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The regular bulletins of the Station are sent free to all citizens of Idaho who request them. Late Bulletins are :

### BULLETINS.

34. Tomato Culture.
35. Meteorological Records; Soil Temperatures.
36. The Codling Moth.
37. Some Conditions of Stock Poisoning in Idaho.

Bulletin No. 38

May, 1903

UNIVERSITY OF IDAHO

AGRICULTURAL EXPERIMENT STATION

Department of Botany

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Grasses and Forage Plants in Idaho

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By L. F. Henderson

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North Idaho Star Print  
Moscow, Idaho

# Grasses and Forage Plants in Idaho

BY

L. F. HENDERSON

One of the most important industries for the Palouse Country of Northern Idaho is destined soon to be, as it already is in Southern Idaho, the cultivation of forage for the raising of fine stock. The rolling hills of this section were once covered with native grasses reaching nearly to the waist. Successive years of almost continuous pasturing by sheep and cattle lessened the amount of this forage, which was finally practically ended by turning almost all the prairie land into wheat farms. As no rotation of crops was practiced, and as many do not even now practice the summer fallow, as the fertility of the land has of a consequence decreased, while owing to the high transportation rates of grain to foreign markets the price continues to be low, it has become apparent to farmers of even moderate sagacity that a different system must be practiced. They have quite generally turned or are turning to diversified farming, to the raising of good breeds of cattle, hogs and poultry, and to increased growing of grasses and other forage plants. This must of a necessity be *intensive* growing, especially as day by day more people are moving into this country from the East and Middle West. Since the pasturage conditions that exist in Montana, Wyoming, and even in Eastern Idaho are not present with us, there is practically no open range left in this section, all of the arable land not covered by timber being already in a state of cultivation. At the same time the dense forests and heavy timber that exist between the farming lands of the Palouse and the ranges near the snow line on the Bitterroot Mountains cut off the latter country from the former for pasturing of cattle, and render the

herding of sheep in large bands precarious and injurious. Therefore what remains for the farmers of this section is to raise those grasses and forage plants which are most nutritious and at the same time will give the greatest yields per acre, on which to fatten as good herds of cattle, sheep and hogs as are raised anywhere. The richness of the lands, the mildness of climate, and the rolling and diversified nature of the ground render this not only possible but practicable. When that time comes, the majority of the then lessened wheat and oat crop will be used upon our own farms in the feeding of high-priced cattle and in the enrichment of the land from their manure, while from the growth of clover and other leguminous crops the nitrogen content of the soil will be increased. Then truly will the Palouse country be the farmer's paradise! Realizing that every aid to this consummation, no matter of how modest a nature, would be helpful to the country, the writer four years ago asked for and obtained from the Board of Regents the setting aside of about two acres of land adjoining the University buildings for experiments with grasses and other forage plants. On a part of this same two acres there had, previous to this time, been planted by a former agriculturist of our station many rows of grasses. These had been hoed like ordinary crops, and had consequently grown finely, but from this very cultivation had offered no index of how *uncultivated* grasses would flourish—the important object-lesson to the farmer. This was the more necessary as many of the farmers and pseudo-farmers of this neighborhood stoutly maintained that grasses and especially clovers, would not grow when sown. This assertion proved the more astounding to the botanist, or even to the ordinary observer, when it was noticed that wherever stock and especially sheep had been kept off a tract of good land for a term of years, not only the native grasses, but even the native clovers again spread over the land and flourished.

#### Description of Grass Plats.

The rows of grasses formerly planted upon the land were left undisturbed, even all cultivation save the cutting out of weeds

being discontinued, in order to see how long a time the different species would sustain themselves. Many under this treatment soon began to "run out," while others have sustained themselves with varying vigor to this day. All of the remaining land in the two acres was laid out in fractional parts of an acre in order that the amount of seed sown and the amount of grass per acre could be known to a certainty. It was also the intention to pasture sheep and cattle at various times upon the land, in order to note what grasses seemed most palatable to different stock. I may add, however, that owing to the remoteness of the station barns and stock, to the open or unfenced condition of the land, to the difficulty of obtaining labor at the proper time, none of these proposed experiments were carried out. There only remains to note what grasses were grown upon the plats or appeared as weeds, which species grew the best and formed the best sod, and finally to give a more detailed account of most of these grasses and other forage plants with illustrative cuts. In this list will be included all of the cultivated grasses and legumes, all of the wild or native species planted, as well as all the unintentionally introduced species, whether desirable or merely weeds. In separate columns will be given (1) the scientific name, (2) the English name where known, (3) their germination. In the latter column no attempt is made to show whether poor germination is inherent, or whether it was due to poor seed. Many plantings would be necessary to determine these points.

No.	Scientific Name.	English Name.	Germination.
1	<i>Agropyron caninum</i>	Bearded Wheat-grass	Poor
2	<i>Agropyron divergens</i>	Wire Bunch-grass	Fine
3	<i>Agropyron pseudorepens</i>	Western Couch-grass	Good
4	<i>Agropyron Richardsoni</i>	Richardson's Wheat-grass	None
5	<i>Agropyron spicatum</i>	{ Blue Stem or Western Wheat-grass	Fine
6	<i>Agropyron tenerum</i>	Slender Wheat-grass	Poor
7	<i>Agrostis alba vulgaris</i>	Redtop	Fine
8	<i>Agrostis alba stolonifera</i>	Creeping Bent	Fine
9	<i>Agrostis canina</i>	Rhode Island Bent	Good
10	<i>Agrostis exarata</i>	Western Bent	Poor
11	<i>Agrostis perennans</i>	Thin-grass	Good
12	<i>Alopecurus pratensis</i>	Meadow Foxtail	Good
13	<i>Andropogon halepensis</i>	Johnson-grass	Poor
14	<i>Anthoxanthum odoratum</i>	Sweet Vernal-grass	Fine
15	<i>Arrhenatherum elatius</i>	Tall Oat-grass	Fine
16	<i>Avena fatua glabrescens</i>	Wild Oats	Spontaneous
	<i>Avena flavescens</i>	See <i>Trisetum flavescens</i> .	
17	<i>Bromus breviaristatus</i>	Short-awned Brome	Fine
18	<i>Bromus Hookerianus</i>	Hooker's Brome	None
19	<i>Bromus inermis</i>	Hungarian Brome	Fine
20	<i>Bromus Kalmii</i>	Kalm's Chess	None
21	<i>Bromus mollis</i>	Downy Chess	Spontaneous
22	<i>Bromus secalinus</i>	Chess, Cheat	Spontaneous
23	<i>Bromus sterilis</i>	Sterile Brome	Spontaneous
24	<i>Bromus unioloides</i>	{ Schrader's Brome or Rescue-grass	Poor
25	<i>Bouteloua curtipendula</i>	Wild Side Oats	Fine
26	<i>Bouteloua oligostachya</i>	Blue Grama	Fine
27	<i>Calamagrostis Langsdorfii</i>	Langsdorf's Reed-grass	None
28	<i>Chaetochloa Italica</i> <i>Germanica</i>	Hungarian Millet	Fine

No.	Scientific Name.	English Name.	Germination.
29	<i>Chaetochloa glauca</i>	Yellow Foxtail	Spontaneous
30	<i>Chaetochloa viridis</i>	Green Foxtail	Spontaneous
31	<i>Cicer arietinum</i>	Chick-pea or Gram	Fine
32	<i>Cynodon dactylon</i>	Bermuda-grass	Poor
33	<i>Cynosurus cristatus</i>	Crested Dog's-tail	Good
34	<i>Dactylis glomerata</i>	Orchard-grass	Fine
35	<i>Elymus Canadensis</i>	Canadian Wild Rye	None
36	<i>Elymus glaucus</i>	Blue Rye	Poor
	<i>Eriocoma cuspidata</i>	See <i>Oryzopsis</i>	
37	<i>Festuca duriuscula</i>	Hard Fescue	Poor
38	<i>Festuca elatior</i>	Tall Meadow Fescue	Fine
39	<i>Festuca elatior pratensis</i>	Meadow Fescue	Fine
40	<i>Festuca Kingii</i>	King's Fescue	None
41	<i>Festuca ovina</i>	Sheep Fescue	Poor
42	<i>Festuca ovina capillata</i>	Slender Fescue	Good
43	<i>Festuca rubra</i>	Red Fescue	Poor
44	<i>Holcus lanatus</i>	Velvet Grass	Spontaneous
45	<i>Hordeum jubatum</i>	Squirrel-tail-grass	Spontaneous
46	<i>Koeleria cristata</i>	Prairie June-grass	Poor
47	<i>Lolium Italicum</i>	Italian Rye-grass	Fine
48	<i>Lolium perenne</i>	Perennial Rye-grass	Fine
49	<i>Lolium temulentum</i>	Poison Darnel	Spontaneous
50	<i>Medicago denticulata</i>	Bur Clover	Spontaneous
51	<i>Medicago lupulina</i>	Black Medick	Spontaneous
52	<i>Medicago sativa</i>	Alfalfa or Lucerne	Fine
53	<i>Melilotus alba</i>	White Sweet Clover	Fine
54	<i>Muhlenbergia racemosa</i>	Wild Timothy	None
55	<i>Onobrychis sativa</i>	Sanfoin	Fine
56	<i>Oryzopsis cuspidata</i>	Indian Millet	Good

No.	Scientific Name.	English Name.	Germination.
57	<i>Panicularia nervata</i>	Nerved Manna-grass	None
58	<i>Panicum Crus-galli</i>	{ Barnyard-grass	Fine
59	<i>Panicum miliaceum</i>	{ Japanese Millet	Poor
60	<i>Panicum sanguinale</i>	Broom-corn Millet	Poor
61	<i>Panicum arachnifera</i>	Crab-grass	Spontaneous
62	<i>Poa arachnifera</i>	Texas Blue-grass	Good
63	<i>Poa Buckleyana</i>	Bunch Red-top	Good
64	<i>Poa compressa</i>	Canada Blue-grass	Fine
65	<i>Poa laevigata</i>	Smooth June-grass	None
66	<i>Poa nemoralis</i>	Wood Meadow-grass	Poor
67	<i>Poa Nevadensis</i>	Nevada Blue-grass	Fine
68	<i>Poa pratensis</i>	Kentucky Blue-grass	Good
69	<i>Poa Sandbergii</i>	Sandberg's Bunch-grass	Spontaneous
70	<i>Poa trivialis</i>	Rough Meadow-grass	None
71	<i>Phalaris arundinacea</i>	Reed Canary-grass	Fine
72	<i>Phleum pratense</i>	Timothy	Fine
73	<i>Polygonum aviculare</i>	Knotweed	Spontaneous
74	<i>Trifolium hybridum</i>	Alsike Clover	Fine
75	<i>Trifolium incarnatum</i>	Crimson Clover	Fine
76	<i>Trifolium pratense</i>	Red Clover	Fine
77	<i>Trifolium procumbens</i>	Hop or Yellow Clover	Spontaneous
78	<i>Trifolium repens</i>	White Clover	Fine
79	<i>Trisetum flavescens</i>	Yellow Oat-grass	Fine
80	<i>Vicia sativa</i>	Tare, Common Vetch	Spontaneous
	<i>Vicia villosa</i>	Hairy Vetch	Fine

Before proceeding to the consideration of these plants individually, it is perfectly natural to consider them in groups. These groups will show what plants are well adapted to this country, what plants germinated and grew well but which have not been tested in large enough areas, what plants through poor germina-



tion or inherent defects seem hardly worth experimenting with, what plants sprang up spontaneously and therefore have not been tested at all but which are spoken well of in many localities, and lastly those plants which may properly be called "weeds." It must be carefully borne in mind that as respects the third class, called "poor," the only evidence I have is from one or at most two sowings. It may easily be found that many of these, when good seed is obtained and more sowings are made, will be found amongst our most valuable forage plants.

#### **Well Adapted to Palouse Country.**

Redtop or Herd's-grass, Creeping Bent, Meadow-Foxtail, Tall Oat-grass, Hungarian or Austrian Brome, Hungarian Millet, Orchard-grass, Tall Meadow Fescue, Meadow Fescue, Italian Rye-grass, Perennial Rye-grass, Alfalfa, Sanfoin, Barnyard Grass and the form known as "Japanese Millet," Canada Blue-grass, Nevada Blue-grass, Kentucky Blue-grass, Reed Canary-grass, Timothy, Alsike Clover, Red Clover, White Clover, Yellow Oat-grass, Hairy Vetch.

