



Tall Whitetop Control at the 102 Ranch and Implications for Native Plant Community Restoration

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The Problem



Tall whitetop (*Lepidium latifolium*)

Invasive Weed

Spreads by rhizomes and can produce 10,000 seeds per plant

- Infests 17 million acres of public rangelands in Western U.S.
- 25,000 acres in the **Truckee River Watershed**
- Estimated overall cost: \$123 billion a year
- Out-competes beneficial watershed vegetation
- Creates monoculture and destroys diverse wildlife habitat



The Problem

Tall Whitetop (TWT) Control Control efforts to Date:

- Herbicides and controlled grazing
 - Knock down but not out
 - Establishment of other weeds
- Reason for poor control:
 - Unsuccessful native plant community restoration



The Problem

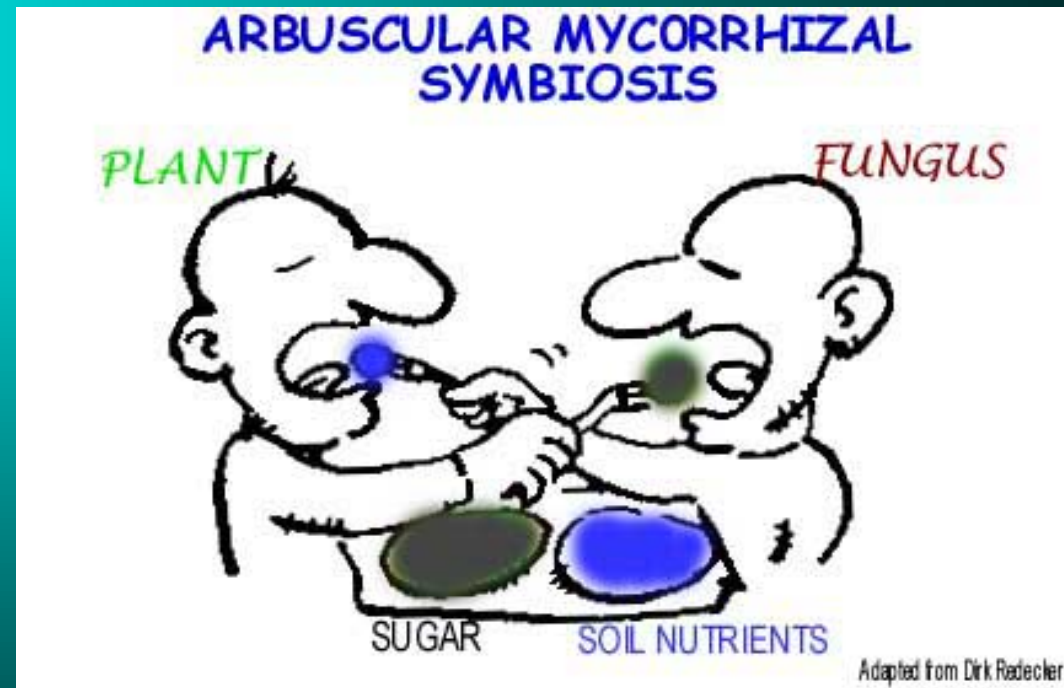
Hypothesis for Native Restoration Failures:

- **Herbicide residues** inhibits germination of native seed applied after treatment
 - No quick establishment to compete with TWT
- TWT monoculture changes **soil biology**
 - TWT is a non-mycorrhizal mustard
 - Soil bioassay did not show mycorrhiza

Why is Mycorrhiza Important?

