The Role of Micropropagation in Hawaiian Plant Conservation

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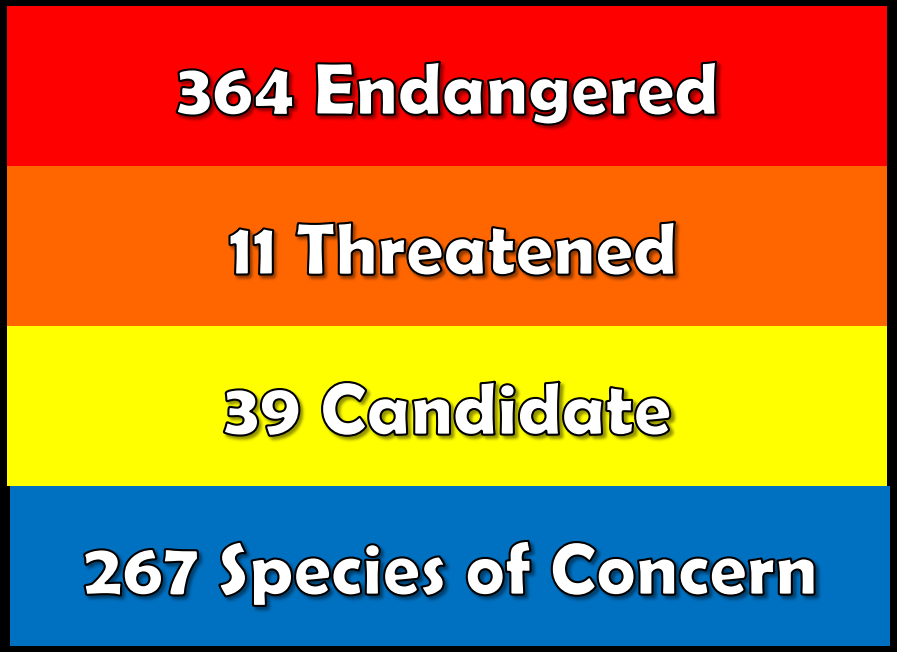
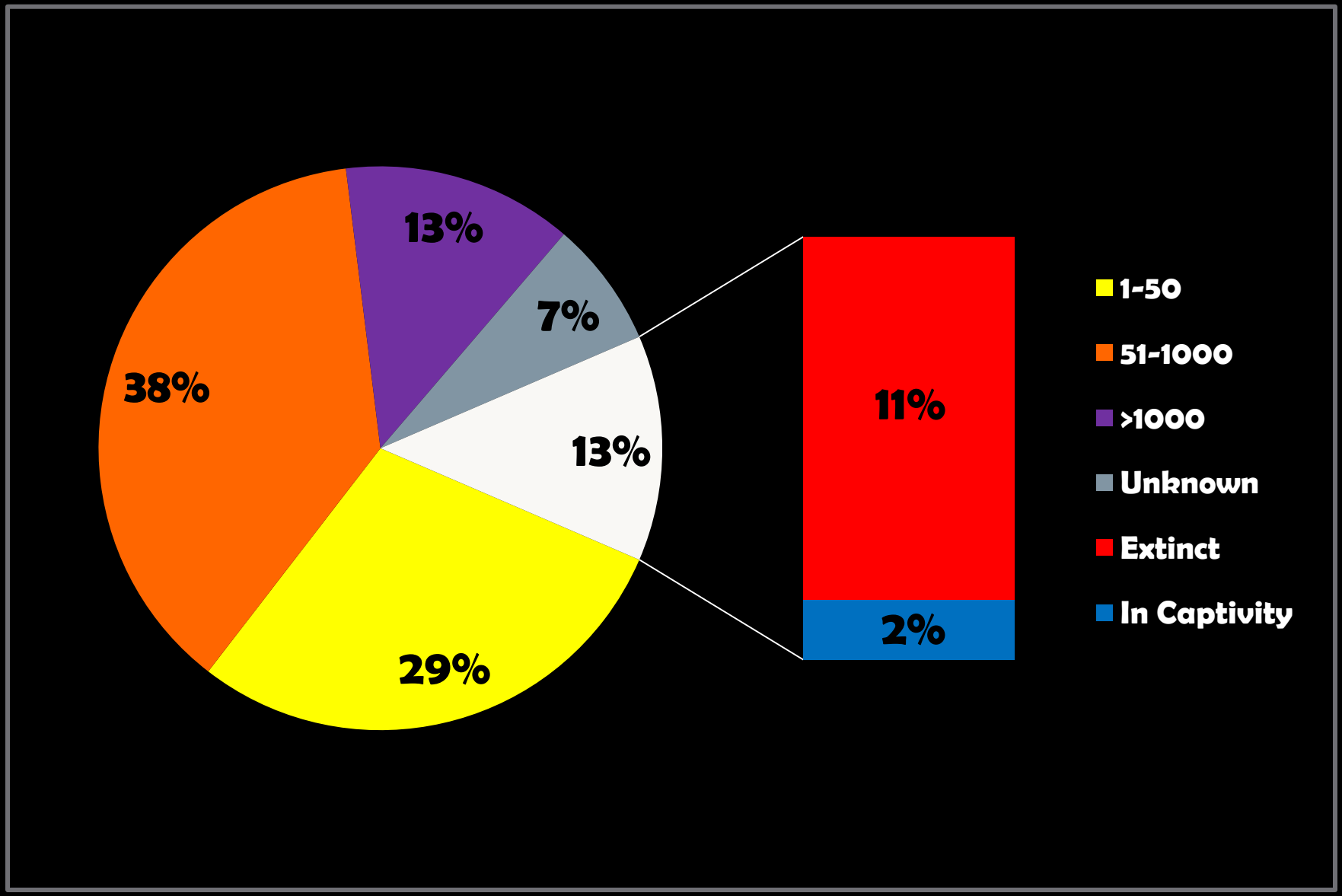
US Fish and Wildlife Service

