



# American Chestnut and Mineland Reclamation: Bringing Technologies Together

Brian C. McCarthy (PI)  
and  
Corie L. McCament (Project Manager)

Dept. of Env. & Plant Biology  
Ohio University  
Athens, OH

E: [mccarthy@ohio.edu](mailto:mccarthy@ohio.edu)







# Objectives

1. Assess the extent to which American chestnut can be used as a reforestation species on mineland sites and aid in restoration efforts of the American chestnut.
2. Evaluate technologies that will maximize success (survival and growth) of seedlings planted on reclaimed mineland sites.

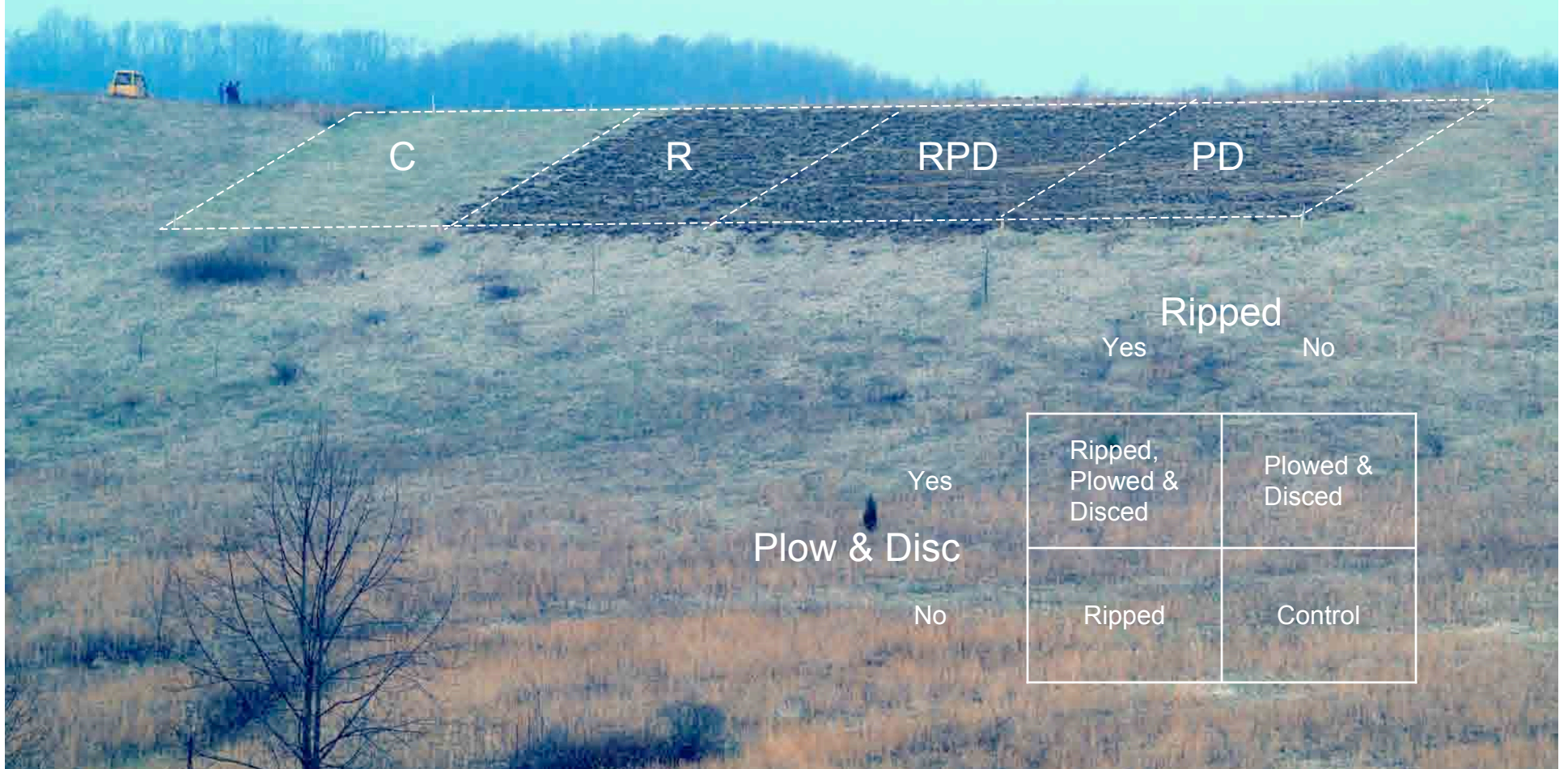




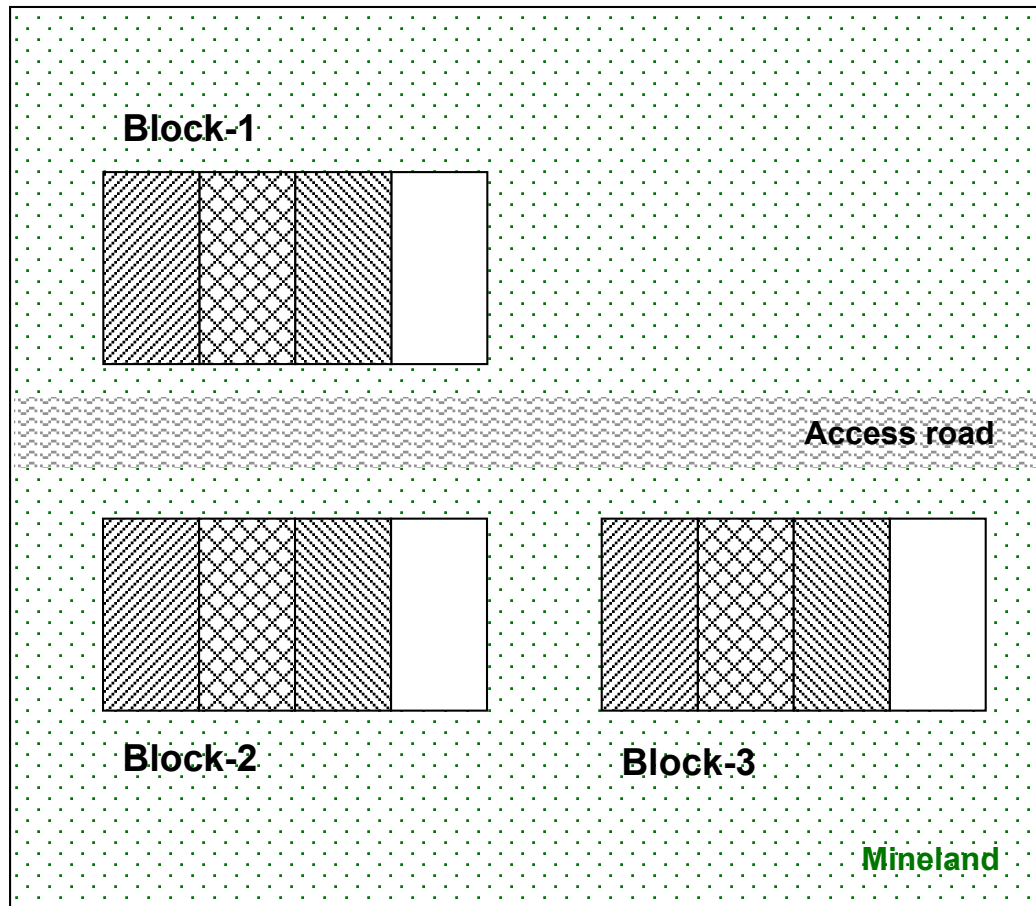






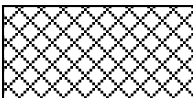

Tri-Valley Wildlife Area (16,200 acres)  
Muskingum County



# Field Design Schematic



## Key to treatments:

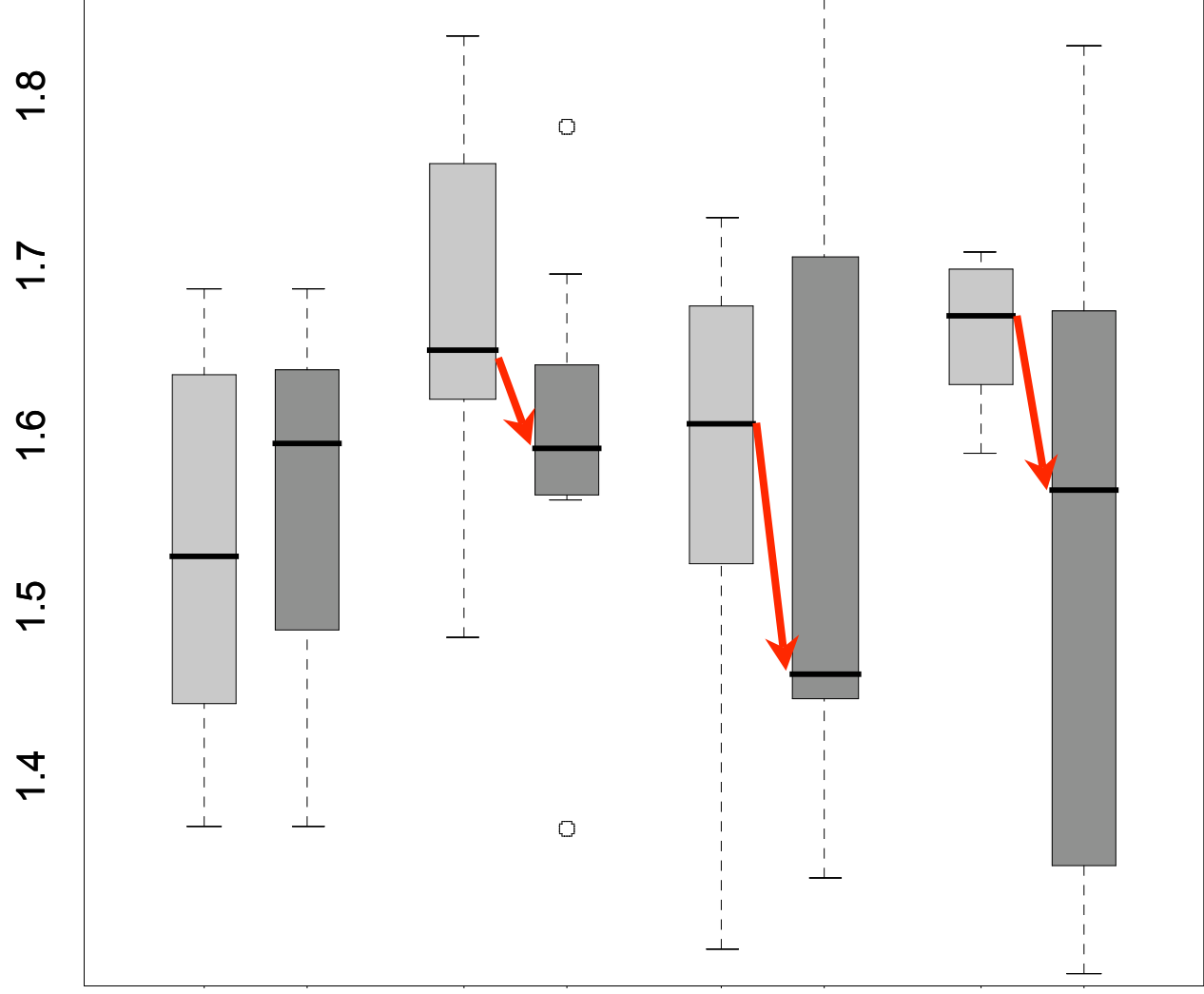
	CONTROL Fescue-dominated
	RIPPED Soil deep ripped to 38-in
	RIPPED, PLOWED & DISCED Soil deep ripped; surface plowed & disked
	PLOWED & DISCED Surface soil plowed & disked

