

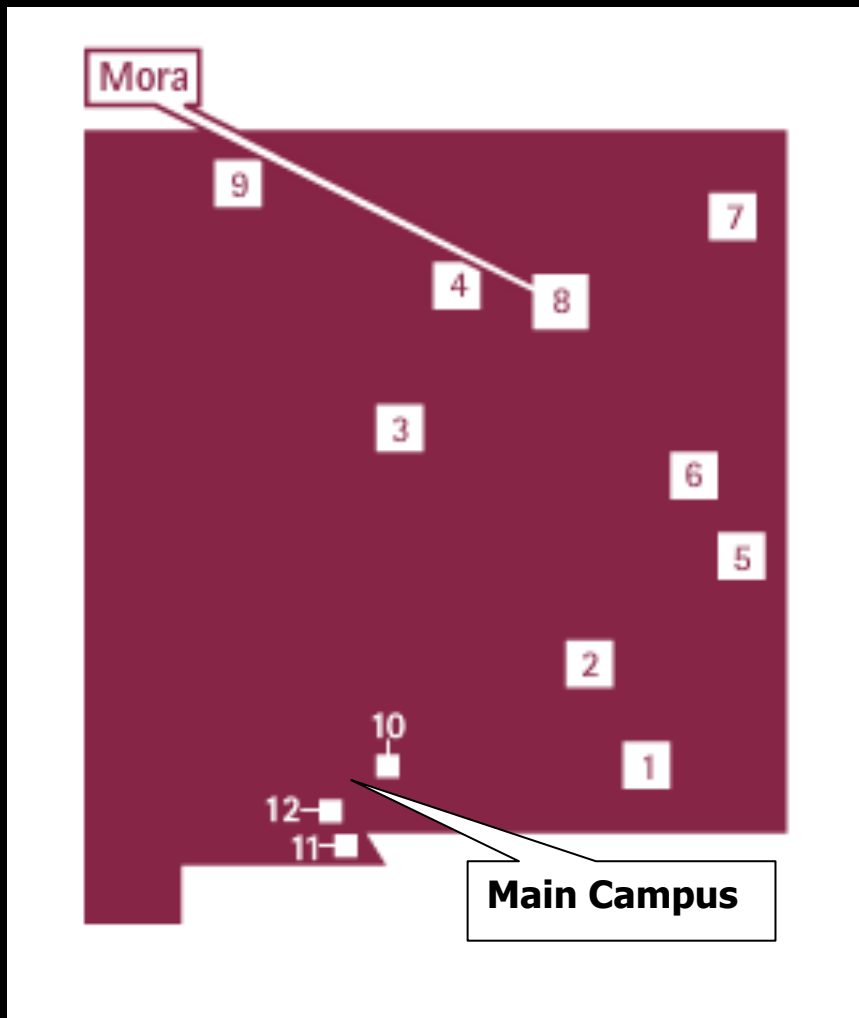
# John T Harrington Forestry Research Center

New Mexico State University

Owen Burney



# New Mexico State University – Ag Experiment Stations



12 Ag Exp Stations

1 Forestry Research Center

# JTH Forestry Research Center - NMSU

Established 1972

Nursery Complex  
(greenhouse, shadehouse,  
cold-frame)

50 acres irrigated land  
(field plots)

70 acres natural mixed  
conifer





# Operations and Research Programs

## Operations

Conservation Seedling Nursery Production

## Research

Nursery Systems

Tree Improvement

Forest Restoration/Mine Reclamation

International Development



## Operations – Conservation Seedling Nursery

Over 2.5 million  
seedlings produces  
since 1980

Average production  
100,000 per year



Over 25 species such as: Ponderosa pine, Douglas-fir, white fir, Engelmann spruce, pinyon pine, and aspen

# Research – Provenance/Progeny Test

First established in 1979

7 tests (2 current)

PIPO, PIEN, ABCO

## Objectives (long-term)

- Tree Improvement (Genetic Gains)
- Used to identify seed transfer guidelines
- Model adaptation to changes in climate





## Research/Operations - Seed Orchard Establishment

Creation of state's first known seed orchards PIPO

(planted 1982)