Total number of taxa: 681



Summary of Native Vascular Plant Taxa



IUCN Red List

224 Hawaiian Plant Taxa

International Union for Conservation of Nature

Hawaii Rare Plant Restoration Group (HRPRG) Agencies

- State
- Federal
- Conservation
- Environmental
- Private landowners
- Local Botanical Gardens

HRPRG

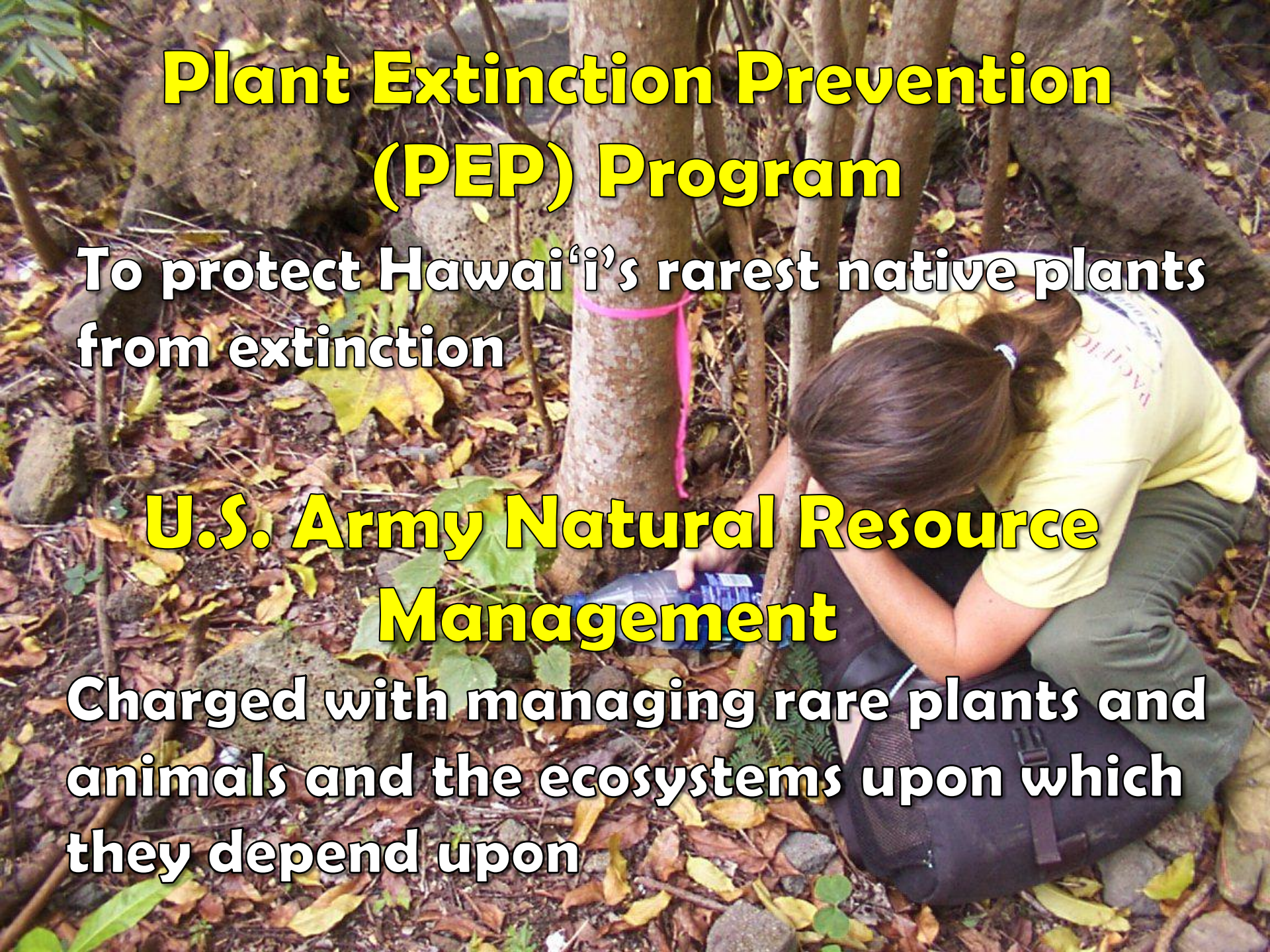
To prevent the extinction of native Hawaiian plants by:

- providing for their recovery through a cooperatively administered conservation system
- sampling, propagating, and reintroducing rare plants
- preserving native plants and their habitats through communication and public education

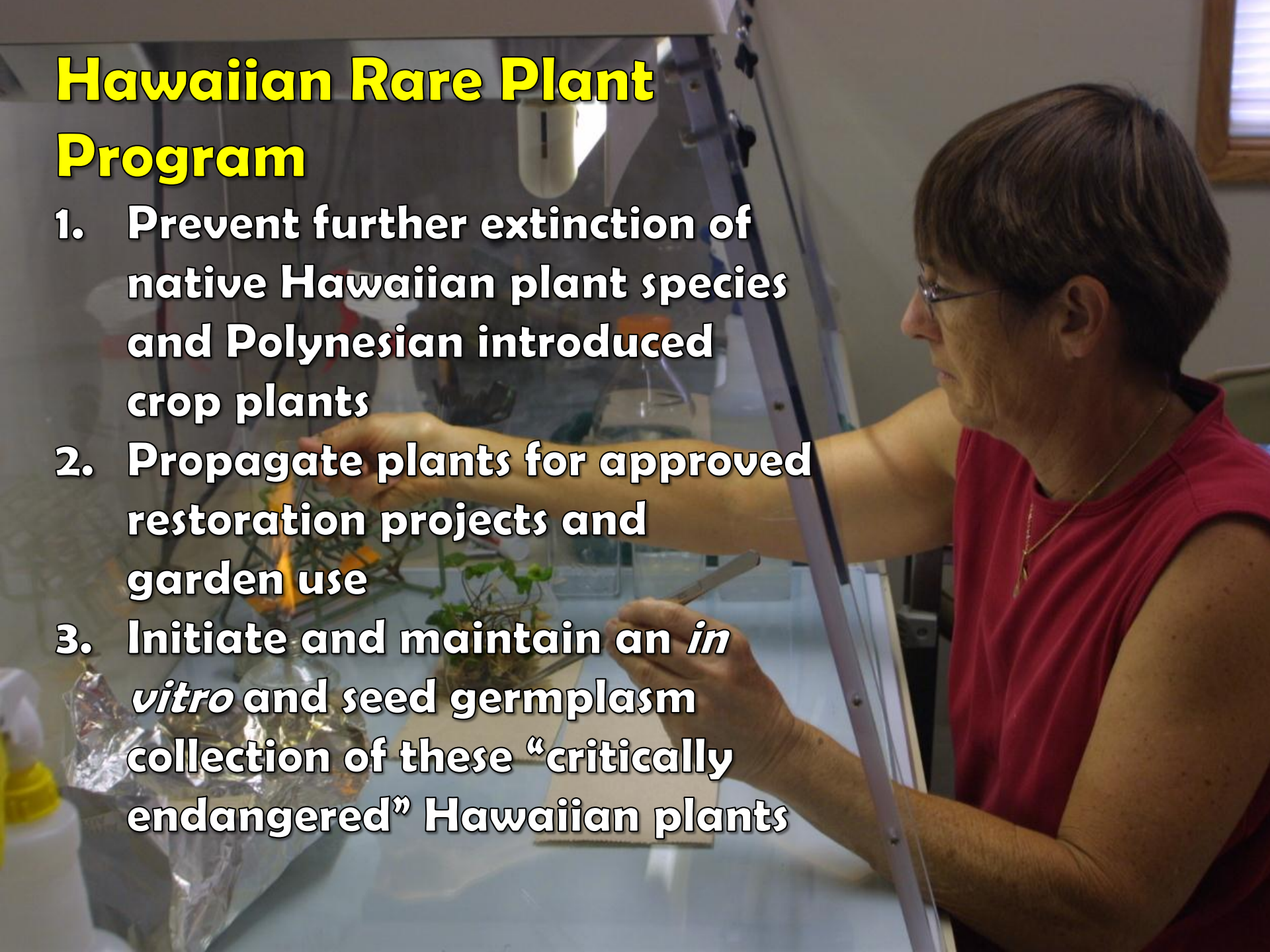
PEP Listing

(originally the Genetic Safety Net List)

- Generated by the Plant Extinction Prevention Program
- Approximately 242 critically endangered Hawaiian plant taxa


