Disentangling drivers of floristic diversity in island systems using phylogenetic approaches

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by

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Authorization to Submit Dissertation

This dissertation of Hannah Elizabeth Marx, submitted for the degree of Doctor of Philosophy with a Major in Bioinformatics and Computational Biology and titled "Disentangling drivers of floristic diversity in island systems using phylogenetic approaches," has been reviewed in final form. Permission, as indicated by the signatures and dates below, is now granted to submit final copies to the College of Graduate Studies for approval.

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Abstract

> "It is interesting to contemplate an entangled bank, clothed with many plants of many kinds, with birds singing on the bushes, with various insects flitting about, and with worms crawling through the damp earth, and to reflect that these elaborately constructed forms, so different from each other, and dependent on each other in so complex a manner, have all been produced by laws acting around us." Darwin (1859)

The complexity of nature is awe inspiring. Identifying patterns is the first step towards understanding how this complexity arose and predicting what will come of it in the future. There are many ways to describe diversity. Measures that include phylogenetic diversity can provide a foundation for assessing hypotheses about ecological processes driving the patterns we observe. In this dissertation, I explore how incorporating the evolutionary history of coexisting species can help to disentangle patterns of diversity at macro-ecological scales. Islands have provided ideal study systems for evolutionary studies since the beginning of the field. I turn to the classical natural "experiments" that island-like systems provide, where many replicates of simplified microcosms represent the global variation in biology and geography.

I begin by introducing a few ways phylogenetic methods have been employed to understand diversity patterns, and discuss some of the challenges and pitfalls of this approach. I explain how evolutionary history can be used to interpret processes driving diversity in species assemblages at macro-scales when specific hypotheses are used with explicit null models. In summary, I postulate about how to improve the community phylogenetic approach with consistent comparable methods, more sophisticated null models, and novel datasets to quantify and qualify diversity.

Darwin's Naturalization Conundrum presents a clear hypothesis to address macro-ecological patterns of species invasion. In the second chapter, I quantify patterns in both functional trait differences and phylogenetic distances between invasive species and the native flora they invaded across 80 uninhabited islands in the San Juan Islands. I compare these trait-based and evolutionary distance-based measures of diversity, and discuss their implications for understanding invasion dynamics. Across the

archipelago, invasives are closely related to natives but differ in ecologically relevant functional traits. These opposing trends may be informing particular stages in the invasion process.

Approaching the limits of plant life, mountains inspired Humboldt to synthesize his thoughts about how species diversity changes across space, and alpine summits constitute some of the last frontiers for biodiversity surveys. To understand the floristic patterns on pristine "sky islands" across the French Alps, I use nested species pools and explicit null models to assess the environmental, historical, and neutral processes that could contribute to the phylogenetic patterns we observe. Although extreme environmental conditions on mountain summits are expected to pose a strong filter and induce phylogenetic clustering of closely related species, we find that stochastic models of speciation, colonization, and local extinction can explain the phylogenetic patterns just as well. This demonstrates the importance of clear hypothesis testing to infer processes that generate phylogenetic diversity patterns.

The primary obstacle to a synthesis of phylogenetic patterns of diversity observed in natural communities or multi-lineage assemblies are comparable methods, especially for phylogeny reconstruction. In the final chapter, I introduce one novel approach for collecting sequence data for well-resolved community phylogenies. High-throughput sequencing approaches can be utilized to overcome one obstacle for describing diversity in remote regions—efficient genetic sequencing of entire species assemblages. I illustrate the efficacy of this approach by describing the diversity of a remote alpine flora in Central Idaho. Similar to the French Alps, stochastic patterns are dominant within and between summits. This suggests that although adaptations to extreme alpine environments drive diversity within particular lineages, species-neutral processes might dictate macro-ecological patterns at regional scales.

Together, these chapters exemplify how the evolutionary history of species assemblages can unravel dominant ecological and evolutionary processes that generate such elaborate complexity observed in nature. As more data are compiled and better models are developed, we continue to unify the patchwork of species distributions and might someday reach our ultimate goal—to provide a predictive framework for anticipating diversity dynamics across the globe.

Acknowledgements

> "How awfully flat I shall feel, if I when I get my notes together on species, the whole thing explodes like an empty puff-ball. Do not work yourself to death." C. Darwin to J. D. Hooker (1854)

So many people from places near and far have made this dissertation a wonderful intellectual adventure.

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How lucky I am. Thank you all.

Dedication

To my family, I love you more

Gerald Marx & Marguerite Conlin-Marx

Samuel, Gretchen & Tessa

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CHAPTER 1

Introduction

> "To do science is to search for repeated patterns, not simply to accumulate facts..." MacArthur (1972), p. 1

> "Botanists usually direct their research towards objects that encompass only a very small part of their science. They are concerned almost exclusively with the discovery of new species of plants, the study of their external structure, their distinguishing characteristics, and the analogies that group them together into classes and families...It is no less important to understand the Geography of Plants..." Humboldt (1807), p. 4

In this dissertation, I aim to illustrate how patterns of evolutionary history can help us to understand why species coexist at macro-ecological scales. Molecular and morphological characters are frequently used to estimate the timing of diversification events and explain distribution patterns within particular clades of interest, and can also elucidate the ecological or evolutionary processes that generated diversity patterns within ecological communities. Community phylogenetics is at the intersect of ecology and evolutionary biology, and as such, has the potential to offer insights into many overarching questions about biodiversity. However, few studies employ consistent methods, making results difficult to compare. Despite valid criticisms about this approach, evolutionary relationships can offer many insights into dominant processes that drive diversity patterns, especially by employing specific hypotheses (Chapter 2) and nested null models (Chapter 3). Technological advances have heralded in an exciting era of next-generation sequencing approaches that are implemented across many sub-disciplines of biology, but their applications for disentangling diversity across species assemblages are still being explored (Chapter 4). Phylogenetics will be even more important as the era of "Big Data" continues to open the flood gates of "-omic" information for ecosystems, and consistent phylogenetic methods, as were employed throughout this dissertation, should be an essential part of the toolbox for comparative ecophylogenetics in the future.

1.0.1 *Measuring Diversity*

Searching for repetitive patterns in natural variation of species distributions can inform global theories about biodiversity patterns (MacArthur, 1972). Studies over the past decade have used a variety of different measures to describe diversity patterns (Pavoine and Bonsall, 2010), and the jungle of methods used to interpret processes driving these patterns continues to grow (Pausas and Verdú, 2010).

Taxonomic descriptions provide a qualitative assessment of the richness of an area (Magurran, 2004), but higher taxa are artificial units limited by biases in species delimitation, and may not be biologically meaningful. Functional traits quantify the similarities and differences in phenotypes face the abiotic environment and are involved in biotic interactions (Westoby and Wright, 2006), but determining what traits are ecologically relevant and measuring them for all species is challenging (McGill *et al.*, 2006). Faith (1992) formally incorporated evolutionary history into diversity measurements with phylogenetic branch lengths. Moving beyond basic descriptions of diversity, Webb (2000) used evolutionary distance to infer how ecological processes shaped community structure. Phylogenetic branch lengths measure the evolutionary time separating species, therefore closely related species are expected to share ecologically relevant functional traits if such traits are phylogenetically conserved (Webb *et al.*, 2002). If niches are also phylogenetically conserved, environmental filtering is expected to cause closely related species with environmentally selected traits to coexist, producing a pattern of phylogenetic "clustering". Alternatively, competitive exclusion is expected to cause phylogenetic "overdispersion", where distantly related species with unique traits fill non-overlapping niche spaces (Webb *et al.*, 2002).

Correlations between patterns in phenotypic traits and phylogenetic distances can explain different processes at different scales (Pavoine and Bonsall, 2010). Integrating phylogenetic measures of diversity with ecological information via functional traits has been successful in linking evolutionary and ecological processes to understand the patterns of species coexistence across taxonomic, spatial, and temporal scales (e.g., Cadotte *et al.*, 2009a; Mouquet *et al.*, 2012; Marx *et al.*, 2016). This fusion of ecology, biogeography, and macroevolution provides a promising avenue for synthesizing patterns of diversity at global scales (Westoby, 2006; Swenson, 2011b), spurring an emerging field called ecophylogenetics (Mouquet *et al.*, 2012; See Provete, 2013, for a more detailed review). Linking ecological processes to explain patterns of phylogenetic diversity in communities via hypothetical functional traits involves many assumptions, including trait and niche conservatism, the ecological relevance of specific functional traits, causes and consequences of biotic interactions (e.g. competition and facilitation), and the importance of current local interactions for community assembly (reviewed in Gerhold *et al.*, 2015). For better (Gerhold *et al.*, 2015) or worse (Pavoine *et al.*, 2013), the phylogeny-as-a-proxy approach continues to be used to infer processes responsible for patterns of species coexistence within a predefined community (Vamosi *et al.*, 2009; Tucker *et al.*, 2016), and evolutionary history can be particularly useful for providing insights into macro-ecological and evolutionary processes in the absence of information on functional traits (Cavender-Bares *et al.*, 2009).

1.0.2 *Towards phylogenetic comparative methods for ecosystems*

Despite the growing body of literature that use phylogenetic diversity measures across different taxonomic and spatial scales, it is challenging to compare studies. There are a plethora of metrics used to describe diversity (Anderson *et al.*, 2011; Tucker *et al.*, 2016), and the choice of these metrics can impact results (Swenson, 2011a). But more importantly, few studies use branch lengths that are scaled to evolutionary time (reviewed in Marx *et al.*, 2016), so direct comparisons between studies are not possible. To bring community phylogenetics into the realm of comparative methods that typically focus on specific lineages (Pennell and Harmon, 2013; Pearse *et al.*, 2014), more consistent use of robust molecular phylogenies that combine uncertainly in molecular phylogeny estimation with uncertainty in phylogenetic diversity metrics (e.g., Park and Potter, 2013) will be necessary.

1.0.3 *Where are all the hypotheses?*

Most studies that incorporate phylogenetic measures of diversity test general ecological hypotheses about the relative importance of abiotic (environmental filtering) or biotic (competitive exclusion) processes for shaping the observed patterns (reviewed in Vamosi *et al.*, 2009). However, one of the main critiques of community phylogenetic methods (Mayfield and Levine, 2010; HilleRisLambers *et al.*, 2012) is that multiple processes can produce phylogenetic patterns of clustering (Kraft *et al.*, 2014) or overdispersion (Godoy *et al.*, 2014). Functional traits can help to tease apart these processes (Pavoine and Bonsall, 2010), but in macro-ecological studies trait measurements are not often available for entire assemblages.

Distinct hypotheses can reduce the complexity of interpretations from phylogenetic patterns by narrowing the focus to investigate more specific questions. For example, Darwin hypothesized that introduced species should be distantly related from the native community to successfully naturalize (Daehler, 2001). There has been a recent renewed interest in addressing Darwin's Naturalization Hypothesis in the light of phylogenetic measures of diversity (Thuiller *et al.*, 2010). Comparing phylogenetic measures of diversity between introduced species and the community they invaded has shed light on the importance of relatedness for invasion (e.g., Marx *et al.*, 2016), and evolutionary distances have been shown to predict invasion dynamics over time (Li *et al.*, 2015).

Assessing the significance of observed patterns in more sophisticated ways is also essential for clarifying conflicting patterns. Nested species pools can aid interpretations by removing environmental or historical structuring when resampling to test for statistical significance (Eiserhardt and Svenning, 2013; Chalmandrier *et al.*, 2013). Null expectations that explicitly model species-neutral assembly (Pigot and Etienne, 2015) are paving the way towards more thoroughly distinguishing process from patterns in community phylogenetics. With such models, phylogenetic diversity patterns can now be used to test other specific hypotheses, such as the neutral theory of island biogeography (Burbrink *et al.*, 2015). To disentangle potential drivers of diversity patterns, nested species pools, multiple null models, and combinations of explanatory environmental factors should be used in tandem to disentangle potential drivers of diversity patterns (Chapter 3). Integrating other models—such as those that parameterize landscape change over time (e.g., Valente *et al.*, 2014), or incorporate interspecific species interactions (e.g., Rosindell *et al.*, 2015)—into usable frameworks for ecologists has the potential to link community interactions (local scale) and macro-ecological assemblages (regional/global scale), vastly improving this field.

1.0.4 *Keeping up with the times*

Advances in sequencing technologies are transforming biological studies (Metzker, 2009). These approaches have many applications for plant biology (Egan *et al.*, 2012) beyond model organisms (Ekblom and Galindo, 2010) and are now being extensively used in phylogenetics (e.g., Godden *et al.*, 2012), systematics (e.g., Straub *et al.*, 2012), and phylogeography (e.g., Puritz *et al.*, 2012) to understand plant diversity patterns. In a community context, these technologies have been used to describe diversity and ecosystem functioning in microbial systems (e.g., Burke *et al.*, 2011; Bik *et al.*, 2012; Poole *et al.*, 2012), but high-throughput sequencing approaches at macro-ecological scales are in their infancy (Ahrendsen *et al.*, 2015).

There are a couple of ways that high-throughput sequencing technologies can improve community phylogenetics. First, they present an efficient way to collect molecular sequence data for well-resolved phylogenies. Targeted enrichment of particular gene regions that are sequenced with high-throughput technologies is incredibly effective for generating sequence data for entire species assemblages, yielding well-resolved community phylogenies that can be comparable to other studies that use similar gene regions for phylogeny inference (Chapter 4).

Second, they provide a novel way to qualify diversity. With increasing availability of molecular sequence data, advances in phylogenetic methods, and the availability of large trait databases (e.g., Kattge *et al.*, 2011), more studies are integrating phylogenies and functional traits into investigations of community assembly (Cadotte *et al.*, 2009a; Cavender-Bares *et al.*, 2009; Cianciaruso, 2011; Marx *et al.*, 2016). However, the choice of ecologically relevant functional traits is not always clear, and because it is impossible to measure all traits, these studies have relied on the use of a few measurable traits as a proxy for unmeasured functional diversity (Westoby and Wright, 2006), (Lavorel and Garnier, 2002). Transcriptomes describe the total diversity of expressed genes in an ecosystem, and in microbial communities—especially the human microbiome—transcribed gene products have been used as 'functional traits' to characterize the community by clustering orthologous transcripts into protein functional categories (e.g., housekeeping, metabolic functions; Segata and Huttenhower, 2011). Metatransriptomics expands beyond a few measurable functional traits to all underlying expressed diversity in the community. While gaining importance within microbial ecosystems (e.g., Morgan *et al.*, 2013), complete transcriptomes have not been used for comparative eco-evolutionary studies in macro-systems beyond phylogeny estimation (e.g., Dunn *et al.*, 2013; Yang and Smith, 2014) despite the fact that they are an obvious candidate for merging ecology and evolutionary biology to understand community assembly (Dicke *et al.*, 2004). Intriguingly, the nested nature of gene products, pathways, and the phenotypes they produce will allow for an exploration of the effect of trait scale on hypotheses of community assembly, and quantifiable measures of functional traits have the potential to be compared across ecosystems—from plants to microbes (McGill *et al.*, 2006; Cadotte *et al.*, 2011).

It has been acknowledged that community ecology is a "mess" because there are few generalizable rules to explain the processes that drive diversity dynamics of species across continents (Lawton, 1999). Nature is chaotic, and due to local contingency, it is very possible that there will never be any laws in community ecology (Simberloff, 2004). True, adding more data and better models could contribute to this mess. But it could also untangle part of the bank, and display some of nature's "imperfect repetition."

> "The existence of the repetition means some prediction is possible—having witnessed an event once, we can partially predict its future course when it repeats itself." MacArthur (1972).p 77

CHAPTER 2

Deconstructing Darwin's Naturalization Conundrum in the San Juan Islands using community phylogenetics and functional traits [1]

2.1 ABSTRACT

AIM — Darwin posed a conundrum about species invasions, postulating the importance of functional distinctiveness from the receiving native community to avoid competition, and, at the same time, the importance of shared similarity to pass environmental filters and successfully establish. Using phylogenetic distances and functional traits, we assessed this conundrum in the flora of 80 mostly uninhabited islands, where over 30% of the species are invasive. We highlight the importance of publicly available datasets to disentangle ecological processes that may drive invasion.

LOCATION — San Juan Islands archipelago, Pacific Northwest of North America

METHODS — Using a supermatrix approach we inferred a maximum likelihood estimate of the mega-phylogeny for the vascular plants on the San Juan Islands. We gathered measurements for five ecologically relevant functional traits—seed mass, maximum height, specific leaf area, leaf size, and leaf nitrogen content. We assessed phylogenetic and functional trait similarity between invasive species and the receiving native community, and tested the significance of the observed patterns against a randomly generated invading community.

RESULTS — Invasive species were more closely related (phylogenetically clustered) to their nearest native than natives were on 40 of the islands, and were more clustered than any random invasive in the species pool on 22 islands. Despite phylogenetic

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similarity, functional traits differed between the two status groups, at least for maximum height and specific leaf area. When comparing functional differences between phylogenetically close relatives, more complex patterns emerge.

Main Conclusion — Only with the combination of both evolutionary history and phenotypic traits were we able to discover support for both sides of Darwin's conundrum—although invasive species have phylogenetically close native relatives, functional traits differ between the two status groups. This implies that both environmental filtering and competitive interactions may be important for invasion success in this archipelago.

Keywords — Biological invasions, community phylogenetics, Darwin's Naturalization Conundrum, functional traits, islands, mega-phylogeny

2.2 INTRODUCTION

Species distributions have constantly been reshuffled on the earth's surface, implicating many species as invasive to a given community at some point. Ranges of invasive species are currently increasing with human-mediated dispersal—especially on islands (Pyšek and Richardson, 2006)—and in the face of accelerating global change, it is of economic importance to predict which species are most likely to become invasive and their potential for future spread and impact (Bellard *et al.*, 2013). Modern species introductions are an important process to study not only for economic and conservation concerns, but also, when considered as recent colonizers in an ecological community, invaders can be used to understand the basic processes of community assembly in natural systems (Tilman, 2004).

Darwin was among the first to realize the value of invasive species in eco- evolutionary studies for understanding community assembly processes. He postulated that the more distantly related species were to each other, the greater their difference in functional traits should be, and thus, the less competition for resources they would experience due to "diversification of structure" (Darwin, 1859). Therefore, invasive species that are distantly related to the native community would be more likely to possess 'novel' traits allowing them to successfully establish via niche differentiation and escape from competition, a prediction that is often defined as "Darwin's Naturalization Hypothesis", DNH (Rejmánek, 1996). However, Darwin also discussed the importance of ancestral similarity, and hypothesized that pre-adapted traits would be important to pass environmental filters and survive within a particular environment. Thus, Darwin presented a conundrum, predicting both similarity and distinctiveness to be important for invasion success.

To assess "Darwin's Naturalization Conundrum", DNC (Diez *et al.*, 2008), the use of phylogenies is becoming standard (e.g. Strauss *et al.*, 2006a; Schaefer *et al.*, 2011; Carboni *et al.*, 2013; Park and Potter, 2013; Ordonez, 2014; Cadotte *et al.*, 2009b, 2010; Davies *et al.*, 2010; Bezeng *et al.*, 2013; Lososová *et al.*, 2015; Lim *et al.*, 2014; Li *et al.*, 2015; Castro *et al.*, 2014). The inclusion of evolutionary information using a phylogenetic approach provides an accurate quantification of relatedness by comparing phylogenetic distances (i.e. difference in branch lengths) between native and invasive species (Cadotte *et al.*, 2009b; Procheş *et al.*, 2008; Thuiller *et al.*, 2010), and relatedness has been shown experimentally to be a useful predictor of invasion success (Cadotte and Strauss, 2011; Jiang *et al.*, 2010), but see Castro *et al.* (2014). In addition, because related species are more likely to share ecologically relevant functional traits (Webb *et al.*, 2002), phylogenetic distance as measured on a molecular phylogeny of the species within a community is often viewed as a proxy for ecological similarity (Cadotte *et al.*, 2009a). However, because complex mechanisms like competition can produce contrasting community phylogenetic patterns (Mayfield and Levine, 2010; Jones *et al.*, 2013; Godoy *et al.*, 2014), linking an ecological process is controversial, especially at varying spatial scales (reviewed in Pavoine and Bonsall, 2010). Functional trait-based metrics combined with evolutionary distances helps to distinguish between different assembly scenarios (Cadotte *et al.*, 2009a; Mouquet *et al.*, 2012), because both could provide complementary information about the ecological interactions or processes that shape communities (Cadotte *et al.*, 2013).

Due to increasing availability of molecular sequence data along with advances in phylogenetic methods (e.g. Smith *et al.*, 2009), detailed regional species inventories (e.g. Cadotte *et al.*, 2006), and the availability of large trait databases (e.g. Kattge *et al.*, 2011), more studies are integrating phylogenies and functional traits to investigate DNC. These studies have been conducted across natural systems ranging from coastal Mediterranean dunes (Carboni *et al.*, 2013) to global communities defined by habitat types (Ordonez, 2014), within particular clades (Strauss *et al.*, 2006b; Park and Potter, 2013), or for all plants in a community (Schaefer *et al.*, 2011; Carboni *et al.*, 2013; Ordonez, 2014; Lim *et al.*, 2014; Li *et al.*, 2015; Lososová *et al.*, 2015). Some have used a mega-phylogenetic approach to estimate a community phylogeny (e.g. Schaefer *et al.*, 2011; Park and Potter, 2013; Lim *et al.*, 2014; Li *et al.*, 2015), while other studies have combined existing phylogenies in a supertree approach (e.g. Strauss *et al.*, 2006a; Carboni *et al.*, 2013; Ordonez, 2014; Lososová *et al.*, 2015). Each study has used different functional traits, different definitions for 'invasive' species, included trait information in different ways, and importantly, used different approaches to test the significance of their patterns and assess hypotheses of species invasiveness or the invasibility of a community. Not surprisingly, their results come to various conclusions when testing DNC (reviewed in Thuiller *et al.*, 2010, Table A.9.2).

For example, in the angiosperm flora of the Azores, Schaefer *et al.* (2011) found invasive species were more phylogenetically distant from the native community than non-invasive introduced species on islands greater than 1km^2, and although invasive species were not closely related to the native flora, their functional similarity for most traits suggested support for 'enemy release' in determining the probability of invasion. However, they did not test these observed patterns against any random expectation. Carboni *et al.* (2013) found invasive species were phylogenetically distant from the native assemblages in 4m^2 plots on invaded coastal dunes, but at coarser spatial scales they were more closely related, and this pattern was robust when randomizing the invaded community. Phylogenetic signals for a few traits indicated the phylogeny was a good proxy for shared ecological similarity, so they hypothesized that their observed pattern was due to biotic resistance through competition at fine spatial resolutions, and habitat filtering at coarser spatial scales. In contrast, Park and Potter (2013) found phylogenetically close relatives in the Cardueae to be more successful invaders in California (but see Sol *et al.*, 2014; Cadotte, 2014) for a critical look at the assumptions and methods of this study, and Lososová *et al.* (2015) found invasives closely related to the native flora of the Czech Republic. A global comparison of vascular plants showed that alien taxa tended to have close native relatives in the community, yet were functionally distinct, highlighting the importance of both environmental filtering and competitive interactions in the naturalization process (Ordonez, 2014). Different methodologies make these studies difficult to compare, and hypotheses often focus on one side of Darwin's conundrum, so explanations for the ecological processes potentially driving these patterns of invasion are often weakly supported or conflicting.

Ordonez (2014) recently shed light on DNC by defining the position of invasive species relative to the realized niche space of the native community in terms of both functional and phylogenetic diversity. When framed in terms of functional niche space, Darwin's conundrum is instead a series of alternate hypotheses. Irrespective of the ecological mechanism, such patterns could be used to predict naturalization success. Thus, invasive species could successfully naturalize under three scenarios: (1) if they are completely distinct from the recipien native community, distantly related and functionally unique "Darwin's Naturalization Hypothesis" (DNH) via niche differentiation (Rejmánek, 1996; Daehler, 2001), (2) if they match the niche of the recipient native community, sharing functional traits irrespective of the phylogenetic relationships (Ordonez, 2014), "matching hypothesis" due to an abiotic filter" (Procheş *et al.*, 2008), or (3) if they differ in functional traits to fill unoccupied niche spaces even if phylogenetically similar (Ordonez, 2014), "filling hypothesis" due to competitive release" (Procheş *et al.*, 2008).

A comprehensive botanical survey of 80 islands in the San Juan archipelago off the Northwest corner of the United States revealed that most of these native communities have been invaded by introduced plant species. While this is perhaps not surprising given increased introductions of plants on islands worldwide (Sax and Gaines, 2008) and predicted drastic range shifts globally (Bellard *et al.*, 2013; Sala *et al.*, 2000), only a few of these islands have year-round human inhabitants, and those that are inhabited are limited to caretakers and seasonal recreation. European history is relatively recent in Northwestern North America, therefore these invasions have occurred within the last 200 years. Furthermore, the extensive replication of invasions across islands ranging in size from 1m² – 0.57km² provides an ideal system to investigate patterns of invasion in light of both phylogenetic and functional similarity.

The definition of what constitutes an 'invasive' species is often difficult to determine (Vermeij, 1996; Richardson and Pysek, 2006). Daehler (1998) distinguished 'invasive' introduced plants as introduced species that have self-sustaining populations in natural, undisturbed areas (in contrast to agricultural lands, urban areas, roadsides, etc.), and in an explicit effort to be consistent with other comparable studies (e.g. Schaefer *et al.*, 2011), this is the definition that we follow here. Given the hypotheses that we are investigating, this geographic criterion for calling introduced species 'invasive' is more meaningful than impact-based definitions of invasive species that may depend less on species composition of local ecosystems, and more upon climatic and edaphic conditions and levels of disturbance (Diez *et al.*, 2009; Schaefer *et al.*, 2011). Because the islands included in this study were mostly uninhabited and relatively undisturbed (besides a few islands with campsites), we categorized all non-native plants in the sampled islands as 'invasive' (as in Schaefer *et al.*, 2011), but note that to definitively classify all naturalized plants as invasive would require information on their relative abundance, exact timing of introduction, and surveys monitoring the spread of each species (Richardson *et al.*, 2000).

In this study, we assessed Darwin's Naturalization Conundrum in the San Juan Islands in light of three scenarios that could explain invasion success—DNH, "matching" or "filling" hypotheses—using metrics and approaches that are comparable to previous studies. We used branch lengths from a time-calibrated species-level megaphylogeny to calculate the evolutionary distances between invasive and native plants across all 80 islands in the archipelago, and compared measurements for five ecologically relevant traits between native and invasive species. Specifically, we addressed (1) how invasive plants are related to their nearest native relative and to the greater native community, and (2) if invasive and native species differ in measurements for phenotypic traits overall, compared to their nearest native, or to the average of the native community. We highlight the importance of biological surveys and publically available datasets to describe multiple aspects of biodiversity patterns, and the use of biologically meaningful null expectations to understand macro-ecological processes of invasion.

2.3 METHODS

2.3.1 *Floristic survey and island community matrix*

Floristic surveys were conducted across islands in the San Juan archipelago (Figure 2.1) from 2005-2010 to compile a complete inventory of the vascular flora on each island visited. Therefore, surveys focused only on smaller islands – generally <25 ha – where we were confident that all habitats could be carefully searched. Permission to conduct surveys and make collections was secured in advance from appropriate public agencies and several private owners. Islands were accessed using small launches by survey teams that included multiple experts in the local flora to ensure consistent and thorough recognition of all species. To document the flora of each island as completely as possible, multiple visits were made that were timed to facilitate detection of species throughout the growing season, in late-April, late-May, and early September. The invasive or native status of each species was determined by multiple floras (see complete reference list in Appendix A.1).

2.3.2 *Phylogeny estimation*

Recent studies testing DNC have incorporated phylogenetic distances using either a Phylomatic supertree (e.g. Ordonez, 2014) or a mega-phylogeny approach (e.g. Schaefer *et al.*, 2011), which builds a community phylogeny from a supermatrix of DNA sequence data (Smith *et al.*, 2009) and incorporates uncertainty in topology and branch lengths using statistical phylogenetic methods. With the constant expansion of readily available sequence data, the advantages of the mega-phylogeny approach to macro-ecological studies are becoming clear (Roquet *et al.*, 2012). To assess the relationships among vascular plants in the San Juan Islands community, we took a supermatrix approach to infer a mega-phylogeny by retrieving publically available sequence data from GenBank for five gene regions (*atpB*, *rbcL*, *matK*, *trnTLF*, and ITS) using the PHLAWD pipeline (Smith *et al.*, 2009). A final by-gene partitioned

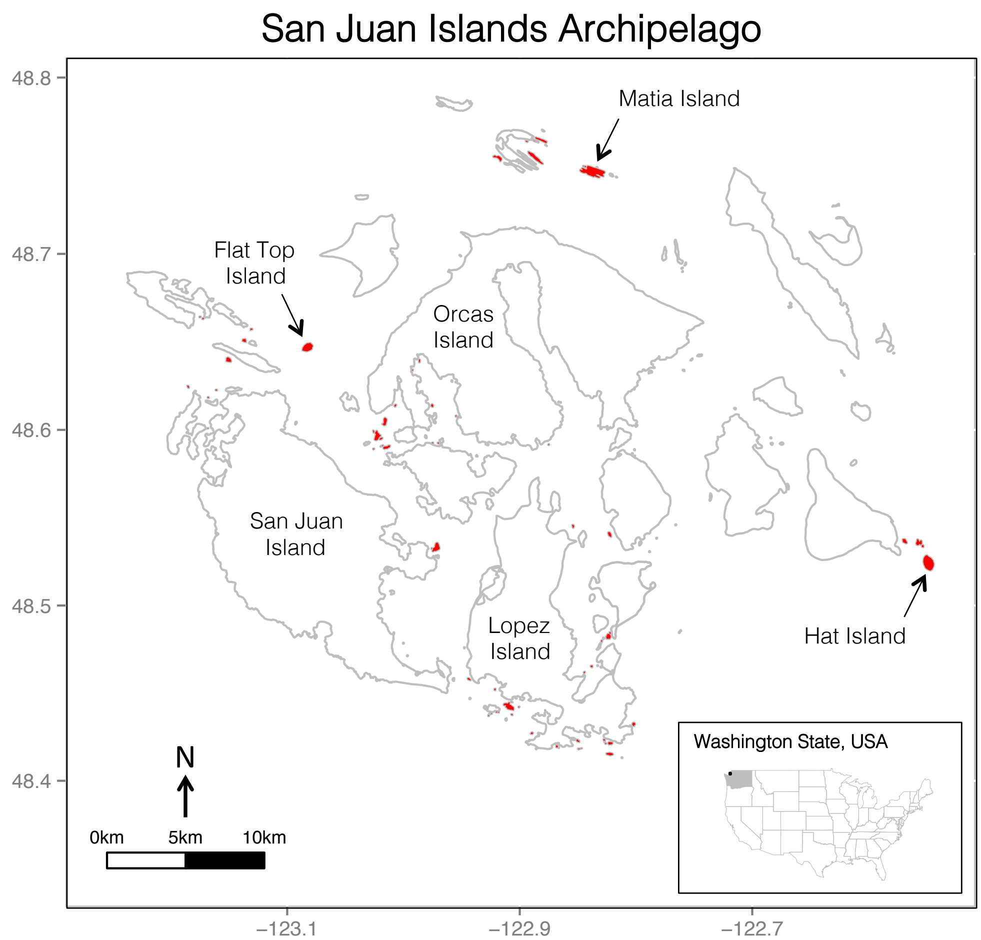

FIGURE 2.1: Map of the San Juan Islands archipelago, Washington State, USA. Islands that were sampled in this study are coloured in red.Three of the larger surrounding islands (unsampled) and three of the largest sampled islands are labelled for reference.

maximum-likelihood (ML) estimate of species relationships for all vascular plants in the San Juan Islands species pool was inferred using the concatenated alignment, implemented in RAxML version 7.4.2 (Stamatakis, 2006).

Generating a tree with branch lengths proportional to time at this scale is a non-trivial task, so other large-scale community phylogenetic analyses have used trees with relativized branch lengths that do not incorporate real time estimates (e.g. Webb, 2000). This is less than ideal, and makes it difficult to compare metrics across studies. In contrast, time-scaled branch lengths place communities on the same axis making such comparisons possible. Because the focus (i.e. community level) and scale (i.e. vascular plants) of this phylogeny is inappropriate for direct divergence time estimation using fossil calibrations, the mega-phylogeny estimate was scaled to time using the "congruification" approach (Eastman *et al.*, 2013), so that this community phylogeny will be comparable to others in the future (see Appendix A.1 for a detailed explanation of methods for phylogeny estimation and time-scaling).

2.3.3 *Functional traits*

Measurements for seed mass (mg), maximum height (m), specific leaf area (SLA, cm^2/g), leaf size (cm), and leaf nitrogen content (%) are a subset of a larger dataset assembled by Cornwell *et al.* (2014), with original data compiled from a number of sources for each trait. All measurements and citations for these functional traits are available in Appendix A.1. Because the values were not normally distributed, trait measurements were log transformed (Westoby, 1998). In cases where there were multiple trait measurements for a species (e.g. for intraspecific taxa), the harmonic mean of all values was used.

In addition to being well sampled across land plants, these five traits have gained acceptance as measurable proxies to link variation in plant phenotypes to ecological strategies (Westoby *et al.*, 2002; Reich *et al.*, 2003; Cornwell *et al.*, 2014). For example, SLA, maximum height, and seed mass comprise the leaf-height-seed (LHS) scheme, widely used to relate interspecific trait variation to trade-offs in ecological strategies (Westoby, 1998; Grime, 1974), in which shorter plants with thicker, narrower leaves (low SLA) fall toward the "stress-tolerant" pole of the functional spectrum.

To test the assumption of niche conservatism, or shared similarity of traits between close relatives (Webb *et al.*, 2002; Cavender-Bares *et al.*, 2004), we used Abouheif's test (Abouheif, 1999) to calculate the phylogenetic autocorrelation between traits (see Appendix A.1 for details).

2.3.4 *Statistical analyses and assessment of Darwin's Naturalization Conundrum*

Although previous tests of DNC have used a variety of different metrics to summarize phylogenetic and functional diversity (Table A.9.2), most have calculated some measure of 'nearest taxon distance', capturing interactions between close relatives (i.e.

'tip effects'), and 'mean pairwise distance', describing community-wide interactions (reviewed in Thuiller *et al.*, 2010). We assessed the phylogenetic distinctiveness of invasive plants by calculating the distance to the nearest native species (DNNS) and the mean phylogenetic distance to each co-occurring native species (MDNS).

To test if invasive plants are functionally unique, we calculated the difference in trait measurements 1) between invasive and native status groups, 2) between each species and it's phylogenetically nearest native relative (the nearest native functional difference, NNFD), and 3) between each species and the average of all co-occurring natives (the mean functional difference, MFD). When there were multiple equally distant nearest native relatives, the median trait measurement was used to calculate the NNFD. Functional distinctiveness was calculated as a difference rather than a distance (e.g. Euclidean). In this way, we were able to address the magnitude of change in trait measurements between species overall, compared to their nearest native relative, or to the average of the native community in which they have naturalized.

To summarize patterns across all islands, the dated ML phylogeny of the vascular flora of the San Juan Islands was pruned to include just species co-occurring on a focal island (i.e. community). For each native (n) and invasive (i) species, phylogenetic ($DNNS_i$ / $DNNS_n$; $MDNS_i$/ $MDNS_n$) and functional distinctiveness ($NNFD_i$ / $NNFD_n$; MFD_i/ MFD_n) metrics were calculated. A t-test was used to evaluate significant differences in observed means of each metric between status groups. To assess DNC, we compared the direction of the difference in means for each significant relationship. For example, if the mean metric for invasive species (e.g. mean $DNNS_i$) was greater than the mean metric for native species (e.g. mean $DNNS_n$), we would conclude (phylogenetic and/or functional) distinctiveness of the invasives from the natives to be important for the successful naturalization in that community.

Finally, we verified if the observed patterns were significantly different from those given any other random invasive species that could potentially colonize each community. We randomly assembled invasive communities, drawing from the pool of all invasive species occurring in the San Juan archipelago without replacement, while preserving the observed number of invasives on each island. This null model of invasion maintains the evolutionary structure of the native community and the richness of the invasive species within each community, but randomizes the identity and the evolutionary distances of the invasive species. For each simulated community, the mean of each metric was recalculated, and the randomization was repeated 1000 times to obtain a null distribution of means. The observed means were compared to each null distribution by measuring the standardized effect size (SES) which is the difference in the observed and expected mean under the null model, divided by the standard deviation of the distribution of the null model. This is similar to the SES described in the R package picante (Kembel *et al.*, 2010), and equivalent to -1 times NRI or NTI described in Webb *et al.* (2002), which is the difference in the observed and expected mean under the null model, divided by the standard deviation of the distribution of the null model. Positive values of the SES_{metric} (z-scores) indicate that observed invasive species are more distinct (phylogenetically or functionally) from the nearest native or native community than any other random invasive species in the species pool (i.e. phylogenetic overdispersion of invasive species compared to the natives), and negative values indicate that invasives are more similar to the nearest native and/or native community (i.e. phylogenetic clustering). Statistical significance was determined for each SES_{metric} by calculating P-values (alpha = 0.05), the proportion of simulated means that were as or more extreme than the observed mean (Kembel *et al.*, 2010). All statistical analyses were conducted in R (R Core Team, 2015).

2.4 RESULTS

2.4.1 *Island communities*

Voucher specimens were deposited in the Burke Museum of Natural History and Culture Herbarium at the University of Washington (WTU), and comprehensive lists were compiled of all species occurring on 80 islands. A total of 442 species of vascular plants were identified and are included in the Floristic Atlas of the San Juan Islands, Washington, which is publically available online (Floristic Atlas of the San Juan Islands, 2013).

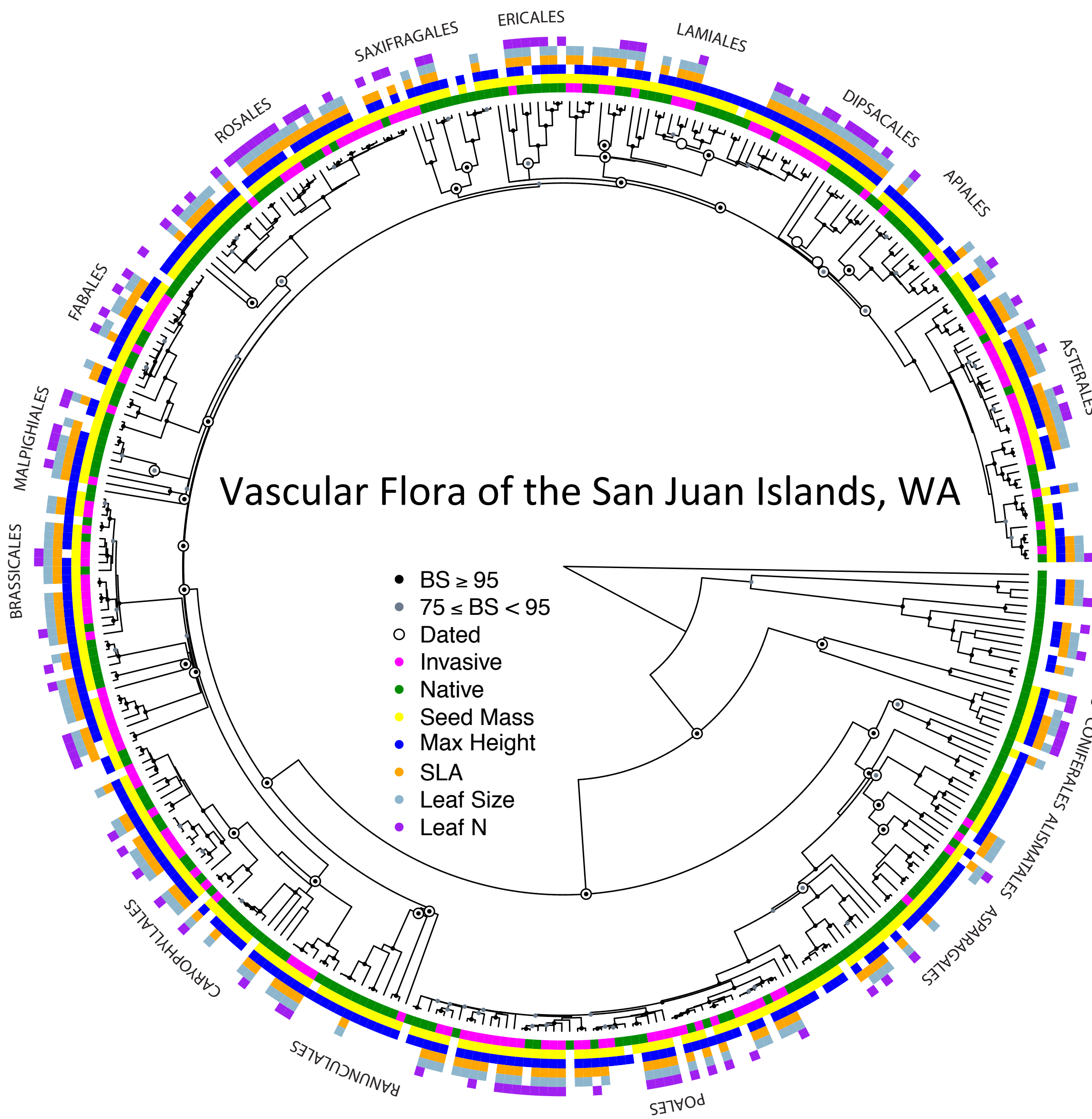

Figure 2.2: Time-calibrated maximum likelihood mega-phylogeny of the vascular flora of the San Juan Islands, with native species (green) and invasive species (pink) indicated by the first character state across the tips. Nodes with a light grey dot have bootstrap support (BS) between 75 and 95, and nodes with a solid black dot have bootstrap support > 95. Nodes that were congruent ('congruified') between the reference timetree and the target tree (community phylogeny) are circled in a solid black line. Coloured bars next to each taxon represent the presence of data for the five functional traits: seed mass, maximum height, specific leaf area (SLA), leaf size, and leaf nitrogen content (leaf N).

Intraspecific taxa were collapsed to species to avoid pseudoreplication, resulting in a total of 415 species used in this study, 150 (36%) of which were identified as invasive. Islands with species lacking available sequence data (Little Oak 2, Swirl Rock East), in which there was only one native (Smallest unnamed island by Long Island), only one invasive (Unnamed west of Castle Island), or no invasive species (East Sucia 5 Island, Shag Reef, Smaller Island near Charles, and Swirl Rock West) were removed, resulting in a total of 72 islands used in the following analyses (Figure 2.1). Islands were binned by size categories for discussion, defined by the 25% and 75% sample quartiles of island area (Appendix A.2, Appendix A.3).

2.4.2 *Phylogeny estimation*

After removal of GenBank sequences identified as submission errors, genetic data for 366 of 415 (88%) species were retained, with a total combined aligned length of 5745 base pairs (see Table A.9.3). Because there were no major conflicts among the individual gene trees (see Figure A.10), the concatenated mega-phylogeny was used for all downstream analyses (Figure 2.2, see Figure A.11 for labelled tips). Highly supported nodes were distributed evenly across the tree, resolving all deep relationships with high support and very few inconsistencies at the genus level. For example, within Asteridae (bootstrap support = 96%), the Ericales are sister to the subclade Lamiidae + Campanulidae (bootstrap support = 98%), consistent with established angiosperm relationships (e.g. Soltis *et al.*, 2011), see Figure A.12 for all bootstrap support values.

2.4.3 *Functional traits*

More than 55% of species overall and more than 60% of the species within most islands had trait measurements for maximum height, seed mass, and SLA, while leaf size and leaf nitrogen content had less complete coverage (Figure 2.2, see Figure A.13, Table A.9.4 for a detailed summary). We found significant phylogenetic signal for all traits except leaf size (Table A.9.5), indicating that the community phylogeny should be a good proxy for ecological similarity.

2.4.4 *Phylogenetic relatedness patterns*

Our phylogenetic analyses showed that invasive species have closer native relatives compared to the native species in each island community (Figure 2.3a; $DNNS_i$ < $DNNS_n$), and this difference was significant for 40 (54.05%) of the islands (Figure 2.4, see Figure A.14 for confidence intervals, Appendix A.4 for *P*-values). At the scale of the whole San Juan Island archipelago the pattern switches, and invasive species are phylogenetically distinct, however this difference was not significant ($P = 0.7569$). The observed mean $DNNS_i$ was less than expected under our null model (SES_{DNNS} < 0) on 22 (30.56%) of the islands (Figure 2.5, Figure A.14), indicating that invasive species occurring on these islands are significantly more phylogenetically similar to their nearest native relative than a random assemblage of invasives from the species pool.

Invasive species were also closely related to the native community as a whole (observed mean $MDNS_i$ < $MDNS_n$ on 21 islands; Figure 2.3b), and this was more significant on larger islands (Figure 2.4). However, compared to the null model, invasives on 22 islands were significantly distinct from the overall native community (Figure 2.5; observed mean $MDNS_i$ > null mean $MDNS_i$). On a few of the smaller islands ($n = 5$), invasives were significantly phylogenetically similar to the native community (observed mean $MDNS_i$ < null mean $MDNS_i$), but never on larger islands (Figure 2.5).

2.4.5 *Functional trait patterns*

Trait measurements showed that invasive species have a shorter maximum height (45 of the islands), a higher SLA (43 of the islands), and lower leaf nitrogen content (31 of the islands) than native species (Figure 2.3c, see Figure A.15 for confidence intervals, Appendix A.7 - Appendix A.9 for *P*-values). Invasives had smaller seeds and leaves than the natives across all islands, but this difference was rarely significant (Figure 2.4).

When accounting for phylogenetic distance, we found less significant functional differences between invasives ($NNFD_i$) and natives ($NNFD_n$; Figure 2.3d, Figure 2.5).

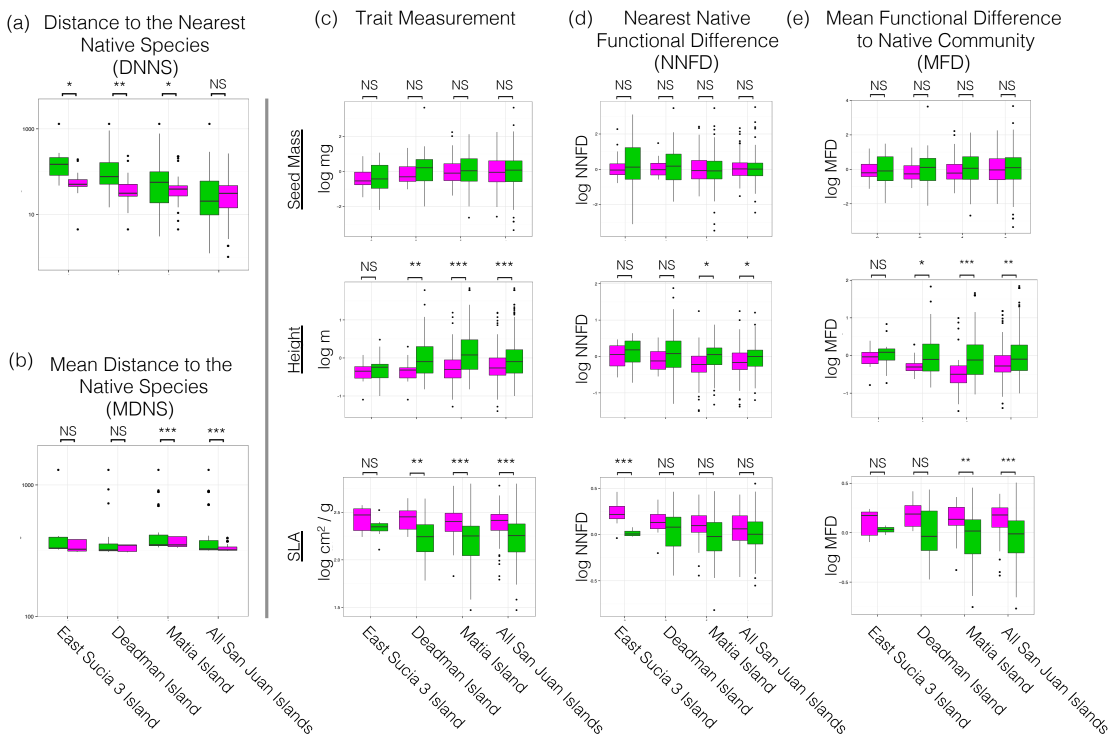

Figure 2.3: Observed phylogenetic and functional trait measures for each native (green) and invasive (pink) species on a representative small (East Sucia 3 Island, n = 34, 60 m^2), medium (Deadman Island, n = 68, 13,441 m^2), and large island (Matia Island, n=143, 570,866 m^2), and the entire San Juan Island archipelago (n = 366, 2,725,785 m^2). (a) Comparison of the distance to the nearest native species (DNNS, log million years). (b) Comparison of the mean phylogenetic distance to the native species (MDNS) between each status group for the three islands and the San Juan Island archipelago. (c) Comparison of trait measurements for each native (green) and invasive (pink) species for three traits with the most data: seed mass, specific leaf area (SLA), and maximum height. (d) Comparison of the nearest native functional difference (NNFD) for the three traits. (e) Comparison of mean functional difference to the all natives in the community (MFD). Boxes show first and third quartiles, solid horizontal lines indicate the median, vertical black lines are the range, and dots are points that lie 1.5x the interquartile range above the third quartile or below the first quartile. Asterisks indicate significant differences in observed means for each metric between status groups (see Appendix A.4 for *P*-values of difference in means).

The means of $NNFD_i$ and $NNFD_n$ were most noticeably different for maximum height (20 of the islands) and SLA (10 of the islands). However, compared to any random invasive in the greater San Juan Islands species pool, invasives were functionally similar to their nearest native relatives for seed mass, maximum height, and leaf size (on 10, 7, and 6 of the islands, respectively; Figure 2.5).

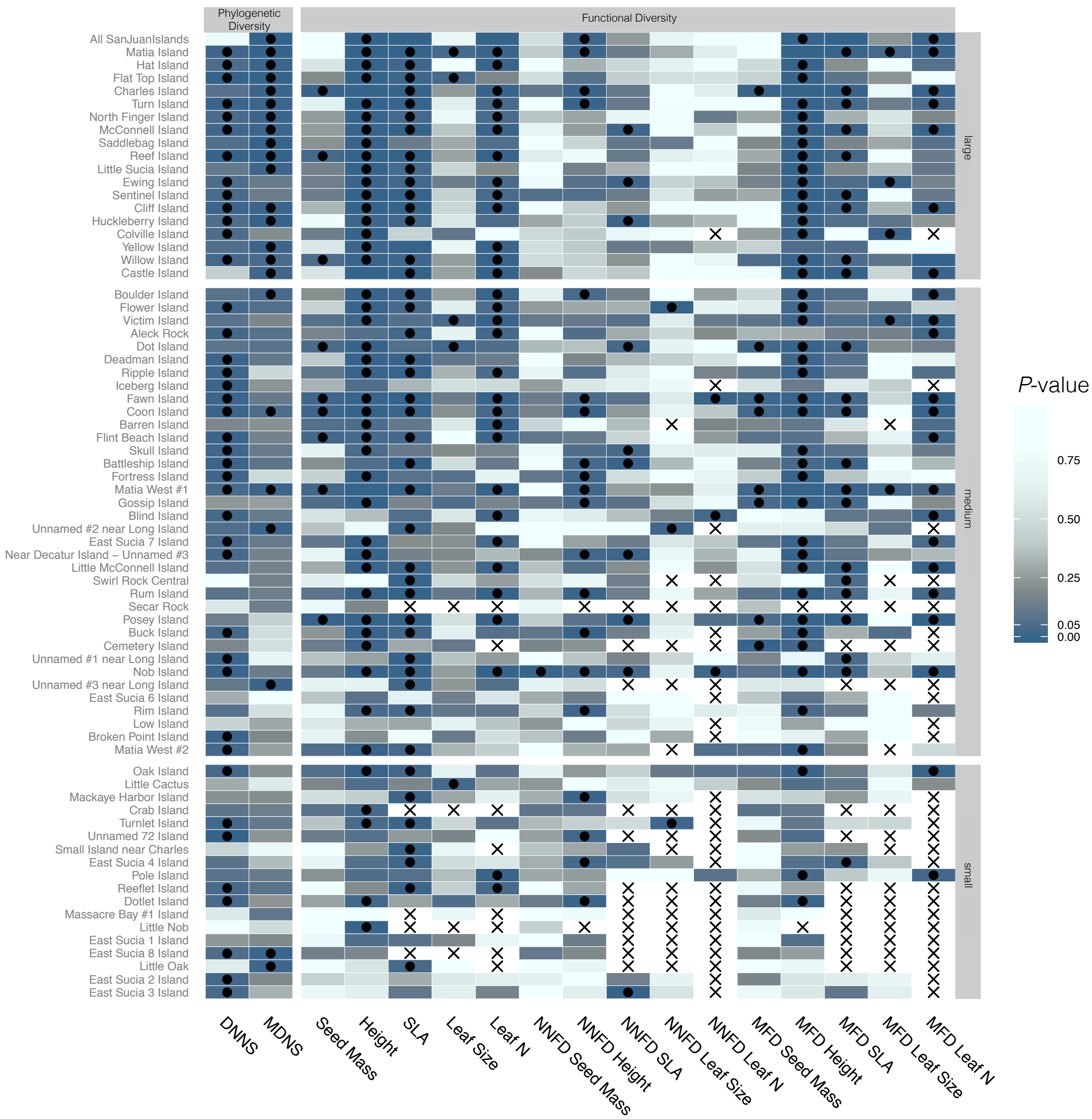

FIGURE 2.4: Significance of difference in means between status groups for phylogenetic and functional diversity indices (x-axis). Darker blue tones indicate decreasing *P*-values from the t-test, and dots indicate significance (*P*-value < 0.05). Islands (y-axis) are ordered by decreasing size from top to bottom, and size categories are noted on the right. Blank cells marked with an 'x' represent islands lacking trait data for the occurring species.

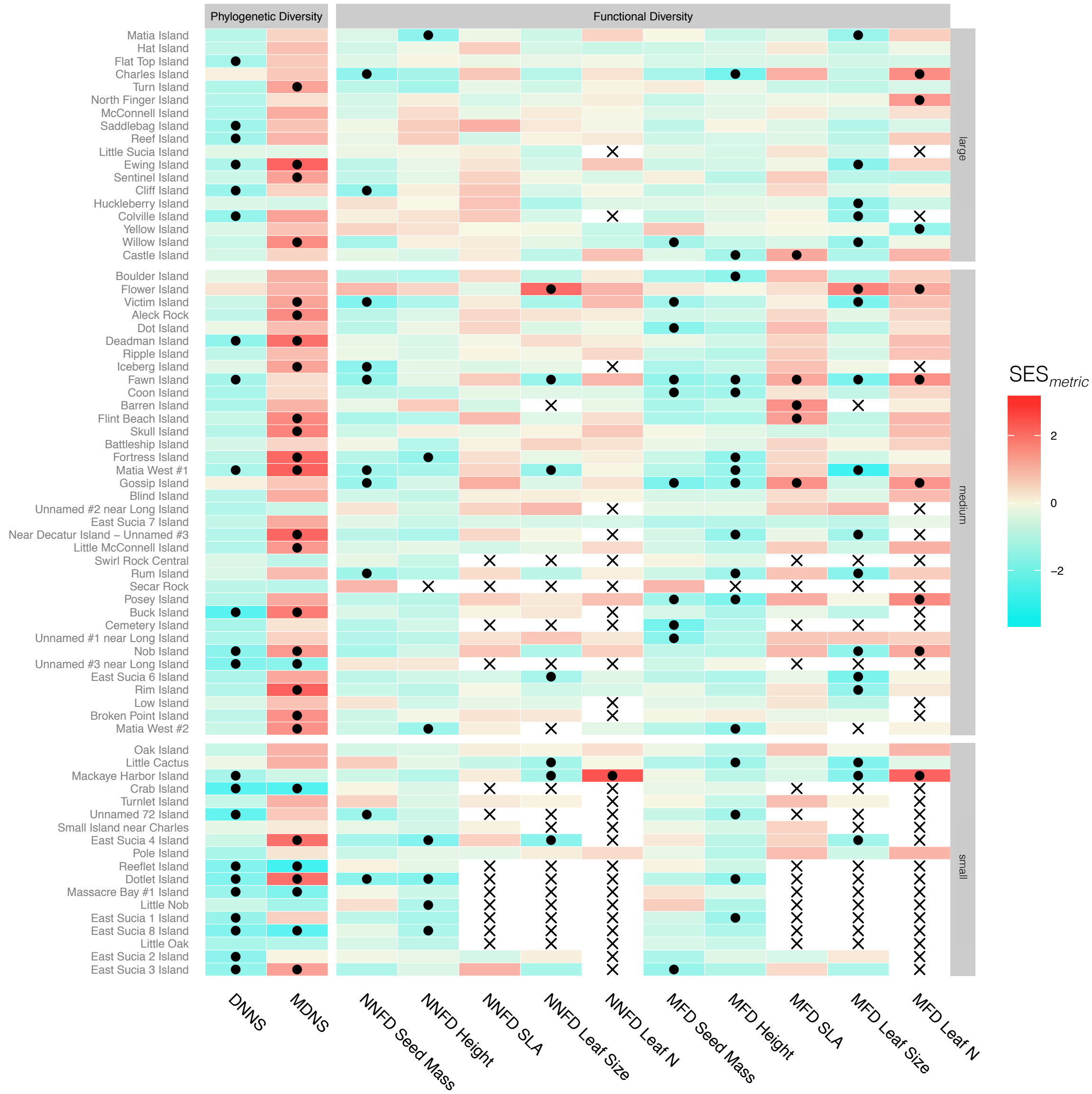

FIGURE 2.5: Significance of standardized effect sizes (SES$_{metric}$) of invasive species for phylogenetic and functional diversity indices (x-axis). Red hues are SES$_{metric}$ > 0 (overdispersion/distinctiveness), blue hues are SES$_{metric}$ < 0 (clustering/similarity). Darker tones indicate increasingly positive or negative z-scores, and dots indicate significance (p-value < 0.05). Islands (y-axis) are ordered by decreasing size from top to bottom, and size categories are noted on the right. Blank cells marked with an 'x' represent islands lacking trait data for the occurring species.

Invasives were also similar to the average trait values of the native community. For seed mass and maximum height, the mean MFD_i was significantly less than the mean MFD_n on 8 and 41 of the islands, respectively (Figure 2.3e, Figure 2.4). However, for SLA, mean MFD_i was significantly greater than mean MFD_n on 22 islands. Invasives were still more similar compared to the random invasive species pool for seed mass (10 islands) and maximum height (16 islands), but SLA was only significantly different on 5 islands (Figure 2.5).

2.5 DISCUSSION

Our analysis of the flora of the San Juan Islands found statistical support that invasive species are phylogenetically similar to their nearest native relative (i.e. non-random phylogenetic clustering). Differences in observed mean $DNNS_i$ and mean $DNNS_n$ were significant across a majority of the islands, and compared to the null model of randomly invaded communities, only support for phylogenetic similarity to the nearest native was found. Less of the islands showed a significant difference between observed mean $MDNS_i$ and mean $MDNS_n$, and we found the opposite relationship when compared to the null model—observed invasives are mostly distinct compared to the native community as a whole (i.e. non-random phylogenetic overdispersion). Thus, the invasive flora of the San Juan Islands exhibits a nested structure of relatedness, where successful invaders have close native relatives, yet are distributed evenly throughout the native flora, rather then clustered within one lineage.

Given the phylogenetic similarity between invasive plants and their close native relatives, and significant phylogenetic signal for all but one trait in the community phylogeny, we expected invasive species to be functionally similar to the natives. Despite this simple prediction, complex patterns emerged. Observed mean trait measurements were significantly different between the native and invasive species on many islands, at least for a few ecologically relevant traits, which is consistent with other studies (e.g. Pyšek and Richardson, 2007; van Kleunen *et al.*, 2010; Ordonez, 2014). In general, invasive species were shorter, with a higher SLA, and higher leaf nitrogen content than co-occurring native species, but with similar leaf sizes and seed masses. Functionally, this translates to invasive plants tending to be shorter annuals with broad, nitrogen-rich leaves, and may be slightly more easily dispersed than the native species in this system. Invasive species were shorter than the mean of the native species that they co-occur with, but still generally quite tall (mean height of invasives = 1.27m, mean height of natives = 3.71m; see Table S3), which might explain their invasion success (Moravcová *et al.*, 2015). In addition, they fall towards the 'fast-return' end (high SLA, high leaf nitrogen content) of the leaf economic spectrum (Wright *et al.*, 2004), which may indicate higher growth and photosynthetic rates compared to native species.Because the trait measurements used were summaries gathered from a variety of other studies and taxonomic treatments, they are fixed traits and do not address the importance of trait plasticity for invasion success. However, in the absence of more detailed measurements they are still useful to provide a broad perspective on functional attributes important for community assembly (Cornwell *et al.*, 2014). Further, trait measurements differed in one direction (i.e. invasive species were always shorter than natives on average) across islands with heterogeneous environments, which is more likely due to broad functional differences between invasive and native species than to plastic ecological responses.

However, when accounting for phylogenetic history along with functional trait comparisons, we saw two different trends. First, the absence of significant differences in observed trait measurements between status groups does not necessarily negate the importance of shared similarity to close native relatives. Invasive and native species had similar measurements for seed mass overall, and there were few significant differences in observed mean NNFD (Figure 2.4). But when compared to the randomized invasive community, 10 islands showed significant similarity to their nearest native relative and to the community mean (Figure 2.5), illustrating the importance of comparing observed relationships to biologically informed null expectations (see Thuiller *et al.*, 2010, for a discussion of null models relevant to DNC). This functional "matching" together with overall phylogenetic similarity to the native community could suggest an environmental filter for seed mass.

Second, when invasive and native species differed in functional trait measurements, invasive species were not necessarily functionally distinct from their nearest native relative. This is especially apparent for SLA, where we found invasives had a significantly greater observed mean SLA on 43 islands, but only 10 were significantly different compared to the nearest native (Figure 2.4), and none of these were significant under the null model (Figure 2.5). However, they were significantly different from the average of the native community. Therefore, our results suggest that for SLA only the disparity in traits matters for successful invasion, and the identity of the invader relative to its nearest native is irrelevant. This pattern suggests support for functional "filling"—overall phylogenetic similarity of invasive species to the natives indicates ancestral similarity of most traits is important to pass an environmental filter and establish, but certain traits (i.e. SLA) must still differ to fill available niche spaces, escape competition, and persist over time.

Although a phylogeny is often considered an appropriate proxy for ecological similarity, we have shown here that the evolutionary history reflects functional patterns for certain traits (e.g. maximum height), but contrasting patterns emerge (e.g. SLA, functional similarity to the community mean) that can only be distinguished with the addition of functional trait measurements and comparisons to null expectations. Similarly, trait comparisons without consideration of phylogenetic similarity would miss the importance of matching close relatives (e.g. seed mass). Even if overall functional distinctiveness between status groups suggests the importance of diversification of structure, phylogenetic similarity to the nearest native along with functional similarity to the natives for a few traits imply that pre-adapted traits are also important for successful invasion in this system, corroborating the findings of Ordonez (2014) across 83 communities worldwide.

Phylogenetic similarity and functional distinctiveness could be explained by a few different mechanisms. First, we found that on smaller islands invasives were more often phylogenetically and functionally similar to their nearest native relative and the native community than on larger islands (Figure 2.5). Because different ecological and evolutionary processes will likely vary in strength across different scales, the effect of spatial scale on phylogenetic patterns of invasiveness has been previously noted (Carboni *et al.*, 2013; Cadotte *et al.*, 2009b). At small spatial scales (i.e. small islands), it is possible that abiotic pressures, such as tidal flooding, sea spray, or nutrient limitation, are creating a stronger effect of environmental or habitat filtering and ancestral traits are important to cope with these extreme conditions. As island size increases, the landscape is more likely to become heterogeneous, increasing the complexity of both abiotic and biotic interactions. Although we treat small and large islands as comparable communities, in actuality larger islands are composed of many different habitats – e.g. mixed conifer forests, meadows, and beaches. If communities were defined by environmental characteristics such as habitat type (e.g. grassland, rock outcrop, or shoreline) instead of geographic boundaries, we may see more homogenous patterns emerge. The environmental heterogeneity and extreme environmental pressures we expect across the islands sampled might also explain why our results differ from some other tests of DNC (e.g Strauss *et al.*, 2006b; Schaefer *et al.*, 2011; Carboni *et al.*, 2013). Future directions include exploring biogeographic (e.g. island size, distance from the mainland or largest nearest island) and environmental factors to disentangle the ecological processes influencing invasion dynamics in the San Juan floristic community.

Additional information on other intrinsic characters of the invasive species could help to explain the patterns of invasion we described. For example, the native range of the introduced species might better describe niche preferences. Species introduced from Europe might have evolved in a similar Holarctic setting, and thus share similar broad lineages (phylogenetic clustering) but fill separate micro-niches and differ in trait space (functional dispersion). It is also possible that other traits, especially characters that were not investigated here (e.g. root structures, habit, phenology), might have different functional patterns.

Because the timing of introductions is unknown, we cannot exclude the possibility of founder effects and residence time as contributors to these patterns as well. A recent analysis of a long-term plant survey by Li *et al.* (2015) provides a mechanistic explanation to support both sides of Darwin's conundrum as naturalization progresses over time. Not only were exotic species with close native relatives more likely to naturalize and dominate the native community, but natives most closely related to exotics were more likely to be replaced (Li *et al.*, 2015). Functional differences for a few traits could signify that displacement is beginning in the San Juan Islands, and additional surveys to investigate this would be an interesting development.

The era of "big data" is contributing immensely to publically available molecular information, and it is tempting to use phylogenetic approaches to explain patterns of community assembly and predict future invasions in the absence of additional phenotypic data for each species. However, we show that trait databases and ecological surveys provide a resource to easily unite function and phylogeny and test eco-evolutionary hypotheses of species invasion, and their complementarity can aid in deconstructing the processes of invasion in natural systems. In particular, clearly defined null models that evaluate the phylogenetic and functional structure of communities enable identification of patterns that could not be generated randomly, and branch lengths that are consistently time-scaled allows for comparison across different systems. Incorporating the growing body of diversity metrics with meaningful null hypotheses and unified methodologies into comparable frameworks has the potential to further deconstruct the patterns of assembly we observe, and predict future ecological change.

2.6 DATA ACCESSIBILITY

Species list with status, and trait measurements for each of the five traits, metadata for each island (total island area, assigned size category), the community matrix with presence/absence of each species across the 80 islands, sequence alignments for each gene region with GenBank accession numbers for each species, the concatenated sequence alignment, treefiles of maximum-likelihood phylograms for each gene region and the concatenated alignment, and a treefile of the maximum-likelihood mega-phylogeny (scaled to time) are available from the Dryad Digital Repository: `http://dx.doi.org/10.5061/dryad.m88g7`. Custom R scripts for all analyses and associated datasets are available on Github (`https://github.com/hmarx/San-Juan-Islands-Invasion`).

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CHAPTER 3

Riders in the sky (islands): using a mega-phylogenetic approach to understand plant species distribution and coexistence at the altitudinal limits of angiosperm plant life [2]

3.1 ABSTRACT

Plant species occurring on high-alpine summits are generally expected to persist due to adaptations to extreme selective forces caused by the coldest climatic conditions where angiosperm life thrives. Using species occurrence data collected from floristic surveys on 15 summits (2,791 - 4,102 m above sea level) throughout the Écrins National Park, France, along with existing molecular sequence data obtained from GenBank, we used a mega-phylogenetic approach to evaluate the phylogenetic structure of high-alpine plant species assemblages. We used two different null models and three nested species pools to address the importance of species-specific and species-neutral processes for driving diversity patterns. In addition, we examined historical, environmental, and neutral factors that might explain species coexistence. Although we found evidence for strong phylogenetic clustering within alpine summits, we were not able to reject models of species-neutral processes to explain patterns of floristic diversity within and between summits. Our results suggest that at the scale of our study, skyline island vegetation presents an emerging neutral phylogenetic structure. Quaternary glacial dynamics may have repeatedly shuffled the pool of high plant species adapted along altitudinal gradients within summits, homogenizing the flora between them.

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3.2 INTRODUCTION

High-elevation ecosystems experience among the most severe climates on earth where plant life thrives (Körner, 2011). Such harsh environments have repeatedly triggered speciation and the evolution of novel traits to cope with strong winds, extended periods of low temperatures, ultraviolet radiation, and shortened growing seasons (Körner, 1995; Bliss, 1962; Billings and Mooney, 1968; Körner, 2003). Often remote and difficult to access, mountains have also been relatively less impacted by anthropogenic pressures and are considered the "last refugia" for a large number of species, among which many are endemics to single mountain ranges (Lomolino, 2001; Körner, 2003). At the same time, alpine ecosystems are anticipated to be at one of the highest risks of alteration from a changing climate due to species range shifts (Morueta-Holme *et al.*, 2015; Dullinger *et al.*, 2012; Jurasinski and Kreyling, 2007; Pauli *et al.*, 2012; Elsen and Tingley, 2015). A better understanding of the diversity at the community level in these relatively remote and understudied ecosystems will be essential for predicting their response. High alpine ecosystems thus harbor relatively important and threatened biodiversity, but also raise fundamental questions regarding the origins of biodiversity and the drivers of species distributions and coexistence under climatically extreme environments. In this work we address these questions by studying plant diversity of an isolated range of high-elevation "sky islands" in French Alps.

Due to their relative isolation and steep environmental gradients, alpine ecosystems are well suited for studying the mechanisms of biodiversity origins and species coexistence. To do so, the approach of community phylogenetics consists in quantifying, from vegetation survey data, the patterns of phylogenetic diversity within (α) and turnover between (β) sites by comparing observed patterns to the ones expected under null models of random community assemblages drawn from a given species pool. This approach has turned out to be useful to link past macroevolutionary history of speciation and lineage diversification with current mechanisms of community assembly and species coexistence (Gerhold *et al.*, 2015; Webb *et al.*, 2002). Community assembly is often assumed to be driven by two opposing forces: on one hand environmental filtering is expected to produce a phylogenetic "clustering", due to closely related species having similar environmentally selected traits (mainly stress tolerance in the

Alpine); on the other hand resource competition is expected to cause phylogenetic "overdispersion" because distantly related species tend to coexist locally due to non-overlapping niche spaces (Webb, 2000; Webb *et al.*, 2002). These two expectations, however, overlook that phylogenetic clustering may also be generated by interspecific competition when community structure is mainly shaped by competitive hierarchy fitness differences (i.e. Mayfield and Levine, 2010), or that allopatric speciation in particular lineages may also generate phylogenetic overdispersion within sampling sites (Pigot and Etienne, 2015).

In high-alpine environments though, it is widely expected that competitive interactions will be reduced and that plant-plant interactions will be dominantly positive through ecological facilitation (i.e. Choler *et al.*, 2001; Callaway *et al.*, 2002). One meta analysis of alpine plant communities in Europe, Asia, New Zealand, and the Americas showed that communities with plants exhibiting a cushion-type life form had a higher overall phylogenetic diversity (Butterfield *et al.*, 2013). Because the cushion habit is a convergent trait that repeatedly evolved in response to harsh environmental conditions (Bliss, 1962; Billings, 1974; Boucher *et al.*, 2016; Aubert *et al.*, 2014), cushion plants seem to facilitate the establishment of other species that are less suited to alpine ecosystems (Anthelme *et al.*, 2014). Facilitative recruitment seems to be specific, restricted to a few stress-intolerant species which tend to not occur in adjacent bareground habitats (Butterfield *et al.*, 2013; Kikvidze *et al.*, 2015). These positive biotic interactions have been shown to increase with increasing environmental stress, and should be pervasive in the high alpine environments of temperate mountains (Callaway *et al.*, 2002), but resulting overall phylogenetic diversity does not change along alpine environmental gradients (Butterfield *et al.*, 2013). We thus expect that the effect of biotic interactions will not be discernable on the phylogenetic diversity of entire summits, and that most forces shaping the vegetation of high alpine summits will be the product of energetic and environmental conditions (e.g., mean climate, heterogeneity, etc.), history (e.g., speciation, quaternary climatic oscillations), and neutral processes (e.g., dispersal limitation, area effects; Table 3.1).

Table 3.1: General environmental, historical, and neutral hypotheses that were tested to explain phylogenetic α- and β-diversity patterns in Alpine communities. Codes for statistical tests: cor = Spearman correlation test; SES = standardized effect size; RD = random draw; MRM = matrix regression model; dependent (response) variable ~ independent (explanatory) variable. α-diversity increase = phylogenetic overdispersion.

Hypothesis of diversity patterns	Explanation	Prediction	Measure	Statistical Test
Environment (Modified from Table 1 of Moser *et al.*, 2005; Fraser and Currie, 1996)				
Maximum elevation (Lomolino, 2001; Rahbek, 1995; Körner, 2003)	Stress increases with elevation	α-diversity should decrease with elevation	log(maximum elevation of summit)	cor(α-: elevation)
Summit area (Lomolino and Weiser, 2001; Rosenzweig, 1995)	Niche availability	α-diversity should increase with summit area	log(total 3D area (south facing) above treeline)	cor(α-: summit area)
Refugial area (Rosenzweig, 1995)	Available area with suitable microclimatic conditions	α-diversity should increase with increasing area of south facing slope	log(area of south facing aspect above glacier with >40° slope)	cor(α-: regugial area)
Maximum slope (Elsen and Tingley, 2015)	Available area with suitable topographic conditions	α-diversity should increase as slope decreases	PCA (mean and maximum slope above glacier (>40° slope))	cor(α-: slope)
Heterogeneity of topography (Bruun *et al.*, 2006; Richerson and Lum, 1980; Shmida and Wilson, 1985; Stein *et al.*, 2014; Terborgh, 1977)	Niche dimensionality	α-diversity should increase with greater diversity of niche space	PCA (elevation range, range of slope)	cor(α-: topography)
Heterogeneity of lithology (Thuiller, 2013; Laliberté *et al.*, 2013)	Niche dimensionality	α-diversity should increase with greater diversity of niche space	diversity of bedrock (Simpson's)	cor(α-: diversity of lithology)
Available energy (climatic favorableness) (Hutchinson, 1959; Wright, 1983; Pianka, 1966; Richerson and Lum, 1980)[3]	More available energy and higher favorability of climate promotes species richness; Summits with similar energy conditions should have similar species (low turnover) adapted to these conditions	α-diversity should increase with increasing available energy; β-diversity should increase with greater difference in available energy between summits	PCA BioClim energy[3]	cor(α-: BioClim energy); MRM(β-$\sim$ BioClim energy distance matrix)

Continued on next page

[3]See AppendixB.12.3 for categories of BioClim variables

Table 3.1 – continued from previous page

Hypothesis of diversity patterns	Explanation	Prediction	Measure	Statistical Test
Stress (climatic harshness) (Whittaker *et al.*, 2001; Fraser and Currie, 1996)[3]	Only certain species will be adapted to the most stressful climatic conditions; Summits with similar stress conditions will have similar species (low turnover) adapted to these conditions	α-diversity should decrease as climatic stress increases; β-diversity should increase with increasing difference in climatic stress between summits	PCA BioClim stress[3]	cor(α-: BioClim stress); MRM(β-$\sim$ BioClim stress distance matrix)
Stability (climatic variability) (Currie, 1991; Fraser and Currie, 1996)[3]	Climate stability promotes species richness; As the climate becomes more variable, turnover between summits should increase	α-diversity should decrease as environmental variability (of the present or the past) increases; β-diversity should increase as environmental variability (of the present or the past) increases	PCA BioClim stability[3]	cor(α-: BioClim stability); MRM(β-$\sim$ BioClim stability distance matrix)
History				
Priority effects among clades (Lee *et al.*, 2012; Ndiribe *et al.*, 2013; Silvertown, 2004)	Early arriving genera out-compete late arriving clades for available niches	Lower α-diversity of younger plant lineages (clustering towards the tips) and higher diversity for older clades (clustering towards the base of the tree); Low turnover (species found on all summits) in deeper nodes (β)	SES_{metric} at each time interval i; PIst	$SES_{metric} \sim$ time intervals; RD null shuffles species across Summit source pool at each node
Recent and rapid diversification (Roquet *et al.*, 2013; Rundell and Price, 2009; Schluter, 1996; Valente *et al.*, 2010; Vermeij, 2006; Verboom *et al.*, 2009)	Rapid diversification of younger clades (e.g. endemics) drive phylogenetic clustering	Less phylogenetic clustering without endemic species	α-diversity (with and without endemic species on each summit)	difference in mean SES_{metric} with and without endemics (paired t-test)
Neutral				
Distance (Hubbell, 2001, 2005; Chase, 2003; Nathan, 2006; Gillespie *et al.*, 2012)	Dispersal limitation	β-diversity should increase (higher turnover) as distance between summits increases	distance between summits	MRM(β-$\sim$ spatial distance matrix)
Summit Area (MacArthur and Wilson, 1967; Lomolino and Brown, 2009; Losos and Ricklefs, 2009a)	Lower extinction rates on larger summits	α-diversity should increase with summit area	log(total 3D area (south facing) above treeline)	cor(α-: summit area)

Environmental Conditions — High mountain ranges typically constitute "sky islands" due to their geographic and climatic isolation from surrounding lowlands. Indeed, harsh climatic conditions of most mountain ranges have been linked to niche differentiation and diversification in particular plant clades in the European Alps (e.g. Boucher *et al.*, 2012) and community diversity across the Northern Hemisphere (Kikvidze *et al.*, 2005). Community diversity of high-alpine ecosystems is predicted to respond to a variety of different environmental factors (Körner, 2003, Table 1), and could contribute to the patterns of phylogenetic diversity in the high elevation flora within and among alpine summits. Diversity patterns in alpine regions generally show a trend of decreasing diversity (e.g. Lomolino, 2001; Bruun *et al.*, 2006; Nobis and Schweingruber, 2013), but increased endemism towards high altitudes (Molina-Venegas *et al.*, 2014; Moser *et al.*, 2005; Loidi *et al.*, 2015). However, when comparing high alpine summits, summit area increases the availability of niches, and should increase community diversity (Rahbek, 1997; McCain, 2010). Similarly, larger refugial areas through the Last Glacial Maximum (LGM hereafter) increase the availability of suitable microhabitats, and should promote diversity (Rosenzweig, 1995). Steep slopes should decrease diversity (Elsen and Tingley, 2015), but topological (Richerson and Lum, 1980) and lithologic (Laliberté *et al.*, 2013) heterogeneity should increase niche availability and be positively correlated with species diversity. Favorable climates should increase diversity (Wright, 1983), but stressful conditions should hinder it (Whittaker *et al.*, 2001). Not mutually exclusive, combinations of environmental factors often explain diversity patterns in complex ways. For instance, in the Austrian Alps available energy (measured by temperature, evapotranspiration, and precipitation) and favorable temperatures rather than stressful minimum temperatures determine species-richness (Moser *et al.*, 2005).

History — Quaternary climate changes may have also strongly imprinted patterns of phylogenetic diversity in high alpine summits. The climate prevailing during glacial cycles of the Pleistocene was unprecedentedly cold, in particular during the last glacial maximum LGM (Clark *et al.*, 2009). These cold epochs profoundly altered ecosystems and induced local extinctions and geographic movements of many plants and animals, thereby strongly imprinting current-day biodiversity patterns (Hewitt, 2000). Nevertheless, some locations functioned as climatic refugia, allowing some species to persist during inhospitable time periods. Increasing evidence has shown that some species survived glacial periods in high latitude refugia, emerging from ice sheets nunataks refugia (Schönswetter *et al.*, 2005; Westergaad *et al.*, 2010; Lohse *et al.*, 2011; Jørgensen *et al.*, 2011; Stehlik *et al.*, 2002, 2001). Thus, multiple lines of genetic and geological evidence show that periphery refugia around the edges of glaciers in the European Alps during the LGM allowed the local persistence of a few distantly related plant clades.

This dynamic evolutionary history of mountain ranges may affect patterns of phylogenetic diversity in two different ways. First, priority effects of early-arriving lineages may fill alpine niches first, dampening diversity of younger lineages that arrive later, as was found in the alpine flora of New Zealand (Lee *et al.*, 2012; Tanentzap *et al.*, 2015). If older clades are driving diversity patterns within alpine summits, we expect to see higher phylogenetic diversity towards the base of the tree (overdispersion), and lower phylogenetic diversity towards the tips (clustering, Table 3.1). We would also expect relatively low turnover between summits for older lineages than for younger ones. Second, recent and rapid diversification might explain alpine diversity patterns (Schluter, 1996), especially because most evidence suggests that allopatric speciation is pervasive in the Alps (Roquet *et al.*, 2013; Boucher *et al.*, 2012). If so, we expect that endemic species would drive phylogenetic clustering due to repeated speciation in particular lineages. On the other hand, isolated communities where local speciation occurred through allopatric speciation may appear phylogenetically overdispersed within each community (Pigot and Etienne, 2015). Hence the need to account for speciation in null model analysis.

Neutral Processes — Noticeably, most explanations of species coexistence in alpine communities predict the importance of traits that are adapted to environmental conditions (Ricklefs, 2004; Bello *et al.*, 2012; Kraft *et al.*, 2014). However, species-neutral processes are also expected to influence diversity patterns (Vellend, 2010; Rosindell *et al.*, 2012). This is especially true for island-like systems, where the equilibrium theory of island biogeography predicts species diversity as a function of island size and distance from the mainland (MacArthur and Wilson, 1967; Lomolino and Brown, 2009; Losos and Ricklefs, 2009b; Lomolino and Weiser, 2001). An extension of this, the unified neutral theory of biodiversity (Hubbell, 2001) describes how simple models of extrinsic factors such as rates of colonization and local extinction on islands are also able to predict biodiversity patterns.

Alpine communities are often considered island-like, and therefore dispersal ability is expected increase rates of colonization between summits that are separated by shorter distances (MacArthur and Wilson, 1963, ,Table 1), thus generating patterns of distance decay in β-diversity. At the same time, larger summit areas promote species diversity as extinction rates are relaxed (Hubbell, 2001). Such stochastic processes are expected to have important consequences for community diversity (Rosindell *et al.*, 2012), but explicit null models of neutral assembly processes have been lacking (Pigot and Etienne, 2015).

Important progress in community phylogenetics has recently been made through the development of more sophisticated null models. Nested null models can distinguish between historical or environmental filters by narrowing down the study specie pool to a certain region or environment (Chalmandrier *et al.*, 2013), and dynamic null models can account for the effects of past allopatric speciation by mimicking neutral speciation and dispersal (Pigot and Etienne, 2015). These models can be integrated to specifically test both niche and neutral hypotheses that might explain diversity patterns, yet few studies have done so (but see Burbrink *et al.*, 2015).

Most studies that have used the community phylogeny approach to understand diversity patterns in alpine systems have focused on elevation gradients (Bryant *et al.*, 2008; Ndiribe *et al.*, 2013; Kraft *et al.*, 2011), but the one that has compared diversity patterns between summits found interesting patterns of phylogenetic history. For instance, comparisons of the phylogenetic diversity among and between "sky islands" have shown that similar environmental conditions can explain angiosperm diversity in the Rocky Mountain National Park (Jin *et al.*, 2015). How important are adaptations to extreme environments for the biodiversity of an alpine community? Can the patterns of diversity we observe in alpine plant communities be explained by phylogenetic distances? Or, are these patterns better explained by species-neutral processes, such as colonization (trait-neutral dispersion) and local extinction?

In this study, we first describe the phylogenetic diversity of seed plants (Spermatophyta) within (α) and between (β) alpine "sky island" communities in the Écrins National Park, France. We then compare the observed diversity to two null models – one that depends on the evolutionary history of species, and one that is species-neutral. The observed patterns were compared to diversity metrics obtained by three nested species pools – one for the entire Flora of the Ecrins range, one restricting species occurring on high alpine summits, and one restricting species that occur in ares which were unglaciated during the LGM period. Finally, we test for correlations between measures of phylogenetic diversity with variables that relate to specific environmental, historical, and neutral hypotheses that could explain the coexistence patterns we observe in these plant assemblages that ride on the physiological limits of plant life (Table 3.1).

3.3 METHODS

3.3.1 *Study area*

The Écrins National Park (hereafter referred to as the Écrins) is one of the most remote and protected natural areas in France. Located in South-eastern France, this national park covers about 178,400 hectares, with approximately 30,000 permanent residents. The Ecrins are characterized by mountainous to alpine ecosystems and contains over 2000 plant species of varying ecological specializations (Boulangeat *et al.*, 2012). Within the park, there are several tens of mountain peaks, the tallest of which is 4,101 meters (Barre des Ecrins, Figure From a geological point of view, these peaks belong to the Ecrins-Pelvoux massif, which largely consists of crystalline basement rocks that were exhumed since the Oligocene and remains of inverted sedimentary basins from the Jurassic (Dumont *et al.*, 2012). The sharp topography that characterize these peaks is due to the high rates of orogeny that formed the Alpide belt (the range extending from the Pyrenees to New Guinea)(Hergarten *et al.*, 2010), which began around 40 Ma and continues today (Nikonov, 1989). Available reconstructions of glacier extents (van der Beek and Bourbon, 2008) show that the summits of most mountains were exposed through the last glacial maximum (LGM; approximately 20,000 years ago), forming "nunataks", isolated unglaciated areas protruding above the sea of ice.

3.3.2 *Reconstitution of the glacier extent*

The ice-extent within the massif during the last glacial episode was reconstructed building on the previous studies reported by van der Beek and Bourbon (2008) and Cossart (2005) for the western and eastern part of the Ecrins-Pelvoux massif, respectively. Identification of geomorphic features characteristics of past glaciers occupation available in the literature such as trim-lines, roches moutonées and erratic boulders were complemented by additional observations in the inner parts of the massif (Delunel, 2010) and there locations implemented in a Geographic Information System (GIS) database. The database was then spatially interpolated using a spline method, considering the 12 nearest neighboring features with the ArcGIS software. The results of the spatial interpolation are represented in Figure 3.1, which illustrate the reconstructed elevation of the glaciers surface during the last glacial maximum in the massif.

3.3.3 *Alpine plant surveys*

Species occurrences were obtained from an intensive campaign of vegetation surveys (relevés) within the Écrins National Park from 2009-2014 conducted by CD and SL along elevation gradients on 15 high summits of the Ecrins – sampling elevations ranged from 2,500m to 4,102m asl. These occurrences were then combined with the vegetation-plot database of the National Alpine Botanical Conservatory (CBNA) to generate the 'Regional' species pool of the Écrins (Figure 3.1). Taxonomic inconsistencies between relevé lists were resolved with the iPlant taxonomy database (Goff *et al.*, 2011) using the R package *taxize* (Chamberlain and Szöcs, 2013).

We defined alpine areas by estimating the treeline upper limit (~2000-2500 m asl), using the French National Forestry Inventory (IFN). Each GPS coordinates of plant

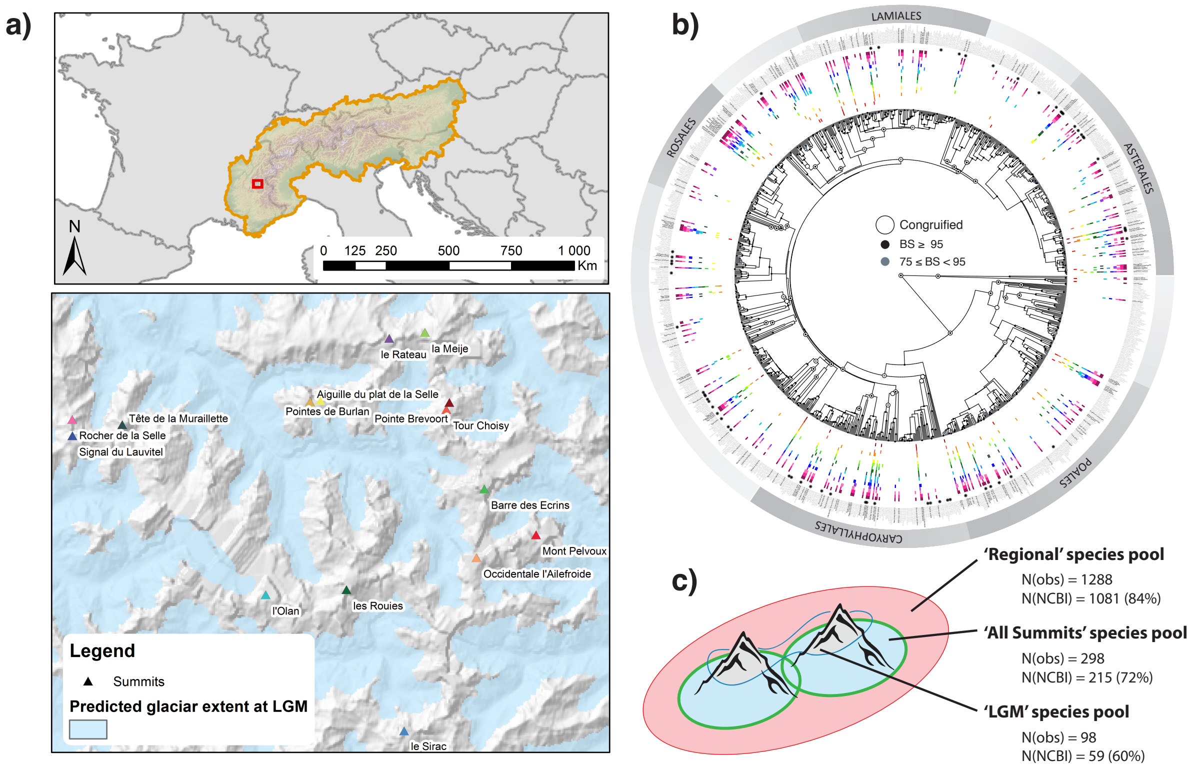

FIGURE 3.1: a) Map of Écrins National Park France with summits sampled. b) Community phylogeny of the flora of the Écrins (Spermatophyta). Nodes that were congruent with the reference timetree ('congruified') are indicated by black circles. Nodes with a light grey dot have bootstrap support (BS) between 75 and 95, and those with a black dot have BS support greater than or equal to 95. The five most species-rich clades are indicated by dark grey bars. Occurrence of each species across summits are indicated by colors along tips. Tip labels colored black highlight alpine species. c) Diagram illustrating the three nested source pools: species that occur in the greater 'Regional' Écrins National Park, species that occur on 'All Summits', and species that currently occur in areas that persisted through the 'LGM'. Summaries of the total species sampled in each relevé (N_{obs}) and total sequences recovered from recovered from GenBank (N_{ncbi}) are listed for each species pool.

occurrences was assigned to one of the 15 study summits, thus resulting in a pool of species that occur within each alpine (biomes above tree-line) summit "community". The combined occurrences of species across all 15 summits comprise the 'All Summits' species pool (i.e. 'Summit community'), which is nested species pool within the 'Regional' Écrins (Figure 3.1).

Paleogeographic reconstructions provide unique and compelling evidence that a large area of alpine summits remained emerged from ice sheet during most glacial periods (e.g. van der Beek and Bourbon, 2008). Given that south facing slopes receive very important solar radiation, it is likely that energetic conditions remained favorable for many high alpine plant specialists (Birks and Willis, 2008). Recent phylogeographic studies point in this direction for different plant taxa of varied lineages (e.g. Schönswetter *et al.*, 2005). To account for potential historical geographic restrictions of the species pool, we used estimates of glacial cover during the last maxima (see *Reconstitution of the glacier extent*) to define alpine rock surfaces that were exposed through the LGM. Species that were sampled in relevé localities above the maximum elevation of the glacier constitute the pool that currently occurs in areas that may have persisted through the LGM (i.e. 'LGM' species pool and community, Figure 3.1).

3.3.4 *Phylogeny estimation*

The 'Regional' Écrins species pool (i.e. the most inclusive) was used to estimate a community phylogeny of all seed plants (Angiosperms + Gymnosperms = Spermatophyta) (Cantino *et al.*, 2007) occurring in our dataset, which could then be pruned for all other species pool comparisons. We retrieved sequence data for five gene regions (*atpB*, *rbcL*, *matK*, *trnTLF*, and ITS) from GenBank (release 209) using the PHLAWD pipeline (Smith *et al.*, 2009). The output alignment for each gene region was cleaned to remove sites that were missing for >50% of the taxa, and maximum likelihood (ML) inference implemented in RAxML (Stamatakis, 2006) was used to estimate gene trees. Outlier taxa (i.e. those falling outside of clades defined by the most recent APG III taxonomy) were identified by visual inspection of each gene tree, and were removed before concatenation into a final alignment using phyutility (Smith and Dunn, 2008). The resulting super-matrix was used to estimate a ML community phylogeny of the

Écrins in RAxML v. 8.0.4, under a GTR-CAT model of nucleotide evolution with simultaneous rapid bootstrap and ML search using 999 replicates, which is ideal for large nucleotide alignments (Stamatakis, 2006). Divergence times from a reference time-tree (Soltis *et al*., 2011; Zanne *et al*., 2014a) were mapped to concordant nodes on the best ML estimate of tree topology using the 'congurification' approach (Eastman *et al*., 2013) in the R package *geiger* (Pennell *et al*., 2014), and the phylogeny was scaled to time using treePL (Smith and O'Meara, 2012). Because names for some taxa had been changed to NCBI taxonomy in the PHLAWD search, taxonomy of the tips was matched back to the input iPlant nomenclature.

3.3.5 *Phylogenetic α-diversity*

Diversity within each summit community (α-diversity) was assessed by calculating two widely used measures of phylogenetic distance: the mean nearest taxon distance (MNTD) and the mean pairwise distance (MPD), recent-tip and phylogeny-wide phylogenetic effects, respectively (Webb, 2000). Using the occurrence matrix for each summit, both observed α-diversity metrics were calculated for all seed plants (Spermatophyta) in the R package *picante* (Kembel *et al*., 2010). Taxonomic scale dependency for phylogenetic patterns has been previously noted in the literature in general (Cavender-Bares *et al*., 2006) and has been shown to reverse phylogenetic diversity trends in plots across the European Alps (Munkemüller *et al*., 2014), so we also compared five clades with the highest species-richness separately (Asterales, Poales, Rosales, Lamiales, Caryophyllales). To assess if phylogenetic community patterns within summits deviated from random, we compared the observed phylogenetic α-diversity patterns with two different null models, and three nested species pools ('Regional', 'All Summits', and 'LGM').

First, we implemented a random draw (RD) null model. This null model randomizes species occurrences in each community by drawing from the species pool to generate an expected community structure, which maintains the species-richness and abundance structure of each community while shuffling the species identity across the phylogeny (Gotelli, 2000). This approach assumes that species in local communities (e.g. each summit) are all equally likely to be present in the species pool (Webb, 2000), and performs well compared to other randomization models for occurrence data (Kembel, 2009). Although the RD null model does generate a random distribution to compare observed patterns, it doesn't model community assembly processes explicitly (Pigot and Etienne, 2015; Gotelli and McGill, 2006). To test for species-neutral processes of community assembly, we utilized a second null model based on DAMOCLES (Pigot and Etienne, 2015) framework (Dynamic Assembly Model Of Colonization, Local Extinction and Speciation). This model simulates neutral assembly of single communities by speciation, colonization and local extinction where rates are independent of species or lineages traits. The model calculates ML estimates for rates of colonization (γ) and local extinction (μ) from the community phylogeny of the species pool, and uses these estimates to simulate null communities. Phylogenetic distances from the simulated communities represent the expectation of community structure if colonization and extinction are random (assuming allopatric speciation) (Pigot and Etienne, 2015). This approach has been shown to help elucidate neutral processes of community structure in other island systems (Burbrink *et al.*, 2015).

Both null models require a pool of species that circumscribes the potential source of observed diversity in the community of interest *a priori* (Webb, 2000), and this choice has been shown to impact results (Swenson *et al.*, 2006; Morin, 2011; Vamosi *et al.*, 2009; Eiserhardt and Svenning, 2013; Chalmandrier *et al.*, 2013; Munkemüller *et al.*, 2014). In particular, restricting the species pool can aid in the interpretation of eco-evolutionary processes that generate community phylogenetic patterns (Chalmandrier *et al.*, 2013; Eiserhardt and Svenning, 2013). For example, under the hypothesis of phylogenetic clustering due to habitat filtering that we might expect to see in alpine communities, restricting the regional species pool to the alpine habitat should remove the environmental effect and reduce the signal of clustering if environmental filtering for phylogenetically conserved traits is an important assembly process (Eiserhardt and Svenning, 2013). Therefore, we explored three different hypothetical species pools to generate null distributions of expected diversity on alpine summits in the Écrins: (1) a regional pool of species occurring anywhere in the greater Écrins ('Regional' species pool), (2) an environmentally restricted pool of species that currently occur on any of the combined summits ('All Summits' species pool), and (3) a geographically restricted pool of species that currently occur in areas that were exposed above glaciation during the LGM ('LGM' species pool). Resampling from the 'Regional' pool assumes that any species within the park has equal probability of colonizing any summit, which may not be accurate due to dispersal and niche limitations. Resampling from 'All Summits' assumes only species currently adapted to alpine conditions have the potential to disperse between each individual summit. Further reduction to the historical 'LGM' pool assumes limited dispersal from these potential refugia.

Deviations of observed patterns from those expected under each null model were evaluated by comparing observed α-diversity metrics to each null distribution given the three species pools ('Regional', 'All Summits', and 'LGM'), and also separately for the five most species-rich clades. For the RD null, species names were shuffled across the phylogenetic distance matrix for each species pool using the R package *picante* (null = phylogeny.pool) and MNTD and MPD were recalculated to generate a null distribution of expected α-diversity (n = 999). Each observed metric was compared to the null by calculating the standardized effect sized (SES) as described in *picante* (Kembel *et al.*, 2010), equal to -1$*$ NRI or NTI in *phylocom* (Webb, 2000; Webb *et al.*, 2008):

$$\mathrm{SES_{RD}} = \frac{\mathrm{Metric_{observed}} - \left(\mathrm{Metric_{expected}}\right)}{\mathrm{sd}\left(\mathrm{Metric_{expected}}\right)} \tag{3.1}$$

For the DAMOCLES null model, separate maximum likelihood parameter estimates for rates of colonization (γ) and local extinction (μ) were calculated from each community (i.e. each summit) given each species pool using the R package *DAMOCLES* (Pigot and Etienne, 2015), and separately for the five most species-rich clades. These expected parameter estimates were used to simulate 999 null communities under an equal-rates scenario (where the parameters are independent of species traits). For all of the null communities MNTD and MPD were recalculated, generating an expected distribution of α-diversity with colonization and local extinction rates that are indifferent to the species present in the community. Standardized effect sizes calculated in *DAMOCLES* are similar to those calculated in *phylocom* (Webb *et al.*, 2008), and were multiplied by -1 to be comparable to the SES_{RD}:

$$\text{SES}_{\text{DAMOCLES}} = -1 * \left(\frac{\text{Metric}_{\text{observed}} - \left(\text{Metric}_{\text{DAMOCLES}}\right)}{\text{sd}\left(\text{Metric}_{\text{DAMOCLES}}\right)} \right) \tag{3.2}$$

Negative values for each SES indicate observed phylogenetic distances lower than expected under the null model (phylogenetic clustering), while positive values indicate higher than expected distances (phylogenetic overdispersion). Significance of each SES pattern was assessed from ranks of observed diversity compared to each of the null models (RD and DAMOCLES) with two-tailed *P*-values (α = 0.05).

To compare the RD null model to the species-neutral DAMOCLES null model we followed Pigot and Etienne (2015). We calculated a standardized effect size for each community that was simulated by i) shuffling the phylogeny (RD) and ii) the equal-rates of γ and μ scenario (DAMOCLES). We compared the observed α-diversity metric in each simulated community (*j*) to the RD null model, resulting in a distribution of SES values relative to the RD null for each community simulated under both null models:

$$\text{SES}_{RD\_RD_j} = -1 * \left(\frac{\text{Metric}_{\text{RD}_j} - \left(\text{Metric}_{\text{RD}}\right)}{\text{sd}\left(\text{Metric}_{\text{RD}}\right)} \right) \tag{3.3}$$

$$\text{SES}_{DAMOCLES\_RD_j} = -1 * \left(\frac{\text{Metric}_{\text{DAMOCLES}_j} - \left(\text{Metric}_{\text{RD}}\right)}{\text{sd}\left(\text{Metric}_{\text{RD}}\right)} \right) \tag{3.4}$$

If the observed SES_{RD} falls within the distribution of $\text{SES}_{\text{DAM}OCLES\_RD}$, then we could not reject a species neutral null model of colonization and local extinction. If the observed SES_{RD} falls within the SES_{RD_RD} distribution, then the RD null model where species are equally likely to be present could not be rejected.

Significant phylogenetic patterns remaining after species pool reduction have specific implications. Reducing the species pool to 'All Summits' restricts the randomized resampling of phylogenetic distances to species occurring in a more extreme environment, and should eliminate an effect of an environmental filter compared to resampling from the 'Regional' pool. Similarly, restricting the species pool to the 'LGM' boundary should remove the effect of dispersal limitations following the LGM.

Therefore, significant patterns that remain after each scaling of the species pool are caused by mechanisms other than environmental filtering (for the 'All Summits' pool) or dispersal limitations (for the 'LGM' pool). We used a paired t-test to quantify the changes in the SES pattern resulting from species pool scaling.

3.3.6 *Phylogenetic β-diversity*

We explored the turnover of phylogenetic diversity between summits (β-diversity) by calculating the richness and divergence differences between each alpine community for all seed plants and the five most species-rich clades (Tucker *et al.*, 2016; Graham and Fine, 2008). We used the occurrence matrix for the alpine summits in the Écrins to compile distance matrices for the widely used PhyloSor (Bryant *et al.*, 2008) and UniFrac (Lozupone and Knight, 2005) indices. We calculated and decomposed each index into its respective compositional β diversity components with the code provided by Leprieur *et al.* (2012) in the R programming language. This allowed us to distinguish between 'true' phylogenetic turnover (PhyloSor_Turn), which is the replacement of species independent of species-richness gradients (Baselga and Orme, 2012), and phylogenetic diversity gradients (PhyloSor_PD) due to differences in richness between nested communities (Leprieur *et al.*, 2012). Environmental filtering is expected to produce high signals of species turnover, in contrast to neutral processes or increased time for speciation, which generate nested assemblages over richness gradients (Leprieur *et al.*, 2012) so decomposing β-diversity is especially important when testing these hypotheses.

To test statistical significance, we shuffled species from the regional species pool of the Écrins to generate randomized communities (equivalent to the RD from the 'Regional' species pool for α-diversity patterns), and obtained standardized effect sizes for pairwise comparisons of each decomposed metric (i.e. $SES_{PhyloSor}$, $SES_{PhyloSor\_Turn}$, $SES_{PhyloSor\_PD}$) between all summit communities. SES values > 1.96 indicate significantly greater species turnover between summits than expected, and values < -1.96 indicate less turnover than expected (Leprieur *et al.*, 2012).

3.3.7 *Drivers of diversity patterns*

We identified specific environmental, historical, and neutral hypotheses that might impact patterns of diversity in alpine systems, summarized in Table 3.1. The variables used to test these hypotheses are explained below.

Environmental — Maximum elevation of the summits was extracted using GIS. Summit area was considered as the total area of the south-facing slope above treeline. Each south-facing aspect (arbitrary SW/S/SE) with >40° slope emerging above the estimated glacier from the LGM provided a proxy for refugia due to their potentially favorable environmental conditions through the LGM (Birks and Willis, 2008). From these potential refugia, area, moments of slope and elevation were computed for each summit, and a principle components analysis (PCA) was used to reduce dimensionality of variables that were combined into one descriptive category. Mean and maximum slope were combined to describe overall slope (Elsen and Tingley, 2015), and the range of elevation and slope were combined to describe the heterogeneity of topography (Bruun *et al.*, 2006; Richerson and Lum, 1980; Shmida and Wilson, 1985; Stein *et al.*, 2014; Terborgh, 1977). Lithology composition was compiled from the vectorized geological map of the Écrins. Simpson's diversity of the lithology was calculated for each summit in the R package *vegan* (Oksanen *et al.*, 2016), and used as an indicator of the heterogeneity of the general bedrock.

Climatic drivers of floristic patters in the Écrins were compiled from BioClim using GIS coordinates to extract data for each summit (Hijmans *et al.*, 2005). Due to their collinearity, we classified each variable as a factor used to test one of three general hypotheses of that have been used to explain patterns of phylogenetic diversity (Table 1, reviewed in Moser *et al.*, 2005): available energy (Hutchinson, 1959; Wright, 1983; Pianka, 1966; Richerson and Lum, 1980), stress (Whittaker *et al.*, 2001; Fraser and Currie, 1996), and stability (Currie, 1991; Fraser and Currie, 1996). We then conducted a PCA on the combined climatic variables belonging to each category to reduce dimensionality, and used the three main axes of variation (>90%) in the statistical analyses described below.

α-diversity—To identify which general geographic or climatic hypotheses (Table 3.1) might explain phylogenetic *α*-diversity patterns in the Écrins alpine communities, we calculated Spearman's *rho* statistic, using ranks to correlate each composite geographic or climatic factors with each SES_{metric} under the RD null model for all three species pools. The DAMOCLES null model was only able to optimize parameters for γ and μ on a few summits, so we only compared results from the RD to the environmental correlates.

β-diversity—For *β*-diversity patterns, we calculated a pairwise Euclidean distance matrix between summits for each of the geographic or composite climatic factors using the function vegdist in the R package *vegan* (Oksanen *et al.*, 2016). We correlated the SES for each compositional *β*-diversity matrix to environmental distance matrices using multiple regression on matrices (MRM; nperm = 999) (Lichstein, 2007), as implemented in the R package *ecodist* (Goslee and Urban, 2007).

Historical — *α-diversity*—The relative diversity of different plant lineages seems to be partly explained by the relative ages of different clades (Lee *et al.*, 2012), and this has been attributed to priority effects of early arriving genera (Table 3.1). To test this hypothesis, we calculated *α*-diversity at multiple time intervals. The Écrins community phylogeny was pruned every million years from 1-5 Ma, every 10 million years from 10-100 Ma, then every 50 million years using the timeSliceTree function in the R package *paleotree* (Bapst, 2012), and the SES_{metric} was recalculated for each interval. A linear model was used to assess the relationship between $SES_{metrics}$ and the time slices.

Alternatively, recent and rapid diversification might explain alpine diversity patterns (Roquet *et al.*, 2013), and endemic species would drive phylogenetic clustering. To evaluate the extent to which the presence of endemic species drives patterns of diversity within alpine summits, we removed species endemic to the Alps from the community phylogeny and recalculated SES_{metric} for each clade within every summit. We then used a paired t-test to assess the significance and direction of the difference in SES_{metric} with and without endemics for each species pool.

β-diversity—Phylogenetic turnover patterns could also be explained by particular lineages (Table 3.1). To identify the phylogenetic β-diversity patterns within particular clades, we calculated the phylogenetic divergence of species between summit communities at different evolutionary time intervals. For each node in the Summit community phylogeny, we calculated PI*st* (Hardy and Senterre, 2007) using the R package *spacodi* (Eastman *et al*., 2011). PI*st* expresses turnover of the phylogenetic distances between communities independent of species-richness and sample size. Observed values of PI*st* were compared to a random expectation by shuffling species occurrences of plants in the Summit species pool (n.rep = 999). Values of PI*st* = 0 have no phylogenetic structuring, and PI*st* > 0 (or PI*st* < 0) indicate spatial phylogenetic clustering (or overdispersion), i.e. species subtending these nodes occur within a particular summit more often than between summits (or have a higher turnover than expected across alpine summits).

Neutral — Spatial components of including summit area and distance separating summits were extracted using GIS. Total area of the south-facing slopes was computed as described for environmental factors above. A pairwise geographic distance matrix between summits was calculated from Euclidean distances using the latitude and longitude of each summit.

α-diversity—We used Spearman ranks to correlate each composite geographic or climatic factors with each SES_{metric} under the RD null model for all three species pools as described for the environmental factors.

β-diversity—For β-diversity patterns, we calculated a pairwise Euclidean distance matrix between summits for each of the spatial factors, and used MRM to assess correlations as described for environment above.

All statistical analyses were conducted in the R version 3.2.3 (R Core Team, 2015).

3.4 RESULTS

3.4.1 *Surveys and species lists*

A total of 1288 seed plant species were identified in the relevés of the Écrins National Park ('Regional' species pool), 98 of which are endemic to the Alpes (Figure 3.1c; see Appendix B.1 for community matrix). The 15 summits contain 289 species ('All Summits' species pool), and 222 of these currently occur in areas that would have been exposed above the glaciers during the LGM ('LGM' species pool). The most species rich orders were Poales (N = 153), Asterales (N = 144), Lamiales (N = 109), Rosales (N = 76) and Caryophyllales (N = 74, Appendix B.1).

3.4.2 *Community phylogeny*

We retrieved 84% (N = 1081) of the total seed plant diversity within the Écrins National Park from publically available sequences in GenBank within the Écrins National Park, 72% (N = 215) of the species occurring on the 15 summits sampled, and 74% (N = 164) of the species persistent though the LGM (Figure 3.1b). Most of the deep phylogenetic relationships were well supported and matched time calibration points, as did as many of the shallow nodes (Appendix B.2, Appendix B.3). The majority of the relationships described by the ML estimate of the community phylogeny are concordant with those of the APGIII classification (APG III, 2009).

3.4.3 *Phylogenetic α-diversity patterns*

RANDOM DRAW NULL MODEL — When we compared observed diversity to what was expected under the RD null model sampling from the 'Regional' species pool, seed plants (Spermatophyta) were significantly phylogenetically clustered within 12/15 of the summits for MNTD (Figure 3.2a, top panel). The species occurring on 'All Summits' and above the 'LGM' boundary were highly phylogenetically clustered within the 'Regional' pool, as well. The five most species rich clades were less phylogenetically clustered than Spermatophyta as a whole. Clades with a higher species-richness (Asterales, Poales, and Rosales) were more clustered than clades with less species (Lamiales and Caryophyllales).

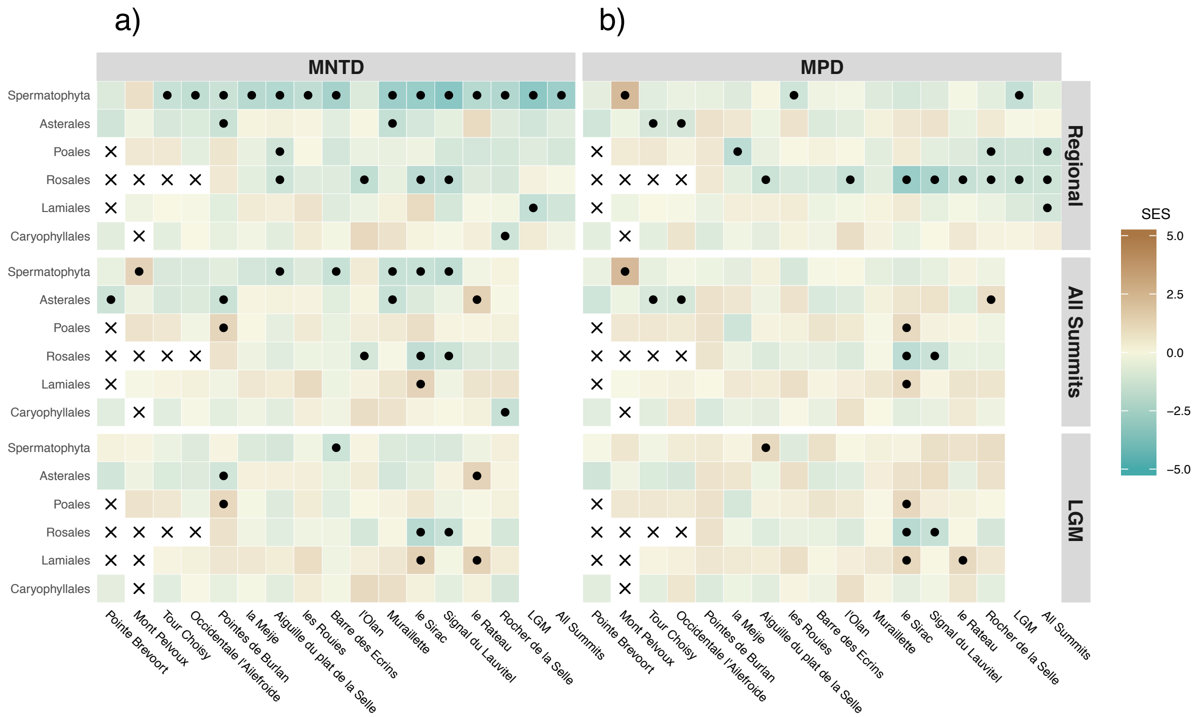

FIGURE 3.2: Phylogenetic diversity patterns on each summit, within the pool of species in the 'LGM' species pool, and 'All Summits' combined (x-axis). Tile colors show standardized effect size under a random draw null model (SES_{RD}) for the three different species pools: the 'Regional' Écrins NP, the pool environmentally restricted to 'All Summits', and the pool historically persistent trough the 'LGM'. Red tones indicate phylogenetic overdispersion (positive SES values); blue tones indicate phylogenetic clustering (negative SES values). Black dots mark values that have statistically significant *P*-values (<0.05). Cells filled with an "x" had too few species for comparison; comparisons were not made for blank cells. a) Mean nearest taxon distance (MNTD). b) Mean pairwise distance (MPD). Rows of each panel (y-axis) separate all seed plants (Spermatophyta) and five of the most species-rich angiosperm clades.

Patterns for MPD within Spermatophyta showed less phylogenetic clustering than MNTD. Only two summits showed significant phylogenetic structure (Figure 3.2b, top panel), one being overdispered (Mont Pelvoux) and the other clustered (les Rouies). Compared to Spermatophyta altogether, specific clades tended to be more phylogenetically clustered for MPD on some summits, especially within Rosales, but most clades showed a random phylogenetic structure on different summits.

Restricting the sampling for the RD null model to the environmentally defined species pool of plants occurring on 'All Summits' removed the significance of phylogenetic clustering for both α-diversity metrics (Figure 3.2, middle panel). This was especially obvious for the Spermatophyta, the highest taxonomic level investigated, where the pattern for MNTD on almost half of the summits shifted from strongly clustered to random. The reduction of emergent phylogenetic clustering was even stronger with the nested pool of species occurring above the 'LGM' boundary, with only one summit remaining significantly clustered (Figure 3.2a, bottom panel). Significance for patterns of MPD also shifted from trending towards clustering to overdispersion, particularly for Rosales, but this was not significant (Figure 3.2b, bottom panel). Paired t-tests for both metrics showed a significant reduction in clustering (i.e. increase of the SES_{mntd} and SES_{mpd} metrics) when the species pool was restricted to both 'All Summits' and the 'LGM' for each clade (Appendix B.5).

DAMOCLES NULL MODEL — The mean maximum likelihood of the parameter estimates for rates of colonization (γ) and local extinction (μ) in the combined Summit community given the 'Regional' species pool were prohibitively high for Spermatophyta (γ = 1137, μ = 6359) and Rosales (γ = 970.6, μ = 3368; Appendix B.7), possibly due to highly clustered species-rich clades within these orders. Exploring parameter space with different starting values, the likelihood surface of parameter estimates within Poales was complex with several local optima, and maximum likelihood estimates were dependent on the starting values (Appendix B.7). Therefore, we compared results from the DAMOCLES null model for Asterales, Poales, Lamiales, and Caryophyllales within 'All Summits' and the 'LGM' communities using the 'Regional' species pool, and each summit community separately using the 'All Summit' and 'LGM' species pools.

With rates calculated given the 'Regional' species pool, the phylogenetic structure of the 'All Summits' community based on MNTD was no different than expected under neutral simulations, but Poales and Lamiales both showed significantly higher clustering than expected for MPD (Appendix B.7). Restricting the species pools decreased the phylogenetic clustering with the DAMOCLES model for Asterales, Poales, and Lamiales, but increased clustering for Caryophyllales. For the 'LGM' community, Lamiales was the only clade significantly clustered for MNTD, and Poales was the only clade significantly clustered for MPD. When rates of γ and μ estimated for each summit were calculated given the 'All Summits' species pool, observed MNTD appears to be no different than the null communities for all four clades (Appendix B.7). However, Asterales and Poales showed greater clustering than expected for MPD on a few summits. When each summit was compared to the 'LGM' species pool, Asterales, Poales and Lamiales tended to be more overdispersed, especially for MNTD (Appendix B.7).

Relative to the RD null model, the density distribution of $SES_{DAMOCLES\_RD}$ mirrored that of SES_{RD_RD} for all four clades (Figure 3.3). Within the 'Summit' community, the observed SES_{RD} falls within the null distributions of both null models ($SES_{DAMOCLES\_RD}$ and SES_{RD_RD}) for MNTD of all four clades (Figure 3.3a). However, the observed SES_{RD} for MPD significantly falls in the lower tail of both null distributions for Poales and Lamiales. Within the 'Persistent LGM' community, only MNTD of Lamiales was found to be significantly clustered compared to both null models (Figure 3.3b).

3.4.4 *Phylogenetic β-diversity patterns*

Phylogenetic β-diversity was generally lower than expected between alpine summits (Appendix B.11), with some pairwise comparisons showing a turnover lower than random expectations (24/105 pairwise comparisons, Appendix B.11). The compositional component $SES_{\mathrm{PhyloSor\_Turn}}$ showed similarly low turnover, except for on Mont Pelvoux, which had much higher true phylogenetic turnover compared to most summits (Appendix B.11). However, opposite trends were found for $SES_{\mathrm{PhyloSor\_PD}}$. Turnover was more or less random for most comparisons, more often trending towards higher turnover, and Mont Pelvoux had much lower turnover than expected (Appendix B.11). The decomposed UniFrac index showed very similar patterns of β-diversity (Appendix B.11).

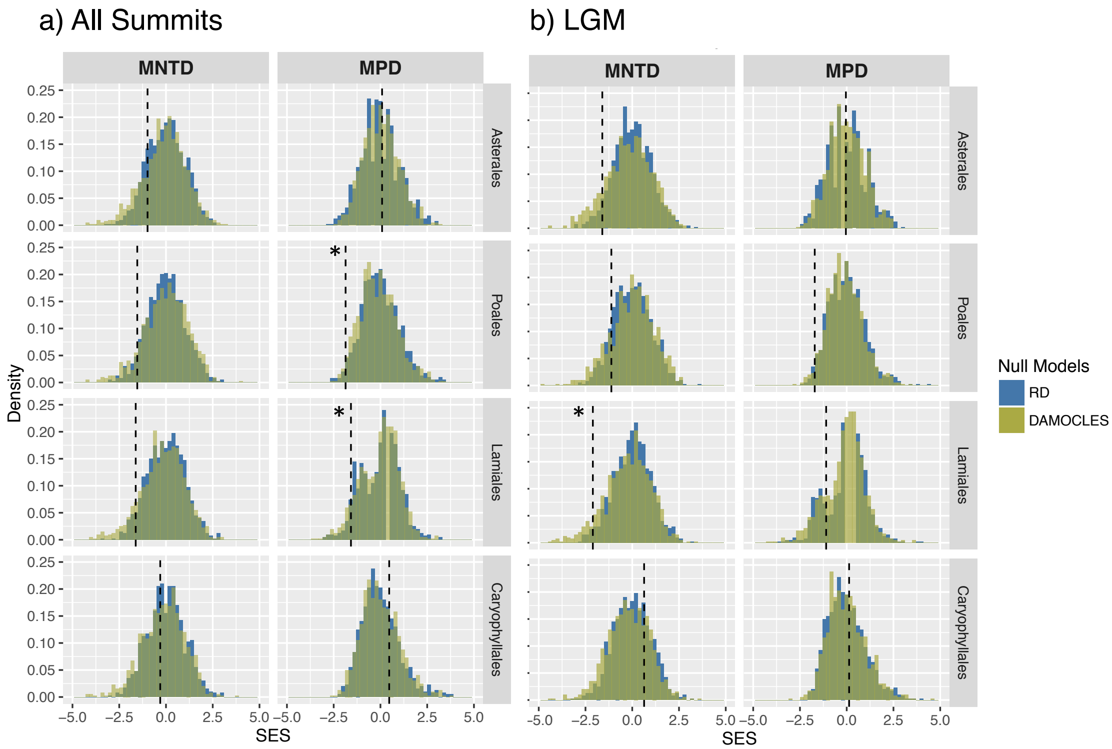

Figure 3.3: Density distributions of $SES_{DAMOCLES}$ (yellow) compared to the SES_{RD_RD} (blue) for mean nearest taxon distance (MNTD) and mean pairwise distance (MPD) within the Asterales, Poales, Lamiale, and Poales clades. Negative SES values indicate phylogenetic clustering, positive values indicate phylogenetic overdispersion. Dotted lines are z-scores observed for SES_{RD} within the a) summit community, sampling from the Écrins source pool, and b) community of species occurring in areas that persisted through the LGM, sampling from the Écrins source pool. Parameters used to estimate colonization and local extinction of the summits relative to the Écrins for each clade are in the text. The asterisk demarks SES_{RD} with P-values < 0.05.

3.4.5 *Drivers of diversity patterns*

Geographic and climatic data compiled for each summit is available in Appendix B.12. Climatic categories and the associated BioClim variables are listed in Appendix Table B.12.3 with PCA loadings that explain >90% of the variation. Diversity of lithology for each summit is shown in Appendix Figure B.12.1.

Environmental Conditions — *α-diversity*—The strength and direction of the correlation between environmental factors and each SES_{metric} varied between taxonomic groups and summits, especially as the species pools were reduced. When

FIGURE 3.4: Spearman correlations between environmental and neutral factors and α-diversity patterns across summits for seed plants (Spermatophyta) and the five most species-rich clades (columns) within each of the three species pools. Green tones indicate a positive relationship between each SES_{metric} and the explanatory factor (rows); pink tones indicated a negative relationship. Black dots mark values that have statistically significant rho correlation (P-values <0.05).

correlated with diversity metrics calculated from the largest species pool ('Regional', Écrins NP), $\mathrm{SES}_{\mathrm{mntd}}$ was only significantly correlated with climatic stress (Caryophyllales), while SES_{mpd} was correlated with refugial area (Lamiales), slope (Lamiales), maximum elevation (Asterales), stress (Caryophyllales), and stability (Spermatophyta, Figure 3.5). As the species pool was restricted to 'All Summits', results were almost unchanged except for SES_{mpd}, which appeared less correlated with refugial area and slope (Lamiales).

When the species pool was further restricted to the 'LGM' boundary, topography became more correlated with SES_{mntd} across all Spermatophyta. The only abiotic factor that was consistently correlated with $SES_{metrics}$ was 'stress' for Caryophyllales. This can be attributed to 'precipitation of the driest quarter', which was the only variable for stress that contributed >90% to the PCA loading (Appendix Table B.12.3). Lithology was never significantly correlated with phylogenetic diversity patterns.

β-diversity—None of the environmental correlates explained a significant amount of the variation in phylogenetic diversity between summits (Appendix Table B.12.4).

History — *α-diversity*—The observed phylogenetic clustering of communities based on MNTD increased towards the tip of the phylogeny (Figure 3.5a), that is, phylogenetic clustering disappeared when aggregating clades of increasing ages (MNTD, $y = -1.852 + 0.021x$, ^{2} = 0.213, P-value = 1.229e-14). Tree-wide community structure measured by MPD was almost not impacted by phylogenetic scale ($y = -0.599 + 0.005x$, R^2 = 0.014, P-value = 3.392e-02). At a time slice around 75 million years ago (Ma) all phylogenetic structure was no different than random, and past 100 Ma there were too few taxa left for meaningful comparisons.

Although the removal of endemic species decreased phylogenetic clustering for most clades (Figure 3.5b, Appendix B.13) this was not significant for any of the species pool comparisons (Appendix Table B.13).

β-diversity—PI*st* was no different than expected if species were randomly chosen from the summit community phylogeny for the majority of the nodes (Appendix B.14), and was never lower than expected by chance. When it was larger than expected by chance it was more often at nodes diverging >100 Ma (Fabales + Rosales, Apiales +

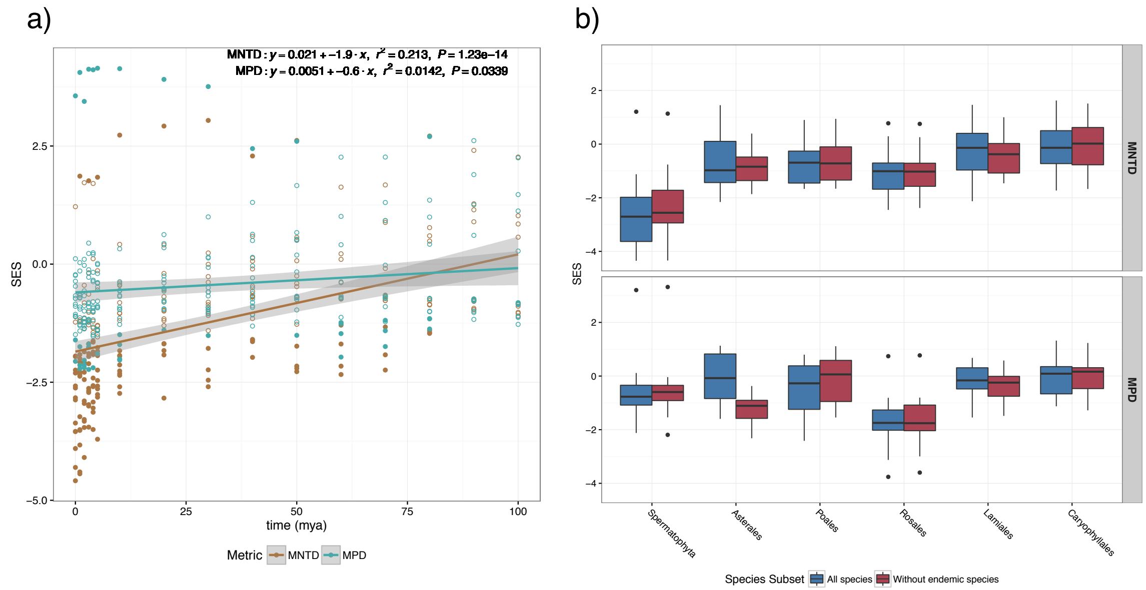

Figure 3.5: Historical correlates to α-diversity patterns. a) SES of α-diversity metrics MNTD (brown) and MPD (blue) for all summits at time slices from community phylogeny of the Écrins NP. Significant $SES_{metrics}$ are solid. b) Distribution of $SES_{metrics}$ across each of the summits with all species (blue boxes) and without endemic species (red boxes), comparing observed values of α-diversity metrics to those expected from a random draw null model, sampling from the Écrins species pool. Boxes show first and third quartiles, solid horizontal lines indicate the median, vertical black lines are the range, and dots are points that lie 1.5x the interquartile range above the third quartile or below the first quartile.

Asterales) with the exception of a few very recently diverged sister taxa (*Festuca ovina* + *Festuca halleri*, *Alchemilla xanthochlora* + *Alchemilla incise*).

Neutral — *α-diversity*—Available area (summit and regugial) became significantly negatively correlated with SES_{mntd} as the species pool was restricted across all Spermatophyta and for Poales. Conversely, SES_{mpd} became less correlated with refugial area for Lamiales.

β-diversity—Distance between summits did not significantly explain phylogenetic turnover between summits (Appendix Table B.12.4).

3.5 DISCUSSION

In this work, we analyzed patterns of phylogenetic diversity of vascular plants in environments that are known to be the most extreme for vascular plant life. Therefore, we predicted to find closely related species coexisting on the high alpine summits of this study due to intense levels of environmental stress filtering species with a certain level of climatic tolerance. Indeed, compared to expected phylogenetic distances from randomly sampling species from the 'Regional' Écrins species pool, high alpine summits showed strong signals of phylogenetic clustering for tip-wise comparisons (MNTD metric), but non-significant (random) structure for tree-wide mean phylogenetic diversity (MPD metric, Figure 3.2). Besides Mont Pelvoux, there was little evidence for phylogenetic overdispersion. Compared to the regional flora of the Écrins there is nested phylogenetic clustering within summits, where clades of closely related species interspersed throughout seed plants coexist on high alpine summits (Figure 3.1). Overall, this pattern suggests that the high alpine flora emerged through repeated adaptation towards extreme climates, in distantly related clades (more or less randomly distributed across the angiosperm phylogeny), and that closely related species tend to occur locally due to strong environmental selection.

This general structure of phylogenetic clustering across the whole flora was reduced when we lifted the blanket of the environmental filter (i.e. reduced the species pool to plants occurring on summits) and considered historical range restrictions (i.e. reduced the species pool to an area that persisted as putative refugia through the LGM). Over half of the summits lost significant clustering under both the RD (Figure 3.2, bottom two panels) and DAMOCLES null models (Appendix Figure B.7.2, bottom two panels). This implies that environmental and historical filtering of certain taxa could explain most diversity patterns within the alpine summits that had diminished clustering when the species pools were reduced (Eiserhardt and Svenning, 2013). More variation in phylogenetic patterns for both metrics became apparent, and a few clades (e.g. Lamiales) and summits (e.g. Sirac) began to shift to a higher diversity of taxa than expected (phylogenetic overdispersion), indicating that adaptive speciation involving phylogenetically divergent traits, or allopatric speciation, might also shape phylogenetic patterns of high alpine summits.

We also tested whether the phylogenetic structure of island-like species assemblages may be greatly influenced by allopatric speciation. Using the DAMOCLES null model, we were able to reject species-neutral colonization and extinction for certain clades of seed plants, such as Lamiales and Poales (Figure 3.3). For Asterales and Caryophyllales, we were unable to reject either null model of random or neutral community assembly. However, because the $SES_{DAMOCLES\_RD}$ and SES_{RD_RD} distributions mirror each other, it is likely that parameterized rates of colonization and local extinction are prohibitively high (especially for Poales, Appendix B.7); therefore, the DAMOCLES null model cannot detect any phylogenetic pattern in rate difference and converges on the random draw null model (Pigot and Etienne, 2015). Still, we could reject both null models for the Lamiales, which may indicate species-specific adaptations to alpine environments are driving the phylogenetic clustering on summits within this plant lineage.

To further explain phylogenetic structure in these alpine species assemblage, we explored abiotic environmental factors, historical imprints on the biotia, and stochastic processes that are not based on species traits. Abiotic factors did correlate to some of the residual clustering within summits, but not necessarily as predicted. Correlation between geographic factors and phylogenetic diversity was not observed across seed plants until the species pool was restricted to a historical geographic area—species currently occupying areas that were predicted to persist through the LGM. Summits with a higher topographic diversity had less phylogenetic clustering, suggesting that lithology does not explain the residual phylogenetic clustering in the Écrins flora as it has in other regions (Laliberté *et al.*, 2013). Summits with a larger available area (both summit and refugial) promoted coexistence between close relatives across all seed plants, opposite to what is predicted for island-area relationships (MacArthur and Wilson, 1967; MacArthur, 1972). Negative phylogenetic diversity-area relationships were observed within investigated clades as well. For example, Poales and Asterales were more clustered on summits with a higher maximum elevation. Local climate also appears to drive clustering within some clades. Higher phylogenetic clustering was correlated with more arid summits (higher stress) within Caryophyllales and more seasonal summits (lower stability) showed higher clustering within Asterales.

Therefore, it appears that selection due to extreme or changeable environments is contingent on the clade and only certain species will be adapted to the most stressful climatic conditions (Whittaker *et al.*, 2001). The environmental stress that is correlated with increased diversity of a few clades may facilitate the survival of species belonging to more distantly related clades as well (Callaway *et al.*, 2002), thus explaining the nested diversity patterns that we observed. All of this said, climatic factors explained relatively little of the residual phylogenetic clustering that persisted through the reduction of the species pools.

We found higher α-diversity of older plant lineages (overdispersion towards the base of the tree) and lower diversity for younger clades (clustering towards the tips), opposite of what was found in the alpine angiosperm flora of New Zealand (Lee *et al.*, 2012). However increased phylogenetic clustering has been found in younger clades on Barro Colorado Island, Panama, which was interpreted as fine niche partitioning to avoid competition or as allopatric speciation followed by secondary sympatry (Pearse *et al.*, 2013). Because competition is not thought to be likely in alpine environments (Choler *et al.*, 2001), the later explanation is more plausible for the Écrins. Phylogenetic clustering between species pairs (MNTD) decreased slightly, but not significantly, when endemic species were excluded, so although recent diversification clearly occurs within some lineages such as the Primulaceae (Roquet *et al.*, 2013), diversification of alpine species likely plays a minor role in explaining residual clustering within summits in general. Thus, rapid diversification in alpine biomes may not be as important for shaping the phylogenetic diversity structure of the alpine flora in the Alps as it seems to be in biodiversity hotspots (Hughes and Atchison, 2015), such as the Great Cape Flora (Verboom *et al.*, 2009), on Mount Kinabalu in East Malaysia (Merckx *et al.*, 2015), or the Andean Paramo (Madriñán *et al.*, 2013).

Phylogenetic diversity between summits was surprisingly uniform. Compositional β-diversity showed that true turnover was lower than expected in general, but when accounting for phylogenetic diversity differences between summits, turnover was higher than expected. The increased phylogenetic β-diversity that was observed (Appendix B.11) is due to differences in species-richness between nested assemblages, not true species turnover (replacement between summits). Turnover was either as high or higher than expected across clades, indicating that the backbone of evolutionary diversity is more variable across summits, which is consistent with the higher α-diversity (overdispersion) found in older clades. None of the variation in species turnover between summits was explained by abiotic factors. Taken together, it appears that species diversity between summits is relatively similar. In addition, the high rates of colonization and local extinction estimated in DAMOCLES corroborate that these neutral processes could be driving homogenization of species diversity across summits in the Écrins (Condit *et al.*, 2002; Tuomisto *et al.*, 2003).

Overall, we find support for convergence to alpine environments between distantly related clades, recent diversification of some lineages within summits, and homogenization of species between communities. While harsh climatic conditions may select for and drive local speciation within protected glacial refugia for some particularly well-adapted clades (Roquet *et al.*, 2013), species-neutral processes could explain low turnover between summits in many scenarios. Protection within large refugial areas may have allowed increased time for local speciation for certain distantly related clades that were present prior to the LGM, while secondary sympatry due to post-glacial recolonization homogenized species across summits (Aguilée *et al.*, 2013; Pigot and Tobias, 2012). Alternatively, summits may not have been as isolated and island-like through the LGM, and dispersal could have continuously homogenized species throughout repeated cycles of glaciation (Ramírez-Barahona and Eguiarte, 2013).

The relative importance of species-specific traits or species-neutral processes is debated, and rarely explicitly tested in studies of community diversity (Chave, 2004). This is especially true in alpine ecosystems, which hold strong preconceptions about the strength of environmental filtering processes. Most studies comparing diversification in alpine regions have focused on one or a few lineages (Roquet *et al.*, 2013; Linder *et al.*, 2014; Uribe-Convers and Tank, 2015), and although our results show that environmental filtering may be important for some specific clades, alpine communities as a whole may be relatively little filtered by summit-specific conditions. Instead, alpine communities in the Écrins may be stochastically homogenized by dispersal between alpine islands as they rode through the LGM together. It could also be that dispersal ability is a conserved trait that is of adaptive advantage in the

Écrins (Baeten *et al.*, 2014; Cline and Zak, 2013). Finally, trait data might assist in more formally addressing the role of adaptation, but is beyond the scope of this study.

This study also illustrates how regional floristic surveys can be utilized to test general macro-ecological hypotheses of diversity dynamics and community assembly. Although the absence of abundance data limits tests of neutrality, we were still able to form general insights from occurrence patterns. The low sample size of summits also restricted our statistical power, and more direct comparisons of this regional sample to alpine islands on other continents could improve these inferences (Ricklefs, 2004).

At the most fundamental level, ecologists and evolutionary biologists seek to understand the processes that derive biological diversity. Describing patterns of diversity is one step toward understanding more complex dynamics (Watt, 1947). Hierarchical hypotheses and nested scale approaches like those employed here can help to distinguish between processes that are contributing to the diversity patterns we observed in the Écrins (Whittaker *et al.*, 2001). Expanding these methods to a more explicit comparative phylogenetic framework across mountain ranges in various latitudinal or climatic regions will be necessary to further evaluate the relative importance of diversification and stochastic structuring.

3.6 DATA ACCESSIBILITY

All input datasets, treefiles, R scripts, output files and figures used in this manuscript are openly available on GitHub (`https://github.com/hmarx/Alpine-Sky-Islands`). Community matrix, environmental metadata, and treefiles will also be deposited on the Dryad Digital Repository.

3.7 ACKNOWLEDGEMENTS

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CHAPTER 4

Phylogenetic diversity of a remote alpine flora using high-throughput sequencing technologies [4]

4.1 Abstract

Documenting biodiversity is challenging in remote areas. We illustrate how high-throughput sequencing technologies enable efficient generation of sequence data that can be used to describe the phylogenetic diversity of an alpine flora. Using evolutionary history, we quantify patterns of phylogenetic diversity within and between summits to infer dominant mechanisms that are important for species to coexist in this extreme environment. High-throughput sequencing data proved incredibly successful for retrieving sequence data from the majority of plant species that were collected across nine summits in the Sawtooth National Forest, Idaho, USA. Patterns in phylogenetic distances indicated that the majority of species coexisting within and between summits were a random subset of the alpine flora. In contrast to what has been found in other alpine flora, we found that a few summits had a higher than expected phylogenetic diversity (significant phylogenetic patterns of overdispersion), but this diversity was quite different between summits (high phylogenetic turnover).

4.2 Introduction

With steep environmental gradients, mountains are ideally structured to provide 'natural experiments' for understanding general patterns of biodiversity, such as latitudinal declines in species richness (Körner, 2000), and adaptive evolution (Körner, 2007; Körner *et al.*, 2011). Alpine regions are the only terrestrial biome with a global distribution (Körner, 2003), yet they represent some of the highest gaps in floristic knowledge (Kier *et al.*, 2005), because remote access and rugged terrain make biological surveys challenging. From a conservation standpoint, this is especially concerning

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because ranges of alpine plants are among those that are expected to shift with a changing climate (Pauli *et al.*, 2012; Dullinger *et al.*, 2012; Morueta-Holme *et al.*, 2015), so cataloging the present floristic diversity in alpine regions is of immediate concern.

Evolutionary relationships between coexisting species provide one way to document the biodiversity of an area (Pavoine and Bonsall, 2010; Jarzyna and Jetz, 2016). Besides offering a means to quantify overall diversity by measuring phylogenetic distances between species (Winter *et al.*, 2013), phylogenetic diversity is comparable across taxonomic and spatial scales if molecular branch lengths are scaled to evolutionary time (de Queiroz and Gatesy, 2007). Patterns of phylogenetic diversity can also point to dominant ecological processes driving species coexistence (Webb *et al.*, 2002). Phylogenetic branch lengths measure evolutionary time separating species, thus more closely related species are expected to share ecologically relevant functional traits if such traits and niches are phylogenetically conserved (Webb *et al.*, 2002). If the environment selects for species adapted to certain abiotic conditions, assemblages of closely related species that share advantageous traits are expected to produce a pattern of phylogenetic "clustering". Alternatively, competition should exclude species that share similar traits, so assemblages of distantly related species with unique traits able to fill non-overlapping niche spaces will cause phylogenetic "overdispersion" (Webb *et al.*, 2002; Webb, 2000)(but see Mayfield and Levine, 2010). Linking ecological processes to explain patterns of phylogenetic diversity in communities via hypothetical functional traits involves many assumptions, including trait and niche conservatism, the functional ecological relevance of specific traits, causes and consequences of biotic interactions (e.g. competition and facilitation), and the importance of current local interactions for community assembly (reviewed in Gerhold *et al.*, 2015). Nevertheless, evolutionary history can be used as a tool to provide some insights into macro-ecological processes, especially in the absence of information about ecologically relevant functional traits (Cavender-Bares *et al.*, 2009; Gerhold *et al.*, 2015), therefore phylogenetic approaches are increasingly employed to describe species diversity (Vamosi *et al.*, 2009; Tucker *et al.*, 2016).

To test hypotheses of community assembly, phylogenetic distances have been measured from supertrees (Bininda-Emonds and Sanderson, 2001; Webb and Donoghue, 2005), DNA barcodes (Kress *et al.*, 2009), and more recently, from megaphylogenies (Smith *et al.*, 2009). The supertrees method prunes species that were absent from the community under investigation from a larger summary phylogeny. Summary phylogenies are most often lacking branch lengths, and taxa that are not present in the supertree are added to the tree by collapsing then into polytomies at some higher taxonomic level (e.g. genus or family) (Webb and Donoghue, 2005). Therefore, resulting trees commonly only contain topological information, and phylogenetic distances are then reduced to nodal distances, which may or may not have much biological meaning. Importantly, supertrees are not reliant upon the primary data for inference, so novel relationships cannot be critically assessed (Smith *et al.*, 2009). Multi-locus DNA barcodes provide an ideal alternative for obtaining robust estimates of species relationships that are also better-resolved then supertree approaches (Bininda-Emonds, 2004) and provide branch lengths that are relatable to evolutionary time (Kress *et al.*, 2009, 2015). Barcoding has been used across global forest plots (e.g. Erickson *et al.*, 2014) and tropical tree assemblages (e.g. Yang *et al.*, 2015) to describe diversity and test community assembly hypotheses, but have been restricted to describing diversity within ecological functional groups (i.e. trees) rather than complete communities. The megaphylogeny approach (Smith *et al.*, 2009) builds a community phylogeny from a supermatirx of DNA sequence data and incorporates uncertainty in topology and branch lengths using statistical phylogenetic methods (Marx *et al.* (2016), Chapter 2). Advances in sequencing technologies, large databases of genetic data, and rapidly growing computational resources are enabling assessment of large-scale phylogenetic hypotheses (Roquet *et al.*, 2012), making this approach useful for describing patterns at macro-ecological scales, but only in cases where existing data are readily available.

In remote areas – such as alpine regions – where we have a poor understanding of the general diversity, much less ecologically relevant functional traits for all species, evolutionary history offers a way to describe species coexistence patterns and address potential processes contributing to it. Alpine environments pose extreme pressures at the limits of plant life (Körner, 2011), and only a subset of species sharing similar traits (Körner, 1995) are expected to be able to survive this filter. If such traits are phylogenetically conserved, closely related species should generate a pattern of phylogenetic clustering. In the Rocky Mountain National Park, Colorado, USA, Jin *et al*. (2015) used a megaphylogenetic approach to assess plant species turnover across 569 plots ranging in elevation from 2195 to 3872 meters. They found that species were more closely related than expected (high phylogenetic clustering) overall within plots, and had a higher than expected turnover within than among plant clades between plots (Jin *et al*., 2015). Abiotic environment (measured by elevation) explained turnover across alpine communities more than spatial distance between sites, as would be expected for niche conservatism in such extreme conditions.

However, DNA barcoding and megaphylogenetic approaches for documenting floristic diversity in alpine regions remain challenging, because these areas are often comprised of many globally rare or locally endemic species (Kier *et al*., 2009; Smith and Cleef, 1988), so genetic sequence data is not easily acquired from direct sequencing or online repositories such as GenBank. High-throughput sequencing technologies provide a means to quickly acquire sequence data from a large number of organisms. While a standard in the field for describing and quantifying microbial diversity (Bik *et al*., 2012), few studies have explored using high-throughput sequencing to understand species coexistence in macro-systems. Ahrendsen *et al*. (2015) assessed the biodiversity of Nebraska grasslands with phylogenetic measures calculated from low-coverage genome sequences using a genome-skimming approach (Straub *et al*., 2012), but were only able to sample dominant grassland species due to monetary and time limitations (Ahrendsen *et al*., 2015).

Targeted-PCR enrichment (Cronn *et al*., 2012), combined with high-throughput sequencing, provides a solution to retrieving genetic sequence data for entire community assemblages (reviewed in (Godden *et al*., 2012); Uribe-Convers *et al*. (2016)). These methods are proving to be useful for resolving diversity patterns within specific lineages (Uribe-Convers *et al*., 2016), but have not yet been applied in ecological or community contexts, despite their potential utility. In this study, we use targeted-PCR and pooled Illumina sequencing to generate data for community phylogenetic inference. For comparison, we also gather available sequence data from GenBank as would be done using a mega-phylogenetic approach (e.g. Roquet *et al*., 2012; Marx *et al.*, 2016). Using the community phylogeny estimated from high-throughput sequencing, we explored measures of phylogenetic diversity within and between alpine summits to understand the diversity of a remote alpine flora in central Idaho, USA.

4.3 METHODS

4.3.1 *Study Area*

The Sawtooth National Forest (NF) located in south-central Idaho, USA (Figure 4.1a) is known for its immense mountainous terrain (Reid, 1963). The mountain ranges within the forest boundary include some of the most remote alpine biomes in the contiguous United States, and its alpine flora has been drastically understudied. Besides management focused efforts (Schlatterer, 1972; Harper *et al.*, 1978), no systematic surveys of this region have been conducted, and prior to this study very few plant collections have been made from alpine summits in the Sawtooth NF.

Part of the Rocky Mountain range, mountains within the Sawtooth NF were formed by the tectonic uplift of the Idaho and Sawtooth batholith (Kiilsgaard *et al.*, 1970). The geology of central Idaho is a complex superposition of many sedimentary, volcanic and tectonic events since the Proterozoic (Link and Janecke, 1999), resulting in the close and interlocking contact between lithologies with very different histories. Three primary mountain ranges transect the Sawtooth NF. The Sawtooth and White Cloud Mountains are the most similar geologically (Kiilsgaard *et al.*, 2006), composed mainly of batholiths (granite, granodiorite, and rhyolite) from the Cretaceous and a more recent intrusive event in the Eocene. These two massifs also both exhibit late-Paleozoic marine sediments (e.g. limestone, mudstone, and sandstone Mahoney *et al.*, 1991) and Eocene andesitic volcanic activity, contributing to the dramatic blanched summits of the White Clouds. The Pioneer Mountains also present substantial amounts of Eocene granitic rocks and some Eocene volcanic activity, but are distinctive from the two other ranges in that they contain Proterozoic gneiss. Main recent geologic episodes include the Laramide orogeny in the late Mesozoic, and extensive glaciations in the quaternary that gave birth to the sharp topography and dramatic surface rock

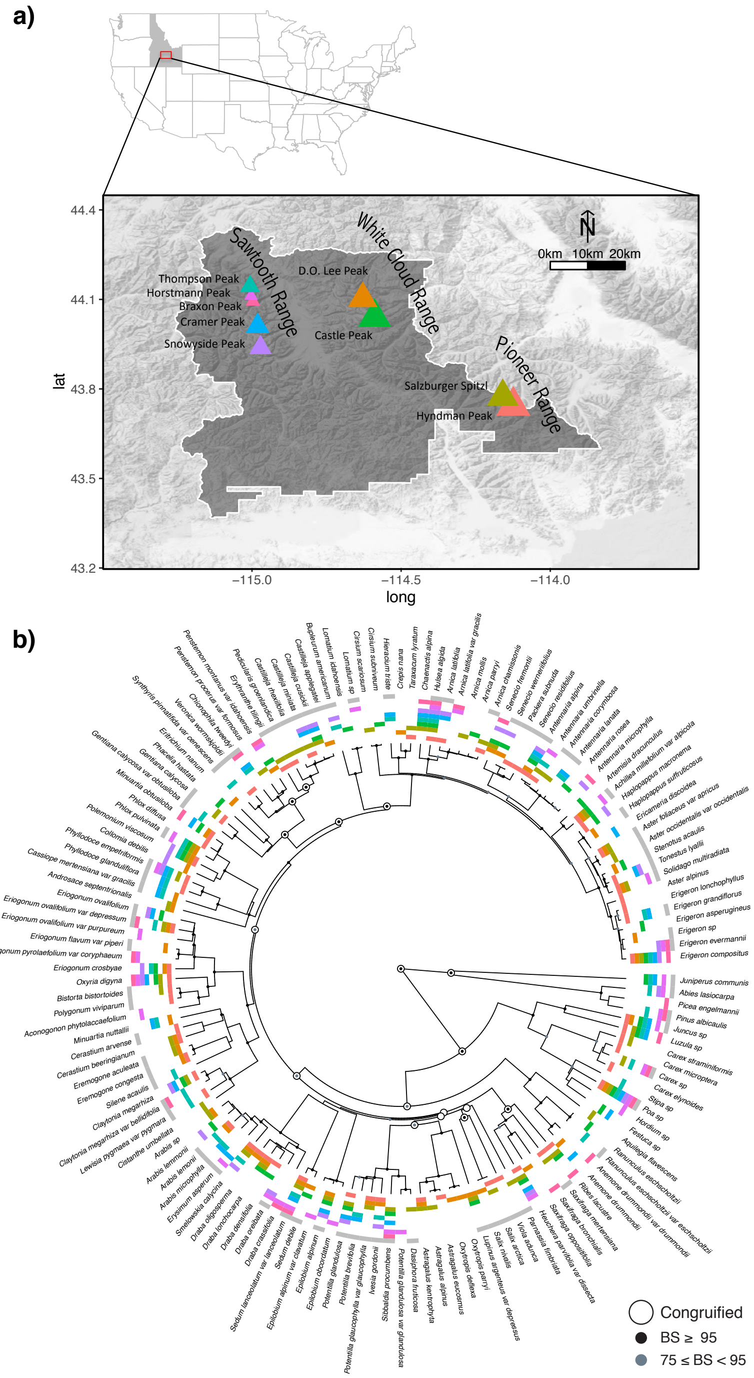

FIGURE 4.1: a) Locations of summits sampled across the Sawtooth National Forest, Idaho, USA (grey area on map inlay). Colored triangles correspond to different summits, and triangle size is proportional to maximum elevation. b) Community phylogeny of the flora on the nine summits samples across the Sawtooth NF. Colors bars on tips match colors of summits on the map, and indicate the presence of each species on each summit. The grey bar closet to tip names shows species that were collected from alpine meadows. Nodes that were congruent with the reference timetree ('congruified') are indicated by black circles. Nodes with a light grey dot have bootstrap support (BS) between 75 and 95, and those with a black dot have BS support greater than or equal to 95.

formations we currently observe (Borgert *et al.*, 1999), giving the area its namesake (Kiilsgaard *et al.*, 1970).

4.3.2 *Species Collections*

Nine alpine summits were sampled from three different mountain ranges across the Sawtooth NF (Table 4.1). Summits were chosen to represent the range of geological composition across the forest, while being feasible to safely climb. Plant collections focused on sampling alpine plant species, here defined as areas above treeline (Billings and Mooney, 1968; Körner, 2003), as this represents a major shift in microclimate (Richardson and Friedland, 2009). Plants were collected at the nine localities beginning at summit and ending near treeline from each aspect of the mountain, as the terrain allowed. Specimens were pressed in the field, and leaf tissues were preserved in silica for molecular analyses. All voucher specimens were deposited in the University of Idaho Stillinger Herbarium (ID), and are accessible through the Consortium of Pacific Northwest Herbaria data portal (Consortium of Pacific Northwest Herbaria, 2013).

4.3.3 *DNA isolation, amplification, and sequencing*

Total genomic DNA was extracted from silica-dried lead tissue for all collections following a modified 2x-CTAB extraction protocol (Doyle and Doyle, 1987). Six gene regions with varying rates of molecular evolution that are frequently employed to resolve both recent and distant phylogenetic relationships (Soltis *et al.*, 2011) were chosen for this study, and included regions of both the nuclear (ITS) and chloroplast (*atpB*, *matK*, *ndhF*, *rbcL*, and *trnTLF*) genomes. For all seed plants that were collected on each alpine summit, we used targeted polymerase chain reaction (PCR) to amplify the six gene regions.

"Universal" primers for plant systematics were used for amplification and sequencing of all gene regions (sequences and references can be found in Appendix C.1). All gene regions were amplified using a two-round PCR strategy in overlapping ~400-600 bp amplicons to merge across the 300 bp paired-end reads generated with

Table 4.1: Summary of the number of species collected on each summit, the total number of species with alignments from MiSeq sequences and alignments retrieved from the PHLAWD pipeline.

Summit	Mountain Range	Elevation (ft)	Total species collected	Total species with MiSeq sequences	Total species obtained from PHLAWD	Species collected on talus	MiSeq talus species	PHLAWD talus species	Meadow species collected	MiSeq meadow species	PHLAWD meadow species
Horstmann Peak	Sawtooth	10350	38	34	21	36	32	20	2	2	2
Braxon Peak	Sawtooth	10353	28	28	18	28	28	18	NA	NA	NA
Thompson Peak	Sawtooth	10508	56	44	35	18	18	12	38	27	24
Snowyside Peak	Sawtooth	10651	42	38	24	28	25	15	14	14	11
Mount Cramer	Sawtooth	10716	43	40	30	43	40	30	NA	NA	NA
D.O. Lee Peak	White Cloud	11342	75	65	37	43	38	22	32	28	19
Salzburger Spitzl	Pioneer	11600	72	64	43	47	41	29	25	24	16
Castle Peak	White Cloud	11815	58	47	34	58	47	34	NA	NA	NA
Hyndman Peak	Pioneer	12009	77	72	49	48	46	28	29	27	23
TOTAL			489	432	291	349	315	208	140	122	95

Illumina MiSeq sequencing, so some gene regions (*atpB*, *matK*, *ndhF*, and *trnTLF*) were amplified in multiple segments (Appendix c.1). Following Uribe-Convers *et al*. (2016), each target-specific primer sequence contained a conserved sequence tag that was added to the 5′ end at the time of oligonucleotide synthesis (CS1 for forward primers and CS2 for reverse primers). The purpose of the added CS1 and CS2 tails is to provide an annealing site for the second pair of primers. After an initial round of PCR using the CS-tagged, target specific primers (PCR1), a second round of PCR was used to add 8 bp sample-specific barcodes and high-throughput sequencing adapters to both the 5′ and 3′ ends of each PCR amplicon (PCR2). From 3′ to 5′, the PCR2 primers included the reverse complement of the conserved sequence tags, sample-specific 8 bp barcodes, and either Illumina P5 (CS1-tagged forward primers) or P7 (CS2-tagged reverse primers) sequencing adapters. Sequences for the CS1 and CS2 conserved sequence tags, barcodes, and sequencing adapters were taken from Uribe-Convers *et al*. (2016) (Appendix c.1). Following PCR2, the resulting amplicons all dual-barcoded samples were pooled together and sequenced on an Illumina MiSeq platform using 300 bp paired end reads. PCR conditions were as follows: PCR1 – 25 µL reactions included 2.5 µL of 10x PCR buffer, 3 µL of 25 µM $MgCl_2$, 0.30 µL of 20 mg/ml BSA, 1 µL of 10 µM dNTP mix, 0.125 µL 10 µM CS1-tagged target specific forward primer, 0.125 µL 10 µM CS2-tagged target specific reverse primer, 0.125 µL of 5000 U/ml Taq DNA polymerase, 1 µL template DNA, and PCR-grade H_2O to volume; PCR1 cycling conditions - 95°C for 2 min. followed by 20 cycles of 95°C for 2 min., 50-60°C for 1 min. (depending on T_m of target specific primers), 68°C for 1 min., followed by a final extension of 68°C for 10 min.; PCR2 – 20 µL reactions included 2 µL of 10x PCR buffer, 3.6 µL of 25 mM $MgCl_2$, 0.60 µL of 20 mg/ml BSA, 0.40 µL of 10 mM dNTP mix, 0.75 µL of 2 µM barcoded primer mix, 0.125 µL of 5000 U/ml Taq DNA polymerase, 1 µL of PCR1 product as template, and PCR-grade H_2O to volume; PCR2 cycling conditions - 95°C for 1 min. followed by 15 cycles of 95°C for 30 sec., 60°C for 30 sec., 68°C for 1 min., followed by a final extension of 68°C for 5 min.