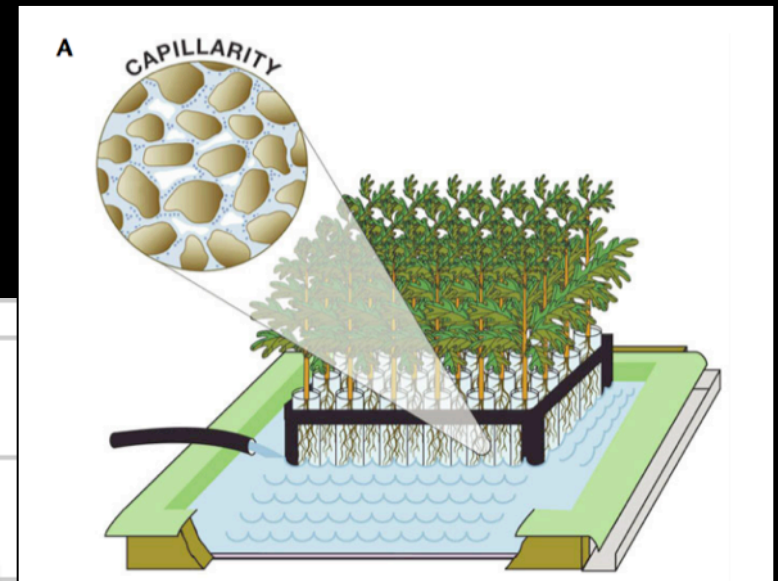
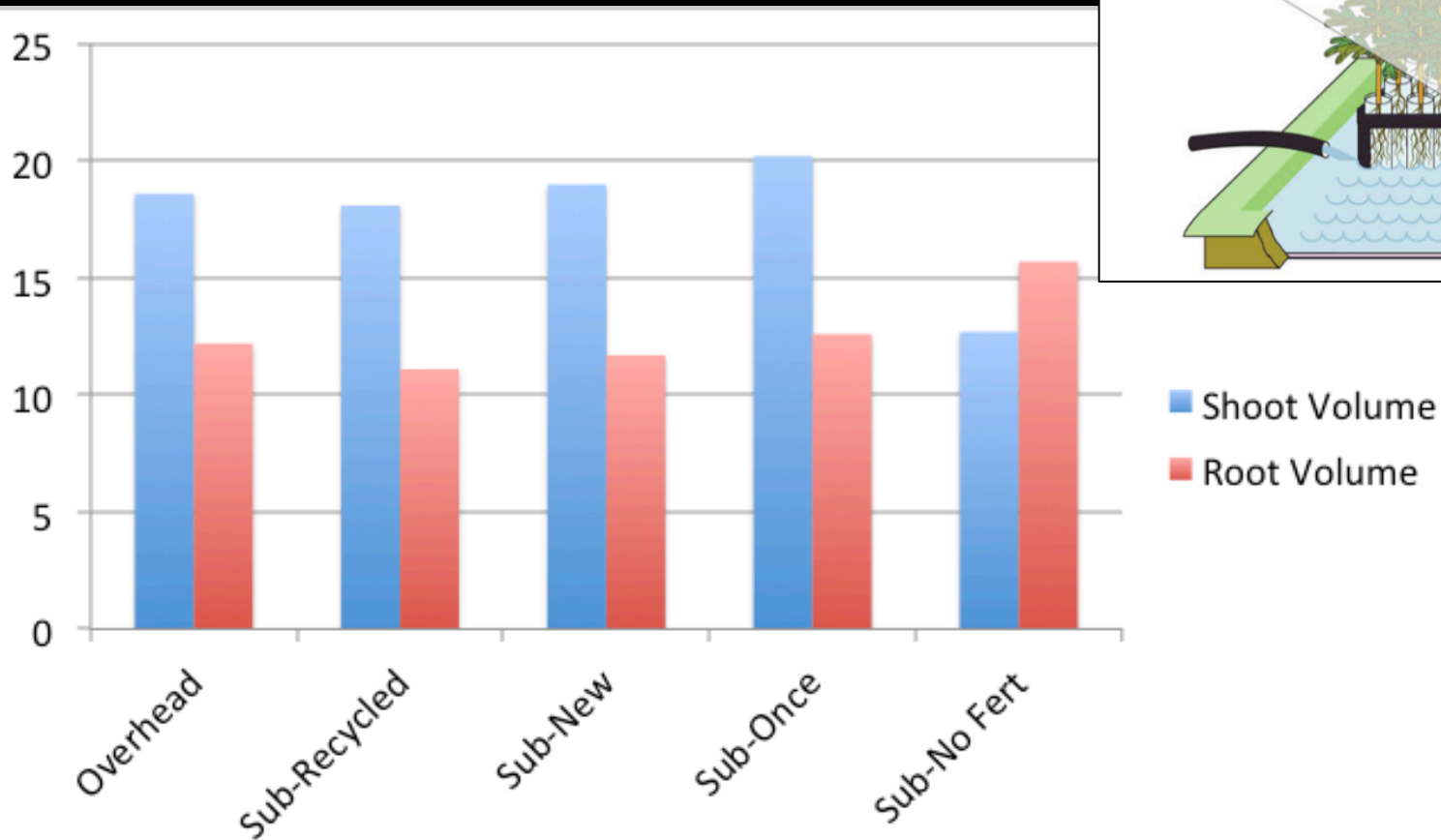
Forward  
Selection





# Research – Fertigation via sub-irrigation

Seedling performance under varying subirrigation fertilizer regimes.