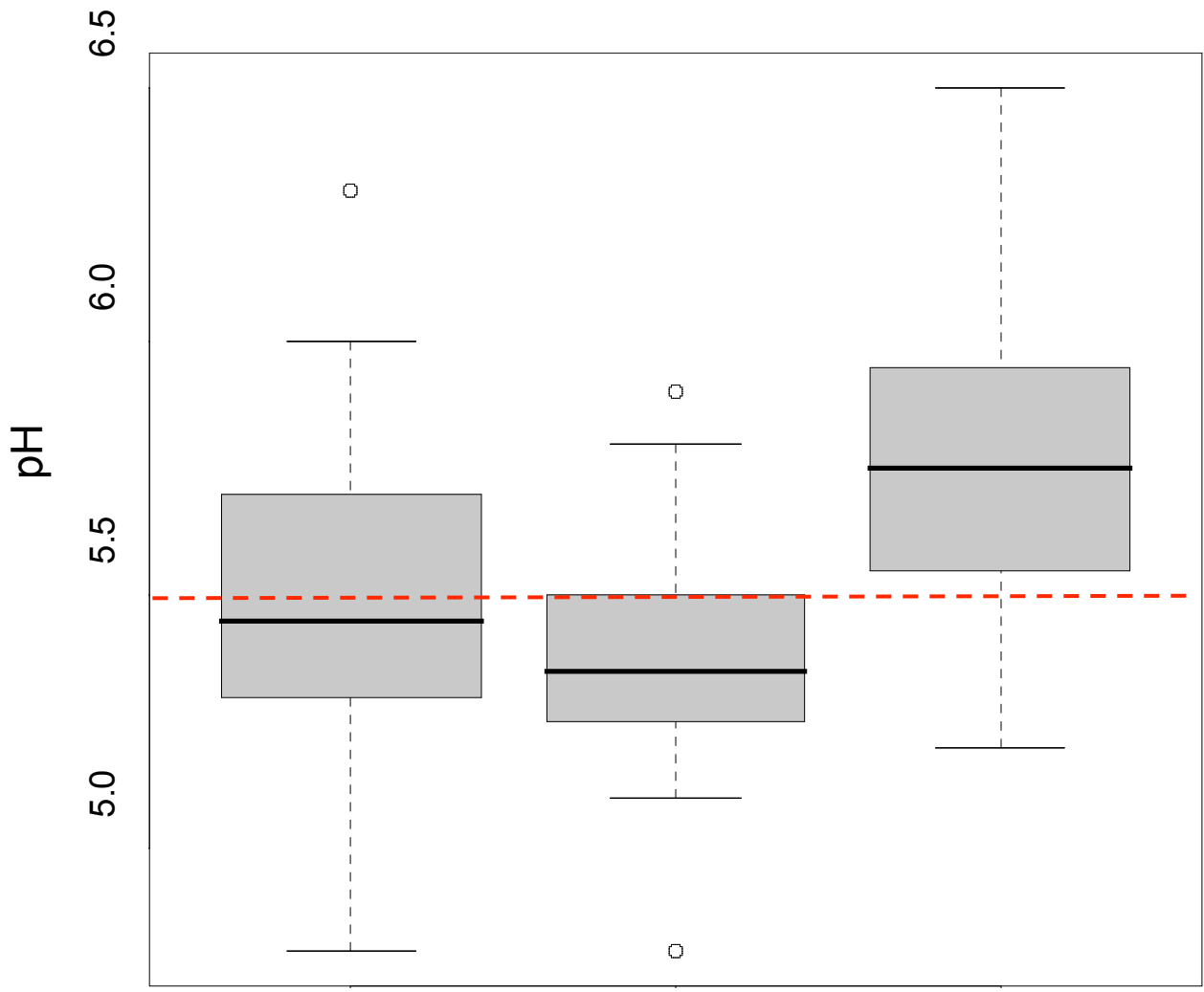
## Experimental Design:

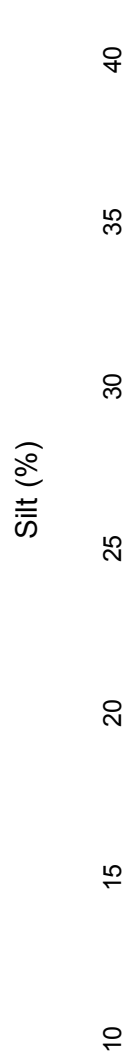
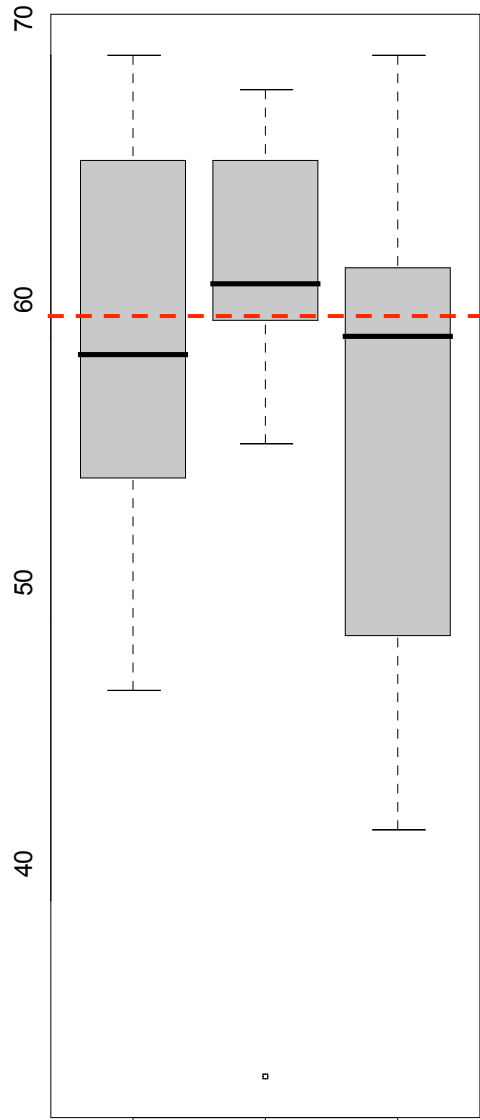
2 × 2 Crossed-Effects Block Design

3 Blocks (each 200 × 100 ft) w/ 4 trts  
Each Trt Plot = 50 × 100ft)

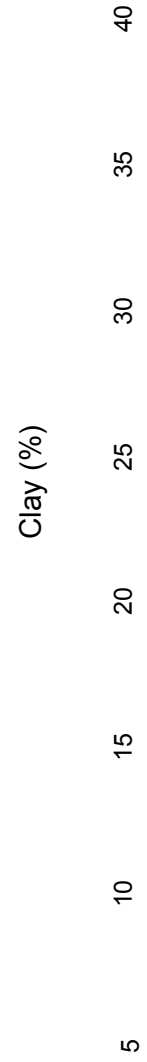
Sample Unit: Chestnut seedlings  
100 per plot (1200 total)