Plant Extinction Prevention (PEP) Program
To protect Hawai'i's rarest native plants from extinction
U.S. Army Natural Resource Management
Charged with managing rare plants and animals and the ecosystems upon which they depend upon

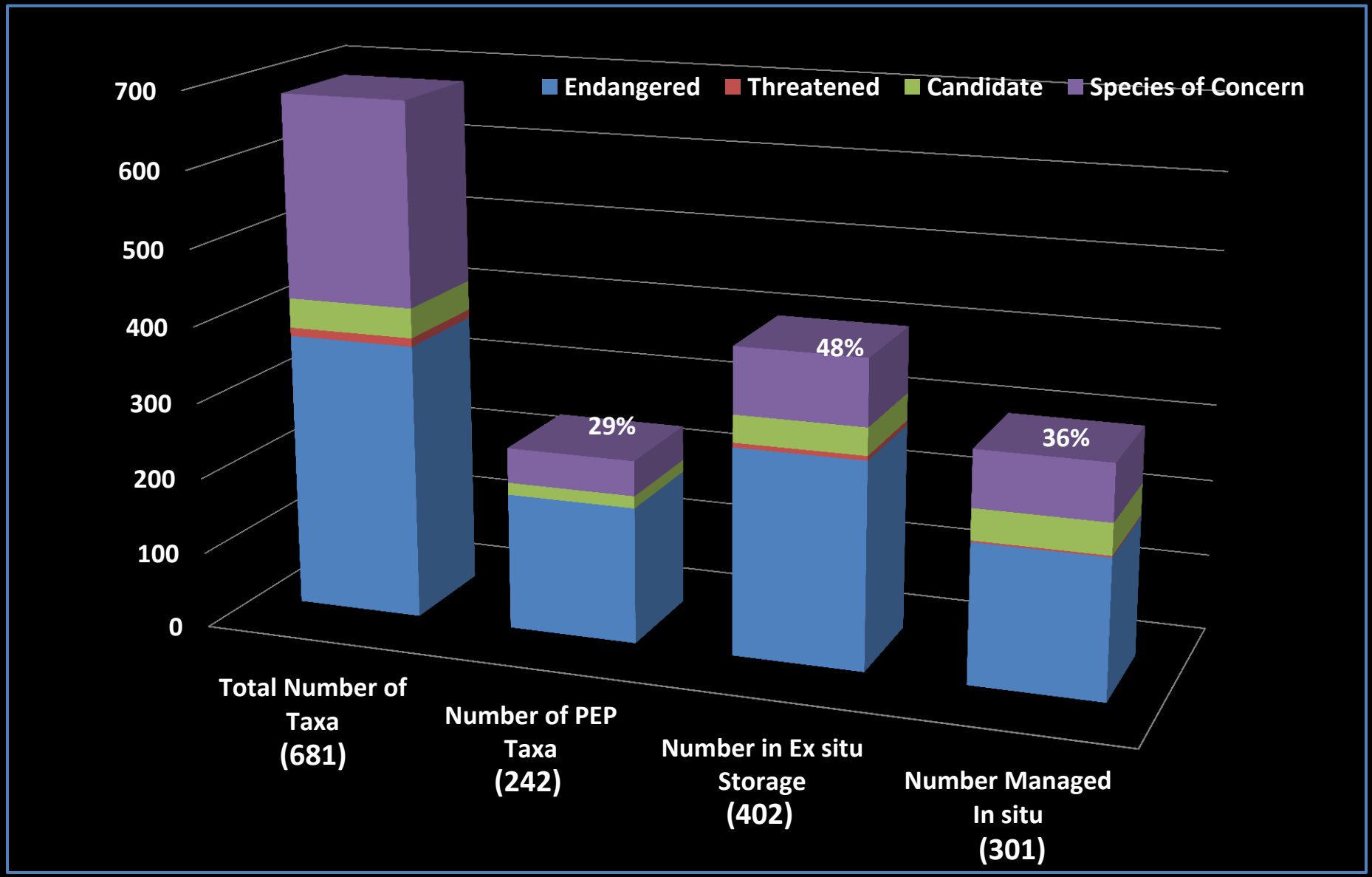

• Protect founders
• Monitor plants
• Collect propagules
• Reintroduction
• Survey for new plants and populations