4.3.4 *MiSeq Read Processing*

Pooled reads from the Illumina MiSeq runs were demultiplexed using the dbcAmplicons pipeline and consensus sequences were generated using the reduce_amplicons.R script in R (`https://github.com/msettles/dbcAmplicons`) following the workflow detailed in Uribe-Convers *et al*. (2016). Briefly, for each sample, read-pairs were identified, sample-specific dual-barcodes and target specific primers were identified and removed (allowing the default matching error of 4 bases), and each read was annotated to include the species name and read number for each gene region. To eliminate fungal contamination that may have been amplified for ITS, and non-specific amplification of poor PCR products for all gene regions, each read was screened against a user-defined reference file of annotated sequences retrieved from GenBank (using the "-screen" option in dbcAmplicons). Reads that mapped with default sensitivity settings were kept. Each read was reduced to the most frequent length variant, paired reads that overlapped by at least 10 bp (default) were merged into a single continuous sequence, and a consensus sequence without ambiguities was produced ("-p consensus" in the R script reduce_amplicons.R). Paired reads that did not overlap were concatenated together using the program *Phyutility* (Smith and Dunn, 2008), and any merged segments were added to the concatenated reads.

4.3.5 *MiSeq Alignments*

Each gene region was aligned using *MAFFT* (Katoh and Standley, 2013) with default settings, and segments of gene regions that were divided for PCR amplification were aligned separately. All alignments were loaded into Geneious version 7.1.9 (`http://www.geneious.com`, Kearse *et al.*, 2012), where visual inspection in addition to a batch blast to the NCBI nucleotide database helped to identify incorrect sequences that escaped our primary screening (e.g. resulting from fungal contamination, non-specific amplification, or contaminated samples). Incorrect sequences (those whose BLAST hit did not match with the species and/or gene region identification) were discarded, gaps were removed, and the segment was realigned. Each gene segment was then concatenated using *Phyutility* (Smith and Dunn, 2008), resulting in a final alignment for each gene region. To avoid replication of overlapping segments, for gene regions that were amplified in multiple overlapping segments, the overlapping region was removed from one segment prior to concatenation.

4.3.6 *Available Sequence Retrieval*

We used the PHLAWD pipeline (Smith *et al.*, 2009) to retrieve published sequences from GenBank for all species in the alpine species pool. Using the combined list of species that were identified across all summits, we searched for the same six gene regions that were amplified with PCR for direct comparison. The PHLAWD pipeline incorporates GenBank taxonomy to sequentially profile align increasingly higher taxonomic groups together with *MAFFT* (Katoh and Standley, 2013), and output as single alignment file for each gene region that is queried. Infraspecific taxa were collapsed to the species level to avoid pseudoreplication, and if there was more than one sequence for a species the longest sequence was kept.

4.3.7 *Phylogenetics*

To obtain evolutionary distances separating every species coexisting on each summit, we estimated a community phylogeny of all alpine species that were collected in the Sawtooth NF. Gene trees were estimated from alignments of the MiSeq sequences for each region under maximum likelihood (ML) using the GTR-CAT model of nucleotide substitution and 1000 bootstrap replicates in RAxML (Stamatakis, 2006). All genes regions were also concatenated together into an alignment using Phyutility (Smith and Dunn, 2008). This concatenated alignment was used to infer a ML estimate for the community phylogeny in RAxML 8.2.8 (Stamatakis, 2006) with a GTR-CAT model partitioned by gene region and using auto MRE bootstrap convergence option to determine the number of bootstrap replicates for stable support values (Pattengale *et al.*, 2009); all analyses were run on the CIPRES cyberinfrastructure for phylogenetic research (Miller *et al.*, 2010, ,last accessed 11 May 2016). Following Marx *et al.* (2016), we used the 'congruification' approach (Eastman *et al.*, 2013) in the R package *geiger* (Pennell *et al.*, 2014) to match node calibrations from the detailed time-tree estimate of Zanne *et al.* (2014a) and penalized likelihood to scale molecular branch lengths to time as implemented in *treePL* (Smith and O'Meara, 2012).

4.3.8 *Phylogenetic Diversity*

α-diversity – To measure the phylogenetic diversity within each alpine summit (α-diversity), we calculated the mean nearest taxon distance (MNTD) and the mean pairwise distance (MPD) (Webb, 2000), which are widely used to detect differences resulting from more recent diversification at the tips of the tree from deeper diversification near the root, respectively (Tucker *et al.*, 2016). We assessed if observed phylogenetic patterns were different from a random expectation by calculating standardized effect sizes (SES) for each metric in the R package *picante* (Kembel *et al.*, 2010) by randomly shuffling the Sawtooth community phylogeny 999 times. Large SES values indicate the observed distance was greater than expected by chance (high diversity, phylogenetic overdispersion), while small values indicate observed diversity was less than expected by chance (low diversity, phylogenetic clustering).

β-diversity – Phylogenetic diversity between summits (β-diversity) was addressed from two perspectives. First, we identified similarities and differences between summits by calculating the unique branch length contribution relative to the total branch lengths shared between each community with the UniFrac index (Lozupone and Knight, 2005), which has been used to test for turnover in other studies of alpine phylogenetic structure (Jin *et al.*, 2015). This broad measure of phylogenetic diversity differences between sites (Baselga, 2009) does not discern between richness gradients of species-poor communities nested within species-rich communities (Wright and Reeves, 1992) and spatial turnover, whereby environmental filtering or historical processes cause distinct lineages to replace others between sites (Qian *et al.*, 2005). Following Leprieur *et al.* (2012), we decomposed UniFrac to separate difference in composition between summits attributed to species richness (UniFrac PD) from those that are true gain or loss of species due to replacement (turnover, UniFrac Turn). Standardized effect sizes of UniFrac indices were quantified by comparing observed values to a null distribution of indices from tips shuffled across the community phylogeny using the R code provided in (Leprieur *et al.*, 2012). SES values > 1.96 (or <1.96) indicate a higher (or lower) phylogenetic β-diversity expected from the compositional diversity (Leprieur *et al.*, 2012).

Second, we identified clades that were contributing to turnover patterns with PI*st*, which measures changes in mean phylogenetic distances between sites compared to species found within sites (Hardy and Senterre, 2007). We used a randomization that shuffles species across the community phylogeny ('1s') to test significance of the phylogenetic structure (Hardy, 2008), with the R package *spacodiR* (Eastman *et al.*, 2011). PI*st* > 0 indicates phylogenetic clustering (species within plots are more closely phylogenetically related than between plots), while PI*st* < 0 indicates clustering overdispersion (species within plots are less phylogenetically related than between plots; Hardy and Senterre (2007)).

All analyses of phylogenetic community structure were conduced in R version 3.2.3 (R Core Team, 2015). A detailed workflow including parameters and scripts used for processing reads, known sequences used for MiSeq read screening, reference sequence files and scripts for PHLAWD searches, parameters used for tree searches, and scripts used to calculate α- and β-diversity are available on GitHub (`https://github.com/hmarx/Sawtooth-Alpine-PD`).

4.4 RESULTS

4.4.1 *Species Collections*

A total of 489 specimens were collected across the nine summits (Table 4.1), and between 28 (Braxon Peak) and 77 (Hyndmann Peak) species were sampled on each summit (Figure 4.2). A few summits (D.O. Lee Peak, Horstmann Peak, Hyndman Peak, Salzburger Spitzl, Snowyside Peak, and Thompson Peak) had alpine meadows, which contributed to the higher number of collections (Table 4.1) and higher taxonomic diversity observed (Figure 4.2a). The five orders with the highest species-richness (number of taxonomic units) were Asterales, Caryophyllales, Poales, Brassicales, and Ericales (Figure 4.2a). Collections at these meadows were distinguished from those made on the talus slopes (Figure 4.1b, Figure 4.2), and phylogenetic diversity analyses were conducted with and without meadow species.

Identification, imaging and processing of the collections was conducted at the University of Idaho Stillinger Herbarium (ID), where all vouchers were deposited. Vouchers and images can be viewed online at the Consortium of the Pacific Northwest Herbaria data portal (Consortium of Pacific Northwest Herbaria, 2013). A list of all species collected on each summit is provided in Appendix C.2.

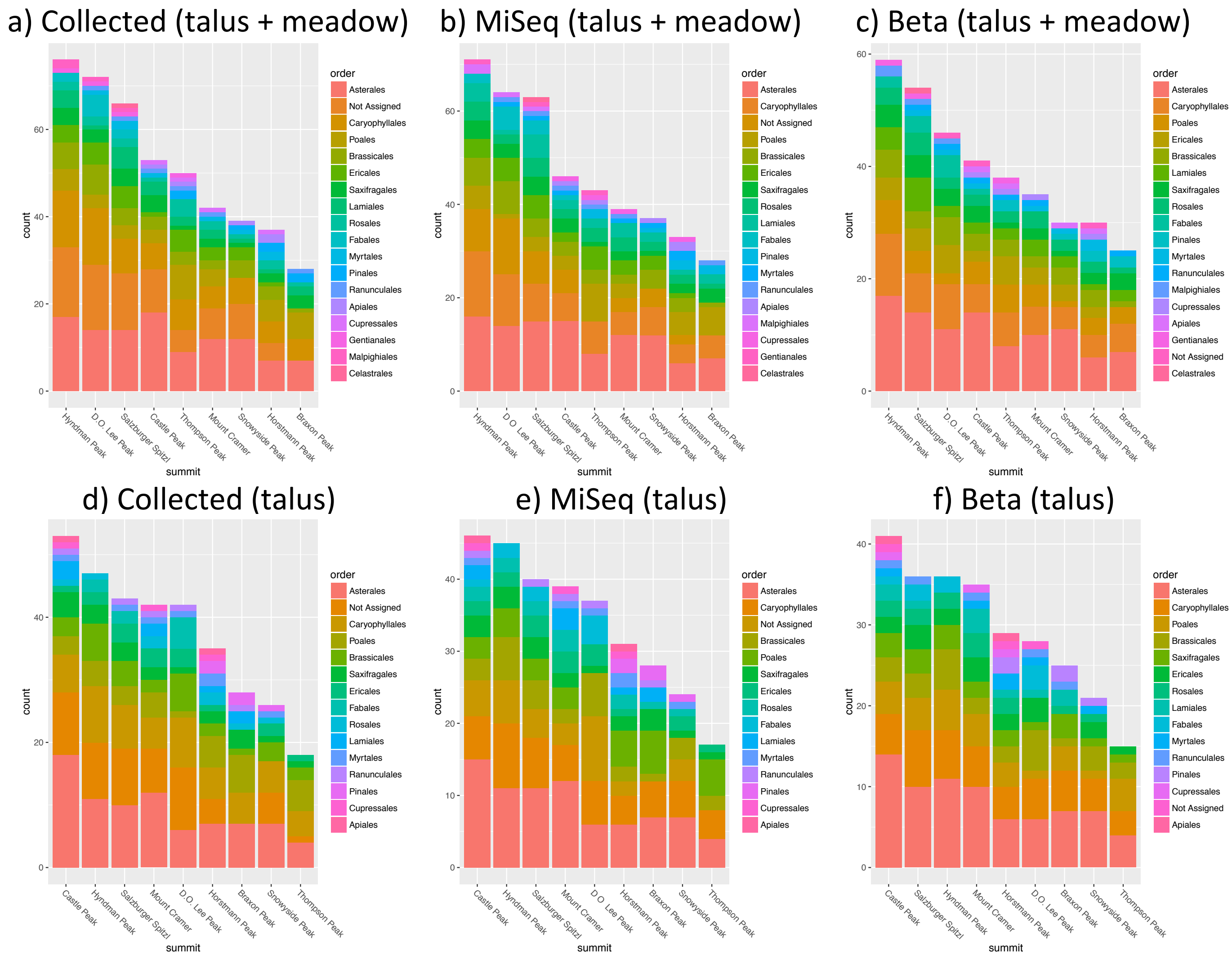

Figure 4.2: Number of species that were on each summit, that were sequenced successfully, and that were included in the community phylogeny that was used to calculate β-diversity. Colors correspond to different plant clades. a-b) all species that were collected on talus and near alpine meadows c-f) only species that were collected on talus.

4.4.2 *Sequencing & Read Processing*

After MiSeq reads were processed, screened, and reduced, the concatenated alignment included 424 species and 8254bp (Table 4.2). The PHLAWD approach retrieved significantly fewer sequences (105) for species occurring on the summits sampled, although the alignment length was longer.

TABLE 4.2: Summary of the number of taxa with sequences retrieved for each gene region using either the MiSeq or PHLAWD approach

Approach	Gene Region	Segment	Number of Taxa	Alignment Length (bp)
MiSeq	**ITS**		**183**	**1001**
	atpB		**257**	**1002**
		atpB1	133	566
		atpB2	194	436
	ndhF		**382**	**1948**
		ndhF1	181	765
		ndhF2	370	492
		ndhF3	81	691
	matK		**303**	**1424**
		matK2	291	712
		matK2	203	712
	rbcL		**93**	**534**
	trnTLF		**165**	**2345**
		trn_ab	107	1110
		trn_cf	95	1235
	Concatenated		**424**	**8254**
PHLAWD	**ITS**		**87**	**768**
	atpB		**8**	**1491**
	ndhF		**19**	**2257**
	matK		**62**	**1816**
	rbcL		**47**	**1419**
	trnTLF		**72**	**1110**
	Concatenated		**105**	**8861**

Because we used universal primers that were designed primarily for angiosperms and/or seed plant systematics, there was taxonomic variation (and biases) in the efficacy of amplification and/or sequencing of each gene region. MiSeq read pairs only merged across *matK_1* and *trn_cf* (primers in Appendix C.1). Of the regions that were amplified in multiple segments, only *atpB1* and *atpB2* overlapped, and 130bp were removed from the second segment before concatenation to the first. Certain gene regions (and segments) were more successful in certain clades. Because of the angiosperm and/or seed plant specific nature of the universal primers employed here, we were not able to retrieve sequences for any ferns or lycophytes that were collected. In addition, graminoids were particularly problematic, especially for *matK*. The segments *ndhF2* and *ndhF3* worked better for graminoids than *ndhF1*, and *trn_cf* worked better than *trn_ab* for graminoids and gymnosperms. *atpB* primers worked well for graminoids and gymnosperms (especially *atpB1*). ITS worked well across a broad range of taxonomic lineages, but there were many sequences that were fungal or from non-specific amplification that had to be removed. *rbcL* was the most effective and specific, and was sequenced across all plant taxonomic groups with very little non-specific amplification.

Summary statistics from Illumina read processing, including coverage of read processing, screening, and reduction, are available on GitHub (`https://github.com/hmarx/Sawtooth-Alpine-PD`).

4.4.3 *Phylogenetics*

No major conflicts with phylogenetic expectations across seed plants were found in each gene tree (Appendix C.3), so the best ML estimate from the alignment of concatenated gene regions was used to calculate phylogenetic diversity metrics (Appendix C.4.1). Bootstrap support was high for both deep and shallow nodes (Appendix C.4.2). Many species were collected on multiple summits (Figure 4.1b), so this ultrametric community phylogeny of the Sawtooth alpine flora (hereafter referred to as the MiSeq community phylogeny) contains duplicate species with unique accessions for each collection (Appendix C.1, Appendix C.6.1). For each summit, the MiSeq community phylogeny (Appendix C.6.1) was pruned to include only accessions coexisting together, and each α-diversity metric was calculated for all seed plants (Spermatophyta) occurring on the summits, as well as the five most species-rich orders. β-diversity calculations require that species names are concordant between summits, so all but one of the duplicated species were removed from the MiSeq community phylogeny for these analyses (Figure 4.1b).

Sequences for each gene region will be submitted to GenBank. Sequence alignments (for each region and concatenated) and treefiles will be available on Dryad and GitHub (https://github.com/hmarx/Sawtooth-Alpine-PD).

4.4.4 *Phylogenetic Diversity*

Within summits, phylogenetic diversity was no different than random overall (Figure 4.3), but did trend towards phylogenetic overdispersion. Across all seed plants (Figure 4.3, top row of both panels), phylogenetic diversity was higher than expected (significantly overdispersed) for tip-wise (MNTD, top panel) distances on Castle Peak, and for tree-wide (MPD, bottom panel) distances on Braxon Peak, Horseman Peak, and Thompson Peak. Phylogenetic clustering was only significant on D.O. Lee Peak for MPD (see Appendix C.5 for values). These general patterns were unchanged when just species found on the talus were considered (Appendix C.6).

The fraction of unique branch lengths between communities is no different from random overall, with a few phylogenetic diversity patterns lower or higher than expected from the species composition observed on some summits (Figure 4.4, see Appendix C.7 for values). True turnover of distinct lineages (rather than nested sets of clades) did reveal higher than expected phylogenetic β-diversity for 7 summit pairs, identifying two clusters of summits with similar species pairs (Figure 4.4c), which may be attributable to plants found in alpine meadows on some but not all summits (Figure 4.4f). Lower than expected turnover was also observed for a few specific clades (Figure 4.5). Certain genera within the Brassicaceae (*Arabis*, *Erysimum* and *Smelowskia*), the Portulacaceae (*Eriogonum*), and the Asteraceae (*Arnica* and *Hulsea*) occur across most summits.

4.5 DISCUSSION

Diversity dynamics have been and continue to be at the heart of evolution and ecology (Chown and Gaston, 2000; Gaston, 2000). Despite copious efforts to catalog and describe the diversity of biological 'hotspots' (Myers *et al.*, 2000), there are large gaps in our understanding of the diversity of much of the planet (Kier *et al.*, 2005). In this

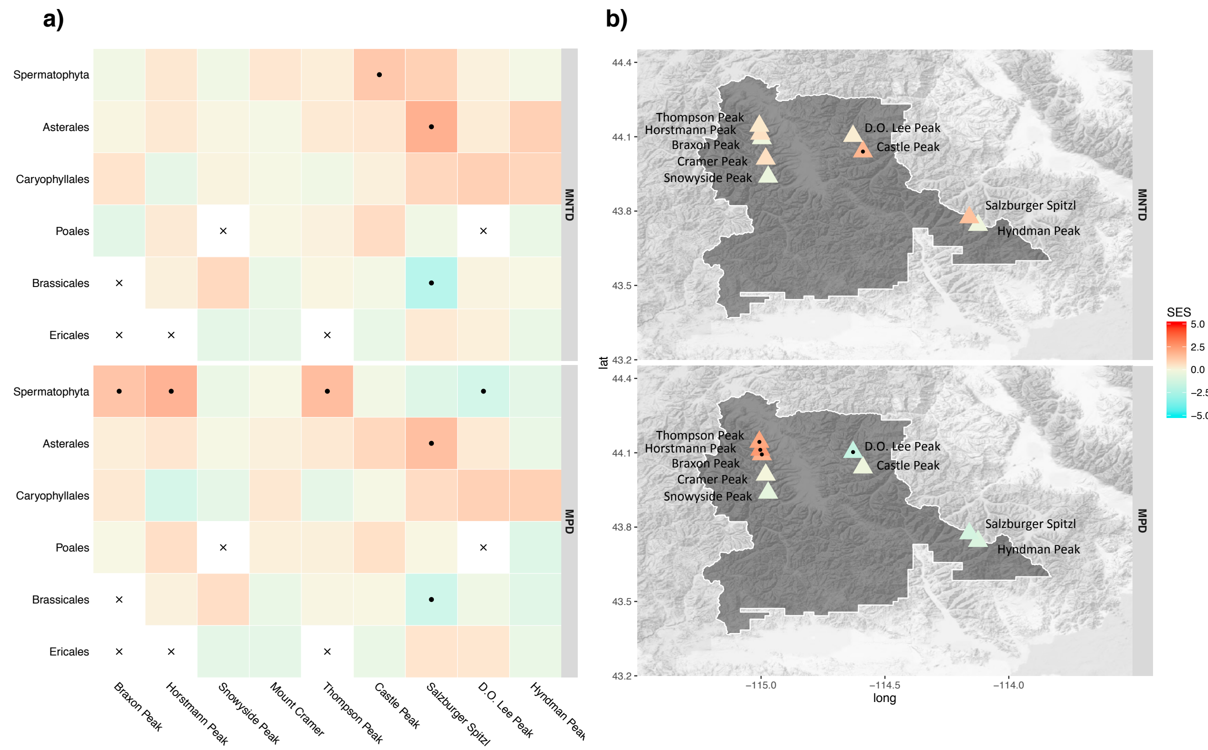

FIGURE 4.3: Measures of phylogenetic diversity within summits (top panels MNTD, bottom panels MPD). a) Tile rows show phylogenetic diversity for all seed plants (Spermatophyta), and each of the five most species-rich clades on each summits (columns). b) Phylogenetic diversity for all seed plants shown over each summit on the map of the Sawtooth NF. Warm tones indicate phylogenetic overdispersion (high species diversity), cool tones indicate phylogenetic clustering (low species diversity). Tiles with black dots mark statistically significant (P-values < 0.05) phylogenetic patterns in community structure (from random resampling the phylogeny). Cells filled with an "x" had too few species for comparison.

study, we used a remote alpine flora to illustrate how high-throughput sequencing approaches not only enable efficient and effective description of diversity, but lay a foundation to test hypotheses that could have generated that diversity. Utilizing high-throughput sequencing technologies dramatically increased the coverage of sequence data that we were able to retrieve compared to mining for publicly available data with the mega-phylogenetic approach (Table 4.2), which was expected considering the remoteness of the summits sampled. And, in contrast to supertree methods, phylogenetic diversity metrics calculated from this resulting well-resolved and time-scaled

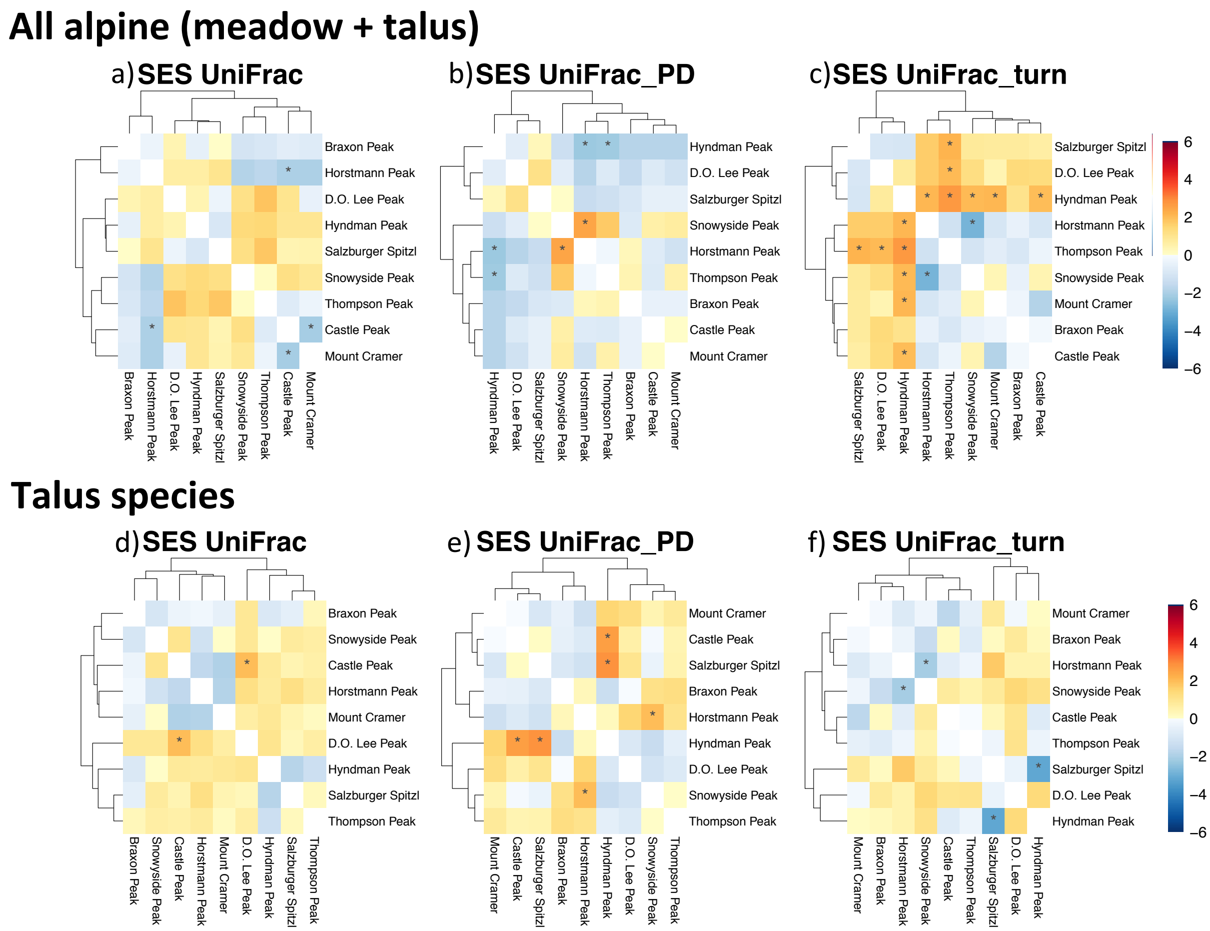

Figure 4.4: Pairwise matrices showing species turnover between summits, measured by standardized effect sizes (SES) of UniFrac distances, decomposed into the portion corresponding to species richness (UniFrac PD) and the portion corresponding to true turnover (UniFrac Turn). a-c) Results with all alpine species (collected near alpine meadows as well as on talus slopes). d-f) Results with only plant species collected on talus slopes. Tiles with warm tones indicate high turnover between summit pairs (summits have unique species), cool tones indicate low turnover between summit pairs (summits share the same species). Tiles with black dots mark summit pairs with statistically significant (P-values < 0.05) higher or lower turnover than expected (from random resampling the phylogeny).

phylogeny will be more precise and can be compared across taxonomic lineages and with other community types.

From the MiSeq community phylogeny, we found that the alpine plant assemblages on nine summits across the Sawtooth NF were composed of random phylogenetic assemblages overall, but a few summits showed a higher diversity of plant species coexisting than expected by chance (Figure 4.3). The opposite pattern, phylo-

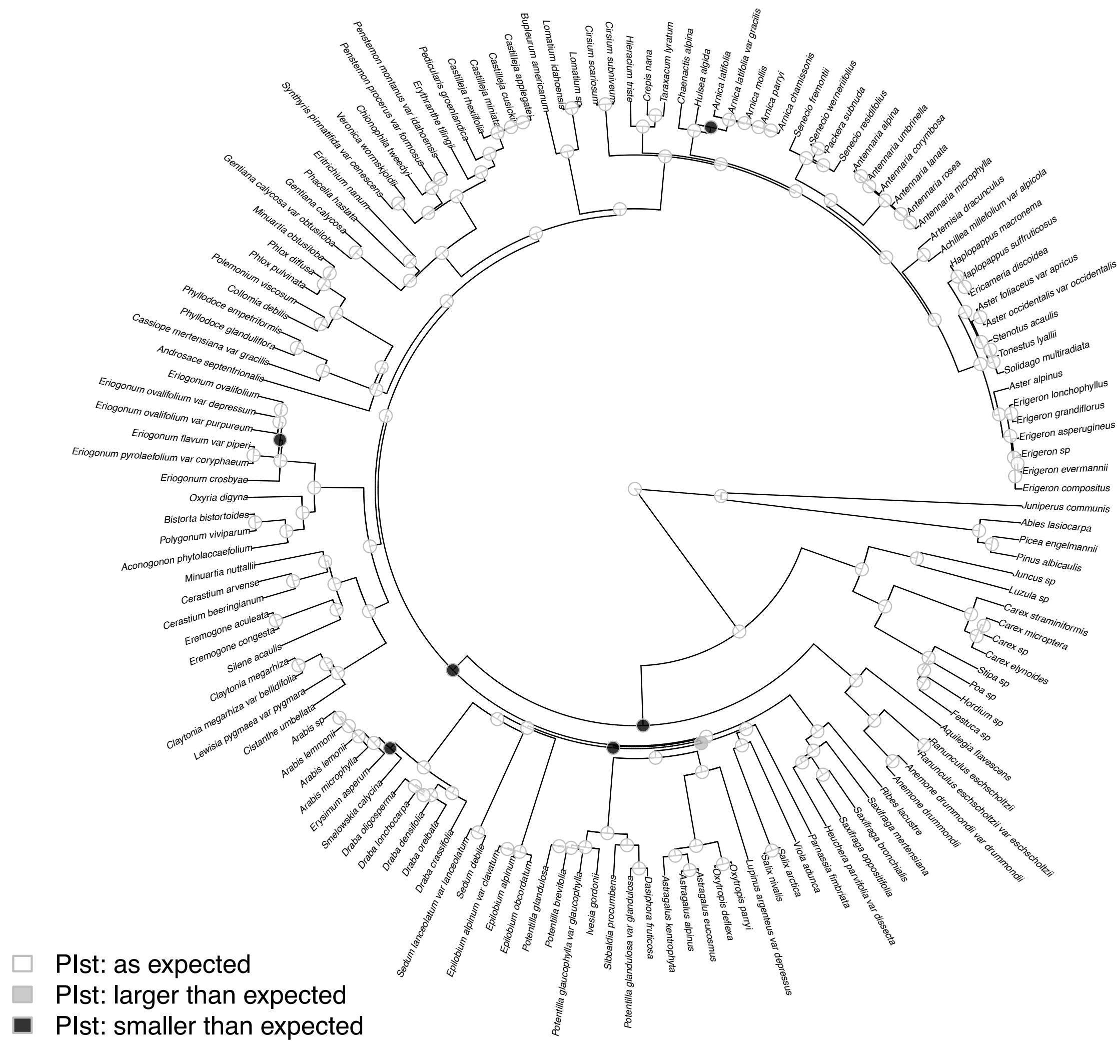

FIGURE 4.5: Phylogenetic turnover between clades on the community phylogeny of summit species. Species subtending nodes with grey dots have a higher than expected turnover between summits (appear only on certain summits), species with black dots have a lower than expected turnover between summits (appear across all summits), and nodes with white dots have turnover no different than random.

genetic clustering, has been found in other studies that have used mega-phylogenies to assess alpine plant assemblages in the Rocky Mountains, USA (Jin *et al.*, 2015), and the Écrins National Park, France (Chapter 3). Using a supertree approach, phylogenetic clustering was found at lower elevations, but phylogenetic structure became more random in the Hengduan Mountains Region of the Himalayas (Li *et al.*, 2013). Beyond alpine communities, patterns of phylogenetic overdispersion are less often observed than phylogenetic clustering (Vamosi *et al.*, 2009), across trophic, taxonomic, and spatial scales.

If functional traits are conserved, a common interpretation of a pattern of phylogenetic overdispersion in communities is competitive exclusion (Webb, 2000). As their name implies, recent scouring of glaciers has greatly impacted the topography of these three mountain ranges across the Sawtooth NF. It could be that the recent and dramatic glacial history has formed microcosms with limited resources where competition is occurring. However, this biotic interaction is expected to be negligible in alpine ecosystems, and the importance of facilitative (positive) biotic interactions has been well documented (e.g Choler *et al.*, 2001; Callaway *et al.*, 2002). Because the probability of convergent evolution in distantly related species should be low, it is difficult to detect phylogenetic overdispersion resulting from limiting similarity is difficult to detect in large assemblages and source pools (Kraft *et al.*, 2007).

Imprints of phylogenetic overdispersion can also appear by environmental filtering if traits are convergent (Cavender-Bares *et al.*, 2009), or by stochastic processes such as allopatric colonization and local extinction (Pigot and Etienne, 2015). Indeed, if glacial retreat from these summits was recent, they could represent very recent colonization events, where dispersal is the limiting factor for coexistence (MacArthur and Wilson, 1967). Environmental qualification of these summits and specific null models would allow more rigorous tests of biogeographic explanations for these species distributions (Chapter 3).

The main limitation of documenting biodiversity using high-throughput sequencing is obtaining samples of the biodiversity. Collection trips into the remote Idaho wilderness to collect leaf tissue for DNA extraction and museum vouchers constituted the bulk of the cost of this study. In addition, the 'universal' plant primers used were designed mainly for eudicots, and were not as effective in monocots or gymnosperms, and furthermore, they were unsuccessful for non-seed producing plants (i.e., ferns and lycophytes). Including primers that are optimized for these groups would be more effective for documenting the complete flora.

A synthesis of biogeography of the flora of Idaho is lacking, partially due to limited documentation, particularly in remote areas. Climate change is altering species distributions, and without detailed records of the species comprising this alpine zone in Idaho, the effects of climate change on this unique flora would remain unknown. The phylogenetic diversity patterns described in this study contribute to our knowledge of the flora in general, and provide an important basis for future monitoring efforts.

4.6 DATA ACCESSIBILITY

Vouchers and images can be viewed online at the Consortium of the Pacific Northwest Herbaria data portal (`http://www.pnwherbaria.org`). All MiSeq sequences and alignments, PHALWD scripts and output alignments, treefiles, R scripts, output files and figures used in this manuscript are openly available on GitHub (`https://github.com/hmarx/Sawtooth-Alpine-PD`). The Sawooth alpine community matrix, and treefiles will be submitted to the Dryad Digital Repository.

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APPENDIX A

Supplementary Information to Chapter 2

A.1 Detailed methods for phylogeny estimation, functional trait measurements for each species, and sources used for each trait

A.1.1 *Floristic survey and island community matrix*

Where possible, nomenclature follows the Flora of North America (Flora of North America Editorial Committee, 1993). Several floras were used to determine invasive status for each species: Flora of North America (Flora of North America Editorial Committee, 1993), the Flora of the Pacific Northwest (Hitchcock and Cronquist, 1973), the Jepson Manual (Baldwin *et al.*, 2012), the Flora of British Columbia (E-Flora BC: Electronic Atlas of the Flora of British Columbia, 2013), and the Oregon Flora Project (Oregon Flora Project, 2013). All voucher specimens were databased and are publically accessible via the Consortium of Pacific Northwest Herbaria (2013).

A.1.2 *Phylogeny Estimation*

Using the total list of species occurrences across all of the 80 San Juan Islands that were sampled, GenBank release 195 was queried to retrieve publically available sequence data using the PHLAWD pipeline (Smith *et al.*, 2009). Five gene regions (*atpB*, *rbcL*, *matK*, *trnTLF*, and ITS) that have been frequently used in plant phylogenetic studies were included, allowing us to compile sequence data from regions with varying rates of evolution that resolve relationships at both deep and shallow phylogenetic scales. When multiple sequences were retrieved for the same species, the longest sequence was retained.

For each gene region, the alignment from the PHLAWD output was cleaned using phyutility (Smith and Dunn, 2008) to remove sites that were missing from >50% of the taxa. Gene trees were inferred under maximum likelihood (ML) with HPC-PTHREADS as implemented in RAxML version 7.4.2 (Stamatakis, 2006), using the

GTR-CAT model of nucleotide evolution, and the simultaneous rapid bootstrap and ML search algorithm with 1000 bootstrap replicates. Rogue and outlier taxa were identified using the program RogueNaRok (Aberer *et al.*, 2013) and by visual comparison of topology to accepted relationships (e.g. Soltis *et al.*, 2011). Sequences identified as GenBank submission errors (misidentified, mislabeled, and/or messy) were removed, alignments for each gene region were cleaned again, and then concatenated into a final alignment using phyutility (Smith and Dunn, 2008). A final by-gene partitioned ML estimate of species relationships for all vascular plants in the San Juan Islands species pool was inferred using the concatenated alignment, with the same parameters as the gene trees implemented in RAxML version 7.4.2 (Stamatakis, 2006).

The mega-phylogeny estimate was scaled to time using the Congruification approach (Eastman *et al.*, 2013) with the function 'congruify' in the R-package geiger v. 2.0 (Pennell *et al.*, 2014). This method resolves topological inconsistencies between two trees with the aim of mapping dates from a timetree to concordant nodes in an unscaled tree. We used the detailed divergence time analysis of the Soltis *et al.* (2011) angiosperm phylogeny from Zanne *et al.* (2014b) as the reference to provide dates for mapping to the nodes in the San Juan Islands community phylogeny. Dates from concordant nodes provided the maximum and minimum age constraints that were applied to each calibration point, and penalized-likelihood rate smoothing (Sanderson, 1997), as implemented in treePL (Smith and O'Meara, 2012), was used to generate a distribution of time-scaled estimates of the community mega-phylogeny with a smoothing parameter set to 10 after optimization on the maximum likelihood tree. Tree files and calibration points are available on Github (`https://github.com/hmarx/San-Juan-Islands-Invasion`).

A.1.3 *Functional Trait Measurements*

Trait data was compiled from a number of published sources: seed mass (Ordonez *et al.*, 2010), maximum height (Ordonez *et al.*, 2010), specific leaf area (Kleyer *et al.*, 2008; Ordonez *et al.*, 2010; Royer *et al.*, 2012), leaflet (leaf) size (Royer *et al.*, 2012), and leaf nitrogen content (Royer *et al.*, 2012). Measurements for maximum height were supplemented with additional records gathered from the Electronic Atlas of the Flora of British Columbia (E-Flora BC: Electronic Atlas of the Flora of British Columbia, 2013) by taking the harmonic means of all values for maximum height that were found for each species. A .csv file of these is also available on Github (`https://github.com/hmarx/San-Juan-Islands-Invasion`).

We calculated the phylogenetic signal for each trait separately, pruning the San Juan Island community phylogeny to just species with data available for that trait. We used Abouheif's test (Abouheif, 1999) to calculate phylogenetic autocorrelation between traits because it was shown to perform substantially better under a Brownian motion model of trait evolution compared to other indices that measure phylogenetic signal (Munkemüller *et al.*, 2012), with the abouheif.moran function in 'adephylo' (Jombart *et al.*, 2010).

TABLE A.1.1: Table of functional trait measurements for each species.

Species	Status	Seed Mass (mg)	Maximum Height (m)	SLA (cm^2/g)	Leaf Size (cm^2)	Leaf Nitrogen (%)
Abies grandis	n	17.2154	68.5714	NA	0.3652	NA
Acer glabrum	n	36.5803	10.0000	268.0890	22.5730	NA
Acer macrophyllum	n	133.3853	19.6973	252.1901	128.0845	2.6400
Achillea millefolium	n	0.1462	0.4615	187.2335	5.6710	2.4980
Achnatherum lemmonii	n	5.6273	0.9000	NA	NA	NA
Acmispon denticulatus	n	6.0500	NA	NA	NA	NA
Acmispon parviflorus	n	2.1327	NA	NA	NA	NA
Adenocaulon bicolor	n	5.4877	1.0000	NA	NA	NA
Agoseris grandiflora	n	1.2299	0.7000	NA	NA	NA
Agrostis exarata	n	0.1052	1.0000	NA	NA	NA
Agrostis scabra	n	0.0653	0.6667	123.2363	NA	1.5500
Agrostis stolonifera	i	0.0693	0.3529	295.1381	3.1708	NA
Aira caryophyllea	i	0.1392	0.3000	194.6000	0.1287	NA
Aira praecox	i	0.1657	0.0800	174.4372	0.1499	NA
Allium acuminatum	n	2.3161	0.3000	NA	NA	NA
Allium cernuum	n	3.8138	0.5000	NA	6.7500	NA
Alnus alnobetula	n	1.7240	NA	233.3844	21.4034	NA
Alnus rubra	n	0.9795	25.0000	153.8291	NA	2.2468
Ambrosia chamissonis	n	NA	NA	NA	NA	NA
Amelanchier alnifolia	n	5.4839	10.0000	106.2329	NA	1.8200
Amsinckia menziesii	n	2.0202	0.8000	234.6785	19.2083	NA
Amsinckia spectabilis	n	1.2043	0.4000	NA	NA	NA
Anagallis arvensis	i	0.4675	0.2857	307.1892	0.4079	2.7478
Anaphalis margaritacea	n	0.0727	0.9000	128.0000	14.7100	NA
Anisocarpus madioides	n	NA	NA	NA	NA	NA
Anthemis arvensis	i	0.6632	0.6000	417.3017	4.6970	NA
Anthoxanthum odoratum	i	0.5237	0.4204	293.3327	1.3671	2.1503
Anthriscus caucalis	i	1.1285	0.9000	377.0497	29.2759	NA
Aphanes australis	i	NA	NA	NA	NA	NA
Aquilegia formosa	n	1.2176	1.0000	NA	NA	NA
Arabidopsis thaliana	i	0.0210	0.4000	326.5611	2.4306	3.5700
Arabis hirsuta	n	0.1001	0.6857	238.5450	3.7400	2.0000
Arbutus menziesii	n	17.7830	13.8605	71.3464	49.2700	1.2112
Arctostaphylos uva ursi	n	11.6630	NA	54.8478	1.7213	1.0871
Arenaria serpyllifolia	n	0.0702	0.2727	205.8548	0.0688	NA
Armeria maritima	n	0.9211	0.5000	186.5288	1.0043	1.7000

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Table a.1.1 – continued from previous page

Species	Status	Seed Mass (mg)	Maximum Height (m)	SLA (cm^2/g)	Leaf Size (cm^2)	Leaf Nitrogen (%)
Artemisia campestris	n	0.1359	1.0000	161.5797	1.7246	NA
Artemisia suksdorfii	n	0.6268	1.5000	NA	NA	NA
Asparagus officinalis	i	23.0949	1.5000	98.5891	0.1320	NA
Aspidotis densa	n	NA	NA	NA	NA	NA
Asplenium trichomanes	n	NA	0.2222	109.0000	10.4200	NA
Athyrium filix femina	n	NA	NA	182.6488	677.3000	2.0881
Atriplex dioica	n	NA	NA	NA	NA	NA
Atriplex gmelinii	n	NA	NA	NA	NA	NA
Atriplex prostrata	i	1.5229	1.0000	205.4211	25.4002	NA
Avena fatua	i	10.5239	0.8000	253.3338	51.7967	2.8300
Barbarea orthoceras	n	NA	0.6000	NA	NA	NA
Barbarea vulgaris	i	0.5656	0.8000	256.4488	28.2195	NA
Bellis perennis	i	0.1129	0.0522	264.4339	3.5855	NA
Berberis aquifolium	n	9.8953	4.5000	NA	NA	NA
Berberis nervosa	n	16.3740	0.6000	NA	NA	NA
Betula papyrifera	n	0.3103	18.0000	147.1621	23.1567	1.9424
Bolboschoenus maritimus	n	2.2393	NA	123.9992	17.7777	NA
Brassica nigra	i	0.8253	1.5000	265.5469	70.5580	NA
Brassica rapa	i	1.9327	0.4000	274.3439	32.4817	NA
Brodiaea coronaria	n	1.5793	0.4000	NA	NA	NA
Bromus carinatus	n	5.6988	1.3000	206.0000	17.1600	NA
Bromus commutatus	i	4.3158	1.2000	269.8068	8.5230	NA
Bromus diandrus	i	9.7034	NA	NA	NA	NA
Bromus hordeaceus	i	1.8857	0.5091	287.4019	1.6103	2.5409
Bromus pacificus	n	NA	NA	NA	NA	NA
Bromus sitchensis	n	NA	NA	NA	NA	NA
Bromus sterilis	i	7.4863	0.5714	337.0945	4.5385	NA
Bromus tectorum	i	3.0262	0.8842	332.0807	7.2083	NA
Bromus vulgaris	i	NA	NA	NA	NA	NA
Buglossoides arvensis	i	5.8603	NA	270.5228	2.0261	NA
Cakile edentula	i	9.8516	0.5000	NA	NA	NA
Cakile maritima	i	13.8482	0.4500	164.3386	8.0935	NA
Calamagrostis purpurascens	n	NA	0.4364	NA	NA	NA
Calandrinia ciliata	n	0.4732	0.3500	NA	NA	NA
Calypso bulbosa	n	0.0004	0.2000	NA	NA	NA
Camassia leichtlinii	n	7.5504	1.0000	NA	NA	NA
Camassia quamash	n	3.8687	0.7000	NA	NA	NA
Campanula rotundifolia	n	0.0592	0.2124	240.9069	0.5027	1.8808
Capsella bursa pastoris	i	0.1052	NA	290.7557	10.4069	4.1845
Cardamine flexuosa	i	0.1266	0.1500	393.5785	6.6100	NA
Cardamine hirsuta	i	0.1170	0.3000	274.2238	3.2202	NA
Cardamine oligosperma	n	0.1520	0.5000	NA	NA	NA
Carex deweyana	n	NA	NA	NA	NA	NA
Carex inops	n	2.4800	0.5000	NA	NA	NA
Carex lyngbyei	n	1.5656	NA	NA	NA	NA
Carex obnupta	n	0.5648	1.5000	NA	NA	NA
Carex pansa	n	0.9436	0.3000	NA	NA	NA
Castilleja attenuata	n	0.0400	0.3500	NA	NA	NA
Castilleja hispida	n	0.1070	0.6000	NA	NA	NA
Castilleja victoriae	n	NA	NA	NA	NA	NA
Cerastium arvense	n	0.2692	0.4000	221.1897	NA	3.5000
Cerastium fontanum	i	0.1283	0.2182	289.9885	0.6179	2.4100
Cerastium glomeratum	i	0.0448	0.5000	203.4600	1.6877	NA
Cerastium pumilum	i	0.0979	0.5000	306.2067	0.1979	NA
Cerastium semidecandrum	i	0.0357	0.2000	187.7626	0.3008	NA
Chamerion angustifolium	n	0.0466	3.0000	185.4535	NA	3.1782
Chenopodium album	i	0.6026	1.0000	220.0738	16.0716	3.5778
Cirsium arvense	i	1.2983	1.3333	133.7820	35.5997	2.2233
Cirsium vulgare	i	2.8023	1.7143	145.4691	51.4243	NA
Clarkia amoena	n	NA	NA	NA	NA	NA
Claytonia exigua	n	0.4560	1.5000	NA	NA	NA
Claytonia parviflora	n	0.2790	0.3000	NA	NA	NA
Claytonia perfoliata	n	0.6511	0.2917	442.3133	6.8312	NA
Claytonia rubra	n	0.2890	0.6000	NA	NA	NA

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Table a.1.1 – continued from previous page

Species	Status	Seed Mass (mg)	Maximum Height (m)	SLA (cm^2/g)	Leaf Size (cm^2)	Leaf Nitrogen (%)
Collinsia grandiflora	n	NA	0.4000	NA	NA	NA
Collinsia parviflora	n	1.6413	0.4000	NA	NA	NA
Conioselinum pacificum	n	NA	NA	NA	NA	NA
Conringia orientalis	i	2.5397	0.5000	301.7384	48.4470	NA
Corallorhiza maculata	n	0.0024	0.5000	NA	NA	NA
Coreopsis lanceolata	i	1.1334	0.2000	NA	NA	NA
Corylus cornuta	n	447.5033	3.0000	302.3200	33.2100	1.9536
Cotoneaster dielsianus	i	19.2776	NA	NA	NA	NA
Cotoneaster franchetii	i	11.5400	NA	NA	NA	NA
Cotoneaster horizontalis	i	10.8921	0.5000	109.3050	0.4127	NA
Crassula tillaea	i	0.0096	NA	NA	NA	NA
Crataegus douglasii	n	24.1205	7.0000	97.3000	NA	NA
Crataegus monogyna	i	104.2862	4.2051	111.7150	4.9758	1.6810
Crepis capillaris	i	0.2316	0.4500	277.8892	14.5706	NA
Cuscuta salina	n	1.2520	NA	NA	NA	NA
Cynosurus cristatus	i	0.5147	0.1778	227.9274	3.5054	NA
Cynosurus echinatus	i	1.4299	0.5000	NA	NA	NA
Cystopteris fragilis	n	NA	0.2769	214.0000	19.7000	NA
Dactylis glomerata	i	0.8335	1.0549	250.9600	10.2678	2.6727
Danthonia californica	n	2.3818	1.3000	NA	NA	NA
Daphne laureola	i	NA	1.8000	90.3419	15.2506	NA
Daucus pusillus	n	0.7802	0.9000	NA	NA	NA
Delphinium menziesii	n	1.5360	0.7000	NA	NA	NA
Delphinium nuttallianum	n	0.4155	0.7000	NA	NA	NA
Digitalis purpurea	i	0.0855	1.3485	226.3814	320.6796	3.7800
Distichlis spicata	n	0.4417	0.4000	NA	NA	NA
Dryopteris expansa	n	NA	0.7000	205.6045	605.3479	NA
Eleocharis palustris	n	0.7042	0.7500	103.1000	NA	1.4500
Elymus glaucus	n	4.2440	1.8000	NA	NA	NA
Elymus repens	i	3.8141	0.9181	260.2344	26.1217	2.3758
Elymus trachycaulus	n	3.5069	1.2000	NA	NA	NA
Epilobium ciliatum	n	0.0717	1.5000	479.8397	4.1763	NA
Epilobium minutum	n	0.0909	0.4500	NA	NA	NA
Epilobium paniculatum	n	NA	NA	NA	NA	NA
Epipactis helleborine	i	0.0026	1.0000	273.9167	22.6196	NA
Equisetum arvense	n	NA	0.2323	104.9467	1.5774	1.6838
Equisetum hyemale	n	NA	1.2000	29.6215	13.6298	NA
Equisetum telmateia	n	NA	1.5000	162.2980	0.4911	NA
Eriophyllum lanatum	n	0.8923	0.6000	NA	NA	NA
Erodium cicutarium	i	2.0373	0.2571	344.7453	8.9187	1.9700
Erophila verna	i	0.0345	0.2500	315.0138	1.1023	NA
Erythronium oregonum	n	5.0544	0.3500	NA	NA	NA
Eschscholzia californica	i	1.3308	0.5000	NA	NA	NA
Festuca arundinacea	i	2.2397	2.0000	176.5743	36.4089	NA
Festuca occidentalis	n	0.2780	1.1000	NA	NA	NA
Festuca pratensis	i	2.0872	0.4875	241.9586	5.0281	NA
Festuca roemeri	n	NA	NA	NA	NA	NA
Festuca rubra	n	1.0298	0.8000	168.0623	0.8117	2.0859
Festuca subuliflora	n	NA	NA	NA	NA	NA
Fragaria vesca	n	0.3229	0.1500	211.2622	17.2218	1.9597
Fragaria virginiana	n	0.4607	0.1500	NA	NA	1.6216
Fritillaria affinis	n	2.2040	0.8000	NA	NA	NA
Galium aparine	n	8.2965	0.5714	333.6211	1.3138	2.8210
Galium triflorum	n	0.7980	0.8000	NA	0.7500	1.9051
Gamochaeta purpurea	n	0.0104	NA	NA	NA	NA
Gaultheria shallon	n	0.1393	3.0000	69.2490	28.7749	0.8890
Gayophytum diffusum	n	0.2988	0.6000	NA	NA	NA
Geranium carolinianum	i	2.4050	0.7000	NA	NA	NA
Geranium dissectum	i	2.2541	0.6000	229.8500	10.6198	NA
Geranium molle	i	1.0827	0.2400	299.0010	6.9262	NA
Geranium robertianum	i	1.3832	0.5455	415.0010	11.9041	2.5768
Geum macrophyllum	n	0.6095	1.0000	NA	NA	NA
Gnaphalium palustre	n	NA	NA	NA	NA	NA
Goodyera oblongifolia	n	0.0014	0.4000	NA	NA	NA

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Table a.1.1 – continued from previous page

Species	Status	Seed Mass (mg)	Maximum Height (m)	SLA (cm^2/g)	Leaf Size (cm^2)	Leaf Nitrogen (%)
Grindelia hirsutula	n	3.8252	0.8000	NA	NA	NA
Grindelia integrifolia	n	3.5730	0.8000	NA	NA	NA
Hedera helix	i	25.0729	2.8571	135.5731	13.6068	1.6836
Hemizonella minima	n	NA	NA	NA	NA	NA
Heracleum maximum	n	7.3861	3.0000	NA	NA	NA
Heuchera micrantha	n	0.0374	0.6000	NA	NA	NA
Hieracium albiflorum	n	0.3744	1.2000	NA	NA	NA
Holcus lanatus	i	0.2710	0.3667	325.8785	7.0408	2.1464
Holodiscus discolor	n	0.1497	2.8576	152.1522	7.8748	1.7606
Honckenya peploides	n	7.5202	0.4000	177.5415	0.3920	NA
Hordeum brachyantherum	n	2.6693	1.0000	NA	NA	NA
Hordeum depressum	i	NA	NA	NA	NA	NA
Hordeum geniculatum	i	NA	NA	NA	NA	NA
Hordeum jubatum	i	1.5730	0.6000	204.2950	1.8100	2.0575
Hordeum murinum	i	4.7193	0.5000	318.4243	2.0952	3.0500
Hutchinsia procumbens	n	NA	NA	NA	NA	NA
Hypericum perforatum	i	0.1258	0.7500	301.1697	1.2455	NA
Hypochaeris glabra	i	0.6650	0.4000	355.6038	4.0878	NA
Hypochaeris radicata	i	0.8484	0.2500	446.5923	17.1452	NA
Ilex aquifolium	i	31.2091	8.2143	67.5910	18.2603	1.5841
Iris germanica	i	NA	NA	130.7747	130.0902	NA
Jacobaea vulgaris	i	0.1980	NA	253.2119	45.7608	NA
Juncus balticus	n	0.0474	0.6000	NA	NA	NA
Juncus bufonius	n	0.0167	0.1636	174.6713	0.7490	NA
Juncus effusus	n	0.0170	1.0909	76.5508	36.0469	1.3246
Juncus laccatus	n	NA	NA	NA	NA	NA
Juniperus maritima	n	NA	NA	NA	NA	NA
Koeleria macrantha	n	0.2944	0.3000	127.8437	4.5400	1.8100
Lactuca muralis	i	0.3088	0.9000	602.3291	NA	NA
Lactuca serriola	i	0.5503	1.5000	170.9256	59.9300	2.8000
Lamium purpureum	i	0.7811	0.4235	343.1070	4.7713	NA
Lapsana communis	i	0.9025	0.6923	477.2848	48.7603	NA
Lathyrus aphaca	i	15.1569	NA	NA	NA	NA
Lathyrus japonicus	n	27.3284	1.5000	NA	NA	NA
Lathyrus nevadensis	n	16.7000	1.0000	NA	NA	NA
Lemna turionifera	n	NA	NA	NA	NA	NA
Lepidium virginicum	n	0.4884	0.6000	251.0200	6.2341	NA
Leymus mollis	n	NA	1.5000	NA	NA	NA
Lilium columbianum	n	2.6462	1.2000	NA	NA	NA
Linaria genistifolia	i	0.1612	1.2000	NA	NA	NA
Linnaea borealis	n	1.7743	0.1000	260.8748	0.8027	1.1884
Listera cordata	n	NA	0.2500	361.7307	1.9584	NA
Lithophragma parviflorum	n	NA	NA	NA	NA	NA
Lolium perenne	i	1.8811	0.4091	259.0772	3.9225	3.1101
Lomatium nudicaule	n	14.9141	0.9000	NA	NA	NA
Lomatium utriculatum	n	NA	NA	NA	NA	NA
Lonicera ciliosa	n	NA	NA	NA	NA	NA
Lonicera hispidula	n	7.2196	6.0000	112.4392	6.2800	1.2000
Lonicera involucrata	n	1.4812	5.0000	140.1128	23.4150	NA
Lotus corniculatus	i	1.2115	0.3000	245.7491	1.3026	2.9013
Lotus purshiana	n	NA	NA	NA	NA	NA
Lupinus bicolor	n	7.6231	0.4000	NA	NA	2.6800
Lupinus microcarpus	n	21.8924	NA	NA	NA	NA
Luzula comosa	n	0.6936	NA	NA	NA	NA
Maianthemum dilatatum	n	17.9918	0.3500	NA	NA	NA
Maianthemum racemosum	n	34.4643	1.0000	NA	NA	NA
Malus fusca	n	18.7449	12.0000	157.0000	NA	NA
Malus pumila	i	22.3587	12.0000	170.6800	NA	1.7349
Marah oreganus	n	NA	NA	NA	NA	NA
Melica bulbosa	n	NA	NA	NA	NA	NA
Melica subulata	n	NA	NA	NA	NA	NA
Micranthes integrifolia	n	NA	NA	NA	NA	NA
Mimulus alsinoides	n	0.0361	0.2500	NA	NA	NA
Mimulus guttatus	n	0.0195	0.8000	635.3008	18.2947	NA

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Table a.1.1 – continued from previous page

Species	Status	Seed Mass (mg)	Maximum Height (m)	SLA (cm^2/g)	Leaf Size (cm^2)	Leaf Nitrogen (%)
Minuartia rubella	n	0.0805	0.1500	NA	NA	NA
Minuartia tenella	n	NA	NA	NA	NA	NA
Monotropa uniflora	n	NA	0.3000	NA	NA	1.9700
Montia fontana	n	0.2620	0.2000	534.0600	0.1083	NA
Montia parvifolia	n	NA	NA	NA	NA	NA
Myosotis discolor	i	0.2047	0.5000	298.7326	0.6737	NA
Myosotis micrantha	i	NA	NA	NA	NA	NA
Myosurus minimus	n	0.0766	0.1000	206.8060	0.8278	NA
Narcissus pseudonarcissus	i	5.2353	NA	192.9352	17.3132	4.3000
Nemophila parviflora	n	4.6918	0.3000	NA	NA	NA
Nepeta cataria	i	0.5515	1.0000	308.6502	4.0148	NA
Oemleria cerasiformis	n	192.0458	3.0000	166.1557	15.6106	1.9200
Oenanthe sarmentosa	n	2.1863	1.0000	NA	NA	NA
Olsynium douglasii	n	2.7284	0.3000	NA	NA	NA
Opuntia fragilis	n	22.3664	0.2000	NA	NA	NA
Orobanche californica	n	0.0110	0.3500	NA	NA	NA
Orobanche uniflora	n	0.0065	0.1500	NA	NA	NA
Osmorhiza chilensis	n	6.6506	NA	NA	1.0700	NA
Osmorhiza purpurea	n	NA	NA	NA	NA	NA
Oxytropis campestris	n	1.7862	0.3000	149.2537	NA	NA
Paxistima myrsinites	n	NA	1.0000	NA	NA	NA
Pentagramma triangularis	n	NA	NA	NA	NA	NA
Perideridia gairdneri	n	1.0302	1.2000	NA	NA	NA
Petroselinum crispum	i	1.6564	NA	NA	NA	NA
Phalaris arundinacea	i	0.6875	2.0000	209.1357	33.6600	3.1800
Philadelphus lewisii	n	0.1118	3.0000	NA	NA	NA
Phyllospadix scouleri	n	NA	0.4000	NA	NA	NA
Picea sitchensis	n	2.3155	60.8607	63.7149	0.1806	1.3409
Pinus contorta	n	5.6666	21.8182	38.1784	NA	1.0818
Piperia elegans	n	NA	NA	NA	NA	NA
Plagiobothrys scouleri	n	NA	NA	NA	NA	NA
Plantago elongata	i	NA	NA	NA	NA	NA
Plantago lanceolata	i	1.2590	0.4356	191.1300	13.3022	1.8269
Plantago major	i	0.1752	0.2308	205.4945	4.5815	1.3422
Plantago maritima	n	0.3961	0.2400	114.9387	6.6694	NA
Plectritis congesta	n	0.5627	0.6000	NA	NA	NA
Poa annua	i	0.2533	0.2921	369.9339	1.3689	3.5147
Poa bulbosa	i	0.5731	0.6000	208.5694	0.1592	1.3423
Poa compressa	i	0.2122	0.6000	204.2454	1.7673	5.0600
Poa confinis	n	NA	NA	NA	NA	NA
Poa pratensis	i	0.2822	0.4615	218.6367	9.6685	2.1665
Poa secunda	n	0.3848	1.2000	NA	NA	1.5837
Poa trivialis	n	0.1500	0.4069	321.6123	0.9054	4.2675
Polygonum aviculare	i	0.9657	1.0000	291.4170	3.3029	3.7338
Polygonum douglasii	n	1.6644	0.4000	NA	NA	NA
Polygonum fowleri	n	NA	0.5000	NA	NA	NA
Polygonum spergulariiforme	n	NA	NA	NA	NA	NA
Polypodium glycyrrhiza	n	NA	NA	NA	NA	NA
Polypodium hesperium	n	NA	NA	NA	NA	NA
Polypogon monspeliensis	i	0.0831	0.7000	NA	NA	NA
Polystichum munitum	n	NA	1.5000	NA	NA	NA
Populus tremuloides	n	0.1173	16.0124	123.5389	18.9983	2.3023
Potentilla anserina	n	0.9026	0.2500	208.7898	34.2478	2.7200
Primula pauciflora	n	0.3123	NA	NA	NA	NA
Prunella vulgaris	i	0.8099	0.2857	288.5187	6.6683	1.6747
Prunus avium	i	178.5459	15.3892	190.4137	26.3700	1.8983
Prunus cerasus	i	162.4190	NA	149.6723	24.4248	2.8299
Prunus emarginata	n	42.2495	15.0000	173.2623	8.0838	NA
Prunus mahaleb	i	83.8024	9.4737	196.9161	7.0142	2.0682
Prunus virginiana	n	68.2564	10.0000	158.5849	21.2623	2.4782
Pseudognaphalium stramineum	n	NA	NA	NA	NA	NA
Pseudotsuga menziesii	n	15.0241	61.1395	60.5069	0.2766	1.2297
Pteridium aquilinum	n	NA	1.7000	140.5285	NA	2.3352
Puccinellia nutkaensis	n	NA	NA	NA	NA	NA

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Table a.1.1 – continued from previous page

Species	Status	Seed Mass (mg)	Maximum Height (m)	SLA (cm^2/g)	Leaf Size (cm^2)	Leaf Nitrogen (%)
Pyrus calleryana	i	12.9000	NA	NA	NA	1.6000
Pyrus communis	i	32.2815	15.0000	62.0633	NA	1.3743
Quercus garryana	n	4273.6435	25.0000	71.3399	22.3920	NA
Ranunculus californicus	n	2.3642	0.6000	NA	NA	NA
Ranunculus occidentalis	n	2.5385	0.6000	NA	NA	NA
Ranunculus uncinatus	n	0.6985	0.9000	NA	NA	NA
Ribes divaricatum	n	2.0600	2.6667	345.8400	11.9800	2.2800
Ribes lacustre	n	0.9198	2.0000	NA	NA	NA
Ribes sanguineum	n	2.5930	2.1646	220.7261	32.9550	2.5400
Rosa gymnocarpa	n	21.0546	1.5000	NA	1.9100	NA
Rosa nutkana	n	11.8768	3.0000	NA	NA	NA
Rubus armeniacus	i	NA	NA	NA	NA	NA
Rubus laciniatus	i	NA	NA	NA	NA	NA
Rubus leucodermis	n	1.0137	2.0000	297.2711	22.9655	NA
Rubus parviflorus	n	0.9947	1.9853	449.3600	49.5618	2.1900
Rubus spectabilis	n	3.1511	4.0000	185.2408	19.7080	NA
Rubus ursinus	n	2.0171	2.9032	183.0052	12.5819	2.0100
Rubus vestitus	i	NA	NA	NA	NA	NA
Rumex acetosella	i	0.5015	0.2416	280.4775	1.6525	2.4984
Rumex conglomeratus	i	1.3350	1.0000	220.0000	41.9000	NA
Rumex crispus	i	1.4103	0.4615	223.1873	141.0410	NA
Rumex occidentalis	n	1.9152	1.5000	NA	NA	NA
Rumex transitorius	n	NA	NA	NA	NA	NA
Sagina decumbens	n	0.0110	0.1500	NA	NA	NA
Sagina maxima	n	NA	NA	NA	NA	NA
Salix hookeriana	n	NA	NA	NA	NA	NA
Salix lasiandra	n	NA	NA	NA	NA	NA
Salix scouleriana	n	NA	NA	NA	NA	NA
Salix sitchensis	n	NA	NA	NA	NA	NA
Sambucus racemosa	n	1.8886	3.3183	281.1332	106.9625	5.9900
Sanicula arctopoides	n	2.8247	0.3000	NA	NA	NA
Sanicula bipinnatifida	n	1.9280	0.6000	NA	NA	NA
Sanicula crassicaulis	n	4.6625	1.2000	NA	NA	NA
Sarcocornia perennis	n	4.8515	NA	NA	NA	NA
Satureja douglasii	n	NA	NA	NA	NA	NA
Saxifraga caespitosa	n	NA	NA	NA	NA	NA
Scorzoneroides autumnalis	i	0.6944	NA	258.2912	1.1202	2.1424
Sedum album	i	0.0329	0.2000	183.5044	0.2244	NA
Sedum lanceolatum	n	0.0807	0.2500	NA	NA	NA
Sedum spathulifolium	n	NA	NA	NA	NA	NA
Selaginella wallacei	n	NA	NA	NA	NA	NA
Senecio sylvaticus	i	0.2628	0.8000	295.0000	53.3600	NA
Senecio vulgaris	i	0.2175	0.4950	302.5705	3.3210	NA
Shepherdia canadensis	n	8.8861	2.0000	NA	NA	NA
Sherardia arvensis	i	1.5546	NA	221.2662	0.0812	NA
Silene antirrhina	i	0.0763	0.8000	NA	NA	NA
Silene coronaria	i	NA	NA	NA	NA	NA
Silene gallica	i	0.3310	0.5000	339.4001	4.3853	NA
Silene menziesii	n	0.2453	0.7000	NA	NA	NA
Silene scouleri	n	0.2956	0.8000	NA	NA	NA
Sinapis arvensis	i	1.6324	0.6667	321.3795	70.9517	NA
Solanum dulcamara	i	2.7738	3.0000	310.8730	13.5665	3.9887
Solidago lepida	n	NA	NA	NA	NA	NA
Soliva sessilis	i	0.9388	NA	NA	NA	NA
Sonchus arvensis	i	0.4659	2.0000	212.3102	49.9429	NA
Sonchus asper	i	0.2720	1.2000	246.2412	50.5997	3.2900
Sonchus oleraceus	i	0.3168	1.2000	348.5341	39.7910	2.8821
Sorbus aucuparia	i	4.3549	1.4660	155.2289	6.1683	2.0540
Sorbus hybrida	i	NA	NA	NA	NA	NA
Sorbus intermedia	i	26.1221	7.2000	174.1615	52.7809	NA
Spergularia canadensis	n	NA	NA	NA	NA	NA
Spergularia macrotheca	n	0.0946	0.4500	NA	NA	NA
Spergularia rubra	i	0.0428	0.3000	153.1572	0.0917	2.7100
Spergularia salina	n	NA	NA	NA	NA	NA

Continued on next page

Table a.1.1 – continued from previous page

Species	Status	Seed Mass (mg)	Maximum Height (m)	SLA (cm^2/g)	Leaf Size (cm^2)	Leaf Nitrogen (%)
Spiranthes romanzoffiana	n	0.0014	0.5000	NA	NA	NA
Stellaria crispa	n	0.0572	0.6000	NA	NA	NA
Stellaria media	i	0.3034	0.4091	358.8464	3.0759	4.0438
Stellaria nitens	n	0.0960	0.2500	NA	NA	NA
Symphoricarpos albus	n	5.8948	1.9870	224.7188	19.4661	1.3716
Symphyotrichum subspicatum	n	NA	NA	NA	NA	NA
Taeniatherum caput medusae	i	6.2167	NA	NA	NA	1.8300
Taraxacum officinale	i	0.6311	0.6000	309.7168	37.1800	3.5693
Taxus brevifolia	n	30.8919	15.0000	90.6239	0.2200	1.1860
Teesdalia nudicaulis	i	0.2901	0.2500	278.9337	1.0444	NA
Tellima grandiflora	n	0.0484	0.8000	342.1184	57.7700	NA
Thuja plicata	n	1.3471	60.0000	NA	NA	1.1863
Tiarella trifoliata	n	0.4267	0.5000	NA	NA	NA
Toxicoscordion venenosum	n	1.6634	NA	NA	NA	NA
Tragopogon porrifolius	i	11.4646	1.0000	293.6887	13.3486	NA
Trientalis latifolia	n	NA	NA	NA	NA	NA
Trifolium dubium	i	0.3798	0.3333	292.4754	1.2899	NA
Trifolium incarnatum	i	2.6653	0.8000	282.8145	14.1868	NA
Trifolium macraei	n	1.5200	0.3000	NA	NA	NA
Trifolium microcephalum	n	0.5192	0.7000	NA	NA	2.8900
Trifolium microdon	n	NA	NA	NA	NA	NA
Trifolium oliganthum	n	1.0620	0.3500	NA	NA	NA
Trifolium pratensis	i	NA	NA	NA	NA	NA
Trifolium procumbens	i	NA	NA	NA	NA	NA
Trifolium repens	i	0.5599	0.1714	280.1702	3.6697	4.0834
Trifolium subterraneum	i	6.5194	NA	250.0000	NA	5.1300
Trifolium tridentatum	n	NA	NA	NA	NA	NA
Trifolium variegatum	n	1.4584	0.6000	NA	NA	NA
Triglochin maritima	n	0.5797	1.2000	110.8527	3.7372	NA
Triphysaria pusilla	n	0.2288	0.2000	NA	NA	NA
Trisetum cernuum	n	0.6653	NA	NA	NA	NA
Triteleia grandiflora	n	1.2025	0.7000	NA	NA	NA
Triteleia hyacinthina	n	1.1856	0.6000	NA	NA	NA
Tsuga heterophylla	n	1.9150	60.0000	90.5098	0.1600	1.1808
Turritis glabra	n	0.0662	1.2000	257.8523	7.3012	NA
Typha latifolia	n	0.0717	2.7273	97.0154	218.5023	1.2402
Urtica dioica	n	0.1361	2.0000	269.0681	31.5490	4.3609
Vaccinium ovatum	n	1.6364	3.0000	NA	NA	0.6841
Vaccinium parvifolium	n	0.2220	4.0000	204.1743	1.5090	NA
Valeriana hookeri	n	NA	NA	NA	NA	NA
Valerianella locusta	i	1.7109	0.0400	317.0000	1.5200	NA
Veronica arvensis	i	0.1134	0.1600	310.9255	1.0498	NA
Veronica chamaedrys	i	0.2064	0.1500	295.9284	2.9231	1.8890
Veronica officinalis	i	0.1339	0.4000	254.8623	0.7742	1.9599
Veronica peregrina	i	0.0325	0.2500	305.9564	0.3956	NA
Veronica serpyllifolia	i	0.0562	0.3000	228.5810	1.8800	NA
Vicia americana	n	12.6481	0.4615	NA	NA	2.5884
Vicia cracca	i	14.1953	2.0000	260.9799	9.5815	4.0709
Vicia hirsuta	i	5.0743	0.7000	214.0023	2.4988	NA
Vicia nigricans	n	89.8090	2.0000	NA	2.1809	NA
Vicia sativa	i	22.0177	0.8000	253.2227	3.2951	NA
Vinca major	i	19.4088	0.4800	188.4611	26.0700	NA
Vitis riparia	i	79.0000	NA	268.4958	NA	1.5700
Vitis vinifera	i	27.8209	NA	268.7573	119.6265	2.5231
Vulpia bromoides	i	0.4415	0.5500	187.6299	0.3770	NA
Vulpia microstachys	n	1.0017	0.4000	NA	NA	NA
Vulpia myuros	i	0.5031	0.9000	215.9508	0.3200	NA
Woodsia scopulina	n	NA	NA	NA	NA	NA
Zostera marina	n	NA	2.5000	NA	NA	NA

A.2 METADATA FOR EACH ISLAND

Table A.2.1: Metadata for each island (total island area, assigned size category), summary of species diversity observed on each island, and the per cent of species with sequence data retrieved from GenBank.

Island name	Area (m^2)	Size category	Total native species	Total invasive species	Total species	Total native tips	Total invasive tips	Total tips	native species (%)	invasive species (%)	native tips (%)	invasive tips (%)
All SanJuanIslands	2725784.93	lg	265	150	415	226	140	366	0.64	0.36	0.62	0.38
Matia Island	570866.14	lg	107	49	156	97	46	143	0.69	0.31	0.68	0.32
Hat Island	458197.00	lg	83	32	115	77	32	109	0.72	0.28	0.71	0.29
Flat Top Island	198380.57	lg	90	45	135	80	40	120	0.67	0.33	0.67	0.33
Charles Island	143319.84	lg	77	44	121	71	42	113	0.64	0.36	0.63	0.37
Turn Island	138385.83	lg	103	49	152	91	47	138	0.68	0.32	0.66	0.34
North Finger Island	137795.28	lg	85	31	116	72	29	101	0.73	0.27	0.71	0.29
McConnell Island	115708.50	lg	100	43	143	87	42	129	0.70	0.30	0.67	0.33
Saddlebag Island	78996.00	lg	106	49	155	93	48	141	0.68	0.32	0.66	0.34
Reef Island	75420.00	lg	78	27	105	66	27	93	0.74	0.26	0.71	0.29
Little Sucia Island	74800.00	lg	68	23	91	58	23	81	0.75	0.25	0.72	0.28
Ewing Island	74700.00	lg	68	18	86	59	18	77	0.79	0.21	0.77	0.23
Sentinel Island	66072.87	lg	66	32	98	58	32	90	0.67	0.33	0.64	0.36
Cliff Island	60404.86	lg	81	34	115	70	33	103	0.70	0.30	0.68	0.32
Huckleberry Island	51778.00	lg	87	37	124	76	35	111	0.70	0.30	0.68	0.32
Colville Island	45546.56	lg	26	23	49	22	21	43	0.53	0.47	0.51	0.49
Yellow Island	44515.42	lg	116	68	184	102	67	169	0.63	0.37	0.60	0.40
Willow Island	39500.00	lg	61	20	81	50	20	70	0.75	0.25	0.71	0.29
Castle Island	34008.10	lg	92	29	121	82	26	108	0.76	0.24	0.76	0.24
Boulder Island	25546.56	med	65	24	89	58	24	82	0.73	0.27	0.71	0.29
Flower Island	18110.24	med	54	24	78	48	22	70	0.69	0.31	0.69	0.31
Victim Island	16437.25	med	66	31	97	58	31	89	0.68	0.32	0.65	0.35
Aleck Rock	14898.79	med	59	22	81	54	22	76	0.73	0.27	0.71	0.29
Dot Island	14485.00	med	66	27	93	56	27	83	0.71	0.29	0.67	0.33
Deadman Island	13441.30	med	51	22	73	47	21	68	0.70	0.30	0.69	0.31
Iceberg Island	12955.47	med	41	22	63	33	21	54	0.65	0.35	0.61	0.39
Ripple Island	12955.47	med	40	17	57	35	17	52	0.70	0.30	0.67	0.33
Fawn Island	12348.18	med	41	32	73	36	32	68	0.56	0.44	0.53	0.47
Coon Island	12186.23	med	60	38	98	50	37	87	0.61	0.39	0.57	0.43
Barren Island	12145.75	med	31	18	49	27	18	45	0.63	0.37	0.60	0.40
Flint Beach Island	11336.03	med	59	20	79	52	19	71	0.75	0.25	0.73	0.27
Skull Island	10323.89	med	59	40	99	46	38	84	0.60	0.40	0.55	0.45
Battleship Island	10000.00	med	58	28	86	50	26	76	0.67	0.33	0.66	0.34
Fortress Island	9311.74	med	41	16	57	36	16	52	0.72	0.28	0.69	0.31
Matia West 1	8994.00	med	59	15	74	52	15	67	0.80	0.20	0.78	0.22
Gossip Island	8583.00	med	46	25	71	42	24	66	0.65	0.35	0.64	0.36
Blind Island	7368.42	med	50	15	65	45	15	60	0.77	0.23	0.75	0.25
Unnamed 2 near Long Island	6477.73	med	24	13	37	21	13	34	0.65	0.35	0.62	0.38
East Sucia 7 Island	6400.00	med	51	20	71	42	20	62	0.72	0.28	0.68	0.32
Near Decatur Island Unnamed 3	5668.02	med	32	14	46	28	14	42	0.70	0.30	0.67	0.33
Little McConnell Island	5425.10	med	53	35	88	46	33	79	0.60	0.40	0.58	0.42
Rum Island	4858.30	med	44	17	61	41	16	57	0.72	0.28	0.72	0.28
Swirl Rock Central	4858.30	med	16	4	20	16	4	20	0.80	0.20	0.80	0.20
Secar Rock	4615.38	med	7	3	10	6	3	9	0.70	0.30	0.67	0.33
Posey Island	4412.96	med	43	36	79	38	36	74	0.54	0.46	0.51	0.49
Buck Island	4372.47	med	10	7	17	10	7	17	0.59	0.41	0.59	0.41
Cemetery Island	3886.64	med	24	7	31	22	7	29	0.77	0.23	0.76	0.24
Unnamed 1 near Long Island	3522.27	med	31	20	51	28	19	47	0.61	0.39	0.60	0.40
Nob Island	2874.49	med	44	22	66	39	22	61	0.67	0.33	0.64	0.36
Unnamed 3 near Long Island	2226.72	med	10	6	16	8	6	14	0.63	0.38	0.57	0.43

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Table a.2.1 – continued from previous page

Island name	Area (m^2)	Size category	Total native species	Total invasive species	Total species	Total native tips	Total invasive tips	Total tips	native species (%)	invasive species (%)	native tips (%)	invasive tips (%)
East Sucia 6 Island	2200.00	med	32	13	45	27	13	40	0.71	0.29	0.68	0.33
Rim Island	2024.29	med	24	12	36	22	12	34	0.67	0.33	0.65	0.35
Low Island	1862.35	med	24	15	39	24	15	39	0.62	0.38	0.62	0.38
Broken Point Island	1850.00	med	34	19	53	29	17	46	0.64	0.36	0.63	0.37
Matia West 2	1800.00	med	14	9	23	13	9	22	0.61	0.39	0.59	0.41
Swirl Rock East	1457.49	sm	1	0	1	0	0	0	0.00	0.00	0.00	0.00
Oak Island	1420.00	sm	33	25	58	27	24	51	0.57	0.43	0.53	0.47
Little Cactus	1336.03	sm	29	11	40	28	11	39	0.73	0.28	0.72	0.28
Crab Island	1214.57	sm	7	7	14	6	7	13	0.50	0.50	0.46	0.54
Mackaye Harbor Island	1214.57	sm	16	14	30	13	14	27	0.53	0.47	0.48	0.52
Unnamed west of Castle Island	1174.09	sm	4	1	5	4	1	5	0.80	0.20	0.80	0.20
Turnlet Island	1112.00	sm	24	20	44	22	20	42	0.55	0.45	0.52	0.48
Unnamed 72 Island	1052.63	sm	22	17	39	19	17	36	0.56	0.44	0.53	0.47
Small Island near Charles	890.69	sm	13	3	16	13	3	16	0.81	0.19	0.81	0.19
East Sucia 4 Island	830.00	sm	42	11	53	35	11	46	0.79	0.21	0.76	0.24
Pole Island	728.74	sm	26	17	43	22	17	39	0.60	0.40	0.56	0.44
Reeflet Island	687.00	sm	23	19	42	19	18	37	0.55	0.45	0.51	0.49
Dotlet Island	630.00	sm	17	10	27	16	10	26	0.63	0.37	0.62	0.38
Massacre Bay 1 Island	566.80	sm	13	9	22	11	9	20	0.59	0.41	0.55	0.45
Little Nob	526.32	sm	9	3	12	9	3	12	0.75	0.25	0.75	0.25
Swirl Rock West	404.86	sm	3	0	3	3	0	3	1.00	0.00	1.00	0.00
East Sucia 1 Island	300.00	sm	35	19	54	29	18	47	0.65	0.35	0.62	0.38
Smaller Island near Charles	242.91	sm	2	0	2	2	0	2	1.00	0.00	1.00	0.00
East Sucia 8 Island	237.00	sm	7	3	10	5	3	8	0.70	0.30	0.63	0.38
Little Oak	179.00	sm	7	8	15	7	8	15	0.47	0.53	0.47	0.53
East Sucia 2 Island	100.00	sm	29	16	45	25	16	41	0.64	0.36	0.61	0.39
East Sucia 5 Island	100.00	sm	6	0	6	5	0	5	1.00	0.00	1.00	0.00
Shag Reef Smallest unnamed island	80.97	sm	2	0	2	2	0	2	1.00	0.00	1.00	0.00
by Long Island	80.97	sm	2	6	8	1	6	7	0.25	0.75	0.14	0.86
East Sucia 3 Island	60.00	sm	23	15	38	19	15	34	0.61	0.39	0.56	0.44
Little Oak 2	1.00	sm	1	0	1	0	0	0	0.00	0.00	0.00	0.00

A.3 COMMUNITY MATRIX OF THE SAN JUAN ARCHIPELAGO, WA

TABLE A.3.1: Community matrix with presence/absence of each species across the 80 islands in the San Juan archipelago, WA.

Specie name	All San Juan Islands	Aleck Rock	Barren Island	Battleship Island	Blind Island	Boulder Island	Broken Point Island	Buck Island	Castle Island	Cemetery Island	Charles Island	Cliff Island	Colville Island	Coon Island	Crab Island	Deadman Island	Dot Island	Doilet Island	East Sucia 1 Island	East Sucia 2 Island	East Sucia 3 Island	East Sucia 4 Island	East Sucia 5 Island	East Sucia 6 Island	East Sucia 7 Island	East Sucia 8 Island	Ewing Island	Fawn Island	Flat Top Island	Flint Beach Island	Flower Island	Fortress Island	Gossip Island	Hat Island	Huckleberry Island	Iceberg Island	Little Cactus	Little McConnell Island	Little Nob	Little Oak	Little Oak 2	Little Sucia Island	Low Island	Mackaye Harbor Island	Massacre Bay 1 Island	Matia Island	Matia West 1	Matia West 2	McConnell Island	Near Decatur Island Unnamed 3	Nob Island	North Finger Island	Oak Island	Pole Island	Posey Island	Reef Island	Reeflet Island	Rim Island	Ripple Island	Rum Island	Saddlebag Island	Secar Rock	Sentinel Island	Shag Reef	Skull Island	Small Island near Charles	Smaller Island near Charles	Smallest unnamed island by Long Island	Swirl Rock East	Swirl Rock Central	Swirl Rock West	Turn Island	Turnlet Island	Unnamed 1 near Long Island	Unnamed 2 near Long Island	Unnamed 3 near Long Island	Unnamed 72 Island	Unnamed west of Castle Island	Victim Island	Willow Island	Yellow Island
Abies grandis	✓	-	-	-	-	-	-	-	-	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	-	-	-	-	-	-	✓	-	-	-	✓	✓	-	✓	-	-	✓	-	-	-	✓	-	-	-	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	✓
Acer glabrum	✓	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acer macrophyllum	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	✓	-	-	✓	-	-	✓	-	-	-	✓	-	-	-	-	✓	-	✓	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-
Achillea millefolium	✓	✓	✓	✓	✓	✓	✓	-	✓	✓	✓	✓	-	✓	-	✓	✓	✓	✓	✓	✓	✓	-	-	✓	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	-	✓	-	✓	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	✓	✓	✓	-	-	-	✓	✓	-	-	-	✓	-	✓	✓	✓	✓	-	-	-	✓	✓	✓
Achnatherum lemmonii	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Adenocaulon bicolor	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-
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Agrostis stolonifera	✓	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	✓
Aira caryophyllea	✓	✓	✓	✓	-	✓	✓	-	-	✓	-	✓	-	✓	-	✓	✓	✓	✓	-	✓	✓	-	✓	✓	✓	✓	-	✓	-	-	✓	-	✓	✓	-	-	✓	-	-	-	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	✓	✓	✓	✓	✓	✓	-	✓	-	✓	-	-	-	-	-	-	✓	✓	✓	-	-	✓	-	✓	✓	✓
Aira praecox	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	✓	✓	✓	-	✓	✓	✓	✓	-	✓	✓	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	-	✓	-	✓	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	✓	-	✓	-	✓	-	-	-	-	-	-	✓	✓	✓	-	-	✓	-	✓	✓	✓
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Alnus rubra	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-
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Amelanchier alnifolia	✓	✓	✓	✓	-	-	-	-	✓	-	✓	✓	-	✓	-	✓	✓	-	-	-	-	✓	-	✓	✓	-	✓	✓	✓	-	✓	✓	✓	✓	✓	✓	-	✓	-	-	-	✓	-	-	-	✓	✓	✓	✓	-	✓	✓	-	-	✓	✓	-	-	✓	✓	✓	-	✓	-	✓	-	-	-	-	-	-	✓	-	-	-	-	-	-	✓	✓	✓
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Amsinckia spectabilis	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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Aphanes australis	✓	✓	✓	✓	✓	✓	-	-	✓	✓	-	✓	-	✓	-	-	✓	-	✓	✓	✓	✓	-	✓	✓	-	-	✓	-	✓	✓	-	✓	✓	-	✓	-	✓	-	-	-	✓	-	-	-	✓	✓	-	✓	-	✓	✓	-	✓	✓	-	-	-	✓	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	✓	-	✓
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Turritis glabra	✓	✓	-	-	-	✓	✓	-	✓	-	-	✓	-	-	-	-	✓	-	-	-	-	✓	-	-	✓	-	✓	✓	✓	-	✓	-	-	✓	-	-	-	✓	-	-	-	✓	-	-	-	-	-	-	✓	✓	-	✓	-	-	✓	-	-	-	-	✓	-	-	-	-	✓	-	-	-	-	-	-	✓	-	-	-	-	-	-	✓	✓	✓
Arabis hirsuta	✓	-	-	✓	✓	✓	✓	-	-	-	-	✓	-	-	-	-	-	-	✓	✓	✓	✓	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	-	-	-	-	-	-	✓	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓
Arbutus menziesii	✓	-	-	✓	-	-	-	-	✓	-	✓	✓	-	✓	-	-	✓	-	-	-	-	-	-	-	✓	-	✓	✓	✓	-	✓	-	✓	-	✓	-	-	✓	-	-	-	✓	-	-	-	✓	✓	-	✓	-	✓	✓	-	-	✓	✓	-	-	-	✓	✓	-	✓	-	✓	-	-	-	-	-	-	✓	-	-	-	-	-	-	✓	✓	✓
Arctostaphylos uva ursi	✓	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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Armeria maritima	✓	✓	-	✓	✓	✓	-	✓	✓	-	✓	-	✓	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	-	-	-	-	-	✓	-	-	-	✓	-	✓	-	✓	✓	✓	-	-	-	-	-
Artemisia campestris	✓	-	-	✓	✓	✓	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Artemisia suksdorfii	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asparagus officinalis	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Aspidotis densa	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Table a.3.1 – continued from previous page

Specie name	All San Juan Islands	Aleck Rock	Barren Island	Battleship Island	Blind Island	Boulder Island	Broken Point Island	Buck Island	Castle Island	Cemetery Island	Charles Island	Cliff Island	Colville Island	Coon Island	Crab Island	Deadman Island	Dot Island	Dotlet Island	East Sucia 1 Island	East Sucia 2 Island	East Sucia 3 Island	East Sucia 4 Island	East Sucia 5 Island	East Sucia 6 Island	East Sucia 7 Island	East Sucia 8 Island	Ewing Island	Fawn Island	Flat Top Island	Flint Beach Island	Flower Island	Fortress Island	Gossip Island	Hat Island	Huckleberry Island	Iceberg Island	Little Cactus	Little McConnell Island	Little Nob	Little Oak	Little Oak 2	Little Sucia Island	Low Island	Mackaye Harbor Island	Massacre Bay 1 Island	Matia Island	Matia West 1	Matia West 2	McConnell Island	Near Decatur Island Unnamed 3	Nob Island	North Finger Island	Oak Island	Pole Island	Posey Island	Reef Island	Reeflet Island	Rim Island	Ripple Island	Rum Island	Saddlebag Island	Secar Rock	Sentinel Island	Shag Reef	Skull Island	Small Island near Charles	Smaller Island near Charles	Smallest unnamed island by Long Island	Swirl Rock East	Swirl Rock Central	Swirl Rock West	Turn Island	Turnlet Island	Unnamed 1 near Long Island	Unnamed 2 near Long Island	Unnamed 3 near Long Island	Unnamed 72 Island	Unnamed west of Castle Island	Victim Island	Willow Island	Yellow Island
Asplenium trichomanes	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-
Athyrium filix femina	✓	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Atriplex dioica	✓	-	✓	-	-	-	✓	-	-	-	-	-	✓	✓	-	✓	-	-	✓	-	-	-	✓	-	✓	✓	-	-	-	✓	✓	-	-	-	-	✓	-	✓	-	-	-	-	-	-	✓	-	-	-	✓	-	-	✓	✓	✓	✓	✓	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	✓	✓	-	✓	-	-	-	-	-	✓
Atriplex gmelinii	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	✓	-	-	✓	-	-	-	✓	-	-	✓	-	-	-	-	-	-	-	-	-	✓	-	-	✓	-	-	-	✓	-	✓	-	-	-	-	-	-	✓	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	✓	-	-	-	-	-
Atriplex prostrata	✓	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	-	-	-	✓	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	✓	✓	-	-	-	✓	-	-	-	✓
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Berberis aquifolium	✓	✓	-	✓	-	✓	✓	-	✓	-	✓	✓	-	✓	-	-	✓	-	✓	✓	-	✓	-	✓	✓	-	-	✓	✓	✓	✓	-	✓	✓	✓	-	-	-	-	-	-	✓	-	-	-	✓	✓	-	✓	-	✓	✓	✓	✓	✓	✓	-	✓	-	✓	✓	-	✓	-	✓	-	-	-	-	-	-	✓	-	-	-	-	✓	-	✓	✓	✓
Berberis nervosa	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	✓	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-
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Brodiaea coronaria	✓	✓	✓	✓	✓	✓	-	-	✓	✓	✓	-	-	-	-	-	✓	-	-	✓	✓	-	-	-	✓	-	-	-	✓	-	✓	✓	✓	✓	-	-	✓	✓	-	-	-	-	-	✓	-	✓	✓	-	-	-	-	-	-	✓	✓	✓	-	-	-	✓	✓	-	✓	-	✓	-	-	-	-	-	-	✓	-	-	-	-	-	-	✓	-	✓
Bromus carinatus	✓	✓	-	-	✓	-	-	-	✓	-	-	✓	✓	✓	-	-	✓	✓	✓	-	-	✓	-	-	-	-	✓	✓	✓	-	-	✓	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	✓	✓	-	-	-	-	-	-	-	✓	✓	-	-	-	✓	-	-	-	-	-	-	✓	✓	-	-	-	-	-	✓	-	-
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Bromus diandrus	✓	✓	✓	✓	✓	✓	-	-	✓	✓	✓	✓	✓	-	✓	✓	-	✓	✓	✓	-	✓	-	✓	✓	-	✓	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	✓	-	✓	-	-	-	-	-	-	-	✓	✓	✓	-	✓	-	-	✓	✓
Bromus hordeaceus	✓	✓	✓	✓	-	✓	✓	✓	✓	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	✓	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	-	✓	-	-	-	-	✓	-	✓	✓	✓	✓	-	✓	-	✓	✓	✓
Bromus pacificus	✓	✓	-	-	-	-	-	-	-	✓	✓	✓	✓	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	✓	-	-	✓	-	-	✓	-	-	-	-	-	-	-	✓	-	-	-	-	-	✓	-	✓	-	✓	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	✓
Bromus sitchensis	✓	-	-	✓	-	-	✓	-	✓	-	-	-	-	✓	-	✓	✓	-	✓	-	-	-	-	-	-	-	-	-	✓	-	✓	-	-	-	✓	✓	-	-	-	-	-	✓	-	-	-	✓	✓	-	✓	-	-	-	✓	✓	-	✓	-	✓	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓
Bromus sterilis	✓	-	-	-	-	-	✓	-	-	-	-	✓	-	✓	-	✓	-	-	✓	-	✓	✓	-	-	-	-	-	✓	-	-	-	-	-	✓	-	-	-	-	-	✓	-	-	✓	-	✓	✓	✓	-	✓	-	✓	✓	✓	-	✓	✓	-	-	-	-	-	-	✓	-	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	✓	-	✓
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Bromus vulgaris	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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Calypso bulbosa	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	✓
Camassia leichtlinii	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	✓	✓	✓	-	-	-	-	-	-	-	-	✓	-	✓	-	✓	✓	✓	✓	✓	-	-	✓	✓	✓	✓	-	-	-	✓	-	-	-	✓	✓	✓	✓	✓	✓	-	-	✓	✓	-	-	✓	✓	-	-	✓	-	✓	✓	-	-	-	-	-	-	✓	✓	-	-	✓	-	✓	✓	✓
Camassia quamash	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Campanula rotundifolia	✓	-	-	-	✓	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Capsella bursa pastoris	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
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Cardamine hirsuta	✓	-	-	✓	-	-	-	-	-	-	✓	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	✓	-	-	✓	✓	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	✓	-	✓	-	-	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	✓	-	✓
Cardamine oligosperma	✓	-	-	-	-	✓	-	-	-	-	-	✓	-	-	-	-	✓	-	✓	-	-	✓	-	✓	✓	-	-	-	-	-	-	-	-	✓	✓	-	-	-	-	-	-	✓	-	-	-	✓	-	-	-	-	-	✓	-	-	-	-	-	-	✓	-	✓	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Carex deweyana	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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Carex lyngbyei	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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Castilleja attenuata	✓	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Castilleja hispida	✓	✓	-	-	✓	✓	-	-	✓	-	-	✓	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	✓	-	✓	✓	-	-	✓	-	-	-	✓	-	-	-	✓	✓	-	✓	✓	-	✓	-	-	-	✓	✓	-	✓	✓	✓	-	✓	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	✓	✓	✓
Castilleja victoriae	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cerastium arvense	✓	✓	-	✓	✓	✓	✓	-	✓	✓	✓	✓	-	✓	-	✓	✓	✓	✓	✓	✓	✓	-	✓	✓	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	-	-	-	✓	-	✓	-	✓	✓	✓	✓	-	✓	✓	✓	✓	✓	✓	-	✓	✓	✓	✓	-	✓	-	✓	✓	-	-	-	✓	-	✓	✓	✓	✓	-	✓	✓	✓	✓	✓
Cerastium fontanum	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-
Cerastium glomeratum	✓	-	✓	✓	-	-	-	-	-	✓	✓	✓	✓	-	-	-	✓	-	-	✓	✓	-	-	✓	✓	-	✓	✓	-	-	✓	-	✓	✓	✓	✓	✓	-	-	-	-	✓	-	-	-	✓	-	-	✓	-	✓	✓	✓	-	✓	✓	-	-	✓	-	✓	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	✓

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Specie name	All San Juan Islands	Aleck Rock	Barren Island	Battleship Island	Blind Island	Boulder Island	Broken Point Island	Buck Island	Castle Island	Cemetery Island	Charles Island	Cliff Island	Colville Island	Coon Island	Crab Island	Deadman Island	Dot Island	Doliet Island	East Sucia 1 Island	East Sucia 2 Island	East Sucia 3 Island	East Sucia 4 Island	East Sucia 5 Island	East Sucia 6 Island	East Sucia 7 Island	East Sucia 8 Island	Ewing Island	Fawn Island	Flat Top Island	Flint Beach Island	Flower Island	Fortress Island	Gossip Island	Hat Island	Huckleberry Island	Iceberg Island	Little Cactus	Little McConnell Island	Little Nob	Little Oak	Little Oak 2	Little Sucia Island	Low Island	Mackaye Harbor Island	Massacre Bay 1 Island	Matia Island	Matia West 1	Matia West 2	McConnell Island	Near Decatur Island Unnamed 3	Nob Island	North Finger Island	Oak Island	Pole Island	Posey Island	Reef Island	Reeflet Island	Rim Island	Ripple Island	Rum Island	Saddlebag Island	Secar Rock	Sentinel Island	Shag Reef	Skull Island	Small Island near Charles	Smaller Island near Charles	Smallest unnamed island by Long Island	Swirl Rock East	Swirl Rock Central	Swirl Rock West	Turn Island	Turnlet Island	Unnamed 1 near Long Island	Unnamed 2 near Long Island	Unnamed 3 near Long Island	Unnamed 72 Island	Unnamed west of Castle Island	Victim Island	Willow Island	Yellow Island
Cerastium pumilum	✓	-	-	-	-	✓	✓	-	✓	-	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	✓	✓	✓	-	-	-	-	✓	-	-	-	-	-	✓	-	✓	-	-	-	✓	-	✓	-	-	-	✓	-	-	-	-	✓	-	-	-	-	-	✓	✓	✓	✓	-	-	-	-	-	-
Cerastium semidecandrum	✓	✓	-	-	-	✓	-	-	✓	-	-	-	-	-	-	-	-	-	✓	✓	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	✓	-	-	-	-	✓	-	-
Chamerion angustifolium	✓	-	-	-	-	-	-	-	✓	-	-	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	✓	-	✓	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	✓
Chenopodium album	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	✓	-	✓	-	✓	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	✓
Cirsium arvense	✓	-	-	-	-	-	-	-	-	-	-	✓	-	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	✓	-	-	-	-	-	✓	-	-	✓	-	-	-	✓	-	-	-	-	-	-	✓	-	-	✓	-	-	-	✓	✓	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	✓	✓
Cirsium vulgare	✓	-	-	-	✓	-	✓	-	✓	-	✓	✓	✓	✓	-	-	✓	-	-	✓	-	-	-	✓	✓	-	✓	-	✓	-	✓	-	-	✓	✓	-	-	✓	-	-	-	-	-	-	-	✓	-	-	✓	-	-	✓	-	-	✓	✓	-	-	-	-	✓	-	✓	-	✓	-	-	✓	-	-	-	✓	-	✓	✓	-	-	-	✓	✓	✓
Clarkia amoena	✓	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Claytonia exigua	✓	-	-	✓	✓	✓	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	✓	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Claytonia parviflora	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	✓	-	-	-	-	✓	-	-	-	-	-	✓	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-
Claytonia perfoliata	✓	✓	✓	-	✓	✓	✓	-	✓	✓	✓	✓	-	✓	-	✓	✓	-	-	-	-	-	-	✓	✓	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	✓	✓	-	-	✓	✓	-	✓	-	-	✓	✓	✓	✓	-	-	-	-	-	✓	-	✓	-	✓	-	-	-	-	-	-	✓	-	-	-	-	✓	-	✓	-	✓
Claytonia rubra	✓	✓	✓	✓	✓	✓	-	-	✓	✓	✓	✓	✓	✓	-	-	✓	✓	✓	✓	✓	-	-	-	✓	-	✓	-	✓	-	-	-	-	-	-	-	✓	✓	-	-	-	✓	-	-	-	-	✓	-	✓	-	✓	✓	-	-	✓	-	-	-	-	-	-	-	✓	-	-	-	-	✓	-	-	-	-	✓	✓	-	-	-	-	-	-	✓
Collinsia grandiflora	✓	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	✓	-	✓	-	✓	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Collinsia parviflora	✓	✓	✓	✓	✓	✓	-	-	-	✓	✓	✓	-	✓	-	✓	✓	✓	-	-	-	✓	-	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	-	✓	-	-	✓	-	✓	-	-	-	✓	-	-	✓	-	✓	✓	-	✓	✓	✓	-	-	✓	✓	✓	-	✓	-	-	-	-	-	-	-	-	✓	✓	-	-	-	✓	-	✓	✓	✓
Conioselinum pacificum	✓	-	-	-	-	-	-	-	✓	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	✓	-	-	-	-	-	-	✓	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	✓	-	✓	-	-	-	-	-	-	✓	-	-	-	✓	-	✓	-	✓	-	-	-	-	✓
Conringia orientalis	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Corallorhiza maculata	✓	-	-	-	-	-	-	-	-	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	✓
Coreopsis lanceolata	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Corylus cornuta	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Cotoneaster dielsianus	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cotoneaster franchetii	✓	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-
Cotoneaster horizontalis	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-
Crassula tillaea	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crataegus douglasii	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crataegus monogyna	✓	-	-	✓	-	-	✓	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	✓	-	-
Crepis capillaris	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Cuscuta salina	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cynosurus cristatus	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cynosurus echinatus	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	✓	✓	-	✓	-	-	✓	✓	✓	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	✓	✓	-	-	-	-	-	-	-	✓
Cystopteris fragilis	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dactylis glomerata	✓	✓	-	✓	-	-	✓	-	-	-	✓	✓	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	-	✓	✓	✓	✓	-	-	-	✓	-	-	-	-	✓	-	-	✓	-	-	✓	-	✓	-	✓	-	✓	✓	✓	-	-	✓	✓	-	✓	-	✓	-	-	-	-	-	-	✓	✓	-	-	-	✓	-	✓	✓	✓
Danthonia californica	✓	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Daphne laureola	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-
Daucus pusillus	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	✓	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Delphinium menziesii	✓	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Delphinium nuttallianum	✓	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Digitalis purpurea	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Distichlis spicata	✓	✓	-	-	-	✓	-	-	-	✓	-	-	✓	✓	-	✓	-	-	-	✓	-	-	-	-	-	-	-	-	✓	✓	✓	-	-	-	✓	-	-	-	-	-	-	-	✓	-	✓	✓	-	-	✓	-	✓	-	✓	✓	✓	✓	-	✓	✓	-	✓	-	-	✓	-	-	-	-	-	✓	-	✓	-	-	✓	✓	✓	-	-	-	✓
Primula pauciflora	✓	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	-	-	-	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	✓	-	-	-	-	-	✓	✓
Erophila verna	✓	-	✓	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	✓	✓	✓	-	-	✓	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	✓	-	-	-	-	✓	-	✓
Dryopteris expansa	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Eleocharis palustris	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Elymus glaucus	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	✓	-	✓	-	✓	✓	✓	✓	-	-	✓	-	-	✓	-	✓	✓	✓	✓	✓	✓	-	✓	✓	✓	-	✓	✓	-	-	✓	✓	✓	-	-	✓	-	✓	✓	✓	✓	-	✓	✓	✓	-	✓	✓	-	✓	-	✓	-	✓	-	-	-	-	-	-	✓	✓	-	-	-	✓	-	✓	✓	✓
Elymus trachycaulus	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Elymus repens	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Epilobium ciliatum	✓	-	-	-	-	-	-	-	✓	-	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Epilobium minutum	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	✓	-	-	-	-	✓	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Epilobium paniculatum	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-
Epipactis helleborine	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Equisetum arvense	✓	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Continued on next page

Table a.3.1 – continued from previous page

Specie name	All San Juan Islands	Aleck Rock	Barren Island	Battleship Island	Bind Island	Boulder Island	Broken Point Island	Buck Island	Castle Island	Cemetery Island	Charles Island	Cliff Island	Colville Island	Coon Island	Crab Island	Deadman Island	Dot Island	Doulet Island	East Sucia 1 Island	East Sucia 2 Island	East Sucia 3 Island	East Sucia 4 Island	East Sucia 5 Island	East Sucia 6 Island	East Sucia 7 Island	East Sucia 8 Island	Ewing Island	Fawn Island	Flat Top Island	Flint Beach Island	Flower Island	Fortress Island	Gossip Island	Hat Island	Huckleberry Island	Iceberg Island	Little Cactus	Little McConnell Island	Little Nob	Little Oak	Little Oak 2	Little Sucia Island	Low Island	Mackaye Harbor Island	Massacre Bay 1 Island	Matia Island	Matia West 1	Matia West 2	McConnell Island	Near Decatur Island Unnamed 3	Nob Island	North Finger Island	Oak Island	Pole Island	Posey Island	Reef Island	Reeflet Island	Rim Island	Ripple Island	Rum Island	Saddlebag Island	Secar Rock	Sentinel Island	Shag Reef	Skull Island	Small Island near Charles	Smaller Island near Charles	Smallest unnamed island by Long Island	Swirl Rock East	Swirl Rock Central	Swirl Rock West	Turn Island	Turnlet Island	Unnamed 1 near Long Island	Unnamed 2 near Long Island	Unnamed 3 near Long Island	Unnamed 72 Island	Unnamed west of Castle Island	Victim Island	Willow Island	Yellow Island
Equisetum hyemale	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Equisetum telmateia	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Eriophyllum lanatum	✓	✓	-	-	✓	✓	-	-	✓	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	✓	-	-	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	✓	✓	-	-	-	-	-	-	-	✓	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓
Erodium cicutarium	✓	-	-	-	-	✓	-	-	-	-	✓	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	✓	-	✓	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	✓	✓	-	-	-	-	-	-	-	-
Erythronium oregonum	✓	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	✓	-	-	-	✓	✓	-	-	-	✓	-	-	-	✓	-	✓	-	-	✓	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	✓	-	-	-	-	✓	-	✓	-	✓	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	✓	-	✓
Eschscholzia californica	✓	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Festuca occidentalis	✓	-	-	-	-	-	-	-	-	-	-	✓	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	-	-	-	-	✓	✓	-	-	-	-	-	-	✓	-	-	-	✓	-	-	✓	-	-	✓	-	-	-	✓	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	✓	✓	✓
Festuca roemeri	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Festuca rubra	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	✓	✓	✓	✓	✓	✓	✓	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	✓	✓	✓	✓	✓	✓	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	-	✓	✓	-	-	-	✓	-	✓	✓	✓	✓	✓	✓	-	✓	✓	✓
Festuca subuliflora	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fragaria vesca	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	✓	-	-	-	-	-	-	✓	✓	-
Fragaria virginiana	✓	✓	-	-	✓	✓	-	-	✓	-	✓	✓	-	-	-	✓	-	-	-	-	-	✓	-	-	✓	-	✓	-	-	✓	-	-	-	-	✓	-	-	✓	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	✓
Fritillaria affinis	✓	✓	-	✓	✓	✓	-	-	✓	✓	✓	-	✓	✓	-	✓	✓	-	✓	✓	✓	✓	-	✓	✓	-	✓	-	✓	✓	✓	-	✓	✓	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	✓	-	✓	✓	-	-	-	✓	-	✓	-	✓	-	✓	✓	-	-	-	-	-	✓	-	✓	✓	-	-	-	✓	✓	✓
Galium aparine	✓	✓	-	✓	✓	✓	✓	-	✓	-	✓	✓	-	✓	-	✓	✓	✓	-	✓	✓	✓	-	✓	✓	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	-	-	-	✓	-	-	-	✓	-	-	✓	✓	✓	✓	✓	-	✓	-	-	✓	✓	✓	✓	-	✓	-	✓	-	-	-	-	-	-	✓	-	-	-	-	-	-	✓	✓	✓
Galium triflorum	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gamochaeta purpurea	✓	✓	-	-	-	✓	-	-	✓	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	✓	✓	✓	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	✓
Gaultheria shallon	✓	-	-	-	-	-	-	-	✓	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	✓	-	-	-	-	✓	✓	-	-	-	-	-	-	✓	-	-	-	✓	✓	-	✓	-	-	✓	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-
Gayophytum diffusum	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Geranium carolinianum	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Geranium dissectum	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	✓	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-
Geranium molle	✓	✓	-	✓	-	✓	✓	-	✓	-	✓	✓	✓	✓	-	✓	✓	✓	✓	-	-	✓	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	✓	✓	✓	✓	-	-	✓	✓	✓	-	✓	✓	✓	-	-	✓	-	✓	✓	-	-	-	✓	✓	-	-	-	✓	-	✓	✓	✓	✓	-	✓	-	✓	✓	✓
Geranium robertianum	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Geum macrophyllum	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gnaphalium palustre	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Goodyera oblongifolia	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	✓	-	-	-	✓	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	✓	-	✓
Grindelia hirsutula	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	✓	-	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	✓	✓	-	-	✓	-	✓	✓	✓	✓	✓	✓	-	✓	✓	✓	-	-	✓	✓	-	-	✓	✓	✓	✓	✓	✓	-	-
Grindelia integrifolia	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	✓	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	-	-	-	-	-	-	-	✓
Hedera helix	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hemizonella minima	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Heracleum maximum	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	✓	✓	-	-	-	-	-	-	-	-	✓	-	-	-	-	✓	-	✓	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Heuchera micrantha	✓	✓	-	-	-	-	✓	-	✓	-	✓	✓	-	✓	-	-	✓	-	✓	-	✓	✓	-	✓	✓	-	✓	✓	✓	-	✓	✓	-	✓	✓	-	-	✓	-	-	-	✓	-	✓	-	-	-	-	✓	✓	✓	✓	-	-	-	✓	-	-	-	✓	✓	-	✓	-	✓	-	-	-	-	-	-	✓	-	-	-	-	-	-	✓	✓	✓
Hieracium albiflorum	✓	-	-	-	-	-	-	-	-	-	-	✓	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	✓	-	-	-	-	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	✓	-	✓	-	-	✓	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	✓	-
Holcus lanatus	✓	✓	✓	✓	✓	✓	-	✓	✓	-	✓	-	✓	✓	✓	✓	✓	-	-	-	-	-	-	-	✓	-	✓	-	✓	✓	✓	✓	-	✓	✓	✓	-	✓	-	-	-	-	-	-	-	✓	✓	✓	✓	✓	-	-	-	✓	✓	-	-	✓	-	-	✓	-	✓	-	✓	-	-	-	-	-	-	✓	-	✓	✓	-	-	-	✓	✓	✓
Holodiscus discolor	✓	-	✓	✓	-	-	-	-	✓	-	✓	✓	-	✓	-	✓	✓	-	-	-	-	✓	-	✓	✓	-	✓	✓	✓	-	✓	✓	✓	✓	✓	-	-	✓	-	-	-	✓	-	-	-	✓	✓	-	✓	-	-	✓	✓	✓	✓	✓	-	✓	-	✓	✓	-	✓	-	-	-	-	-	-	-	-	✓	-	-	-	-	✓	-	✓	✓	✓
Honckenya peploides	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	✓
Hordeum brachyantherum	✓	-	✓	-	-	-	-	-	-	-	-	✓	-	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	✓	✓	✓	-	-	-	✓	-	-	✓	✓	-	-	-	-	-	✓	-	-	-	✓	-	✓	✓	-	-	-	✓	✓	-	-	-	✓	✓	-	-	✓	-	-	-	-	✓	-	✓	-	-	-	-	-	-	-	-	-
Hordeum depressum	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hordeum geniculatum	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hordeum jubatum	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-
Hordeum murinum	✓	✓	-	-	✓	✓	-	✓	✓	-	-	-	✓	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	-	✓	-	✓	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	✓	-	-	-	-	-	✓	✓	-	✓	-	✓	✓	-	-	✓	-	-	-	✓	-	✓	-	✓	-	✓	-	-	-	-	✓
Hutchinsia procumbens	✓	-	-	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-
Hypericum perforatum	✓	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hypochaeris glabra	✓	-	-	-	-	-	-	-	-	-	-	✓	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hypochaeris radicata	✓	✓	✓	✓	✓	-	-	✓	✓	-	✓	✓	✓	✓	-	✓	✓	-	-	-	-	-	-	-	✓	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	-	-	-	✓	-	-	-	✓	✓	✓	✓	✓	✓	-	✓	-	✓	-	✓	-	✓	✓	✓	-	✓	-	✓	-	-	✓	-	-	-	✓	✓	✓	✓	-	✓	-	✓	✓	✓
Ilex aquifolium	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	✓
Iris germanica	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Juncus balticus	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-
Juncus bufonius	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Juncus effusus	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Continued on next page

Table a.3.1 – continued from previous page

Specie name	All San Juan Islands	Aleck Rock	Barren Island	Battleship Island	Bind Island	Boulder Island	Broken Point Island	Buck Island	Castle Island	Cemetery Island	Charles Island	Cliff Island	Colville Island	Coon Island	Crab Island	Deadman Island	Dot Island	Dotlet Island	East Sucia 1 Island	East Sucia 2 Island	East Sucia 3 Island	East Sucia 4 Island	East Sucia 5 Island	East Sucia 6 Island	East Sucia 7 Island	East Sucia 8 Island	Ewing Island
Juncus laccatus	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Juniperus maritima	✓	-	-	✓	-	-	✓	-	-	-	-	✓	-	✓	-	-	✓	-	-	✓	✓	✓	-	✓	✓	-	✓
Koeleria macrantha	✓	✓	-	✓	✓	✓	-	-	✓	-	-	-	-	-	-	✓	✓	-	✓	✓	✓	✓	-	✓	✓	-	-
Lactuca serriola	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-
Lamium purpureum	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-
Lapsana communis	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lathyrus aphaca	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lathyrus japonicus	✓	✓	-	✓	-	-	-	-	✓	-	✓	-	-	✓	-	✓	-	-	-	✓	-	-	-	-	-	-	✓
Lathyrus nevadensis	✓	-	-	✓	-	-	-	-	-	-	✓	✓	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	✓
Lemna turionifera	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Scorzoneroides autumnalis	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lepidium virginicum	✓	-	-	✓	-	✓	-	-	✓	-	✓	-	-	✓	-	-	✓	-	✓	✓	✓	✓	-	✓	✓	-	✓
Leymus mollis	✓	✓	-	-	-	-	-	-	✓	✓	✓	✓	-	✓	-	✓	-	-	-	✓	-	-	-	-	-	-	✓
Lilium columbianum	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Linaria genistifolia	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Linnaea borealis	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Listera cordata	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithophragma parviflorum	✓	-	-	✓	-	-	-	-	-	-	-	-	-	✓	-	-	✓	✓	✓	-	-	✓	-	-	-	-	-
Buglossoides arvensis	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lolium perenne	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lomatium nudicaule	✓	✓	-	✓	✓	✓	-	-	✓	-	✓	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-
Lomatium utriculatum	✓	-	-	-	✓	✓	-	-	✓	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-
Lonicera ciliosa	✓	-	-	✓	-	-	-	-	✓	-	✓	-	-	-	-	-	✓	-	-	-	-	✓	-	-	✓	-	✓
Lonicera hispidula	✓	-	-	-	-	-	-	-	✓	-	-	✓	-	✓	-	-	✓	-	-	-	-	✓	-	-	✓	-	✓
Lonicera involucrata	✓	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lotus corniculatus	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acmispon denticulatus	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acmispon parviflorus	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Lotus purshiana	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lupinus bicolor	✓	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lupinus microcarpus	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Luzula comosa	✓	✓	-	✓	✓	✓	-	-	✓	-	✓	✓	-	✓	-	-	✓	-	-	-	-	✓	-	-	-	-	✓
Maianthemum dilatatum	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Maianthemum racemosum	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	✓	✓	-	✓
Malus fusca	✓	-	-	-	-	✓	-	-	✓	-	✓	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-
Malus pumila	✓	✓	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Marah oreganus	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Melica bulbosa	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Melica subulata	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mimulus alsinoides	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mimulus guttatus	✓	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-
Minuartia rubella	✓	-	-	-	✓	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Minuartia tenella	✓	✓	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-
Monotropa uniflora	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Montia fontana	✓	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Montia parvifolia	✓	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lactuca muralis	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-
Myosotis discolor	✓	-	-	-	-	✓	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Myosotis micrantha	✓	-	-	✓	-	-	✓	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-

Specie name	Fawn Island	Flat Top Island	Flint Beach Island	Flower Island	Fortress Island	Gossip Island	Hat Island	Huckleberry Island	Iceberg Island	Little Cactus	Little McConnell Island	Little Nob	Little Oak	Little Oak 2	Little Sucia Island	Low Island	Mackaye Harbor Island	Massacre Bay 1 Island	Matia Island	Matia West 1	Matia West 2	McConnell Island	Near Decatur Island Unnamed 3	Nob Island	North Finger Island	Oak Island	Pole Island
Juncus laccatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Juniperus maritima	✓	-	-	-	-	✓	✓	✓	-	-	✓	-	-	-	✓	-	-	-	-	-	-	✓	-	✓	✓	✓	-
Koeleria macrantha	✓	-	✓	-	-	-	✓	✓	-	✓	✓	-	-	-	-	-	✓	-	✓	✓	-	✓	✓	✓	✓	-	✓
Lactuca serriola	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lamium purpureum	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Lapsana communis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-
Lathyrus aphaca	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lathyrus japonicus	-	✓	-	✓	✓	-	-	-	-	✓	-	-	-	-	✓	✓	-	-	✓	-	-	-	-	-	-	✓	-
Lathyrus nevadensis	✓	✓	-	-	-	✓	✓	✓	-	-	✓	-	-	-	✓	✓	-	-	-	-	-	✓	-	-	✓	-	-
Lemna turionifera	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-
Scorzoneroides autumnalis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-
Lepidium virginicum	-	✓	✓	-	-	✓	✓	✓	✓	✓	✓	-	-	-	✓	-	-	-	✓	✓	✓	✓	-	-	✓	✓	-
Leymus mollis	-	✓	✓	✓	-	-	✓	✓	-	-	✓	-	-	-	✓	✓	-	-	✓	✓	-	✓	-	-	✓	✓	-
Lilium columbianum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-
Linaria genistifolia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Linnaea borealis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Listera cordata	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithophragma parviflorum	-	-	-	-	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-
Buglossoides arvensis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lolium perenne	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	✓	-	-	-	-	-
Lomatium nudicaule	-	-	✓	✓	-	✓	✓	-	-	✓	-	-	-	-	-	-	-	-	✓	-	-	✓	-	✓	✓	-	-
Lomatium utriculatum	-	-	✓	-	-	-	✓	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	✓	-	-	-	-
Lonicera ciliosa	-	✓	-	-	-	-	-	✓	-	-	-	-	-	-	✓	-	-	-	✓	✓	-	✓	-	-	✓	-	-
Lonicera hispidula	✓	✓	-	-	-	-	✓	✓	-	-	✓	-	-	-	✓	-	-	-	✓	✓	-	✓	-	✓	✓	✓	-
Lonicera involucrata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lotus corniculatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acmispon denticulatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acmispon parviflorus	-	✓	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lotus purshiana	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-
Lupinus bicolor	-	✓	-	-	-	-	-	-	-	✓	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-
Lupinus microcarpus	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Luzula comosa	✓	✓	✓	-	-	✓	✓	✓	-	-	✓	-	-	-	✓	-	-	-	✓	✓	-	✓	-	-	✓	-	-
Maianthemum dilatatum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	✓	-	-
Maianthemum racemosum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Malus fusca	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-
Malus pumila	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	✓	-	-	-	✓	-	-	-	-	-	-	-	-
Marah oreganus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Melica bulbosa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Melica subulata	✓	✓	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	✓	-	-	-	-	-
Mimulus alsinoides	-	✓	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mimulus guttatus	-	✓	-	✓	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	✓	✓	-	-	-
Minuartia rubella	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Minuartia tenella	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Monotropa uniflora	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-
Montia fontana	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-
Montia parvifolia	-	-	-	-	✓	✓	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lactuca muralis	✓	✓	-	-	-	-	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	✓	-	-	✓	-	-
Myosotis discolor	✓	✓	-	-	-	-	-	✓	-	-	-	-	-	-	✓	-	✓	-	-	-	-	✓	-	-	-	✓	-
Myosotis micrantha	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Specie name	Posey Island	Reef Island	Reeflet Island	Rim Island	Ripple Island	Rum Island	Saddlebag Island	Secar Rock	Sentinel Island	Shag Reef	Skull Island	Small Island near Charles	Smaller Island near Charles	Smallest unnamed island by Long Island	Swirl Rock East	Swirl Rock Central	Swirl Rock West	Turn Island	Turnlet Island	Unnamed 1 near Long Island	Unnamed 2 near Long Island	Unnamed 3 near Long Island	Unnamed 72 Island	Unnamed west of Castle Island	Victim Island	Willow Island	Yellow Island
Juncus laccatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Juniperus maritima	✓	✓	✓	-	-	-	✓	-	-	-	✓	-	-	-	-	-	-	✓	✓	-	-	-	✓	-	✓	-	✓
Koeleria macrantha	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	✓	-	✓
Lactuca serriola	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lamium purpureum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lapsana communis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Lathyrus aphaca	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Lathyrus japonicus	-	-	✓	-	✓	✓	✓	-	✓	-	-	-	-	-	-	-	-	✓	✓	✓	-	-	-	-	✓	-	✓
Lathyrus nevadensis	-	-	-	-	✓	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	✓
Lemna turionifera	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Scorzoneroides autumnalis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lepidium virginicum	✓	✓	-	-	✓	-	✓	-	✓	-	✓	-	-	-	-	-	-	✓	✓	✓	✓	-	-	-	✓	✓	✓
Leymus mollis	✓	✓	✓	-	✓	✓	✓	-	-	-	-	-	-	-	-	✓	-	✓	-	✓	✓	-	✓	-	-	-	-
Lilium columbianum	-	-	-	-	-	-	✓	-	✓	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-
Linaria genistifolia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Linnaea borealis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-
Listera cordata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithophragma parviflorum	-	-	-	-	-	-	✓	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Buglossoides arvensis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Lolium perenne	✓	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-
Lomatium nudicaule	-	✓	-	-	-	-	✓	-	✓	-	-	✓	-	-	-	✓	-	-	-	-	✓	-	-	-	-	-	✓
Lomatium utriculatum	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-
Lonicera ciliosa	-	✓	-	-	✓	-	✓	-	✓	-	✓	-	-	-	-	-	-	✓	-	-	-	-	-	-	✓	✓	✓
Lonicera hispidula	✓	✓	-	-	-	-	-	-	✓	-	✓	-	-	-	-	-	-	✓	-	-	-	-	-	-	✓	✓	✓
Lonicera involucrata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lotus corniculatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Acmispon denticulatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	✓
Acmispon parviflorus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-
Lotus purshiana	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lupinus bicolor	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lupinus microcarpus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-
Luzula comosa	-	✓	-	-	✓	✓	✓	-	✓	-	✓	-	-	-	-	-	-	✓	-	-	-	-	-	-	✓	✓	✓
Maianthemum dilatatum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Maianthemum racemosum	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Malus fusca	-	-	-	✓	-	-	✓	-	✓	-	✓	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	✓	✓
Malus pumila	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Marah oreganus	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Melica bulbosa	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Melica subulata	✓	✓	-	-	-	-	✓	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	✓
Mimulus alsinoides	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓
Mimulus guttatus	-	-	-	-	-	-	✓	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	-
Minuartia rubella	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Minuartia tenella	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Monotropa uniflora	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-
Montia fontana	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Montia parvifolia	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	✓	-	-	-	-	-	-	✓	-	✓
Lactuca muralis	-	✓	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	✓	✓	-	-	✓
Myosotis discolor	✓	-	-	-	-	-	✓	-	✓	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	✓
Myosotis micrantha	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Continued on next page

Table a.3.1 – continued from previous page

Specie name	All San Juan Islands	Aleck Rock	Barren Island	Battleship Island	Bind Island	Boulder Island	Broken Point Island	Buck Island	Castle Island	Cemetery Island	Charles Island	Cliff Island	Colville Island	Coon Island	Crab Island	Deadman Island	Dot Island	Dotlet Island	East Sucia 1 Island	East Sucia 2 Island	East Sucia 3 Island	East Sucia 4 Island	East Sucia 5 Island	East Sucia 6 Island	East Sucia 7 Island	East Sucia 8 Island	Ewing Island	Fawn Island	Flat Top Island	Flint Beach Island	Flower Island	Fortress Island	Gossip Island	Hat Island	Huckleberry Island	Iceberg Island	Little Cactus	Little McConnell Island	Little Nob	Little Oak	Little Oak 2	Little Sucia Island	Low Island	Mackaye Harbor Island	Massacre Bay 1 Island	Matia Island	Matia West 1	Matia West 2	McConnell Island	Near Decatur Island Unnamed 3	Nob Island	North Finger Island	Oak Island	Pole Island	Posey Island	Reef Island	Reeflet Island	Rim Island	Ripple Island	Rum Island	Saddlebag Island	Secar Rock	Sentinel Island	Shag Reef	Skull Island	Small Island near Charles	Smaller Island near Charles	Smallest unnamed island by Long Island	Swirl Rock East	Swirl Rock Central	Swirl Rock West	Turn Island	Turnlet Island	Unnamed 1 near Long Island	Unnamed 2 near Long Island	Unnamed 3 near Long Island	Unnamed 72 Island	Unnamed west of Castle Island	Victim Island	Willow Island	Yellow Island
Myosurus minimus	✓	-	-	-	-	✓	-	-	✓	-	-	✓	-	-	-	-	-	-	✓	✓	✓	✓	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Narcissus pseudonarcissus	✓	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nemophila parviflora	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	✓	-	-
Nepeta cataria	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Oemleria cerasiformis	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oenanthe sarmentosa	✓	-	-	-	-	-	-	-	✓	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Olsynium douglasii	✓	-	-	✓	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Opuntia fragilis	✓	✓	✓	✓	✓	✓	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	✓	-	✓	✓	✓
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Table a.3.1 – continued from previous page

Specie name	All San Juan Islands	Aleck Rock	Barren Island	Battleship Island	Blind Island	Boulder Island	Broken Point Island	Buck Island	Castle Island	Cemetery Island	Charles Island	Cliff Island	Colville Island	Coon Island	Crab Island	Deadman Island	Dot Island	Dotlet Island	East Sucia 1 Island	East Sucia 2 Island	East Sucia 3 Island	East Sucia 4 Island	East Sucia 5 Island	East Sucia 6 Island	East Sucia 7 Island	East Sucia 8 Island	Ewing Island	Fawn Island	Flat Top Island	Flint Beach Island	Flower Island	Fortress Island	Gossip Island	Hat Island	Huckleberry Island	Iceberg Island	Little Cactus	Little McConnell Island	Little Nob	Little Oak	Little Oak 2	Little Sucia Island	Low Island	Mackaye Harbor Island	Massacre Bay 1 Island	Matia Island	Matia West 1	Matia West 2	McConnell Island	Near Decatur Island Unnamed 3	Nob Island	North Finger Island	Oak Island	Pole Island	Posey Island	Reef Island	Reeflet Island	Rim Island	Ripple Island	Rum Island	Saddlebag Island	Secar Rock	Sentinel Island	Shag Reef	Skull Island	Small Island near Charles	Smaller Island near Charles	Smallest unnamed island by Long Island	Swirl Rock East	Swirl Rock Central	Swirl Rock West	Turn Island	Turnlet Island	Unnamed 1 near Long Island	Unnamed 2 near Long Island	Unnamed 3 near Long Island	Unnamed 72 Island	Unnamed west of Castle Island	Victim Island	Willow Island	Yellow Island
Prunus emarginata	✓	-	-	✓	-	-	-	-	✓	-	-	✓	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	✓	-	✓	-	✓	-	-	✓	✓	-	-	-	-	-	-	✓	-	-	-	✓	-	-	✓	✓	-	-	-	-	-	✓	-	-	-	-	✓	-	✓	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	✓	✓
Prunus mahaleb	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Prunus virginiana	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pseudognaphalium stramineum	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pseudotsuga menziesii	✓	✓	-	✓	✓	✓	-	-	✓	-	✓	✓	-	✓	-	✓	✓	-	-	-	-	✓	-	-	✓	-	✓	✓	✓	✓	✓	-	✓	✓	✓	-	-	✓	-	-	-	✓	-	-	-	✓	✓	-	✓	✓	✓	✓	✓	-	✓	✓	-	-	-	✓	✓	-	✓	-	✓	-	-	-	-	-	-	✓	✓	-	-	-	-	-	-	✓	✓
Pteridium aquilinum	✓	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	✓	-	-	-	-	✓	-	-	-	-	-	-	-	✓	-	-	-	✓	✓	-	✓	-	-	✓	-	-	-	✓	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	✓
Puccinellia nutkaensis	✓	✓	✓	-	✓	✓	✓	-	✓	-	-	✓	✓	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	-	-	✓	-	✓	-	✓	✓	✓	-	-	✓	-	✓	-	-	-	✓	-	-	-	✓	-	✓	✓	✓	-	-	-	-	✓	✓	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	-	-	✓
Pyrus calleryana	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pyrus communis	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Quercus garryana	✓	-	-	-	-	-	✓	-	-	✓	✓	✓	-	✓	-	✓	-	-	-	-	-	-	-	-	-	-	-	✓	✓	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	✓	-	✓	-	✓	✓	-	-	-	✓	-	-	✓	-	✓	-	-	-	-	-	-	✓	-	-	-	-	-	-	✓	-	✓
Ranunculus californicus	✓	✓	-	-	✓	-	-	-	✓	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-
Ranunculus occidentalis	✓	✓	-	-	✓	-	-	-	✓	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ranunculus uncinatus	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ribes divaricatum	✓	-	-	-	✓	-	-	-	✓	-	✓	-	✓	-	-	✓	-	-	✓	-	-	-	-	✓	✓	-	✓	-	✓	✓	✓	-	-	-	-	-	-	✓	-	-	-	✓	-	-	-	✓	✓	-	✓	✓	-	-	-	✓	-	✓	-	✓	✓	✓	-	-	-	-	✓	-	-	-	-	-	-	✓	-	-	-	-	-	-	✓	✓	✓
Ribes lacustre	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ribes sanguineum	✓	-	-	-	-	-	-	-	✓	-	✓	-	-	✓	-	-	✓	-	-	-	-	-	-	-	✓	-	✓	✓	✓	-	-	-	-	✓	✓	-	-	-	-	-	-	✓	-	-	-	✓	✓	-	✓	✓	-	✓	-	-	-	-	-	-	-	✓	✓	-	✓	-	-	-	-	-	-	-	-	✓	✓	-	-	-	-	-	-	-	✓
Rosa gymnocarpa	✓	-	-	-	-	-	-	-	✓	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	✓	-	-	-	-	✓	✓	-	-	-	-	-	-	✓	-	-	-	✓	✓	-	✓	-	-	✓	-	-	-	✓	-	-	-	-	✓	-	✓	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	✓	✓	-
Rosa nutkana	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	✓	-	✓	✓	✓	✓	-	✓	✓	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	✓	✓	✓	-	✓	✓	✓	✓	-	✓	✓	✓	✓	✓	✓	-	✓	✓	✓	✓	-	-	-	✓	✓	-	-	-	-	-	✓	-	-	-	-	✓	-	✓	✓	✓
Rubus armeniacus	✓	-	-	✓	-	-	✓	-	✓	-	-	-	✓	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	✓	-	✓	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	-	-	-	-	-	-	✓	✓	-	-	-	✓	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-
Rubus laciniatus	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	✓	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-
Rubus leucodermis	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rubus parviflorus	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-
Rubus spectabilis	✓	-	-	-	-	-	-	✓	✓	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rubus ursinus	✓	✓	✓	✓	-	✓	-	✓	✓	-	✓	✓	✓	-	-	✓	✓	-	✓	-	-	-	-	✓	✓	-	✓	-	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	-	-	-	✓	-	-	-	✓	✓	✓	✓	✓	-	-	✓	✓	✓	-	-	-	✓	✓	✓	-	-	-	✓	-	-	-	-	-	-	✓	✓	✓	-	-	-	-	✓	-	✓
Rubus vestitus	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Rumex acetosella	✓	✓	✓	✓	✓	✓	-	-	✓	-	✓	-	✓	✓	-	✓	✓	-	✓	-	✓	-	-	✓	✓	-	✓	✓	✓	✓	-	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-	-	✓	✓	✓	✓	✓	-	✓	-	-	-	✓	✓	-	✓	✓	-	-	✓	-	✓	-	-	-	-	-	-	✓	✓	-	-	-	✓	-	✓	✓	✓
Rumex conglomeratus	✓	-	-	✓	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rumex crispus	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rumex occidentalis	✓	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Rumex transitorius	✓	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	-	-	-	✓	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sagina decumbens	✓	✓	✓	-	-	✓	✓	-	✓	✓	✓	-	-	-	-	✓	✓	-	✓	✓	✓	✓	-	✓	✓	-	-	-	✓	✓	-	-	-	✓	-	✓	✓	✓	-	-	-	-	✓	-	-	✓	✓	-	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	-	-	-	-	-	✓
Sagina maxima	✓	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Salix hookeriana	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Salix lasiandra	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Salix scouleriana	✓	-	-	✓	-	-	-	-	✓	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	✓	-	✓	-	✓	-	✓	-	-	✓	-	-	-	✓	-	-	-	✓	✓	-	-	-	-	✓	-	-	-	-	-	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	✓	✓
Salix sitchensis	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sambucus racemosa	✓	-	-	✓	-	-	-	-	✓	-	✓	-	✓	-	-	✓	✓	-	-	-	-	-	-	-	-	-	✓	-	✓	-	✓	-	-	-	✓	✓	-	-	-	-	-	✓	-	-	-	✓	✓	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Sanicula arctopoides	✓	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sanicula bipinnatifida	✓	-	-	-	-	-	-	-	✓	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sanicula crassicaulis	✓	✓	✓	✓	-	✓	✓	-	✓	✓	✓	✓	-	✓	-	-	✓	-	-	✓	-	-	-	-	-	-	-	-	✓	✓	-	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	✓	-	-	-	-	-	✓	-	-	-	✓	-	✓	✓	-	✓	-	✓	✓	-	✓	-	-	-	-	-	-	-	-	✓	✓	-	-	-	-	-	-	✓	✓
Sarcocornia perennis	✓	✓	✓	-	-	-	✓	-	-	-	✓	✓	-	✓	✓	✓	-	-	-	✓	-	-	-	-	-	-	-	✓	-	-	✓	-	-	-	-	-	-	✓	-	-	-	-	✓	-	✓	-	-	-	✓	-	✓	✓	✓	✓	✓	✓	✓	-	-	-	✓	✓	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	✓	-	-	-	✓
Satureja douglasii	✓	-	-	-	-	-	-	-	-	-	✓	✓	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	-	-	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	✓	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	✓	-	-
Saxifraga caespitosa	✓	✓	-	✓	✓	✓	-	-	✓	-	-	✓	-	-	-	-	-	-	✓	-	-	✓	-	✓	✓	-	✓	-	-	✓	-	✓	✓	-	-	-	-	-	-	-	-	✓	-	-	-	-	✓	-	-	✓	✓	-	-	-	-	-	-	-	-	✓	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	-
Micranthes integrifolia	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Festuca arundinacea	✓	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Festuca pratensis	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-
Sedum album	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sedum lanceolatum	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	-	✓	✓	✓	-	-	-	-	-	✓	✓	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	✓	-	✓	-	-	✓	✓	✓	✓	✓	-	✓	✓	✓	-	-	✓	-	✓	-	✓	✓	-	-	-	-	✓	-	-	-	✓	-	✓	✓	✓	-	-	✓	✓	✓	✓	✓
Sedum spathulifolium	✓	✓	-	✓	✓	✓	✓	-	✓	-	✓	✓	-	✓	-	✓	-	-	✓	-	✓	✓	-	✓	✓	-	-	✓	✓	-	✓	✓	✓	-	-	✓	-	✓	-	-	-	✓	-	✓	-	✓	✓	✓	✓	-	✓	✓	✓	-	-	✓	-	✓	-	✓	-	-	✓	-	✓	-	-	-	-	-	-	✓	-	-	-	-	✓	-	✓	✓	✓

Continued on next page

Table a.3.1 – continued from previous page

Specie name	All San Juan Islands	Aleck Rock	Barren Island	Battleship Island	Blind Island	Boulder Island	Broken Point Island	Buck Island	Castle Island	Cemetery Island	Charles Island	Cliff Island	Colville Island	Coon Island	Crab Island	Deadman Island	Dot Island	Dotlet Island	East Sucia 1 Island	East Sucia 2 Island	East Sucia 3 Island	East Sucia 4 Island	East Sucia 5 Island	East Sucia 6 Island	East Sucia 7 Island	East Sucia 8 Island	Ewing Island
Selaginella wallacei	✓	✓	✓	✓	✓	✓	-	-	✓	-	✓	✓	-	✓	-	✓	✓	✓	-	✓	✓	-	-	-	✓	-	✓
Jacobaea vulgaris	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Senecio sylvaticus	✓	-	-	-	-	-	-	-	✓	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Senecio vulgaris	✓	-	✓	✓	-	✓	-	-	-	✓	✓	✓	-	✓	-	-	-	-	-	-	-	-	-	✓	✓	-	-
Shepherdia canadensis	✓	✓	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sherardia arvensis	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silene antirrhina	✓	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	✓	-	-	-	-	-	-	-	-	-	-
Silene coronaria	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silene gallica	✓	-	✓	✓	✓	-	-	-	✓	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	✓	-	-
Silene menziesii	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Silene scouleri	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Solanum dulcamara	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Solidago lepida	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Soliva sessilis	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sonchus arvensis	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sonchus asper	✓	-	-	✓	-	-	✓	-	-	-	-	-	-	✓	-	✓	-	-	-	-	-	-	-	-	✓	-	✓
Sonchus oleraceus	✓	✓	✓	✓	✓	✓	-	-	✓	-	✓	✓	✓	✓	✓	-	✓	-	✓	✓	✓	-	-	-	-	-	-
Sorbus aucuparia	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sorbus hybrida	✓	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sorbus intermedia	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spergularia canadensis	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spergularia macrotheca	✓	✓	-	-	-	✓	-	✓	-	✓	-	-	✓	-	-	✓	-	-	-	-	-	-	-	-	-	-	-
Spergularia rubra	✓	-	-	-	-	✓	-	-	-	-	✓	-	-	✓	-	-	-	-	-	-	-	-	-	-	✓	-	✓
Spergularia salina	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	✓	-	-	-	-	-	-	-	-	-	-	-	-
Spiranthes romanzoffiana	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stellaria crispa	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stellaria media	✓	✓	✓	✓	✓	✓	✓	-	✓	-	✓	✓	✓	-	-	✓	✓	✓	-	✓	✓	-	-	-	-	-	-
Stellaria nitens	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	✓	-	✓	-	-	-	-	-	-	-	✓
Symphoricarpos albus	✓	✓	✓	✓	-	✓	✓	-	✓	-	✓	✓	-	✓	-	✓	✓	-	-	✓	✓	✓	-	✓	✓	-	✓
Symphyotrichum subspicatum	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Taeniatherum caput medusae	✓	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Taraxacum officinale	✓	✓	-	✓	✓	✓	-	-	✓	-	✓	✓	-	✓	-	-	✓	-	-	✓	-	-	-	-	-	-	-
Taxus brevifolia	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Teesdalia nudicaulis	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellima grandiflora	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thuja plicata	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tiarella trifoliata	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tragopogon porrifolius	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trientalis latifolia	✓	-	-	-	-	-	-	-	-	-	✓	✓	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	✓
Trifolium dubium	✓	-	-	-	-	-	-	-	-	-	✓	✓	-	✓	-	-	✓	-	-	-	-	-	-	-	-	-	-
Trifolium incarnatum	✓	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trifolium macraei	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trifolium microcephalum	✓	-	-	-	-	-	✓	-	-	-	-	✓	-	✓	-	-	✓	✓	-	-	-	-	-	-	-	-	✓
Trifolium microdon	✓	✓	-	✓	✓	✓	-	-	✓	-	✓	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-
Trifolium oliganthum	✓	-	-	✓	-	✓	✓	-	✓	-	-	-	-	✓	-	-	✓	-	-	-	-	✓	-	-	-	-	-
Trifolium pratensis	✓	-	-	-	-	-	-	-	-	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trifolium procumbens	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trifolium repens	✓	-	-	-	-	-	-	-	-	-	✓	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-
Trifolium subterraneum	✓	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Specie name	Fawn Island	Flat Top Island	Flint Beach Island	Flower Island	Fortress Island	Gossip Island	Hat Island	Huckleberry Island	Iceberg Island	Little Cactus	Little McConnell Island	Little Nob	Little Oak	Little Oak 2	Little Sucia Island	Low Island	Mackaye Harbor Island	Massacre Bay 1 Island	Matia Island	Matia West 1	Matia West 2	McConnell Island	Near Decatur Island Unnamed 3	Nob Island	North Finger Island	Oak Island	Pole Island
Selaginella wallacei	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-	✓	-	✓	✓	-	✓	✓	✓	✓	-	-
Jacobaea vulgaris	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-
Senecio sylvaticus	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Senecio vulgaris	✓	✓	-	-	-	✓	✓	-	-	-	✓	-	✓	-	✓	✓	-	-	-	-	-	-	-	✓	-	✓	✓
Shepherdia canadensis	-	-	✓	-	-	-	-	-	✓	-	-	-	-	-	✓	-	-	-	✓	-	-	-	-	-	-	-	-
Sherardia arvensis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-
Silene antirrhina	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silene coronaria	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silene gallica	✓	✓	-	-	-	✓	✓	-	-	✓	-	-	-	-	-	-	✓	-	✓	-	-	-	-	-	-	-	-
Silene menziesii	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silene scouleri	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Solanum dulcamara	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Solidago lepida	-	-	✓	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Soliva sessilis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-
Sonchus arvensis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sonchus asper	✓	✓	✓	✓	-	-	-	✓	✓	-	-	-	✓	-	-	-	-	✓	✓	✓	✓	-	-	✓	-	-	✓
Sonchus oleraceus	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	✓	✓	-	-	✓	-	-	-	-	✓	✓	✓	-
Sorbus aucuparia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sorbus hybrida	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sorbus intermedia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spergularia canadensis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spergularia macrotheca	-	✓	✓	✓	-	✓	-	-	✓	✓	✓	✓	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-
Spergularia rubra	-	✓	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	✓	✓	✓	-	-	-	✓	-	-
Spergularia salina	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spiranthes romanzoffiana	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stellaria crispa	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stellaria media	✓	✓	✓	✓	-	✓	✓	✓	-	✓	✓	-	-	-	✓	✓	-	-	✓	✓	-	✓	-	✓	✓	✓	✓
Stellaria nitens	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Symphoricarpos albus	✓	-	-	✓	✓	✓	✓	✓	-	-	✓	-	-	-	-	✓	-	-	✓	✓	-	✓	-	✓	✓	✓	✓
Symphyotrichum subspicatum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Taeniatherum caput medusae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Taraxacum officinale	✓	-	✓	-	-	-	✓	✓	-	-	✓	-	-	-	✓	-	-	-	✓	-	-	✓	-	✓	✓	-	-
Taxus brevifolia	-	✓	-	-	-	-	✓	✓	-	-	-	-	-	-	✓	-	-	-	✓	✓	-	-	-	-	-	-	-
Teesdalia nudicaulis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellima grandiflora	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	✓	-	-	-	✓	-	-	-	-	-	-	-	-
Thuja plicata	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	✓	-	-	-	✓	✓	-	✓	-	-	-	-	-
Tiarella trifoliata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-
Tragopogon porrifolius	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trientalis latifolia	-	✓	-	-	-	-	✓	✓	-	-	-	-	-	-	✓	-	-	-	✓	-	-	✓	-	-	✓	-	-
Trifolium dubium	✓	✓	-	-	✓	✓	✓	✓	-	-	✓	-	-	-	-	-	-	-	✓	-	-	✓	-	-	-	✓	-
Trifolium incarnatum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trifolium macraei	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trifolium microcephalum	✓	✓	-	-	-	-	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	✓	-	✓	-	✓	-	-	-
Trifolium microdon	-	-	✓	-	-	-	✓	-	-	✓	✓	-	-	-	✓	-	-	-	✓	✓	-	✓	-	✓	✓	-	-
Trifolium oliganthum	-	-	-	-	-	✓	✓	✓	-	-	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-
Trifolium pratensis	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-
Trifolium procumbens	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-
Trifolium repens	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-
Trifolium subterraneum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-

Specie name	Posey Island	Reef Island	Reeflet Island	Rim Island	Ripple Island	Rum Island	Saddlebag Island	Secar Rock	Sentinel Island	Shag Reef	Skull Island	Small Island near Charles	Smaller Island near Charles	Smallest unnamed island by Long Island	Swirl Rock East	Swirl Rock Central	Swirl Rock West	Turn Island	Turnlet Island	Unnamed 1 near Long Island	Unnamed 2 near Long Island	Unnamed 3 near Long Island	Unnamed 72 Island	Unnamed west of Castle Island	Victim Island	Willow Island	Yellow Island
Selaginella wallacei	-	✓	✓	✓	-	✓	✓	-	✓	-	✓	-	-	-	-	-	-	✓	-	-	-	-	-	-	✓	✓	✓
Jacobaea vulgaris	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Senecio sylvaticus	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Senecio vulgaris	✓	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Shepherdia canadensis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	✓
Sherardia arvensis	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silene antirrhina	-	✓	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-
Silene coronaria	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silene gallica	-	-	-	-	✓	✓	✓	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silene menziesii	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silene scouleri	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-
Solanum dulcamara	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Solidago lepida	-	-	-	-	✓	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Soliva sessilis	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-
Sonchus arvensis	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-
Sonchus asper	✓	✓	-	-	-	✓	-	-	-	-	-	-	-	✓	-	✓	-	✓	-	✓	✓	-	-	-	✓	✓	✓
Sonchus oleraceus	-	-	✓	✓	✓	-	✓	-	✓	-	✓	-	-	-	-	-	-	✓	✓	✓	✓	✓	-	-	✓	✓	✓
Sorbus aucuparia	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-
Sorbus hybrida	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sorbus intermedia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-
Spergularia canadensis	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spergularia macrotheca	-	-	-	-	✓	-	-	✓	-	✓	-	✓	-	-	-	✓	-	-	-	✓	✓	✓	-	-	-	-	-
Spergularia rubra	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	✓	-
Spergularia salina	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spiranthes romanzoffiana	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Stellaria crispa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stellaria media	✓	✓	-	✓	✓	✓	✓	-	-	-	✓	-	-	-	-	-	-	✓	✓	-	-	-	✓	-	✓	✓	✓
Stellaria nitens	-	-	✓	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Symphoricarpos albus	✓	✓	-	✓	✓	✓	✓	-	✓	-	✓	-	-	-	-	-	-	✓	✓	-	-	-	-	-	✓	✓	✓
Symphyotrichum subspicatum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Taeniatherum caput medusae	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Taraxacum officinale	✓	✓	-	-	✓	-	✓	-	✓	-	✓	-	-	-	-	-	-	✓	✓	-	-	-	-	-	✓	-	✓
Taxus brevifolia	-	✓	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	✓
Teesdalia nudicaulis	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellima grandiflora	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thuja plicata	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-
Tiarella trifoliata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tragopogon porrifolius	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Trientalis latifolia	-	✓	-	-	-	-	✓	-	✓	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	✓	-	✓
Trifolium dubium	✓	-	-	-	-	✓	✓	-	✓	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	✓
Trifolium incarnatum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trifolium macraei	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trifolium microcephalum	-	-	-	-	-	✓	✓	-	✓	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	✓	-	✓
Trifolium microdon	-	✓	-	-	✓	-	-	-	✓	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	✓	-	✓
Trifolium oliganthum	✓	-	-	-	-	-	✓	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	✓
Trifolium pratensis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trifolium procumbens	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trifolium repens	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trifolium subterraneum	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Continued on next page

Table a.3.1 – continued from previous page

Specie name	All San Juan Islands	Aleck Rock	Barren Island	Battleship Island	Bind Island	Boulder Island	Broken Point Island	Buck Island	Castle Island	Cemetery Island	Charles Island	Cliff Island	Colville Island	Coon Island	Crab Island	Deadman Island	Dot Island	Dollet Island	East Sucia 1 Island	East Sucia 2 Island	East Sucia 3 Island	East Sucia 4 Island	East Sucia 5 Island	East Sucia 6 Island	East Sucia 7 Island	East Sucia 8 Island	Ewing Island
Trifolium tridentatum	✓	✓	✓	✓	✓	✓	-	-	✓	-	✓	✓	-	✓	-	✓	✓	✓	✓	-	✓	-	-	✓	-	-	✓
Trifolium variegatum	✓	-	-	-	-	✓	-	-	-	-	✓	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-
Triglochin maritima	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Triphysaria pusilla	✓	-	-	✓	-	✓	-	-	✓	-	✓	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-
Trisetum cernuum	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-
Triteleia grandiflora	✓	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Triteleia hyacinthina	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	✓	-	-	-
Tsuga heterophylla	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Typha latifolia	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Urtica dioica	✓	-	-	✓	-	-	✓	-	✓	-	-	✓	-	-	-	✓	✓	-	-	-	-	-	-	-	-	-	-
Vaccinium ovatum	✓	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vaccinium parvifolium	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Valeriana hookeri	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Valerianella locusta	✓	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Veronica arvensis	✓	✓	-	-	-	✓	✓	-	✓	-	✓	✓	-	✓	-	-	✓	✓	-	-	-	-	-	-	-	-	-
Veronica chamaedrys	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Veronica officinalis	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Veronica peregrina	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Veronica serpyllifolia	✓	-	-	-	-	-	-	-	-	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vicia americana	✓	✓	-	✓	✓	✓	-	-	✓	-	✓	✓	-	-	-	-	✓	-	-	-	-	-	-	-	✓	-	✓
Vicia cracca	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vicia hirsuta	✓	-	-	✓	-	✓	-	-	✓	-	✓	✓	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-
Vicia nigricans	✓	-	-	-	-	-	-	-	✓	-	-	-	✓	-	-	-	-	-	-	✓	-	-	-	-	-	-	✓
Vicia sativa	✓	-	-	✓	-	-	-	-	✓	-	✓	✓	-	✓	-	✓	✓	-	-	-	-	-	-	-	-	-	-
Vinca major	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vitis riparia	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vitis vinifera	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vulpia bromoides	✓	✓	-	✓	✓	✓	✓	✓	✓	-	✓	-	✓	✓	-	✓	✓	✓	-	-	-	-	-	✓	✓	-	✓
Vulpia microstachys	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vulpia myuros	✓	-	✓	-	✓	-	-	-	-	-	-	✓	✓	✓	-	✓	✓	✓	-	-	-	✓	-	-	-	-	✓
Woodsia scopulina	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toxicoscordion venenosum	✓	✓	-	✓	✓	✓	-	-	✓	✓	✓	-	-	✓	-	✓	✓	-	✓	✓	✓	-	-	-	✓	-	✓
Zostera marina	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Specie name	Fawn Island	Flat Top Island	Flint Beach Island	Flower Island	Fortress Island	Gossip Island	Hat Island	Huckleberry Island	Iceberg Island	Little Cactus	Little McConnell Island	Little Nob	Little Oak	Little Oak 2	Little Sucia Island	Low Island	Mackaye Harbor Island	Massacre Bay 1 Island	Matia Island	Matia West 1	Matia West 2	McConnell Island	Near Decatur Island Unnamed 3	Nob Island	North Finger Island	Oak Island	Pole Island
Trifolium tridentatum	✓	-	✓	-	✓	-	-	✓	✓	✓	-	-	-	-	-	-	✓	-	✓	✓	-	✓	✓	✓	✓	-	-
Trifolium variegatum	-	✓	✓	-	-	-	✓	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Triglochin maritima	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	-	-	-	-
Triphysaria pusilla	✓	-	-	-	-	✓	✓	✓	✓	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trisetum cernuum	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	✓	✓	-	✓	-	-	-	-	-
Triteleia grandiflora	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-
Triteleia hyacinthina	-	-	-	-	✓	-	-	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-
Tsuga heterophylla	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	-	-	-	-	-	-	-
Typha latifolia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-
Urtica dioica	-	✓	-	-	✓	✓	-	✓	-	-	-	-	-	-	✓	✓	-	-	✓	-	-	-	-	-	✓	-	-
Vaccinium ovatum	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vaccinium parvifolium	-	-	-	-	-	-	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-
Valeriana hookeri	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	✓	-	-	-	-	-	✓	-	-
Valerianella locusta	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Veronica arvensis	✓	✓	✓	-	-	✓	✓	✓	-	-	✓	-	-	-	-	-	✓	-	✓	-	-	✓	-	-	-	-	-
Veronica chamaedrys	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Veronica officinalis	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Veronica peregrina	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-
Veronica serpyllifolia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vicia americana	-	✓	✓	-	✓	-	✓	✓	-	-	-	-	-	-	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓
Vicia cracca	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vicia hirsuta	✓	✓	-	-	-	-	✓	✓	✓	-	✓	-	-	-	✓	-	✓	-	✓	-	-	✓	✓	-	-	✓	✓
Vicia nigricans	-	✓	-	✓	-	-	✓	-	-	-	-	-	-	-	✓	-	-	-	✓	✓	-	✓	-	-	✓	-	-
Vicia sativa	✓	✓	-	-	-	✓	✓	✓	-	-	✓	-	-	-	✓	-	✓	-	✓	-	-	✓	-	✓	✓	✓	✓
Vinca major	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vitis riparia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vitis vinifera	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vulpia bromoides	✓	-	✓	-	✓	✓	✓	✓	✓	✓	✓	-	✓	-	✓	-	✓	-	✓	✓	-	✓	✓	✓	✓	✓	✓
Vulpia microstachys	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-
Vulpia myuros	✓	✓	✓	-	-	-	-	✓	-	-	-	-	-	-	-	✓	✓	✓	✓	✓	-	✓	-	-	✓	-	-
Woodsia scopulina	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toxicoscordion venenosum	-	✓	-	✓	-	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-	-	✓	-	-	✓	✓	-	✓	-	-
Zostera marina	-	-	-	-	✓	-	✓	✓	-	-	-	-	-	-	✓	-	-	-	✓	-	-	✓	-	-	-	-	-

Specie name	Posey Island	Reef Island	Reeflet Island	Rim Island	Ripple Island	Rum Island	Saddlebag Island	Secar Rock	Sentinel Island	Shag Reef	Skull Island	Small Island near Charles	Smaller Island near Charles	Smallest unnamed island by Long Island	Swirl Rock East	Swirl Rock Central	Swirl Rock West	Turn Island	Turnlet Island	Unnamed 1 near Long Island	Unnamed 2 near Long Island	Unnamed 3 near Long Island	Unnamed 72 Island	Unnamed west of Castle Island	Victim Island	Willow Island	Yellow Island
Trifolium tridentatum	-	✓	✓	-	-	-	✓	-	✓	-	✓	-	-	-	-	-	-	✓	-	✓	✓	-	✓	-	-	✓	✓
Trifolium variegatum	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	✓	-	✓
Triglochin maritima	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Triphysaria pusilla	✓	-	-	-	-	-	✓	-	-	-	✓	-	-	-	-	-	-	✓	-	✓	-	-	-	-	-	-	✓
Trisetum cernuum	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Triteleia grandiflora	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Triteleia hyacinthina	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Tsuga heterophylla	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Typha latifolia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Urtica dioica	-	✓	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	✓	-	-	-	-
Vaccinium ovatum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vaccinium parvifolium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Valeriana hookeri	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Valerianella locusta	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Veronica arvensis	✓	✓	-	-	-	✓	✓	-	✓	-	✓	-	-	-	-	-	-	✓	-	-	-	-	-	-	✓	✓	✓
Veronica chamaedrys	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Veronica officinalis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Veronica peregrina	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Veronica serpyllifolia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vicia americana	✓	✓	-	-	-	-	✓	-	✓	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	✓
Vicia cracca	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Vicia hirsuta	✓	-	-	-	-	✓	✓	-	✓	-	✓	-	-	-	-	-	-	✓	-	-	-	-	-	-	✓	-	✓
Vicia nigricans	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	✓
Vicia sativa	-	✓	-	✓	-	✓	✓	-	✓	-	✓	-	-	-	-	-	-	-	-	-	✓	-	-	-	✓	-	✓
Vinca major	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vitis riparia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Vitis vinifera	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Vulpia bromoides	✓	✓	✓	✓	✓	✓	✓	-	✓	-	✓	-	-	-	-	-	-	✓	-	-	-	-	✓	-	✓	✓	✓
Vulpia microstachys	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vulpia myuros	-	✓	-	✓	-	-	✓	-	-	-	✓	-	-	-	-	-	-	✓	✓	-	-	-	✓	-	✓	✓	✓
Woodsia scopulina	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-
Toxicoscordion venenosum	-	✓	✓	-	✓	✓	✓	-	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	✓	✓
Zostera marina	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	✓	-	✓	✓	-	-	-	-	-	-

A.4 PHYLOGENETIC DIVERSITY SUMMARY

Table A.4.1: Tables summarizing phylogenetic diversity.