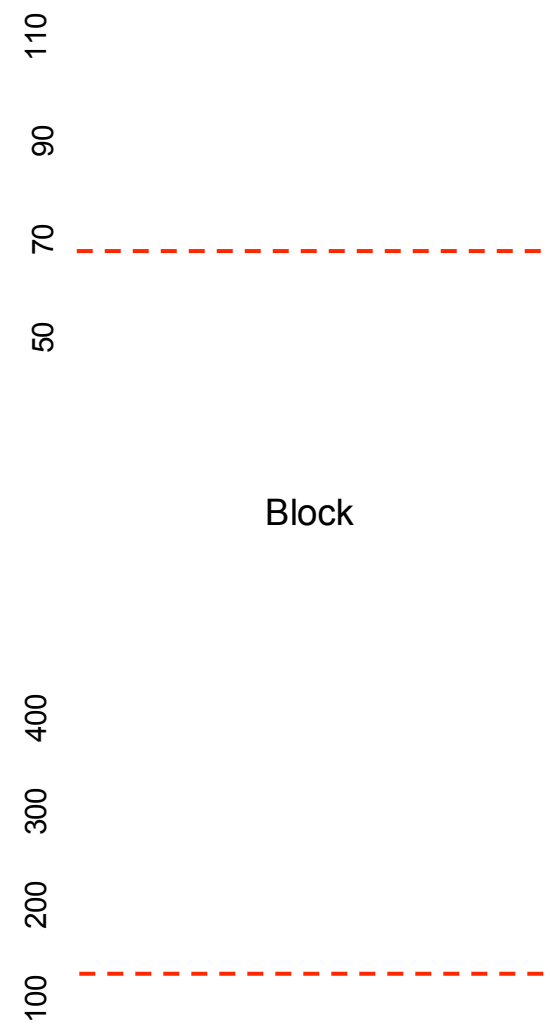
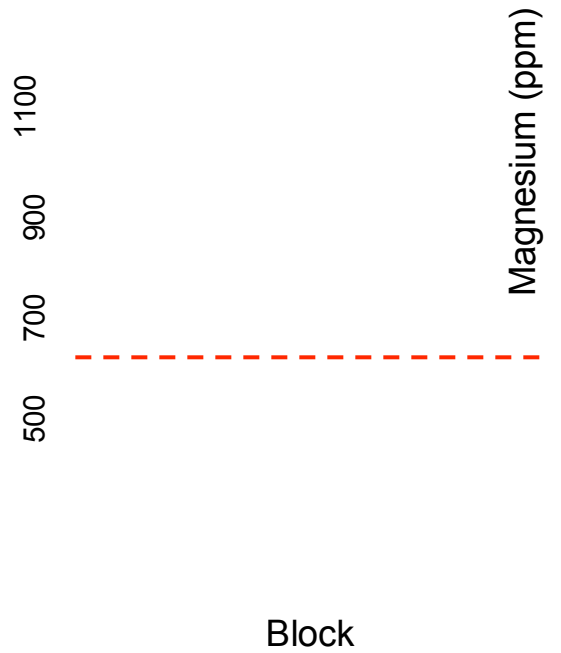
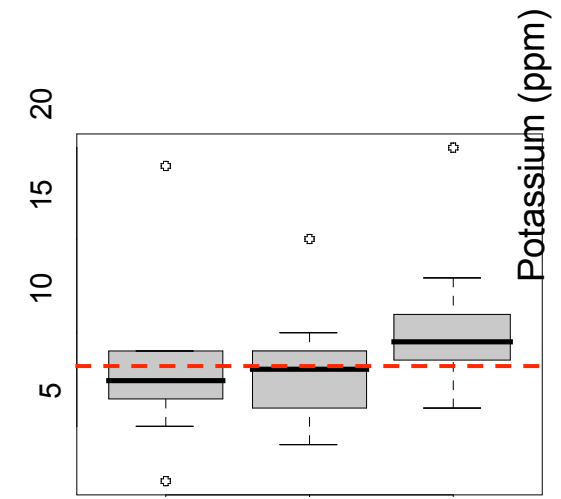