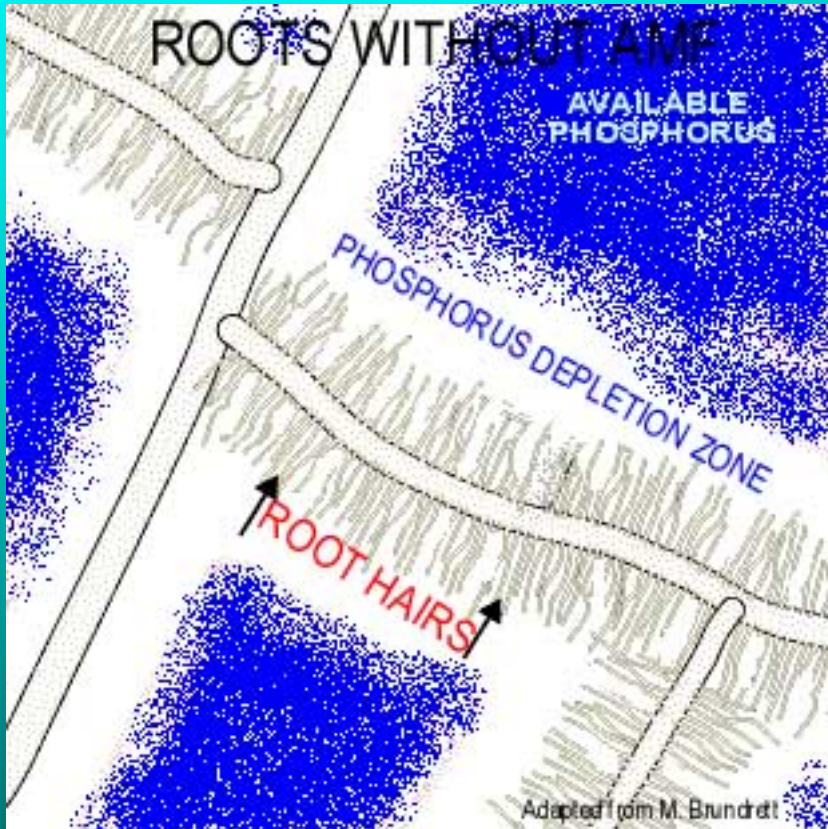
AM SYMBIOSIS

- **Ancient**
 - 400 million yrs ago
 - 1st land plants
- **AM fungi**
 - Essential to land plant establishment
- **Plant hosts**
 - 90% of all species
 - Only 4 non-mycorrhizal plant families

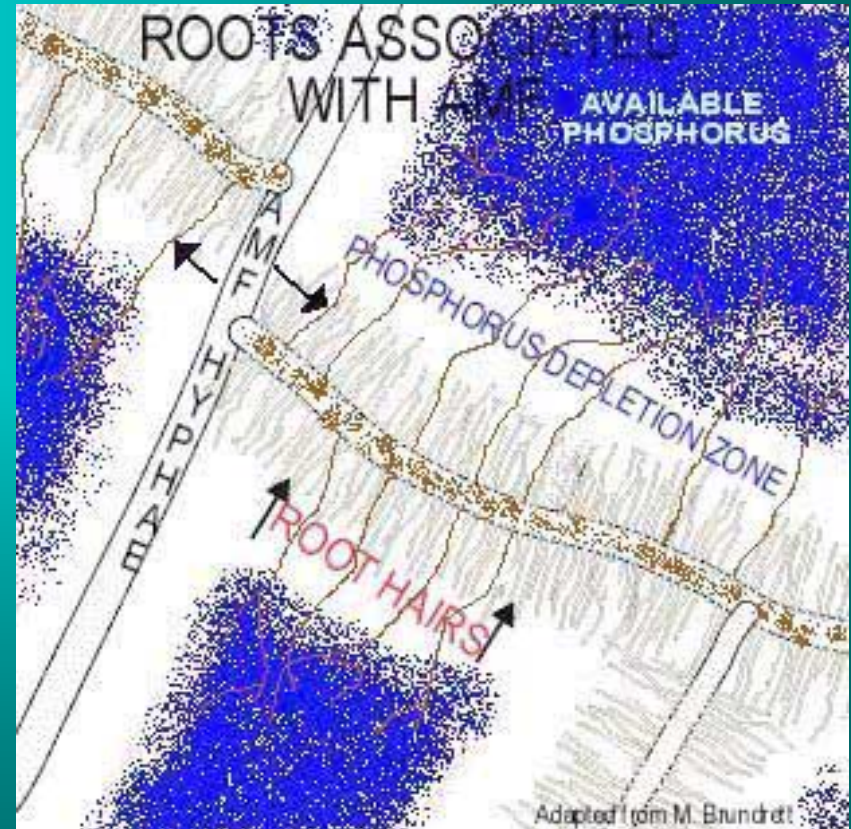


Why is Mycorrhiza Important?

