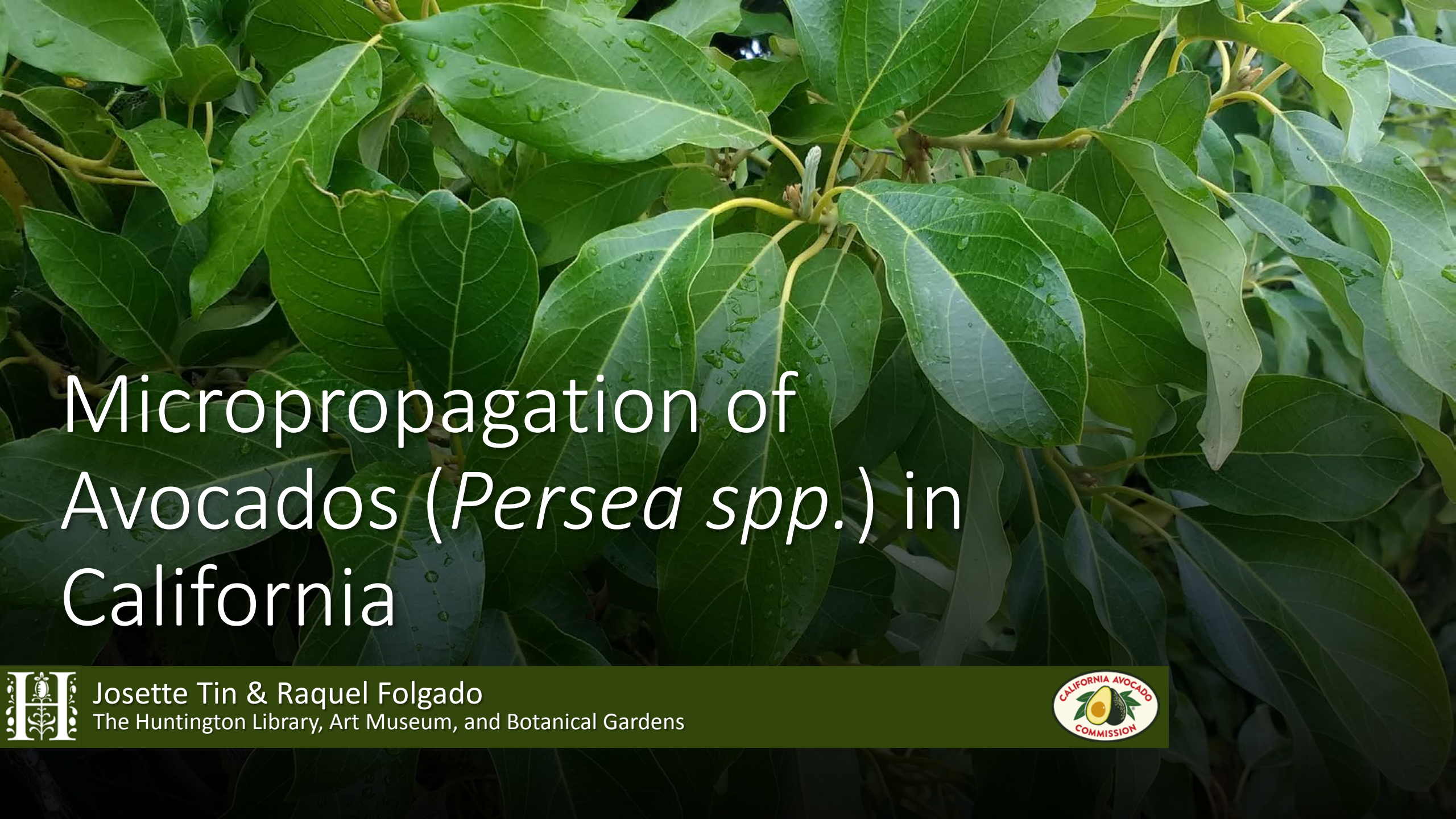


Micropropagation of Avocados (*Persea spp.*) in California

Josette Tin & Raquel Folgado
The Huntington Library, Art Museum, and Botanical Gardens