Hawaiian Rare Plant Program

1. Prevent further extinction of native Hawaiian plant species and Polynesian introduced crop plants
2. Propagate plants for approved restoration projects and garden use
3. Initiate and maintain an *in vitro* and seed germplasm collection of these "critically endangered" Hawaiian plants

US Fish and Wildlife Federal Status Summary



Ex-situ Conservation


Tetlyd 10-01
V07 Kupana 0. PEP


Sexually Derived Explants
Seed
Embryos
Ovules
Pollen
Spores

Vegetative Explants

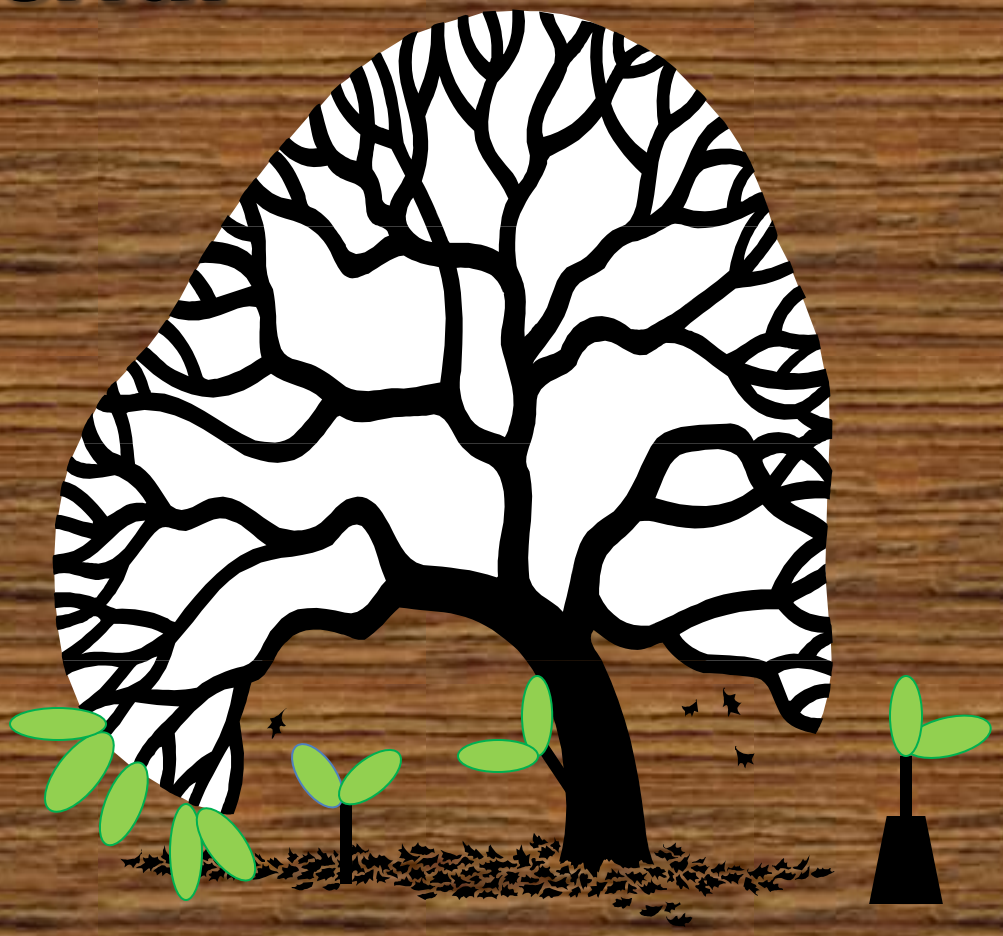
- Apical meristem
- Axillary meristem
- Root meristem
- Stem internodes
- Inflorescence
- Leaves

Preservation of the Original Plant Genotype

- Selection of suitable plant material
- Post harvest handling
- Proper surface disinfestation
- Plant medium
- Culture conditions