#### **Good, but not Tested Through Long Enough Period.**

Wire Bunch-grass, Western Couch-grass, Western Wheat-grass, Rhode Island Bent, Short-awned Brome, Wild Side-Oats, Blue Grama, Gram or Chick-pea, Crested Dog's-tail, Sheep Fescue, Indian Millet, Texas Blue-grass, Bunch Redtop, Crimson Clover.

#### **Those Which Have Done Poorly, or are Poor by Nature.**

Bearded Wheat-grass, Richardson's Wheat-grass, Slender Wheat-grass, Western Bent, Thin-grass, Johnson-grass, Sweet Vernal-grass, Hooker's Brome, Kalm's Chess, Rescue-grass or Schrad-er's Brome, Landsdorf's Reed-grass, Bermuda-grass, Canadian Wild Rye, Blue Rye, Hard Fescue, King's Fescue, Slender Fescue, Red Fescue, Prairie June-grass, Wild Timothy, Nerved Manna-grass, Broom-corn Millet, Smooth June-grass, Wood Meadow-grass, Rough Meadow-grass.

### Spontaneous but Good.

Bur Clover, Black Medick, Sandberg's Bunch-grass, Knotweed, Yellow Clover, Tare or Common Vetch.

### Weeds.

Wild Oats, Downy Brome, Sterile Brome, Chess, Chess or Cheat, White Sweet Clover, Crab-grass, Foxtail, Velvet-grass, Squirrel-tail-grass.

It will perhaps be of use to note what kinds of soil, as regards moisture and humus, will best support our grasses and forage plants. It is likewise important to know which of them will grow on our poorer and drier soils, in order that these spots on many of our farms may be utilized.

### Wet or Moist Meadows.

Western Wheat-grass, Redtop, Meadow Foxtail, Barnyard-grass, Reed Canary-grass, Timothy. A few native grasses are important adjuncts in such places, such as Cord-grass (*Spartina*,) Slough-grass (*Beckmannia*,) Northern Redtop (*Agrostis exarata*,) Whitetop (*Agrostis microphylla*,) the Danthonias, the Deschampsias, the Manna-grasses (*Panicularia*) Small Reed-grass (*Calamagrostis Canadensis*,) many Bog-rushes (*Junci*,) and many Sedges (*Carex*.)

### Rich Uplands.

Wire Bunch-grass, Western Couch-grass, Western Wheat-grass, Redtop, Rhode Island Bent, Tall Oat-grass, Yellow Oat-grass, Hungarian Brome, Wild Side-Oats, Blue Grama, German Millet, Chick-pea or Gram, Crested Dog's-tail, Orchard-grass, Tall Meadow Fescue, Meadow Fescue, Sheep Fescue, Prairie June-grass, Italian Rye-grass, Perennial Rye-grass, Alfalfa, Sanfoin, Indian Millet, Barnyard-grass, Texas Blue-grass, Bunch Redtop, Canada Blue-grass, Nevada Blue-grass, Kentucky Blue-grass, Reed Canary-grass, Timothy, Alsike Clover, Red Clover, White Clover, Hairy Vetch.

### Dry or Sandy Soil.

Wire Bunch-grass, Sweet Vernal-grass, Tall Oat-grass, Hungarian Brome, Orchard-grass, Sheep Fescue, Prairie June-grass, Indian Millet, Bunch Redtop, Canada Blue-grass, Sandberg's Bunch-grass, Red Clover, Hairy Vetch.

I shall now take up these plants seriatim, touching slightly upon their good or bad qualities, the accepted methods and seasons for sowing with amounts of seed per acre, while for all really practical experiments on a large scale, yields per acre, and value for forage as tested in Idaho, I shall refer my readers to a recent bulletin from this station by the Director and Agriculturist, Hiram T. French, entitled "Some Grasses and Clovers and How to Grow Them in Idaho, Bulletin No. 33."

### Red Top or Herd's Grass.

(*Agrostis alba vulgaris*)



Red-top or Herd's-grass  
(*Agrostis alba vulgaris*.)  
Lamson-Scribner, Bulletin No. 14, U. S. Dep't. Agriculture.

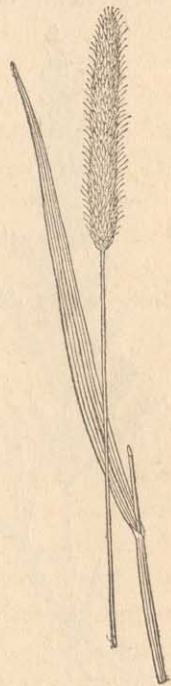
This grass is in most localities recognized as comparatively valueless, except when planted in wet or moist meadows. It was therefore a matter of much surprise to find that it grew splendidly on our Station plats, which are all upland soil, giving a strong growth which would well repay cutting for hay, and making at the same time a dense mat of roots. While it is probably true that this grass is best adapted to moist meadows and to mixture with other grasses, it is likewise true that it will well repay planting in the field where the soil has previously been put in a perfect state for seeding. The heads are at first contracted, then expanded; while the color is purplish or generally of a dark purple. In April it begins to give good grazing, and this continues to the dry

season, to be then interrupted until the coming of the fall rains. In wet meadows, not however covered with water, it leaves nothing to be desired, especially when mixed with other grasses. A meadow on Mary's River, composed of this grass and Meadow Foxtail with wild grasses and sedges, furnished good hay crops and the best of pasture a good part of the year. This is now considered but a variety of the Fiorin (*Agrostis alba*), while another probable variety, *Agrostis alba stolonifera*, gives us a creeping form with more rootstocks, and known as "Creeping Bent." Though there is some question amongst experts about its feeding qualities as hay, there can be none as to its grazing qualities. It is especially valuable in wet meadows to furnish a matting under the feet of cattle to prevent "poaching," and eventually to drive out the rushes and sedges. The seed is very small and light when uncleaned, but when well cleaned is quite heavy, about 35 pounds to the bushel. Since it is the almost invariable practice to sow the seed with other seeds, such as timothy, clover and meadow foxtail, the amount to sow per acre will depend much upon the land and the quantity of this grass desired. The well cleaned seed can be purchased in many places at about 12 cents per pound.

#### Meadow Foxtail.

(*Alopecurus pratensis*.)

This valued perennial grass comes from Europe but has been long in America and is highly prized. Never amounting to much when sown alone, and never forming the bulk of hay from any meadow, when mixed with other grasses so as to be held up well it forms a valuable adjunct to the grass crop, but especially to the pasturage, from its nutritious leaves and matted rootstocks. The flower cluster or spike is remarkably like



Meadow Foxtail.  
(*Alopecurus pratensis*.) Scribner. Bulletin No. 14. U. S. Dep't. Agriculture.

that of timothy but somewhat more delicate, with spreading hairs or awns, and the stem never reaches the woody or reedy condition that does timothy. It is likewise an earlier grass than timothy, while on account of its matted rootstocks successive mowings seem to do it good. Like redtop it endures the cropping of sheep and cattle well, in this respect also surpassing timothy, but never yielding more than a fraction of the hay that the last mentioned grass does. In England, the home of fine meadows, it is esteemed amongst the best of pasture grasses. It will not, however, compared with other meadow grasses be so remunerative at first, since it takes several years to reach its finest sod-production. On the station plats, destitute of any irrigation and but little summer rain, it has sustained itself for 6 or 7 years, and produced seed every year.

**Tall Oat Grass. Evergreen Grass.**

(*Arrhenatherum elatius.*)

This is a tall perennial from Europe and Western Asia, and so closely resembling some of the oats that it used to be put in that genus and was called *Avena elatior* by Linnaeus. It will grow in any of the soils that range from rich to poor, and from normally moist



Tall Oat-Grass. (*Arrhenatherum elatius.*) Scribner, Bulletin No. 102. U. S. Dep't. of Agriculture.

to dry. On account of this adaptability to even the drier and poorer soils, it is a favorite in many places, though there is probably no grass about which such a diversity of opinions exists. Abhorred in England as a "bitter worthless grass," "whose cultivation," according to one, "would create a suspicion of lunacy," it is well liked in France and in many other European countries. In the United States the grass bears generally a good name, and in some of the drought-suffering states of the Middle West it is placed at the head of grasses on account of its capacity to withstand slight rainfall or even lack of rain. It is well not to have too much of this grass for two reasons. First it comes to maturity so rapidly that it leaves little time to mow it between flowering and seeding. Second, it has quite a bitter principle in it, which makes it rather disagreeable to cattle or horses when fed alone. It is far better therefore to sow it with other grasses, such as orchard grass or red clover. With us at Moscow it does well either on the naturally moist uplands, in the drier and lighter, or even in the sandy soils. It is said to be easier on the land than timothy and to produce more tons to the acre. This latter is certainly the case in North Idaho. The only drawback to it is its liability to smut, and this could possibly be largely overcome if the seed were treated with some fungicide such as hot water, blue vitriol, formalin, etc. About two bushels should be sown to the acre, as the seed is light in the chaff, weighing only 14 pounds to the bushel.

#### Rhode Island Bent.

(*Agrostis canina*.)

Though this plant, or a variety of it is indigenous to our mountains, the seed sown on the plat was eastern. This plant makes a close sod and is valuable for meadows and pastures, but does not take the place of the Red-top. Undoubtedly its main use is to form a mixture with other grasses in our meadow hay, especially if the meadow be too dry to grow the red top well. Dr. Beal highly recommends it as a lawn-grass, mixed with Kentucky Blue-grass or June-grass. If sown alone, 4 bushels to the acre is recommended.

Hungarian Brome. Austrian Brome. Smooth Brome.

(*Bromus inermis.*)

On the Station plats this is unquestionably the finest grass grown, far surpassing in yield and luxuriance clover, timothy,

orchard-grass, or even tall fescue. It is undoubtedly one of the finest gifts in the way of a forage-crop that the old world has ever given to the new. Preferring moist, rich soil, it flourishes on dry, hard hillsides. Its good qualities are, an abundant crop of nutritious hay, a capacity to withstand drought, a splendid root-system, and an abundance of good pasturage early and late in the year. These two latter attributes are especially valuable, as it must be planted alone or its matted rootstocks will choke out all other grasses.



Hungarian Brome Grass (*Bromus inermis.*) Pam-  
mel. Bulletin No. 9, U. S. Dep't. of Agriculture.

In Hungary it is said to be planted with lucerne or alfalfa, at the rate of 3 to 2, this being about the only forage plant it cannot kill out. It loves heat, and as has been shown by Director French on the Idaho

Experiment Farm, grows better upon the south than upon the north hillsides. Three and three-fourth tons yield per acre is reported from Canada, while on good land in the Palouse Country four tons per acre is not unusual. From 20 to 25 pounds of seed per acre is generally recommended. Three plats were planted as experiments, and where the soil had been put in best tilth, there the brome-grass grew the best. While this is the case, there is little doubt that this seed *will* catch if very little cultivation is given to the soil. The best results have been obtained from spring sowing. Very little can be expected of it the first year, but after this period there is no forage plant in this country that equals it for combined amount of yield, palatableness to cattle or horses, and continuous pasturage throughout the growing season.

#### Hungarian Millet.

(*Chaetochloa Italica Germanica.*)

This plant is often known as "German Millet," but Williams in the "Yearbook of the Department of Agriculture for 1898" says that the proper name of this plant is Hungarian Millet, and that it is but a variety of the German Millet. It grows well at Moscow, and produces a large yield, being surpassed by very few grasses. There seems to be about as much diversity of opinion in respect to its value as there is to its name. On account of its rapid growth it is most valuable as a catch crop, for it will mature for cutting in from 6 to 8 weeks after seeding. Nearly all authorities agree that it makes very good hay, though de-



German Millet (*Chaetochloa Italica Germanica.*) Lamson-Scribner, Bulletin No. 104, U. S. Dep't. of Agriculture.

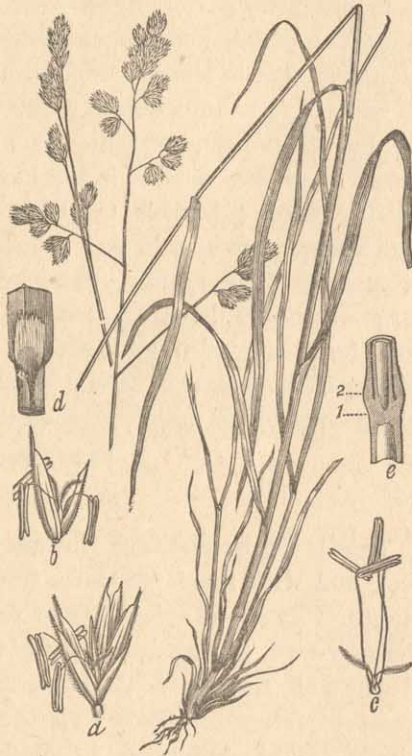


ficient in protein, if cut just as the heads begin to appear; if cut when ripe it is of little value, if not positively injurious. Like Crimson Clover, it is an excellent soiling crop. The hay, according to Dr. Beal, is sweet-smelling, well relished by stock and quite equal to ordinary hay. For drier seasons or soil it will probably be found quite equal to wheat or oat hay, when we compare the early ripening and capacity to withstand drought of the former with the more valuable hay of the latter. One bushel of seed should be sown to the acre, and the earth pressed about the seed with a plank drag. If a small planting should happen to get too ripe before cutting, it had better be allowed to go to seed, as the grain is a valuable food for poultry.