Micropropagation

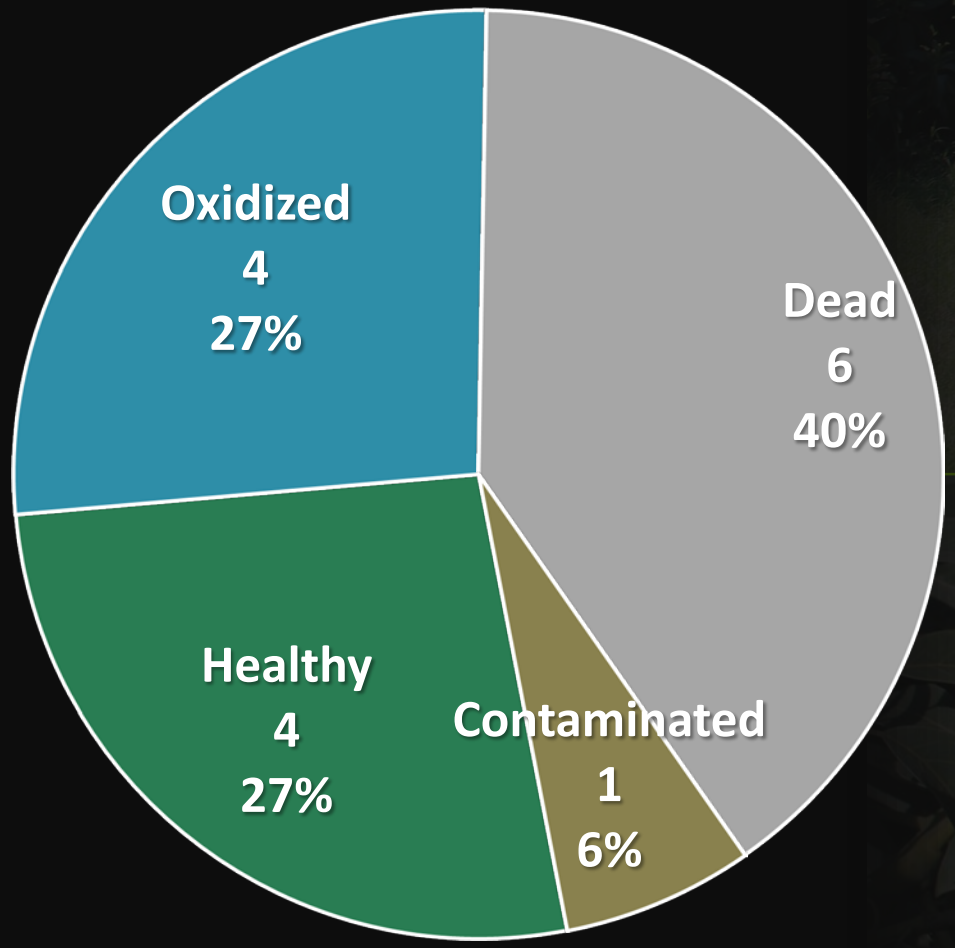
- Initiation
- Establishment
- Multiplication
- Rooting
- Acclimation

