Enhancement of Avocado Productivity. Plant improvement - selection and evaluation of improved varieties and rootstocks

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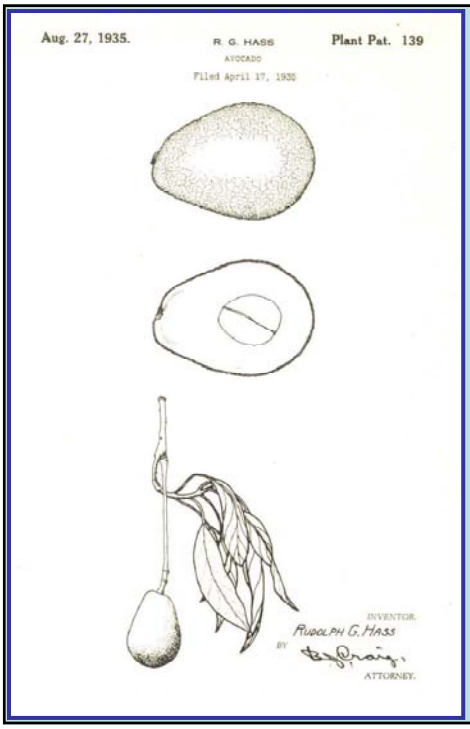


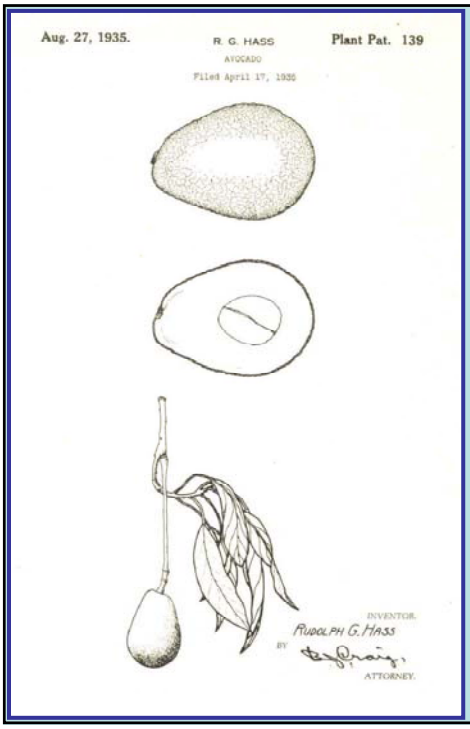
Challenges to development and establishment of new varieties

The Hass sets a very high standard for fruit quality

Selection and introduction of new varieties takes many years and is very labor intensive

Requires coordinated effort between academia, growers, packers and consumers

Will the industry want the variety once it is developed? Crystal ball gazing is required!



Our leading cultivar, 'Hass' CAN BE improved:

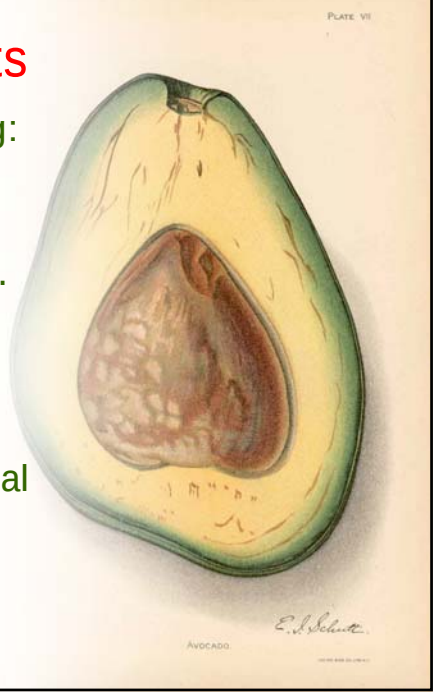
- Fruit size
- Postharvest quality
- Tree size and structure
- Bearing habit
- Alternate bearing
- Cold tolerance
- Insect tolerance
- Salinity tolerance
- Productivity
- Seasonality