Selection of Suitable Plant Material

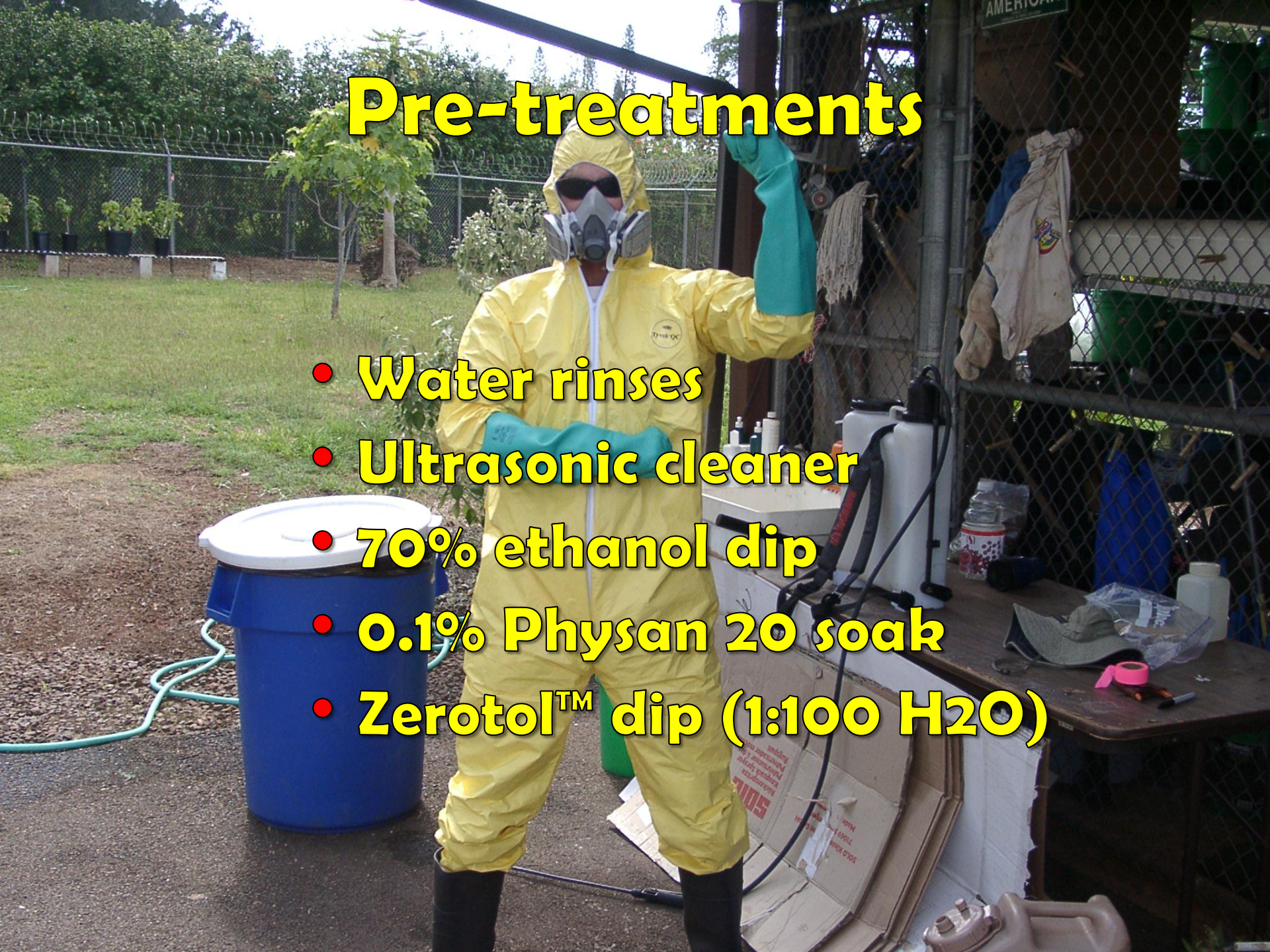
- Time of harvest
- Juvenility
- General health



Bonga, J.M.; Von Aderkas, P. *In Vitro* Culture of Trees. Dordrecht: Kluwer Academic Publishers; 1992.

