

Factors Affecting Performance of Artificially Regenerated American Chestnut on Reclaimed Mine Sites

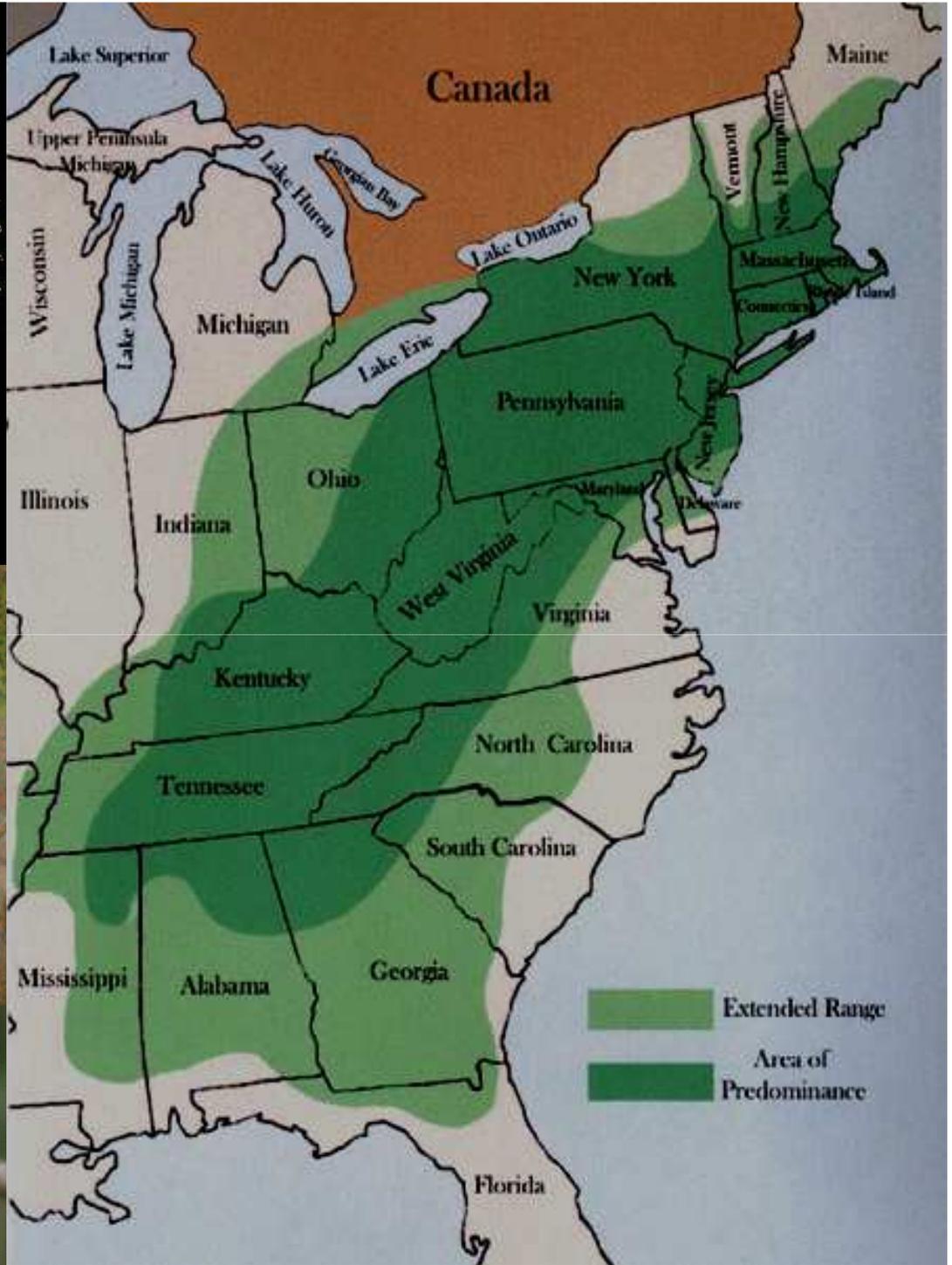
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Accelerating Succession

QUESTION-1:

What can be done to accelerate succession on sites that have been abandoned or reclaimed and fail to regenerate forest cover after 25-30 years?

QUESTION-2:

(a)What can be done to encourage native hardwood species especially American chestnut, to regenerate on these sites?

(b)Might these sites make good reintroduction points for hybrid American chestnuts as this species is restored in upcoming years?

Tri-Valley WMA

- Tri-Valley Wildlife Management Area, Muskingum County, east-central Ohio.
- 16,000 acres; one of the oldest SMCRA reclaimed sites in Ohio (ca. 1979).
- Site prepared spring 2007 using FRA methods.