Observed phylogenetic diversity

Island name	mean $DNNS_n$ obs	mean $DNNS_i$ obs	t.DNNS obs P-value	t.DNNS obs CI (low)	t.DNNS obs CI (high)	mean $MDNS_n$ obs	mean $MDNS_i$ obs	t.MDNS obs P-value	t.MDNS obs CI (low)	t.MDNS obs CI (high)
All SanJuanIslands	50.349	47.798	0.757	-13.641	18.741	388.374	334.816	0	32.714	74.401
Aleck Rock	120.268	55.135	0.028	7.104	123.161	384.683	339.579	0.072	-4.153	94.361
Barren Island	157.697	79.311	0.176	-37.225	193.998	396.676	343.269	0.218	-33.347	140.161
Battleship Island	151.226	62.946	0.014	18.877	157.683	366.251	323.576	0.095	-7.607	92.956
Blind Island	142.625	59.223	0.034	6.452	160.354	378.688	334.899	0.116	-11.14	98.72
Boulder Island	116.492	65.35	0.078	-5.915	108.199	394.938	343.286	0.041	2.302	101
Broken Point Island	108.73	59.537	0.013	11.064	87.321	271.538	289.884	0.194	-46.579	9.885
Buck Island	121.892	39.078	0.027	11.332	154.296	287.187	296.785	0.503	-39.93	20.734
Castle Island	75.319	58.984	0.418	-23.502	56.171	386.787	337.818	0.019	8.295	89.643
Cemetery Island	118.64	69.98	0.182	-26.446	123.766	295.394	288.721	0.512	-14.636	27.984
Charles Island	116.902	73.285	0.073	-4.086	91.319	415.096	355.026	0.01	14.827	105.312
Cliff Island	97.045	43.562	0.012	11.932	95.034	398.162	340.735	0.008	15.297	99.557
Colville Island	171.046	81.662	0.05	0.152	178.616	353.231	317.659	0.211	-21.758	92.901
Coon Island	141.487	53.194	0.012	19.947	156.637	371.184	323.219	0.051	-0.228	96.158
Crab Island	144.6	49.366	0.09	-20.006	210.472	281.411	226.104	0.14	-21.481	132.095
Deadman Island	155.615	53.683	0.007	28.632	175.23	375.147	333.683	0.113	-10.168	93.095
Dot Island	115.476	66.978	0.094	-8.417	105.412	373.994	330.462	0.08	-5.417	92.482
Dotlet Island	253.16	53.192	0.04	10.662	389.275	476.336	394.159	0.232	-58.247	222.601
East Sucia 1 Island	107.601	64.493	0.238	-29.698	115.914	336.094	307.359	0.192	-15.239	72.709
East Sucia 2 Island	167.095	53.65	0.033	9.819	217.072	376.691	322.873	0.186	-27.675	135.311
East Sucia 3 Island	211.721	67.402	0.037	9.787	278.851	401.56	348.487	0.316	-54.773	160.919
East Sucia 4 Island	131.876	60.997	0.077	-8.092	149.851	346.923	326.446	0.352	-23.443	64.398
East Sucia 6 Island	98.333	74.909	0.308	-23.096	69.943	295.427	297.915	0.818	-24.661	19.687
East Sucia 7 Island	146.174	59.625	0.035	6.341	166.758	385.512	339.818	0.122	-12.71	104.098
East Sucia 8 Island	167.011	37.204	0.053	-2.356	261.97	310.385	222.594	0.007	39.136	136.446
Ewing Island	95.801	45.08	0.047	0.73	100.712	385.317	347.954	0.123	-10.428	85.155
Fawn Island	176.264	52.456	0.009	32.975	214.643	384.055	329.976	0.117	-14.272	122.429

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Table a.4.1 – continued from previous page

Island name	mean $DNNS_n$ obs	mean $DNNS_i$ obs	t.DNNS obs *P*-value	t.DNNS obs CI (low)	t.DNNS obs CI (high)	mean $MDNS_n$ obs	mean $MDNS_i$ obs	t.MDNS obs *P*-value	t.MDNS obs CI (low)	t.MDNS obs CI (high)
Flat Top Island	108.104	48.227	0.005	18.807	100.948	407.366	346.738	0.003	21.21	100.045
Flint Beach Island	151.828	63.278	0.012	20.148	156.952	364.248	329.557	0.156	-13.61	82.994
Flower Island	156.728	74.823	0.03	8.135	155.677	376.819	328.984	0.06	-2.002	97.672
Fortress Island	156.729	52.31	0.021	16.398	192.441	369.728	345.624	0.477	-43.698	91.907
Gossip Island	155.21	106.719	0.242	-33.703	130.686	369.288	334.258	0.26	-26.728	96.789
Hat Island	95.082	52.029	0.049	0.138	85.969	405.023	346.577	0.005	17.9	98.991
Huckleberry Island	104.777	59.154	0.047	0.629	90.617	411.948	343.524	0.002	26.416	110.432
Iceberg Island	191.542	68.364	0.011	29.679	216.677	380.349	337.38	0.235	-29.154	115.092
Little Cactus	134.417	82.574	0.303	-48.946	152.632	347.725	325.951	0.577	-56.94	100.489
Little McConnell Island	108.283	59.967	0.073	-4.664	101.296	331.633	307.94	0.16	-9.698	57.083
Little Nob	111.305	98.807	0.88	-235.078	260.076	280.699	250.976	0.477	-94.188	153.634
Little Oak	127.506	100.488	0.588	-78.607	132.644	300.457	271.725	0.023	4.696	52.767
Little Sucia Island	93.691	68.055	0.114	-6.374	57.645	381.57	329.148	0.021	8.135	96.71
Low Island	127.162	93.279	0.436	-53.415	121.182	335.897	307.724	0.288	-25.386	81.732
Mackaye Harbor Island	208.426	84.173	0.218	-82.999	331.506	453.564	358.534	0.206	-59.715	249.776
Massacre Bay 1 Island	115.33	94.667	0.573	-55.9	97.226	295.286	270.154	0.103	-5.756	56.02
Matia Island	96.196	54.342	0.025	5.351	78.357	431.362	362.435	0	32.404	105.45
Matia West 1	107.288	47.821	0.036	3.913	115.022	472.7	400.06	0.009	18.482	126.799
Matia West 2	151.239	74.999	0.033	6.825	145.655	278.443	301.602	0.272	-65.986	19.668
McConnell Island	86.908	44.759	0.022	6.173	78.126	385.394	335.884	0.007	13.728	85.292
Near Decatur Island Unnamed 3	188.184	63.197	0.044	3.324	246.652	430.512	371.532	0.162	-25.149	143.108
Nob Island	161.332	41.665	0.008	33.562	205.77	386.549	338.288	0.126	-14.189	110.71
North Finger Island	90.92	46.998	0.039	2.186	85.659	385.323	331.904	0.011	12.675	94.162
Oak Island	161.342	67.558	0.031	8.925	178.643	353.539	318.894	0.221	-21.939	91.229
Pole Island	111.446	71.467	0.083	-5.491	85.449	294.367	282.462	0.122	-3.354	27.164
Posey Island	96.605	62.439	0.137	-11.271	79.604	302.162	291.771	0.429	-15.776	36.558
Reef Island	131.071	42.429	0	40.823	136.461	441.013	367.094	0.002	27.238	120.599
Reeflet Island	228.652	63.517	0.043	5.456	324.814	462.519	359.377	0.078	-12.925	219.21
Rim Island	179.93	68.445	0.074	-11.431	234.402	373.11	342.482	0.507	-63.56	124.816
Ripple Island	91.476	55.772	0.02	5.906	65.503	290.91	285.683	0.467	-9.146	19.598
Rum Island	126.052	63.918	0.08	-7.76	132.028	373.691	331.561	0.136	-13.832	98.092
Saddlebag Island	85.489	53.028	0.058	-1.113	66.036	393.709	340.116	0.003	18.74	88.446
Secar Rock	147.153	91.943	0.555	-193.246	303.666	314.525	273.908	0.136	-22.8	104.035
Sentinel Island	116.056	59.801	0.043	1.693	110.818	370.451	333.342	0.127	-10.871	85.088
Skull Island	152.816	63.197	0.018	16.252	162.987	375.755	334.12	0.123	-11.678	94.949

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Table a.4.1 – continued from previous page

Island name	mean $DNNS_n$ obs	mean $DNNS_i$ obs	t.DNNS obs *P*-value	t.DNNS obs CI (low)	t.DNNS obs CI (high)	mean $MDNS_n$ obs	mean $MDNS_i$ obs	t.MDNS obs *P*-value	t.MDNS obs CI (low)	t.MDNS obs CI (high)
Small Island near Charles	163.237	96.691	0.448	-206.871	339.964	296.051	285.896	0.726	-77.142	97.454
Swirl Rock Central	95.941	91.458	0.939	-148.785	157.752	292.946	275.455	0.153	-10.345	45.328
Turn Island	90.405	47.364	0.014	9.031	77.05	388.347	338.667	0.006	14.649	84.713
Turnlet Island	185.563	69.793	0.025	15.687	215.855	382.052	329.767	0.109	-12.551	117.12
Unnamed 1 near Long Island	113.736	62.72	0.013	11.113	90.918	288.965	284.472	0.666	-16.331	25.318
Unnamed 2 near Long Island	131.443	78.383	0.063	-2.993	109.111	304.503	288.34	0.012	3.861	28.464
Unnamed 3 near Long Island	138.593	65.764	0.113	-20.027	165.685	301.085	266.771	0.012	9.09	59.538
Unnamed 72 Island	124.546	53.793	0.001	29.43	112.076	293.072	284.238	0.23	-5.872	23.54
Victim Island	101.747	57.122	0.08	-5.516	94.767	356.588	324.905	0.179	-14.894	78.26
Willow Island	127.368	63.385	0.031	5.891	122.075	439.011	377.015	0.042	2.467	121.523
Yellow Island	83.443	53.951	0.065	-1.829	60.812	360.041	320.851	0.014	7.966	70.415

Standardized Effect Size (SES) of phylogenetic diversity

Island name	mean SES $DNNS_i$	median SES $DNNS_i$	sd SES $DNNS_i$	se SES $DNNS_i$	obs.z SES $DNNS_i$	rankLow SES $DNNS_i$	rankHi SES $DNNS_i$	*P*-value SES $DNNS_i$	mean SES $MDNS_i$	median SES $MDNS_i$	sd SES $MDNS_i$	se SES $MDNS_i$	obs.z SES $MDNS_i$	rankLow SES $MDNS_i$	rankHi SES $MDNS_i$	*P*-value SES $MDNS_i$
Aleck Rock	69.202	67.986	12.469	2.188	-1.128	129	871	0.129	329.683	329.555	4.444	10.425	2.227	983	17	0.017
Barren Island	107.875	107.351	18.293	3.411	-1.562	61	939	0.061	335.106	334.974	5.978	10.597	1.365	914	86	0.086
Battleship Island	70.808	70.555	11.470	2.239	-0.685	259	741	0.259	320.002	319.736	5.227	10.119	0.684	759	241	0.241
Blind Island	78.776	78.752	15.152	2.491	-1.291	97	903	0.097	326.560	326.049	5.535	10.327	1.506	923	77	0.077
Boulder Island	69.639	69.774	12.233	2.202	-0.351	374	626	0.374	335.818	335.768	5.142	10.620	1.452	922	78	0.078
Broken Point Island	76.382	75.391	14.497	2.415	-1.162	119	881	0.119	270.871	270.370	9.104	8.566	2.088	971	29	0.029
Buck Island	133.853	133.622	29.139	4.233	-3.252	0	1000	0.000	277.119	276.970	7.788	8.763	2.525	993	7	0.007
Castle Island	67.893	67.596	11.911	2.147	-0.748	218	782	0.218	333.530	333.262	6.081	10.547	0.705	764	236	0.236
Cemetery Island	115.435	114.511	28.628	3.650	-1.588	53	947	0.053	286.334	286.298	6.164	9.055	0.387	658	342	0.342
Charles Island	72.085	71.834	7.974	2.280	0.150	570	430	0.430	350.575	350.562	4.606	11.086	0.966	827	173	0.173

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Table a.4.1 – continued from previous page

Island name	mean SES $DNNS_i$	median SES $DNNS_i$	sd SES $DNNS_i$	se SES $DNNS_i$	obs.z SES $DNNS_i$	rankLow SES $DNNS_i$	rankHi SES $DNNS_i$	p-value SES $DNNS_i$	mean SES $MDNS_i$	median SES $MDNS_i$	sd SES $MDNS_i$	se SES $MDNS_i$	obs.z SES $MDNS_i$	rankLow SES $MDNS_i$	rankHi SES $MDNS_i$	p-value SES $MDNS_i$
Cliff Island	61.413	61.006	9.533	1.942	-1.872	24	976	0.024	337.700	337.481	4.085	10.679	0.743	771	229	0.229
Colville Island	111.271	110.937	14.722	3.519	-2.011	16	984	0.016	312.227	312.071	3.133	9.873	1.734	949	51	0.051
Coon Island	67.624	67.571	9.140	2.138	-1.579	54	946	0.054	322.024	321.959	2.289	10.183	0.522	713	287	0.287
Crab Island	152.234	154.218	31.608	4.814	-3.254	2	998	0.002	296.293	298.692	20.769	9.370	-3.380	2	998	0.002
Deadman Island	88.651	87.694	16.622	2.803	-2.104	14	986	0.014	323.788	323.730	3.582	10.239	2.763	997	3	0.003
Dot Island	69.591	68.899	10.996	2.201	-0.238	424	576	0.424	324.326	324.163	5.269	10.256	1.165	876	124	0.124
Dotlet Island	114.582	113.958	25.638	3.623	-2.395	4	996	0.004	372.457	372.079	7.879	11.778	2.755	996	4	0.004
East Sucia 1 Island	95.870	95.147	16.167	3.032	-1.941	23	977	0.023	304.514	304.368	3.657	9.630	0.778	778	222	0.222
East Sucia 2 Island	85.609	85.175	14.800	2.707	-2.159	5	995	0.005	322.666	322.514	5.383	10.204	0.038	520	480	0.480
East Sucia 3 Island	100.960	100.770	16.389	3.193	-2.048	13	987	0.013	335.876	335.704	7.040	10.621	1.791	960	40	0.040
East Sucia 4 Island	78.538	78.355	20.017	2.484	-0.876	197	803	0.197	308.656	308.415	6.457	9.761	2.755	993	7	0.007
East Sucia 6 Island	107.249	106.833	21.395	3.392	-1.512	64	936	0.064	285.918	285.525	7.312	9.042	1.641	938	62	0.062
East Sucia 7 Island	73.861	73.181	13.334	2.336	-1.068	144	856	0.144	331.376	331.123	5.393	10.479	1.566	933	67	0.067
East Sucia 8 Island	150.212	156.764	48.006	4.750	-2.354	8	992	0.008	293.564	291.031	22.588	9.283	-3.142	6	994	0.006
Ewing Island	68.924	68.464	15.521	2.180	-1.536	47	953	0.047	331.043	330.865	5.630	10.468	3.004	999	1	0.001
Fawn Island	71.139	71.252	11.099	2.250	-1.683	37	963	0.037	327.445	327.476	5.132	10.355	0.493	707	293	0.293
Flat Top Island	61.849	61.621	8.220	1.956	-1.657	45	955	0.045	344.275	344.222	2.629	10.887	0.937	825	175	0.175
Flint Beach Island	76.140	75.455	13.362	2.408	-0.963	165	835	0.165	318.221	317.937	5.090	10.063	2.227	987	13	0.013
Flower Island	69.581	69.002	12.823	2.200	0.409	664	336	0.336	325.342	325.256	2.709	10.288	1.344	896	104	0.104
Fortress Island	70.428	69.093	15.102	2.227	-1.200	108	892	0.108	321.132	321.079	8.398	10.155	2.916	997	3	0.003
Gossip Island	104.856	104.346	13.148	3.316	0.142	574	426	0.426	325.892	325.636	8.280	10.306	1.010	833	167	0.167
Hat Island	63.188	62.762	10.010	1.998	-1.115	125	875	0.125	342.620	342.602	3.497	10.835	1.132	870	130	0.130
Huckleberry Island	64.681	64.544	9.094	2.045	-0.608	281	719	0.281	346.324	346.183	3.927	10.952	-0.713	250	750	0.250
Iceberg Island	73.908	73.578	12.902	2.337	-0.430	355	645	0.355	325.750	325.410	6.744	10.301	1.725	956	44	0.044
Little Cactus	86.508	85.504	18.350	2.736	-0.214	435	565	0.435	311.185	311.554	10.215	9.841	1.446	909	91	0.091
Little McConnell Island	73.546	73.137	10.040	2.326	-1.353	80	920	0.080	301.470	301.515	3.362	9.533	1.925	967	33	0.033
Little Nob	146.520	154.123	51.661	4.633	-0.924	179	821	0.179	289.079	285.056	22.759	9.141	-1.674	87	913	0.087
Little Oak	149.545	149.039	30.721	4.729	-1.597	57	943	0.057	281.445	281.526	7.023	8.900	-1.384	86	914	0.086
Little Sucia Island	73.249	73.506	12.326	2.316	-0.421	347	653	0.347	332.885	332.816	7.918	10.527	-0.472	317	683	0.317
Low Island	104.595	103.993	18.546	3.308	-0.610	277	723	0.277	303.287	302.986	4.129	9.591	1.074	851	149	0.149
Mackaye Harbor Island	115.999	114.833	19.656	3.668	-1.619	49	951	0.049	361.053	360.905	2.978	11.417	-0.846	200	800	0.200
Massacre Bay 1 Island	147.145	146.736	27.917	4.653	-1.880	30	970	0.030	293.467	293.689	9.627	9.280	-2.422	11	989	0.011
Matia Island	63.884	63.619	7.284	2.020	-1.310	93	907	0.093	360.124	360.051	3.261	11.388	0.709	763	237	0.237
Matia West 1	73.285	71.891	16.328	2.317	-1.560	48	952	0.048	383.717	383.673	5.309	12.134	3.078	999	1	0.001
Matia West 2	97.374	96.661	24.612	3.079	-0.909	192	808	0.192	273.686	273.090	13.406	8.655	2.082	983	17	0.017

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Table a.4.1 – continued from previous page

Island name	mean SES DNNS$_i$	median SES DNNS$_i$	sd SES DNNS$_i$	se SES DNNS$_i$	obs.z SES DNNS$_i$	rankLow SES DNNS$_i$	rankHi SES DNNS$_i$	p-value SES DNNS$_i$	mean SES MDNS$_i$	median SES MDNS$_i$	sd SES MDNS$_i$	se SES MDNS$_i$	obs.z SES MDNS$_i$	rankLow SES MDNS$_i$	rankHi SES MDNS$_i$	p-value SES MDNS$_i$
McConnell Island	56.410	56.072	7.933	1.784	-1.469	61	939	0.061	330.844	330.713	3.252	10.462	1.550	937	63	0.063
Near Decatur Island Unnamed 3	91.531	90.909	20.718	2.894	-1.368	81	919	0.081	353.743	353.713	6.042	11.186	2.944	1000	0	0.000
Nob Island	69.963	69.312	12.942	2.212	-2.186	6	994	0.006	328.952	329.036	4.848	10.402	1.926	976	24	0.024
North Finger Island	61.346	60.974	10.668	1.940	-1.345	85	915	0.085	330.248	330.056	3.748	10.443	0.442	693	307	0.307
Oak Island	78.597	78.386	11.246	2.485	-0.982	166	834	0.166	310.486	310.203	5.979	9.818	1.406	916	84	0.084
Pole Island	100.000	99.088	17.952	3.162	-1.589	52	948	0.052	280.857	280.545	4.395	8.881	0.365	654	346	0.346
Posey Island	75.529	75.224	9.811	2.388	-1.334	97	903	0.097	285.534	285.512	3.889	9.029	1.604	946	54	0.054
Reef Island	60.545	59.971	10.416	1.915	-1.739	32	968	0.032	363.158	363.184	2.916	11.484	1.350	917	83	0.083
Reeflet Island	102.987	102.790	16.739	3.257	-2.358	7	993	0.007	372.563	372.634	3.529	11.781	-3.737	0	1000	0.000
Rim Island	99.170	99.453	22.909	3.136	-1.341	90	910	0.090	319.034	318.486	7.594	10.089	3.088	1000	0	0.000
Ripple Island	73.861	73.208	15.700	2.336	-1.152	120	880	0.120	279.697	279.540	5.061	8.845	1.183	887	113	0.113
Rum Island	72.992	72.353	15.622	2.308	-0.581	298	702	0.298	323.964	323.670	6.265	10.245	1.213	875	125	0.125
Saddlebag Island	65.714	65.323	7.232	2.078	-1.754	33	967	0.033	337.301	337.211	2.693	10.666	1.046	864	136	0.136
Secar Rock	150.480	157.495	49.034	4.759	-1.194	110	890	0.110	290.125	291.319	12.942	9.175	-1.253	92	908	0.092
Sentinel Island	68.927	68.754	10.296	2.180	-0.886	205	795	0.205	323.429	323.518	5.558	10.228	1.784	957	43	0.043
Skull Island	75.230	74.773	9.393	2.379	-1.281	88	912	0.088	325.115	325.018	3.792	10.281	2.375	991	9	0.009
Small Island near Charles	112.901	112.064	44.635	3.570	-0.363	362	638	0.362	281.478	281.609	16.958	8.901	0.260	589	411	0.411
Swirl Rock Central	112.825	111.194	38.891	3.568	-0.549	300	700	0.300	283.880	283.669	7.354	8.977	-1.146	125	875	0.125
Turn Island	57.006	56.991	6.814	1.803	-1.415	76	924	0.076	333.417	333.511	3.053	10.544	1.720	953	47	0.047
Turnlet Island	82.994	82.537	12.987	2.625	-1.017	159	841	0.159	324.481	324.238	3.740	10.261	1.414	914	86	0.086
Unnamed 1 near Long Island	83.364	83.009	14.059	2.636	-1.468	65	935	0.065	279.910	279.661	6.002	8.852	0.760	773	227	0.227
Unnamed 2 near Long Island	109.735	109.105	22.365	3.470	-1.402	83	917	0.083	291.489	291.487	3.323	9.218	-0.947	166	834	0.166
Unnamed 3 near Long Island	150.512	150.066	35.342	4.760	-2.398	9	991	0.009	289.753	289.970	10.247	9.163	-2.243	17	983	0.017
Unnamed 72 Island	108.731	107.820	18.195	3.438	-3.019	1	999	0.001	280.532	280.296	3.835	8.871	0.966	835	165	0.165
Victim Island	66.135	65.688	10.061	2.091	-0.896	177	823	0.177	315.721	315.647	5.389	9.984	1.704	956	44	0.044
Willow Island	77.130	76.421	14.828	2.439	-0.927	178	822	0.178	361.715	361.549	7.035	11.438	2.175	978	22	0.022
Yellow Island	56.763	56.631	5.088	1.795	-0.553	291	709	0.291	317.877	317.859	2.737	10.052	1.087	868	132	0.132

A.5 FUNCTIONAL DIVERSITY SUMMARY FOR SEED MASS

TABLE A.5.1: Tables of the summary statistics for difference in functional differences (measurements, NNFD, MFD, SES NNFD, SES MFD) between status groups for each island.

Observed functional diversity of seed mass (mg).

Island name	Total tips with trait	Median total	Min total	Max total	Total native tips with trait	Median native	Min native	Max native	Total invasive tips with trait	Median invasive	Min invasive	Max invasive	t-test obs P-value	CI (low)	CI (high)	mean$NNFD_n$	mean$NNFD_i$	t-test NNFD P-value	t-test NNFD CI (low)	t-test NNFD CI (high)	meanMFD_n	meanMFD_i	t-test MFD P-value	t-test MFD CI (low)	t-test MFD CI (high)
Aleck Rock	69	0.013	-1.983	1.437	48	0.263	-1.983	1.437	21	-0.300	-1.447	1.349	0.167	-0.662	0.118	0.167	0.113	0.779	-0.334	0.443	0.018	-0.200	0.325	-0.225	0.660
Barren Island	40	-0.218	-1.959	1.350	23	0.215	-1.959	1.350	17	-0.499	-1.462	1.022	0.064	-0.916	0.028	0.042	0.295	0.447	-0.923	0.416	0.003	-0.362	0.176	-0.173	0.904
Battleship Island	70	0.019	-1.349	2.018	45	0.221	-1.093	1.626	25	-0.300	-1.349	2.018	0.215	-0.664	0.153	0.138	0.168	0.879	-0.420	0.360	0.036	-0.255	0.162	-0.121	0.703
Blind Island	55	-0.186	-2.185	1.350	41	-0.036	-2.185	1.350	14	-0.327	-0.781	0.987	0.527	-0.510	0.265	0.145	0.229	0.697	-0.515	0.348	-0.008	-0.041	0.871	-0.383	0.450
Boulder Island	75	-0.200	-2.185	1.350	52	-0.011	-2.185	1.350	23	-0.518	-1.447	1.141	0.214	-0.618	0.142	0.166	0.063	0.627	-0.323	0.530	-0.004	-0.158	0.476	-0.279	0.587
Broken Point Island	44	-0.133	-1.959	3.631	27	0.013	-1.959	3.631	17	-0.355	-1.009	2.018	0.650	-0.713	0.450	0.382	0.095	0.371	-0.355	0.929	0.015	0.038	0.945	-0.699	0.653
Buck Island	17	0.013	-1.093	1.075	10	0.402	-1.093	1.075	7	-0.355	-0.781	0.674	0.234	-1.030	0.272	0.154	-0.466	0.095	-0.128	1.368	0.000	-0.379	0.263	-0.316	1.073
Castle Island	99	0.026	-2.185	1.953	74	0.217	-2.185	1.953	25	-0.300	-1.447	1.343	0.546	-0.483	0.259	-0.063	0.216	0.206	-0.720	0.161	-0.009	-0.070	0.765	-0.349	0.471
Cemetery Island	27	-0.250	-1.959	3.631	21	0.013	-1.959	3.631	6	-0.759	-1.462	0.987	0.133	-1.669	0.256	0.110	-1.436	0.176	-1.003	4.095	0.002	-1.035	0.004	0.374	1.699
Charles Island	105	0.215	-2.628	3.631	63	0.365	-2.628	3.631	42	-0.266	-1.678	1.343	0.004	-0.805	-0.159	-0.008	-0.348	0.102	-0.069	0.749	-0.003	-0.482	0.005	0.148	0.810
Cliff Island	94	-0.168	-3.349	3.631	62	0.110	-3.349	3.631	32	-0.290	-1.349	1.399	0.330	-0.590	0.200	0.027	0.026	0.998	-0.368	0.369	-0.081	-0.078	0.987	-0.421	0.415
Colville Island	40	-0.025	-1.349	2.018	19	0.305	-1.332	1.953	21	-0.355	-1.349	2.018	0.134	-0.889	0.123	0.133	-0.022	0.470	-0.277	0.589	0.009	-0.312	0.262	-0.251	0.893
Coon Island	81	-0.079	-2.185	3.631	45	0.343	-2.185	3.631	36	-0.299	-1.369	1.343	0.016	-0.804	-0.085	0.291	-0.009	0.163	-0.125	0.725	0.034	-0.385	0.031	0.040	0.797
Crab Island	12	0.351	-1.009	0.987	5	0.583	0.013	0.878	7	-0.499	-1.009	0.987	0.084	-1.347	0.103	0.320	-0.450	0.095	-0.169	1.708	0.158	-0.540	0.085	-0.131	1.527
Deadman Island	62	-0.011	-1.983	3.631	41	0.215	-1.983	3.631	21	-0.300	-1.009	1.343	0.387	-0.619	0.244	0.106	0.101	0.985	-0.457	0.466	-0.029	-0.090	0.801	-0.423	0.545
Dot Island	76	-0.182	-1.959	1.626	51	0.026	-1.959	1.626	25	-0.421	-1.349	1.343	0.044	-0.655	-0.009	0.235	0.034	0.345	-0.221	0.624	0.035	-0.332	0.029	0.039	0.694
Dotlet Island	23	-0.285	-1.093	0.987	13	0.013	-1.093	0.919	10	-0.437	-0.946	0.987	0.271	-0.834	0.247	0.022	-0.399	0.129	-0.134	0.975	0.098	-0.294	0.150	-0.154	0.936
East Sucia 1 Island	43	-0.300	-1.959	1.141	26	-0.357	-1.959	1.075	17	-0.242	-1.462	1.141	0.729	-0.423	0.598	0.094	0.142	0.872	-0.643	0.548	0.050	0.088	0.882	-0.554	0.479
East Sucia 2 Island	38	0.076	-2.185	1.953	23	0.221	-2.185	1.953	15	-0.200	-1.462	1.141	0.442	-0.850	0.379	0.140	0.356	0.626	-1.113	0.681	0.028	-0.427	0.176	-0.215	1.124
East Sucia 3 Island	32	-0.525	-2.185	1.075	18	-0.421	-2.185	1.075	14	-0.534	-1.462	0.874	0.727	-0.684	0.483	0.241	0.184	0.890	-0.783	0.898	0.000	-0.101	0.736	-0.505	0.707
East Sucia 4 Island	43	0.035	-1.959	1.537	33	0.013	-1.959	1.537	10	0.076	-0.856	0.987	0.687	-0.416	0.620	0.050	-0.231	0.309	-0.272	0.835	0.046	0.102	0.824	-0.578	0.465
East Sucia 6 Island	39	0.013	-1.959	1.537	27	0.074	-1.959	1.537	12	-0.327	-1.462	0.987	0.379	-0.818	0.323	0.013	-0.296	0.298	-0.286	0.904	0.000	-0.247	0.385	-0.330	0.824
East Sucia 7 Island	59	0.100	-1.959	1.537	40	0.263	-1.959	1.537	19	-0.355	-1.369	1.037	0.103	-0.752	0.072	0.030	0.087	0.803	-0.519	0.404	0.000	-0.340	0.106	-0.076	0.757
East Sucia 8 Island	7	0.275	-0.856	0.583	4	0.396	0.013	0.583	3	-0.781	-0.856	0.275	0.149	-2.200	0.599	0.117	-0.604	0.110	-0.260	1.704	-0.105	-0.801	0.188	-0.630	2.021
Ewing Island	72	0.049	-1.983	1.953	54	0.290	-1.983	1.953	18	-0.299	-1.369	1.349	0.144	-0.705	0.107	-0.114	-0.039	0.747	-0.544	0.394	-0.010	-0.299	0.162	-0.121	0.701
Fawn Island	64	-0.225	-1.482	3.631	33	0.090	-1.427	3.631	31	-0.355	-1.482	1.343	0.018	-0.906	-0.087	0.222	-0.167	0.128	-0.117	0.895	0.020	-0.497	0.019	0.090	0.944
Flat Top Island	110	0.080	-2.849	3.631	71	0.276	-2.849	3.631	39	-0.421	-1.447	2.252	0.200	-0.627	0.133	0.056	0.176	0.506	-0.477	0.237	-0.004	-0.163	0.442	-0.249	0.565
Flint Beach Island	64	-0.060	-2.185	1.563	46	0.234	-2.185	1.563	18	-0.427	-1.080	0.987	0.031	-0.778	-0.039	0.218	-0.144	0.097	-0.067	0.791	-0.008	-0.365	0.083	-0.048	0.762
Flower Island	64	0.248	-1.777	3.631	43	0.305	-1.777	3.631	21	0.035	-1.349	1.288	0.434	-0.635	0.277	0.165	0.474	0.250	-0.843	0.224	0.029	-0.105	0.584	-0.354	0.621
Fortress Island	47	0.013	-2.185	1.437	31	0.198	-2.185	1.437	16	-0.189	-1.482	0.987	0.429	-0.625	0.270	0.127	-0.251	0.104	-0.081	0.837	0.006	-0.193	0.406	-0.279	0.677
Gossip Island	59	-0.281	-2.185	1.343	37	0.198	-2.185	1.250	22	-0.490	-1.462	1.343	0.058	-0.805	0.014	0.222	-0.131	0.118	-0.092	0.798	0.037	-0.395	0.041	0.018	0.848
Hat Island	96	-0.093	-2.849	1.953	65	0.164	-2.849	1.953	31	-0.259	-1.349	1.494	0.546	-0.460	0.245	0.111	0.099	0.946	-0.346	0.370	0.062	-0.068	0.484	-0.238	0.497
Huckleberry Island	102	-0.060	-1.983	2.018	67	0.026	-1.983	1.626	35	-0.300	-1.349	2.018	0.770	-0.400	0.297	0.043	0.255	0.287	-0.604	0.182	-0.006	-0.051	0.800	-0.307	0.397
Iceberg Island	49	-0.071	-1.983	1.075	29	0.164	-1.983	1.075	20	-0.427	-1.369	0.987	0.324	-0.662	0.223	0.187	-0.053	0.258	-0.183	0.662	-0.004	-0.158	0.532	-0.339	0.646
Little Cactus	37	-0.281	-1.983	1.437	26	0.088	-1.983	1.437	11	-0.355	-1.349	0.987	0.184	-0.885	0.178	0.146	0.471	0.240	-0.883	0.233	-0.006	-0.353	0.207	-0.203	0.897
Little McConnell Island	73	0.013	-2.185	2.125	41	0.221	-2.185	2.125	32	-0.140	-1.678	1.343	0.299	-0.566	0.177	0.273	0.061	0.365	-0.253	0.678	0.006	-0.126	0.528	-0.283	0.547
Little Nob	10	0.230	-1.024	0.987	7	0.426	-1.024	0.878	3	0.035	-0.596	0.987	0.962	-1.620	1.566	0.443	-0.094	0.428	-2.065	3.141	0.537	0.342	0.753	-4.761	5.150

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Table a.5.1 – continued from previous page

Island name	Total tips with trait	Median total	Min total	Max total	Total native tips with trait	Median native	Min native	Max native	Total invasive tips with trait	Median invasive	Min invasive	Max invasive	t-test obs P-value	CI (low)	CI (high)	$meanNNFD_n$	$meanNNFD_i$	t-test NNFD P-value	t-test NNFD CI (low)	t-test NNFD CI (high)	$meanMFD_n$	$meanMFD_i$	t-test MFD P-value	t-test MFD CI (low)	t-test MFD CI (high)
Little Oak	14	-0.171	-1.447	0.987	6	0.114	-1.093	0.583	8	-0.460	-1.447	0.987	0.783	-0.998	0.770	0.229	0.310	0.889	-1.453	1.291	-0.033	-0.037	0.995	-1.189	1.196
Little Sucia Island	73	0.113	-1.462	1.953	51	0.305	-1.427	1.953	22	-0.018	-1.462	1.349	0.155	-0.735	0.121	0.109	0.060	0.834	-0.419	0.518	-0.005	-0.307	0.176	-0.140	0.744
Low Island	35	-0.015	-1.959	1.437	20	0.298	-1.959	1.437	15	-0.079	-1.009	1.141	0.569	-0.688	0.385	-0.388	-0.022	0.238	-0.989	0.256	-0.060	-0.163	0.741	-0.529	0.734
Mackaye Harbor Island	26	-0.143	-1.959	1.343	12	-0.195	-1.959	1.075	14	-0.132	-0.946	1.343	0.503	-0.445	0.880	0.176	-0.207	0.307	-0.390	1.156	0.000	0.217	0.527	-0.923	0.488
Massacre Bay 1 Island	18	0.057	-1.093	0.987	9	0.080	-1.093	0.686	9	0.035	-0.673	0.987	0.985	-0.570	0.580	-0.233	-0.187	0.909	-0.917	0.825	-0.088	0.099	0.571	-0.893	0.518
Matia Island	127	-0.027	-2.628	2.252	82	0.043	-2.628	2.125	45	-0.092	-1.369	2.252	0.874	-0.299	0.351	-0.020	0.136	0.396	-0.520	0.207	0.005	-0.033	0.825	-0.304	0.380
Matia West 1	59	0.129	-1.959	1.953	45	0.305	-1.959	1.953	14	-0.437	-1.369	0.987	0.023	-0.955	-0.075	-0.131	-0.168	0.851	-0.359	0.433	0.002	-0.515	0.026	0.068	0.966
Matia West 2	22	-0.029	-1.369	1.382	13	0.343	-1.093	1.382	9	-0.565	-1.369	0.987	0.059	-1.304	0.027	0.009	-0.056	0.852	-0.650	0.780	0.000	-0.638	0.068	-0.053	1.330
McConnell Island	115	0.013	-2.849	3.631	74	0.162	-2.849	3.631	41	-0.163	-1.488	2.252	0.255	-0.555	0.149	0.014	-0.055	0.680	-0.264	0.403	-0.079	-0.136	0.762	-0.312	0.425
Near Decatur Island Unnamed 3	40	0.024	-1.959	1.626	26	0.155	-1.959	1.626	14	-0.186	-0.856	0.987	0.679	-0.572	0.377	0.211	-0.128	0.210	-0.199	0.878	0.000	-0.098	0.686	-0.388	0.583
Nob Island	56	0.024	-2.185	3.631	35	0.426	-2.185	3.631	21	-0.355	-1.349	1.343	0.119	-0.870	0.102	0.483	-0.200	0.007	0.201	1.165	0.066	-0.384	0.077	-0.051	0.951
North Finger Island	91	0.013	-2.849	2.125	63	0.215	-2.849	2.125	28	-0.210	-1.369	1.343	0.252	-0.587	0.157	-0.091	0.100	0.371	-0.614	0.233	-0.011	-0.224	0.287	-0.184	0.612
Oak Island	47	0.100	-1.349	3.631	23	0.583	-1.093	3.631	24	-0.075	-1.349	1.343	0.061	-1.005	0.025	0.161	0.032	0.669	-0.481	0.740	0.063	-0.475	0.071	-0.049	1.124
Pole Island	37	0.035	-0.835	1.343	21	0.305	-0.835	1.102	16	-0.164	-0.781	1.343	0.222	-0.673	0.162	0.155	-0.098	0.289	-0.228	0.734	-0.026	-0.245	0.328	-0.231	0.669
Posey Island	69	-0.186	-2.018	3.631	34	0.207	-1.179	3.631	35	-0.421	-2.018	0.987	0.005	-0.978	-0.186	0.183	-0.023	0.393	-0.275	0.686	-0.030	-0.503	0.048	0.005	0.942
Reef Island	81	0.090	-2.849	3.631	54	0.321	-2.849	3.631	27	-0.298	-1.349	1.343	0.031	-0.817	-0.041	-0.077	0.044	0.595	-0.570	0.330	-0.102	-0.322	0.295	-0.198	0.638
Reeflet Island	32	0.063	-3.349	1.437	14	0.324	-3.349	1.437	18	-0.075	-1.009	0.987	0.986	-0.726	0.713	-0.082	-0.197	0.854	-1.227	1.457	-0.024	0.133	0.734	-1.141	0.827
Rim Island	33	0.013	-1.959	1.343	21	0.221	-1.959	1.273	12	-0.327	-0.856	1.343	0.709	-0.671	0.463	0.333	0.046	0.443	-0.469	1.044	0.000	-0.104	0.715	-0.475	0.683
Ripple Island	49	-0.071	-1.349	1.834	33	0.221	-1.024	1.834	16	-0.327	-1.349	1.141	0.102	-0.776	0.074	0.063	0.156	0.684	-0.552	0.367	0.020	-0.351	0.091	-0.063	0.806
Rum Island	54	0.116	-1.959	3.631	38	0.309	-1.959	3.631	16	-0.327	-0.946	1.343	0.087	-0.857	0.061	0.125	-0.132	0.334	-0.272	0.787	-0.026	-0.453	0.079	-0.052	0.905
Saddlebag Island	129	-0.071	-2.849	2.283	83	0.164	-2.849	2.283	46	-0.264	-2.579	2.018	0.218	-0.549	0.127	0.078	0.087	0.955	-0.328	0.310	0.017	-0.211	0.191	-0.115	0.572
Secar Rock	7	0.583	-1.024	1.141	4	0.505	-1.024	0.686	3	0.674	-0.596	1.141	0.734	-1.562	2.039	-0.034	0.403	0.703	-4.553	3.678	-0.115	0.740	0.369	-3.731	2.021
Sentinel Island	82	0.153	-2.185	3.631	51	0.343	-2.185	3.631	31	-0.200	-1.349	2.211	0.131	-0.685	0.091	0.200	-0.150	0.067	-0.025	0.724	-0.016	-0.219	0.297	-0.183	0.589
Skull Island	80	0.077	-2.861	3.631	42	0.290	-2.861	3.631	38	-0.043	-1.447	1.923	0.654	-0.514	0.324	0.157	0.070	0.717	-0.391	0.564	0.020	-0.095	0.603	-0.325	0.555
Small Island near Charles	16	0.024	-1.093	1.174	13	0.013	-1.093	1.174	3	0.035	-1.009	0.674	0.816	-1.900	1.627	0.304	-0.273	0.376	-1.144	2.298	0.000	-0.136	0.818	-1.596	1.869
Swirl Rock Central	18	0.024	-1.093	1.174	14	-0.011	-1.093	1.174	4	0.155	-0.565	0.674	0.608	-0.595	0.936	0.232	0.037	0.517	-0.434	0.824	-0.051	0.170	0.535	-1.012	0.569
Turn Island	128	0.062	-3.349	3.631	81	0.215	-3.349	3.631	47	-0.079	-1.159	2.018	0.633	-0.404	0.247	0.039	-0.001	0.831	-0.331	0.412	0.003	0.002	0.992	-0.346	0.349
Turnlet Island	40	0.067	-1.959	1.437	20	0.335	-1.959	1.437	20	-0.075	-1.009	1.141	0.373	-0.664	0.256	0.037	0.304	0.341	-0.831	0.297	0.006	-0.083	0.718	-0.409	0.587
Unnamed 1 near Long Island	42	-0.191	-1.959	1.437	24	-0.040	-1.959	1.437	18	-0.532	-1.462	0.987	0.368	-0.725	0.275	0.096	0.055	0.891	-0.568	0.651	-0.006	-0.374	0.182	-0.182	0.917
Unnamed 2 near Long Island	30	-0.054	-1.959	1.343	17	-0.311	-1.959	1.174	13	0.035	-1.009	1.343	0.372	-0.290	0.750	0.379	0.459	0.817	-0.796	0.635	-0.015	0.133	0.630	-0.784	0.487
Unnamed 3 near Long Island	11	-0.220	-1.369	0.674	5	-0.036	-1.024	0.583	6	-0.360	-1.369	0.674	0.660	-1.037	0.690	0.125	-0.186	0.658	-2.135	2.758	0.347	-0.138	0.568	-2.434	3.406
Unnamed 72 Island	35	-0.071	-1.349	1.350	18	0.218	-1.093	1.350	17	-0.298	-1.349	0.987	0.136	-0.798	0.113	0.051	-0.289	0.270	-0.282	0.960	-0.030	-0.342	0.200	-0.174	0.800
Victim Island	80	-0.075	-2.849	3.631	51	0.215	-2.849	3.631	29	-0.421	-1.462	2.018	0.074	-0.779	0.037	0.110	-0.205	0.117	-0.080	0.710	-0.007	-0.371	0.091	-0.059	0.786
Willow Island	65	-0.071	-1.709	1.626	45	0.090	-1.709	1.626	20	-0.327	-1.369	0.987	0.049	-0.744	-0.001	0.036	-0.114	0.487	-0.279	0.579	0.000	-0.373	0.052	-0.003	0.749
Yellow Island	156	0.054	-3.349	3.631	90	0.127	-3.349	3.631	66	-0.058	-1.462	2.211	0.562	-0.228	0.418	0.150	0.260	0.503	-0.432	0.213	0.023	0.157	0.433	-0.472	0.203

SES of functional differences for seed mass (mg).

Island name	mean SES NNFD$_i$	median SES NNFD$_i$	sd SES NNFD$_i$	se SES NNFD$_i$	SES NNFD$_i$ obs z	SES NNFD$_i$ rankLow	SES NNFD$_i$ rankHi	P-value SES NNFD$_i$ ranks	mean SES MFD$_i$	median SES MFD$_i$	sd SES MFD$_i$	se SES MFD$_i$	SES MFD$_i$ obs z	SES MFD$_i$ rankLow	SES MFD$_i$ rankHi	P-value SES MFD$_i$ ranks
Aleck Rock	0.358	0.355	0.201	0.011	-1.222	117	883	0.117	-0.043	-0.044	0.194	-0.001	-0.808	212	788	0.212
Barren Island	0.367	0.359	0.215	0.012	-0.334	381	619	0.381	-0.023	-0.029	0.210	-0.001	-1.613	56	944	0.056
Battleship Island	0.186	0.178	0.147	0.006	-0.126	468	532	0.468	-0.215	-0.210	0.164	-0.007	-0.244	407	593	0.407
Blind Island	0.445	0.435	0.269	0.014	-0.803	215	785	0.215	0.112	0.110	0.241	0.004	-0.635	265	735	0.265
Boulder Island	0.261	0.263	0.166	0.008	-1.196	111	889	0.111	0.130	0.125	0.176	0.004	-1.631	53	947	0.053
Broken Point Island	0.282	0.293	0.224	0.009	-0.834	200	800	0.200	0.052	0.049	0.211	0.002	-0.063	473	527	0.473
Buck Island	-0.271	-0.265	0.319	-0.009	-0.613	268	732	0.268	-0.164	-0.162	0.330	-0.005	-0.650	265	735	0.265
Castle Island	0.281	0.285	0.180	0.009	-0.359	367	633	0.367	0.018	0.013	0.181	0.001	-0.487	321	679	0.321
Cemetery Island	-0.607	-0.567	0.631	-0.019	-1.313	108	892	0.108	-0.072	-0.080	0.364	-0.002	-2.645	2	998	0.002
Charles Island	-0.076	-0.078	0.130	-0.002	-2.090	18	982	0.018	-0.288	-0.287	0.120	-0.009	-1.622	52	948	0.052
Cliff Island	0.292	0.290	0.131	0.009	-2.028	25	975	0.025	0.066	0.063	0.148	0.002	-0.974	160	840	0.160
Colville Island	-0.061	-0.061	0.236	-0.002	0.165	567	433	0.433	-0.118	-0.118	0.195	-0.004	-0.993	160	840	0.160
Coon Island	0.185	0.185	0.162	0.006	-1.193	119	881	0.119	-0.160	-0.156	0.132	-0.005	-1.699	40	960	0.040
Crab Island	-0.460	-0.451	0.350	-0.015	0.029	502	498	0.498	-0.452	-0.444	0.341	-0.014	-0.260	395	605	0.395
Deadman Island	0.172	0.177	0.218	0.005	-0.322	373	627	0.373	-0.032	-0.029	0.198	-0.001	-0.295	375	625	0.375
Dot Island	0.232	0.237	0.159	0.007	-1.251	109	891	0.109	0.033	0.036	0.162	0.001	-2.253	11	989	0.011
Dotlet Island	0.253	0.253	0.290	0.008	-2.246	11	989	0.011	0.041	0.044	0.274	0.001	-1.220	115	885	0.115
East Sucia 1 Island	0.372	0.374	0.194	0.012	-1.185	129	871	0.129	0.249	0.253	0.206	0.008	-0.781	238	762	0.238
East Sucia 2 Island	0.400	0.405	0.258	0.013	-0.172	432	568	0.432	-0.072	-0.071	0.229	-0.002	-1.552	57	943	0.057
East Sucia 3 Island	0.543	0.548	0.248	0.017	-1.450	80	920	0.080	0.346	0.362	0.230	0.011	-1.938	35	965	0.035
East Sucia 4 Island	0.252	0.262	0.292	0.008	-1.656	53	947	0.053	0.021	0.022	0.270	0.001	0.299	605	395	0.395
East Sucia 6 Island	0.025	0.012	0.281	0.001	-1.142	130	870	0.130	0.042	0.034	0.238	0.001	-1.220	106	894	0.106
East Sucia 7 Island	0.185	0.184	0.219	0.006	-0.445	330	670	0.330	-0.088	-0.101	0.192	-0.003	-1.316	83	917	0.083
East Sucia 8 Island	-0.416	-0.440	0.555	-0.013	-0.340	361	636	0.361	-0.285	-0.300	0.555	-0.009	-0.928	164	833	0.164
Ewing Island	0.211	0.213	0.216	0.007	-1.154	136	864	0.136	-0.114	-0.115	0.212	-0.004	-0.873	196	804	0.196
Fawn Island	0.179	0.176	0.167	0.006	-2.073	17	983	0.017	-0.201	-0.202	0.145	-0.006	-2.041	21	979	0.021
Flat Top Island	0.244	0.248	0.130	0.008	-0.525	297	703	0.297	-0.078	-0.079	0.127	-0.002	-0.662	244	756	0.244
Flint Beach Island	0.187	0.184	0.213	0.006	-1.555	54	946	0.054	-0.046	-0.047	0.204	-0.001	-1.560	55	945	0.055
Flower Island	0.202	0.206	0.219	0.006	1.241	894	106	0.106	-0.158	-0.156	0.181	-0.005	0.293	607	393	0.393
Fortress Island	0.082	0.072	0.257	0.003	-1.297	88	912	0.088	0.031	0.030	0.245	0.001	-0.914	179	821	0.179
Gossip Island	0.223	0.216	0.184	0.007	-1.926	23	977	0.023	0.025	0.029	0.169	0.001	-2.491	6	994	0.006
Hat Island	0.214	0.211	0.146	0.007	-0.787	210	790	0.210	0.057	0.056	0.145	0.002	-0.862	194	806	0.194
Huckleberry Island	0.193	0.195	0.132	0.006	0.466	691	309	0.309	0.010	0.014	0.142	0.000	-0.430	320	680	0.320
Iceberg Island	0.329	0.325	0.176	0.010	-2.171	13	987	0.013	0.146	0.137	0.198	0.005	-1.533	68	932	0.068
Little Cactus	0.254	0.253	0.254	0.008	0.855	812	188	0.188	0.013	0.009	0.271	0.000	-1.350	88	912	0.088

Continued on next page

Table a.5.1 – continued from previous page

Island name	mean SES $NNFD_i$	median SES $NNFD_i$	sd SES $NNFD_i$	se SES $NNFD_i$	SES $NNFD_i$ obs z	SES $NNFD_i$ rankLow	SES $NNFD_i$ rankHi	P-value SES $NNFD_i$ ranks	mean SES MFD_i	median SES MFD_i	sd SES MFD_i	se SES MFD_i	SES MFD_i obs z	SES MFD_i rankLow	SES MFD_i rankHi	P-value SES MFD_i ranks
Little McConnell Island	0.155	0.148	0.157	0.005	-0.595	279	721	0.279	-0.023	-0.022	0.147	-0.001	-0.697	248	752	0.248
Little Nob	-0.369	-0.380	0.558	-0.012	0.493	691	309	0.309	-0.147	-0.158	0.570	-0.005	0.859	808	192	0.192
Little Oak	0.551	0.554	0.385	0.017	-0.625	260	740	0.260	0.173	0.176	0.328	0.005	-0.639	271	729	0.271
Little Sucia Island	0.100	0.105	0.190	0.003	-0.214	405	595	0.405	-0.246	-0.248	0.180	-0.008	-0.341	349	651	0.349
Low Island	-0.122	-0.125	0.258	-0.004	0.390	661	339	0.339	-0.072	-0.077	0.237	-0.002	-0.387	365	635	0.365
Mackaye Harbor Island	0.014	0.010	0.255	0.000	-0.869	180	820	0.180	0.256	0.248	0.234	0.008	-0.167	449	551	0.449
Massacre Bay 1 Island	-0.150	-0.148	0.385	-0.005	-0.096	455	545	0.455	-0.035	-0.041	0.313	-0.001	0.431	663	337	0.337
Matia Island	0.200	0.201	0.116	0.006	-0.550	289	711	0.289	-0.035	-0.038	0.117	-0.001	0.017	513	487	0.487
Matia West 1	0.228	0.219	0.221	0.007	-1.791	39	961	0.039	-0.212	-0.210	0.237	-0.007	-1.278	108	892	0.108
Matia West 2	0.195	0.202	0.294	0.006	-0.853	184	816	0.184	-0.259	-0.255	0.294	-0.008	-1.292	102	898	0.102
McConnell Island	0.023	0.023	0.118	0.001	-0.661	250	750	0.250	-0.068	-0.070	0.122	-0.002	-0.552	292	708	0.292
Near Decatur Island Unnamed 3	0.177	0.176	0.250	0.006	-1.220	108	892	0.108	0.061	0.059	0.231	0.002	-0.689	254	746	0.254
Nob Island	0.124	0.127	0.205	0.004	-1.581	55	945	0.055	-0.186	-0.192	0.180	-0.006	-1.097	126	874	0.126
North Finger Island	0.221	0.221	0.162	0.007	-0.749	222	778	0.222	-0.061	-0.064	0.162	-0.002	-1.004	151	849	0.151
Oak Island	0.197	0.200	0.230	0.006	-0.719	230	770	0.230	-0.439	-0.439	0.187	-0.014	-0.191	431	569	0.431
Pole Island	0.134	0.120	0.250	0.004	-0.931	175	825	0.175	-0.180	-0.182	0.211	-0.006	-0.308	373	627	0.373
Posey Island	0.150	0.146	0.158	0.005	-1.092	139	861	0.139	-0.232	-0.232	0.151	-0.007	-1.791	37	963	0.037
Reef Island	0.087	0.091	0.173	0.003	-0.252	410	590	0.410	-0.167	-0.167	0.184	-0.005	-0.843	202	798	0.202
Reeflet Island	-0.221	-0.221	0.208	-0.007	0.117	551	449	0.449	0.113	0.115	0.210	0.004	0.095	534	466	0.466
Rim Island	0.318	0.305	0.282	0.010	-0.965	173	827	0.173	-0.045	-0.052	0.252	-0.001	-0.232	422	578	0.422
Ripple Island	0.203	0.214	0.203	0.006	-0.236	386	614	0.386	-0.154	-0.152	0.217	-0.005	-0.909	185	815	0.185
Rum Island	0.316	0.317	0.249	0.010	-1.797	37	963	0.037	-0.259	-0.263	0.224	-0.008	-0.865	190	810	0.190
Saddlebag Island	0.103	0.101	0.100	0.003	-0.163	439	561	0.439	-0.088	-0.085	0.108	-0.003	-1.134	137	863	0.137
Secar Rock	-0.368	-0.379	0.591	-0.012	1.305	895	96	0.096	-0.079	-0.113	0.618	-0.003	1.326	897	94	0.094
Sentinel Island	0.003	0.000	0.137	0.000	-1.119	129	871	0.129	-0.243	-0.239	0.145	-0.008	0.165	559	441	0.441
Skull Island	0.186	0.187	0.135	0.006	-0.857	206	794	0.206	-0.092	-0.091	0.131	-0.003	-0.023	492	508	0.492
Small Island near Charles	-0.105	-0.074	0.522	-0.003	-0.321	348	652	0.348	-0.022	-0.029	0.538	-0.001	-0.212	431	569	0.431
Swirl Rock Central	0.194	0.204	0.444	0.006	-0.353	362	638	0.362	0.135	0.127	0.475	0.004	0.075	540	460	0.460
Turn Island	0.127	0.125	0.104	0.004	-1.232	109	891	0.109	-0.024	-0.020	0.115	-0.001	0.226	574	426	0.426
Turnlet Island	0.164	0.156	0.193	0.005	0.729	760	240	0.240	-0.088	-0.088	0.194	-0.003	0.029	509	491	0.491
Unnamed 1 near Long Island	0.360	0.367	0.225	0.011	-1.356	96	904	0.096	0.129	0.127	0.230	0.004	-2.186	11	989	0.011
Unnamed 2 near Long Island	0.352	0.349	0.280	0.011	0.383	641	359	0.359	0.228	0.223	0.267	0.007	-0.355	368	632	0.368
Unnamed 3 near Long Island	-0.307	-0.301	0.384	-0.010	0.314	612	388	0.388	0.201	0.188	0.387	0.006	-0.877	199	801	0.199
Unnamed 72 Island	0.197	0.194	0.263	0.006	-1.849	22	978	0.022	-0.138	-0.150	0.208	-0.004	-0.984	156	844	0.156
Victim Island	0.198	0.198	0.168	0.006	-2.400	12	988	0.012	-0.107	-0.102	0.152	-0.003	-1.732	47	953	0.047
Willow Island	0.198	0.200	0.187	0.006	-1.665	58	942	0.058	-0.049	-0.047	0.189	-0.002	-1.711	45	955	0.045
Yellow Island	0.203	0.203	0.079	0.006	0.706	757	243	0.243	0.074	0.074	0.086	0.002	0.977	835	165	0.165

A.6 FUNCTIONAL DIVERSITY SUMMARY FOR MAXIMUM HEIGHT

TABLE A.6.1: Tables of the summary statistics for difference in functional differences (measurements, NNFD, MFD, SES NNFD, SES MFD) between status groups for each island.

Observed functional diversity of maximum height (m).

Island name	Total tips with trait	Median total	Min total	Max total	Total native tips with trait	Median native	Min native	Max native	Total invasive tips with trait	Median invasive	Min invasive	Max invasive	t-test obs P-value	CI (low)	CI (high)	$meanNNFD_n$	$meanNNFD_i$	t-test NNFD P-value	t-test NNFD CI (low)	t-test NNFD CI (high)	$meanMFD_n$	$meanMFD_i$	t-test MFD P-value	t-test MFD CI (low)	t-test MFD CI (high)
Aleck Rock	66	-0.251	-1.097	1.786	46	-0.222	-0.824	1.786	20	-0.375	-1.097	1.079	0.068	-0.486	0.018	0.127	-0.104	0.059	-0.010	0.472	-0.011	-0.160	0.291	-0.135	0.435
Barren Island	38	-0.301	-1.097	1.000	22	-0.159	-0.824	1.000	16	-0.347	-1.097	0.079	0.048	-0.509	-0.002	-0.049	-0.007	0.787	-0.360	0.277	0.035	-0.177	0.107	-0.049	0.473
Battleship Island	68	-0.222	-1.097	1.786	44	-0.097	-0.699	1.786	24	-0.301	-1.097	1.079	0.053	-0.480	0.003	0.091	-0.156	0.032	0.022	0.471	0.026	-0.238	0.037	0.017	0.511
Blind Island	52	-0.280	-1.097	1.786	39	-0.222	-0.824	1.786	13	-0.301	-1.097	0.234	0.357	-0.352	0.131	0.078	-0.003	0.594	-0.228	0.391	-0.002	-0.040	0.737	-0.193	0.271
Boulder Island	72	-0.301	-1.097	1.786	50	-0.232	-1.000	1.786	22	-0.367	-1.097	0.079	0.006	-0.420	-0.073	0.120	-0.131	0.038	0.014	0.488	-0.002	-0.205	0.030	0.021	0.386
Broken Point Island	44	-0.232	-1.097	1.398	27	-0.155	-0.824	1.398	17	-0.293	-1.097	0.624	0.216	-0.438	0.102	0.160	-0.055	0.136	-0.072	0.501	0.000	-0.069	0.642	-0.232	0.371
Buck Island	17	-0.293	-1.097	0.602	10	-0.048	-0.602	0.602	7	-0.336	-1.097	-0.260	0.009	-0.872	-0.148	0.004	-0.479	0.004	0.179	0.787	0.000	-0.510	0.013	0.126	0.895
Castle Island	94	-0.222	-1.097	1.786	71	-0.046	-1.000	1.786	23	-0.301	-1.097	0.234	0.000	-0.585	-0.208	-0.036	-0.106	0.472	-0.126	0.267	-0.009	-0.380	0.000	0.187	0.555
Cemetery Island	26	-0.321	-0.824	1.398	21	-0.222	-0.824	1.398	5	-0.523	-0.602	-0.301	0.019	-0.549	-0.053	0.001	-0.547	0.226	-0.491	1.588	0.000	-0.301	0.023	0.045	0.558
Charles Island	102	-0.222	-1.398	1.836	64	-0.071	-0.824	1.836	38	-0.341	-1.398	0.234	0.000	-0.666	-0.289	0.005	-0.296	0.009	0.077	0.526	0.014	-0.477	0.000	0.291	0.690
Cliff Island	92	-0.155	-1.097	1.836	62	0.000	-1.000	1.836	30	-0.303	-1.097	0.456	0.000	-0.613	-0.199	0.002	-0.088	0.409	-0.127	0.307	0.000	-0.352	0.002	0.137	0.567
Colville Island	41	-0.155	-1.097	0.624	21	0.114	-0.523	0.602	20	-0.301	-1.097	0.624	0.002	-0.601	-0.142	-0.094	-0.186	0.400	-0.127	0.310	0.009	-0.308	0.011	0.077	0.557
Coon Island	79	-0.222	-1.283	1.786	43	-0.097	-0.824	1.786	36	-0.321	-1.283	0.301	0.000	-0.586	-0.177	0.145	-0.198	0.007	0.097	0.589	0.027	-0.356	0.001	0.163	0.601
Crab Island	10	-0.195	-0.534	0.079	4	-0.048	-0.097	0.000	6	-0.301	-0.534	0.079	0.032	-0.468	-0.030	0.097	-0.189	0.101	-0.103	0.675	0.065	-0.189	0.105	-0.098	0.606
Deadman Island	59	-0.260	-1.097	1.786	39	-0.097	-0.824	1.786	20	-0.318	-1.097	0.301	0.003	-0.583	-0.124	0.111	-0.081	0.183	-0.093	0.476	0.006	-0.285	0.018	0.052	0.530
Dot Island	75	-0.222	-1.097	1.786	49	-0.097	-0.824	1.786	26	-0.318	-1.097	0.255	0.002	-0.528	-0.130	0.057	-0.047	0.367	-0.126	0.336	0.018	-0.329	0.002	0.136	0.557
Dotlet Island	22	-0.276	-1.097	0.255	13	-0.222	-0.602	0.255	9	-0.523	-1.097	-0.046	0.022	-0.575	-0.054	0.014	-0.359	0.008	0.114	0.633	0.037	-0.314	0.012	0.091	0.611
East Sucia 1 Island	41	-0.301	-1.097	0.653	25	-0.222	-1.000	0.653	16	-0.341	-1.097	0.079	0.055	-0.437	0.005	0.003	-0.213	0.136	-0.071	0.503	0.002	-0.216	0.066	-0.015	0.449
East Sucia 2 Island	36	-0.232	-1.000	0.653	22	-0.222	-1.000	0.653	14	-0.297	-0.699	0.234	0.535	-0.299	0.158	0.034	0.029	0.976	-0.321	0.331	0.000	-0.070	0.547	-0.165	0.306
East Sucia 3 Island	31	-0.336	-1.097	0.477	17	-0.243	-1.000	0.477	14	-0.348	-1.097	0.079	0.612	-0.308	0.185	0.108	0.033	0.604	-0.218	0.368	0.014	-0.062	0.561	-0.189	0.340
East Sucia 4 Island	41	-0.222	-1.097	1.786	32	-0.193	-1.000	1.786	9	-0.293	-1.097	-0.046	0.069	-0.612	0.025	0.021	-0.360	0.032	0.035	0.728	0.005	-0.294	0.071	-0.027	0.625
East Sucia 6 Island	38	-0.276	-1.097	1.000	27	-0.222	-1.000	1.000	11	-0.305	-1.097	0.234	0.082	-0.529	0.034	-0.018	-0.254	0.132	-0.075	0.546	0.000	-0.247	0.087	-0.038	0.533
East Sucia 7 Island	57	-0.243	-1.097	1.786	39	-0.164	-0.824	1.786	18	-0.303	-1.097	0.234	0.007	-0.549	-0.091	0.046	-0.133	0.273	-0.146	0.504	0.000	-0.320	0.008	0.087	0.553
East Sucia 8 Island	7	-0.293	-1.097	0.000	4	-0.097	-0.523	0.000	3	-0.523	-1.097	-0.293	0.185	-1.312	0.395	-0.142	-0.573	0.187	-0.340	1.202	-0.037	-0.458	0.260	-0.473	1.317
Ewing Island	71	0.000	-1.097	1.786	54	0.060	-0.824	1.786	17	-0.293	-1.097	1.079	0.010	-0.645	-0.093	-0.009	-0.205	0.078	-0.024	0.416	0.000	-0.399	0.007	0.116	0.683
Fawn Island	62	-0.232	-1.097	1.786	31	-0.097	-0.824	1.786	31	-0.301	-1.097	0.079	0.001	-0.683	-0.181	0.173	-0.135	0.045	0.007	0.609	0.017	-0.432	0.001	0.185	0.712
Flat Top Island	109	-0.155	-1.097	1.786	71	0.000	-0.824	1.786	38	-0.301	-1.097	1.187	0.000	-0.528	-0.164	0.007	-0.142	0.070	-0.013	0.311	0.006	-0.304	0.002	0.118	0.501
Flint Beach Island	62	-0.297	-1.097	1.786	45	-0.222	-0.824	1.786	17	-0.336	-1.097	0.079	0.032	-0.450	-0.022	0.100	-0.162	0.119	-0.071	0.594	0.001	-0.192	0.076	-0.021	0.405
Flower Island	62	-0.097	-1.097	1.786	42	-0.023	-0.786	1.786	20	-0.301	-1.097	0.477	0.005	-0.585	-0.111	0.061	-0.088	0.289	-0.132	0.430	-0.022	-0.285	0.025	0.034	0.493
Fortress Island	48	-0.276	-1.097	1.000	33	-0.222	-0.824	1.000	15	-0.436	-1.097	0.079	0.003	-0.531	-0.116	0.014	-0.245	0.023	0.038	0.480	0.014	-0.324	0.003	0.126	0.549
Gossip Island	56	-0.301	-1.097	1.786	35	-0.097	-0.824	1.786	21	-0.376	-1.097	0.079	0.001	-0.611	-0.168	0.168	-0.082	0.041	0.011	0.489	0.002	-0.385	0.002	0.155	0.619
Hat Island	96	-0.155	-1.097	1.836	66	-0.097	-0.824	1.836	30	-0.301	-1.097	0.915	0.001	-0.504	-0.126	0.007	-0.087	0.317	-0.093	0.282	0.021	-0.272	0.004	0.097	0.489
Huckleberry Island	104	-0.188	-1.097	1.836	70	-0.097	-0.824	1.836	34	-0.297	-1.097	1.079	0.018	-0.468	-0.045	-0.007	-0.079	0.417	-0.104	0.247	-0.002	-0.281	0.013	0.060	0.498
Iceberg Island	45	-0.260	-1.097	1.000	26	-0.222	-0.824	1.000	19	-0.301	-1.097	0.079	0.054	-0.420	0.004	0.021	-0.048	0.555	-0.165	0.303	-0.001	-0.168	0.128	-0.050	0.382
Little Cactus	33	-0.301	-1.097	0.477	23	-0.222	-0.824	0.477	10	-0.339	-1.097	-0.260	0.058	-0.429	0.008	0.040	0.012	0.876	-0.356	0.413	-0.001	-0.211	0.067	-0.016	0.435
Little McConnell Island	70	-0.276	-1.097	1.786	39	-0.222	-0.824	1.786	31	-0.305	-1.097	0.234	0.010	-0.509	-0.071	0.155	-0.125	0.065	-0.017	0.577	0.011	-0.256	0.028	0.031	0.504
Little Nob	9	-0.097	-0.620	0.255	7	-0.097	-0.456	0.255	2	-0.577	-0.620	-0.534	0.002	-0.706	-0.237	0.114	-0.523	NA	NA	NA	0.170	-0.514	NA	NA	NA

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Table a.6.1 – continued from previous page

Island name	Total tips with trait	Median total	Min total	Max total	Total native tips with trait	Median native	Min native	Max native	Total invasive tips with trait	Median invasive	Min invasive	Max invasive	t-test obs P-value	CI (low)	CI (high)	$meanNNFD_n$	$meanNNFD_i$	t-test NNFD P-value	t-test NNFD CI (low)	t-test NNFD CI (high)	$meanMFD_n$	$meanMFD_i$	t-test MFD P-value	t-test MFD CI (low)	t-test MFD CI (high)
Little Oak	13	-0.336	-1.097	0.079	6	-0.367	-0.602	-0.097	7	-0.305	-1.097	0.079	0.541	-0.487	0.272	-0.151	-0.085	0.692	-0.430	0.298	-0.059	0.001	0.711	-0.412	0.293
Little Sucia Island	75	0.000	-1.097	1.836	54	0.176	-0.602	1.836	21	-0.301	-1.097	1.079	0.000	-0.756	-0.264	0.028	-0.140	0.152	-0.064	0.400	0.002	-0.510	0.000	0.261	0.762
Low Island	35	-0.243	-0.824	0.477	20	-0.048	-0.824	0.477	15	-0.301	-0.620	0.079	0.315	-0.343	0.114	-0.099	-0.093	0.975	-0.353	0.343	0.037	-0.095	0.281	-0.115	0.378
Mackaye Harbor Island	25	-0.301	-1.097	0.477	12	-0.367	-0.620	0.477	13	-0.293	-1.097	-0.046	0.404	-0.375	0.157	0.152	-0.306	0.010	0.121	0.795	0.000	-0.109	0.428	-0.171	0.390
Massacre Bay 1 Island	16	-0.222	-0.620	0.079	8	-0.188	-0.602	0.000	8	-0.232	-0.620	0.079	0.846	-0.205	0.247	-0.101	-0.141	0.757	-0.233	0.311	-0.022	-0.013	0.947	-0.303	0.285
Matia Island	125	-0.097	-1.283	1.836	85	0.079	-0.824	1.836	40	-0.301	-1.283	1.187	0.000	-0.647	-0.222	-0.010	-0.250	0.016	0.047	0.432	0.001	-0.447	0.000	0.230	0.666
Matia West 1	60	-0.046	-1.097	1.836	47	0.176	-1.000	1.836	13	-0.436	-1.097	0.079	0.000	-0.953	-0.416	0.000	-0.305	0.020	0.051	0.560	0.030	-0.684	0.000	0.433	0.996
Matia West 2	21	-0.293	-1.097	1.000	13	-0.097	-0.602	1.000	8	-0.523	-1.097	0.079	0.007	-0.926	-0.170	-0.109	-0.270	0.323	-0.182	0.503	0.000	-0.548	0.009	0.151	0.944
McConnell Island	115	-0.222	-1.097	1.836	75	0.000	-0.824	1.836	40	-0.301	-1.097	1.187	0.001	-0.519	-0.132	0.021	-0.100	0.258	-0.091	0.334	0.031	-0.298	0.002	0.122	0.536
Near Decatur Island Unnamed 3	38	-0.232	-1.097	1.786	25	-0.097	-0.620	1.786	13	-0.361	-1.097	-0.155	0.001	-0.712	-0.195	0.041	-0.308	0.024	0.049	0.650	0.000	-0.454	0.001	0.188	0.720
Nob Island	54	-0.222	-1.097	1.786	34	-0.155	-0.824	1.786	20	-0.301	-1.097	0.079	0.004	-0.599	-0.119	0.144	-0.167	0.031	0.031	0.591	0.039	-0.359	0.004	0.131	0.666
North Finger Island	88	-0.075	-1.097	1.836	62	0.000	-0.620	1.836	26	-0.199	-1.097	0.234	0.001	-0.470	-0.121	0.002	-0.102	0.280	-0.088	0.298	0.016	-0.313	0.001	0.140	0.519
Oak Island	47	-0.301	-1.097	1.786	24	-0.097	-0.620	1.786	23	-0.336	-1.097	0.079	0.004	-0.713	-0.150	0.121	-0.055	0.245	-0.128	0.481	0.031	-0.390	0.010	0.112	0.731
Pole Island	35	-0.305	-1.097	0.653	20	-0.216	-0.620	0.653	15	-0.305	-1.097	0.079	0.056	-0.483	0.007	0.081	-0.122	0.254	-0.154	0.560	0.017	-0.261	0.038	0.017	0.540
Posey Island	67	-0.301	-1.283	1.786	36	-0.159	-0.699	1.786	31	-0.336	-1.283	0.234	0.000	-0.672	-0.215	0.118	-0.107	0.088	-0.035	0.483	0.004	-0.415	0.001	0.177	0.661
Reef Island	78	-0.097	-1.097	1.836	53	0.000	-0.824	1.836	25	-0.260	-1.097	0.234	0.000	-0.618	-0.204	0.010	-0.024	0.764	-0.190	0.257	0.016	-0.374	0.001	0.170	0.611
Reeflet Island	30	-0.276	-1.097	0.602	14	-0.159	-0.699	0.602	16	-0.297	-1.097	0.125	0.205	-0.457	0.103	-0.002	-0.168	0.288	-0.150	0.481	0.035	-0.133	0.284	-0.152	0.489
Rim Island	32	-0.276	-1.097	1.079	21	-0.222	-0.620	1.079	11	-0.301	-1.097	0.079	0.040	-0.595	-0.015	0.054	-0.380	0.020	0.075	0.794	0.000	-0.305	0.045	0.008	0.603
Ripple Island	47	-0.260	-0.620	1.204	32	-0.130	-0.620	1.204	15	-0.336	-0.617	0.079	0.001	-0.532	-0.138	0.031	-0.127	0.071	-0.014	0.331	-0.040	-0.335	0.003	0.106	0.484
Rum Island	53	-0.222	-1.097	1.836	37	-0.097	-0.699	1.836	16	-0.345	-1.097	0.079	0.000	-0.774	-0.249	0.086	-0.257	0.007	0.100	0.587	0.001	-0.512	0.000	0.240	0.785
Saddlebag Island	126	-0.097	-1.283	1.836	82	-0.046	-0.824	1.836	44	-0.276	-1.283	1.079	0.005	-0.452	-0.084	-0.003	-0.068	0.451	-0.105	0.235	0.010	-0.272	0.004	0.091	0.474
Secar Rock	7	-0.347	-0.534	0.000	4	-0.222	-0.398	0.000	3	-0.347	-0.534	-0.301	0.186	-0.492	0.125	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sentinel Island	79	-0.222	-1.097	1.786	51	-0.097	-0.824	1.786	28	-0.301	-1.097	0.234	0.000	-0.581	-0.195	0.090	-0.152	0.062	-0.013	0.496	0.021	-0.348	0.001	0.162	0.575
Skull Island	79	-0.222	-1.097	1.786	42	-0.126	-1.000	1.786	37	-0.301	-1.097	1.176	0.046	-0.482	-0.005	0.178	-0.069	0.055	-0.005	0.499	0.014	-0.243	0.040	0.012	0.502
Small Island near Charles	16	-0.301	-0.620	0.477	13	-0.301	-0.620	0.477	3	-0.301	-0.620	-0.301	0.246	-0.527	0.171	0.116	-0.401	0.283	-0.857	1.891	0.000	-0.178	0.254	-0.172	0.527
Swirl Rock Central	19	-0.301	-0.620	0.176	15	-0.336	-0.620	0.176	4	-0.297	-0.620	0.079	0.950	-0.414	0.435	-0.016	-0.091	0.712	-0.469	0.619	-0.015	0.010	0.879	-0.447	0.397
Turn Island	124	-0.155	-1.283	1.836	79	0.000	-1.000	1.836	45	-0.301	-1.283	0.915	0.001	-0.538	-0.150	0.001	-0.274	0.007	0.078	0.472	0.019	-0.310	0.002	0.119	0.538
Turnlet Island	39	-0.222	-1.097	1.786	20	-0.097	-0.824	1.786	19	-0.301	-1.097	0.079	0.043	-0.589	-0.010	0.091	-0.041	0.423	-0.201	0.465	0.003	-0.248	0.109	-0.060	0.563
Unnamed 1 near Long Island	40	-0.341	-1.097	0.463	23	-0.301	-0.824	0.463	17	-0.436	-1.097	0.234	0.272	-0.347	0.101	0.062	-0.065	0.375	-0.161	0.416	-0.008	-0.053	0.699	-0.189	0.279
Unnamed 2 near Long Island	32	-0.301	-0.824	0.398	20	-0.318	-0.824	0.398	12	-0.297	-0.620	0.234	0.728	-0.171	0.241	0.038	0.001	0.814	-0.287	0.362	-0.010	0.044	0.627	-0.279	0.172
Unnamed 3 near Long Island	12	-0.301	-0.534	0.079	6	-0.324	-0.398	-0.097	6	-0.151	-0.534	0.079	0.651	-0.237	0.356	-0.133	0.024	0.497	-0.739	0.426	-0.030	0.087	0.555	-0.589	0.357
Unnamed 72 Island	34	-0.331	-1.097	0.653	18	-0.247	-0.699	0.653	16	-0.331	-1.097	0.023	0.073	-0.490	0.023	0.062	-0.280	0.021	0.055	0.630	0.016	-0.258	0.052	-0.003	0.551
Victim Island	81	-0.222	-1.097	1.398	51	-0.164	-0.824	1.398	30	-0.297	-1.097	0.624	0.019	-0.412	-0.039	0.005	-0.163	0.117	-0.043	0.378	0.006	-0.225	0.020	0.038	0.425
Willow Island	63	-0.097	-1.097	1.786	44	-0.048	-0.824	1.786	19	-0.293	-1.097	0.234	0.002	-0.649	-0.161	-0.054	-0.146	0.423	-0.139	0.324	-0.028	-0.405	0.004	0.123	0.631
Yellow Island	144	-0.222	-1.283	1.836	87	-0.176	-0.824	1.836	57	-0.301	-1.283	1.079	0.012	-0.360	-0.045	0.004	-0.062	0.394	-0.086	0.218	-0.010	-0.173	0.059	-0.006	0.332

SES of functional differences for maximum height (m).

Island name	mean SES $NNFD_i$	median SES $NNFD_i$	sd SES $NNFD_i$	se SES $NNFD_i$	SES $NNFD_i$ obs z	SES $NNFD_i$ rankLow	SES $NNFD_i$ rankHi	P-value SES $NNFD_i$ ranks	mean SES MFD_i	median SES MFD_i	sd SES MFD_i	se SES MFD_i	SES MFD_i obs z	SES MFD_i rankLow	SES MFD_i rankHi	P-value SES MFD_i ranks
Aleck Rock	-0.049	-0.051	0.100	-0.002	-0.549	307	693	0.307	-0.083	-0.082	0.103	-0.003	-0.749	232	768	0.232
Barren Island	-0.136	-0.135	0.143	-0.004	0.897	816	184	0.184	-0.067	-0.073	0.111	-0.002	-0.985	166	834	0.166
Battleship Island	-0.031	-0.031	0.094	-0.001	-1.325	99	901	0.099	-0.196	-0.196	0.087	-0.006	-0.484	323	677	0.323
Blind Island	0.169	0.161	0.163	0.005	-1.055	141	859	0.141	0.045	0.038	0.129	0.001	-0.661	249	751	0.249
Boulder Island	-0.003	-0.002	0.097	0.000	-1.314	99	901	0.099	-0.007	-0.008	0.094	0.000	-2.112	11	989	0.011
Broken Point Island	-0.043	-0.046	0.128	-0.001	-0.092	469	531	0.469	-0.093	-0.092	0.116	-0.003	0.206	584	416	0.416
Buck Island	-0.263	-0.264	0.203	-0.008	-1.058	138	862	0.138	-0.225	-0.234	0.188	-0.007	-1.517	53	947	0.053
Castle Island	-0.051	-0.051	0.089	-0.002	-0.627	246	754	0.246	-0.227	-0.230	0.091	-0.007	-1.675	48	952	0.048
Cemetery Island	-0.321	-0.306	0.302	-0.010	-0.748	223	777	0.223	-0.063	-0.073	0.180	-0.002	-1.323	83	917	0.083
Charles Island	-0.166	-0.166	0.078	-0.005	-1.676	55	945	0.055	-0.307	-0.308	0.064	-0.010	-2.643	2	998	0.002
Cliff Island	-0.104	-0.105	0.088	-0.003	0.186	582	418	0.418	-0.293	-0.292	0.080	-0.009	-0.746	222	778	0.222
Colville Island	-0.232	-0.228	0.111	-0.007	0.419	663	337	0.337	-0.257	-0.259	0.106	-0.008	-0.473	327	673	0.327
Coon Island	-0.111	-0.109	0.077	-0.004	-1.127	131	869	0.131	-0.228	-0.227	0.072	-0.007	-1.777	37	963	0.037
Crab Island	-0.071	-0.085	0.214	-0.002	-0.554	286	714	0.286	-0.110	-0.121	0.214	-0.003	-0.368	364	636	0.364
Deadman Island	-0.018	-0.014	0.105	-0.001	-0.597	277	723	0.277	-0.198	-0.200	0.105	-0.006	-0.830	204	796	0.204
Dot Island	-0.031	-0.027	0.086	-0.001	-0.195	408	592	0.408	-0.211	-0.213	0.082	-0.007	-1.429	69	931	0.069
Dotlet Island	0.018	0.013	0.160	0.001	-2.362	8	992	0.008	-0.001	-0.009	0.153	0.000	-2.043	17	983	0.017
East Sucia 1 Island	-0.021	-0.016	0.118	-0.001	-1.623	60	940	0.060	-0.015	-0.022	0.110	0.000	-1.825	26	974	0.026
East Sucia 2 Island	0.071	0.072	0.128	0.002	-0.325	370	630	0.370	-0.015	-0.019	0.118	0.000	-0.474	322	678	0.322
East Sucia 3 Island	0.111	0.124	0.138	0.004	-0.570	269	731	0.269	0.115	0.111	0.124	0.004	-1.429	73	927	0.073
East Sucia 4 Island	-0.025	-0.020	0.143	-0.001	-2.347	12	988	0.012	-0.120	-0.127	0.140	-0.004	-1.237	111	889	0.111
East Sucia 6 Island	-0.144	-0.142	0.136	-0.005	-0.810	216	784	0.216	-0.061	-0.064	0.127	-0.002	-1.471	68	932	0.068
East Sucia 7 Island	-0.031	-0.029	0.107	-0.001	-0.947	165	835	0.165	-0.193	-0.196	0.099	-0.006	-1.275	91	909	0.091
East Sucia 8 Island	-0.074	-0.102	0.328	-0.002	-1.523	44	946	0.044	0.004	-0.020	0.317	0.000	-1.459	52	938	0.052
Ewing Island	-0.170	-0.174	0.118	-0.005	-0.296	381	619	0.381	-0.320	-0.325	0.109	-0.010	-0.726	251	749	0.251
Fawn Island	-0.104	-0.105	0.089	-0.003	-0.341	365	635	0.365	-0.297	-0.298	0.077	-0.009	-1.761	32	968	0.032
Flat Top Island	-0.145	-0.145	0.071	-0.005	0.038	516	484	0.484	-0.264	-0.263	0.066	-0.008	-0.608	294	706	0.294
Flint Beach Island	0.027	0.030	0.143	0.001	-1.320	96	904	0.096	-0.030	-0.032	0.109	-0.001	-1.488	73	927	0.073
Flower Island	-0.166	-0.164	0.114	-0.005	0.681	753	247	0.247	-0.280	-0.284	0.102	-0.009	-0.050	492	508	0.492
Fortress Island	-0.027	-0.024	0.108	-0.001	-2.025	25	975	0.025	-0.093	-0.099	0.112	-0.003	-2.070	14	986	0.014
Gossip Island	-0.005	-0.001	0.111	0.000	-0.692	245	755	0.245	-0.158	-0.163	0.110	-0.005	-2.056	19	981	0.019
Hat Island	-0.075	-0.074	0.074	-0.002	-0.168	426	574	0.426	-0.227	-0.227	0.080	-0.007	-0.557	288	712	0.288
Huckleberry Island	-0.078	-0.079	0.068	-0.002	-0.003	503	497	0.497	-0.256	-0.258	0.071	-0.008	-0.354	365	635	0.365
Iceberg Island	-0.014	-0.016	0.096	0.000	-0.344	356	644	0.356	-0.057	-0.059	0.105	-0.002	-1.048	156	844	0.156
Little Cactus	0.065	0.067	0.136	0.002	-0.396	325	675	0.325	0.044	0.036	0.145	0.001	-1.756	29	971	0.029

Continued on next page

Table a.6.1 – continued from previous page

Island name	mean SES $NNFD_i$	median SES $NNFD_i$	sd SES $NNFD_i$	se SES $NNFD_i$	SES $NNFD_i$ obs z	SES $NNFD_i$ rankLow	SES $NNFD_i$ rankHi	P-value SES $NNFD_i$ ranks	mean SES MFD_i	median SES MFD_i	sd SES MFD_i	se SES MFD_i	SES MFD_i obs z	SES MFD_i rankLow	SES MFD_i rankHi	P-value SES MFD_i ranks
Little McConnell Island	-0.088	-0.087	0.102	-0.003	-0.357	353	647	0.353	-0.162	-0.165	0.079	-0.005	-1.183	130	870	0.130
Little Nob	-0.073	-0.101	0.309	-0.002	-1.459	48	940	0.048	-0.081	-0.111	0.303	-0.003	-1.428	59	929	0.059
Little Oak	0.120	0.109	0.177	0.004	-1.162	106	894	0.106	0.158	0.147	0.172	0.005	-0.916	180	820	0.180
Little Sucia Island	-0.134	-0.128	0.100	-0.004	-0.063	453	547	0.453	-0.447	-0.451	0.093	-0.014	-0.681	245	755	0.245
Low Island	0.029	0.021	0.160	0.001	-0.765	229	771	0.229	-0.039	-0.043	0.127	-0.001	-0.437	325	675	0.325
Mackaye Harbor Island	-0.116	-0.115	0.149	-0.004	-1.274	101	899	0.101	0.044	0.040	0.124	0.001	-1.235	102	898	0.102
Massacre Bay 1 Island	0.033	0.015	0.191	0.001	-0.905	177	822	0.177	0.077	0.065	0.180	0.002	-0.500	347	652	0.347
Matia Island	-0.108	-0.108	0.066	-0.003	-2.146	13	987	0.013	-0.392	-0.393	0.058	-0.012	-0.940	167	833	0.167
Matia West 1	-0.109	-0.107	0.121	-0.003	-1.632	57	943	0.057	-0.461	-0.461	0.119	-0.015	-1.873	22	978	0.022
Matia West 2	-0.020	-0.015	0.135	-0.001	-1.847	34	966	0.034	-0.247	-0.256	0.154	-0.008	-1.959	13	987	0.013
McConnell Island	-0.142	-0.140	0.080	-0.004	0.526	695	305	0.305	-0.270	-0.271	0.070	-0.009	-0.398	355	645	0.355
Near Decatur Island Unnamed 3	-0.114	-0.114	0.127	-0.004	-1.536	55	945	0.055	-0.206	-0.202	0.125	-0.007	-1.977	23	977	0.023
Nob Island	-0.092	-0.094	0.096	-0.003	-0.781	230	770	0.230	-0.234	-0.237	0.095	-0.007	-1.308	86	914	0.086
North Finger Island	-0.120	-0.117	0.093	-0.004	0.191	565	435	0.435	-0.274	-0.275	0.085	-0.009	-0.460	333	667	0.333
Oak Island	0.003	0.007	0.102	0.000	-0.569	278	722	0.278	-0.272	-0.272	0.094	-0.009	-1.256	106	894	0.106
Pole Island	-0.071	-0.066	0.139	-0.002	-0.366	351	649	0.351	-0.118	-0.122	0.109	-0.004	-1.308	86	914	0.086
Posey Island	-0.013	-0.009	0.076	0.000	-1.239	119	881	0.119	-0.237	-0.233	0.073	-0.007	-2.424	11	989	0.011
Reef Island	-0.117	-0.116	0.106	-0.004	0.878	806	194	0.194	-0.313	-0.312	0.092	-0.010	-0.664	261	739	0.261
Reeflet Island	-0.125	-0.120	0.125	-0.004	-0.341	347	653	0.347	-0.034	-0.038	0.114	-0.001	-0.868	195	805	0.195
Rim Island	-0.167	-0.170	0.171	-0.005	-1.250	105	895	0.105	-0.141	-0.144	0.137	-0.004	-1.200	118	882	0.118
Ripple Island	-0.055	-0.050	0.119	-0.002	-0.602	277	723	0.277	-0.185	-0.189	0.115	-0.006	-1.313	82	918	0.082
Rum Island	-0.094	-0.096	0.127	-0.003	-1.284	95	905	0.095	-0.307	-0.310	0.117	-0.010	-1.755	37	963	0.037
Saddlebag Island	-0.119	-0.119	0.058	-0.004	0.867	795	205	0.205	-0.275	-0.274	0.059	-0.009	0.048	516	484	0.484
Secar Rock	NaN	NA	NA	NaN	NA	0	0	0.000	NaN	NA	NA	NaN	NA	0	0	0.000
Sentinel Island	-0.120	-0.120	0.088	-0.004	-0.362	357	643	0.357	-0.255	-0.253	0.076	-0.008	-1.213	115	885	0.115
Skull Island	-0.080	-0.079	0.070	-0.003	0.164	555	445	0.445	-0.218	-0.218	0.067	-0.007	-0.383	353	647	0.353
Small Island near Charles	-0.129	-0.118	0.350	-0.004	-0.777	205	792	0.205	0.028	0.008	0.275	0.001	-0.746	223	777	0.223
Swirl Rock Central	0.199	0.177	0.291	0.006	-0.998	132	868	0.132	0.120	0.100	0.260	0.004	-0.420	344	656	0.344
Turn Island	-0.160	-0.160	0.067	-0.005	-1.690	52	948	0.052	-0.292	-0.296	0.062	-0.009	-0.283	404	596	0.404
Turnlet Island	0.016	0.012	0.105	0.001	-0.541	297	703	0.297	-0.144	-0.144	0.103	-0.005	-1.012	156	844	0.156
Unnamed 1 near Long Island	0.073	0.070	0.114	0.002	-1.211	120	880	0.120	0.080	0.079	0.109	0.003	-1.215	113	887	0.113
Unnamed 2 near Long Island	0.099	0.096	0.143	0.003	-0.688	256	744	0.256	0.092	0.083	0.134	0.003	-0.356	386	614	0.386
Unnamed 3 near Long Island	-0.044	-0.058	0.209	-0.001	0.326	679	321	0.321	0.107	0.094	0.211	0.003	-0.096	487	516	0.487
Unnamed 72 Island	-0.169	-0.165	0.123	-0.005	-0.900	187	813	0.187	-0.069	-0.074	0.110	-0.002	-1.713	29	971	0.029
Victim Island	-0.047	-0.046	0.080	-0.001	-1.444	72	928	0.072	-0.131	-0.133	0.080	-0.004	-1.180	113	887	0.113
Willow Island	-0.160	-0.162	0.099	-0.005	0.143	573	427	0.427	-0.301	-0.305	0.101	-0.010	-1.028	157	843	0.157
Yellow Island	-0.082	-0.083	0.044	-0.003	0.439	666	334	0.334	-0.163	-0.165	0.046	-0.005	-0.209	426	574	0.426

A.7 FUNCTIONAL DIVERSITY SUMMARY FOR SPECIFIC LEAF AREA (SLA)

TABLE A.7.1: Tables of the summary statistics for difference in functional differences (measurements, NNFD, MFD, SES NNFD, SES MFD) between status groups for each island.

Observed functional diversity of Specific Leaf Area (cm^2/g).

Island name	Total tips with trait	Median total	Min total	Max total	Total native tips with trait	Median native	Min native	Max native	Total invasive tips with trait	Median invasive	Min invasive	Max invasive	t-test obs P-value	CI (low)	CI (high)	$meanNNFD_n$	$meanNNFD_i$	t-test NNFD P-value	t-test NNFD CI (low)	t-test NNFD CI (high)	$meanMFD_n$	$meanMFD_i$	t-test MFD P-value	t-test MFD CI (low)	t-test MFD CI (high)
Aleck Rock	34	2.342	1.782	2.650	14	2.272	1.782	2.646	20	2.453	2.232	2.650	0.025	0.022	0.292	-0.084	0.160	0.300	-0.846	0.358	-0.159	0.165	0.145	-0.841	0.193
Barren Island	25	2.448	2.026	2.728	9	2.262	2.026	2.728	16	2.473	2.242	2.650	0.108	-0.039	0.338	0.027	0.147	0.355	-0.433	0.192	0.007	0.176	0.554	-1.177	0.839
Battleship Island	43	2.345	1.782	2.650	19	2.262	1.782	2.523	24	2.421	2.048	2.650	0.003	0.063	0.280	-0.064	0.142	0.003	-0.335	-0.077	-0.038	0.179	0.011	-0.380	-0.055
Blind Island	27	2.345	1.782	2.650	14	2.293	1.782	2.646	13	2.491	2.163	2.650	0.060	-0.006	0.287	0.002	0.135	0.362	-0.452	0.186	-0.083	0.152	0.098	-0.525	0.056
Boulder Island	39	2.352	1.782	2.646	17	2.272	1.782	2.646	22	2.475	2.185	2.568	0.016	0.028	0.247	-0.021	0.145	0.154	-0.401	0.070	-0.045	0.154	0.061	-0.408	0.011
Broken Point Island	29	2.391	1.853	2.803	12	2.365	1.853	2.803	17	2.400	2.048	2.568	0.775	-0.146	0.193	0.116	0.139	0.923	-0.700	0.653	0.186	0.046	0.288	-0.174	0.453
Buck Island	11	2.273	2.225	2.650	4	2.265	2.225	2.271	7	2.458	2.242	2.650	0.022	0.033	0.305	0.000	0.116	0.150	-0.308	0.075	0.011	0.085	0.309	-0.266	0.118
Castle Island	58	2.335	1.582	2.681	35	2.268	1.582	2.681	23	2.470	2.163	2.650	0.000	0.110	0.314	0.045	0.106	0.388	-0.206	0.082	-0.008	0.235	0.001	-0.376	-0.110
Cemetery Island	10	2.327	1.853	2.646	5	2.272	1.853	2.646	5	2.481	2.289	2.568	0.294	-0.186	0.508	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Charles Island	65	2.398	1.582	2.650	26	2.229	1.582	2.646	39	2.458	2.163	2.650	0.000	0.129	0.357	0.024	0.141	0.116	-0.267	0.031	-0.014	0.256	0.002	-0.427	-0.112
Cliff Island	57	2.352	1.582	2.780	26	2.267	1.582	2.681	31	2.458	2.126	2.780	0.001	0.096	0.338	0.028	0.122	0.240	-0.254	0.067	-0.048	0.175	0.030	-0.424	-0.024
Colville Island	29	2.438	2.048	2.681	10	2.292	2.225	2.681	19	2.458	2.048	2.650	0.438	-0.076	0.169	0.020	0.066	0.682	-0.288	0.197	0.024	0.016	0.930	-0.184	0.200
Coon Island	52	2.348	1.782	2.650	17	2.268	1.782	2.646	35	2.438	2.126	2.650	0.005	0.064	0.322	-0.033	0.103	0.243	-0.380	0.108	-0.049	0.179	0.036	-0.437	-0.018
Crab Island	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Deadman Island	40	2.342	1.782	2.650	20	2.244	1.782	2.646	20	2.453	2.242	2.650	0.002	0.077	0.312	0.036	0.134	0.339	-0.308	0.113	0.006	0.187	0.069	-0.376	0.016
Dot Island	49	2.370	1.782	2.803	24	2.334	1.782	2.803	25	2.462	1.956	2.780	0.063	-0.006	0.233	-0.093	0.114	0.029	-0.392	-0.023	-0.046	0.122	0.028	-0.316	-0.019
Dotlet Island	15	2.345	2.225	2.568	6	2.329	2.225	2.523	9	2.458	2.242	2.568	0.273	-0.061	0.197	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
East Sucia 1 Island	26	2.317	2.060	2.576	11	2.314	2.060	2.539	15	2.340	2.216	2.576	0.079	-0.012	0.200	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
East Sucia 2 Island	22	2.348	2.107	2.576	8	2.348	2.107	2.523	14	2.399	2.163	2.576	0.302	-0.059	0.178	0.000	0.089	0.150	-0.215	0.038	0.060	0.034	0.594	-0.078	0.129
East Sucia 3 Island	22	2.365	2.107	2.576	8	2.348	2.107	2.523	14	2.473	2.242	2.576	0.105	-0.022	0.207	0.017	0.237	0.000	-0.319	-0.119	0.028	0.103	0.099	-0.167	0.016
East Sucia 4 Island	24	2.325	1.782	2.576	15	2.314	1.782	2.523	9	2.458	2.242	2.576	0.017	0.033	0.300	-0.063	0.153	0.073	-0.460	0.026	-0.079	0.183	0.035	-0.500	-0.023
East Sucia 6 Island	24	2.330	2.026	2.646	13	2.345	2.026	2.646	11	2.308	2.163	2.521	0.634	-0.097	0.157	0.060	0.048	0.909	-0.226	0.250	-0.101	0.037	0.312	-0.456	0.179
East Sucia 7 Island	36	2.324	1.782	2.650	18	2.308	1.782	2.646	18	2.324	2.039	2.650	0.207	-0.050	0.221	-0.072	0.058	0.136	-0.305	0.045	-0.076	0.067	0.111	-0.321	0.036
East Sucia 8 Island	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ewing Island	42	2.300	1.782	2.653	25	2.268	1.782	2.653	17	2.334	2.163	2.650	0.025	0.018	0.253	0.002	0.157	0.020	-0.284	-0.027	-0.008	0.137	0.052	-0.291	0.001
Fawn Island	49	2.391	1.782	2.780	18	2.249	1.782	2.646	31	2.448	2.242	2.780	0.001	0.112	0.358	-0.072	0.141	0.080	-0.459	0.032	-0.084	0.211	0.024	-0.541	-0.050
Flat Top Island	68	2.342	1.782	2.803	30	2.270	1.782	2.803	38	2.402	2.048	2.780	0.013	0.030	0.243	0.009	0.062	0.413	-0.183	0.077	-0.031	0.096	0.086	-0.273	0.019
Flint Beach Island	30	2.414	1.782	2.650	14	2.272	1.782	2.646	16	2.467	2.242	2.650	0.025	0.022	0.295	0.046	0.163	0.447	-0.467	0.232	0.028	0.179	0.333	-0.507	0.206
Flower Island	39	2.352	1.782	2.803	20	2.265	1.782	2.803	19	2.415	2.163	2.650	0.034	0.012	0.284	-0.044	0.065	0.312	-0.331	0.112	-0.006	0.140	0.141	-0.346	0.054
Fortress Island	26	2.348	2.026	2.650	12	2.293	2.026	2.646	14	2.453	2.242	2.650	0.084	-0.016	0.239	0.074	0.178	0.497	-0.475	0.267	-0.002	0.102	0.372	-0.368	0.160
Gossip Island	36	2.434	1.782	2.803	14	2.348	1.782	2.803	22	2.467	2.117	2.650	0.174	-0.056	0.287	-0.270	0.119	0.082	-0.844	0.067	-0.196	0.173	0.038	-0.710	-0.029
Hat Island	55	2.352	1.782	2.803	25	2.272	1.782	2.803	30	2.462	1.830	2.780	0.020	0.023	0.259	-0.022	0.054	0.460	-0.285	0.134	-0.013	0.093	0.215	-0.279	0.066
Huckleberry Island	63	2.334	1.782	2.803	30	2.291	1.782	2.803	33	2.404	1.830	2.780	0.022	0.018	0.231	-0.062	0.134	0.013	-0.347	-0.045	-0.033	0.101	0.060	-0.273	0.006
Iceberg Island	28	2.370	2.026	2.650	10	2.309	2.026	2.646	18	2.420	2.185	2.650	0.332	-0.070	0.194	-0.079	0.055	0.625	-1.036	0.768	-0.031	0.104	0.573	-0.965	0.696
Little Cactus	16	2.424	2.060	2.646	6	2.249	2.060	2.646	10	2.463	2.242	2.555	0.184	-0.086	0.364	0.000	0.089	0.595	-0.706	0.528	-0.143	0.109	0.105	-0.644	0.140
Little McConnell Island	48	2.400	1.782	2.650	18	2.267	1.782	2.646	30	2.443	2.126	2.650	0.016	0.032	0.279	-0.029	0.088	0.204	-0.304	0.069	-0.053	0.167	0.013	-0.387	-0.053
Little Nob	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Continued on next page

Table a.7.1 – continued from previous page

Island name	Total tips with trait	Median total	Min total	Max total	Total native tips with trait	Median native	Min native	Max native	Total invasive tips with trait	Median invasive	Min invasive	Max invasive	t-test obs P-value	CI (low)	CI (high)	$meanNNFD_n$	$meanNNFD_i$	t-test NNFD P-value	t-test NNFD CI (low)	t-test NNFD CI (high)	$meanMFD_n$	$meanMFD_i$	t-test MFD P-value	t-test MFD CI (low)	t-test MFD CI (high)
Little Oak	9	2.274	2.225	2.528	2	2.249	2.225	2.272	7	2.391	2.242	2.528	0.036	0.012	0.252	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Little Sucia Island	48	2.336	1.782	2.681	27	2.272	1.782	2.681	21	2.404	2.126	2.650	0.034	0.010	0.233	0.010	0.081	0.318	-0.213	0.072	0.012	0.114	0.196	-0.259	0.056
Low Island	23	2.476	2.060	2.728	8	2.336	2.060	2.728	15	2.486	2.216	2.568	0.289	-0.095	0.280	-0.021	0.078	0.471	-0.404	0.206	-0.012	0.021	0.857	-0.533	0.468
Mackaye Harbor Island	18	2.332	2.060	2.531	5	2.225	2.060	2.345	13	2.404	2.242	2.531	0.016	0.049	0.336	0.095	0.189	0.521	-0.508	0.320	0.030	0.165	0.249	-0.442	0.170
Massacre Bay 1 Island	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Matia Island	87	2.330	1.472	2.803	44	2.252	1.472	2.803	43	2.404	1.830	2.780	0.000	0.084	0.277	-0.022	0.075	0.135	-0.223	0.031	-0.045	0.140	0.005	-0.311	-0.059
Matia West 1	37	2.273	1.782	2.650	24	2.189	1.782	2.646	13	2.448	2.185	2.650	0.000	0.118	0.371	0.019	0.110	0.260	-0.255	0.074	-0.050	0.229	0.003	-0.453	-0.106
Matia West 2	15	2.289	1.988	2.650	7	2.262	1.988	2.400	8	2.420	2.185	2.650	0.042	0.007	0.353	0.052	0.130	0.293	-0.233	0.078	-0.032	0.180	0.189	-0.581	0.157
McConnell Island	68	2.332	1.582	2.780	29	2.239	1.582	2.646	39	2.404	1.830	2.780	0.001	0.090	0.304	-0.026	0.120	0.011	-0.256	-0.035	-0.053	0.163	0.005	-0.363	-0.069
Near Decatur Island Unnamed 3	26	2.300	1.782	2.803	14	2.251	1.782	2.803	12	2.335	2.242	2.650	0.158	-0.047	0.269	-0.114	0.102	0.015	-0.384	-0.048	-0.044	0.079	0.095	-0.271	0.024
Nob Island	34	2.395	1.782	2.803	14	2.249	1.782	2.803	20	2.478	2.242	2.650	0.007	0.076	0.413	-0.201	0.138	0.036	-0.649	-0.029	-0.084	0.221	0.029	-0.569	-0.041
North Finger Island	52	2.344	1.782	2.780	27	2.344	1.782	2.653	25	2.355	2.126	2.780	0.029	0.013	0.235	0.072	0.045	0.691	-0.112	0.166	0.008	0.085	0.313	-0.233	0.078
Oak Island	36	2.347	1.782	2.650	13	2.262	1.782	2.646	23	2.404	2.216	2.650	0.022	0.030	0.339	0.011	0.125	0.427	-0.419	0.192	-0.004	0.199	0.141	-0.489	0.083
Pole Island	25	2.352	2.060	2.646	10	2.267	2.060	2.646	15	2.458	2.242	2.568	0.067	-0.010	0.263	0.112	0.135	0.834	-0.254	0.208	0.047	0.142	0.391	-0.342	0.153
Posey Island	50	2.399	1.782	2.650	18	2.244	1.782	2.646	32	2.461	2.163	2.650	0.001	0.103	0.348	-0.067	0.182	0.002	-0.397	-0.101	-0.031	0.223	0.003	-0.405	-0.103
Reef Island	48	2.299	1.782	2.780	24	2.196	1.782	2.539	24	2.395	2.126	2.780	0.000	0.103	0.313	-0.053	0.093	0.121	-0.335	0.043	-0.012	0.165	0.028	-0.332	-0.022
Reeflet Island	19	2.313	2.060	2.650	4	2.166	2.060	2.268	15	2.361	2.126	2.650	0.009	0.075	0.363	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Rim Island	21	2.345	2.060	2.555	10	2.249	2.060	2.539	11	2.458	2.242	2.555	0.041	0.007	0.267	0.093	0.169	0.506	-0.348	0.196	-0.037	0.123	0.123	-0.378	0.058
Ripple Island	30	2.348	2.026	2.650	15	2.271	2.026	2.539	15	2.458	2.216	2.650	0.003	0.060	0.272	0.074	0.139	0.583	-0.337	0.208	-0.054	0.146	0.101	-0.455	0.054
Rum Island	34	2.344	1.782	2.650	18	2.267	1.782	2.539	16	2.453	2.242	2.650	0.001	0.104	0.346	0.025	0.165	0.141	-0.334	0.054	0.033	0.227	0.048	-0.385	-0.002
Saddlebag Island	71	2.345	1.782	2.803	29	2.314	1.782	2.803	42	2.406	1.830	2.780	0.127	-0.025	0.194	-0.008	0.107	0.105	-0.256	0.026	-0.037	0.070	0.173	-0.265	0.050
Secar Rock	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sentinel Island	49	2.352	1.782	2.650	20	2.232	1.782	2.646	29	2.448	2.163	2.650	0.003	0.069	0.298	-0.049	0.120	0.130	-0.393	0.056	-0.071	0.165	0.015	-0.417	-0.055
Skull Island	57	2.340	1.782	2.803	22	2.315	1.782	2.803	35	2.400	1.793	2.650	0.112	-0.025	0.224	-0.105	0.079	0.038	-0.357	-0.012	-0.055	0.094	0.080	-0.316	0.020
Small Island near Charles	8	2.309	2.060	2.503	5	2.271	2.060	2.345	3	2.486	2.476	2.503	0.005	0.122	0.385	-0.143	0.209	0.068	-0.770	0.065	-0.086	0.260	0.230	-1.987	1.295
Swirl Rock Central	10	2.309	2.060	2.503	6	2.248	2.060	2.345	4	2.467	2.391	2.503	0.001	0.124	0.341	-0.057	0.210	0.143	-0.711	0.175	-0.067	0.209	0.048	-0.549	-0.004
Turn Island	80	2.329	1.582	2.780	36	2.265	1.582	2.653	44	2.395	1.830	2.780	0.003	0.054	0.245	0.004	0.105	0.113	-0.228	0.025	-0.027	0.125	0.032	-0.289	-0.014
Turnlet Island	28	2.344	1.782	2.650	10	2.293	1.782	2.400	18	2.453	2.216	2.650	0.014	0.043	0.325	-0.153	0.148	0.487	-3.767	3.164	-0.161	0.212	0.473	-4.574	3.829
Unnamed 1 near Long Island	25	2.391	2.060	2.650	8	2.272	2.060	2.400	17	2.465	2.163	2.650	0.004	0.057	0.258	0.000	0.139	0.170	-0.400	0.123	0.025	0.161	0.046	-0.270	-0.003
Unnamed 2 near Long Island	18	2.368	2.060	2.650	6	2.272	2.060	2.400	12	2.431	2.163	2.650	0.026	0.022	0.289	0.064	0.154	0.799	-3.153	2.972	-0.039	0.172	0.484	-2.298	1.877
Unnamed 3 near Long Island	8	2.404	2.185	2.568	2	2.248	2.225	2.271	6	2.484	2.185	2.568	0.027	0.030	0.342	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Unnamed 72 Island	22	2.372	2.060	2.780	6	2.285	2.060	2.646	16	2.424	2.242	2.780	0.248	-0.102	0.335	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Victim Island	51	2.378	1.853	2.803	21	2.314	1.853	2.803	30	2.443	1.956	2.650	0.066	-0.008	0.235	-0.051	0.085	0.068	-0.284	0.011	-0.032	0.092	0.053	-0.250	0.002
Willow Island	39	2.334	1.582	2.803	21	2.239	1.582	2.803	18	2.424	2.126	2.650	0.019	0.031	0.317	-0.003	0.087	0.228	-0.239	0.060	-0.077	0.128	0.047	-0.405	-0.004
Yellow Island	92	2.391	1.782	2.780	33	2.249	1.782	2.646	59	2.432	1.830	2.780	0.000	0.090	0.254	0.004	0.118	0.118	-0.258	0.030	0.013	0.116	0.058	-0.210	0.004

SES of functional differences for Specific Leaf Area (cm^2/g).

Island name	mean SES $NNFD_i$	median SES $NNFD_i$	sd SES $NNFD_i$	se SES $NNFD_i$	SES $NNFD_i$ obs z	SES $NNFD_i$ rankLow	SES $NNFD_i$ rankHi	P-value SES $NNFD_i$ ranks	mean SES MFD_i	median SES MFD_i	sd SES MFD_i	se SES MFD_i	SES MFD_i obs z	SES MFD_i rankLow	SES MFD_i rankHi	P-value SES MFD_i ranks
Aleck Rock	0.127	0.128	0.054	0.004	0.630	724	276	0.276	0.138	0.141	0.044	0.004	0.622	712	288	0.288
Barren Island	0.185	0.187	0.052	0.006	-0.716	236	764	0.236	0.086	0.087	0.043	0.003	2.069	988	12	0.012
Battleship Island	0.137	0.138	0.046	0.004	0.101	534	466	0.466	0.154	0.154	0.038	0.005	0.677	726	274	0.274
Blind Island	0.126	0.126	0.068	0.004	0.129	564	436	0.436	0.126	0.128	0.049	0.004	0.525	690	310	0.310
Boulder Island	0.112	0.114	0.056	0.004	0.586	705	295	0.295	0.104	0.106	0.042	0.003	1.180	891	109	0.109
Broken Point Island	0.111	0.112	0.066	0.004	0.424	665	335	0.335	0.060	0.063	0.046	0.002	-0.291	353	647	0.353
Buck Island	0.112	0.130	0.094	0.004	0.048	431	543	0.431	0.109	0.123	0.093	0.003	-0.252	328	646	0.328
Castle Island	0.095	0.095	0.049	0.003	0.240	591	409	0.409	0.172	0.174	0.039	0.005	1.628	966	34	0.034
Cemetery Island	NA	NA	NA	NA	NA	0	0	0.000	NA	NA	NA	NA	NA	0	0	0.000
Charles Island	0.099	0.099	0.044	0.003	0.973	837	163	0.163	0.206	0.206	0.034	0.007	1.466	927	73	0.073
Cliff Island	0.072	0.074	0.051	0.002	0.985	839	161	0.161	0.153	0.154	0.038	0.005	0.594	726	274	0.274
Colville Island	0.021	0.025	0.049	0.001	0.912	814	186	0.186	0.013	0.017	0.046	0.000	0.060	489	511	0.489
Coon Island	0.117	0.119	0.042	0.004	-0.335	377	623	0.377	0.167	0.169	0.032	0.005	0.357	603	397	0.397
Crab Island	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Deadman Island	0.140	0.144	0.073	0.004	-0.082	448	552	0.448	0.145	0.148	0.056	0.005	0.756	780	220	0.220
Dot Island	0.078	0.078	0.053	0.002	0.696	750	250	0.250	0.074	0.076	0.041	0.002	1.168	884	116	0.116
Dotlet Island	NA	NA	NA	NA	NA	0	0	0.000	NA	NA	NA	NA	NA	0	0	0.000
East Sucia 1 Island	NA	NA	NA	NA	NA	0	0	0.000	NA	NA	NA	NA	NA	0	0	0.000
East Sucia 2 Island	0.134	0.137	0.065	0.004	-0.700	222	778	0.222	0.072	0.074	0.056	0.002	-0.681	217	783	0.217
East Sucia 3 Island	0.147	0.152	0.064	0.005	1.409	933	67	0.067	0.072	0.075	0.051	0.002	0.605	718	282	0.282
East Sucia 4 Island	0.098	0.102	0.070	0.003	0.801	785	215	0.215	0.129	0.134	0.075	0.004	0.710	759	241	0.241
East Sucia 6 Island	0.086	0.087	0.057	0.003	-0.663	226	774	0.226	0.056	0.059	0.055	0.002	-0.334	348	652	0.348
East Sucia 7 Island	0.090	0.092	0.054	0.003	-0.582	285	715	0.285	0.116	0.118	0.049	0.004	-0.997	156	844	0.156
East Sucia 8 Island	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ewing Island	0.134	0.133	0.060	0.004	0.393	659	341	0.341	0.143	0.148	0.050	0.005	-0.127	412	588	0.412
Fawn Island	0.104	0.104	0.042	0.003	0.906	827	173	0.173	0.161	0.160	0.031	0.005	1.632	953	47	0.047
Flat Top Island	0.071	0.073	0.039	0.002	-0.241	399	601	0.399	0.113	0.113	0.029	0.004	-0.602	276	724	0.276
Flint Beach Island	0.087	0.087	0.062	0.003	1.227	896	104	0.104	0.093	0.096	0.048	0.003	1.793	974	26	0.026
Flower Island	0.091	0.093	0.056	0.003	-0.452	327	673	0.327	0.120	0.121	0.044	0.004	0.463	648	352	0.352
Fortress Island	0.149	0.153	0.061	0.005	0.488	669	331	0.331	0.067	0.068	0.056	0.002	0.631	742	258	0.258
Gossip Island	0.026	0.026	0.061	0.001	1.529	936	64	0.064	0.070	0.071	0.049	0.002	2.075	983	17	0.017
Hat Island	0.007	0.007	0.056	0.000	0.839	797	203	0.203	0.081	0.084	0.042	0.003	0.286	594	406	0.406
Huckleberry Island	0.089	0.089	0.043	0.003	1.041	843	157	0.157	0.113	0.113	0.033	0.004	-0.362	348	652	0.348
Iceberg Island	0.083	0.085	0.052	0.003	-0.533	296	704	0.296	0.044	0.048	0.053	0.001	1.122	880	120	0.120
Little Cactus	0.166	0.167	0.075	0.005	-1.017	147	853	0.147	0.135	0.140	0.053	0.004	-0.498	277	723	0.277

Continued on next page

Table a.7.1 – continued from previous page

Island name	mean SES $NNFD_i$	median SES $NNFD_i$	sd SES $NNFD_i$	se SES $NNFD_i$	SES $NNFD_i$ obs z	SES $NNFD_i$ rankLow	SES $NNFD_i$ rankHi	P-value SES $NNFD_i$ ranks	mean SES MFD_i	median SES MFD_i	sd SES MFD_i	se SES MFD_i	SES MFD_i obs z	SES MFD_i rankLow	SES MFD_i rankHi	P-value SES MFD_i ranks
Little McConnell Island	0.120	0.122	0.042	0.004	-0.751	228	772	0.228	0.139	0.141	0.032	0.004	0.868	807	193	0.193
Little Nob	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Little Oak	NA	NA	NA	NA	NA	0	0	0.000	NA	NA	NA	NA	NA	0	0	0.000
Little Sucia Island	0.069	0.068	0.058	0.002	0.215	581	419	0.419	0.096	0.097	0.047	0.003	0.386	645	355	0.355
Low Island	0.107	0.112	0.089	0.003	-0.317	368	632	0.368	0.000	0.008	0.058	0.000	0.355	596	404	0.404
Mackaye Harbor Island	0.174	0.177	0.066	0.005	0.233	575	425	0.425	0.197	0.200	0.054	0.006	-0.580	268	732	0.268
Massacre Bay 1 Island	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Matia Island	0.082	0.083	0.039	0.003	-0.192	417	583	0.417	0.154	0.155	0.029	0.005	-0.491	300	700	0.300
Matia West 1	0.061	0.063	0.070	0.002	0.690	750	250	0.250	0.184	0.189	0.063	0.006	0.723	756	244	0.244
Matia West 2	0.120	0.123	0.056	0.004	0.183	549	451	0.451	0.172	0.175	0.059	0.005	0.133	530	470	0.470
McConnell Island	0.134	0.133	0.045	0.004	-0.307	389	611	0.389	0.155	0.155	0.038	0.005	0.233	588	412	0.412
Near Decatur Island Unnamed 3	0.053	0.059	0.075	0.002	0.650	729	271	0.271	0.093	0.098	0.052	0.003	-0.253	383	617	0.383
Nob Island	0.077	0.078	0.061	0.002	1.000	846	154	0.154	0.164	0.167	0.045	0.005	1.256	899	101	0.101
North Finger Island	0.076	0.075	0.047	0.002	-0.666	251	749	0.251	0.093	0.093	0.037	0.003	-0.201	419	581	0.419
Oak Island	0.114	0.114	0.051	0.004	0.211	569	431	0.431	0.162	0.161	0.039	0.005	0.971	829	171	0.171
Pole Island	0.156	0.158	0.056	0.005	-0.386	336	664	0.336	0.087	0.091	0.046	0.003	1.196	897	103	0.103
Posey Island	0.145	0.143	0.046	0.005	0.820	787	213	0.213	0.171	0.172	0.035	0.005	1.511	944	56	0.056
Reef Island	0.139	0.139	0.058	0.004	-0.783	204	796	0.204	0.188	0.191	0.048	0.006	-0.475	297	703	0.297
Reeflet Island	NA	NA	NA	NA	NA	0	0	0.000	NA	NA	NA	NA	NA	0	0	0.000
Rim Island	0.171	0.171	0.065	0.005	-0.033	484	516	0.484	0.102	0.106	0.056	0.003	0.369	636	364	0.364
Ripple Island	0.137	0.139	0.053	0.004	0.047	502	498	0.498	0.107	0.110	0.046	0.003	0.849	792	208	0.208
Rum Island	0.136	0.136	0.054	0.004	0.527	704	296	0.296	0.179	0.182	0.045	0.006	1.059	851	149	0.149
Saddlebag Island	0.053	0.052	0.037	0.002	1.476	929	71	0.071	0.085	0.087	0.030	0.003	-0.505	296	704	0.296
Secar Rock	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sentinel Island	0.083	0.084	0.050	0.003	0.739	777	223	0.223	0.133	0.135	0.036	0.004	0.880	804	196	0.196
Skull Island	0.089	0.088	0.036	0.003	-0.273	412	588	0.412	0.114	0.114	0.026	0.004	-0.775	213	787	0.213
Small Island near Charles	0.194	0.200	0.140	0.006	0.112	462	414	0.414	0.173	0.180	0.113	0.005	0.770	737	139	0.139
Swirl Rock Central	0.243	0.243	0.000	0.008	NA	0	4	0.000	0.192	0.192	0.000	0.006	Inf	4	0	0.000
Turn Island	0.115	0.116	0.034	0.004	-0.294	388	612	0.388	0.152	0.152	0.029	0.005	-0.934	162	838	0.162
Turnlet Island	0.134	0.136	0.050	0.004	0.277	474	323	0.323	0.161	0.164	0.043	0.005	1.153	713	84	0.084
Unnamed 1 near Long Island	0.114	0.116	0.057	0.004	0.429	669	331	0.331	0.113	0.114	0.049	0.004	0.995	833	167	0.167
Unnamed 2 near Long Island	0.101	0.104	0.071	0.003	0.748	783	217	0.217	0.124	0.126	0.053	0.004	0.907	816	184	0.184
Unnamed 3 near Long Island	NA	NA	NA	NA	NA	0	0	0.000	NA	NA	NA	NA	NA	0	0	0.000
Unnamed 72 Island	NA	NA	NA	NA	NA	0	0	0.000	NA	NA	NA	NA	NA	0	0	0.000
Victim Island	0.076	0.076	0.041	0.002	0.227	591	409	0.409	0.087	0.089	0.032	0.003	0.157	541	459	0.459
Willow Island	0.076	0.078	0.049	0.002	0.218	578	422	0.422	0.152	0.156	0.042	0.005	-0.583	272	728	0.272
Yellow Island	0.118	0.117	0.030	0.004	0.006	507	493	0.493	0.117	0.116	0.025	0.004	-0.018	494	506	0.494

A.8 FUNCTIONAL DIVERSITY SUMMARY FOR LEAF SIZE

TABLE A.8.1: Tables of the summary statistics for difference in functional differences (measurements, NNFD, MFD, SES NNFD, SES MFD) between status groups for each island.

Observed functional diversity of Leaf Size (cm^2).

Island name	Total tips with trait	Median total	Min total	Max total	Total native tips with trait	Median native	Min native	Max native	Total invasive tips with trait	Median invasive	Min invasive	Max invasive	t-test obs P-value	CI (low)	CI (high)	$meanNNFD_n$	$meanNNFD_i$	t-test NNFD P-value	t-test NNFD CI (low)	t-test NNFD CI (high)	$meanMFD_n$	$meanMFD_i$	t-test MFD P-value	t-test MFD CI (low)	t-test MFD CI (high)
Aleck Rock	32	0.789	-0.890	1.600	13	0.824	-0.558	1.289	19	0.488	-0.890	1.600	0.667	-0.593	0.385	-0.142	0.278	0.467	-1.970	1.131	-0.576	0.213	0.158	-2.118	0.539
Barren Island	24	0.520	-0.965	1.714	8	0.829	-0.965	1.289	16	0.358	-0.890	1.714	0.558	-0.885	0.498	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Battleship Island	40	0.677	-0.890	2.029	17	0.795	-0.558	2.029	23	0.521	-0.890	1.704	0.499	-0.597	0.296	0.229	0.444	0.344	-0.679	0.248	0.121	0.190	0.815	-0.681	0.542
Blind Island	27	0.642	-0.824	1.711	14	0.615	-0.558	1.235	13	0.642	-0.824	1.711	0.555	-0.404	0.731	-0.246	0.336	0.151	-1.415	0.251	-0.313	0.340	0.123	-1.513	0.205
Boulder Island	37	0.398	-1.038	1.600	15	0.657	-0.558	1.289	22	0.270	-1.038	1.600	0.262	-0.668	0.187	-0.061	0.024	0.814	-0.846	0.678	-0.084	0.084	0.635	-0.914	0.579
Broken Point Island	28	0.725	-0.890	1.711	11	0.834	-0.091	1.499	17	0.519	-0.890	1.711	0.123	-0.915	0.115	-0.176	0.357	0.305	-1.671	0.605	-0.153	-0.033	0.793	-1.144	0.903
Buck Island	11	0.321	-0.824	1.295	4	0.551	-0.091	1.295	7	0.321	-0.824	1.234	0.618	-1.342	0.860	0.000	0.237	0.657	-1.632	1.158	0.828	-0.430	0.065	-0.138	2.654
Castle Island	56	0.774	-0.824	2.831	33	0.824	-0.743	2.831	23	0.518	-0.824	1.727	0.272	-0.632	0.182	-0.024	0.029	0.833	-0.565	0.459	0.083	-0.103	0.450	-0.313	0.686
Cemetery Island	9	0.227	-0.890	1.350	4	0.794	-0.091	1.350	5	0.136	-0.890	0.521	0.113	-1.633	0.224	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Charles Island	62	0.774	-1.038	2.029	24	0.865	-0.743	2.029	38	0.513	-1.038	1.727	0.248	-0.609	0.161	-0.089	-0.096	0.976	-0.445	0.458	0.125	0.024	0.723	-0.483	0.685
Cliff Island	56	0.705	-0.890	2.107	26	0.829	-0.658	2.107	30	0.520	-0.890	1.711	0.457	-0.531	0.242	-0.019	0.000	0.953	-0.664	0.627	0.299	0.024	0.336	-0.305	0.854
Colville Island	29	0.519	-0.824	2.029	10	1.089	-0.091	2.029	19	0.488	-0.824	1.711	0.096	-1.017	0.091	-0.143	-0.267	0.764	-0.781	1.029	0.184	-0.576	0.010	0.218	1.303
Coon Island	50	0.796	-1.038	1.711	15	0.829	-0.558	1.693	35	0.565	-1.038	1.711	0.216	-0.667	0.156	-0.054	0.106	0.678	-1.027	0.708	-0.162	-0.155	0.989	-1.182	1.169
Crab Island	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Deadman Island	36	0.705	-0.890	2.029	16	0.865	-0.558	2.029	20	0.503	-0.890	1.704	0.098	-0.893	0.079	0.011	0.371	0.408	-1.279	0.560	-0.171	-0.093	0.885	-1.253	1.097
Dot Island	47	0.840	-0.890	2.029	23	0.908	-0.558	2.029	24	0.503	-0.890	1.778	0.024	-0.874	-0.065	-0.018	0.093	0.655	-0.614	0.392	-0.031	-0.410	0.210	-0.225	0.983
Dotlet Island	14	0.127	-0.890	1.283	5	0.754	-0.091	1.283	9	0.021	-0.890	0.840	0.057	-1.558	0.029	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
East Sucia 1 Island	26	0.705	-0.890	1.600	11	0.795	-0.091	1.235	15	0.247	-0.890	1.600	0.181	-0.866	0.173	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
East Sucia 2 Island	22	0.705	-0.798	1.711	8	0.615	-0.082	1.289	14	0.883	-0.798	1.711	0.573	-0.395	0.694	0.000	0.185	0.661	-1.177	0.806	0.147	0.304	0.686	-1.044	0.729
East Sucia 3 Island	21	0.573	-0.890	1.600	7	0.657	-0.082	1.289	14	0.368	-0.890	1.600	0.616	-0.684	0.417	-0.052	-0.294	0.533	-0.615	1.098	0.067	-0.159	0.614	-0.780	1.231
East Sucia 4 Island	22	0.705	-0.890	1.467	13	0.754	-0.558	1.289	9	0.657	-0.890	1.467	0.496	-0.943	0.482	-0.094	-0.404	0.254	-0.261	0.881	0.087	-0.330	0.386	-0.611	1.445
East Sucia 6 Island	23	0.573	-0.890	1.711	12	0.812	-0.091	1.289	11	0.218	-0.890	1.711	0.149	-0.995	0.166	0.000	-0.235	0.807	-6.876	7.346	-0.418	-0.509	0.870	-1.964	2.145
East Sucia 7 Island	35	0.798	-1.038	1.711	17	0.829	-0.558	1.693	18	0.582	-1.038	1.711	0.216	-0.822	0.194	0.047	0.226	0.553	-0.800	0.442	0.033	-0.170	0.593	-0.580	0.986
East Sucia 8 Island	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ewing Island	40	0.827	-1.038	2.029	24	0.846	-0.743	2.029	16	0.233	-1.038	1.711	0.134	-0.977	0.138	-0.004	-0.187	0.441	-0.308	0.675	0.079	-0.705	0.016	0.164	1.403
Fawn Island	47	0.657	-0.824	1.704	17	0.834	-0.558	1.693	30	0.520	-0.824	1.704	0.129	-0.674	0.089	0.028	-0.175	0.588	-0.632	1.039	-0.148	-0.445	0.464	-0.618	1.211
Flat Top Island	66	0.822	-1.038	2.782	29	0.896	-0.658	2.782	37	0.521	-1.038	1.711	0.034	-0.769	-0.032	0.254	0.112	0.511	-0.294	0.578	0.137	-0.174	0.231	-0.211	0.833
Flint Beach Island	29	0.754	-0.824	1.704	13	0.795	-0.558	1.354	16	0.498	-0.824	1.704	0.866	-0.546	0.462	0.068	0.098	0.936	-0.832	0.772	-0.064	0.101	0.672	-0.997	0.667
Flower Island	38	0.902	-0.824	2.149	19	0.863	-0.558	2.029	19	1.011	-0.824	2.149	0.608	-0.332	0.559	-0.084	0.802	0.003	-1.416	-0.357	-0.014	0.561	0.098	-1.276	0.125
Fortress Island	24	0.829	-0.890	1.600	10	0.865	-0.091	1.499	14	0.270	-0.890	1.600	0.071	-1.064	0.047	-0.102	0.086	0.812	-4.382	4.006	-0.041	-0.414	0.714	-5.407	6.153
Gossip Island	35	0.754	-0.824	2.114	13	0.896	-0.558	1.762	22	0.498	-0.824	2.114	0.054	-0.939	0.008	-0.338	0.096	0.505	-2.038	1.170	-0.277	-0.059	0.750	-1.972	1.536
Hat Island	54	0.705	-0.890	1.778	25	0.798	-0.658	1.695	29	0.611	-0.890	1.778	0.884	-0.386	0.334	-0.097	0.036	0.641	-0.723	0.455	-0.053	0.006	0.830	-0.624	0.505
Huckleberry Island	61	0.824	-0.890	2.506	30	0.832	-0.658	2.029	31	0.518	-0.890	2.506	0.557	-0.508	0.277	0.076	-0.238	0.267	-0.253	0.881	0.029	-0.509	0.091	-0.092	1.167
Iceberg Island	26	0.458	-1.038	2.149	8	0.774	-0.091	2.029	18	0.359	-1.038	2.149	0.504	-0.900	0.460	0.000	0.368	0.736	-8.360	7.624	-0.314	0.273	0.411	-3.363	2.190
Little Cactus	16	0.358	-0.824	0.840	6	0.774	-0.091	0.834	10	0.213	-0.824	0.840	0.032	-1.040	-0.056	0.000	-0.310	0.750	-7.574	8.194	-0.415	-0.603	0.753	-2.596	2.973
Little McConnell Island	48	0.796	-0.890	2.107	18	0.827	-0.558	2.107	30	0.518	-0.890	1.711	0.232	-0.648	0.162	0.143	0.076	0.806	-0.496	0.630	0.077	0.016	0.835	-0.555	0.677
Little Nob	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Continued on next page

Table a.8.1 – continued from previous page

Island name	Total tips with trait	Median total	Min total	Max total	Total native tips with trait	Median native	Min native	Max native	Total invasive tips with trait	Median invasive	Min invasive	Max invasive	t-test obs P-value	CI (low)	CI (high)	$meanNNFD_n$	$meanNNFD_i$	t-test NNFD P-value	t-test NNFD CI (low)	t-test NNFD CI (high)	$meanMFD_n$	$meanMFD_i$	t-test MFD P-value	t-test MFD CI (low)	t-test MFD CI (high)
Little Oak	9	0.521	-0.824	1.704	2	0.332	-0.091	0.754	7	0.521	-0.824	1.704	0.930	-1.964	1.859	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Little Sucia Island	47	0.829	-0.890	2.029	27	0.834	-0.658	2.029	20	0.520	-0.890	1.622	0.451	-0.636	0.288	0.186	0.140	0.852	-0.457	0.548	0.214	-0.120	0.349	-0.397	1.064
Low Island	23	0.521	-0.965	1.600	8	0.829	-0.965	1.535	15	0.519	-0.703	1.600	0.647	-0.957	0.621	-0.584	-0.353	0.675	-1.504	1.042	-0.334	-0.201	0.853	-1.971	1.705
Mackaye Harbor Island	17	0.398	-0.824	1.124	4	0.705	-0.091	0.824	13	0.247	-0.824	1.124	0.284	-0.941	0.322	0.000	-0.376	0.704	-6.941	7.693	-0.337	-0.611	0.684	-3.043	3.590
Massacre Bay 1 Island	10	0.588	-0.495	1.704	2	0.369	-0.091	0.829	8	0.588	-0.495	1.704	0.708	-2.699	3.161	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Matia Island	81	0.824	-1.090	2.831	41	0.908	-0.796	2.831	40	0.618	-1.090	1.711	0.034	-0.758	-0.031	0.115	-0.147	0.306	-0.249	0.774	0.056	-0.541	0.029	0.064	1.128
Matia West 1	37	0.657	-1.038	2.029	24	0.796	-0.796	2.029	13	0.207	-1.038	1.704	0.132	-1.044	0.145	0.105	-0.246	0.228	-0.257	0.959	0.093	-0.794	0.026	0.122	1.653
Matia West 2	12	0.486	-1.038	1.704	4	0.774	-0.091	1.100	8	0.213	-1.038	1.704	0.330	-1.453	0.538	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
McConnell Island	69	0.824	-0.890	2.149	31	0.829	-0.558	2.107	38	0.739	-0.890	2.149	0.380	-0.495	0.191	0.007	0.069	0.776	-0.499	0.377	0.085	-0.073	0.479	-0.291	0.609
Near Decatur Island Unnamed 3	27	0.754	-0.890	1.518	15	0.824	-0.558	1.518	12	0.323	-0.890	1.234	0.193	-0.869	0.187	-0.117	-0.007	0.710	-0.732	0.511	-0.062	-0.435	0.247	-0.289	1.037
Nob Island	33	0.657	-0.890	1.704	13	0.798	-0.558	1.693	20	0.513	-0.890	1.704	0.259	-0.789	0.220	-0.132	-0.282	0.675	-0.612	0.911	-0.221	-0.586	0.367	-0.489	1.219
North Finger Island	52	0.861	-1.038	2.506	28	0.832	-0.558	2.107	24	0.992	-1.038	2.506	0.720	-0.563	0.392	0.130	0.056	0.776	-0.453	0.601	0.107	-0.108	0.549	-0.513	0.944
Oak Island	35	0.795	-0.890	2.149	12	0.811	-0.558	1.350	23	0.521	-0.890	2.149	0.649	-0.565	0.358	-0.190	0.254	0.111	-1.002	0.114	-0.007	0.210	0.552	-0.984	0.551
Pole Island	24	0.716	-0.824	2.149	9	0.834	-0.091	1.289	15	0.519	-0.824	2.149	0.356	-0.698	0.262	0.124	0.151	0.939	-0.806	0.753	-0.056	-0.201	0.715	-0.704	0.994
Posey Island	47	0.657	-1.162	1.711	16	0.811	-1.162	1.693	31	0.521	-0.890	1.711	0.517	-0.607	0.312	0.112	0.273	0.553	-0.722	0.399	0.161	0.173	0.969	-0.658	0.634
Reef Island	48	0.796	-0.890	2.831	25	0.829	-0.658	2.831	23	0.508	-0.890	1.711	0.275	-0.740	0.215	-0.102	0.092	0.628	-1.024	0.636	-0.317	-0.224	0.803	-0.861	0.675
Reeflet Island	20	0.601	-0.890	1.600	5	0.824	-0.091	1.295	15	0.321	-0.890	1.600	0.413	-0.956	0.420	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Rim Island	19	0.518	-0.890	1.600	8	0.789	-0.091	1.289	11	0.321	-0.890	1.600	0.105	-1.099	0.115	-0.235	-0.115	0.840	-1.863	1.623	-0.529	-0.544	0.971	-0.942	0.973
Ripple Island	28	0.705	-0.890	1.600	13	0.795	-0.091	1.328	15	0.488	-0.890	1.600	0.321	-0.692	0.236	0.097	0.150	0.922	-1.585	1.479	-0.215	-0.176	0.938	-1.268	1.189
Rum Island	34	0.650	-0.890	1.704	18	0.846	-0.558	1.693	16	0.359	-0.890	1.704	0.112	-0.855	0.094	0.025	-0.097	0.718	-0.580	0.824	-0.245	-0.419	0.691	-0.740	1.088
Saddlebag Island	70	0.837	-0.890	2.107	30	0.902	-0.658	2.107	40	0.684	-0.890	1.727	0.293	-0.538	0.165	-0.076	0.254	0.120	-0.750	0.091	0.165	-0.147	0.292	-0.287	0.913
Secar Rock	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sentinel Island	48	0.726	-1.090	2.107	19	0.824	-0.558	2.107	29	0.521	-1.090	1.778	0.425	-0.609	0.262	-0.116	0.093	0.556	-0.938	0.521	-0.068	-0.170	0.777	-0.651	0.856
Skull Island	54	0.832	-0.890	2.149	20	0.849	-0.558	2.029	34	0.724	-0.890	2.149	0.201	-0.626	0.135	0.012	0.148	0.634	-0.729	0.457	0.037	-0.216	0.439	-0.428	0.935
Small Island near Charles	7	0.321	-0.703	0.840	4	0.378	-0.091	0.824	3	0.321	-0.703	0.840	0.697	-1.818	1.379	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Swirl Rock Central	9	0.754	-0.091	1.704	5	0.754	-0.091	0.829	4	0.581	0.207	1.704	0.480	-0.716	1.325	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Turn Island	76	0.811	-0.890	2.107	33	0.834	-0.658	2.107	43	0.701	-0.890	1.849	0.605	-0.432	0.254	-0.070	-0.099	0.888	-0.385	0.442	0.217	-0.098	0.132	-0.101	0.729
Turnlet Island	27	0.840	-0.890	1.600	9	0.824	-0.558	1.518	18	0.849	-0.890	1.600	0.464	-0.841	0.399	-0.386	0.186	0.019	-1.029	-0.117	-0.725	0.129	0.457	-8.679	6.972
Unnamed 1 near Long Island	24	0.636	-0.890	1.711	7	0.795	-0.091	1.535	17	0.321	-0.890	1.711	0.366	-0.925	0.360	0.000	0.471	0.460	-3.323	2.381	0.717	0.435	0.459	-0.875	1.438
Unnamed 2 near Long Island	17	0.824	-0.703	1.711	5	0.754	-0.091	0.824	12	0.916	-0.703	1.711	0.190	-0.231	1.038	0.021	0.530	0.020	-0.913	-0.106	0.441	0.741	0.101	-0.674	0.075
Unnamed 3 near Long Island	8	0.229	-1.038	1.600	2	-0.044	-0.091	0.002	6	0.420	-1.038	1.600	0.240	-0.462	1.466	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Unnamed 72 Island	20	0.572	-0.890	1.499	5	0.834	-0.091	1.499	15	0.227	-0.890	1.405	0.177	-1.184	0.254	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Victim Island	52	0.774	-0.890	1.711	22	0.832	-0.091	1.693	30	0.498	-0.890	1.711	0.035	-0.683	-0.026	0.033	-0.111	0.593	-0.411	0.699	-0.022	-0.503	0.027	0.059	0.903
Willow Island	37	0.829	-1.038	1.711	19	0.829	-0.558	1.693	18	0.664	-1.038	1.711	0.260	-0.801	0.226	0.087	0.099	0.969	-0.648	0.625	0.162	-0.432	0.093	-0.117	1.304
Yellow Island	87	0.829	-0.890	2.831	31	0.829	-0.658	2.831	56	0.760	-0.890	2.078	0.701	-0.405	0.274	0.019	0.284	0.160	-0.640	0.110	0.006	0.051	0.856	-0.549	0.458

SES of functional differences for Leaf Size (cm^2).

Island name	mean SES $NNFD_i$	median SES $NNFD_i$	sd SES $NNFD_i$	se SES $NNFD_i$	SES $NNFD_i$ obs z	SES $NNFD_i$ rankLow	SES $NNFD_i$ rankHi	P-value SES $NNFD_i$ ranks	mean SES MFD_i	median SES MFD_i	sd SES MFD_i	se SES MFD_i	SES MFD_i obs z	SES MFD_i rankLow	SES MFD_i rankHi	P-value SES MFD_i ranks
Aleck Rock	0.193	0.187	0.215	0.006	0.394	654	346	0.346	0.301	0.305	0.216	0.010	-0.408	340	660	0.340
Barren Island	NA	NA	NA	NA	NA	0	0	0.000	NA	NA	NA	NA	NA	0	0	0.000
Battleship Island	0.294	0.302	0.213	0.009	0.706	759	241	0.241	0.175	0.181	0.205	0.006	0.073	519	481	0.481
Blind Island	0.287	0.287	0.284	0.009	0.173	568	431	0.431	0.477	0.471	0.273	0.015	-0.499	303	696	0.303
Boulder Island	0.283	0.290	0.239	0.009	-1.089	120	880	0.120	0.395	0.402	0.238	0.012	-1.306	92	908	0.092
Broken Point Island	0.261	0.255	0.286	0.008	0.337	626	374	0.374	0.037	0.047	0.247	0.001	-0.284	369	631	0.369
Buck Island	0.062	0.032	0.536	0.002	0.325	626	346	0.346	0.167	0.172	0.511	0.005	-1.168	117	855	0.117
Castle Island	0.243	0.247	0.183	0.008	-1.170	134	866	0.134	0.157	0.166	0.180	0.005	-1.450	78	922	0.078
Cemetery Island	NA	NA	NA	NA	NA	0	0	0.000	NA	NA	NA	NA	NA	0	0	0.000
Charles Island	0.126	0.126	0.169	0.004	-1.308	98	902	0.098	0.187	0.187	0.157	0.006	-1.042	154	846	0.154
Cliff Island	0.137	0.132	0.213	0.004	-0.646	259	741	0.259	0.128	0.122	0.185	0.004	-0.559	294	706	0.294
Colville Island	-0.081	-0.076	0.278	-0.003	-0.668	259	741	0.259	-0.179	-0.179	0.206	-0.006	-1.932	29	971	0.029
Coon Island	0.191	0.188	0.198	0.006	-0.431	346	654	0.346	0.031	0.032	0.172	0.001	-1.080	133	867	0.133
Crab Island	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Deadman Island	0.216	0.223	0.287	0.007	0.542	698	302	0.302	0.027	0.026	0.285	0.001	-0.423	338	662	0.338
Dot Island	0.202	0.210	0.201	0.006	-0.540	276	724	0.276	-0.125	-0.122	0.201	-0.004	-1.413	87	913	0.087
Dotlet Island	NA	NA	NA	NA	NA	0	0	0.000	NA	NA	NA	NA	NA	0	0	0.000
East Sucia 1 Island	NA	NA	NA	NA	NA	0	0	0.000	NA	NA	NA	NA	NA	0	0	0.000
East Sucia 2 Island	0.141	0.151	0.268	0.004	0.166	558	442	0.442	0.222	0.237	0.271	0.007	0.304	610	390	0.390
East Sucia 3 Island	0.163	0.182	0.290	0.005	-1.574	64	936	0.064	0.268	0.291	0.292	0.008	-1.460	77	923	0.077
East Sucia 4 Island	0.319	0.330	0.330	0.010	-2.192	15	984	0.015	0.298	0.318	0.359	0.009	-1.749	42	957	0.042
East Sucia 6 Island	0.190	0.191	0.256	0.006	-1.657	44	956	0.044	0.168	0.170	0.265	0.005	-2.549	11	989	0.011
East Sucia 7 Island	0.371	0.368	0.233	0.012	-0.624	264	736	0.264	0.132	0.133	0.261	0.004	-1.156	117	883	0.117
East Sucia 8 Island	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ewing Island	0.014	0.016	0.274	0.000	-0.734	223	777	0.223	-0.121	-0.123	0.266	-0.004	-2.197	19	981	0.019
Fawn Island	0.175	0.169	0.180	0.006	-1.943	24	976	0.024	-0.013	-0.010	0.172	0.000	-2.518	6	994	0.006
Flat Top Island	0.159	0.157	0.164	0.005	-0.288	388	612	0.388	-0.068	-0.070	0.136	-0.002	-0.781	214	786	0.214
Flint Beach Island	0.200	0.207	0.221	0.006	-0.461	325	675	0.325	0.350	0.353	0.225	0.011	-1.107	142	858	0.142
Flower Island	0.200	0.216	0.210	0.006	2.873	999	1	0.001	0.091	0.105	0.202	0.003	2.330	990	10	0.010
Fortress Island	0.190	0.181	0.324	0.006	-0.322	385	615	0.385	-0.141	-0.137	0.316	-0.004	-0.863	171	829	0.171
Gossip Island	0.226	0.234	0.229	0.007	-0.566	287	713	0.287	0.118	0.134	0.205	0.004	-0.863	190	810	0.190
Hat Island	0.184	0.182	0.213	0.006	-0.693	248	752	0.248	0.204	0.206	0.192	0.006	-1.030	146	854	0.146
Huckleberry Island	0.051	0.049	0.193	0.002	-1.499	60	940	0.060	-0.107	-0.094	0.198	-0.003	-2.030	21	979	0.021
Iceberg Island	0.447	0.439	0.244	0.014	-0.325	374	626	0.374	0.311	0.316	0.247	0.010	-0.153	428	572	0.428
Little Cactus	0.208	0.224	0.303	0.007	-1.710	48	952	0.048	0.140	0.150	0.308	0.004	-2.414	15	985	0.015

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Table a.8.1 – continued from previous page

Island name	mean SES $NNFD_i$	median SES $NNFD_i$	sd SES $NNFD_i$	se SES $NNFD_i$	SES $NNFD_i$ obs z	SES $NNFD_i$ rankLow	SES $NNFD_i$ rankHi	p-value SES $NNFD_i$ ranks	mean SES MFD_i	median SES MFD_i	sd SES MFD_i	se SES MFD_i	SES MFD_i obs z	SES MFD_i rankLow	SES MFD_i rankHi	p-value SES MFD_i ranks
Little McConnell Island	0.143	0.144	0.181	0.005	-0.367	357	643	0.357	0.152	0.155	0.156	0.005	-0.871	207	793	0.207
Little Nob	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Little Oak	NA	NA	NA	NA	NA	0	0	0.000	NA	NA	NA	NA	NA	0	0	0.000
Little Sucia Island	0.353	0.359	0.227	0.011	-0.939	173	827	0.173	0.068	0.081	0.241	0.002	-0.779	216	784	0.216
Low Island	-0.199	-0.210	0.352	-0.006	-0.438	335	665	0.335	0.159	0.150	0.300	0.005	-1.200	99	901	0.099
Mackaye Harbor Island	0.203	0.212	0.341	0.006	-1.697	45	954	0.045	0.205	0.209	0.358	0.006	-2.282	20	979	0.020
Massacre Bay 1 Island	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Matia Island	-0.009	-0.008	0.165	0.000	-0.843	197	803	0.197	-0.247	-0.249	0.153	-0.008	-1.913	29	971	0.029
Matia West 1	0.264	0.274	0.264	0.008	-1.931	30	970	0.030	0.291	0.297	0.289	0.009	-3.752	0	1000	0.000
Matia West 2	NA	NA	NA	NA	NA	0	0	0.000	NA	NA	NA	NA	NA	0	0	0.000
McConnell Island	0.021	0.018	0.199	0.001	0.241	594	406	0.406	0.010	0.015	0.156	0.000	-0.535	304	696	0.304
Near Decatur Island Unnamed 3	0.006	0.015	0.271	0.000	-0.047	464	536	0.464	0.030	0.036	0.267	0.001	-1.745	42	958	0.042
Nob Island	0.156	0.157	0.291	0.005	-1.505	66	934	0.066	-0.026	-0.019	0.267	-0.001	-2.101	24	976	0.024
North Finger Island	0.104	0.109	0.192	0.003	-0.253	393	607	0.393	-0.079	-0.082	0.205	-0.002	-0.145	441	559	0.441
Oak Island	0.242	0.246	0.197	0.008	0.061	518	482	0.482	0.226	0.228	0.185	0.007	-0.088	455	545	0.455
Pole Island	0.106	0.111	0.233	0.003	0.193	572	428	0.428	-0.001	0.007	0.239	0.000	-0.839	205	795	0.205
Posey Island	0.212	0.220	0.200	0.007	0.306	603	397	0.397	0.181	0.178	0.187	0.006	-0.042	482	518	0.482
Reef Island	0.068	0.066	0.264	0.002	0.091	534	466	0.466	0.038	0.038	0.213	0.001	-1.232	100	900	0.100
Reeflet Island	NA	NA	NA	NA	NA	0	0	0.000	NA	NA	NA	NA	NA	0	0	0.000
Rim Island	0.119	0.109	0.294	0.004	-0.798	214	786	0.214	0.073	0.070	0.304	0.002	-2.030	28	972	0.028
Ripple Island	0.173	0.176	0.269	0.005	-0.086	449	551	0.449	0.019	0.028	0.269	0.001	-0.723	221	779	0.221
Rum Island	0.214	0.221	0.259	0.007	-1.198	122	878	0.122	0.120	0.121	0.241	0.004	-2.235	16	984	0.016
Saddlebag Island	0.214	0.214	0.131	0.007	0.300	621	379	0.379	0.026	0.025	0.129	0.001	-1.346	88	912	0.088
Secar Rock	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sentinel Island	0.134	0.128	0.244	0.004	-0.166	445	555	0.445	0.074	0.072	0.198	0.002	-1.233	116	884	0.116
Skull Island	0.133	0.134	0.161	0.004	0.095	539	461	0.461	-0.073	-0.076	0.152	-0.002	-0.940	172	828	0.172
Small Island near Charles	NA	NA	NA	NA	NA	0	0	0.000	NA	NA	NA	NA	NA	0	0	0.000
Swirl Rock Central	NA	NA	NA	NA	NA	0	0	0.000	NA	NA	NA	NA	NA	0	0	0.000
Turn Island	0.030	0.033	0.160	0.001	-0.806	202	798	0.202	0.049	0.053	0.131	0.002	-1.120	136	864	0.136
Turnlet Island	0.167	0.177	0.224	0.005	0.087	414	383	0.383	0.114	0.121	0.209	0.004	0.071	409	388	0.388
Unnamed 1 near Long Island	0.235	0.236	0.236	0.007	0.999	841	159	0.159	0.225	0.223	0.212	0.007	0.994	841	159	0.159
Unnamed 2 near Long Island	0.184	0.188	0.278	0.006	1.244	892	108	0.108	0.385	0.386	0.268	0.012	1.325	905	95	0.095
Unnamed 3 near Long Island	NA	NA	NA	NA	NA	0	0	0.000	NA	NA	NA	NA	NA	0	0	0.000
Unnamed 72 Island	NA	NA	NA	NA	NA	0	0	0.000	NA	NA	NA	NA	NA	0	0	0.000
Victim Island	0.171	0.171	0.179	0.005	-1.579	54	946	0.054	-0.059	-0.059	0.176	-0.002	-2.522	6	994	0.006
Willow Island	0.178	0.174	0.230	0.006	-0.344	357	643	0.357	-0.018	-0.019	0.217	-0.001	-1.904	31	969	0.031
Yellow Island	0.292	0.294	0.128	0.009	-0.055	479	521	0.479	0.065	0.065	0.127	0.002	-0.107	457	543	0.457

A.9 Functional diversity summary for leaf nitrogen content

Table A.9.1: Tables of the summary statistics for difference in functional differences (measurements, NNFD, MFD, SES NNFD, SES MFD) between status groups for each island.

Observed functional diversity of Leaf Nitrogen Content (%).