Shepherd-Brokaw Orchard

Initiation

- Citric acid
- NaDCC
  (sodium dichloroisocyanurate)
- Silver and/or copper

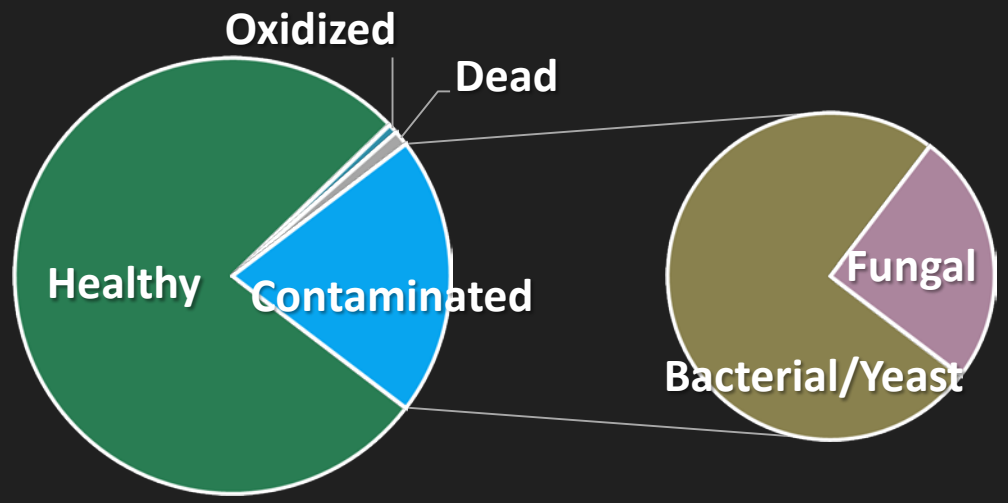
Initiation: Field Material

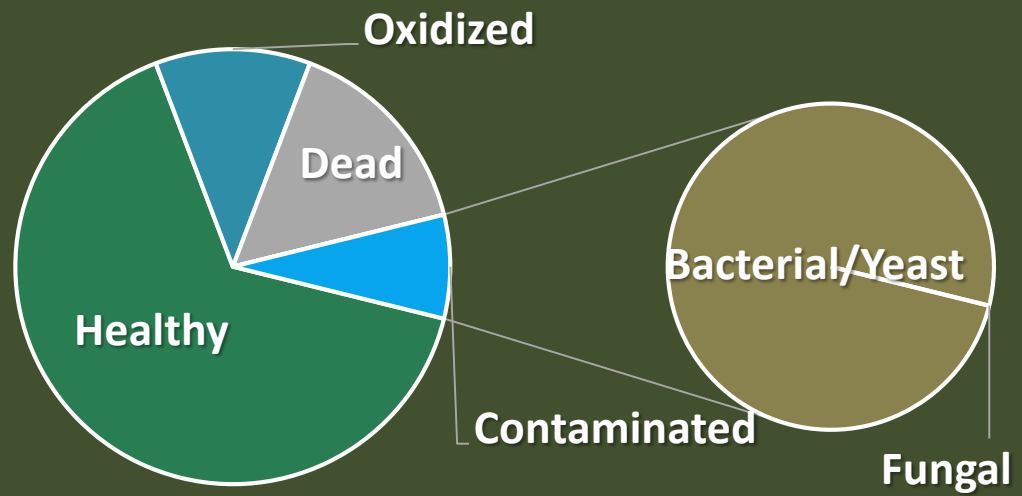


cv. ‘Irving’

Initiation: Nursery Material

cv. ‘Duke-7’





Establishment Experiments (WPM vs Persea)

cv. ‘Mexicola’

cv. ‘Pinkerton’

cv. ‘Lamb Hass’

Establishment Experiments (WPM vs Persea)

Cultivar	1 (WPM → WPM)	2 (WPM → WPM + CW)	3 (WPM → P + CW)	4 (P → P + CW)
Mexicola	×	×	×	×
Pinkerton	×	✓	✓	✓
Lamb Hass	×	×	×	×

cv. ‘Pinkerton’

- Initiation medium has no effect
- Genotype specific medium
- Coconut water could be beneficial
- More studies are needed

cv. ‘Rincon’

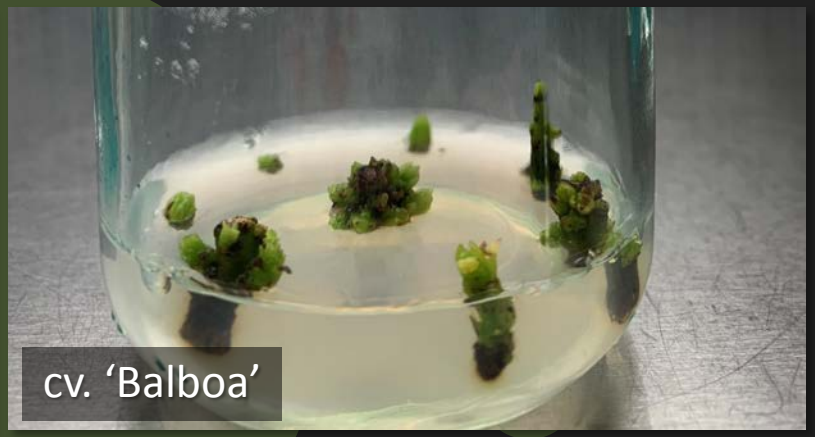
Establishment

cv. ‘Northrop’