Post-harvest Handling

- Submit samples as soon as possible
- Factors affecting sample viability
  - Excessive temperatures
  - Anaerobic conditions
  - Microbial growth
  - Damage


Pre-treatments
• Water rinses
• Ultrasonic cleaner
• 70% ethanol dip
• 0.1% Physan 20 soak
• Zerotol™ dip (1:100 H2O)

Treatments

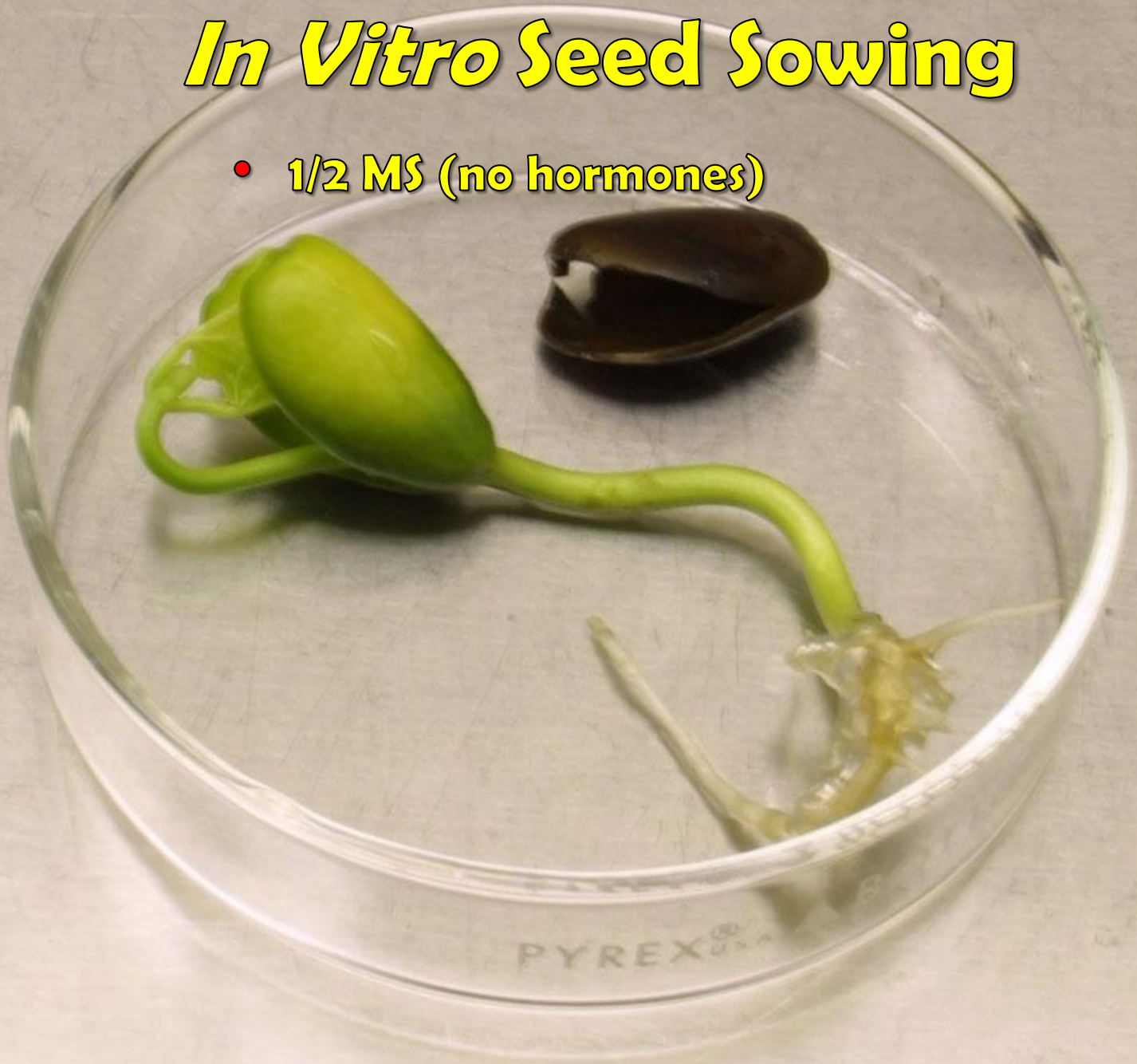
- 5% to 10% bleach (e.g. Clorox ®) solution soaks
- Plant Preservative Mixture® (PPM) soaks
- Clorine gas sterilization