Block



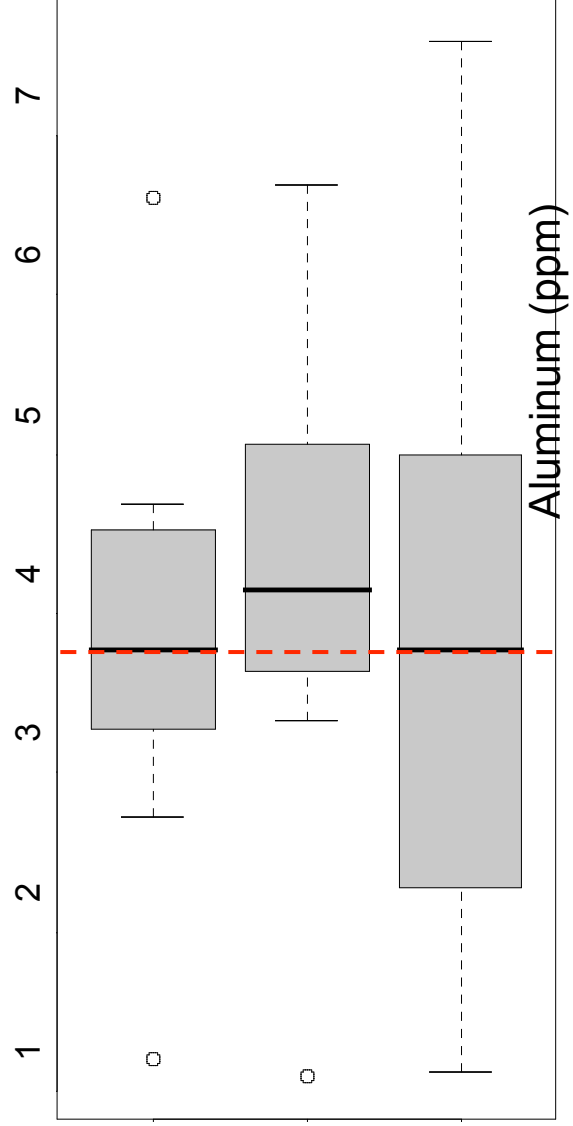
Block



Block

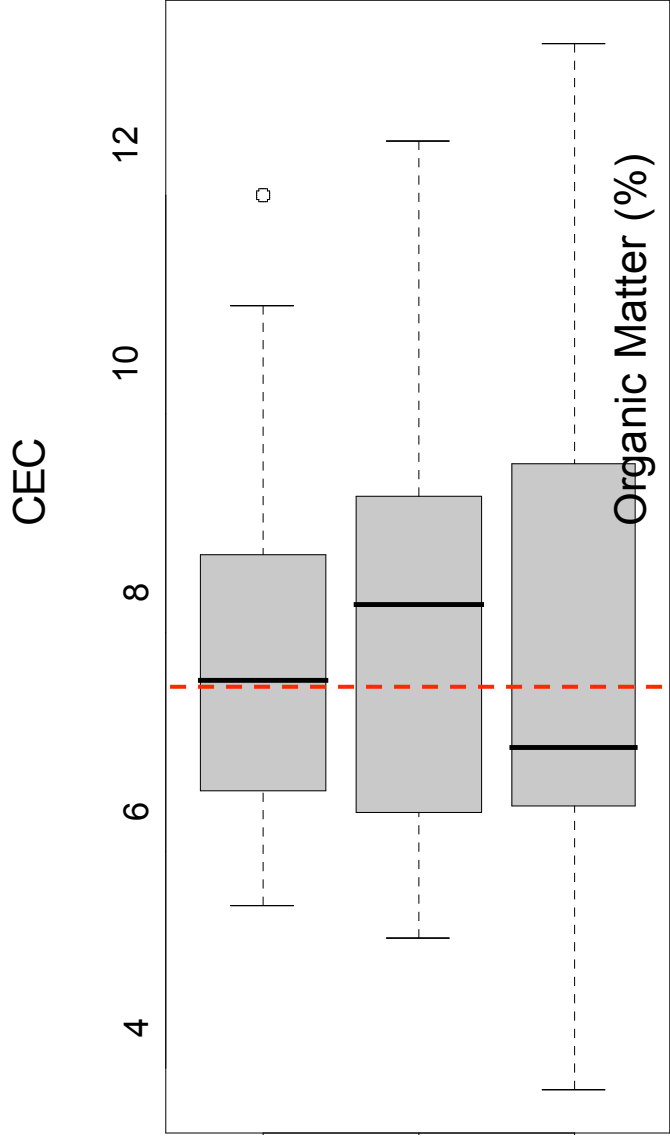
Block

Block



1 2 3 4 5 6 7

Block



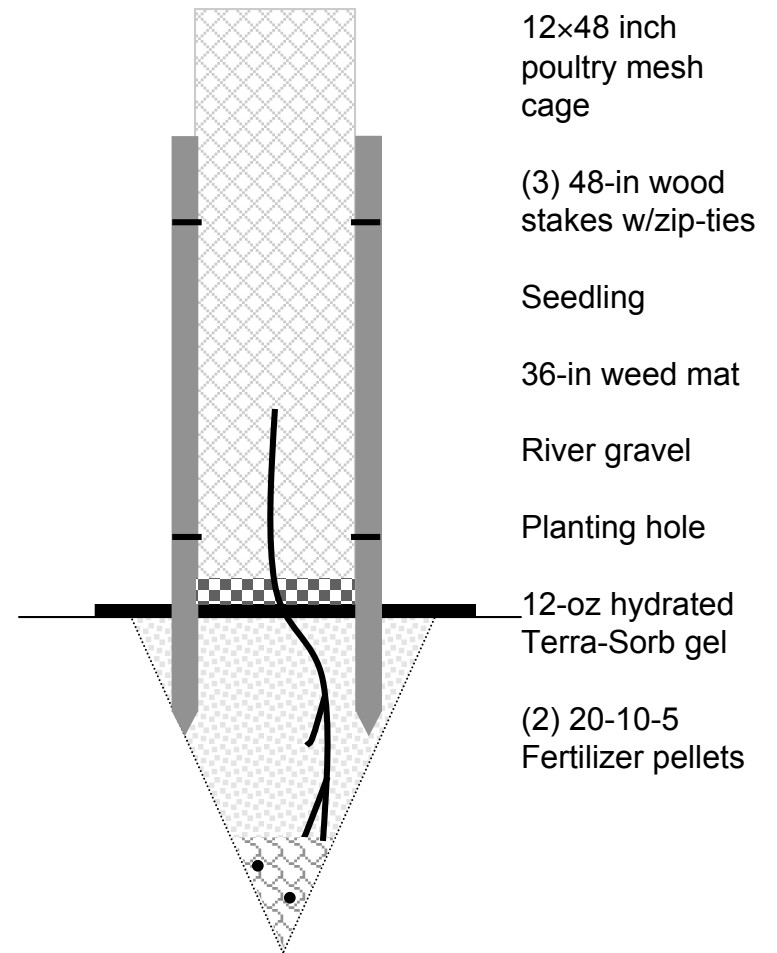
0.8 1.0 1.2 1.4 1.6 1.8

Block





## Planting Methodology





PD

July 2007



Control

July 2007

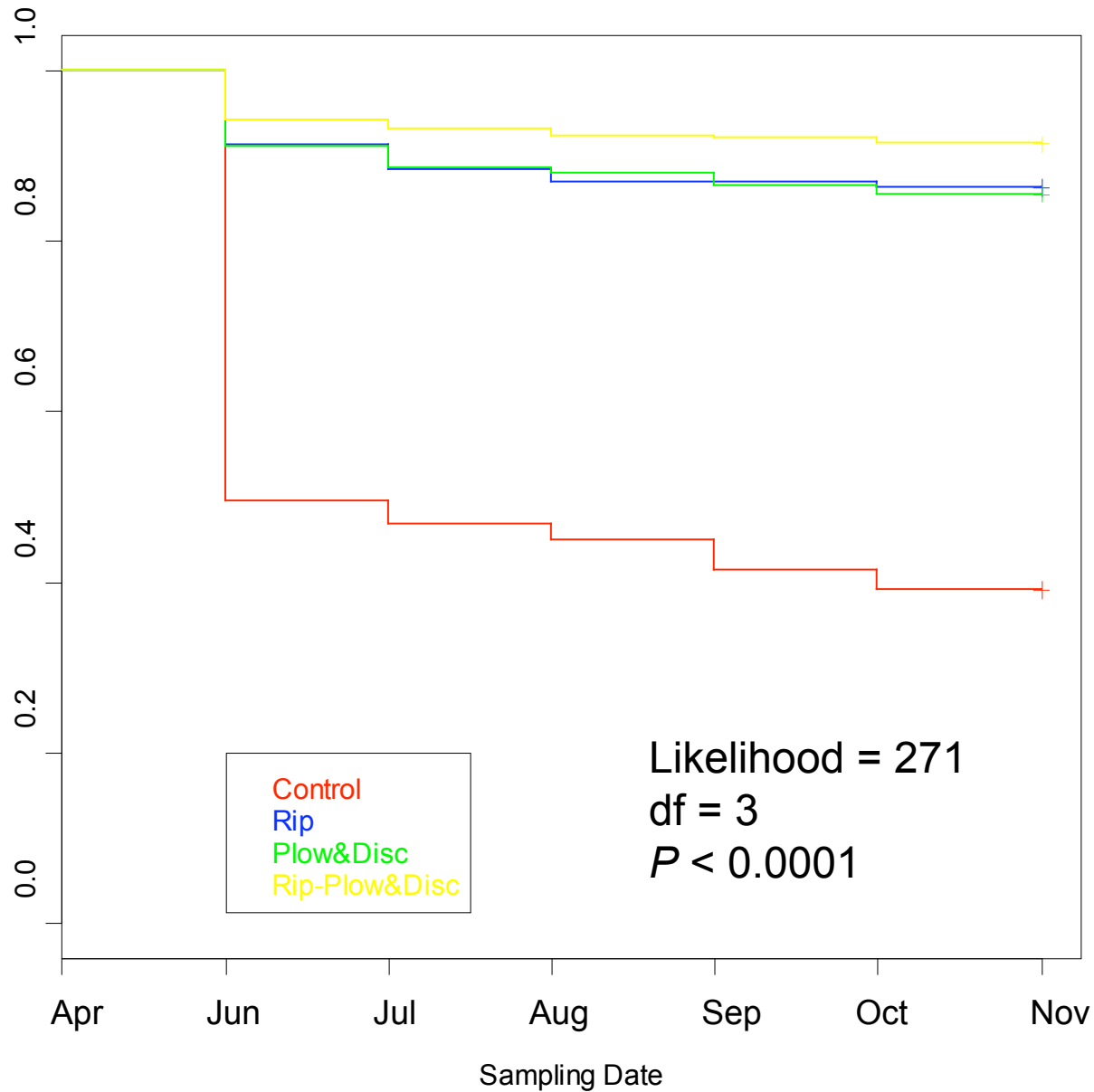


15/16ths

July 2007

# Survival Analysis by Treatment

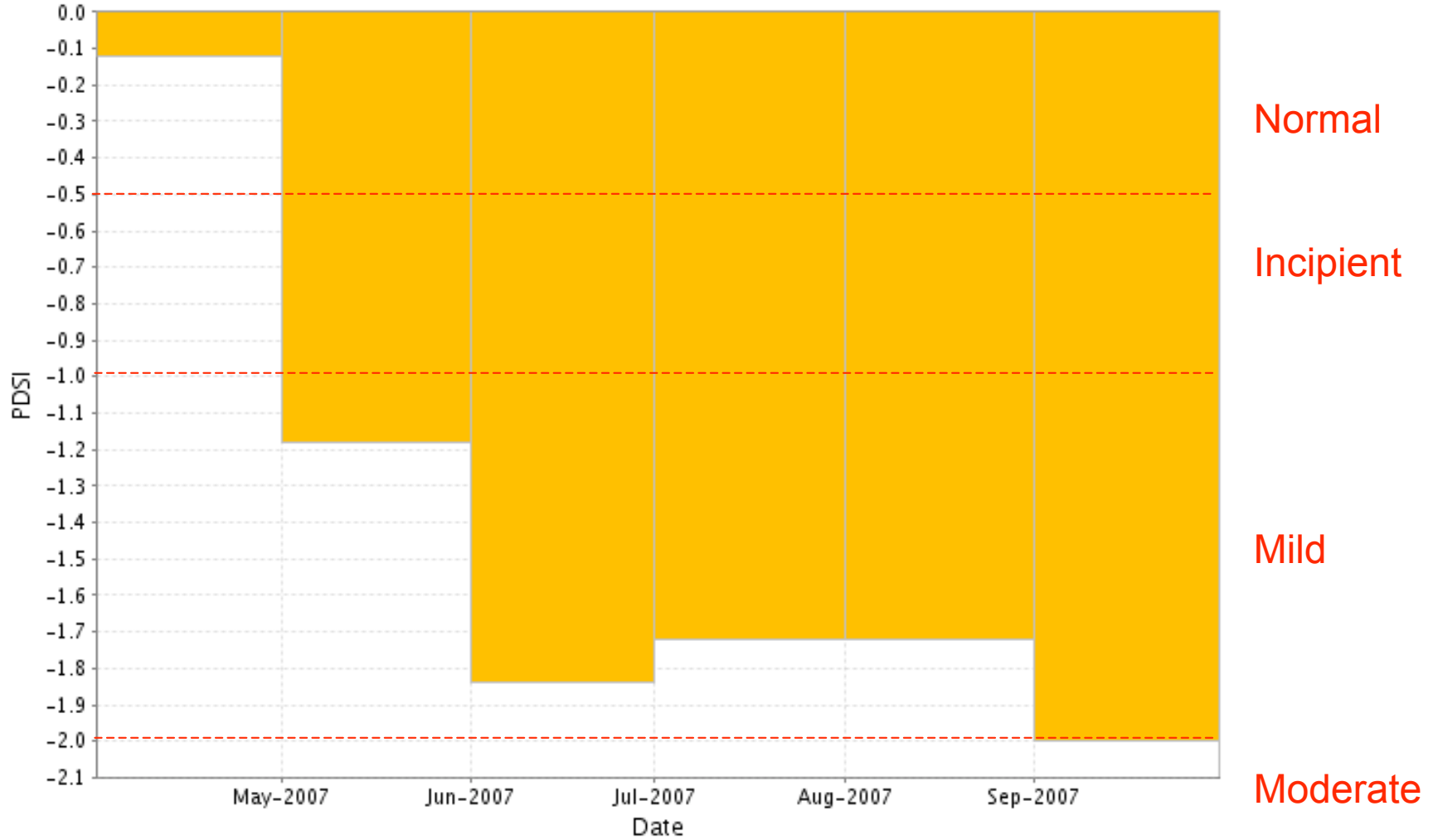
- Cox Proportional Hazards Model -



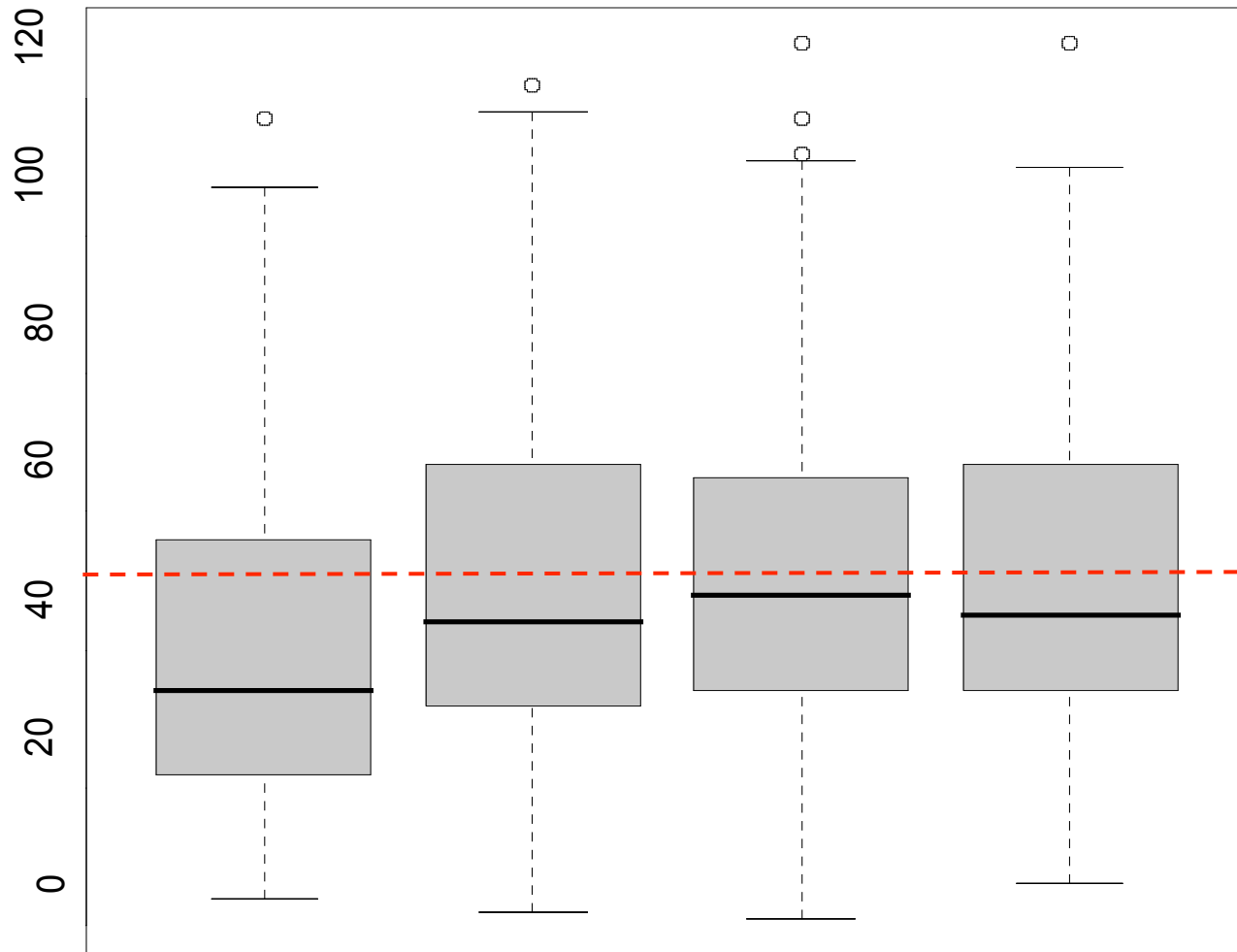