Island name	Total tips with trait	Median total	Min total	Max total	Total native tips with trait	Median native	Min native	Max native	Total invasive tips with trait	Median invasive	Min invasive	Max invasive	t-test obs P-value	CI (low)	CI (high)	$meanNNFD_n$	$meanNNFD_i$	t-test NNFD P-value	t-test NNFD CI (low)	t-test NNFD CI (high)	$meanMFD_n$	$meanMFD_i$	t-test MFD P-value	t-test MFD CI (low)	t-test MFD CI (high)
Aleck Rock	24	0.367	0.090	0.607	12	0.282	0.090	0.544	12	0.416	0.239	0.607	0.028	0.014	0.225	-0.049	0.063	0.202	-0.317	0.093	-0.080	0.135	0.023	-0.391	-0.039
Barren Island	14	0.398	0.137	0.607	6	0.282	0.137	0.398	8	0.456	0.332	0.607	0.002	0.087	0.302	0.000	0.069	0.179	-0.200	0.062	-0.029	0.137	0.052	-0.335	0.003
Battleship Island	28	0.365	0.083	0.777	17	0.301	0.083	0.777	11	0.427	0.226	0.607	0.119	-0.026	0.218	0.052	0.090	0.755	-0.308	0.232	-0.004	0.102	0.337	-0.339	0.128
Blind Island	19	0.358	0.090	0.607	12	0.310	0.090	0.544	7	0.460	0.332	0.607	0.025	0.019	0.246	-0.138	0.073	0.028	-0.381	-0.041	-0.123	0.167	0.024	-0.522	-0.059
Boulder Island	23	0.398	0.090	0.607	12	0.302	0.090	0.544	11	0.433	0.294	0.607	0.011	0.035	0.237	-0.066	0.073	0.271	-0.498	0.220	-0.096	0.183	0.035	-0.528	-0.030
Broken Point Island	16	0.439	0.137	0.640	8	0.424	0.137	0.640	8	0.472	0.226	0.607	0.514	-0.106	0.203	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Buck Island	7	0.332	0.230	0.484	3	0.303	0.230	0.319	4	0.370	0.332	0.484	0.068	-0.011	0.221	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Castle Island	37	0.332	-0.165	0.777	27	0.260	-0.165	0.777	10	0.472	0.332	0.607	0.000	0.095	0.304	0.072	0.073	0.985	-0.138	0.136	-0.070	0.218	0.010	-0.494	-0.083
Cemetery Island	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Charles Island	40	0.383	-0.051	0.777	22	0.282	-0.051	0.777	18	0.430	0.262	0.710	0.004	0.054	0.264	0.056	0.093	0.605	-0.189	0.115	-0.045	0.245	0.004	-0.467	-0.114
Cliff Island	33	0.319	-0.051	0.640	22	0.276	-0.051	0.640	11	0.405	0.226	0.607	0.011	0.036	0.257	0.034	0.029	0.960	-0.559	0.569	-0.096	0.124	0.016	-0.381	-0.059
Colville Island	16	0.401	0.226	0.777	6	0.339	0.230	0.777	10	0.432	0.226	0.607	0.818	-0.189	0.232	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Coon Island	27	0.398	0.079	0.704	13	0.319	0.079	0.544	14	0.416	0.262	0.704	0.036	0.009	0.248	-0.091	-0.017	0.386	-0.256	0.108	-0.170	0.102	0.001	-0.404	-0.138
Crab Island	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Deadman Island	25	0.336	0.090	0.777	16	0.282	0.090	0.777	9	0.405	0.262	0.607	0.127	-0.029	0.220	0.177	0.065	0.512	-0.310	0.534	0.080	0.149	0.679	-0.460	0.322
Dot Island	29	0.398	0.079	0.777	19	0.319	0.079	0.777	10	0.426	0.332	0.607	0.055	-0.003	0.212	0.045	0.051	0.946	-0.204	0.191	-0.031	0.095	0.144	-0.298	0.048
Dotlet Island	8	0.456	0.319	0.607	5	0.450	0.319	0.544	3	0.546	0.405	0.607	0.302	-0.120	0.290	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
East Sucia 1 Island	14	0.347	0.128	0.704	7	0.319	0.258	0.544	7	0.398	0.128	0.704	0.702	-0.142	0.203	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
East Sucia 2 Island	13	0.398	0.128	0.607	6	0.349	0.137	0.544	7	0.405	0.128	0.607	0.616	-0.146	0.235	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
East Sucia 3 Island	13	0.398	0.137	0.704	6	0.349	0.137	0.544	7	0.460	0.262	0.704	0.164	-0.059	0.310	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
East Sucia 4 Island	14	0.261	0.079	0.544	12	0.259	0.079	0.544	2	0.333	0.262	0.405	0.558	-0.354	0.472	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
East Sucia 6 Island	13	0.303	0.137	0.544	10	0.302	0.137	0.544	3	0.398	0.262	0.405	0.557	-0.117	0.191	0.000	0.086	NA	NA	NA	-0.052	0.087	NA	NA	NA
East Sucia 7 Island	25	0.332	0.079	0.544	17	0.301	0.079	0.544	8	0.372	0.262	0.517	0.041	0.004	0.182	-0.024	0.024	0.381	-0.164	0.068	-0.042	0.097	0.046	-0.276	-0.003
East Sucia 8 Island	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ewing Island	33	0.358	-0.051	0.777	23	0.319	-0.051	0.777	10	0.419	0.239	0.704	0.040	0.007	0.254	0.043	0.151	0.369	-0.387	0.173	-0.050	0.147	0.161	-0.505	0.111
Fawn Island	26	0.401	0.079	0.704	14	0.276	0.079	0.544	12	0.476	0.262	0.704	0.002	0.081	0.306	-0.086	0.149	0.008	-0.398	-0.074	-0.132	0.242	0.000	-0.524	-0.225
Flat Top Island	40	0.398	-0.051	0.777	23	0.394	-0.051	0.777	17	0.405	0.226	0.704	0.181	-0.034	0.174	0.059	0.009	0.526	-0.116	0.218	-0.037	-0.013	0.785	-0.205	0.158
Flint Beach Island	20	0.398	0.090	0.607	11	0.319	0.090	0.544	9	0.460	0.332	0.607	0.018	0.025	0.234	-0.066	0.082	0.248	-0.517	0.220	-0.119	0.169	0.031	-0.531	-0.044
Flower Island	23	0.405	0.083	0.777	13	0.319	0.083	0.777	10	0.472	0.332	0.607	0.047	0.002	0.262	-0.054	0.073	0.669	-0.976	0.723	-0.030	0.125	0.439	-0.680	0.371
Fortress Island	17	0.398	0.137	0.640	10	0.358	0.137	0.640	7	0.405	0.262	0.484	0.668	-0.094	0.143	0.122	0.061	0.670	-0.432	0.554	0.012	0.035	0.889	-0.591	0.544
Gossip Island	18	0.367	0.083	0.640	10	0.282	0.083	0.640	8	0.412	0.262	0.607	0.166	-0.049	0.261	0.013	0.062	0.744	-0.492	0.393	-0.009	0.218	0.205	-0.644	0.190
Hat Island	30	0.383	-0.051	0.607	18	0.311	-0.051	0.544	12	0.437	0.200	0.607	0.006	0.048	0.253	0.000	-0.001	0.986	-0.145	0.147	-0.072	0.141	0.070	-0.449	0.023
Huckleberry Island	42	0.298	-0.165	0.777	26	0.267	-0.165	0.777	16	0.372	0.200	0.607	0.052	-0.001	0.219	0.090	0.008	0.336	-0.094	0.259	-0.043	0.077	0.241	-0.333	0.091
Iceberg Island	18	0.419	0.230	0.777	8	0.358	0.230	0.777	10	0.446	0.332	0.704	0.478	-0.107	0.215	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Little Cactus	8	0.398	0.258	0.607	4	0.358	0.258	0.428	4	0.401	0.333	0.607	0.283	-0.096	0.265	0.000	0.080	0.416	-0.838	0.678	-0.083	0.018	0.209	-0.340	0.138
Little McConnell Island	29	0.336	0.079	0.607	15	0.260	0.079	0.544	14	0.387	0.128	0.607	0.021	0.020	0.230	-0.025	0.060	0.222	-0.229	0.059	-0.076	0.156	0.004	-0.372	-0.092
Little Nob	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Continued on next page

Table a.9.1 – continued from previous page

Island name	Total tips with trait	Median total	Min total	Max total	Total native tips with trait	Median native	Min native	Max native	Total invasive tips with trait	Median invasive	Min invasive	Max invasive	t-test obs P-value	CI (low)	CI (high)	$meanNNFD_n$	$meanNNFD_i$	t-test NNFD P-value	t-test NNFD CI (low)	t-test NNFD CI (high)	$meanMFD_n$	$meanMFD_i$	t-test MFD P-value	t-test MFD CI (low)	t-test MFD CI (high)
Little Oak	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Little Sucia Island	29	0.358	-0.051	0.777	22	0.355	-0.051	0.777	7	0.405	0.239	0.607	0.207	-0.055	0.236	0.065	0.042	0.807	-0.179	0.225	-0.070	0.121	0.109	-0.430	0.049
Low Island	12	0.449	0.137	0.640	4	0.377	0.137	0.640	8	0.472	0.405	0.607	0.378	-0.215	0.434	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mackaye Harbor Island	7	0.398	0.258	0.704	4	0.358	0.258	0.544	3	0.405	0.262	0.704	0.630	-0.391	0.545	0.000	0.385	NA	NA	NA	-0.122	0.324	NA	NA	NA
Massacre Bay 1 Island	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Matia Island	58	0.334	-0.051	0.777	35	0.303	-0.051	0.777	23	0.405	0.200	0.710	0.007	0.036	0.216	0.046	0.083	0.599	-0.178	0.105	-0.044	0.167	0.006	-0.357	-0.065
Matia West 1	29	0.332	-0.051	0.777	22	0.259	-0.051	0.777	7	0.433	0.332	0.607	0.002	0.084	0.314	0.055	0.101	0.612	-0.258	0.167	-0.057	0.231	0.043	-0.563	-0.014
Matia West 2	11	0.398	0.260	0.544	6	0.358	0.260	0.544	5	0.405	0.332	0.517	0.414	-0.073	0.161	0.128	-0.008	0.061	-0.009	0.281	0.127	0.044	0.472	-0.543	0.708
McConnell Island	38	0.341	-0.051	0.607	24	0.298	-0.051	0.544	14	0.401	0.200	0.607	0.009	0.035	0.223	-0.005	0.050	0.407	-0.199	0.087	-0.065	0.138	0.010	-0.351	-0.055
Near Decatur Island Unnamed 3	15	0.358	0.090	0.704	9	0.358	0.090	0.450	6	0.367	0.262	0.704	0.344	-0.094	0.241	-0.020	0.138	0.330	-0.612	0.297	-0.029	0.125	0.344	-0.598	0.291
Nob Island	21	0.413	0.079	0.607	13	0.301	0.079	0.544	8	0.501	0.405	0.607	0.001	0.103	0.313	-0.085	0.132	0.022	-0.390	-0.044	-0.103	0.235	0.004	-0.522	-0.153
North Finger Island	31	0.398	-0.051	0.777	21	0.340	-0.051	0.777	10	0.446	0.262	0.607	0.043	0.004	0.239	0.147	-0.020	0.121	-0.053	0.387	-0.029	0.145	0.181	-0.444	0.096
Oak Island	18	0.367	0.079	0.607	10	0.311	0.079	0.544	8	0.416	0.262	0.607	0.089	-0.020	0.258	-0.072	0.078	0.083	-0.332	0.033	-0.178	0.200	0.005	-0.569	-0.186
Pole Island	16	0.401	0.137	0.607	9	0.319	0.137	0.544	7	0.546	0.332	0.607	0.006	0.058	0.290	-0.036	0.105	0.084	-0.308	0.024	-0.047	0.170	0.025	-0.397	-0.037
Posey Island	27	0.336	0.079	0.710	13	0.260	0.079	0.544	14	0.460	0.128	0.710	0.009	0.046	0.293	-0.040	0.105	0.066	-0.301	0.012	-0.088	0.213	0.000	-0.430	-0.172
Reef Island	30	0.352	0.074	0.704	19	0.260	0.074	0.640	11	0.427	0.262	0.704	0.003	0.070	0.296	0.008	0.049	0.707	-0.289	0.208	-0.040	0.147	0.128	-0.443	0.067
Reeflet Island	10	0.401	0.258	0.704	2	0.288	0.258	0.319	8	0.416	0.262	0.704	0.036	0.013	0.282	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Rim Island	13	0.398	0.137	0.607	8	0.339	0.137	0.544	5	0.460	0.332	0.607	0.094	-0.024	0.262	0.000	0.046	0.591	-0.646	0.555	-0.057	0.127	0.135	-0.483	0.113
Ripple Island	20	0.360	0.137	0.607	13	0.319	0.137	0.544	7	0.405	0.333	0.607	0.045	0.003	0.216	-0.008	0.074	0.170	-0.212	0.048	-0.015	0.126	0.066	-0.294	0.012
Rum Island	21	0.398	0.083	0.607	15	0.303	0.083	0.544	6	0.456	0.398	0.607	0.003	0.068	0.272	0.000	0.075	0.284	-0.225	0.074	0.007	0.184	0.031	-0.335	-0.020
Saddlebag Island	42	0.338	-0.051	0.640	24	0.311	-0.051	0.640	18	0.376	0.200	0.607	0.056	-0.002	0.186	0.036	0.050	0.831	-0.147	0.120	-0.062	0.088	0.071	-0.314	0.015
Secar Rock	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sentinel Island	30	0.401	0.079	0.553	16	0.310	0.079	0.544	14	0.416	0.262	0.553	0.037	0.006	0.184	-0.066	0.028	0.263	-0.278	0.092	-0.132	0.060	0.113	-0.458	0.074
Skull Island	28	0.347	0.079	0.777	14	0.311	0.079	0.777	14	0.401	0.138	0.704	0.168	-0.043	0.230	0.023	0.107	0.590	-0.448	0.279	-0.083	0.145	0.127	-0.539	0.084
Small Island near Charles	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Swirl Rock Central	7	0.405	0.230	0.544	4	0.358	0.230	0.544	3	0.484	0.405	0.517	0.262	-0.105	0.297	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Turn Island	51	0.333	-0.051	0.640	30	0.298	-0.051	0.640	21	0.347	0.128	0.607	0.040	0.004	0.178	0.011	0.004	0.895	-0.106	0.120	-0.059	0.084	0.041	-0.279	-0.007
Turnlet Island	16	0.401	0.090	0.704	7	0.319	0.090	0.544	9	0.427	0.262	0.704	0.086	-0.023	0.309	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Unnamed 1 near Long Island	15	0.405	0.230	0.572	6	0.358	0.230	0.544	9	0.460	0.262	0.572	0.256	-0.058	0.195	0.000	0.008	0.962	-0.921	0.905	-0.003	0.051	0.617	-0.554	0.445
Unnamed 2 near Long Island	11	0.336	0.230	0.544	4	0.358	0.230	0.544	7	0.336	0.262	0.517	0.979	-0.195	0.199	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Unnamed 3 near Long Island	8	0.472	0.230	0.572	2	0.275	0.230	0.319	6	0.515	0.433	0.572	0.065	-0.044	0.511	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Unnamed 72 Island	10	0.416	0.246	0.640	4	0.432	0.246	0.640	6	0.416	0.262	0.607	0.975	-0.271	0.278	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Victim Island	29	0.358	0.079	0.704	17	0.301	0.079	0.544	12	0.443	0.226	0.704	0.005	0.051	0.256	-0.006	0.111	0.121	-0.270	0.036	-0.104	0.148	0.007	-0.418	-0.087
Willow Island	23	0.347	0.034	0.607	14	0.276	0.034	0.544	9	0.427	0.332	0.607	0.002	0.075	0.284	0.000	-0.021	0.700	-0.100	0.141	-0.185	0.167	0.000	-0.460	-0.244
Yellow Island	50	0.383	0.074	0.777	26	0.311	0.074	0.777	24	0.439	0.196	0.704	0.009	0.031	0.203	0.053	-0.035	0.344	-0.104	0.280	0.002	-0.003	0.942	-0.147	0.158

SES of functional differences for Leaf Nitrogen Content (%).

Island name	mean SES $NNFD_i$	median SES $NNFD_i$	sd SES $NNFD_i$	se SES $NNFD_i$	SES $NNFD_i$ obs z	SES $NNFD_i$ rankLow	SES $NNFD_i$ rankHi	P-value SES $NNFD_i$ ranks	mean SES MFD_i	median SES MFD_i	sd SES MFD_i	se SES MFD_i	SES MFD_i obs z	SES MFD_i rankLow	SES MFD_i rankHi	P-value SES MFD_i ranks
Aleck Rock	0.050	0.051	0.063	0.002	0.211	593	401	0.401	0.086	0.086	0.072	0.003	0.680	750	244	0.244
Barren Island	0.093	0.090	0.080	0.003	-0.296	382	613	0.382	0.124	0.123	0.076	0.004	0.177	585	410	0.410
Battleship Island	0.063	0.061	0.065	0.002	0.422	701	299	0.299	0.059	0.060	0.058	0.002	0.743	782	218	0.218
Blind Island	0.066	0.067	0.077	0.002	0.090	528	457	0.457	0.072	0.071	0.079	0.002	1.208	884	101	0.101
Boulder Island	0.058	0.060	0.065	0.002	0.237	584	398	0.398	0.126	0.128	0.064	0.004	0.891	812	170	0.170
Broken Point Island	NA	NA	NA	NA	NA	0	0	0.000	NA	NA	NA	NA	NA	0	0	0.000
Buck Island	NA	NA	NA	NA	NA	0	0	0.000	NA	NA	NA	NA	NA	0	0	0.000
Castle Island	-0.009	-0.004	0.074	0.000	1.103	863	119	0.119	0.129	0.129	0.066	0.004	1.351	905	77	0.077
Cemetery Island	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Charles Island	0.062	0.060	0.074	0.002	0.426	688	311	0.311	0.117	0.115	0.059	0.004	2.172	978	21	0.021
Cliff Island	0.030	0.026	0.081	0.001	-0.020	519	477	0.477	0.116	0.114	0.070	0.004	0.112	553	443	0.443
Colville Island	NA	NA	NA	NA	NA	0	0	0.000	NA	NA	NA	NA	NA	0	0	0.000
Coon Island	0.011	0.010	0.053	0.000	-0.513	297	702	0.297	0.072	0.070	0.048	0.002	0.616	744	255	0.255
Crab Island	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Deadman Island	0.051	0.056	0.071	0.002	0.192	538	421	0.421	0.067	0.071	0.071	0.002	1.158	849	110	0.110
Dot Island	0.063	0.062	0.066	0.002	-0.173	433	567	0.433	0.066	0.067	0.069	0.002	0.408	676	324	0.324
Dotlet Island	NA	NA	NA	NA	NA	0	0	0.000	NA	NA	NA	NA	NA	0	0	0.000
East Sucia 1 Island	NA	NA	NA	NA	NA	0	0	0.000	NA	NA	NA	NA	NA	0	0	0.000
East Sucia 2 Island	NA	NA	NA	NA	NA	0	0	0.000	NA	NA	NA	NA	NA	0	0	0.000
East Sucia 3 Island	NA	NA	NA	NA	NA	0	0	0.000	NA	NA	NA	NA	NA	0	0	0.000
East Sucia 4 Island	NA	NA	NA	NA	NA	0	0	0.000	NA	NA	NA	NA	NA	0	0	0.000
East Sucia 6 Island	0.127	0.121	0.086	0.004	-0.483	319	675	0.319	0.084	0.082	0.079	0.003	0.043	525	469	0.469
East Sucia 7 Island	0.066	0.065	0.061	0.002	-0.680	238	762	0.238	0.118	0.121	0.067	0.004	-0.309	368	632	0.368
East Sucia 8 Island	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ewing Island	0.025	0.016	0.128	0.001	0.979	831	129	0.129	0.062	0.052	0.111	0.002	0.768	780	180	0.180
Fawn Island	0.070	0.068	0.060	0.002	1.318	910	90	0.090	0.114	0.114	0.061	0.004	2.107	981	19	0.019
Flat Top Island	0.016	0.013	0.066	0.000	-0.104	473	526	0.473	0.026	0.024	0.054	0.001	-0.728	219	780	0.219
Flint Beach Island	0.048	0.050	0.070	0.002	0.498	694	292	0.292	0.065	0.067	0.078	0.002	1.320	896	90	0.090
Flower Island	-0.032	-0.030	0.076	-0.001	1.383	912	68	0.068	0.009	0.009	0.074	0.000	1.564	932	48	0.048
Fortress Island	0.049	0.050	0.072	0.002	0.165	576	415	0.415	0.038	0.040	0.081	0.001	-0.031	468	523	0.468
Gossip Island	0.029	0.025	0.079	0.001	0.419	694	285	0.285	0.057	0.058	0.080	0.002	2.013	950	29	0.029
Hat Island	0.089	0.083	0.097	0.003	-0.935	157	830	0.157	0.159	0.158	0.083	0.005	-0.215	411	576	0.411
Huckleberry Island	0.040	0.038	0.063	0.001	-0.504	302	698	0.302	0.123	0.122	0.055	0.004	-0.838	199	801	0.199
Iceberg Island	NA	NA	NA	NA	NA	0	0	0.000	NA	NA	NA	NA	NA	0	0	0.000
Little Cactus	0.085	0.086	0.108	0.003	-0.042	395	440	0.395	0.067	0.071	0.104	0.002	-0.469	257	578	0.257

Continued on next page

Table a.9.1 – continued from previous page

Island name	mean SES NNFD$_i$	median SES NNFD$_i$	sd SES NNFD$_i$	se SES NNFD$_i$	SES NNFD$_i$ obs z	SES NNFD$_i$ rankLow	SES NNFD$_i$ rankHi	P-value SES NNFD$_i$ ranks	mean SES MFD$_i$	median SES MFD$_i$	sd SES MFD$_i$	se SES MFD$_i$	SES MFD$_i$ obs z	SES MFD$_i$ rankLow	SES MFD$_i$ rankHi	P-value SES MFD$_i$ ranks
Little McConnell Island	0.033	0.033	0.049	0.001	0.561	719	281	0.281	0.091	0.091	0.045	0.003	1.450	930	70	0.070
Little Nob	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Little Oak	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Little Sucia Island	-0.162	-0.162	0.000	-0.005	Inf	2	0	0.000	0.062	0.062	0.000	0.002	Inf	2	0	0.000
Low Island	NA	NA	NA	NA	NA	0	0	0.000	NA	NA	NA	NA	NA	0	0	0.000
Mackaye Harbor Island	0.034	0.031	0.104	0.001	3.361	944	6	0.006	0.045	0.047	0.093	0.001	3.006	944	6	0.006
Massacre Bay 1 Island	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Matia Island	0.041	0.041	0.056	0.001	0.754	788	212	0.212	0.123	0.124	0.053	0.004	0.846	810	190	0.190
Matia West 1	0.098	0.089	0.112	0.003	0.027	515	428	0.428	0.158	0.158	0.104	0.005	0.705	722	221	0.221
Matia West 2	0.029	0.029	0.094	0.001	-0.393	311	662	0.311	0.036	0.037	0.093	0.001	0.086	516	457	0.457
McConnell Island	0.051	0.048	0.058	0.002	-0.018	516	484	0.484	0.114	0.112	0.053	0.004	0.448	691	309	0.309
Near Decatur Island Unnamed 3	NA	NA	NA	NA	NA	0	0	0.000	NA	NA	NA	NA	NA	0	0	0.000
Nob Island	0.073	0.073	0.075	0.002	0.793	795	203	0.203	0.113	0.113	0.075	0.004	1.621	952	46	0.046
North Finger Island	-0.034	-0.029	0.073	-0.001	0.202	573	425	0.425	0.015	0.012	0.067	0.000	1.931	964	34	0.034
Oak Island	0.052	0.054	0.055	0.002	0.464	698	300	0.300	0.111	0.113	0.066	0.004	1.343	921	77	0.077
Pole Island	0.069	0.068	0.064	0.002	0.566	724	273	0.273	0.072	0.069	0.070	0.002	1.394	925	72	0.072
Posey Island	0.053	0.052	0.048	0.002	1.099	874	124	0.124	0.110	0.110	0.046	0.003	2.227	984	14	0.014
Reef Island	0.026	0.022	0.081	0.001	0.275	635	360	0.360	0.088	0.088	0.069	0.003	0.856	812	183	0.183
Reeflet Island	NA	NA	NA	NA	NA	0	0	0.000	NA	NA	NA	NA	NA	0	0	0.000
Rim Island	0.113	0.109	0.106	0.004	-0.635	245	730	0.245	0.102	0.100	0.088	0.003	0.292	608	367	0.367
Ripple Island	0.029	0.027	0.071	0.001	0.634	759	236	0.236	0.047	0.046	0.076	0.001	1.035	858	137	0.137
Rum Island	0.065	0.067	0.076	0.002	0.138	551	436	0.436	0.111	0.112	0.082	0.004	0.891	822	165	0.165
Saddlebag Island	0.054	0.052	0.049	0.002	-0.085	474	526	0.474	0.114	0.113	0.041	0.004	-0.631	266	734	0.266
Secar Rock	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sentinel Island	0.066	0.065	0.065	0.002	-0.580	268	729	0.268	0.141	0.140	0.066	0.004	-1.224	110	887	0.110
Skull Island	0.064	0.061	0.046	0.002	0.930	828	171	0.171	0.093	0.095	0.044	0.003	1.180	895	104	0.104
Small Island near Charles	NA	NA	NA	NA	NA	0	0	0.000	NA	NA	NA	NA	NA	0	0	0.000
Swirl Rock Central	NA	NA	NA	NA	NA	0	0	0.000	NA	NA	NA	NA	NA	0	0	0.000
Turn Island	-0.001	0.002	0.064	0.000	0.075	517	483	0.483	0.122	0.121	0.060	0.004	-0.627	247	753	0.247
Turnlet Island	NA	NA	NA	NA	NA	0	0	0.000	NA	NA	NA	NA	NA	0	0	0.000
Unnamed 1 near Long Island	-0.019	-0.021	0.080	-0.001	0.337	628	351	0.351	-0.008	-0.011	0.075	0.000	0.783	766	213	0.213
Unnamed 2 near Long Island	NA	NA	NA	NA	NA	0	0	0.000	NA	NA	NA	NA	NA	0	0	0.000
Unnamed 3 near Long Island	NA	NA	NA	NA	NA	0	0	0.000	NA	NA	NA	NA	NA	0	0	0.000
Unnamed 72 Island	NA	NA	NA	NA	NA	0	0	0.000	NA	NA	NA	NA	NA	0	0	0.000
Victim Island	0.052	0.052	0.047	0.002	1.232	898	102	0.102	0.088	0.088	0.054	0.003	1.116	878	122	0.122
Willow Island	0.072	0.071	0.097	0.002	-0.961	144	849	0.144	0.178	0.175	0.082	0.006	-0.130	451	542	0.451
Yellow Island	0.017	0.019	0.052	0.001	-1.003	143	857	0.143	0.081	0.079	0.042	0.003	-2.003	20	980	0.020

Table A.9.2: Review of previous studies that compared phylogenetic (and functional) distinctiveness between introduced and native species to test Darwin's Naturalization Conundrum in natural plant communities (see Thuiller *et al*. (2010) for a summary of all studies investigating phylogenetic patterns of invasions). Results find phylogenetic and/or functional similarity (i.e. clustering, "-"), dissimilarity (i.e. overdispersion, "+") of invasive species nested in or compared to the native community, or no significant pattern ("ns"). Statistical models are coded as follows: response variable $\sim$ explanatory variable$_1$ + explanatory variable$_2$. Test is indicated in parentheses, GLM = generalized linear model.

Reference	Taxonomic Scale	Spatial Scale (grain)	Phylogeny type (method)	Phylogenetic distance metrics	Traits	Trait difference metrics	Statistical model (test)	Null Hypothesis	Results : Traits	Results : Phylogenetic (scales)
Strauss *et al*. (2006a)	Poaceae (genus-level)	California (state and five ecologically diverse reserves)	Supertree	MNNPD, MPD	Area of origin	χ^2	Phylogenetic distance metrics $\sim$ pest vs. non-pest (t-test)	None	ns	+
Cadotte *et al*. (2009b)	Angiosperms	Australia, small scale (Royal National Park) and large scale (whole continent)	Supertree & Maximum likelihood (*matK*, *rbcL*, & ITS), missing species added as polytomies	Phylogenetic signal of occupancy (Blomberg's K)	None	NA	Compared to 95% CI of the expected distribution under the null model	Randomize species occurrence matrix	NA	- (large scale), ns (small scale)
Cadotte *et al*. (2010)	Angiosperms	Central and Northern California, 4 sites, 30-50 replicate plots ($1m^2$)	Mega-phylogeny (*matK*, *rbcL*, & ITS)	PD, MNND*, MPD*	None	NA	Compared to 95% CI of the expected distribution under the null model	Randomize species occurrence matrix (swap names)	NA	- (within pots), low phylogenetic turnover
Davis *et al*. (2010)	Angiosperms	California, serpentine ecosystem, small ($16m^2$) and large ($10{,}816m^2$) spatial scales	Supertree	MNNPD	None	NA	Compared to 95% CI of the expected distribution under the null model	Randomize species occurrence matrix	NA	+ (stronger at small scales)
Schaefer *et al*. (2011)	Angiosperms (species-level)	Azores (plots $100m^2$ - $1km^2$, Sao Miguel Islands, Azores Archipelago)	Mega-phylogeny (*matK*, *rbcL*)	PNND, MPD **	Life form, seed weight, plant height, seed number, dispersal type, mode of introduction, pollination system	AET, DNNTV	Phylogenetic distance metrics $\sim$ Invasive vs. non-invasive introduced (t-test). 3 models: Probability of invasion success $\sim$ phylogenetic distance metrics (+) AET (+) DNNTV (GLM)	None	AET: life form and seed weight explain more variation than PNND . DNNTV: PNND & dissimilarity in life form	+ (>$1km^2$) ns ($100m^2$)
Carboni *et al*. (2013)	Angiosperms (species-level)	Mediterranean coastal dunes (plots $4m^2$, $64m^2$, $35km^2$)	Supertree	DNNS†, MDNS†	Leaf thickness, SLA, height, seed mass, seed shape	Abouheif's test	Probability of community invasion $\sim$ phylogenetic distance metrics + plot identity (random effect) + invader identity (random effect) (MCMCglmm)	Randomize presence /absence of invasives among sites, 2-tailed p-value explains pattern for each invader	Phylogenetic signal for leaf thickness, seed mass & seed shape	+ ($4m^2$) -($64m^2$, $35km^2$)
Bezeng *et al*. (2013)	Angiosperms	Robben Island, South Africa, $50m^2$ plots	Bayesian from barcode regions (*rbcL* & *matK*)	PNND, MPD	None	NA	Phylogenetic distance metrics $\sim$ invasive vs. native (Mann-Whitney U-test); PNND $\sim$ scale (island vs. plot) + status category (invasive-native, invasive-invasive, native-native)	Randomize species occurrence matrix	NA	- (both observed and random communities)
Park and Potter (2013)	Cardueae (species-level)	California (state and floristic provinces)	Mega-phylogeny (*matK*, *trnL-F* & ITS)	MNND, MPD	None	NA	Phylogenetic distance metrics $\sim$ invasive vs. non-invasive introduced (t-test)	NRI/NTI (random assemblages of non-native taxa)	NA	-

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Table a.9.2 – continued from previous page

Reference	Taxonomic Scale	Spatial Scale (grain)	Phylogeny type (method)	Phylogenetic distance metrics	Traits	Trait difference metrics	Statistical model (test)	Null Hypothesis	Results : Traits	Results : Phylogenetic (scales)
Ordonez (2014)	Vascular Plants (genus-level)	Global (83 communities worldwide; global, continental, habitat types)	Supertree	MNNPD‡ ,MPD‡	SLA, maximum height, seed mass	MFD‡, MNNF‡	Phylogenetic distance metrics ∼ alien vs. native (Bonferroni-corrected unequal sample sizes t-test)	NRI/NTI (random assemblages)	+	-
Lim *et al.* (2014)	Vascular Plants (species-level)	United Kingdom (country and countryside survey plots)	Mega-phylogeny (*matK*, *rbcL*; ultra-metric)	PNND, MPD, D (random vs. Brownian)	Life form, height, clonality, and Ellenberg indicator values for light, soil fertility, soil pH, salt tolerance	Invasive vs. non-invasive introduced (binary trait) ∼ each trait, (GLM)	Phylogenetic distance metrics ∼ Invasive vs. non-invasive introduced (GLM country scale, linear mixed effect model plots))	Randomize all tips (for D)	Invasives have different abiotic preferences (nitrogen and moisture)	ns (both scales)
Li *et al.* (2015)	Seed Plants	Permanent-plot study, New Jersey, USA (40 year survey)	Mega-phylogeny (*matK*, *rbcL* & ITS)	MNNPD, MPD, MPD_{ab}	NA	NA	Standardized effect size (SES)	Randomize exotic tips	NA	-
Lososová *et al.* (2015)	Vascular Plants (species-level)	Czech Republic	Supertree (ultra-metric)	MNTD, MPD	None	NA	Standardized effect size (SES)	Random alien assemblages	NA	-

Phylogenetic Distinctiveness Acronyms :

+ : over-dispersion (DNH)
- : clustering
ns : not significant
D: phylogenetic signal of invasiveness (Fritz and Purvis, 2010)
DNNS: distance of the invader to its nearest native species
MDNS: mean distance of the invader relative to native species
MNND: distance from each nonnative taxon to its nearest native relative
MNND*: mean nearest neighbor distance (Webb *et al.*, 2002)
MNNPD: mean phylogenetic distance for each taxa to nearest native
MNTD: mean nearest taxon distance
MPD: mean phylogenetic distance of each taxa to the native community
MPD_{ab}: abundance-weighted MPD
MPD*: mean pairwise distance (Webb *et al.*, 2002)
NRI: net relatedness index (difference between the observed and expected MPD)
NTI: nearest taxon index (difference between the observed and expected MNNPD)
PD: phylogenetic diversity (Faith, 1992)
PNND: phylogenetic nearest neighbor distance
* Calculated for status groups separately
** At different divergence time intervals (SPACoDi)
† Residuals regressed against total plot richness
‡ Standardized by the maximum distance for all compared taxa

Functional Distinctiveness Acronyms :

+ : over-dispersion (DNH)
- : clustering
ns : not significant
AET: absolute ecological trait values
DNNTV: difference in trait values between an introduced and its nearest native relative
MNNFD: mean functional distance to the nearest native relative for each taxa
MFD: mean functional distance between each taxa and all native species it co-occurs with

Table a.9.3: Table with the number of native and invasive species retrieved for each gene region, the final sequence length of each gene region, and per cent of each gene partition in the final concatenated nucleotide matrix post cleaning.

	atpB	*rbcL*	*matK*	*trnTLF*	ITS	TOTAL
Total native tips	41	114	119	128	176	226
Total invasive tips	21	133	134	108	125	140
Total tips	62	247	253	236	301	366
Final sequence length	1451	1311	1456	881	646	5745
Matrix coverage	0.17%	0.67%	0.69%	0.64%	0.82%	0.60%

Table a.9.4: Table summarizing the number of species with data for each trait, and the mean, median, minimum, and maximum trait measurements for each trait.

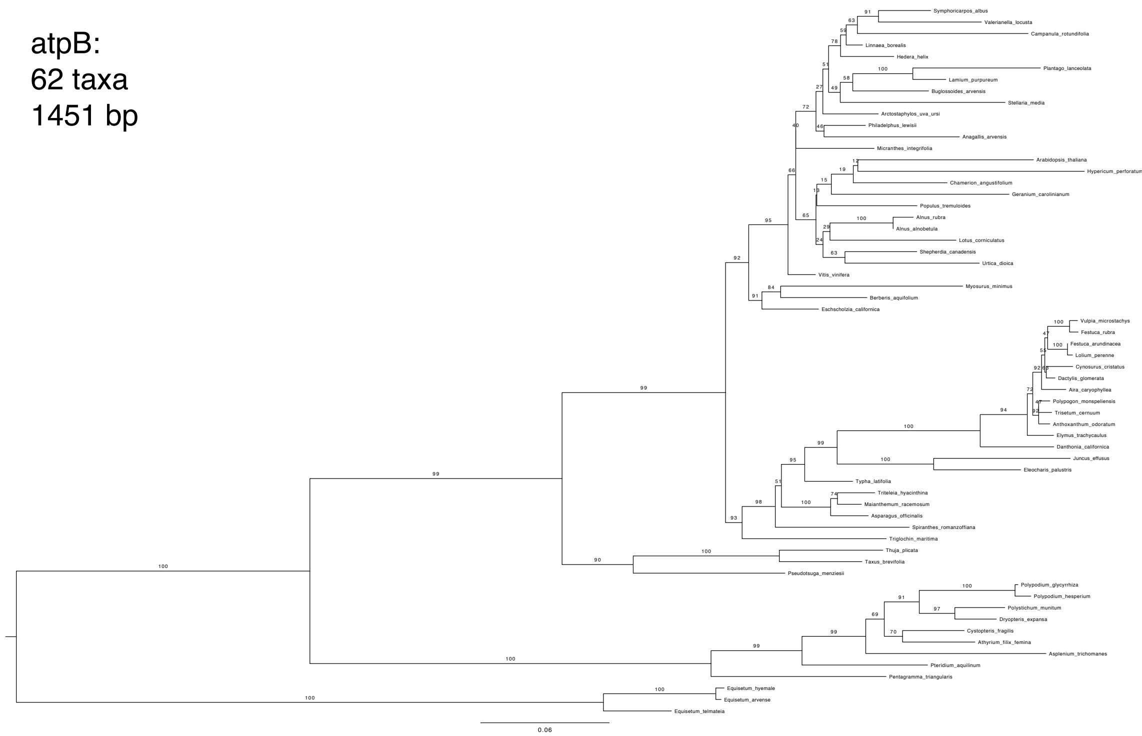
	Seed Mass (mg)	Maximum Height (m)	SLA (cm^2/g)	Leaf Size (cm^2)	Leaf Nitrogen (%)
Total species with trait	322 (87%)	307 (83 %)	200 (55%)	190 (52%)	110 (36%)
Mean (tot)	21.78	2.78	232.87	25.49	2.37
Median (tot)	1.05	0.69	225.55	6.79	2.14
Min (tot)	0.0004	0.04	29.62	0.07	0.68
Max (tot)	4273.64	68.57	635.30	677.30	5.99
Total natives with trait	187.00	190.00	80.00	75.00	54.00
Mean (nat)	31.57	3.71	196.92	34.60	2.05
Median (nat)	1.20	0.80	180.10	7.87	1.93
Min (nat)	0.0004	0.10	29.62	0.07	0.68
Max (nat)	4273.64	68.57	635.30	677.30	5.99
Total invasives with trait	135.00	117.00	120.00	115.00	56.00
Mean (inv)	8.21	1.27	256.84	19.56	2.69
Median (inv)	0.90	0.55	260.61	6.17	2.53
Min (inv)	0.0026	0.04	62.06	0.08	1.34
Max (inv)	178.55	15.39	602.33	320.68	5.13

TABLE A.9.5: Results of Abouheif's test (function abouheif.moran in the R-based package 'adephylo) for the five traits: seed mass (mg), maximum height (m), specific leaf area (SLA, cm^2/g), leaf size (cm), and lead nitrogen content (%). We found a phylogenetic signal for all traits except for leaf size.

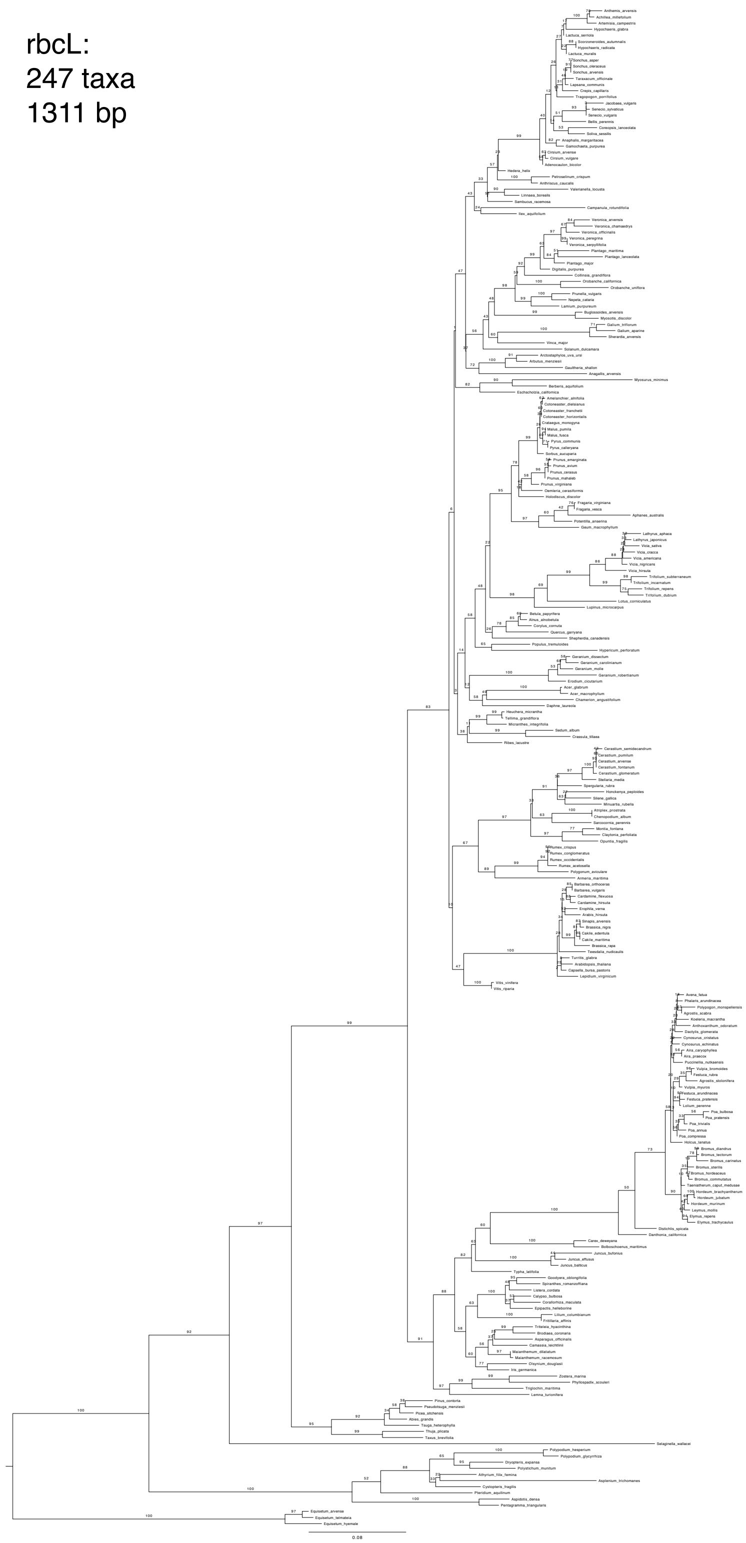
Trait	Observed	Std. Observed	P value
Seed Mass (mg)	0.450	11.60	0.001
Maximum Height (m)	0.191	4.855	0.001
SLA (cm^2/g)	0.328	6.649	0.001
Leaf Size (cm)	0.082	1.678	0.054
Leaf Nitrogen (%)	0.293	4.688	0.001

A.10 MAXIMUM LIKELIHOOD PHYLOGRAM FOR EACH GENE TREE

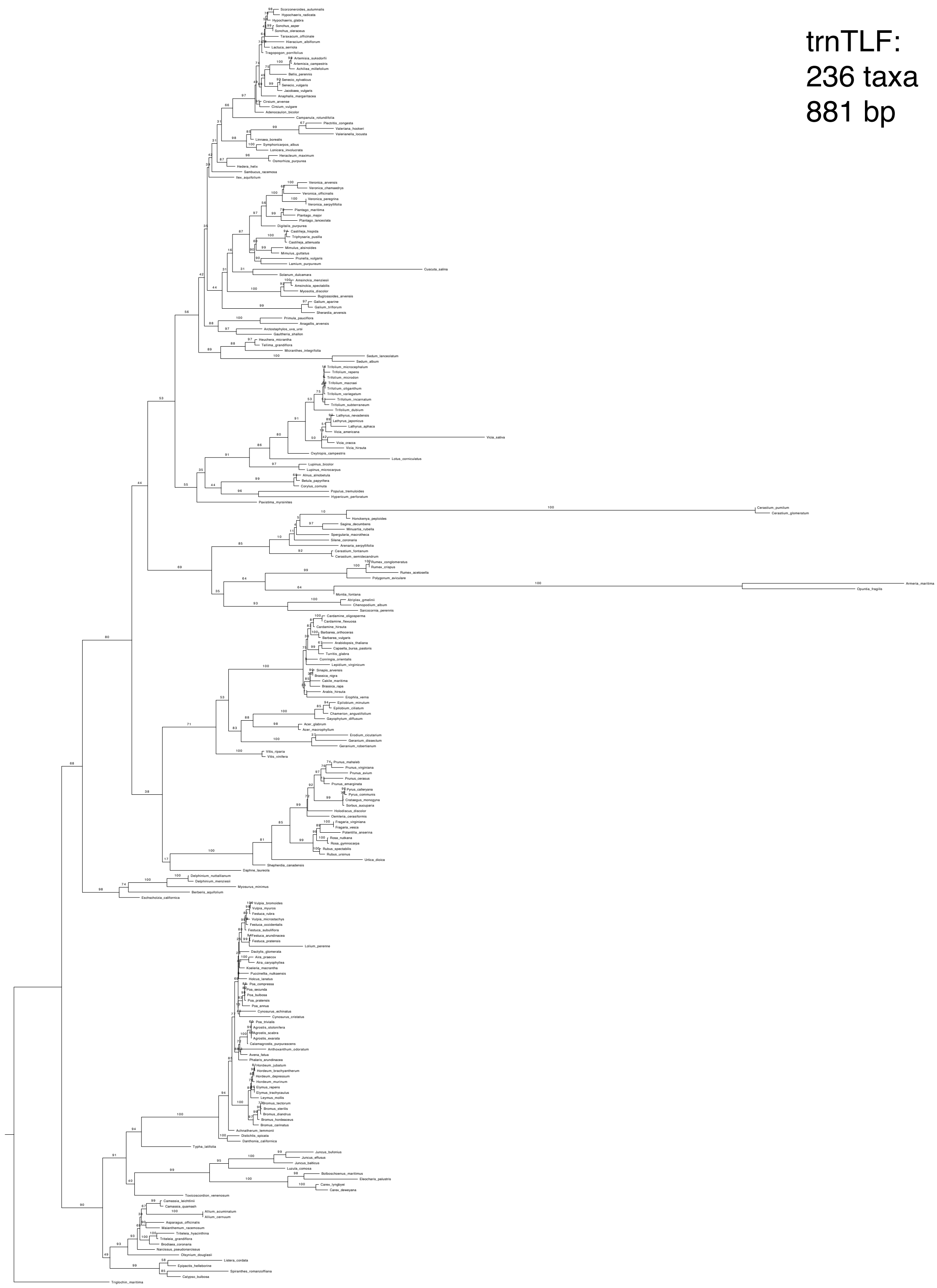
atpB:
62 taxa
1451 bp



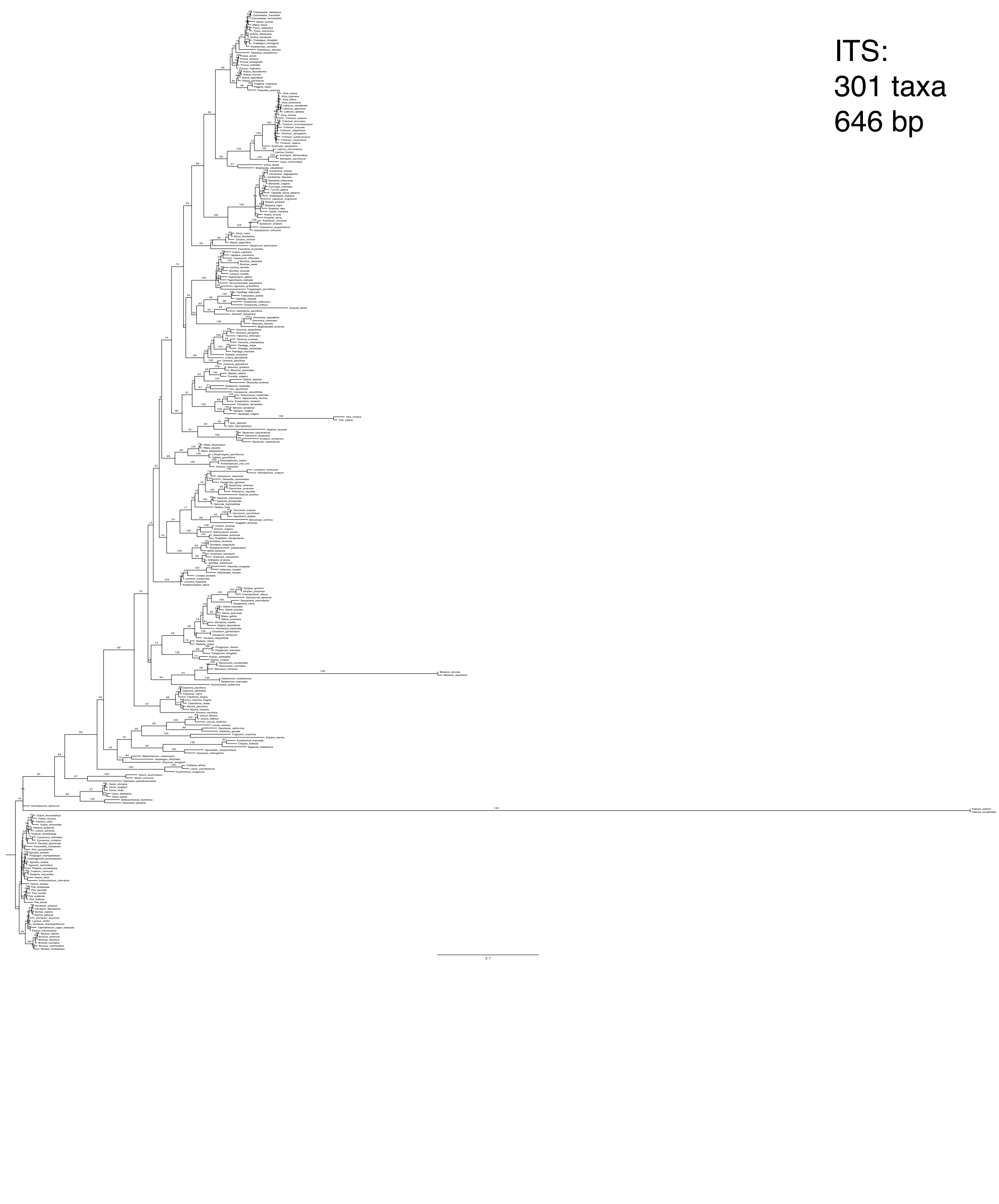
rbcL:
247 taxa
1311 bp



matK:
253 taxa
1456 bp



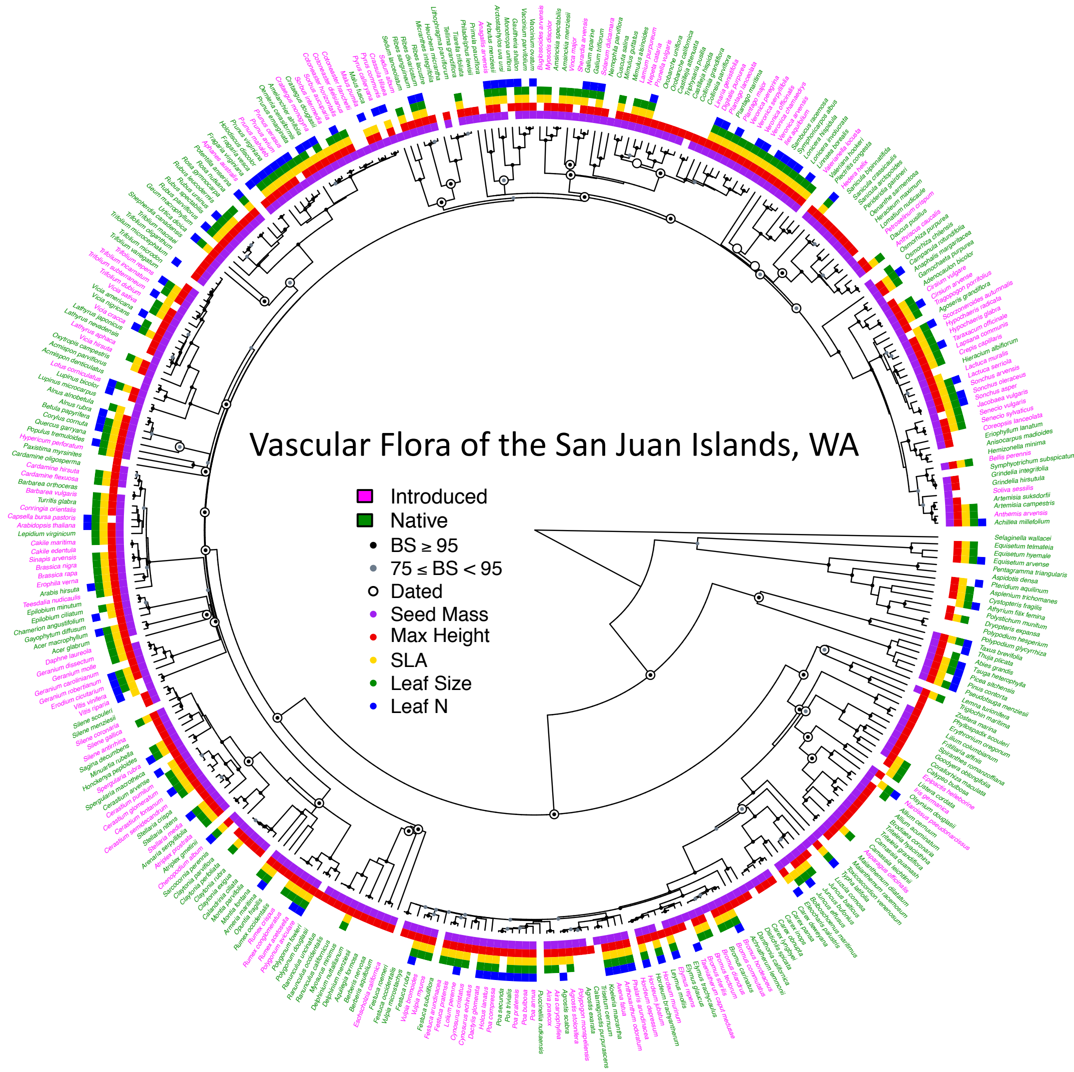
trnTLF:
236 taxa
881 bp



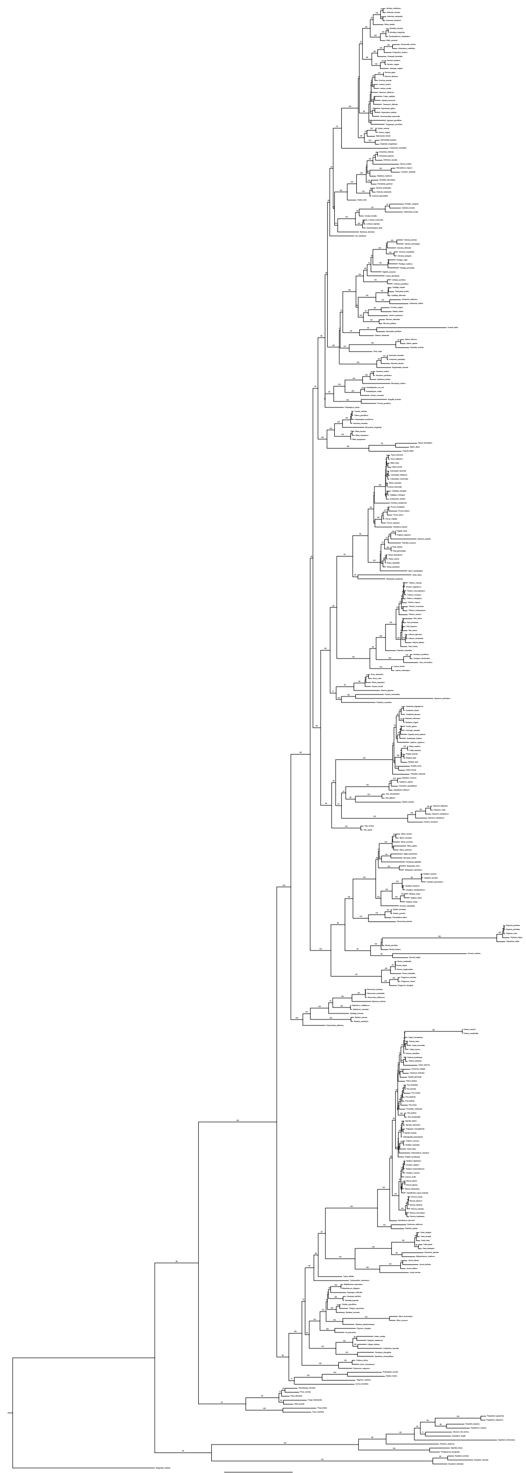
ITS:
301 taxa
646 bp

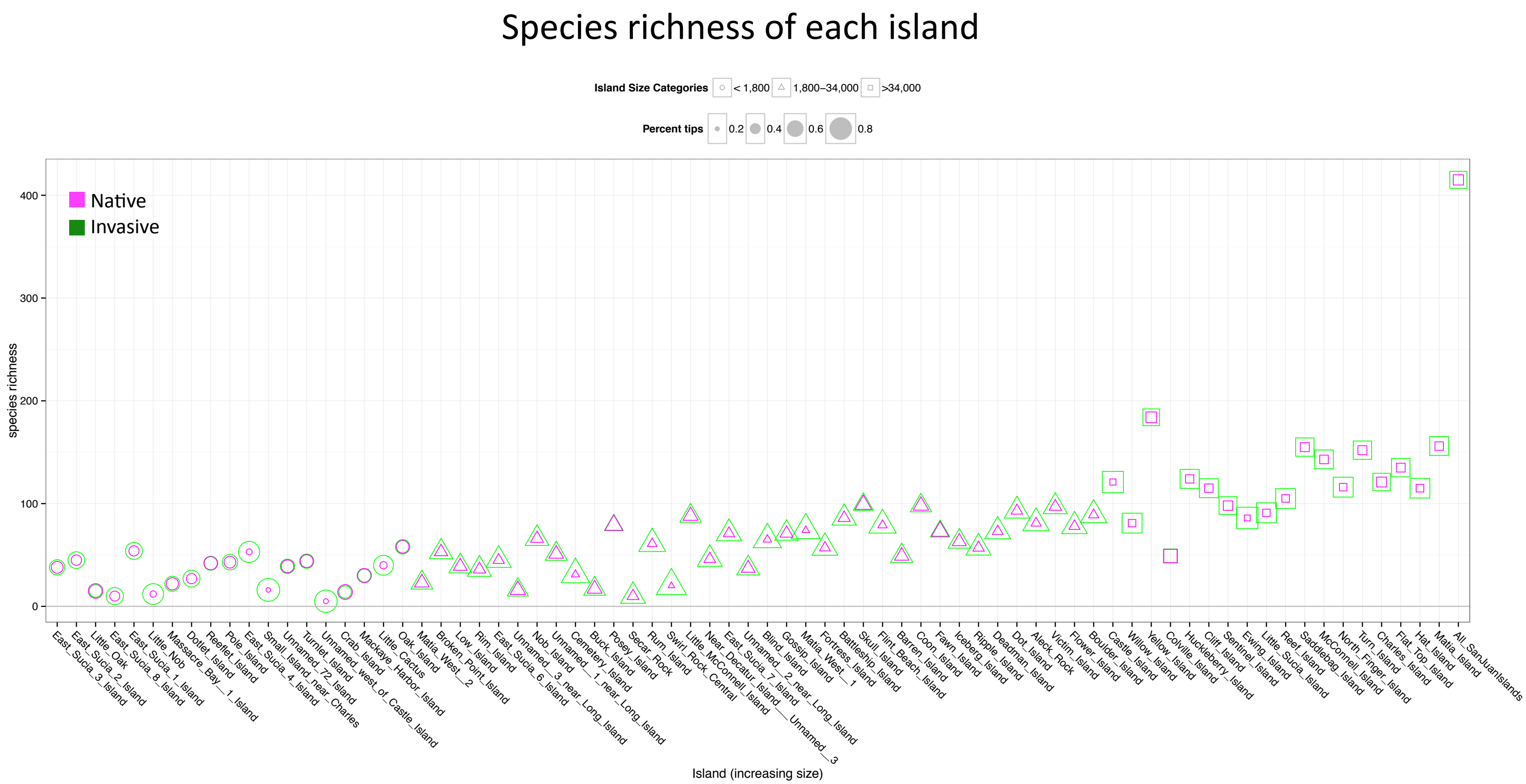
A.11 MAXIMUM LIKELIHOOD MEGA-PHYLOGENY OF THE VASCULAR FLORA OF THE SAN JUAN ISLANDS

Maximum likelihood mega-phylogeny of the vascular flora of the San Juan Islands, with species names labelled. Nodes and tips as in Fig. 2.2.

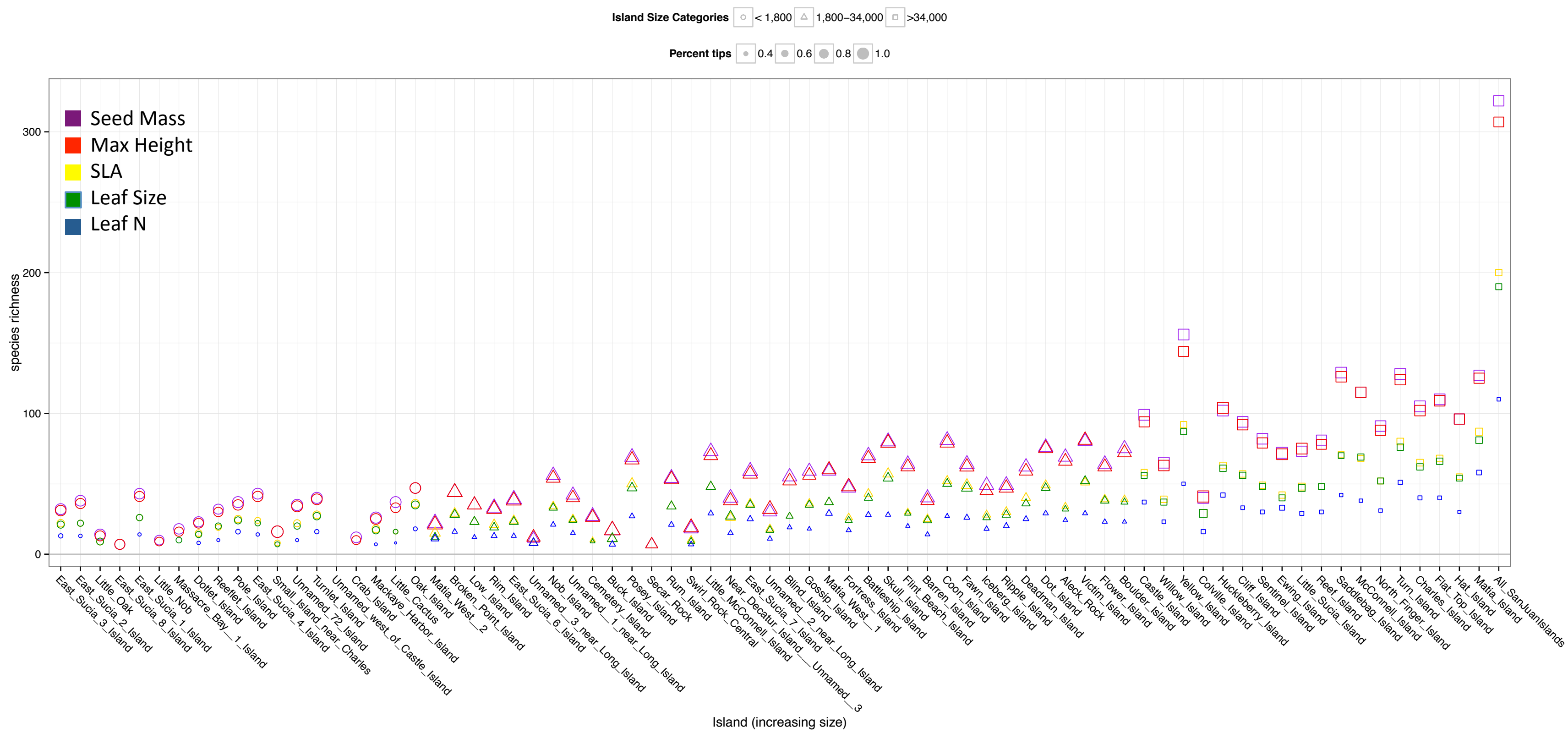


A.12 MAXIMUM LIKELIHOOD PHYLOGRAM FOR THE CONCATENATED DATASET



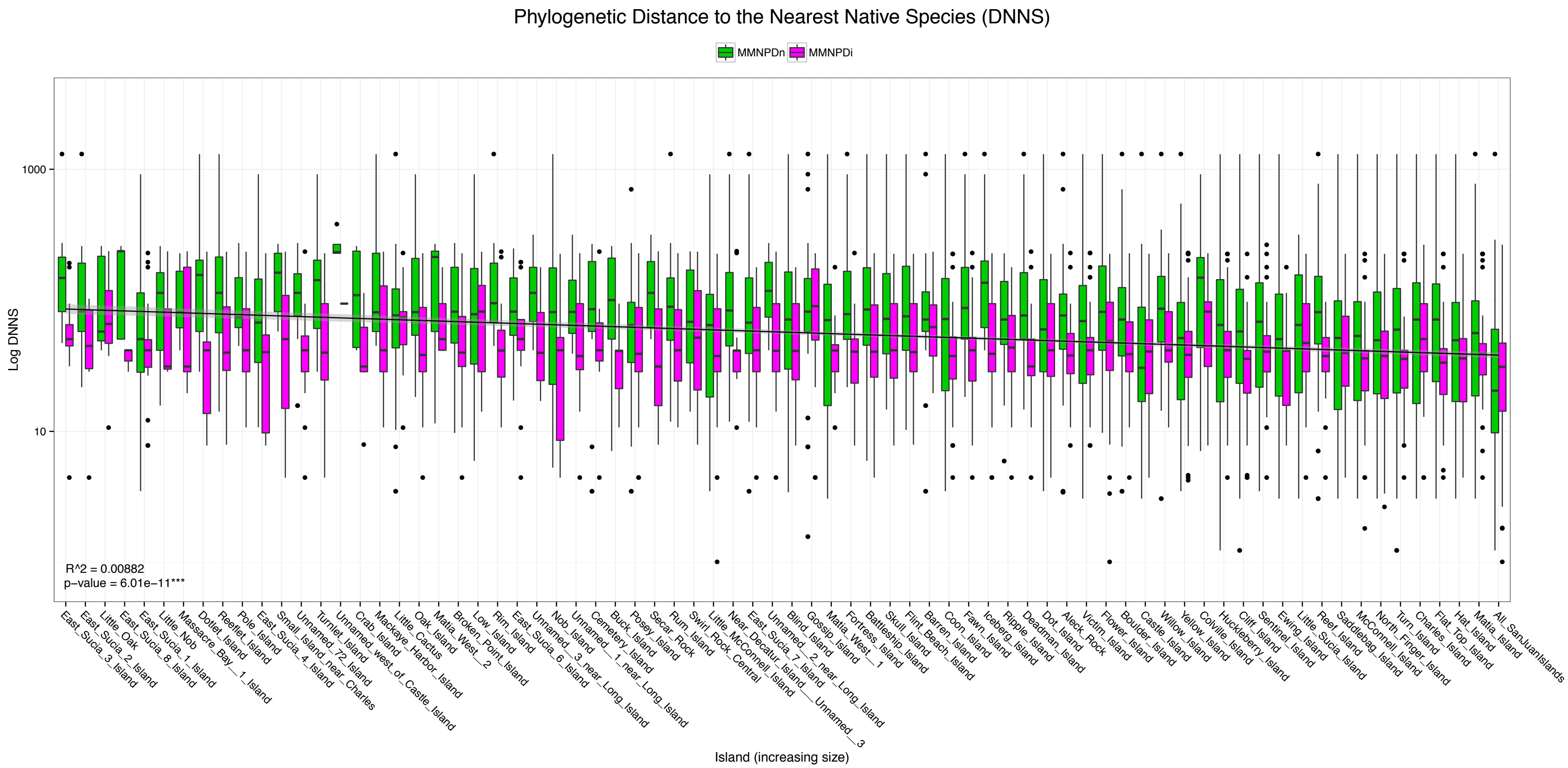

Species richness of each island
Island Size Categories
< 1,800
1,800–34,000
>34,000
Percent tips
0.2
0.4
0.6
0.8
Native
Invasive
species richness
0
100
200
300
400
Island (increasing size)
East_Sucia_3_Island
East_Sucia_2_Island
Little_Oak
East_Sucia_8_Island
East_Sucia_1_Island
Little_Nob
Massacre_Bay__1_Island
Dotlet_Island
Reeflet_Island
Pole_Island
East_Sucia_4_Island
Small_Island_near_Charles
Unnamed_72_Island
Turnlet_Island
Unnamed_west_of_Castle_Island
Crab_Island
Mackaye_Harbor_Island
Little_Cactus
Oak_Island
Matia_West__2
Broken_Point_Island
Low_Island
Rim_Island
East_Sucia_6_Island
Unnamed__3_near_Long_Island
Nob_Island
Unnamed__1_near_Long_Island
Cemetery_Island
Buck_Island
Posey_Island
Secar_Rock
Rum_Island
Swirl_Rock_Central
Little_McConnell_Island
Near_Decatur_Island___Unnamed__3
East_Sucia_7_Island
Unnamed__2_near_Long_Island
Blind_Island
Gossip_Island
Matia_West__1
Fortress_Island
Battleship_Island
Skull_Island
Flint_Beach_Island
Barren_Island
Coon_Island
Fawn_Island
Iceberg_Island
Ripple_Island
Deadman_Island
Dot_Island
Aleck_Rock
Victim_Island
Flower_Island
Boulder_Island
Castle_Island
Willow_Island
Yellow_Island
Colville_Island
Huckleberry_Island
Cliff_Island
Sentinel_Island
Ewing_Island
Little_Sucia_Island
Reef_Island
Saddlebag_Island
McConnell_Island
North_Finger_Island
Turn_Island
Charles_Island
Flat_Top_Island
Hat_Island
Matia_Island
All_SanJuanIslands

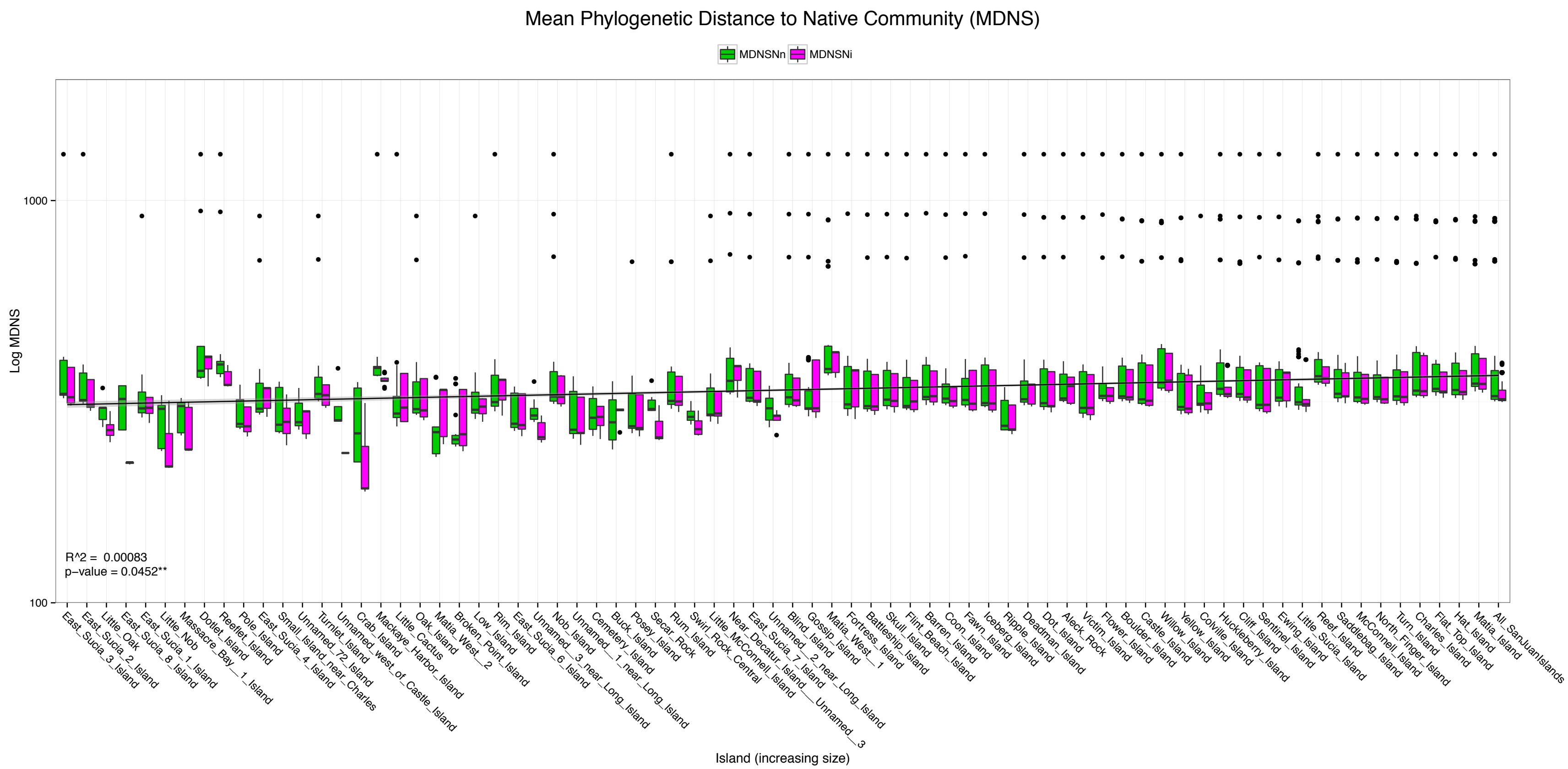
Percent of species with trait data on each island



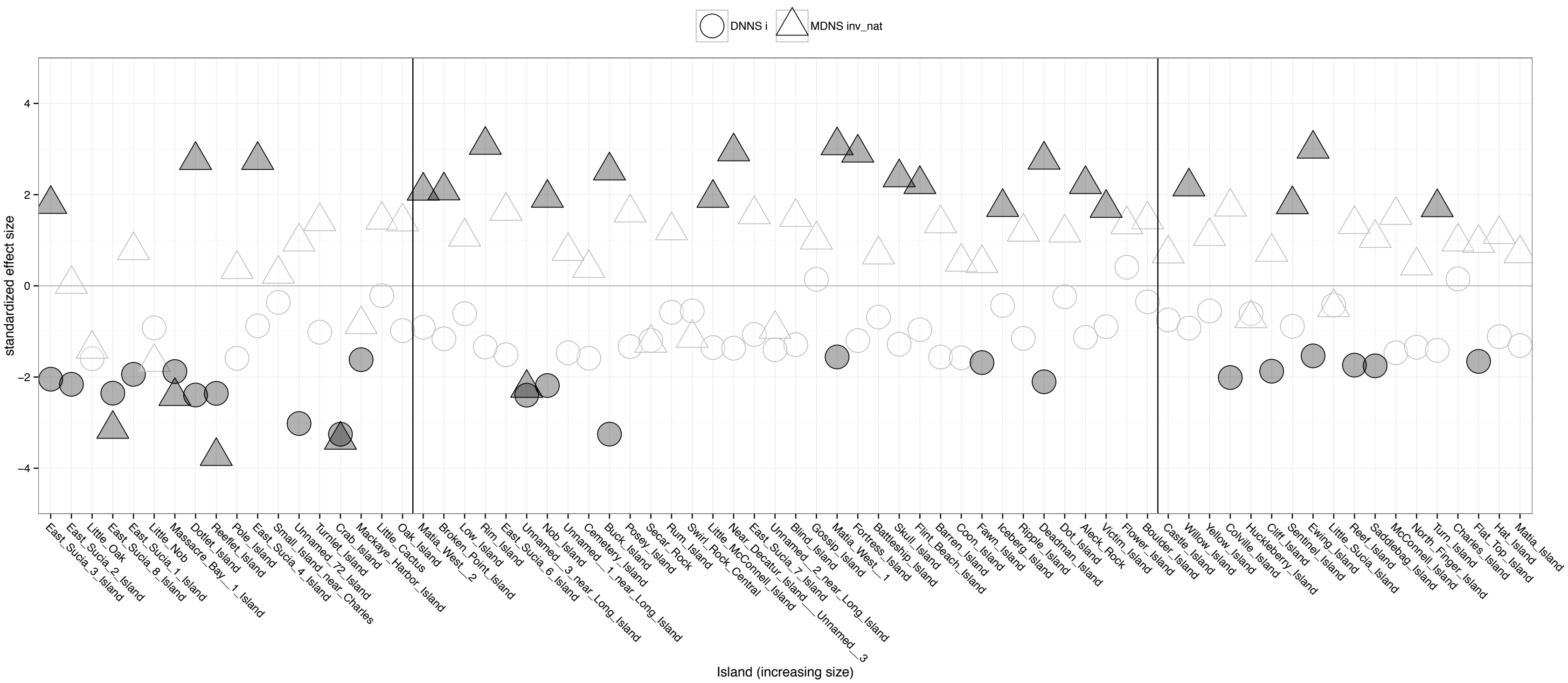
A.14 PLOTS OF PHYLOGENETIC DIVERSITY MEASURES

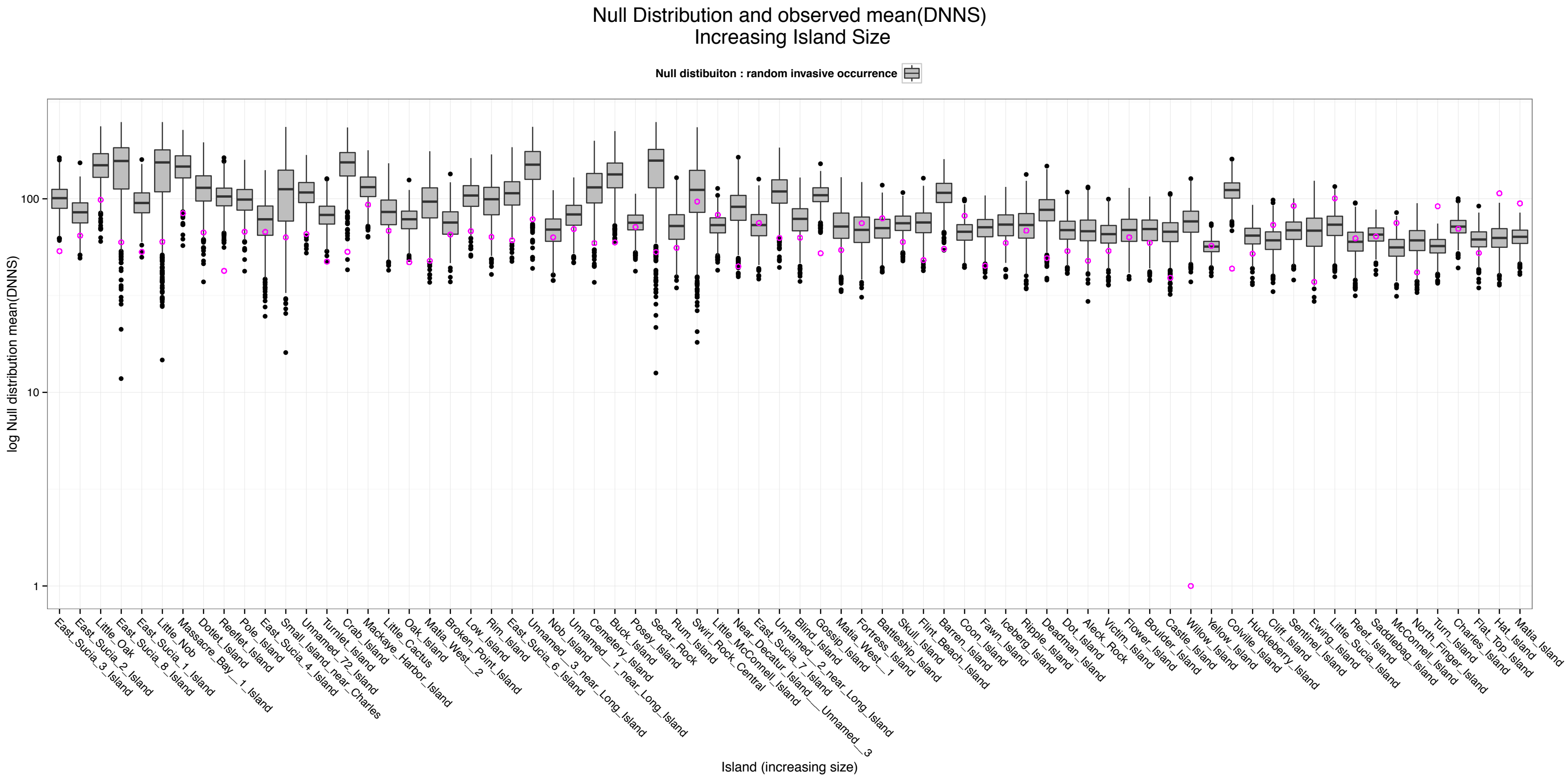
Plots of phylogenetic diversity measures (DNNS, MDNS, SES_{DNNS}, SES_{MDNS}) for native and invasive plant species across all islands.

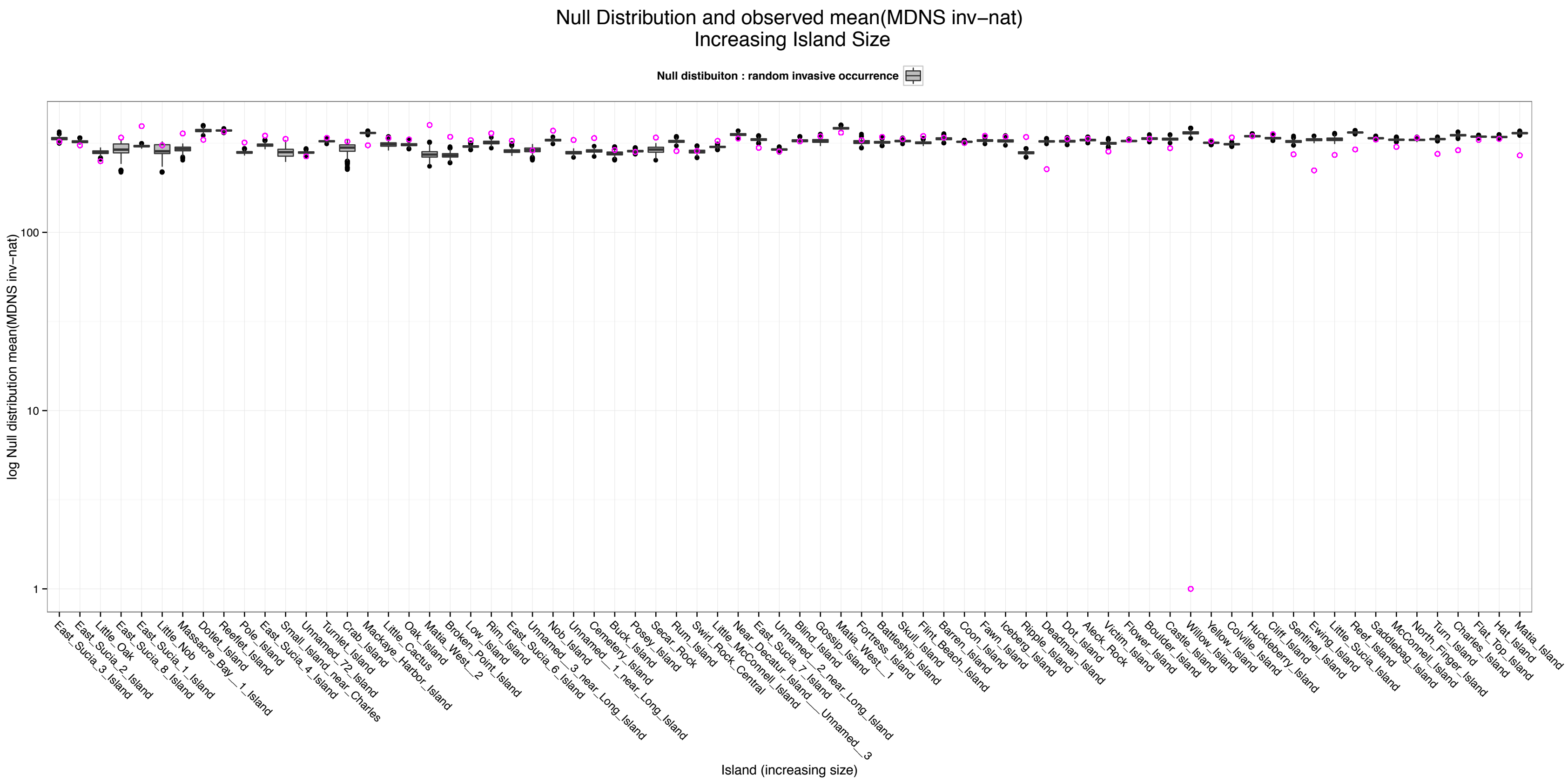



Mean Phylogenetic Distance to Native Community (MDNS)
MDNSNn
MDNSNi
Log MDNS
1000
100
R^2 = 0.00083
p−value = 0.0452**
East_Sucia_3_Island
East_Sucia_2_Island
Little_Oak
East_Sucia_8_Island
East_Sucia_1_Island
Little_Nob
Massacre_Bay__1_Island
Dotlet_Island
Reeflet_Island
Pole_Island
East_Sucia_4_Island
Small_Island_near_Charles
Unnamed_72_Island
Turnlet_Island
Unnamed_west_of_Castle_Island
Crab_Island
Mackaye_Harbor_Island
Little_Cactus
Oak_Island
Matia_West__2
Broken_Point_Island
Low_Island
Rim_Island
East_Sucia_6_Island
Unnamed__3_near_Long_Island
Nob_Island
Unnamed__1_near_Long_Island
Cemetery_Island
Buck_Island
Posey_Island
Secar_Rock
Rum_Island
Swirl_Rock_Central
Little_McConnell_Island
Near_Decatur_Island___Unnamed__3
East_Sucia_7_Island
Unnamed__2_near_Long_Island
Blind_Island
Gossip_Island
Matia_West__1
Fortress_Island
Battleship_Island
Skull_Island
Flint_Beach_Island
Barren_Island
Coon_Island
Fawn_Island
Iceberg_Island
Ripple_Island
Deadman_Island
Dot_Island
Aleck_Rock
Victim_Island
Flower_Island
Boulder_Island
Castle_Island
Willow_Island
Yellow_Island
Colville_Island
Huckleberry_Island
Cliff_Island
Sentinel_Island
Ewing_Island
Little_Sucia_Island
Reef_Island
Saddlebag_Island
McConnell_Island
North_Finger_Island
Turn_Island
Charles_Island
Flat_Top_Island
Hat_Island
Matia_Island
All_SanJuanIslands
Island (increasing size)

Significane of Phylogenetic Distances for
invasive species to nearest native (DNNS),
and native community (MDNS)



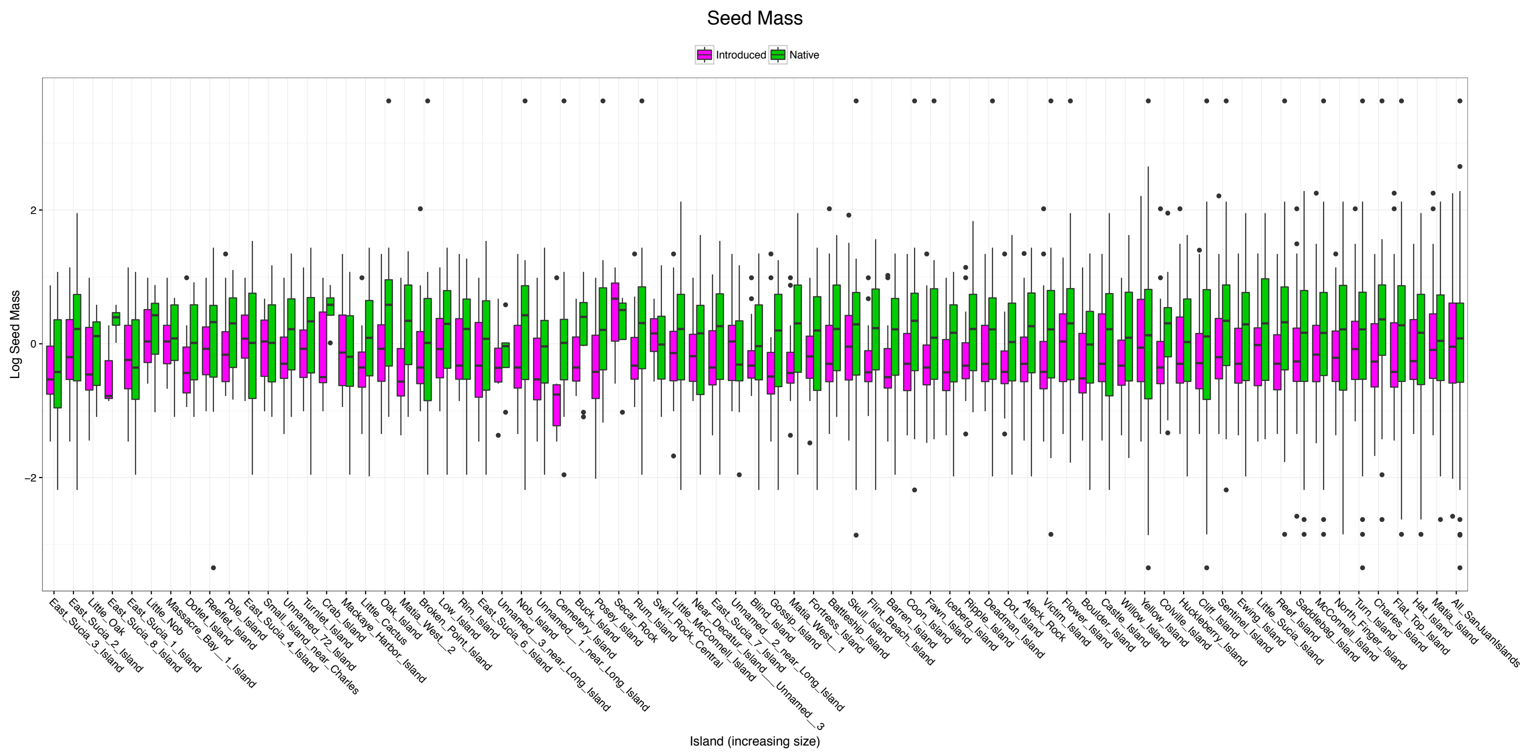

Null Distribution and observed mean(DNNS)
Increasing Island Size
Null distibuiton : random invasive occurrence
log Null distribution mean(DNNS)
100
10
1
Island (increasing size)
East_Sucia_3_Island
East_Sucia_2_Island
Little_Oak
East_Sucia_8_Island
East_Sucia_1_Island
Little_Nob
Massacre_Bay__1_Island
Dotlet_Island
Reeflet_Island
Pole_Island
East_Sucia_4_Island
Small_Island_near_Charles
Unnamed_72_Island
Turnlet_Island
Crab_Island
Mackaye_Harbor_Island
Little_Cactus
Oak_Island
Matia_West__2
Broken_Point_Island
Low_Island
Rim_Island
East_Sucia_6_Island
Unnamed__3_near_Long_Island
Nob_Island
Unnamed__1_near_Long_Island
Cemetery_Island
Buck_Island
Posey_Island
Secar_Rock
Rum_Island
Swirl_Rock_Central
Little_McConnell_Island
Near_Decatur_Island__Unnamed__3
East_Sucia_7_Island
Unnamed__2_near_Long_Island
Blind_Island
Gossip_Island
Matia_West__1
Fortress_Island
Battleship_Island
Skull_Island
Flint_Beach_Island
Barren_Island
Coon_Island
Fawn_Island
Iceberg_Island
Ripple_Island
Deadman_Island
Dot_Island
Aleck_Rock
Victim_Island
Flower_Island
Boulder_Island
Castle_Island
Willow_Island
Yellow_Island
Colville_Island
Huckleberry_Island
Cliff_Island
Sentinel_Island
Ewing_Island
Little_Sucia_Island
Reef_Island
Saddlebag_Island
McConnell_Island
North_Finger_Island
Turn_Island
Charles_Island
Flat_Top_Island
Hat_Island
Matia_Island

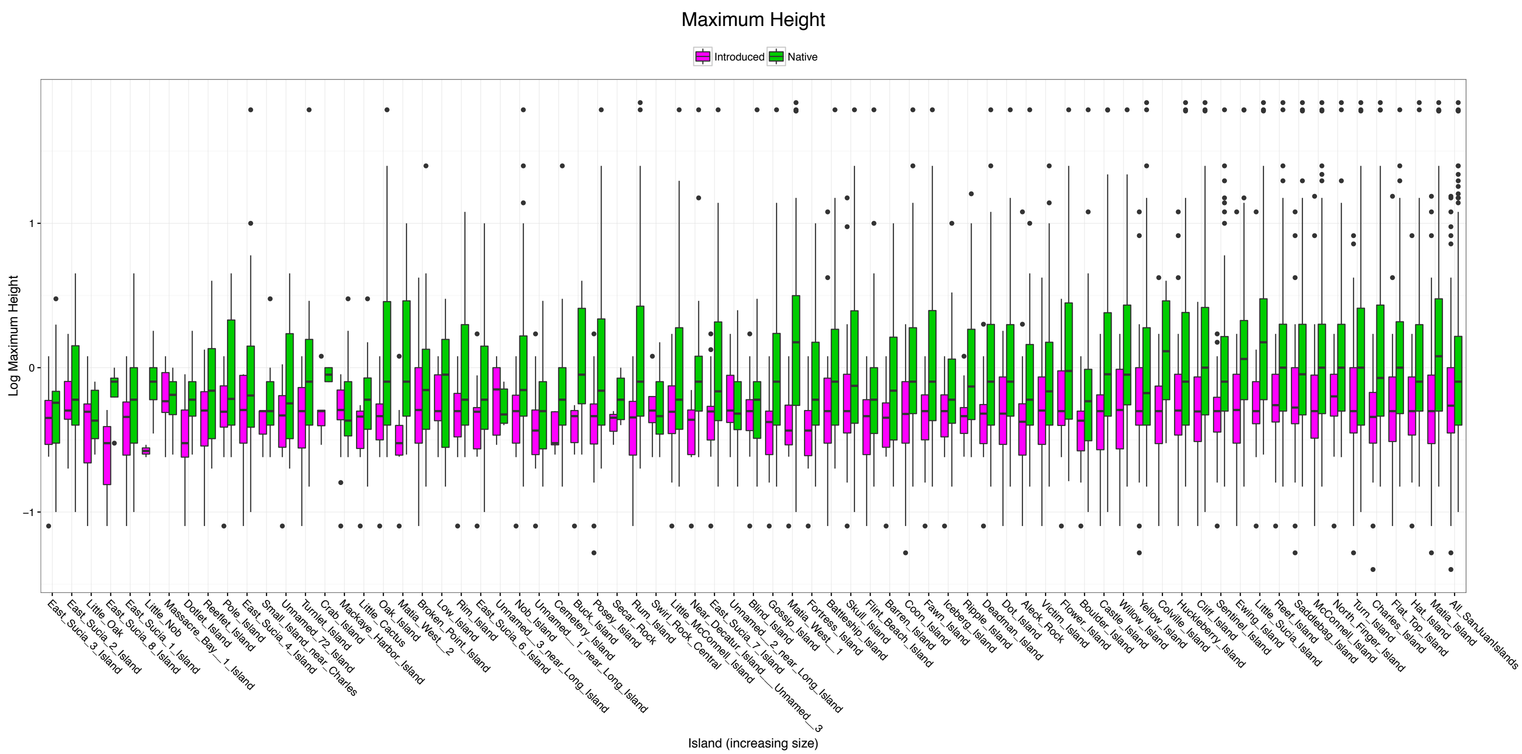


Null Distribution and observed mean(MDNS inv−nat)
Increasing Island Size
Null distibuiton : random invasive occurrence
log Null distribution mean(MDNS inv−nat)
100
10
1
East_Sucia_3_Island
East_Sucia_2_Island
Little_Oak
East_Sucia_8_Island
East_Sucia_1_Island
Little_Nob
Massacre_Bay__1_Island
Dotlet_Island
Reeflet_Island
Pole_Island
East_Sucia_4_Island
Small_Island_near_Charles
Unnamed_72_Island
Turnlet_Island
Crab_Island
Mackaye_Harbor_Island
Little_Cactus
Oak_Island
Matia_West__2
Broken_Point_Island
Low_Island
Rim_Island
East_Sucia_6_Island
Unnamed__3_near_Long_Island
Nob_Island
Unnamed__1_near_Long_Island
Cemetery_Island
Buck_Island
Posey_Island
Secar_Rock
Rum_Island
Swirl_Rock_Central
Little_McConnell_Island
Near_Decatur_Island___Unnamed__3
East_Sucia_7_Island
Unnamed__2_near_Long_Island
Blind_Island
Gossip_Island
Matia_West__1
Fortress_Island
Battleship_Island
Skull_Island
Flint_Beach_Island
Barren_Island
Coon_Island
Fawn_Island
Iceberg_Island
Ripple_Island
Deadman_Island
Dot_Island
Aleck_Rock
Victim_Island
Flower_Island
Boulder_Island
Castle_Island
Willow_Island
Yellow_Island
Colville_Island
Huckleberry_Island
Cliff_Island
Sentinel_Island
Ewing_Island
Little_Sucia_Island
Reef_Island
Saddlebag_Island
McConnell_Island
North_Finger_Island
Turn_Island
Charles_Island
Flat_Top_Island
Hat_Island
Matia_Island
Island (increasing size)

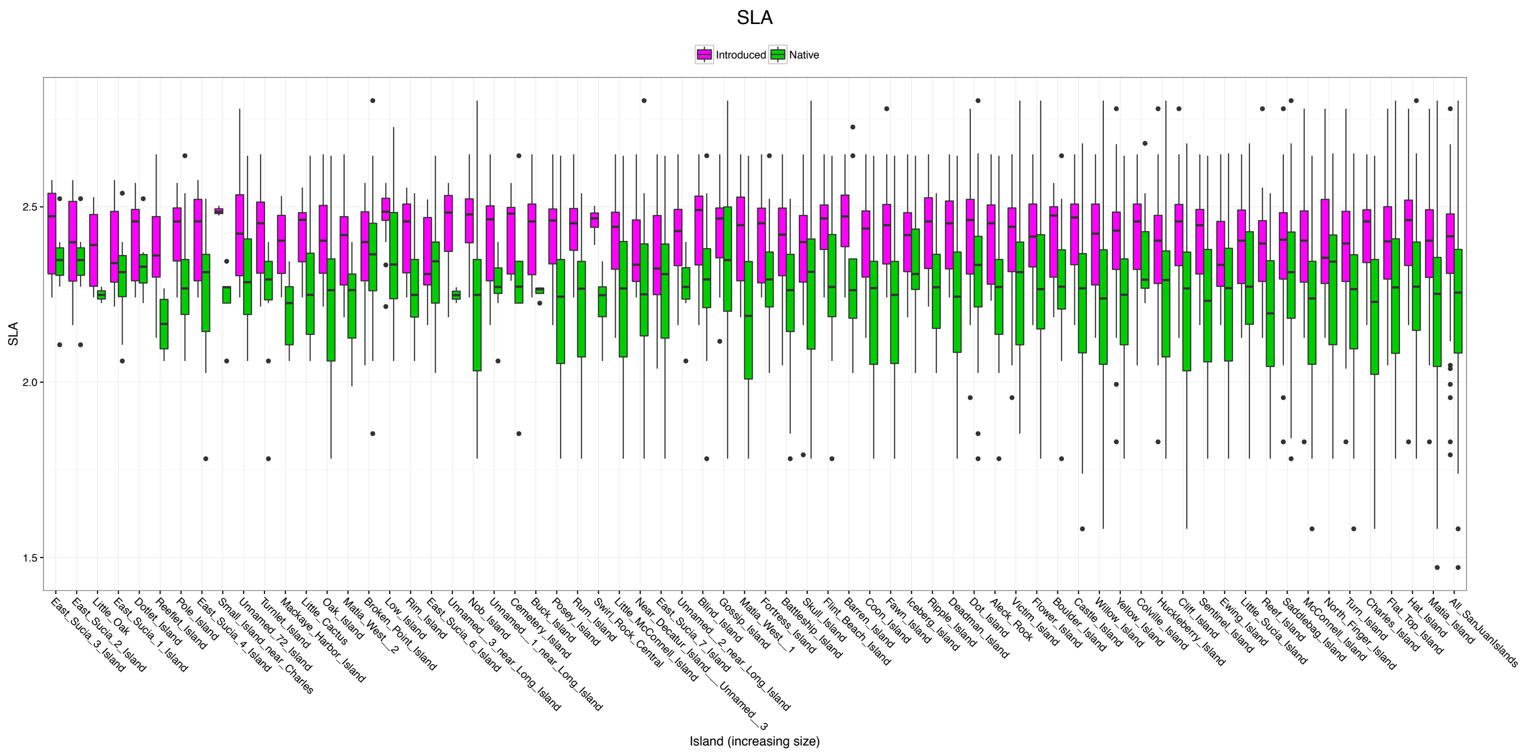
A.15 PLOTS OF FUNCTIONAL DIVERSITY MEASURES

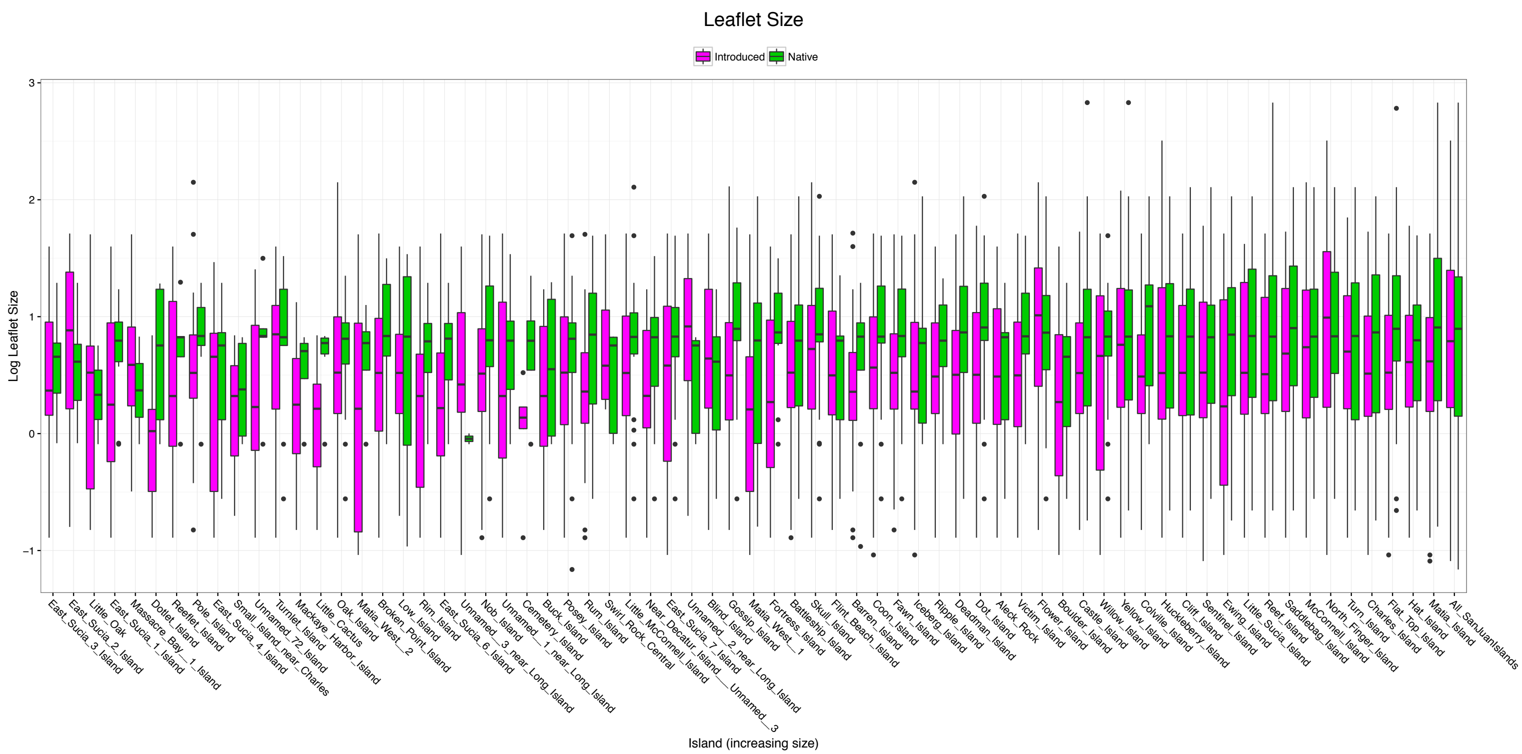
Plots of functional diversity measures (trait measurements, NNFD, MFD, SES_{NNFD}, SES_{MFD}) for native and invasive plant species across all islands.



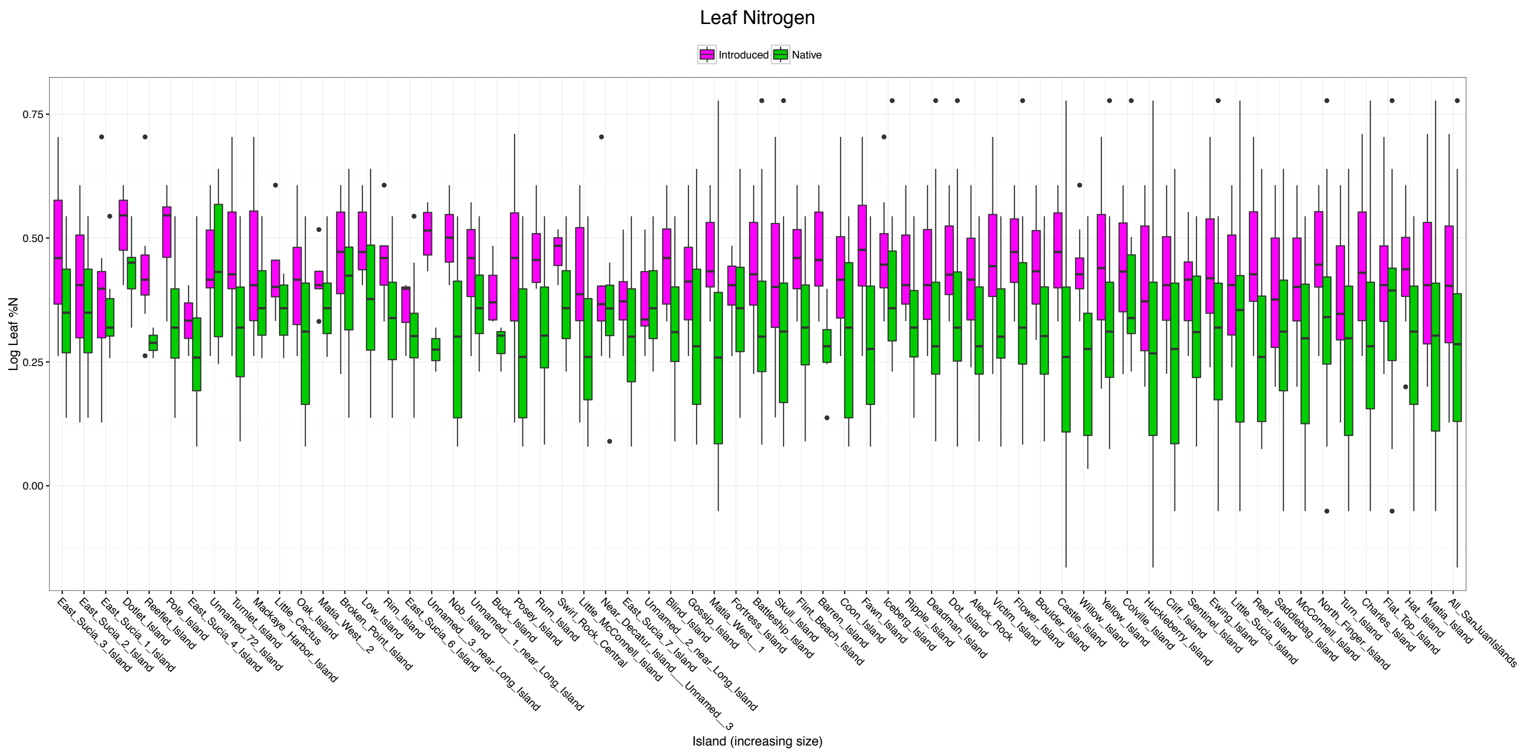


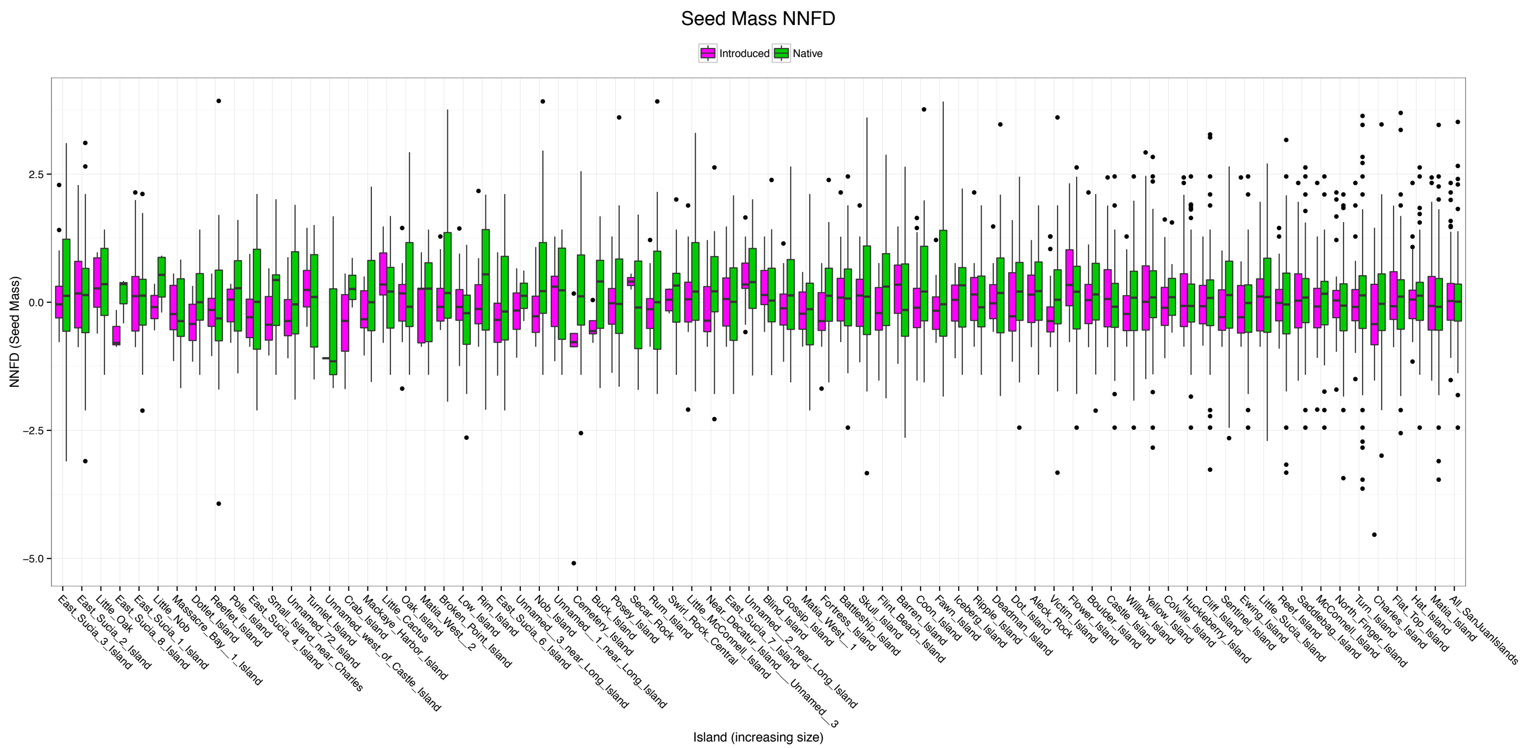
Maximum Height
Introduced
Native
Log Maximum Height
1
0
−1
East_Sucia_3_Island
East_Sucia_2_Island
Little_Oak
East_Sucia_8_Island
East_Sucia_1_Island
Little_Nob
Massacre_Bay__1_Island
Dotlet_Island
Reeflet_Island
Pole_Island
East_Sucia_4_Island
Small_Island_near_Charles
Unnamed_72_Island
Turnlet_Island
Crab_Island
Mackaye_Harbor_Island
Little_Cactus
Oak_Island
Matia_West__2
Broken_Point_Island
Low_Island
Rim_Island
East_Sucia_6_Island
Unnamed__3_near_Long_Island
Nob_Island
Unnamed__1_near_Long_Island
Cemetery_Island
Buck_Island
Posey_Island
Secar_Rock
Rum_Island
Swirl_Rock_Central
Little_McConnell_Island
Near_Decatur_Island___Unnamed__3
East_Sucia_7_Island
Unnamed__2_near_Long_Island
Blind_Island
Gossip_Island
Matia_West__1
Fortress_Island
Battleship_Island
Skull_Island
Flint_Beach_Island
Barren_Island
Coon_Island
Fawn_Island
Iceberg_Island
Ripple_Island
Deadman_Island
Dot_Island
Aleck_Rock
Victim_Island
Flower_Island
Boulder_Island
Castle_Island
Willow_Island
Yellow_Island
Colville_Island
Huckleberry_Island
Cliff_Island
Sentinel_Island
Ewing_Island
Little_Sucia_Island
Reef_Island
Saddlebag_Island
McConnell_Island
North_Finger_Island
Turn_Island
Charles_Island
Flat_Top_Island
Hat_Island
Matia_Island
All_SanJuanIslands
Island (increasing size)

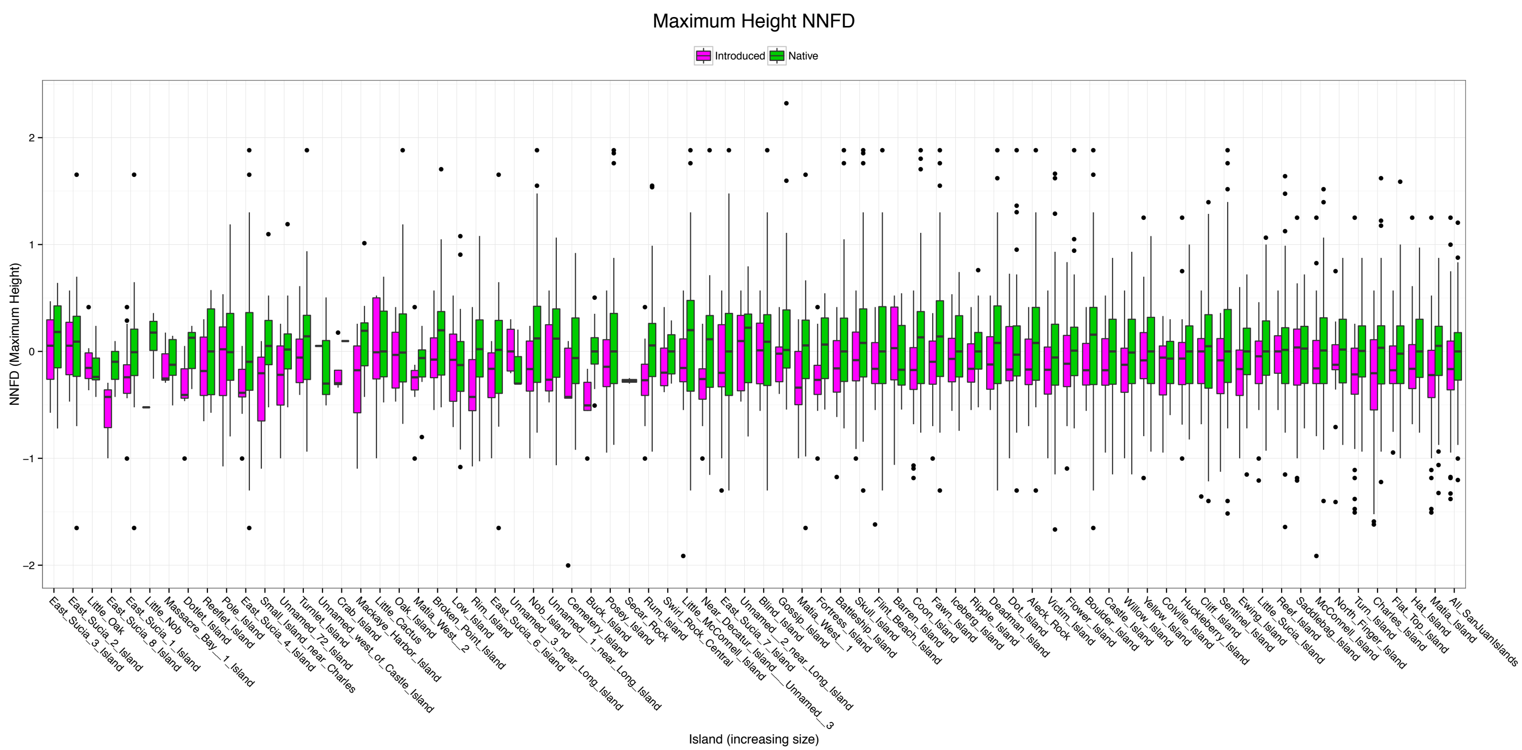

SLA
Introduced
Native
SLA
2.5
2.0
1.5
East_Sucia_3_Island
East_Sucia_2_Island
Little_Oak
East_Sucia_1_Island
Dotlet_Island
Reeflet_Island
Pole_Island
East_Sucia_4_Island
Small_Island_near_Charles
Unnamed_72_Island
Turnlet_Island
Mackaye_Harbor_Island
Little_Cactus
Oak_Island
Matia_West__2
Broken_Point_Island
Low_Island
Rim_Island
East_Sucia_6_Island
Unnamed__3_near_Long_Island
Nob_Island
Unnamed__1_near_Long_Island
Cemetery_Island
Buck_Island
Posey_Island
Rum_Island
Swirl_Rock_Central
Little_McConnell_Island
Near_Decatur_Island___Unnamed__3
East_Sucia_7_Island
Unnamed__2_near_Long_Island
Blind_Island
Gossip_Island
Matia_West__1
Fortress_Island
Battleship_Island
Skull_Island
Flint_Beach_Island
Barren_Island
Coon_Island
Fawn_Island
Iceberg_Island
Ripple_Island
Deadman_Island
Dot_Island
Aleck_Rock
Victim_Island
Flower_Island
Boulder_Island
Castle_Island
Willow_Island
Yellow_Island
Colville_Island
Huckleberry_Island
Cliff_Island
Sentinel_Island
Ewing_Island
Little_Sucia_Island
Reef_Island
Saddlebag_Island
McConnell_Island
North_Finger_Island
Turn_Island
Charles_Island
Flat_Top_Island
Hat_Island
Matia_Island
All_SanJuanIslands
Island (increasing size)



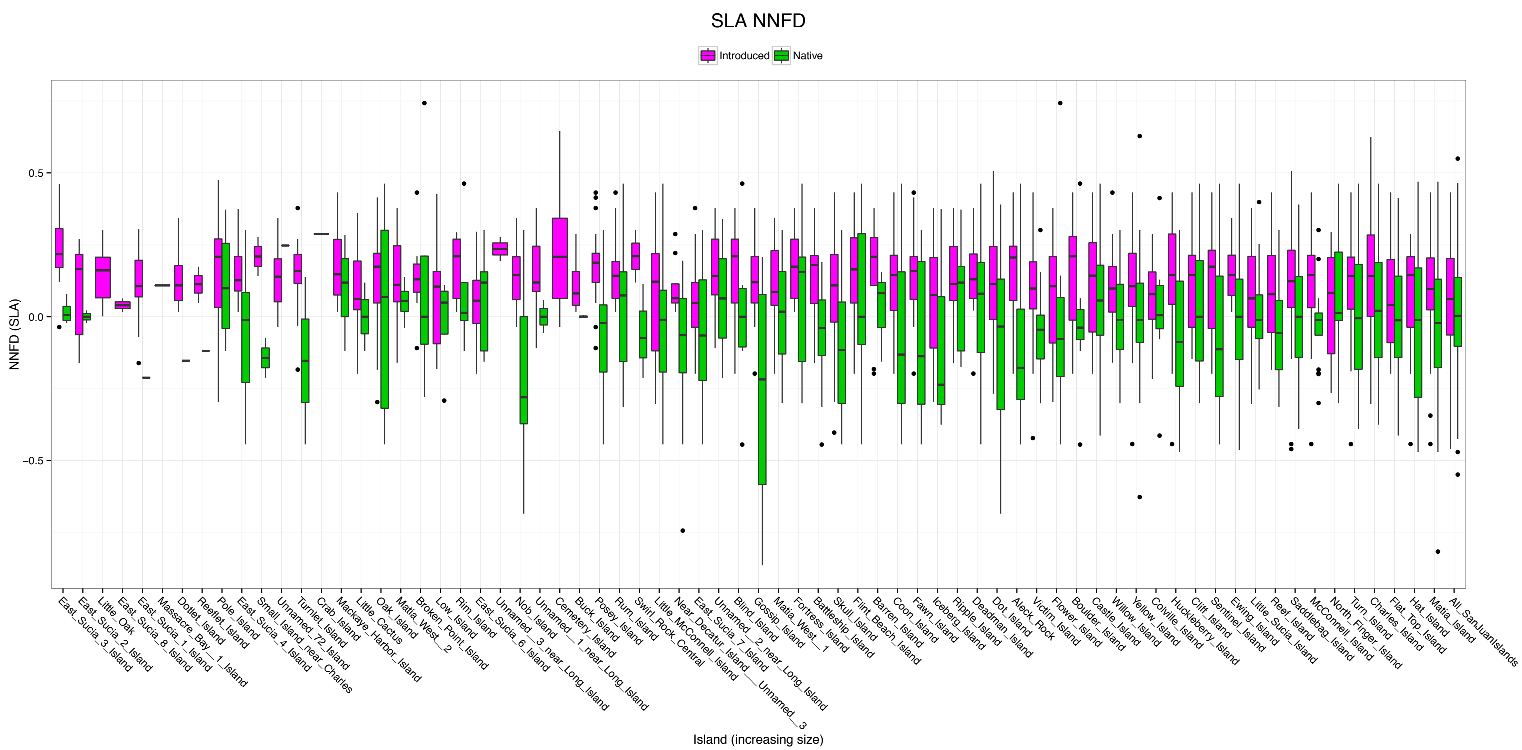
Leaflet Size
Introduced
Native
Log Leaflet Size
3
2
1
0
−1
East_Sucia_3_Island
East_Sucia_2_Island
Little_Oak
East_Sucia_1_Island
Massacre_Bay__1_Island
Dotlet_Island
Reeflet_Island
Pole_Island
East_Sucia_4_Island
Small_Island_near_Charles
Unnamed_72_Island
Turnlet_Island
Mackaye_Harbor_Island
Little_Cactus
Oak_Island
Matia_West__2
Broken_Point_Island
Low_Island
Rim_Island
East_Sucia_6_Island
Unnamed__3_near_Long_Island
Nob_Island
Unnamed__1_near_Long_Island
Cemetery_Island
Buck_Island
Posey_Island
Rum_Island
Swirl_Rock_Central
Little_McConnell_Island
Near_Decatur_Island___Unnamed__3
East_Sucia_7_Island
Unnamed__2_near_Long_Island
Blind_Island
Gossip_Island
Matia_West__1
Fortress_Island
Battleship_Island
Skull_Island
Flint_Beach_Island
Barren_Island
Coon_Island
Fawn_Island
Iceberg_Island
Ripple_Island
Deadman_Island
Dot_Island
Aleck_Rock
Victim_Island
Flower_Island
Boulder_Island
Castle_Island
Willow_Island
Yellow_Island
Colville_Island
Huckleberry_Island
Cliff_Island
Sentinel_Island
Ewing_Island
Little_Sucia_Island
Reef_Island
Saddlebag_Island
McConnell_Island
North_Finger_Island
Turn_Island
Charles_Island
Flat_Top_Island
Hat_Island
Matia_Island
All_SanJuanIslands
Island (increasing size)


Leaf Nitrogen
Introduced
Native
Log Leaf %N
0.75
0.50
0.25
0.00
East_Sucia_3_Island
East_Sucia_2_Island
East_Sucia_1_Island
Dotlet_Island
Reeflet_Island
Pole_Island
East_Sucia_4_Island
Unnamed_72_Island
Turnlet_Island
Mackaye_Harbor_Island
Little_Cactus
Oak_Island
Matia_West__2
Broken_Point_Island
Low_Island
Rim_Island
East_Sucia_6_Island
Unnamed__3_near_Long_Island
Nob_Island
Unnamed__1_near_Long_Island
Buck_Island
Posey_Island
Rum_Island
Swirl_Rock_Central
Little_McConnell_Island
Near_Decatur_Island___Unnamed__3
East_Sucia_7_Island
Unnamed__2_near_Long_Island
Blind_Island
Gossip_Island
Matia_West__1
Fortress_Island
Battleship_Island
Skull_Island
Flint_Beach_Island
Barren_Island
Coon_Island
Fawn_Island
Iceberg_Island
Ripple_Island
Deadman_Island
Dot_Island
Aleck_Rock
Victim_Island
Flower_Island
Boulder_Island
Castle_Island
Willow_Island
Yellow_Island
Colville_Island
Huckleberry_Island
Cliff_Island
Sentinel_Island
Ewing_Island
Little_Sucia_Island
Reef_Island
Saddlebag_Island
McConnell_Island
North_Finger_Island
Turn_Island
Charles_Island
Flat_Top_Island
Hat_Island
Matia_Island
All_SanJuanIslands
Island (increasing size)

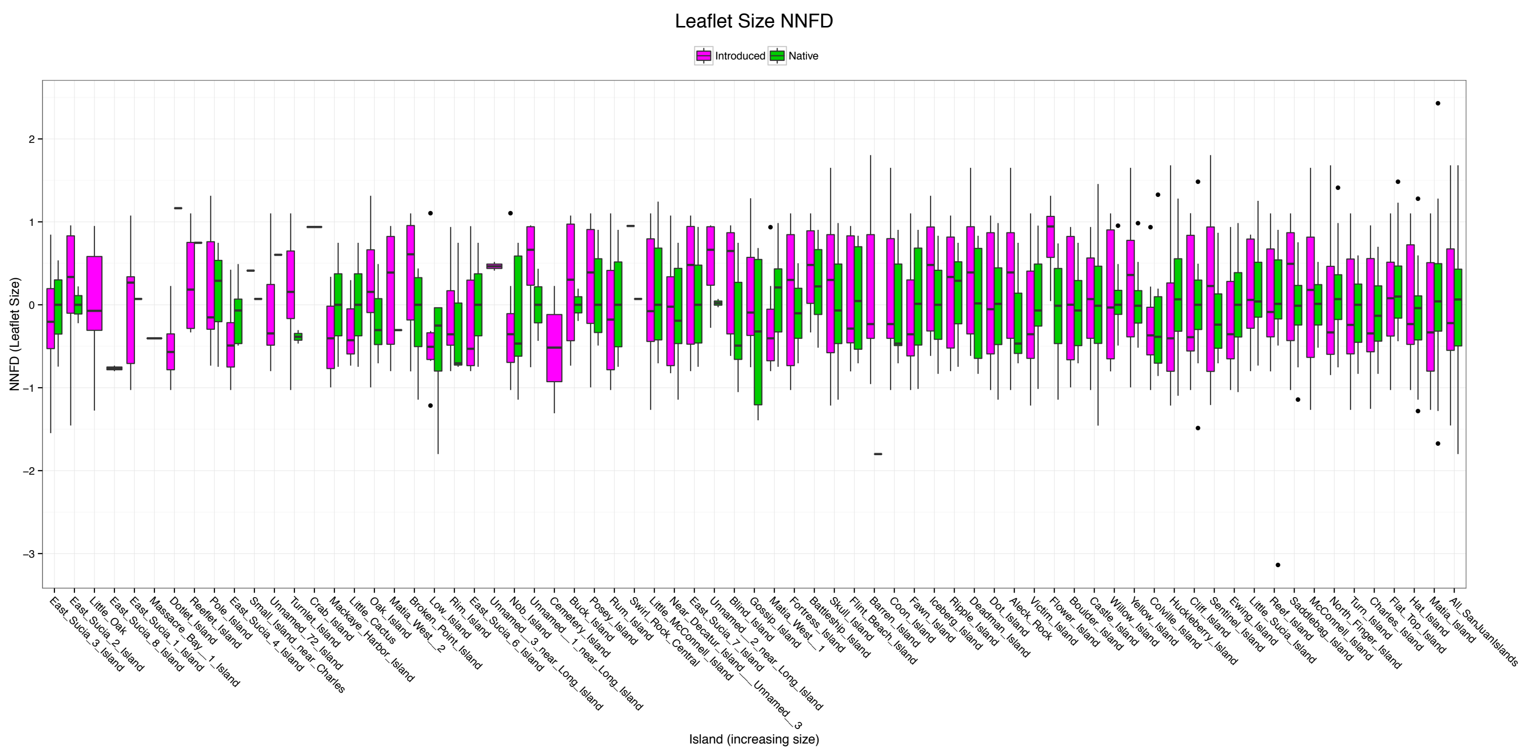

Seed Mass NNFD
Introduced
Native
NNFD (Seed Mass)
2.5
0.0
-2.5
-5.0
East_Sucia_3_Island
East_Sucia_2_Island
Little_Oak
East_Sucia_8_Island
East_Sucia_1_Island
Little_Nob
Massacre_Bay__1_Island
Dolfet_Island
Reefnet_Island
Pole_Island
East_Sucia_4_Island
Small_Island_near_Charles
Unnamed_72_Island
Turnlet_Island
Unnamed_west_of_Castle_Island
Crab_Island
Mackaye_Harbor_Island
Little_Cactus
Oak_Island
Matia_West__2
Broken_Point_Island
Low_Island
Rim_Island
East_Sucia_6_Island
Unnamed__3_near_Long_Island
Nob_Island
Unnamed__1_near_Long_Island
Cemetery_Island
Buck_Island
Posey_Island
Secar_Rock
Rum_Island
Swirl_Rock_Central
Little_McConnell_Island
Near_Decatur_Island__Unnamed__3
East_Sucia_7_Island
Unnamed__2_near_Long_Island
Blind_Island
Gossip_Island
Matia_West__1
Fortress_Island
Battleship_Island
Skull_Island
Flint_Beach_Island
Barren_Island
Coon_Island
Fawn_Island
Iceberg_Island
Ripple_Island
Deadman_Island
Dot_Island
Aleck_Rock
Victim_Island
Flower_Island
Boulder_Island
Castle_Island
Willow_Island
Yellow_Island
Colville_Island
Huckleberry_Island
Cliff_Island
Sentinel_Island
Ewing_Island
Little_Sucia_Island
Reef_Island
Saddlebag_Island
McConnell_Island
North_Finger_Island
Turn_Island
Charles_Island
Flat_Top_Island
Hat_Island
Matia_Island
All_SanJuanIslands
Island (increasing size)



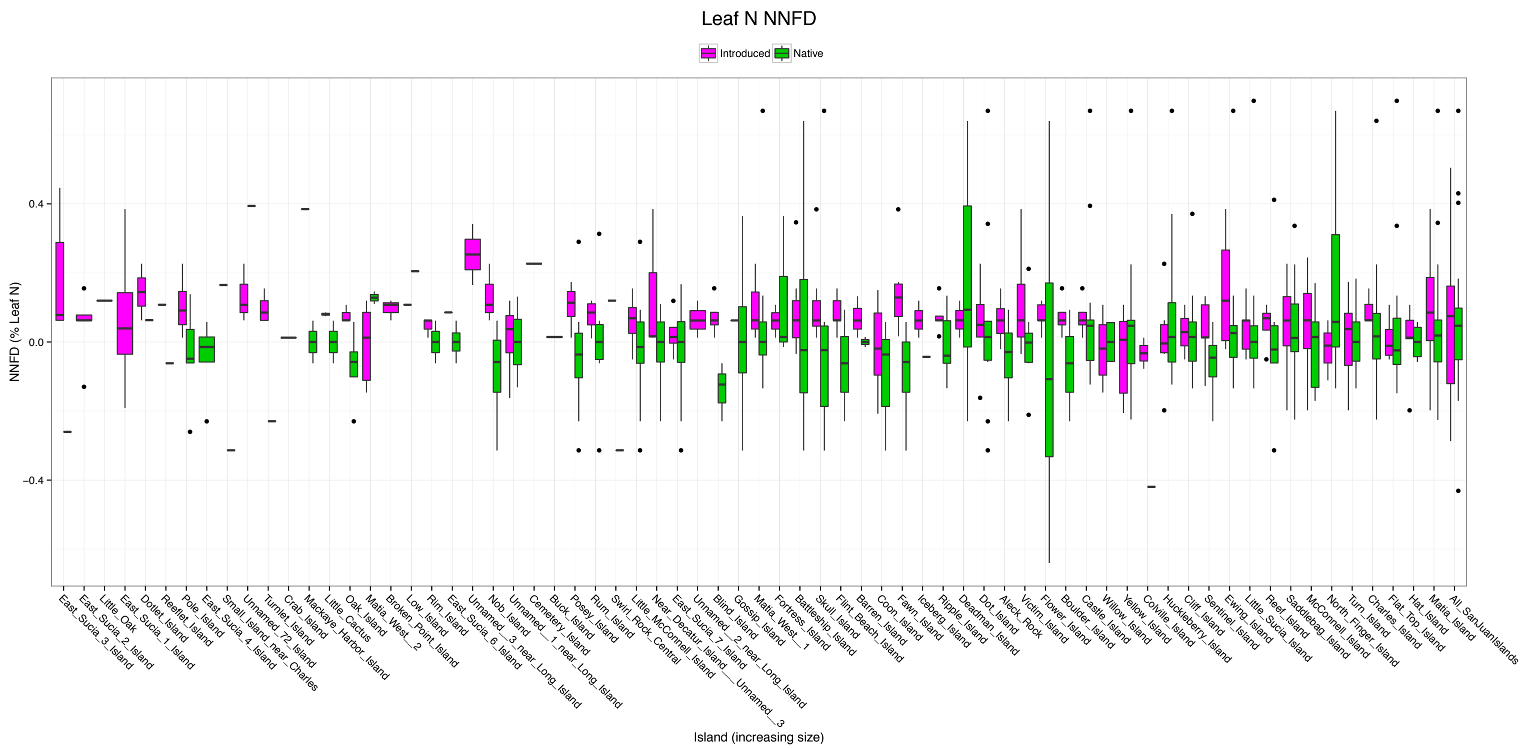
Maximum Height NNFD
Introduced
Native
NNFD (Maximum Height)
2
1
0
−1
−2
East_Sucia_3_Island
East_Sucia_2_Island
Little_Oak
East_Sucia_8_Island
East_Sucia_1_Island
Little_Nob
Massacre_Bay__1_Island
Dotlet_Island
Reeflet_Island
Pole_Island
East_Sucia_4_Island
Small_Island_near_Charles
Unnamed_72_Island
Turnlet_Island
Unnamed_west_of_Castle_Island
Crab_Island
Mackaye_Harbor_Island
Little_Cactus
Oak_Island
Matia_West__2
Broken_Point_Island
Low_Island
Rim_Island
East_Sucia_6_Island
Unnamed__3_near_Long_Island
Nob_Island
Unnamed__1_near_Long_Island
Cemetery_Island
Buck_Island
Posey_Island
Secar_Rock
Rum_Island
Swirl_Rock_Central
Little_McConnell_Island
Near_Decatur_Island___Unnamed__3
East_Sucia_7_Island
Unnamed__2_near_Long_Island
Blind_Island
Gossip_Island
Matia_West__1
Fortress_Island
Battleship_Island
Skull_Island
Flint_Beach_Island
Barren_Island
Coon_Island
Fawn_Island
Iceberg_Island
Ripple_Island
Deadman_Island
Dot_Island
Aleck_Rock
Victim_Island
Flower_Island
Boulder_Island
Castle_Island
Willow_Island
Yellow_Island
Colville_Island
Huckleberry_Island
Cliff_Island
Sentinel_Island
Ewing_Island
Little_Sucia_Island
Reef_Island
Saddlebag_Island
McConnell_Island
North_Finger_Island
Turn_Island
Charles_Island
Flat_Top_Island
Hat_Island
Matia_Island
All_SanJuanIslands
Island (increasing size)

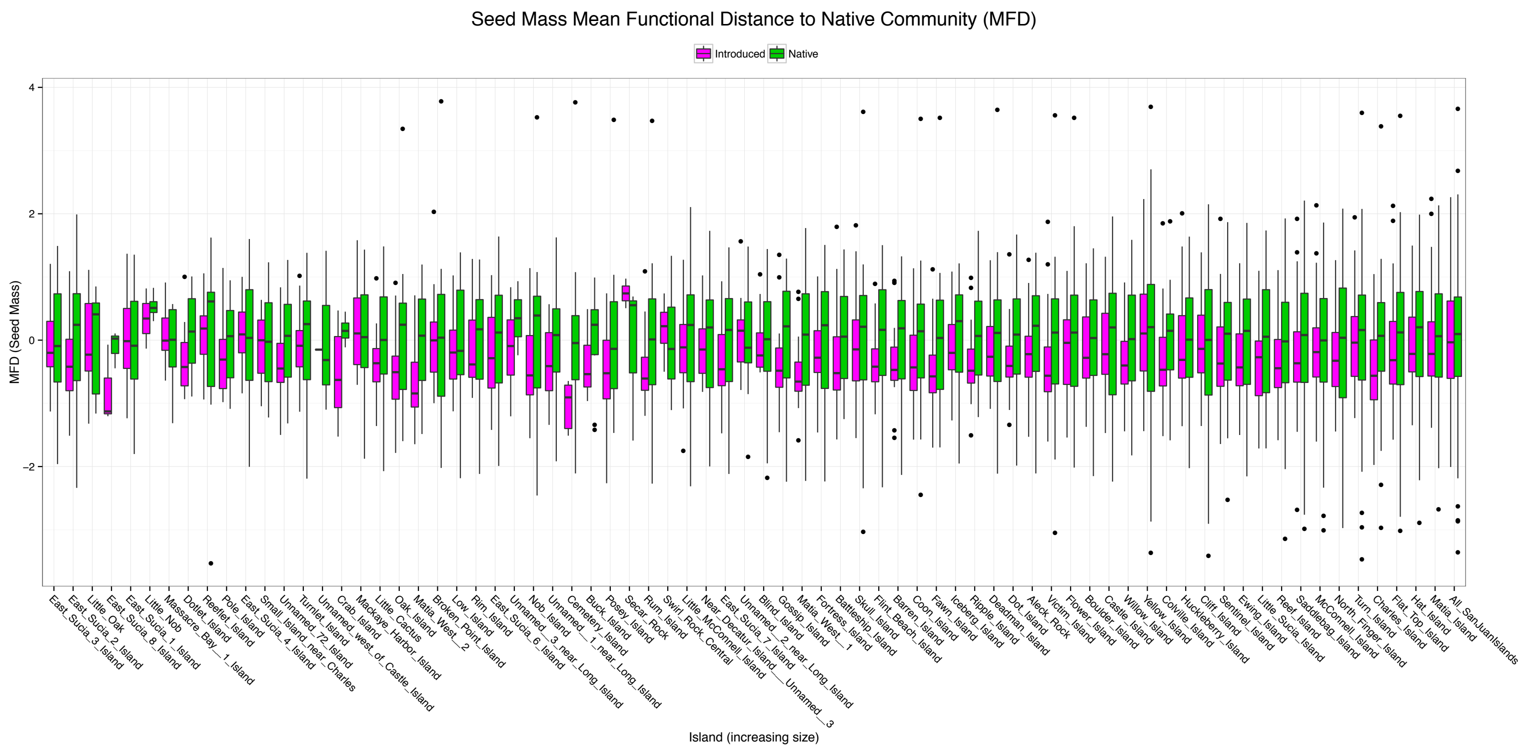


SLA NNFD
Introduced
Native
NNFD (SLA)
0.5
0.0
-0.5
East_Sucia_3_Island
East_Sucia_2_Island
Little_Oak
East_Sucia_8_Island
East_Sucia_1_Island
Massacre_Bay__1_Island
Doilet_Island
Reefet_Island
Pole_Island
East_Sucia_4_Island
Small_Island_near_Charles
Unnamed_72_Island
Turnlet_Island
Crab_Island
Mackaye_Harbor_Island
Little_Cactus
Oak_Island
Matia_West__2
Broken_Point_Island
Low_Island
Rim_Island
East_Sucia_6_Island
Unnamed__3_near_Long_Island
Nob_Island
Unnamed__1_near_Long_Island
Cemetery_Island
Buck_Island
Posey_Island
Rum_Island
Swirl_Rock_Central
Little_McConnell_Island
Near_Decatur_Island___Unnamed__3
East_Sucia_7_Island
Unnamed__2_near_Long_Island
Blind_Island
Gossip_Island
Matia_West__1
Fortress_Island
Battleship_Island
Skull_Island
Flint_Beach_Island
Barren_Island
Coon_Island
Fawn_Island
Iceberg_Island
Ripple_Island
Deadman_Island
Dot_Island
Aleck_Rock
Victim_Island
Flower_Island
Boulder_Island
Castle_Island
Willow_Island
Yellow_Island
Colville_Island
Huckleberry_Island
Cliff_Island
Sentinel_Island
Ewing_Island
Little_Sucia_Island
Reef_Island
Saddlebag_Island
McConnell_Island
North_Finger_Island
Turn_Island
Charles_Island
Flat_Top_Island
Hat_Island
Matia_Island
All_SanJuanIslands
Island (increasing size)

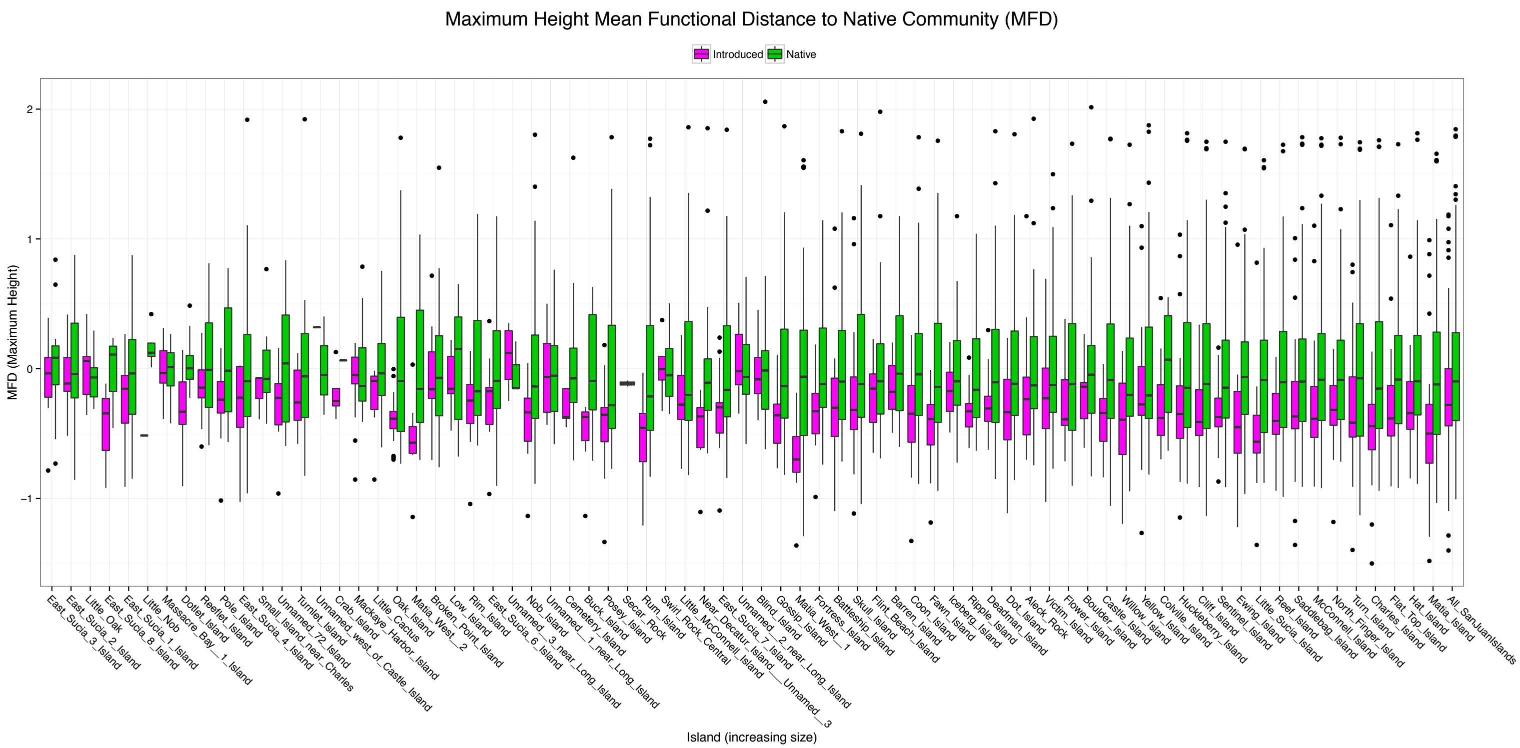


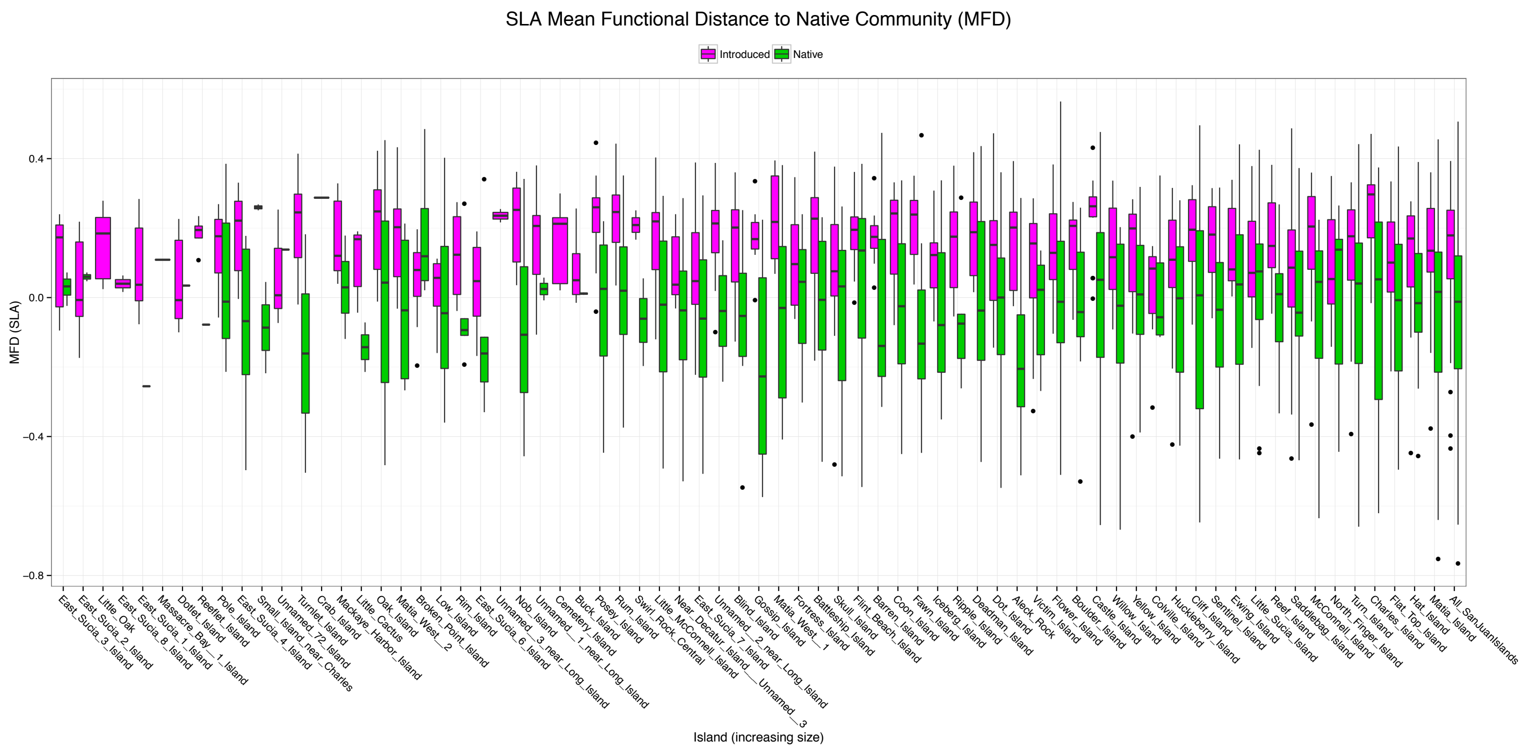
Leaflet Size NNFD
Introduced
Native
NNFD (Leaflet Size)
2
1
0
−1
−2
−3
East_Sucia_3_Island
East_Sucia_2_Island
Little_Oak
East_Sucia_8_Island
East_Sucia_1_Island
Massacre_Bay__1_Island
Dolet_Island
Reeflet_Island
Pole_Island
East_Sucia_4_Island
Small_Island_near_Charles
Unnamed_72_Island
Turnlet_Island
Crab_Island
Mackaye_Harbor_Island
Little_Cactus
Oak_Island
Matia_West__2
Broken_Point_Island
Low_Island
Rim_Island
East_Sucia_6_Island
Unnamed__3_near_Long_Island
Nob_Island
Unnamed__1_near_Long_Island
Cemetery_Island
Buck_Island
Posey_Island
Rum_Island
Swirl_Rock_Central
Little_McConnell_Island
Near_Decatur_Island___Unnamed__3
East_Sucia_7_Island
Unnamed__2_near_Long_Island
Blind_Island
Gossip_Island
Matia_West__1
Fortress_Island
Battleship_Island
Skull_Island
Flint_Beach_Island
Barren_Island
Coon_Island
Fawn_Island
Iceberg_Island
Ripple_Island
Deadman_Island
Dot_Island
Aleck_Rock
Victim_Island
Flower_Island
Boulder_Island
Castle_Island
Willow_Island
Yellow_Island
Colville_Island
Huckleberry_Island
Cliff_Island
Sentinel_Island
Ewing_Island
Little_Sucia_Island
Reef_Island
Saddlebag_Island
McConnell_Island
North_Finger_Island
Turn_Island
Charles_Island
Flat_Top_Island
Hat_Island
Matia_Island
All_SanJuanIslands
Island (increasing size)

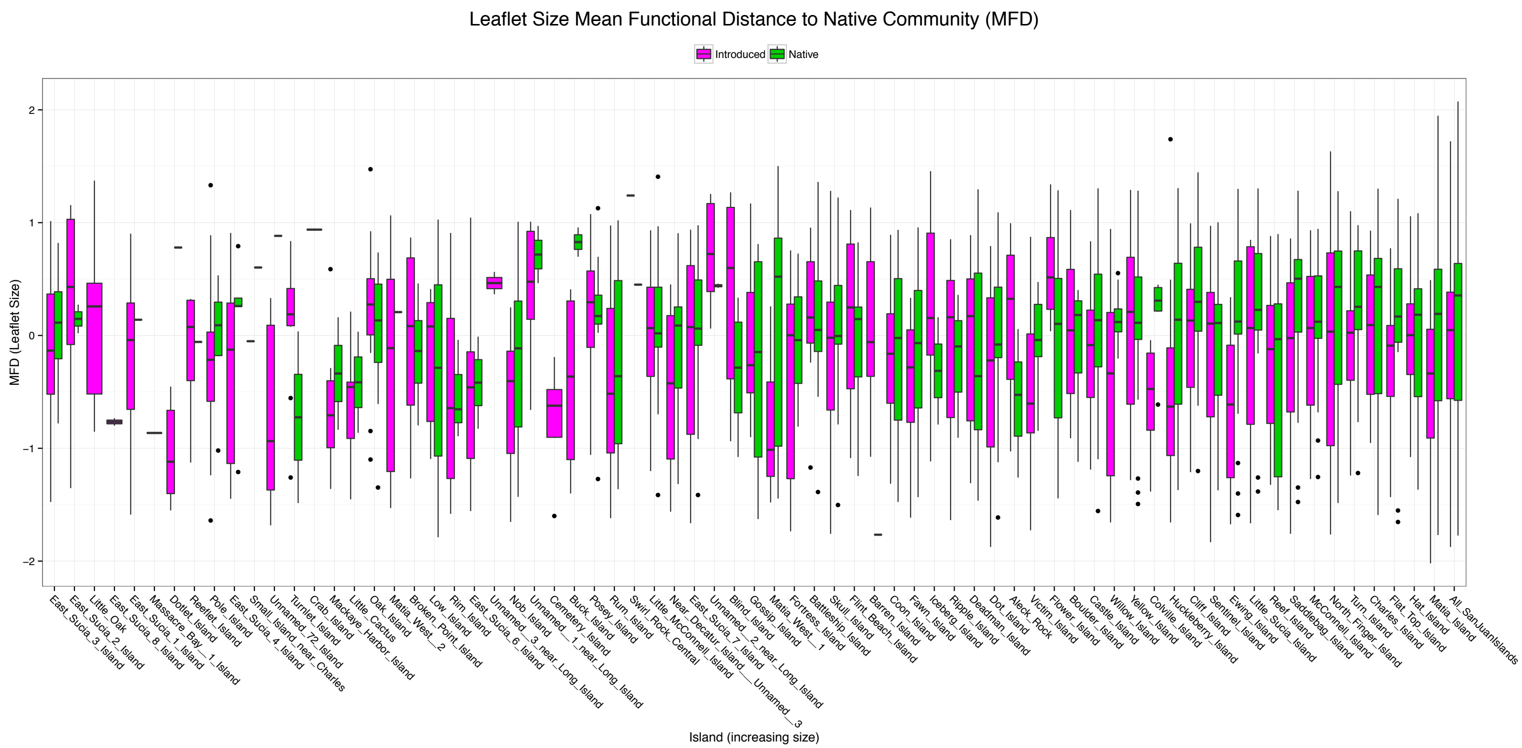

Leaf N NNFD
Introduced
Native
NNFD (% Leaf N)
0.4
0.0
-0.4
Island (increasing size)
East_Sucia_3_Island
East_Sucia_2_Island
Little_Oak
East_Sucia_1_Island
Dotlet_Island
Reeflet_Island
Pole_Island
East_Sucia_4_Island
Small_Island_near_Charles
Unnamed_72
Turnlet_Island
Crab_Island
Mackaye_Harbor_Island
Little_Cactus
Oak_Island
Matia_West_2
Broken_Point_Island
Low_Island
Rim_Island
East_Sucia_6_Island
Unnamed_3_near_Long_Island
Nob_Island
Unnamed_1_near_Long_Island
Cemetery_Island
Buck_Island
Posey_Island
Rum_Island
Swirl_Rock_Central
Little_McConnell_Island
Near_Decatur_Island___Unnamed_3
East_Sucia_7_Island
Unnamed_2_near_Long_Island
Blind_Island
Gossip_Island
Matia_West_1
Fortress_Island
Battleship_Island
Skull_Island
Flint_Beach_Island
Barren_Island
Coon_Island
Fawn_Island
Iceberg_Island
Ripple_Island
Deadman_Island
Dot_Island
Aleck_Rock
Victim_Island
Flower_Island
Boulder_Island
Castle_Island
Willow_Island
Yellow_Island
Colville_Island
Huckleberry_Island
Cliff_Island
Sentinel_Island
Ewing_Island
Little_Sucia_Island
Reef_Island
Saddlebag_Island
McConnell_Island
North_Finger_Island
Turn_Island
Charles_Island
Flat_Top_Island
Hat_Island
Matia_Island
All_SanJuanIslands