# Research - Mountain Mahogany Restoration

Collaboration: NMSU and Univ. of Wyoming

Evaluation of mountain mahogany (*Cercocarpus montanus*) seed source and site conditions on seed germination and planted seedlings.

(Common Garden Study)

4 Planting Sites:

- Laramie, WY
- Lyons, CO
- Woodland Park, CO
- Mora, NM



# Research – Southwestern White Pine Gene Conservation

## Blister Rust Resistance

The collection and long-term conservation of resistant genotypes through clonal propagation and orchard establishment.

### Collaborator:

James Jacobs

USDA Forest Service

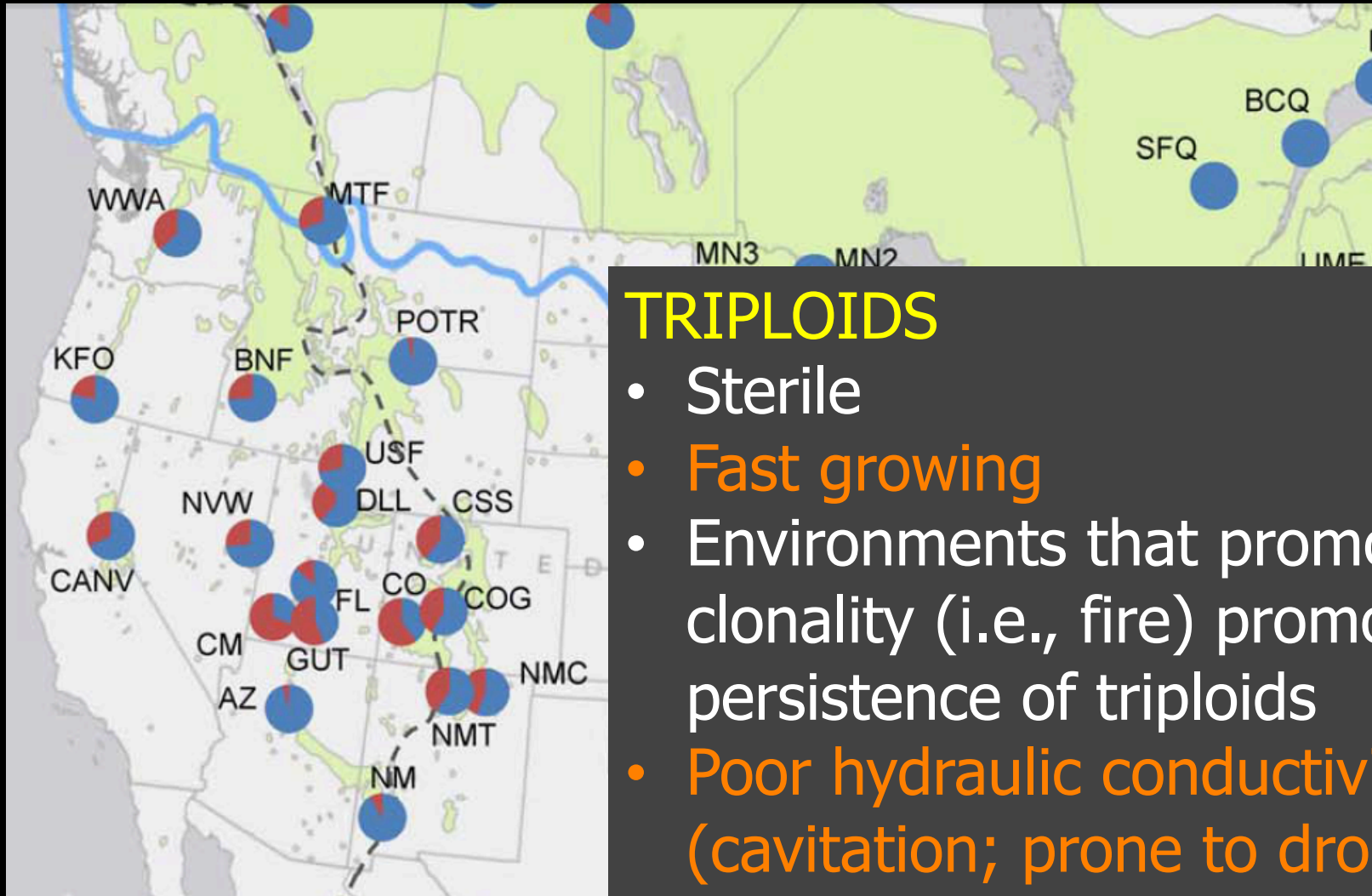
Forest Health Protection

Albuquerque, NM





# Research – Artificial Aspen Regeneration



Mock et al. (2012) Widespread Triploidy in Western North American Aspen (*Populus tremuloides*)

