Tahoe Whitetop Eradication and Native Plant Community Restoration

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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
- Drives out beneficial watershed vegetation
- Creates monoculture and destroys diverse wildlife habitat

The Problem
The Problem

Tall Whitetop (TWT) Eradication

Eradication efforts to Date:

- Herbicides and controlled grazing
  - Knock down but not out

- 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 nonmycorrhizal 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
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
Demonstration Project

Project monitoring (3 years)

- 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
Demonstration Project

102 Ranch Project Cooperators:

Truckee River Investors, Reforestation Technologies Int’l (RTI), BASF, Western Botanical Services, Great Basin Earthwork, and Juniper Rose

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QUESTIONS ?