







# CHESTNUT TREE PRODUCTION IN VITRO

Michigan State University - Roger's Reserve Jackson

# CHESTNUT MICRO PROPAGATION IN MICHIGAN

- The chestnut production in Michigan is increasing every year in volume of chestnuts as well in land and trees planted. The availability of healthy trees is one of the limited factor that is affecting or will affect eventually the chestnut industry in Michigan. Pests and diseases are spreading all over the states and the lack of healthy source material can endanger the chestnut program. The alternative is producing healthy trees in vitro (tissue culture)

# PROPAGATION

- *Seed: High genetic variability as a clonal grafted tree or tree production as a seedling*
- *Rooting Cutting: difficult to root by conventional methods*
- ***Tissue culture (Micro propagation): Proven that is effective and can generate plant production in a big scale***

# Tissue Culture Lab: Plant Biotechnology Resource And Outreach Center (Guo-Qing Song/Pete Callow)

- Used Commercial cultivars as plant donors.
- Forcing vitro plants “sprouting”
- Harvest shoots to established the culture

# Tissue Culture Chestnut Production



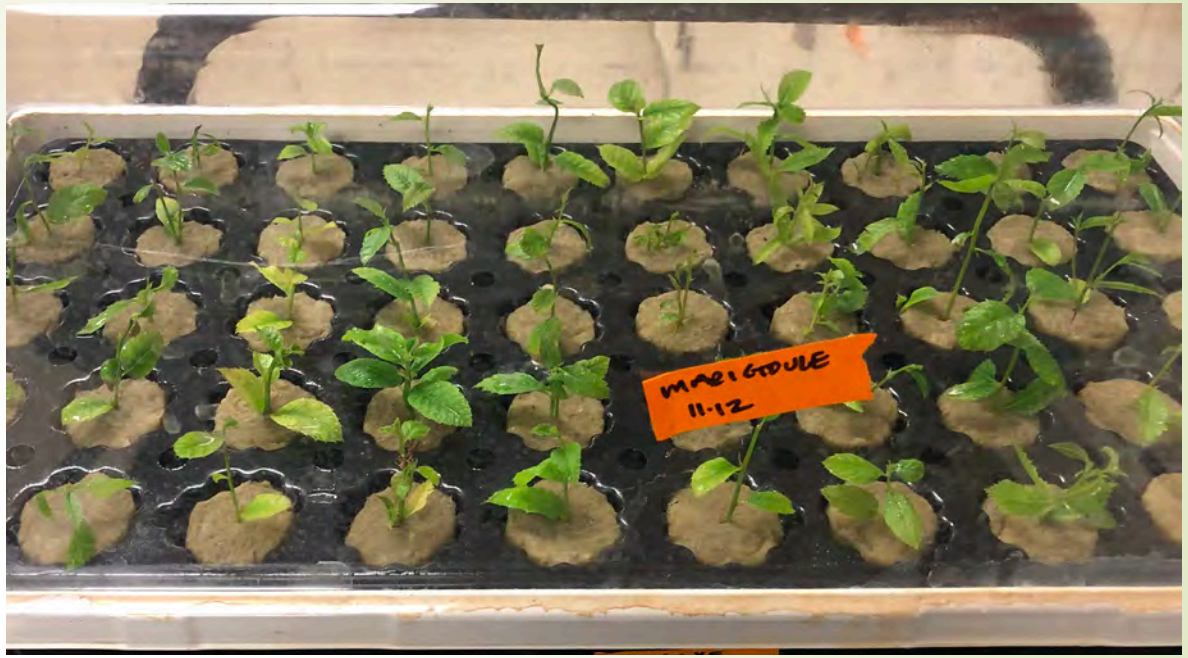
# Multiplication Stage



Elongation/Proliferation Stage

# Rooting Stage (liquid or soil environment)

Media with IBA(growth hormone) or elongating shoots dip into IBA ……. We found that both work




# Acclimation Stage

100% humidity with no cuticle development

Under lights and temperature control (micro domes)

# ACCLIMATION ON FOGGING/GREENHOUSE SYSTEM

Removed from lights and micro domes from the tissue lab

REMOVE ADAPTED CHESTNUT TREES OUT THE FOGGING/GREENHOUSE TO THE MAIN GREENHOUSE

# SELECTION OF TREES TO BE A MOTHER PLANT, ROOTSTOCK OR DIRECT PLANTING

MOTHER TREE (Bigger pots and keep them in greenhouse)

Trees selected for rootstock or direct Planting

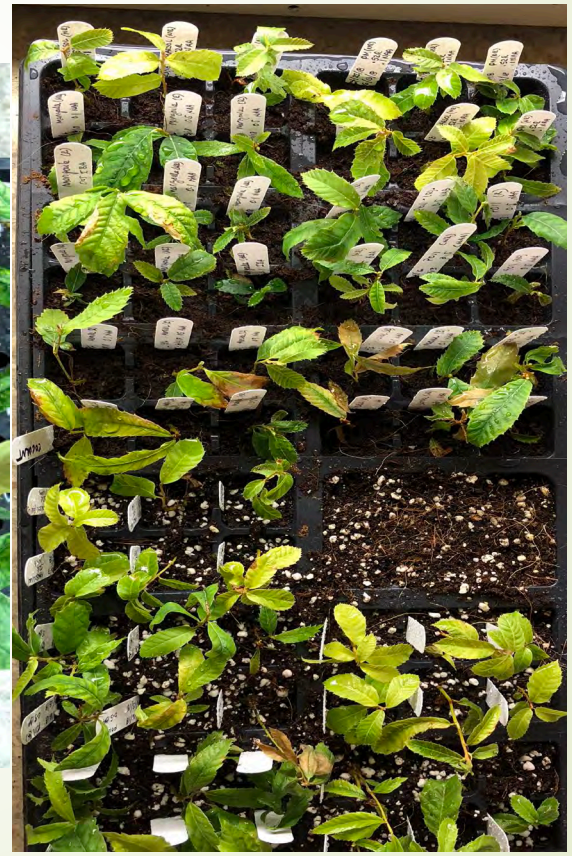
Direct Planting - Dormant trees


TISSUE CULTURE IS GIVING US MORE CONTROL TO MANIPULATE GROWING RESPONSES FROM DIFFERENT CULTIVAR TYPES AND ALLOW US TO CONTROL THE GENETICS FOR PROPAGATION

# ROCK WOOL VS SOIL

ROCK WOOL

SOIL MIXED



Rock wool

Greenhouse Soil Mixed

# COCONUT SOIL

100% Coco, 75/25% coco/perlite and Greenhouse mixed (bacto 75/25%)

# Challenges

- Establish the final protocol on TISSUE CULTURE
- Rooting elongated shoots into a cheaper system
  - Soil mixed (sphagnum, coconut, perlite)
  - Rock wool, jiffy plugs
  - Hydroponics
  - Cut timing for all tissue culture stages
- Control environment
  - Humidity
  - Temperature
  - Lighting
- Establish the final protocol to produce trees from MOTHER PLANTS
- AND……..

## *Infrastructure:*

**Tissue Culture laboratory For.....**

***Production of vitro plants***

***Production of mother plants***

**Large greenhouse space With...**

***Fogging system***

***Heating system***

***Nutrition system***

***Lighting system***

# *QUESTIONS??*