# Research – Artificial Aspen Regeneration

NMSU, Utah State University, and  
University of Alberta

1. To assess the effectiveness of a planted seedling-based “nucleation” strategy for aspen restoration (adding genetic diversity)
2. To determine whether aspen seedling establishment and development varies among seed sources from a range of triploidy rates.



## Research – Artificial Aspen Regeneration

- Seed will be collect from NM, Utah, Montana, and Alberta across the range of triploidy rates.
- Seedlings grown in Mora.
- Planted collectively in nucleated plots “tree islands”
- Protected by fencing from herbivory
- Assessed for survival, growth, and ploidy level



# Research – Mine Reclamation with Soil Amendments



## Research – Mine Reclamation with Soil Amendments

Currently under a confidentiality agreement

## Research – Alternative Container Types



NMSU

Purdue University

University of  
Idaho

USFS



# Tree Nursery Production – Polybags



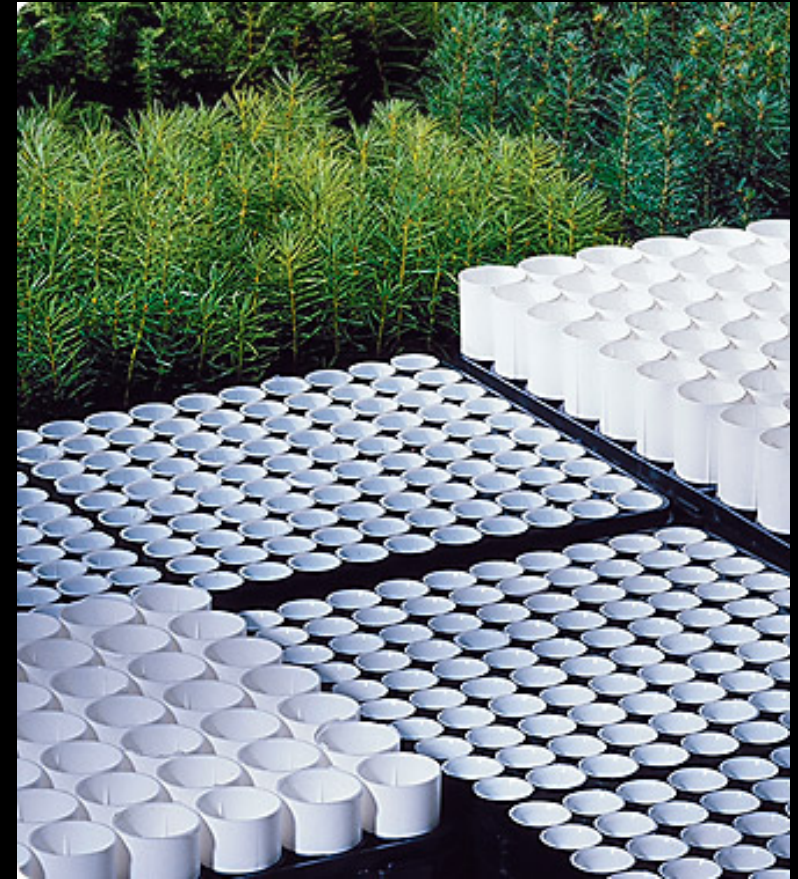
Photo by O. Burney



Photo by D Haase



# Tree Nursery Production – Modern Containers



<http://www.stuwe.com/>



# The Plastic Bottle... A Potential Resource



(Plastic Disclosure Project photo)

In 2009, 120 billion plastic water bottles alone were produced worldwide





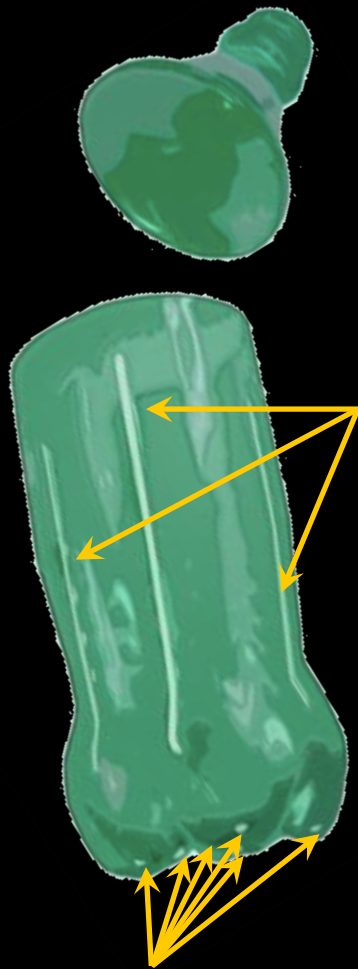
# Current Studies – New Mexico State University