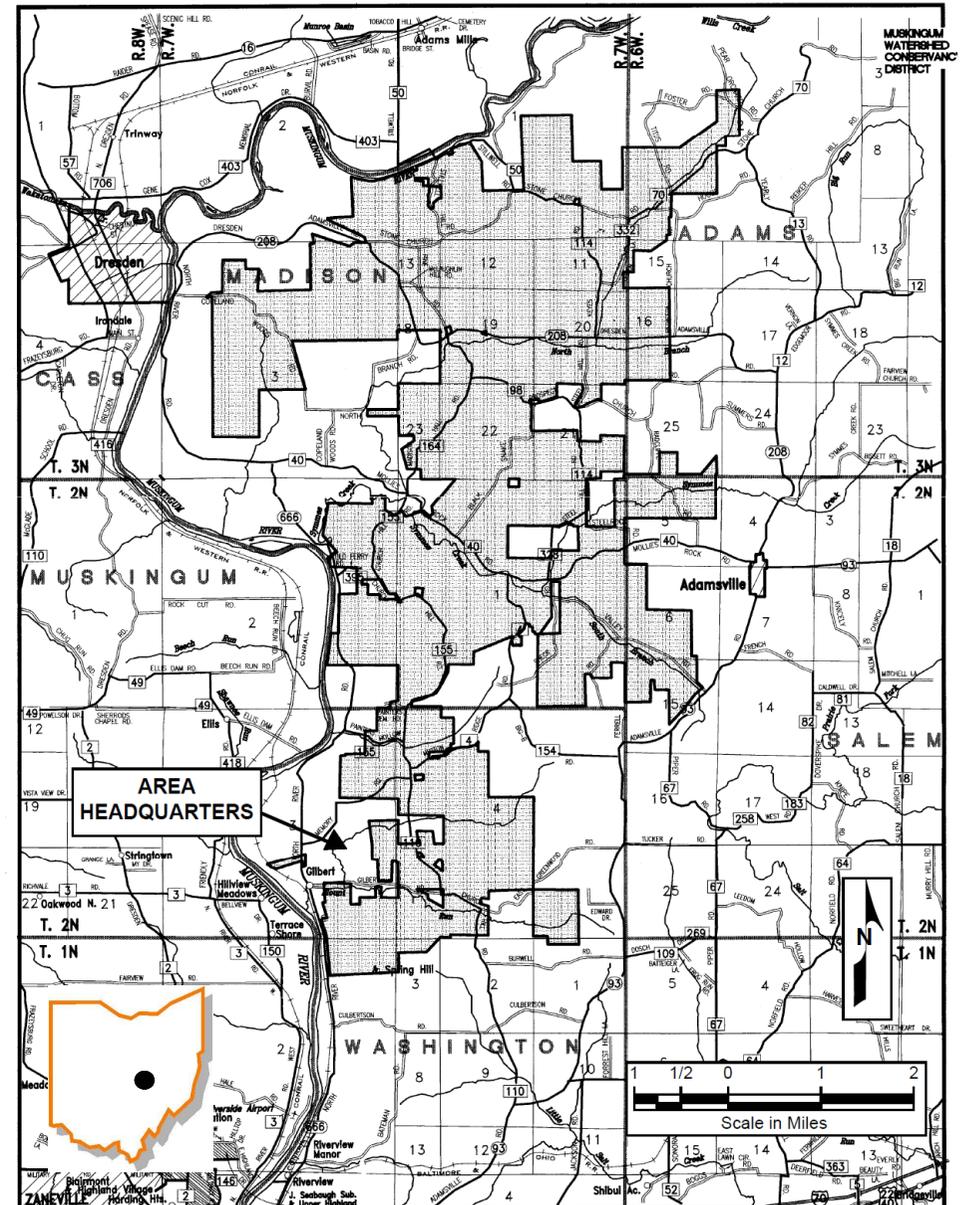


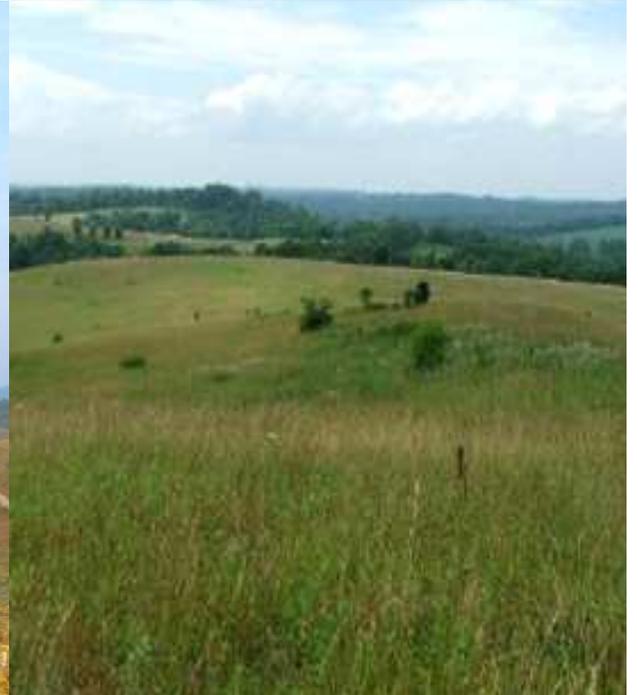
DIVISION OF WILDLIFE
Ohio Department of Natural Resources

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(997)