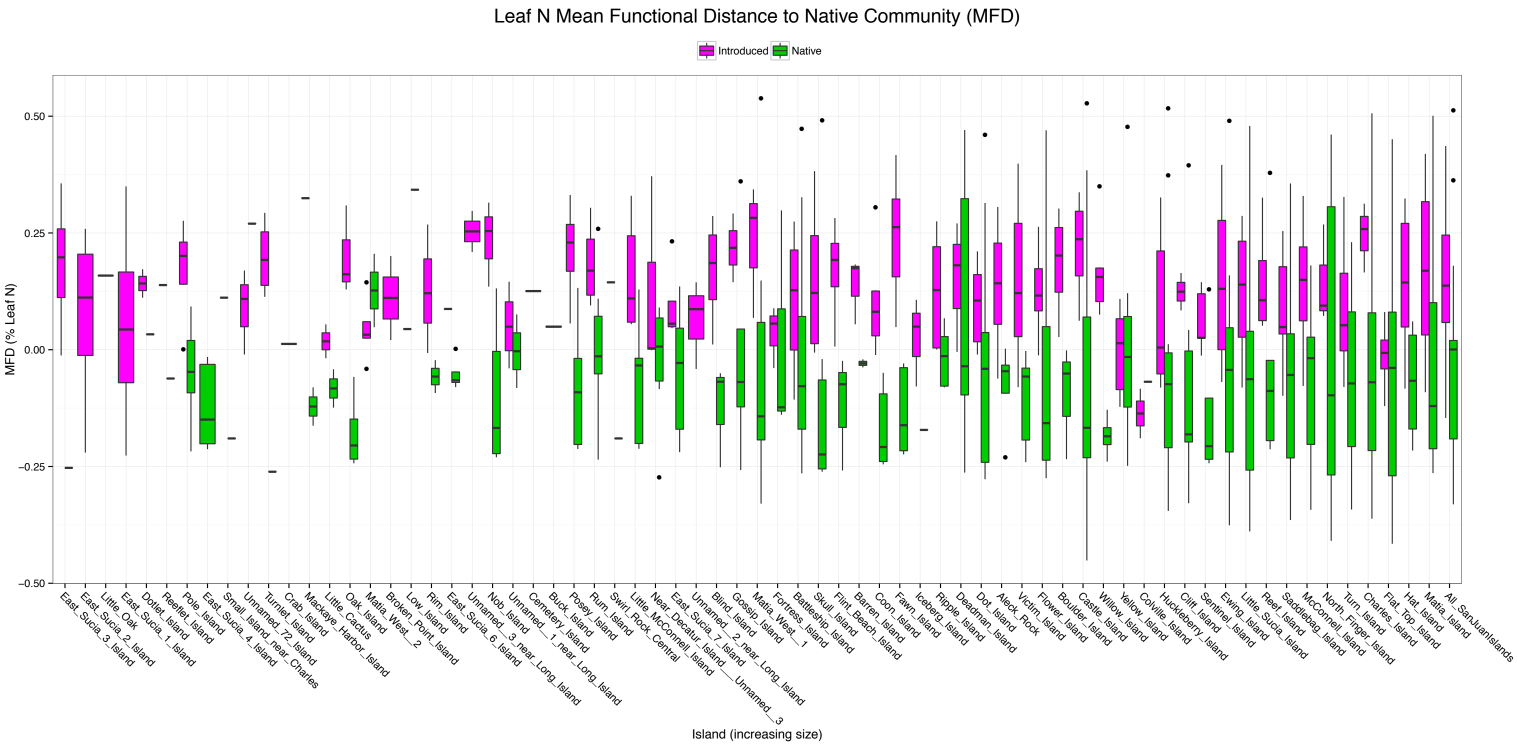
Seed Mass Mean Functional Distance to Native Community (MFD)
Introduced
Native
MFD (Seed Mass)
4
2
0
−2
East_Sucia_3_Island
East_Sucia_2_Island
Little_Oak
East_Sucia_8_Island
East_Sucia_1_Island
Little_Nob
Massacre_Bay__1_Island
Dotlet_Island
Reeflet_Island
Pole_Island
East_Sucia_4_Island
Small_Island_near_Charles
Unnamed_72_Island
Turnlet_Island
Unnamed_west_of_Castle_Island
Crab_Island
Mackaye_Harbor_Island
Little_Cactus
Oak_Island
Matia_West__2
Broken_Point_Island
Low_Island
Rim_Island
East_Sucia_6_Island
Unnamed__3_near_Long_Island
Nob_Island
Unnamed__1_near_Long_Island
Cemetery_Island
Buck_Island
Posey_Island
Secar_Rock
Rum_Island
Swirl_Rock_Central
Little_McConnell_Island
Near_Decatur_Island___Unnamed__3
East_Sucia_7_Island
Unnamed__2_near_Long_Island
Blind_Island
Gossip_Island
Matia_West__1
Fortress_Island
Battleship_Island
Skull_Island
Flint_Beach_Island
Barren_Island
Coon_Island
Fawn_Island
Iceberg_Island
Ripple_Island
Deadman_Island
Dot_Island
Aleck_Rock
Victim_Island
Flower_Island
Boulder_Island
Castle_Island
Willow_Island
Yellow_Island
Colville_Island
Huckleberry_Island
Cliff_Island
Sentinel_Island
Ewing_Island
Little_Sucia_Island
Reef_Island
Saddlebag_Island
McConnell_Island
North_Finger_Island
Turn_Island
Charles_Island
Flat_Top_Island
Hat_Island
Matia_Island
All_SanJuanIslands
Island (increasing size)

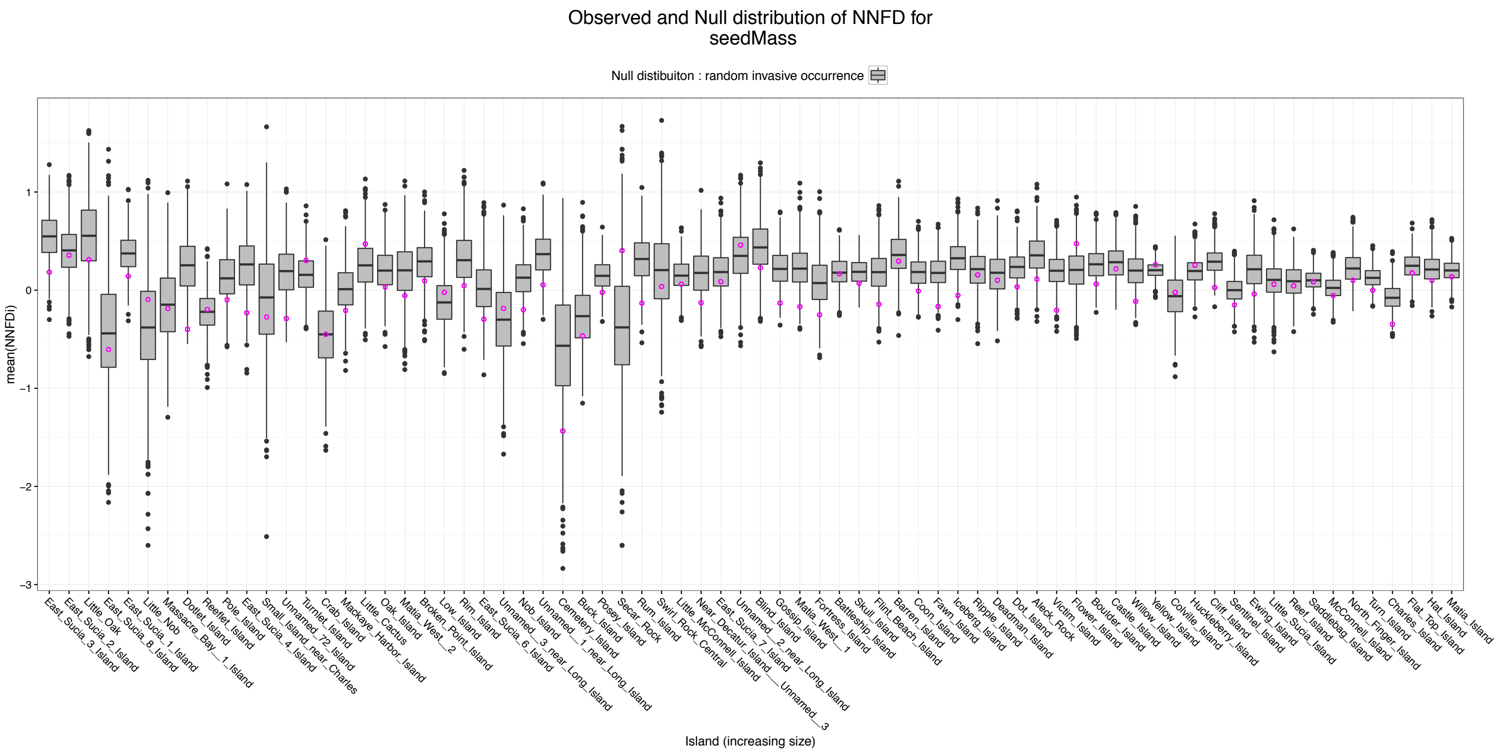

Maximum Height Mean Functional Distance to Native Community (MFD)
Introduced
Native
MFD (Maximum Height)
2
1
0
−1
Island (increasing size)
East_Sucia_3_Island
East_Sucia_2_Island
Little_Oak
East_Sucia_8_Island
East_Sucia_1_Island
Little_Nob
Massacre_Bay__1_Island
Dotlet_Island
Reeflet_Island
Pole_Island
East_Sucia_4_Island
Small_Island_near_Charles
Unnamed_72_Island
Turret_Island
Unnamed_west_of_Castle_Island
Crab_Island
Mackaye_Harbor_Island
Little_Cactus
Oak_Island
Matia_West__2
Broken_Point_Island
Low_Island
Rim_Island
East_Sucia_6_Island
Unnamed__3_near_Long_Island
Nob_Island
Unnamed__1_near_Long_Island
Cemetery_Island
Buck_Island
Posey_Island
Secar_Rock
Rum_Island
Swirl_Rock_Central
Little_McConnell_Island
Near_Decatur_Island__Unnamed__3
East_Sucia_7_Island
Unnamed__2_near_Long_Island
Blind_Island
Gossip_Island
Matia_West__1
Fortress_Island
Battleship_Island
Skull_Island
Flint_Beach_Island
Barren_Island
Coon_Island
Fawn_Island
Iceberg_Island
Ripple_Island
Deadman_Island
Dot_Island
Aleck_Rock
Victim_Island
Flower_Island
Boulder_Island
Castle_Island
Willow_Island
Yellow_Island
Colville_Island
Huckleberry_Island
Cliff_Island
Sentinel_Island
Ewing_Island
Little_Sucia_Island
Reef_Island
Saddlebag_Island
McConnell_Island
North_Finger_Island
Turn_Island
Charles_Island
Flat_Top_Island
Hat_Island
Matia_Island
All_SanJuanIslands

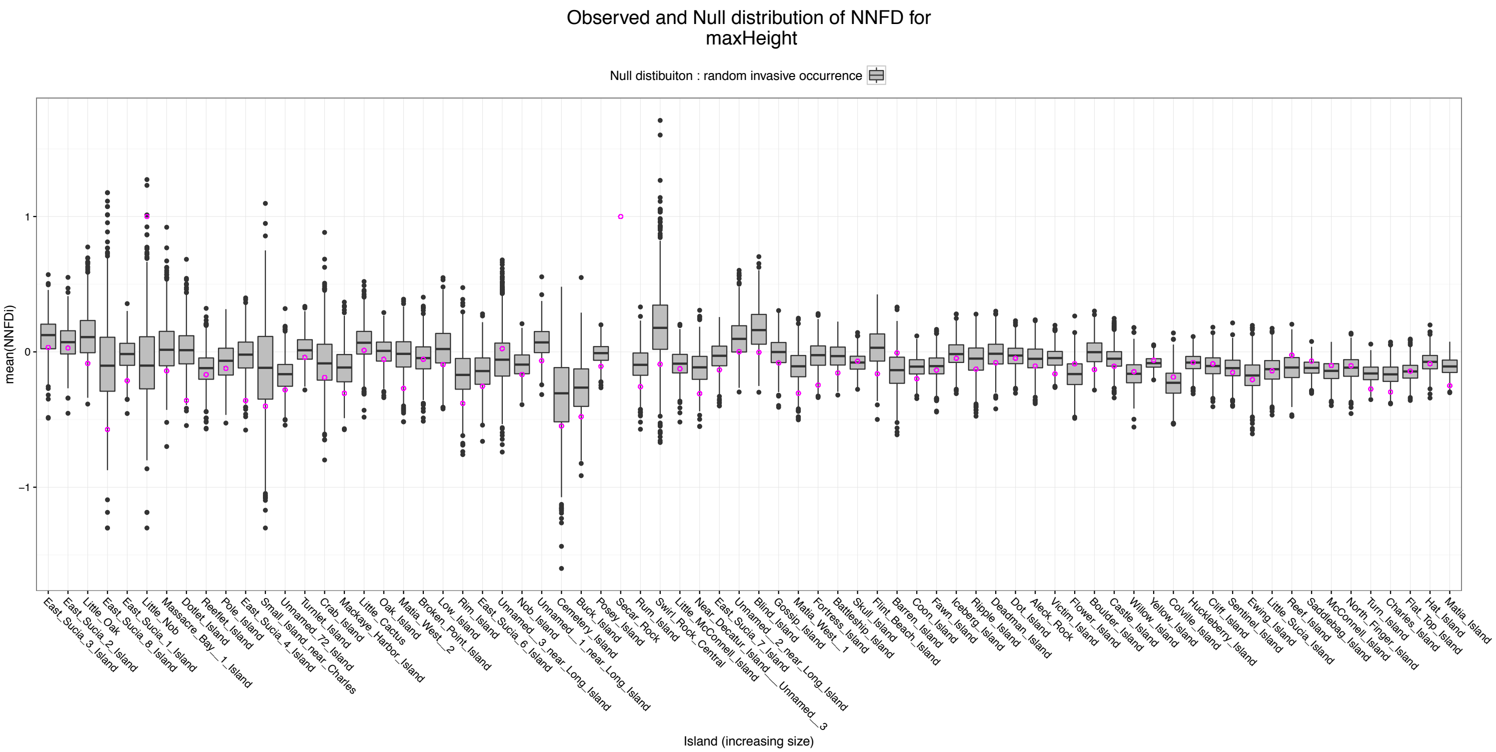

SLA Mean Functional Distance to Native Community (MFD)
Introduced
Native
MFD (SLA)
0.4
0.0
-0.4
-0.8
East_Sucia_3_Island
East_Sucia_2_Island
Little_Oak
East_Sucia_8_Island
East_Sucia_1_Island
Massacre_Bay__1_Island
Doliet_Island
Reeflet_Island
Pole_Island
East_Sucia_4_Island
Small_Island_near_Charles
Unnamed_72_Island
Tumlet_Island
Crab_Island
Mackaye_Harbor_Island
Little_Cactus
Oak_Island
Matia_West__2
Broken_Point_Island
Low_Island
Rim_Island
East_Sucia_6_Island
Unnamed__3_near_Long_Island
Nob_Island
Unnamed__1_near_Long_Island
Cemetery_Island
Buck_Island
Posey_Island
Rum_Island
Swirl_Rock_Central
Little_McConnell_Island
Near_Decatur_Island__Unnamed__3
East_Sucia_7_Island
Unnamed__2_near_Long_Island
Blind_Island
Gossip_Island
Matia_West__1
Fortress_Island
Battleship_Island
Skull_Island
Flint_Beach_Island
Barren_Island
Coon_Island
Fawn_Island
Iceberg_Island
Ripple_Island
Deadman_Island
Dot_Island
Aleck_Rock
Victim_Island
Flower_Island
Boulder_Island
Castle_Island
Willow_Island
Yellow_Island
Colville_Island
Huckleberry_Island
Cliff_Island
Sentinel_Island
Ewing_Island
Little_Sucia_Island
Reef_Island
Saddlebag_Island
McConnell_Island
North_Finger_Island
Turn_Island
Charles_Island
Flat_Top_Island
Hat_Island
Matia_Island
All_SanJuanIslands
Island (increasing size)



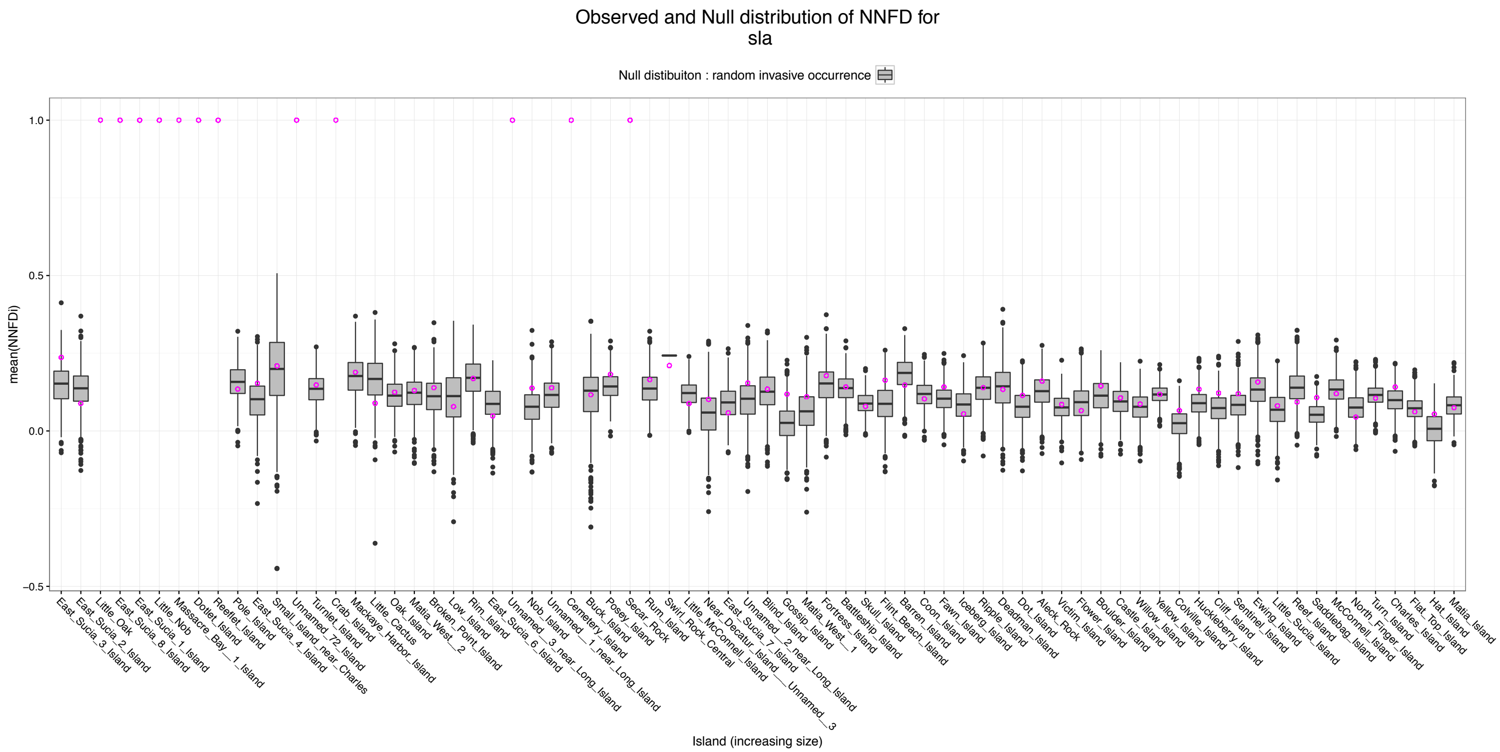
Leaflet Size Mean Functional Distance to Native Community (MFD)
Introduced
Native
MFD (Leaflet Size)
2
1
0
−1
−2
East_Sucia_3_Island
East_Sucia_2_Island
Little_Oak
East_Sucia_8_Island
East_Sucia_1_Island
Massacre_Bay__1_Island
Dotlet_Island
Reeflet_Island
Pole_Island
East_Sucia_4_Island
Small_Island_near_Charles
Unnamed_72_Island
Turnlet_Island
Crab_Island
Mackaye_Harbor_Island
Little_Cactus
Oak_Island
Matia_West__2
Broken_Point_Island
Low_Island
Rim_Island
East_Sucia_6_Island
Unnamed__3_near_Long_Island
Nob_Island
Unnamed__1_near_Long_Island
Cemetery_Island
Buck_Island
Posey_Island
Rum_Island
Swirl_Rock_Central
Little_McConnell_Island
Near_Decatur_Island___Unnamed__3
East_Sucia_7_Island
Unnamed__2_near_Long_Island
Blind_Island
Gossip_Island
Matia_West__1
Fortress_Island
Battleship_Island
Skull_Island
Flint_Beach_Island
Barren_Island
Coon_Island
Fawn_Island
Iceberg_Island
Ripple_Island
Deadman_Island
Dot_Island
Aleck_Rock
Victim_Island
Flower_Island
Boulder_Island
Castle_Island
Willow_Island
Yellow_Island
Colville_Island
Huckleberry_Island
Cliff_Island
Sentinel_Island
Ewing_Island
Little_Sucia_Island
Reef_Island
Saddlebag_Island
McConnell_Island
North_Finger_Island
Turn_Island
Charles_Island
Flat_Top_Island
Hat_Island
Matia_Island
All_SanJuanIslands
Island (increasing size)

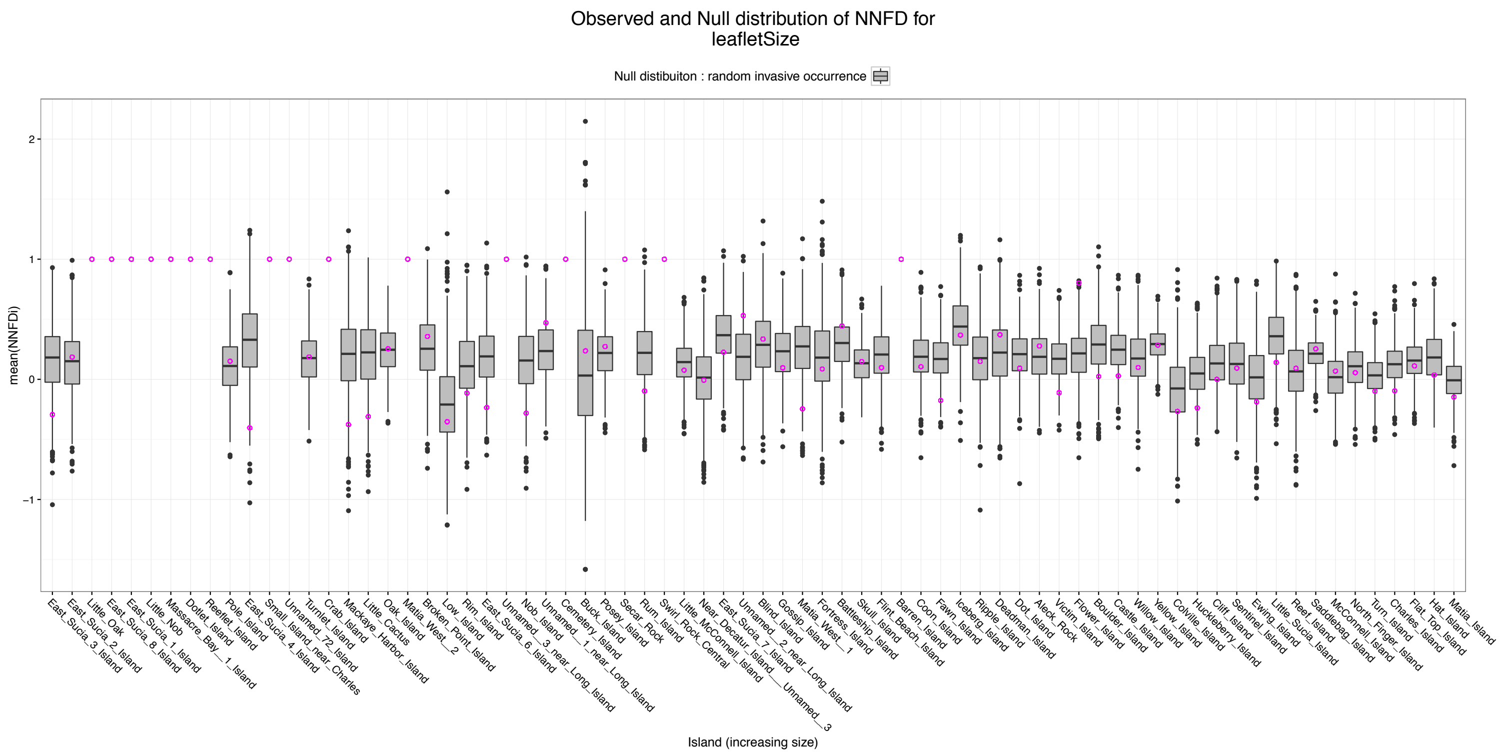

Leaf N Mean Functional Distance to Native Community (MFD)
Introduced
Native
MFD (% Leaf N)
0.50
0.25
0.00
−0.25
−0.50
Island (increasing size)
East_Sucia_3_Island
East_Sucia_2_Island
Little_Oak
East_Sucia_1_Island
Dollet_Island
Reeflet_Island
Pole_Island
East_Sucia_4_Island
Small_Island_near_Charles
Unnamed_72_Island
Turnlet_Island
Crab_Island
Mackaye_Harbor_Island
Little_Cactus
Oak_Island
Matia_West_2
Broken_Point_Island
Low_Island
Rim_Island
East_Sucia_6_Island
Unnamed_3_near_Long_Island
Nob_Island
Unnamed_1_near_Long_Island
Cemetery_Island
Buck_Island
Posey_Island
Rum_Island
Swirl_Rock_Central
Little_McConnell_Island
Near_Decatur_Island___Unnamed_3
East_Sucia_7_Island
Unnamed_2_near_Long_Island
Blind_Island
Gossip_Island
Matia_West_1
Fortress_Island
Battleship_Island
Skull_Island
Flint_Beach_Island
Barren_Island
Coon_Island
Fawn_Island
Iceberg_Island
Ripple_Island
Deadman_Island
Dot_Island
Aleck_Rock
Victim_Island
Flower_Island
Boulder_Island
Castle_Island
Willow_Island
Yellow_Island
Colville_Island
Huckleberry_Island
Cliff_Island
Sentinel_Island
Ewing_Island
Little_Sucia_Island
Reef_Island
Saddlebag_Island
McConnell_Island
North_Finger_Island
Turn_Island
Charles_Island
Flat_Top_Island
Hat_Island
Matia_Island
All_SanJuanIslands

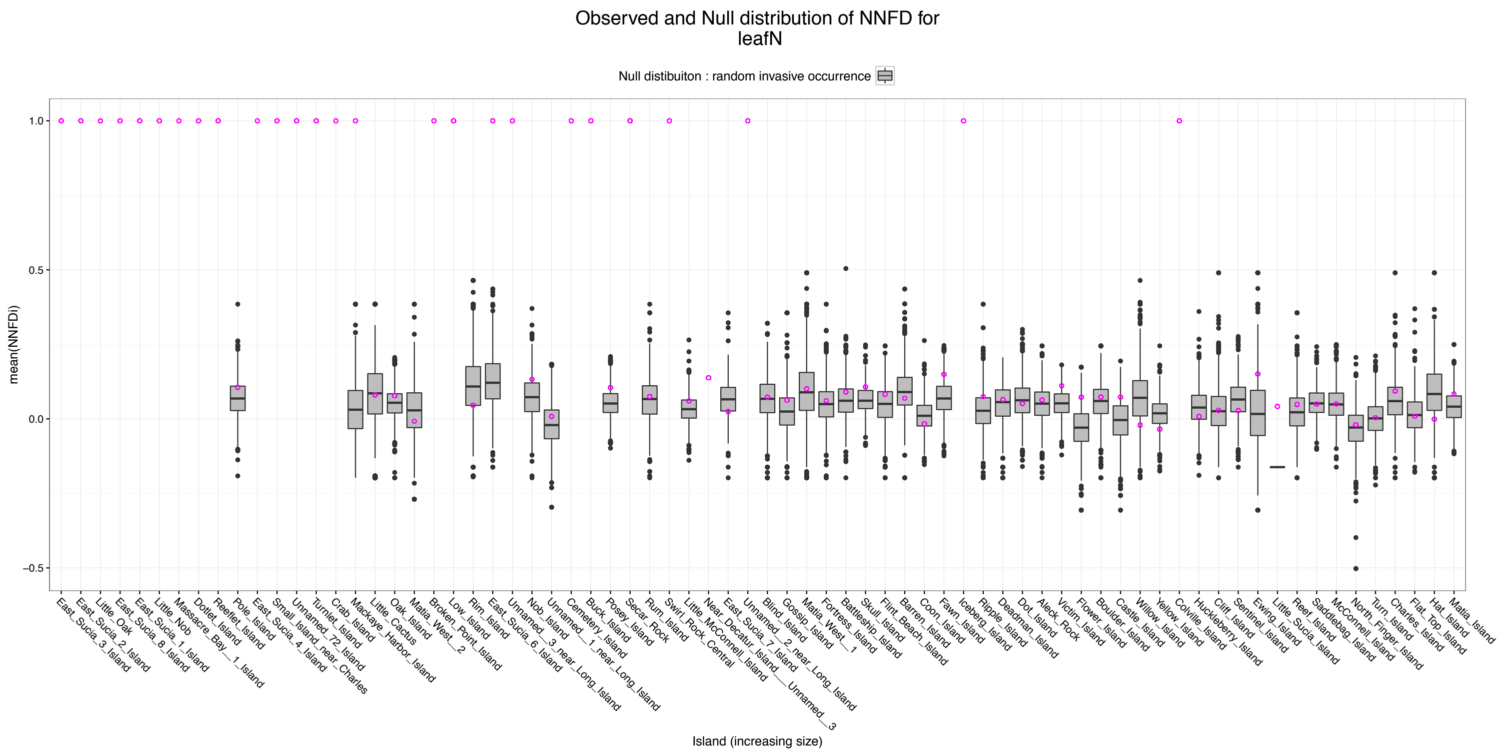

Observed and Null distribution of NNFD for seedMass
Null distibuiton : random invasive occurrence
mean(NNFDi)
1
0
−1
−2
−3
East_Sucia_3_Island
East_Sucia_2_Island
Little_Oak
East_Sucia_8_Island
East_Sucia_1_Island
Little_Nob
Massacre_Bay__1_Island
Dollet_Island
Reeflet_Island
Pole_Island
East_Sucia_4_Island
Small_Island_near_Charles
Unnamed_72_Island
Turnlet_Island
Crab_Island
Mackaye_Harbor_Island
Little_Cactus
Oak_Island
Matia_West__2
Broken_Point_Island
Low_Island
Rim_Island
East_Sucia_6_Island
Unnamed__3_near_Long_Island
Nob_Island
Unnamed__1_near_Long_Island
Cemetery_Island
Buck_Island
Posey_Island
Secar_Rock
Rum_Island
Swirl_Rock_Central
Little_McConnell_Island
Near_Decatur_Island__Unnamed__3
East_Sucia_7_Island
Unnamed__2_near_Long_Island
Blind_Island
Gossip_Island
Matia_West__1
Fortress_Island
Battleship_Island
Skull_Island
Flint_Beach_Island
Barren_Island
Coon_Island
Fawn_Island
Iceberg_Island
Ripple_Island
Deadman_Island
Dot_Island
Aleck_Rock
Victim_Island
Flower_Island
Boulder_Island
Castle_Island
Willow_Island
Yellow_Island
Colville_Island
Huckleberry_Island
Cliff_Island
Sentinel_Island
Ewing_Island
Little_Sucia_Island
Reef_Island
Saddlebag_Island
McConnell_Island
North_Finger_Island
Turn_Island
Charles_Island
Flat_Top_Island
Hat_Island
Matia_Island
Island (increasing size)

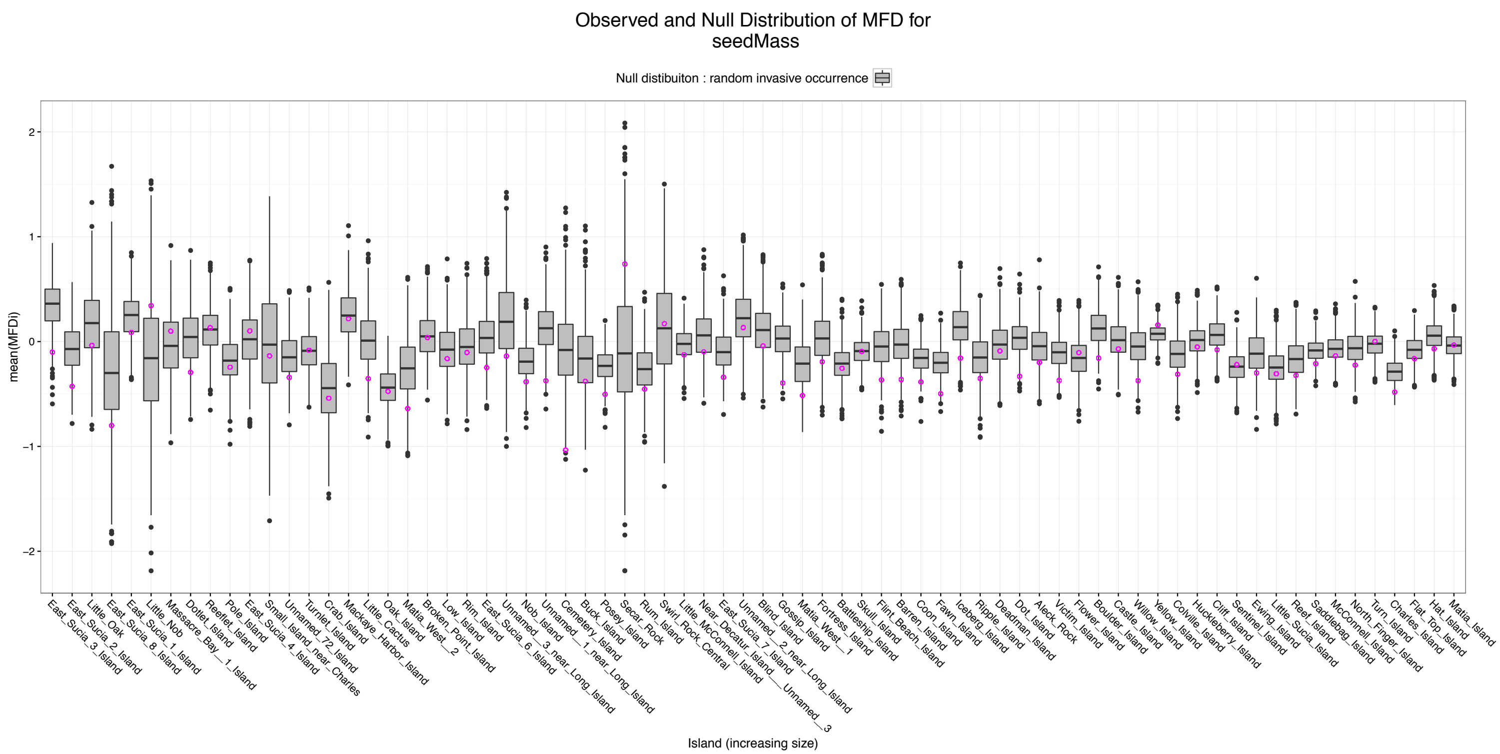


Observed and Null distribution of NNFD for maxHeight
Null distibuiton : random invasive occurrence
mean(NNFDi)
1
0
−1
Island (increasing size)
East_Sucia_3_Island
East_Sucia_2_Island
Little_Oak
East_Sucia_8_Island
East_Sucia_1_Island
Little_Nob
Massacre_Bay__1_Island
Dollet_Island
Reeflet_Island
Pole_Island
East_Sucia_4_Island
Small_Island_near_Charles
Unnamed_72_Island
Turnlet_Island
Crab_Island
Mackaye_Harbor_Island
Little_Cactus
Oak_Island
Matia_West__2
Broken_Point_Island
Low_Island
Rim_Island
East_Sucia_6_Island
Unnamed__3_near_Long_Island
Nob_Island
Unnamed__1_near_Long_Island
Cemetery_Island
Buck_Island
Posey_Island
Secar_Rock
Rum_Island
Swirl_Rock_Central
Little_McConnell_Island
Near_Decatur_Island__Unnamed__3
East_Sucia_7_Island
Unnamed__2_near_Long_Island
Blind_Island
Gossip_Island
Matia_West__1
Fortress_Island
Battleship_Island
Skull_Island
Flint_Beach_Island
Barren_Island
Coon_Island
Fawn_Island
Iceberg_Island
Ripple_Island
Deadman_Island
Dot_Island
Aleck_Rock
Victim_Island
Flower_Island
Boulder_Island
Castle_Island
Willow_Island
Yellow_Island
Colville_Island
Huckleberry_Island
Cliff_Island
Sentinel_Island
Ewing_Island
Little_Sucia_Island
Reef_Island
Saddlebag_Island
McConnell_Island
North_Finger_Island
Turn_Island
Charles_Island
Flat_Top_Island
Hat_Island
Matia_Island

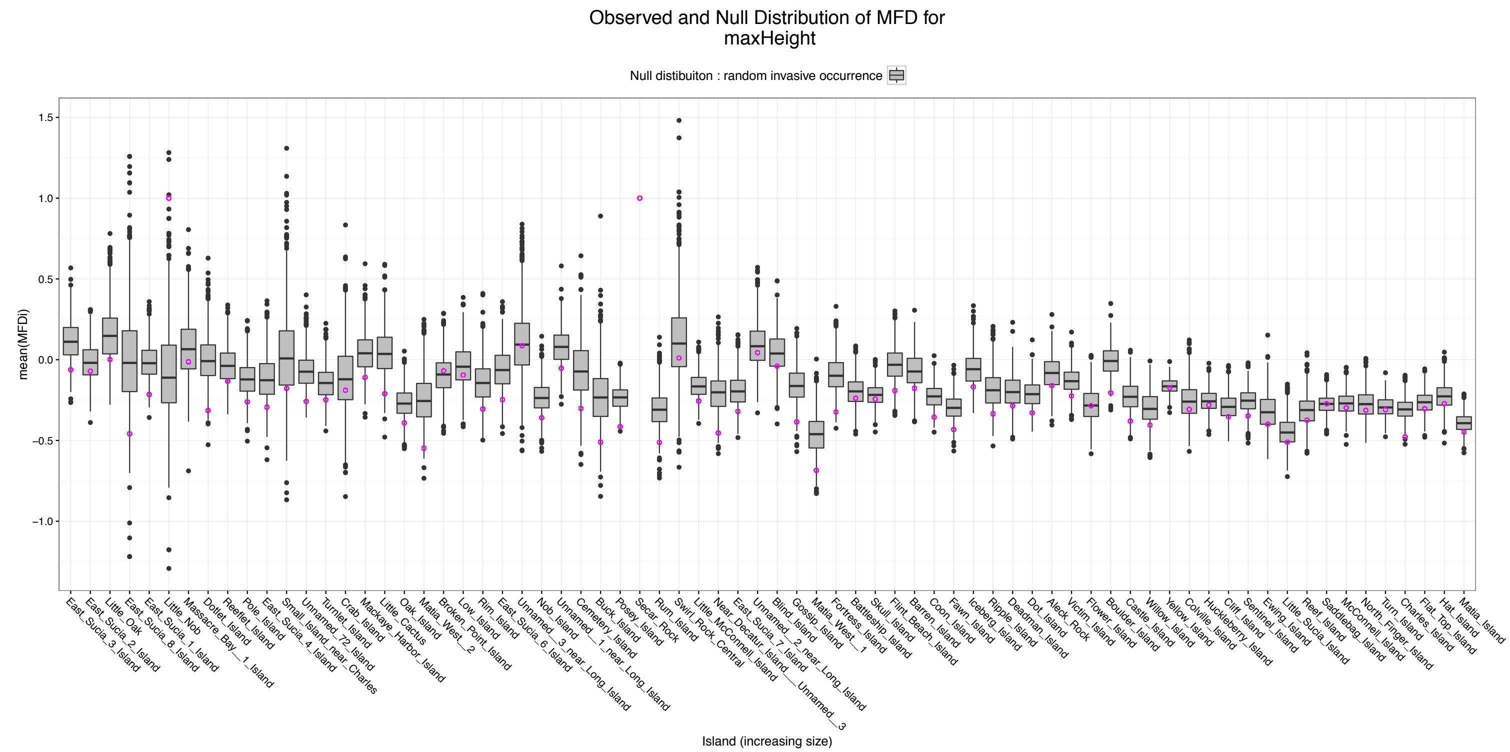

Observed and Null distribution of NNFD for
sla
Null distibuiton : random invasive occurrence
mean(NNFDi)
1.0
0.5
0.0
-0.5
East_Sucia_3_Island
East_Sucia_2_Island
Little_Oak
East_Sucia_8_Island
East_Sucia_1_Island
Little_Nob
Massacre_Bay__1_Island
Doilet_Island
Reeflet_Island
Pole_Island
East_Sucia_4_Island
Small_Island_near_Charles
Unnamed_72_Island
Turnlet_Island
Crab_Island
Mackaye_Harbor_Island
Little_Cactus
Oak_Island
Matia_West__2
Broken_Point_Island
Low_Island
Rim_Island
East_Sucia_6_Island
Unnamed__3_near_Long_Island
Nob_Island
Unnamed__1_near_Long_Island
Cemetery_Island
Buck_Island
Posey_Island
Secar_Rock
Rum_Island
Swirl_Rock_Central
Little_McConnell_Island
Near_Decatur_Island___Unnamed__3
East_Sucia_7_Island
Unnamed__2_near_Long_Island
Blind_Island
Gossip_Island
Matia_West__1
Fortress_Island
Battleship_Island
Skull_Island
Flint_Beach_Island
Barren_Island
Coon_Island
Fawn_Island
Iceberg_Island
Ripple_Island
Deadman_Island
Dot_Island
Aleck_Rock
Victim_Island
Flower_Island
Boulder_Island
Castle_Island
Willow_Island
Yellow_Island
Colville_Island
Huckleberry_Island
Cliff_Island
Sentinel_Island
Ewing_Island
Little_Sucia_Island
Reef_Island
Saddlebag_Island
McConnell_Island
North_Finger_Island
Turn_Island
Charles_Island
Flat_Top_Island
Hat_Island
Matia_Island
Island (increasing size)


Observed and Null distribution of NNFD for
leafletSize
Null distibuiton : random invasive occurrence
mean(NNFDi)
2
1
0
−1
Island (increasing size)

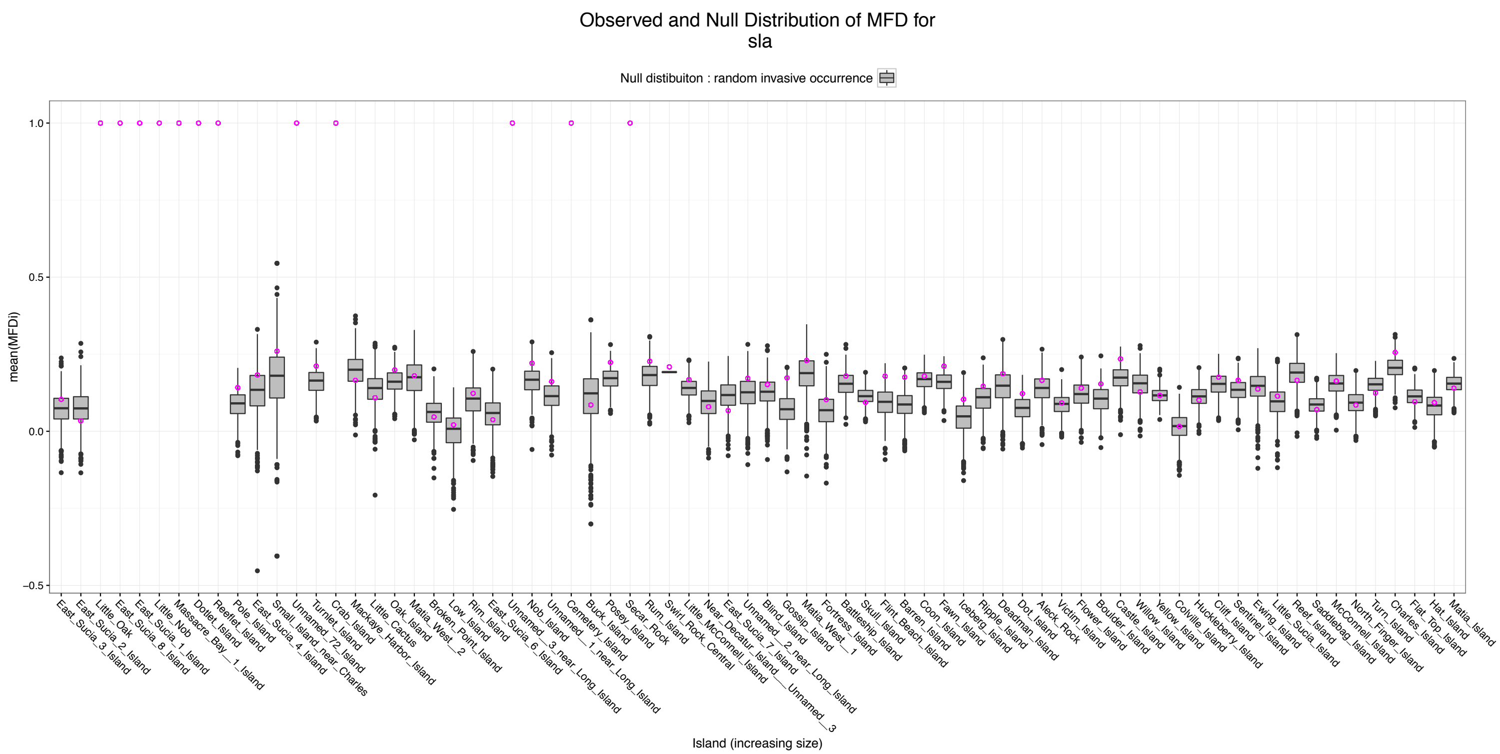

Observed and Null distribution of NNFD for
leafN
Null distibuiton : random invasive occurrence
mean(NNFDi)
1.0
0.5
0.0
-0.5
East_Sucia_3_Island
East_Sucia_2_Island
Little_Oak
East_Sucia_8_Island
East_Sucia_1_Island
Little_Nob
Massacre_Bay__1_Island
Dottet_Island
Reeflet_Island
Pole_Island
East_Sucia_4_Island
Small_Island_near_Charles
Unnamed_72_Island
Turnlet_Island
Crab_Island
Mackaye_Harbor_Island
Little_Cactus
Oak_Island
Matia_West__2
Broken_Point_Island
Low_Island
Rim_Island
East_Sucia_6_Island
Unnamed__3_near_Long_Island
Nob_Island
Unnamed__1_near_Long_Island
Cemetery_Island
Buck_Island
Posey_Island
Secar_Rock
Rum_Island
Swirl_Rock_Central
Little_McConnell_Island
Near_Decatur_Island__Unnamed__3
East_Sucia_7_Island
Unnamed__2_near_Long_Island
Blind_Island
Gossip_Island
Matia_West__1
Fortress_Island
Battleship_Island
Skull_Island
Flint_Beach_Island
Barren_Island
Coon_Island
Fawn_Island
Iceberg_Island
Ripple_Island
Deadman_Island
Dot_Island
Aleck_Rock
Victim_Island
Flower_Island
Boulder_Island
Castle_Island
Willow_Island
Yellow_Island
Colville_Island
Huckleberry_Island
Cliff_Island
Sentinel_Island
Ewing_Island
Little_Sucia_Island
Reef_Island
Saddlebag_Island
McConnell_Island
North_Finger_Island
Turn_Island
Charles_Island
Flat_Top_Island
Hat_Island
Matia_Island
Island (increasing size)



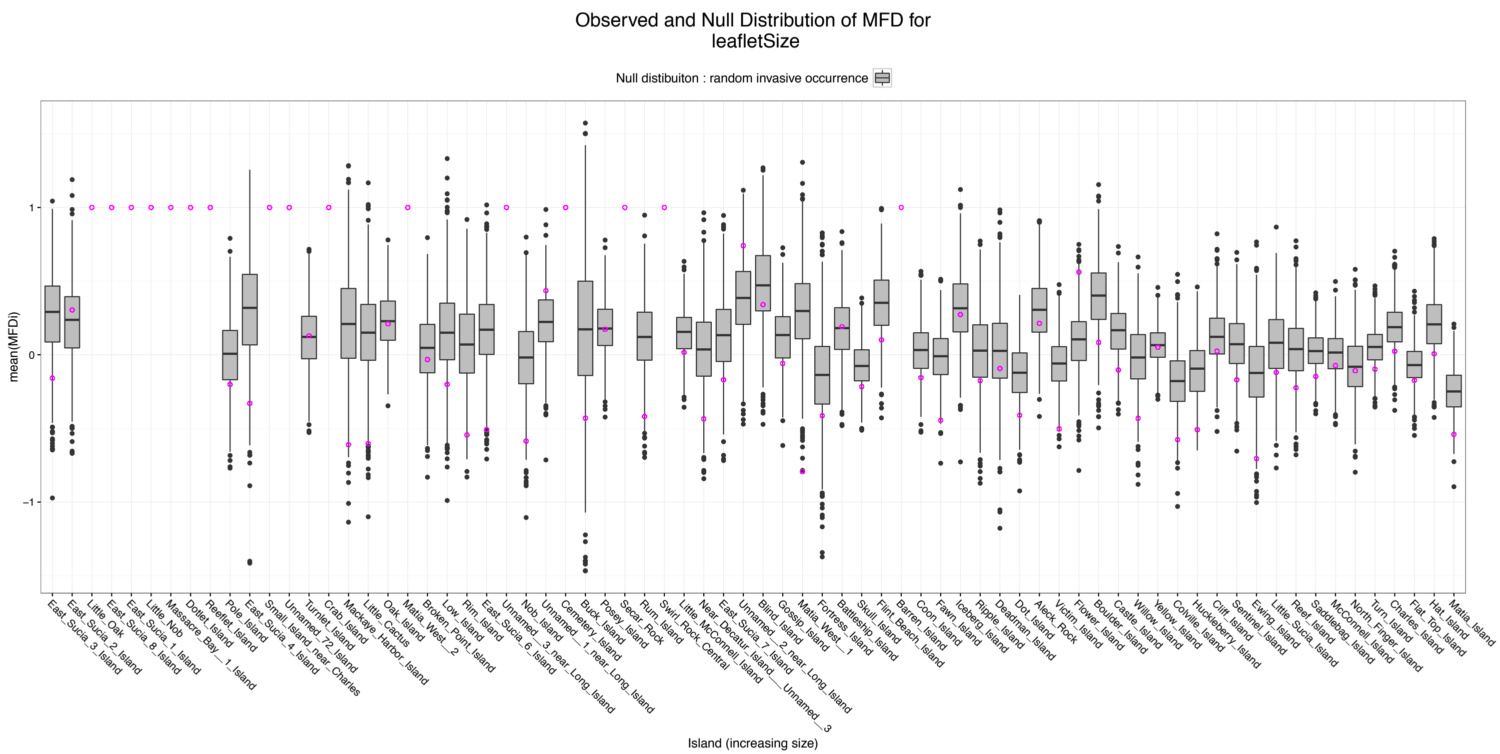
Observed and Null Distribution of MFD for
seedMass
Null distibuiton : random invasive occurrence
mean(MFDi)
2
1
0
−1
−2
East_Sucia_3_Island
East_Sucia_2_Island
Little_Oak
East_Sucia_8_Island
East_Sucia_1_Island
Little_Nob
Massacre_Bay__1_Island
Dotlet_Island
Reeflet_Island
Pole_Island
East_Sucia_4_Island
Small_Island_near_Charles
Unnamed_72_Island
Turnlet_Island
Crab_Island
Mackaye_Harbor_Island
Little_Cactus
Oak_Island
Matia_West__2
Broken_Point_Island
Low_Island
Rim_Island
East_Sucia_6_Island
Unnamed__3_near_Long_Island
Nob_Island
Unnamed__1_near_Long_Island
Cemetery_Island
Buck_Island
Posey_Island
Secar_Rock
Rum_Island
Swirl_Rock_Central
Little_McConnell_Island
Near_Decatur_Island__Unnamed__3
East_Sucia_7_Island
Unnamed__2_near_Long_Island
Blind_Island
Gossip_Island
Matia_West__1
Fortress_Island
Battleship_Island
Skull_Island
Flint_Beach_Island
Barren_Island
Coon_Island
Fawn_Island
Iceberg_Island
Ripple_Island
Deadman_Island
Dot_Island
Aleck_Rock
Victim_Island
Flower_Island
Boulder_Island
Castle_Island
Willow_Island
Yellow_Island
Colville_Island
Huckleberry_Island
Cliff_Island
Sentinel_Island
Ewing_Island
Little_Sucia_Island
Reef_Island
Saddlebag_Island
McConnell_Island
North_Finger_Island
Turn_Island
Charles_Island
Flat_Top_Island
Hat_Island
Matia_Island
Island (increasing size)



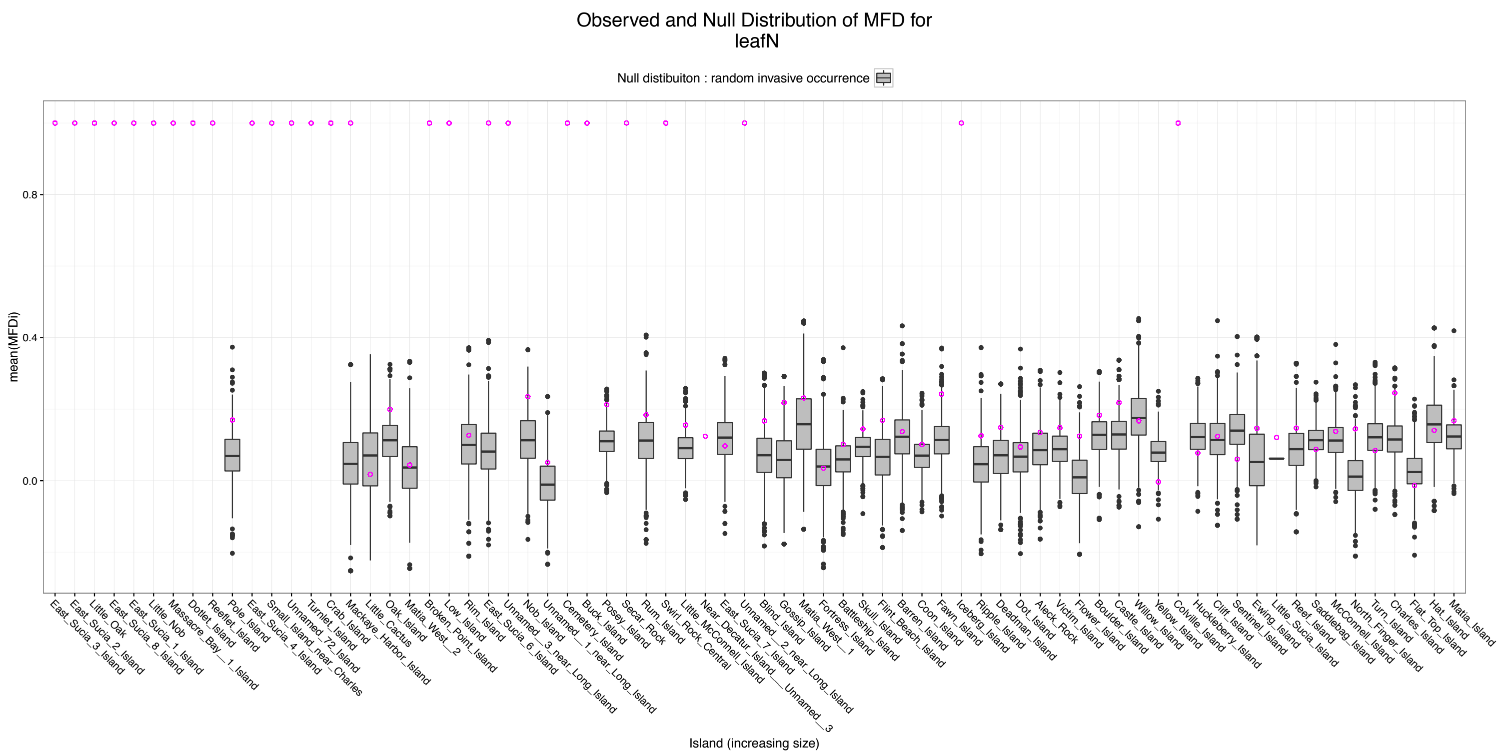
Observed and Null Distribution of MFD for
maxHeight
Null distibuiton : random invasive occurrence
mean(MFDi)
1.5
1.0
0.5
0.0
−0.5
−1.0
Island (increasing size)
East_Sucia_3_Island
East_Sucia_2_Island
Little_Oak
East_Sucia_8_Island
East_Sucia_1_Island
Little_Nob
Massacre_Bay__1_Island
Dotlet_Island
Reeflet_Island
Pole_Island
East_Sucia_4_Island
Small_Island_near_Charles
Unnamed_72_Island
Turnlet_Island
Crab_Island
Mackaye_Harbor_Island
Little_Cactus
Oak_Island
Matia_West__2
Broken_Point_Island
Low_Island
Rim_Island
East_Sucia_6_Island
Unnamed__3_near_Long_Island
Nob_Island
Unnamed__1_near_Long_Island
Cemetery_Island
Buck_Island
Posey_Island
Secar_Rock
Rum_Island
Swirl_Rock_Central
Little_McConnell_Island
Near_Decatur_Island___Unnamed__3
East_Sucia_7_Island
Unnamed__2_near_Long_Island
Blind_Island
Gossip_Island
Matia_West__1
Fortress_Island
Battleship_Island
Skull_Island
Flint_Beach_Island
Barren_Island
Coon_Island
Fawn_Island
Iceberg_Island
Ripple_Island
Deadman_Island
Dot_Island
Aleck_Rock
Victim_Island
Flower_Island
Boulder_Island
Castle_Island
Willow_Island
Yellow_Island
Colville_Island
Huckleberry_Island
Cliff_Island
Sentinel_Island
Ewing_Island
Little_Sucia_Island
Reef_Island
Saddlebag_Island
McConnell_Island
North_Finger_Island
Turn_Island
Charles_Island
Flat_Top_Island
Hat_Island
Matia_Island



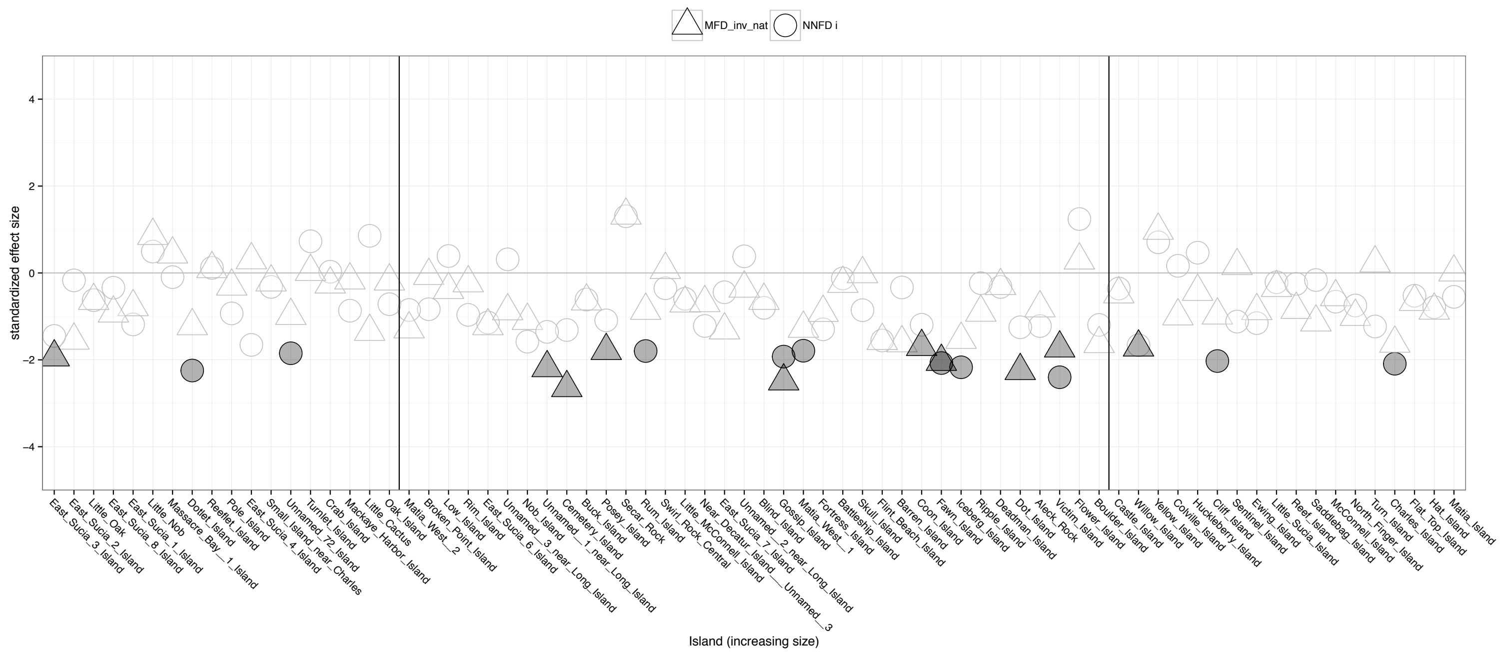
Observed and Null Distribution of MFD for
sla
Null distibuiton : random invasive occurrence
mean(MFDi)
1.0
0.5
0.0
−0.5
East_Sucia_3_Island
East_Sucia_2_Island
Little_Oak
East_Sucia_8_Island
East_Sucia_1_Island
Little_Nob
Massacre_Bay__1_Island
Dotlet_Island
Reeflet_Island
Pole_Island
East_Sucia_4_Island
Small_Island_near_Charles
Unnamed_72_Island
Turnlet_Island
Crab_Island
Mackaye_Harbor_Island
Little_Cactus
Oak_Island
Matia_West__2
Broken_Point_Island
Low_Island
Rim_Island
East_Sucia_6_Island
Unnamed__3_near_Long_Island
Nob_Island
Unnamed__1_near_Long_Island
Cemetery_Island
Buck_Island
Posey_Island
Secar_Rock
Rum_Island
Swirl_Rock_Central
Little_McConnell_Island
Near_Decatur_Island___Unnamed__3
East_Sucia_7_Island
Unnamed__2_near_Long_Island
Blind_Island
Gossip_Island
Matia_West__1
Fortress_Island
Battleship_Island
Skull_Island
Flint_Beach_Island
Barren_Island
Coon_Island
Fawn_Island
Iceberg_Island
Ripple_Island
Deadman_Island
Dot_Island
Aleck_Rock
Victim_Island
Flower_Island
Boulder_Island
Castle_Island
Willow_Island
Yellow_Island
Colville_Island
Huckleberry_Island
Cliff_Island
Sentinel_Island
Ewing_Island
Little_Sucia_Island
Reef_Island
Saddlebag_Island
McConnell_Island
North_Finger_Island
Turn_Island
Charles_Island
Flat_Top_Island
Hat_Island
Matia_Island
Island (increasing size)



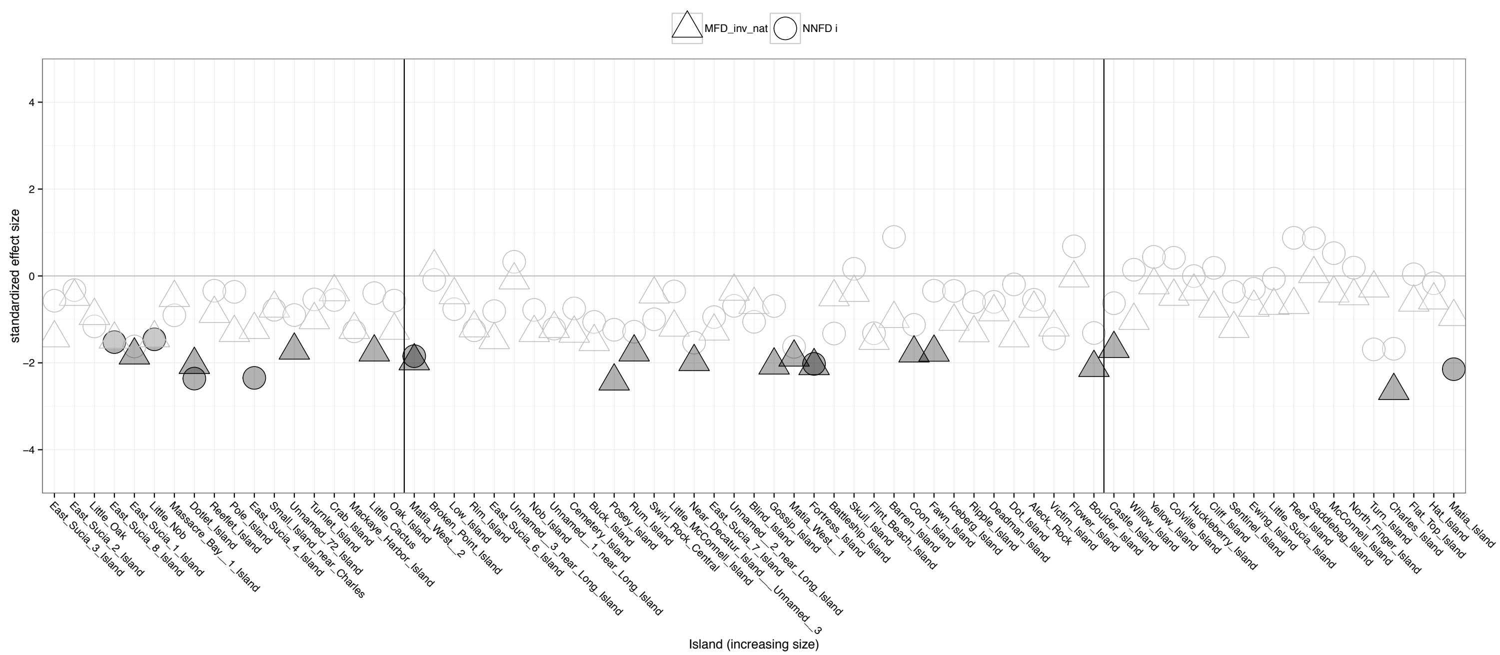
Observed and Null Distribution of MFD for
leafletSize
Null distibuiton : random invasive occurrence
mean(MFDi)
1
0
−1
East_Sucia_3_Island
East_Sucia_2_Island
Little_Oak
East_Sucia_8_Island
East_Sucia_1_Island
Little_Nob
Massacre_Bay__1_Island
Dotlet_Island
Reeflet_Island
Pole_Island
East_Sucia_4_Island
Small_Island_near_Charles
Unnamed_72_Island
Turnlet_Island
Crab_Island
Mackaye_Harbor_Island
Little_Cactus
Oak_Island
Matia_West__2
Broken_Point_Island
Low_Island
Rim_Island
East_Sucia_6_Island
Unnamed__3_near_Long_Island
Nob_Island
Unnamed__1_near_Long_Island
Cemetery_Island
Buck_Island
Posey_Island
Secar_Rock
Rum_Island
Swirl_Rock_Central
Little_McConnell_Island
Near_Decatur_Island___Unnamed__3
East_Sucia_7_Island
Unnamed__2_near_Long_Island
Bird_Island
Gossip_Island
Matia_West__1
Fortress_Island
Battleship_Island
Skull_Island
Flint_Beach_Island
Barren_Island
Coon_Island
Fawn_Island
Iceberg_Island
Ripple_Island
Deadman_Island
Dot_Island
Aleck_Rock
Victim_Island
Flower_Island
Boulder_Island
Castle_Island
Willow_Island
Yellow_Island
Colville_Island
Huckleberry_Island
Cliff_Island
Sentinel_Island
Ewing_Island
Little_Sucia_Island
Reef_Island
Saddlebag_Island
McConnell_Island
North_Finger_Island
Turn_Island
Charles_Island
Flat_Top_Island
Hat_Island
Matia_Island
Island (increasing size)

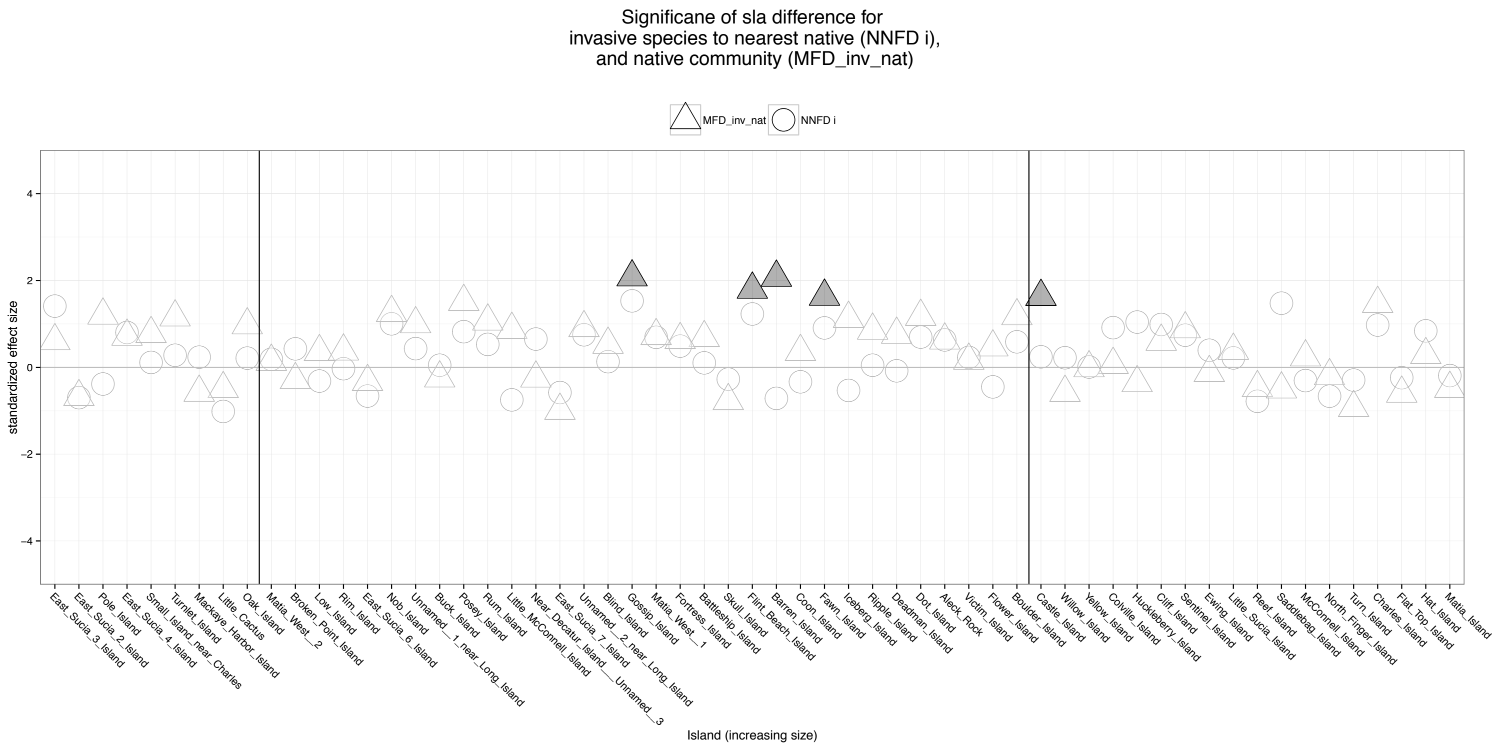

Observed and Null Distribution of MFD for
leafN
Null distibuiton : random invasive occurrence
mean(MFDi)
0.8
0.4
0.0
East_Sucia_3_Island
East_Sucia_2_Island
Little_Oak
East_Sucia_8_Island
East_Sucia_1_Island
Little_Nob
Massacre_Bay__1_Island
Dotlet_Island
Reeflet_Island
Pole_Island
East_Sucia_4_Island
Small_Island_near_Charles
Unnamed_72_Island
Turnlet_Island
Crab_Island
Mackaye_Harbor_Island
Little_Cactus
Oak_Island
Matia_West__2
Broken_Point_Island
Low_Island
Rim_Island
East_Sucia_6_Island
Unnamed__3_near_Long_Island
Nob_Island
Unnamed__1_near_Long_Island
Cemetery_Island
Buck_Island
Posey_Island
Secar_Rock
Rum_Island
Swirl_Rock_Central
Little_McConnell_Island
Near_Decatur_Island___Unnamed__3
East_Sucia_7_Island
Unnamed__2_near_Long_Island
Blind_Island
Gossip_Island
Matia_West__1
Fortress_Island
Battleship_Island
Skull_Island
Flint_Beach_Island
Barren_Island
Coon_Island
Fawn_Island
Iceberg_Island
Ripple_Island
Deadman_Island
Dot_Island
Aleck_Rock
Victim_Island
Flower_Island
Boulder_Island
Castle_Island
Willow_Island
Yellow_Island
Colville_Island
Huckleberry_Island
Cliff_Island
Sentinel_Island
Ewing_Island
Little_Sucia_Island
Reef_Island
Saddlebag_Island
McConnell_Island
North_Finger_Island
Turn_Island
Charles_Island
Flat_Top_Island
Hat_Island
Matia_Island
Island (increasing size)

Significane of seedMass difference for
invasive species to nearest native (NNFD i),
and native community (MFD_inv_nat)

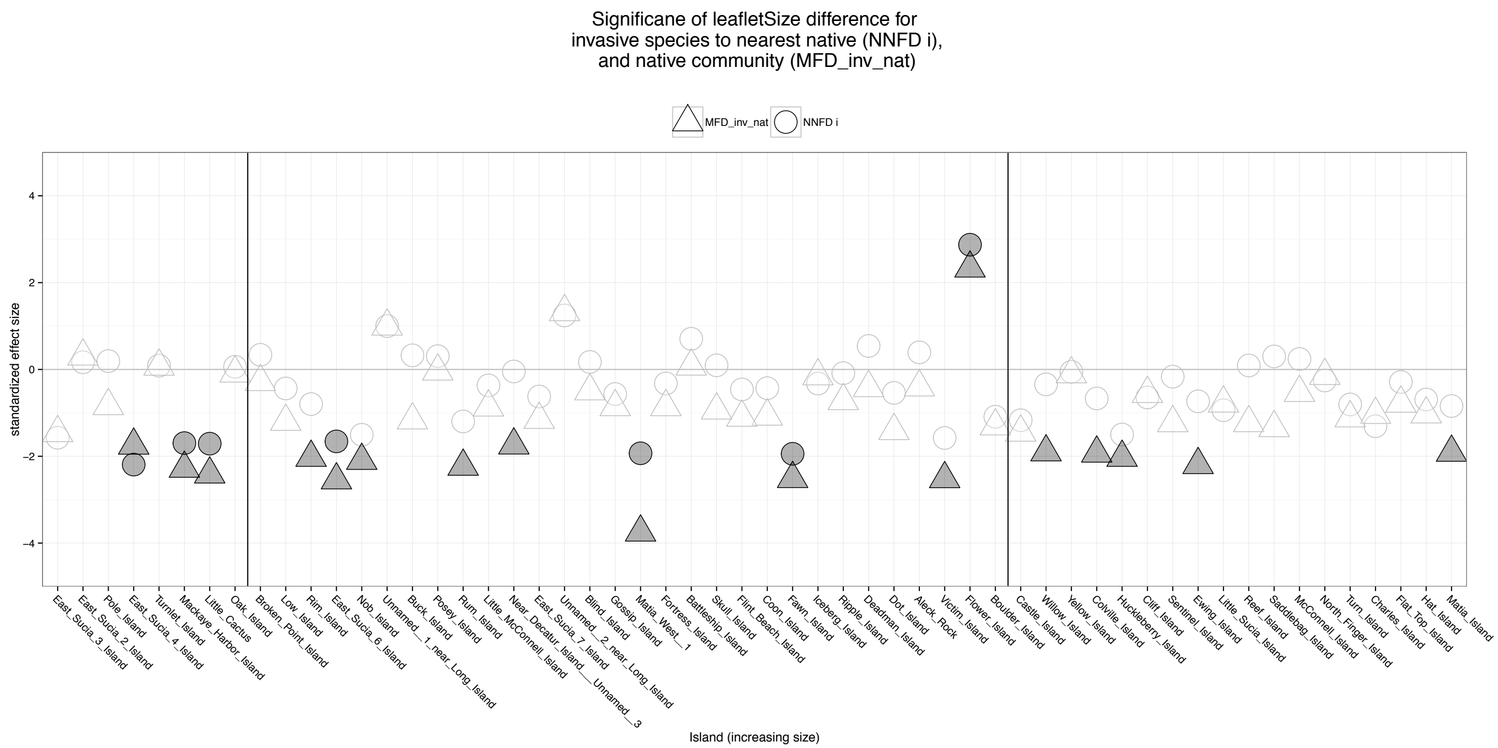


Significane of maxHeight difference for
invasive species to nearest native (NNFD i),
and native community (MFD_inv_nat)

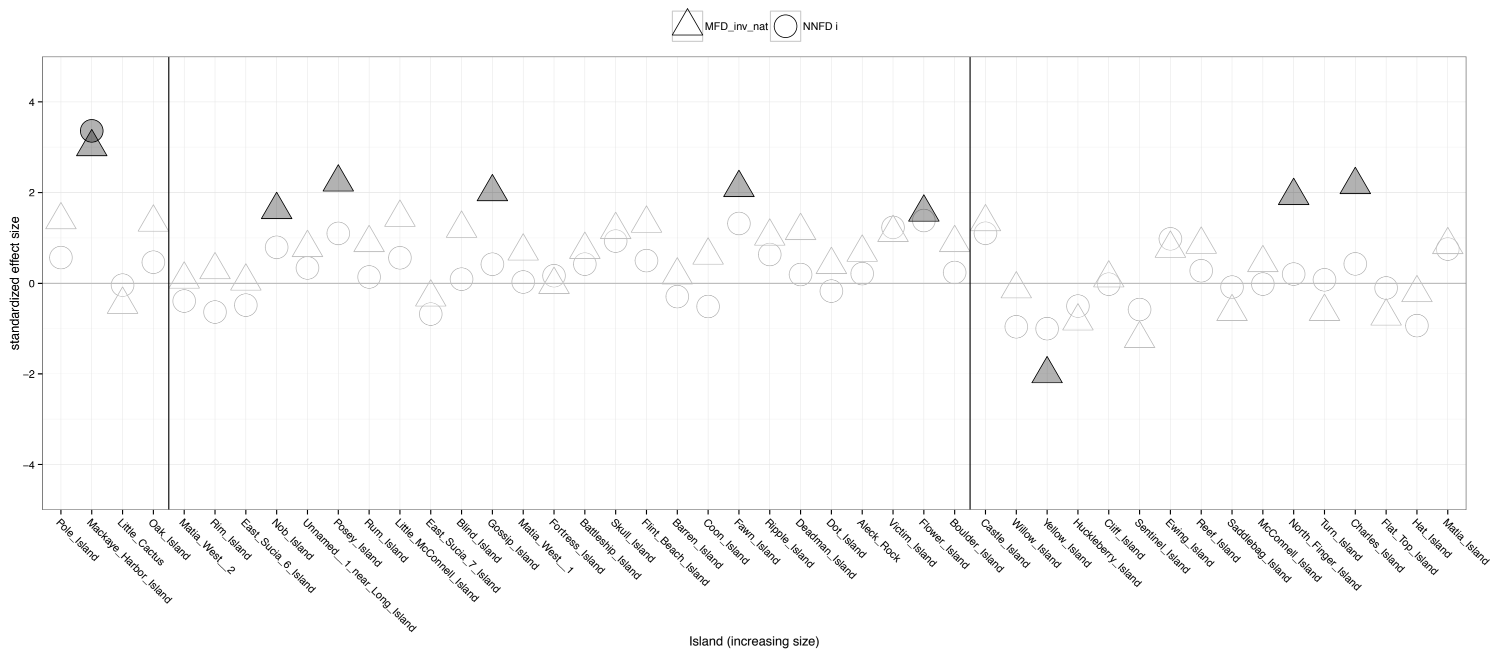




Significane of sla difference for
invasive species to nearest native (NNFD i),
and native community (MFD_inv_nat)
MFD_inv_nat
NNFD i
standardized effect size
4
2
0
−2
−4
East_Sucia_3_Island
East_Sucia_2_Island
Pole_Island
East_Sucia_4_Island
Small_Island_near_Charles
Turnlet_Island
Mackaye_Harbor_Island
Little_Cactus
Oak_Island
Matia_West__2
Broken_Point_Island
Low_Island
Rim_Island
East_Sucia_6_Island
Nob_Island
Unnamed__1_near_Long_Island
Buck_Island
Posey_Island
Rum_Island
Little_McConnell_Island
Near_Decatur_Island___Unnamed__3
East_Sucia_7_Island
Unnamed__2_near_Long_Island
Blind_Island
Gossip_Island
Matia_West__1
Fortress_Island
Battleship_Island
Skull_Island
Flint_Beach_Island
Barren_Island
Coon_Island
Fawn_Island
Iceberg_Island
Ripple_Island
Deadman_Island
Dot_Island
Aleck_Rock
Victim_Island
Flower_Island
Boulder_Island
Castle_Island
Willow_Island
Yellow_Island
Colville_Island
Huckleberry_Island
Cliff_Island
Sentinel_Island
Ewing_Island
Little_Sucia_Island
Reef_Island
Saddlebag_Island
McConnell_Island
North_Finger_Island
Turn_Island
Charles_Island
Flat_Top_Island
Hat_Island
Matia_Island
Island (increasing size)


Significane of leafletSize difference for
invasive species to nearest native (NNFD i),
and native community (MFD_inv_nat)
MFD_inv_nat
NNFD i
standardized effect size
4
2
0
−2
−4
East_Sucia_3_Island
East_Sucia_2_Island
Pole_Island
East_Sucia_4_Island
Turnlet_Island
Mackaye_Harbor_Island
Little_Cactus
Oak_Island
Broken_Point_Island
Low_Island
Rim_Island
East_Sucia_6_Island
Nob_Island
Unnamed__1_near_Long_Island
Buck_Island
Posey_Island
Rum_Island
Little_McConnell_Island
Near_Decatur_Island__Unnamed__3
East_Sucia_7_Island
Unnamed__2_near_Long_Island
Blind_Island
Gossip_Island
Matia_West__1
Fortress_Island
Battleship_Island
Skull_Island
Flint_Beach_Island
Coon_Island
Fawn_Island
Iceberg_Island
Ripple_Island
Deadman_Island
Dot_Island
Aleck_Rock
Victim_Island
Flower_Island
Boulder_Island
Castle_Island
Willow_Island
Yellow_Island
Colville_Island
Huckleberry_Island
Cliff_Island
Sentinel_Island
Ewing_Island
Little_Sucia_Island
Reef_Island
Saddlebag_Island
McConnell_Island
North_Finger_Island
Turn_Island
Charles_Island
Flat_Top_Island
Hat_Island
Matia_Island
Island (increasing size)

Significane of leafN difference for
invasive species to nearest native (NNFD i),
and native community (MFD_inv_nat)



APPENDIX B

Supplementary Information to Chapter 3

B.1 Écrins community matrix and summary

Table B.1.1: Matrix with the endemic status for each species and their presence in each of the three species pools (the 'Regional' Écrins National Park, 'All Summits' together, and species that occur in areas that persisted through the 'LGM').

Species name	Endemic	Regional	All Summits	LGM	Aiguille du plat de la Selle	Barre des Ecrins	la Meije	le Sirac	les Rouies	l'Olan	Mont Pelvoux	Occidentale l'Ailefroide	Pointe Brevoort	Pointes de Burlan	Rocher de la Selle	Tour Choisy	Tête de la Muraillette	le Rateau	Signal du Lauvitel
Abies alba	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acer campestre	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acer monspessulanum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acer opalus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acer platanoides	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acer pseudoplatanus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Achillea distans	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Achillea millefolium	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	✓	-
Achillea nobilis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Achillea roseo	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Achnatherum calamagrostis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acinos alpinus	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	✓	-
Aconitum anthora	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aconitum laeve	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aconitum variegatum	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Actaea spicata	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Adenostyles alliariae	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Adenostyles alpina	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-
Adenostyles leucophylla	✓	✓	✓	-	-	-	-	✓	-	-	-	-	-	-	✓	-	-	-	-
Adonis aestivalis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Adoxa moschatellina	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aegopodium podagraria	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aethionema saxatile	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aethusa cynapium	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Agrestis alpina	-	✓	✓	✓	-	-	✓	✓	-	-	-	-	✓	-	✓	-	✓	✓	✓
Agrestis rupestris	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	-	-	✓	-	-	✓	✓
Agrimonia eupatoria	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Agrostis agrostiflora	-	✓	✓	✓	-	-	-	✓	-	-	-	-	-	-	✓	-	-	✓	-
Agrostis capillaris	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-
Agrostis stolonifera	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ajuga chamaepitys	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ajuga genevensis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ajuga pyramidalis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ajuga reptans	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alchemilla alpina	-	✓	✓	✓	✓	-	✓	✓	✓	✓	-	-	-	-	✓	-	-	✓	✓
Alchemilla baltica	-	✓	✓	✓	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	✓

Continued on next page

Table b.1.1 – continued from previous page

Species name	Endemic	Regional	All Summits	LGM	Aiguille du plat de la Selle	Barre des Ecrins	la Meije	le Sirac	les Rouies	l'Olan	Mont Pelvoux	Occidentale l'Ailefroide	Pointe Brevoort	Pointes de Burlan	Rocher de la Selle	Tour Choisy	Tête de la Muraillette	le Rateau	Signal du Lauvitel
Alchemilla conjuncta	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alchemilla connivens	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alchemilla fissa	-	✓	✓	✓	-	-	-	✓	-	-	-	-	-	-	-	-	✓	✓	✓
Alchemilla flabellata	-	✓	✓	✓	-	✓	-	✓	-	-	-	-	-	-	-	-	✓	✓	✓
Alchemilla glabra	-	✓	✓	✓	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	✓
Alchemilla glaucescens	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	✓	✓
Alchemilla gracilis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alchemilla incisa	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-
Alchemilla monticola	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alchemilla NA	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	✓	-
Alchemilla pentaphyllea	-	✓	✓	✓	✓	-	-	✓	-	✓	-	-	-	-	✓	-	-	-	-
Alchemilla plicata	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alchemilla saxatilis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alchemilla subcrenata	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alchemilla transiens	-	✓	✓	✓	-	-	-	✓	-	-	-	-	-	-	-	-	-	✓	-
Alchemilla xanthochlora	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-
Alisma plantago aquatica	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alliaria petiolata	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Allium lineare	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Allium oleraceum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Allium schoenoprasum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Allium scorodoprasum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Allium senescens	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Allium tauricum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Allium ursinum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Allium victorialis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alnus glutinosa	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alnus incana	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alnus viridis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alopecurus magellanicus	-	✓	✓	✓	-	-	-	✓	-	-	-	-	-	-	-	-	✓	-	-
Alopecurus myosuroides	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alsinanthus biflorus	-	✓	✓	✓	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-
Alyssoides utriculata	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alyssum alpestre	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alyssum alyssoides	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Amelanchier ovalis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Amygdalus communis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Androrchis pallens	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Androsace carnea	✓	✓	✓	-	-	-	-	-	-	✓	-	-	-	-	✓	-	-	-	-
Androsace helvetica	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Androsace maxima	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Androsace obtusifolia	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	-	✓	-	✓
Androsace vandellii	-	✓	✓	✓	-	-	✓	-	✓	-	-	-	-	-	-	-	-	✓	-
Androsace vitaliana	✓	✓	✓	✓	-	-	-	✓	-	-	-	-	-	-	-	-	-	✓	-
Anemone narcissiflora	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anemonoides baldensis	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	✓
Anemonoides ranunculoides	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Angelica sylvestris	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antennaria carpatica	-	✓	✓	✓	-	✓	-	-	-	-	-	✓	-	-	✓	-	-	-	-
Antennaria dioica	-	✓	✓	✓	-	-	-	✓	-	-	✓	-	-	-	✓	-	✓	✓	-
Anthericum liliago	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anthoxanthum odoratum	-	✓	✓	✓	✓	✓	-	✓	-	✓	✓	-	-	-	✓	-	-	✓	✓
Anthriscus sylvestris	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Continued on next page

Table b.1.1 – continued from previous page

Species name	Endemic	Regional	All Summits	LGM	Aiguille du plat de la Selle	Barre des Ecrins	la Meije	le Sirac	les Rouies	l'Olan	Mont Pelvoux	Occidentale l'Ailefroide	Pointe Brevoort	Pointes de Burlan	Rocher de la Selle	Tour Choisy	Tête de la Muraillette	le Rateau	Signal du Lauvitel
Anthyllis montana	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anthyllis vulneraria	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antirrhinum majus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aquilegia vulgaris	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arabidopsis thaliana	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arabis allionii	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arabis alpina	-	✓	✓	✓	-	-	✓	✓	✓	✓	-	-	-	-	✓	-	-	✓	✓
Arabis auriculata	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arabis caerulea	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arabis ciliata	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arabis collina	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arabis hirsuta	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arabis nova	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arabis sagittata	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arabis soyeri	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arctium minus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arctium nemorosum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arctostaphylos uva ursi	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arenaria gothica	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arenaria serpyllifolia	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aretia pubescens	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	✓	✓	-	✓	✓	-	-	-
Armeria alpina	-	✓	✓	✓	-	-	-	-	-	✓	-	-	-	-	✓	-	✓	-	✓
Armeria arenaria	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-
Arnica montana	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arrhenatherum elatius	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arrhenatherum parlatorei	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Artemisia absinthium	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Artemisia alba	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Artemisia atrata	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Artemisia campestris	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Artemisia genipi	✓	✓	✓	✓	-	-	-	✓	✓	-	-	✓	-	-	-	-	-	-	-
Artemisia umbelliformis	-	✓	✓	✓	-	-	✓	-	✓	✓	-	✓	✓	✓	✓	✓	✓	✓	✓
Artemisia vulgaris	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arum maculatum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aruncus dioicus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asarum europaeum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asparagus tenuifolius	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asperugo procumbens	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asperula cynanchica	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asphodelus albus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asphodelus macrocarpus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asplenium adiantum nigrum	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-
Asplenium ceterach	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asplenium exiguum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asplenium ramosum	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	✓
Asplenium ruta muraria	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asplenium septentrionale	-	✓	✓	✓	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-
Asplenium trichomanes	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-
Asplenium viride	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aster alpinus	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	-	✓	-	-
Astragalus alpinus	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	-	✓	-	✓
Astragalus australis	✓	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	✓
Astragalus austriacus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Table b.1.1 – continued from previous page

Species name	Endemic	Regional	All Summits	LGM	Aiguille du plat de la Selle	Barre des Ecrins	la Meije	le Sirac	les Rouies	l'Olan	Mont Pelvoux	Occidentale l'Ailefroide	Pointe Brevoort	Pointes de Burlan	Rocher de la Selle	Tour Choisy	Tête de la Muraillette	le Rateau	Signal du Lauvitel
Astragalus cicer	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Astragalus danicus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Astragalus depressus	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Astragalus glycyphyllos	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Astragalus monspessulanus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Astragalus onobrychis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Astragalus penduliflorus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Astragalus sempervirens	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Astragalus stella	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Astragalus vesicarius	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Astrantia major	-	✓	✓	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-
Athamanta cretensis	-	✓	✓	✓	-	-	-	-	-	✓	-	-	-	-	✓	-	-	-	-
Athyrium alpestre	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Athyrium filix femina	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Atocion rupestre	-	✓	✓	✓	-	-	✓	✓	-	-	-	-	-	-	✓	-	-	-	✓
Atragene alpina	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Atropa belladonna	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aucuba NA	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barbarea intermedia	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barbarea vulgaris	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bartsia alpina	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	✓	-
Bellardiochloa variegata	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bellidiastrum michelii	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Berardia subacaulis	✓	✓	✓	✓	-	-	-	✓	-	-	-	-	-	-	✓	-	-	-	-
Berberis vulgaris	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Betonica officinalis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Betula pendula	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Betula pubescens	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Biscutella laevigata	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bistorta officinalis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bistorta vivipara	-	✓	✓	✓	-	-	-	✓	-	✓	-	✓	-	-	✓	-	✓	-	✓
Bitteria digitata	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Blackstonia perfoliata	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Blechnum spicant	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Blysmus compressus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bombycilaena erecta	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bothriochloa ischaemum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Botrychium lunaria	-	✓	✓	✓	-	-	-	✓	-	✓	-	-	-	-	✓	-	-	✓	✓
Botrychium NA	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Brachypodium pinnatum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Brachypodium rupestre	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Brachypodium sylvaticum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Brassica repanda	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Briza media	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromus benekenii	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromus erectus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromus hordeaceus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromus inermis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromus squarrosus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromus sterilis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromus tectorum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bryonia cretica	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Buddleja davidii	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Continued on next page

Table b.1.1 – continued from previous page

Species name	Endemic	Regional	All Summits	LGM	Aiguille du plat de la Selle	Barre des Ecrins	la Meije	le Sirac	les Rouies	l'Olan	Mont Pelvoux	Occidentale l'Ailefroide	Pointe Brevoort	Pointes de Burlan	Rocher de la Selle	Tour Choisy	Tête de la Muraillette	le Rateau	Signal du Lauvitel
Buglossoides arvensis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Buglossoides incrassata	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bunias orientalis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bunium bulbocastanum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Buphthalmum salicifolium	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bupleurum falcatum	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bupleurum petraeum	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bupleurum ranunculoides	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bupleurum rotundifolium	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bupleurum stellatum	-	✓	✓	✓	-	-	-	✓	-	✓	✓	-	-	-	✓	-	-	-	-
Buxus sempervirens	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cacalia alliariae	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Cacalia alpina	-	✓	✓	✓	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-
Cacalia leucophylla	-	✓	✓	✓	✓	✓	✓	-	✓	✓	-	✓	-	✓	✓	-	✓	✓	✓
Calamagrostis epigejos	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calamagrostis pseudophragmites	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calamagrostis schraderiana	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calamagrostis varia	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calamagrostis villosa	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calathiana bavarica	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calathiana brachyphylla	-	✓	✓	✓	-	-	-	-	-	✓	-	-	-	-	✓	-	✓	-	✓
Calathiana orbicularis	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	✓
Calathiana verna	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-
Callianthemum coriandrifolium	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Calluna vulgaris	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caltha palustris	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calystegia sepium	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Camelina microcarpa	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Campanula alpestris	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-
Campanula cenisia	✓	✓	✓	✓	-	-	-	✓	✓	-	-	-	-	✓	✓	-	✓	-	✓
Campanula glomerata	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Campanula latifolia	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Campanula linifolia	-	✓	✓	✓	✓	✓	✓	✓	✓	-	-	✓	-	✓	✓	-	-	✓	✓
Campanula NA	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Campanula patula	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Campanula persicifolia	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Campanula rapunculoides	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Campanula rhomboidalis	✓	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-
Campanula rotundifolia	✓	✓	✓	✓	-	-	✓	✓	✓	-	-	-	-	✓	✓	-	✓	✓	✓
Campanula spicata	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Campanula trachelium	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Capsella bursa pastoris	-	✓	✓	✓	-	-	-	✓	-	-	-	-	-	-	-	-	-	✓	-
Cardamine alpina	-	✓	✓	-	-	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-
Cardamine bellidifolia	-	✓	✓	✓	-	-	✓	-	-	-	-	-	-	-	✓	-	-	✓	-
Cardamine heptaphylla	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cardamine hirsuta	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cardamine impatiens	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cardamine pentaphyllos	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cardamine resedifolia	-	✓	✓	✓	✓	-	✓	-	✓	✓	-	-	-	-	✓	✓	-	✓	-
Carduus acanthoides	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carduus carlinifolius	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-
Carduus defloratus	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-
Carduus medius	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	✓	-

Continued on next page

Table b.1.1 – continued from previous page

Species name	Endemic	Regional	All Summits	LGM	Aiguille du plat de la Selle	Barre des Ecrins	la Meije	le Sirac	les Rouies	l'Olan	Mont Pelvoux	Occidentale l'Ailefroide	Pointe Brevoort	Pointes de Burlan	Rocher de la Selle	Tour Choisy	Tête de la Muraillette	le Rateau	Signal du Lauvitel
Carduus nutans	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carduus personata	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carex acutiformis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carex alba	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carex atrata	-	✓	✓	✓	-	✓	-	-	-	-	-	✓	-	-	✓	-	✓	✓	✓
Carex bicolor	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-
Carex capillaris	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carex caryophyllea	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carex cespitosa	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carex chillanensis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carex davalliana	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carex digitata	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-
Carex echinata	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carex ferruginea	-	✓	✓	✓	✓	✓	-	✓	-	✓	-	✓	-	✓	✓	-	✓	✓	✓
Carex flacca	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carex flava	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carex foetida	-	✓	✓	✓	✓	-	-	✓	-	-	-	-	-	-	✓	-	✓	-	✓
Carex frigida	-	✓	✓	✓	-	-	-	✓	✓	-	-	-	-	-	✓	-	-	✓	-
Carex hirta	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carex hordeistichos	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carex hostiana	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carex humilis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carex liparocarpos	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carex macloviana	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carex montana	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carex muricata	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carex NA	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carex pallescens	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carex panicea	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carex planostachys	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carex rostrata	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carex rupestris	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-
Carex spicata	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carex sylvatica	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carex vesicaria	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carex viridula	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carex vulpina	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carlina acanthifolia	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carlina acaulis	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-
Carlina biebersteinii	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carlina vulgaris	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carum carvi	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cassida alpina	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	✓	-
Catananche caerulea	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caucalis platycarpos	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cedrus atlantica	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Centaurea jacea	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Centaurea NA	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Centaurea scabiosa	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Centaurea solstitialis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Centaurea stoebe	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Centaurea uniflora	✓	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-
Centaurium erythraea	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Continued on next page

Table b.1.1 – continued from previous page

Species name	Endemic	Regional	All Summits	LGM	Aiguille du plat de la Selle	Barre des Ecrins	la Meije	le Sirac	les Rouies	l'Olan	Mont Pelvoux	Occidentale l'Ailefroide	Pointe Brevoort	Pointes de Burlan	Rocher de la Selle	Tour Choisy	Tête de la Muraillette	le Rateau	Signal du Lauvitel
Centranthus angustifolius	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Centranthus calcitrapae	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cephalanthera damasonium	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cephalanthera longifolia	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cephalaria alpina	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cerastium alpinum	-	✓	✓	✓	-	-	-	-	✓	-	-	-	-	-	✓	-	-	-	✓
Cerastium arvense	✓	✓	✓	✓	-	✓	-	✓	-	-	-	-	-	-	✓	-	-	✓	✓
Cerastium cerastoides	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	-	✓	-	✓
Cerastium fontanum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cerastium latifolium	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	✓
Cerastium pedunculatum	✓	✓	✓	✓	-	✓	✓	-	✓	✓	-	✓	-	-	✓	-	✓	✓	✓
Cerastium pumilum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cerastium semidecandrum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cerastium uniflorum	-	✓	✓	✓	-	✓	-	-	-	✓	-	-	✓	-	✓	✓	✓	-	✓
Cerasus avium	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cerinthe glabra	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cerinthe minor	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chaenorhinum rubrifolium	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chaenorrhinum minus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chaerophyllum aureum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chaerophyllum temulum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chaerophyllum villarsii	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chamaedrys montana	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chamaenerion montanum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chamerion dodonaei	-	✓	✓	✓	-	-	✓	-	✓	-	-	✓	-	✓	-	-	-	✓	-
Chamorchis alpina	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chara Linnaeus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chelidonium majus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chenopodium album	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chenopodium bonus henricus	-	✓	✓	✓	-	-	-	✓	-	-	-	-	-	-	-	-	-	✓	✓
Chondrilla juncea	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysosplenium alternifolium	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cichorium intybus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cirsium acaule	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-
Cirsium arvense	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cirsium eriophorum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cirsium monspessulanum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cirsium NA	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cirsium palustre	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cirsium spinosissimum	✓	✓	✓	✓	✓	-	-	✓	✓	✓	-	-	-	-	✓	-	-	✓	✓
Cirsium vulgare	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cladium mariscus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Clematis vitalba	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Clinopodium acinos	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Clinopodium alpinum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Clinopodium grandiflorum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Clinopodium nepeta	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Clinopodium vulgare	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Coincya monensis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Coincya richeri	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Colchicum alpinum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Colchicum autumnale	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Colutea arborescens	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Table b.1.1 – continued from previous page

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Compl ment flore	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Consolida regalis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Convallaria majalis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Convolvulus arvensis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conyza canadensis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Corallorhiza trifida	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Coristospermum ferulaceum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cormus domestica	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Coronilla minima	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Coronilla vaginalis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Corydalis intermedia	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Corydalis solida	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Corylus avellana	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cotoneaster integerrimus	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-
Cotoneaster NA	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	✓	-
Cotoneaster tomentosus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crataegus laevigata	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crataegus monogyna	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crepis aurea	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crepis biennis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crepis conyzifolia	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crepis foetida	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crepis nicaeensis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crepis paludosa	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crepis pontana	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crepis pygmaea	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	✓	-
Crepis pyrenaica	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crepis vesicaria	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crocus vernus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cruciata glabra	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cruciata laevipes	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crupina vulgaris	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cryptogramma crispa	-	✓	✓	✓	-	✓	-	✓	-	✓	-	-	-	-	✓	-	✓	✓	✓
Cucubalus baccifer	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cuscuta epilinum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cuscuta epithymum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cuscuta europaea	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cuscuta planiflora	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanus montanus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanus segetum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cynoglossum officinale	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cynosurus cristatus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cypripedium calceolus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cystopteris dickieana	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cystopteris fragilis	-	✓	✓	✓	-	-	-	-	-	✓	-	-	-	-	✓	-	-	✓	✓
Cytisophyllum sessilifolium	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dactylis glomerata	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dactylorhiza fuchsii	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dactylorhiza incarnata	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dactylorhiza lapponica	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dactylorhiza maculata	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dactylorhiza majalis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dactylorhiza sambucina	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Continued on next page

Table b.1.1 – continued from previous page

Species name	Endemic	Regional	All Summits	LGM	Aiguille du plat de la Selle	Barre des Ecrins	la Meije	le Sirac	les Rouies	l'Olan	Mont Pelvoux	Occidentale l'Ailefroide	Pointe Brevoort	Pointes de Burlan	Rocher de la Selle	Tour Choisy	Tête de la Muraillette	le Rateau	Signal du Lauvitel
Dactylorhiza viridis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Danthonia decumbens	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Daphne alpina	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-
Daphne cneorum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Daphne laureola	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Daphne mezereum	-	✓	✓	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-
Dasistepha asclepiadea	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Daucus carota	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Deschampsia cespitosa	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Deschampsia flexuosa	-	✓	✓	✓	-	-	-	✓	-	-	-	-	-	-	✓	-	-	✓	-
Descurainia sophia	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Descurainia tanacetifolia	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dianthus carthusianorum	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dianthus caryophyllus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dianthus deltoides	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dianthus hyssopifolius	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dianthus pavonius	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Diaphyllum longifolium	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Digitalis grandiflora	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Digitalis lutea	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dioscorea communis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dittrichia graveolens	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Doronicum grandiflorum	-	✓	✓	✓	-	✓	-	-	-	-	-	-	-	-	✓	-	✓	✓	✓
Doronicum pardalianches	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dorycnium pentaphyllum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Draba aizoides	✓	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	-	✓	-	✓
Draba dubia	-	✓	✓	✓	✓	-	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓
Draba fladnizensis	-	✓	✓	✓	-	✓	✓	-	-	✓	-	-	-	-	✓	-	-	-	✓
Draba siliquosa	-	✓	✓	✓	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-
Draba verna	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dracocephalum ruyschiana	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Drosera rotundifolia	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dryas octopetala	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	✓	-	-	✓	-	-
Dryopteris dilatata	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dryopteris expansa	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dryopteris filix mas	-	✓	✓	✓	-	-	-	✓	✓	-	-	-	-	-	✓	-	-	✓	✓
Dryopteris mindshelkensis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Echinops ritro	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Echinops sphaerocephalus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Echium vulgare	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ecologie verticale	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Edritria ferruginea	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Eleocharis macrostachya	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Eleocharis mamillata	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Eleocharis quinqueflora	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Eleocharis uniglumis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Elymus caninus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Elymus NA	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Elymus repens	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Elytrigia intermedia	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Empetrum nigrum	-	✓	✓	✓	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-
Epilobium alpestre	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Epilobium alsinifolium	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	✓	-

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Table b.1.1 – continued from previous page

Species name	Endemic	Regional	All Summits	LGM	Aiguille du plat de la Selle	Barre des Ecrins	la Meije	le Sirac	les Rouies	l'Olan	Mont Pelvoux	Occidentale l'Ailefroide	Pointe Brevoort	Pointes de Burlan	Rocher de la Selle	Tour Choisy	Tête de la Muraillette	le Rateau	Signal du Lauvitel
Epilobium anagallidifolium	-	✓	✓	✓	✓	-	-	-	✓	✓	-	-	-	-	✓	-	✓	✓	✓
Epilobium angustifolium	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Epilobium collinum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Epilobium hirsutum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Epilobium palustre	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Epilobium parviflorum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Epipactis atrorubens	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Epipactis helleborine	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Epipactis palustris	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Epipogium aphyllum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Equisetum arvense	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Equisetum fluviatile	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Equisetum hyemale	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Equisetum NA	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Equisetum palustre	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Equisetum variegatum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Erigeron acer	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-
Erigeron acris	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Erigeron annuus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Erigeron gaudinii	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-
Erigeron glabratus	✓	✓	✓	✓	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	✓
Erigeron NA	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Erigeron neglectus	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Erigeron uniflorus	-	✓	✓	✓	-	✓	-	-	✓	✓	-	-	-	✓	✓	✓	-	-	✓
Erinus alpinus	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-
Eriophorum angustifolium	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Eriophorum latifolium	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Eriophorum scheuchzeri	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-
Eritrichium nanum	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	-	✓	✓	-	-	✓
Erodium cicutarium	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Erucastrum nasturtiifolium	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Eryngium alpinum	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-
Eryngium campestre	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Erysimum jugicola	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Erysimum nevadense	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Erysimum ochroleucum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Erysimum rhaeticum	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Erysimum virgatum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Euonymus europaeus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Euonymus latifolius	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Eupatorium cannabinum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Euphorbia brittingeri	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Euphorbia cyparissias	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	✓	-
Euphorbia exigua	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Euphorbia helioscopia	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Euphrasia alpina	-	✓	✓	✓	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-
Euphrasia drosocalyx	-	✓	✓	✓	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-
Euphrasia hirtella	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Euphrasia kerneri	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Euphrasia minima	-	✓	✓	✓	✓	✓	-	✓	✓	✓	-	-	-	✓	✓	-	✓	✓	✓
Euphrasia pectinata	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Euphrasia salisburgensis	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	✓
Euphrasia stricta	-	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-

Continued on next page

Table b.1.1 – continued from previous page

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Fagus sylvatica	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fallopia convolvulus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fallopia japonica	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Festuca acuminata	✓	✓	✓	✓	-	-	-	✓	-	-	-	-	-	-	✓	-	-	✓	✓
Festuca altissima	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Festuca arundinacea	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Festuca chalcophaea	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	✓	✓	-	✓	✓	✓
Festuca flavescens	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Festuca gigantea	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Festuca halleri	✓	✓	✓	✓	✓	✓	-	✓	✓	✓	-	✓	-	✓	✓	-	✓	✓	✓
Festuca heterophylla	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Festuca laevigata	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	✓	-
Festuca melanopsis	✓	✓	✓	✓	✓	-	-	-	-	-	-	-	-	-	✓	-	-	-	-
Festuca ovina	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-
Festuca pratensis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Festuca quadriflora	-	✓	✓	✓	-	-	-	✓	-	-	-	-	-	-	✓	-	✓	-	✓
Festuca rubra	-	✓	✓	✓	-	-	✓	✓	-	-	-	-	-	-	✓	-	-	-	-
Festuca valesiaca	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Filago arvensis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Filipendula ulmaria	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Filipendula vulgaris	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fourraea alpina	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fragaria vesca	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Frangula NA	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fraxinus excelsior	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fumana procumbens	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gagea liotardii	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gagea nakaiana	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Galeopsis ladanum	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Galeopsis tetrahit	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Galium aparine	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Galium boreale	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Galium commune	-	✓	✓	-	-	-	-	✓	-	-	-	-	-	-	✓	-	-	-	-
Galium corrudifolium	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Galium glaucum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Galium lucidum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Galium megalospermum	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Galium mollugo	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Galium odoratum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Galium palustre	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Galium pseudohelveticum	✓	✓	✓	✓	-	-	-	✓	-	-	-	-	-	-	✓	-	✓	✓	✓
Galium pumilum	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-
Galium rotundifolium	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Galium rubrum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Galium sylvaticum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Galium verum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gamochaeta norvegica	-	✓	✓	✓	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-
Gamochaeta sylvatica	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Genista cinerea	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Genista pilosa	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Genistella sagittalis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gentiana acaulis	-	✓	✓	✓	-	-	-	-	-	✓	-	-	-	-	✓	-	✓	-	✓
Gentiana cruciata	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Table b.1.1 – continued from previous page

Species name	Endemic	Regional	All Summits	LGM	Aiguille du plat de la Selle	Barre des Ecrins	la Meije	le Sirac	les Rouies	l'Olan	Mont Pelvoux	Occidentale l'Ailefroide	Pointe Brevoort	Pointes de Burlan	Rocher de la Selle	Tour Choisy	Tête de la Muraillette	le Rateau	Signal du Lauvitel
Gentiana nivalis	-	✓	✓	✓	-	-	-	✓	-	-	-	-	-	-	✓	-	-	-	✓
Gentiana pneumonanthe	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gentiana verna	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	-	✓	-	-
Gentianella campestris	-	✓	✓	✓	-	-	-	✓	-	-	-	-	-	-	✓	-	-	-	-
Gentianella tenella	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gentianopsis ciliata	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gentianusa lutea	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gentianusa punctata	-	✓	✓	-	-	-	-	-	-	✓	-	-	-	-	✓	-	-	-	-
Geranium argenteum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Geranium columbinum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Geranium lucidum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Geranium molle	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Geranium nodosum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Geranium phaeum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Geranium pyrenaicum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Geranium rivulare	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-
Geranium robertianum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Geranium rotundifolium	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Geranium sanguineum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Geranium sylvaticum	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	✓	-
Geum reptans	-	✓	✓	✓	-	✓	✓	✓	✓	-	-	✓	-	✓	✓	-	✓	✓	✓
Geum rivale	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Geum urbanum	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	✓	-
Glechoma hederacea	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Glechoma nepetella	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Globularia bisnagarica	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Globularia cordifolia	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	✓	-
Glyceria fluitans	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Glyceria notata	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gnaphalium hoppeanum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gnaphalium supinum	-	✓	✓	✓	✓	-	✓	-	✓	✓	-	-	-	-	✓	-	✓	✓	✓
Goodyera repens	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gymnadenia conopsea	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gymnadenia nigra	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gymnocarpium dryopteris	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gymnocarpium robertianum	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-
Gypsophila repens	-	✓	✓	✓	-	-	✓	-	-	-	-	-	-	✓	✓	-	✓	-	-
Hedera helix	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hedysarum hedysaroides	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Helianthemum apenninum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Helianthemum grandiflorum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Helianthemum nummularium	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Helianthemum oelandicum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Helictotrichon pratense	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Helictotrichon pubescens	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Helictotrichon sedenense	-	✓	✓	✓	-	✓	-	✓	-	-	-	-	-	✓	✓	-	✓	✓	✓
Helictotrichon sempervirens	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Helictotrichon versicolor	-	✓	✓	✓	-	-	-	-	-	-	-	✓	-	-	✓	-	✓	-	✓
Helleborus foetidus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hepatica nobilis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Heracleum sphondylium	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Herniaria alpina	-	✓	✓	✓	-	-	-	✓	✓	-	-	✓	-	✓	✓	-	-	-	-
Herniaria hirsuta	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Table b.1.1 – continued from previous page

Species name	Endemic	Regional	All Summits	LGM	Aiguille du plat de la Selle	Barre des Ecrins	la Meije	le Sirac	les Rouies	l'Olan	Mont Pelvoux	Occidentale l'Ailefroide	Pointe Brevoort	Pointes de Burlan	Rocher de la Selle	Tour Choisy	Tête de la Muraillette	le Rateau	Signal du Lauvitel
Herniaria incana	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Herorchis morio	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hieracium alpinum	-	✓	✓	✓	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-
Hieracium amplexicaule	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hieracium antarcticum	-	✓	✓	✓	-	-	-	✓	-	-	-	-	-	-	✓	-	-	-	-
Hieracium argillaceum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hieracium aurantiacum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hieracium bifidum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hieracium cymosum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hieracium diaphanoides	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hieracium glaucinum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hieracium intybaceum	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hieracium inuloides	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hieracium juranum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hieracium lachenalii	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hieracium lactucella	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hieracium lawsonii	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hieracium murorum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hieracium NA	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hieracium niphobium	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-
Hieracium piliferum	-	✓	✓	✓	-	✓	-	-	-	-	-	✓	-	-	✓	-	-	-	-
Hieracium pilosella	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-
Hieracium piloselloides	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hieracium pilosum	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-
Hieracium praealtum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hieracium prenanthoides	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hieracium sabaudum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hieracium schmidtii	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hieracium umbellatum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hieracium umbrosum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hieracium valdepilosum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hieracium villosum	-	✓	✓	✓	-	✓	-	-	-	✓	-	-	-	-	✓	-	-	-	-
Himantoglossum hircinum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hippocrepis comosa	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hippocrepis emerus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hippophae rhamnoides	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Holcus lanatus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Holosteum umbellatum	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Homogyne alpina	-	✓	✓	✓	✓	-	-	-	-	✓	-	-	-	-	✓	-	✓	-	-
Hordelymus europaeus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hordeum marinum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hornungia alpina	✓	✓	✓	✓	-	✓	✓	-	✓	✓	-	-	-	-	✓	✓	✓	✓	✓
Humulus lupulus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Huperzia selago	-	✓	✓	-	-	-	-	-	-	-	✓	✓	-	-	-	-	-	-	-
Hylotelephium NA	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hylotelephium telephium	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hyoscyamus niger	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hypericum hirsutum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hypericum maculatum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hypericum montanum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hypericum perforatum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hypericum richeri	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-
Hypochaeris maculata	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Continued on next page

Table b.1.1 – continued from previous page

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Hypochaeris radicata	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hyssopus officinalis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iberis pinnata	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ilex aquifolium	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Impatiens glandulifera	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Imperatoria ostruthium	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-
Inula conyza	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Inula montana	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Isatis tinctoria	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ixoca pusilla	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Jacobaea incana	-	✓	✓	-	-	-	-	✓	-	-	-	-	-	-	✓	-	-	-	✓
Jasione montana	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Jonorchis abortiva	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Juglans nigra	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Juglans regia	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Juncus alpinoarticulatus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Juncus arcticus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Juncus articulatus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Juncus bufonius	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Juncus compressus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Juncus effusus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Juncus filiformis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Juncus inflexus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Juncus jacquini	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Juncus trifidus	-	✓	✓	✓	-	✓	-	✓	-	✓	✓	-	-	✓	✓	-	-	✓	✓
Juncus triglumis	-	✓	✓	✓	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-
Juniperus communis	-	✓	✓	-	-	-	-	-	-	✓	✓	-	-	-	✓	-	-	-	-
Juniperus sabina	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-
Juniperus sibirica	-	✓	✓	✓	-	-	-	✓	-	✓	-	-	✓	-	✓	-	-	✓	-
Kernera saxatilis	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-
Knautia arvensis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Knautia dipsacifolia	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Knautia NA	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kobresia curvula	-	✓	✓	✓	-	-	-	✓	-	-	-	✓	-	-	✓	-	✓	-	✓
Kobresia myosuroides	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	-	✓	-	✓
Koeleria cenisia	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Koeleria pyramidata	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Koeleria vallesiana	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Laburnum alpinum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Laburnum anagyroides	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lactuca alpina	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lactuca muralis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lactuca perennis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lactuca serriola	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lamium amplexicaule	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lamium garganicum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lamium maculatum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lamium purpureum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lappula squarrosa	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lapsana communis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Larix decidua	-	✓	✓	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-
Laserpitium gallicum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Laserpitium halleri	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Table b.1.1 – continued from previous page

Species name	Endemic	Regional	All Summits	LGM	Aiguille du plat de la Selle	Barre des Ecrins	la Meije	le Sirac	les Rouies	l'Olan	Mont Pelvoux	Occidentale l'Ailefroide	Pointe Brevoort	Pointes de Burlan	Rocher de la Selle	Tour Choisy	Tête de la Muraillette	le Rateau	Signal du Lauvitel
Laserpitium latifolium	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Laserpitium siler	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lathyrus latifolius	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lathyrus linifolius	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lathyrus ochraceus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lathyrus pratensis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lathyrus sphaericus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lathyrus sylvestris	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lathyrus vernus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lavandula angustifolia	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leontodon autumnalis	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Leontodon crispus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leontodon hirtus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leontodon hispidus	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-
Leontodon NA	✓	✓	✓	-	-	-	-	✓	-	-	-	-	-	-	✓	-	-	-	-
Leontodon pyrenaicus	-	✓	✓	✓	✓	✓	-	✓	-	✓	-	✓	-	-	✓	-	✓	✓	-
Leontopodium brachyactis	-	✓	✓	✓	-	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-
Leontopodium NA	-	✓	✓	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-
Lerouxia nemorum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leucanthemopsis alpina	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	✓	✓	✓	✓	✓	✓	✓
Leucanthemum adustum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leucanthemum atratum	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leucanthemum NA	✓	✓	✓	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-
Leucanthemum pallens	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leucanthemum vulgare	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ligustrum vulgare	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lilium bulbiferum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lilium martagon	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Limodorum rubrum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Linaria alpina	-	✓	✓	✓	-	✓	✓	✓	✓	✓	-	✓	✓	✓	✓	✓	✓	✓	✓
Linaria angustissima	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Linaria repens	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Linaria simplex	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Linum alpinum	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-
Linum catharticum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Linum suffruticosum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Linum tenuifolium	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Listera nidus avis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Listera ovata	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithospermum officinale	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lloydia serotina	-	✓	✓	✓	-	-	-	-	-	✓	-	-	-	-	✓	-	-	-	✓
Lolium perenne	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lomelosia graminifolia	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lonicera caerulea	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lonicera etrusca	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lonicera nigra	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lonicera webbiana	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lonicera xylosteum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Loroglossum anthropophorum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lotus alpinus	-	✓	✓	✓	-	✓	-	✓	-	✓	-	-	-	✓	✓	-	✓	✓	✓
Lotus corniculatus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lotus delortii	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lunaria annua	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Table b.1.1 – continued from previous page

Species name	Endemic	Regional	All Summits	LGM	Aiguille du plat de la Selle	Barre des Ecrins	la Meije	le Sirac	les Rouies	l'Olan	Mont Pelvoux	Occidentale l'Ailefroide	Pointe Brevoort	Pointes de Burlan	Rocher de la Selle	Tour Choisy	Tête de la Muraillette	le Rateau	Signal du Lauvitel
Lunaria rediviva	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Luzula alpinopilosa	-	✓	✓	✓	✓	✓	✓	✓	-	✓	-	-	-	-	✓	-	-	✓	✓
Luzula campestris	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-
Luzula lutea	-	✓	✓	✓	-	-	-	-	-	✓	-	✓	-	-	✓	-	✓	✓	✓
Luzula luzulina	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Luzula maxima	-	✓	✓	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-
Luzula multiflora	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Luzula nivea	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Luzula nutans	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	✓
Luzula spicata	-	✓	✓	✓	✓	✓	-	✓	✓	✓	✓	-	-	✓	✓	✓	-	✓	✓
Luzula sudetica	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-
Luzula sylvatica	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lycopus europaeus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lysimachia arvensis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lysimachia vulgaris	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lythrum salicaria	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Macrosyringion glutinosum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Maianthemum bifolium	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Malus domestica	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Malus sylvestris	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Malva alcea	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Malva moschata	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Matricaria matricarioides	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Medicago lupulina	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Medicago minima	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Medicago sativa	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Melampyrum NA	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Melampyrum sylvaticum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Melica ciliata	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Melica nutans	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Melica uniflora	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Melilotus albus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Melilotus officinalis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Melittis melissophyllum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mentha aquatica	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mentha arvensis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mentha longifolia	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Merendera verna	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Meum athamanticum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Micranthes stellaris	-	✓	✓	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	✓	-
Microthlaspi perfoliatum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Milium effusum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Minuartia laricifolia	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-
Minuartia oreina	-	✓	✓	✓	-	-	-	-	✓	-	-	-	-	-	-	-	-	-	-
Minuartia rostrata	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Minuartia rupestris	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Minuartia sedoides	-	✓	✓	✓	-	✓	✓	✓	✓	✓	-	✓	✓	✓	✓	-	✓	-	✓
Minuartia verna	-	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	✓	✓	-	✓	-	✓
Minuartia villarii	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Moehringia muscosa	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Moehringia trinervia	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molinia caerulea	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Moneses uniflora	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Table b.1.1 – continued from previous page

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Monotropa hypopitys	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Murbeckiella pinnatifida	-	✓	✓	✓	✓	-	-	-	✓	✓	-	✓	-	-	✓	-	-	-	✓
Muscari comosum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Muscari neglectum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mutellina adonidifolia	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Myosotis alpestris	-	✓	✓	✓	-	✓	-	-	✓	-	-	✓	-	-	✓	-	✓	✓	✓
Myosotis arvensis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Myosotis corsicana	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Myosotis decumbens	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Myosotis NA	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Myosotis ramosissima	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Myosotis stricta	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Myricaria germanica	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Narcissus poeticus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nardus stricta	-	✓	✓	✓	✓	-	-	✓	-	-	-	-	-	-	✓	-	-	✓	-
Nasturtium officinale	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Neotinea ustulata	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nepeta nuda	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Noccaea caerulescens	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Noccaea rotundifolia	✓	✓	✓	✓	-	-	-	✓	-	-	-	-	-	-	✓	-	✓	-	✓
Odontites NA	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Omalotheca NA	-	✓	✓	✓	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-
Onobrychis saxatilis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Onobrychis viciifolia	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ononis arvensis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ononis cristata	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ononis fruticosa	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ononis natrix	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ononis pusilla	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ononis rotundifolia	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ophioglossum vulgatum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ophrys fuciflora	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ophrys insectifera	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ophrys sphegodes	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orchis mascula	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orchis militaris	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orchis purpurea	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orchites globosa	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oreoselinum nigrum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Origanum vulgare	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orlaya grandiflora	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ornithogalum umbellatum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orobanche caryophyllacea	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orobanche laserpitii	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orobanche major	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orobanche NA	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orobanche purpurea	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orobanche teucrii	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orthantha lutea	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orthilia secunda	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oxalis acetosella	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oxalis fontana	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oxyria digyna	-	✓	✓	✓	-	✓	✓	-	✓	-	-	✓	-	-	✓	-	-	✓	✓

Continued on next page

Table b.1.1 – continued from previous page

Species name	Endemic	Regional	All Summits	LGM	Aiguille du plat de la Selle	Barre des Ecrins	la Meije	le Sirac	les Rouies	l'Olan	Mont Pelvoux	Occidentale l'Ailefroide	Pointe Brevoort	Pointes de Burlan	Rocher de la Selle	Tour Choisy	Tête de la Muraillette	le Rateau	Signal du Lauvitel
Oxytropis campestris	✓	✓	✓	✓	-	-	-	-	-	-	-	-	-	✓	✓	-	✓	-	✓
Oxytropis fetida	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oxytropis helvetica	✓	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-
Oxytropis jacquini	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oxytropis lapponica	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	✓
Oxytropis NA	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oxytropis pilosa	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pachypleurum NA	-	✓	✓	✓	✓	✓	-	✓	-	✓	-	✓	-	-	✓	-	✓	-	✓
Padus avium	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Paeonia officinalis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Papaver alpinum	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Papaver aurantiacum	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Papaver dubium	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Parageum montanum	-	✓	✓	✓	✓	-	-	✓	-	-	-	-	-	-	✓	-	✓	✓	✓
Paris quadrifolia	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Parnassia palustris	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Paronychia kapela	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Paronychia polygonifolia	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-
Pastinaca sativa	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Patzkea paniculata	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedicularis comosa	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedicularis foliosa	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedicularis gyroflexa	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedicularis kerneri	-	✓	✓	✓	-	✓	-	-	✓	✓	-	✓	-	✓	-	-	-	✓	-
Pedicularis NA	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedicularis rostratospicata	✓	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	✓
Pedicularis tuberosa	-	✓	✓	✓	-	-	-	✓	-	-	-	-	-	-	✓	-	-	-	-
Pedicularis verticillata	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Persicaria amphibia	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Persicaria lapathifolia	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Persicaria maculosa	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Persicaria mitis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Petasites albus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Petasites hybridus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Petasites paradoxus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Petrorhagia prolifera	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Petrorhagia saxifraga	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phaca hypoglottis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phegopteris connectilis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phleum alpinum	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	✓	✓
Phleum phleoides	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phleum pratense	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phragmites australis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phyteuma michelii	✓	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-
Phyteuma ovatum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phyteuma scheuchzeri	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phyteuma scorzonerifolium	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phyteuma spicatum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Picea abies	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Picris hieracioides	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pilosella peleteriana	-	✓	✓	✓	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-
Pimpinella major	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pimpinella saxifraga	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Table b.1.1 – continued from previous page

Species name	Endemic	Regional	All Summits	LGM	Aiguille du plat de la Selle	Barre des Ecrins	la Meije	le Sirac	les Rouies	l'Olan	Mont Pelvoux	Occidentale l'Ailefroide	Pointe Brevoort	Pointes de Burlan	Rocher de la Selle	Tour Choisy	Tête de la Muraillette	le Rateau	Signal du Lauvitel
Pinguicula alpina	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pinguicula vulgaris	-	✓	✓	✓	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-
Pinus mugo	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pinus nigra	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pinus sylvestris	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pisum heterophyllum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Plantago atrata	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Plantago holosteum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Plantago lanceolata	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Plantago major	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Plantago maritima	-	✓	✓	-	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-
Plantago media	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Plantago neumannii	-	✓	✓	✓	✓	-	-	✓	-	✓	-	-	-	-	✓	-	✓	-	✓
Plantago sempervirens	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Platanthera chlorantha	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pleisolirion liliastrum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pleurospermum austriacum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Poa alpina	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	-	✓	✓	-	✓	✓	✓
Poa annua	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-
Poa badensis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Poa bulbosa	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Poa cenisia	✓	✓	✓	✓	✓	-	✓	-	-	-	-	-	-	-	✓	-	-	✓	✓
Poa chaixii	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Poa glauca	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Poa laxa	-	✓	✓	✓	✓	✓	✓	-	✓	✓	-	-	✓	-	✓	✓	-	✓	✓
Poa nemoralis	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-
Poa perconcinna	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Poa pratensis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Poa supina	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	✓
Poa trivialis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polichia galeobdolon	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polycnemum majus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polygala alpestris	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-
Polygala alpina	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Polygala amarella	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polygala calcarea	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polygala chamaebuxus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polygala comosa	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polygala vulgaris	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polygonatum odoratum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polygonatum verticillatum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polygonum alpinum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polygonum aviculare	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-
Polygonum viviparum	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	✓
Polypodium interjectum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polypodium vulgare	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polystichum aculeatum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polystichum lonchitis	-	✓	✓	✓	-	-	-	✓	✓	-	-	-	-	-	✓	-	-	✓	✓
Populus alba	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Populus nigra	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Populus tremula	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Porrum sphaerocephaluon	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potamogeton alpinus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Table b.1.1 – continued from previous page

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Potentilla argentea	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potentilla aurea	-	✓	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	-
Potentilla caulescens	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potentilla chrysantha	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potentilla cinerea	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potentilla crantzii	-	✓	✓	✓	-	-	-	✓	-	-	-	-	-	-	✓	-	-	✓	✓
Potentilla erecta	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potentilla frigida	-	✓	✓	✓	-	-	-	✓	-	✓	-	-	-	-	-	✓	-	-	✓
Potentilla grandiflora	-	✓	✓	✓	-	-	-	✓	-	✓	-	-	-	-	✓	-	-	✓	-
Potentilla hirta	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potentilla inclinata	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potentilla NA	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potentilla neumanniana	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potentilla nivalis	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-
Potentilla reptans	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potentilla rupestris	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Prenanthes purpurea	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Primula elatior	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Primula farinosa	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Primula hirsuta	-	✓	✓	✓	-	-	-	✓	-	✓	-	✓	-	-	✓	-	-	✓	✓
Primula latifolia	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Primula pedemontana	-	✓	✓	✓	-	-	-	✓	-	-	-	-	-	-	-	-	-	-	-
Primula veris	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Primula vulgaris	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Prunella grandiflora	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Prunella laciniata	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Prunella vulgaris	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Prunus domestica	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Prunus mahaleb	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Prunus spinosa	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pseudorchis albida	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pseudoturritis turrita	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ptarmica macrophylla	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ptarmica nana	✓	✓	✓	✓	-	✓	-	✓	✓	✓	-	✓	-	✓	✓	-	✓	✓	✓
Pteridium aquilinum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pteroselinum austriacum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ptychotis saxifraga	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pulmonaria angustifolia	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pulmonaria longifolia	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pulmonaria montana	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pulmonaria saccharata	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pulsatilla alpina	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pulsatilla halleri	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pulsatilla montana	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pulsatilla vernalis	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-
Pyrola chlorantha	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pyrola media	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pyrola minor	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pyrola rotundifolia	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pyrus pyraster	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pythius dulcis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Quercus petraea	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Quercus pubescens	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Table b.1.1 – continued from previous page

Species name	Endemic	Regional	All Summits	LGM	Aiguille du plat de la Selle	Barre des Ecrins	la Meije	le Sirac	les Rouies	l'Olan	Mont Pelvoux	Occidentale l'Ailefroide	Pointe Brevoort	Pointes de Burlan	Rocher de la Selle	Tour Choisy	Tête de la Muraillette	le Rateau	Signal du Lauvitel
Quercus robur	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ranunculus aconitifolius	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ranunculus acris	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ranunculus aduncus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ranunculus arvensis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ranunculus auricomus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ranunculus bulbosus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ranunculus glacialis	-	✓	✓	✓	-	✓	✓	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Ranunculus gramineus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ranunculus grenierianus	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-
Ranunculus kuepferi	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ranunculus lanuginosus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ranunculus montanus	-	✓	✓	✓	-	-	-	-	-	✓	-	-	-	-	✓	-	-	-	-
Ranunculus parnassifolius	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-
Ranunculus platanifolius	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ranunculus polyanthemos	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ranunculus pyrenaeus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ranunculus repens	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ranunculus seguieri	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ranunculus trichophyllus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ranunculus tuberosus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rapunculus hemisphaericus	-	✓	✓	✓	✓	✓	-	✓	✓	✓	-	✓	-	✓	✓	-	-	✓	✓
Rapunculus orbicularis	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Rapunculus spicatus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Reseda lutea	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Reseda phyteuma	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rhamnus alpina	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rhamnus cathartica	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rhamnus pumila	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-
Rhamnus saxatilis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rhaponticum NA	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rhinanthus alectorolophus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rhinanthus glacialis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rhinanthus minor	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rhinanthus NA	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rhododendron ferrugineum	-	✓	✓	✓	✓	-	-	✓	-	✓	-	-	-	-	✓	-	-	-	-
Rhynchopera paniculata	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ribes alpinum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ribes carpaticum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ribes uva crispa	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rorippa amphibia	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rorippa islandica	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rorippa NA	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rorippa sylvestris	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rosa agrestis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rosa caesia	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rosa canina	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rosa dumalis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rosa elliptica	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rosa ferruginea	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rosa micrantha	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rosa montana	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rosa NA	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Table b.1.1 – continued from previous page

Species name	Endemic	Regional	All Summits	LGM	Aiguille du plat de la Selle	Barre des Ecrins	la Meije	le Sirac	les Rouies	l'Olan	Mont Pelvoux	Occidentale l'Ailefroide	Pointe Brevoort	Pointes de Burlan	Rocher de la Selle	Tour Choisy	Tête de la Muraillette	le Rateau	Signal du Lauvitel
Rosa pendulina	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rosa rubiginosa	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rosa spinosissima	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rosa villosa	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rubus caesius	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rubus fruticosus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rubus gremlii	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rubus idaeus	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-
Rubus pruinosus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rubus saxatilis	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-
Rubus tomentosus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rubus ulmifolius	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rumex acetosa	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rumex acetosella	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rumex alpestris	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rumex alpinus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rumex crispus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rumex obtusifolius	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rumex scutatus	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	✓
Ruyschiana austriaca	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sagina glabra	-	✓	✓	✓	-	-	✓	✓	-	✓	-	-	-	-	-	-	-	-	✓
Sagina procumbens	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sagina saginoides	-	✓	✓	✓	-	-	-	-	✓	-	-	✓	-	-	-	-	-	-	-
Salix alba	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Salix appendiculata	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-
Salix aurita	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Salix breviserrata	-	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	✓	-
Salix caprea	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Salix cinerea	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Salix daphnoides	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Salix eleagnos	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Salix foetida	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Salix glaucosericea	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-
Salix hastata	-	✓	✓	✓	-	-	✓	-	-	-	-	-	-	-	-	-	-	✓	-
Salix herbacea	-	✓	✓	✓	✓	✓	-	✓	✓	✓	-	✓	-	-	✓	-	✓	✓	✓
Salix laggeri	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-
Salix myrsinifolia	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Salix NA	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Salix pentandra	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Salix purpurea	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Salix repens	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Salix reticulata	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓
Salix retusa	-	✓	✓	✓	-	-	-	-	-	-	-	✓	-	✓	✓	-	✓	✓	✓
Salix serpyllifolia	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Salix triandra	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Salvia nubicola	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Salvia pratensis	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sambucus ebulus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sambucus nigra	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sambucus racemosa	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sanguisorba minor	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sanguisorba officinalis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sanicula europaea	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Table b.1.1 – continued from previous page

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Saponaria ocymoides	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Saponaria officinalis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Satureja montana	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Satyrium bifolium	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Saussurea alpina	✓	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Saussurea discolor	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Saxifraga aizoides	-	✓	✓	✓	-	-	✓	✓	✓	-	-	✓	-	✓	✓	-	-	✓	✓
Saxifraga androsacea	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	✓
Saxifraga aspera	-	✓	✓	✓	-	-	✓	-	-	-	-	-	-	-	✓	-	-	-	-
Saxifraga biflora	✓	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Saxifraga bryoides	-	✓	✓	✓	-	✓	✓	✓	✓	✓	-	✓	✓	✓	✓	✓	✓	✓	✓
Saxifraga cuneifolia	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Saxifraga exarata	✓	✓	✓	✓	✓	-	✓	-	✓	✓	-	✓	-	-	✓	✓	-	✓	✓
Saxifraga granulata	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Saxifraga moschata	✓	✓	✓	-	-	✓	✓	✓	-	✓	-	-	✓	-	✓	✓	-	✓	-
Saxifraga oppositifolia	✓	✓	✓	✓	-	✓	✓	✓	✓	✓	-	✓	✓	✓	✓	✓	✓	✓	✓
Saxifraga paniculata	-	✓	✓	✓	-	✓	✓	✓	✓	✓	-	-	-	✓	✓	-	✓	✓	✓
Saxifraga retusa	✓	✓	✓	✓	-	✓	-	✓	✓	-	-	-	-	-	-	-	-	-	-
Saxifraga rotundifolia	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Scabiosa columbaria	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Scabiosa lucida	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-
Scabiosa triandra	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Schoenus nigricans	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Scirpus sylvaticus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Scleranthus annuus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Scleranthus perennis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Scorzonera austriaca	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Scorzonera hispanica	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Scorzoneroides autumnalis	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-
Scrophularia canina	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Scrophularia lucida	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Scrophularia nodosa	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Scrophularia peregrina	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Securigera varia	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sedella atrata	-	✓	✓	✓	-	-	✓	-	-	-	-	-	-	-	✓	-	✓	✓	✓
Sedum acre	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sedum album	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sedum alpestre	-	✓	✓	✓	✓	-	✓	✓	✓	✓	-	✓	-	-	✓	-	-	✓	✓
Sedum anacampseros	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	✓
Sedum annuum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sedum anopetalum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sedum dasyphyllum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sedum maximum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sedum NA	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sedum ochroleucum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sedum rupestre	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sedum sediforme	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sedum sexangulare	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selaginella selaginoides	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sempervivum arachnoideum	-	✓	✓	✓	-	✓	-	✓	-	✓	-	-	-	✓	✓	-	✓	✓	✓
Sempervivum montanum	✓	✓	✓	✓	✓	✓	-	✓	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓
Sempervivum NA	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sempervivum tectorum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Table b.1.1 – continued from previous page

Species name	Endemic	Regional	All Summits	LGM	Aiguille du plat de la Selle	Barre des Ecrins	la Meije	le Sirac	les Rouies	l'Olan	Mont Pelvoux	Occidentale l'Ailefroide	Pointe Brevoort	Pointes de Burlan	Rocher de la Selle	Tour Choisy	Tête de la Muraillette	le Rateau	Signal du Lauvitel
Senecio doria	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Senecio doronicum	-	✓	✓	✓	-	-	-	-	✓	✓	✓	-	-	-	✓	-	-	✓	✓
Senecio erucifolius	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Senecio incanus	✓	✓	✓	✓	✓	✓	✓	-	✓	✓	-	✓	-	✓	✓	-	✓	✓	✓
Senecio ovatus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Senecio squalidus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Senecio viscosus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Serratula tinctoria	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Seseli annuum	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sesleria caerulea	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	-	✓	-	✓
Setaria viridis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sibbaldia procumbens	-	✓	✓	✓	✓	✓	-	✓	✓	✓	-	-	-	-	✓	-	✓	✓	-
Silaum silaus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silene acaulis	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Silene armeria	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silene dioica	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silene flos cuculi	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silene flos jovis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silene italica	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silene latifolia	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silene nutans	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silene otites	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silene saxifraga	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silene vallesia	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silene vulgaris	-	✓	✓	✓	-	-	-	✓	-	-	-	-	-	-	✓	-	-	-	✓
Sinapis alba	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sinapis arvensis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sisymbrium austriacum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Solanum dulcamara	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Soldanella alpina	-	✓	✓	✓	✓	-	-	✓	-	✓	-	-	-	-	-	-	-	-	✓
Solidago gigantea	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Solidago virgaurea	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	-	-	✓	-
Sonchus arvensis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sonchus oleraceus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sorbus aria	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sorbus aucuparia	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sorbus chamaemespilus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sorbus mougeotii	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sorbus NA	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sparganium angustifolium	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sparganium emersum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sparganium erectum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spiesia halleri	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stachys annua	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stachys pradica	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stachys recta	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stachys sylvatica	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Staehelina dubia	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stellaria alsine	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stellaria graminea	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stellaria holostea	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stellaria media	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stellaria nemorum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Continued on next page

Table b.1.1 – continued from previous page

Species name	Endemic	Regional	All Summits	LGM	Aiguille du plat de la Selle	Barre des Ecrins	la Meije	le Sirac	les Rouies	l'Olan	Mont Pelvoux	Occidentale l'Ailefroide	Pointe Brevoort	Pointes de Burlan	Rocher de la Selle	Tour Choisy	Tête de la Muraillette	le Rateau	Signal du Lauvitel
Stipa capillata	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stipa eriocaulis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stipa pennata	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Streptopus amplexifolius	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strobus cembra	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Succisa pratensis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Swertia perennis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Symphyotrichum novi belgii	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Symphytum officinale	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Symphytum tuberosum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Synema perenne	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tanacetum corymbosum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Taraxacum alpinum	-	✓	✓	✓	-	-	-	✓	✓	-	-	-	-	-	-	-	✓	✓	✓
Taraxacum dissectum	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-
Taraxacum erythrospermum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Taraxacum fulvum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Taraxacum lapponicum	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-
Taraxacum montanum	✓	✓	✓	✓	✓	-	-	✓	-	✓	-	-	-	-	✓	-	✓	-	✓
Taraxacum NA	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Taraxacum officinale	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-
Taraxacum rubicundum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Taraxacum sellandii	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Taxus baccata	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Telephium imperati	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tetragonolobus maritimus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Teucrium chamaedrys	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Teucrium scordium	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Teucrium scorodonia	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thalictrum aquilegiifolium	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thalictrum foetidum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thalictrum minus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thalictrum simplex	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thelycrania sanguinea	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thesium alpinum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thesium humifusum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thesium linophyllon	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thlaspi arvense	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thymus oenipontanus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thymus praecox	✓	✓	✓	✓	-	-	✓	✓	-	-	-	-	-	-	✓	-	-	✓	-
Thymus pulegioides	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thymus serpyllum	-	✓	✓	✓	-	-	-	-	✓	✓	-	-	-	-	-	-	✓	-	✓
Thymus striatus	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-
Tilia cordata	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tilia platyphyllos	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tofieldia calyculata	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tolpis staticifolia	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-
Torilis japonica	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tozzia alpina	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tragopogon crocifolius	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tragopogon dubius	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tragopogon porrifolius	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tragopogon pratensis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trasus tomentosus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Continued on next page

Table b.1.1 – continued from previous page

Species name	Endemic	Regional	All Summits	LGM	Aiguille du plat de la Selle	Barre des Ecrins	la Meije	le Sirac	les Rouies	l'Olan	Mont Pelvoux	Occidentale l'Ailefroide	Pointe Brevoort	Pointes de Burlan	Rocher de la Selle	Tour Choisy	Tête de la Muraillette	le Rateau	Signal du Lauvitel
Trichophorum alpinum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichophorum cespitosum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trifolium alpestre	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trifolium alpinum	-	✓	✓	✓	-	-	-	✓	-	✓	✓	-	-	-	✓	-	-	✓	-
Trifolium arvense	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trifolium aureum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trifolium badium	-	✓	✓	✓	-	-	-	✓	-	-	-	-	-	✓	✓	-	-	-	-
Trifolium campestre	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trifolium diffusum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trifolium medium	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trifolium ochroleucon	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trifolium pallescens	-	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	✓	-	-	-	-
Trifolium pratense	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	✓	-	✓	✓	-
Trifolium repens	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Trifolium rubens	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trifolium saxatile	✓	✓	✓	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-
Trifolium spadiceum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trifolium thalii	-	✓	✓	✓	-	-	-	✓	-	✓	-	-	-	✓	✓	-	✓	✓	✓
Triglochin palustre	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trigonella monspeliaca	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trimorpha alpina	-	✓	✓	✓	-	✓	-	✓	-	-	-	-	-	-	✓	-	✓	-	-
Trimorpha attica	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trinia glauca	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trisetaria distichophylla	-	✓	✓	✓	-	-	-	✓	-	-	-	-	-	-	✓	-	✓	✓	✓
Trisetum flavescens	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-
Trisetum spicatum	-	✓	✓	✓	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-
Triticum aestivum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Triticum durum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trollius europaeus	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-
Tulipa sylvestris	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turritis glabra	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tussilago farfara	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Typha latifolia	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ulmus glabra	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ulmus minor	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Urtica dioica	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-
Vaccinium myrtillus	-	✓	✓	✓	-	-	-	✓	-	✓	✓	-	-	-	✓	-	-	✓	✓
Vaccinium uliginosum	-	✓	✓	✓	-	-	-	✓	-	✓	✓	✓	-	✓	✓	-	-	✓	✓
Vaccinium vitis idaea	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Valeriana dioica	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Valeriana montana	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-
Valeriana officinalis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Valeriana saliunca	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Valeriana tripteris	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Valeriana tuberosa	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Valerianella dentata	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Valerianella locusta	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Veratrum album	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Verbascum chaixii	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Verbascum lychnitis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Verbascum nigrum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Verbascum pulverulentum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Verbascum thapsus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Continued on next page

Table b.1.1 – continued from previous page

Species name	Endemic	Regional	All Summits	LGM	Aiguille du plat de la Selle	Barre des Ecrins	la Meije	le Sirac	les Rouies	l'Olan	Mont Pelvoux	Occidentale l'Ailefroide	Pointe Brevoort	Pointes de Burlan	Rocher de la Selle	Tour Choisy	Tête de la Muraillette	le Rateau	Signal du Lauvitel
Verbena officinalis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Veronica agrestis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Veronica allionii	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-
Veronica alpina	-	✓	✓	✓	✓	✓	✓	-	✓	✓	-	✓	-	✓	✓	✓	✓	✓	✓
Veronica anagallis aquatica	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Veronica aphylla	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Veronica arvensis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Veronica austriaca	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Veronica beccabunga	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Veronica bellidioides	-	✓	✓	✓	-	✓	-	-	-	-	✓	-	-	-	✓	-	-	-	-
Veronica chamaedrys	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Veronica fruticans	-	✓	✓	✓	-	-	-	✓	-	-	-	✓	-	-	✓	-	✓	✓	-
Veronica fruticulosa	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Veronica hederifolia	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Veronica officinalis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Veronica persica	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Veronica serpyllifolia	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Veronica spicata	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Veronica triphyllos	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Veronica urticifolia	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Veronica verna	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Viburnum lantana	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Viburnum opulus	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vicia cracca	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vicia hirsuta	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vicia hybrida	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vicia onobrychioides	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vicia sativa	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vicia sepium	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vicia sylvatica	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vicia tenuifolia	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vicia tetrasperma	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vinca minor	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vincetoxicum hirundinaria	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Viola biflora	-	✓	✓	-	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-
Viola calcarata	✓	✓	✓	✓	-	-	-	✓	-	-	-	-	-	-	✓	-	-	-	✓
Viola canina	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Viola hirta	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Viola laricicola	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Viola mirabilis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Viola NA	✓	✓	✓	✓	-	-	-	-	-	✓	-	-	-	-	-	-	-	-	-
Viola odorata	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Viola palustris	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Viola pyrenaica	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Viola reichenbachiana	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Viola riviniana	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Viola rupestris	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-
Viola suavis	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Viola tricolor	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Viscum album	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Woodsia alpina	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Xeranthemum inapertum	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zz Lichens	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

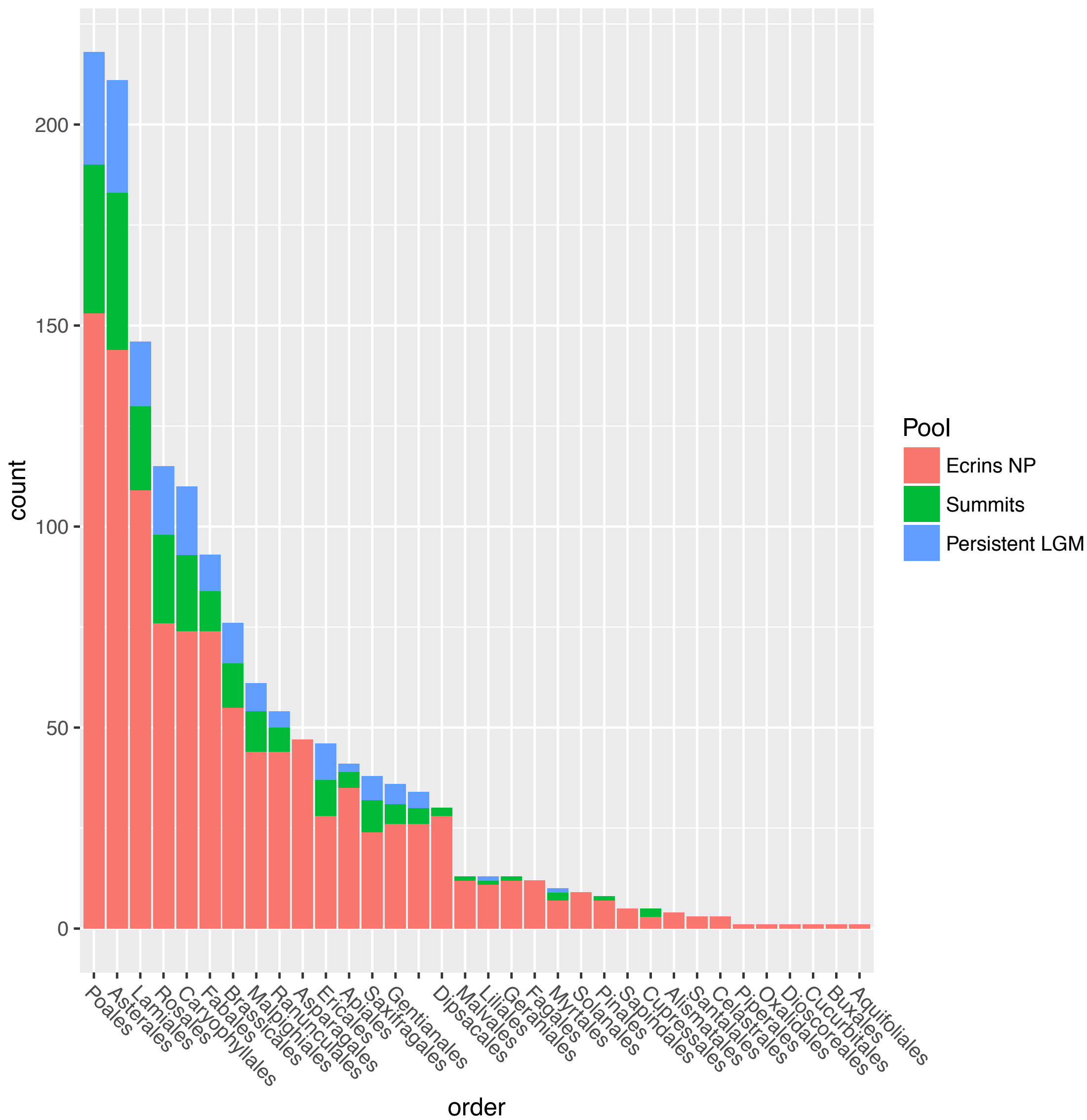

FIGURE B.1.1: Richness of plant orders in the Regional, All Summits, and LGM species pools.

B.2 MAXIMUM LIKELIHOOD PHYLOGRAM FOR EACH GENE TREE PRODUCED WITH RAXML HPC-PTHREADS VERSION 7.4.2 (STAMATAKIS, 2006)

FIGURE B.2.1: Gene tree for *atpB*. Node values show bootstrap support.

Figure B.2.2: Gene tree for ITS. Node values show bootstrap support.

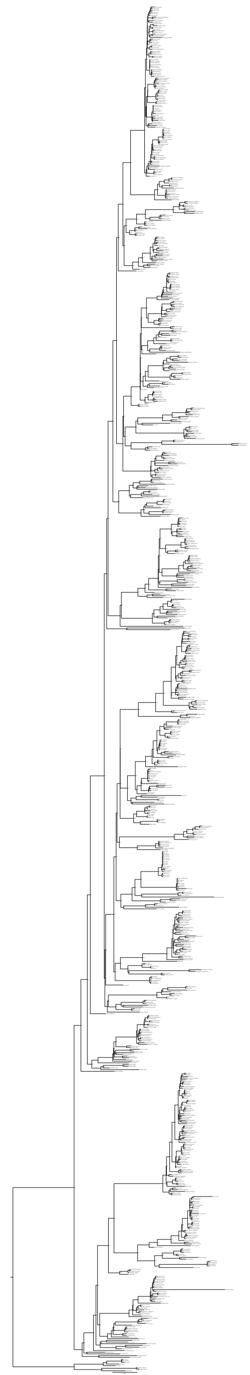

Figure b.2.3: Gene tree for *matK*. Node values show bootstrap support.

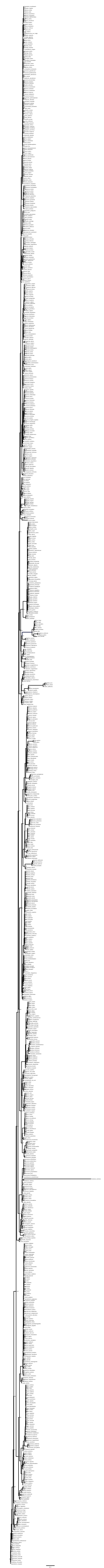

Figure b.2.4: Gene tree for *rbcL*. Node values show bootstrap support.