Photos by O. Burney



# STUDY 1 - Opacity by Spiral Control



Slits or Internal  
Silicon Ridges

Drainage Holes



# STUDY 2 - Container Type

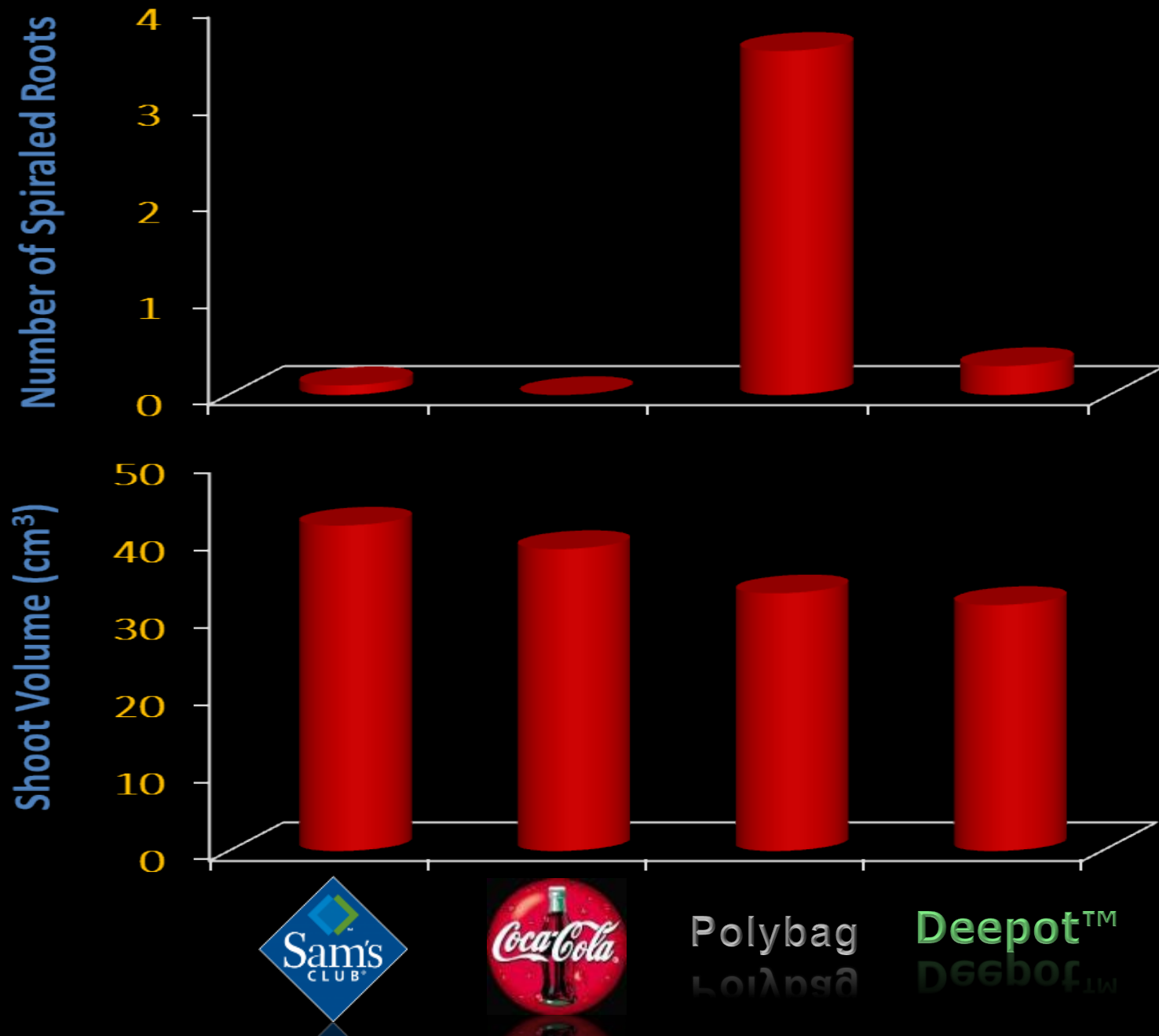


Polybag

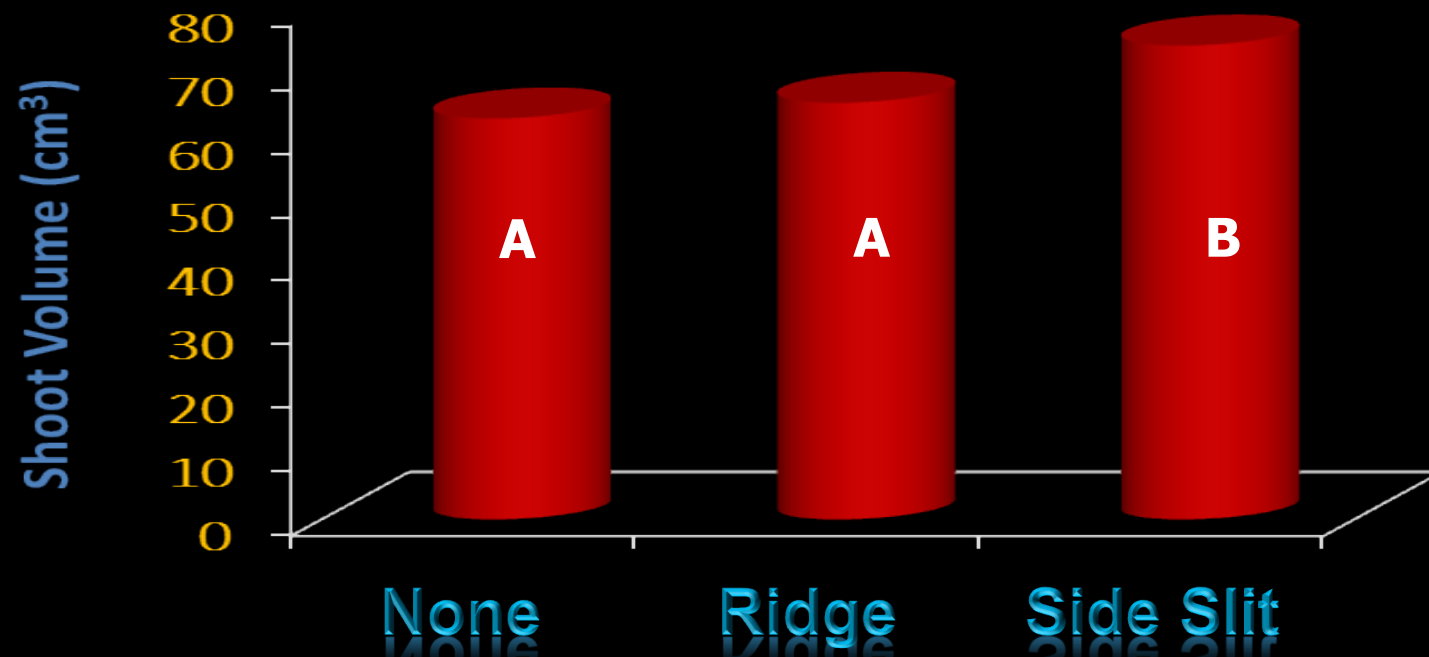
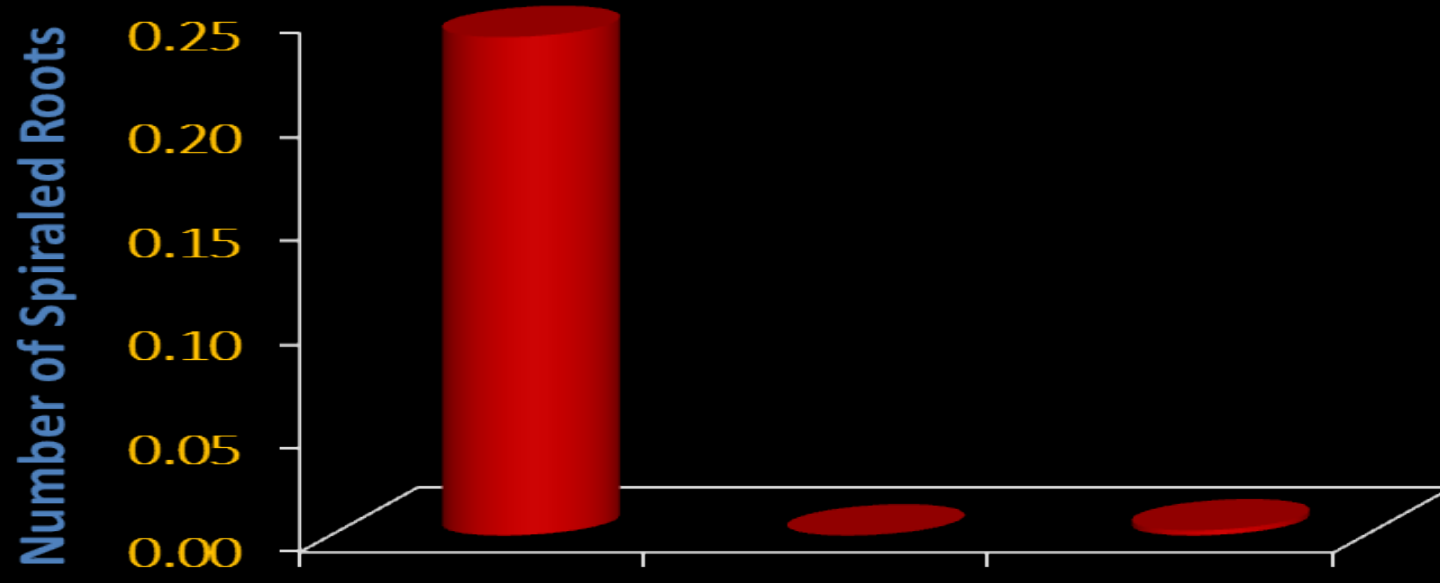
Deepot™