TRI-VALLEY WILDLIFE AREA Muskingum County

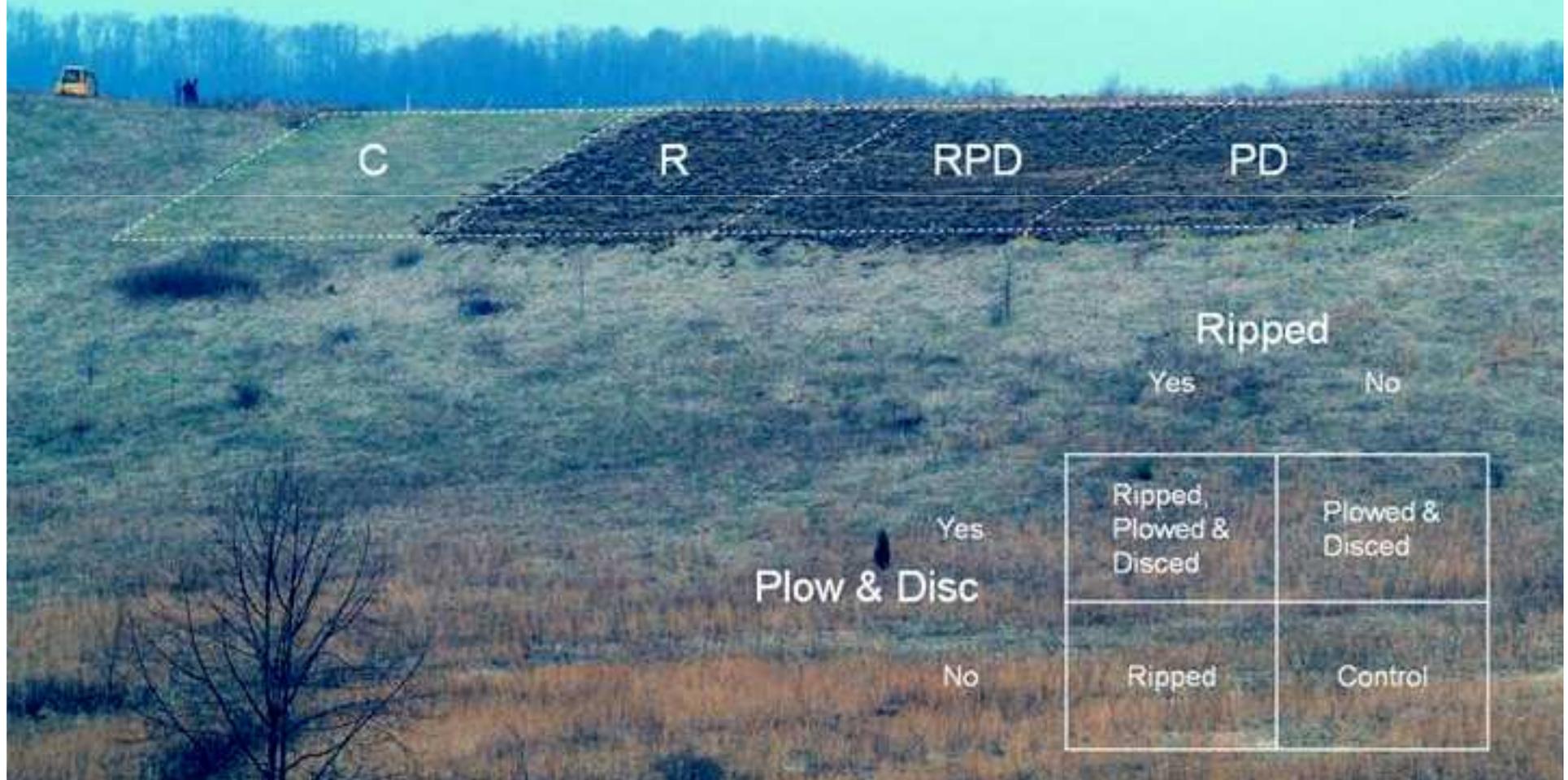
PUBLIC HUNTING AND FISHING
16,200 ACRES

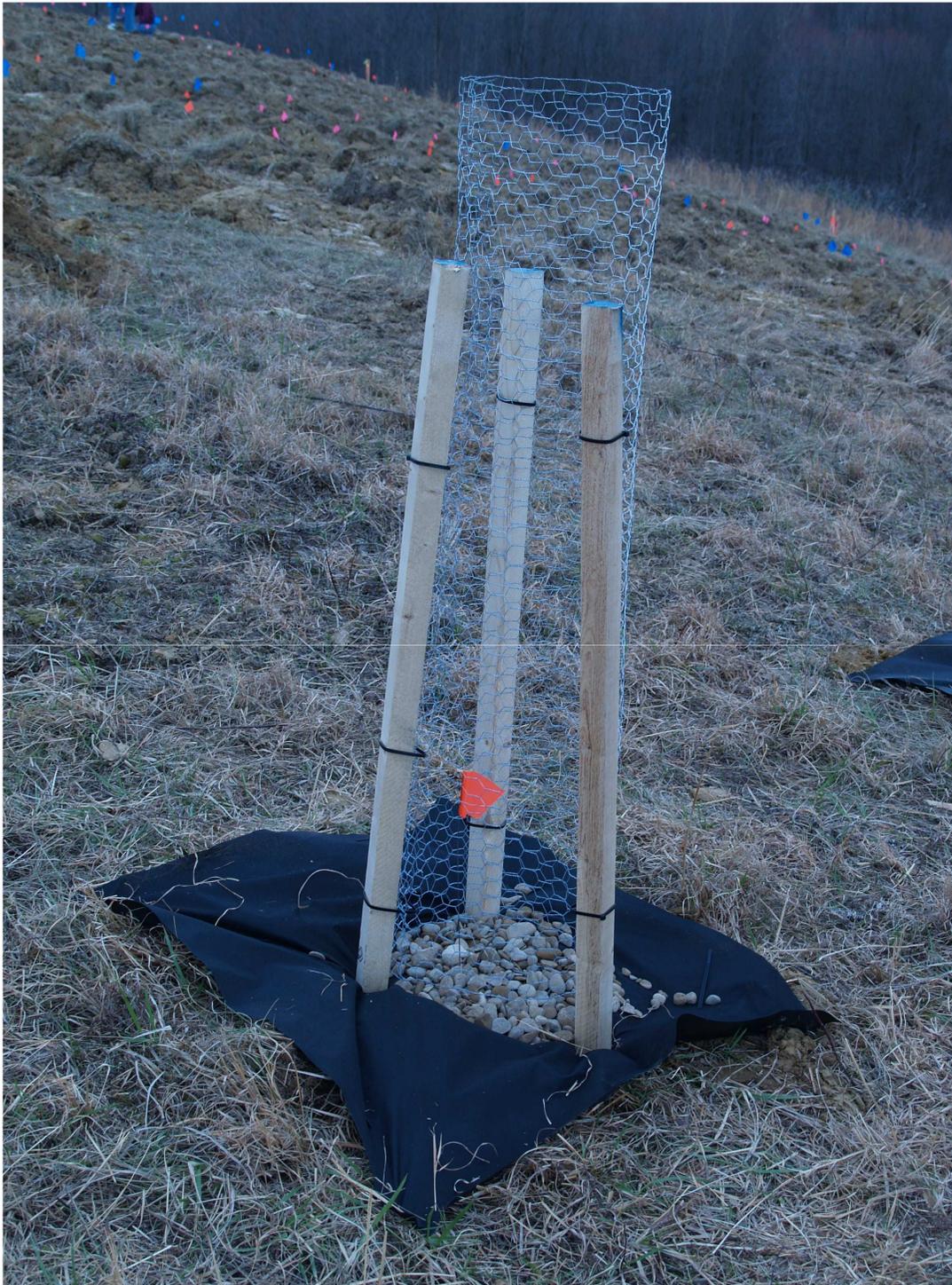






3 replicate blocks
3 treatment + control plot per block

