



Forest Health Armillaria Inoculation

Intermountain Forest Tree Nutrition Cooperative

2003 Annual Meeting

Terry M. Shaw

Forest Health / Nutrition

Armillaria ostoyae Inoculation



- Completed Work
- Current Status
- Proposed Direction



Forest Health

1999-2000 *Armillaria* Collection Summary

Collection Year	1999	2000
Number of Sites	15	15
Number sites <i>Armillaria</i> collected	12	13
Number sites with <i>Armillaria ostoyae</i>	8	9

Forest Health *Amillaria ostoyae* Inoculation by Region



Regions					
SC WA	NC WA	NE WA	N ID	C ID	NE OR
0 (4)	0 (2)	6 (6)	9 (12)	0 (4)	2 (2)

Forest Health

Armillaria ostoyae Inoculation by Vegetation and Rock Type



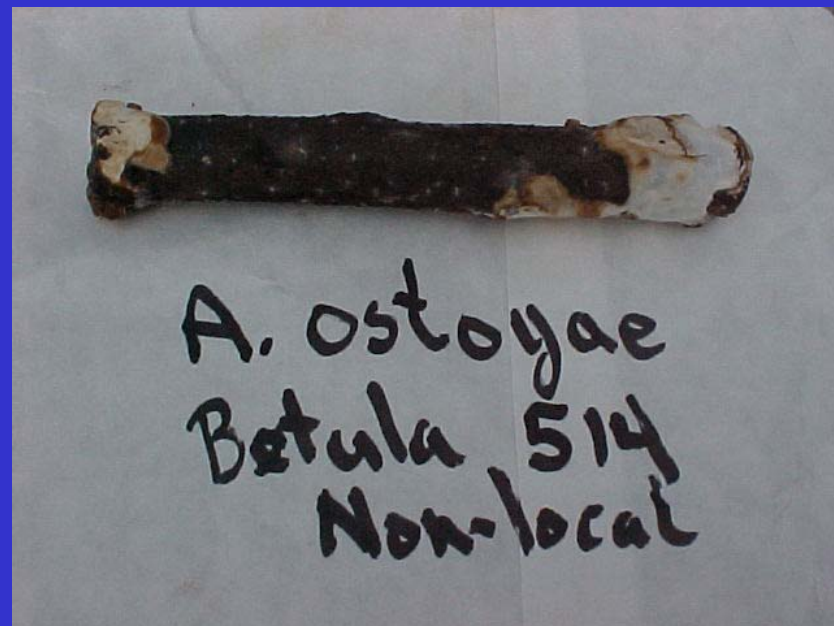
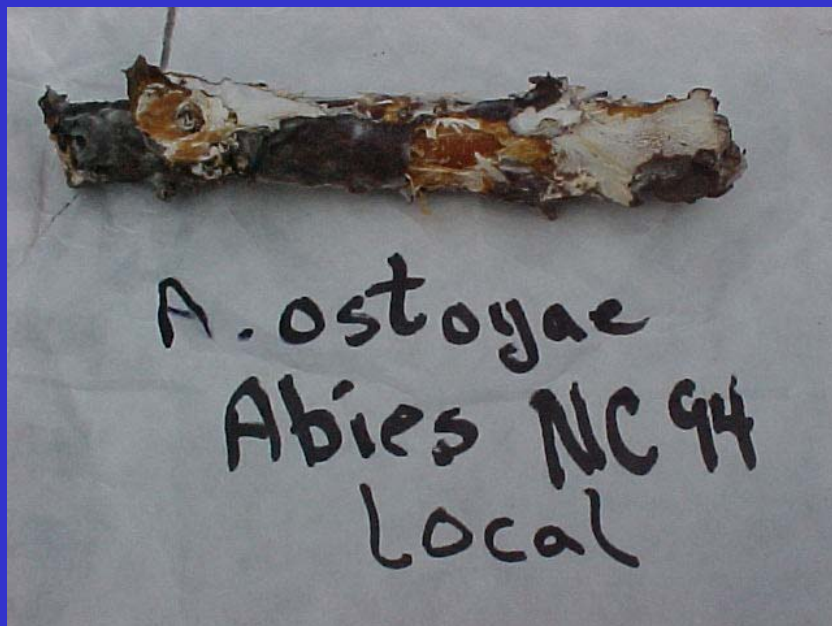
	Douglas-fir	Grand fir	Cedar/Hemlock	Total
Granite	0 (3)	2 (3)	1 (2)	3 (8)
Basalt	1 (3)	1 (3)	3 (3)	5 (9)
Meta-Sed	0 (0)	1 (1)	4 (4)	5 (5)
Mix	0 (2)	1 (3)	3 (3)	4 (8)
Total	1 (8)	5 (10)	11 (12)	17 (30)