Deepot™

# Container Types



# Spiral Control

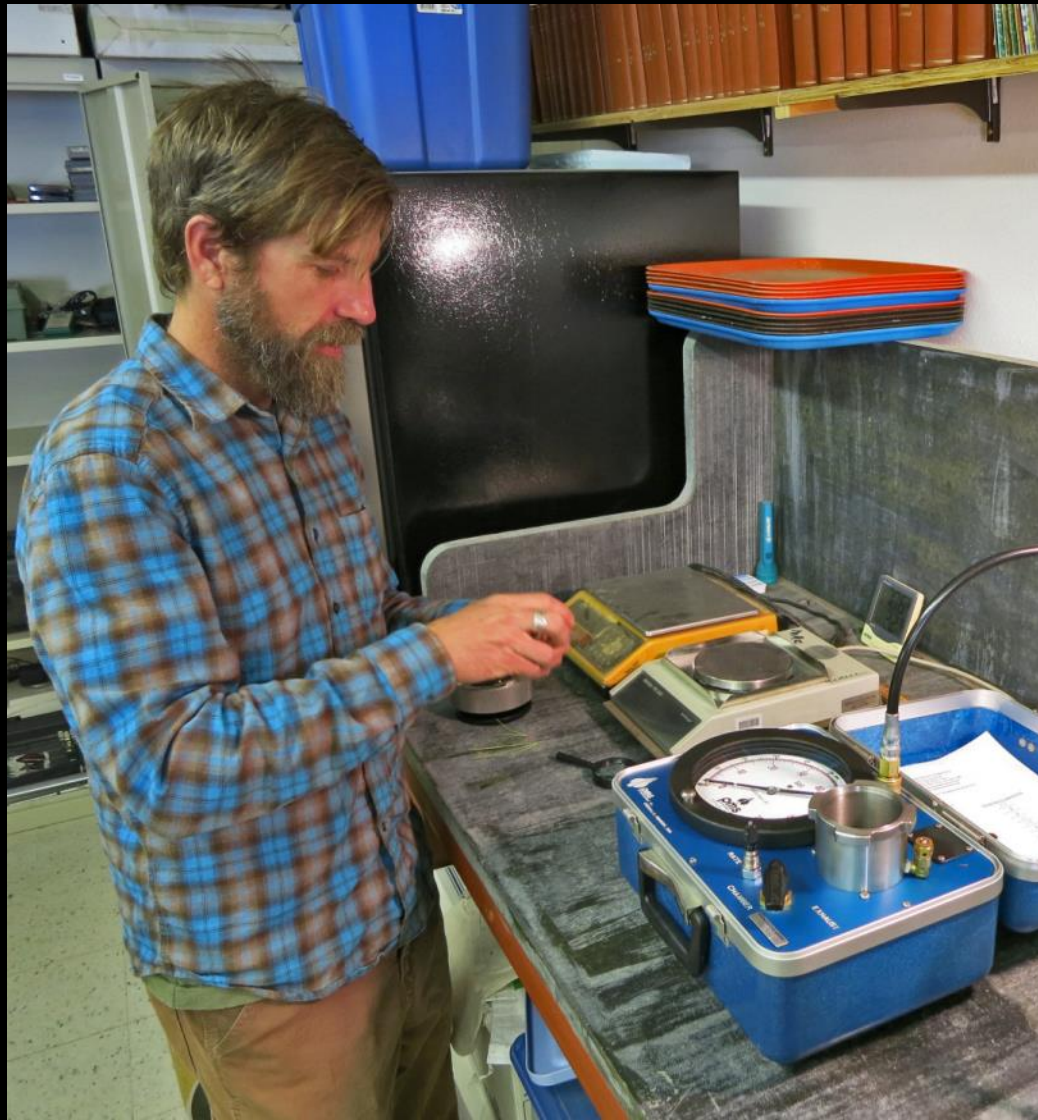




## Coca-Cola Bottle – Produces High Quality Seedlings



# Future Research Directions

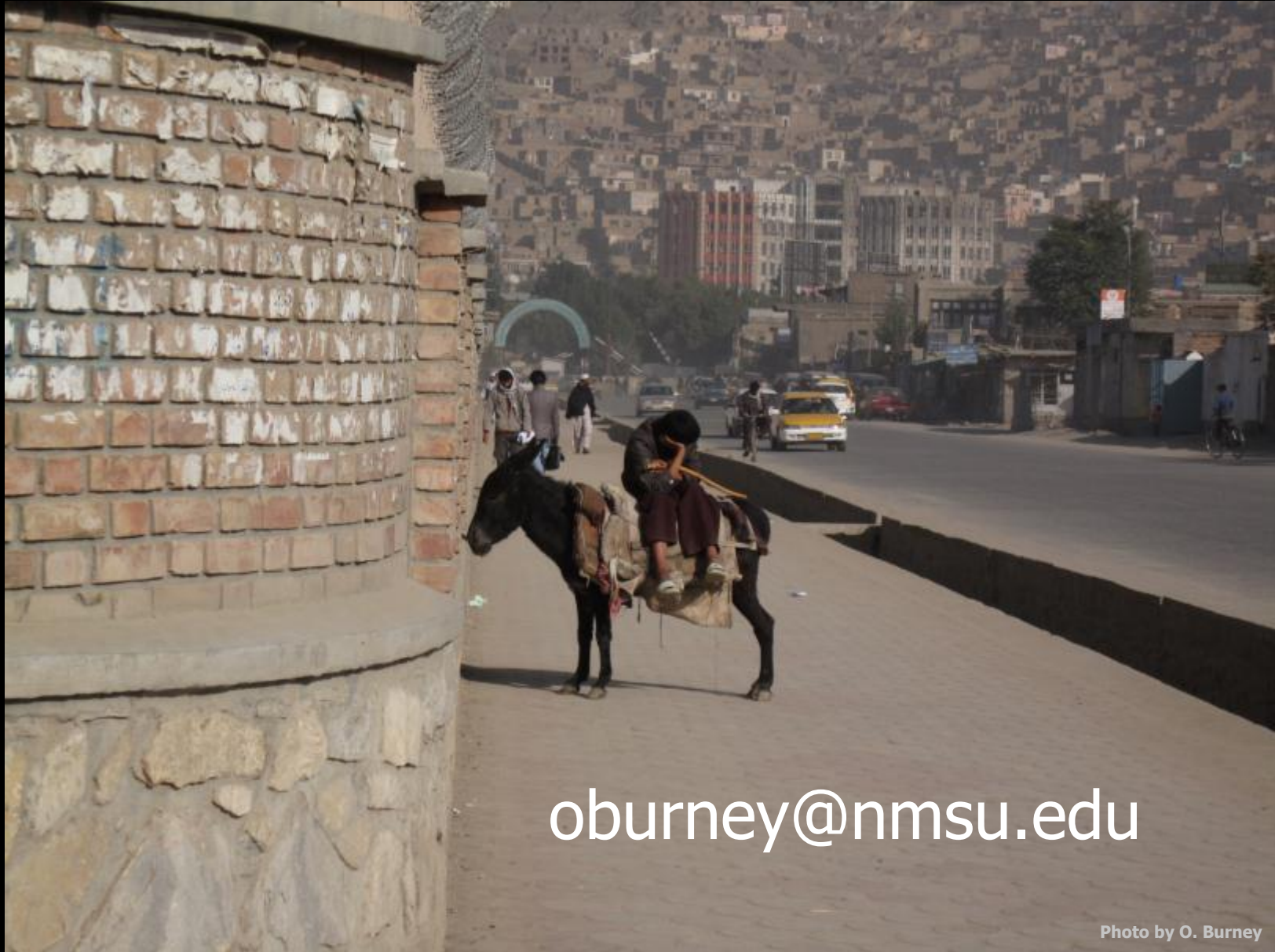


## Future – A few examples

1. Seed source selection for drought tolerance
2. Drought conditioning during the nursery phase
3. Post-fire planting comparing arrangement methods (nucleation vs grid)
4. ???



# QUESTIONS



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Photo by O. Burney