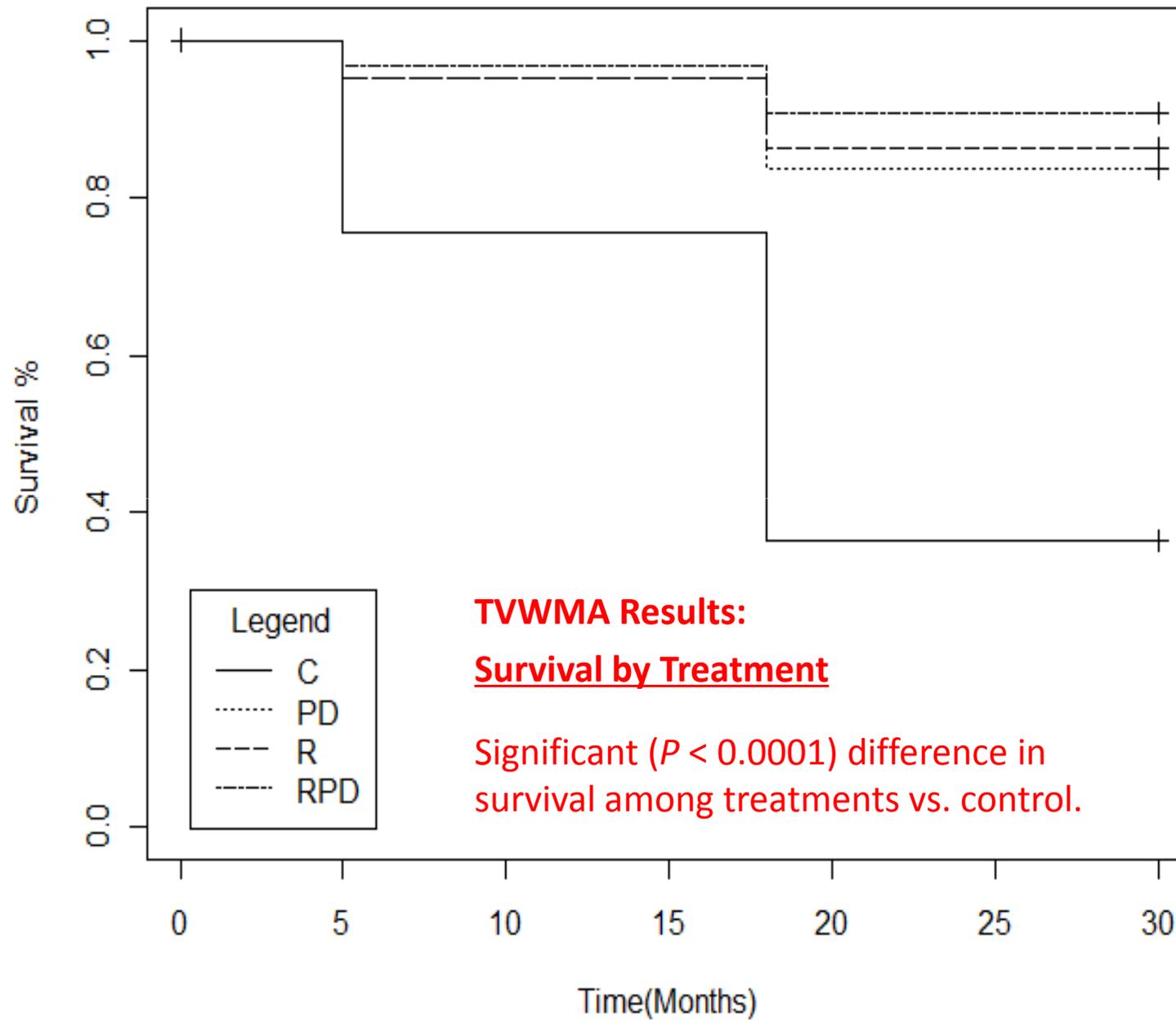




CHESTNUT:

- Pure American (“Pure”)
 - 7/8ths hybrid (“B1”)
 - 15/16ths hybrid (“B2”)
-
- 500 of each
 - Monitored for height growth and survival for three years.

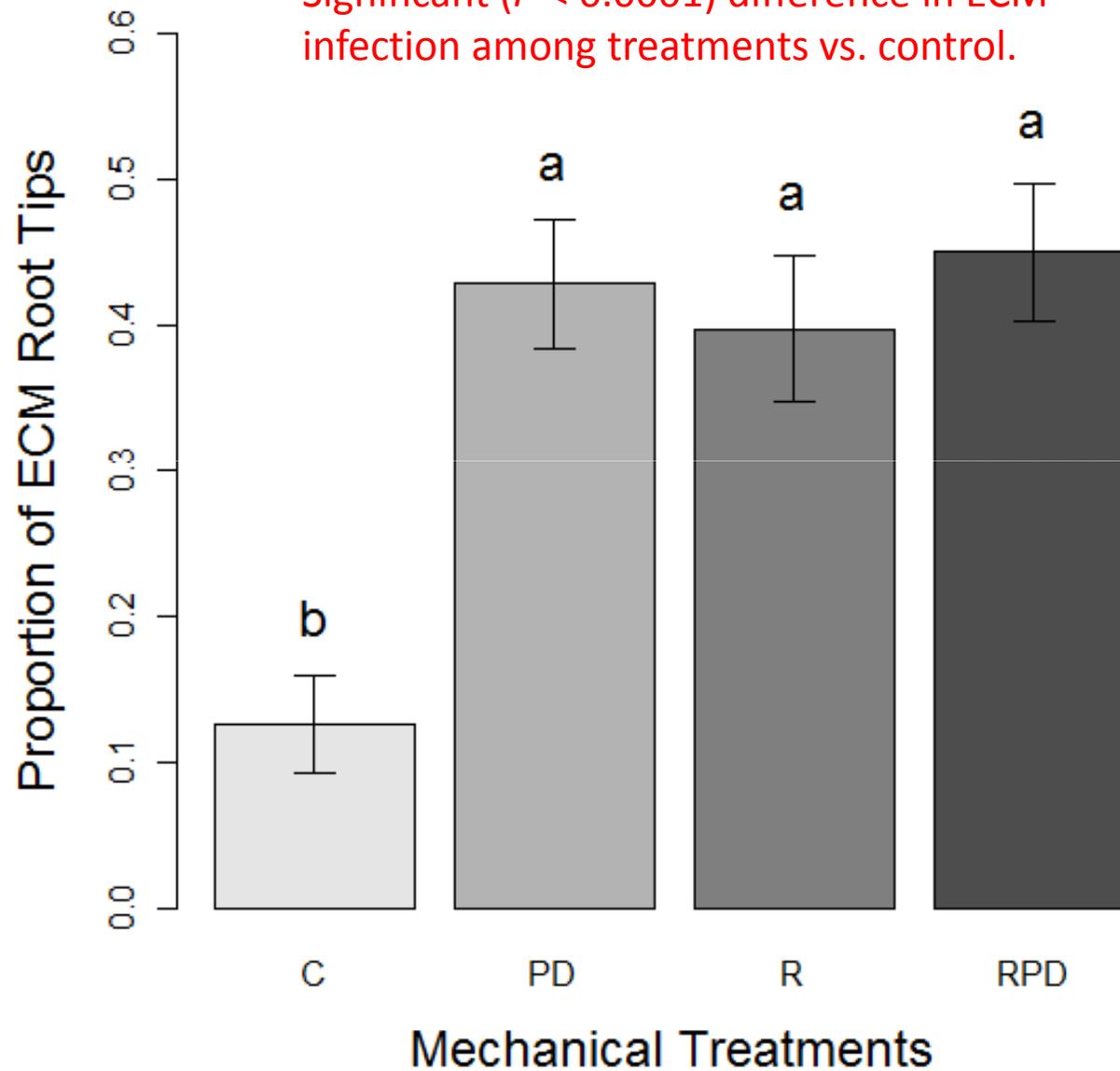




TVWMA Results:

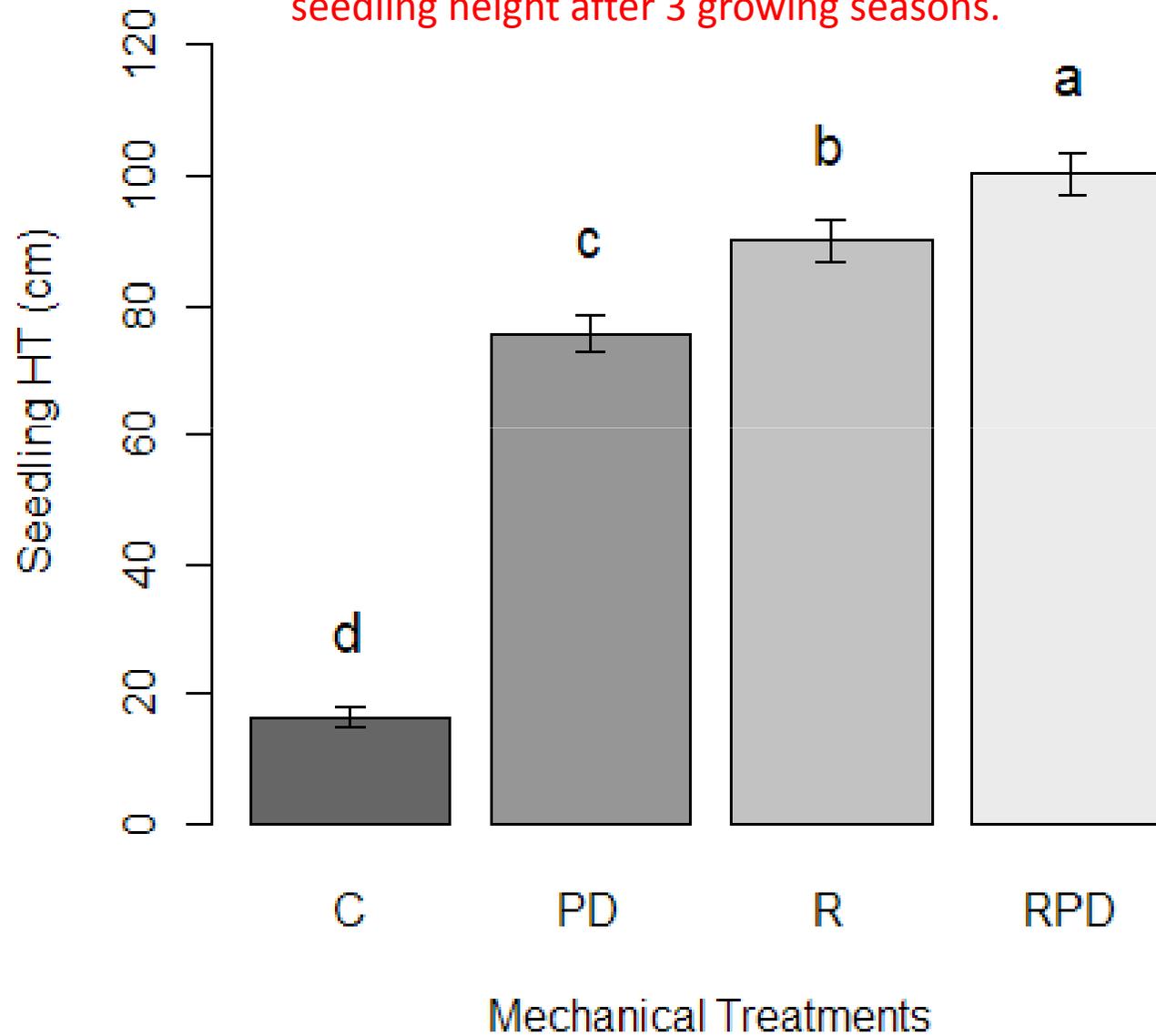
ECM Root Tips

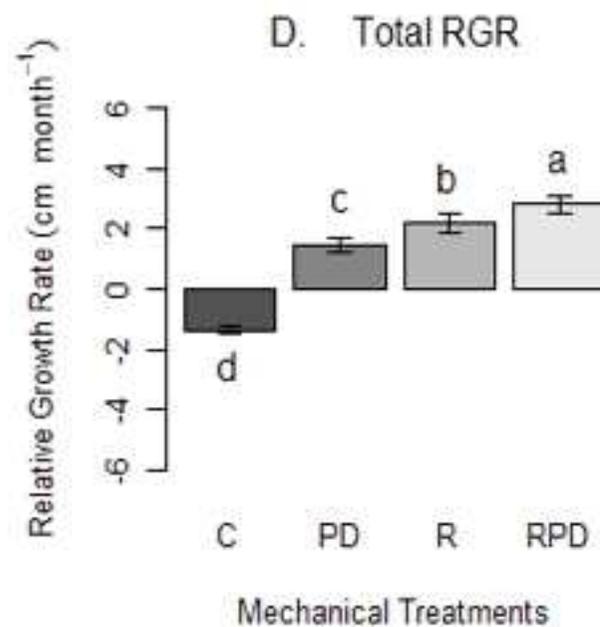
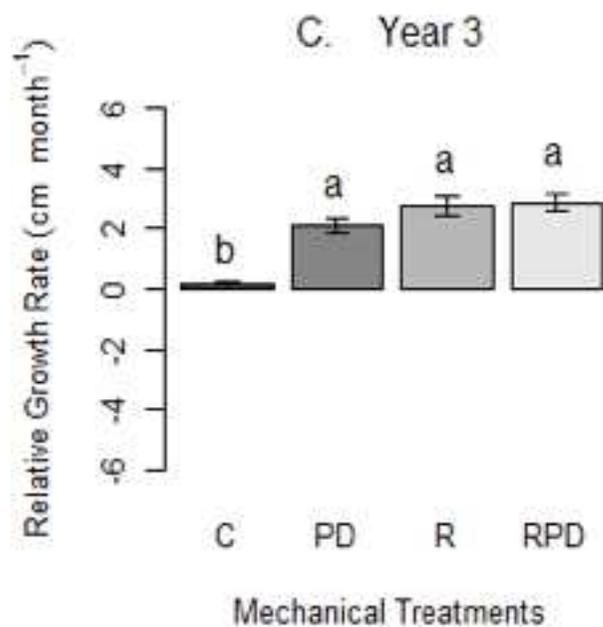
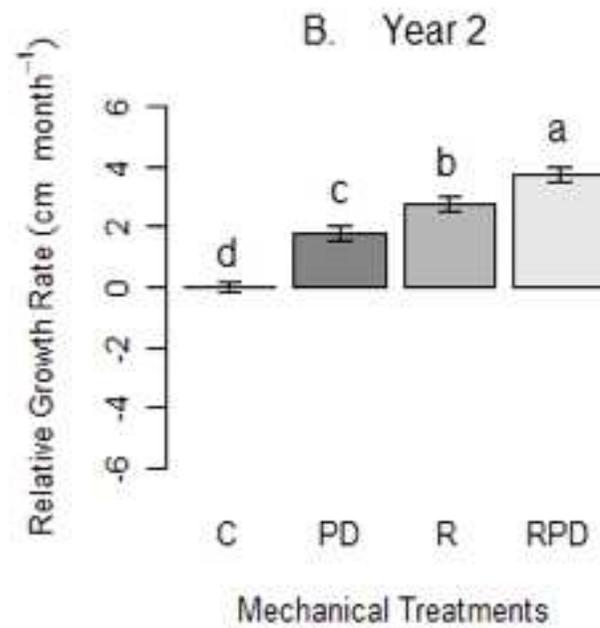
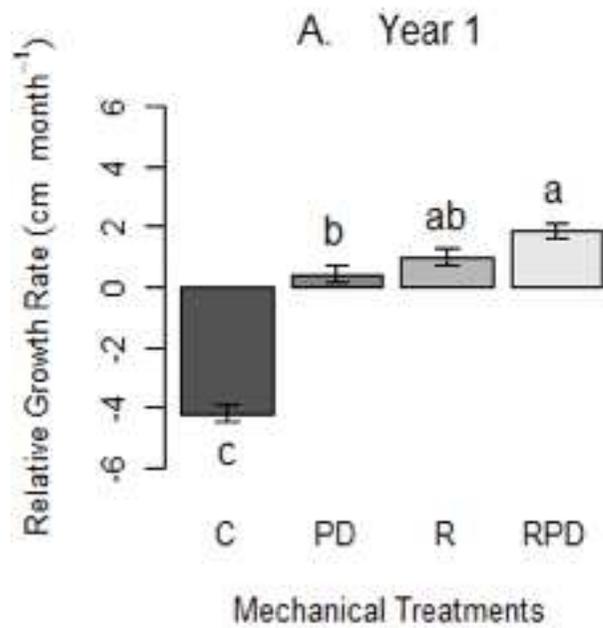
Significant ($P < 0.0001$) difference in ECM infection among treatments vs. control.