Forest Health Root Inoculation

Pathogenetic *A. ostoyae* Isolates

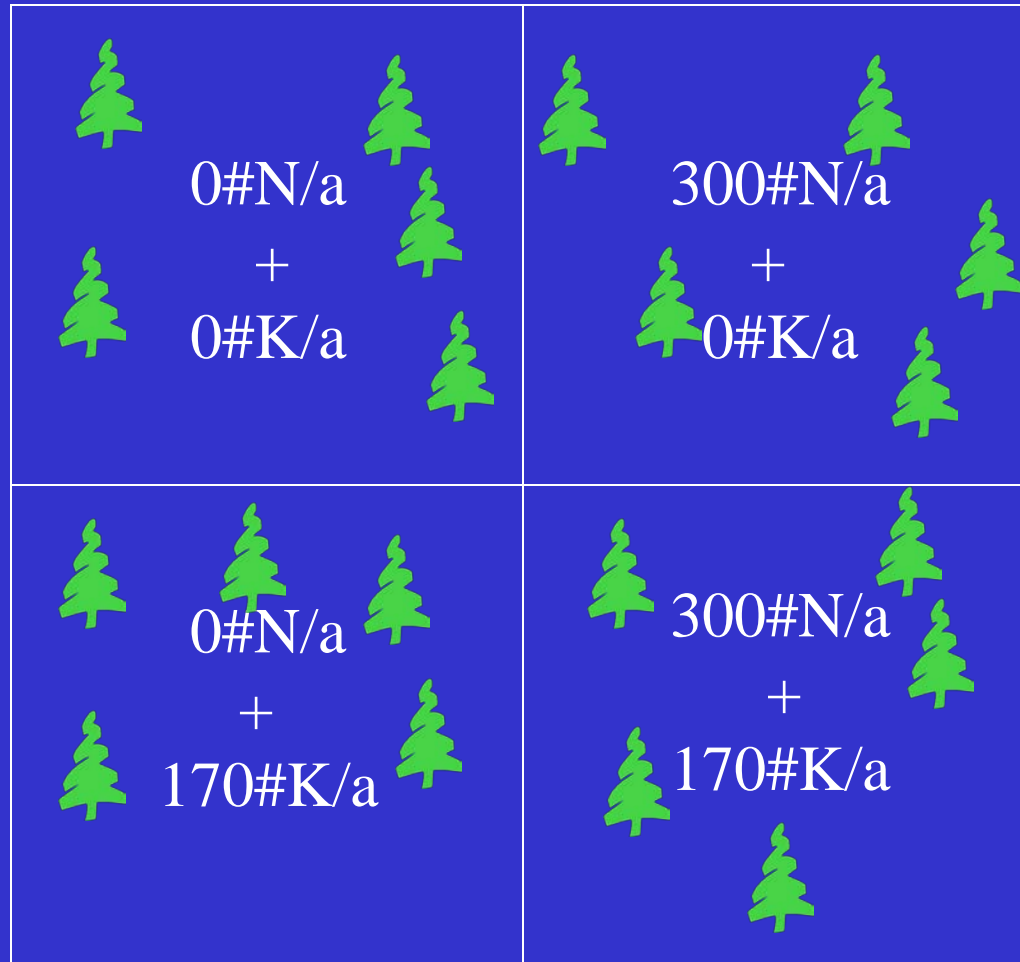
- Local *A. ostoyae* Isolate
- Regional *A. ostoyae* Isolate



Forest Health Core Treatment Design



A. ostoyae Inoculation Design



Forest Health



Armillaria ostoyae Inoculation

Each tree received one local isolate and one regional isolate.



Five trees per plot were inoculated



Excavation and attachment



Forest Health

Root Bark and *A. ostoyae* Inoculation Time Table



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- 1998 root bark collection 1994 installations
 - 1999-2000 collect and colonize *A. spp.* isolates
 - 2000-2001 collect and colonize *A. spp.* isolates
 - Fall/2000 inoculate 8 Forest Health sites with *A. ostoyae* and collect root bark
 - Fall/2001 inoculate 9 Forest Health sites with *A. ostoyae* and collect root bark
 - ~~Fall/2002 collect and verify *A. ostoyae* infection from 8 Forest Health sites~~
 - Spring/2002 Preliminary Infection Investigation
 - ~~Fall/2003 collect and verify *A. ostoyae* infection from 9 Forest Health sites~~

Preliminary Investigation

Spring 2002



- Three Forest Health Sites were Examined
 - Bovill (335) N. ID., Springdale (346) N.E. WA., Enterprise (337) N.E. OR.
 - Examined 1-2 trees on the 4 core plots per site

Preliminary Investigation

Spring 2002



Preliminary Investigation

Spring 2002



Forest Health

A. ostoyae Inoculation

Current Time Table



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- Spring/2003 - collect inoculated roots from 8 Forest Health sites for verification of *A. ostoyae* infection
 - Spring/2004 - collect inoculated roots from 9 Forest Health sites for verification of *A. ostoyae* infection

Forest Health

Inoculation Methodology Test

Proposed Direction



- Method objective is to culture inoculum blocks with aggressive / healthy rhizomorphs growing from them that can be attached to the roots of the host tree.
- **Stick Bridge Method:** Consists of a large (armillaria colonized) hardwood inoculum block and small fresh (from live tree) hardwood dowel. The fresh dowel is inserted inside the large armillaria colonized block and allowed to colonize to the end of the stick. The protruding stick bridge with large block inoculum are then placed adjacent to root with stick bridge end in contact with root. Noticable infection should occur with a few months.
- **Cruickshank and Morrison**

Forest Health

Inoculation Methodology Test

Time Table



- **September/2003 - Resurrect for culturing archived *A. ostoyae* isolates collected from Forest Health sites in 1999 and 2000.**
- **November /2003 – Inoculate and culture substrate blocks to be used for field inoculations.**
- **April- May / 2004- Use colonized block to inoculate four Forest Health sites for inoculation methodology test**
- **Sept-Oct / 2004 – Check for host infection after only a few months**