### Orchard Grass.

(*Dactylis glomerata*.)

This grass, on account of its adaptability for mixed seeding and for planting on very diverse soils, as well as on account of its high nutritive ratio, is one of the best we have. Experienced grass-growers all over England and America give it the highest recommendation. Though it thrives best in rich, well drained soil, it will grow on poor land, especially when mixed with clove and tall oat-grass, and in shade or on sunny slopes. Its nutritive



Orchard Grass. (*Dactylis glomerata*.) Panmel Bulletin No. 9. U. S. Dep't. of Agriculture.

ratio as well as its greater adaptability to different soils put it far ahead of timothy. It will not, however, furnish as much hay to the acre when planted alone, but this deficiency may be entirely overcome when sown with the above mentioned seeds, while the nutritive ratio from the mixture will be much higher than in timothy alone. Many strive to remedy this difficulty by planting clover with the timothy, but this is a mistake, for the two do not mature together, the timothy being too young when the clover is fit to cut. Again, even when sown alone, it makes a better pasture than does timothy, especially when sown thick, the plants being then much less inclined to "stool" than timothy. No permanent upland pasture or hay-field can afford to be without it. It affords an earlier and later pasturage than do most other grasses, standing next to Meadow Foxtail in earliness. About two bushels of seed, of 14 pounds weight each, is most commonly recommended, but when using mixtures one should be governed by which grass he wishes most of in his hay. Scribner even recommends sowing 3 or 4 bushels to the acre, but this is certainly an unnecessary amount in our country. Like the tall oat-grass, it matures very rapidly, therefore no one should have a very large acreage in this grass alone. It should be cut just at flowering, for if allowed to go to seed, it is almost worthless. It will often pay the farmer to raise a small amount just for the seed, as it always commands a high price on the market.

#### **Tall Fescue.**

(*Festuca elatior.*)

This is a perennial from Europe, varying in height from 3 to 5 feet, and with fine large leaves from a foot to a foot and a half in length. It grows splendidly on our plats, being exceeded in its dense growth and great amount of forage only by the Hungarian Brome and the Reed Canary-grass amongst the grasses. The great trouble with the seed is to find them fresh and free from weeds. Prof. Spillman, in Bulletin 41 of the Washington

Station, recommends, with this grass and its variety the meadow fescue, that the farmer should grow a small patch for seed, when the larger sowings made from this would be free from weeds. English authorities consider this one of the most nutritious grasses and the best of the fescues, since the quality of the hay is excellent and the pasturage unsurpassed. In our country, north as well as south, it bears a good name. In sowing alone about 2 bushels per acre should be used. This is however not a dry ground grass, but reaches its best proportions and value in rich, moist ground. The variety *pratensis*, or Meadow Fescue, is preferred by many, for though it does not grow so tall and furnishes less in weight per acre, it does not tend to grow so much in tufts and is slightly earlier. The variety *arundinacea*, the form shown in the cut, is even a taller, stouter form than the tall meadow fescue, but it is doubtful whether it is so well adapted to our country, as under our late rains, often accompanied by heavy winds, it is inclined to "lodge."



Tall Fescue (*Festuca elatior*.)  
Lamson-Scribner, Bulletin No.  
14. U. S. Dep't. of Agriculture.

### Italian Rye-grass.

(*Lolium Italicum*.)

The fact that this grass is an annual, while *Lolium perenne*, as the specific name implies, is a perennial, serves to keep the two plants separated specifically, though the other character relied upon, the presence of the awn or "beard" is a very inconstant

character, since specimens can be found, one stem bearing awns and others from the same plant being awnless. For our country,

where the ground becomes very hard and dry when not cultivated, this species will probably be found the better grass of the two, the extra cost of seed and putting in being the only drawback. This will probably be found more than compensated by the higher yield of hay per acre, as this plant has the record of producing under irrigation, according to Dr. Beal, "seven and a half tons of dry hay per acre and of being cut four or five times"! Certainly no one could desire to see a finer grass than this proved on our plats the first year of sowing. It is a heavy seeder, as is the perennial ryegrass, and on this account is frequently



Italian Rye-grass (*Lolium italicum*.) Lamson-Scribner, Bulletin No. 14, U. S. Dep't. of Agriculture.

used with the latter to adulterate the more highly priced seeds, such as Meadow Fescue and its varieties. With both of these grasses 25 to 30 pounds per acre is recommended.

## Perennial Rye-grass.

(*Lolium perenne.*)

In many of the moist districts on the continent this grass has taken the place that timothy does with us, but it is doubtful whether it will ever rank highly in the unirrigated parts of Idaho, though in the southern and irrigated parts of our

state it may obtain as good a name for itself as elsewhere. On our plats it has shown a tendency to "run out" in a few years, though undoubtedly it would prove a useful adjunct in moist meadows along our rivers when mixed with other grasses. As a milk-producer, it is doubtful if this grass can be excelled.

### Alfalfa. Lucerne.

(*Medicago sativa.*)

It needs no bard in Idaho to sing the praises of this plant. Though it is peculiarly adapted to the southern or irrigated portions of our state, where it forms the main hay-crop and is cut several times a season, it will grow well in many



Perennial Rye-grass (*Lolium perenne.*) Smith,  
Bulletin No. 22. U. S. Dept. of Agriculture.

of our northern fields without irrigation. The writer remembers seeing nowhere in the state a finer stand of alfalfa than he did a few years since on or near the top of a ridge in Potlatch Prairie. The powerful root-system this plant possesses renders it

independent of surface water, provided the subsoil contains sufficient. In Colorado its roots were traced 16 feet into the ground in a vertical direction. Probably none of our present forage crops have been in cultivation longer than alfalfa, as it stood in high estimation amongst the Greeks and Romans 2500 years ago. It is a common expression in books and bulletins that this plant will not grow well in clay, but this is a great mistake, *provided always* there is no "hard pan" close to the surface. The one re-

quirement of the plant is the possibility of sending its roots deep into the soil. From my personal observations, however, I should judge the clovers better adapted to our unirrigated lands than alfalfa, though I know there are many who dispute this conclusion. As to its value for hog-pastures, one has but to visit some of the farms near Moscow where hogs are raised on a large scale to be convinced of this fact. Danger from "bloat" can be largely avoid-



Alfalfa (*Medicago sativa*.) Pammel, Bulletin No. 9, U. S. Department of Agriculture.

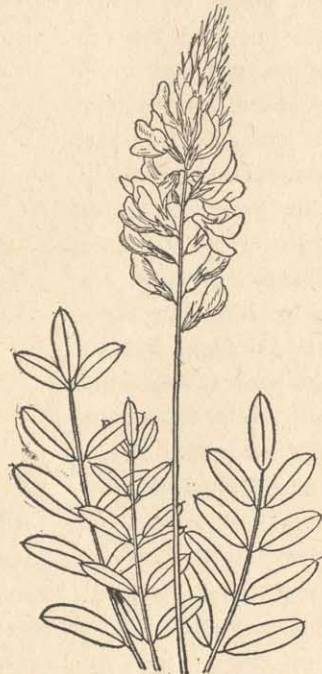
ed by sowing other grasses with alfalfa. These should be vigorous, tall growers, such as tall oat-grass or orchard-grass, or the alfalfa will soon crowd them out. If alfalfa seed is to be planted alone, about 20 to 30 pounds per acre is the amount to sow. After

the seed<sup>is</sup> sown the ground should be rolled lightly or gone over with a "clod masher." This applies equally to the clovers and to most of the grasses as well. It is especially necessary for alfalfa<sup>or</sup> clover, since if the ground is left too light the young plants will almost invariably die soon after germination from lack of moisture, the delicate roots not being able to penetrate through the dry top-soil to the moister earth beneath.

### Sanfoin or Esparcette.

(*Anobrychis sativa.*)

This plant grows finely throughout the Palouse region, but it is doubtful whether it can surpass or even equal alfalfa and the clovers. Its main service in Europe, where it is extensively cultivated, is its adaptability to the poorer and drier soils, which are too poor for the clovers or for alfalfa. Once well established, it grows well where alfalfa would be a failure, and will endure through a long series of years. No one could desire to see a finer looking forage plant than it appears on our station plats. The hay has the reputation of being more nutritious than red clover. About 80 pounds per acre is recommended, and this sown quite deep, planted from the first of May to the middle of June. I know of no place in Idaho where a careful trial of this forage plant has been made, so its success here is problematical.

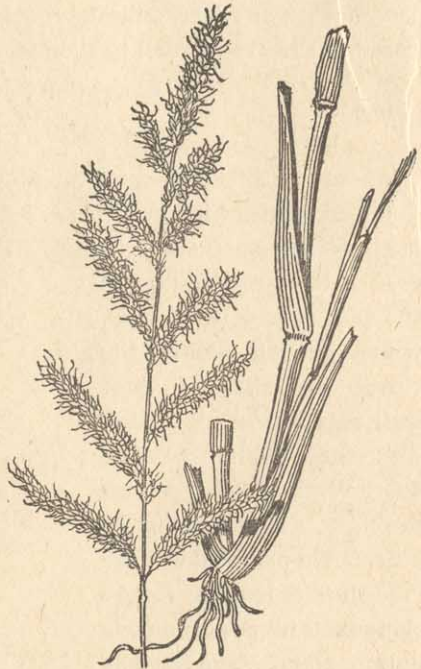


Sanfoin (*Anobrychis sativa.*) Smith, Bulletin No. 32, U. S. Department of Agriculture.

### Barnyard-grass. Japanese Millet.

(*Panicum Crus-galli.*)

He, who has only seen this plant as it grows in his barnyard, his cultivated fields, or along water courses, would have a very faint idea of what it may become under cultivation, and likewise what are its good qualities. A prettier field of grass I think it was my good fortune never to see than a couple of acres of this grass in the irrigated nursery of Mr. Whitney at Payette in Southern Idaho. It stood about five feet high and as thick as it was possible for grass to grow. I was informed that the yield on a like piece of land the previous year had given over 5 tons of dry hay to the acre. Experiments conducted with this grass upon our own plats showed hardly less yield. Not only the matter of yield is important, but the plant is very much relished by stock when cut at proper season and well cured. A va-



Barnyard-grass (*Panicum crus-galli.*) Williams  
Bulletin No. 6. U. S. Dep't. of Agriculture.

riety, called "Japanese Millet, yields even greater amounts to the acre, 15 to 18 tons of green fodder having been taken from one acre. It is a taller, coarser plant, but on account of this gross character dries with difficulty and is therefore better adapted to



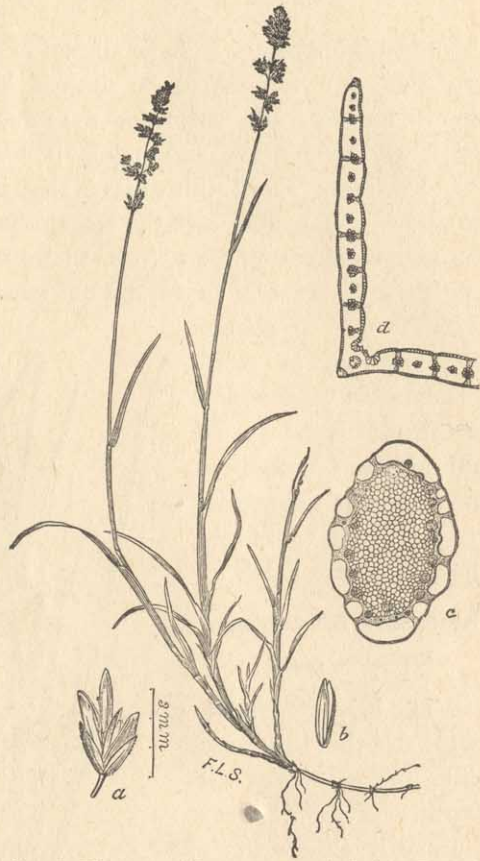
the silo than for hay. Barnyard-grass, and of course all its varieties, such as Japanese Millet, Ankee Millet and others is an annual, and, as its succulent character would prove, must have a great quantity of water to reach perfection. It is doubtful whether most of our Palouse uplands would yield the water needed, but where the ground is moist, on the north hillsides or in well tilled bottomlands along streams, no better grass can be sown. Where the land is at all dry, it would not compare with Hungarian or the German Millet.