TVWMA Results: Seedling Height

Significant ($P < 0.0001$) difference in final seedling height after 3 growing seasons.

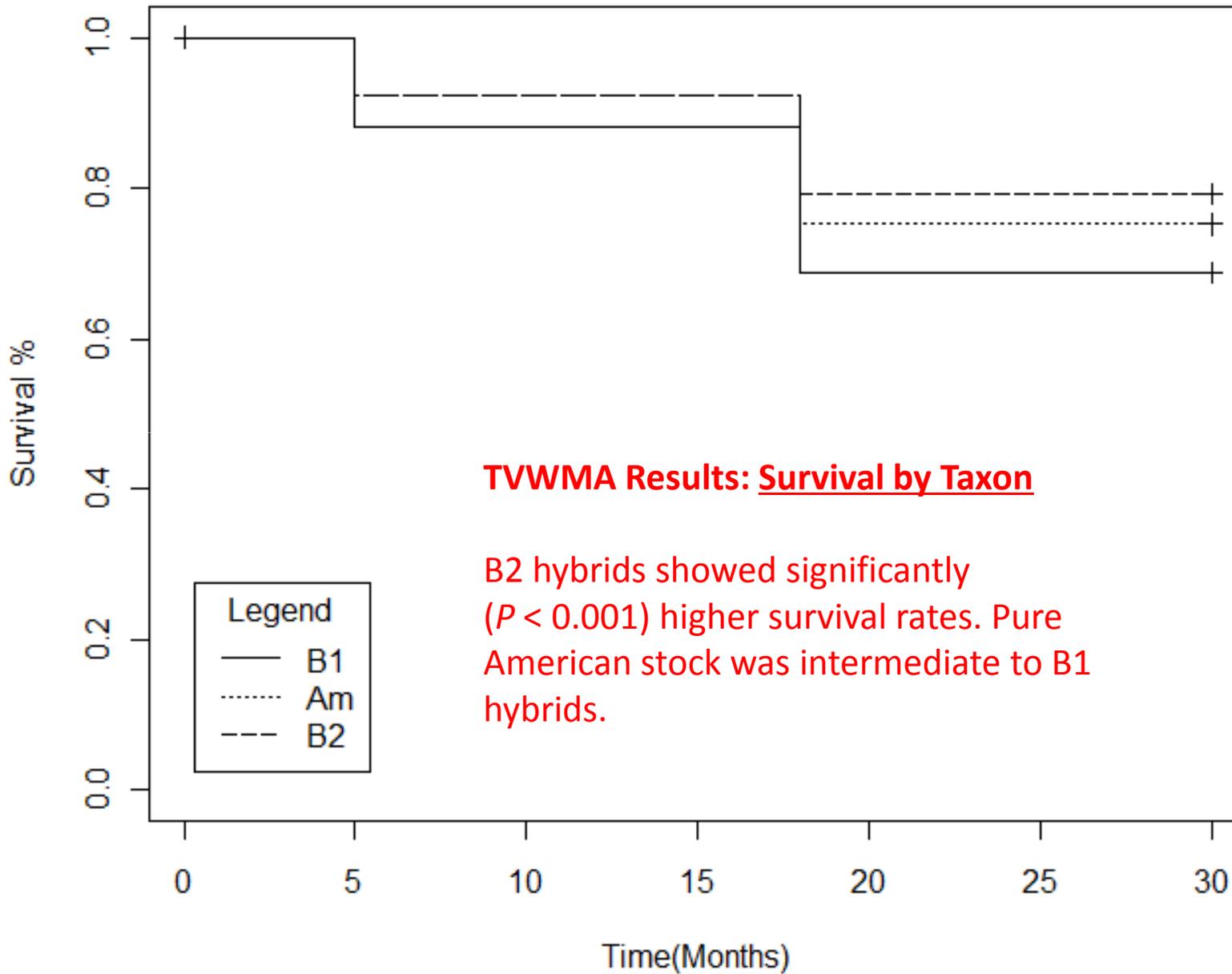




TVWMA Results:

Relative Growth Rate

Mechanical treatments showed a significant ($P < 0.05$) positive effect on RGR compared to control.



Summary: TVWMA

- 1) FRA methods for accelerating succession on previously reclaimed lands work well to encourage hardwood seedling growth and survival.
- 2) Any form of surface manipulation encourages seedling growth and survival. Effect of ripping may be delayed for several more years.
- 3) Chestnut and its hybrids perform well on these sites and may be used for reforestation as well as reintroduction sites for chestnut restoration.





Accelerating Forest Succession

- via FRA Loose End Dumping -

QUESTION-1:

How well does American chestnut (and its hybrids) perform on fresh end dump sites in Ohio?

QUESTION-2:

Compare & contrast the efficacy of direct seeding vs. bare root planting.