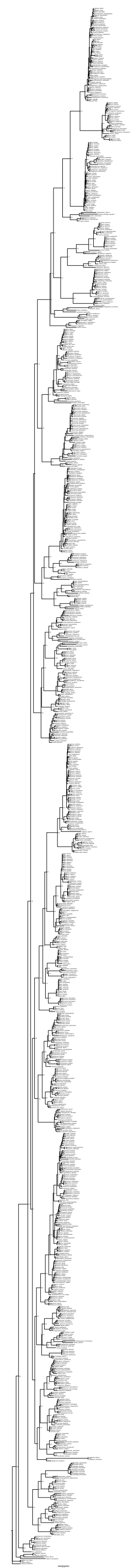

Figure b.2.5: Gene tree for *trnTLF*. Node values show bootstrap support.

B.3 MAXIMUM LIKELIHOOD PHYLOGRAM FOR THE CONCATENATED DATASET

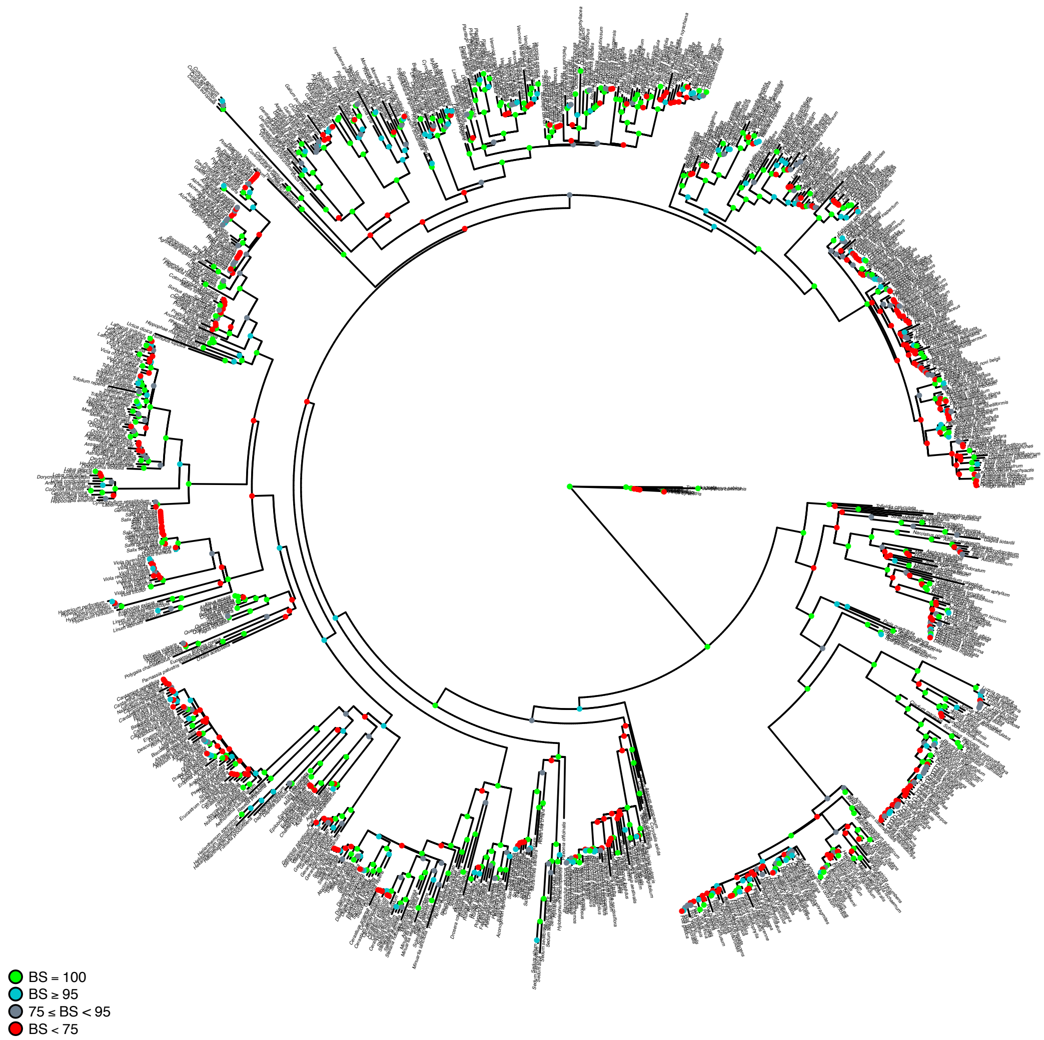

FIGURE B.3.1: Maximum likelihood phylogram for the concatenated dataset produced with RAxML HPC-PTHREADS version 7.4.2 (Stamatakis, 2006). Node colors indicate bootsrap support (BS).

B.4 PHYLOGENETIC α-DIVERSITY OUTPUT FOR RD NULL MODEL

TABLE B.4.1: Table showing output statistics for phylogenetic α-diversity under the RD null model on each summit: the number of taxa (N taxa), the observed phylogenetic diversity (obs), the mean phylogenetic diversity from the phylogeny shuffle randomization (rand mean), the standard deviation of phylogenetic diversity from the phylogeny shuffle randomization (rand sd), the rank of the observed metric compared to the metric calculated after the phylogeny shuffle randomization (obs rank), the z-score or standardized effect size (SES) of the observed metric compared to the phylogeny shuffle randomization (obs z) , the *P*-value (quantile) of observed metric compared to the phylogeny shuffle randomization (obs p = obs rank / runs), if the *P*-value was significant (sig), the number of phylogeny shuffles (runs), the phylogenetic diversity metric calculated (metric), the clade the metric was calculated for (clade), and the species pool the metric was calculated in (pool; Regional = Écrins National Park, All Alpine = just alpine species, LGM = only species that occur in areas that persisted through the LGM).

Summits	N taxa	obs	rand mean	rand sd	obs rank	obs z	obs p	sig	runs	metric	clade	pool
Barre des Ecrins	40	60.169	107.775	14.441	1	-3.297	0.001	1	999	mntd	Spermatophyta	Regional
Brevoort	11	133.958	169.596	31.711	131	-1.124	0.131	0	999	mntd	Spermatophyta	Regional
Burlan	33	84.833	115.963	16.204	22	-1.921	0.022	1	999	mntd	Spermatophyta	Regional
Choisy	17	97.578	148.68	25.782	16	-1.982	0.016	1	999	mntd	Spermatophyta	Regional
La Meije	36	71.645	112.208	15.265	1	-2.657	0.001	1	999	mntd	Spermatophyta	Regional
Lauvitel	96	43.75	76.41	7.51	1	-4.349	0.001	1	999	mntd	Spermatophyta	Regional
Muraillette	62	54.293	91.918	10.364	1	-3.631	0.001	1	999	mntd	Spermatophyta	Regional
Occidentale Ailefroide	29	82.665	122.833	17.755	5	-2.262	0.005	1	999	mntd	Spermatophyta	Regional
Olan	63	78.923	91.115	10.612	120	-1.149	0.12	0	999	mntd	Spermatophyta	Regional
Pelvoux	16	182.468	151.413	25.707	884	1.208	0.884	0	999	mntd	Spermatophyta	Regional
Persistent	164	39.523	59.451	4.724	1	-4.218	0.001	1	999	mntd	Spermatophyta	Regional
Plat de la Selle	31	71.591	120.048	17.205	2	-2.816	0.002	1	999	mntd	Spermatophyta	Regional
Rateau	100	55.921	74.937	7.03	5	-2.705	0.005	1	999	mntd	Spermatophyta	Regional
Rocher de la Selle	150	47.958	62.003	4.916	3	-2.857	0.003	1	999	mntd	Spermatophyta	Regional
Rouies	40	75.866	109.08	14.413	7	-2.304	0.007	1	999	mntd	Spermatophyta	Regional
Sirac	76	49.723	84.464	9.1	1	-3.818	0.001	1	999	mntd	Spermatophyta	Regional
Summits	215	39.005	52.014	3.571	1	-3.643	0.001	1	999	mntd	Spermatophyta	Regional
Barre des Ecrins	7	46.95	61.082	15.332	186	-0.922	0.186	0	999	mntd	Asterales	Regional
Brevoort	2	33.909	103.18	41.827	60	-1.656	0.06	0	999	mntd	Asterales	Regional
Burlan	5	33.411	70.758	20.009	25	-1.867	0.025	1	999	mntd	Asterales	Regional
Choisy	3	49.755	86.8	27.341	105	-1.355	0.105	0	999	mntd	Asterales	Regional
La Meije	4	84.098	78.344	23.639	609	0.243	0.609	0	999	mntd	Asterales	Regional
Lauvitel	12	39.816	46.941	9.371	242	-0.76	0.242	0	999	mntd	Asterales	Regional
Muraillette	11	26.743	48.74	10.193	17	-2.158	0.017	1	999	mntd	Asterales	Regional
Occidentale Ailefroide	5	47.355	71.667	19.814	125	-1.227	0.125	0	999	mntd	Asterales	Regional
Olan	10	53.107	51.986	10.939	533	0.102	0.533	0	999	mntd	Asterales	Regional
Pelvoux	2	88.063	103.347	42.359	239	-0.361	0.239	0	999	mntd	Asterales	Regional
Persistent	28	22.037	28.346	4.001	70	-1.577	0.07	0	999	mntd	Asterales	Regional
Plat de la Selle	5	78.429	71.496	19.967	629.5	0.347	0.63	0	999	mntd	Asterales	Regional
Rateau	16	49.574	39.547	6.91	928	1.451	0.928	0	999	mntd	Asterales	Regional
Rocher de la Selle	31	23.367	27.1	3.551	156	-1.051	0.156	0	999	mntd	Asterales	Regional
Rouies	10	52.506	51.037	10.986	554	0.134	0.554	0	999	mntd	Asterales	Regional
Sirac	13	32.661	44.94	8.564	84	-1.434	0.084	0	999	mntd	Asterales	Regional
Summits	39	21.002	23.833	2.9	170	-0.977	0.17	0	999	mntd	Asterales	Regional
Barre des Ecrins	10	35.488	56.064	13.567	62	-1.517	0.062	0	999	mntd	Poales	Regional
Brevoort	1	NA	NA	NA	NA	NA	NA	NA	999	mntd	Poales	Regional
Burlan	6	94.019	74.443	21.726	809	0.901	0.809	0	999	mntd	Poales	Regional
Choisy	2	176.543	134.522	54.12	866.5	0.776	0.867	0	999	mntd	Poales	Regional
La Meije	6	60.9	73.98	22.014	286	-0.594	0.286	0	999	mntd	Poales	Regional
Lauvitel	18	31.186	43.512	8.396	71	-1.468	0.071	0	999	mntd	Poales	Regional
Muraillette	11	46.63	53.972	12.963	297	-0.566	0.297	0	999	mntd	Poales	Regional
Occidentale Ailefroide	6	55.521	72.567	21.613	234	-0.789	0.234	0	999	mntd	Poales	Regional
Olan	9	51.141	59.56	15.398	288	-0.547	0.288	0	999	mntd	Poales	Regional
Pelvoux	3	134.804	106.445	37.807	796.5	0.75	0.797	0	999	mntd	Poales	Regional
Persistent	28	29.227	35.305	5.901	155	-1.03	0.155	0	999	mntd	Poales	Regional

Continued on next page

Table b.4.1 – continued from previous page

Summits	N taxa	obs	rand mean	rand sd	obs rank	obs z	obs p	sig	runs	metric	clade	pool
Plat de la Selle	11	32.003	53.683	12.985	42	-1.67	0.042	1	999	mntd	Poales	Regional
Rateau	22	28.22	39.482	7.363	60	-1.529	0.06	0	999	mntd	Poales	Regional
Rocher de la Selle	29	26.56	34.799	5.737	87	-1.436	0.087	0	999	mntd	Poales	Regional
Rouies	5	82.469	80.594	24.939	513	0.075	0.513	0	999	mntd	Poales	Regional
Sirac	14	44.216	48.181	10.627	358	-0.373	0.358	0	999	mntd	Poales	Regional
Summits	37	24.412	30.773	4.394	75	-1.448	0.075	0	999	mntd	Poales	Regional
Barre des Ecrins	3	43.716	79.682	35.604	151.5	-1.01	0.152	0	999	mntd	Rosales	Regional
Brevoort	0	NA	NA	NA	NA	NA	NA	NA	999	mntd	Rosales	Regional
Burlan	2	141.873	101.373	52.118	769	0.777	0.769	0	999	mntd	Rosales	Regional
Choisy	1	NA	NA	NA	NA	NA	NA	NA	999	mntd	Rosales	Regional
La Meije	2	60.974	101.354	50.707	145	-0.796	0.145	0	999	mntd	Rosales	Regional
Lauvitel	8	9.514	53.208	18.159	2	-2.406	0.002	1	999	mntd	Rosales	Regional
Muraillette	6	44.02	59.896	22.503	260	-0.705	0.26	0	999	mntd	Rosales	Regional
Occidentale Ailefroide	1	NA	NA	NA	NA	NA	NA	NA	999	mntd	Rosales	Regional
Olan	5	10.653	64.778	23.657	5	-2.288	0.005	1	999	mntd	Rosales	Regional
Pelvoux	0	NA	NA	NA	NA	NA	NA	NA	999	mntd	Rosales	Regional
Persistent	17	37.138	34.341	9.548	616	0.293	0.616	0	999	mntd	Rosales	Regional
Plat de la Selle	4	24.698	72.911	28.67	37	-1.682	0.037	1	999	mntd	Rosales	Regional
Rateau	15	25.296	37.028	10.825	148	-1.084	0.148	0	999	mntd	Rosales	Regional
Rocher de la Selle	10	24.535	46.683	15.739	83	-1.407	0.083	0	999	mntd	Rosales	Regional
Rouies	3	43.716	81.344	37.227	167.5	-1.011	0.168	0	999	mntd	Rosales	Regional
Sirac	11	10.188	44.008	13.788	3	-2.453	0.003	1	999	mntd	Rosales	Regional
Summits	22	30.526	30.175	8.024	550	0.044	0.55	0	999	mntd	Rosales	Regional
Barre des Ecrins	5	43.655	56.953	12.912	155	-1.03	0.155	0	999	mntd	Lamiales	Regional
Brevoort	1	NA	NA	NA	NA	NA	NA	NA	999	mntd	Lamiales	Regional
Burlan	5	44.075	56.515	13.179	163	-0.944	0.163	0	999	mntd	Lamiales	Regional
Choisy	2	73.188	72.946	17.553	249	0.014	0.249	0	999	mntd	Lamiales	Regional
La Meije	3	75.805	65.986	15.328	598.5	0.641	0.599	0	999	mntd	Lamiales	Regional
Lauvitel	8	34.6	49.031	9.692	72	-1.489	0.072	0	999	mntd	Lamiales	Regional
Muraillette	5	62.082	57.138	12.708	659	0.389	0.659	0	999	mntd	Lamiales	Regional
Occidentale Ailefroide	4	60.255	61.153	13.847	481	-0.065	0.481	0	999	mntd	Lamiales	Regional
Olan	6	48.839	54.404	11.449	303	-0.486	0.303	0	999	mntd	Lamiales	Regional
Pelvoux	2	67.428	73.657	18.022	203.5	-0.346	0.204	0	999	mntd	Lamiales	Regional
Persistent	16	23.448	36.536	6.147	21	-2.129	0.021	1	999	mntd	Lamiales	Regional
Plat de la Selle	2	81.037	73.037	18.238	874	0.439	0.874	0	999	mntd	Lamiales	Regional
Rateau	9	45.361	46.363	9.51	444	-0.105	0.444	0	999	mntd	Lamiales	Regional
Rocher de la Selle	11	41.295	42.707	8.271	435	-0.171	0.435	0	999	mntd	Lamiales	Regional
Rouies	5	69.91	57.002	12.318	825	1.048	0.825	0	999	mntd	Lamiales	Regional
Sirac	6	70.58	54.12	11.236	933	1.465	0.933	0	999	mntd	Lamiales	Regional
Summits	21	24.54	32.516	4.945	54	-1.613	0.054	0	999	mntd	Lamiales	Regional
Barre des Ecrins	5	74.518	78.417	20.989	395	-0.186	0.395	0	999	mntd	Caryophyllales	Regional
Brevoort	2	75.164	120.922	54.093	261	-0.846	0.261	0	999	mntd	Caryophyllales	Regional
Burlan	3	73.498	95.92	32.33	253.5	-0.694	0.254	0	999	mntd	Caryophyllales	Regional
Choisy	2	75.164	119.944	54.219	266	-0.826	0.266	0	999	mntd	Caryophyllales	Regional
La Meije	5	75.007	80.115	21.641	390	-0.236	0.39	0	999	mntd	Caryophyllales	Regional
Lauvitel	14	52.348	53.261	10.402	467	-0.088	0.467	0	999	mntd	Caryophyllales	Regional
Muraillette	7	88.375	70.737	16.178	863	1.09	0.863	0	999	mntd	Caryophyllales	Regional
Occidentale Ailefroide	4	86.262	85.867	25.004	512.5	0.016	0.513	0	999	mntd	Caryophyllales	Regional
Olan	4	124.937	84.227	25.041	947.5	1.626	0.948	0	999	mntd	Caryophyllales	Regional
Pelvoux	1	NA	NA	NA	NA	NA	NA	NA	999	mntd	Caryophyllales	Regional
Persistent	17	55.104	49.318	9.025	738	0.641	0.738	0	999	mntd	Caryophyllales	Regional
Plat de la Selle	2	76.088	120.94	52.721	341.5	-0.851	0.342	0	999	mntd	Caryophyllales	Regional
Rateau	6	84.007	75.034	19.07	680	0.471	0.68	0	999	mntd	Caryophyllales	Regional
Rocher de la Selle	15	34.954	51.534	9.583	41	-1.73	0.041	1	999	mntd	Caryophyllales	Regional
Rouies	4	101.334	86.898	24.346	752	0.593	0.752	0	999	mntd	Caryophyllales	Regional
Sirac	7	74.822	70.463	16.705	602	0.261	0.602	0	999	mntd	Caryophyllales	Regional
Summits	19	44.451	46.897	7.812	379	-0.313	0.379	0	999	mntd	Caryophyllales	Regional
Barre des Ecrins	40	275.315	281.524	18.121	378	-0.343	0.378	0	999	mpd	Spermatophyta	Regional
Brevoort	11	255.277	281.755	34.391	221	-0.77	0.221	0	999	mpd	Spermatophyta	Regional
Burlan	33	267.641	280.895	18.981	224	-0.698	0.224	0	999	mpd	Spermatophyta	Regional
Choisy	17	256.807	281.439	27.049	165	-0.911	0.165	0	999	mpd	Spermatophyta	Regional
La Meije	36	261.161	280.437	17.786	140	-1.084	0.14	0	999	mpd	Spermatophyta	Regional
Lauvitel	96	269.245	280.759	10.638	145	-1.082	0.145	0	999	mpd	Spermatophyta	Regional
Muraillette	62	265.98	280.042	13.498	151	-1.042	0.151	0	999	mpd	Spermatophyta	Regional
Occidentale Ailefroide	29	270.618	281.178	20.012	306	-0.528	0.306	0	999	mpd	Spermatophyta	Regional
Olan	63	277.386	280.099	13.038	437	-0.208	0.437	0	999	mpd	Spermatophyta	Regional
Pelvoux	16	378.248	281.672	30.126	990	3.206	0.99	1	999	mpd	Spermatophyta	Regional
Persistent	164	263.342	280.535	8.104	9	-2.122	0.009	1	999	mpd	Spermatophyta	Regional
Plat de la Selle	31	283.098	280.797	20.208	590	0.114	0.59	0	999	mpd	Spermatophyta	Regional
Rateau	100	278.17	279.687	10.965	446	-0.138	0.446	0	999	mpd	Spermatophyta	Regional
Rocher de la Selle	150	273.505	280.552	8.62	210	-0.817	0.21	0	999	mpd	Spermatophyta	Regional
Rouies	40	251.873	280.933	17.278	40	-1.682	0.04	1	999	mpd	Spermatophyta	Regional
Sirac	76	262.779	281.336	12.579	58	-1.475	0.058	0	999	mpd	Spermatophyta	Regional
Summits	215	275.967	281.015	6.752	231	-0.748	0.231	0	999	mpd	Spermatophyta	Regional
Barre des Ecrins	7	85.788	104.741	16.599	116	-1.142	0.116	0	999	mpd	Asterales	Regional
Brevoort	2	33.909	103.38	43.515	71	-1.596	0.071	0	999	mpd	Asterales	Regional

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Table b.4.1 – continued from previous page

Summits	N taxa	obs	rand mean	rand sd	obs rank	obs z	obs p	sig	runs	metric	clade	pool
Burlan	5	126.409	103.597	20.16	806	1.132	0.806	0	999	mpd	Asterales	Regional
Choisy	3	65.602	105.451	29.142	50	-1.367	0.05	1	999	mpd	Asterales	Regional
La Meije	4	124.576	104.097	24.882	664	0.823	0.664	0	999	mpd	Asterales	Regional
Lauvitel	12	116.575	104.456	11.984	822	1.011	0.822	0	999	mpd	Asterales	Regional
Muraillette	11	109.028	104.378	12.873	675	0.361	0.675	0	999	mpd	Asterales	Regional
Occidentale Ailefroide	5	75.773	104.923	20.699	50	-1.408	0.05	1	999	mpd	Asterales	Regional
Olan	10	92.599	103.748	13.293	287	-0.839	0.287	0	999	mpd	Asterales	Regional
Pelvoux	2	88.063	105.484	41.162	215.5	-0.423	0.216	0	999	mpd	Asterales	Regional
Persistent	28	103.932	104.478	7.11	431	-0.077	0.431	0	999	mpd	Asterales	Regional
Plat de la Selle	5	95.793	104.195	20.848	478	-0.403	0.478	0	999	mpd	Asterales	Regional
Rateau	16	97.967	104.581	10.314	243	-0.641	0.243	0	999	mpd	Asterales	Regional
Rocher de la Selle	31	109.451	104.588	6.834	754	0.711	0.754	0	999	mpd	Asterales	Regional
Rouies	10	118.279	104.241	13.662	787	1.028	0.787	0	999	mpd	Asterales	Regional
Sirac	13	114.576	104.236	11.699	794	0.884	0.794	0	999	mpd	Asterales	Regional
Summits	39	105.048	104.416	5.742	522	0.11	0.522	0	999	mpd	Asterales	Regional
Barre des Ecrins	10	137.228	133.838	11.04	577	0.307	0.577	0	999	mpd	Poales	Regional
Brevoort	1	NA	NA	NA	NA	NA	NA	NA	999	mpd	Poales	Regional
Burlan	6	146.847	133.37	17.063	791	0.79	0.791	0	999	mpd	Poales	Regional
Choisy	2	176.543	132.746	54.882	878.5	0.798	0.879	0	999	mpd	Poales	Regional
La Meije	6	93.142	133.623	16.757	30	-2.416	0.03	1	999	mpd	Poales	Regional
Lauvitel	18	127.774	133.55	7.213	197	-0.801	0.197	0	999	mpd	Poales	Regional
Muraillette	11	125.113	134.119	10.285	172	-0.876	0.172	0	999	mpd	Poales	Regional
Occidentale Ailefroide	6	138.065	133.775	15.848	560	0.271	0.56	0	999	mpd	Poales	Regional
Olan	9	135.045	134.227	11.582	486	0.071	0.486	0	999	mpd	Poales	Regional
Pelvoux	3	155.674	134.256	33.323	764.5	0.643	0.765	0	999	mpd	Poales	Regional
Persistent	28	124.623	133.667	5.394	60	-1.677	0.06	0	999	mpd	Poales	Regional
Plat de la Selle	11	127.717	133.748	9.823	228	-0.614	0.228	0	999	mpd	Poales	Regional
Rateau	22	126.775	133.515	6.144	131	-1.097	0.131	0	999	mpd	Poales	Regional
Rocher de la Selle	29	124.689	133.81	5.111	46	-1.785	0.046	1	999	mpd	Poales	Regional
Rouies	5	135.173	133.703	20.357	455	0.072	0.455	0	999	mpd	Poales	Regional
Sirac	14	139.244	133.795	9.009	702	0.605	0.702	0	999	mpd	Poales	Regional
Summits	37	125.793	133.74	4.195	37	-1.894	0.037	1	999	mpd	Poales	Regional
Barre des Ecrins	3	52.345	100.767	38.272	114	-1.265	0.114	0	999	mpd	Rosales	Regional
Brevoort	0	NA	NA	NA	NA	NA	NA	NA	999	mpd	Rosales	Regional
Burlan	2	141.873	103.35	52.001	759	0.741	0.759	0	999	mpd	Rosales	Regional
Choisy	1	NA	NA	NA	NA	NA	NA	NA	999	mpd	Rosales	Regional
La Meije	2	60.974	103.732	52.724	140.5	-0.811	0.141	0	999	mpd	Rosales	Regional
Lauvitel	8	37.763	101.89	20.508	1	-3.127	0.001	1	999	mpd	Rosales	Regional
Muraillette	6	79.264	101.176	24.476	193	-0.895	0.193	0	999	mpd	Rosales	Regional
Occidentale Ailefroide	1	NA	NA	NA	NA	NA	NA	NA	999	mpd	Rosales	Regional
Olan	5	44.51	100.601	27.767	11	-2.02	0.011	1	999	mpd	Rosales	Regional
Pelvoux	0	NA	NA	NA	NA	NA	NA	NA	999	mpd	Rosales	Regional
Persistent	17	77.637	101.794	12.859	41	-1.879	0.041	1	999	mpd	Rosales	Regional
Plat de la Selle	4	42.41	102.402	32.229	20	-1.861	0.02	1	999	mpd	Rosales	Regional
Rateau	15	73.907	102.311	13.89	25	-2.045	0.025	1	999	mpd	Rosales	Regional
Rocher de la Selle	10	70.553	102.066	18.234	44	-1.728	0.044	1	999	mpd	Rosales	Regional
Rouies	3	52.345	100.88	38.027	108	-1.276	0.108	0	999	mpd	Rosales	Regional
Sirac	11	38.927	101.758	16.713	1	-3.759	0.001	1	999	mpd	Rosales	Regional
Summits	22	81.886	101.343	11.135	45	-1.747	0.045	1	999	mpd	Rosales	Regional
Barre des Ecrins	5	70.514	73.399	6.82	262	-0.423	0.262	0	999	mpd	Lamiales	Regional
Brevoort	1	NA	NA	NA	NA	NA	NA	NA	999	mpd	Lamiales	Regional
Burlan	5	69.238	73.218	7.441	218	-0.535	0.218	0	999	mpd	Lamiales	Regional
Choisy	2	73.188	73.149	17.918	261	0.002	0.261	0	999	mpd	Lamiales	Regional
La Meije	3	78.421	73.375	11.192	635.5	0.451	0.636	0	999	mpd	Lamiales	Regional
Lauvitel	8	69.971	73.194	4.941	210	-0.652	0.21	0	999	mpd	Lamiales	Regional
Muraillette	5	75.121	73.122	7.523	654.5	0.266	0.655	0	999	mpd	Lamiales	Regional
Occidentale Ailefroide	4	72.148	73.085	8.738	442	-0.107	0.442	0	999	mpd	Lamiales	Regional
Olan	6	71.921	73.055	6.187	375	-0.183	0.375	0	999	mpd	Lamiales	Regional
Pelvoux	2	67.428	74.525	16.954	203.5	-0.419	0.204	0	999	mpd	Lamiales	Regional
Persistent	16	69.657	73.305	3.041	87	-1.2	0.087	0	999	mpd	Lamiales	Regional
Plat de la Selle	2	81.037	73.086	18.255	871	0.436	0.871	0	999	mpd	Lamiales	Regional
Rateau	9	72.475	73.096	4.471	437	-0.139	0.437	0	999	mpd	Lamiales	Regional
Rocher de la Selle	11	71.7	73.503	3.899	298	-0.463	0.298	0	999	mpd	Lamiales	Regional
Rouies	5	77.382	73.401	7.011	786	0.568	0.786	0	999	mpd	Lamiales	Regional
Sirac	6	77.392	73.271	6.086	848	0.677	0.848	0	999	mpd	Lamiales	Regional
Summits	21	69.258	73.268	2.597	39	-1.544	0.039	1	999	mpd	Lamiales	Regional
Barre des Ecrins	5	111.549	119.581	26.624	300	-0.302	0.3	0	999	mpd	Caryophyllales	Regional
Brevoort	2	75.164	117.625	53.122	260	-0.799	0.26	0	999	mpd	Caryophyllales	Regional
Burlan	3	74.793	117.682	38.033	221.5	-1.128	0.222	0	999	mpd	Caryophyllales	Regional
Choisy	2	75.164	117.646	53.981	287.5	-0.787	0.288	0	999	mpd	Caryophyllales	Regional
La Meije	5	111.227	118.742	25.791	280	-0.291	0.28	0	999	mpd	Caryophyllales	Regional
Lauvitel	14	119.996	120.145	13.324	431	-0.011	0.431	0	999	mpd	Caryophyllales	Regional
Muraillette	7	125.124	119.198	20.706	548	0.286	0.548	0	999	mpd	Caryophyllales	Regional
Occidentale Ailefroide	4	148.035	118.049	30.309	864	0.989	0.864	0	999	mpd	Caryophyllales	Regional
Olan	4	158.821	118.32	30.645	937	1.322	0.937	0	999	mpd	Caryophyllales	Regional
Pelvoux	1	NA	NA	NA	NA	NA	NA	NA	999	mpd	Caryophyllales	Regional

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Table b.4.1 – continued from previous page

Summits	N taxa	obs	rand mean	rand sd	obs rank	obs z	obs p	sig	runs	metric	clade	pool
Persistent	17	121.798	119.606	11.593	542	0.189	0.542	0	999	mpd	Caryophyllales	Regional
Plat de la Selle	2	76.088	120.772	53.71	344	-0.832	0.344	0	999	mpd	Caryophyllales	Regional
Rateau	6	138.826	120.648	23.558	787	0.772	0.787	0	999	mpd	Caryophyllales	Regional
Rocher de la Selle	15	121.965	119.393	12.303	539	0.209	0.539	0	999	mpd	Caryophyllales	Regional
Rouies	4	127.351	117.889	30.963	569.5	0.306	0.57	0	999	mpd	Caryophyllales	Regional
Sirac	7	107.649	120.42	20.526	266	-0.622	0.266	0	999	mpd	Caryophyllales	Regional
Summits	19	124.752	119.482	10.767	659	0.489	0.659	0	999	mpd	Caryophyllales	Regional
Barre des Ecrins	40	60.169	90.063	14.792	18	-2.021	0.018	1	999	mntd	Spermatophyta	All Summits
Brevoort	11	133.958	156.726	36.125	268	-0.63	0.268	0	999	mntd	Spermatophyta	All Summits
Burlan	33	84.833	98.992	16.169	206	-0.876	0.206	0	999	mntd	Spermatophyta	All Summits
Choisy	17	97.578	132.436	26.858	91	-1.298	0.091	0	999	mntd	Spermatophyta	All Summits
La Meije	36	71.645	95.089	15.566	63	-1.506	0.063	0	999	mntd	Spermatophyta	All Summits
Lauvitel	96	43.75	59.046	6.641	13	-2.303	0.013	1	999	mntd	Spermatophyta	All Summits
Muraillette	62	54.293	73.296	9.447	21	-2.011	0.021	1	999	mntd	Spermatophyta	All Summits
Occidentale Ailefroide	29	82.665	104.566	17.733	104	-1.235	0.104	0	999	mntd	Spermatophyta	All Summits
Olan	63	78.923	73.086	9.417	732	0.62	0.732	0	999	mntd	Spermatophyta	All Summits
Pelvoux	16	182.468	133.873	26.454	958	1.837	0.958	1	999	mntd	Spermatophyta	All Summits
Plat de la Selle	31	71.591	101.709	17.036	32	-1.768	0.032	1	999	mntd	Spermatophyta	All Summits
Rateau	100	55.921	57.35	5.83	403	-0.245	0.403	0	999	mntd	Spermatophyta	All Summits
Rocher de la Selle	150	47.958	47.064	3.686	583	0.242	0.583	0	999	mntd	Spermatophyta	All Summits
Rouies	40	75.866	90.22	13.75	159	-1.044	0.159	0	999	mntd	Spermatophyta	All Summits
Sirac	76	49.723	66.201	8.264	22	-1.994	0.022	1	999	mntd	Spermatophyta	All Summits
Summits	215	39.005	39.005	0	500.5	NA	0.501	0	999	mntd	Spermatophyta	All Summits
Barre des Ecrins	7	46.95	61.674	15.522	186	-0.949	0.186	0	999	mntd	Asterales	All Summits
Brevoort	2	33.909	105.113	39.864	42.5	-1.786	0.043	1	999	mntd	Asterales	All Summits
Burlan	5	33.411	73.043	20.842	23	-1.902	0.023	1	999	mntd	Asterales	All Summits
Choisy	3	49.755	87.685	28.204	91	-1.345	0.091	0	999	mntd	Asterales	All Summits
La Meije	4	84.098	79.483	24.201	588	0.191	0.588	0	999	mntd	Asterales	All Summits
Lauvitel	12	39.816	44.019	9.023	333	-0.466	0.333	0	999	mntd	Asterales	All Summits
Muraillette	11	26.743	46.926	10.225	19	-1.974	0.019	1	999	mntd	Asterales	All Summits
Occidentale Ailefroide	5	47.355	72.222	20.795	120	-1.196	0.12	0	999	mntd	Asterales	All Summits
Olan	10	53.107	50.175	11.16	593	0.263	0.593	0	999	mntd	Asterales	All Summits
Pelvoux	2	88.063	106.917	42.042	205.5	-0.448	0.206	0	999	mntd	Asterales	All Summits
Plat de la Selle	5	78.429	72.214	20.993	640.5	0.296	0.641	0	999	mntd	Asterales	All Summits
Rateau	16	49.574	36.619	6.72	972	1.928	0.972	1	999	mntd	Asterales	All Summits
Rocher de la Selle	31	23.367	23.445	2.124	475	-0.037	0.475	0	999	mntd	Asterales	All Summits
Rouies	10	52.506	49.935	11.454	577	0.224	0.577	0	999	mntd	Asterales	All Summits
Sirac	13	32.661	42.034	8.179	138	-1.146	0.138	0	999	mntd	Asterales	All Summits
Summits	39	21.002	21.002	0	500.5	NA	0.501	0	999	mntd	Asterales	All Summits
Barre des Ecrins	10	35.488	42.599	11.404	263	-0.624	0.263	0	999	mntd	Poales	All Summits
Brevoort	1	NA	NA	NA	NA	NA	NA	NA	999	mntd	Poales	All Summits
Burlan	6	94.019	59.979	19.34	970.5	1.76	0.971	1	999	mntd	Poales	All Summits
Choisy	2	176.543	126.388	61.034	929	0.822	0.929	0	999	mntd	Poales	All Summits
La Meije	6	60.9	59.236	18.691	533	0.089	0.533	0	999	mntd	Poales	All Summits
Lauvitel	18	31.186	30.172	5.94	572	0.171	0.572	0	999	mntd	Poales	All Summits
Muraillette	11	46.63	38.983	10.421	769	0.734	0.769	0	999	mntd	Poales	All Summits
Occidentale Ailefroide	6	55.521	60.527	18.977	370	-0.264	0.37	0	999	mntd	Poales	All Summits
Olan	9	51.141	44.817	12.678	687	0.499	0.687	0	999	mntd	Poales	All Summits
Pelvoux	3	134.804	95.919	38.155	824.5	1.019	0.825	0	999	mntd	Poales	All Summits
Plat de la Selle	11	32.003	39.355	10.278	243	-0.715	0.243	0	999	mntd	Poales	All Summits
Rateau	22	28.22	27.642	4.357	554	0.133	0.554	0	999	mntd	Poales	All Summits
Rocher de la Selle	29	26.56	25.586	2.701	603	0.361	0.603	0	999	mntd	Poales	All Summits
Rouies	5	82.469	68.044	21.911	736.5	0.658	0.737	0	999	mntd	Poales	All Summits
Sirac	14	44.216	33.954	8.24	897	1.245	0.897	0	999	mntd	Poales	All Summits
Summits	37	24.412	24.412	0	500.5	NA	0.501	0	999	mntd	Poales	All Summits
Barre des Ecrins	3	43.716	61.731	38.899	344.5	-0.463	0.345	0	999	mntd	Rosales	All Summits
Brevoort	0	NA	NA	NA	NA	NA	NA	NA	999	mntd	Rosales	All Summits
Burlan	2	141.873	81.975	58.16	764	1.03	0.764	0	999	mntd	Rosales	All Summits
Choisy	1	NA	NA	NA	NA	NA	NA	NA	999	mntd	Rosales	All Summits
La Meije	2	60.974	83.336	57.5	351.5	-0.389	0.352	0	999	mntd	Rosales	All Summits
Lauvitel	8	9.514	41.79	17.498	22	-1.845	0.022	1	999	mntd	Rosales	All Summits
Muraillette	6	44.02	45.043	22.135	492	-0.046	0.492	0	999	mntd	Rosales	All Summits
Occidentale Ailefroide	1	NA	NA	NA	NA	NA	NA	NA	999	mntd	Rosales	All Summits
Olan	5	10.653	47.335	24.898	44	-1.473	0.044	1	999	mntd	Rosales	All Summits
Pelvoux	0	NA	NA	NA	NA	NA	NA	NA	999	mntd	Rosales	All Summits
Plat de la Selle	4	24.698	53.221	29.179	213.5	-0.978	0.214	0	999	mntd	Rosales	All Summits
Rateau	15	25.296	34.872	8.607	133	-1.113	0.133	0	999	mntd	Rosales	All Summits
Rocher de la Selle	10	24.535	39.87	13.768	125	-1.114	0.125	0	999	mntd	Rosales	All Summits
Rouies	3	43.716	58.899	36.391	366	-0.417	0.366	0	999	mntd	Rosales	All Summits
Sirac	11	10.188	37.728	12.503	18	-2.203	0.018	1	999	mntd	Rosales	All Summits
Summits	22	30.526	30.526	0	500.5	NA	0.501	0	999	mntd	Rosales	All Summits
Barre des Ecrins	5	43.655	49.265	14.189	358	-0.395	0.358	0	999	mntd	Lamiales	All Summits
Brevoort	1	NA	NA	NA	NA	NA	NA	NA	999	mntd	Lamiales	All Summits
Burlan	5	44.075	48.695	15.224	411	-0.303	0.411	0	999	mntd	Lamiales	All Summits
Choisy	2	73.188	69.552	19.907	337	0.183	0.337	0	999	mntd	Lamiales	All Summits
La Meije	3	75.805	61.599	17.88	736.5	0.795	0.737	0	999	mntd	Lamiales	All Summits

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Table b.4.1 – continued from previous page

Summits	N taxa	obs	rand mean	rand sd	obs rank	obs z	obs p	sig	runs	metric	clade	pool
Lauvitel	8	34.6	38.372	10.768	376	-0.35	0.376	0	999	mntd	Lamiales	All Summits
Muraillette	5	62.082	48.774	14.896	790	0.893	0.79	0	999	mntd	Lamiales	All Summits
Occidentale Ailefroide	4	60.255	54.465	16.269	601.5	0.356	0.602	0	999	mntd	Lamiales	All Summits
Olan	6	48.839	45.015	13.205	649	0.29	0.649	0	999	mntd	Lamiales	All Summits
Pelvoux	2	67.428	69.626	20.193	263.5	-0.109	0.264	0	999	mntd	Lamiales	All Summits
Plat de la Selle	2	81.037	69.259	20.878	874	0.564	0.874	0	999	mntd	Lamiales	All Summits
Rateau	9	45.361	36.315	9.318	829	0.971	0.829	0	999	mntd	Lamiales	All Summits
Rocher de la Selle	11	41.295	33.115	7.744	851	1.056	0.851	0	999	mntd	Lamiales	All Summits
Rouies	5	69.91	48.377	14.456	916.5	1.49	0.917	0	999	mntd	Lamiales	All Summits
Sirac	6	70.58	44.949	13.5	979	1.899	0.979	1	999	mntd	Lamiales	All Summits
Summits	21	24.54	24.54	0	500.5	NA	0.501	0	999	mntd	Lamiales	All Summits
Barre des Ecrins	5	74.518	81.173	21.869	376	-0.304	0.376	0	999	mntd	Caryophyllales	All Summits
Brevoort	2	75.164	124.602	55.015	173.5	-0.899	0.174	0	999	mntd	Caryophyllales	All Summits
Burlan	3	73.498	102.726	36.815	185.5	-0.794	0.186	0	999	mntd	Caryophyllales	All Summits
Choisy	2	75.164	125.97	55.967	165	-0.908	0.165	0	999	mntd	Caryophyllales	All Summits
La Meije	5	75.007	82.888	22.148	347.5	-0.356	0.348	0	999	mntd	Caryophyllales	All Summits
Lauvitel	14	52.348	51.789	8.705	568	0.064	0.568	0	999	mntd	Caryophyllales	All Summits
Muraillette	7	88.375	71.082	16.686	831	1.036	0.831	0	999	mntd	Caryophyllales	All Summits
Occidentale Ailefroide	4	86.262	88.517	26.676	483	-0.085	0.483	0	999	mntd	Caryophyllales	All Summits
Olan	4	124.937	88.687	27.378	867	1.324	0.867	0	999	mntd	Caryophyllales	All Summits
Pelvoux	1	NA	NA	NA	NA	NA	NA	NA	999	mntd	Caryophyllales	All Summits
Plat de la Selle	2	76.088	122.139	55.114	273	-0.836	0.273	0	999	mntd	Caryophyllales	All Summits
Rateau	6	84.007	77.018	19.455	629.5	0.359	0.63	0	999	mntd	Caryophyllales	All Summits
Rocher de la Selle	15	34.954	50.383	7.569	3	-2.038	0.003	1	999	mntd	Caryophyllales	All Summits
Rouies	4	101.334	89.47	26.672	672.5	0.445	0.673	0	999	mntd	Caryophyllales	All Summits
Sirac	7	74.822	70.991	16.615	569.5	0.231	0.57	0	999	mntd	Caryophyllales	All Summits
Summits	19	44.451	44.451	0	500.5	NA	0.501	0	999	mntd	Caryophyllales	All Summits
Barre des Ecrins	40	275.315	276.317	17.653	516	-0.057	0.516	0	999	mpd	Spermatophyta	All Summits
Brevoort	11	255.277	273.915	36.95	294	-0.504	0.294	0	999	mpd	Spermatophyta	All Summits
Burlan	33	267.641	276.316	20.212	367	-0.429	0.367	0	999	mpd	Spermatophyta	All Summits
Choisy	17	256.807	276.829	30.235	248	-0.662	0.248	0	999	mpd	Spermatophyta	All Summits
La Meije	36	261.161	276.461	19.857	224	-0.77	0.224	0	999	mpd	Spermatophyta	All Summits
Lauvitel	96	269.245	275.809	9.608	259	-0.683	0.259	0	999	mpd	Spermatophyta	All Summits
Muraillette	62	265.98	275.822	13.293	242	-0.74	0.242	0	999	mpd	Spermatophyta	All Summits
Occidentale Ailefroide	29	270.618	275.724	22.748	451	-0.224	0.451	0	999	mpd	Spermatophyta	All Summits
Olan	63	277.386	276.652	13.996	536	0.052	0.536	0	999	mpd	Spermatophyta	All Summits
Pelvoux	16	378.248	275.946	31.571	996	3.24	0.996	1	999	mpd	Spermatophyta	All Summits
Plat de la Selle	31	283.098	275.309	21.129	681	0.369	0.681	0	999	mpd	Spermatophyta	All Summits
Rateau	100	278.17	276.201	8.98	564	0.219	0.564	0	999	mpd	Spermatophyta	All Summits
Rocher de la Selle	150	273.505	276.018	5.504	308	-0.457	0.308	0	999	mpd	Spermatophyta	All Summits
Rouies	40	251.873	276.162	18.145	80	-1.339	0.08	0	999	mpd	Spermatophyta	All Summits
Sirac	76	262.779	275.25	11.698	160	-1.066	0.16	0	999	mpd	Spermatophyta	All Summits
Summits	215	275.967	275.967	0	500.5	NA	0.501	0	999	mpd	Spermatophyta	All Summits
Barre des Ecrins	7	85.788	105.199	15.599	92	-1.244	0.092	0	999	mpd	Asterales	All Summits
Brevoort	2	33.909	103.885	43.297	56	-1.616	0.056	0	999	mpd	Asterales	All Summits
Burlan	5	126.409	104.302	19.727	803	1.121	0.803	0	999	mpd	Asterales	All Summits
Choisy	3	65.602	105.306	29.953	46	-1.326	0.046	1	999	mpd	Asterales	All Summits
La Meije	4	124.576	103.913	23.789	685	0.869	0.685	0	999	mpd	Asterales	All Summits
Lauvitel	12	116.575	105.204	10.546	855	1.078	0.855	0	999	mpd	Asterales	All Summits
Muraillette	11	109.028	104.697	11.425	686	0.379	0.686	0	999	mpd	Asterales	All Summits
Occidentale Ailefroide	5	75.773	104.648	19.887	33	-1.452	0.033	1	999	mpd	Asterales	All Summits
Olan	10	92.599	105.19	12.343	260	-1.02	0.26	0	999	mpd	Asterales	All Summits
Pelvoux	2	88.063	105.009	41.669	223	-0.407	0.223	0	999	mpd	Asterales	All Summits
Plat de la Selle	5	95.793	104.791	20.064	462.5	-0.448	0.463	0	999	mpd	Asterales	All Summits
Rateau	16	97.967	105.787	8.227	137	-0.951	0.137	0	999	mpd	Asterales	All Summits
Rocher de la Selle	31	109.451	105.114	3.447	969	1.258	0.969	1	999	mpd	Asterales	All Summits
Rouies	10	118.279	105.208	12.536	800	1.043	0.8	0	999	mpd	Asterales	All Summits
Sirac	13	114.576	105.494	10.037	804	0.905	0.804	0	999	mpd	Asterales	All Summits
Summits	39	105.048	105.048	0	500.5	NA	0.501	0	999	mpd	Asterales	All Summits
Barre des Ecrins	10	137.228	126.071	11.879	860	0.939	0.86	0	999	mpd	Poales	All Summits
Brevoort	1	NA	NA	NA	NA	NA	NA	NA	999	mpd	Poales	All Summits
Burlan	6	146.847	126.129	18.318	928.5	1.131	0.929	0	999	mpd	Poales	All Summits
Choisy	2	176.543	126.395	61.004	919.5	0.822	0.92	0	999	mpd	Poales	All Summits
La Meije	6	93.142	125.382	18.884	61	-1.707	0.061	0	999	mpd	Poales	All Summits
Lauvitel	18	127.774	125.854	6.9	545	0.278	0.545	0	999	mpd	Poales	All Summits
Muraillette	11	125.113	126.183	10.586	378	-0.101	0.378	0	999	mpd	Poales	All Summits
Occidentale Ailefroide	6	138.065	125.878	18.837	672	0.647	0.672	0	999	mpd	Poales	All Summits
Olan	9	135.045	125.834	13.171	747	0.699	0.747	0	999	mpd	Poales	All Summits
Pelvoux	3	155.674	126.825	36.528	798	0.79	0.798	0	999	mpd	Poales	All Summits
Plat de la Selle	11	127.717	125.249	11.266	493	0.219	0.493	0	999	mpd	Poales	All Summits
Rateau	22	126.775	125.79	5.355	503	0.184	0.503	0	999	mpd	Poales	All Summits
Rocher de la Selle	29	124.689	125.826	3.16	333	-0.36	0.333	0	999	mpd	Poales	All Summits
Rouies	5	135.173	126.73	22.033	527.5	0.383	0.528	0	999	mpd	Poales	All Summits
Sirac	14	139.244	126.231	8.771	992	1.483	0.992	1	999	mpd	Poales	All Summits
Summits	37	125.793	125.793	0	500.5	NA	0.501	0	999	mpd	Poales	All Summits
Barre des Ecrins	3	52.345	85.016	44.655	325	-0.732	0.325	0	999	mpd	Rosales	All Summits

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Table b.4.1 – continued from previous page

Summits	N taxa	obs	rand mean	rand sd	obs rank	obs z	obs p	sig	runs	metric	clade	pool
Brevoort	0	NA	NA	NA	NA	NA	NA	NA	999	mpd	Rosales	All Summits
Burlan	2	141.873	85.638	59.769	731.5	0.941	0.732	0	999	mpd	Rosales	All Summits
Choisy	1	NA	NA	NA	NA	NA	NA	NA	999	mpd	Rosales	All Summits
La Meije	2	60.974	82.874	58.724	369.5	-0.373	0.37	0	999	mpd	Rosales	All Summits
Lauvitel	8	37.763	82.46	22.979	19	-1.945	0.019	1	999	mpd	Rosales	All Summits
Muraillette	6	79.264	81.277	27.955	461	-0.072	0.461	0	999	mpd	Rosales	All Summits
Occidentale Ailefroide	1	NA	NA	NA	NA	NA	NA	NA	999	mpd	Rosales	All Summits
Olan	5	44.51	83.019	33.11	139.5	-1.163	0.14	0	999	mpd	Rosales	All Summits
Pelvoux	0	NA	NA	NA	NA	NA	NA	NA	999	mpd	Rosales	All Summits
Plat de la Selle	4	42.41	83.242	36.113	108	-1.131	0.108	0	999	mpd	Rosales	All Summits
Rateau	15	73.907	81.543	12.267	265	-0.623	0.265	0	999	mpd	Rosales	All Summits
Rocher de la Selle	10	70.553	81.972	18.516	284	-0.617	0.284	0	999	mpd	Rosales	All Summits
Rouies	3	52.345	79.201	43.714	368.5	-0.614	0.369	0	999	mpd	Rosales	All Summits
Sirac	11	38.927	81.318	17.548	9	-2.416	0.009	1	999	mpd	Rosales	All Summits
Summits	22	81.886	81.886	0	500.5	NA	0.501	0	999	mpd	Rosales	All Summits
Barre des Ecrins	5	70.514	69.45	6.963	491	0.153	0.491	0	999	mpd	Lamiales	All Summits
Brevoort	1	NA	NA	NA	NA	NA	NA	NA	999	mpd	Lamiales	All Summits
Burlan	5	69.238	69.168	6.749	419	0.01	0.419	0	999	mpd	Lamiales	All Summits
Choisy	2	73.188	69.479	20.186	334	0.184	0.334	0	999	mpd	Lamiales	All Summits
La Meije	3	78.421	68.928	12.477	749	0.761	0.749	0	999	mpd	Lamiales	All Summits
Lauvitel	8	69.971	69.322	3.913	497.5	0.166	0.498	0	999	mpd	Lamiales	All Summits
Muraillette	5	75.121	69.416	6.403	811	0.891	0.811	0	999	mpd	Lamiales	All Summits
Occidentale Ailefroide	4	72.148	69.783	8.58	542.5	0.276	0.543	0	999	mpd	Lamiales	All Summits
Olan	6	71.921	69.172	5.702	608	0.482	0.608	0	999	mpd	Lamiales	All Summits
Pelvoux	2	67.428	68.046	22.069	279	-0.028	0.279	0	999	mpd	Lamiales	All Summits
Plat de la Selle	2	81.037	68.736	21.844	879	0.563	0.879	0	999	mpd	Lamiales	All Summits
Rateau	9	72.475	69.189	3.4	839	0.966	0.839	0	999	mpd	Lamiales	All Summits
Rocher de la Selle	11	71.7	69.178	2.823	810	0.893	0.81	0	999	mpd	Lamiales	All Summits
Rouies	5	77.382	69.052	6.884	947.5	1.21	0.948	0	999	mpd	Lamiales	All Summits
Sirac	6	77.392	69.196	5.69	983	1.44	0.983	1	999	mpd	Lamiales	All Summits
Summits	21	69.258	69.258	0	500.5	NA	0.501	0	999	mpd	Lamiales	All Summits
Barre des Ecrins	5	111.549	126.37	24.552	236.5	-0.604	0.237	0	999	mpd	Caryophyllales	All Summits
Brevoort	2	75.164	125.028	55.422	156.5	-0.9	0.157	0	999	mpd	Caryophyllales	All Summits
Burlan	3	74.793	122.784	37.319	146	-1.286	0.146	0	999	mpd	Caryophyllales	All Summits
Choisy	2	75.164	124.451	56.37	169.5	-0.874	0.17	0	999	mpd	Caryophyllales	All Summits
La Meije	5	111.227	124.657	24.965	234	-0.538	0.234	0	999	mpd	Caryophyllales	All Summits
Lauvitel	14	119.996	124.697	8.036	237.5	-0.585	0.238	0	999	mpd	Caryophyllales	All Summits
Muraillette	7	125.124	124.778	19.307	442	0.018	0.442	0	999	mpd	Caryophyllales	All Summits
Occidentale Ailefroide	4	148.035	124.936	29.749	766.5	0.776	0.767	0	999	mpd	Caryophyllales	All Summits
Olan	4	158.821	124.17	30.301	875.5	1.144	0.876	0	999	mpd	Caryophyllales	All Summits
Pelvoux	1	NA	NA	NA	NA	NA	NA	NA	999	mpd	Caryophyllales	All Summits
Plat de la Selle	2	76.088	122.827	56.144	277.5	-0.832	0.278	0	999	mpd	Caryophyllales	All Summits
Rateau	6	138.826	123.988	21.587	714.5	0.687	0.715	0	999	mpd	Caryophyllales	All Summits
Rocher de la Selle	15	121.965	124.551	6.935	378	-0.373	0.378	0	999	mpd	Caryophyllales	All Summits
Rouies	4	127.351	126.608	29.226	486	0.025	0.486	0	999	mpd	Caryophyllales	All Summits
Sirac	7	107.649	124.554	19.032	188	-0.888	0.188	0	999	mpd	Caryophyllales	All Summits
Summits	19	124.752	124.752	0	500.5	NA	0.501	0	999	mpd	Caryophyllales	All Summits
Barre des Ecrins	39	60.816	80.016	10.539	32	-1.822	0.032	1	999	mntd	Spermatophyta	LGM
Brevoort	10	164.09	154.231	30.804	619	0.32	0.619	0	999	mntd	Spermatophyta	LGM
Burlan	31	91.574	89.148	13.22	567	0.183	0.567	0	999	mntd	Spermatophyta	LGM
Choisy	16	114.136	124.132	21.369	325	-0.468	0.325	0	999	mntd	Spermatophyta	LGM
La Meije	33	73.339	87.444	11.956	121	-1.18	0.121	0	999	mntd	Spermatophyta	LGM
Lauvitel	95	44.495	49.965	4.216	96	-1.297	0.096	0	999	mntd	Spermatophyta	LGM
Muraillette	62	54.293	62.371	6.978	119	-1.158	0.119	0	999	mntd	Spermatophyta	LGM
Occidentale Ailefroide	28	78.659	94.205	14.125	133	-1.101	0.133	0	999	mntd	Spermatophyta	LGM
Olan	59	65.449	64.14	7.137	565	0.183	0.565	0	999	mntd	Spermatophyta	LGM
Pelvoux	13	141.391	137.483	24.631	567	0.159	0.567	0	999	mntd	Spermatophyta	LGM
Persistent	164	39.523	39.523	0	500.5	NA	0.501	0	999	mntd	Spermatophyta	LGM
Plat de la Selle	31	71.591	89.336	12.849	82	-1.381	0.082	0	999	mntd	Spermatophyta	LGM
Rateau	81	52.44	54.302	5.076	359	-0.367	0.359	0	999	mntd	Spermatophyta	LGM
Rocher de la Selle	118	46.205	44.945	3.037	671	0.415	0.671	0	999	mntd	Spermatophyta	LGM
Rouies	40	75.866	78.618	10.23	401	-0.269	0.401	0	999	mntd	Spermatophyta	LGM
Sirac	72	50.698	57.959	5.712	98	-1.271	0.098	0	999	mntd	Spermatophyta	LGM
Summits	164	39.523	39.523	0	500.5	NA	0.501	0	999	mntd	Spermatophyta	LGM
Barre des Ecrins	7	46.95	57.675	16.768	284	-0.64	0.284	0	999	mntd	Asterales	LGM
Brevoort	2	33.909	105.704	44.637	56.5	-1.608	0.057	0	999	mntd	Asterales	LGM
Burlan	5	33.411	68.128	21.826	46	-1.591	0.046	1	999	mntd	Asterales	LGM
Choisy	3	49.755	85.16	29.099	135.5	-1.217	0.136	0	999	mntd	Asterales	LGM
La Meije	4	84.098	75.203	26.317	602.5	0.338	0.603	0	999	mntd	Asterales	LGM
Lauvitel	11	45.891	43.555	10.86	586	0.215	0.586	0	999	mntd	Asterales	LGM
Muraillette	11	26.743	43.298	10.978	63	-1.508	0.063	0	999	mntd	Asterales	LGM
Occidentale Ailefroide	5	47.355	70.058	21.605	160	-1.051	0.16	0	999	mntd	Asterales	LGM
Olan	10	53.107	46.022	12.077	695	0.587	0.695	0	999	mntd	Asterales	LGM
Pelvoux	2	88.063	104.79	43.976	188	-0.38	0.188	0	999	mntd	Asterales	LGM
Persistent	28	22.037	22.037	0	500.5	NA	0.501	0	999	mntd	Asterales	LGM
Plat de la Selle	5	78.429	69.517	21.848	649	0.408	0.649	0	999	mntd	Asterales	LGM

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Table b.4.1 – continued from previous page

Summits	N taxa	obs	rand mean	rand sd	obs rank	obs z	obs p	sig	runs	metric	clade	pool
Rateau	14	51.41	36.162	8.186	966	1.863	0.966	1	999	mntd	Asterales	LGM
Rocher de la Selle	21	27.509	26.796	4.253	635	0.168	0.635	0	999	mntd	Asterales	LGM
Rouies	10	52.506	46.771	12.233	664	0.469	0.664	0	999	mntd	Asterales	LGM
Sirac	11	32.989	42.77	11.029	198	-0.887	0.198	0	999	mntd	Asterales	LGM
Summits	28	22.037	22.037	0	500.5	NA	0.501	0	999	mntd	Asterales	LGM
Barre des Ecrins	10	35.488	46.75	12.088	182	-0.932	0.182	0	999	mntd	Poales	LGM
Brevoort	1	NA	NA	NA	NA	NA	NA	NA	999	mntd	Poales	LGM
Burlan	6	94.019	63.485	19.216	957	1.589	0.957	1	999	mntd	Poales	LGM
Choisy	2	176.543	128.834	58.038	882.5	0.822	0.883	0	999	mntd	Poales	LGM
La Meije	6	60.9	63.297	18.764	451	-0.128	0.451	0	999	mntd	Poales	LGM
Lauvitel	18	31.186	33.702	5.675	342	-0.443	0.342	0	999	mntd	Poales	LGM
Muraillette	11	46.63	43.734	10.54	603	0.275	0.603	0	999	mntd	Poales	LGM
Occidentale Ailefroide	6	55.521	64.161	18.505	302	-0.467	0.302	0	999	mntd	Poales	LGM
Olan	9	51.141	50.23	13.314	528	0.068	0.528	0	999	mntd	Poales	LGM
Pelvoux	3	134.804	95.636	38.102	832.5	1.028	0.833	0	999	mntd	Poales	LGM
Persistent	28	29.227	29.227	0	500.5	NA	0.501	0	999	mntd	Poales	LGM
Plat de la Selle	11	32.003	43.845	11.093	145	-1.068	0.145	0	999	mntd	Poales	LGM
Rateau	18	33.311	33.575	5.687	483	-0.046	0.483	0	999	mntd	Poales	LGM
Rocher de la Selle	23	31.756	30.477	3.245	649	0.394	0.649	0	999	mntd	Poales	LGM
Rouies	5	82.469	69.745	21.79	707	0.584	0.707	0	999	mntd	Poales	LGM
Sirac	14	44.216	37.614	7.964	791	0.829	0.791	0	999	mntd	Poales	LGM
Summits	28	29.227	29.227	0	500.5	NA	0.501	0	999	mntd	Poales	LGM
Barre des Ecrins	3	43.716	55.842	35.42	406.5	-0.342	0.407	0	999	mntd	Rosales	LGM
Brevoort	0	NA	NA	NA	NA	NA	NA	NA	999	mntd	Rosales	LGM
Burlan	2	141.873	79.071	56.581	793.5	1.11	0.794	0	999	mntd	Rosales	LGM
Choisy	1	NA	NA	NA	NA	NA	NA	NA	999	mntd	Rosales	LGM
La Meije	2	60.974	77.581	55.434	430.5	-0.3	0.431	0	999	mntd	Rosales	LGM
Lauvitel	8	9.514	39.277	14.963	25	-1.989	0.025	1	999	mntd	Rosales	LGM
Muraillette	6	44.02	41.781	19.972	550	0.112	0.55	0	999	mntd	Rosales	LGM
Occidentale Ailefroide	1	NA	NA	NA	NA	NA	NA	NA	999	mntd	Rosales	LGM
Olan	5	10.653	44.536	23.262	54	-1.457	0.054	0	999	mntd	Rosales	LGM
Pelvoux	0	NA	NA	NA	NA	NA	NA	NA	999	mntd	Rosales	LGM
Persistent	17	37.138	37.138	0	500.5	NA	0.501	0	999	mntd	Rosales	LGM
Plat de la Selle	4	24.698	48.889	26.751	247.5	-0.904	0.248	0	999	mntd	Rosales	LGM
Rateau	12	38.866	37.887	9.199	533	0.106	0.533	0	999	mntd	Rosales	LGM
Rocher de la Selle	7	14.274	40.175	17.579	69	-1.473	0.069	0	999	mntd	Rosales	LGM
Rouies	3	43.716	56.381	37.14	416.5	-0.341	0.417	0	999	mntd	Rosales	LGM
Sirac	11	10.188	37.902	10.641	6	-2.604	0.006	1	999	mntd	Rosales	LGM
Summits	17	37.138	37.138	0	500.5	NA	0.501	0	999	mntd	Rosales	LGM
Barre des Ecrins	5	43.655	48.857	15.217	355.5	-0.342	0.356	0	999	mntd	Lamiales	LGM
Brevoort	1	NA	NA	NA	NA	NA	NA	NA	999	mntd	Lamiales	LGM
Burlan	4	68.585	53.819	16.849	673.5	0.876	0.674	0	999	mntd	Lamiales	LGM
Choisy	2	73.188	69.373	21.072	288	0.181	0.288	0	999	mntd	Lamiales	LGM
La Meije	3	75.805	60.4	19.278	666	0.799	0.666	0	999	mntd	Lamiales	LGM
Lauvitel	8	34.6	36.697	10.966	433.5	-0.191	0.434	0	999	mntd	Lamiales	LGM
Muraillette	5	62.082	49.018	15.047	800	0.868	0.8	0	999	mntd	Lamiales	LGM
Occidentale Ailefroide	4	60.255	54.123	16.785	614.5	0.365	0.615	0	999	mntd	Lamiales	LGM
Olan	6	48.839	43.136	13.035	681.5	0.437	0.682	0	999	mntd	Lamiales	LGM
Pelvoux	1	NA	NA	NA	NA	NA	NA	NA	999	mntd	Lamiales	LGM
Persistent	16	23.448	23.448	0	500.5	NA	0.501	0	999	mntd	Lamiales	LGM
Plat de la Selle	2	81.037	69.631	20.812	802.5	0.548	0.803	0	999	mntd	Lamiales	LGM
Rateau	7	62.106	39.685	11.702	967	1.916	0.967	1	999	mntd	Lamiales	LGM
Rocher de la Selle	9	39.39	33.967	9.58	732.5	0.566	0.733	0	999	mntd	Lamiales	LGM
Rouies	5	69.91	49.092	15.475	885.5	1.345	0.886	0	999	mntd	Lamiales	LGM
Sirac	6	70.58	43.981	13.604	985.5	1.955	0.986	1	999	mntd	Lamiales	LGM
Summits	16	23.448	23.448	0	500.5	NA	0.501	0	999	mntd	Lamiales	LGM
Barre des Ecrins	5	74.518	78.782	21.027	412.5	-0.203	0.413	0	999	mntd	Caryophyllales	LGM
Brevoort	2	75.164	121.774	55.838	191	-0.835	0.191	0	999	mntd	Caryophyllales	LGM
Burlan	3	73.498	98.329	36.245	228	-0.685	0.228	0	999	mntd	Caryophyllales	LGM
Choisy	2	75.164	124.547	54.821	174.5	-0.901	0.175	0	999	mntd	Caryophyllales	LGM
La Meije	5	75.007	77.726	21.669	447.5	-0.125	0.448	0	999	mntd	Caryophyllales	LGM
Lauvitel	14	52.348	56.672	5.499	217.5	-0.786	0.218	0	999	mntd	Caryophyllales	LGM
Muraillette	7	88.375	68.937	15.467	886.5	1.257	0.887	0	999	mntd	Caryophyllales	LGM
Occidentale Ailefroide	4	86.262	85.52	27.436	557	0.027	0.557	0	999	mntd	Caryophyllales	LGM
Olan	4	124.937	85.402	25.916	923.5	1.526	0.924	0	999	mntd	Caryophyllales	LGM
Pelvoux	1	NA	NA	NA	NA	NA	NA	NA	999	mntd	Caryophyllales	LGM
Persistent	17	55.104	55.104	0	500.5	NA	0.501	0	999	mntd	Caryophyllales	LGM
Plat de la Selle	2	76.088	124.83	56.646	289.5	-0.86	0.29	0	999	mntd	Caryophyllales	LGM
Rateau	5	85.59	77.898	21.122	661.5	0.364	0.662	0	999	mntd	Caryophyllales	LGM
Rocher de la Selle	14	49.366	56.764	5.34	104.5	-1.385	0.105	0	999	mntd	Caryophyllales	LGM
Rouies	4	101.334	85.859	27.276	692	0.567	0.692	0	999	mntd	Caryophyllales	LGM
Sirac	7	74.822	68.99	15.615	647	0.373	0.647	0	999	mntd	Caryophyllales	LGM
Summits	17	55.104	55.104	0	500.5	NA	0.501	0	999	mntd	Caryophyllales	LGM
Barre des Ecrins	39	275.853	263.586	10.586	891	1.159	0.891	0	999	mpd	Spermatophyta	LGM
Brevoort	10	259.738	262.394	24.914	441	-0.107	0.441	0	999	mpd	Spermatophyta	LGM
Burlan	31	271.366	263.504	12.159	717	0.647	0.717	0	999	mpd	Spermatophyta	LGM

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Table b.4.1 – continued from previous page

Summits	N taxa	obs	rand mean	rand sd	obs rank	obs z	obs p	sig	runs	metric	clade	pool
Choisy	16	258.374	263.333	19.085	363	-0.26	0.363	0	999	mpd	Spermatophyta	LGM
La Meije	33	265.048	263.355	11.818	526	0.143	0.526	0	999	mpd	Spermatophyta	LGM
Lauvitel	95	269.743	263.568	5.015	893	1.231	0.893	0	999	mpd	Spermatophyta	LGM
Muraillette	62	265.98	263.266	7.654	623	0.355	0.623	0	999	mpd	Spermatophyta	LGM
Occidentale Ailefroide	28	271.749	264.187	13.182	683	0.574	0.683	0	999	mpd	Spermatophyta	LGM
Olan	59	264.124	263.414	7.942	534	0.089	0.534	0	999	mpd	Spermatophyta	LGM
Pelvoux	13	281.495	263.306	21.155	789	0.86	0.789	0	999	mpd	Spermatophyta	LGM
Persistent	164	263.342	263.342	0	500.5	NA	0.501	0	999	mpd	Spermatophyta	LGM
Plat de la Selle	31	283.098	262.945	12.865	970	1.567	0.97	1	999	mpd	Spermatophyta	LGM
Rateau	81	269.38	263.144	6.143	836	1.015	0.836	0	999	mpd	Spermatophyta	LGM
Rocher de la Selle	118	268.239	263.49	3.59	927	1.323	0.927	0	999	mpd	Spermatophyta	LGM
Rouies	40	251.873	263.328	10.718	143	-1.069	0.143	0	999	mpd	Spermatophyta	LGM
Sirac	72	264.689	263.333	6.824	549	0.199	0.549	0	999	mpd	Spermatophyta	LGM
Summits	164	263.342	263.342	0	500.5	NA	0.501	0	999	mpd	Spermatophyta	LGM
Barre des Ecrins	7	85.788	103.634	15.894	153	-1.123	0.153	0	999	mpd	Asterales	LGM
Brevoort	2	33.909	106.011	43.762	56	-1.648	0.056	0	999	mpd	Asterales	LGM
Burlan	5	126.409	104.787	20.546	817	1.052	0.817	0	999	mpd	Asterales	LGM
Choisy	3	65.602	102.755	30.438	59.5	-1.221	0.06	0	999	mpd	Asterales	LGM
La Meije	4	124.576	103.915	24.049	662	0.859	0.662	0	999	mpd	Asterales	LGM
Lauvitel	11	119.008	104.105	11.153	950	1.336	0.95	0	999	mpd	Asterales	LGM
Muraillette	11	109.028	103.686	11.001	683	0.486	0.683	0	999	mpd	Asterales	LGM
Occidentale Ailefroide	5	75.773	104.284	20.366	55	-1.4	0.055	0	999	mpd	Asterales	LGM
Olan	10	92.599	104.277	12.072	240	-0.967	0.24	0	999	mpd	Asterales	LGM
Pelvoux	2	88.063	102.384	44.859	210	-0.319	0.21	0	999	mpd	Asterales	LGM
Persistent	28	103.932	103.932	0	500.5	NA	0.501	0	999	mpd	Asterales	LGM
Plat de la Selle	5	95.793	104.098	20.309	471	-0.409	0.471	0	999	mpd	Asterales	LGM
Rateau	14	98.222	104.234	8.377	191	-0.718	0.191	0	999	mpd	Asterales	LGM
Rocher de la Selle	21	109.41	103.8	5.047	872	1.112	0.872	0	999	mpd	Asterales	LGM
Rouies	10	118.279	104.081	11.827	875	1.201	0.875	0	999	mpd	Asterales	LGM
Sirac	11	116.633	104.403	11.073	848	1.105	0.848	0	999	mpd	Asterales	LGM
Summits	28	103.932	103.932	0	500.5	NA	0.501	0	999	mpd	Asterales	LGM
Barre des Ecrins	10	137.228	124.531	12.991	859	0.977	0.859	0	999	mpd	Poales	LGM
Brevoort	1	NA	NA	NA	NA	NA	NA	NA	999	mpd	Poales	LGM
Burlan	6	146.847	123.825	21.168	939	1.088	0.939	0	999	mpd	Poales	LGM
Choisy	2	176.543	127.328	59.871	898.5	0.822	0.899	0	999	mpd	Poales	LGM
La Meije	6	93.142	123.14	20.247	78	-1.482	0.078	0	999	mpd	Poales	LGM
Lauvitel	18	127.774	124.533	6.827	659	0.475	0.659	0	999	mpd	Poales	LGM
Muraillette	11	125.113	124.869	11.517	421	0.021	0.421	0	999	mpd	Poales	LGM
Occidentale Ailefroide	6	138.065	123.706	20.164	721	0.712	0.721	0	999	mpd	Poales	LGM
Olan	9	135.045	125.417	13.12	758	0.734	0.758	0	999	mpd	Poales	LGM
Pelvoux	3	155.674	127.216	35.577	815.5	0.8	0.816	0	999	mpd	Poales	LGM
Persistent	28	124.623	124.623	0	500.5	NA	0.501	0	999	mpd	Poales	LGM
Plat de la Selle	11	127.717	124.631	11.182	545	0.276	0.545	0	999	mpd	Poales	LGM
Rateau	18	126.929	124.584	6.777	579	0.346	0.579	0	999	mpd	Poales	LGM
Rocher de la Selle	23	124.816	124.577	4.058	439.5	0.059	0.44	0	999	mpd	Poales	LGM
Rouies	5	135.173	125.11	23.02	555	0.437	0.555	0	999	mpd	Poales	LGM
Sirac	14	139.244	124.901	8.798	995	1.63	0.995	1	999	mpd	Poales	LGM
Summits	28	124.623	124.623	0	500.5	NA	0.501	0	999	mpd	Poales	LGM
Barre des Ecrins	3	52.345	78.657	41.8	377.5	-0.629	0.378	0	999	mpd	Rosales	LGM
Brevoort	0	NA	NA	NA	NA	NA	NA	NA	999	mpd	Rosales	LGM
Burlan	2	141.873	78.78	56.077	791	1.125	0.791	0	999	mpd	Rosales	LGM
Choisy	1	NA	NA	NA	NA	NA	NA	NA	999	mpd	Rosales	LGM
La Meije	2	60.974	77.582	55.901	418	-0.297	0.418	0	999	mpd	Rosales	LGM
Lauvitel	8	37.763	78.556	19.713	23	-2.069	0.023	1	999	mpd	Rosales	LGM
Muraillette	6	79.264	78.054	26.113	525	0.046	0.525	0	999	mpd	Rosales	LGM
Occidentale Ailefroide	1	NA	NA	NA	NA	NA	NA	NA	999	mpd	Rosales	LGM
Olan	5	44.51	77.906	29.577	161	-1.129	0.161	0	999	mpd	Rosales	LGM
Pelvoux	0	NA	NA	NA	NA	NA	NA	NA	999	mpd	Rosales	LGM
Persistent	17	77.637	77.637	0	500.5	NA	0.501	0	999	mpd	Rosales	LGM
Plat de la Selle	4	42.41	77.763	34.483	153	-1.025	0.153	0	999	mpd	Rosales	LGM
Rateau	12	78.634	77.936	12.028	472	0.058	0.472	0	999	mpd	Rosales	LGM
Rocher de la Selle	7	44.831	77.146	22.979	102	-1.406	0.102	0	999	mpd	Rosales	LGM
Rouies	3	52.345	76.366	41.34	389	-0.581	0.389	0	999	mpd	Rosales	LGM
Sirac	11	38.927	76.877	14.59	8	-2.601	0.008	1	999	mpd	Rosales	LGM
Summits	17	77.637	77.637	0	500.5	NA	0.501	0	999	mpd	Rosales	LGM
Barre des Ecrins	5	70.514	69.845	5.843	521.5	0.115	0.522	0	999	mpd	Lamiales	LGM
Brevoort	1	NA	NA	NA	NA	NA	NA	NA	999	mpd	Lamiales	LGM
Burlan	4	76.886	69.764	8.108	820	0.878	0.82	0	999	mpd	Lamiales	LGM
Choisy	2	73.188	69.353	21.417	282	0.179	0.282	0	999	mpd	Lamiales	LGM
La Meije	3	78.421	69.637	11.994	642	0.732	0.642	0	999	mpd	Lamiales	LGM
Lauvitel	8	69.971	69.741	3.056	468	0.075	0.468	0	999	mpd	Lamiales	LGM
Muraillette	5	75.121	69.588	6.272	827.5	0.882	0.828	0	999	mpd	Lamiales	LGM
Occidentale Ailefroide	4	72.148	69.325	8.289	576	0.341	0.576	0	999	mpd	Lamiales	LGM
Olan	6	71.921	69.591	4.916	652	0.474	0.652	0	999	mpd	Lamiales	LGM
Pelvoux	1	NA	NA	NA	NA	NA	NA	NA	999	mpd	Lamiales	LGM
Persistent	16	69.657	69.657	0	500.5	NA	0.501	0	999	mpd	Lamiales	LGM

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Table b.4.1 – continued from previous page

Summits	N taxa	obs	rand mean	rand sd	obs rank	obs z	obs p	sig	runs	metric	clade	pool
Plat de la Selle	2	81.037	68.65	22.308	815	0.555	0.815	0	999	mpd	Lamiales	LGM
Rateau	7	75.857	69.662	4.025	951	1.539	0.951	1	999	mpd	Lamiales	LGM
Rocher de la Selle	9	71.728	69.592	2.694	731	0.793	0.731	0	999	mpd	Lamiales	LGM
Rouies	5	77.382	69.249	6.729	926	1.209	0.926	0	999	mpd	Lamiales	LGM
Sirac	6	77.392	69.805	4.712	966.5	1.61	0.967	1	999	mpd	Lamiales	LGM
Summits	16	69.657	69.657	0	500.5	NA	0.501	0	999	mpd	Lamiales	LGM
Barre des Ecrins	5	111.549	121.414	25.057	282.5	-0.394	0.283	0	999	mpd	Caryophyllales	LGM
Brevoort	2	75.164	124.037	56.002	185	-0.873	0.185	0	999	mpd	Caryophyllales	LGM
Burlan	3	74.793	119.417	39.503	189.5	-1.13	0.19	0	999	mpd	Caryophyllales	LGM
Choisy	2	75.164	121.567	57.826	206	-0.802	0.206	0	999	mpd	Caryophyllales	LGM
La Meije	5	111.227	121.831	25.413	302.5	-0.417	0.303	0	999	mpd	Caryophyllales	LGM
Lauvitel	14	119.996	121.948	6.978	297	-0.28	0.297	0	999	mpd	Caryophyllales	LGM
Muraillette	7	125.124	122.486	18.571	504	0.142	0.504	0	999	mpd	Caryophyllales	LGM
Occidentale Ailefroide	4	148.035	120.909	30.46	823.5	0.891	0.824	0	999	mpd	Caryophyllales	LGM
Olan	4	158.821	120.439	31.334	926.5	1.225	0.927	0	999	mpd	Caryophyllales	LGM
Pelvoux	1	NA	NA	NA	NA	NA	NA	NA	999	mpd	Caryophyllales	LGM
Persistent	17	121.798	121.798	0	500.5	NA	0.501	0	999	mpd	Caryophyllales	LGM
Plat de la Selle	2	76.088	122.799	55.532	306.5	-0.841	0.307	0	999	mpd	Caryophyllales	LGM
Rateau	5	145.842	121.036	27.255	852	0.91	0.852	0	999	mpd	Caryophyllales	LGM
Rocher de la Selle	14	116.074	121.548	7.074	226	-0.774	0.226	0	999	mpd	Caryophyllales	LGM
Rouies	4	127.351	121.866	29.704	511	0.185	0.511	0	999	mpd	Caryophyllales	LGM
Sirac	7	107.649	121.702	19.099	223	-0.736	0.223	0	999	mpd	Caryophyllales	LGM
Summits	17	121.798	121.798	0	500.5	NA	0.501	0	999	mpd	Caryophyllales	LGM

B.5 PHYLOGENETIC α-DIVERSITY SUMMARY FOR RANDOM DRAW (RD) NULL MODEL

TABLE B.5.1: Results from a t-test comparing means of SES_{metric} between species pools for the Spermatophyta and the five most species rich orders. Significant *P*-values (< 0.05) are highlighted in bold.

Pool	Clade	Metric	Mean of diff	t-value	df	*P*-value	Conf low	Conf high
All Summits	Spermatophyta	mntd	-1.429	-7.720	14	$\mathbf{2.07 \cdot 10^{-7}}$	-1.826	-1.032
All Summits	Spermatophyta	mpd	-0.294	-12.879	14	$\mathbf{4 \cdot 10^{-9}}$	-0.343	-0.245
LGM	Spermatophyta	mntd	-1.774	-6.760	14	$\mathbf{9.18 \cdot 10^{-6}}$	-2.337	-1.211
LGM	Spermatophyta	mpd	-1.012	-3.626	14	**0.0028**	-1.611	-0.413
All Summits	Clades	mntd	-0.408	-6.581	67	$\mathbf{8 \cdot 10^{-9}}$	-0.531	-0.284
All Summits	Clades	mpd	-0.352	-5.643	67	$\mathbf{3.66 \cdot 10^{-7}}$	-0.477	-0.228
LGM	Clades	mntd	-0.470	-7.511	66	**0**	-0.595	-0.345
LGM	Clades	mpd	-0.435	-6.295	66	$\mathbf{2.8 \cdot 10^{-8}}$	-0.573	-0.297

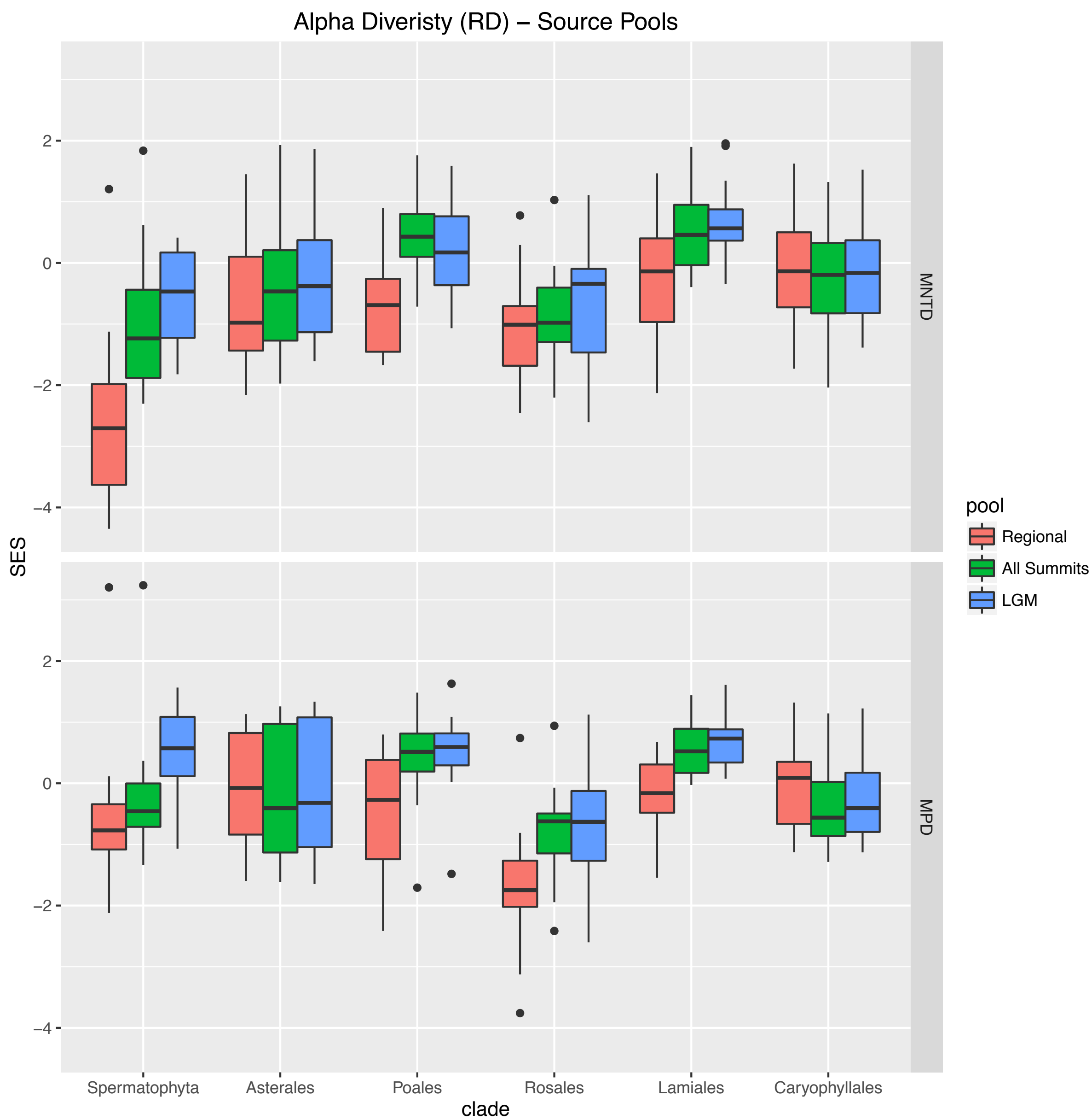

FIGURE B.5.1: Boxplots of phylogenetic diversity (MNTD, MPD) of each summit standardized by effect size under the RD null model (SES_{RD}) given the three different species pools. Boxes show first and third quartiles, solid horizontal lines indicate the median, vertical black lines are the range, and dots are points that lie 1.5x the interquartile range above the third quartile or below the first quartile.

B.6 PHYLOGENETIC α-DIVERSITY OUTPUT FOR DAMOCLES NULL MODEL

Table B.6.1: Table showing output statistics for phylogenetic α-diversity under the DAMOCLES null model on each summit: the number of taxa (N taxa), the observed phylogenetic diversity (obs), the mean phylogenetic diversity from the phylogeny shuffle randomization (rand mean), the standard deviation of phylogenetic diversity from the phylogeny shuffle randomization (rand sd), the rank of the observed metric compared to the metric calculated after the phylogeny shuffle randomization (obs rank), the z-score or standardized effect size (SES) of the observed metric compared to the phylogeny shuffle randomization (obs z) , the *P*-value (quantile) of observed metric compared to the phylogeny shuffle randomization (obs p = obs rank / runs), if the *P*-value was significant (sig), the number of phylogeny shuffles (runs), the phylogenetic diversity metric calculated (metric), the clade the metric was calculated for (clade), and the species pool the metric was calculated in (pool; Regional = Écrins National Park, All Alpine = just alpine species, LGM = only species that occur in areas that persisted through the LGM).

Summits	N taxa	obs	rand mean	rand sd	obs rank	obs z	obs p	sig	runs	metric	clade	pool	model
All Summits	39	21.002	23.821	2.861	182	-0.986	0.182	0	1000	mntd	Asterales	Regional	RD
All Summits	37	24.412	31.149	4.388	69	-1.536	0.069	0	1000	mntd	Poales	Regional	RD
All Summits	21	24.54	32.543	4.944	49	-1.619	0.049	1	1000	mntd	Lamiales	Regional	RD
All Summits	19	44.451	46.947	8.104	384	-0.308	0.384	0	1000	mntd	Caryophyllales	Regional	RD
LGM	28	22.037	28.504	4.04	59	-1.601	0.059	0	1000	mntd	Asterales	Regional	RD
LGM	28	29.227	35.547	5.66	137	-1.117	0.137	0	1000	mntd	Poales	Regional	RD
LGM	16	23.448	36.208	6.061	21	-2.105	0.021	1	1000	mntd	Lamiales	Regional	RD
LGM	17	55.104	49.577	8.708	731	0.635	0.73	0	1000	mntd	Caryophyllales	Regional	RD
Plat de la Selle	5	57.031	72.622	20.594	222	-0.757	0.222	0	1000	mntd	Asterales	All Summits	RD
Barre des Ecrins	7	27.238	62.28	16.258	22	-2.155	0.022	1	1000	mntd	Asterales	All Summits	RD
La Meije	4	92.65	79.191	23.9	673	0.563	0.672	0	1000	mntd	Asterales	All Summits	RD
Sirac	13	52.98	42.113	8.212	902	1.323	0.901	0	1000	mntd	Asterales	All Summits	RD
Rouies	10	35.134	49.952	11.475	104	-1.291	0.104	0	1000	mntd	Asterales	All Summits	RD
Olan	10	46.436	50.279	11.332	382	-0.339	0.382	0	1000	mntd	Asterales	All Summits	RD
Occidentale Ailefroide	5	21.957	71.564	21.085	6	-2.353	0.006	1	1000	mntd	Asterales	All Summits	RD
Brevoort	2	102.297	104.183	42.537	379.5	-0.044	0.379	0	1000	mntd	Asterales	All Summits	RD
Burlan	5	75.022	72.425	21.177	550	0.123	0.549	0	1000	mntd	Asterales	All Summits	RD
Rocher de la Selle	31	22.33	23.383	2.048	323	-0.514	0.323	0	1000	mntd	Asterales	All Summits	RD
Choisy	3	95.55	88.338	27.575	530.5	0.262	0.53	0	1000	mntd	Asterales	All Summits	RD
Muraillette	11	43.107	47.331	10.083	338	-0.419	0.338	0	1000	mntd	Asterales	All Summits	RD
Rateau	16	21.489	36.953	6.517	8	-2.373	0.008	1	1000	mntd	Asterales	All Summits	RD
Lauvitel	12	41.138	44.76	9.142	351	-0.396	0.351	0	1000	mntd	Asterales	All Summits	RD
Plat de la Selle	11	25.954	39.105	10.304	106	-1.276	0.106	0	1000	mntd	Poales	All Summits	RD
Barre des Ecrins	10	29.845	42.206	11.551	167	-1.07	0.167	0	1000	mntd	Poales	All Summits	RD
La Meije	6	61.896	59.421	18.77	540	0.132	0.539	0	1000	mntd	Poales	All Summits	RD
Sirac	14	25.937	34.223	8.146	180	-1.017	0.18	0	1000	mntd	Poales	All Summits	RD
Rouies	5	35.457	67.286	22.713	99.5	-1.401	0.099	0	1000	mntd	Poales	All Summits	RD
Olan	9	39.481	45.821	13.376	323	-0.474	0.323	0	1000	mntd	Poales	All Summits	RD
Pelvoux	3	104.421	96.715	39.337	670	0.196	0.669	0	1000	mntd	Poales	All Summits	RD
Occidentale Ailefroide	6	76.915	59.174	19.461	822	0.912	0.821	0	1000	mntd	Poales	All Summits	RD
Brevoort	1	NA	NA	NA	1	NA	0.001	0	1000	mntd	Poales	All Summits	RD
Burlan	6	42.785	59.828	19.248	208	-0.885	0.208	0	1000	mntd	Poales	All Summits	RD
Rocher de la Selle	29	22.93	25.765	2.631	151	-1.077	0.151	0	1000	mntd	Poales	All Summits	RD
Choisy	2	28.146	126.273	59.654	78.5	-1.645	0.078	0	1000	mntd	Poales	All Summits	RD
Muraillette	11	43.484	39.44	10.737	630	0.377	0.629	0	1000	mntd	Poales	All Summits	RD
Rateau	22	29.997	27.676	4.519	684	0.514	0.683	0	1000	mntd	Poales	All Summits	RD
Lauvitel	18	30.227	30.137	6.206	516	0.014	0.515	0	1000	mntd	Poales	All Summits	RD
Plat de la Selle	2	81.037	68.451	21.699	522.5	0.58	0.522	0	1000	mntd	Lamiales	All Summits	RD
Barre des Ecrins	5	43.229	48.602	14.527	352	-0.37	0.352	0	1000	mntd	Lamiales	All Summits	RD
La Meije	3	55.944	60.892	18.257	351	-0.271	0.351	0	1000	mntd	Lamiales	All Summits	RD
Sirac	6	52.799	44.486	13.118	748.5	0.634	0.748	0	1000	mntd	Lamiales	All Summits	RD
Rouies	5	31.219	48.378	14.257	110	-1.204	0.11	0	1000	mntd	Lamiales	All Summits	RD

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Table b.6.1 – continued from previous page

Summits	N taxa	obs	rand mean	rand sd	obs rank	obs z	obs p	sig	runs	metric	clade	pool	model
Olan	6	38.338	44.34	13.162	313	-0.456	0.313	0	1000	mntd	Lamiales	All Summits	RD
Pelvoux	2	73.188	70.017	20.417	302	0.155	0.302	0	1000	mntd	Lamiales	All Summits	RD
Occidentale Ailefroide	4	49.872	53.194	16.339	430	-0.203	0.43	0	1000	mntd	Lamiales	All Summits	RD
Brevoort	1	NA	NA	NA	1	NA	0.001	0	1000	mntd	Lamiales	All Summits	RD
Burlan	5	39.717	49.267	14.487	224.5	-0.659	0.224	0	1000	mntd	Lamiales	All Summits	RD
Rocher de la Selle	11	44.028	32.984	7.643	933	1.445	0.932	0	1000	mntd	Lamiales	All Summits	RD
Choisy	2	81.037	67.954	22.247	890	0.588	0.889	0	1000	mntd	Lamiales	All Summits	RD
Muraillette	5	46.821	49.147	14.935	468	-0.156	0.468	0	1000	mntd	Lamiales	All Summits	RD
Rateau	9	35.111	36.32	9.512	467	-0.127	0.467	0	1000	mntd	Lamiales	All Summits	RD
Lauvitel	8	30.182	38.326	10.292	216	-0.791	0.216	0	1000	mntd	Lamiales	All Summits	RD
Plat de la Selle	2	178.922	125.269	55.871	701	0.96	0.7	0	1000	mntd	Caryophyllales	All Summits	RD
Barre des Ecrins	5	82.274	81.669	23.059	530	0.026	0.529	0	1000	mntd	Caryophyllales	All Summits	RD
La Meije	5	103.632	81.822	21.846	852.5	0.998	0.852	0	1000	mntd	Caryophyllales	All Summits	RD
Sirac	7	50.3	70.85	16.888	117	-1.217	0.117	0	1000	mntd	Caryophyllales	All Summits	RD
Rouies	4	89.506	90.466	26.019	498.5	-0.037	0.498	0	1000	mntd	Caryophyllales	All Summits	RD
Olan	4	79.426	87.969	27.879	411	-0.306	0.411	0	1000	mntd	Caryophyllales	All Summits	RD
Pelvoux	1	NA	NA	NA	1	NA	0.001	0	1000	mntd	Caryophyllales	All Summits	RD
Occidentale Ailefroide	4	89.506	88.963	26.859	511	0.02	0.51	0	1000	mntd	Caryophyllales	All Summits	RD
Brevoort	2	178.922	121.837	57.392	864	0.995	0.863	0	1000	mntd	Caryophyllales	All Summits	RD
Burlan	3	109.376	97.771	36.844	584.5	0.315	0.584	0	1000	mntd	Caryophyllales	All Summits	RD
Rocher de la Selle	15	59.158	49.982	7.635	842.5	1.202	0.842	0	1000	mntd	Caryophyllales	All Summits	RD
Choisy	2	178.922	124.217	54.855	860	0.997	0.859	0	1000	mntd	Caryophyllales	All Summits	RD
Muraillette	7	62.023	70.881	16.858	309.5	-0.525	0.309	0	1000	mntd	Caryophyllales	All Summits	RD
Rateau	6	98.028	75.495	19.287	873.5	1.168	0.873	0	1000	mntd	Caryophyllales	All Summits	RD
Lauvitel	14	53.013	51.795	8.594	562	0.142	0.561	0	1000	mntd	Caryophyllales	All Summits	RD
Plat de la Selle	5	39.204	68.66	21.803	81	-1.351	0.081	0	1000	mntd	Asterales	LGM	RD
Barre des Ecrins	7	29.892	57.266	16.913	41	-1.619	0.041	1	1000	mntd	Asterales	LGM	RD
La Meije	4	89.342	76.849	26.106	638.5	0.479	0.638	0	1000	mntd	Asterales	LGM	RD
Sirac	11	44.335	43.702	10.892	511	0.058	0.51	0	1000	mntd	Asterales	LGM	RD
Rouies	10	62.908	46.345	12.246	909	1.353	0.908	0	1000	mntd	Asterales	LGM	RD
Olan	10	36.793	46.475	12.164	243	-0.796	0.243	0	1000	mntd	Asterales	LGM	RD
Pelvoux	2	105.1	104.182	43.136	749	0.021	0.748	0	1000	mntd	Asterales	LGM	RD
Occidentale Ailefroide	5	18.61	69.275	21.507	6	-2.356	0.006	1	1000	mntd	Asterales	LGM	RD
Brevoort	2	102.297	106.049	44.238	438	-0.085	0.438	0	1000	mntd	Asterales	LGM	RD
Burlan	5	52.57	69.773	22.205	234	-0.775	0.234	0	1000	mntd	Asterales	LGM	RD
Rocher de la Selle	21	39.027	26.496	4.09	999	3.064	0.998	1	1000	mntd	Asterales	LGM	RD
Choisy	3	95.55	86.701	28.703	520.5	0.308	0.52	0	1000	mntd	Asterales	LGM	RD
Muraillette	11	47.367	43.53	11.259	602	0.341	0.601	0	1000	mntd	Asterales	LGM	RD
Rateau	14	23.059	36.436	8.126	45	-1.646	0.045	1	1000	mntd	Asterales	LGM	RD
Lauvitel	11	54.879	43.557	11.102	838	1.02	0.837	0	1000	mntd	Asterales	LGM	RD
Plat de la Selle	11	34.779	43.314	10.559	201	-0.808	0.201	0	1000	mntd	Poales	LGM	RD
Barre des Ecrins	10	41.746	45.825	11.953	367	-0.341	0.367	0	1000	mntd	Poales	LGM	RD
La Meije	6	70.147	62.955	18.712	630	0.384	0.629	0	1000	mntd	Poales	LGM	RD
Sirac	14	24.414	37.845	7.976	46	-1.684	0.046	1	1000	mntd	Poales	LGM	RD
Rouies	5	60.39	69.82	22.21	335	-0.425	0.335	0	1000	mntd	Poales	LGM	RD
Olan	9	53.02	50.404	13.687	589	0.191	0.588	0	1000	mntd	Poales	LGM	RD
Pelvoux	3	104.421	98.309	37.22	617	0.164	0.616	0	1000	mntd	Poales	LGM	RD
Occidentale Ailefroide	6	71.587	63.317	19.175	639	0.431	0.638	0	1000	mntd	Poales	LGM	RD
Brevoort	1	NA	NA	NA	1	NA	0.001	0	1000	mntd	Poales	LGM	RD
Burlan	6	42.078	63.415	19.031	151	-1.121	0.151	0	1000	mntd	Poales	LGM	RD
Rocher de la Selle	23	39.073	30.482	3.307	997.5	2.598	0.997	1	1000	mntd	Poales	LGM	RD
Choisy	2	152.811	125.111	59.007	498	0.469	0.498	0	1000	mntd	Poales	LGM	RD
Muraillette	11	62.076	43.301	11.419	951	1.644	0.95	1	1000	mntd	Poales	LGM	RD
Rateau	18	43.307	33.217	5.828	961	1.731	0.96	1	1000	mntd	Poales	LGM	RD
Lauvitel	18	44.434	33.569	5.789	971	1.877	0.97	1	1000	mntd	Poales	LGM	RD
Barre des Ecrins	5	31.795	48.156	14.583	142	-1.122	0.142	0	1000	mntd	Lamiales	LGM	RD
La Meije	3	55.944	61.944	18.388	345	-0.326	0.345	0	1000	mntd	Lamiales	LGM	RD
Sirac	6	54.185	42.976	13.613	801.5	0.823	0.801	0	1000	mntd	Lamiales	LGM	RD
Rouies	5	19.786	49.008	15.342	45	-1.905	0.045	1	1000	mntd	Lamiales	LGM	RD
Olan	6	5.341	43.78	13.372	1	-2.875	0.001	1	1000	mntd	Lamiales	LGM	RD
Pelvoux	1	NA	NA	NA	1	NA	0.001	0	1000	mntd	Lamiales	LGM	RD
Occidentale Ailefroide	4	37.659	54.953	16.835	136.5	-1.027	0.136	0	1000	mntd	Lamiales	LGM	RD
Brevoort	1	NA	NA	NA	1	NA	0.001	0	1000	mntd	Lamiales	LGM	RD
Burlan	4	40.928	53.192	17.437	276	-0.703	0.276	0	1000	mntd	Lamiales	LGM	RD
Rocher de la Selle	9	46.048	33.788	8.944	913.5	1.371	0.913	0	1000	mntd	Lamiales	LGM	RD
Choisy	2	81.037	69.447	21.383	841.5	0.542	0.841	0	1000	mntd	Lamiales	LGM	RD
Muraillette	5	47.653	49.386	15.091	491	-0.115	0.491	0	1000	mntd	Lamiales	LGM	RD
Rateau	7	35.152	40.002	11.67	362.5	-0.416	0.362	0	1000	mntd	Lamiales	LGM	RD
Lauvitel	8	46.889	36.259	10.792	837	0.985	0.836	0	1000	mntd	Lamiales	LGM	RD
Plat de la Selle	2	178.922	119.899	56.369	685	1.047	0.684	0	1000	mntd	Caryophyllales	LGM	RD
Barre des Ecrins	5	82.274	78.627	21.389	580.5	0.17	0.58	0	1000	mntd	Caryophyllales	LGM	RD
La Meije	5	98.98	78.866	20.814	822	0.966	0.821	0	1000	mntd	Caryophyllales	LGM	RD
Sirac	7	54.47	68.632	15.359	184.5	-0.922	0.184	0	1000	mntd	Caryophyllales	LGM	RD
Rouies	4	97.892	85.983	26.784	607	0.445	0.606	0	1000	mntd	Caryophyllales	LGM	RD
Olan	4	79.426	87.245	26.571	422.5	-0.294	0.422	0	1000	mntd	Caryophyllales	LGM	RD
Pelvoux	1	NA	NA	NA	1	NA	0.001	0	1000	mntd	Caryophyllales	LGM	RD

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Table b.6.1 – continued from previous page

Summits	N taxa	obs	rand mean	rand sd	obs rank	obs z	obs p	sig	runs	metric	clade	pool	model
Occidentale Ailefroide	4	97.892	85.225	25.91	614	0.489	0.613	0	1000	mntd	Caryophyllales	LGM	RD
Burlan	3	101.623	94.182	35.07	466.5	0.212	0.466	0	1000	mntd	Caryophyllales	LGM	RD
Rocher de la Selle	14	49.544	56.873	5.435	108.5	-1.348	0.108	0	1000	mntd	Caryophyllales	LGM	RD
Muraillette	7	58.701	69.402	14.795	239.5	-0.723	0.239	0	1000	mntd	Caryophyllales	LGM	RD
Rateau	5	102.415	78.067	21.592	838	1.128	0.837	0	1000	mntd	Caryophyllales	LGM	RD
Lauvitel	14	47.722	56.607	5.445	76.5	-1.632	0.076	0	1000	mntd	Caryophyllales	LGM	RD
All Summits	39	105.048	104.514	6.143	517	0.087	0.516	0	1000	mpd	Asterales	Regional	RD
All Summits	37	125.793	133.572	4.174	44	-1.863	0.044	1	1000	mpd	Poales	Regional	RD
All Summits	21	69.258	73.27	2.544	41	-1.577	0.041	1	1000	mpd	Lamiales	Regional	RD
All Summits	19	124.752	119.685	10.827	664	0.468	0.663	0	1000	mpd	Caryophyllales	Regional	RD
LGM	28	103.932	104.244	7.315	452	-0.043	0.452	0	1000	mpd	Asterales	Regional	RD
LGM	28	124.623	133.677	5.297	46	-1.709	0.046	1	1000	mpd	Poales	Regional	RD
LGM	16	69.657	73.038	3.077	94	-1.099	0.094	0	1000	mpd	Lamiales	Regional	RD
LGM	17	121.798	120.306	11.539	508	0.129	0.507	0	1000	mpd	Caryophyllales	Regional	RD
Plat de la Selle	5	82.095	105.331	19.741	92	-1.177	0.092	0	1000	mpd	Asterales	All Summits	RD
Barre des Ecrins	7	76.768	105.522	15.649	16	-1.837	0.016	1	1000	mpd	Asterales	All Summits	RD
La Meije	4	96.551	105.384	23.146	476.5	-0.382	0.476	0	1000	mpd	Asterales	All Summits	RD
Sirac	13	101.531	105.117	10.179	299	-0.352	0.299	0	1000	mpd	Asterales	All Summits	RD
Rouies	10	87.252	105.076	12.468	84	-1.43	0.084	0	1000	mpd	Asterales	All Summits	RD
Olan	10	83.539	105.661	12.135	22	-1.823	0.022	1	1000	mpd	Asterales	All Summits	RD
Occidentale Ailefroide	5	72.505	104.328	19.781	22	-1.609	0.022	1	1000	mpd	Asterales	All Summits	RD
Brevoort	2	102.297	104.183	42.537	379.5	-0.044	0.379	0	1000	mpd	Asterales	All Summits	RD
Burlan	5	90.813	104.629	19.469	291.5	-0.71	0.291	0	1000	mpd	Asterales	All Summits	RD
Rocher de la Selle	31	109.184	105.15	3.531	925	1.142	0.924	0	1000	mpd	Asterales	All Summits	RD
Choisy	3	98.924	104.999	28.99	451	-0.21	0.451	0	1000	mpd	Asterales	All Summits	RD
Muraillette	11	85.655	105.243	11.199	36	-1.749	0.036	1	1000	mpd	Asterales	All Summits	RD
Rateau	16	85.143	104.948	8.372	11	-2.366	0.011	1	1000	mpd	Asterales	All Summits	RD
Lauvitel	12	100.628	104.822	10.594	277	-0.396	0.277	0	1000	mpd	Asterales	All Summits	RD
Plat de la Selle	11	115.449	125.764	10.643	157	-0.969	0.157	0	1000	mpd	Poales	All Summits	RD
Barre des Ecrins	10	110.324	125.445	11.815	104	-1.28	0.104	0	1000	mpd	Poales	All Summits	RD
La Meije	6	134.819	125.631	19.026	605	0.483	0.604	0	1000	mpd	Poales	All Summits	RD
Sirac	14	99.446	125.456	9.081	18	-2.864	0.018	1	1000	mpd	Poales	All Summits	RD
Rouies	5	119.012	125.829	22.046	283.5	-0.309	0.283	0	1000	mpd	Poales	All Summits	RD
Olan	9	121.904	125.439	13.704	332	-0.258	0.332	0	1000	mpd	Poales	All Summits	RD
Pelvoux	3	140.482	125.541	37.505	672.5	0.398	0.672	0	1000	mpd	Poales	All Summits	RD
Occidentale Ailefroide	6	111.128	124.746	19.715	184	-0.691	0.184	0	1000	mpd	Poales	All Summits	RD
Brevoort	1	NA	NA	NA	1	NA	0.001	0	1000	mpd	Poales	All Summits	RD
Burlan	6	119.86	125.954	19.628	277	-0.31	0.277	0	1000	mpd	Poales	All Summits	RD
Rocher de la Selle	29	126.335	125.692	3.37	540	0.191	0.539	0	1000	mpd	Poales	All Summits	RD
Choisy	2	28.146	126.273	59.654	78.5	-1.645	0.078	0	1000	mpd	Poales	All Summits	RD
Muraillette	11	103.081	125.722	11.255	43	-2.012	0.043	1	1000	mpd	Poales	All Summits	RD
Rateau	22	115.69	125.723	5.281	43	-1.9	0.043	1	1000	mpd	Poales	All Summits	RD
Lauvitel	18	116.917	125.706	6.66	115	-1.32	0.115	0	1000	mpd	Poales	All Summits	RD
Plat de la Selle	2	81.037	68.451	21.699	522.5	0.58	0.522	0	1000	mpd	Lamiales	All Summits	RD
Barre des Ecrins	5	70.711	69.198	6.567	528	0.23	0.527	0	1000	mpd	Lamiales	All Summits	RD
La Meije	3	68.491	69.681	11.39	361	-0.104	0.361	0	1000	mpd	Lamiales	All Summits	RD
Sirac	6	72.713	69.234	5.344	721.5	0.651	0.721	0	1000	mpd	Lamiales	All Summits	RD
Rouies	5	67.709	69.021	6.99	286	-0.188	0.286	0	1000	mpd	Lamiales	All Summits	RD
Olan	6	70.944	69.003	5.818	550	0.334	0.549	0	1000	mpd	Lamiales	All Summits	RD
Pelvoux	2	73.188	70.017	20.417	302	0.155	0.302	0	1000	mpd	Lamiales	All Summits	RD
Occidentale Ailefroide	4	70.649	69.113	8.307	512	0.185	0.511	0	1000	mpd	Lamiales	All Summits	RD
Brevoort	1	NA	NA	NA	1	NA	0.001	0	1000	mpd	Lamiales	All Summits	RD
Burlan	5	61.942	69.649	6.148	104	-1.254	0.104	0	1000	mpd	Lamiales	All Summits	RD
Rocher de la Selle	11	71.394	69.194	2.675	785	0.822	0.784	0	1000	mpd	Lamiales	All Summits	RD
Choisy	2	81.037	67.954	22.247	890	0.588	0.889	0	1000	mpd	Lamiales	All Summits	RD
Muraillette	5	70.442	69.478	6.73	467	0.143	0.467	0	1000	mpd	Lamiales	All Summits	RD
Rateau	9	69.782	69.154	3.484	521	0.18	0.52	0	1000	mpd	Lamiales	All Summits	RD
Lauvitel	8	67.241	69.123	3.952	264	-0.476	0.264	0	1000	mpd	Lamiales	All Summits	RD
Plat de la Selle	2	178.922	125.269	55.871	701	0.96	0.7	0	1000	mpd	Caryophyllales	All Summits	RD
Barre des Ecrins	5	123.09	124.788	25.176	411	-0.067	0.411	0	1000	mpd	Caryophyllales	All Summits	RD
La Meije	5	128.43	124.961	24.261	484.5	0.143	0.484	0	1000	mpd	Caryophyllales	All Summits	RD
Sirac	7	120.583	123.612	20.217	352	-0.15	0.352	0	1000	mpd	Caryophyllales	All Summits	RD
Rouies	4	149.117	127.276	28.066	782.5	0.778	0.782	0	1000	mpd	Caryophyllales	All Summits	RD
Olan	4	119.817	123.623	30.475	351	-0.125	0.351	0	1000	mpd	Caryophyllales	All Summits	RD
Pelvoux	1	NA	NA	NA	1	NA	0.001	0	1000	mpd	Caryophyllales	All Summits	RD
Occidentale Ailefroide	4	149.117	124.598	29.706	790	0.825	0.789	0	1000	mpd	Caryophyllales	All Summits	RD
Brevoort	2	178.922	121.837	57.392	864	0.995	0.863	0	1000	mpd	Caryophyllales	All Summits	RD
Burlan	3	144.149	120.497	38.742	584.5	0.611	0.584	0	1000	mpd	Caryophyllales	All Summits	RD
Rocher de la Selle	15	120.336	124.713	7.286	289.5	-0.601	0.289	0	1000	mpd	Caryophyllales	All Summits	RD
Choisy	2	178.922	124.217	54.855	860	0.997	0.859	0	1000	mpd	Caryophyllales	All Summits	RD
Muraillette	7	100.501	124.936	19.339	125.5	-1.264	0.125	0	1000	mpd	Caryophyllales	All Summits	RD
Rateau	6	139.665	124.338	21.863	739.5	0.701	0.739	0	1000	mpd	Caryophyllales	All Summits	RD
Lauvitel	14	110.838	124.866	8.124	49	-1.727	0.049	1	1000	mpd	Caryophyllales	All Summits	RD
Plat de la Selle	5	74.255	103.101	20.372	44	-1.416	0.044	1	1000	mpd	Asterales	LGM	RD
Barre des Ecrins	7	73.927	103.904	16.057	15	-1.867	0.015	1	1000	mpd	Asterales	LGM	RD
La Meije	4	95.449	103.148	24.657	484	-0.312	0.484	0	1000	mpd	Asterales	LGM	RD

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Table b.6.1 – continued from previous page

Summits	N taxa	obs	rand mean	rand sd	obs rank	obs z	obs p	sig	runs	metric	clade	pool	model
Sirac	11	102.755	103.874	10.961	381	-0.102	0.381	0	1000	mpd	Asterales	LGM	RD
Rouies	10	104.383	104.06	11.732	441	0.028	0.441	0	1000	mpd	Asterales	LGM	RD
Olan	10	85.634	104.025	11.903	80	-1.545	0.08	0	1000	mpd	Asterales	LGM	RD
Pelvoux	2	105.1	104.182	43.136	749	0.021	0.748	0	1000	mpd	Asterales	LGM	RD
Occidentale Ailefroide	5	71.668	103.455	20.491	38	-1.551	0.038	1	1000	mpd	Asterales	LGM	RD
Brevoort	2	102.297	106.049	44.238	438	-0.085	0.438	0	1000	mpd	Asterales	LGM	RD
Burlan	5	85.817	105.001	20.32	184	-0.944	0.184	0	1000	mpd	Asterales	LGM	RD
Rocher de la Selle	21	93.633	104.149	4.704	26	-2.236	0.026	1	1000	mpd	Asterales	LGM	RD
Choisy	3	98.924	104.63	30.219	438.5	-0.189	0.438	0	1000	mpd	Asterales	LGM	RD
Muraillette	11	100.372	103.824	10.846	301	-0.318	0.301	0	1000	mpd	Asterales	LGM	RD
Rateau	14	116.377	103.562	8.84	938	1.45	0.937	0	1000	mpd	Asterales	LGM	RD
Lauvitel	11	103.033	104.32	10.746	383	-0.12	0.383	0	1000	mpd	Asterales	LGM	RD
Plat de la Selle	11	123.783	124.224	11.63	396	-0.038	0.396	0	1000	mpd	Poales	LGM	RD
Barre des Ecrins	10	115.754	124.664	12.802	204	-0.696	0.204	0	1000	mpd	Poales	LGM	RD
La Meije	6	148.935	123.342	20.567	980	1.244	0.979	1	1000	mpd	Poales	LGM	RD
Sirac	14	98.881	125.073	8.828	13	-2.967	0.013	1	1000	mpd	Poales	LGM	RD
Rouies	5	143.945	124.689	22.298	821	0.864	0.82	0	1000	mpd	Poales	LGM	RD
Olan	9	128.79	124.716	13.604	540	0.3	0.539	0	1000	mpd	Poales	LGM	RD
Pelvoux	3	140.482	126.078	36.924	625	0.39	0.624	0	1000	mpd	Poales	LGM	RD
Occidentale Ailefroide	6	108.259	125.273	18.919	166	-0.899	0.166	0	1000	mpd	Poales	LGM	RD
Brevoort	1	NA	NA	NA	1	NA	0.001	0	1000	mpd	Poales	LGM	RD
Burlan	6	119.719	124.658	19.832	314	-0.249	0.314	0	1000	mpd	Poales	LGM	RD
Rocher de la Selle	23	120.911	124.658	4.082	169.5	-0.918	0.169	0	1000	mpd	Poales	LGM	RD
Choisy	2	152.811	125.111	59.007	498	0.469	0.498	0	1000	mpd	Poales	LGM	RD
Muraillette	11	102.669	124.082	11.654	58	-1.837	0.058	0	1000	mpd	Poales	LGM	RD
Rateau	18	127.054	124.419	6.702	611	0.393	0.61	0	1000	mpd	Poales	LGM	RD
Lauvitel	18	127.387	124.639	6.691	616	0.411	0.615	0	1000	mpd	Poales	LGM	RD
Barre des Ecrins	5	67.853	69.619	6.125	284	-0.288	0.284	0	1000	mpd	Lamiales	LGM	RD
La Meije	3	68.491	70.335	11.285	351	-0.163	0.351	0	1000	mpd	Lamiales	LGM	RD
Sirac	6	72.99	69.44	5.096	759.5	0.697	0.759	0	1000	mpd	Lamiales	LGM	RD
Rouies	5	64.851	69.925	6.154	179	-0.825	0.179	0	1000	mpd	Lamiales	LGM	RD
Olan	6	64.345	69.535	4.97	150	-1.044	0.15	0	1000	mpd	Lamiales	LGM	RD
Pelvoux	1	NA	NA	NA	1	NA	0.001	0	1000	mpd	Lamiales	LGM	RD
Occidentale Ailefroide	4	66.578	70.046	8.162	352.5	-0.425	0.352	0	1000	mpd	Lamiales	LGM	RD
Brevoort	1	NA	NA	NA	1	NA	0.001	0	1000	mpd	Lamiales	LGM	RD
Burlan	4	66.211	69.022	9.281	296.5	-0.303	0.296	0	1000	mpd	Lamiales	LGM	RD
Rocher de la Selle	9	72.757	69.646	2.643	905.5	1.177	0.905	0	1000	mpd	Lamiales	LGM	RD
Choisy	2	81.037	69.447	21.383	841.5	0.542	0.841	0	1000	mpd	Lamiales	LGM	RD
Muraillette	5	71.273	70.067	6.039	550.5	0.2	0.55	0	1000	mpd	Lamiales	LGM	RD
Rateau	7	66.591	69.645	3.87	203.5	-0.789	0.203	0	1000	mpd	Lamiales	LGM	RD
Lauvitel	8	70.743	69.524	3.401	607	0.358	0.606	0	1000	mpd	Lamiales	LGM	RD
Plat de la Selle	2	178.922	119.899	56.369	685	1.047	0.684	0	1000	mpd	Caryophyllales	LGM	RD
Barre des Ecrins	5	123.09	121.362	25.665	459.5	0.067	0.459	0	1000	mpd	Caryophyllales	LGM	RD
La Meije	5	127.267	121.828	24.792	514	0.219	0.513	0	1000	mpd	Caryophyllales	LGM	RD
Sirac	7	121.278	120.91	19.511	431.5	0.019	0.431	0	1000	mpd	Caryophyllales	LGM	RD
Rouies	4	151.912	122.002	30.653	849	0.976	0.848	0	1000	mpd	Caryophyllales	LGM	RD
Olan	4	119.817	123.436	29.443	375.5	-0.123	0.375	0	1000	mpd	Caryophyllales	LGM	RD
Pelvoux	1	NA	NA	NA	1	NA	0.001	0	1000	mpd	Caryophyllales	LGM	RD
Occidentale Ailefroide	4	151.912	121.879	30.086	864	0.998	0.863	0	1000	mpd	Caryophyllales	LGM	RD
Burlan	3	140.273	118.334	39.178	541.5	0.56	0.541	0	1000	mpd	Caryophyllales	LGM	RD
Rocher de la Selle	14	112.213	122.235	7.025	124.5	-1.427	0.124	0	1000	mpd	Caryophyllales	LGM	RD
Muraillette	7	99.947	122.122	19.029	143.5	-1.165	0.143	0	1000	mpd	Caryophyllales	LGM	RD
Rateau	5	147.943	121.44	25.686	900	1.032	0.899	0	1000	mpd	Caryophyllales	LGM	RD
Lauvitel	14	110.043	121.67	7.029	39.5	-1.654	0.039	1	1000	mpd	Caryophyllales	LGM	RD
All Summits	39	21.002	24.142	3.361	171	-0.934	0.171	0	1000	mntd	Asterales	Regional	DAMOCLES
All Summits	37	24.412	31.155	5.139	87	-1.312	0.087	0	1000	mntd	Poales	Regional	DAMOCLES
All Summits	21	24.54	33.321	5.741	56	-1.53	0.056	0	1000	mntd	Lamiales	Regional	DAMOCLES
All Summits	19	44.451	48.159	9.296	369	-0.399	0.369	0	1000	mntd	Caryophyllales	Regional	DAMOCLES
LGM	28	22.037	29.282	5.107	64	-1.419	0.064	0	1000	mntd	Asterales	Regional	DAMOCLES
LGM	28	29.227	35.639	6.582	163	-0.974	0.163	0	1000	mntd	Poales	Regional	DAMOCLES
LGM	16	23.448	37.683	7.534	17	-1.89	0.017	1	1000	mntd	Lamiales	Regional	DAMOCLES
LGM	17	55.104	51.271	9.867	656	0.388	0.655	0	1000	mntd	Caryophyllales	Regional	DAMOCLES
Plat de la Selle	5	57.031	NA	NA	278	NA	0.278	0	1000	mntd	Asterales	All Summits	DAMOCLES
Barre des Ecrins	7	27.238	NA	NA	24	NA	0.024	0	1000	mntd	Asterales	All Summits	DAMOCLES
La Meije	4	92.65	NA	NA	573	NA	0.572	0	1000	mntd	Asterales	All Summits	DAMOCLES
Sirac	13	52.98	43.364	11.549	819	0.833	0.818	0	1000	mntd	Asterales	All Summits	DAMOCLES
Rouies	10	35.134	51.247	14.631	123	-1.101	0.123	0	1000	mntd	Asterales	All Summits	DAMOCLES
Olan	10	46.436	53.163	14.812	341	-0.454	0.341	0	1000	mntd	Asterales	All Summits	DAMOCLES
Occidentale Ailefroide	5	21.957	NA	NA	6	NA	0.006	0	1000	mntd	Asterales	All Summits	DAMOCLES
Brevoort	2	102.297	NA	NA	356	NA	0.356	0	1000	mntd	Asterales	All Summits	DAMOCLES
Burlan	5	75.022	NA	NA	539	NA	0.538	0	1000	mntd	Asterales	All Summits	DAMOCLES
Rocher de la Selle	31	22.33	23.522	2.36	330	-0.505	0.33	0	1000	mntd	Asterales	All Summits	DAMOCLES
Choisy	3	95.55	NA	NA	510	NA	0.509	0	1000	mntd	Asterales	All Summits	DAMOCLES
Muraillette	11	43.107	49.55	15.235	371	-0.423	0.371	0	1000	mntd	Asterales	All Summits	DAMOCLES
Rateau	16	21.489	38.152	8.497	11	-1.961	0.011	1	1000	mntd	Asterales	All Summits	DAMOCLES
Lauvitel	12	41.138	49.014	11.598	266	-0.679	0.266	0	1000	mntd	Asterales	All Summits	DAMOCLES

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Table b.6.1 – continued from previous page

Summits	N taxa	obs	rand mean	rand sd	obs rank	obs z	obs p	sig	runs	metric	clade	pool	model
Plat de la Selle	11	25.954	44.703	14.802	61	-1.267	0.061	0	1000	mntd	Poales	All Summits	DAMOCLES
Barre des Ecrins	10	29.845	44.408	17.161	176	-0.849	0.176	0	1000	mntd	Poales	All Summits	DAMOCLES
La Meije	6	61.896	NA	NA	582	NA	0.581	0	1000	mntd	Poales	All Summits	DAMOCLES
Sirac	14	25.937	51.952	9.095	1	-2.86	0.001	1	1000	mntd	Poales	All Summits	DAMOCLES
Rouies	5	35.457	NA	NA	110	NA	0.11	0	1000	mntd	Poales	All Summits	DAMOCLES
Olan	9	39.481	47.308	18.333	366	-0.427	0.366	0	1000	mntd	Poales	All Summits	DAMOCLES
Pelvoux	3	104.421	NA	NA	384	NA	0.384	0	1000	mntd	Poales	All Summits	DAMOCLES
Occidentale Ailefroide	6	76.915	NA	NA	739	NA	0.738	0	1000	mntd	Poales	All Summits	DAMOCLES
Brevoort	1	NA	NA	NA	257	NA	0.257	0	1000	mntd	Poales	All Summits	DAMOCLES
Burlan	6	42.785	NA	NA	232	NA	0.232	0	1000	mntd	Poales	All Summits	DAMOCLES
Rocher de la Selle	29	22.93	25.791	3.001	144	-0.953	0.144	0	1000	mntd	Poales	All Summits	DAMOCLES
Choisy	2	28.146	NA	NA	45.5	NA	0.045	0	1000	mntd	Poales	All Summits	DAMOCLES
Muraillette	11	43.484	43.337	13.616	548	0.011	0.547	0	1000	mntd	Poales	All Summits	DAMOCLES
Rateau	22	29.997	27.979	4.829	691	0.418	0.69	0	1000	mntd	Poales	All Summits	DAMOCLES
Lauvitel	18	30.227	29.999	6.872	556	0.033	0.555	0	1000	mntd	Poales	All Summits	DAMOCLES
Plat de la Selle	2	81.037	NA	NA	466.5	NA	0.466	0	1000	mntd	Lamiales	All Summits	DAMOCLES
Barre des Ecrins	5	43.229	NA	NA	368	NA	0.368	0	1000	mntd	Lamiales	All Summits	DAMOCLES
La Meije	3	55.944	NA	NA	310.5	NA	0.31	0	1000	mntd	Lamiales	All Summits	DAMOCLES
Sirac	6	52.799	60.646	10.274	250	-0.764	0.25	0	1000	mntd	Lamiales	All Summits	DAMOCLES
Rouies	5	31.219	NA	NA	156	NA	0.156	0	1000	mntd	Lamiales	All Summits	DAMOCLES
Olan	6	38.338	NA	NA	345	NA	0.345	0	1000	mntd	Lamiales	All Summits	DAMOCLES
Pelvoux	2	73.188	NA	NA	315	NA	0.315	0	1000	mntd	Lamiales	All Summits	DAMOCLES
Occidentale Ailefroide	4	49.872	NA	NA	239	NA	0.239	0	1000	mntd	Lamiales	All Summits	DAMOCLES
Brevoort	1	NA	NA	NA	1	NA	0.001	0	1000	mntd	Lamiales	All Summits	DAMOCLES
Burlan	5	39.717	NA	NA	322	NA	0.322	0	1000	mntd	Lamiales	All Summits	DAMOCLES
Rocher de la Selle	11	44.028	40.33	8.83	688	0.419	0.687	0	1000	mntd	Lamiales	All Summits	DAMOCLES
Choisy	2	81.037	NA	NA	584.5	NA	0.584	0	1000	mntd	Lamiales	All Summits	DAMOCLES
Muraillette	5	46.821	NA	NA	443	NA	0.443	0	1000	mntd	Lamiales	All Summits	DAMOCLES
Rateau	9	35.111	41.718	11.115	291	-0.594	0.291	0	1000	mntd	Lamiales	All Summits	DAMOCLES
Lauvitel	8	30.182	40.177	13.031	215	-0.767	0.215	0	1000	mntd	Lamiales	All Summits	DAMOCLES
Plat de la Selle	2	178.922	NA	NA	536	NA	0.535	0	1000	mntd	Caryophyllales	All Summits	DAMOCLES
Barre des Ecrins	5	82.274	NA	NA	544.5	NA	0.544	0	1000	mntd	Caryophyllales	All Summits	DAMOCLES
La Meije	5	103.632	NA	NA	763	NA	0.762	0	1000	mntd	Caryophyllales	All Summits	DAMOCLES
Sirac	7	50.3	75.543	19.753	73.5	-1.278	0.073	0	1000	mntd	Caryophyllales	All Summits	DAMOCLES
Rouies	4	89.506	NA	NA	520.5	NA	0.52	0	1000	mntd	Caryophyllales	All Summits	DAMOCLES
Olan	4	79.426	NA	NA	391	NA	0.391	0	1000	mntd	Caryophyllales	All Summits	DAMOCLES
Pelvoux	1	NA	NA	NA	268	NA	0.268	0	1000	mntd	Caryophyllales	All Summits	DAMOCLES
Occidentale Ailefroide	4	89.506	NA	NA	413.5	NA	0.413	0	1000	mntd	Caryophyllales	All Summits	DAMOCLES
Brevoort	2	178.922	NA	NA	588	NA	0.587	0	1000	mntd	Caryophyllales	All Summits	DAMOCLES
Burlan	3	109.376	NA	NA	518	NA	0.517	0	1000	mntd	Caryophyllales	All Summits	DAMOCLES
Rocher de la Selle	15	59.158	50.614	8.598	828.5	0.994	0.828	0	1000	mntd	Caryophyllales	All Summits	DAMOCLES
Choisy	2	178.922	NA	NA	592.5	NA	0.592	0	1000	mntd	Caryophyllales	All Summits	DAMOCLES
Muraillette	7	62.023	NA	NA	292	NA	0.292	0	1000	mntd	Caryophyllales	All Summits	DAMOCLES
Rateau	6	98.028	NA	NA	732	NA	0.731	0	1000	mntd	Caryophyllales	All Summits	DAMOCLES
Lauvitel	14	53.013	54.676	9.276	437	-0.179	0.437	0	1000	mntd	Caryophyllales	All Summits	DAMOCLES
Plat de la Selle	5	39.204	NA	NA	41	NA	0.041	0	1000	mntd	Asterales	LGM	DAMOCLES
Barre des Ecrins	7	29.892	NA	NA	33	NA	0.033	0	1000	mntd	Asterales	LGM	DAMOCLES
La Meije	4	89.342	NA	NA	570	NA	0.569	0	1000	mntd	Asterales	LGM	DAMOCLES
Sirac	11	44.335	44.407	13.748	546	-0.005	0.545	0	1000	mntd	Asterales	LGM	DAMOCLES
Rouies	10	62.908	49.311	15.169	837	0.896	0.836	0	1000	mntd	Asterales	LGM	DAMOCLES
Olan	10	36.793	55.246	13.566	62	-1.36	0.062	0	1000	mntd	Asterales	LGM	DAMOCLES
Pelvoux	2	105.1	NA	NA	457	NA	0.457	0	1000	mntd	Asterales	LGM	DAMOCLES
Occidentale Ailefroide	5	18.61	NA	NA	8	NA	0.008	0	1000	mntd	Asterales	LGM	DAMOCLES
Brevoort	2	102.297	NA	NA	355.5	NA	0.355	0	1000	mntd	Asterales	LGM	DAMOCLES
Burlan	5	52.57	NA	NA	260	NA	0.26	0	1000	mntd	Asterales	LGM	DAMOCLES
Rocher de la Selle	21	39.027	26.817	4.975	970	2.454	0.969	1	1000	mntd	Asterales	LGM	DAMOCLES
Choisy	3	95.55	NA	NA	519.5	NA	0.519	0	1000	mntd	Asterales	LGM	DAMOCLES
Muraillette	11	47.367	45.711	13.857	604	0.119	0.603	0	1000	mntd	Asterales	LGM	DAMOCLES
Rateau	14	23.059	42.045	9.504	8	-1.998	0.008	1	1000	mntd	Asterales	LGM	DAMOCLES
Lauvitel	11	54.879	59.543	12.7	360	-0.367	0.36	0	1000	mntd	Asterales	LGM	DAMOCLES
Plat de la Selle	11	34.779	47.931	13.008	128	-1.011	0.128	0	1000	mntd	Poales	LGM	DAMOCLES
Barre des Ecrins	10	41.746	49.556	15.119	314	-0.517	0.314	0	1000	mntd	Poales	LGM	DAMOCLES
La Meije	6	70.147	NA	NA	614.5	NA	0.614	0	1000	mntd	Poales	LGM	DAMOCLES
Sirac	14	24.414	53.488	8.699	1	-3.342	0.001	1	1000	mntd	Poales	LGM	DAMOCLES
Rouies	5	60.39	NA	NA	339.5	NA	0.339	0	1000	mntd	Poales	LGM	DAMOCLES
Olan	9	53.02	51.264	18.694	599	0.094	0.598	0	1000	mntd	Poales	LGM	DAMOCLES
Pelvoux	3	104.421	NA	NA	364.5	NA	0.364	0	1000	mntd	Poales	LGM	DAMOCLES
Occidentale Ailefroide	6	71.587	NA	NA	630	NA	0.629	0	1000	mntd	Poales	LGM	DAMOCLES
Brevoort	1	NA	NA	NA	273	NA	0.273	0	1000	mntd	Poales	LGM	DAMOCLES
Burlan	6	42.078	NA	NA	145	NA	0.145	0	1000	mntd	Poales	LGM	DAMOCLES
Rocher de la Selle	23	39.073	34.157	3.555	910	1.383	0.909	0	1000	mntd	Poales	LGM	DAMOCLES
Choisy	2	152.811	NA	NA	420	NA	0.42	0	1000	mntd	Poales	LGM	DAMOCLES
Muraillette	11	62.076	46.957	13.713	884	1.103	0.883	0	1000	mntd	Poales	LGM	DAMOCLES
Rateau	18	43.307	33.766	6.381	924	1.495	0.923	0	1000	mntd	Poales	LGM	DAMOCLES
Lauvitel	18	44.434	36.923	6.141	891	1.223	0.89	0	1000	mntd	Poales	LGM	DAMOCLES
Barre des Ecrins	5	31.795	NA	NA	171.5	NA	0.171	0	1000	mntd	Lamiales	LGM	DAMOCLES

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Table b.6.1 – continued from previous page

Summits	N taxa	obs	rand mean	rand sd	obs rank	obs z	obs p	sig	runs	metric	clade	pool	model
La Meije	3	55.944	NA	NA	350	NA	0.35	0	1000	mntd	Lamiales	LGM	DAMOCLES
Sirac	6	54.185	NA	NA	320	NA	0.32	0	1000	mntd	Lamiales	LGM	DAMOCLES
Rouies	5	19.786	NA	NA	31	NA	0.031	0	1000	mntd	Lamiales	LGM	DAMOCLES
Olan	6	5.341	NA	NA	3	NA	0.003	0	1000	mntd	Lamiales	LGM	DAMOCLES
Pelvoux	1	NA	NA	NA	260	NA	0.26	0	1000	mntd	Lamiales	LGM	DAMOCLES
Occidentale Ailefroide	4	37.659	NA	NA	123	NA	0.123	0	1000	mntd	Lamiales	LGM	DAMOCLES
Brevoort	1	NA	NA	NA	1	NA	0.001	0	1000	mntd	Lamiales	LGM	DAMOCLES
Burlan	4	40.928	NA	NA	255	NA	0.255	0	1000	mntd	Lamiales	LGM	DAMOCLES
Rocher de la Selle	9	46.048	35.627	10.848	841	0.961	0.84	0	1000	mntd	Lamiales	LGM	DAMOCLES
Choisy	2	81.037	NA	NA	556.5	NA	0.556	0	1000	mntd	Lamiales	LGM	DAMOCLES
Muraillette	5	47.653	NA	NA	125	NA	0.125	0	1000	mntd	Lamiales	LGM	DAMOCLES
Rateau	7	35.152	NA	NA	19	NA	0.019	0	1000	mntd	Lamiales	LGM	DAMOCLES
Lauvitel	8	46.889	38.94	12.599	750	0.631	0.749	0	1000	mntd	Lamiales	LGM	DAMOCLES
Plat de la Selle	2	178.922	NA	NA	493	NA	0.493	0	1000	mntd	Caryophyllales	LGM	DAMOCLES
Barre des Ecrins	5	82.274	NA	NA	574	NA	0.573	0	1000	mntd	Caryophyllales	LGM	DAMOCLES
La Meije	5	98.98	NA	NA	704	NA	0.703	0	1000	mntd	Caryophyllales	LGM	DAMOCLES
Sirac	7	54.47	75.293	20.432	119	-1.019	0.119	0	1000	mntd	Caryophyllales	LGM	DAMOCLES
Rouies	4	97.892	NA	NA	585.5	NA	0.585	0	1000	mntd	Caryophyllales	LGM	DAMOCLES
Olan	4	79.426	NA	NA	473	NA	0.473	0	1000	mntd	Caryophyllales	LGM	DAMOCLES
Pelvoux	1	NA	NA	NA	278	NA	0.278	0	1000	mntd	Caryophyllales	LGM	DAMOCLES
Occidentale Ailefroide	4	97.892	NA	NA	460.5	NA	0.46	0	1000	mntd	Caryophyllales	LGM	DAMOCLES
Burlan	3	101.623	NA	NA	416	NA	0.416	0	1000	mntd	Caryophyllales	LGM	DAMOCLES
Rocher de la Selle	14	49.544	57.139	6.145	110	-1.236	0.11	0	1000	mntd	Caryophyllales	LGM	DAMOCLES
Muraillette	7	58.701	NA	NA	135	NA	0.135	0	1000	mntd	Caryophyllales	LGM	DAMOCLES
Rateau	5	102.415	NA	NA	769.5	NA	0.769	0	1000	mntd	Caryophyllales	LGM	DAMOCLES
Lauvitel	14	47.722	56.883	5.649	51.5	-1.622	0.051	0	1000	mntd	Caryophyllales	LGM	DAMOCLES
All Summits	39	105.048	104.33	5.708	539	0.126	0.538	0	1000	mpd	Asterales	Regional	DAMOCLES
All Summits	37	125.793	134.024	4.146	39	-1.985	0.039	1	1000	mpd	Poales	Regional	DAMOCLES
All Summits	21	69.258	73.399	2.635	36	-1.572	0.036	1	1000	mpd	Lamiales	Regional	DAMOCLES
All Summits	19	124.752	119.766	10.915	644	0.457	0.643	0	1000	mpd	Caryophyllales	Regional	DAMOCLES
LGM	28	103.932	104.312	6.829	472	-0.056	0.472	0	1000	mpd	Asterales	Regional	DAMOCLES
LGM	28	124.623	134.084	4.95	37	-1.911	0.037	1	1000	mpd	Poales	Regional	DAMOCLES
LGM	16	69.657	73.323	3.368	105	-1.089	0.105	0	1000	mpd	Lamiales	Regional	DAMOCLES
LGM	17	121.798	120.128	11.771	521	0.142	0.52	0	1000	mpd	Caryophyllales	Regional	DAMOCLES
Plat de la Selle	5	82.095	NA	NA	96	NA	0.096	0	1000	mpd	Asterales	All Summits	DAMOCLES
Barre des Ecrins	7	76.768	NA	NA	23	NA	0.023	0	1000	mpd	Asterales	All Summits	DAMOCLES
La Meije	4	96.551	NA	NA	367	NA	0.367	0	1000	mpd	Asterales	All Summits	DAMOCLES
Sirac	13	101.531	104.551	10.575	364	-0.286	0.364	0	1000	mpd	Asterales	All Summits	DAMOCLES
Rouies	10	87.252	104.481	12.924	82	-1.333	0.082	0	1000	mpd	Asterales	All Summits	DAMOCLES
Olan	10	83.539	103.281	12.654	32	-1.56	0.032	1	1000	mpd	Asterales	All Summits	DAMOCLES
Occidentale Ailefroide	5	72.505	NA	NA	36	NA	0.036	0	1000	mpd	Asterales	All Summits	DAMOCLES
Brevoort	2	102.297	NA	NA	316	NA	0.316	0	1000	mpd	Asterales	All Summits	DAMOCLES
Burlan	5	90.813	NA	NA	260	NA	0.26	0	1000	mpd	Asterales	All Summits	DAMOCLES
Rocher de la Selle	31	109.184	105.181	3.4	891	1.177	0.89	0	1000	mpd	Asterales	All Summits	DAMOCLES
Choisy	3	98.924	NA	NA	391	NA	0.391	0	1000	mpd	Asterales	All Summits	DAMOCLES
Muraillette	11	85.655	104.973	12.447	45	-1.552	0.045	1	1000	mpd	Asterales	All Summits	DAMOCLES
Rateau	16	85.143	104.394	8.33	5	-2.311	0.005	1	1000	mpd	Asterales	All Summits	DAMOCLES
Lauvitel	12	100.628	103.94	10.547	336	-0.314	0.336	0	1000	mpd	Asterales	All Summits	DAMOCLES
Plat de la Selle	11	115.449	127.605	11.218	118	-1.084	0.118	0	1000	mpd	Poales	All Summits	DAMOCLES
Barre des Ecrins	10	110.324	126.158	13	102	-1.218	0.102	0	1000	mpd	Poales	All Summits	DAMOCLES
La Meije	6	134.819	NA	NA	625	NA	0.624	0	1000	mpd	Poales	All Summits	DAMOCLES
Sirac	14	99.446	133.428	6.626	2	-5.128	0.002	1	1000	mpd	Poales	All Summits	DAMOCLES
Rouies	5	119.012	NA	NA	291	NA	0.291	0	1000	mpd	Poales	All Summits	DAMOCLES
Olan	9	121.904	125.07	16.751	324	-0.189	0.324	0	1000	mpd	Poales	All Summits	DAMOCLES
Pelvoux	3	140.482	NA	NA	337	NA	0.337	0	1000	mpd	Poales	All Summits	DAMOCLES
Occidentale Ailefroide	6	111.128	NA	NA	173	NA	0.173	0	1000	mpd	Poales	All Summits	DAMOCLES
Brevoort	1	NA	NA	NA	257	NA	0.257	0	1000	mpd	Poales	All Summits	DAMOCLES
Burlan	6	119.86	NA	NA	294	NA	0.294	0	1000	mpd	Poales	All Summits	DAMOCLES
Rocher de la Selle	29	126.335	125.995	3.487	495	0.098	0.495	0	1000	mpd	Poales	All Summits	DAMOCLES
Choisy	2	28.146	NA	NA	33.5	NA	0.033	0	1000	mpd	Poales	All Summits	DAMOCLES
Muraillette	11	103.081	126.703	11.058	35	-2.136	0.035	1	1000	mpd	Poales	All Summits	DAMOCLES
Rateau	22	115.69	125.651	5.623	59	-1.772	0.059	0	1000	mpd	Poales	All Summits	DAMOCLES
Lauvitel	18	116.917	125.688	7.154	104	-1.226	0.104	0	1000	mpd	Poales	All Summits	DAMOCLES
Plat de la Selle	2	81.037	NA	NA	466.5	NA	0.466	0	1000	mpd	Lamiales	All Summits	DAMOCLES
Barre des Ecrins	5	70.711	NA	NA	462	NA	0.462	0	1000	mpd	Lamiales	All Summits	DAMOCLES
La Meije	3	68.491	NA	NA	263	NA	0.263	0	1000	mpd	Lamiales	All Summits	DAMOCLES
Sirac	6	72.713	74.29	3.51	238	-0.449	0.238	0	1000	mpd	Lamiales	All Summits	DAMOCLES
Rouies	5	67.709	NA	NA	317	NA	0.317	0	1000	mpd	Lamiales	All Summits	DAMOCLES
Olan	6	70.944	NA	NA	562	NA	0.561	0	1000	mpd	Lamiales	All Summits	DAMOCLES
Pelvoux	2	73.188	NA	NA	230	NA	0.23	0	1000	mpd	Lamiales	All Summits	DAMOCLES
Occidentale Ailefroide	4	70.649	NA	NA	301	NA	0.301	0	1000	mpd	Lamiales	All Summits	DAMOCLES
Brevoort	1	NA	NA	NA	1	NA	0.001	0	1000	mpd	Lamiales	All Summits	DAMOCLES
Burlan	5	61.942	NA	NA	118	NA	0.118	0	1000	mpd	Lamiales	All Summits	DAMOCLES
Rocher de la Selle	11	71.394	70.977	2.489	544	0.167	0.543	0	1000	mpd	Lamiales	All Summits	DAMOCLES
Choisy	2	81.037	NA	NA	584.5	NA	0.584	0	1000	mpd	Lamiales	All Summits	DAMOCLES
Muraillette	5	70.442	NA	NA	456	NA	0.456	0	1000	mpd	Lamiales	All Summits	DAMOCLES

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Table b.6.1 – continued from previous page

Summits	N taxa	obs	rand mean	rand sd	obs rank	obs z	obs p	sig	runs	metric	clade	pool	model
Rateau	9	69.782	70.4	3.659	358	-0.169	0.358	0	1000	mpd	Lamiales	All Summits	DAMOCLES
Lauvitel	8	67.241	69.182	4.72	278	-0.411	0.278	0	1000	mpd	Lamiales	All Summits	DAMOCLES
Plat de la Selle	2	178.922	NA	NA	536	NA	0.535	0	1000	mpd	Caryophyllales	All Summits	DAMOCLES
Barre des Ecrins	5	123.09	NA	NA	408.5	NA	0.408	0	1000	mpd	Caryophyllales	All Summits	DAMOCLES
La Meije	5	128.43	NA	NA	459	NA	0.459	0	1000	mpd	Caryophyllales	All Summits	DAMOCLES
Sirac	7	120.583	124.037	20.742	362.5	-0.167	0.362	0	1000	mpd	Caryophyllales	All Summits	DAMOCLES
Rouies	4	149.117	NA	NA	751.5	NA	0.751	0	1000	mpd	Caryophyllales	All Summits	DAMOCLES
Olan	4	119.817	NA	NA	326	NA	0.326	0	1000	mpd	Caryophyllales	All Summits	DAMOCLES
Pelvoux	1	NA	NA	NA	268	NA	0.268	0	1000	mpd	Caryophyllales	All Summits	DAMOCLES
Occidentale Ailefroide	4	149.117	NA	NA	695.5	NA	0.695	0	1000	mpd	Caryophyllales	All Summits	DAMOCLES
Brevoort	2	178.922	NA	NA	588	NA	0.587	0	1000	mpd	Caryophyllales	All Summits	DAMOCLES
Burlan	3	144.149	NA	NA	509	NA	0.508	0	1000	mpd	Caryophyllales	All Summits	DAMOCLES
Rocher de la Selle	15	120.336	124.513	7.346	245.5	-0.569	0.245	0	1000	mpd	Caryophyllales	All Summits	DAMOCLES
Choisy	2	178.922	NA	NA	592.5	NA	0.592	0	1000	mpd	Caryophyllales	All Summits	DAMOCLES
Muraillette	7	100.501	NA	NA	108	NA	0.108	0	1000	mpd	Caryophyllales	All Summits	DAMOCLES
Rateau	6	139.665	NA	NA	620	NA	0.619	0	1000	mpd	Caryophyllales	All Summits	DAMOCLES
Lauvitel	14	110.838	123.629	8.699	74	-1.47	0.074	0	1000	mpd	Caryophyllales	All Summits	DAMOCLES
Plat de la Selle	5	74.255	NA	NA	34	NA	0.034	0	1000	mpd	Asterales	LGM	DAMOCLES
Barre des Ecrins	7	73.927	NA	NA	29	NA	0.029	0	1000	mpd	Asterales	LGM	DAMOCLES
La Meije	4	95.449	NA	NA	410	NA	0.41	0	1000	mpd	Asterales	LGM	DAMOCLES
Sirac	11	102.755	103.846	11.998	404	-0.091	0.404	0	1000	mpd	Asterales	LGM	DAMOCLES
Rouies	10	104.383	103.786	12.392	467	0.048	0.467	0	1000	mpd	Asterales	LGM	DAMOCLES
Olan	10	85.634	102.489	10.795	50	-1.561	0.05	1	1000	mpd	Asterales	LGM	DAMOCLES
Pelvoux	2	105.1	NA	NA	419	NA	0.419	0	1000	mpd	Asterales	LGM	DAMOCLES
Occidentale Ailefroide	5	71.668	NA	NA	40	NA	0.04	0	1000	mpd	Asterales	LGM	DAMOCLES
Brevoort	2	102.297	NA	NA	312.5	NA	0.312	0	1000	mpd	Asterales	LGM	DAMOCLES
Burlan	5	85.817	NA	NA	192	NA	0.192	0	1000	mpd	Asterales	LGM	DAMOCLES
Rocher de la Selle	21	93.633	104.039	5.013	24	-2.076	0.024	1	1000	mpd	Asterales	LGM	DAMOCLES
Choisy	3	98.924	NA	NA	404	NA	0.404	0	1000	mpd	Asterales	LGM	DAMOCLES
Muraillette	11	100.372	102.526	11.521	399	-0.187	0.399	0	1000	mpd	Asterales	LGM	DAMOCLES
Rateau	14	116.377	101.893	8.463	974	1.711	0.973	1	1000	mpd	Asterales	LGM	DAMOCLES
Lauvitel	11	103.033	107.651	6.708	178	-0.688	0.178	0	1000	mpd	Asterales	LGM	DAMOCLES
Plat de la Selle	11	123.783	124.579	12.225	407	-0.065	0.407	0	1000	mpd	Poales	LGM	DAMOCLES
Barre des Ecrins	10	115.754	123.443	14.015	240	-0.549	0.24	0	1000	mpd	Poales	LGM	DAMOCLES
La Meije	6	148.935	NA	NA	904.5	NA	0.904	0	1000	mpd	Poales	LGM	DAMOCLES
Sirac	14	98.881	130.592	6.752	2	-4.696	0.002	1	1000	mpd	Poales	LGM	DAMOCLES
Rouies	5	143.945	NA	NA	753	NA	0.752	0	1000	mpd	Poales	LGM	DAMOCLES
Olan	9	128.79	124.352	16.308	542	0.272	0.541	0	1000	mpd	Poales	LGM	DAMOCLES
Pelvoux	3	140.482	NA	NA	315	NA	0.315	0	1000	mpd	Poales	LGM	DAMOCLES
Occidentale Ailefroide	6	108.259	NA	NA	174	NA	0.174	0	1000	mpd	Poales	LGM	DAMOCLES
Brevoort	1	NA	NA	NA	273	NA	0.273	0	1000	mpd	Poales	LGM	DAMOCLES
Burlan	6	119.719	NA	NA	353	NA	0.353	0	1000	mpd	Poales	LGM	DAMOCLES
Rocher de la Selle	23	120.911	124.172	3.767	179	-0.866	0.179	0	1000	mpd	Poales	LGM	DAMOCLES
Choisy	2	152.811	NA	NA	402	NA	0.402	0	1000	mpd	Poales	LGM	DAMOCLES
Muraillette	11	102.669	123.758	13.343	68	-1.581	0.068	0	1000	mpd	Poales	LGM	DAMOCLES
Rateau	18	127.054	124.932	6.524	595	0.325	0.594	0	1000	mpd	Poales	LGM	DAMOCLES
Lauvitel	18	127.387	124.218	6.858	638	0.462	0.637	0	1000	mpd	Poales	LGM	DAMOCLES
Barre des Ecrins	5	67.853	NA	NA	319.5	NA	0.319	0	1000	mpd	Lamiales	LGM	DAMOCLES
La Meije	3	68.491	NA	NA	274.5	NA	0.274	0	1000	mpd	Lamiales	LGM	DAMOCLES
Sirac	6	72.99	NA	NA	285	NA	0.285	0	1000	mpd	Lamiales	LGM	DAMOCLES
Rouies	5	64.851	NA	NA	178	NA	0.178	0	1000	mpd	Lamiales	LGM	DAMOCLES
Olan	6	64.345	NA	NA	130	NA	0.13	0	1000	mpd	Lamiales	LGM	DAMOCLES
Pelvoux	1	NA	NA	NA	260	NA	0.26	0	1000	mpd	Lamiales	LGM	DAMOCLES
Occidentale Ailefroide	4	66.578	NA	NA	178	NA	0.178	0	1000	mpd	Lamiales	LGM	DAMOCLES
Brevoort	1	NA	NA	NA	1	NA	0.001	0	1000	mpd	Lamiales	LGM	DAMOCLES
Burlan	4	66.211	NA	NA	229	NA	0.229	0	1000	mpd	Lamiales	LGM	DAMOCLES
Rocher de la Selle	9	72.757	69.89	3.08	854	0.931	0.853	0	1000	mpd	Lamiales	LGM	DAMOCLES
Choisy	2	81.037	NA	NA	556.5	NA	0.556	0	1000	mpd	Lamiales	LGM	DAMOCLES
Muraillette	5	71.273	NA	NA	171	NA	0.171	0	1000	mpd	Lamiales	LGM	DAMOCLES
Rateau	7	66.591	NA	NA	16	NA	0.016	0	1000	mpd	Lamiales	LGM	DAMOCLES
Lauvitel	8	70.743	69.811	4.038	537	0.231	0.536	0	1000	mpd	Lamiales	LGM	DAMOCLES
Plat de la Selle	2	178.922	NA	NA	493	NA	0.493	0	1000	mpd	Caryophyllales	LGM	DAMOCLES
Barre des Ecrins	5	123.09	NA	NA	419	NA	0.419	0	1000	mpd	Caryophyllales	LGM	DAMOCLES
La Meije	5	127.267	NA	NA	397	NA	0.397	0	1000	mpd	Caryophyllales	LGM	DAMOCLES
Sirac	7	121.278	125.23	20.212	348	-0.196	0.348	0	1000	mpd	Caryophyllales	LGM	DAMOCLES
Rouies	4	151.912	NA	NA	777.5	NA	0.777	0	1000	mpd	Caryophyllales	LGM	DAMOCLES
Olan	4	119.817	NA	NA	386	NA	0.386	0	1000	mpd	Caryophyllales	LGM	DAMOCLES
Pelvoux	1	NA	NA	NA	278	NA	0.278	0	1000	mpd	Caryophyllales	LGM	DAMOCLES
Occidentale Ailefroide	4	151.912	NA	NA	688.5	NA	0.688	0	1000	mpd	Caryophyllales	LGM	DAMOCLES
Burlan	3	140.273	NA	NA	443	NA	0.443	0	1000	mpd	Caryophyllales	LGM	DAMOCLES
Rocher de la Selle	14	112.213	121.816	7.433	95	-1.292	0.095	0	1000	mpd	Caryophyllales	LGM	DAMOCLES
Muraillette	7	99.947	NA	NA	63	NA	0.063	0	1000	mpd	Caryophyllales	LGM	DAMOCLES
Rateau	5	147.943	NA	NA	827.5	NA	0.827	0	1000	mpd	Caryophyllales	LGM	DAMOCLES
Lauvitel	14	110.043	121.74	7.311	69.5	-1.6	0.069	0	1000	mpd	Caryophyllales	LGM	DAMOCLES

B.7 PHYLOGENETIC α-DIVERSITY SUMMARY FOR DAMOCLES NULL MODEL

TABLE B.7.1: Mean rates of maximum likelihood estimates of local extinction (μ) and colonization (γ) estimated in DAMOCLES from exploring starting parameter space across 30 replicates for each clade, and comparing the community of species in the 'Regional' Écrins NP to the community in the 'All Summits' source pool.