### Canada Blue-grass.

(*Poa compressa.*)

This plant is a perennial, and closely related to the Kentucky

Blue-grass. It can readily be told from that species by its smaller panicle or flower cluster, and by its *compressed* stem. When stems from the two plants are rolled in the fingers at the same time, the difference becomes even more apparent. It forms a close turf with its creeping rootstocks, and for this reason furnishes good grazing, though it seldom becomes



Canada Blue-grass (*Poa compressa.*) Smith, Bulletin No. 22, U. S. Department of Agriculture.

thick enough for hay. A small plat of this grass on our Station last year left nothing to be desired in turf and leaf, though the stems were too short for anything but pasture. It is a very nutritious grass, and makes the best of butter and of milk. A good thing about this grass is that it will grow in the driest ground. A few years ago the writer observed it growing well at Cornell University in New York, where the ground in places was so dry and gravelly that it did not seem possible that any grass could thrive. It should not, however, be sown on any moist land which is intended soon to be put into hoed crops, for the running rootstocks are as difficult to kill as those of quack grass.

### Kentucky Blue-grass.

(*Poa pratensis*.)

While it is undoubtedly the fact that this grass will grow in almost all localities of the Palouse country, it is the writer's opinion from personal observation that it does not compare here with the same grass in many states of the east, nor to its magnificent growth in Western Oregon and Washington. Though it forms a fine sod and furnishes some good pasturage, it does



Kentucky Blue-grass (*Poa pratensis*.) Pammel, Bulletin No. 9, U. S. Department of Agriculture.

not generally reach a height to furnish much hay. From 6 to 18 inches are the ordinary extremes of growth for this grass in this country, though Prof. Spillman succeeded in getting a stand (of a possibly different variety) fully 30 inches high on the Agricultural Station at Pullman. This criticism does not apply when the grass is planted in moist meadows or in many of our moister woodlands, for in such localities I have often seen it 2½ feet high and growing spontaneously. So many of our grasses are superior to it here that its absence would not be severely felt. Yet our students would miss its strong sod and close growth in their athletic contests and military maneuvers on our college campus, were its place to be supplied by any other grass.

#### Nevada Blue-grass.

(*Poa Nevadensis*).

This is a perennial, and the first native grass yet mentioned. It is a beautiful tall plant, grows well on our plats, is greedily eaten by all kinds of animals, and so promises to be one of our first class grasses. The seed is difficult to procure, and to anyone who wishes to experiment with it I would advise the collection of a little seed, sowing a well prepared small plat of ground, and from this collecting more seed for more sowings. Too little is known of this grass yet, for with the exception of Prof. Spillman and myself, I know of no one who has tried it thoroughly, even in small plats. It is "bunch grass", and so, lacking the strong rootstocks of *Poa pratensis* or *Poa compressa*, it may not hold its own in a state of cultivation. It is difficult for the novice



Nevada Blue-grass (*Poa Nevadensis*.) Rydberg & Shear, Bulletin No. 6. U. S. Department of Agriculture.

to tell this plant from several other wild Poas that grow in our country, such as *Poa gracillima*, *P. Buckleyana*, and *P. Sandbergii*, but if it be borne in mind that it is ordinarily taller than any of these, has a light bluish color, and a longer, narrower panicle, it will not be difficult to tell it from others, especially if he is searching for it in its most common localities—along moist hillsides of the Potlatch, Clearwater and Snake rivers.

### Reed Canary-grass.

(*Phalaris arundinacea.*)

I know of no grass growing on our plats that gave me more of a surprise than did this. Ordinarily a lover of wet ground and often found growing in water several feet deep, it grows well on our Palouse hills, and has sustained itself with vigor on our plats for over seven years. This would be of little consequence if the



Reed Canary-grass (*Phalaris arundinacea.*) Rydberg and Shear, Bulletin No. 5, U. S. Department of Agriculture.

plant were worthless for forage. It is however a good grass, whether raised for hay or for pasturage. It furnishes a good quantity of hay in many places along the Columbia and other streams. At Coeur d'Alene I was informed by a man who has a large overflowed bottom on the lake, that he prizes it as highly as any feed he cuts. Mr. J. I. Gould says it is used extensively for fodder in Sweden. I cannot but think the indifferent name it bears in many places is due to its being cut too late for hay, when it becomes reedy and unpalatable. It should always be cut at time of flowering. Prof. Spillman, now Agrostologist at Washington, but lately Agriculturist at the Washington Agricultural College at Pullman, speaks of this grass in Bulletin 41, as

follows: "After our cows had eaten down the Italian Rye-grass, they ate down an 8-inch growth of reed canary-grass as close as possible to the ground, though they were in a field where other food was plentiful". It is a tall grower, often reaching 5 or 6 feet in height, and abounds in a quantity of green succulent leaves. It can be started either from seed, or from pieces of the large rootstock.

### Timothy. *rierd's Grass.*

(*Phleum pratense*)

Whatever may be the different opinions as to the value of this grass or to the injurious effect upon the soil, it is certain that it is still the standard of comparison amongst the grasses, and in the market commands the highest price. This preference for timothy is well stated by Dr. Beal of Michigan when he says: "Consumers buy timothy and fear to buy anything else, even though it were better, because they do not know what it is. They will buy even if it is dead ripe." It certainly has many good qualities, such as palatability to horses, abundance of seeds and their high germinative ratio; but these good qualities are more than offset by its bad. Amongst these are its exhaustive effect upon the land, the poor pasturage it furnishes, its tendency to grow in clumps, its late maturing, bringing it too near to harvest time, and the fact that it cannot be sown to good advantage with clover since they come to maturity at different times. As it is not a good hay for cows when used alone, and as it cannot be planted with red clover, this again detracts from its usefulness, and renders it inferior to orchard and brome grasses for the drier grounds, and to redtop and meadow foxtail for the moister. As it will, however, probably continue to be a standard grass for years to come, it is better to sow it with alsike clover, as this ripens later than the red, will give more diversity and a higher nutritive ratio to the hay, and tends to fill up the bare spaces about timothy when sown alone in moist land. Major H. E. Alvord in the Rural New Yorker gives us his ideas as to the value of timothy and to his method of treating it. He



Timothy (*Phleum pratense*.) Jared G. Smith, Bulletin  
No. 5, U. S. Department of Agriculture.

says: "Timothy is not a favorite of mine. Its hold upon the land is too slight, and, as a rule, it falls off in yield too fast after the first crop. My preference is to treat it like a grain crop, sow alone on well prepared land in August, a half bushel of seed to the acre. After cutting the first crop turn over at once, manure and reseed; or cut once, top-dress well, cut a rowen crop, then one crop the second year, plow and reseed. I know of no suitable mixture for timothy, if for hay, and do not consider it as desirable as a large part of any mixture for pasture."

It should be sown at the rate of 16 to 20 pounds per acre when sown alone.

### Alsike Clover.

(*Trifolium hybridum*.)

Nearly all of the clovers do well on our Palouse uplands. This was doubted for many years, and is still doubted by those who do not care to be convinced, but it has been established by this Station and by many growers about Moscow beyond cavil. It is more difficult to have it "catch" in this country than in many of the Eastern states, or than in the country lying west of the Cascade Mountains, but this can be largely overcome by packing the earth over the seed so that when it germinates it may not be cut

off from moisture by the surface of light, dry soil before the roots have sunk low enough to enable the plants to care for themselves. Our plant under consideration, Alsike clover, is more adapted to wet meadows than are the red or white clover, on account of its shallow root-system keeping the plant out of the cold, wet sub-soil, but for this very reason it is not so well adapted to our uplands, as it dries out in summer. Still, on our plats sloping north, this plant has been raised to as good a condition as one would wish to see, and could not



Alsike Clove, (*Trifolium hybridum*.) Smith, Bulletin No. 2 U. S. Department of Agriculture.

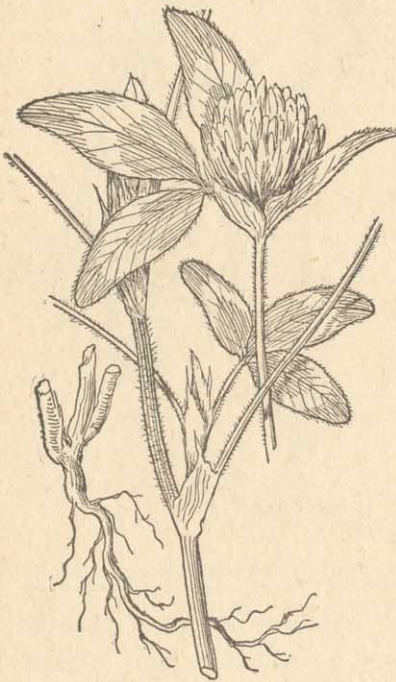
be called in any way a failure did not the red clover do better. On account of its succulent nature it is dried with more difficulty than the red. There is one advantage that Alsike clover has

over red clover, and that is, its shorter flower-tube, enabling its nectar to be reached by the common honey bee, which in the red clover or in Mammoth red clover cannot be done. For this reason it is well to plant some of the Alsike or white clover with the red and stimulate the bees to work upon the latter, in this way aiding in its fertilization, for they *will* collect the pollen even if they cannot reach the nectar.

### Red Clover.

(*Trifolium pratense.*)

This is perhaps to be reckoned the king of forage plants, first from its high nutritive ratio, second from its power of restoring



Red Clover, (*Trifolium pratense.*) Smith, Bulletin No. 2 U. S. Department of Agriculture.

the fertility of worn-out soils or of keeping in a high state of fertility those already in a good condition. This is especially the case if clover is fed upon the farm, since the manure obtained from clover-fed stock still contains about 90 to 95 per cent of its nitrogen. Its usefulness in restoring poor or worn-out soils lies in its power of collecting nitrogen through bacteria in its nodules, and thus restoring it to the soil. Though clover removes from the soil more potash, phosphoric acid and lime than most other crops, this waste can be largely or entirely overcome by restoring it to the soil in the form of manure, thus increasing

the fertility of the land while many a dollar is made in the sale of fat cattle. A great advantage the clover-raiser has in this



country over the eastern farmer is likewise to be found in its greater longevity. While clover has generally in the East to be resown at the end of every two or three years, I have often seen fields of clover in Washington and Oregon 10 years old. Even on our plats here red clover is still bearing every year in the same rows in which it was planted 7 years ago and from the same roots. As to the benefit derived from plowing under clover, Dr. Voelcker, an eminent English authority, says: "Clover not only provides abundance of nitrogenous food, but delivers this food in a really available power (as nitrates) more gradually and continually, and with more certainty of a good result than such food can be applied to the land in the shape of nitrogenous spring top-dressing." When sown alone about 20 pounds is recommended to the acre, and the ground rolled or smoothed with a clod-masher.

### White Clover.

*Trifolium repens.*

While it is true that no farm can afford entirely to neglect this plant, it is equally true that we do not want too much of it. As it is a low creeper, its peculiar province is to form some pasturage where other grasses and clovers sustain themselves with difficulty—on hard clay, on dry points, in the farmyard, and



White Clover. (*Trifolium repens.*) Smith, Bul. No. 2, U. S. Dep't. of Agriculture.

wherever else grazing for horses or cattle is to be sustained. It is a fine honey-producing plant, though its season is not a long one, and it should not be neglected by the apiarist. It is like-

wise in high repute, together with the Kentucky Bluegrass, for lawns. It is only during the dry season that its vigor is checked, and not even then in our country when growing in cultivated soil; while it is one of the first to furnish pasturage in the spring and the latest to stop after the fall rains commence. In fact, it often remains green here all through the winter when covered with snow or protected by other vegetation.

#### Yellow Oat-grass.

(*Trisetum flavescens*).

A grass of fine appearance as grown upon our plats. In Europe it has a high reputation both as a hay grass and for pasture. It is a loosely tufted perennial and grows with us about 2½ to 3 feet high. Hardly a grass tested showed more culms or stems and flower clusters. By many this is classed with the true oats, and is often written *Avena flavescens*. This grass is claimed to have yielded on clayey loam 2,858 pounds of hay, and 4,083 pounds of aftermath per acre. This, added to the fact that it is relished by stock where tested, and will grow on almost any kind of soil, will probably make it one of our best agricultural grasses.

#### Hairy Vetch.

(*Vicia villosa*.)