1. Increased hyperhydricity
2. Healthy base callus
3. New shoots

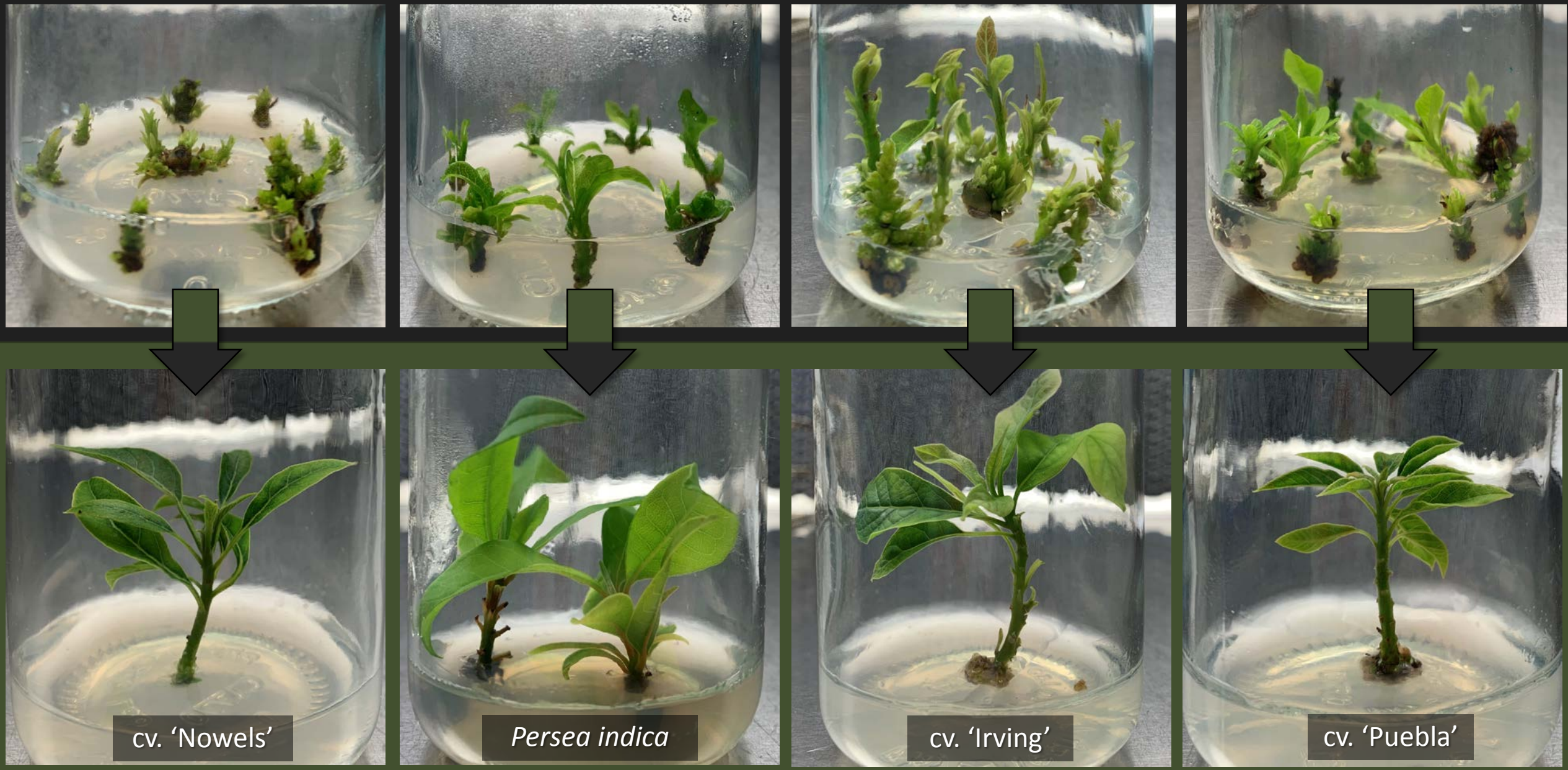
cv. ‘Mexicola’

cv. ‘Toro Canyon’



Multiplication

Rooting: Elongation

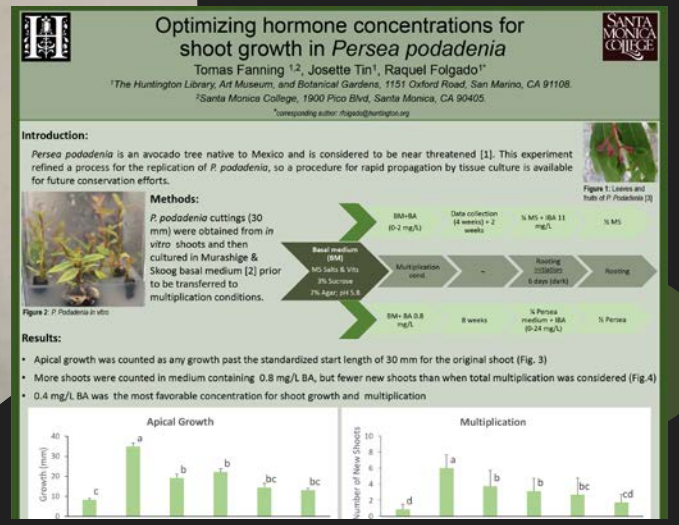


Rooting

cv. ‘Irving’