We have the potential to improve

It is dangerous to have an industry based on one variety

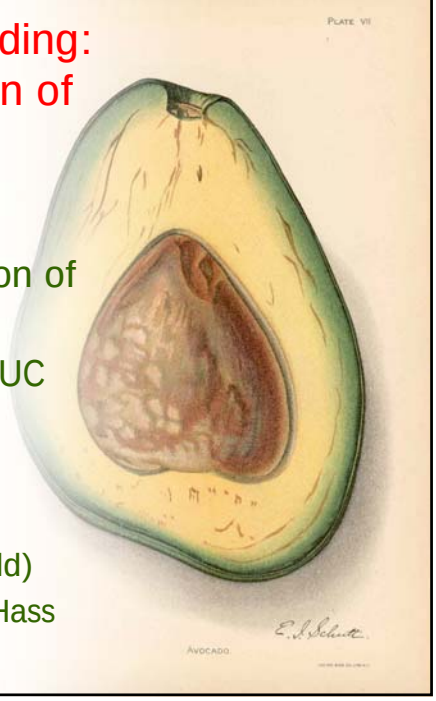
Program Components

- Conventional scion breeding: selection and evaluation of improved varieties
- Initiate collaboration with R. Schnell (USDA-ARS)
- Germplasm preservation
- Scion:rootstock evaluation
- Collaboration w/ international research community
- Outreach and maintaining www.ucavo.ucr.edu



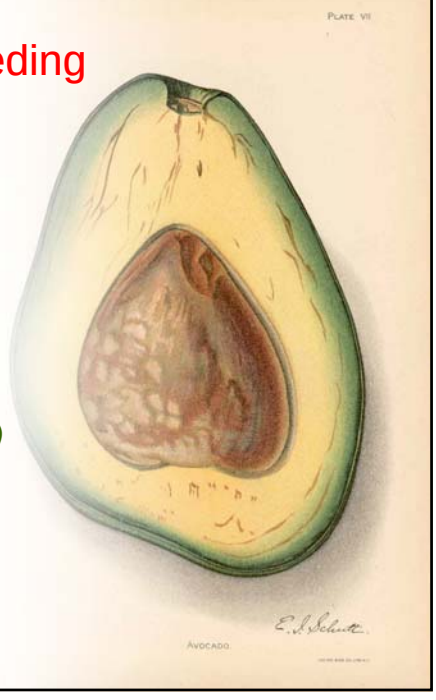
Conventional scion breeding: selection and evaluation of improved varieties

- 2005 Audit with Lavi and Chaparro and implementation of recommendations
- Preliminary selections from UC Program
- Introduction of interesting material from elsewhere
  - 2 selections from Chile (in field)
  - Working on intro of Maluma Hass



Conventional scion breeding Isolation Blocks

- GEM x Marvel (BL516)
- GEM x Thille
- *Gwen*
- *Lamb Hass x GEM*
- *Lamb Hass x Nobel (BL667)*
- *Lamb x Thille*
- *Lamb*
- *Stewart*



Conventional scion breeding: Field 4 Maternal Block

Gwen	Green Gold
GEM	Murietta Green
Harvest	XX3
Lamb Hass	Puebla
Marvel	Reed
Nobel	SirPrize

We are in the process of working in other interesting material to use as breeding stock. Material will be replaced as needed.

Components of evaluation

First Selection

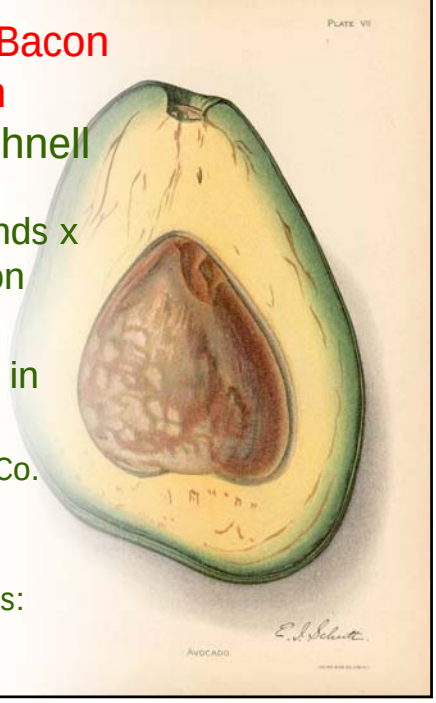
- *Flavor*
- *Fruit characteristics – size, seed size etc.*