Though this plant is an annual or nearly so, it frequently acts like a perennial. Several rows of hairy vetch were planted on our plats in '95-'96, and though they have been cut almost every year since, yet it has sustained itself in the same rows all this time through its abundant seed. While an almost unequalled soiling crop, the nutritive value of its hay is very high, showing according to Coudon 23 per cent. of crude protein. It produces a huge crop on good soil, often over 10 tons of green matter per acre in our section. Though the first planting is rather costly, from the high price of seed, this can be largely overcome by the prospective raiser's planting a small plat and gathering the seed at the end of the first year. While a valuable plant *as long as we*

*desire it*, it is a difficult one to get rid of on cultivated soil, from the way it resows the ground from pods opening through a large part of the season. An enthusiast says of it and other vetches, not without a large fund of truth to draw upon: "Sheep fatten faster upon this than any other herbage; horses improve more rapidly upon it than on clovers or the grasses; horned cattle thrive surprisingly upon this fodder; cows yield more butter from the tare than from any other provender; pigs voraciously consume and prosper upon it." A bushel and a half or two bushels of seed should be sown to the acre in April or in May according to soil and earliness of season.

## PLANTS OF PROMISE, NOT SUFFICIENTLY TESTED.

### Wire Bunch-Grass.

(*Agropyron divergens*).



Wire Bunch-grass.  
(*Agropyron divergens*)  
Rydberg and Shear.  
Bul. No. 5, Div. of Agros-  
tology, U.S. Dept. of A.

This plant took kindly to cultivation on our plats, and made a fine stand. If such results could be obtained upon a large tract of land and under the ordinary preparation of the soil they would be most valuable, for this grass together with the Bunch Red-top, (*Poa Buckleyana*) at one time covered our hills and formed the bulk of pasturage. It is a highly nutritious grass, cures standing in the field, and it is no uncommon sight in places where it has resisted extermination, as along the breaks of our larger streams, to see horses pawing away the snow and eating these cured stalks to the ground. Experiments on a wider scale are needed with many of our native grasses.

### Western Couch-grass.

(*Agropyron pseudorepens*)

This plant bears about the same relation to the moister hill-sides and natural meadows that the last does to the drier uplands. It is a near relative to the Couch-grass (*A. repens*) of the Eastern states, and like this species propagates by running rootstocks, and not by bunched fibrous roots like the last. It is therefore much easier to get a stand with it, but it is doubtful whether it is so nutritious or useful.

### Blue-stem, or Western Wheat-grass.

(*Agropyron spicatum*)

Another surprise was furnished when this plant developed on the plats. It belongs naturally to the alkali districts of Idaho, Wyoming, Montana and elsewhere, and prospers best on low but not wet spots in such soil. It was hardly to be expected, therefore, that it should do well on our Palouse uplands. At the end of the growing season of the first year, but more especially at the close of



Western Wheat-grass (*Agropyron spicatum*), Scribner.  
Yearbook of Dept. of Agriculture for 1899.

the second season, this plant covered the plat with its blue-green leaves and stems, while the earth beneath was simply matted with its rootstocks. From appearances this grass may be as valuable in this country as it is in its native haunts, where it furnishes a valuable though limited amount of hay,—“unsurpassed by any other species of the region where it grows”. Scribner tells us that “after three or four successive cuttings in Montana, the yield diminishes very much,” but the grass is “brought up by letting it stand a year or two, or by dragging over the sod a sharp-toothed harrow, thus breaking the roots into small pieces, every fragment of which makes a new plant.”



Short-awned Brome-grass—*(Bromus breviaristatus)*, Rydberg and Shear. Bul. No. 5, Dept. of Agriculture.

### Short-awned Brome.

*(Bromus breviaristatus)*

This grass is found growing spontaneously all over our moister hills and valleys. Being a native, it naturally occurred to us that it would be a good plan to try it in a state of cultivation. Three small plats were sown with the seed, with the result that it germinated well. The plant has in nature a way of spreading out its stems over the ground which would, if this were invariably the case, make it a poor hay-furnisher. This was largely corrected when the seeds were sown thick, and upon two of the plats it rose and sustained itself well in this position. It is a coarser, weedier grass than the Hungarian Brome, and it is doubtful whether it would take its place. Cattle and horses do not seem to be very fond of the green plant, but they will eat

the hay readily. It is too soon to say much of it, except that it promises well,

### Wild Side-Oats.

(*Bouteloua curtipendula*)

This is a grass which inhabits the plains east of the Rocky Mountains from the British boundary to and into Mexico. At

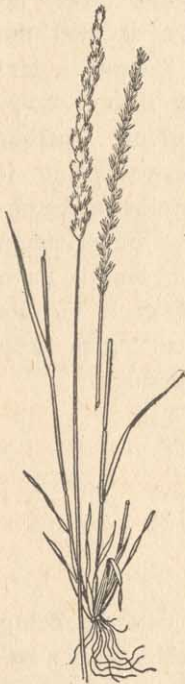


Side Oats (*Bouteloua curtipendula*), Scribner. Bul.No. 14, U. S. Dept. of Agriculture.

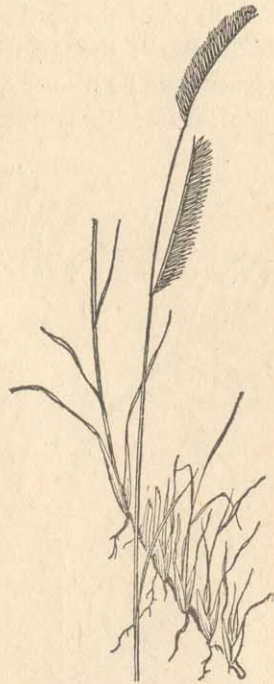
one time, with the succeeding one, it furnished much of the native pasture of this great district. The hay, though scanty, is eaten readily by stock, while its radical leaves furnish much good pasturage. Though it grew finely in our plats for three or four years, it finally showed a tendency with the next to "run out". This might be the case with almost any grass when carried to a distant country and planted in but one or two rows; while possibly this might have been avoided had a disc run across the rows several times and cut up the matted bunches of the plants.

**Blue Grama.***(Bouteloua oligostachya).*

Almost the same remarks apply to this grass that were made of the last, save that the stems are shorter than in that species, only 12 to 18 $\frac{1}{4}$  inches high, and of a consequence it yields even less hay, though this is highly esteemed. Its blue-green radical leaves grow quite thick, while "no other grass better withstands the tramping of stock, and it is unsurpassed for grazing purposes". Much like our Wire Bunch-grass it cures into hay while standing, and seems to lose none of its nutritious properties.



Crested Dog's Tail  
(*Cynosurus cristatus*).  
Lamson-Scribner.  
Bul. No. 14, U. S. Dept.  
of Agriculture.



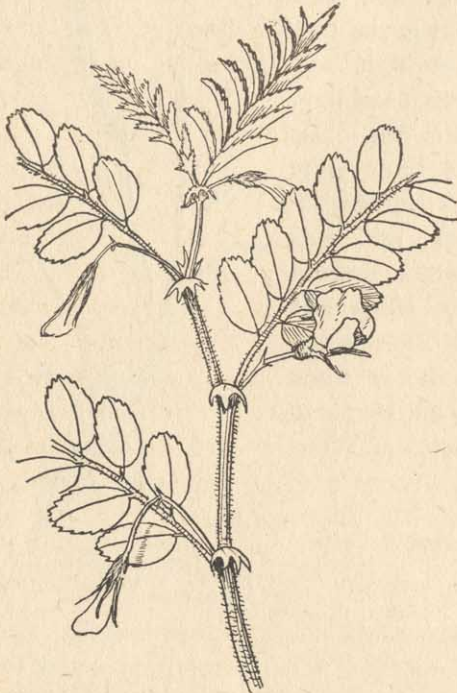
Blue Grama (*Bouteloua oligostachya*) Rydberg and Shear.  
Bul. No. 5, U. S. Dept. of  
Agriculture.

**Crested Dog's Tail.***(Cynosurus cristatus).*

This grass should never be sown alone, except it be for a lawn, when its sward is equal to that of the best Kentucky Blue-grass. Its main use is in connection with other grasses which thrive in bottom-lands, and in such places no other grass surpasses it. It is much used in Europe for this purpose, while its delicate, strong stems when mature are much used in the manufacture of Leghorn hats. It grew well on the plats, forming a fine sod, but it would have grown better had it been sown with the seed of some slightly higher grass, which could have furnished it some of the shade it seems to crave.

**Chick-pea. Gram.***(Cicer arietinum).*

This plant was quite widely advertised in our state as "The Idaho Pea", though why it should have been given this name rather than its proper one, unless for the purpose of advertisement, it were difficult to tell. It has been cultivated for centuries



in Southern Europe, and while its main province is to furnish food for man, it is also valuable and much used for forage. It grew finely, as do all northern peas, on the plats, while an acre-field of it next the college grounds furnished a heavy crop. It is doubtful whether as a forage plant it would surpass the vetches, but no experiments of sufficient length have been made of it in this country to give any valuable results.

Gram or Chick Pea [*Cicer arietinum*]. Bulletin No. 2,  
Div of Agrostology, U. S. Dept. of Agriculture.  
Jared G. Smith.

**Sheep Fescue.***(Festuca ovina)*

This is a very cosmopolitan plant, it or its varieties being found in nearly every northern country in the world. It is a native in the northwest, though the seeds for our experiments were



from the eastern states. It is one of our most valued "bunch-grasses," whether under cultivation or in its native state, but the poor germination of its seeds or at least the scanty plants in any sowing that comes to maturity, make its cultivation a "side issue". Its province seems to be that of a filler with other grasses. It is a very nutritious grass, its wiry leaves and stems being highly appreciated by sheep, horses and cattle. It is a fine grass to sow with others of the smaller kinds on light, dry soils. In every sowing made here, the number of plants which came to maturity was small, while when sown with other grasses it made quite a noticeable amount of the forage. More experiments are needed, both with foreign seed and with seed of our native varieties. The same remarks would apply to the Red Fescue (*Festuca rubra*), had it not germinated so poorly in our plats that no particular notice was due it.



Sheep Fescue (*Festuca ovina*), Rydberg & Shear.  
Bul. No. 5, U.S. Dept. of  
Agriculture.

### Indian Millet.

(*Eriocoma cuspidata*)

The seed for this trial was gathered near Blackfoot, Idaho, without much idea that the plant would grow well in Northern Idaho. The next spring a bed was prepared and the seed sown. They germinated well, and by fall a good stand was in evidence. As this plant belongs particularly to the light soils amongst the sage-brush, this was rather to be wondered at. The grass is common to all that vast region from British America to Texas, and from the

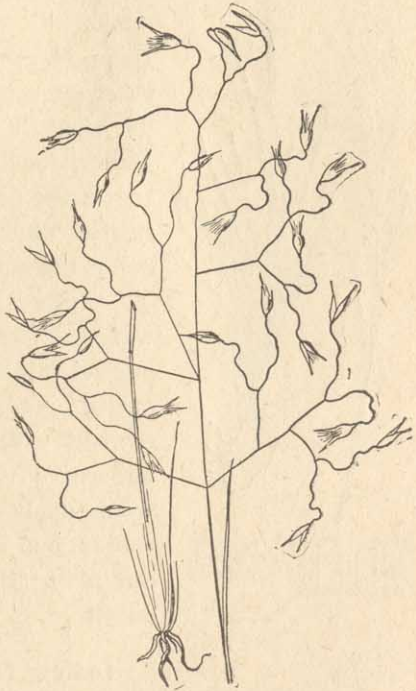
Missouri River to the Cascade Mountains in Oregon and Washington. It is a true "bunch-grass," and the ripe seeds, stems and leaves are greedily eaten by stock. Its province, if its cultivation continue successful, is very similar to that of Sheep Fescue—a filler amongst many other grasses which thrive on dry, light soils. Further experiments are needed with this grass, especially upon dry, unirrigated lands in Southern Idaho.