Persea podadenia

- 80-90% rooting rate



Optimizing hormone concentrations for shoot growth in *Persea podadenia*

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Introduction:

Persea podadenia is an avocado tree native to Mexico and is considered to be near threatened [1]. This experiment refined a process for the replication of *P. podadenia*, so a procedure for rapid propagation by tissue culture is available for future conservation efforts.

Figure 1: Leaves and fruits of *P. Podadenia* [3]

Methods:

P. podadenia cuttings (30 mm) were obtained from *in vitro* shoots and then cultured in Murashige & Skoog basal medium [2] prior to be transferred to multiplication conditions.

Figure 2: *P. Podadenia in vitro*

Results:

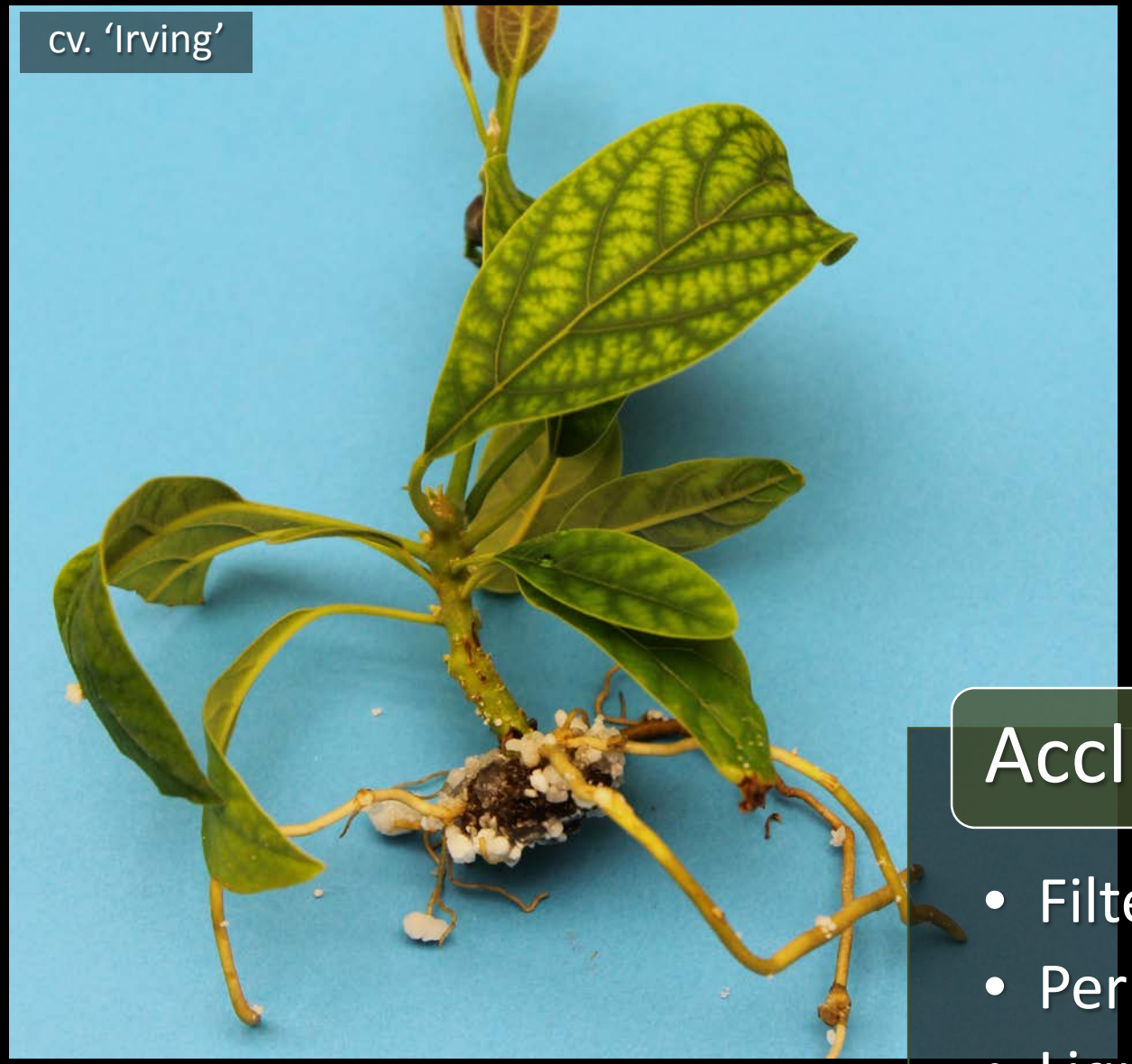
- Apical growth was counted as any growth past the standardized start length of 30 mm for the original shoot (Fig. 3)
- More shoots were counted in medium containing 0.8 mg/L BA, but fewer new shoots than when total multiplication was considered (Fig.4)
- 0.4 mg/L BA was the most favorable concentration for shoot growth and multiplication