Secondary Selection

- *Yield*
- *Maturity and postharvest quality*
- *Tree vigor – growth habit*
- *Flowering, stress tolerance*

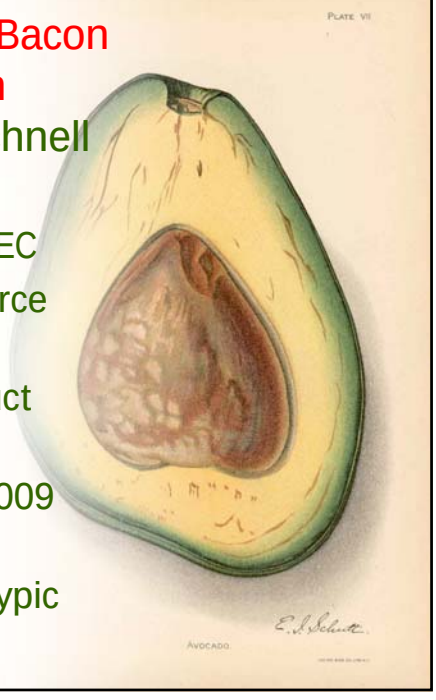
Establishment of Hass x Bacon Mapping Population
Collaboration with R. Schnell

- In 2007 established Simmonds x Tonnage mapping population
- Schnell will plant 2 Hass x Bacon mapping populations in FL in 2008
  - Seed collected from Ventura Co. 2007
  - Parentage analysis complete
  - Includes 4 groups of seedlings: HxB, BxH, H self, B self



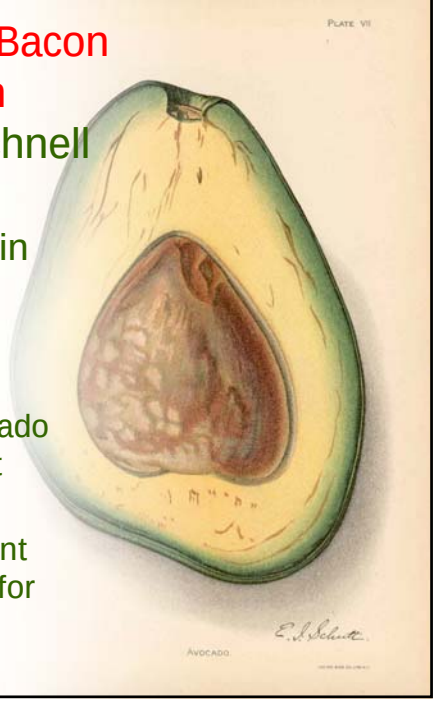
Establishment of Hass x Bacon Mapping Population
Collaboration with R. Schnell

- Establish 3rd mapping population in CA at UC SCREC
- Collect seed from same source in February 2009
- Germinate seeds and conduct parentage analysis in 2009
- Plant in field either in Fall 2009 or Spring 2010
- Initiate collection of phenotypic data in 2011