#### Texas Blue-grass.

(*Poa arachnifera*)

A small plat was planted several years ago with the seed of this grass. As it is a native of Texas and adjacent countries, it was from this considered almost useless to plant the seed. Ever since that time the plant has thriven on its original plat, and, from

its strong, cord-like root-stocks, has shown a disposition to *travel* to neighboring plats. Its bright green foliage and handsome panicle of cottony-looking flowers, make it a conspicuous grass. This cottony or *spider-web* appearance of its flowers gave it its specific name *arachnifera*, and readily separates it from all other Poas, even those which have somewhat cottony flowers. It produces both male and female heads, a not uncommon thing in the Poas, and seed seems to be readily fertilized. It makes a

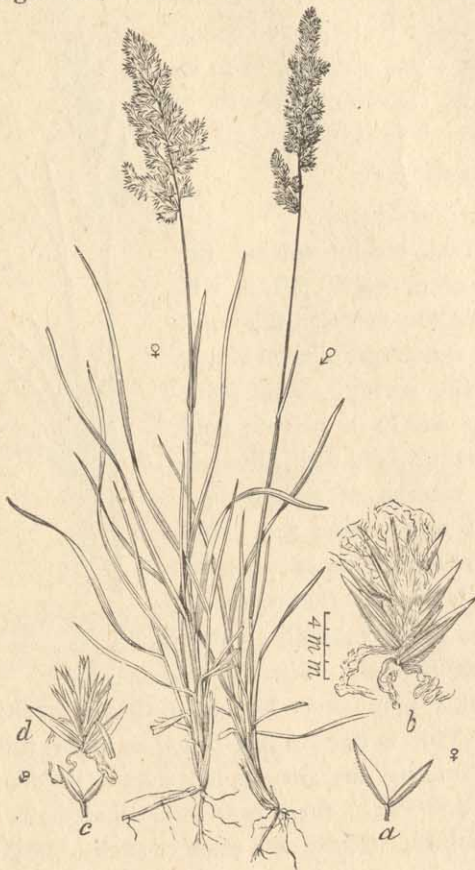


Indian Millet (*Eriocoma cuspidata*) Lamson-Scribner. Bul. No. 14. U. S. Dept. of Agriculture.

tough sod, and is said to withstand any amount of heat and drought. It can be propagated perhaps more readily by "root cuttings" than by its wooly seeds. It is early to produce pasturage, for which purpose it is highly recommended. It is altogether a promising grass, if it be found that it will withstand our variable but not severe winters.

**Bunch Red-Top.**  
(*Poa Buckleyana*)

This is a native of our country, and at one time probably furnished the greater part of the wild hay and pasturage in the Palouse. It is a bunch-grass, having no noticeable root-stocks, as have most of the Poas. It is



Texas Blue Grass, (*Poa arachnifera*) Scribner  
Bul. No. 102, U. S. Dept. of Agriculture.

much like the Nevada Blue-grass (*Poa Nevadensis*), and would have been mentioned with that grass, had its seed germinated as well, and were the plant as large as is that species. From the fact that it once grew so splendidly in this country in a wild state, the probabilities are that it will grow again under cultiva-

*Hard Fescue* (*Festuca duriuscula*.) Only a few scattered bunches developed, so that little can be said about it here. It is considered a good pasture grass for dry, sandy soils.

*King's Fescue*. (*Festuca Kingii*.) A fine grass where it grows in a state of nature in Montana, Colorado and Eastern Idaho, giving much coarse but nutritious winter forage.

*Red Fescue* (*Festuca rubra*). Though this plant grows naturally in Idaho, it did not germinate well on the plats. It is found all over the Northern states of the Union, and where found is highly esteemed. It differs from most of the fescues in having running root-stocks. It is nutritious, good for binding sand, valuable for forage as well as for lawns.

*Slender Fescue* (*Festuca ovina capillata*). This variety of the Sheep Fescue is a graceful little plant, grows well on the plats, and is considered valuable for lawns. It is too short for hay, and is of doubtful value for pasturage.



Prairie June Grass  
[*Koeleria cristata*.]

Rydberg & Shear. Bulletin No. 55, U. S. Department of Agriculture.

*Prairie June-grass* (*Koeleria cristata*). This is a native in Idaho as well as in the greater part of the United States. It grows on moist or dry natural meadows, and in some places furnishes a good part of the forage, as in Long Valley. It germinated poorly on the plats, so that very little can be told of its adaptability to cultivation in Idaho. It is a nice little bunch-grass, is said to be liked as hay, and on moist meadows often grows two feet high. It is doubtful however if it can be ever considered in the same class with our more valued grasses.

*Wild Timothy* (*Muhlenbergia racemosa*).

Did not germinate. Said to be a good hay grass in the Northwestern states east of the Rockies.

*Nerved Manna-grass* (*Panicularia nervata*). Failed to germinate, of doubtful value save in wet meadows.

*Broom-corn Millet* (*Panicum miliaceum*). Grew poorly on our plats, but further experiments are advisable. It is mainly valuable for its seed, which amounts at times to 70 bushels to the acre, and is valuable for man, stock and particularly poultry.

*Smooth June-grass* (*Poa laevigata*). A native of the Rocky Mountain region, on both sides the range. It is a handsome, valuable grass in a state of nature, but none of the seed germinated on the plats.

*Wood Meadow-grass* (*Poa nemoralis*). Grew poorly in our plats. A valuable grass for open woodlands or shaded parks, but agriculturally of little consequence.

*Rough Meadow-grass* (*Poa trivialis*). None germinated on the plats. Highly esteemed when mixed with other grasses in meadows.

#### SPONTANEOUS BUT GOOD FORAGE PLANTS.



Bur Clover. [*Medicago denticulata* Smith, Bulletin No. 2, U. S. Dep't of Agriculture.

*Bur Clover* (*Medicago denticulata*.) This plant grew quite commonly on the plats from seed mixed with the grass-seed. It is a native of Europe, and though not so valuable as clover or alfalfa helps out the pasturage in the later season. Stock of all kinds like the burs, and it is said they will "pick them from the plant while they are growing, and search for them on the ground after the foliage has become completely dry and dead."

*Black Medick* (*Medicago lupulina*). Introduced with grass seed.

It grows well in rich fields, yielding enormously, but it is doubtful whether in such locations it would compare with alfalfa or the clovers. It will also grow on land too poor for any of these, and in such places can be planted with beneficial results.

*Sandberg's Bunch-grass* (*Poa Sandbergii*). This is one of our native grasses, growing best on our rather rocky and dry hillsides. It is a little bunch-grass and furnishes much of the forage in such localities. It is probably too small a plant to be profitably cultivated, but cultivation might improve it. Cattle and horses are extremely



Black Medick. (*Medicago lupulina*). Smith, Bulletin No. 2. U. S. Department of Agriculture.

fond of it, which its early growth in the spring in no way lessens.

*Knotweed or Door-Mat* (*Polygonum aviculare*). Though this little plant, belonging to the Buckwheat family, is a nuisance in cultivated ground, and especially in grass plats during the first year, it is a very favorite forage for milch cows, and it is interesting to observe these animals almost licking up its prostrate stems and leaves in pastures and in barnyards. It keeps more or less green throughout the season, and furnishes many a good bite when other forage is lacking and where other forage plants will not grow. Even the driest roadsides and pastures are invaded by this little plant.

*Yellow or Hop Clover* (*Trifolium procumbens*). It is difficult to determine whether this plant should be classed with benefi-



Knotweed. (*Polygonum aviculare*). Smith. Bulletin No. 2, U. S. Department of Agriculture.

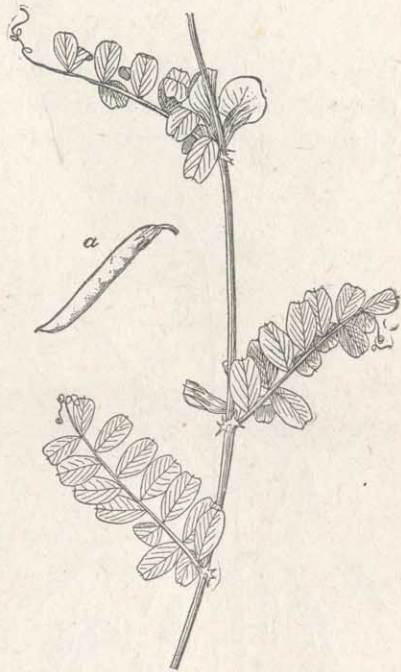
ial plants or with weeds. When it appears so commonly where it is not wanted, as in our cultivated grounds and grass plats, introduced with seed often as an adulterant, it is certainly a weed of the worst type. In such localities its annual roots are more like those of a perennial, pushing far down into the earth and spreading out in a mat scarcely less objectionable than the last. In sandy pastures however or along dry roadsides it adds quite considerably to the natural summer pasturage, and in such localities is not to be condemned.

*Common Vetch* or *Tare* (*Vicia sativa*). This annual vetch comes about as near being a weed with us as the last, though not so common. It hasn't established itself anywhere in this country outside of cultivated fields, and there but precariously. It also comes in with grass seed or others, but has been cultivated in Europe for thousands of years. It has proved to be cultivable in many parts of the United States, and in such localities furnishes good summer feed for horses and cattle. It can also be cut as hay, furnishing at times a large amount and of good quality.

### PLANTS UNDOUBTEDLY WEEDS.

*Wild Oats* (*Avena sativa glabrescens*). This is the variety commonly known throughout the Palouse country, and of such serious inconvenience to wheat-raisers. Though animals are

fond of its succulent young leaves and stalks, and it is capable of furnishing much grazing upon summer-fallow, I know of no one who would not be willing to do without it in our country. The seed has great endurance, and can live for years covered in the ground. Many expedients are in vogue for its suppression, such as pasturing cattle upon it on the summer-fallow, replowing with the disc after it has got a good start in the spring, planting even more quickly growing plants where the seed abounds, and others; but undoubtedly the best way to suppress this pest is to put parts of the farm alternately into clovers and grasses.



Spring Vetch. (*Vicia Sativa*.) Smith. Circular No. 6. U. S. Department of Agriculture.

*Downy Chess* (*Bromus mollis*). This grass grows all over our roadsides and invades our cultivated grounds where not kept out by cultivation. It is eaten by stock only when extremely hungry though the grass cut just at flowering is said to furnish rather palatable hay. In the summer after it has ripened its heads, it is no uncommon sight to see horses and cattle nipping these off for the nutritious kernels they contain.

*Sterile Brome* (*Bromus sterilis*). A worse weed than any of the other Bromes.

*Chess or Cheat* (*Bromus secalinus* and *Bromus racemosus*). Both of these plants are to be found in our country and with them the now almost obsolete farmer who is sure they are produced from wheat which has degenerated or "gone bad". As



they are not covered with so fuzzy a coat as is the downy chess, they are not disliked so much by stock, especially the first, and when cut at the flowering season make good hay. None the



Wild Oats. (*Avena sativa*). Lamson-Scribner. Bulletin No. 14, U. S. Department of Agriculture.



Chess. (*Bromus secalinus*). Lamson-Scribner. Bulletin No. 14, U. S. Department of Agriculture.

less, they are both an unmitigated nuisance in wheat fields, in gardens, and in the first years of grass culture. As they are both annuals, they soon disappear where brought into contact with perennial grasses and clovers.

*Darnel* (*Lolium temulentum*). This is a weed whose seeds are often introduced with those of other grasses. While many claim it is perfectly harmless, Mr. Scribner says of it: "The grain contains a narcotic or poisonous principle which causes eruptions, trembling and vertigo in man or flesh-eating animals. If the

seeds are malted with barley, the ale causes intoxication very suddenly.

*Fox-tail. Pigeon-grass* (*Chaetochloa glauca* and *Chaetochloa viridis*). Both of these plants are weeds and should be eradicated



Squirrel-tail grass. (*Hordeum jubatum*). Williams. Bulletin No. 6, U. S. Department of Agriculture. Yellow Fox-tail, (*Chaetochloa glauca*). Scribner. Bulletin No. 14, U. S. Department of Agriculture.

ed whenever they make their appearance in the cultivated land. Little can be said for either of them, though it is probable that they are the ancestors of many of our cultivated millets.

*Squirrel-tail-grass* (*Hordeum jubatum*). A weed pure and simple, and of the most dangerous kind. Though it is common to the irrigated parts of Southern Idaho, and is occasionally found in Northern Idaho, it should be stamped out wherever it is

possible. This would of course be difficult to do where it is found in extensive fields, as in Southern Idaho, but it *can* be done where the farmer is determined to get rid of it. The way commonly recommended is to cut the meadows where this grass



Velvet-grass, (*Hollcus lanatus*).  
Lamson-Scribner. Bulletin No.  
14, U. S. Department of Agri-  
culture.



Crab-grass, (*Panicum sanguin-*  
*nale*). Lamson - Scribner.  
Bulletin No. 14, U. S. De-  
partment of Agriculture.

abounds before it has time to ripen its seeds and its terrible barbs. When this grass is cut with others while it is in flower, it forms fair hay, though its presence could be dispensed with at all times. Prof. Aven Nelson, of the Wyoming Agricultural Station, has shown what an injury this grass can be to stock of all kinds. In Bulletin No. 19 of that Station, he says: "The awned heads when taken into the mouth break up into numerous sections, scatter about within the mouth and everywhere adhere to the mucous

membrane which soon becomes pierced with the long stiff awns. As the animal continues to feed, more awns are added and those already present are pushed deeper into the flesh. Inflammation soon results. As the swelling and festering progresses the awns are packed in tighter and cause suppuration of the gums as well as ulceration of the jaw-bones and teeth. The teeth become loosened and drop out, but the animal, impelled by hunger, still endeavors to eat such hay as may be offered." The nasal passages, throat and probably the stomach also become invaded by the awns and suffer, while even the eyeballs may be attacked by the awns hanging in the wool or hair, and total blindness ensue.