Apical Growth

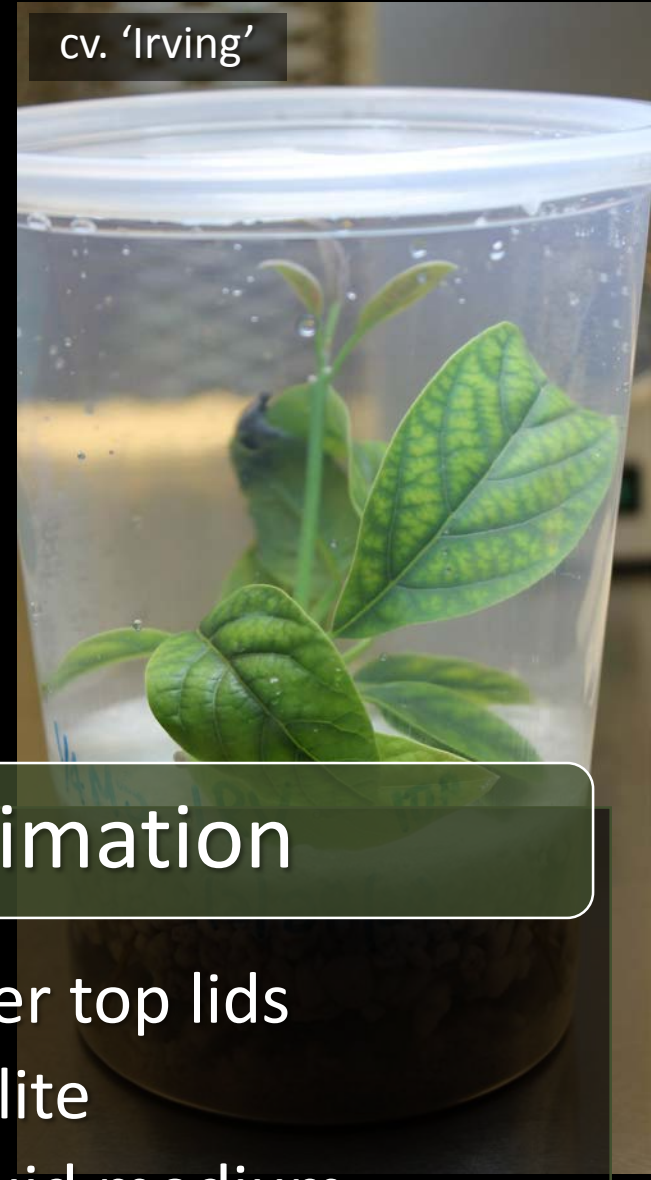
Multiplication

Persea indica

cv. ‘Puebla’ on seedling



cv. ‘Irving’



cv. ‘Irving’

Acclimation

- Filter top lids
- Perlite
- Liquid medium

Cryopreservation & Micrografting

1

2

3

cv. ‘Puebla’ on seedling

4

Initiation

- Reduced oxidation and contamination

Establishment/Multiplication

- Critical elements were identified

Rooting

- Adjustments to salts achieved better quality rooted plants

Acclimation

- Soil-less system was optimized

Summary

- Successfully introduced over 50 avocado (40 are adult material) genotypes in tissue culture, an *in vitro* repository has been created at the Huntington
- More in-depth studies are planned to standardize the tissue culture of avocado, which will help the mass propagation of rootstocks and conservation avocado diversity

Acknowledgements

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AUSTRALIA

QAAFI
Queensland Alliance for Agriculture and Food Innovation

Thank you!

Any questions/comments, please feel free to contact Raquel Folgado, rfolgado@huntington.org