Establishment of Hass x Bacon Mapping Population

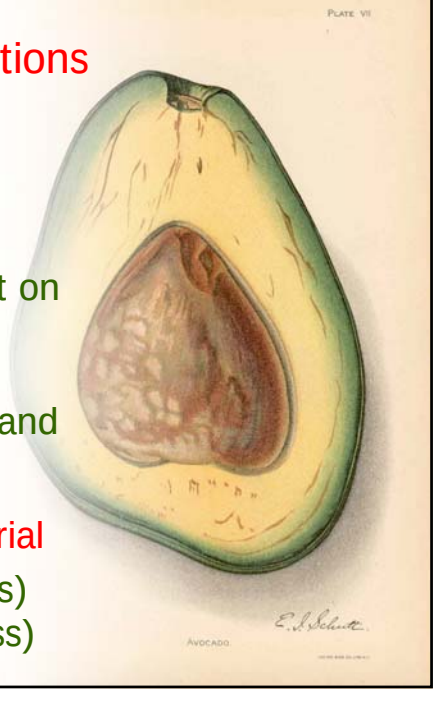
Collaboration with R. Schnell



What does the CA industry gain from this collaboration?

- Access to R. Schnell's >250 microsatellite markers
- Increased knowledge of avocado genetic relationships and trait expression
- Assist in UC scion improvement program to develop capacity for parentage analysis

Scion Rootstock Interactions



Hass rootstock trial

1986 w/ 10 rootstocks

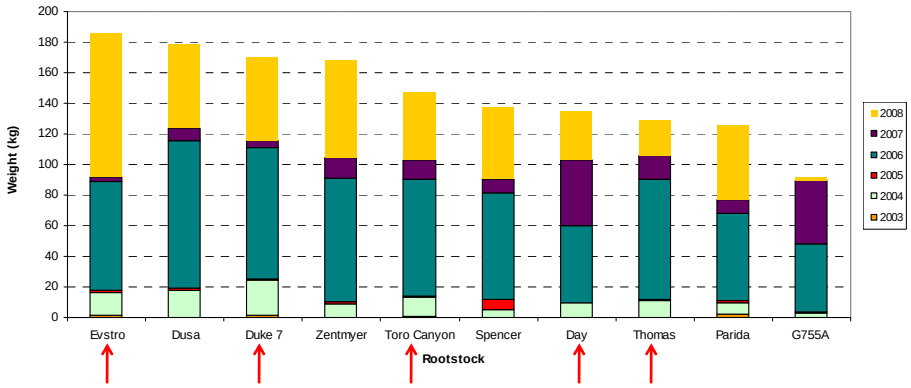
Results published 2007

Demonstrated rootstock effect on several horticultural traits including yield, fruit size, alternate bearing, tree size and tree nutrition

Hass x Lamb Hass rootstock trial

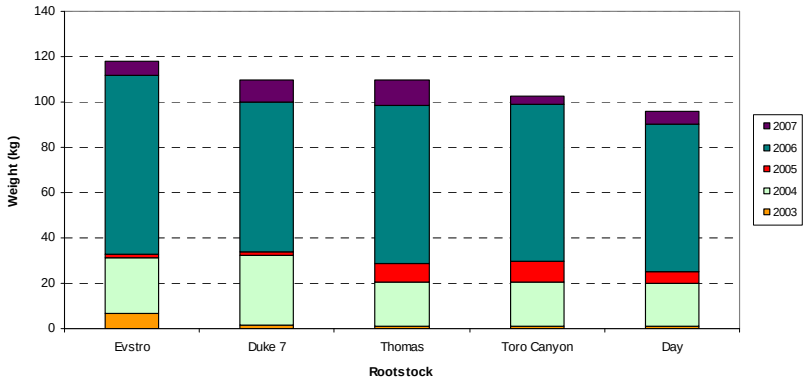
1999 w/ 10 rootstocks (Hass) and 5 rootstocks (Lamb Hass)

Hass component – Yield through 2008



Fruit Size: Duke 7 has largest cumulative fruit size. Statistically same as Zentmyer, Thomas, Day, Dusa and Toro Canyon