*Velvet-grass* (*Holcus lanatus*). Though this grass has often been cultivated and has even been seen in cultivation in Idaho, it ranks as a weed. On account of its velvety coat and lack of nutriment stock do not eat it unless driven to it by hunger. Though it is too widely established as a weed, it is a matter of surprise why any should cultivate it when there are so many other grasses and forage plants adapted to any soil.

*White Sweet Clover* (*Melilotus alba*). Though people are often found with the hardihood requisite for cultivating this plant, it more frequently establishes itself through grass seed. It is a good plant for bees, and has some merits as a stock plant when kept closely eaten down, but when once allowed to go to seed and establish itself, it is difficult to eradicate. Its cultivation is to be avoided in this country.

*Crab-grass* (*Panicum sanguinale*). Though this plant ranks in Southern States either as a splendid forage plant or as a weed, according to whether the field is given up to it for grass purposes or whether it is fought in cultivated fields, in our country it is to be considered only as a weed, and should be hoed out wherever it appears. It is doubtful whether it will be a serious pest in North Idaho, as it has to the writer's knowledge made its appearance only twice in the Station plats.

### SOME OF IDAHO'S NATIVE PLANTS.

Before concluding this bulletin, it will not perhaps be devoid of interest to some to know what forage plants grow spontaneously in Idaho. This is not intended as a complete list of such plants, as no careful survey of the vegetation of the state has ever been undertaken. Nor is it the intention of the writer to include in this list those plants which are eaten by either sheep or goats, for these are nearly co-extensive with the vegetation. It is intended to give only those plants which are known to furnish food to cattle or horses, though it is not the writer's intention to decide whether these may or may not be altogether helpful as forage, or even whether some of them may not be poisonous. About this latter class of plants we know too little. I shall, however, exclude all plants known to be dangerous to stock at most times. The first column will give the scientific names of the plants arranged alphabetically, with their English names where known, the second their localities through the state, the third their habitats, abundance and value.

SCIENTIFIC AND ENGLISH NAMES.	LOCALITY.	HABITAT, ABUNDANCE, VALUE.
<i>Agropyron caninum</i> , bearded wheat-grass	North, south	On hills, rare, and of doubtful utility
<i>Agropyron divergens</i> , wire bunch-grass	North, south	On dry hills and plains, common and very nutritious
<i>Agropyron divergens inermis</i> , brdl's b'ch-g'rs	North Idaho	With the last rare and equally valuable
<i>Agropyron Gmelini</i> , Gmelin's wheat-grass	Abo't Hailey	Bottoms, rare, and of a consequence of little value
<i>Agropyron pseudorepens</i> , west'n co'ch-grs	Idaho	Natural meadows and bottom lands, rather abundant and valuable
<i>Agropyron spicatum</i> , blue-stm, ws'n wht-grs	South Idaho	Alkaline meadows or drier ground, common and valuable
<i>Agropyron tenerum</i> , slender wheat-grass	North, south	Meadows and river bottoms, common and valuable
<i>Agrostis exarata</i> , white top western bent	In all parts of the state	Meadows and dried lands, common and somewhat valuable
<i>Agrostis foliosa</i> , leafy red-top	Northern and central	Meadows, rare, but of good appearance
<i>Agrostis humilis</i> , low purple bent	East Idaho	High mountains, low, rare, and of doubtful value
<i>Agrostis hyemalis</i> , tickle grass; fool hay	North, south	Meadows and along water-courses, abundant and of little value
<i>Agrostis microphylla</i> , hairy white-top	North, south	Meadows and along water-courses, not abundant, and of some value
<i>Alopecurus geniculatus</i> , water fox-tail	North, south	Wet meadows and marshes, not abundant, but valuable
<i>Alopecurus geniculatus fulvus</i> , tawny w. f. t'l	South Idaho	Wet meadows and marshes, not abundant, but valuable
<i>Alopecurus pallescens</i> , pale fox-tail	North Idaho	Moist or wet meadows, not uncommon, and valuable
<i>Amarantus blitoides</i> , prostrate amaranth	North Idaho	Rich hillsides, abundant in localities, furnishing some pasturage
<i>Artemisia Ludoviciana</i> , Lewis' mugwort	Throughout Idaho	Rich hillsides and bottom lands, frequent, not rejected with hay
<i>Artemisia rigida</i> , rigid sage-brush	Southern Idaho	Hills and rocky ground, not common, much cropped by cattle

#### Astragalus.

##### Rattle-pods.

There are various species of this genus throughout Idaho. Some are pastured by cattle, some merely avoided, except in hay, and some are probably "loco-weeds" or poisonous. It is too soon to say which species are of value as forage, and those which are large enough for grazing are included, in hopes that more light may be thrown upon them.

SCIENTIFIC NAMES.	SCIENTIFIC NAMES.
<i>Astragalus adsurgens</i>	<i>Astragalus Hookerianus</i>
" <i>arrectus</i>	" <i>hypoglottis</i>
" <i>Beckwithii</i>	" <i>juncus</i>

SCIENTIFIC NAMES.	SCIENTIFIC NAMES.
<i>Astragalus campestris</i>	<i>Astragalus Mortoni</i>
“ <i>collinus</i>	“ <i>obscurus</i>
“ <i>diphysus</i>	“ <i>reventus</i>
“ <i>filipes</i>	“ <i>Spaldingii</i>
“ <i>inflexus</i>	

SCIENTIFIC AND ENGLISH NAMES.	LOCATION.	HABITAT, ABUNDANCE, VALUE.
<i>Atriplex argentea</i> , silvery salt-bush	South'rn and S. E. Idaho	Moist alkaline soil, abundant and valuable
<i>Atriplex confertifolia</i> , spiny salt bush. White sage. Winter fat	South'rn and S. E. Idaho	Dry, rocky hillsides and plains, abundant and valuable
<i>Atriplex Nuttallii</i> , Nuttali's salt-bush	South'rn and S. E. Idaho	Dry, gravelly sage-brush and sub-alkaline bottoms, valuable
<i>Atriplex truncata</i> , Utah salt-bush	South'rn and centr'l Idaho	Moist alkaline soil, abundant and valuable
<i>Balsamorhiza sagittata</i> , balsam root, wild sunflower	Throughout the state	Open hills, abundant north, less in the south, valuable
<i>Bromus breviaristatus</i> , short-awned brome	North Idaho	Meadows and uplands, quite abundant, of some value
<i>Bromus ciliatus</i> , hairy brome, nod'ing brome	North'rn and centr'l Idaho	Woodlands and wooded hills, not abundant, of some value
<i>Calamagrostis canadensis</i> , blue joint	North'rn and centr'l Idaho	Water-courses, marshes and lakes. Abundant and valuable
<i>C. hyperborea elongata</i> , yellow top	Snake River canyon S. Id.	On bluffs, rare, and of unknown value
<i>C. Montanensis</i> , Montana reed-grass	Fremont county	Dry, rocky land or in sage-brush, abundant and apparently valuable
<i>C. purpurascens</i> , Alpine reed-grass	Eastern Ida.	High altitudes, Salmon River mountains, rare but valuable
<i>C. Suksdorfii</i> , pine-grass	North'rn and centr'l Idaho	Yellow pine lands, the most abundant grass in Idaho, one of the poorest

## Carrex.

## Sedge.

All over Idaho. Some furnish considerable forage, while many are nutritious or give doubtful amounts of forage. A difficult genus, even for the skilled botanist, so no attempt will be made to give English names. Those species which are known to furnish forage or hay, or can do so, are given.

SCIENTIFIC NAMES.	SCIENTIFIC NAMES.
<i>Carex abietina</i>	<i>Carex lanuginosa</i>
<i>C. ablata</i>	<i>C. laeviculmis</i>
<i>C. acutina</i>	<i>C. Liddoni</i>

SCIENTIFIC NAMES.		SCIENTIFIC NAMES.	
Carex	amplifolia	Carex	marcida
C.	athrostachya	C.	Nebraskensis
C.	atrata	C.	nova
C.	aurea	C.	pratensis
C.	auriculata	C.	Preslii
C.	canescens	C.	Pyrenaica
C.	“ alpicola	C.	siccata
C.	“ Oregana	C.	scoparia
C.	Douglasii	C.	stipata
C.	festiva	C.	straminea
C.	“ stricta	C.	tenella
C.	filifolia	C.	tenuirostris
C.	fusca	C.	Tolmiei
C.	Gayana	C.	tergidula
C.	hystricina	C.	utriculata
C.	Geyeri	C.	vesicaria
C.	incurva	C.	viridula
C.	irrasa	C.	vulgaris alpina
C.	Kelloggii	C.	vulpinoidea

SCIENTIFIC AND ENGLISH NAMES	LOCATION.	HABITAT, ABUNDANCE, VALUE.
Cirsium foliosum leafy thistle	North and centr'l Idaho	Moist fields and meadows, common and nutritious
Cirsium lanceolatum bull thistle	Commonly introduced	Waysides, common, eaten by stock, especially when cut
Cyperus acuminatus awned cyperus	Southern Idaho	Sandy river bottoms, small and of lit- tle value
Cyperus erythrorhizos, red-rooted cyperus	Northern Idaho	Sandy river bottoms, larger, not com- mon, of doubtful value
Cyperus Houghtoni Houghton's cyperus	Northern Idaho	Along Clearwater river, common, of doubtful value
Cyperus strigosus harsh cyperus	North'rn and southern	River bottoms, common, and of little value
Danthonia Californica, Cal. oat grass	North and south	Moist or dry natural meadows, abund- ant and valuable
Danthonia intermedia, smaller oat gr's	Northern Idaho	In moist or dry natural meadows, abundant and valuable
Deschampsia atropurpurea, mountain hair grass	Eastern central	In moist places, high altitudes of Sal- mon river mountains, rare and valu- able
Deschampsia caespitosa, tuft'd hair-grs	North and south	Marshes and river bottoms, common and valuable
Deschampsia calycina oat-like hair-grass	North and south	Meadows and along streams, common, of some value
Deschampsia elongata, nod'g h'r-grs	North and central	Meadows and hillsides, common, of little value



SCIENTIFIC AND ENGLISH NAMES.	LOCATION.	HABITAT, ABUNDANCE, VALUE.
<i>Distichlis spicata</i> , salt-grass	Southern Idaho	Wet or moist saline soil, abundant and of some value
<i>Etonia obtusata</i> , early bunch-grass	Southern Idaho	Arroyos, rare and of some value
<i>Eleocharis acicularis</i> , Needle rush	North and south	Wet meadows and sandy soil, common, of little value
<i>Eleocharis obtusa</i> , tufted spike-rush	North and south	Wet meadows and sandy soil, common, of little value
<i>Eleocharis palustris</i> common spike-rush	North and south	Wet meadows and in water, common, of some value
<i>Eragrostis lutescens</i> , low upright eragrostis	Southern Idaho	Moist sand along Payette river, rare, of little value
<i>Eragrostis reptans</i> , creeping eragrostis	North and south	Moist sand, Snake river, common, of little value
<i>Elymus Canadensis</i> Canadian wild rye	North and south	Moist or dry river bottoms, not com- mon, of little value
<i>Elymus condensatus</i> giant rye grass	North and south	Moist or dry river bottoms, common and quite valuable as hay
<i>Elymus Macounii</i> Macoun's rye grass	Southeastern Idaho	Dry or dried natural meadows, Black- foot, not common, of doubtful value
<i>Elymus glaucus</i> , blue mountain rye grass	North and center	Open hills or woodlands, common and valuable
<i>Elymus Sitanion</i> bristly wild rye	North and south	Open hills and dry meadows, common and nearly a weed
<i>Elymus triticoides</i> , wild wheat	North and south	Meadows and along streams, not com- mon, valuable
<i>Eriogonum fascicula- tum</i> , clustered eriogo- num	Southern Idaho	Common on dry hills and plains, brow- sed somewhat
<i>Eriogonum vimineum</i> , wild buckwheat	Southern Idaho	Common on dry hills and plains, pal- atable to animals
<i>Erodium cicutarium</i> , al- filaria, filaree, pin cl'ver	North and south	Common on hills, a valuable forage, especially for sheep
<i>Eurotia lanata</i> , whita sage	Southern Idaho	Open hills, rare and valuable
<i>Glycyrrhiza lepidota</i> , wild liquorice	North and south	Common in moist sand of Snake river, pastured
<i>Festuca Jonesii</i> , Jones' fescue	Northern Idaho	Open woods in bottoms, quite abund- ant and valuable
<i>Festuca Kingii</i> . King's fescue	Eastern Idaho	Higher altitudes, grassy slopes of Lost River mountains, not common but valuable
<i>Festuca microstachys</i> bearded fescue	North and south	Dry plains, common and not valuable
<i>Festuca octoflora</i> , slender fescue	North and south	Dry plains, common and not valuable
<i>Festuca ovina</i> , sheep fescue	North and south	Dry hills, common in many forms and very valuable
<i>Festuca rubra</i> , red fescue	North and south	In moister ground, not common, very valuable