Role of AM Symbiosis



Roots without AM fungi



Roots Associated with AM fungi



With Mycorrhiza

Not Treated

The Proposed Solution

Treat with herbicide and follow with mycorrhiza and activated charcoal treated seed

- **Activated charcoal** will neutralize residual herbicide surrounding seed to allow germ
- **Mycorrhiza** will help increase establishment and survival of mycorrhiza dependent natives

Demonstration Project

One acre plot at 102 Ranch along Truckee River
(Tracy, NV)

2 Irrigation levels- No Irrigation and Supplemental
2 Seed treatments – Control and Treated (M + C)
2 Herbicide treatments – Plateau and untreated

Irrigation



Site Preparation





Coated Seed

Animal Repellents



Crimped straw- one pass



Crimped Straw –two passes



Results

Project monitoring

Vegetation:

- Germination, cover, frequency, diversity, establishment, vigor, and vitality, permanent photo points
- Mycorrhiza:
 - Root sampling and staining for mycorrhiza presence and abundance
- Soil Fertility
- Soil Microbiology
 - Soil bacteria and fungal presence, diversity and activity

Monitoring



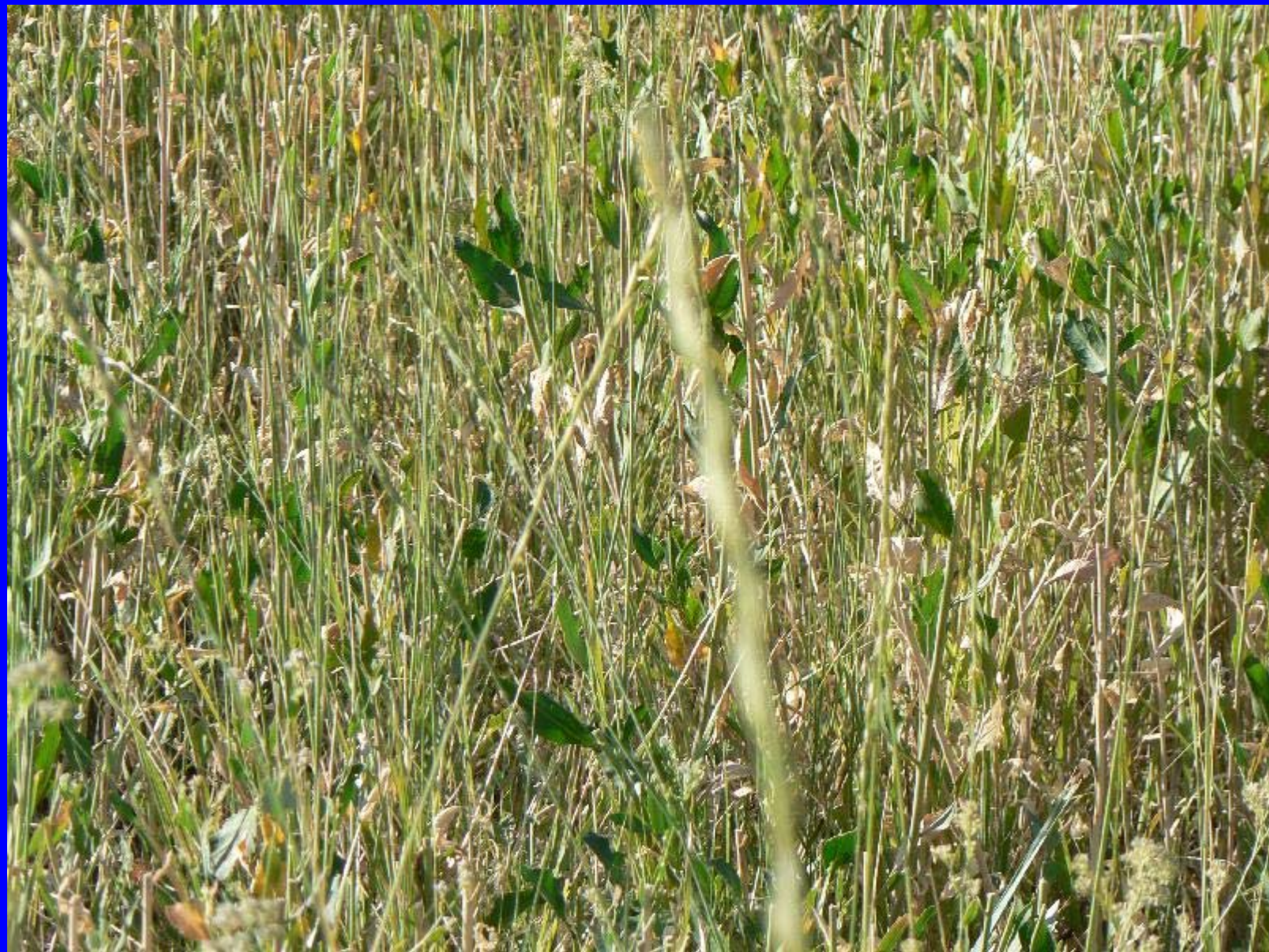
June 2006





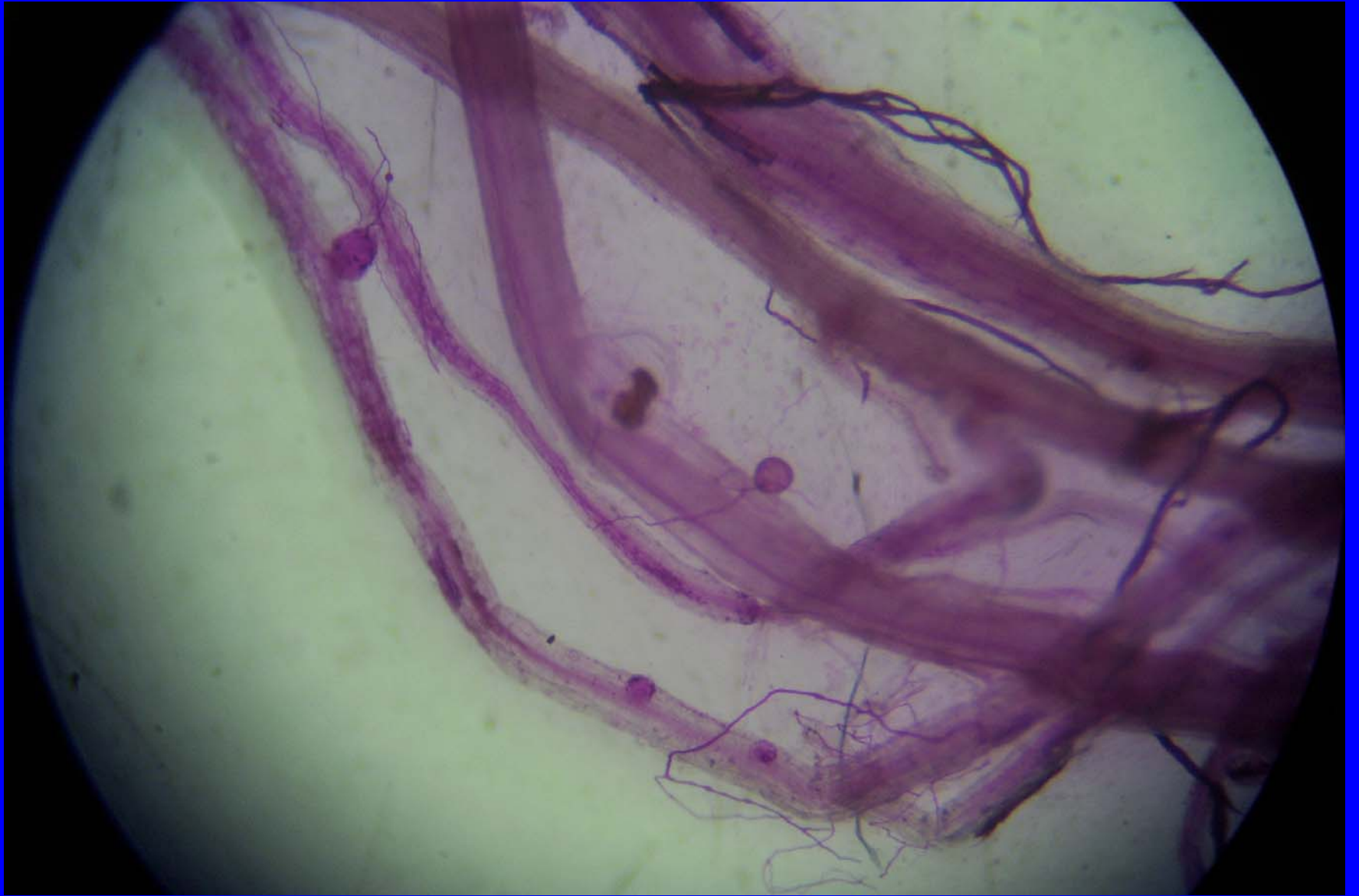
PLOT #1





August 2006





Demonstration Project

102 Ranch Project Cooperators:

- Truckee River Investors
- Reforestation Technologies Int'l (RTI),
- John Sargent
- Kelley Erosion Control
- Shannon Peters

QUESTIONS?