# Palmer Drought Severity Index

**OH Central - PDSI**  
**200704 - 200710**



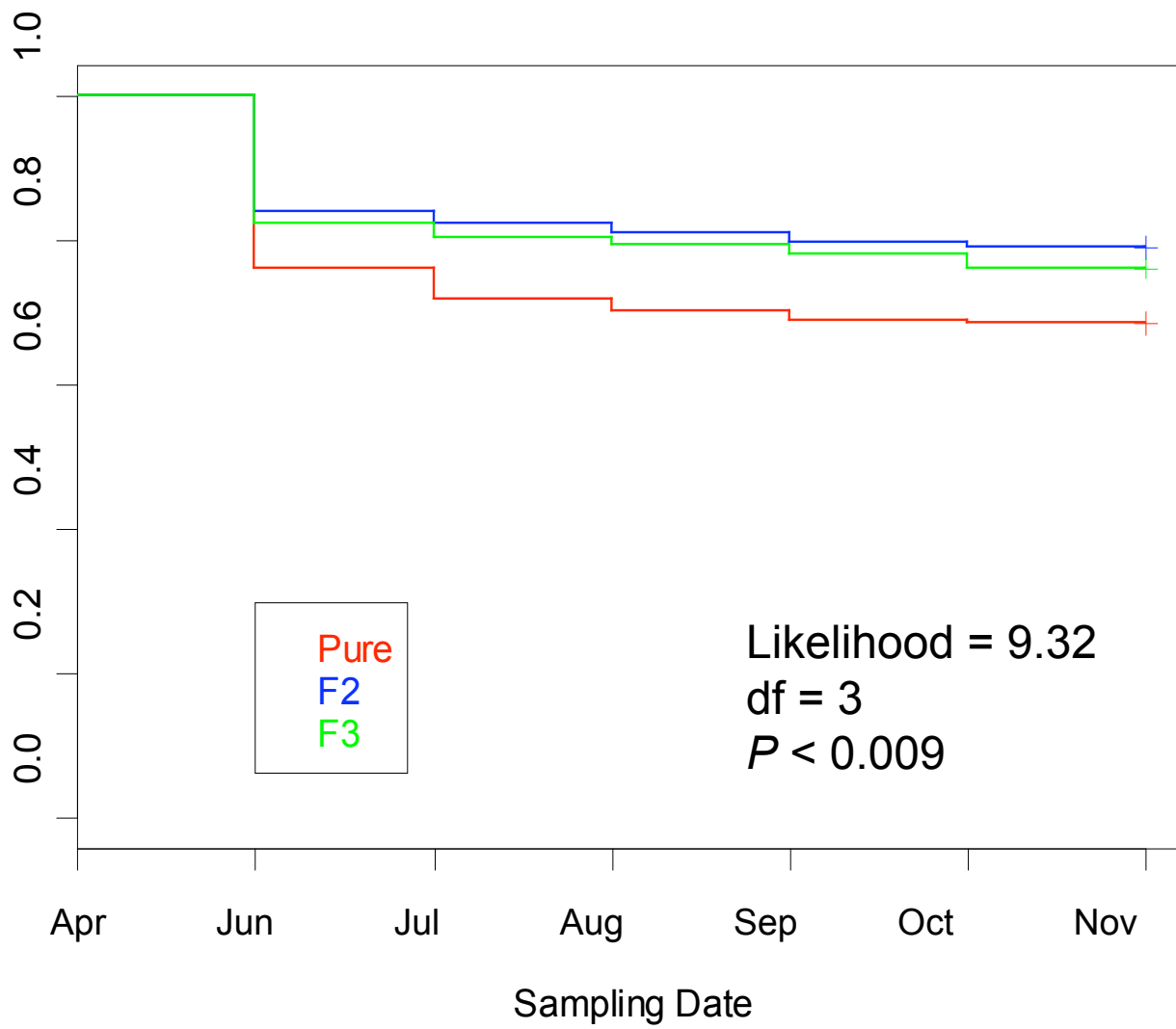
# Seedling Growth by Treatment



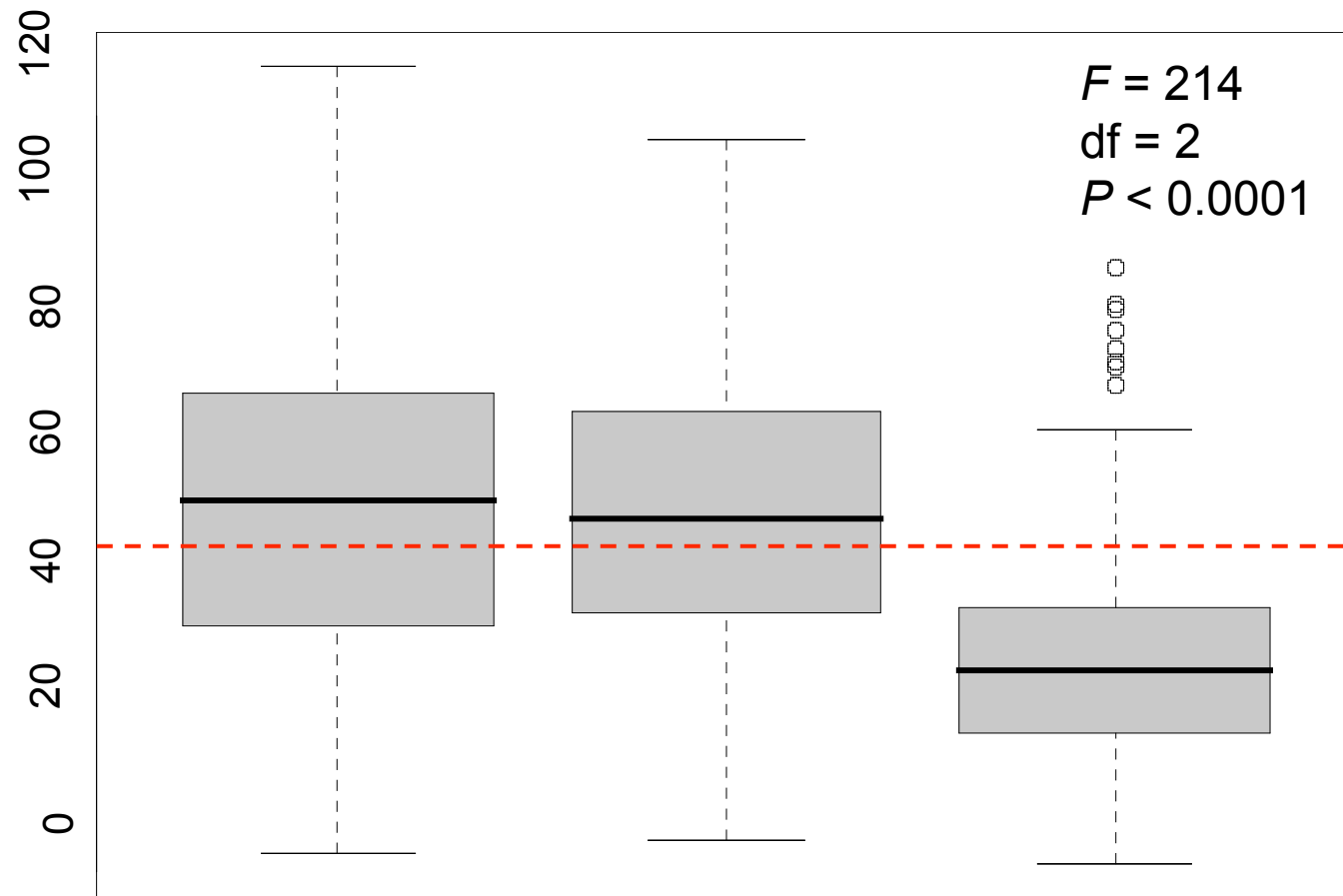
$F = 12.7$   
 $df = 3$   
 $P < 0.001$

# Survival Analysis by Genetic Origin

- Cox Proportional Hazards Model -



# Seedling Growth by Type



# Summary

1. While **blocking** was found not to be important in this particular experiment (likely due to very close proximity), it is an important practice for mineland restoration studies and should always be implemented as part of good experimental design and planting practices.
2. Any form of **soil treatment** that reduces SBD aids in increased survival of first year tree seedlings. Effects of deep ripping will not likely be seen for several years.
3. **American chestnut** seedlings perform (survival & height) well on mineland sites, especially when competing grass & herb species have been controlled via soil treatment.
4. Our data suggest that there is likely a **hybrid vigor** effect with F2 and F3 progeny exhibiting higher growth and survival.
5. **Planting method** will likely have a significant effect on growth and survival, especially during environmentally challenging growth periods. Our planting method is resistant to mild to moderate drought and is justified for expensive hybrid seedlings.

# Acknowledgements

## Collaborators:

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Jenise Bauman

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Mike Hiscar (USDI-OSM)

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Meredith Maxey  
Keith Gilland

16 Ohio ACF Chapter Volunteers

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