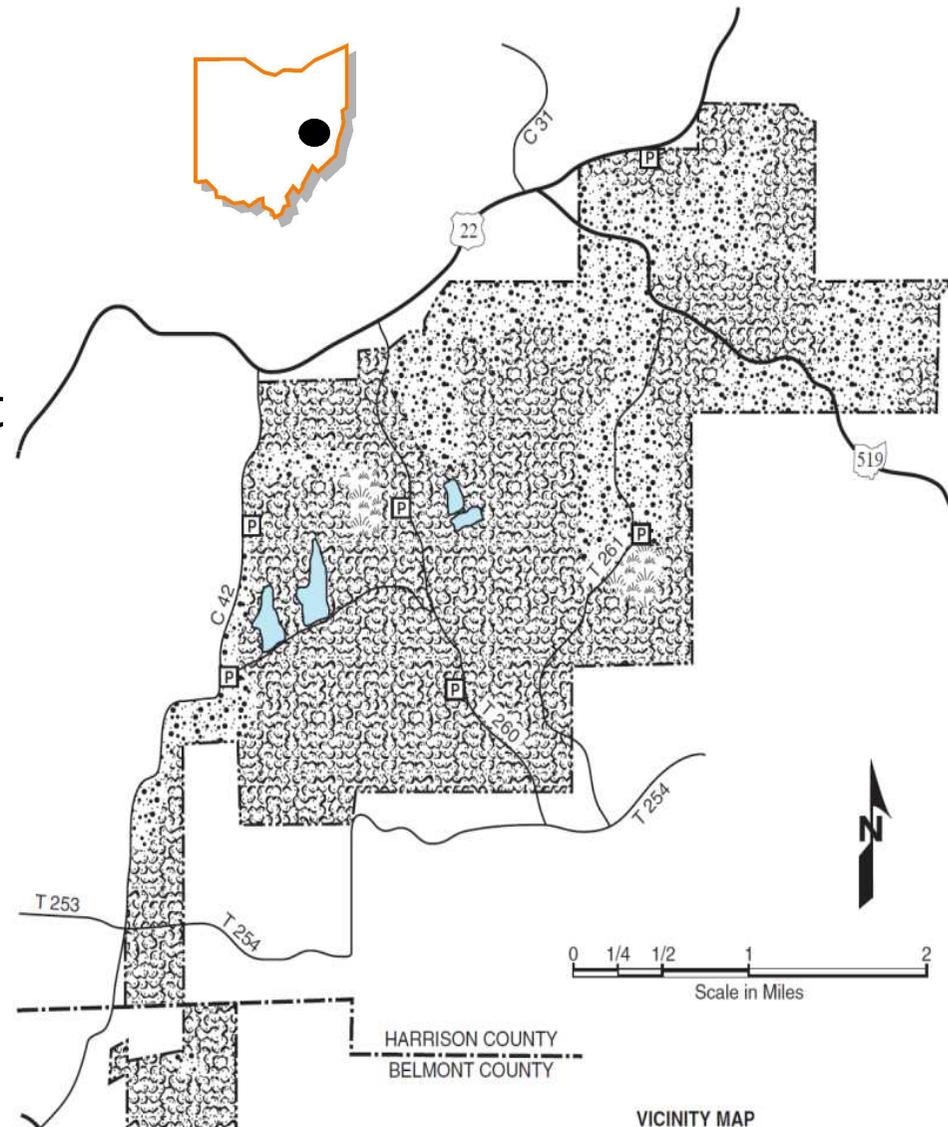


JOCKEY HOLLOW WILDLIFE AREA

Belmont and Harrison Counties

Jockey Hollow WMA

- Jockey Hollow Wildlife Management Area, Belmont & Harrison Cos. Ohio.
- Ca. 3500 acres, one of newest reclamations in Ohio.
- Reclaimed using FRA end-dump method in 2007-2008.



Plantra™ tree tubes:
<http://www.plantra.com/>



Photo: Mike Hiscar



Planting Materials

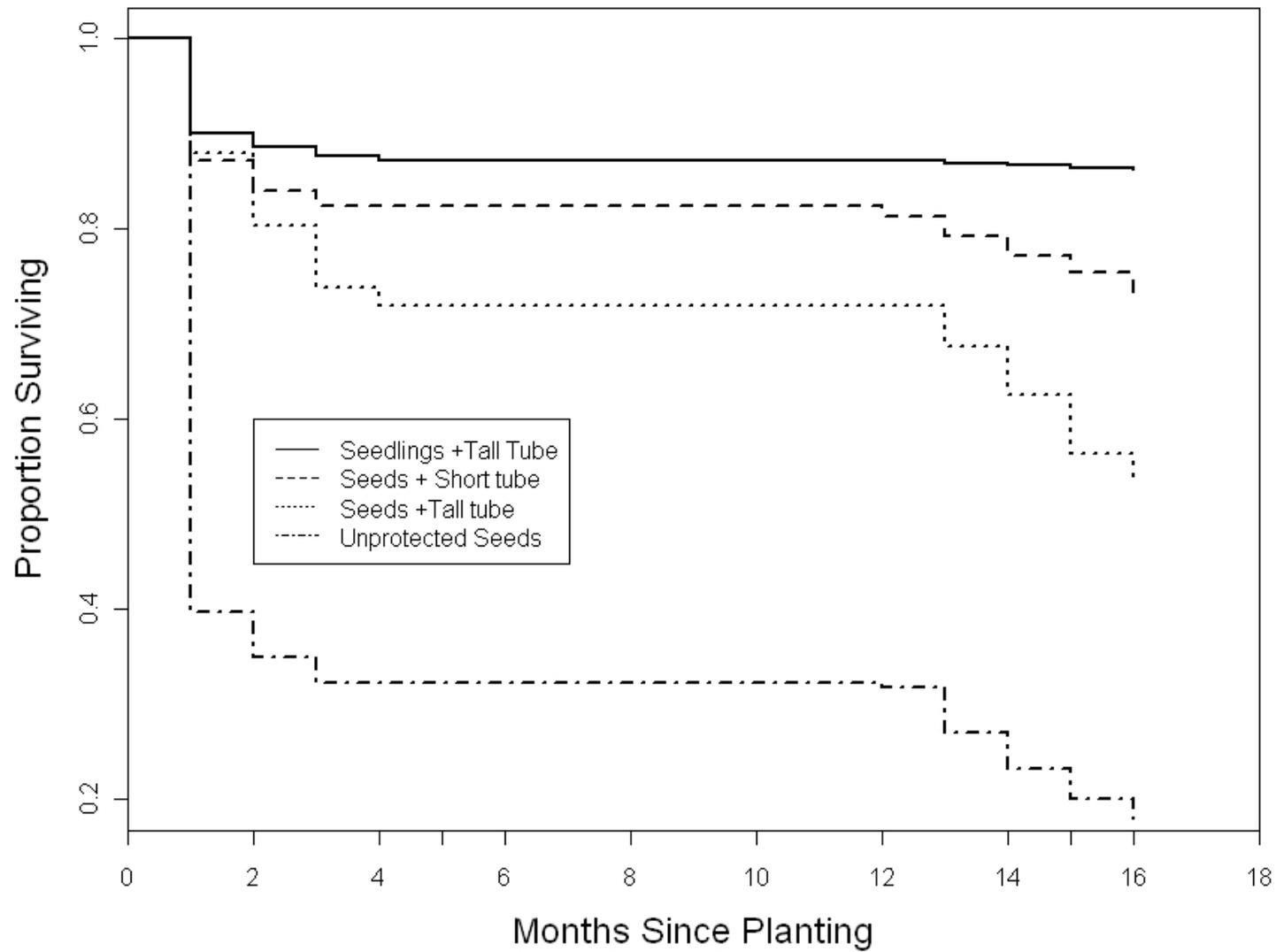
Chestnut Seedlings:

950 bare root 1-0 stock
4-ft tree tube (all)
(w/stake + net)

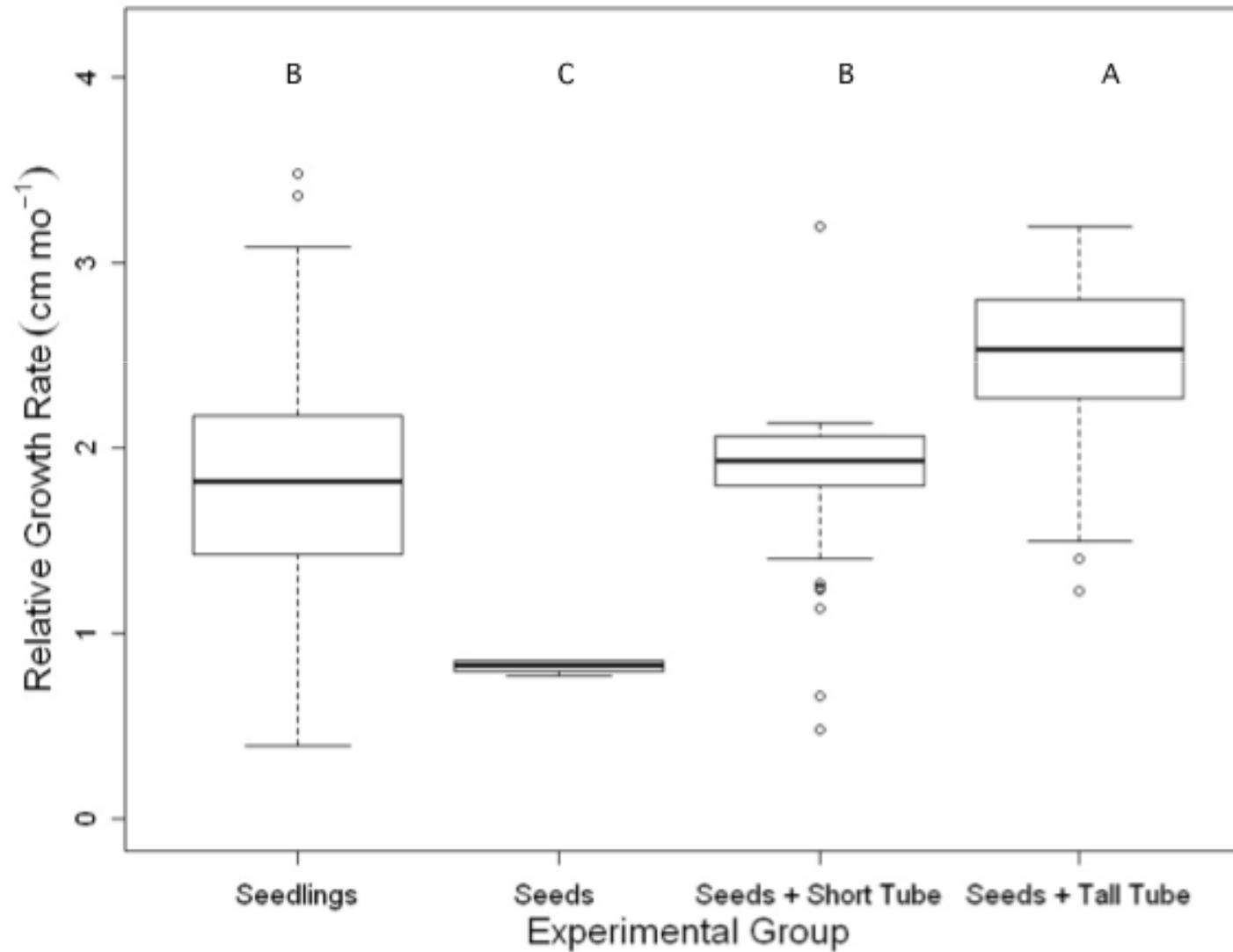
Chestnut Seeds:

876 seeds (pre-stratified)
 $\frac{1}{2}$ w/planting tube
 $\frac{1}{4}$ w/short, $\frac{1}{4}$ w/long
 $\frac{1}{2}$ w/o planting tube

JHWMA Introduction Protocol results:
Seedlings protected with a tall tube showed significantly greater survival rates



JHWMA Results: Introduction protocol
Seeds planted with a tall protective tube showed the
greatest RGR



Slide 25

I1

Include letters for stats and F/P

Brian McCarthy, 4/27/2010

Summary: JHWMA

- 1) FRA end dump method is conducive to growing American chestnut and its hybrids.
- 2) Direct seeding does not appear to be efficacious. Mortality is much greater than bare root seedlings.
- 3) Direct seeding still requires a tree tube for adequate success (as do seedlings), so there is no savings in time, money, or energy.

Conclusions

- 1) FRA methods (both ripping for reclaimed mine lands and loose end dumping for new reclamations) are effective methods for promoting return to forest conditions in Ohio.
- 2) While not all species perform well under these conditions, American chestnut and its hybrids *have* proven to do well. Thus, mine reclamation sites may prove to be effective areas for future restoration of this species.

Acknowledgements

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THE
AMERICAN
CHESTNUT
FOUNDATION®

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Division of Mineral Resources Management
Oxford Mining Company



A bright sun with a prominent lens flare is positioned in the upper left quadrant of a clear blue sky. The sun's rays radiate across the sky, creating a starburst effect. Below the sky, a green landscape with rolling hills and scattered trees is visible. The overall scene is bright and clear.

Questions?

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