	Regional (n taxa)	All Summits (n taxa)	μ (extinction)	γ (colonization)	loglik
Spermatophyta	1081	215	6359	1137	-459.5
Asterales	144	39	12.45	3.03	-70.03
Poales	153	37	8659.96	1939.85	-72.26
Rosales	76	22	3368	970.6	-39.70
Lamiales	109	21	125.84	21.65	-44.69
Caryophyllales	74	19	69.57	20.76	-38.98

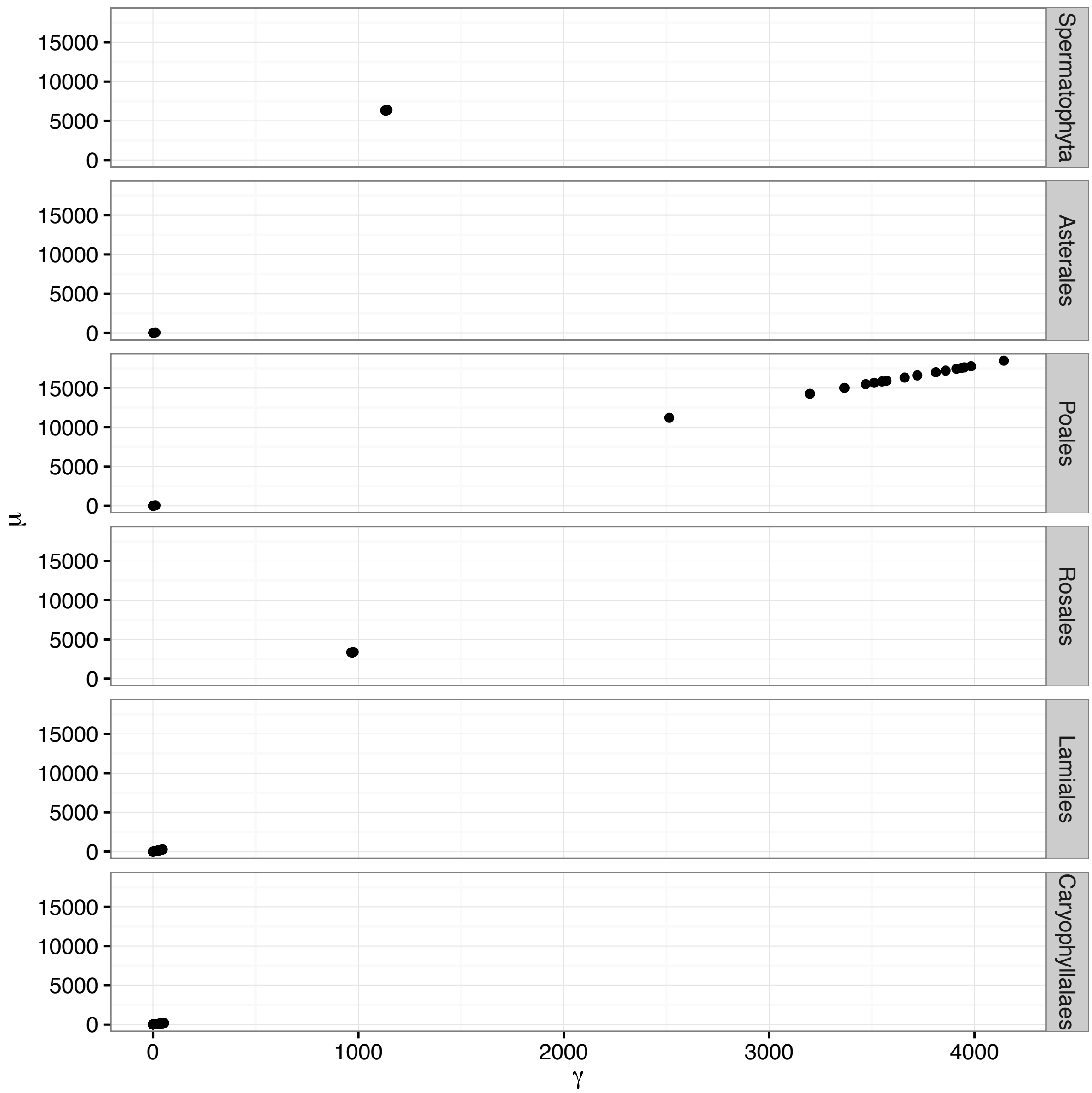

FIGURE B.7.1: Mean rates of local extinction (μ) and colonization (γ) from 30 bootstrap replicates estimated in DAMOCLES for each clade, comparing the community of summit species to the 'Regional' Écrins NP species pool.

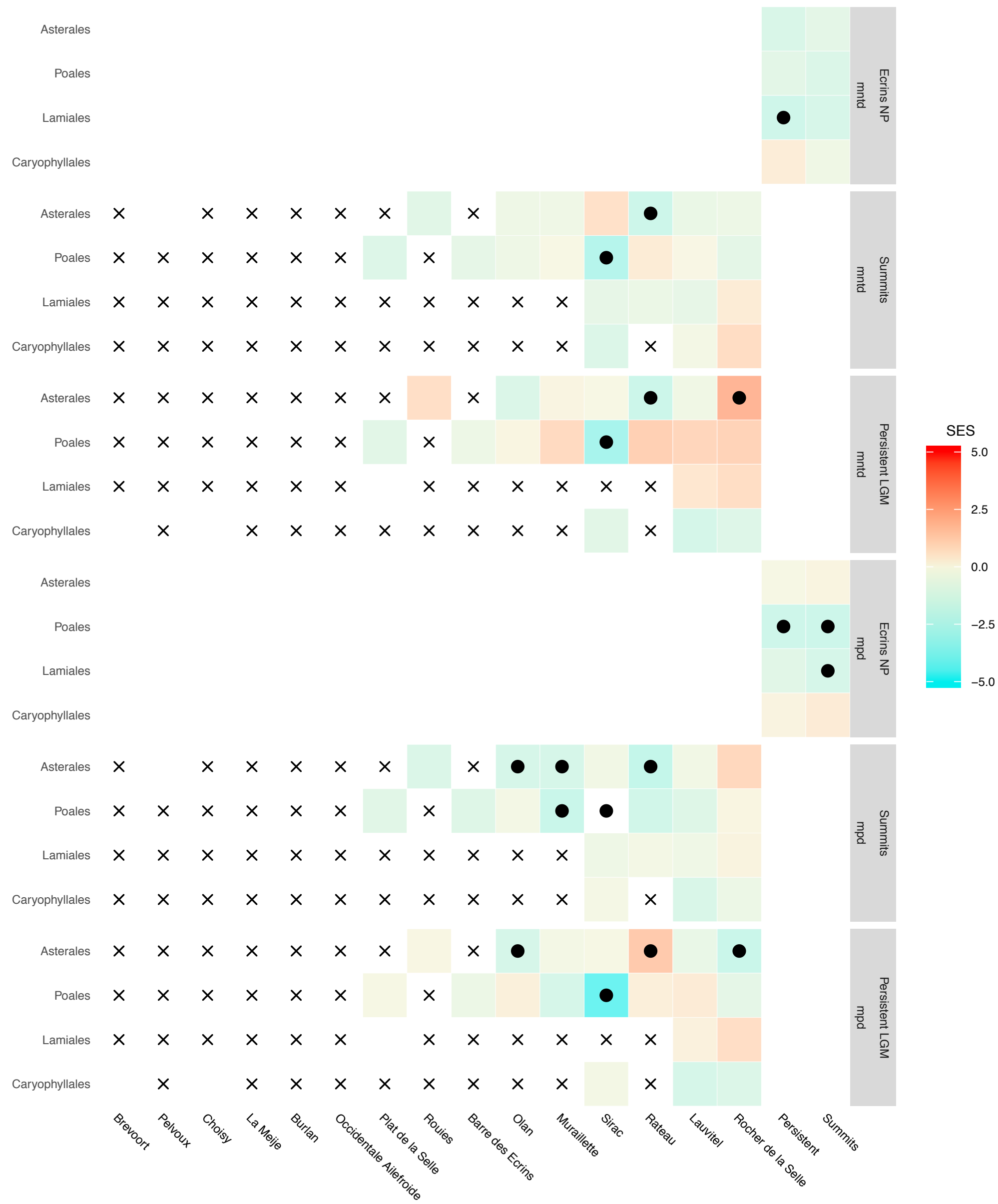

FIGURE B.7.2: Phylogenetic diversity (MNTD, MPD) of each summit standardized by effect size under the DAMOCLES null model ($SES_{DAMOCLES}$) given the three different species pools: the 'Regional' Écrins, 'All Summits', and the 'LGM'. Rows of each panel separate four of the most species rich angiosperm orders. Red tones indicate phylogenetic overdispersion, blue tones indicate phylogenetic clustering. Black dots mark values that have statistically significant *P*-values (<0.05). Cells filled with an "x" had too few species for comparison.

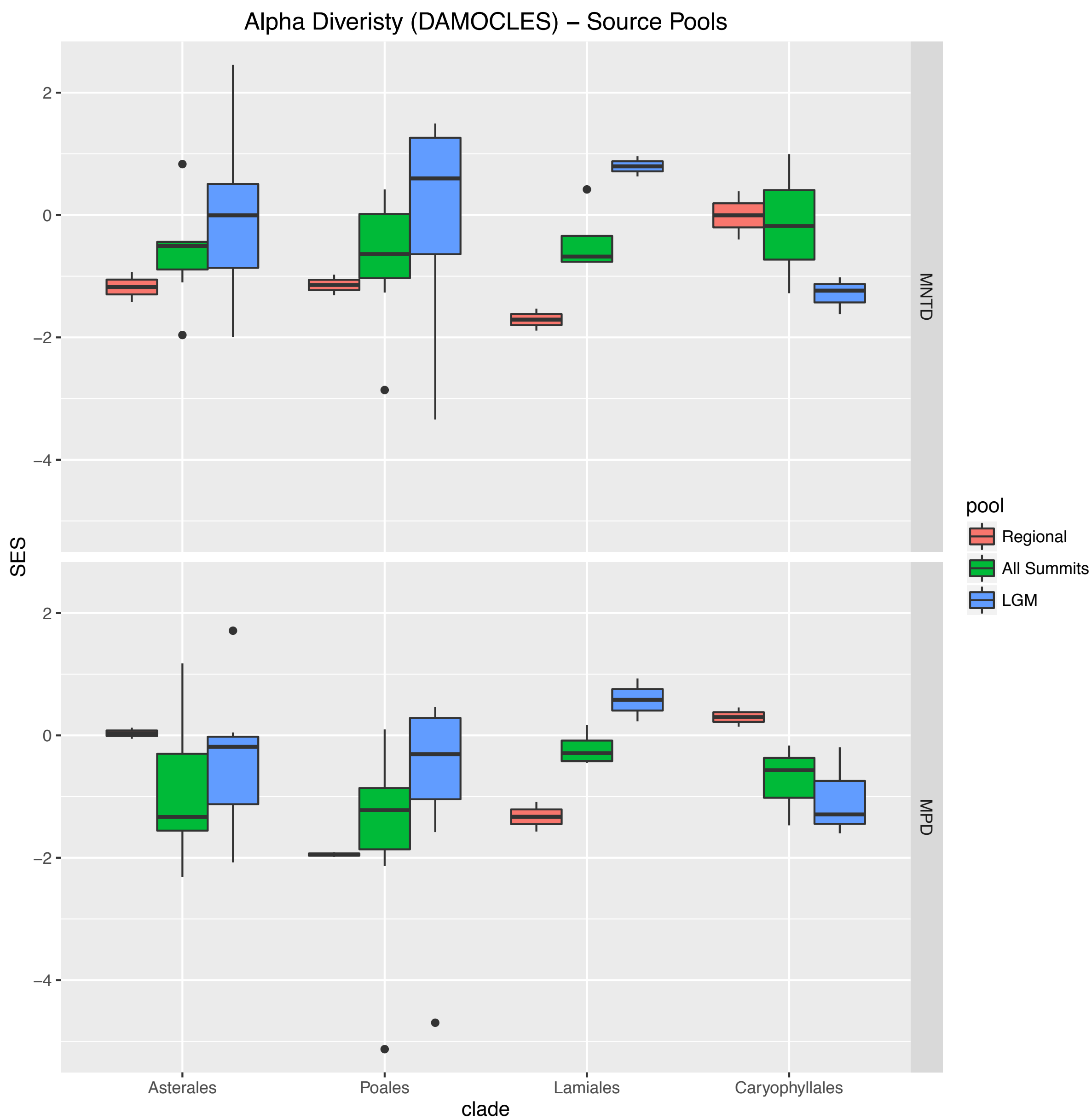

Figure B.7.3: Boxplots of phylogenetic diversity (MNTD, MPD) of each summit standardized by effect size under the DAMOCLES null model ($SES_{DAMOCLES}$) given the three different species pools. Boxes show first and third quartiles, solid horizontal lines indicate the median, vertical black lines are the range, and dots are points that lie 1.5x the interquartile range above the third quartile or below the first quartile.

B.8 COMPARISON OF PHYLOGENETIC α-DIVERSITY BETWEEN RD AND DAMOCLES NULL MODELS

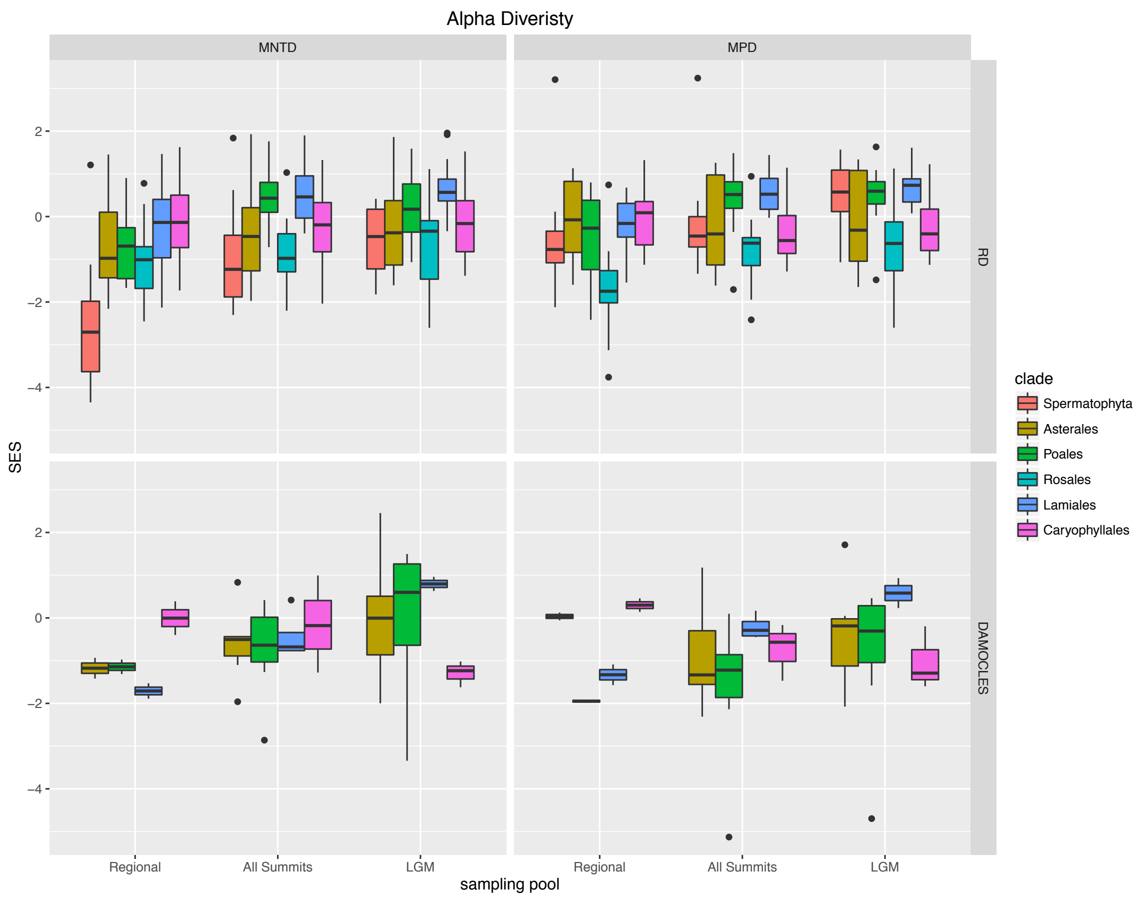

FIGURE B.8.1: Box plots of standardized effect sizes (SES) for phylogenetic diversity within summit communities for each clade measured by phylogenetic mean nearest taxon distance (MNTD) and mean pairwise distance (MPD) under two different null models: random draw (RD) of species from different species pools (the Écrins NP, Persistent LGM, or Summits) or the DAMOCLES model of local extinction and colonization with parameters estimated from the same three species pools. Positive SES values indicate phylogenetic overdispersion; negative values indicate phylogenetic clustering. Boxes show first and third quartiles, solid horizontal lines indicate the median, vertical black lines are the range, and dots are points that lie 1.5x the interquartile range above the third quartile or below the first quartile.

B.9 PHYLOGENETIC β-DIVERSITY OUTPUT FOR PHYLOSOR INDEX

TABLE B.9.1: Table of summarizing results of decomposed PhyloSor indices for each summit pair: observed PhyloSor distance (PhyloSor), observed component of PhyloSor distance describing species replacement (PhyloSor Turn), observed component of PhyloSor distance describing species nestedness (PhyloSor PD), standardized effect size (SES) comparing observed PhyloSor distance to expected from shuffling the phylogeny tips (SES PhyloSor), SES component of PhyloSor distance describing species replacement (SES PhyloSor Turn), SES component of PhyloSor distance describing species nestedness (SES PhyloSor PD).

Summit Pair	PhyloSor	PhyloSor Turn	PhyloSor PD	SES PhyloSor	SES PhyloSor Turn	SES PhyloSor PD
Ecrins NP-Summits	0.494	0.000	0.494	5.035	NA	5.035
Ecrins NP-Persistent	0.589	0.000	0.589	6.563	NA	6.563
Ecrins NP-Under Ice	0.648	0.000	0.648	3.656	NA	3.656
Ecrins NP-Plat de la Selle	0.829	0.000	0.829	3.059	NA	3.059
Ecrins NP-Barre des Ecrins	0.805	0.000	0.805	3.335	NA	3.335
Ecrins NP-La Meije	0.817	0.000	0.817	3.228	NA	3.228
Ecrins NP-Sirac	0.724	0.000	0.724	4.566	NA	4.566
Ecrins NP-Rouies	0.792	0.000	0.792	2.634	NA	2.634
Ecrins NP-Olan	0.693	0.000	0.693	0.939	NA	0.939
Ecrins NP-Pelvoux	0.829	0.000	0.829	-2.267	NA	-2.267
Ecrins NP-Occidentale Ailefroide	0.822	0.000	0.822	2.008	NA	2.008
Ecrins NP-Brevoort	0.894	0.000	0.894	0.802	NA	0.802
Ecrins NP-Burlan	0.807	0.000	0.807	2.098	NA	2.098
Ecrins NP-Rocher de la Selle	0.571	0.000	0.571	3.946	NA	3.946
Ecrins NP-Choisy	0.869	0.000	0.869	1.489	NA	1.489
Ecrins NP-Muraillette	0.745	0.000	0.745	3.742	NA	3.742
Ecrins NP-Rateau	0.659	0.000	0.659	3.837	NA	3.837
Ecrins NP-Lauvitel	0.684	0.000	0.684	4.756	NA	4.756
Summits-Persistent	0.133	0.000	0.133	3.965	NA	3.965
Summits-Under Ice	0.227	0.000	0.227	0.292	NA	0.292
Summits-Plat de la Selle	0.567	0.000	0.567	0.826	NA	0.826
Summits-Barre des Ecrins	0.516	0.000	0.516	1.151	NA	1.151
Summits-La Meije	0.541	0.000	0.541	1.090	NA	1.090
Summits-Sirac	0.357	0.000	0.357	1.939	NA	1.939
Summits-Rouies	0.489	0.000	0.489	0.182	NA	0.182
Summits-Olan	0.302	0.000	0.302	-2.247	NA	-2.247
Summits-Pelvoux	0.567	0.000	0.567	-4.833	NA	-4.833
Summits-Occidentale Ailefroide	0.553	0.000	0.553	-0.328	NA	-0.328
Summits-Brevoort	0.716	0.000	0.716	-1.230	NA	-1.230
Summits-Burlan	0.521	0.000	0.521	-0.309	NA	-0.309
Summits-Rocher de la Selle	0.107	0.000	0.107	-0.038	NA	-0.038
Summits-Choisy	0.656	0.000	0.656	-0.590	NA	-0.590
Summits-Muraillette	0.396	0.000	0.396	1.060	NA	1.060
Summits-Rateau	0.244	0.000	0.244	0.646	NA	0.646
Summits-Lauvitel	0.287	0.000	0.287	1.974	NA	1.974
Persistent-Under Ice	0.255	0.175	0.079	1.112	3.135	-2.155
Persistent-Plat de la Selle	0.469	0.000	0.469	-0.551	NA	-0.551
Persistent-Barre des Ecrins	0.413	0.004	0.409	-0.366	-0.530	-0.186
Persistent-La Meije	0.457	0.031	0.425	-0.226	0.171	-0.313
Persistent-Sirac	0.244	0.012	0.232	-0.335	-0.846	0.146
Persistent-Rouies	0.380	0.000	0.380	-1.361	NA	-1.361
Persistent-Olan	0.270	0.114	0.156	-1.419	5.853	-4.475
Persistent-Pelvoux	0.632	0.306	0.325	-0.870	7.759	-7.757
Persistent-Occidentale Ailefroide	0.468	0.028	0.440	-1.368	1.305	-1.864
Persistent-Brevoort	0.647	0.007	0.640	-2.537	-0.605	-1.659
Persistent-Burlan	0.420	0.007	0.413	-2.022	-0.803	-1.468
Persistent-Rocher de la Selle	0.163	0.140	0.023	1.138	1.079	-0.160
Persistent-Choisy	0.575	0.005	0.570	-1.949	-0.583	-1.468
Persistent-Muraillette	0.277	0.000	0.277	-0.708	NA	-0.708
Persistent-Rateau	0.262	0.167	0.095	1.360	3.175	-1.794
Persistent-Lauvitel	0.163	0.004	0.159	-0.250	-0.270	-0.168
Under Ice-Plat de la Selle	0.448	0.094	0.354	0.204	-0.559	0.728
Under Ice-Barre des Ecrins	0.353	0.038	0.315	0.181	-1.337	1.283

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Table b.9.1 – continued from previous page

Summit Pair	PhyloSor	PhyloSor Turn	PhyloSor PD	SES PhyloSor	SES PhyloSor Turn	SES PhyloSor PD
Under Ice-La Meije	0.393	0.055	0.338	0.152	-1.202	1.201
Under Ice-Sirac	0.296	0.179	0.116	0.685	-0.644	1.539
Under Ice-Rouies	0.324	0.041	0.283	-0.296	-0.494	0.106
Under Ice-Olan	0.264	0.199	0.065	-1.723	0.224	-2.049
Under Ice-Pelvoux	0.503	0.186	0.317	-2.926	1.377	-3.730
Under Ice-Occidentale Ailefroide	0.373	0.000	0.373	-0.513	NA	-0.513
Under Ice-Brevoort	0.598	0.032	0.566	-1.518	-0.538	-0.728
Under Ice-Burlan	0.333	0.000	0.333	-0.518	NA	-0.518
Under Ice-Rocher de la Selle	0.224	0.115	0.108	-0.203	-0.459	0.317
Under Ice-Choisy	0.518	0.028	0.491	-1.167	-0.913	-0.203
Under Ice-Muraillette	0.309	0.151	0.158	0.464	-0.278	0.779
Under Ice-Rateau	0.079	0.062	0.017	-0.469	-0.656	0.294
Under Ice-Lauvitel	0.270	0.220	0.050	0.722	-0.305	1.711
Plat de la Selle-Barre des Ecrins	0.296	0.241	0.055	-0.967	-0.622	-0.235
Plat de la Selle-La Meije	0.329	0.302	0.027	-0.978	-0.618	-0.426
Plat de la Selle-Sirac	0.329	0.090	0.240	-1.396	-1.030	-0.199
Plat de la Selle-Rouies	0.266	0.177	0.089	-1.348	-1.673	0.827
Plat de la Selle-Olan	0.360	0.059	0.301	1.315	-1.363	2.653
Plat de la Selle-Pelvoux	0.553	0.553	0.000	0.869	2.700	-3.469
Plat de la Selle-Occidentale Ailefroide	0.358	0.344	0.014	-1.604	-1.233	-0.609
Plat de la Selle-Brevoort	0.463	0.283	0.180	-0.747	0.563	-1.477
Plat de la Selle-Burlan	0.391	0.348	0.043	-0.386	-0.709	0.797
Plat de la Selle-Rocher de la Selle	0.500	0.020	0.480	0.800	-0.139	0.845
Plat de la Selle-Choisy	0.370	0.266	0.104	-1.046	-0.085	-0.998
Plat de la Selle-Muraillette	0.353	0.169	0.184	-1.100	-1.044	0.273
Plat de la Selle-Rateau	0.440	0.103	0.336	0.126	-0.356	0.477
Plat de la Selle-Lauvitel	0.403	0.103	0.301	-0.723	-0.419	-0.217
Barre des Ecrins-La Meije	0.217	0.189	0.028	-2.974	-2.636	-0.163
Barre des Ecrins-Sirac	0.312	0.146	0.166	-1.367	-1.162	0.009
Barre des Ecrins-Rouies	0.187	0.157	0.030	-2.726	-2.840	0.423
Barre des Ecrins-Olan	0.314	0.081	0.233	1.028	-1.902	3.296
Barre des Ecrins-Pelvoux	0.497	0.458	0.039	0.345	3.157	-4.090
Barre des Ecrins-Occidentale Ailefroide	0.241	0.200	0.041	-1.741	-0.573	-1.291
Barre des Ecrins-Brevoort	0.328	0.014	0.314	-2.919	-1.452	-1.404
Barre des Ecrins-Burlan	0.208	0.203	0.005	-2.122	-0.833	-1.554
Barre des Ecrins-Rocher de la Selle	0.434	0.003	0.431	0.705	-1.446	1.470
Barre des Ecrins-Choisy	0.242	0.037	0.204	-2.867	-1.722	-1.040
Barre des Ecrins-Muraillette	0.253	0.120	0.132	-2.023	-2.065	0.624
Barre des Ecrins-Rateau	0.343	0.047	0.296	-0.148	-1.312	1.033
Barre des Ecrins-Lauvitel	0.296	0.038	0.259	-1.333	-1.627	0.260
La Meije-Sirac	0.370	0.184	0.185	-0.758	-0.527	-0.123
La Meije-Rouies	0.161	0.098	0.063	-2.684	-3.184	1.313
La Meije-Olan	0.413	0.179	0.234	1.010	-1.272	2.660
La Meije-Pelvoux	0.529	0.511	0.018	-0.351	1.840	-3.561
La Meije-Occidentale Ailefroide	0.274	0.262	0.013	-2.798	-1.622	-1.270
La Meije-Brevoort	0.307	0.029	0.278	-2.258	-0.347	-1.963
La Meije-Burlan	0.270	0.249	0.021	-1.734	-1.423	-0.367
La Meije-Rocher de la Selle	0.478	0.033	0.445	0.793	-0.657	1.230
La Meije-Choisy	0.234	0.066	0.167	-2.405	-1.147	-1.161
La Meije-Muraillette	0.272	0.108	0.164	-3.597	-3.516	1.063
La Meije-Rateau	0.376	0.053	0.324	-0.196	-1.312	1.017
La Meije-Lauvitel	0.347	0.066	0.280	-1.475	-1.740	0.373
Sirac-Rouies	0.329	0.201	0.127	-1.176	-0.070	-1.086
Sirac-Olan	0.247	0.197	0.050	-1.609	-1.425	0.147
Sirac-Pelvoux	0.548	0.387	0.161	0.070	4.946	-5.511
Sirac-Occidentale Ailefroide	0.366	0.162	0.204	-2.082	-0.712	-1.060
Sirac-Brevoort	0.548	0.126	0.422	-1.986	0.133	-1.537
Sirac-Burlan	0.326	0.156	0.169	-1.451	0.078	-1.431
Sirac-Rocher de la Selle	0.308	0.065	0.243	1.079	-0.995	1.980
Sirac-Choisy	0.484	0.152	0.331	-1.854	-0.423	-0.993
Sirac-Muraillette	0.304	0.271	0.033	-1.235	-0.648	-0.598
Sirac-Rateau	0.304	0.205	0.099	0.907	-0.131	1.165
Sirac-Lauvitel	0.237	0.172	0.065	-0.961	-0.971	0.239
Rouies-Olan	0.315	0.123	0.192	0.664	-1.202	2.121
Rouies-Pelvoux	0.548	0.494	0.054	0.628	2.651	-3.468
Rouies-Occidentale Ailefroide	0.246	0.174	0.072	-1.621	-1.090	-0.349
Rouies-Brevoort	0.364	0.022	0.342	-2.077	-1.295	-0.749
Rouies-Burlan	0.280	0.248	0.032	-0.272	0.152	-0.588
Rouies-Rocher de la Selle	0.416	0.021	0.394	-0.492	-1.408	0.606
Rouies-Choisy	0.269	0.030	0.239	-1.738	-1.428	-0.376
Rouies-Muraillette	0.235	0.136	0.100	-2.843	-2.031	-0.350
Rouies-Rateau	0.303	0.034	0.269	-1.241	-1.489	0.132
Rouies-Lauvitel	0.262	0.035	0.227	-2.229	-1.516	-0.869
Olan-Pelvoux	0.419	0.146	0.272	-1.666	1.020	-2.585
Olan-Occidentale Ailefroide	0.382	0.116	0.266	-0.387	-1.595	1.611
Olan-Brevoort	0.529	0.001	0.528	-0.232	-1.121	0.569

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Table b.9.1 – continued from previous page

Summit Pair	PhyloSor	PhyloSor Turn	PhyloSor PD	SES PhyloSor	SES PhyloSor Turn	SES PhyloSor PD
Olan-Burlan	0.375	0.156	0.219	0.046	-1.148	1.528
Olan-Rocher de la Selle	0.238	0.046	0.192	-2.844	-0.997	-1.857
Olan-Choisy	0.442	0.001	0.442	0.526	-1.110	1.123
Olan-Muraillette	0.307	0.224	0.083	-0.754	-2.497	3.763
Olan-Rateau	0.265	0.216	0.049	-1.664	0.393	-2.240
Olan-Lauvitel	0.229	0.216	0.013	-1.788	1.361	-3.378
Pelvoux-Occidentale Ailefroide	0.479	0.468	0.011	-0.922	0.804	-2.749
Pelvoux-Brevoort	0.498	0.328	0.169	0.326	-1.011	2.377
Pelvoux-Burlan	0.488	0.452	0.036	-0.169	1.820	-3.016
Pelvoux-Rocher de la Selle	0.560	0.139	0.421	-2.635	3.386	-4.978
Pelvoux-Choisy	0.474	0.386	0.088	0.259	-0.823	2.757
Pelvoux-Muraillette	0.595	0.481	0.114	-0.185	2.481	-3.805
Pelvoux-Rateau	0.501	0.202	0.299	-2.855	1.614	-3.921
Pelvoux-Lauvitel	0.578	0.366	0.212	-0.527	4.119	-5.287
Occidentale Ailefroide-Brevoort	0.388	0.160	0.228	-1.422	-0.778	-0.425
Occidentale Ailefroide-Burlan	0.299	0.266	0.033	-0.396	-0.236	-0.198
Occidentale Ailefroide-Rocher de la Selle	0.490	0.031	0.459	-0.561	-0.615	-0.079
Occidentale Ailefroide-Choisy	0.330	0.200	0.130	-2.015	-1.704	0.172
Occidentale Ailefroide-Muraillette	0.332	0.164	0.168	-0.675	0.367	-1.100
Occidentale Ailefroide-Rateau	0.417	0.093	0.323	-0.461	0.308	-0.700
Occidentale Ailefroide-Lauvitel	0.372	0.082	0.290	-1.750	-0.407	-1.229
Brevoort-Burlan	0.388	0.110	0.278	-1.573	-0.876	-0.389
Brevoort-Rocher de la Selle	0.660	0.000	0.660	-1.216	NA	-1.216
Brevoort-Choisy	0.113	0.000	0.113	-0.935	NA	-0.935
Brevoort-Muraillette	0.466	0.035	0.432	-2.636	-1.219	-0.743
Brevoort-Rateau	0.584	0.027	0.557	-1.779	-0.703	-0.766
Brevoort-Lauvitel	0.544	0.007	0.537	-2.523	-0.740	-1.703
Burlan-Rocher de la Selle	0.455	0.030	0.425	-0.314	-0.052	-0.260
Burlan-Choisy	0.309	0.130	0.179	-1.620	-1.410	0.098
Burlan-Muraillette	0.253	0.114	0.139	-1.664	-0.562	-0.989
Burlan-Rateau	0.388	0.104	0.284	-0.817	-0.254	-0.511
Burlan-Lauvitel	0.322	0.065	0.257	-1.848	-0.389	-1.391
Rocher de la Selle-Choisy	0.592	0.002	0.589	-0.781	-0.778	-0.257
Rocher de la Selle-Muraillette	0.337	0.050	0.286	0.547	-0.784	1.190
Rocher de la Selle-Rateau	0.246	0.123	0.123	-0.406	-0.926	0.664
Rocher de la Selle-Lauvitel	0.235	0.061	0.174	0.710	-1.293	2.087
Choisy-Muraillette	0.399	0.074	0.326	-2.688	-1.738	-0.229
Choisy-Rateau	0.507	0.031	0.476	-1.602	-1.152	-0.125
Choisy-Lauvitel	0.465	0.019	0.447	-1.980	-0.710	-1.275
Muraillette-Rateau	0.343	0.210	0.133	0.456	0.032	0.434
Muraillette-Lauvitel	0.202	0.089	0.112	-1.190	-0.690	-0.444
Rateau-Lauvitel	0.281	0.247	0.035	0.221	-0.303	1.019

B.10 PHYLOGENETIC β-DIVERSITY OUTPUT FOR UNIFRAC INDEX

TABLE B.10.1: Table of summarizing results of decomposed UniFrac indices for each summit pair: observed UniFrac distance (UniFrac), observed component of UniFrac distance describing species replacement (UniFrac Turn), observed component of UniFrac distance describing species nestedness (UniFrac PD), standardized effect size (SES) comparing observed UniFrac distance to expected from shuffling the phylogeny tips (SES UniFrac), SES component of UniFrac distance describing species replacement (SES UniFrac Turn), SES component of UniFrac distance describing species nestedness (SES UniFrac PD).

Summit Pair	UniFrac	UniFrac Turn	UniFrac PD	SES UniFrac	SES UniFrac Turn	SES UniFrac PD
Ecrins NP-Summits	0.662	0.000	0.662	4.794	NA	4.794
Ecrins NP-Persistent	0.741	0.000	0.741	6.128	NA	6.128
Ecrins NP-Under Ice	0.787	0.000	0.787	3.528	NA	3.528
Ecrins NP-Plat de la Selle	0.907	0.000	0.907	2.985	NA	2.985
Ecrins NP-Barre des Ecrins	0.892	0.000	0.892	3.234	NA	3.234
Ecrins NP-La Meije	0.899	0.000	0.899	3.138	NA	3.138
Ecrins NP-Sirac	0.840	0.000	0.840	4.364	NA	4.364
Ecrins NP-Rouies	0.884	0.000	0.884	2.576	NA	2.576
Ecrins NP-Olan	0.819	0.000	0.819	0.941	NA	0.941
Ecrins NP-Pelvoux	0.906	0.000	0.906	-2.288	NA	-2.288
Ecrins NP-Occidentale Ailefroide	0.903	0.000	0.903	1.979	NA	1.979
Ecrins NP-Brevoort	0.944	0.000	0.944	0.803	NA	0.803
Ecrins NP-Burlan	0.893	0.000	0.893	2.068	NA	2.068
Ecrins NP-Rocher de la Selle	0.727	0.000	0.727	3.782	NA	3.782
Ecrins NP-Choisy	0.930	0.000	0.930	1.478	NA	1.478
Ecrins NP-Muraillette	0.854	0.000	0.854	3.610	NA	3.610
Ecrins NP-Rateau	0.794	0.000	0.794	3.688	NA	3.688
Ecrins NP-Lauvitel	0.813	0.000	0.813	4.515	NA	4.515
Summits-Persistent	0.235	0.000	0.235	3.813	NA	3.813
Summits-Under Ice	0.370	0.000	0.370	0.309	NA	0.309
Summits-Plat de la Selle	0.724	0.000	0.724	0.829	NA	0.829
Summits-Barre des Ecrins	0.680	0.000	0.680	1.143	NA	1.143
Summits-La Meije	0.702	0.000	0.702	1.085	NA	1.085
Summits-Sirac	0.526	0.000	0.526	1.890	NA	1.890
Summits-Rouies	0.657	0.000	0.657	0.200	NA	0.200
Summits-Olan	0.464	0.000	0.464	-2.331	NA	-2.331
Summits-Pelvoux	0.723	0.000	0.723	-5.153	NA	-5.153
Summits-Occidentale Ailefroide	0.712	0.000	0.712	-0.312	NA	-0.312
Summits-Brevoort	0.835	0.000	0.835	-1.234	NA	-1.234
Summits-Burlan	0.685	0.000	0.685	-0.292	NA	-0.292
Summits-Rocher de la Selle	0.194	0.000	0.194	-0.024	NA	-0.024
Summits-Choisy	0.792	0.000	0.792	-0.579	NA	-0.579
Summits-Muraillette	0.567	0.000	0.567	1.056	NA	1.056
Summits-Rateau	0.392	0.000	0.392	0.657	NA	0.657
Summits-Lauvitel	0.446	0.000	0.446	1.928	NA	1.928
Persistent-Under Ice	0.406	0.298	0.108	1.111	2.991	-2.407
Persistent-Plat de la Selle	0.639	0.000	0.639	-0.535	NA	-0.535
Persistent-Barre des Ecrins	0.584	0.007	0.577	-0.347	-0.539	0.002
Persistent-La Meije	0.627	0.061	0.566	-0.206	0.193	-0.317
Persistent-Sirac	0.392	0.023	0.369	-0.319	-0.862	0.361
Persistent-Rouies	0.551	0.000	0.551	-1.376	NA	-1.376
Persistent-Olan	0.425	0.205	0.220	-1.443	5.519	-5.296
Persistent-Pelvoux	0.774	0.469	0.305	-0.863	6.596	-7.166
Persistent-Occidentale Ailefroide	0.637	0.054	0.584	-1.382	1.340	-2.092
Persistent-Brevoort	0.786	0.014	0.772	-2.613	-0.630	-0.443
Persistent-Burlan	0.592	0.014	0.578	-2.086	-0.822	-0.809
Persistent-Rocher de la Selle	0.281	0.246	0.034	1.139	1.083	-0.223
Persistent-Choisy	0.731	0.011	0.720	-1.994	-0.601	-0.635
Persistent-Muraillette	0.434	0.000	0.434	-0.698	NA	-0.698
Persistent-Rateau	0.416	0.286	0.129	1.347	3.034	-2.117
Persistent-Lauvitel	0.280	0.007	0.273	-0.234	-0.270	-0.123
Under Ice-Plat de la Selle	0.619	0.172	0.447	0.225	-0.546	0.736
Under Ice-Barre des Ecrins	0.522	0.074	0.448	0.205	-1.383	1.567

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Table b.10.1 – continued from previous page

Summit Pair	UniFrac	UniFrac Turn	UniFrac PD	SES UniFrac	SES UniFrac Turn	SES UniFrac PD
Under Ice-La Meije	0.564	0.105	0.460	0.175	-1.238	1.423
Under Ice-Sirac	0.456	0.304	0.152	0.699	-0.632	1.490
Under Ice-Rouies	0.489	0.079	0.410	-0.275	-0.489	0.270
Under Ice-Olan	0.418	0.332	0.085	-1.770	0.255	-1.865
Under Ice-Pelvoux	0.670	0.314	0.356	-3.083	1.377	-2.747
Under Ice-Occidentale Ailefroide	0.543	0.000	0.543	-0.497	NA	-0.497
Under Ice-Brevoort	0.748	0.062	0.686	-1.537	-0.539	-0.049
Under Ice-Burlan	0.500	0.000	0.500	-0.501	NA	-0.501
Under Ice-Rocher de la Selle	0.366	0.207	0.159	-0.185	-0.444	0.364
Under Ice-Choisy	0.683	0.054	0.629	-1.172	-0.946	0.401
Under Ice-Muraillette	0.472	0.262	0.209	0.481	-0.253	0.714
Under Ice-Rateau	0.147	0.117	0.030	-0.460	-0.650	0.320
Under Ice-Lauvitel	0.426	0.361	0.065	0.731	-0.284	1.645
Plat de la Selle-Barre des Ecrins	0.457	0.388	0.069	-0.966	-0.601	-0.161
Plat de la Selle-La Meije	0.495	0.464	0.031	-0.977	-0.595	-0.377
Plat de la Selle-Sirac	0.496	0.164	0.331	-1.422	-1.052	0.237
Plat de la Selle-Rouies	0.420	0.300	0.120	-1.369	-1.749	1.070
Plat de la Selle-Olan	0.530	0.112	0.418	1.294	-1.425	2.611
Plat de la Selle-Pelvoux	0.713	0.712	0.000	0.873	2.422	-3.050
Plat de la Selle-Occidentale Ailefroide	0.528	0.512	0.015	-1.650	-1.247	-0.538
Plat de la Selle-Brevoort	0.633	0.441	0.192	-0.730	0.604	-1.266
Plat de la Selle-Burlan	0.562	0.516	0.046	-0.358	-0.690	0.834
Plat de la Selle-Rocher de la Selle	0.667	0.039	0.628	0.806	-0.128	0.718
Plat de la Selle-Choisy	0.541	0.421	0.120	-1.048	-0.039	-0.853
Plat de la Selle-Muraillette	0.522	0.289	0.232	-1.100	-1.064	0.552
Plat de la Selle-Rateau	0.611	0.187	0.424	0.149	-0.333	0.469
Plat de la Selle-Lauvitel	0.575	0.186	0.389	-0.711	-0.401	0.011
Barre des Ecrins-La Meije	0.356	0.318	0.039	-3.225	-2.845	0.050
Barre des Ecrins-Sirac	0.475	0.254	0.221	-1.388	-1.193	0.335
Barre des Ecrins-Rouies	0.316	0.272	0.044	-2.922	-3.067	0.725
Barre des Ecrins-Olan	0.478	0.150	0.327	1.026	-2.032	3.393
Barre des Ecrins-Pelvoux	0.664	0.628	0.036	0.370	2.794	-3.566
Barre des Ecrins-Occidentale Ailefroide	0.389	0.333	0.055	-1.809	-0.549	-1.147
Barre des Ecrins-Brevoort	0.494	0.028	0.466	-3.163	-1.564	-0.281
Barre des Ecrins-Burlan	0.345	0.338	0.007	-2.239	-0.824	-1.502
Barre des Ecrins-Rocher de la Selle	0.605	0.005	0.600	0.714	-1.501	1.784
Barre des Ecrins-Choisy	0.390	0.072	0.317	-3.107	-1.852	-0.204
Barre des Ecrins-Muraillette	0.403	0.214	0.189	-2.102	-2.216	1.083
Barre des Ecrins-Rateau	0.511	0.090	0.421	-0.124	-1.371	1.349
Barre des Ecrins-Lauvitel	0.457	0.073	0.384	-1.356	-1.723	0.856
La Meije-Sirac	0.540	0.311	0.229	-0.748	-0.505	0.049
La Meije-Rouies	0.278	0.178	0.100	-2.888	-3.540	1.838
La Meije-Olan	0.585	0.304	0.281	1.007	-1.313	2.570
La Meije-Pelvoux	0.692	0.676	0.016	-0.321	1.735	-3.074
La Meije-Occidentale Ailefroide	0.430	0.415	0.016	-3.016	-1.683	-1.167
La Meije-Brevoort	0.470	0.057	0.414	-2.402	-0.335	-1.492
La Meije-Burlan	0.425	0.398	0.027	-1.806	-1.462	-0.270
La Meije-Rocher de la Selle	0.647	0.064	0.583	0.799	-0.660	1.198
La Meije-Choisy	0.379	0.124	0.254	-2.580	-1.193	-0.617
La Meije-Muraillette	0.428	0.194	0.233	-3.937	-4.044	2.140
La Meije-Rateau	0.547	0.100	0.447	-0.173	-1.366	1.326
La Meije-Lauvitel	0.515	0.125	0.391	-1.506	-1.838	1.038
Sirac-Rouies	0.495	0.335	0.160	-1.185	-0.035	-0.903
Sirac-Olan	0.396	0.330	0.066	-1.651	-1.462	0.294
Sirac-Pelvoux	0.708	0.558	0.150	0.092	4.198	-4.791
Sirac-Occidentale Ailefroide	0.536	0.279	0.257	-2.167	-0.706	-0.566
Sirac-Brevoort	0.708	0.224	0.484	-2.050	0.186	-0.931
Sirac-Burlan	0.491	0.270	0.221	-1.481	0.115	-1.176
Sirac-Rocher de la Selle	0.471	0.122	0.349	1.076	-1.011	1.942
Sirac-Choisy	0.652	0.264	0.387	-1.912	-0.396	-0.436
Sirac-Muraillette	0.466	0.427	0.040	-1.244	-0.631	-0.533
Sirac-Rateau	0.466	0.341	0.125	0.914	-0.104	1.047
Sirac-Lauvitel	0.383	0.294	0.090	-0.963	-0.975	0.348
Rouies-Olan	0.479	0.218	0.261	0.679	-1.232	2.136
Rouies-Pelvoux	0.708	0.661	0.047	0.645	2.393	-3.023
Rouies-Occidentale Ailefroide	0.395	0.296	0.099	-1.671	-1.110	-0.151
Rouies-Brevoort	0.534	0.043	0.491	-2.183	-1.369	0.137
Rouies-Burlan	0.438	0.398	0.040	-0.246	0.186	-0.588
Rouies-Rocher de la Selle	0.587	0.042	0.545	-0.476	-1.467	1.124
Rouies-Choisy	0.424	0.059	0.365	-1.814	-1.509	0.254
Rouies-Muraillette	0.381	0.239	0.142	-3.037	-2.151	0.119
Rouies-Rateau	0.465	0.066	0.399	-1.254	-1.557	0.691
Rouies-Lauvitel	0.415	0.068	0.347	-2.328	-1.582	-0.171
Olan-Pelvoux	0.591	0.255	0.335	-1.713	1.057	-2.176
Olan-Occidentale Ailefroide	0.553	0.208	0.345	-0.363	-1.690	1.879
Olan-Brevoort	0.692	0.002	0.690	-0.209	-1.177	1.017

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Table b.10.1 – continued from previous page

Summit Pair	UniFrac	UniFrac Turn	UniFrac PD	SES UniFrac	SES UniFrac Turn	SES UniFrac PD
Olan-Burlan	0.545	0.270	0.276	0.073	-1.177	1.613
Olan-Rocher de la Selle	0.384	0.087	0.297	-3.003	-1.018	-1.285
Olan-Choisy	0.613	0.001	0.612	0.546	-1.153	1.384
Olan-Muraillette	0.470	0.366	0.103	-0.741	-2.633	4.141
Olan-Rateau	0.419	0.356	0.064	-1.709	0.423	-2.079
Olan-Lauvitel	0.373	0.355	0.017	-1.838	1.353	-3.276
Pelvoux-Occidentale Ailefroide	0.648	0.638	0.010	-0.910	0.820	-2.465
Pelvoux-Brevoort	0.665	0.494	0.170	0.359	-0.999	2.300
Pelvoux-Burlan	0.656	0.623	0.033	-0.138	1.732	-2.726
Pelvoux-Rocher de la Selle	0.718	0.243	0.474	-2.731	3.290	-4.499
Pelvoux-Choisy	0.643	0.557	0.086	0.292	-0.806	2.789
Pelvoux-Muraillette	0.746	0.649	0.097	-0.159	2.269	-3.136
Pelvoux-Rateau	0.667	0.336	0.331	-3.000	1.596	-2.965
Pelvoux-Lauvitel	0.733	0.536	0.196	-0.511	3.613	-4.397
Occidentale Ailefroide-Brevoort	0.559	0.276	0.283	-1.444	-0.766	-0.024
Occidentale Ailefroide-Burlan	0.460	0.420	0.040	-0.369	-0.200	-0.185
Occidentale Ailefroide-Rocher de la Selle	0.657	0.060	0.598	-0.546	-0.616	0.260
Occidentale Ailefroide-Choisy	0.497	0.334	0.163	-2.112	-1.807	0.613
Occidentale Ailefroide-Muraillette	0.499	0.282	0.216	-0.659	0.406	-1.017
Occidentale Ailefroide-Rateau	0.588	0.170	0.418	-0.441	0.344	-0.651
Occidentale Ailefroide-Lauvitel	0.542	0.152	0.390	-1.796	-0.391	-0.736
Brevoort-Burlan	0.559	0.198	0.361	-1.617	-0.889	0.106
Brevoort-Rocher de la Selle	0.795	0.000	0.795	-1.220	NA	-1.220
Brevoort-Choisy	0.204	0.000	0.204	-0.946	NA	-0.946
Brevoort-Muraillette	0.636	0.067	0.569	-2.784	-1.297	0.283
Brevoort-Rateau	0.737	0.052	0.685	-1.816	-0.720	0.035
Brevoort-Lauvitel	0.704	0.014	0.691	-2.629	-0.772	-0.552
Burlan-Rocher de la Selle	0.625	0.059	0.566	-0.296	-0.033	-0.170
Burlan-Choisy	0.473	0.230	0.242	-1.677	-1.478	0.566
Burlan-Muraillette	0.404	0.204	0.199	-1.715	-0.547	-0.697
Burlan-Rateau	0.559	0.189	0.370	-0.810	-0.229	-0.285
Burlan-Lauvitel	0.487	0.122	0.365	-1.914	-0.374	-0.936
Rocher de la Selle-Choisy	0.743	0.005	0.739	-0.772	-0.807	0.271
Rocher de la Selle-Muraillette	0.504	0.096	0.408	0.561	-0.790	1.235
Rocher de la Selle-Rateau	0.395	0.219	0.176	-0.389	-0.931	0.777
Rocher de la Selle-Lauvitel	0.381	0.115	0.266	0.723	-1.329	2.160
Choisy-Muraillette	0.571	0.137	0.434	-2.857	-1.875	0.729
Choisy-Rateau	0.673	0.061	0.612	-1.635	-1.226	0.612
Choisy-Lauvitel	0.635	0.037	0.598	-2.049	-0.735	-0.435
Muraillette-Rateau	0.511	0.348	0.163	0.474	0.062	0.347
Muraillette-Lauvitel	0.336	0.164	0.171	-1.200	-0.686	-0.266
Rateau-Lauvitel	0.439	0.396	0.043	0.242	-0.282	1.004

B.11 PHYLOGENETIC β-DIVERSITY SUMMARY FOR PHYLOSOR AND UNIFRAC INDICIES

TABLE B.11.1: Number of significantly (sig) high or low turnover for pairwise comparisons of phylogenetic β-diversity measured by PhyloSor and UniFrac distances decomposed into true turnover (turnover) and phylogenetic diversity (PD) components

Clade	Total pairwise	Metric	Sig high	Sig low	Turnover sig high	Turnover sig low	PD sig high	PD sig low
Spermatophyta	105	PhyloSor	0	24	7	8	8	16
		UniFrac	0	24	7	8	10	14
Asterales	66	PhyloSor	3	0	2	1	5	0
		UniFrac	1	1	2	6	7	0
Caryophyllales	66	PhyloSor	1	1	0	0	1	1
		UniFrac	0	2	0	0	0	2
Lamiales	66	PhyloSor	0	17	0	11	0	1
		UniFrac	0	17	0	12	3	1
Poales	66	PhyloSor	0	6	1	2	0	3
		UniFrac	0	8	1	2	0	3
Rosales	55	PhyloSor	1	13	2	1	5	10
		UniFrac	1	15	0	1	5	9

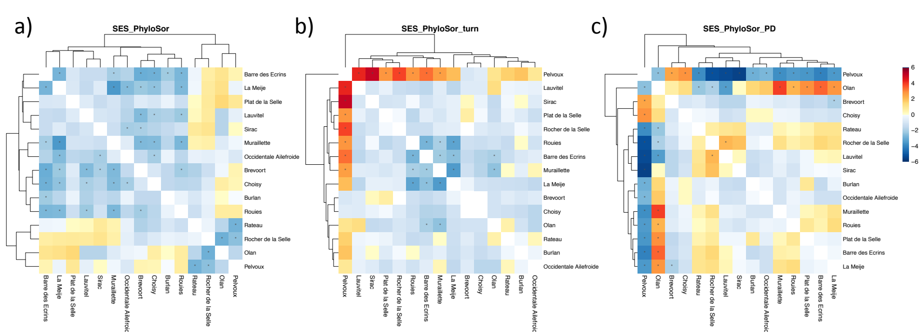

FIGURE B.11.1: Standardized effect sizes (SES) for phylogenetic β-diversity. PhyloSor distances decomposed into turnover (turn) and phylogenetic diversity (PD) components. Warm tones indicate values > 1; cool tones < 1. Dots highlight cells with statistically significant higher (SES > 1.96) or lower (SES < -1.96) than expected values than expected compared to randomized communities from shuffling the tips of the phylogeny.

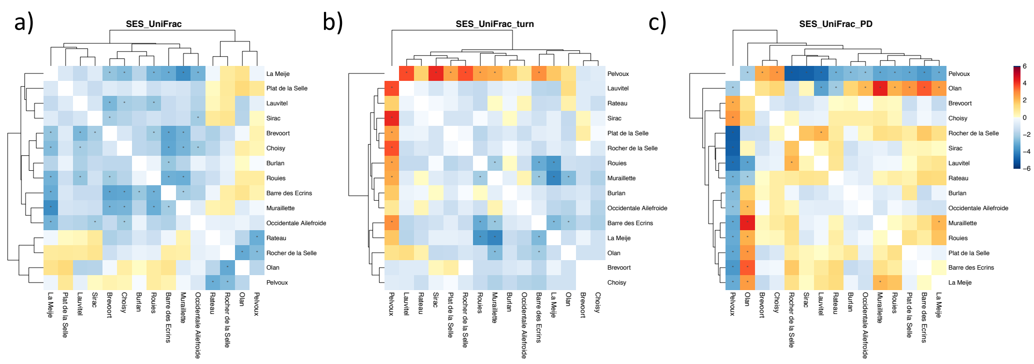

FIGURE B.11.2: Standardized effect sizes (SES) for phylogenetic β-diversity. UniFrac distances decomposed into turnover (turn) and phylogenetic diversity (PD) components. Warm tones indicate values > 1; cool tones < 1. Dots highlight cells with statistically significant higher (SES > 1.96) or lower (SES < -1.96) than expected values than expected compared to randomized communities from shuffling the tips of the phylogeny.

Asterales

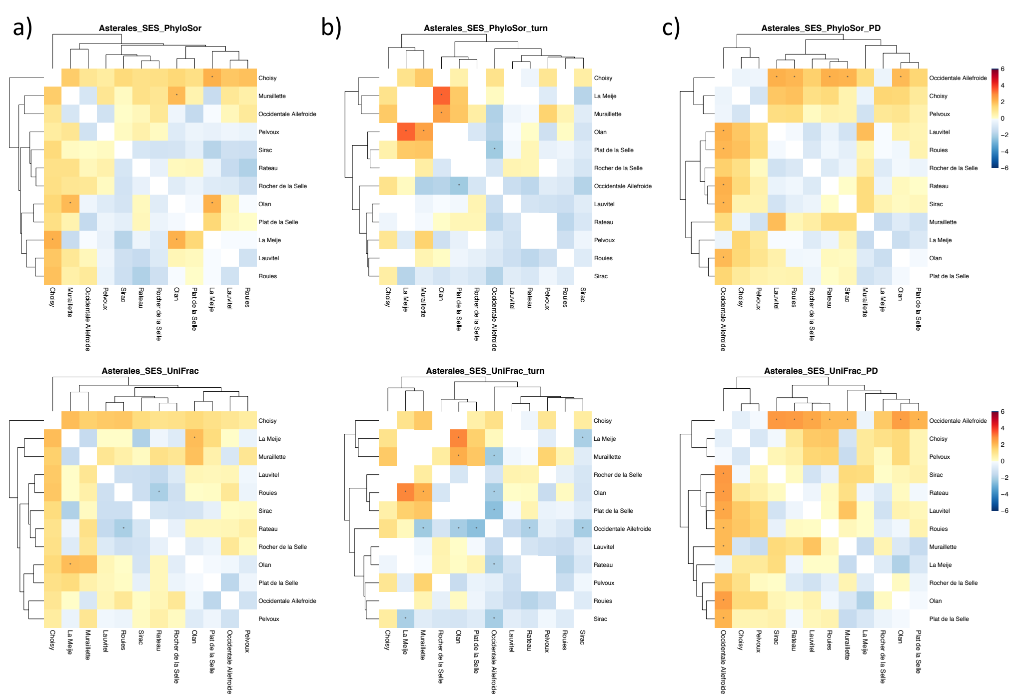

FIGURE B.11.3: Standardized effect sizes (SES) for phylogenetic β-diversity within the Asterales clade. a) PhyloSor (top panel) and UniFrac (bottom panel) distances decomposed into b) turnover (turn) and c) phylogenetic diversity (PD) components. Warm tones indicate values > 1; cool tones < 1. Dots highlight cells with statistically significant higher (SES > 1.96) or lower (SES < -1.96) than expected values than expected compared to randomized communities from shuffling the tips of the Summit phylogeny.

Poales

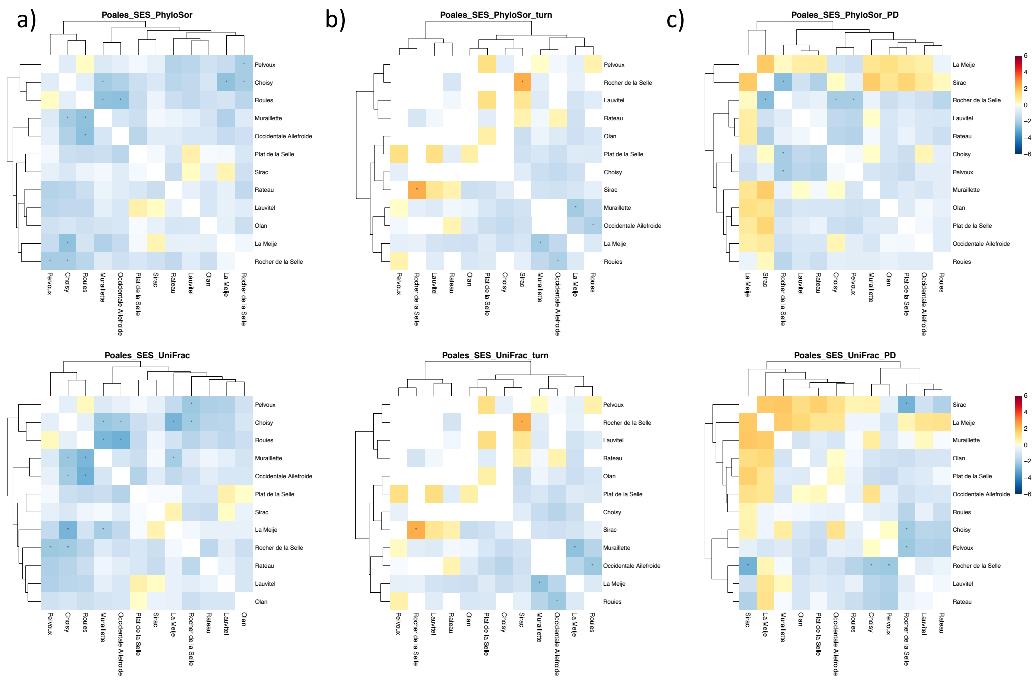

FIGURE B.11.4: Standardized effect sizes (SES) for phylogenetic β-diversity within the Poales clade. a) PhyloSor (top panel) and UniFrac (bottom panel) distances decomposed into b) turnover (turn) and c) phylogenetic diversity (PD) components. Warm tones indicate values > 1; cool tones < 1. Dots highlight cells with statistically significant higher (SES > 1.96) or lower (SES < -1.96) than expected values than expected compared to randomized communities from shuffling the tips of the Summit phylogeny.

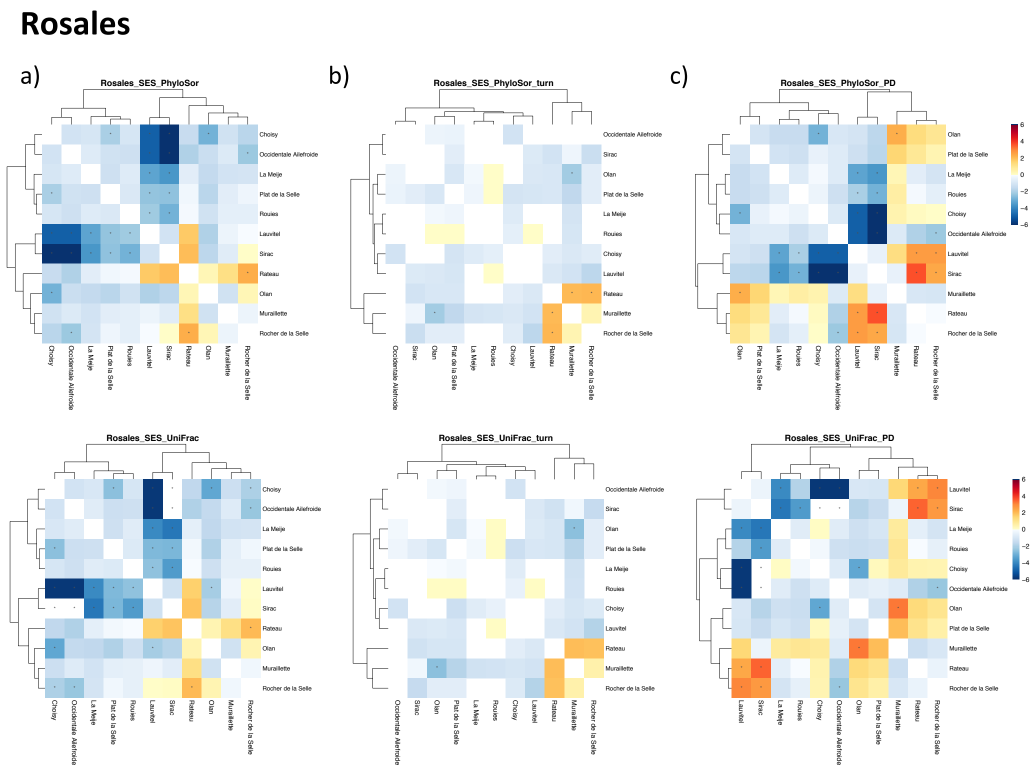

FIGURE B.11.5: Standardized effect sizes (SES) for phylogenetic β-diversity within the Rosales clade. a) PhyloSor (top panel) and UniFrac (bottom panel) distances decomposed into b) turnover (turn) and c) phylogenetic diversity (PD) components. Warm tones indicate values > 1; cool tones < 1. Dots highlight cells with statistically significant higher (SES > 1.96) or lower (SES < -1.96) than expected values than expected compared to randomized communities from shuffling the tips of the Summit phylogeny.

Lamiales

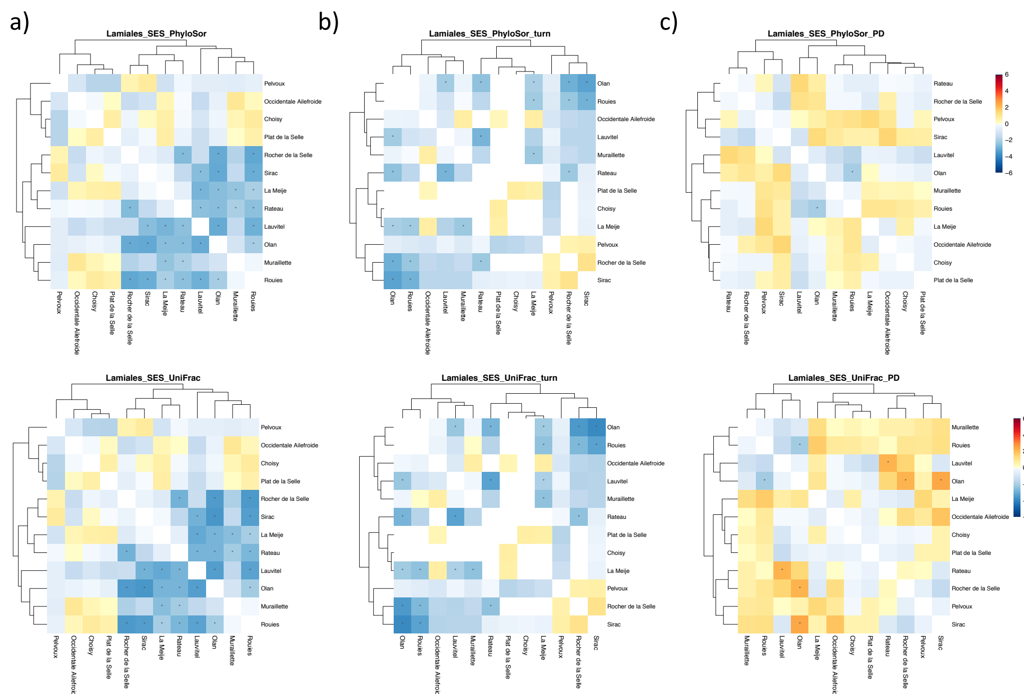

FIGURE B.11.6: Standardized effect sizes (SES) for phylogenetic β-diversity within the Lamiales clade. a) PhyloSor (top panel) and UniFrac (bottom panel) distances decomposed into b) turnover (turn) and c) phylogenetic diversity (PD) components. Warm tones indicate values > 1; cool tones < 1. Dots highlight cells with statistically significant higher (SES > 1.96) or lower (SES < -1.96) than expected values than expected compared to randomized communities from shuffling the tips of the Summit phylogeny.

Caryophyllales

FIGURE B.11.7: Standardized effect sizes (SES) for phylogenetic β-diversity within the Caryophyllales clade. a) PhyloSor (top panel) and UniFrac (bottom panel) distances decomposed into b) turnover (turn) and c) phylogenetic diversity (PD) components. Warm tones indicate values > 1; cool tones < 1. Dots highlight cells with statistically significant higher (SES > 1.96) or lower (SES < -1.96) than expected values than expected compared to randomized communities from shuffling the tips of the Summit phylogeny.

B.12 ENVIRONMENTAL DATA AND SUMMARIES

TABLE B.12.1: Environmental factors for each summit: ntaxa (number of taxa), elevation, min S. elevation (minimum elevation of south facing slope), max S. elevation (maximum elevation of south facing slope), range S. elevation (range in elevation of south facing slope), mean S. elevation (mean elevation of south facing slope), SD S. elevation (standard deviation of elevation of south facing slope), median S. elevation (median elevation of south facing slope), area (total summit area), S. area (area of south facing slope), min slope (minimum slope), max slope (maximum slope), range slope (range of slope), mean slope, SD slope (standard deviation of slope), geologic composition (Calcaires, Calcite, Dolerites, Gneiss, Granites, Micaschistes, Migmatites, other), Simpson's D of geologic diversity, sum geol type (number of different geologic types)

Summit	ntax	X WGS84	Y WGS84	elevation	min S. elevation	max S. elevation	range S. elevation	mean S. elevation	SD S. elevation	median S. elevation	area	S. area	min slope	max slope	range slope	mean slope	SD slope	Calcaires	Calcite	Dolerites	Gneiss	Granites	Micaschistes	Migmatites	other	Simpson's D	sum geol type
Pointe Brevoort	17	6.3286	44.9675	3765	3377	3693	316	3518.99	79.345	3513	88125	152199.702	33.384	65.618	32.234	52.947	6.856	0.000	0.000	0.000	0.000	0.871	0.000	0.000	0.129	0.225	2
Mont Pelvoux	18	6.3999	44.8988	3946	2976	3778	802	3395.37	203.757	3407	460625	684904.795	31.986	64.723	32.736	47.197	4.456	0.006	0.028	0.000	0.208	0.000	0.000	0.697	0.061	0.466	5
Tour Choisy	21	6.3262	44.9639	3671	3240	3666	426	3432.93	105.122	3420	98125	160734.393	36.092	64.088	27.996	50.372	6.858	0.000	0.000	0.000	0.379	0.490	0.000	0.000	0.130	0.599	3
Pointes de Burlan	46	6.2338	44.9685	3207	3074	3270	196	3163.41	51.917	3162	53125	90758.462	36.673	63.323	26.650	51.678	6.676	0.000	0.000	0.000	0.459	0.526	0.000	0.000	0.015	0.512	3
Aiguille du plat de la Selle	46	6.2225	44.9644	3597	2690	3561	871	3068.72	183.279	3048	516250	922178.936	4.520	72.428	67.908	53.661	7.448	0.000	0.000	0.002	0.439	0.388	0.000	0.000	0.170	0.628	4
Occidentale l'Ailefroide	49	6.3561	44.8848	3954	2823	3895	1072	3423.08	257.013	3424	425000	664274.268	24.970	69.814	44.844	48.809	6.087	0.000	0.000	0.000	0.694	0.118	0.000	0.003	0.185	0.470	4
la Meije	52	6.3123	45.0075	3983	2959	3925	966	3454.32	208.908	3434	886250	785173.396	26.466	72.688	46.222	53.146	8.348	0.000	0.000	0.000	0.019	0.431	0.000	0.095	0.455	0.598	4
Barre des Ecrins	60	6.3599	44.9224	4102	2682	4064	1382	3368.14	367.724	3389	648125	1366343.302	32.312	78.743	46.431	57.763	9.639	0.000	0.000	0.004	0.119	0.000	0.000	0.804	0.072	0.334	4
les Rouies	62	6.2578	44.8642	3589	2734	3547	813	3159.03	194.384	3153	406250	246293.483	24.488	77.172	52.684	53.591	8.370	0.000	0.000	0.000	0.286	0.000	0.000	0.354	0.361	0.663	3
Tête de la Muraillette	86	6.0799	44.9466	3019	2286	2977	691	2727.60	134.378	2744	308125	252021.545	23.095	65.434	42.339	49.898	7.033	0.000	0.000	0.000	0.936	0.000	0.000	0.000	0.064	0.120	2
l'Olan	94	6.1968	44.8592	3564	2835	3522	687	3183.86	151.981	3185	406250	709031.034	25.008	71.618	46.610	52.611	7.316	0.000	0.000	0.000	0.762	0.000	0.000	0.000	0.238	0.363	2
le Sirac	113	6.3068	44.7890	3440	2412	3418	1006	2980.57	207.404	2988	933125	518522.747	13.456	68.199	54.743	51.300	6.755	0.000	0.000	0.000	0.010	0.000	0.000	0.795	0.195	0.331	3
Signal du Lauvitel	144	6.0599	44.9377	2904	2385	2910	525	2662.23	127.851	2663	246667	388952.003	35.433	62.411	26.978	48.618	5.718	0.000	0.000	0.005	0.396	0.372	0.027	0.000	0.200	0.664	5
le Rateau	145	6.2790	44.9969	3809	3117	3722	605	3459.74	126.976	3465	455000	193768.395	27.726	68.647	40.921	52.132	6.837	0.000	0.000	0.000	0.000	0.826	0.000	0.000	0.174	0.287	2
Rocher de la Selle	217	6.0413	44.9482	2791	2115	2785	670	2465.88	168.684	2466	155625	243683.441	37.893	63.041	25.148	49.183	6.022	0.000	0.000	0.000	0.905	0.052	0.000	0.000	0.042	0.176	3

Table b.12.2: Values for 19 BioClim variables on each summit (see Table b.12.3 for definitions).

Summit	present bio 1	present bio 2	present bio 3	present bio 4	present bio 5	present bio 6	present bio 7	present bio 8	present bio 9	present bio 10	present bio 11	present bio 12	present bio 13	present bio 14	present bio 15	present bio 16	present bio 17	present bio 18	present bio 19
Pointe Brevoort	-3.64	109.95	38.00	6192.75	157.75	-125.25	283.00	-58.67	79.75	79.75	-64.64	14068.23	1392.71	826.48	16.00	4178.13	2842.46	2842.46	3971.65
Mont Pelvoux	-14.76	110.00	39.00	6052.45	144.30	-137.70	281.99	-65.93	67.23	67.30	-73.77	15264.78	1528.63	878.33	17.10	4585.89	3006.05	3016.05	4344.90
Tour Choisy	-2.43	110.00	38.26	6193.95	159.57	-123.17	282.74	-57.48	81.57	81.57	-63.22	13974.20	1384.21	819.55	16.00	4152.62	2823.89	2823.89	3945.36
Pointes de Burlan	5.53	104.80	37.80	6189.36	163.74	-111.26	275.00	-50.47	88.74	88.74	-55.26	12832.81	1225.92	816.71	13.00	3677.76	2742.63	2742.63	3526.51
Aiguille du plat de la Selle	-2.64	104.00	37.00	6133.14	155.04	-120.29	275.33	-57.03	80.36	80.36	-62.68	13423.93	1281.37	846.11	13.00	3844.10	2866.37	2866.37	3687.54
Occidentale l'Ailefroide	-8.93	110.05	39.00	6114.02	151.03	-131.03	282.05	-62.04	74.12	74.12	-68.98	14892.72	1487.88	848.94	17.85	4463.63	2916.72	2916.72	4223.63
la Meije	-5.43	108.50	38.25	6136.83	155.44	-124.93	280.38	-59.30	77.57	77.57	-65.18	13899.21	1363.88	838.83	15.00	4091.65	2875.23	2875.23	3897.86
Barre des Ecrins	-14.94	106.00	38.00	6019.59	141.06	-135.09	276.15	-65.97	66.91	66.91	-73.94	14868.41	1479.73	850.00	17.00	4439.20	2939.39	2939.39	4209.20
les Rouies	3.32	110.34	39.00	6213.05	164.46	-117.54	282.00	-52.81	87.46	87.46	-57.81	14242.16	1379.40	848.70	15.00	4138.20	2893.23	2893.23	3934.77
Tête de la Muraillette	21.39	97.80	36.00	6465.19	179.48	-87.99	267.47	-40.61	108.19	108.19	-41.99	13400.08	1247.06	869.07	12.00	3741.19	2883.74	2883.74	3647.94
l'Olan	9.75	105.62	38.00	6229.49	167.93	-107.25	275.18	-47.25	93.93	93.93	-51.25	14079.30	1314.34	914.34	12.62	3943.01	3010.66	3010.66	3786.84
le Sirac	11.03	107.11	38.00	6265.12	172.03	-107.43	279.46	-46.54	96.03	96.03	-50.54	14665.42	1426.58	838.86	17.00	4279.73	2885.43	2885.43	4031.71
Signal du Lauvitel	26.32	99.22	36.67	6537.80	185.25	-84.02	269.27	-37.61	113.32	113.32	-38.41	13350.00	1244.88	859.66	12.00	3734.63	2862.53	2862.53	3691.38
le Rateau	-4.15	108.13	38.00	6144.41	155.44	-124.24	279.68	-58.69	78.53	78.53	-64.35	13615.14	1324.96	832.05	14.80	3974.88	2844.71	2844.71	3794.83
Rocher de la Selle	29.88	100.53	37.00	6601.01	190.00	-80.12	270.12	-35.12	117.88	117.88	-35.27	13272.85	1242.35	850.34	12.00	3727.05	2835.62	2835.62	3714.90

Table b.12.3: Results from PCA of categorized geographic and climatic (BioClim) variables. Bold text indicate BioClim variables with PCA loadings >90%.

BioClim Code	BioClim Code	Description	PCA Loading
Available energy (favorableness)	BIO1	Annual Mean Temperature	-0.011
	BIO5	Max Temperature of Warmest Month	-0.011
	BIO8	Mean Temperature of Wettest Quarter	-0.008
	BIO10	Mean Temperature of Warmest Quarter	-0.013
	BIO12	**Annual Precipitation**	**0.877**
	BIO13	Precipitation of Wettest Month	0.12
	BIO16	Precipitation of Wettest Quarter	0.359
	BIO18	Precipitation of Warmest Quarter	0.062
	BIO19	Precipitation of Coldest Quarter	0.29
Stress (harshness)	BIO6	Min Temperature of Coldest Month	0.085
	BIO7	Temperature Annual Range	-0.011
	BIO9	Mean Temperature of Driest Quarter	0.075
	BIO11	Mean Temperature of Coldest Quarter	0.057
	BIO14	Precipitation of Driest Month	-0.285
	BIO17	**Precipitation of Driest Quarter**	**0.95**
Stability (variability)	BIO2	Mean Diurnal Range	-0.019
	BIO3	Isothermality	-0.004
	BIO4	**Temperature Seasonality**	**1**
	BIO15	Precipitation Seasonality	-0.009

Table B.12.4: Results of correlation between environmental factors and phylogenetic β-diversity patterns sampling from the 'Regional' Écrins NP source pool for the random draw (RD) null model. Statistics for SES_{mntd} and SES_{mpd} from multiple regression on $SES_{PhyloSor}$ distance matrices (MRM) for β-diversity patterns. Bold text indicates significant P-values. Clades are indicated above columns. Note that none of the P-values are < 0.05.

Hypothesis of β-diversity patterns ($SES_{PhyloSor}$)	Spermatophyta		Asterales		Caryophyllales		Lamiales		Poales		Rosales	
	r^2	P	r^2	P	r^2	P	r^2	P	r^2	P	r^2	P
Geographic (spatial)												
Distance	$7.86 \cdot 10^{-7}$	0.993	0.0225	0.271	0.00119	0.781	0.0128	0.393	0.00634	0.521	0.00971	0.481
Climatic												
Available energy (favorableness)	$6.80 \cdot 10^{-5}$	0.943	0.0469	0.189	0.0134	0.383	0.0193	0.395	0.0191	0.36	0.0118	0.546
Stress (harshness)	0.0392	0.128	0.0394	0.271	0.0409	0.128	0.0124	0.528	0.00129	0.845	0.0018	0.856
Stability (variability)	0.000375	0.879	0.0122	0.51	0.0366	0.159	0.0613	0.148	0.00992	0.492	0.00118	0.837

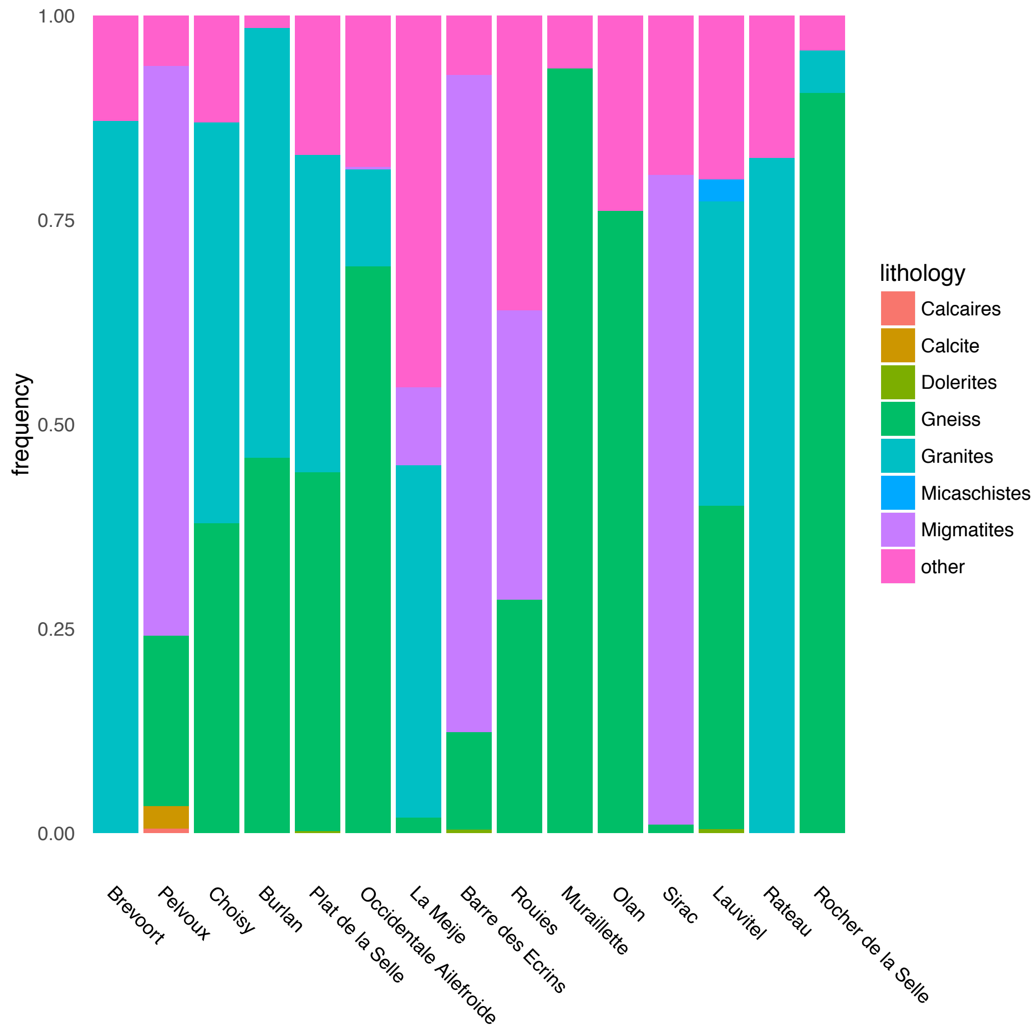

FIGURE B.12.1: Diversity of lithology within each summit.

B.13 SUMMARY OF α-DIVERSITY WITH AND WITHOUT ENDEMICS.

TABLE B.13.1: Results from a t-test comparing means of SES_{metric} with and without endemic species for each species pool and clade. Significant P-values (< 0.05) are highlighted in bold.

Pool	Clade	Metric	mean difference	t-values	df	P-values	CI Low	CI High
Regional	Spermatophyta	mntd	-1.428808878	-7.720223903	14	**$2.07 \cdot 10^{-6}$**	-1.825752062	-1.031865693
Regional	Spermatophyta	mpd	-0.071772327	-1.772318857	14	0.098093207	-0.158628217	0.015083563
All Summits	Spermatophyta	mntd	-0.030955944	-0.29695062	14	0.770864368	-0.254541593	0.192629704
All Summits	Spermatophyta	mpd	0.0821651	2.505754281	14	0.025185058	0.011836331	0.152493868
LGM	Spermatophyta	mntd	-0.151119547	-1.173793132	14	0.260060212	-0.427249288	0.125010193
LGM	Spermatophyta	mpd	0.068507402	1.511309984	14	0.152949171	-0.028715382	0.165730185
Regional NP	Clades	mntd	0.038516887	0.732164632	67	0.466621593	-0.066486858	0.143520632
Regional NP	Clades	mpd	0.146535334	1.723544211	67	0.089402295	-0.023164839	0.316235508
All Summits	Clades	mntd	0.013678729	0.238206876	67	0.812447666	-0.100939531	0.12829699
All Summits	Clades	mpd	0.024287765	0.322188718	67	0.748312899	-0.12617865	0.17475418
LGM	Clades	mntd	-0.056601902	-0.907163491	66	0.367620658	-0.181176297	0.067972493
LGM	Clades	mpd	-0.015497619	-0.193986211	66	0.846782502	-0.175003772	0.144008534

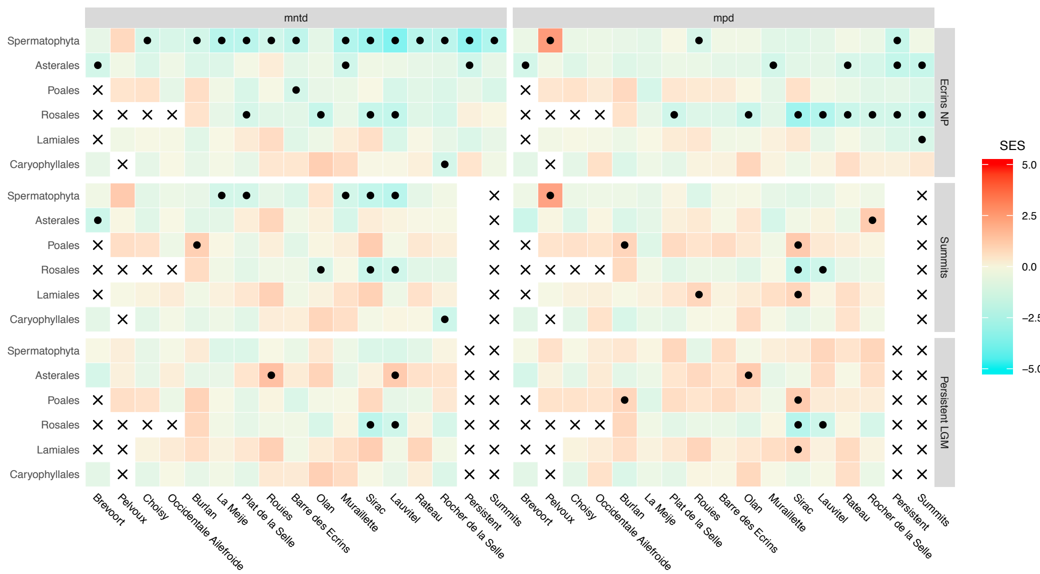

FIGURE B.13.1: Phylogenetic α-diversity with endemic species removed. Colors correspond to SES_{RD} for each metric given the three different species pools: the 'Regional' Écrins NP, 'All Summits', and the Persistent 'LGM'. Red tones indicate phylogenetic overdispersion, blue tones indicate phylogenetic clustering. Black dots mark values that have statistically significant P-values (<0.05). Cells filled with an "x" had too few species for comparison. Rows of each panel separate four of the most species rich angiosperm orders.

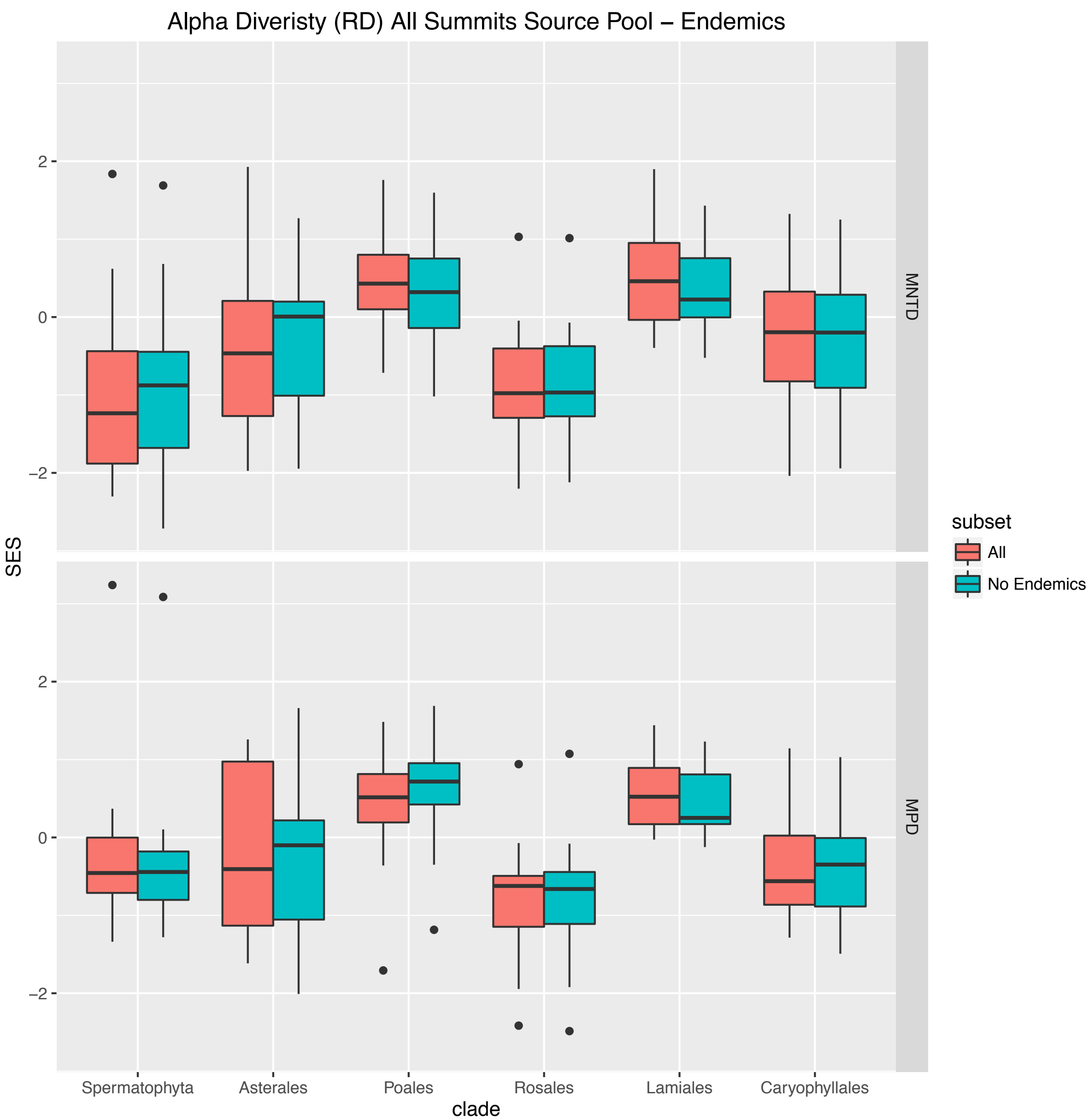

Figure B.13.2: Box plots of standardized effect sizes (SES_{RD}) for each α-diversity metric with and without endemic species within the All Summits species pool. Positive SES values indicate phylogenetic overdispersion; negative values indicate phylogenetic clustering. Boxes show first and third quartiles, solid horizontal lines indicate the median, vertical black lines are the range, and dots are points that lie 1.5x the interquartile range above the third quartile or below the first quartile.

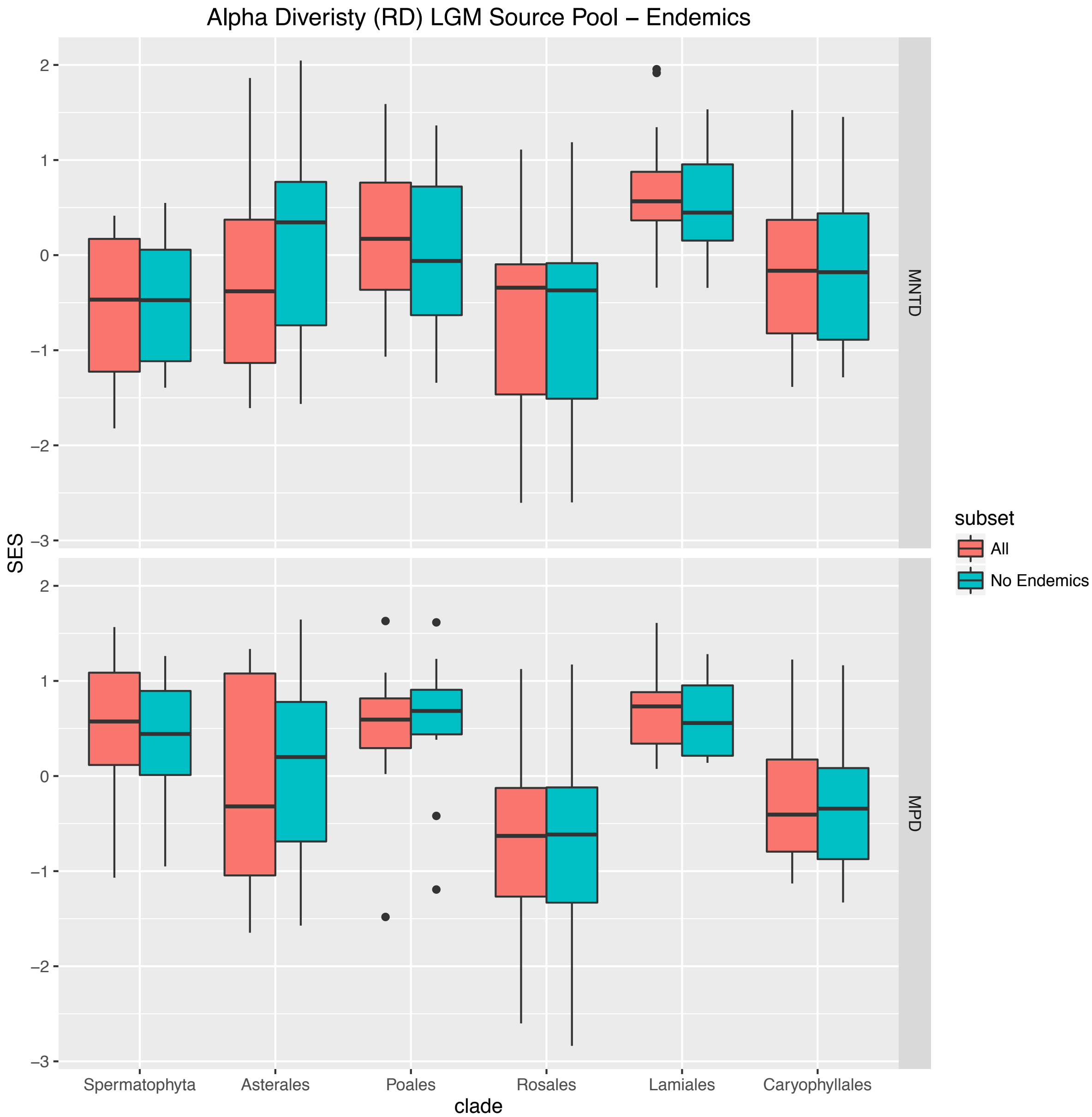

FIGURE B.13.3: Box plots of standardized effect sizes (SES_{RD}) for each α-diversity metric with and without endemic species within the LGM species pool. Positive SES values indicate phylogenetic overdispersion; negative values indicate phylogenetic clustering. Boxes show first and third quartiles, solid horizontal lines indicate the median, vertical black lines are the range, and dots are points that lie 1.5x the interquartile range above the third quartile or below the first quartile.

B.14 PHYLOGENETIC β-DIVERSITY SUMMARY FOR PI*st*.

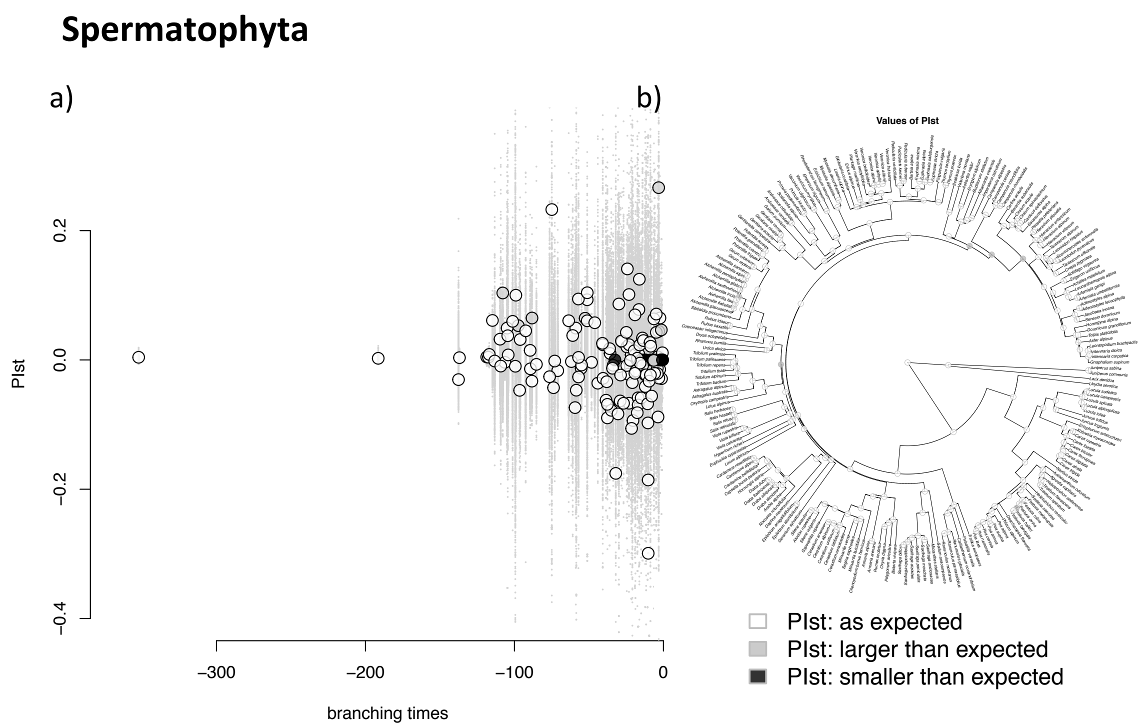

FIGURE B.14.1: a) PI*st* values (y-axis) calculated for each node of the community phylogeny on summit species. The x-axis shows branching times in millions of years (0 = present). Unfilled circles show observed values of PI*st* as expected, light grey shaded circles show values of PI*st* larger than expected, and dark shaded circles have values of PI*st* smaller than expected given a random shuffling on species abundances across the summit community dataset for each node of the summit community phylogeny. Small grey dots are values obtained from each permutation of the randomization at each node (n=999). b) The same PI*st* values plotted on corresponding nodes on phylogeny.

Asterales

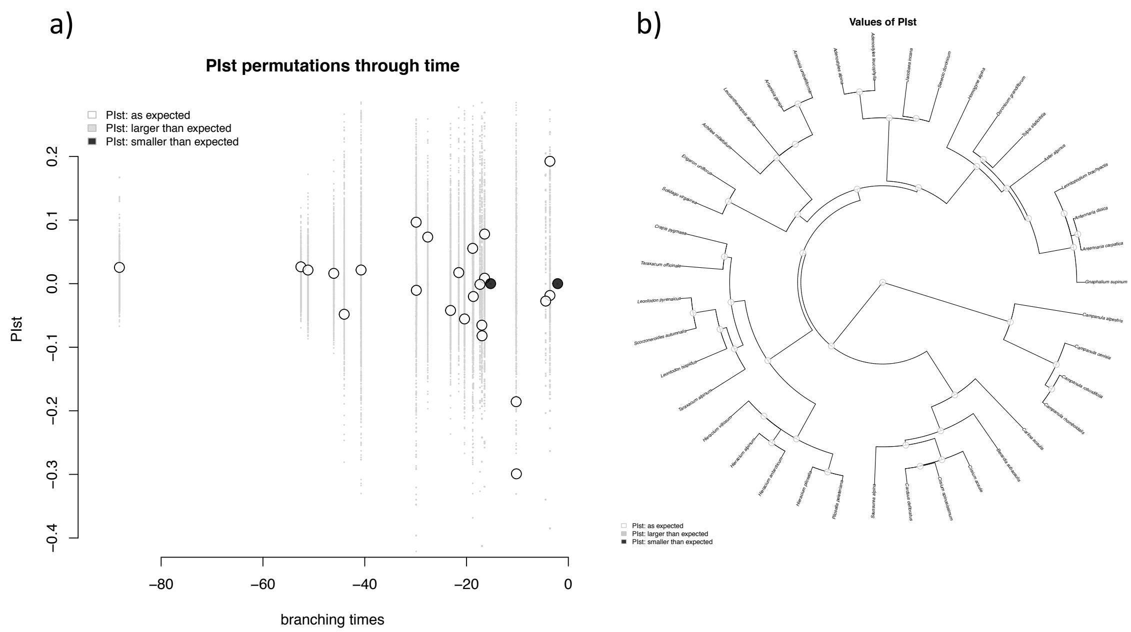

Figure B.14.2: a) PI*st* values (y-axis) within the Asterales clade calculated for each node of the community phylogeny of All Summit species. The x-axis shows branching times in millions of years (0 = present). Unfilled circles show observed values of PI*st* as expected, light grey shaded circles show values of PI*st* larger than expected, and dark shaded circles have values of PI*st* smaller than expected given a random shuffling on species abundances across the summit community dataset for each node of the summit community phylogeny. Small grey dots are values obtained from each permutation of the randomization at each node (n=999). b) The same PI*st* values plotted on corresponding nodes on phylogeny.

Poales

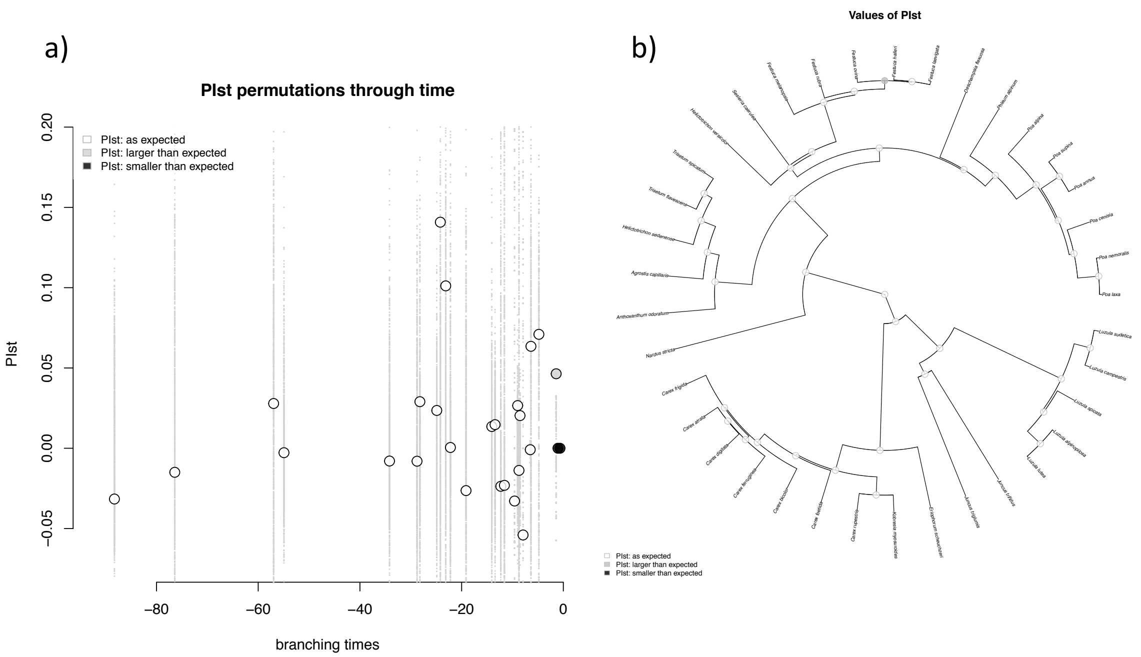

Figure b.14.3: a) PI*st* values (y-axis) within the Poales clade calculated for each node of the community phylogeny on Summit species. The x-axis shows branching times in millions of years (0 = present). Unfilled circles show observed values of PI*st* as expected, light grey shaded circles show values of PI*st* larger than expected, and dark shaded circles have values of PI*st* smaller than expected given a random shuffling on species abundances across the summit community dataset for each node of the summit community phylogeny. Small grey dots are values obtained from each permutation of the randomization at each node (n=999). b) The same PI*st* values plotted on corresponding nodes on phylogeny.

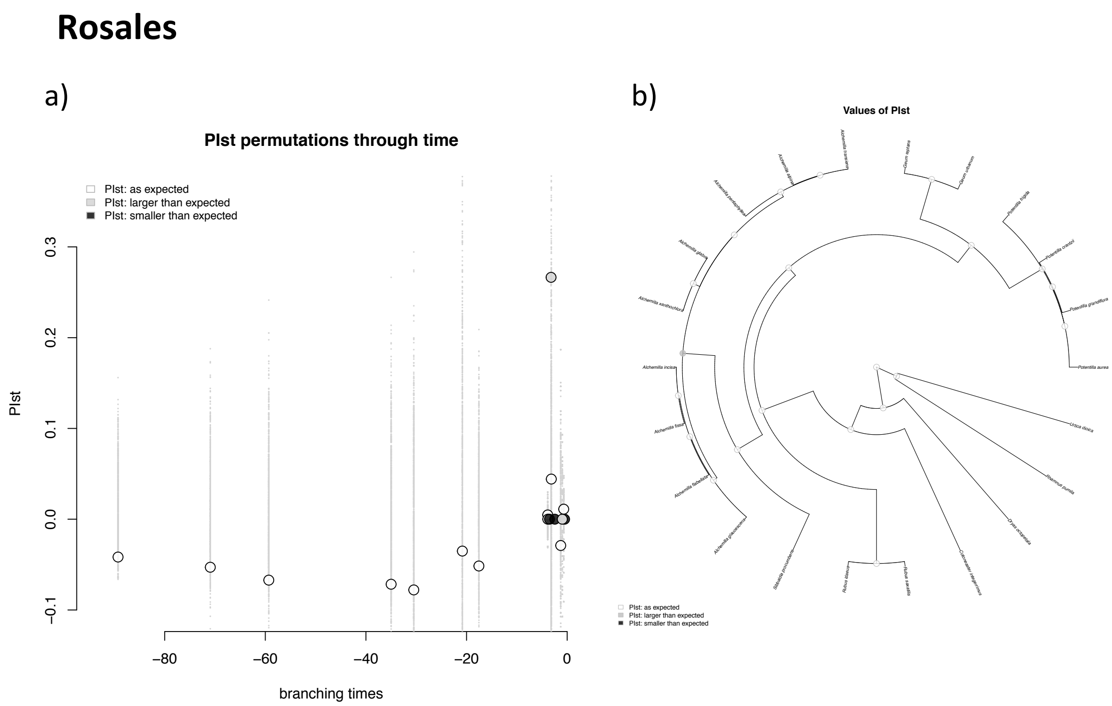

FIGURE B.14.4: a) PI*st* values (y-axis) within the Rosales clade calculated for each node of the community phylogeny of All Summit species. The x-axis shows branching times in millions of years (0 = present). Unfilled circles show observed values of PI*st* as expected, light grey shaded circles show values of PI*st* larger than expected, and dark shaded circles have values of PI*st* smaller than expected given a random shuffling on species abundances across the summit community dataset for each node of the summit community phylogeny. Small grey dots are values obtained from each permutation of the randomization at each node (n=999). b) The same PI*st* values plotted on corresponding nodes on phylogeny.

Lamiales

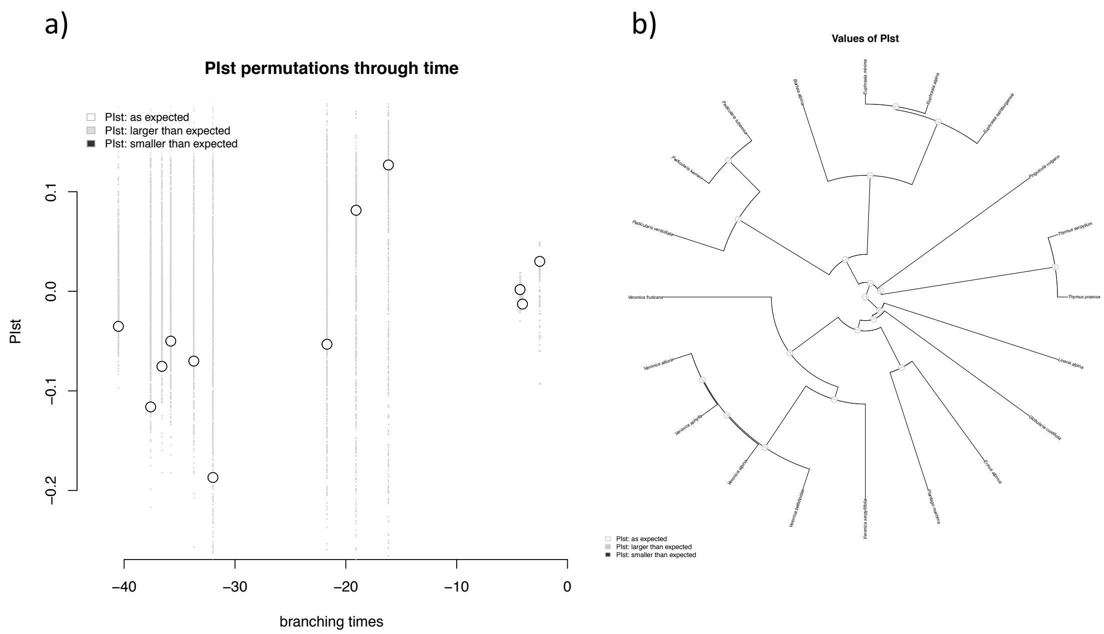

Figure B.14.5: a) PI*st* values (y-axis) within the Lamiales clade calculated for each node of the community phylogeny on Summit species. The x-axis shows branching times in millions of years (0 = present). Unfilled circles show observed values of PI*st* as expected, light grey shaded circles show values of PI*st* larger than expected, and dark shaded circles have values of PI*st* smaller than expected given a random shuffling on species abundances across the summit community dataset for each node of the summit community phylogeny. Small grey dots are values obtained from each permutation of the randomization at each node (n=999). b) The same PI*st* values plotted on corresponding nodes on phylogeny.

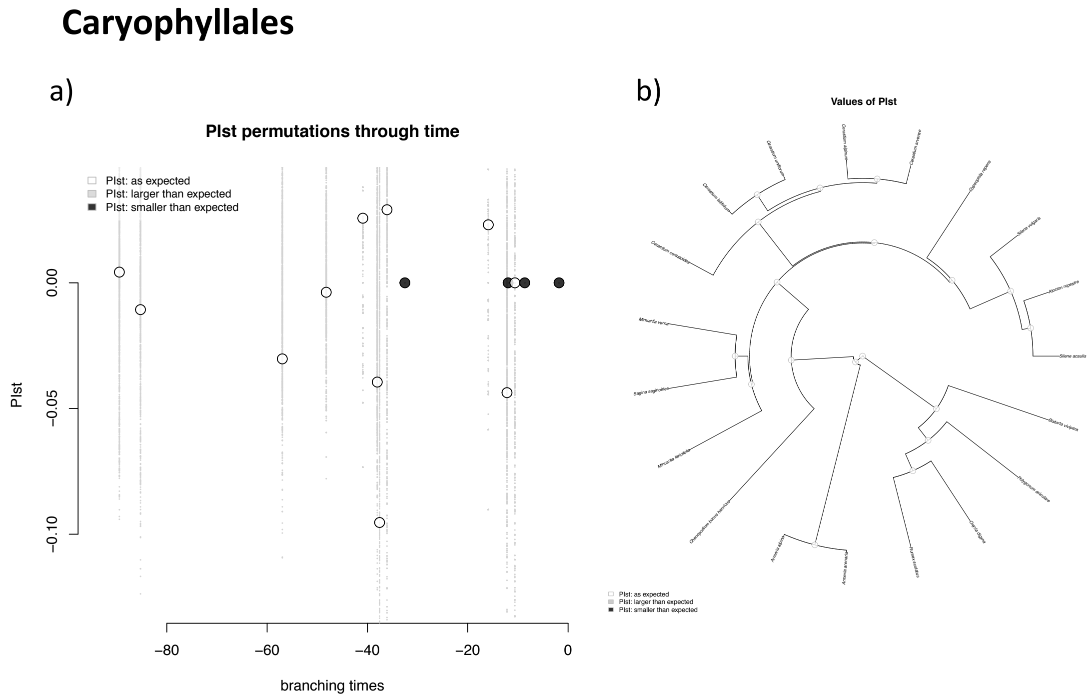

Figure b.14.6: a) PI*st* values (y-axis) within the Caryophyllales clade calculated for each node of the community phylogeny on Summit species. The x-axis shows branching times in millions of years (0 = present). Unfilled circles show observed values of PI*st* as expected, light grey shaded circles show values of PI*st* larger than expected, and dark shaded circles have values of PI*st* smaller than expected given a random shuffling on species abundances across the summit community dataset for each node of the summit community phylogeny. Small grey dots are values obtained from each permutation of the randomization at each node (n=999). b) The same PI*st* values plotted on corresponding nodes on phylogeny.

APPENDIX C

Supplementary Information to Chapter 4

C.1 Primer Information

Table C.1.1: Table with target-specific primer pair sequences and citations for each gene region (and segments).

Primer Pair Name	5′ Primer	5′ Sequence	Reference	3′ Primer	5′ Sequence	Reference
ITS	ITS-5	ggAAggAgAAgTCgTAACAAgg	White *et al.* (1990); Baldwin (1992)	ITS-4	TCCTCCgCTTATTgATATgC	White *et al.* (1990); Baldwin (1992)
atpB1	S1494R	TCAgTACACAAAgATTTAAggTCAT	Hoot *et al.* (1995)	S611	AACgTACTCgTgAAggAAATgATCT	Hoot *et al.* (1995)
atpB2	S766R	TAACATCTCggAAATATTCCgCCAT	Hoot *et al.* (1995)	S2	TATgAgAATCAATCCTACTACTTCT	Hoot *et al.* (1995)
ndhF1	ndhF 5′-PCR	ATggAACAgACATATCAATATgSgTgg	Olmstead and Sweere (1994)	ndhF 803R	gAAAAATTCCCgCCgCTACCATAg	Olmstead and Sweere (1994)
ndhF2	ndhF 803	CTATggTAgCggCgggAATTTTTC	Olmstead and Sweere (1994)	ndhF 1318R	CgAAACATATAAAATgCRgTTAATCC	Olmstead and Sweere (1994)
ndhF3	ndhF 1318	ggATTAACYgCATTTTATATgTTTCg	Olmstead and Sweere (1994)	ndhF 3′-PCR	CCCYASATATTTgATACCTTCKCC	Olmstead and Sweere (1994)
matK1	matK1F	ACTgTATCgCACTATgTATCA	Sang *et al.* (1997)	matK4R	gCATCTTTTACCCARTAgCgAAg	Bremer *et al.* (2002)
matK2	matk3F	AAgATgCCTCTTCTTTGCAT	Sang *et al.* (1997)	matK3R	gATCCgCTgTgATAATgAgA	Sang *et al.* (1997)
rbcL	rbcL 5′-PCR	ggCCgTCgACATgTCACCACAAACAgARACTAAAgC	Olmstead and Palmer (1994)	rbcL Z674R	gATTTCgCCTgTTTCggCTTgTgCTTTATAAA	Olmstead and Palmer (1994)
trn_ab	a (B48557)	CATTACAAATgCgATgCTCT	Taberlet *et al.* (1991)	b (A49291)	TCTACCgATTTCgCCATATC	Taberlet *et al.* (1991)
trn_cf	c (B49317)	CgAAATCggTAgACgCTACg	Taberlet *et al.* (1991)	f (A50272)	ATTTgAACTggTgACACgAg	Taberlet *et al.* (1991)

C.2 SAWTOOTH COLLECTION INFORMATION

Table C.2.1: Table with collection information and voucher numbers for each accession

β Tip Label	*PHLAWD Tip Label*	*DNA Accession Number*	Voucher Number	*Voucher Name*	Date Collected	Summit	Range	Meadow	Locality Detail	Elevation (ft.)	WGS N	WGS W	Leaf Sample
Erigeron compositus	*Erigeron compositus*	*Erigeron compositus 13537*	Marx 2012-001	*Erigeron compositus*	31/07/12	Thompson Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Thompson Peak: Just below summit	10508	44.14369	115.00683	✓
NA	*Eritrichium nanum*	*NA*	Marx 2012-002	*Eritrichium nanum*	31/07/12	Thompson Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Thompson Peak: Just below summit	10508	44.14369	115.00683	✓
Sedum lanceolatum var lanceolatum	*Sedum lanceolatum*	*Sedum lanceolatum var lanceolatum 13539*	Marx 2012-003	*Sedum lanceolatum var. lanceolatum*	31/07/12	Thompson Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Thompson Peak: SW slope heading down from summit	10661	44.14139	115.01000	✓
Smelowskia calycina	*Smelowskia calycina*	*Smelowskia calycina 13550*	Marx 2012-004	*Smelowskia calycina*	31/07/12	Thompson Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Thompson Peak: SW slope heading down from summit	10661	44.14139	115.01000	✓
Antennaria umbrinella	*Antennaria umbrinella*	*Antennaria umbrinella 13540*	Marx 2012-005	*Antennaria umbrinella*	31/07/12	Thompson Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Thompson Peak: SW slope heading down from summit	10661	44.14139	115.01000	✓
Eriogonum crosbyae		*Eriogonum crosbyae 13541*	Marx 2012-006	*Eriogonum crosbyae*	31/07/12	Thompson Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Thompson Peak: SW slope heading down from summit	10661	44.14139	115.01000	✓
Eriogonum ovalifolium var depressum	*Eriogonum ovalifolium*	*Eriogonum ovalifolium var depressum 13542*	Marx 2012-007	*Eriogonum ovalifolium*	31/07/12	Thompson Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Thompson Peak: SW slope heading down from summit	10661	44.14139	115.01000	✓
Eriogonum ovalifolium var depressum	*Eriogonum ovalifolium*	*Eriogonum ovalifolium var depressum 13543*	Marx 2012-008	*Eriogonum ovalifolium*	31/07/12	Thompson Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Thompson Peak: SW slope heading down from summit	10661	44.14139	115.01000	✓
Minuartia nuttallii	*Sabulina nuttallii*	*Minuartia nuttallii 13544*	Marx 2012-009	*Minuartia nuttallii*	31/07/12	Thompson Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Thompson Peak: SW slope heading down from summit	10661	44.14139	115.01000	✓
Hulsea algida	*Hulsea algida*	*Hulsea algida 13545*	Marx 2012-010	*Hulsea algida*	31/07/12	Thompson Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Thompson Peak: SW slope heading down from summit	10661	44.14139	115.01000	✓
Arabis lemonii	*Boechera lemmonii*	*Arabis cf lemonii 13546*	Marx 2012-011	*Arabis c.f lemmonii*	31/07/12	Thompson Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Thompson Peak: SW slope heading down from summit	10661	44.14139	115.01000	✓

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Table c.2.1 – continued from previous page

β Tip Label	PHLAWD Tip Label	DNA Accession Number	Voucher Number	Voucher Name	Date Collected	Summit	Range	Meadow	Locality Detail	Elevation (ft.)	WGS N	WGS W	Leaf Sample
Luzula sp		*Juncus sp 13547*	Marx 2012-012	*NA*	31/07/12	Thompson Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Thompson Peak: SW slope heading down from summit	10661	44.14139	115.01000	✓
Carex sp		*Carex sp 13548*	Marx 2012-013	*NA*	31/07/12	Thompson Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Thompson Peak: SW slope heading down from summit	10661	44.14139	115.01000	✓
NA		*NA*	Marx 2012-014 (a-d)	*Draba oligosperma*	31/07/12	Thompson Peak	Sawtooth Mountains	✓	Idaho: Sawtooth National Forest: Sawtooth Mountains: Thompson Peak: South facing gravel slope just above camp at Profile Lake	9064	44.14639	115.00528	-
Carex sp		*Carex sp 13549*	Marx 2012-015	*NA*	31/07/12	Thompson Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Thompson Peak: SW slope heading down from summit	10661	44.14139	115.01000	✓
Poa sp		*Poa sp 13551*	Marx 2012-016	*NA*	31/07/12	Thompson Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Thompson Peak: SW slope heading down from summit	10661	44.14139	115.01000	✓
Stipa sp	*Stenotus acaulis*	*Stipa sp 13552*	Marx 2012-017	*NA*	31/07/12	Thompson Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Thompson Peak: SW slope heading down from summit	10661	44.14139	115.01000	✓
Chaenactis alpina		*Chaenactis alpina 13553*	Marx 2012-018	*Chaenactis alpina*	31/07/12	Thompson Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Thompson Peak: SW slope heading down from summit	10661	44.14139	115.01000	✓
Polemonium viscosum	*Polemonium viscosum*	*Polemonium viscosum 13554*	Marx 2012-019	*Polemonium viscosum*	31/07/12	Thompson Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Thompson Peak: SW slope heading down from summit	10661	44.14139	115.01000	✓
Silene acaulis	*Silene acaulis*	*Silene acaulis 13555*	Marx 2012-020	*Silene acaulis*	31/07/12	Thompson Peak	Sawtooth Mountains	✓	Idaho: Sawtooth National Forest: Sawtooth Mountains: Thompson Peak: Meadow just at base of west side of mountain, just south of a snowpack	10105	44.14219	115.01358	✓
NA		*NA*	Marx 2012-021a	*Minuartia obtusiloba*	31/07/12	Thompson Peak	Sawtooth Mountains	✓	Idaho: Sawtooth National Forest: Sawtooth Mountains: Thompson Peak: Meadow just at base of west side of mountain, just south of a snowpack	10105	44.14219	115.01358	-
NA		*NA*	Marx 2012-021b	*Cassiope mertensiana var. gracilis*	31/07/12	Thompson Peak	Sawtooth Mountains	✓	Idaho: Sawtooth National Forest: Sawtooth Mountains: Thompson Peak: Meadow just at base of west side of mountain, just south of a snowpack	10105	44.14219	115.01358	-
NA	*Castilleja applegatei*	*NA*	Marx 2012-022	*Castelleja applegatei*	31/07/12	Thompson Peak	Sawtooth Mountains	✓	Idaho: Sawtooth National Forest: Sawtooth Mountains: Thompson Peak: South facing gravel slope just above camp at Profile Lake	9064	44.14639	115.00528	✓

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Table c.2.1 – continued from previous page

β Tip Label	*PHLAWD Tip Label*	*DNA Accession Number*	Voucher Number	*Voucher Name*	Date Collected	Summit	Range	Meadow	Locality Detail	Elevation (ft.)	WGS N	WGS W	Leaf Sample
NA	*Castilleja applegatei*	*NA*	Marx 2012-023	*Castelleja applegatei*	31/07/12	Thompson Peak	Sawtooth Mountains	✓	Idaho: Sawtooth National Forest: Sawtooth Mountains: Thompson Peak: South facing gravel slope just above camp at Profile Lake	9064	44.14639	115.00528	✓
NA	*Castilleja applegatei*	*NA*	Marx 2012-024	*Castelleja applegatei*	31/07/12	Thompson Peak	Sawtooth Mountains	✓	Idaho: Sawtooth National Forest: Sawtooth Mountains: Thompson Peak: South facing gravel slope just above camp at Profile Lake	9064	44.14639	115.00528	✓
NA		*NA*	Marx 2012-025	*Gentiana calycosa*	31/07/12	Thompson Peak	Sawtooth Mountains	✓	Idaho: Sawtooth National Forest: Sawtooth Mountains: Thompson Peak: Meadow just at base of west side of mountain, just south of a snowpack	10105	44.14219	115.01358	-
Ivesia gordonii	*Ivesia gordonii*	*Ivesia gordonii 13559*	Marx 2012-026	*Ivesia gordonii*	31/07/12	Thompson Peak	Sawtooth Mountains	✓	Idaho: Sawtooth National Forest: Sawtooth Mountains: Thompson Peak: Meadow just at base of west side of mountain, just south of a snowpack	10105	44.14219	115.01358	✓
Bupleurum americanum	*Bupleurum americanum*	*Bupleurum americanum 13560*	Marx 2012-027	*Bupleurum americanum*	31/07/12	Thompson Peak	Sawtooth Mountains	✓	Idaho: Sawtooth National Forest: Sawtooth Mountains: Thompson Peak: Meadow just at base of west side of mountain, just south of a snowpack	10105	44.14219	115.01358	✓
NA	*Potentilla glaucophylla*	*NA*	Marx 2012-028	*Potentilla glaucophylla var. glaucophylla*	31/07/12	Thompson Peak	Sawtooth Mountains	✓	Idaho: Sawtooth National Forest: Sawtooth Mountains: Thompson Peak: Meadow just at base of west side of mountain, just south of a snowpack	10105	44.14219	115.01358	✓
Lewisia pygmaea var pygmara	*Lewisia pygmaea*	*Lewisia pygmaea var pygmara 14010*	Clevenger 2012-001	*Lewisia pygmaea var. pygmara*	01/08/12	Thompson Peak	Sawtooth Mountains	✓	Idaho: Sawtooth National Forest: Sawtooth Mountains: Thompson Peak: Meadow just at base of west side of mountain, just south of a snowpack	10105	44.14219	115.01358	✓
Arabis microphylla	*Boechera microphylla*	*Arabis microphylla 14011*	Clevenger 2012-002	*Arabis microphylla*	01/08/12	Thompson Peak	Sawtooth Mountains	✓	Idaho: Sawtooth National Forest: Sawtooth Mountains: Thompson Peak: Meadow just at base of west side of mountain, just south of a snowpack	10105	44.14219	115.01358	✓
Erigeron grandiflorus	*Erigeron grandiflorus*	*Erigeron grandiflorus 14012*	Clevenger 2012-003	*Erigeron grandiflorus*	01/08/12	Thompson Peak	Sawtooth Mountains	✓	Idaho: Sawtooth National Forest: Sawtooth Mountains: Thompson Peak: Meadow just at base of west side of mountain, just south of a snowpack	10105	44.14219	115.01358	✓
Chionophila tweedyi	*Chionophila tweedyi*	*Chionophila tweedyi 14013*	Clevenger 2012-004	*Chionophila tweedyi*	01/08/12	Thompson Peak	Sawtooth Mountains	✓	Idaho: Sawtooth National Forest: Sawtooth Mountains: Thompson Peak: Meadow just at base of west side of mountain, just south of a snowpack	10105	44.14219	115.01358	✓

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Table c.2.1 – continued from previous page

β Tip Label	*PHLAWD Tip Label*	*DNA Accession Number*	Voucher Number	*Voucher Name*	Date Collected	Summit	Range	Meadow	Locality Detail	Elevation (ft.)	WGS N	WGS W	Leaf Sample
Potentilla brevifolia	*Sibbaldia procumbens*	*Potentilla brevifolia 14015*	Clevenger 2012-005	*Sibbaldia procumbens*	01/08/12	Thompson Peak	Sawtooth Mountains	✓	Idaho: Sawtooth National Forest: Sawtooth Mountains: Thompson Peak: Meadow just at base of west side of mountain, just south of a snowpack	10105	44.14219	115.01358	✓
Antennaria lanata	*Potentilla brevifolia*	*Antennaria lanata 14016*	Clevenger 2012-006	*Potentilla brevifolia*	01/08/12	Thompson Peak	Sawtooth Mountains	✓	Idaho: Sawtooth National Forest: Sawtooth Mountains: Thompson Peak: Meadow just at base of west side of mountain, just south of a snowpack	10105	44.14219	115.01358	✓
Hieracium triste	*Antennaria lanata*	*Hieracium triste 14017*	Clevenger 2012-007	*Antennaria lanata*	01/08/12	Thompson Peak	Sawtooth Mountains	✓	Idaho: Sawtooth National Forest: Sawtooth Mountains: Thompson Peak: Meadow just at base of west side of mountain, just south of a snowpack	10105	44.14219	115.01358	✓
Carex sp	*Hieracium triste*	*Carex sp 14018*	Clevenger 2012-008	*Hieracium triste*	01/08/12	Thompson Peak	Sawtooth Mountains	✓	Idaho: Sawtooth National Forest: Sawtooth Mountains: Thompson Peak: Meadow just at base of west side of mountain, just south of a snowpack	10105	44.14219	115.01358	✓
NA		*NA*	Clevenger 2012-009	*NA*	01/08/12	Thompson Peak	Sawtooth Mountains	✓	Idaho: Sawtooth National Forest: Sawtooth Mountains: Thompson Peak: Meadow just at base of west side of mountain, just south of a snowpack	10105	44.14219	115.01358	✓
NA		*NA*	Clevenger 2012-010	*NA*	01/08/12	Thompson Peak	Sawtooth Mountains	✓	Idaho: Sawtooth National Forest: Sawtooth Mountains: Thompson Peak: Meadow just at base of west side of mountain, just south of a snowpack	10105	44.14219	115.01358	✓
NA		*NA*	Clevenger 2012-011	*NA*	01/08/12	Thompson Peak	Sawtooth Mountains	✓	Idaho: Sawtooth National Forest: Sawtooth Mountains: Thompson Peak: Meadow just at base of west side of mountain, just south of a snowpack	10105	44.14219	115.01358	-
Antennaria alpina	*Antennaria alpina*	*Antennaria alpina 14019*	Clevenger 2012-012	*Antennaria alpina*	01/08/12	Thompson Peak	Sawtooth Mountains	✓	Idaho: Sawtooth National Forest: Sawtooth Mountains: Thompson Peak: Meadow just at base of west side of mountain, just south of a snowpack	10105	44.14219	115.01358	✓
Phlox pulvinata		*Phlox pulvinata 14020*	Clevenger 2012-013	*Phlox pulvinata*	01/08/12	Thompson Peak	Sawtooth Mountains	✓	Idaho: Sawtooth National Forest: Sawtooth Mountains: Thompson Peak: Meadow just at base of west side of mountain, just south of a snowpack	10105	44.14219	115.01358	✓
Phyllodoce empetriformis	*Phyllodoce empetriformis*	*Phyllodoce empetriformis 14021*	Clevenger 2012-014	*Phyllodoce empetriformis*	01/08/12	Thompson Peak	Sawtooth Mountains	✓	Idaho: Sawtooth National Forest: Sawtooth Mountains: Thompson Peak: Meadow just at base of west side of mountain, just south of a snowpack	10105	44.14219	115.01358	✓

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Table c.2.1 – continued from previous page

β Tip Label	*PHLAWD Tip Label*	*DNA Accession Number*	Voucher Number	*Voucher Name*	Date Collected	Summit	Range	Meadow	Locality Detail	Elevation (ft.)	WGS N	WGS W	Leaf Sample
Cassiope mertensiana var gracilis	*Cassiope mertensiana*	*Cassiope mertensiana var gracilis 14022*	Clevenger 2012-015	*Cassiope mertensiana var. gracilis*	01/08/12	Thompson Peak	Sawtooth Mountains	✓	Idaho: Sawtooth National Forest: Sawtooth Mountains: Thompson Peak: Meadow just at base of west side of mountain, just south of a snowpack	10105	44.14219	115.01358	✓
Phyllodoce glanduliflora	*Phyllodoce glanduliflora*	*Phyllodoce glanduliflora 14023*	Clevenger 2012-016	*Phyllodoce glanduliflora*	01/08/12	Thompson Peak	Sawtooth Mountains	✓	Idaho: Sawtooth National Forest: Sawtooth Mountains: Thompson Peak: Meadow just at base of west side of mountain, just south of a snowpack	10105	44.14219	115.01358	✓
Ivesia gordonii	*Ivesia gordonii*	*Ivesia gordonii 14024*	Clevenger 2012-017	*Ivesia gordonii*	01/08/12	Thompson Peak	Sawtooth Mountains	✓	Idaho: Sawtooth National Forest: Sawtooth Mountains: Thompson Peak: Meadow just at base of west side of mountain, just south of a snowpack	10105	44.14219	115.01358	✓
Juncus sp		*Luzula sp 14025*	Clevenger 2012-018	*NA*	01/08/12	Thompson Peak	Sawtooth Mountains	✓	Idaho: Sawtooth National Forest: Sawtooth Mountains: Thompson Peak: Meadow just at base of west side of mountain, just south of a snowpack	10105	44.14219	115.01358	✓
Carex sp		*Carex sp 14026*	Clevenger 2012-019	*NA*	01/08/12	Thompson Peak	Sawtooth Mountains	✓	Idaho: Sawtooth National Forest: Sawtooth Mountains: Thompson Peak: Meadow just at base of west side of mountain, just south of a snowpack	10105	44.14219	115.01358	✓
Ranunculus eschscholtzii var eschscholtzii	*Ranunculus eschscholtzii*	*Ranunculus eschscholtzii var eschscholtzii 14027*	Clevenger 2012-020	*Ranunculus eschscholtzii*	01/08/12	Thompson Peak	Sawtooth Mountains	✓	Idaho: Sawtooth National Forest: Sawtooth Mountains: Thompson Peak: Meadow just at base of west side of mountain, just south of a snowpack	10105	44.14219	115.01358	✓
Synthyris pinnatifida var cenescens	*Veronica paysoni*	*Synthyris pinnatifida var cenescens 14028*	Clevenger 2012-021	*Synthyris pinnatifida var. cenescens*	01/08/12	Thompson Peak	Sawtooth Mountains	✓	Idaho: Sawtooth National Forest: Sawtooth Mountains: Thompson Peak: Meadow just at base of west side of mountain, just south of a snowpack	10105	44.14219	115.01358	✓
Abies lasiocarpa	*Abies lasiocarpa*	*Abies lasiocarpa 14029*	Clevenger 2012-022	*Abies lasiocarpa*	01/08/12	Thompson Peak	Sawtooth Mountains	✓	Idaho: Sawtooth National Forest: Sawtooth Mountains: Thompson Peak: Meadow just at base of west side of mountain, just south of a snowpack	10105	44.14219	115.01358	✓
Pinus albicaulis	*Pinus albicaulis*	*Pinus albicaulis 14030*	Clevenger 2012-023	*Pinus albicaulis*	01/08/12	Thompson Peak	Sawtooth Mountains	✓	Idaho: Sawtooth National Forest: Sawtooth Mountains: Thompson Peak: Meadow just at base of west side of mountain, just south of a snowpack	10105	44.14219	115.01358	✓
Juniperus communis	*Juniperus communis*	*Juniperus communis 14031*	Clevenger 2012-024	*Juniperus communis*	01/08/12	Thompson Peak	Sawtooth Mountains	✓	Idaho: Sawtooth National Forest: Sawtooth Mountains: Thompson Peak: Meadow just at base of west side of mountain, just south of a snowpack	10105	44.14219	115.01358	✓

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Table c.2.1 – continued from previous page

β Tip Label	*PHLAWD Tip Label*	*DNA Accession Number*	Voucher Number	*Voucher Name*	Date Collected	Summit	Range	Meadow	Locality Detail	Elevation (ft.)	WGS N	WGS W	Leaf Sample
Gentiana calycosa var obtusiloba		*Gentiana calycosa var obtusiloba 14032*	Clevenger 2012-025	*Gentiana calycosa*	01/08/12	Thompson Peak	Sawtooth Mountains	✓	Idaho: Sawtooth National Forest: Sawtooth Mountains: Thompson Peak: Meadow just at base of west side of mountain, just south of a snowpack	10105	44.14219	115.01358	✓
NA		*NA*	Clevenger 2012-026	*Senecio fremontii*	01/08/12	Thompson Peak	Sawtooth Mountains	✓	Idaho: Sawtooth National Forest: Sawtooth Mountains: Thompson Peak: Meadow just at base of west side of mountain, just south of a snowpack	10105	44.14219	115.01358	✓
Claytonia megarhiza var bellidifolia	*Claytonia megarhiza*	*Claytonia megarhiza var bellidifolia 14034*	Clevenger 2012-027	*Claytonia megarhiza*	01/08/12	Thompson Peak	Sawtooth Mountains	✓	Idaho: Sawtooth National Forest: Sawtooth Mountains: Thompson Peak: Meadow just at base of west side of mountain, just south of a snowpack	10105	44.14219	115.01358	✓
Epilobium alpinum var clavatum		*Epilobium alpinum var clavatum 14123*	Zion 2012-001	*Epilobium alpinum*	07/08/12	Horstmann Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Horstmann Peak: Just below summit to the SW	10350	44.11170	115.00318	✓
Solidago multiradiata	*Solidago multiradiata*	*Solidago multiradiata 14124*	Zion 2012-002	*Solidago multiradiata*	07/08/12	Horstmann Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Horstmann Peak: Just below summit to the SW	10350	44.11170	115.00318	✓
Oxyria digyna	*Oxyria digyna*	*Oxyria digyna 14125*	Zion 2012-003	*Oxyria digyna*	07/08/12	Horstmann Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Horstmann Peak: Just below summit to the SW	10350	44.11170	115.00318	✓
Eriogonum pyrolaefolium var coryphaeum		*Eriogonum pyrolaefolium var coryphaeum 14126*	Zion 2012-004	*Eriogonum pyrolaefolium var. coryphaeum*	07/08/12	Horstmann Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Horstmann Peak: Just below summit to the SW	10350	44.11170	115.00318	✓
NA		*NA*	Zion 2012-005	*Senecio fremontii*	07/08/12	Horstmann Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Horstmann Peak: Just below summit to the SW	10350	44.11170	115.00318	✓
Arnica latifolia var gracilis		*Arnica latifolia var gracilis 14128*	Zion 2012-006	*Arnica latifolia*	07/08/12	Horstmann Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Horstmann Peak: Just below summit to the SW	10350	44.11170	115.00318	✓
Juncus sp		*Luzula sp 14129*	Zion 2012-007	*NA*	07/08/12	Horstmann Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Horstmann Peak: Just below summit to the SW	10350	44.11170	115.00318	✓
Epilobium obcordatum	*Epilobium obcordatum*	*Epilobium obcordatum 14130*	Zion 2012-008	*Epilobium obcordatum*	07/08/12	Horstmann Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Horstmann Peak: Just below summit to the SW	10350	44.11170	115.00318	✓
NA	*Eriogonum ovalifolium*	*NA*	Zion 2012-009	*Eriogonum ovalifolium*	07/08/12	Horstmann Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Horstmann Peak: Just below summit to the SW	10350	44.11170	115.00318	✓
Poa sp		*Poa sp 14132*	Zion 2012-010	*NA*	07/08/12	Horstmann Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Horstmann Peak: Just below summit to the SW	10350	44.11170	115.00318	✓
Eriogonum ovalifolium var purpureum	*Eriogonum ovalifolium*	*Eriogonum ovalifolium var purpureum 14133*	Zion 2012-011	*Eriogonum ovalifolium*	07/08/12	Horstmann Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Horstmann Peak: Just below summit to the SW	10350	44.11170	115.00318	✓

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Table c.2.1 – continued from previous page

β Tip Label	*PHLAWD Tip Label*	*DNA Accession Number*	Voucher Number	*Voucher Name*	Date Collected	Summit	Range	Meadow	Locality Detail	Elevation (ft.)	WGS N	WGS W	Leaf Sample
Lomatium sp		*Lomatium sp 14134*	Zion 2012-012	*Lomatium sp.*	07/08/12	Horstmann Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Horstmann Peak: Just below summit to the SW	10350	44.11170	115.00318	✓
Achillea millefolium var alpicola	*Achillea millefolium*	*Achillea millefolium var alpicola 14136*	Zion 2012-014	*Achillea millefolium var. alpicola*	07/08/12	Horstmann Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Horstmann Peak: Just below summit to the SW	10350	44.11170	115.00318	✓
Sedum lanceolatum var lanceolatum	*Sedum lanceolatum*	*Sedum lanceolatum var lanceolatum 14137*	Zion 2012-015	*Sedum lanceolatum var. lanceolatum*	07/08/12	Horstmann Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Horstmann Peak: Just below summit to the SW	10350	44.11170	115.00318	✓
Poa sp		*Poa sp 14138*	Zion 2012-016	*NA*	07/08/12	Horstmann Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Horstmann Peak: Just below summit to the SW	10350	44.11170	115.00318	✓
Phlox pulvinata		*Phlox pulvinata 14215*	Zion 2012-017	*Phlox pulvinata*	07/08/12	Horstmann Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Horstmann Peak: Just below summit to the SW	10350	44.11170	115.00318	✓
Heuchera parvifolia var dissecta	*Heuchera parvifolia*	*Heuchera parvifolia var dissecta 14216*	Zion 2012-018	*Heuchera parvifolia var. dissecta*	07/08/12	Horstmann Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Horstmann Peak: Just below summit to the SW	10350	44.11170	115.00318	✓
Draba oreibata	*Draba stenoloba*	*Draba oreibata 14217*	Zion 2012-019	*Draba oreibata*	07/08/12	Horstmann Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Horstmann Peak: Just below summit to the SW	10350	44.11170	115.00318	✓
Draba crassifolia	*Draba crassifolia*	*Draba cf crassifolia 14218*	Zion 2012-020	*Draba c.f. crassifolia*	07/08/12	Horstmann Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Horstmann Peak: Just below summit to the SW	10350	44.11170	115.00318	✓
Phyllodoce empetriformis		*Unknown 14219*	Zion 2012-021	*Phyllodoce empetriformis*	07/08/12	Horstmann Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Horstmann Peak: Just below summit to the SW	10350	44.11170	115.00318	✓
NA	*Cystopteris fragilis*	*NA*	Zion 2012-022	*Cystopteris fragilis*	07/08/12	Horstmann Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Horstmann Peak: Just below summit to the SW	10350	44.11170	115.00318	✓
NA	*Cryptogramma crispa*	*NA*	Zion 2012-023	*Cryptogramma crispa*	07/08/12	Horstmann Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Horstmann Peak: Just below summit to the SW	10350	44.11170	115.00318	✓
Hulsea algida	*Hulsea algida*	*Hulsea algida 14222*	Zion 2012-024	*Hulsea algida*	07/08/12	Horstmann Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Horstmann Peak: Just below summit to the SW	10350	44.11170	115.00318	✓
Antennaria umbrinella	*Antennaria umbrinella*	*Antennaria umbrinella 14223*	Zion 2012-025	*Antennaria umbrinella*	07/08/12	Horstmann Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Horstmann Peak: Just below summit to the SW	10350	44.11170	115.00318	✓
Erigeron evermannii		*Erigeron evermannii 14224*	Zion 2012-026	*Erigeron evermannii*	07/08/12	Horstmann Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Horstmann Peak: Just below summit to the SW	10350	44.11170	115.00318	✓
Hordium sp		*Hordium sp 14225*	Zion 2012-027	*NA*	07/08/12	Horstmann Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Horstmann Peak: Just below summit to the SW	10350	44.11170	115.00318	✓
Carex sp		*Carex sp 14226*	Zion 2012-028	*NA*	07/08/12	Horstmann Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Horstmann Peak: Just below summit to the SW	10350	44.11170	115.00318	✓

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Table c.2.1 – continued from previous page

β Tip Label	*PHLAWD Tip Label*	*DNA Accession Number*	Voucher Number	*Voucher Name*	Date Collected	Summit	Range	Meadow	Locality Detail	Elevation (ft.)	WGS N	WGS W	Leaf Sample
Sibbaldia procumbens	*Sibbaldia procumbens*	*Sibbaldia procumbens 14227*	Zion 2012-029	*Sibbaldia procumbens*	07/08/12	Horstmann Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Horstmann Peak: Just below summit to the SW	10350	44.11170	115.00318	✓
Juncus sp		*Luzula sp 14228*	Zion 2012-030	*NA*	07/08/12	Horstmann Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Horstmann Peak: Just below summit to the SW	10350	44.11170	115.00318	✓
Aconogonon phytolaccaefolium		*Aconogonon phytolaccaefolium 14229*	Zion 2012-031	*Aconogonon phytolaccaefolium*	07/08/12	Horstmann Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Horstmann Peak: Just below summit to the SW	10350	44.11170	115.00318	✓
Potentilla glandulosa var glandulosa	*Drymocallis glandulosa*	*Potentilla glandulosa var glandulosa 14230*	Zion 2012-032	*Potentilla glandulosa*	07/08/12	Horstmann Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Horstmann Peak: Just below summit to the SW	10350	44.11170	115.00318	✓
Pinus albicaulis	*Pinus albicaulis*	*Pinus albicaulis 14231*	Zion 2012-033	*Pinus albicaulis*	07/08/12	Horstmann Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Horstmann Peak: Just below summit to the SW	10350	44.11170	115.00318	✓
Abies lasiocarpa	*Abies lasiocarpa*	*Abies lasiocarpa 14232*	Zion 2012-034	*Abies lasiocarpa*	07/08/12	Horstmann Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Horstmann Peak: Just below summit to the SW	10350	44.11170	115.00318	✓
Juniperus communis	*Juniperus communis*	*Juniperus communis 14233*	Zion 2012-035	*Juniperus communis*	07/08/12	Horstmann Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Horstmann Peak: Just below summit to the SW	10350	44.11170	115.00318	✓
Penstemon montanus var idahoensis	*Penstemon montanus*	*Penstemon montanus var idahoensis 14234*	Zion 2012-036	*Penstemon montanus var. idahoensis*	07/08/12	Horstmann Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Horstmann Peak: Just below summit to the SW	10350	44.11170	115.00318	✓
Erysimum asperum	*Erysimum asperum*	*Erysimum asperum 14235*	Zion 2012-037	*Erysimum asperum*	07/08/12	Horstmann Peak	Sawtooth Mountains	✓	Idaho: Sawtooth National Forest: Sawtooth Mountains: Horstmann Peak: treeline	10020	44.11012	115.00285	✓
Lomatium sp		*Lomatium sp 14236*	Zion 2012-038	*Lomatium sp.*	07/08/12	Horstmann Peak	Sawtooth Mountains	✓	Idaho: Sawtooth National Forest: Sawtooth Mountains: Horstmann Peak: treeline	10020	44.11012	115.00285	✓
Anemone drummondii var drummondii	*Anemone drummondii*	*Anemone drummondii var drummondii 13562*	Marx 2012-029	*Anemone drummondii*	10/08/12	Braxon Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Braxon Peak: Summit down south face to treeline	10353	44.09333	114.99681	✓
Carex sp		*Carex sp 13563*	Marx 2012-030	*NA*	10/08/12	Braxon Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Braxon Peak: Summit down south face to treeline	10353	44.09333	114.99681	✓
Eriogonum ovalifolium var depressum	*Eriogonum ovalifolium*	*Eriogonum ovalifolium var depressum 13564*	Marx 2012-031	*Eriogonum ovalifolium*	10/08/12	Braxon Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Braxon Peak: Summit down south face to treeline	10353	44.09333	114.99681	✓
Minuartia obtusiloba	*Minuartia obtusiloba*	*Minuartia obtusiloba 13565*	Marx 2012-032	*Minuartia obtusiloba*	10/08/12	Braxon Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Braxon Peak: Summit down south face to treeline	10353	44.09333	114.99681	✓
Poa sp		*Poa sp 13566*	Marx 2012-033	*NA*	10/08/12	Braxon Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Braxon Peak: Summit down south face to treeline	10353	44.09333	114.99681	✓

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Table c.2.1 – continued from previous page

β Tip Label	*PHLAWD Tip Label*	*DNA Accession Number*	Voucher Number	*Voucher Name*	Date Collected	Summit	Range	Meadow	Locality Detail	Elevation (ft.)	WGS N	WGS W	Leaf Sample
Eriogonum pyrolaefolium var coryphaeum		*Eriogonum pyrolaefolium var coryphaeum 13567*	Marx 2012-034	*Eriogonum pyrolaefolium var. coryphaeum*	10/08/12	Braxon Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Braxon Peak: Summit down south face to treeline	10353	44.09333	114.99681	✓
Poa sp		*Poa sp 13568*	Marx 2012-035	*NA*	10/08/12	Braxon Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Braxon Peak: Summit down south face to treeline	10353	44.09333	114.99681	✓
Draba crassifolia	*Draba crassifolia*	*Draba cf crassifolia 13569*	Marx 2012-036	*Draba c.f. crassifolia*	10/08/12	Braxon Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Braxon Peak: Summit down south face to treeline	10353	44.09333	114.99681	✓
Penstemon montanus var idahoensis	*Penstemon montanus*	*Penstemon montanus var idahoensis 13570*	Marx 2012-037	*Penstemon montanus var. idahoensis*	10/08/12	Braxon Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Braxon Peak: Summit down south face to treeline	10353	44.09333	114.99681	✓
Picea engelmannii	*Picea engelmannii*	*Picea engelmannii 13571*	Marx 2012-038	*Picea engelmannii*	10/08/12	Braxon Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Braxon Peak: Summit down south face to treeline	10353	44.09333	114.99681	✓
Luzula sp		*Juncus sp 13572*	Marx 2012-039	*NA*	10/08/12	Braxon Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Braxon Peak: Summit down south face to treeline	10353	44.09333	114.99681	✓
Pinus albicaulis	*Pinus albicaulis*	*Pinus albicaulis 13573*	Marx 2012-040	*Pinus albicaulis*	10/08/12	Braxon Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Braxon Peak: Summit down south face to treeline	10353	44.09333	114.99681	✓
Sibbaldia procumbens	*Sibbaldia procumbens*	*Sibbaldia procumbens 13574*	Marx 2012-041	*Sibbaldia procumbens*	10/08/12	Braxon Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Braxon Peak: Summit down south face to treeline	10353	44.09333	114.99681	✓
Hulsea algida	*Hulsea algida*	*Hulsea algida 13575*	Marx 2012-042	*Hulsea algida*	10/08/12	Braxon Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Braxon Peak: Summit down south face to treeline	10353	44.09333	114.99681	✓
Sedum lanceolatum var lanceolatum	*Sedum lanceolatum*	*Sedum lanceolatum var lanceolatum 13576*	Marx 2012-043	*Sedum lanceolatum var. lanceolatum*	10/08/12	Braxon Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Braxon Peak: Summit down south face to treeline	10353	44.09333	114.99681	✓
Arnica latifolia var gracilis		*Arnica latifolia var gracilis 13577*	Marx 2012-044	*Arnica latifolia*	10/08/12	Braxon Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Braxon Peak: Summit down south face to treeline	10353	44.09333	114.99681	✓
Erigeron evermannii		*Erigeron evermannii 13578*	Marx 2012-045	*Erigeron evermannii*	10/08/12	Braxon Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Braxon Peak: Summit down south face to treeline	10353	44.09333	114.99681	✓
Chaenactis alpina		*Chaenactis alpina 13579*	Marx 2012-046	*Chaenactis alpina*	10/08/12	Braxon Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Braxon Peak: Summit down south face to treeline	10353	44.09333	114.99681	✓
Oxyria digyna	*Oxyria digyna*	*Oxyria digyna 13580*	Marx 2012-047	*Oxyria digyna*	10/08/12	Braxon Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Braxon Peak: Summit down south face to treeline	10353	44.09333	114.99681	✓
Claytonia megarhiza var bellidifolia	*Claytonia megarhiza*	*Claytonia megarhiza var bellidifolia 14001*	Marx 2012-048	*Claytonia megarhiza*	10/08/12	Braxon Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Braxon Peak: Summit down south face to treeline	10353	44.09333	114.99681	✓

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Table c.2.1 – continued from previous page

β Tip Label	*PHLAWD Tip Label*	*DNA Accession Number*	Voucher Number	*Voucher Name*	Date Collected	Summit	Range	Meadow	Locality Detail	Elevation (ft.)	WGS N	WGS W	Leaf Sample
Ribes lacustre	*Ribes lacustre*	*Ribes lacustre 14002*	Marx 2012-049	*Ribes lacustre*	10/08/12	Braxon Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Braxon Peak: Summit down south face to treeline	10353	44.09333	114.99681	✓
Luzula sp		*Juncus sp 14003*	Marx 2012-050	*NA*	10/08/12	Braxon Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Braxon Peak: Summit down south face to treeline	10353	44.09333	114.99681	✓
Antennaria microphylla	*Antennaria microphylla*	*Antennaria microphylla 14004*	Marx 2012-051	*Antennaria microphylla*	10/08/12	Braxon Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Braxon Peak: Summit down south face to treeline	10353	44.09333	114.99681	✓
Senecio fremontii		*Senecio fremontii 14005*	Marx 2012-052	*Senecio fremontii*	10/08/12	Braxon Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Braxon Peak: Summit down south face to treeline	10353	44.09333	114.99681	✓
Saxifraga bronchialis	*Saxifraga bronchialis*	*Saxifraga bronchialis 14006*	Marx 2012-053	*Saxifraga bronchialis*	10/08/12	Braxon Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Braxon Peak: Summit down south face to treeline	10353	44.09333	114.99681	✓
Poa sp		*Poa sp 14007*	Marx 2012-054	*NA*	10/08/12	Braxon Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Braxon Peak: Summit down south face to treeline	10353	44.09333	114.99681	✓
Chionophila tweedyi	*Chionophila tweedyi*	*Chionophila tweedyi 14008*	Marx 2012-055	*Chionophila tweedyi*	10/08/12	Braxon Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Braxon Peak: Summit down south face to treeline	10353	44.09333	114.99681	✓
Erigeron compositus	*Erigeron compositus*	*Erigeron compositus 14009*	Marx 2012-056	*Erigeron compositus*	10/08/12	Braxon Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Braxon Peak: Summit down south face to treeline	10353	44.09333	114.99681	✓
Castilleja miniata	*Castilleja miniata*	*Castilleja miniata 14289*	Marx 2013-057	*Castilleja miniata*	19/07/13	Mount Cramer	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Mount Cramer: east ridge from summit to treeline	10716	44.01108	114.98117	✓
Phyllodoce glanduliflora	*Phyllodoce glanduliflora*	*Phyllodoce glanduliflora 14290*	Marx 2013-058	*Phyllodoce glanduliflora*	19/07/13	Mount Cramer	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Mount Cramer: east ridge from summit to treeline	10716	44.01108	114.98117	✓
Phyllodoce empetriformis	*Phyllodoce empetriformis*	*Phyllodoce empetriformis 14291*	Marx 2013-059	*Phyllodoce empetriformis*	19/07/13	Mount Cramer	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Mount Cramer: east ridge from summit to treeline	10716	44.01108	114.98117	✓
Cassiope mertensiana var gracilis	*Cassiope mertensiana*	*Cassiope mertensiana var gracilis 14292*	Marx 2013-060	*Cassiope mertensiana var. gracilis*	19/07/13	Mount Cramer	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Mount Cramer: east ridge from summit to treeline	10716	44.01108	114.98117	✓
Claytonia megarhiza	*Claytonia megarhiza*	*Claytonia megarhiza 14293*	Marx 2013-061	*Claytonia megarhiza*	19/07/13	Mount Cramer	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Mount Cramer: east ridge from summit to treeline	10716	44.01108	114.98117	✓
Chionophila tweedyi	*Chionophila tweedyi*	*Chionophila tweedyi 14294*	Marx 2013-062	*Chionophila tweedyi*	19/07/13	Mount Cramer	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Mount Cramer: east ridge from summit to treeline	10716	44.01108	114.98117	✓
Luzula sp		*Luzula sp 14295*	Marx 2013-063	*NA*	19/07/13	Mount Cramer	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Mount Cramer: east ridge from summit to treeline	10716	44.01108	114.98117	✓
NA		*NA*	Marx 2013-064	*Arabis microphylla*	19/07/13	Mount Cramer	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Mount Cramer: east ridge from summit to treeline	10716	44.01108	114.98117	-

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Table c.2.1 – continued from previous page