Plant Media

- Murashige and Skoog (MS)
- Woody Plant Medium (WPM)
- Knudson
- Modified mixes

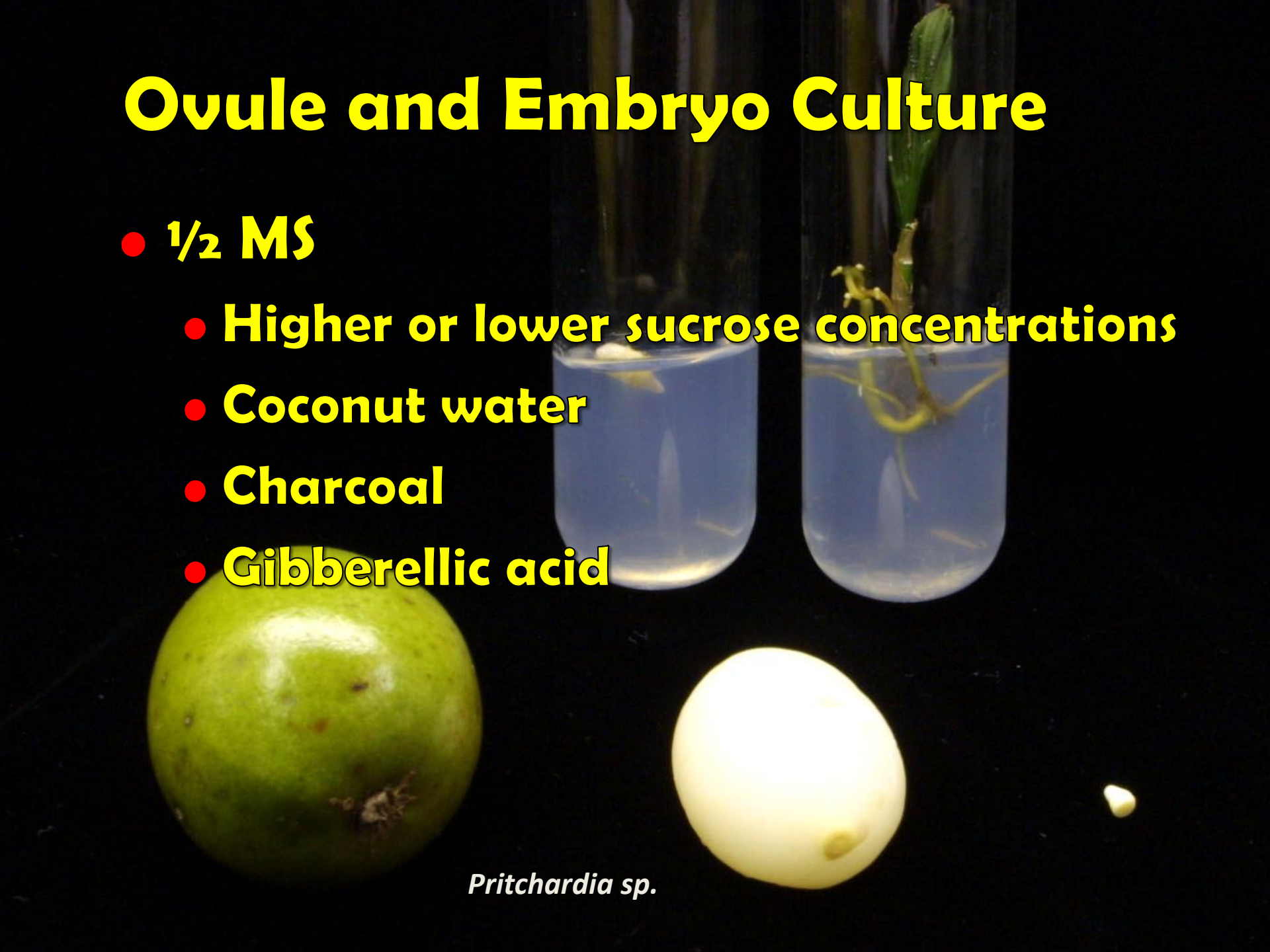
In Vitro Seed Sowing

- 1/2 MS (no hormones)



Ovule and Embryo Culture

- ½ MS
  - Higher or lower sucrose concentrations
  - Coconut water
  - Charcoal
  - Gibberellic acid



Pritchardia sp.

Organogenesis

- Modified Murashige and Skoog
  - Auxin
  - Cytokinin

Avoid or minimize callus stage


Greenhouse Establishment

Flueggea neowawrea
(mēhamehame)

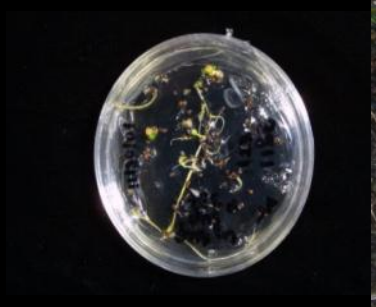

COOKEI


Kokia cookei
(koki'o)

Saved from

EXTINCTION

(we hope)



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