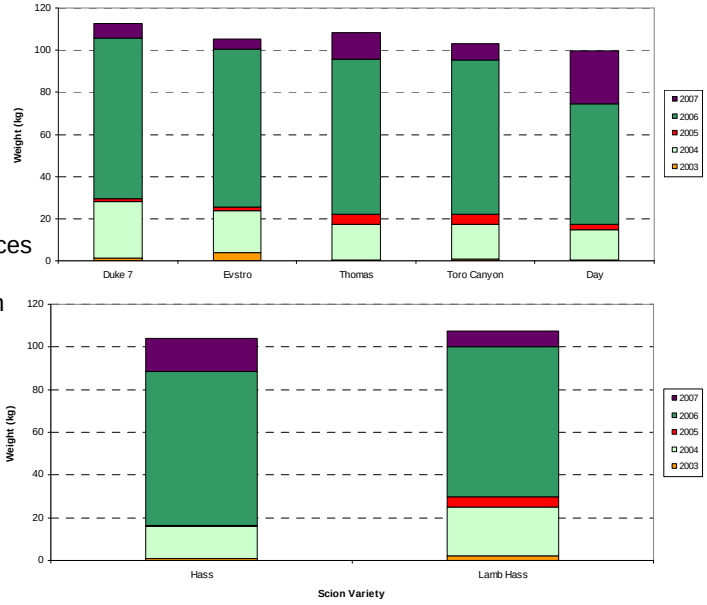
Lamb Hass component – Yield through 2007



Fruit Size: no differences detected due to rootstock

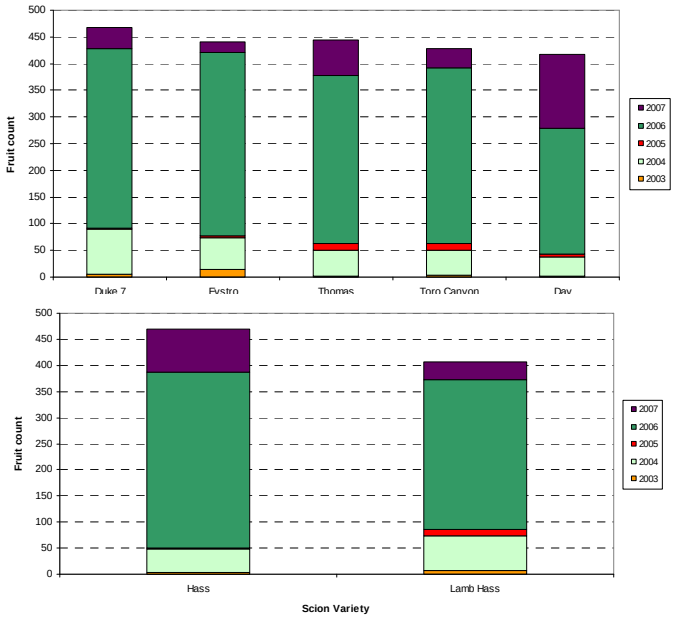
Hass vs. Lamb Hass – Yield through 2007

Yield: no differences detected due to rootstock or scion



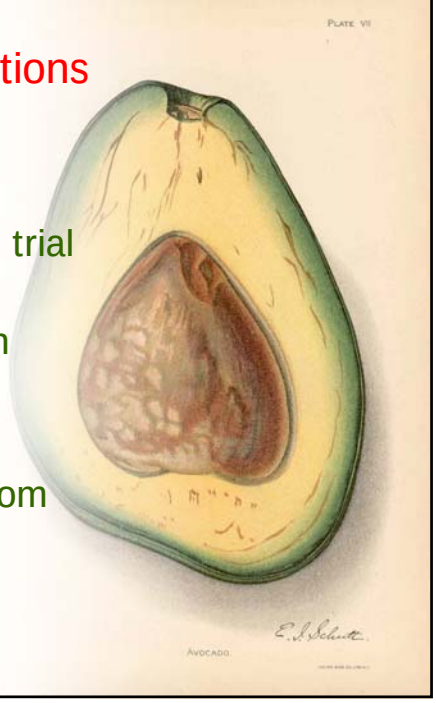
Hass vs. Lamb Hass – Fruit count through 2007

Fruit count: no differences detected due to rootstock. Hass with significantly higher fruit numbers but lower fruit size (8 oz vs 9.4 oz)