β Tip Label	PHLAWD Tip Label	DNA Accession Number	Voucher Number	Voucher Name	Date Collected	Summit	Range	Meadow	Locality Detail	Elevation (ft.)	WGS N	WGS W	Leaf Sample
Castilleja cusickii	*Castilleja cusickii*	*Castilleja cusickii 14296*	Marx 2013-065	*Castilleja cusickii*	19/07/13	Mount Cramer	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Mount Cramer: east ridge from summit to treeline	10716	44.01108	114.98117	✓
Chaenactis alpina		*Chaenactis alpina 14297*	Marx 2013-066	*Chaenactis alpina*	19/07/13	Mount Cramer	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Mount Cramer: east ridge from summit to treeline	10716	44.01108	114.98117	✓
NA	*Cryptogramma crispa*	*NA*	Marx 2013-067	*Cryptogramma crispa*	19/07/13	Mount Cramer	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Mount Cramer: east ridge from summit to treeline	10716	44.01108	114.98117	✓
Hieracium triste	*Hieracium triste*	*Hieracium triste 14299*	Marx 2013-068	*Hieracium triste*	19/07/13	Mount Cramer	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Mount Cramer: east ridge from summit to treeline	10716	44.01108	114.98117	✓
Sedum lanceolatum var lanceolatum	*Sedum lanceolatum*	*Sedum lanceolatum var lanceolatum 14300*	Marx 2013-069	*Sedum lanceolatum var. lanceolatum*	19/07/13	Mount Cramer	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Mount Cramer: east ridge from summit to treeline	10716	44.01108	114.98117	✓
Epilobium alpinum		*Epilobium alpinum 14301*	Marx 2013-070	*Epilobium alpinum*	19/07/13	Mount Cramer	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Mount Cramer: east ridge from summit to treeline	10716	44.01108	114.98117	✓
Erysimum asperum	*Erysimum asperum*	*Erysimum asperum 14302*	Marx 2013-071	*Erysimum asperum*	19/07/13	Mount Cramer	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Mount Cramer: east ridge from summit to treeline	10716	44.01108	114.98117	✓
Arnica latifolia		*Arnica latifolia 14303*	Marx 2013-072	*Arnica latifolia*	19/07/13	Mount Cramer	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Mount Cramer: east ridge from summit to treeline	10716	44.01108	114.98117	✓
Minuartia obtusiloba	*Minuartia obtusiloba*	*Minuartia obtusiloba 14304*	Marx 2013-073	*Minuartia obtusiloba*	19/07/13	Mount Cramer	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Mount Cramer: east ridge from summit to treeline	10716	44.01108	114.98117	✓
Minuartia nuttallii	*Sabulina nuttallii*	*Minuartia nuttallii 14305*	Marx 2013-074	*Minuartia nuttallii*	19/07/13	Mount Cramer	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Mount Cramer: east ridge from summit to treeline	10716	44.01108	114.98117	✓
Arabis microphylla	*Boechera microphylla*	*Arabis microphylla 14306*	Marx 2013-075	*Arabis microphylla*	19/07/13	Mount Cramer	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Mount Cramer: east ridge from summit to treeline	10716	44.01108	114.98117	✓
Erigeron compositus	*Erigeron compositus*	*Erigeron compositus 14307*	Marx 2013-076	*Erigeron compositus*	19/07/13	Mount Cramer	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Mount Cramer: east ridge from summit to treeline	10716	44.01108	114.98117	✓
Tonestus lyallii	*Tonestus lyallii*	*Tonestus lyallii 14308*	Marx 2013-077	*Tonestus lyallii*	19/07/13	Mount Cramer	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Mount Cramer: east ridge from summit to treeline	10716	44.01108	114.98117	✓
Anemone drummondii	*Anemone drummondii*	*Anemone drummondii 14309*	Marx 2013-078	*Anemone drummondii*	19/07/13	Mount Cramer	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Mount Cramer: east ridge from summit to treeline	10716	44.01108	114.98117	✓
Erigeron grandiflorus	*Erigeron grandiflorus*	*Erigeron grandiflorus 14310*	Marx 2013-079	*Erigeron grandiflorus*	19/07/13	Mount Cramer	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Mount Cramer: east ridge from summit to treeline	10716	44.01108	114.98117	✓
Antennaria alpina	*Antennaria alpina*	*Antennaria alpina 14311*	Marx 2013-080	*Antennaria alpina*	19/07/13	Mount Cramer	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Mount Cramer: east ridge from summit to treeline	10716	44.01108	114.98117	✓

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Table c.2.1 – continued from previous page

β *Tip Label*	*PHLAWD Tip Label*	*DNA Accession Number*	Voucher Number	*Voucher Name*	Date Collected	Summit	Range	Meadow	Locality Detail	Elevation (ft.)	WGS N	WGS W	Leaf Sample
Antennaria lanata	*Antennaria lanata*	*Antennaria lanata 14312*	Marx 2013-081	*Antennaria lanata*	19/07/13	Mount Cramer	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Mount Cramer: east ridge from summit to treeline	10716	44.01108	114.98117	✓
Poa sp		*Unknown 14313*	Marx 2013-082	*NA*	19/07/13	Mount Cramer	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Mount Cramer: east ridge from summit to treeline	10716	44.01108	114.98117	✓
Potentilla glandulosa	*Potentilla brevifolia*	*Potentilla glandulosa 14314*	Marx 2013-083	*Potentilla glandulosa*	19/07/13	Mount Cramer	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Mount Cramer: east ridge from summit to treeline	10716	44.01108	114.98117	✓
Ericameria discoidea	*Ericameria discoidea*	*Ericameria discoidea 14315*	Marx 2013-084	*Ericameria discoidea*	19/07/13	Mount Cramer	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Mount Cramer: east ridge from summit to treeline	10716	44.01108	114.98117	✓
Arnica latifolia		*Arnica latifolia 14316*	Marx 2013-085	*Arnica latifolia*	19/07/13	Mount Cramer	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Mount Cramer: east ridge from summit to treeline	10716	44.01108	114.98117	✓
Poa sp		*Unknown 14317*	Marx 2013-086	*NA*	19/07/13	Mount Cramer	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Mount Cramer: east ridge from summit to treeline	10716	44.01108	114.98117	✓
Festuca sp		*Festuca sp 14318*	Marx 2013-087	*NA*	19/07/13	Mount Cramer	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Mount Cramer: east ridge from summit to treeline	10716	44.01108	114.98117	✓
Poa sp		*Unknown 14319*	Marx 2013-088	*NA*	19/07/13	Mount Cramer	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Mount Cramer: east ridge from summit to treeline	10716	44.01108	114.98117	✓
Heuchera parvifolia var dissecta	*Heuchera parvifolia*	*Heuchera parvifolia var dissecta 14320*	Marx 2013-089	*Heuchera parvifolia var. dissecta*	19/07/13	Mount Cramer	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Mount Cramer: east ridge from summit to treeline	10716	44.01108	114.98117	✓
Hulsea algida	*Hulsea algida*	*Hulsea algida 14321*	Marx 2013-090	*Hulsea algida*	19/07/13	Mount Cramer	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Mount Cramer: east ridge from summit to treeline	10716	44.01108	114.98117	✓
Antennaria alpina	*Antennaria alpina*	*Antennaria alpina 14322*	Marx 2013-091	*Antennaria alpina*	19/07/13	Mount Cramer	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Mount Cramer: east ridge from summit to treeline	10716	44.01108	114.98117	✓
Sibbaldia procumbens	*Sibbaldia procumbens*	*Sibbaldia procumbens 14323*	Marx 2013-092	*Sibbaldia procumbens*	19/07/13	Mount Cramer	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Mount Cramer: east ridge from summit to treeline	10716	44.01108	114.98117	✓
NA	*Luzula hitchcockii*	*NA*	Marx 2013-093	*Luzula hitchcockii*	19/07/13	Mount Cramer	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Mount Cramer: east ridge from summit to treeline	10716	44.01108	114.98117	✓
Juncus sp		*Juncus sp 14325*	Marx 2013-094	*NA*	19/07/13	Mount Cramer	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Mount Cramer: east ridge from summit to treeline	10716	44.01108	114.98117	✓
NA		*NA*	Marx 2013-095	*Carex c.f. phaeocephala*	19/07/13	Mount Cramer	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Mount Cramer: east ridge from summit to treeline	10716	44.01108	114.98117	✓
Eriogonum ovalifolium	*Eriogonum ovalifolium*	*Eriogonum ovalifolium 14327*	Marx 2013-096	*Eriogonum ovalifolium*	19/07/13	Mount Cramer	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Mount Cramer: east ridge from summit to treeline	10716	44.01108	114.98117	✓

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Table c.2.1 – continued from previous page

β Tip Label	*PHLAWD Tip Label*	*DNA Accession Number*	Voucher Number	*Voucher Name*	Date Collected	Summit	Range	Meadow	Locality Detail	Elevation (ft.)	WGS N	WGS W	Leaf Sample
Potentilla brevifolia	*Potentilla brevifolia*	*Potentilla brevifolia 14328*	Marx 2013-097	*Potentilla brevifolia*	19/07/13	Mount Cramer	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Mount Cramer: east ridge from summit to treeline	10716	44.01108	114.98117	✓
Oxyria digyna	*Oxyria digyna*	*Oxyria digyna 14329*	Marx 2013-098	*Oxyria digyna*	19/07/13	Mount Cramer	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Mount Cramer: east ridge from summit to treeline	10716	44.01108	114.98117	✓
Juniperus communis	*Juniperus communis*	*Juniperus communis 14330*	Marx 2013-099	*Juniperus communis*	19/07/13	Mount Cramer	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Mount Cramer: east ridge from summit to treeline	10716	44.01108	114.98117	✓
Castilleja cusickii	*Castilleja cusickii*	*Castilleja cusickii 14331*	Marx 2013-100	*Castilleja cusickii*	22/07/13	Snowyside Peak	Sawtooth Mountains	✓	Idaho: Sawtooth National Forest: Sawtooth Mountains: Snowyside Peak: collected along trail	10651	43.93825	114.97142	✓
Castilleja miniata	*Castilleja miniata*	*Castilleja miniata 14332*	Marx 2013-101	*Castilleja miniata*	22/07/13	Snowyside Peak	Sawtooth Mountains	✓	Idaho: Sawtooth National Forest: Sawtooth Mountains: Snowyside Peak: collected along trail	10651	43.93825	114.97142	✓
NA	*Cryptogramma crispa*	*NA*	Marx 2013-102	*Cryptogramma crispa*	22/07/13	Snowyside Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountians: Snowyside Peak: along west face and south ridge line (trail to summit)	10651	43.93825	114.97142	✓
Senecio fremontii		*Senecio fremontii 14334*	Marx 2013-103	*Senecio fremontii*	22/07/13	Snowyside Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountians: Snowyside Peak: along west face and south ridge line (trail to summit)	10651	43.93825	114.97142	✓
Draba oreibata		*Draba oreibata 14335*	Marx 2013-104	*Draba oreibata*	22/07/13	Snowyside Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountians: Snowyside Peak: along west face and south ridge line (trail to summit)	10651	43.93825	114.97142	✓
Collomia debilis	*Collomia debilis*	*Collomia debilis 14336*	Marx 2013-105	*Collomia debilis*	22/07/13	Snowyside Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountians: Snowyside Peak: along west face and south ridge line (trail to summit)	10651	43.93825	114.97142	✓
Chaenactis alpina		*Chaenactis alpina 14337*	Marx 2013-106	*Chaenactis alpina*	22/07/13	Snowyside Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountians: Snowyside Peak: along west face and south ridge line (trail to summit)	10651	43.93825	114.97142	✓
Senecio werneriifolius		*Senecio werneriifolius 14338*	Marx 2013-107	*Senecio werneriifolius*	22/07/13	Snowyside Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountians: Snowyside Peak: along west face and south ridge line (trail to summit)	10651	43.93825	114.97142	✓
Epilobium alpinum		*Epilobium alpinum 14339*	Marx 2013-108	*Epilobium alpinum*	22/07/13	Snowyside Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountians: Snowyside Peak: along west face and south ridge line (trail to summit)	10651	43.93825	114.97142	✓
Erigeron evermannii		*Erigeron evermannii 14340*	Marx 2013-109	*Erigeron evermannii*	22/07/13	Snowyside Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Snowyside Peak: along west face and south ridge line (trail to summit)	10651	43.93825	114.97142	✓

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Table c.2.1 – continued from previous page

β Tip Label	*PHLAWD Tip Label*	*DNA Accession Number*	Voucher Number	*Voucher Name*	Date Collected	Summit	Range	Meadow	Locality Detail	Elevation (ft.)	WGS N	WGS W	Leaf Sample
Claytonia megarhiza	*Claytonia megarhiza*	*Claytonia megarhiza 14341*	Marx 2013-110	*Claytonia megarhiza*	22/07/13	Snowyside Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountians: Snowyside Peak: along west face and south ridge line (trail to summit)	10651	43.93825	114.97142	✓
Haplopappus macronema		*Haplopappus macronema 14342*	Marx 2013-111	*Haplopappus macronema*	22/07/13	Snowyside Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountians: Snowyside Peak: along west face and south ridge line (trail to summit)	10651	43.93825	114.97142	✓
Oxyria digyna	*Oxyria digyna*	*Oxyria digyna 14343*	Marx 2013-112	*Oxyria digyna*	22/07/13	Snowyside Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountians: Snowyside Peak: along west face and south ridge line (trail to summit)	10651	43.93825	114.97142	✓
Eriogonum ovalifolium	*Eriogonum ovalifolium*	*Eriogonum ovalifolium 14344*	Marx 2013-113	*Eriogonum ovalifolium*	22/07/13	Snowyside Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountians: Snowyside Peak: along west face and south ridge line (trail to summit)	10651	43.93825	114.97142	✓
Arabis lemmonii	*Boechera lemmonii*	*Arabis cf lemmonii 14345*	Marx 2013-114	*Arabis c.f lemmonii*	22/07/13	Snowyside Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountians: Snowyside Peak: along west face and south ridge line (trail to summit)	10651	43.93825	114.97142	✓
Heuchera parvifolia var dissecta	*Heuchera parvifolia*	*Heuchera parvifolia var dissecta 14346*	Marx 2013-115	*Heuchera parvifolia var. dissecta*	22/07/13	Snowyside Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountians: Snowyside Peak: along west face and south ridge line (trail to summit)	10651	43.93825	114.97142	✓
Ivesia gordonii	*Ivesia gordonii*	*Ivesia gordonii 14347*	Marx 2013-116	*Ivesia gordonii*	22/07/13	Snowyside Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountians: Snowyside Peak: along west face and south ridge line (trail to summit)	10651	43.93825	114.97142	✓
Antennaria microphylla	*Antennaria microphylla*	*Antennaria microphylla 14348*	Marx 2013-117	*Antennaria microphylla*	22/07/13	Snowyside Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountians: Snowyside Peak: along west face and south ridge line (trail to summit)	10651	43.93825	114.97142	✓
Eriogonum ovalifolium	*Eriogonum ovalifolium*	*Eriogonum ovalifolium 14349*	Marx 2013-118	*Eriogonum ovalifolium*	22/07/13	Snowyside Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountians: Snowyside Peak: along west face and south ridge line (trail to summit)	10651	43.93825	114.97142	✓
Eriogonum crosbyae		*Eriogonum crosbyae 14350*	Marx 2013-119	*Eriogonum crosbyae*	22/07/13	Snowyside Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountians: Snowyside Peak: along west face and south ridge line (trail to summit)	10651	43.93825	114.97142	✓
Abies lasiocarpa	*Abies lasiocarpa*	*Abies lasiocarpa 14351*	Marx 2013-120	*Abies lasiocarpa*	22/07/13	Snowyside Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountians: Snowyside Peak: along west face and south ridge line (trail to summit)	10651	43.93825	114.97142	✓
NA		*NA*	Marx 2013-121	*Pinus albicaulis*	22/07/13	Snowyside Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountians: Snowyside Peak: along west face and south ridge line (trail to summit)	10651	43.93825	114.97142	✓

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Table c.2.1 – continued from previous page

β Tip Label	*PHLAWD Tip Label*	*DNA Accession Number*	Voucher Number	*Voucher Name*	Date Collected	Summit	Range	Meadow	Locality Detail	Elevation (ft.)	WGS N	WGS W	Leaf Sample
Smelowskia calycina	*Smelowskia calycina*	*Smelowskia calycina 14352*	Marx 2013-122	*Smelowskia calycina*	22/07/13	Snowyside Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Snowyside Peak: collected on summit	10651	43.93825	114.97142	✓
Polemonium viscosum	*Polemonium viscosum*	*Polemonium viscosum 14353*	Marx 2013-123	*Polemonium viscosum*	22/07/13	Snowyside Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Snowyside Peak: collected on summit	10651	43.93825	114.97142	✓
NA		*NA*	Marx 2013-124	*Carex proposita*	22/07/13	Snowyside Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Snowyside Peak: collected on summit	10651	43.93825	114.97142	✓
NA	*Selaginella densa*	*NA*	Marx 2013-125	*Selaginella densa*	22/07/13	Snowyside Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Snowyside Peak: collected on summit	10651	43.93825	114.97142	✓
Erigeron compositus	*Erigeron compositus*	*Erigeron compositus 14355*	Marx 2013-126	*Erigeron compositus*	22/07/13	Snowyside Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Snowyside Peak: collected on summit	10651	43.93825	114.97142	✓
Poa sp		*Unknown 14356*	Marx 2013-127	*NA*	22/07/13	Snowyside Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Snowyside Peak: collected on summit	10651	43.93825	114.97142	✓
Poa sp		*unknown 14357*	Marx 2013-128	*NA*	22/07/13	Snowyside Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Snowyside Peak: collected on summit	10651	43.93825	114.97142	✓
Poa sp		*Unknown 14358*	Marx 2013-129	*NA*	22/07/13	Snowyside Peak	Sawtooth Mountains	-	Idaho: Sawtooth National Forest: Sawtooth Mountains: Snowyside Peak: collected on summit	10651	43.93825	114.97142	✓
Phyllodoce empetriformis	*Phyllodoce empetriformis*	*Phyllodoce empetriformis 14359*	Marx 2013-130	*Phyllodoce empetriformis*	22/07/13	Snowyside Peak	Sawtooth Mountains	✓	Idaho: Sawtooth National Forest: Sawtooth Mountians: Snowyside Peak: collected at second treeline only	10651	43.93825	114.97142	✓
Antennaria alpina	*Antennaria alpina*	*Antennaria alpina 14360*	Marx 2013-131	*Antennaria alpina*	22/07/13	Snowyside Peak	Sawtooth Mountains	✓	Idaho: Sawtooth National Forest: Sawtooth Mountians: Snowyside Peak: collected at second treeline only	10651	43.93825	114.97142	✓
Arnica latifolia		*Arnica latifolia 14361*	Marx 2013-132	*Arnica latifolia*	22/07/13	Snowyside Peak	Sawtooth Mountains	✓	Idaho: Sawtooth National Forest: Sawtooth Mountians: Snowyside Peak: collected at second treeline only	10651	43.93825	114.97142	✓
NA		*NA*	Marx 2013-133	*NA*	22/07/13	Snowyside Peak	Sawtooth Mountains	✓	Idaho: Sawtooth National Forest: Sawtooth Mountians: Snowyside Peak: collected at second treeline only	10651	43.93825	114.97142	✓
Tonestus lyallii	*Tonestus lyallii*	*Tonestus lyallii 14362*	Marx 2013-134	*Tonestus lyallii*	22/07/13	Snowyside Peak	Sawtooth Mountains	✓	Idaho: Sawtooth National Forest: Sawtooth Mountians: Snowyside Peak: collected at second treeline only	10651	43.93825	114.97142	✓
Erigeron evermannii		*Erigeron evermannii 14363*	Marx 2013-135	*Erigeron evermannii*	22/07/13	Snowyside Peak	Sawtooth Mountains	✓	Idaho: Sawtooth National Forest: Sawtooth Mountains: Snowyside Peak: collected at second treeline only	10651	43.93825	114.97142	✓

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Table c.2.1 – continued from previous page

β Tip Label	*PHLAWD Tip Label*	*DNA Accession Number*	Voucher Number	*Voucher Name*	Date Collected	Summit	Range	Meadow	Locality Detail	Elevation (ft.)	WGS N	WGS W	Leaf Sample
Draba oreibata	*Draba lonchocarpa*	*Draba cf oreibata 14404*	Marx 2013-136	*Draba c.f. oreibata*	22/07/13	Snowyside Peak	Sawtooth Mountains	✓	Idaho: Sawtooth National Forest: Sawtooth Mountians: Snowyside Peak: collected at second treeline only	10651	43.93825	114.97142	✓
Bupleurum americanum	*Bupleurum americanum*	*Bupleurum americanum 14364*	Marx 2013-137	*Bupleurum americanum*	22/07/13	Snowyside Peak	Sawtooth Mountains	✓	Idaho: Sawtooth National Forest: Sawtooth Mountians: Snowyside Peak: collected at second treeline only	10651	43.93825	114.97142	✓
Potentilla glandulosa	*Potentilla brevifolia*	*Potentilla glandulosa 14405*	Marx 2013-138	*Potentilla glandulosa*	22/07/13	Snowyside Peak	Sawtooth Mountains	✓	Idaho: Sawtooth National Forest: Sawtooth Mountians: Snowyside Peak: collected at second treeline only	10651	43.93825	114.97142	✓
Hulsea algida	*Hulsea algida*	*Hulsea algida 14365*	Marx 2013-139	*Hulsea algida*	22/07/13	Snowyside Peak	Sawtooth Mountains	✓	Idaho: Sawtooth National Forest: Sawtooth Mountians: Snowyside Peak: collected at second treeline only	10651	43.93825	114.97142	✓
Eriogonum ovalifolium	*Eriogonum ovalifolium*	*Eriogonum ovalifolium 14366*	Marx 2013-140	*Eriogonum ovalifolium*	22/07/13	Snowyside Peak	Sawtooth Mountains	✓	Idaho: Sawtooth National Forest: Sawtooth Mountians: Snowyside Peak: collected at second treeline only	10651	43.93825	114.97142	✓
Poa sp		*Unknown 14367*	Marx 2013-141	*NA*	22/07/13	Snowyside Peak	Sawtooth Mountains	✓	Idaho: Sawtooth National Forest: Sawtooth Mountians: Snowyside Peak: collected at second treeline only	10651	43.93825	114.97142	✓
NA	*Castilleja applegatei*	*NA*	Marx 2013-142	*Castilleja applegatei*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	✓
Castilleja cusickii	*Castilleja cusickii*	*Castilleja cusickii 14238*	Marx 2013-143	*Castilleja cusickii*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	✓
Ranunculus eschscholtzii	*Ranunculus eschscholtzii*	*Ranunculus eschscholtzii 14239*	Marx 2013-144	*Ranunculus eschscholtzii*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	✓
Arnica parryi	*Arnica mollis*	*Arnica parryi 14240*	Marx 2013-145	*Arnica parryi*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	✓
Draba densifolia	*Draba densifolia*	*Draba cf densifolia 14241*	Marx 2013-146	*Draba c.f. densifolia*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	✓
Eriogonum crosbyae		*Eriogonum crosbyae 14242*	Marx 2013-147	*Eriogonum crosbyae*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	✓

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β Tip Label	*PHLAWD Tip Label*	*DNA Accession Number*	Voucher Number	*Voucher Name*	Date Collected	Summit	Range	Meadow	Locality Detail	Elevation (ft.)	WGS N	WGS W	Leaf Sample
Senecio werneriifolius		*Senecio werneriifolius 14243*	Marx 2013-148	*Senecio werneriifolius*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	✓
Eriogonum ovalifolium	*Eriogonum ovalifolium*	*Eriogonum ovalifolium 14244*	Marx 2013-149	*Eriogonum ovalifolium*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	✓
Phacelia hastata	*Phacelia hastata*	*Phacelia hastata 14245*	Marx 2013-150	*Phacelia hastata*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	✓
Lomatium idahoensis	*Lomatium idahoense*	*Lomatium idahoensis 14246*	Marx 2013-151	*Lomatium idahoensis*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	✓
Erigeron asperugineus		*Erigeron asperugineus 14247*	Marx 2013-152	*Erigeron asperugineus*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	✓
Erigeron compositus	*Erigeron compositus*	*Erigeron compositus 14248*	Marx 2013-153	*Erigeron compositus*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	✓
Minuartia obtusiloba	*Minuartia obtusiloba*	*Minuartia obtusiloba 14249*	Marx 2013-154	*Minuartia obtusiloba*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	✓
Heuchera parvifolia var dissecta	*Heuchera parvifolia*	*Heuchera parvifolia var dissecta 14250*	Marx 2013-155	*Heuchera parvifolia var. dissecta*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	✓
NA		*NA*	Marx 2013-156	*NA*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	-
Poa sp		*Unknown 14251*	Marx 2013-157	*NA*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	✓
Epilobium alpinum		*Epilobium alpinum 14252*	Marx 2013-158	*Epilobium alpinum*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	✓
NA		*NA*	Marx 2013-159	*Senecio fremontii*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	✓

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β Tip Label	*PHLAWD Tip Label*	*DNA Accession Number*	Voucher Number	*Voucher Name*	Date Collected	Summit	Range	Meadow	Locality Detail	Elevation (ft.)	WGS N	WGS W	Leaf Sample
Phlox pulvinata		*Phlox cf pulvinata 14254*	Marx 2013-160	*Phlox c.f. pulvinata*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	✓
Potentilla glandulosa	*Potentilla brevifolia*	*Potentilla glandulosa 14255*	Marx 2013-161	*Potentilla glandulosa*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	✓
Sibbaldia procumbens	*Sibbaldia procumbens*	*Sibbaldia procumbens 14256*	Marx 2013-162	*Sibbaldia procumbens*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	✓
Oxyria digyna	*Oxyria digyna*	*Oxyria digyna 14257*	Marx 2013-163	*Oxyria digyna*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	✓
Antennaria alpina	*Antennaria alpina*	*Antennaria alpina 14258*	Marx 2013-164	*Antennaria alpina*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	✓
Ribes lacustre	*Ribes lacustre*	*Ribes lacustre 14259*	Marx 2013-165	*Ribes lacustre*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	✓
NA	*Cystopteris fragilis*	*NA*	Marx 2013-166	*Cystopteris fragilis*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	✓
Poa sp		*Unknown 14261*	Marx 2013-167	*NA*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	✓
Festuca sp		*Festuca sp 14262*	Marx 2013-168	*NA*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	✓
Juncus sp		*Juncus sp 14263*	Marx 2013-169	*NA*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	✓
NA	*Tonestus lyallii*	*NA*	Marx 2013-170	*Tonestus lyallii*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	✓
NA	*Selaginella densa*	*NA*	Marx 2013-171	*Selaginella densa*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	✓

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β Tip Label	*PHLAWD Tip Label*	*DNA Accession Number*	Voucher Number	*Voucher Name*	Date Collected	Summit	Range	Meadow	Locality Detail	Elevation (ft.)	WGS N	WGS W	Leaf Sample
Arabis lemmonii	*Boechera lemmonii*	*Arabis cf lemmonii 14266*	Marx 2013-172	*Arabis c.f lemmonii*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	✓
Claytonia megarhiza	*Claytonia megarhiza*	*Claytonia megarhiza 14267*	Marx 2013-173	*Claytonia megarhiza*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	✓
Draba lonchocarpa	*Draba lonchocarpa*	*Draba cf lonchocarpa 14268*	Marx 2013-174	*Draba c.f. lonchocarpa*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	✓
Luzula sp		*Luzula sp 14269*	Marx 2013-175	*NA*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	✓
NA	*Micranthes ferruginea*	*NA*	Marx 2013-176	*Saxifraga ferruginea*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	✓
Polemonium viscosum	*Polemonium viscosum*	*Polemonium viscosum 14271*	Marx 2013-177	*Polemonium viscosum*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	✓
Sedum debile		*Sedum debile 14272*	Marx 2013-178	*Sedum debile*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	✓
Antennaria rosea	*Antennaria rosea*	*Antennaria rosea 14273*	Marx 2013-179	*Antennaria rosea*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	✓
Haplopappus macronema		*Haplopappus macronema 14274*	Marx 2013-180	*Haplopappus macronema*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	✓
Senecio fremontii		*Senecio fremontii 14275*	Marx 2013-181	*Senecio fremontii*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	✓
Hulsea algida	*Hulsea algida*	*Hulsea algida 14276*	Marx 2013-182	*Hulsea algida*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	✓
Senecio werneriifolius		*Senecio werneriifolius 14277*	Marx 2013-183	*Senecio werneriifolius*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	✓

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Table c.2.1 – continued from previous page

β Tip Label	PHLAWD Tip Label	DNA Accession Number	Voucher Number	Voucher Name	Date Collected	Summit	Range	Meadow	Locality Detail	Elevation (ft.)	WGS N	WGS W	Leaf Sample
Stenotus acaulis	*Stenotus acaulis*	*Stenotus acaulis 14278*	Marx 2013-184	*Stenotus acaulis*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	✓
Penstemon montanus var idahoensis	*Penstemon montanus*	*Penstemon montanus var idahoensis 14279*	Marx 2013-185	*Penstemon montanus var. idahoensis*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	✓
Eriogonum ovalifolium	*Eriogonum ovalifolium*	*Eriogonum ovalifolium 14280*	Marx 2013-186	*Eriogonum ovalifolium*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	✓
Poa sp		*Unknown 14281*	Marx 2013-187	*NA*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	✓
Poa sp		*Unknown 14282*	Marx 2013-188	*NA*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	✓
Chaenactis alpina		*Chaenactis alpina 14283*	Marx 2013-189	*Chaenactis alpina*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	✓
Artemisia dracunculus	*Artemisia dracunculus*	*Artemisia dracunculus 14284*	Marx 2013-190	*Artemisia dracunculus*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	✓
Juniperus communis	*Juniperus communis*	*Juniperus communis 14285*	Marx 2013-191	*Juniperus communis*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	✓
Lupinus argenteus var depressus	*Lupinus argenteus*	*Lupinus argenteus var depressus 14286*	Marx 2013-192	*Lupinus argenteus var. depressus*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	✓
Achillea millefolium var alpicola	*Achillea millefolium*	*Achillea millefolium var alpicola 14287*	Marx 2013-193	*Achillea millefolium var. alpicola*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	✓
Cirsium subniveum	*Cirsium subniveum*	*Cirsium subniveum 14288*	Marx 2013-194	*Cirsium subniveum*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	✓
NA		*NA*	Marx 2013-195	*Arabis c.f lemmonii*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	✓

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Table c.2.1 – continued from previous page

β Tip Label	*PHLAWD Tip Label*	*DNA Accession Number*	Voucher Number	*Voucher Name*	Date Collected	Summit	Range	Meadow	Locality Detail	Elevation (ft.)	WGS N	WGS W	Leaf Sample
NA		*NA*	Marx 2013-196	*Arabis microphylla*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	-
NA		*NA*	Marx 2013-197	*Draba c.f. stenoloba*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	✓
NA		*NA*	Marx 2013-417	*Arnica latifolia*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	✓
NA		*NA*	Marx 2013-419	*Haplopappus suffruticosus*	25/07/13	Castle Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: Castle Peak: summit down southwest slope to treeline	11815	44.04019	114.58878	✓
Castilleja cusickii	*Castilleja cusickii*	*Castilleja cusickii 14368*	Marx 2013-198	*Castilleja cusickii*	07/08/13	Salzburger Spitzl	Pioneer Mountains	✓	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Meadow below treeline	9777	43.76392	114.16531	✓
Castilleja miniata	*Castilleja miniata*	*Castilleja miniata 14369*	Marx 2013-199a	*Castilleja miniata*	07/08/13	Salzburger Spitzl	Pioneer Mountains	✓	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Meadow above treeline	10089	43.76619	114.15839	✓
Castilleja rhexiifolia	*Castilleja rhexiifolia*	*Castilleja rhexiifolia 14406*	Marx 2013-199b	*Castilleja rhexiifolia*	07/08/13	Salzburger Spitzl	Pioneer Mountains	✓	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Meadow above treeline	10089	43.76619	114.15839	✓
Parnassia fimbriata	*Parnassia fimbriata*	*Parnassia fimbriata 14370*	Marx 2013-200	*Parnassia fimbriata*	07/08/13	Salzburger Spitzl	Pioneer Mountains	✓	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Meadow above treeline	10089	43.76619	114.15839	✓
Poa sp		*Unknown 14407*	Marx 2013-201	*NA*	07/08/13	Salzburger Spitzl	Pioneer Mountains	✓	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Meadow above treeline	10089	43.76619	114.15839	✓
Lupinus argenteus var depressus	*Lupinus argenteus*	*Lupinus argenteus var depressus 14408*	Marx 2013-202	*Lupinus argenteus var. depressus*	07/08/13	Salzburger Spitzl	Pioneer Mountains	✓	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Meadow above treeline	10089	43.76619	114.15839	✓
Epilobium alpinum		*Epilobium alpinum 14409*	Marx 2013-203	*Epilobium alpinum*	07/08/13	Salzburger Spitzl	Pioneer Mountains	✓	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Meadow above treeline	10089	43.76619	114.15839	✓
Pedicularis groenlandica	*Pedicularis groenlandica*	*Pedicularis groenlandica 14410*	Marx 2013-204	*Pedicularis groenlandica*	07/08/13	Salzburger Spitzl	Pioneer Mountains	✓	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Meadow above treeline	10089	43.76619	114.15839	✓
Poa sp		*Unknown 14411*	Marx 2013-205	*NA*	07/08/13	Salzburger Spitzl	Pioneer Mountains	✓	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Meadow above treeline	10089	43.76619	114.15839	✓
Phyllodoce empetriformis	*Phyllodoce empetriformis*	*Phyllodoce empetriformis 14412*	Marx 2013-206	*Phyllodoce empetriformis*	07/08/13	Salzburger Spitzl	Pioneer Mountains	✓	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Meadow above treeline	10089	43.76619	114.15839	✓
Erythranthe tilingii	*Erythranthe tilingii*	*Erythranthe tilingii 14413*	Marx 2013-207	*Erythranthe tilingii*	07/08/13	Salzburger Spitzl	Pioneer Mountains	✓	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Meadow above treeline	10089	43.76619	114.15839	✓

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Table c.2.1 – continued from previous page

β Tip Label	PHLAWD Tip Label	DNA Accession Number	Voucher Number	Voucher Name	Date Collected	Summit	Range	Meadow	Locality Detail	Elevation (ft.)	WGS N	WGS W	Leaf Sample
Gentiana calycosa		*Gentiana calycosa 14414*	Marx 2013-208	*Gentiana calycosa*	07/08/13	Salzburger Spitzl	Pioneer Mountians	✓	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Meadow above treeline	10089	43.76619	114.15839	✓
Dasiphora fruticosa	*Dasiphora fruticosa*	*Dasiphora fruticosa 14415*	Marx 2013-209	*Dasiphora fruticosa*	07/08/13	Salzburger Spitzl	Pioneer Mountians	✓	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Meadow above treeline	10089	43.76619	114.15839	✓
Arnica chamissonis		*Arnica chamissonis 14416*	Marx 2013-210	*Arnica chamissonis*	07/08/13	Salzburger Spitzl	Pioneer Mountians	✓	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Meadow above treeline	10089	43.76619	114.15839	✓
Bistorta bistortoides	*Bistorta vivipara*	*Bistorta bistortoides 14417*	Marx 2013-211	*Bistorta bistortoides*	07/08/13	Salzburger Spitzl	Pioneer Mountians	✓	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Meadow above treeline	10089	43.76619	114.15839	✓
Antennaria corymbosa	*Antennaria corymbosa*	*Antennaria corymbosa 14418*	Marx 2013-212	*Antennaria corymbosa*	07/08/13	Salzburger Spitzl	Pioneer Mountians	✓	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Meadow above treeline	10089	43.76619	114.15839	✓
Solidago multiradiata	*Solidago multiradiata*	*Solidago multiradiata 14419*	Marx 2013-213	*Solidago multiradiata*	07/08/13	Salzburger Spitzl	Pioneer Mountians	✓	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Meadow above treeline	10089	43.76619	114.15839	✓
Aster occidentalis var occidentalis		*Aster occidentalis var occidentalis 14420*	Marx 2013-214	*Aster occidentalis var. occidentalis*	07/08/13	Salzburger Spitzl	Pioneer Mountians	✓	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Meadow above treeline	10089	43.76619	114.15839	✓
Salix arctica	*Salix arctica*	*Salix arctica 14421*	Marx 2013-215	*Salix arctica*	07/08/13	Salzburger Spitzl	Pioneer Mountians	✓	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Meadow above treeline	10089	43.76619	114.15839	✓
Phyllodoce empetriformis	*Phyllodoce empetriformis*	*Phyllodoce empetriformis 14422*	Marx 2013-216	*Phyllodoce empetriformis*	07/08/13	Salzburger Spitzl	Pioneer Mountians	✓	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Meadow above treeline	10089	43.76619	114.15839	✓
Poa sp		*Unknown 14423*	Marx 2013-217	*NA*	07/08/13	Salzburger Spitzl	Pioneer Mountians	✓	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Meadow above treeline	10089	43.76619	114.15839	✓
Saxifraga mertensiana	*Saxifraga mertensiana*	*Saxifraga mertensiana 14424*	Marx 2013-218	*Saxifraga mertensiana*	07/08/13	Salzburger Spitzl	Pioneer Mountians	✓	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Meadow above treeline	10089	43.76619	114.15839	✓
Sibbaldia procumbens	*Sibbaldia procumbens*	*Sibbaldia procumbens 14425*	Marx 2013-219	*Sibbaldia procumbens*	07/08/13	Salzburger Spitzl	Pioneer Mountians	✓	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Meadow above treeline	10089	43.76619	114.15839	✓
NA		*NA*	Marx 2013-220	*NA*	07/08/13	Salzburger Spitzl	Pioneer Mountians	✓	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Meadow above treeline	10089	43.76619	114.15839	-
NA		*NA*	Marx 2013-221	*Eremogone congesta*	07/08/13	Salzburger Spitzl	Pioneer Mountians	✓	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Meadow above treeline	10089	43.76619	114.15839	-
Potentilla glaucophylla var glaucophylla	*Potentilla glaucophylla*	*Potentilla glaucophylla var glaucophylla 14426*	Marx 2013-222	*Potentilla glaucophylla var. glaucophylla*	07/08/13	Salzburger Spitzl	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Tallus down from summit	11600	43.77446	114.15942	✓

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Table c.2.1 – continued from previous page

β Tip Label	*PHLAWD Tip Label*	*DNA Accession Number*	Voucher Number	*Voucher Name*	Date Collected	Summit	Range	Meadow	Locality Detail	Elevation (ft.)	WGS N	WGS W	Leaf Sample
Astragalus alpinus	*Astragalus alpinus*	*Astragalus alpinus 14427*	Marx 2013-223	*Astragalus alpinus*	07/08/13	Salzburger Spitzl	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Tallus down from summit	11600	43.77446	114.15942	✓
Aquilegia flavescens	*Aquilegia flavescens*	*Aquilegia flavescens 14428*	Marx 2013-224	*Aquilegia flavescens*	07/08/13	Salzburger Spitzl	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Tallus down from summit	11600	43.77446	114.15942	✓
NA	*Cryptogramma crispa*	*NA*	Marx 2013-225	*Cryptogramma crispa*	07/08/13	Salzburger Spitzl	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Tallus down from summit	11600	43.77446	114.15942	✓
NA		*NA*	Marx 2013-226	*Aster foliaceus var. apricus*	07/08/13	Salzburger Spitzl	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Tallus down from summit	11600	43.77446	114.15942	-
Aster foliaceus var apricus	*Symphyotrichum foliaceum*	*Aster foliaceus var apricus 14430*	Marx 2013-227	*Aster foliaceus var. apricus*	07/08/13	Salzburger Spitzl	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Tallus down from summit	11600	43.77446	114.15942	✓
Achillea millefolium var alpicola	*Achillea millefolium*	*Achillea millefolium var alpicola 14431*	Marx 2013-228	*Achillea millefolium var. alpicola*	07/08/13	Salzburger Spitzl	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Tallus down from summit	11600	43.77446	114.15942	✓
Bistorta bistortoides	*Bistorta vivipara*	*Bistorta bistortoides 14432*	Marx 2013-229	*Bistorta bistortoides*	07/08/13	Salzburger Spitzl	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Tallus down from summit	11600	43.77446	114.15942	✓
Chaenactis alpina		*Chaenactis alpina 14433*	Marx 2013-230	*Chaenactis alpina*	07/08/13	Salzburger Spitzl	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Tallus down from summit	11600	43.77446	114.15942	✓
Cistanthe umbellata	*Calyptridium umbellatum*	*Cistanthe umbellata 14434*	Marx 2013-231	*Cistanthe umbellata*	07/08/13	Salzburger Spitzl	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Tallus down from summit	11600	43.77446	114.15942	✓
Cirsium scariosum	*Cirsium scariosum*	*Cirsium scariosum 14435*	Marx 2013-232	*Cirsium scariosum*	07/08/13	Salzburger Spitzl	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Tallus down from summit	11600	43.77446	114.15942	✓
Ribes lacustre	*Ribes lacustre*	*Ribes lacustre 14436*	Marx 2013-233	*Ribes lacustre*	07/08/13	Salzburger Spitzl	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Tallus down from summit	11600	43.77446	114.15942	✓
Potentilla sp	*Potentilla sp*	*Potentilla sp 14437*	Marx 2013-234	*NA*	07/08/13	Salzburger Spitzl	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Tallus down from summit	11600	43.77446	114.15942	✓
Eremogone aculeata	*Eremogone aculeata*	*Eremogone aculeata 14438*	Marx 2013-235	*Eremogone aculeata*	07/08/13	Salzburger Spitzl	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Tallus down from summit	11600	43.77446	114.15942	✓
Poa sp	*Unknown*	*Unknown 14439*	Marx 2013-236	*NA*	07/08/13	Salzburger Spitzl	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Tallus down from summit	11600	43.77446	114.15942	✓
NA		*NA*	Marx 2013-237	*NA*	07/08/13	Salzburger Spitzl	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Tallus down from summit	11600	43.77446	114.15942	-
Luzula sp		*Juncus sp 14440*	Marx 2013-238	*NA*	07/08/13	Salzburger Spitzl	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Tallus down from summit	11600	43.77446	114.15942	✓

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Table c.2.1 – continued from previous page

β Tip Label	PHLAWD Tip Label	DNA Accession Number	Voucher Number	Voucher Name	Date Collected	Summit	Range	Meadow	Locality Detail	Elevation (ft.)	WGS N	WGS W	Leaf Sample
NA		*NA*	Marx 2013-239	*Epilobium alpinum*	07/08/13	Salzburger Spitzl	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Tallus down from summit	11600	43.77446	114.15942	✓
Potentilla glandulosa	*Drymocallis glandulosa*	*Potentilla glandulosa 14442*	Marx 2013-240	*Potentilla glandulosa*	07/08/13	Salzburger Spitzl	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Tallus down from summit	11600	43.77446	114.15942	✓
Taraxacum lyratum		*Taraxacum lyratum 14443*	Marx 2013-241	*Taraxacum lyratum*	07/08/13	Salzburger Spitzl	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Tallus down from summit	11600	43.77446	114.15942	✓
Sedum lanceolatum var lanceolatum	*Sedum lanceolatum*	*Sedum lanceolatum var lanceolatum 14444*	Marx 2013-242	*Sedum lanceolatum var. lanceolatum*	07/08/13	Salzburger Spitzl	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Tallus down from summit	11600	43.77446	114.15942	✓
Oxyria digyna	*Oxyria digyna*	*Oxyria digyna 14445*	Marx 2013-243	*Oxyria digyna*	07/08/13	Salzburger Spitzl	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Tallus down from summit	11600	43.77446	114.15942	✓
Antennaria umbrinella	*Antennaria umbrinella*	*Antennaria umbrinella 14446*	Marx 2013-244	*Antennaria umbrinella*	07/08/13	Salzburger Spitzl	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Tallus down from summit	11600	43.77446	114.15942	✓
Penstemon procerus var formosus		*Unknown 14447*	Marx 2013-245	*NA*	07/08/13	Salzburger Spitzl	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Tallus down from summit	11600	43.77446	114.15942	✓
Claytonia megarhiza	*Claytonia megarhiza*	*Claytonia megarhiza 14448*	Marx 2013-246	*Claytonia megarhiza*	07/08/13	Salzburger Spitzl	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Tallus down from summit	11600	43.77446	114.15942	✓
Heuchera parvifolia var dissecta	*Heuchera parvifolia*	*Heuchera parvifolia var dissecta 14449*	Marx 2013-247	*Heuchera parvifolia var. dissecta*	07/08/13	Salzburger Spitzl	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Tallus down from summit	11600	43.77446	114.15942	✓
Eriogonum ovalifolium var depressum	*Eriogonum ovalifolium*	*Eriogonum ovalifolium var depressum 14450*	Marx 2013-248	*Eriogonum ovalifolium*	07/08/13	Salzburger Spitzl	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Tallus down from summit	11600	43.77446	114.15942	✓
Cerastium beeringianum	*Cerastium beeringianum*	*Cerastium beeringianum 14451*	Marx 2013-249	*Cerastium beeringianum*	07/08/13	Salzburger Spitzl	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Tallus down from summit	11600	43.77446	114.15942	✓
Erigeron compositus	*Erigeron compositus*	*Erigeron compositus 14452*	Marx 2013-250	*Erigeron compositus*	07/08/13	Salzburger Spitzl	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Tallus down from summit	11600	43.77446	114.15942	✓
Arnica mollis	*Arnica mollis*	*Arnica mollis 14453*	Marx 2013-251	*Arnica mollis*	07/08/13	Salzburger Spitzl	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Tallus down from summit	11600	43.77446	114.15942	✓
Arabis sp		*Arabis sp 14454*	Marx 2013-252	*Arabis sp.*	07/08/13	Salzburger Spitzl	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Tallus down from summit	11600	43.77446	114.15942	✓
Draba lonchocarpa	*Draba lonchocarpa*	*Draba lonchocarpa 14455*	Marx 2013-253	*Draba lonchocarpa*	07/08/13	Salzburger Spitzl	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Tallus down from summit	11600	43.77446	114.15942	✓
Astragalus kentrophyta	*Astragalus kentrophyta*	*Astragalus kentrophyta 14456*	Marx 2013-254	*Astragalus kentrophyta*	07/08/13	Salzburger Spitzl	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Tallus down from summit	11600	43.77446	114.15942	✓

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Table c.2.1 – continued from previous page

β Tip Label	*PHLAWD Tip Label*	*DNA Accession Number*	Voucher Number	*Voucher Name*	Date Collected	Summit	Range	Meadow	Locality Detail	Elevation (ft.)	WGS N	WGS W	Leaf Sample
NA	*Phacelia hastata*	*NA*	Marx 2013-255	*Phacelia hastata*	07/08/13	Salzburger Spitzl	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Tallus down from summit	11600	43.77446	114.15942	✓
Carex sp		*Carex sp 14458*	Marx 2013-256	*Carex sp.*	07/08/13	Salzburger Spitzl	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Tallus down from summit	11600	43.77446	114.15942	✓
Hulsea algida	*Hulsea algida*	*Hulsea algida 14459*	Marx 2013-257	*Hulsea algida*	07/08/13	Salzburger Spitzl	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Tallus down from summit	11600	43.77446	114.15942	✓
Antennaria umbrinella	*Antennaria umbrinella*	*Antennaria umbrinella 14460*	Marx 2013-258	*Antennaria umbrinella*	07/08/13	Salzburger Spitzl	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Tallus down from summit	11600	43.77446	114.15942	✓
NA		*NA*	Marx 2013-259	*Selaginella watsonii*	07/08/13	Salzburger Spitzl	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Tallus down from summit	11600	43.77446	114.15942	-
Phlox pulvinata		*Phlox cf pulvinata 14461*	Marx 2013-260	*Phlox c.f. pulvinata*	07/08/13	Salzburger Spitzl	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Tallus down from summit	11600	43.77446	114.15942	✓
Poa sp		*Unknown 14462*	Marx 2013-261	*NA*	07/08/13	Salzburger Spitzl	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Tallus down from summit	11600	43.77446	114.15942	✓
Poa sp		*Unknown 14463*	Marx 2013-262	*NA*	07/08/13	Salzburger Spitzl	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Tallus down from summit	11600	43.77446	114.15942	✓
Androsace septentrionalis	*Androsace septentrionalis*	*Androsace septentrionalis 14464*	Marx 2013-263	*Androsace septentrionalis*	07/08/13	Salzburger Spitzl	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Tallus down from summit	11600	43.77446	114.15942	✓
Smelowskia calycina	*Smelowskia calycina*	*Smelowskia calycina 14465*	Marx 2013-264	*Smelowskia calycina*	07/08/13	Salzburger Spitzl	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Tallus down from summit	11600	43.77446	114.15942	✓
Senecio fremontii		*Senecio fremontii 14466*	Marx 2013-265	*Senecio fremontii*	07/08/13	Salzburger Spitzl	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Tallus down from summit	11600	43.77446	114.15942	✓
Polemonium viscosum	*Polemonium viscosum*	*Polemonium viscosum 14467*	Marx 2013-266	*Polemonium viscosum*	07/08/13	Salzburger Spitzl	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Tallus down from summit	11600	43.77446	114.15942	✓
Carex straminiformis		*Carex cf straminiformis 14468*	Marx 2013-267	*Carex c.f. straminiformis*	07/08/13	Salzburger Spitzl	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Tallus down from summit	11600	43.77446	114.15942	✓
Smelowskia calycina	*Smelowskia calycina*	*Smelowskia calycina 14469*	Marx 2013-268	*Smelowskia calycina*	07/08/13	Salzburger Spitzl	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountians: Salzburger Spitzl: Tallus down from summit	11600	43.77446	114.15942	✓
Saxifraga mertensiana	*Saxifraga mertensiana*	*Saxifraga mertensiana 14570*	Marx 2013-269	*Saxifraga mertensiana*	09/08/13	Hyndman Peak	Pioneer Mountians	✓	Idaho: Sawtooth National Forest: Pioneer Mountians: Hyndman Peak: in meadow above treeline	10770	43.74357	114.12403	✓
NA	*Agoseris aurantiaca*	*NA*	Marx 2013-270	*Agoseris aurantiaca*	09/08/13	Hyndman Peak	Pioneer Mountians	✓	Idaho: Sawtooth National Forest: Pioneer Mountians: Hyndman Peak: in meadow above treeline	10770	43.74357	114.12403	✓

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Table c.2.1 – continued from previous page

β Tip Label	*PHLAWD Tip Label*	*DNA Accession Number*	Voucher Number	*Voucher Name*	Date Collected	Summit	Range	Meadow	Locality Detail	Elevation (ft.)	WGS N	WGS W	Leaf Sample
Potentilla glaucophylla var glaucophylla	*Potentilla glaucophylla*	*Potentilla glaucophylla var glaucophylla 14572*	Marx 2013-271	*Potentilla glaucophylla var. glaucophylla*	09/08/13	Hyndman Peak	Pioneer Mountians	✓	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: in meadow above treeline	10770	43.74357	114.12403	✓
Polygonum viviparum	*Polemonium viscosum*	*Polygonum viviparum 14573*	Marx 2013-272	*Polygonum viviparum*	09/08/13	Hyndman Peak	Pioneer Mountians	✓	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: in meadow above treeline	10770	43.74357	114.12403	✓
Erythranthe tilingii	*Erythranthe tilingii*	*Erythranthe tilingii 14574*	Marx 2013-273	*Erythranthe tilingii*	09/08/13	Hyndman Peak	Pioneer Mountians	✓	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: in meadow above treeline	10770	43.74357	114.12403	✓
Cerastium arvense	*Cerastium arvense*	*Cerastium arvense 14575*	Marx 2013-274	*Cerastium arvense*	09/08/13	Hyndman Peak	Pioneer Mountians	✓	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: in meadow above treeline	10770	43.74357	114.12403	✓
Viola adunca	*Viola adunca*	*Viola cf adunca 14576*	Marx 2013-275	*Viola c.f. adunca*	09/08/13	Hyndman Peak	Pioneer Mountians	✓	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: in meadow above treeline	10770	43.74357	114.12403	✓
Gentiana calycosa		*Gentiana calycosa 14577*	Marx 2013-276	*Gentiana calycosa*	09/08/13	Hyndman Peak	Pioneer Mountians	✓	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: in meadow above treeline	10770	43.74357	114.12403	✓
Salix arctica	*Salix arctica*	*Salix arctica 14578*	Marx 2013-277	*Salix arctica*	09/08/13	Hyndman Peak	Pioneer Mountians	✓	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: in meadow above treeline	10770	43.74357	114.12403	✓
Senecio residifolius		*Unknown 14579*	Marx 2013-278	*NA*	09/08/13	Hyndman Peak	Pioneer Mountians	✓	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: in meadow above treeline	10770	43.74357	114.12403	✓
Packera subnuda	*Packera subnuda*	*Packera subnuda 14580*	Marx 2013-279	*Packera subnuda*	09/08/13	Hyndman Peak	Pioneer Mountians	✓	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: in meadow above treeline	10770	43.74357	114.12403	✓
Phyllodoce glanduliflora	*Phyllodoce glanduliflora*	*Phyllodoce glanduliflora 14581*	Marx 2013-280	*Phyllodoce glanduliflora*	09/08/13	Hyndman Peak	Pioneer Mountians	✓	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: in meadow above treeline	10770	43.74357	114.12403	✓
Arnica chamissonis		*Arnica chamissonis 14582*	Marx 2013-281	*Arnica chamissonis*	09/08/13	Hyndman Peak	Pioneer Mountians	✓	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: in meadow above treeline	10770	43.74357	114.12403	✓
Aster foliaceus var apricus	*Symphyotrichum foliaceum*	*Aster foliaceus var apricus 14583*	Marx 2013-282	*Aster foliaceus var. apricus*	09/08/13	Hyndman Peak	Pioneer Mountians	✓	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: in meadow above treeline	10770	43.74357	114.12403	✓
Bistorta bistortoides	*Bistorta vivipara*	*Bistorta bistortoides 14584*	Marx 2013-283	*Bistorta bistortoides*	09/08/13	Hyndman Peak	Pioneer Mountians	✓	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: in meadow above treeline	10770	43.74357	114.12403	✓
Poa sp		*Unknown 14585*	Marx 2013-284	*NA*	09/08/13	Hyndman Peak	Pioneer Mountians	✓	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: in meadow above treeline	10770	43.74357	114.12403	✓
Castilleja miniata	*Castilleja miniata*	*Castilleja miniata 14586*	Marx 2013-285	*Castilleja miniata*	09/08/13	Hyndman Peak	Pioneer Mountians	✓	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: in meadow above treeline	10770	43.74357	114.12403	✓
Veronica wormskjoldii	*Veronica wormskjoldii*	*Veronica wormskjoldii 14587*	Marx 2013-286	*Veronica wormskjoldii*	09/08/13	Hyndman Peak	Pioneer Mountians	✓	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: in meadow above treeline	10770	43.74357	114.12403	✓

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β Tip Label	*PHLAWD Tip Label*	*DNA Accession Number*	Voucher Number	*Voucher Name*	Date Collected	Summit	Range	Meadow	Locality Detail	Elevation (ft.)	WGS N	WGS W	Leaf Sample
NA	*Cystopteris fragilis*	*NA*	Marx 2013-287	*Cystopteris fragilis*	09/08/13	Hyndman Peak	Pioneer Mountians	✓	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: in meadow above treeline	10770	43.74357	114.12403	✓
Eremogone congesta	*Eremogone congesta*	*Eremogone congesta 14589*	Marx 2013-288	*Eremogone congesta*	09/08/13	Hyndman Peak	Pioneer Mountians	✓	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: in meadow above treeline	10770	43.74357	114.12403	✓
Juncus sp		*Juncus sp 14590*	Marx 2013-289	*NA*	09/08/13	Hyndman Peak	Pioneer Mountians	✓	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: in meadow above treeline	10770	43.74357	114.12403	✓
Antennaria alpina	*Antennaria alpina*	*Antennaria alpina 14591*	Marx 2013-290	*Antennaria alpina*	09/08/13	Hyndman Peak	Pioneer Mountians	✓	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: in meadow above treeline	10770	43.74357	114.12403	✓
Lewisia pygmaea var pygmara	*Lewisia pygmaea*	*Lewisia pygmaea var pygmara 14592*	Marx 2013-291	*Lewisia pygmaea var. pygmara*	09/08/13	Hyndman Peak	Pioneer Mountians	✓	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: in meadow above treeline	10770	43.74357	114.12403	✓
Potentilla glaucophylla var glaucophylla	*Potentilla glaucophylla*	*Potentilla glaucophylla var glaucophylla 14593*	Marx 2013-292	*Potentilla glaucophylla var. glaucophylla*	09/08/13	Hyndman Peak	Pioneer Mountians	✓	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: in meadow above treeline	10770	43.74357	114.12403	✓
Poa sp		*Unknown 14594*	Marx 2013-293	*NA*	09/08/13	Hyndman Peak	Pioneer Mountians	✓	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: in meadow above treeline	10770	43.74357	114.12403	✓
Solidago multiradiata	*Solidago multiradiata*	*Solidago multiradiata 14595*	Marx 2013-294	*Solidago multiradiata*	09/08/13	Hyndman Peak	Pioneer Mountians	✓	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: in meadow above treeline	10770	43.74357	114.12403	✓
Pedicularis groenlandica	*Pedicularis groenlandica*	*Pedicularis groenlandica 14596*	Marx 2013-295	*Pedicularis groenlandica*	09/08/13	Hyndman Peak	Pioneer Mountians	✓	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: in meadow above treeline	10770	43.74357	114.12403	✓
Phyllodoce empetriformis	*Phyllodoce empetriformis*	*Phyllodoce empetriformis 14597*	Marx 2013-296	*Phyllodoce empetriformis*	09/08/13	Hyndman Peak	Pioneer Mountians	✓	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: in meadow above treeline	10770	43.74357	114.12403	✓
Astragalus eucosmus	*Astragalus eucosmus*	*Astragalus cf eucosmus 14598*	Marx 2013-297	*Astragalus c.f. eucosmus*	09/08/13	Hyndman Peak	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: south facing tallus/boulder field from summit	12009	43.74938	114.13120	✓
Arnica latifolia		*Arnica latifolia 14599*	Marx 2013-298	*Arnica latifolia*	09/08/13	Hyndman Peak	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: south facing tallus/boulder field from summit	12009	43.74938	114.13120	✓
Erigeron grandiflorus	*Erigeron grandiflorus*	*Erigeron grandiflorus 14600*	Marx 2013-299	*Erigeron grandiflorus*	09/08/13	Hyndman Peak	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: south facing tallus/boulder field from summit	12009	43.74938	114.13120	✓
Antennaria umbrinella	*Antennaria umbrinella*	*Antennaria umbrinella 14601*	Marx 2013-300	*Antennaria umbrinella*	09/08/13	Hyndman Peak	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: south facing tallus/boulder field from summit	12009	43.74938	114.13120	✓

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β Tip Label	*PHLAWD Tip Label*	*DNA Accession Number*	Voucher Number	*Voucher Name*	Date Collected	Summit	Range	Meadow	Locality Detail	Elevation (ft.)	WGS N	WGS W	Leaf Sample
Eriogonum ovalifolium var depressum	*Eriogonum ovalifolium*	*Eriogonum ovalifolium var depressum 14602*	Marx 2013-301	*Eriogonum ovalifolium*	09/08/13	Hyndman Peak	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: south facing tallus/boulder field from summit	12009	43.74938	114.13120	✓
Carex elynoides		*Carex elynoides 14603*	Marx 2013-302	*Carex elynoides*	09/08/13	Hyndman Peak	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: south facing tallus/boulder field from summit	12009	43.74938	114.13120	✓
Draba oligosperma	*Draba oligosperma*	*Draba oligosperma 14604*	Marx 2013-303	*Draba oligosperma*	09/08/13	Hyndman Peak	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: south facing tallus/boulder field from summit	12009	43.74938	114.13120	✓
Draba densifolia	*Draba densifolia*	*Draba cf densifolia 14605*	Marx 2013-304	*Draba c.f. densifolia*	09/08/13	Hyndman Peak	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: south facing tallus/boulder field from summit	12009	43.74938	114.13120	✓
Minuartia obtusiloba		*Minuartia cf obtusiloba 14606*	Marx 2013-305	*Minuartia c.f. obtusiloba*	09/08/13	Hyndman Peak	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: south facing tallus/boulder field from summit	12009	43.74938	114.13120	✓
Eriogonum crosbyae		*Eriogonum crosbyae 14607*	Marx 2013-306	*Eriogonum crosbyae*	09/08/13	Hyndman Peak	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: south facing tallus/boulder field from summit	12009	43.74938	114.13120	✓
Minuartia obtusiloba	*Minuartia obtusiloba*	*Minuartia obtusiloba 14608*	Marx 2013-307	*Minuartia obtusiloba*	09/08/13	Hyndman Peak	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: south facing tallus/boulder field from summit	12009	43.74938	114.13120	✓
Aster alpinus	*Aster alpinus*	*Aster alpinus 14609*	Marx 2013-308	*Aster alpinus*	09/08/13	Hyndman Peak	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: south facing tallus/boulder field from summit	12009	43.74938	114.13120	✓
Draba lonchocarpa	*Draba lonchocarpa*	*Draba lonchocarpa 14610*	Marx 2013-309	*Draba lonchocarpa*	09/08/13	Hyndman Peak	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: south facing tallus/boulder field from summit	12009	43.74938	114.13120	✓
Sedum lanceolatum var lanceolatum	*Sedum lanceolatum*	*Sedum lanceolatum var lanceolatum 14611*	Marx 2013-310	*Sedum lanceolatum var. lanceolatum*	09/08/13	Hyndman Peak	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: south facing tallus/boulder field from summit	12009	43.74938	114.13120	✓
Erigeron lonchophyllus	*Erigeron lonchophyllus*	*Erigeron lonchophyllus 14612*	Marx 2013-311	*Erigeron lonchophyllus*	09/08/13	Hyndman Peak	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: south facing tallus/boulder field from summit	12009	43.74938	114.13120	✓
Ivesia gordonii	*Ivesia gordonii*	*Ivesia gordonii 14613*	Marx 2013-312	*Ivesia gordonii*	09/08/13	Hyndman Peak	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: south facing tallus/boulder field from summit	12009	43.74938	114.13120	✓

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β Tip Label	*PHLAWD Tip Label*	*DNA Accession Number*	Voucher Number	*Voucher Name*	Date Collected	Summit	Range	Meadow	Locality Detail	Elevation (ft.)	WGS N	WGS W	Leaf Sample
Claytonia megarhiza	*Claytonia megarhiza*	*Claytonia megarhiza 14614*	Marx 2013-313	*Claytonia megarhiza*	09/08/13	Hyndman Peak	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: south facing tallus/boulder field from summit	12009	43.74938	114.13120	✓
Taraxacum lyratum		*Taraxacum lyratum 14615*	Marx 2013-314	*Taraxacum lyratum*	09/08/13	Hyndman Peak	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: south facing tallus/boulder field from summit	12009	43.74938	114.13120	✓
NA		*NA*	Marx 2013-315	*Senecio fremontii*	09/08/13	Hyndman Peak	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: south facing tallus/boulder field from summit	12009	43.74938	114.13120	✓
Smelowskia calycina	*Smelowskia calycina*	*Smelowskia calycina 14617*	Marx 2013-316	*Smelowskia calycina*	09/08/13	Hyndman Peak	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: south facing tallus/boulder field from summit	12009	43.74938	114.13120	✓
Ribes lacustre	*Ribes lacustre*	*Ribes lacustre 14618*	Marx 2013-317	*Ribes lacustre*	09/08/13	Hyndman Peak	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: south facing tallus/boulder field from summit	12009	43.74938	114.13120	✓
Achillea millefolium var alpicola	*Achillea millefolium*	*Achillea millefolium var alpicola 14619*	Marx 2013-318	*Achillea millefolium var. alpicola*	09/08/13	Hyndman Peak	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: south facing tallus/boulder field from summit	12009	43.74938	114.13120	✓
Astragalus kentrophyta	*Astragalus kentrophyta*	*Astragalus kentrophyta 14620*	Marx 2013-319	*Astragalus kentrophyta*	09/08/13	Hyndman Peak	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: south facing tallus/boulder field from summit	12009	43.74938	114.13120	✓
Minuartia obtusiloba	*Minuartia obtusiloba*	*Minuartia obtusiloba 14621*	Marx 2013-320	*Minuartia obtusiloba*	09/08/13	Hyndman Peak	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: south facing tallus/boulder field from summit	12009	43.74938	114.13120	✓
Tonestus lyallii	*Tonestus lyallii*	*Tonestus lyallii 14622*	Marx 2013-321	*Tonestus lyallii*	09/08/13	Hyndman Peak	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: south facing tallus/boulder field from summit	12009	43.74938	114.13120	✓
Erigeron compositus	*Erigeron compositus*	*Erigeron compositus 14623*	Marx 2013-322	*Erigeron compositus*	09/08/13	Hyndman Peak	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: south facing tallus/boulder field from summit	12009	43.74938	114.13120	✓
Phlox diffusa	*Phlox diffusa*	*Phlox cf diffusa 14624*	Marx 2013-323	*Phlox c.f. diffusa*	09/08/13	Hyndman Peak	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: south facing tallus/boulder field from summit	12009	43.74938	114.13120	✓
Heuchera parvifolia var dissecta	*Heuchera parvifolia*	*Heuchera parvifolia var dissecta 14625*	Marx 2013-324	*Heuchera parvifolia var. dissecta*	09/08/13	Hyndman Peak	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: south facing tallus/boulder field from summit	12009	43.74938	114.13120	✓

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β Tip Label	*PHLAWD Tip Label*	*DNA Accession Number*	Voucher Number	*Voucher Name*	Date Collected	Summit	Range	Meadow	Locality Detail	Elevation (ft.)	WGS N	WGS W	Leaf Sample
Haplopappus macronema		*Haplopappus macronema 14626*	Marx 2013-325	*Haplopappus macronema*	09/08/13	Hyndman Peak	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: south facing tallus/boulder field from summit	12009	43.74938	114.13120	✓
Hulsea algida	*Hulsea algida*	*Hulsea algida 14627*	Marx 2013-326	*Hulsea algida*	09/08/13	Hyndman Peak	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: south facing tallus/boulder field from summit	12009	43.74938	114.13120	✓
Cerastium beeringianum	*Cerastium beeringianum*	*Cerastium beeringianum 14628*	Marx 2013-327	*Cerastium beeringianum*	09/08/13	Hyndman Peak	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: south facing tallus/boulder field from summit	12009	43.74938	114.13120	✓
Draba lonchocarpa	*Draba lonchocarpa*	*Draba lonchocarpa 14629*	Marx 2013-328	*Draba lonchocarpa*	09/08/13	Hyndman Peak	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: south facing tallus/boulder field from summit	12009	43.74938	114.13120	✓
Arabis lemonii	*Boechera lemmonii*	*Arabis cf lemonii 14630*	Marx 2013-329	*Arabis c.f lemmonii*	09/08/13	Hyndman Peak	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: south facing tallus/boulder field from summit	12009	43.74938	114.13120	✓
Oxyria digyna	*Oxyria digyna*	*Oxyria digyna 14631*	Marx 2013-330	*Oxyria digyna*	09/08/13	Hyndman Peak	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: south facing tallus/boulder field from summit	12009	43.74938	114.13120	✓
Cerastium beeringianum	*Cerastium beeringianum*	*Cerastium beeringianum 14632*	Marx 2013-331	*Cerastium beeringianum*	09/08/13	Hyndman Peak	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: south facing tallus/boulder field from summit	12009	43.74938	114.13120	✓
Polemonium viscosum	*Polemonium viscosum*	*Polemonium viscosum 14633*	Marx 2013-332	*Polemonium viscosum*	09/08/13	Hyndman Peak	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: south facing tallus/boulder field from summit	12009	43.74938	114.13120	✓
Potentilla glandulosa	*Drymocallis glandulosa*	*Potentilla glandulosa 14634*	Marx 2013-333	*Potentilla glandulosa*	09/08/13	Hyndman Peak	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: south facing tallus/boulder field from summit	12009	43.74938	114.13120	✓
NA		*NA*	Marx 2013-334	*Androsace septentrionalis*	09/08/13	Hyndman Peak	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: south facing tallus/boulder field from summit	12009	43.74938	114.13120	-
Carex straminiformis		*Carex cf straminiformis 14635*	Marx 2013-335	*Carex c.f. straminiformis*	09/08/13	Hyndman Peak	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: south facing tallus/boulder field from summit	12009	43.74938	114.13120	✓
Poa sp		*Unknown 14636*	Marx 2013-336	*NA*	09/08/13	Hyndman Peak	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: south facing tallus/boulder field from summit	12009	43.74938	114.13120	✓

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β Tip Label	*PHLAWD Tip Label*	*DNA Accession Number*	Voucher Number	*Voucher Name*	Date Collected	Summit	Range	Meadow	Locality Detail	Elevation (ft.)	WGS N	WGS W	Leaf Sample
Luzula sp		*Juncus sp 14637*	Marx 2013-337	*NA*	09/08/13	Hyndman Peak	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: south facing tallus/boulder field from summit	12009	43.74938	114.13120	✓
Carex microptera		*Carex microptera 14638*	Marx 2013-338	*Carex microptera*	09/08/13	Hyndman Peak	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: south facing tallus/boulder field from summit	12009	43.74938	114.13120	✓
Poa sp		*Unknown 14639*	Marx 2013-339	*NA*	09/08/13	Hyndman Peak	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: south facing tallus/boulder field from summit	12009	43.74938	114.13120	✓
Poa sp		*Unknown 14640*	Marx 2013-340	*NA*	09/08/13	Hyndman Peak	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: south facing tallus/boulder field from summit	12009	43.74938	114.13120	✓
Poa sp		*Unknown 14641*	Marx 2013-341	*NA*	09/08/13	Hyndman Peak	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: south facing tallus/boulder field from summit	12009	43.74938	114.13120	✓
Poa sp		*Unknown 14642*	Marx 2013-342	*NA*	09/08/13	Hyndman Peak	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: south facing tallus/boulder field from summit	12009	43.74938	114.13120	✓
Poa sp		*Unknown 14643*	Marx 2013-343	*NA*	09/08/13	Hyndman Peak	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: south facing tallus/boulder field from summit	12009	43.74938	114.13120	✓
NA		*NA*	Marx 2013-418	*Phlox c.f. pulvinata*	09/08/13	Hyndman Peak	Pioneer Mountians	-	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: south facing tallus/boulder field from summit	12009	43.74938	114.13120	✓
NA	*Sibbaldia procumbens*	*NA*	Marx 2013-420	*Sibbaldia procumbens*	09/08/13	Hyndman Peak	Pioneer Mountians	✓	Idaho: Sawtooth National Forest: Pioneer Mountains: Hyndman Peak: in meadow above treeline	10770	43.74357	114.12403	✓
Castilleja applegatei	*Castilleja applegatei*	*Castilleja applegatei 14644*	Marx 2013-344	*Castilleja applegatei*	14/08/13	D.O. Lee Peak	White Cloud Mountains	✓	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: along trail	9653	44.11113	114.64097	✓
NA		*NA*	Marx 2013-345	*Castilleja applegatei*	14/08/13	D.O. Lee Peak	White Cloud Mountains	✓	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: along trail	9653	44.11113	114.64097	✓
NA		*NA*	Marx 2013-346	*Gentiana calycosa*	14/08/13	D.O. Lee Peak	White Cloud Mountains	✓	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: collected in alpine meadow	9814	44.10969	114.63886	✓
Cassiope mertensiana var gracilis	*Cassiope mertensiana*	*Cassiope mertensiana var gracilis 14646*	Marx 2013-347	*Cassiope mertensiana var. gracilis*	14/08/13	D.O. Lee Peak	White Cloud Mountains	✓	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: collected in alpine meadow	9814	44.10969	114.63886	✓
Lupinus argenteus var depressus	*Lupinus argenteus*	*Lupinus argenteus var depressus 14647*	Marx 2013-348	*Lupinus argenteus var. depressus*	14/08/13	D.O. Lee Peak	White Cloud Mountains	✓	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: collected in alpine meadow	9814	44.10969	114.63886	✓

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Table c.2.1 – continued from previous page

β Tip Label	PHLAWD Tip Label	DNA Accession Number	Voucher Number	Voucher Name	Date Collected	Summit	Range	Meadow	Locality Detail	Elevation (ft.)	WGS N	WGS W	Leaf Sample
Aster foliaceus var apricus	*Symphyotrichum foliaceum*	*Aster foliaceus var apricus 14648*	Marx 2013-349	*Aster foliaceus var. apricus*	14/08/13	D.O. Lee Peak	White Cloud Mountains	✓	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: collected in alpine meadow	9814	44.10969	114.63886	✓
Eriogonum ovalifolium var depressum	*Eriogonum ovalifolium*	*Eriogonum ovalifolium var depressum 14649*	Marx 2013-350	*Eriogonum ovalifolium*	14/08/13	D.O. Lee Peak	White Cloud Mountains	✓	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: collected in alpine meadow	9814	44.10969	114.63886	✓
Eriogonum flavum var piperi	*Eriogonum flavum*	*Eriogonum flavum var piperi 14650*	Marx 2013-351	*Eriogonum flavum var. piperi*	14/08/13	D.O. Lee Peak	White Cloud Mountains	✓	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: collected in alpine meadow	9814	44.10969	114.63886	✓
Potentilla glaucophylla var glaucophylla	*Potentilla glaucophylla*	*Potentilla glaucophylla var glaucophylla 14651*	Marx 2013-352	*Potentilla glaucophylla var. glaucophylla*	14/08/13	D.O. Lee Peak	White Cloud Mountains	✓	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: collected in alpine meadow	9814	44.10969	114.63886	✓
Poa sp		*Unknown 14652*	Marx 2013-353	*NA*	14/08/13	D.O. Lee Peak	White Cloud Mountains	✓	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: collected in alpine meadow	9814	44.10969	114.63886	✓
Solidago multiradiata	*Solidago multiradiata*	*Solidago multiradiata 14653*	Marx 2013-354	*Solidago multiradiata*	14/08/13	D.O. Lee Peak	White Cloud Mountains	✓	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: collected in alpine meadow	9814	44.10969	114.63886	✓
Eriogonum flavum var piperi	*Eriogonum flavum*	*Eriogonum flavum var piperi 14654*	Marx 2013-355	*Eriogonum flavum var. piperi*	14/08/13	D.O. Lee Peak	White Cloud Mountains	✓	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: collected in alpine meadow	9814	44.10969	114.63886	✓
Sedum lanceolatum var lanceolatum	*Sedum lanceolatum*	*Sedum lanceolatum var lanceolatum 14655*	Marx 2013-356	*Sedum lanceolatum var. lanceolatum*	14/08/13	D.O. Lee Peak	White Cloud Mountains	✓	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: collected in alpine meadow	9814	44.10969	114.63886	✓
Sedum debile		*Sedum debile 14656*	Marx 2013-357	*Sedum debile*	14/08/13	D.O. Lee Peak	White Cloud Mountains	✓	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: collected in alpine meadow	9814	44.10969	114.63886	✓
Haplopappus suffruticosus		*Haplopappus suffruticosus 14657*	Marx 2013-358	*Haplopappus suffruticosus*	14/08/13	D.O. Lee Peak	White Cloud Mountains	✓	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: collected in alpine meadow	9814	44.10969	114.63886	✓
Juncus sp		*Juncus sp 14658*	Marx 2013-359	*NA*	14/08/13	D.O. Lee Peak	White Cloud Mountains	✓	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: collected in alpine meadow	9814	44.10969	114.63886	✓
NA		*NA*	Marx 2013-360	*Carex sp.*	14/08/13	D.O. Lee Peak	White Cloud Mountains	✓	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: collected in alpine meadow	9814	44.10969	114.63886	✓
Salix nivalis	*Salix nivalis*	*Salix nivalis 14660*	Marx 2013-361	*Salix nivalis*	14/08/13	D.O. Lee Peak	White Cloud Mountains	✓	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: collected in alpine meadow	9814	44.10969	114.63886	✓
Antennaria alpina	*Antennaria alpina*	*Antennaria alpina 14661*	Marx 2013-362	*Antennaria alpina*	14/08/13	D.O. Lee Peak	White Cloud Mountains	✓	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: collected in alpine meadow	9814	44.10969	114.63886	✓
Poa sp		*Unknown 14662*	Marx 2013-363	*NA*	14/08/13	D.O. Lee Peak	White Cloud Mountains	✓	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: collected in alpine meadow	9814	44.10969	114.63886	✓

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Table c.2.1 – continued from previous page

β Tip Label	*PHLAWD Tip Label*	*DNA Accession Number*	Voucher Number	*Voucher Name*	Date Collected	Summit	Range	Meadow	Locality Detail	Elevation (ft.)	WGS N	WGS W	Leaf Sample
Eremogone aculeata	*Eremogone aculeata*	*Eremogone aculeata 14663*	Marx 2013-364	*Eremogone aculeata*	14/08/13	D.O. Lee Peak	White Cloud Mountains	✓	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: collected in alpine meadow	9814	44.10969	114.63886	✓
Ivesia gordonii	*Ivesia gordonii*	*Ivesia gordonii 14664*	Marx 2013-365	*Ivesia gordonii*	14/08/13	D.O. Lee Peak	White Cloud Mountains	✓	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: collected in alpine meadow	9814	44.10969	114.63886	✓
Achillea millefolium var alpicola	*Achillea millefolium*	*Achillea millefolium var alpicola 14665*	Marx 2013-366	*Achillea millefolium var. alpicola*	14/08/13	D.O. Lee Peak	White Cloud Mountains	✓	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: collected in alpine meadow	9814	44.10969	114.63886	✓
NA		*NA*	Marx 2013-367	*NA*	14/08/13	D.O. Lee Peak	White Cloud Mountains	✓	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: collected in alpine meadow	9814	44.10969	114.63886	-
Stenotus acaulis	*Stenotus acaulis*	*Stenotus acaulis 14666*	Marx 2013-368	*Stenotus acaulis*	14/08/13	D.O. Lee Peak	White Cloud Mountains	✓	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: collected in alpine meadow	9814	44.10969	114.63886	✓
Erigeron sp		*Unknown 14667*	Marx 2013-369	*NA*	14/08/13	D.O. Lee Peak	White Cloud Mountains	✓	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: collected in alpine meadow	9814	44.10969	114.63886	✓
Arabis lemonii	*Boechera lemmonii*	*Arabis cf lemonii 14668*	Marx 2013-370	*Arabis c.f lemmonii*	14/08/13	D.O. Lee Peak	White Cloud Mountains	✓	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: collected in alpine meadow	9814	44.10969	114.63886	✓
Phlox pulvinata		*Phlox pulvinata 14669*	Marx 2013-371	*Phlox pulvinata*	14/08/13	D.O. Lee Peak	White Cloud Mountains	✓	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: collected in alpine meadow	9814	44.10969	114.63886	✓
Eremogone congesta	*Eremogone congesta*	*Eremogone congesta 14670*	Marx 2013-372	*Eremogone congesta*	14/08/13	D.O. Lee Peak	White Cloud Mountains	✓	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: collected in alpine meadow	9814	44.10969	114.63886	✓
Senecio werneriifolius		*Senecio werneriifolius 14671*	Marx 2013-373	*Senecio werneriifolius*	14/08/13	D.O. Lee Peak	White Cloud Mountains	✓	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: collected in alpine meadow	9814	44.10969	114.63886	✓
Senecio werneriifolius		*Senecio werneriifolius 14672*	Marx 2013-374	*Senecio werneriifolius*	14/08/13	D.O. Lee Peak	White Cloud Mountains	✓	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: collected in alpine meadow	9814	44.10969	114.63886	✓
Poa sp		*Unknown 14673*	Marx 2013-375	*NA*	14/08/13	D.O. Lee Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: in tallus, north face then west to treeline	11342	44.10277	114.62859	✓
Poa sp		*Unknown 14674*	Marx 2013-376	*NA*	14/08/13	D.O. Lee Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: in tallus, north face then west to treeline	11342	44.10277	114.62859	✓
Epilobium alpinum		*Epilobium alpinum 14675*	Marx 2013-377	*Epilobium alpinum*	14/08/13	D.O. Lee Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: in tallus, north face then west to treeline	11342	44.10277	114.62859	✓
Penstemon montanus var idahoensis		*Unknown 14676*	Marx 2013-378	*NA*	14/08/13	D.O. Lee Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: in tallus, north face then west to treeline	11342	44.10277	114.62859	✓

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Table c.2.1 – continued from previous page

β Tip Label	*PHLAWD Tip Label*	*DNA Accession Number*	Voucher Number	*Voucher Name*	Date Collected	Summit	Range	Meadow	Locality Detail	Elevation (ft.)	WGS N	WGS W	Leaf Sample
Poa sp		*Unknown 14677*	Marx 2013-379	*NA*	14/08/13	D.O. Lee Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: in tallus, north face then west to treeline	11342	44.10277	114.62859	✓
Oxytropis deflexa	*Oxytropis deflexa*	*Oxytropis cf deflexa 14678*	Marx 2013-380	*Oxytropis c.f. deflexa*	14/08/13	D.O. Lee Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: in tallus, north face then west to treeline	11342	44.10277	114.62859	✓
NA	*Minuartia obtusiloba*	*NA*	Marx 2013-381	*Minuartia obtusiloba*	14/08/13	D.O. Lee Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: in tallus, north face then west to treeline	11342	44.10277	114.62859	✓
Collomia debilis	*Collomia debilis*	*Collomia debilis 14680*	Marx 2013-382	*Collomia debilis*	14/08/13	D.O. Lee Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: in tallus, north face then west to treeline	11342	44.10277	114.62859	✓
Eriogonum crosbyae		*Eriogonum crosbyae 14681*	Marx 2013-384	*Eriogonum crosbyae*	14/08/13	D.O. Lee Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: in tallus, north face then west to treeline	11342	44.10277	114.62859	✓
Anemone drummondii	*Anemone drummondii*	*Anemone drummondii 14682*	Marx 2013-385	*Anemone drummondii*	14/08/13	D.O. Lee Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: in tallus, north face then west to treeline	11342	44.10277	114.62859	✓
Arabis sp		*Arabis sp 14683*	Marx 2013-386	*Arabis sp.*	14/08/13	D.O. Lee Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: in tallus, north face then west to treeline	11342	44.10277	114.62859	✓
Antennaria alpina	*Antennaria alpina*	*Antennaria alpina 14684*	Marx 2013-387	*Antennaria alpina*	14/08/13	D.O. Lee Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: in tallus, north face then west to treeline	11342	44.10277	114.62859	✓
Senecio werneriifolius		*Senecio werneriifolius 14685*	Marx 2013-388	*Senecio werneriifolius*	14/08/13	D.O. Lee Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: in tallus, north face then west to treeline	11342	44.10277	114.62859	✓
Minuartia obtusiloba		*Minuartia cf obtusiloba 14686*	Marx 2013-389	*Minuartia c.f. obtusiloba*	14/08/13	D.O. Lee Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: in tallus, north face then west to treeline	11342	44.10277	114.62859	✓
Cerastium beeringianum	*Cerastium beeringianum*	*Cerastium beeringianum 14687*	Marx 2013-390	*Cerastium beeringianum*	14/08/13	D.O. Lee Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: in tallus, north face then west to treeline	11342	44.10277	114.62859	✓
Draba oligosperma	*Draba oligosperma*	*Draba oligosperma 14688*	Marx 2013-391	*Draba oligosperma*	14/08/13	D.O. Lee Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: in tallus, north face then west to treeline	11342	44.10277	114.62859	✓

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Table c.2.1 – continued from previous page

β Tip Label	*PHLAWD Tip Label*	*DNA Accession Number*	Voucher Number	*Voucher Name*	Date Collected	Summit	Range	Meadow	Locality Detail	Elevation (ft.)	WGS N	WGS W	Leaf Sample
Androsace septentrionalis	*Androsace septentrionalis*	*Androsace septentrionalis 14689*	Marx 2013-392	*Androsace septentrionalis*	14/08/13	D.O. Lee Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: in tallus, north face then west to treeline	11342	44.10277	114.62859	✓
Draba lonchocarpa	*Draba lonchocarpa*	*Draba lonchocarpa 14690*	Marx 2013-393	*Draba lonchocarpa*	14/08/13	D.O. Lee Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: in tallus, north face then west to treeline	11342	44.10277	114.62859	✓
Oxytropis deflexa	*Oxytropis deflexa*	*Oxytropis cf deflexa 14691*	Marx 2013-394	*Oxytropis c.f. deflexa*	14/08/13	D.O. Lee Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: in tallus, north face then west to treeline	11342	44.10277	114.62859	✓
Poa sp		*Unknown 14692*	Marx 2013-395	*NA*	14/08/13	D.O. Lee Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: in tallus, north face then west to treeline	11342	44.10277	114.62859	✓
Smelowskia calycina	*Smelowskia calycina*	*Smelowskia calycina 14693*	Marx 2013-396	*Smelowskia calycina*	14/08/13	D.O. Lee Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: in tallus, north face then west to treeline	11342	44.10277	114.62859	✓
Draba lonchocarpa	*Draba lonchocarpa*	*Draba lonchocarpa 14694*	Marx 2013-397	*Draba lonchocarpa*	14/08/13	D.O. Lee Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: in tallus, north face then west to treeline	11342	44.10277	114.62859	✓
Oxytropis parryi	*Oxytropis parryi*	*Oxytropis parryi 14695*	Marx 2013-398	*Oxytropis parryi*	14/08/13	D.O. Lee Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: in tallus, north face then west to treeline	11342	44.10277	114.62859	✓
NA	*Oxyria digyna*	*NA*	Marx 2013-399	*Oxyria digyna*	14/08/13	D.O. Lee Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: in tallus, north face then west to treeline	11342	44.10277	114.62859	✓
Minuartia nuttallii	*Sabulina nuttallii*	*Minuartia nuttallii 14697*	Marx 2013-400	*Minuartia nuttallii*	14/08/13	D.O. Lee Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: in tallus, north face then west to treeline	11342	44.10277	114.62859	✓
Polemonium viscosum	*Polemonium viscosum*	*Polemonium viscosum 14698*	Marx 2013-401	*Polemonium viscosum*	14/08/13	D.O. Lee Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: in tallus, north face then west to treeline	11342	44.10277	114.62859	✓
Crepis nana	*Crepis nana*	*Crepis nana 14699*	Marx 2013-402	*Crepis nana*	14/08/13	D.O. Lee Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: in tallus, north face then west to treeline	11342	44.10277	114.62859	✓
Erigeron compositus	*Erigeron compositus*	*Erigeron compositus 14700*	Marx 2013-403	*Erigeron compositus*	14/08/13	D.O. Lee Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: in tallus, north face then west to treeline	11342	44.10277	114.62859	✓

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Table c.2.1 – continued from previous page

β Tip Label	PHLAWD Tip Label	DNA Accession Number	Voucher Number	Voucher Name	Date Collected	Summit	Range	Meadow	Locality Detail	Elevation (ft.)	WGS N	WGS W	Leaf Sample
Astragalus kentrophyta	*Astragalus kentrophyta*	*Astragalus kentrophyta 14701*	Marx 2013-404	*Astragalus kentrophyta*	14/08/13	D.O. Lee Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: in tallus, north face then west to treeline	11342	44.10277	114.62859	✓
Eriogonum ovalifolium var depressum	*Eriogonum ovalifolium*	*Eriogonum ovalifolium var depressum 14702*	Marx 2013-405	*Eriogonum ovalifolium*	14/08/13	D.O. Lee Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: in tallus, north face then west to treeline	11342	44.10277	114.62859	✓
Draba oligosperma	*Draba oligosperma*	*Draba oligosperma 14703*	Marx 2013-406	*Draba oligosperma*	14/08/13	D.O. Lee Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: in tallus, north face then west to treeline	11342	44.10277	114.62859	✓
Stenotus acaulis	*Stenotus acaulis*	*Stenotus acaulis 14704*	Marx 2013-407	*Stenotus acaulis*	14/08/13	D.O. Lee Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: in tallus, north face then west to treeline	11342	44.10277	114.62859	✓
Minuartia obtusiloba	*Minuartia obtusiloba*	*Minuartia obtusiloba 14705*	Marx 2013-408	*Minuartia obtusiloba*	14/08/13	D.O. Lee Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: in tallus, north face then west to treeline	11342	44.10277	114.62859	✓
Arabis lemonii		*Unknown 14706*	Marx 2013-409	*NA*	14/08/13	D.O. Lee Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: in tallus, north face then west to treeline	11342	44.10277	114.62859	✓
Senecio fremontii		*Senecio fremontii 14707*	Marx 2013-410	*Senecio fremontii*	14/08/13	D.O. Lee Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: in tallus, north face then west to treeline	11342	44.10277	114.62859	✓
Saxifraga oppositifolia	*Saxifraga oppositifolia*	*Saxifraga oppositifolia 14708*	Marx 2013-411	*Saxifraga oppositifolia*	14/08/13	D.O. Lee Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: in tallus, north face then west to treeline	11342	44.10277	114.62859	✓
NA		*NA*	Marx 2013-412	*Carex sp.*	14/08/13	D.O. Lee Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: in tallus, north face then west to treeline	11342	44.10277	114.62859	✓
NA	*Eritrichium nanum*	*NA*	Marx 2013-413	*Eritrichium nanum*	14/08/13	D.O. Lee Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: in tallus, north face then west to treeline	11342	44.10277	114.62859	✓
Eritrichium nanum	*Eritrichium nanum*	*Eritrichium nanum 14711*	Marx 2013-414	*Eritrichium nanum*	14/08/13	D.O. Lee Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: in tallus, north face then west to treeline	11342	44.10277	114.62859	✓
Eritrichium nanum	*Eritrichium nanum*	*Eritrichium nanum 14712*	Marx 2013-415	*Eritrichium nanum*	14/08/13	D.O. Lee Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: in tallus, north face then west to treeline	11342	44.10277	114.62859	✓

Continued on next page

Table c.2.1 – continued from previous page

β Tip Label	*PHLAWD Tip Label*	*DNA Accession Number*	Voucher Number	*Voucher Name*	Date Collected	Summit	Range	Meadow	Locality Detail	Elevation (ft.)	WGS N	WGS W	Leaf Sample
Eritrichium nanum	*Eritrichium nanum*	*Eritrichium nanum 14713*	Marx 2013-416	*Eritrichium nanum*	14/08/13	D.O. Lee Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: in tallus, north face then west to treeline	11342	44.10277	114.62859	✓
NA	*Sibbaldia procumbens*	*NA*	Marx 2013-421	*Sibbaldia procumbens*	14/08/13	D.O. Lee Peak	White Cloud Mountains	✓	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: collected in alpine meadow	9814	44.10969	114.63886	✓
NA	*Astragalus kentrophyta*	*NA*	Marx 2013-422	*Astragalus kentrophyta*	14/08/13	D.O. Lee Peak	White Cloud Mountains	-	Idaho: Sawtooth National Forest: White Cloud Mountains: D.O. Lee Peak: in tallus, north face then west to treeline	11342	44.10277	114.62859	✓

C.3 Maximum likelihood phylograms for each gene region sequenced using the high-throughput approach. Node values indicate bootstrap support.

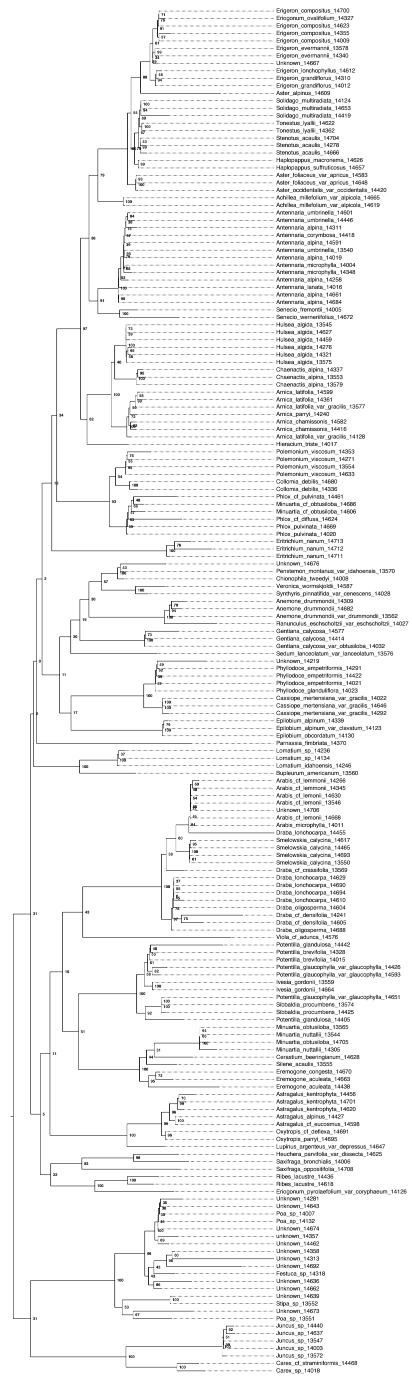

Figure C.3.1: ITS gene tree for the alpine flora of the Sawtooth National Forest

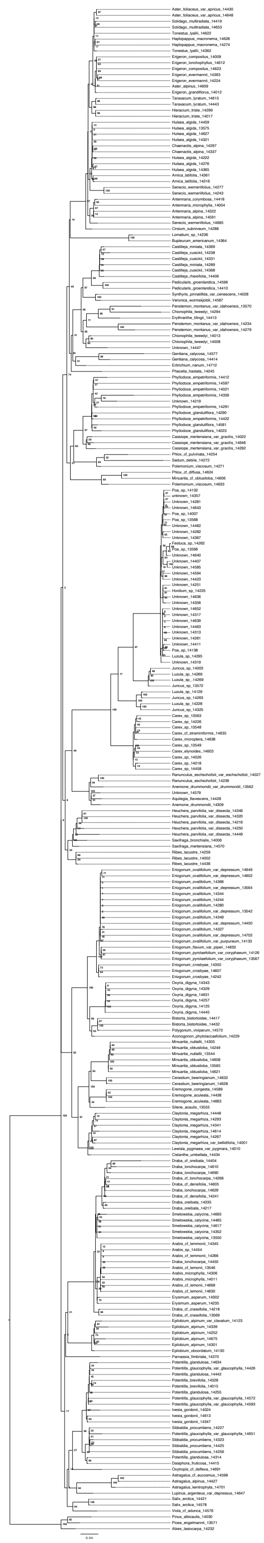

Figure c.3.2: *atpB* gene tree for the alpine flora of the Sawtooth National Forest

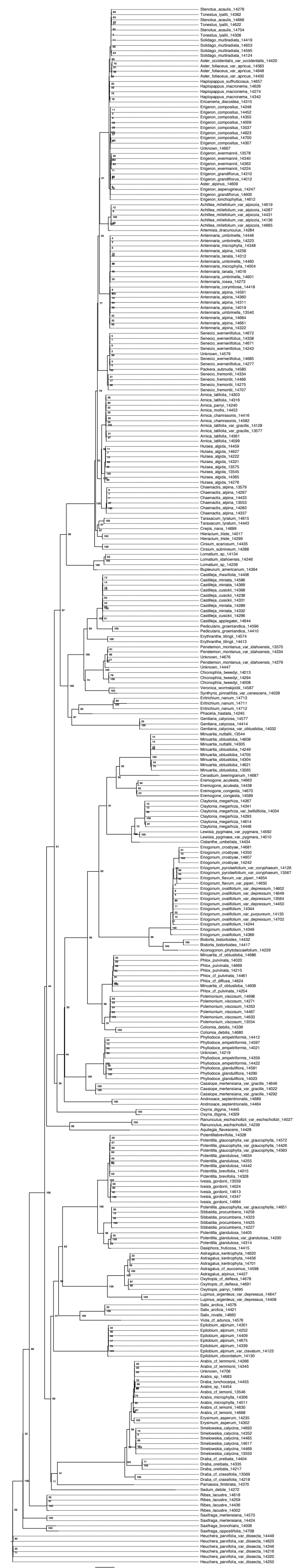

Figure c.3.3: *matK* gene tree for the alpine flora of the Sawtooth National Forest

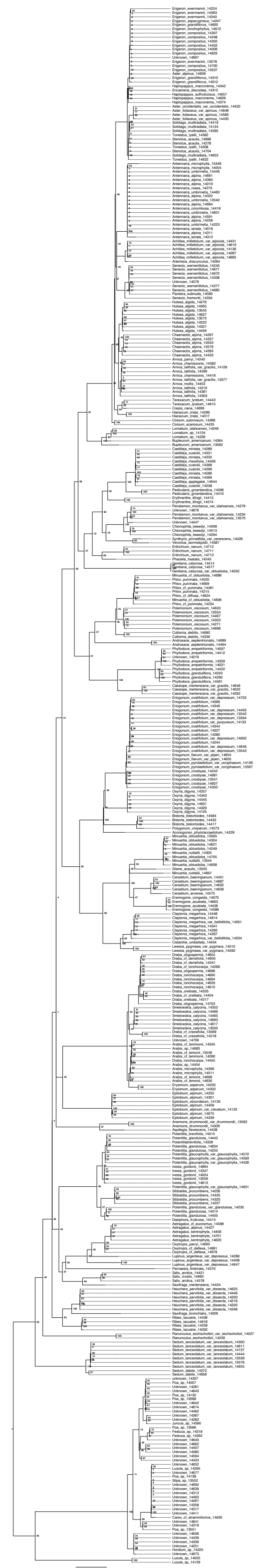

Figure c.3.4: *ndhF* gene tree for the alpine flora of the Sawtooth National Forest

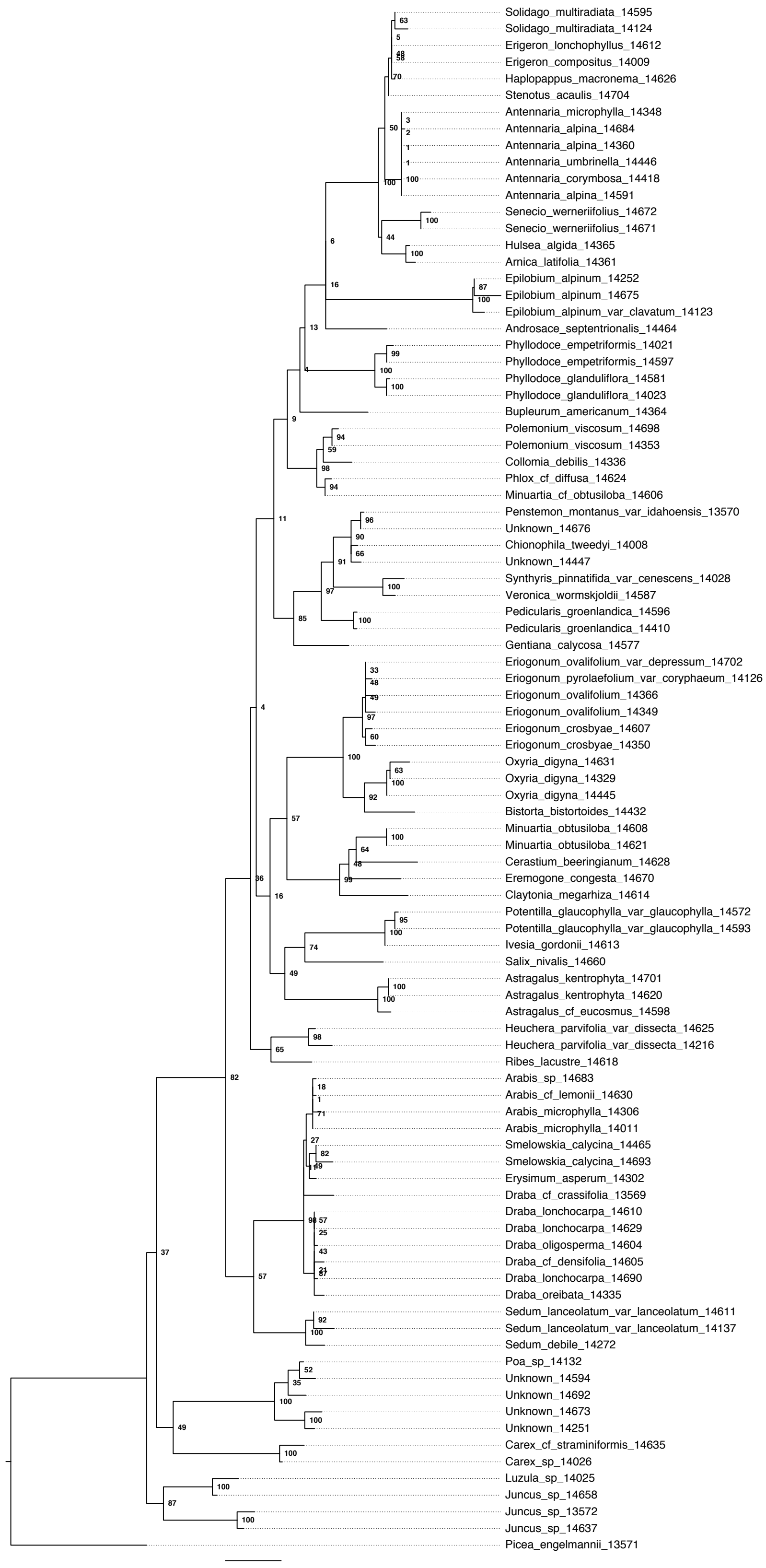

Figure c.3.5: *rbcL* gene tree for the alpine flora of the Sawtooth National Forest

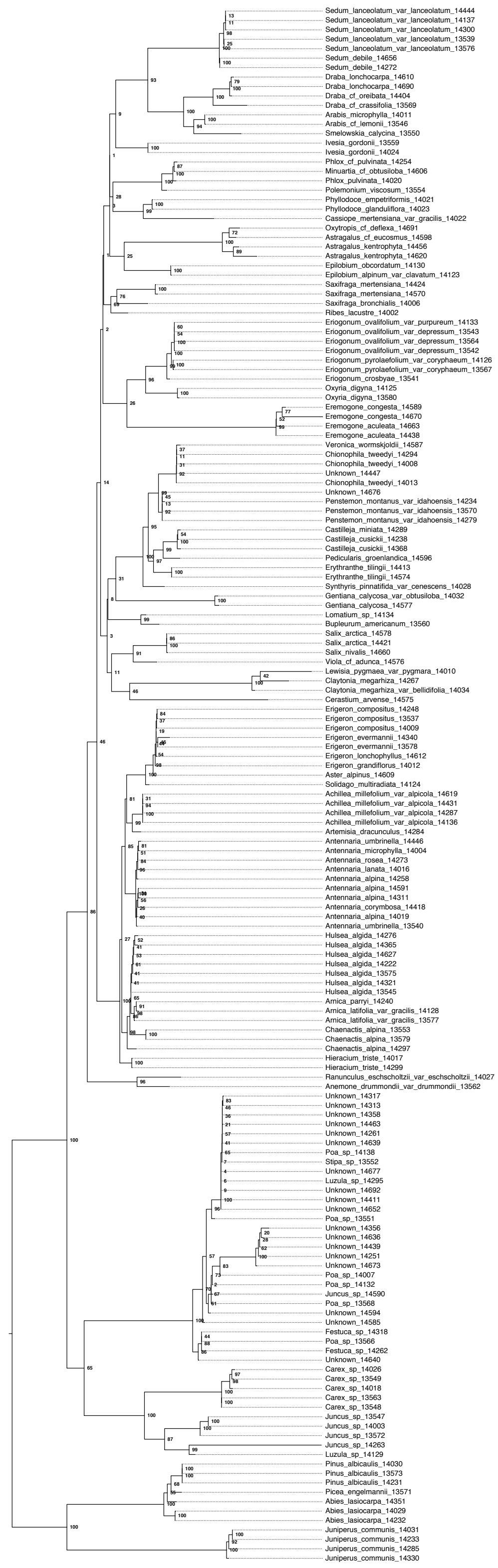

Figure c.3.6: *trnTLF* gene tree for the alpine flora of the Sawtooth National Forest

C.4 COMMUNITY PHYLOGENY OF ALPINE FLORA IN THE SAWTOOTH NATIONAL FOREST

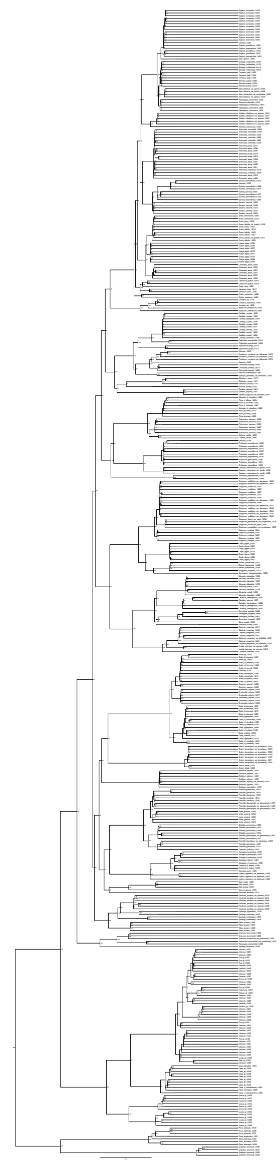

FIGURE C.4.1: Maximum likelihood phylogram for concatenated alignment of gene regions sequenced using the high-throughput sequencing approach. Node values indicate bootstrap support.

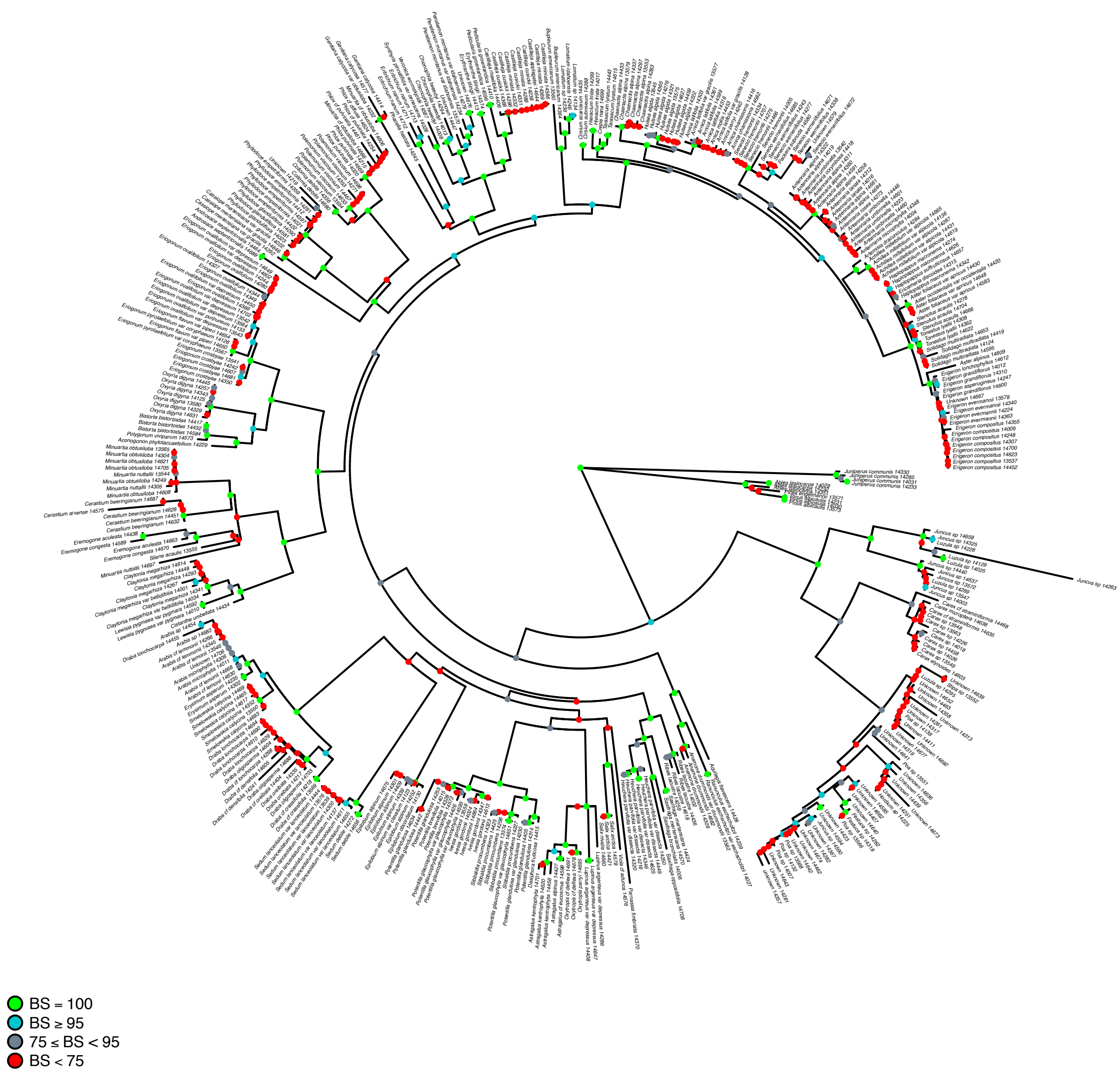

FIGURE C.4.2: Maximum likelihood phylogram (fan) for concatenated alignment of gene regions sequenced using the high-throughput sequencing approach. Node colors indicate bootstrap support.

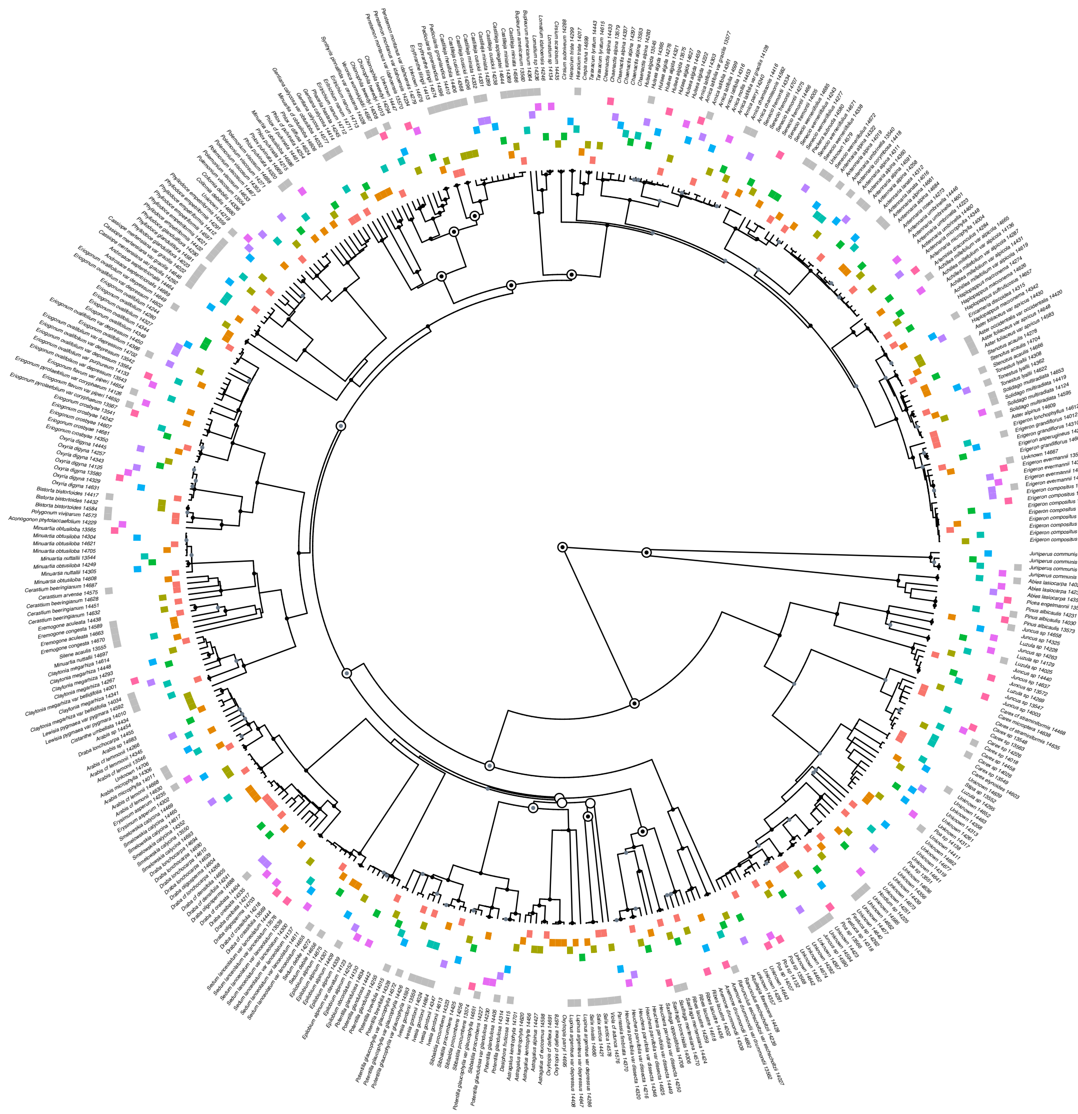

Figure c.4.3: Community phylogeny of the alpine flora across nine summits within the Sawtooth National Forest estimated from high-throughput data. Tips labels show species names with their DNA accession numbers. Colors bars on tips match colors of summits on the map in Figure 4.1a, and indicate the presence of each species on each summit. The grey bar closest to tip names shows species that were collected from alpine meadows. Nodes that were congruent with the reference timetree ('congruified') are indicated by black circles. Nodes with a light grey dot have bootstrap support (BS) between 75 and 95, and those with a black dot have BS support greater than or equal to 95.

C.5 PHYLOGENETIC α-DIVERSITY OUTPUT

TABLE C.5.1: Table showing output statistics for phylogenetic α-diversity on each summit: the number of taxa (N taxa), the observed phylogenetic diversity (obs), the mean phylogenetic diversity from the phylogeny shuffle randomization (rand mean), the standard deviation of phylogenetic diversity from the phylogeny shuffle randomization (rand sd), the rank of the observed metric compared to the metric calculated after the phylogeny shuffle randomization (obs rank), the z-score or standardized effect size (SES) of the observed metric compared to the phylogeny shuffle randomization (obs z) , the P-value (quantile) of observed metric compared to the phylogeny shuffle randomization (obs p = obs rank / runs), if the P-value was significant (sig), the number of phylogeny shuffles (runs), the phylogenetic diversity metric calculated (metric), the clade the metric was calculated for (clade), and the species pool the metric was calculated in (pool; All Alpine = species collected on the talus slopes and near the meadow, Talus = only species collected on the talus slopes).

Summits	N taxa	obs	rand mean	rand sd	obs rank	obs z	obs p	sig	runs	metric	clade	pool
Braxon Peak	28	92.232	95.249	19.167	4533	-0.157	0.453	0	10000	mntd	Spermatophyta	All Alpine
Castle Peak	46	95.545	70.198	12.020	9885	2.109	0.988	1	10000	mntd	Spermatophyta	All Alpine
D.O. Lee Peak	37	68.776	81.055	14.956	2198	-0.821	0.220	0	10000	mntd	Spermatophyta	All Alpine
Horstmann Peak	31	109.224	89.324	17.489	8599	1.138	0.860	0	10000	mntd	Spermatophyta	All Alpine
Hyndman Peak	45	58.787	71.392	12.301	1637	-1.025	0.164	0	10000	mntd	Spermatophyta	All Alpine
Mount Cramer	39	90.082	78.342	14.090	7834	0.833	0.783	0	10000	mntd	Spermatophyta	All Alpine
Salzburger Spitzl	40	84.530	77.036	13.792	6923	0.543	0.692	0	10000	mntd	Spermatophyta	All Alpine
Snowyside Peak	24	111.675	102.914	21.655	6535	0.405	0.653	0	10000	mntd	Spermatophyta	All Alpine
Thompson Peak	17	97.717	121.978	28.644	2063	-0.847	0.206	0	10000	mntd	Spermatophyta	All Alpine
Braxon Peak	7	38.875	37.961	12.373	5488	0.074	0.549	0	10000	mntd	Asterales	All Alpine
Castle Peak	15	25.176	21.784	5.771	7155	0.588	0.715	0	10000	mntd	Asterales	All Alpine
D.O. Lee Peak	6	48.118	41.998	14.139	6735	0.433	0.673	0	10000	mntd	Asterales	All Alpine
Horstmann Peak	6	49.588	41.810	14.135	7121	0.550	0.712	0	10000	mntd	Asterales	All Alpine
Hyndman Peak	11	39.223	27.381	7.918	9297	1.496	0.930	0	10000	mntd	Asterales	All Alpine
Mount Cramer	12	24.606	25.565	7.239	4565	-0.132	0.456	0	10000	mntd	Asterales	All Alpine
Salzburger Spitzl	11	48.381	27.534	7.919	9958	2.633	0.996	1	10000	mntd	Asterales	All Alpine
Snowyside Peak	7	38.973	37.768	12.045	5603	0.100	0.560	0	10000	mntd	Asterales	All Alpine
Thompson Peak	4	63.195	53.563	19.409	7261.5	0.496	0.726	0	10000	mntd	Asterales	All Alpine
Braxon Peak	5	114.135	91.659	32.176	7629.5	0.699	0.763	0	10000	mntd	Caryophyllales	All Alpine
Castle Peak	6	88.380	80.631	27.740	5998.5	0.279	0.600	0	10000	mntd	Caryophyllales	All Alpine
D.O. Lee Peak	6	121.635	80.579	27.988	9275	1.467	0.927	0	10000	mntd	Caryophyllales	All Alpine
Horstmann Peak	4	75.554	104.880	38.718	2216.5	-0.757	0.222	0	10000	mntd	Caryophyllales	All Alpine
Hyndman Peak	9	87.032	62.448	19.894	8836	1.236	0.884	0	10000	mntd	Caryophyllales	All Alpine
Mount Cramer	5	87.098	90.882	31.965	4368.5	-0.118	0.437	0	10000	mntd	Caryophyllales	All Alpine
Salzburger Spitzl	7	102.476	73.688	24.600	8772	1.170	0.877	0	10000	mntd	Caryophyllales	All Alpine
Snowyside Peak	5	95.937	91.135	32.305	5353	0.149	0.535	0	10000	mntd	Caryophyllales	All Alpine
Thompson Peak	4	90.453	104.775	38.844	3776.5	-0.369	0.378	0	10000	mntd	Caryophyllales	All Alpine
Braxon Peak	6	52.143	77.726	26.224	2013	-0.976	0.201	0	10000	mntd	Poales	All Alpine
Castle Peak	3	206.235	145.190	61.088	6501	0.999	0.650	0	10000	mntd	Poales	All Alpine
D.O. Lee Peak	0	NA	NA	NA	NA	NA	NA	NA	10000	mntd	Poales	All Alpine
Horstmann Peak	5	109.045	93.056	33.410	6411.5	0.479	0.641	0	10000	mntd	Poales	All Alpine
Hyndman Peak	4	84.804	114.745	44.202	2511.5	-0.677	0.251	0	10000	mntd	Poales	All Alpine
Mount Cramer	3	147.413	145.929	61.023	6177	0.024	0.618	0	10000	mntd	Poales	All Alpine
Salzburger Spitzl	3	123.258	144.875	61.262	4616	-0.353	0.462	0	10000	mntd	Poales	All Alpine
Snowyside Peak	0	NA	NA	NA	NA	NA	NA	NA	10000	mntd	Poales	All Alpine
Thompson Peak	5	99.468	92.860	33.309	5334.5	0.198	0.533	0	10000	mntd	Poales	All Alpine
Braxon Peak	1	NA	NA	NA	NA	NA	NA	NA	10000	mntd	Brassicales	All Alpine
Castle Peak	3	41.341	44.513	13.450	3477	-0.236	0.348	0	10000	mntd	Brassicales	All Alpine
D.O. Lee Peak	6	31.266	30.376	7.774	5428	0.114	0.543	0	10000	mntd	Brassicales	All Alpine
Horstmann Peak	2	58.828	54.451	18.985	4350.5	0.231	0.435	0	10000	mntd	Brassicales	All Alpine
Hyndman Peak	6	30.302	30.266	7.735	4988	0.005	0.499	0	10000	mntd	Brassicales	All Alpine
Mount Cramer	2	41.703	54.262	19.182	2733	-0.655	0.273	0	10000	mntd	Brassicales	All Alpine
Salzburger Spitzl	4	8.368	38.321	10.681	57	-2.804	0.006	1	10000	mntd	Brassicales	All Alpine
Snowyside Peak	3	60.124	44.547	13.477	7925	1.156	0.792	0	10000	mntd	Brassicales	All Alpine
Thompson Peak	2	55.839	54.238	19.160	3114.5	0.084	0.311	0	10000	mntd	Brassicales	All Alpine
Braxon Peak	0	NA	NA	NA	NA	NA	NA	NA	10000	mntd	Ericales	All Alpine

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Table c.5.1 – continued from previous page

Summits	N taxa	obs	rand mean	rand sd	obs rank	obs z	obs p	sig	runs	metric	clade	pool
Castle Peak	2	74.045	123.443	73.128	3806	-0.675	0.381	0	10000	mntd	Ericales	All Alpine
D.O. Lee Peak	3	106.168	92.741	47.564	5969	0.282	0.597	0	10000	mntd	Ericales	All Alpine
Horstmann Peak	1	NA	NA	NA	NA	NA	NA	NA	10000	mntd	Ericales	All Alpine
Hyndman Peak	2	74.045	124.052	73.690	3839.5	-0.679	0.384	0	10000	mntd	Ericales	All Alpine
Mount Cramer	3	57.968	92.277	47.241	2527	-0.726	0.253	0	10000	mntd	Ericales	All Alpine
Salzburger Spitzl	3	116.215	92.441	47.658	8374.5	0.499	0.837	0	10000	mntd	Ericales	All Alpine
Snowyside Peak	2	58.974	124.395	73.464	2107	-0.891	0.211	0	10000	mntd	Ericales	All Alpine
Thompson Peak	1	NA	NA	NA	NA	NA	NA	NA	10000	mntd	Ericales	All Alpine
Braxon Peak	28	333.960	281.946	29.228	9499	1.780	0.950	0	10000	mpd	Spermatophyta	All Alpine
Castle Peak	46	272.762	281.693	21.827	3540	-0.409	0.354	0	10000	mpd	Spermatophyta	All Alpine
D.O. Lee Peak	37	248.790	281.242	24.858	839	-1.306	0.084	0	10000	mpd	Spermatophyta	All Alpine
Horstmann Peak	31	352.356	282.215	27.365	9891	2.563	0.989	1	10000	mpd	Spermatophyta	All Alpine
Hyndman Peak	45	268.592	281.511	21.904	2956	-0.590	0.296	0	10000	mpd	Spermatophyta	All Alpine
Mount Cramer	39	277.497	281.167	23.747	4642	-0.155	0.464	0	10000	mpd	Spermatophyta	All Alpine
Salzburger Spitzl	40	258.819	281.671	23.430	1686	-0.975	0.169	0	10000	mpd	Spermatophyta	All Alpine
Snowyside Peak	24	285.578	282.429	31.402	5770	0.100	0.577	0	10000	mpd	Spermatophyta	All Alpine
Thompson Peak	17	284.225	281.779	37.932	5927	0.064	0.593	0	10000	mpd	Spermatophyta	All Alpine
Braxon Peak	7	76.091	73.640	7.281	6041.5	0.337	0.604	0	10000	mpd	Asterales	All Alpine
Castle Peak	15	78.124	73.413	3.930	9000	1.199	0.900	0	10000	mpd	Asterales	All Alpine
D.O. Lee Peak	6	77.668	73.477	8.447	6793	0.496	0.679	0	10000	mpd	Asterales	All Alpine
Horstmann Peak	6	78.881	73.446	8.319	7445	0.653	0.744	0	10000	mpd	Asterales	All Alpine
Hyndman Peak	11	70.403	73.562	5.005	2293	-0.631	0.229	0	10000	mpd	Asterales	All Alpine
Mount Cramer	12	74.592	73.531	4.674	5600	0.227	0.560	0	10000	mpd	Asterales	All Alpine
Salzburger Spitzl	11	83.827	73.457	5.054	9967	2.052	0.997	1	10000	mpd	Asterales	All Alpine
Snowyside Peak	7	72.747	73.419	7.407	4126	-0.091	0.413	0	10000	mpd	Asterales	All Alpine
Thompson Peak	4	80.259	73.421	12.320	7127	0.555	0.713	0	10000	mpd	Asterales	All Alpine
Braxon Peak	5	173.450	159.246	27.108	6904	0.524	0.690	0	10000	mpd	Caryophyllales	All Alpine
Castle Peak	6	156.292	158.668	23.418	3589	-0.101	0.359	0	10000	mpd	Caryophyllales	All Alpine
D.O. Lee Peak	6	191.568	159.210	22.995	9391	1.407	0.939	0	10000	mpd	Caryophyllales	All Alpine
Horstmann Peak	4	105.950	158.730	33.737	855	-1.564	0.085	0	10000	mpd	Caryophyllales	All Alpine
Hyndman Peak	9	182.992	159.063	16.775	9518	1.426	0.952	1	10000	mpd	Caryophyllales	All Alpine
Mount Cramer	5	174.327	159.413	27.133	7299	0.550	0.730	0	10000	mpd	Caryophyllales	All Alpine
Salzburger Spitzl	7	179.214	159.116	20.573	8614	0.977	0.861	0	10000	mpd	Caryophyllales	All Alpine
Snowyside Peak	5	136.850	158.837	27.514	1653.5	-0.799	0.165	0	10000	mpd	Caryophyllales	All Alpine
Thompson Peak	4	132.575	158.453	33.661	1906.5	-0.769	0.191	0	10000	mpd	Caryophyllales	All Alpine
Braxon Peak	6	190.828	191.252	23.638	4184.5	-0.018	0.418	0	10000	mpd	Poales	All Alpine
Castle Peak	3	236.290	191.316	52.607	6603.5	0.855	0.660	0	10000	mpd	Poales	All Alpine
D.O. Lee Peak	0	NA	NA	NA	NA	NA	NA	NA	10000	mpd	Poales	All Alpine
Horstmann Peak	5	217.315	190.824	29.311	8070	0.904	0.807	0	10000	mpd	Poales	All Alpine
Hyndman Peak	4	146.133	190.885	37.911	1561.5	-1.180	0.156	0	10000	mpd	Poales	All Alpine
Mount Cramer	3	206.880	191.113	52.626	6247.5	0.300	0.625	0	10000	mpd	Poales	All Alpine
Salzburger Spitzl	3	194.802	191.299	52.652	5131.5	0.067	0.513	0	10000	mpd	Poales	All Alpine
Snowyside Peak	0	NA	NA	NA	NA	NA	NA	NA	10000	mpd	Poales	All Alpine
Thompson Peak	5	198.744	191.426	29.157	5297	0.251	0.530	0	10000	mpd	Poales	All Alpine
Braxon Peak	1	NA	NA	NA	NA	NA	NA	NA	10000	mpd	Brassicales	All Alpine
Castle Peak	3	55.018	53.994	10.980	3931.5	0.093	0.393	0	10000	mpd	Brassicales	All Alpine
D.O. Lee Peak	6	52.407	54.111	4.605	2988	-0.370	0.299	0	10000	mpd	Brassicales	All Alpine
Horstmann Peak	2	58.828	54.203	19.375	4370.5	0.239	0.437	0	10000	mpd	Brassicales	All Alpine
Hyndman Peak	6	49.387	54.131	4.522	1279.5	-1.049	0.128	0	10000	mpd	Brassicales	All Alpine
Mount Cramer	2	41.703	54.048	19.227	2785	-0.642	0.278	0	10000	mpd	Brassicales	All Alpine
Salzburger Spitzl	4	40.015	54.085	7.574	527.5	-1.858	0.053	0	10000	mpd	Brassicales	All Alpine
Snowyside Peak	3	64.410	54.040	11.162	7577	0.929	0.758	0	10000	mpd	Brassicales	All Alpine
Thompson Peak	2	55.839	54.306	19.243	3101	0.080	0.310	0	10000	mpd	Brassicales	All Alpine
Braxon Peak	0	NA	NA	NA	NA	NA	NA	NA	10000	mpd	Ericales	All Alpine
Castle Peak	2	74.045	123.424	73.399	3832.5	-0.673	0.383	0	10000	mpd	Ericales	All Alpine
D.O. Lee Peak	3	153.362	122.526	51.726	5979.5	0.596	0.598	0	10000	mpd	Ericales	All Alpine
Horstmann Peak	1	NA	NA	NA	NA	NA	NA	NA	10000	mpd	Ericales	All Alpine
Hyndman Peak	2	74.045	123.507	73.297	3833.5	-0.675	0.383	0	10000	mpd	Ericales	All Alpine
Mount Cramer	3	77.769	123.125	51.195	3255	-0.886	0.325	0	10000	mpd	Ericales	All Alpine
Salzburger Spitzl	3	158.386	123.098	51.401	8134	0.687	0.813	0	10000	mpd	Ericales	All Alpine
Snowyside Peak	2	58.974	123.076	73.409	2138	-0.873	0.214	0	10000	mpd	Ericales	All Alpine
Thompson Peak	1	NA	NA	NA	NA	NA	NA	NA	10000	mpd	Ericales	All Alpine
Braxon Peak	28	92.232	95.249	19.167	4533	-0.157	0.453	0	10000	mntd	Spermatophyta	Talus
Castle Peak	46	95.545	70.198	12.020	9885	2.109	0.988	1	10000	mntd	Spermatophyta	Talus
D.O. Lee Peak	37	68.776	81.055	14.956	2198	-0.821	0.220	0	10000	mntd	Spermatophyta	Talus
Horstmann Peak	31	109.224	89.324	17.489	8599	1.138	0.860	0	10000	mntd	Spermatophyta	Talus
Hyndman Peak	45	58.787	71.392	12.301	1637	-1.025	0.164	0	10000	mntd	Spermatophyta	Talus
Mount Cramer	39	90.082	78.342	14.090	7834	0.833	0.783	0	10000	mntd	Spermatophyta	Talus
Salzburger Spitzl	40	84.530	77.036	13.792	6923	0.543	0.692	0	10000	mntd	Spermatophyta	Talus
Snowyside Peak	24	111.675	102.914	21.655	6535	0.405	0.653	0	10000	mntd	Spermatophyta	Talus
Thompson Peak	17	97.717	121.978	28.644	2063	-0.847	0.206	0	10000	mntd	Spermatophyta	Talus
Braxon Peak	7	38.875	37.961	12.373	5488	0.074	0.549	0	10000	mntd	Asterales	Talus
Castle Peak	15	25.176	21.784	5.771	7155	0.588	0.715	0	10000	mntd	Asterales	Talus
D.O. Lee Peak	6	48.118	41.998	14.139	6735	0.433	0.673	0	10000	mntd	Asterales	Talus
Horstmann Peak	6	49.588	41.810	14.135	7121	0.550	0.712	0	10000	mntd	Asterales	Talus
Hyndman Peak	11	39.223	27.381	7.918	9297	1.496	0.930	0	10000	mntd	Asterales	Talus

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Table c.5.1 – continued from previous page

Summits	N taxa	obs	rand mean	rand sd	obs rank	obs z	obs p	sig	runs	metric	clade	pool
Mount Cramer	12	24.606	25.565	7.239	4565	-0.132	0.456	0	10000	mntd	Asterales	Talus
Salzburger Spitzl	11	48.381	27.534	7.919	9958	2.633	0.996	1	10000	mntd	Asterales	Talus
Snowyside Peak	7	38.973	37.768	12.045	5603	0.100	0.560	0	10000	mntd	Asterales	Talus
Thompson Peak	4	63.195	53.563	19.409	7261.5	0.496	0.726	0	10000	mntd	Asterales	Talus
Braxon Peak	5	114.135	91.659	32.176	7629.5	0.699	0.763	0	10000	mntd	Caryophyllales	Talus
Castle Peak	6	88.380	80.631	27.740	5998.5	0.279	0.600	0	10000	mntd	Caryophyllales	Talus
D.O. Lee Peak	6	121.635	80.579	27.988	9275	1.467	0.927	0	10000	mntd	Caryophyllales	Talus
Horstmann Peak	4	75.554	104.880	38.718	2216.5	-0.757	0.222	0	10000	mntd	Caryophyllales	Talus
Hyndman Peak	9	87.032	62.448	19.894	8836	1.236	0.884	0	10000	mntd	Caryophyllales	Talus
Mount Cramer	5	87.098	90.882	31.965	4368.5	-0.118	0.437	0	10000	mntd	Caryophyllales	Talus
Salzburger Spitzl	7	102.476	73.688	24.600	8772	1.170	0.877	0	10000	mntd	Caryophyllales	Talus
Snowyside Peak	5	95.937	91.135	32.305	5353	0.149	0.535	0	10000	mntd	Caryophyllales	Talus
Thompson Peak	4	90.453	104.775	38.844	3776.5	-0.369	0.378	0	10000	mntd	Caryophyllales	Talus
Braxon Peak	1	NA	NA	NA	NA	NA	NA	NA	10000	mntd	Brassicales	Talus
Castle Peak	3	41.341	44.513	13.450	3477	-0.236	0.348	0	10000	mntd	Brassicales	Talus
D.O. Lee Peak	6	31.266	30.376	7.774	5428	0.114	0.543	0	10000	mntd	Brassicales	Talus
Horstmann Peak	2	58.828	54.451	18.985	4350.5	0.231	0.435	0	10000	mntd	Brassicales	Talus
Hyndman Peak	6	30.302	30.266	7.735	4988	0.005	0.499	0	10000	mntd	Brassicales	Talus
Mount Cramer	2	41.703	54.262	19.182	2733	-0.655	0.273	0	10000	mntd	Brassicales	Talus
Salzburger Spitzl	4	8.368	38.321	10.681	57	-2.804	0.006	1	10000	mntd	Brassicales	Talus
Snowyside Peak	3	60.124	44.547	13.477	7925	1.156	0.792	0	10000	mntd	Brassicales	Talus
Thompson Peak	2	55.839	54.238	19.160	3114.5	0.084	0.311	0	10000	mntd	Brassicales	Talus
Braxon Peak	0	NA	NA	NA	NA	NA	NA	NA	10000	mntd	Ericales	Talus
Castle Peak	2	74.045	123.443	73.128	3806	-0.675	0.381	0	10000	mntd	Ericales	Talus
D.O. Lee Peak	3	106.168	92.741	47.564	5969	0.282	0.597	0	10000	mntd	Ericales	Talus
Horstmann Peak	1	NA	NA	NA	NA	NA	NA	NA	10000	mntd	Ericales	Talus
Hyndman Peak	2	74.045	124.052	73.690	3839.5	-0.679	0.384	0	10000	mntd	Ericales	Talus
Mount Cramer	3	57.968	92.277	47.241	2527	-0.726	0.253	0	10000	mntd	Ericales	Talus
Salzburger Spitzl	3	116.215	92.441	47.658	8374.5	0.499	0.837	0	10000	mntd	Ericales	Talus
Snowyside Peak	2	58.974	124.395	73.464	2107	-0.891	0.211	0	10000	mntd	Ericales	Talus
Thompson Peak	1	NA	NA	NA	NA	NA	NA	NA	10000	mntd	Ericales	Talus
Braxon Peak	3	179.988	107.979	50.663	7818	1.421	0.782	0	10000	mntd	Saxifragales	Talus
Castle Peak	3	179.988	108.821	50.480	9945.5	1.410	0.994	1	10000	mntd	Saxifragales	Talus
D.O. Lee Peak	1	NA	NA	NA	NA	NA	NA	NA	10000	mntd	Saxifragales	Talus
Horstmann Peak	2	235.347	157.501	90.789	6804.5	0.857	0.680	0	10000	mntd	Saxifragales	Talus
Hyndman Peak	3	179.988	108.379	50.938	8980.5	1.406	0.898	0	10000	mntd	Saxifragales	Talus
Mount Cramer	2	235.347	156.200	91.047	6850.5	0.869	0.685	0	10000	mntd	Saxifragales	Talus
Salzburger Spitzl	3	179.988	108.058	50.920	8403.5	1.413	0.840	0	10000	mntd	Saxifragales	Talus
Snowyside Peak	1	NA	NA	NA	NA	NA	NA	NA	10000	mntd	Saxifragales	Talus
Thompson Peak	1	NA	NA	NA	NA	NA	NA	NA	10000	mntd	Saxifragales	Talus
Braxon Peak	28	333.960	281.946	29.228	9499	1.780	0.950	0	10000	mpd	Spermatophyta	Talus
Castle Peak	46	272.762	281.693	21.827	3540	-0.409	0.354	0	10000	mpd	Spermatophyta	Talus
D.O. Lee Peak	37	248.790	281.242	24.858	839	-1.306	0.084	0	10000	mpd	Spermatophyta	Talus
Horstmann Peak	31	352.356	282.215	27.365	9891	2.563	0.989	1	10000	mpd	Spermatophyta	Talus
Hyndman Peak	45	268.592	281.511	21.904	2956	-0.590	0.296	0	10000	mpd	Spermatophyta	Talus
Mount Cramer	39	277.497	281.167	23.747	4642	-0.155	0.464	0	10000	mpd	Spermatophyta	Talus
Salzburger Spitzl	40	258.819	281.671	23.430	1686	-0.975	0.169	0	10000	mpd	Spermatophyta	Talus
Snowyside Peak	24	285.578	282.429	31.402	5770	0.100	0.577	0	10000	mpd	Spermatophyta	Talus
Thompson Peak	17	284.225	281.779	37.932	5927	0.064	0.593	0	10000	mpd	Spermatophyta	Talus
Braxon Peak	7	76.091	73.640	7.281	6041.5	0.337	0.604	0	10000	mpd	Asterales	Talus
Castle Peak	15	78.124	73.413	3.930	9000	1.199	0.900	0	10000	mpd	Asterales	Talus
D.O. Lee Peak	6	77.668	73.477	8.447	6793	0.496	0.679	0	10000	mpd	Asterales	Talus
Horstmann Peak	6	78.881	73.446	8.319	7445	0.653	0.744	0	10000	mpd	Asterales	Talus
Hyndman Peak	11	70.403	73.562	5.005	2293	-0.631	0.229	0	10000	mpd	Asterales	Talus
Mount Cramer	12	74.592	73.531	4.674	5600	0.227	0.560	0	10000	mpd	Asterales	Talus
Salzburger Spitzl	11	83.827	73.457	5.054	9967	2.052	0.997	1	10000	mpd	Asterales	Talus
Snowyside Peak	7	72.747	73.419	7.407	4126	-0.091	0.413	0	10000	mpd	Asterales	Talus
Thompson Peak	4	80.259	73.421	12.320	7127	0.555	0.713	0	10000	mpd	Asterales	Talus
Braxon Peak	5	173.450	159.246	27.108	6904	0.524	0.690	0	10000	mpd	Caryophyllales	Talus
Castle Peak	6	156.292	158.668	23.418	3589	-0.101	0.359	0	10000	mpd	Caryophyllales	Talus
D.O. Lee Peak	6	191.568	159.210	22.995	9391	1.407	0.939	0	10000	mpd	Caryophyllales	Talus
Horstmann Peak	4	105.950	158.730	33.737	855	-1.564	0.085	0	10000	mpd	Caryophyllales	Talus
Hyndman Peak	9	182.992	159.063	16.775	9518	1.426	0.952	1	10000	mpd	Caryophyllales	Talus
Mount Cramer	5	174.327	159.413	27.133	7299	0.550	0.730	0	10000	mpd	Caryophyllales	Talus
Salzburger Spitzl	7	179.214	159.116	20.573	8614	0.977	0.861	0	10000	mpd	Caryophyllales	Talus
Snowyside Peak	5	136.850	158.837	27.514	1653.5	-0.799	0.165	0	10000	mpd	Caryophyllales	Talus
Thompson Peak	4	132.575	158.453	33.661	1906.5	-0.769	0.191	0	10000	mpd	Caryophyllales	Talus
Braxon Peak	1	NA	NA	NA	NA	NA	NA	NA	10000	mpd	Brassicales	Talus
Castle Peak	3	55.018	53.994	10.980	3931.5	0.093	0.393	0	10000	mpd	Brassicales	Talus
D.O. Lee Peak	6	52.407	54.111	4.605	2988	-0.370	0.299	0	10000	mpd	Brassicales	Talus
Horstmann Peak	2	58.828	54.203	19.375	4370.5	0.239	0.437	0	10000	mpd	Brassicales	Talus
Hyndman Peak	6	49.387	54.131	4.522	1279.5	-1.049	0.128	0	10000	mpd	Brassicales	Talus
Mount Cramer	2	41.703	54.048	19.227	2785	-0.642	0.278	0	10000	mpd	Brassicales	Talus
Salzburger Spitzl	4	40.015	54.085	7.574	527.5	-1.858	0.053	0	10000	mpd	Brassicales	Talus
Snowyside Peak	3	64.410	54.040	11.162	7577	0.929	0.758	0	10000	mpd	Brassicales	Talus
Thompson Peak	2	55.839	54.306	19.243	3101	0.080	0.310	0	10000	mpd	Brassicales	Talus

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Table c.5.1 – continued from previous page

Summits	N taxa	obs	rand mean	rand sd	obs rank	obs z	obs p	sig	runs	metric	clade	pool
Braxon Peak	0	NA	NA	NA	NA	NA	NA	NA	10000	mpd	Ericales	Talus
Castle Peak	2	74.045	123.424	73.399	3832.5	-0.673	0.383	0	10000	mpd	Ericales	Talus
D.O. Lee Peak	3	153.362	122.526	51.726	5979.5	0.596	0.598	0	10000	mpd	Ericales	Talus
Horstmann Peak	1	NA	NA	NA	NA	NA	NA	NA	10000	mpd	Ericales	Talus
Hyndman Peak	2	74.045	123.507	73.297	3833.5	-0.675	0.383	0	10000	mpd	Ericales	Talus
Mount Cramer	3	77.769	123.125	51.195	3255	-0.886	0.325	0	10000	mpd	Ericales	Talus
Salzburger Spitzl	3	158.386	123.098	51.401	8134	0.687	0.813	0	10000	mpd	Ericales	Talus
Snowyside Peak	2	58.974	123.076	73.409	2138	-0.873	0.214	0	10000	mpd	Ericales	Talus
Thompson Peak	1	NA	NA	NA	NA	NA	NA	NA	10000	mpd	Ericales	Talus
Braxon Peak	3	207.668	155.660	50.314	7881	1.034	0.788	0	10000	mpd	Saxifragales	Talus
Castle Peak	3	207.668	156.496	49.745	9861.5	1.029	0.986	1	10000	mpd	Saxifragales	Talus
D.O. Lee Peak	1	NA	NA	NA	NA	NA	NA	NA	10000	mpd	Saxifragales	Talus
Horstmann Peak	2	235.347	156.814	90.558	6823.5	0.867	0.682	0	10000	mpd	Saxifragales	Talus
Hyndman Peak	3	207.668	155.749	50.679	9229	1.024	0.923	0	10000	mpd	Saxifragales	Talus
Mount Cramer	2	235.347	157.083	90.732	6814	0.863	0.681	0	10000	mpd	Saxifragales	Talus
Salzburger Spitzl	3	207.668	156.906	49.639	8185.5	1.023	0.818	0	10000	mpd	Saxifragales	Talus
Snowyside Peak	1	NA	NA	NA	NA	NA	NA	NA	10000	mpd	Saxifragales	Talus
Thompson Peak	1	NA	NA	NA	NA	NA	NA	NA	10000	mpd	Saxifragales	Talus

C.6 PLOTS OF PHYLOGENETIC α-DIVERSITY FOR TALUS SPECIES

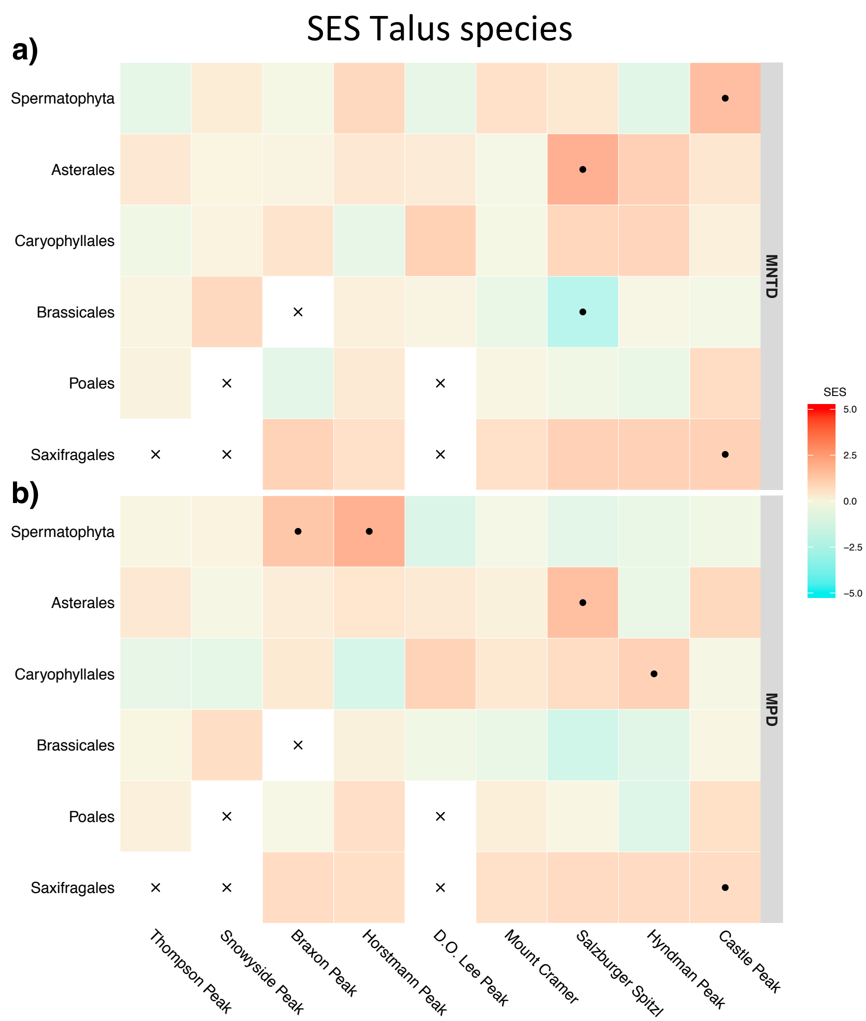

FIGURE C.6.1: Measures of phylogenetic diversity for species found only on talus within summits (top panels MNTD, bottom panels MPD). a) Tile rows show phylogenetic diversity for all seed plants (Spermatophyta), and each of the five most species-rich clades on each summit (columns). b) Phylogenetic diversity for all seed plants shown for each summit on the map of the Sawtooth National Forest. Warm tones indicate phylogenetic overdispersion (high species diversity), cool tones indicate phylogenetic clustering (low species diversity). Tiles with black dots mark statistically significant (P-values < 0.05) phylogenetic patterns in community structure (from random resampling the phylogeny). Cells filled with an "x" had too few species for comparison.

C.7 PHYLOGENETIC β-DIVERSITY OUTPUT

TABLE C.7.1: Table with results of decomposed UniFrac indices for each summit pair: observed UniFrac distance (UniFrac), observed component of UniFrac distance describing species replacement (UniFrac Turn), observed component of UniFrac distance describing species nestedness (UniFrac PD), standardized effect size (SES) comparing observed UniFrac distance to expected from shuffling the phylogeny tips (SES UniFrac), SES component of UniFrac distance describing species replacement (SES UniFrac Turn), SES component of UniFrac distance describing species nestedness (SES UniFrac PD), and the species pool (pool) considered for the calculation(All Alpine = all species combined, Talus = just species that occurred on the talus slopes).

Summit Pair	UniFrac	UniFrac Turn	UniFrac PD	SES UniFrac	SES UniFrac Turn	SES UniFrac PD	pool
Braxon Peak-Castle Peak	0.511	0.402	0.109	-0.623	-0.069	-0.478	All Alpine
Braxon Peak-D.O. Lee Peak	0.632	0.575	0.057	0.390	1.341	-1.479	All Alpine
Braxon Peak-Horstmann Peak	0.466	0.392	0.074	-0.364	-0.449	0.234	All Alpine
Braxon Peak-Hyndman Peak	0.587	0.478	0.109	-0.490	1.069	-1.745	All Alpine
Braxon Peak-Mount Cramer	0.501	0.437	0.064	-0.788	-0.230	-0.496	All Alpine
Braxon Peak-Salzburger Spitzl	0.570	0.411	0.159	0.039	0.783	-0.943	All Alpine
Braxon Peak-Snowyside Peak	0.508	0.489	0.019	-0.958	-0.350	-0.853	All Alpine
Braxon Peak-Thompson Peak	0.479	0.342	0.137	-1.033	-1.009	0.404	All Alpine
Castle Peak-D.O. Lee Peak	0.538	0.521	0.017	0.953	1.299	-0.797	All Alpine
Castle Peak-Horstmann Peak	0.454	0.414	0.039	-1.888	-0.914	-0.791	All Alpine
Castle Peak-Hyndman Peak	0.545	0.528	0.018	0.958	1.905	-1.662	All Alpine
Castle Peak-Mount Cramer	0.327	0.270	0.057	-2.096	-1.800	-0.026	All Alpine
Castle Peak-Salzburger Spitzl	0.499	0.442	0.057	0.441	0.657	-0.445	All Alpine
Castle Peak-Snowyside Peak	0.502	0.362	0.140	1.152	0.451	0.600	All Alpine
Castle Peak-Thompson Peak	0.508	0.497	0.012	-0.709	-0.234	-0.865	All Alpine
D.O. Lee Peak-Horstmann Peak	0.637	0.627	0.010	0.668	1.642	-1.772	All Alpine
D.O. Lee Peak-Hyndman Peak	0.488	0.446	0.042	0.340	0.705	-0.662	All Alpine
D.O. Lee Peak-Mount Cramer	0.539	0.523	0.016	-0.495	0.361	-1.149	All Alpine
D.O. Lee Peak-Salzburger Spitzl	0.453	0.362	0.091	-0.343	-0.991	1.128	All Alpine
D.O. Lee Peak-Snowyside Peak	0.615	0.536	0.079	1.142	1.214	-0.564	All Alpine
D.O. Lee Peak-Thompson Peak	0.615	0.593	0.022	1.914	2.084	-0.836	All Alpine
Horstmann Peak-Hyndman Peak	0.619	0.579	0.040	0.653	2.124	-2.246	All Alpine
Horstmann Peak-Mount Cramer	0.437	0.434	0.003	-1.892	-0.951	-1.227	All Alpine
Horstmann Peak-Salzburger Spitzl	0.607	0.536	0.071	0.947	1.713	-1.463	All Alpine
Horstmann Peak-Snowyside Peak	0.462	0.360	0.103	-1.967	-2.917	2.435	All Alpine
Horstmann Peak-Thompson Peak	0.449	0.394	0.055	-1.575	-1.182	-0.152	All Alpine
Hyndman Peak-Mount Cramer	0.546	0.493	0.053	0.862	2.018	-1.739	All Alpine
Hyndman Peak-Salzburger Spitzl	0.324	0.272	0.051	-0.882	-0.985	0.330	All Alpine
Hyndman Peak-Snowyside Peak	0.583	0.449	0.134	1.353	1.992	-1.295	All Alpine
Hyndman Peak-Thompson Peak	0.567	0.560	0.006	1.367	2.700	-2.294	All Alpine
Mount Cramer-Salzburger Spitzl	0.546	0.456	0.090	0.479	0.736	-0.501	All Alpine
Mount Cramer-Snowyside Peak	0.501	0.412	0.089	0.952	0.359	0.711	All Alpine
Mount Cramer-Thompson Peak	0.401	0.335	0.066	-0.352	-0.668	0.554	All Alpine
Salzburger Spitzl-Snowyside Peak	0.590	0.415	0.175	1.275	0.868	0.039	All Alpine
Salzburger Spitzl-Thompson Peak	0.626	0.597	0.029	1.694	2.129	-1.286	All Alpine
Snowyside Peak-Thompson Peak	0.529	0.381	0.147	0.146	-1.078	1.857	All Alpine
Braxon Peak-Castle Peak	0.511	0.402	0.109	-0.361	0.082	-0.456	Talus
Braxon Peak-D.O. Lee Peak	0.634	0.593	0.041	0.822	0.738	0.013	Talus
Braxon Peak-Horstmann Peak	0.461	0.392	0.069	-0.138	-0.254	0.215	Talus
Braxon Peak-Hyndman Peak	0.496	0.472	0.023	-0.977	0.178	-1.261	Talus
Braxon Peak-Mount Cramer	0.501	0.437	0.064	-0.502	-0.047	-0.479	Talus
Braxon Peak-Salzburger Spitzl	0.482	0.430	0.052	-0.582	0.211	-0.880	Talus
Braxon Peak-Snowyside Peak	0.493	0.393	0.101	-1.013	-1.522	1.132	Talus
Braxon Peak-Thompson Peak	0.542	0.291	0.251	0.238	-0.832	1.272	Talus
Castle Peak-D.O. Lee Peak	0.623	0.486	0.138	1.859	0.926	0.604	Talus
Castle Peak-Horstmann Peak	0.454	0.409	0.045	-1.539	-0.643	-0.813	Talus
Castle Peak-Hyndman Peak	0.510	0.368	0.142	0.707	-0.823	2.477	Talus
Castle Peak-Mount Cramer	0.327	0.270	0.057	-1.886	-1.649	0.041	Talus
Castle Peak-Salzburger Spitzl	0.500	0.449	0.051	0.362	0.219	0.181	Talus
Castle Peak-Snowyside Peak	0.544	0.316	0.228	1.030	0.822	-0.088	Talus
Castle Peak-Thompson Peak	0.651	0.330	0.320	0.543	-0.093	0.479	Talus
D.O. Lee Peak-Horstmann Peak	0.708	0.640	0.068	1.153	0.463	1.484	Talus
D.O. Lee Peak-Hyndman Peak	0.560	0.529	0.030	0.963	1.364	-0.871	Talus
D.O. Lee Peak-Mount Cramer	0.613	0.512	0.101	0.658	-0.139	1.148	Talus

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Table c.7.1 – continued from previous page

Summit Pair	UniFrac	UniFrac Turn	UniFrac PD	SES UniFrac	SES UniFrac Turn	SES UniFrac PD	pool
D.O. Lee Peak-Salzburger Spitzl	0.534	0.420	0.114	0.279	-0.356	0.910	Talus
D.O. Lee Peak-Snowyside Peak	0.580	0.557	0.023	0.895	1.448	-1.103	Talus
D.O. Lee Peak-Thompson Peak	0.587	0.454	0.133	0.703	1.077	-0.763	Talus
Horstmann Peak-Hyndman Peak	0.618	0.554	0.063	0.727	0.462	0.240	Talus
Horstmann Peak-Mount Cramer	0.446	0.444	0.002	-1.667	-0.703	-1.267	Talus
Horstmann Peak-Salzburger Spitzl	0.620	0.613	0.007	1.314	1.821	-1.205	Talus
Horstmann Peak-Snowyside Peak	0.520	0.344	0.177	-1.102	-2.052	1.966	Talus
Horstmann Peak-Thompson Peak	0.664	0.425	0.239	0.786	-0.295	1.041	Talus
Hyndman Peak-Mount Cramer	0.543	0.460	0.083	0.922	0.061	1.595	Talus
Hyndman Peak-Salzburger Spitzl	0.285	0.155	0.130	-1.760	-3.329	2.848	Talus
Hyndman Peak-Snowyside Peak	0.536	0.474	0.062	-0.004	1.097	-1.401	Talus
Hyndman Peak-Thompson Peak	0.445	0.166	0.279	-1.185	-0.378	-0.540	Talus
Mount Cramer-Salzburger Spitzl	0.558	0.548	0.010	0.433	0.841	-0.924	Talus
Mount Cramer-Snowyside Peak	0.568	0.413	0.155	0.035	-0.238	0.363	Talus
Mount Cramer-Thompson Peak	0.607	0.304	0.303	0.147	-0.593	0.835	Talus
Salzburger Spitzl-Snowyside Peak	0.600	0.476	0.124	0.805	0.857	-0.408	Talus
Salzburger Spitzl-Thompson Peak	0.537	0.177	0.360	0.224	-0.267	0.471	Talus
Snowyside Peak-Thompson Peak	0.607	0.515	0.092	0.667	0.473	0.025	Talus