

Site and substrate treatments influence American chestnut budset and survival

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Background

- Cross-Ridge mining
 - Overburden returned
- Mountaintop Removal
 - Overburden in valleys



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Background

- Historic Surface Mining
 - Left "as is"
 - Valleys filled in
 - Erosion/Landslides
 - Mass Instability
 - Water Pollution
 - Trees Planted



Burger et al., 2005

Background

- Post Surface Mining Control and Reclamation Act of 1977



Background

- The Forestry Reclamation Approach (FRA)
 - ✗ 1. Create a suitable rooting medium for good tree growth that is no less than 4 feet deep and comprised of topsoil, weathered sandstone and/or the best available material.
 - ✗ 2. Loosely grade the topsoil or topsoil substitute established in step one to create a noncompacted growth medium.
 - ✗ 3. Use ground covers that are compatible with growing trees.
 - ✗ 4. Plant two types of trees—early successional species for wildlife and soil stability, and commercially valuable crop trees.
 - ✗ 5. Use proper tree planting techniques. (Burger et al., 2005).

Background

- FRA




Background

- American chestnut
 - Not available in the past
 - Chestnut blight (*Cryphonectria parasitica*)
- Center of Range
- Growth
 - Increased light levels
 - Moderately acidic soils
 - Well drained soils



Background

- Budset
 - Photoperiod
 - Temperature
 - Nutrient availability
- American chestnut
 - Neoform (sustained)



Objective

- Determine the influence of site and planting treatments on:
 - Survival of differing genetic stock of *C. dentata*
 - Budset of differing genetic stock of *C. dentata*



Hypotheses

- American chestnut will set bud sooner than hybrids.
- All chestnut on south facing slopes will delay budset.
- Fertilizer, Terra-Sorb, and native soil will delay budset.

Methods

- Study site



Methods

- 2 sites, 4 plots
 - Flat (A,B)
 - NE
 - Sloped (C,D)
 - SE



B

A

C

D



Methods

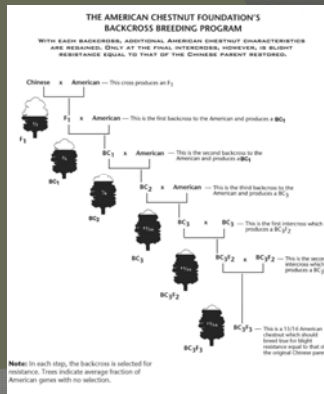
- Lot 1 – Pure American chestnut

Terra-Sorb Applied	Fertilizer Applied	Soil Sterilized
Terra-Sorb Not Applied	Fertilizer Not Applied	Soil Un-Sterilized



Methods

- Lot 2 – Hybrid families
 - GM: American
 - NB8: B1F3
 - SA: B2F3
 - WT: American
 - GB: American
- Mesh tree shelter
- May, 2008



Methods

- 1.5m x 1.5m spacing
- Treatments randomly assigned to planting spots
- Directly seeded
- 18" tall direct seed Blue-X shelter or yellow mesh
- Pile Native Rock around tube



Methods

- Budget
 - Every two weeks
 - Growing, Set, Dead
 - 90%
- Survival
 - Every two weeks

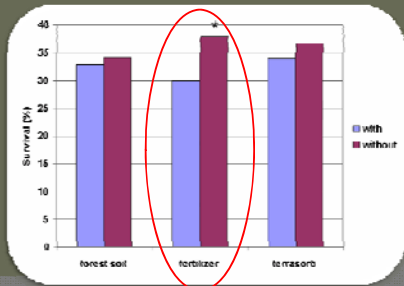


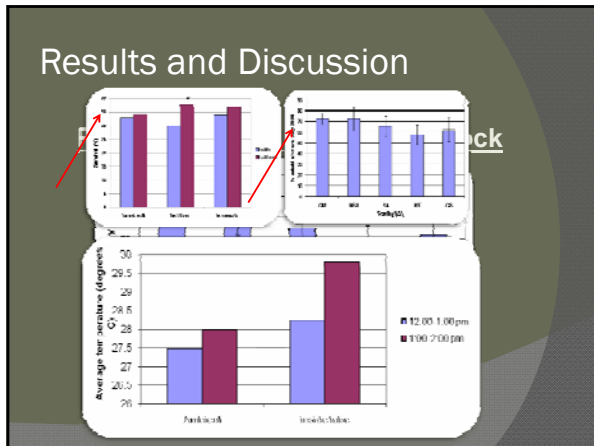
Methods

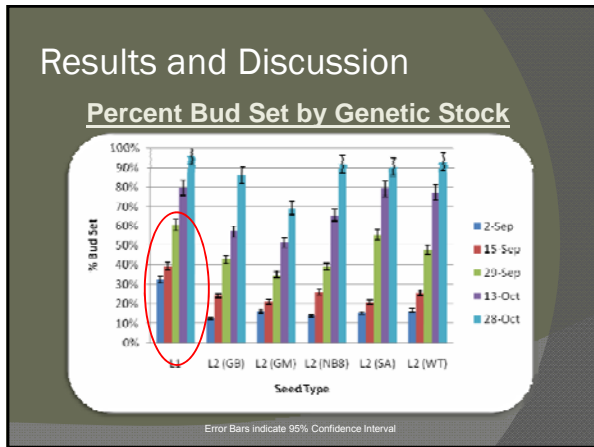
- Statistical Analysis
 - Randomized Block Design
 - Repeated Measures
- SPSS 16.0
- Microsoft Excel 2007
- $\alpha = 0.05$

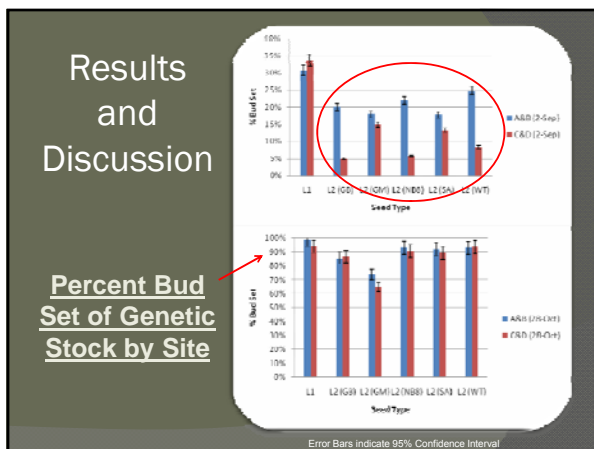
Results and Discussion

Percent Survival by Treatment









Implications

- Money saving
 - No treatment is the better treatment
- Site matters
 - South facing slopes generally have warmer soil temperatures which may delay budset
- Similar survival and budset between genetic families used.



Acknowledgements

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Questions?