Scion Rootstock Interactions

Plans for 2008-09



Would like to plan for another trial

Planning would be done in consultation with G. Douhan and D. Crowley

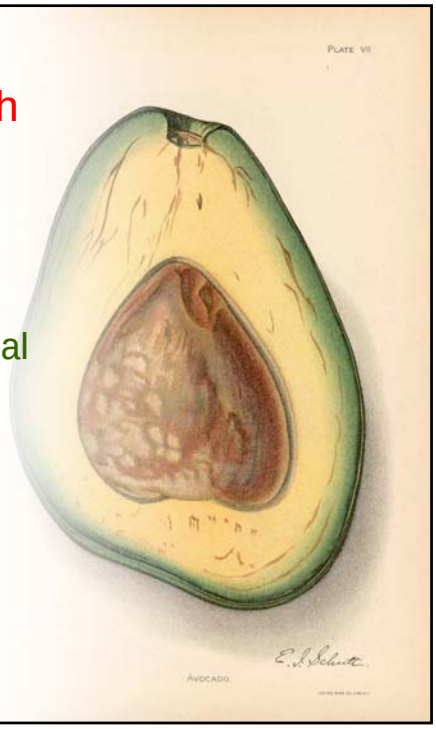
Collect additional yield data from current trial

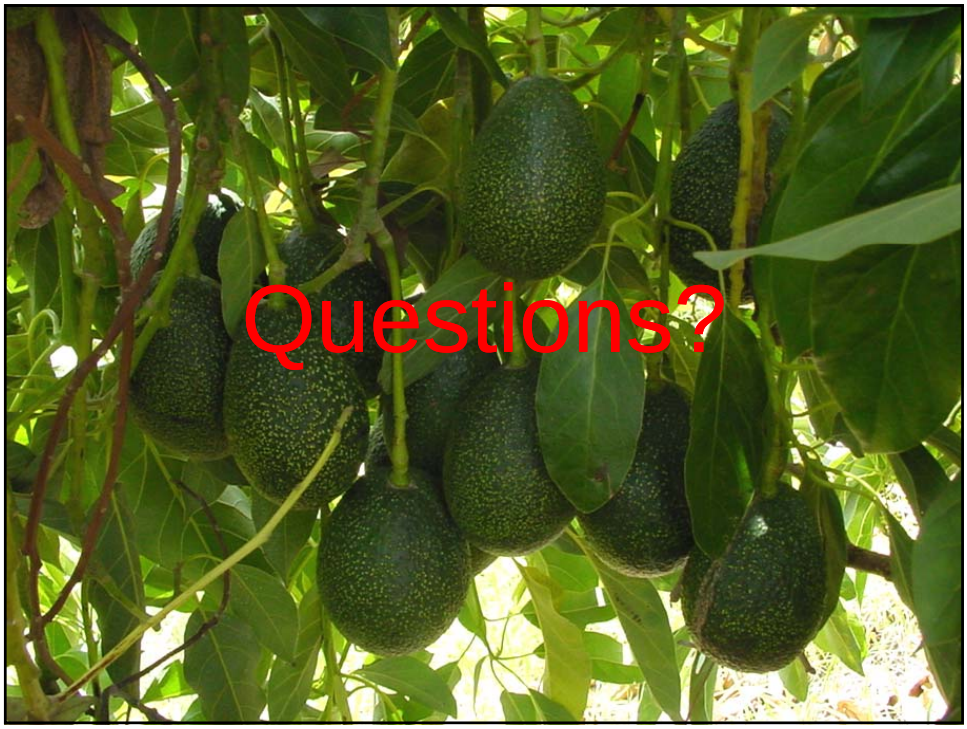
The Importance of the Germplasm Collection

- Preservation of older varieties from the CA and elsewhere
- Largest collection of varieties focused on MX-Guat races
- Home to interesting materials that may one day be useful for future breeding
- Public Education

Research/Public Outreach

- Collaboration with UC Researchers
- Collaboration w/ international research community
- Outreach and maintaining www.ucavo.ucr.edu




Questions?