SCIENTIFIC AND ENGLISH NAMES.	LOCATION.	HABITAT, ABUNDANCE, VALUE.
<i>Helianthus annuus</i> , sunflower	Southern Idaho	Roadsides, and railways, the heads especially cropped by cattle
<i>Hierochloa borealis</i> , seneca grass, holy-grass	Southern Idaho	Mountains, delightfully scented, valuable in hay or for pasturage
<i>Homalocenchrus oryzoides</i> , cut grass, wild rice	Southern Idaho	In water, Payette river, Payette, rare and of doubtful value
<i>Hordeum jubatum</i> , squirrel-tail-grass	Most frequ't in the south	Wet meadows and over irrigated lands, a weed always, a pest when ripe
<i>Hordeum maritimum</i> , seaside barley	Northern Idaho	Introduced about towns and along roads, rare and almost a weed
<i>Hordeum nodosum</i> , meadow barley	North and south	In pastures and along streams, rather abundant and valuable
<i>Hosackia Purshiana</i> , Pursh's hosackia	North and south	A legume common in meadows, somewhat pastured
<i>Hydrophyllum capitatum</i> , headed wat'r leaf	North and south	Loved by sheep and cropped by cattle, possibly with the grass, common

## Juncus.

Bull-rush. Bog-rush.

These plants are common in moist or dry land, growing commonly with the sedges (*Carex*). Though not rejected when cut with hay, and though many are cropped by cattle, they are of doubtful value. A partial list of the most common species follows:

SCIENTIFIC NAMES.	SCIENTIFIC NAMES.
<i>Juncus balticus</i>	<i>Juncus Parryi</i>
J. <i>bufonius</i>	J. <i>Regelii</i>
J. <i>effusus</i>	J. <i>Richardsonianus</i>
J. <i>longistylis</i>	J. <i>subtriflorus</i>
J. <i>Mertensianus</i>	J. <i>tenuis</i>
J. <i>Nevadensis</i>	J. <i>Toreyi</i>
J. <i>nodosus</i>	J. <i>triandrus</i>
J. <i>orthophyllus</i>	

SCIENTIFIC AND ENGLISH NAMES.	LOCATION.	HABITAT, ABUNDANCE, VALUE.
<i>Koeleria cristata</i> , prairie June-grass	North and centr'l Ida.	Moist or dry prairies, common and valuable for grazing and hay
<i>Lathyrus bijugatus</i> , low few-leaved pea	North Idaho	Copses and wooded hills, not abundant nor valuable
<i>Lathyrus decaphyllus</i> , prairie vetchling	North and south	Copses and open hills, common and valuable
<i>Lathyrus ochroleucus</i> (?) white-flowered pea	North and central	Common in copses and hillsides, greedily eaten by stock
<i>Lathyrus pauciflorus</i> , few-leaved-pea	North Idaho	Common along bluffs of Snake, Clearwater and Potlatch, valuable
<i>Lathyrus venosus</i> , veiny-leaved pea	Southern Idaho	Not uncommon on hills, valuable

## Lupinus.

## Lupines.

The seeds of some of these species have been shown to be poisonous to stock; the stems when dried before the seeds ripen form fair hay. The most common species are:

SCIENTIFIC NAMES.	SCIENTIFIC NAMES.
Lupinus argentens	Lupinus ornatus
L. laxiflorus	L. sericeus
L. leucophyllus	

SCIENTIFIC AND ENGLISH NAMES.	LOCATION.	HABITAT, ABUNDANCE, VALUE.
Luzula campestris, common wood-rush	North and south	Open woods, common and of some value
Luzula parviflora, small-flowered wood-rush	North and south	Open woods, common and of some value
Luzula spadicea, mountain wood-rush	Eastern Idaho	In coniferous woods in high mountains, rare and of little value
Luzula spicata, spiked wood-rush	North and cent. Ida.	Open ground, high mountains, rare and of little value
Melica bulbosa, bulbous melic-grass	North and cent. Ida.	Dry meadows and mountain slopes, common and valuable
Melica spectabilis, handsome melic-grass	Southern Idaho	Moist or wet natural meadows, common and valuable
Oryzopsis cuspidata, Indian millet	Central and southern Id.	Amongst sage-brush, common and valuable
Oryzopsis exigua, small mountain rice	North and south	Open pine woods in mountains, not common, but valuable
Panicularia Americana, reed manna-grass	North'n and central	In water or wet meadows, not uncommon, of uncertain value
Panicularia fluitans, water manna-grass	North and south	In water and in wet meadows, common and of some value
Panicularia nervata, nerved manna-grass	North and south	In moist or wet meadows, abundant and valuable
Panicularia pauciflora, few-flwr'd manna-gr's	North and south	With the last, and like it
Panicum capillare, w'ch grass, tumble-grass	North and south	Along streams in sandy soil, common and of little value
Panicum crus-galli, barnyard grass	North and south	Along streams and in cultivated ground, abundant and valuable
Panicum dichotomum, forked panic-grass	Northern Idaho	Dry, sandy or rocky ground along streams, not common, of some value
Panicum Scribnerianum, Scribner's panic-grass	North and south	In like places with last, more common and of more value
Phalaris arundinacea, reed canary-grass	Eastern Idaho	In and along streams and lakes, not common, valuable
Phragmites vulgairs, reed-grass, plume-gr's	Northern Idaho	Along Salmon river, rare and of little value
Phleum alpinum, wild or mountain timothy	Southern Idaho	Wet or moist natural meadows, rare, but valuable

SCIENTIFIC AND ENGLISH NAMES.	LOCATION.	HABITAT, ABUNDANCE, VALUE.
<i>Poa airoides</i> , slender meadow-grass	North and south	Rather dry soil, Nampa, rare and valuable
<i>Poa annua</i> , goose-grass	North and south	Along streams and roadsides, common but of little value
<i>Poa Buckleyana</i> , bunch red-top	Northern Idaho	Open plains and hillsides, common "bunchgrass", valuable
<i>Poa flava</i> , false red-top	North Idaho	Along lakes and streams, not common and of some value
<i>Poa gracillima</i> , graceful June-grass	North and central	Open woods along streams, not uncommon and valuable
<i>Poa lœvigata</i> , bunch blue-grass	Eastern Idaho	Somewhat wooded hills, not common and valuable
<i>Poa nemoralis</i> , wood meadow-grass	North Idaho	Open woods, Lost river mountains, rare and valuable
<i>Poa Nevadensis</i> , Nevada blue-grass	Northern and cent.	Open hills and plains, not a common "bunchgrass", valuable
<i>Poa nervosa</i> , woodland June-grass	Eastern Idaho	In open woods on hills, not common, but valuable
<i>Poa pseudopræterensis</i> , prairie meadow-grass	North Idaho	Borders of sandy creeks, near Challis, valuable in places, rare with us
<i>Poa Sandbergii</i> , Sandberg's June-grass	Eastern Idaho	A common little grass on our hills, valuable
<i>Poa Suksdorfii</i> (?)	North and south	Sawtooth mountains, not common and apparently valuable
<i>Polypogon Monspeliensis</i> , beard-grass	North and south	Common along streams and ditches, of some value
<i>Potentilla fruticosa</i> , bush cinquefoil	Southern Idaho	Not common along lakes and in mountains, cropped
<i>Purshia tridentata</i> , Purshia	Southern Idaho	Dry hills and plains, not common, cropped by cattle
<i>Salsola kali</i> tragus, Russian thistle	Southern Idaho	Commonly introduced, the young plants eaten with relish
<i>Sarcobatus vermiculatus</i> , greasewood	Northern Idaho	Moist alkaline soil, common, cropped by sheep and cattle
<i>Scirpus atrovirens</i> , dark-green bull-rush	North and south	Moist or wet places, common, of some value with hay
<i>Scirpus lacustris</i> , great-bull-rush, tule	Northern and cent.	In lakes and streams, common, of slight value
<i>Scirpus microcarpus</i> , small-fruited bull-rush	North and south	Wooded bogs, common and of some value
<i>Sparganium simplex</i> , lesser bur-reed	North and south	Marshes and lake borders, common and of some value
<i>Sparganium eurycarpum</i> , greater bur-reed	North and south	Marshes and lake borders, common and of some value
<i>Spartina cynosuroides</i> , cord-grass	Northern Idaho	In and along lakes and streams, not common, of little value
<i>Sporobolus airoides</i> , alkali saccaton,	Southern Idaho	Dry or moist alkaline land, common and valuable
<i>Sporobolus asperifolius</i> , rough-leaved drop-seed	Southern Idaho	Alkaline flats, not uncommon and valuable
<i>Sporobolus depauperatus</i> , steel-grass, drop-seed	Northern Idaho	Dried soil along creeks, common and valuable

SCIENTIFIC AND ENGLISH NAMES.	LOCATION.	HABITAT, ABUNDANCE, VALUB.
<i>Stipa comata</i> , needle-grass	Southern Idaho	Sage-brush land, common, of some value
<i>Stipa Lettermani</i> Letterman's-grass	Northern and cent.	Dry, grassy hills, rather rare, valuable
<i>Stipa occidentalis</i> , western needle-grass	Southern Idaho	Plains, rare and valuable
<i>Stipa stricta</i> , straight needle-grass	Central Idaho	Mountains above Payette lakes, not common, but valuable
<i>Stipa viridula</i> , green needle-grass	Central and southern	Open woods, mountains, not common, but valuable
<i>Stipa Williamsii</i> (?) William's needle-grass	Northern Idaho	Grassy woods of pinus ponderosa, not uncommon, valuable
<i>Thermopsis montana</i> , yellow bean	North and south	Common on moist hills and valleys, avoided green, eaten in hay
<i>Trifolium altissimum</i> , wild red clover	North Idaho	Common in moist meadows, valuable in hay, hardly eaten green
<i>Trifolium cyathiferum</i> , shield clover	North and south	Moist or wet natural meadows, common, valuable
<i>Trifolium eriocephalum</i> , wooly-headed clover	Central Idaho	Moist or wet natural meadows in mountains, not common, valuable
<i>Trifolium involucreatum</i> , seaside clover	North Idaho	Borders of marshes, rare and valuable
<i>Trifolium Haydeni</i> , Hayden's clover	Central Idaho	High altitudes, Lost river mountains, rare and valuable
<i>Trifolium longipes</i> , taller wild white clover	Northern and cent.	Natural meadows and along streams, common and valuable
<i>Trifolium longipes latifolium</i> , low wild white clover	Northern Idaho	Moist grassy woodlands, common and valuable
<i>Trifolium megacephalum</i> , big-headed clover	Southern Idaho	Hillsides, not common, but valuable
<i>Trifolium microcephalum</i> , small-headed cl'r	North and south	Common in moist sandy ground, low, but valuable
<i>Trifolium plumosum</i> , great white crested clover	Northern Idaho	Common in adobe soil in Camas prairie, not liked by cattle when green
<i>Trifolium Rusbyi</i> , Rusby's clover	Central Idaho	Moist natural meadows, Long valley, not common, valuable
<i>Trifolium tridentatum</i> , annual wild red clover	Southern Idaho	Moist natural meadows and along streams, not common, valuable
<i>Triglochin maritimum</i> , seaside arrow-grass	Central and southern Id	Marshes, not uncommon, and of some value for grazing
<i>Trisetum canescens</i> , hairy false oat	Northern Idaho	Open woods along streams, common and valuable
<i>Trisetum subspicatum</i> , downy false oat	Central Idaho	Mountain slopes, not common, valuable
<i>Veratrum Californicum</i> , white hellebore, skunk cabbage	North and South	Common in moist meadows, cropped by cattle, but root-stock poisonous
<i>Vicia Americana</i> , American vetch	North and south	Fields and meadows, common and valuable.