

Enhancement of Avocado Productivity
I. Plant Improvement - Selection and Evaluation of
Improved Varieties and Rootstocks

Continuing Project; Year 2 of 20

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Benefit to the Industry

This project will help to maintain and enhance the California avocado industry by introducing consistently heavier producing, high-quality avocado varieties, better pollinizer varieties, and improved rootstock hybrids. Increasing the genetic diversity of varieties will decrease the risk of major pest and disease invasions on a susceptible monoculture.

Objectives

- A. To produce new avocado varieties, superior to 'Hass' in consistent productivity and postharvest fruit quality and marketability, with fruit of optimum maturity and size year-round. This includes determining the different cultural needs of each cultivar.
- B. To collaborate with other researchers worldwide in evaluating and exchanging promising plant material.
- C. To collaborate with Dr. Menge (Dept. of Plant Pathology, UCR), and Dr. Crowley on rootstock selection and evaluation for both root rot resistance and salinity tolerance.

Collaborate with Dr. Menge and Dr. Thorp on identification and evaluation of dwarfing material.

- D. To assist Dr. Mike Clegg on coordination of pollinizer research plots.
- E. To assist Drs. Morse and Hoddle on identifying plant material tolerant to Persea mite and the avocado thrips.
- F. To maintain and improve the CAS variety block and the Persea germplasm block located at the UC South Coast Research and Extension Center.
- G. To insure the timely and effective dissemination of information developed from this research program.

Summary

- A. To produce new avocado varieties, superior to 'Hass' in consistent productivity and postharvest fruit quality and marketability, with fruit of optimum maturity and size year-round. This includes determining the different cultural needs of each cultivar.**

This is the primary objective of the breeding program. To this end, during 1998 we contacted all cooperators on record who have test material. These initial contacts are being followed up this current year with field visits and site evaluations. In Spring 1998 we initiated further cooperator trials at the following sites:

Topworked trials at Non-UC Sites:

Santa Paula (Ventura County)

'GEM', 'Harvest', 'SirPrize', 'RT5176', 'OA184', 'Marvel', 'Hass'; 10 replicates

De Luz Canyon (San Diego County)

'Lamb Hass', 'SirPrize', 'GEM', 'OA184', 'Marvel', '5-552', 'Nobel', 'Hass', 'Harvest'; 10 replicates

San Luis Obispo (San Luis Obispo County)

'RT5176', 'Hass', 'SirPrize', 'GEM', 'Harvest', 'OA184'; 9 replicates Pollenizer trial using 'Bacon', 'Nobel', 'Marvel'; 7 replicates

Rainbow (San Diego County)

1997 Trials: 2 'GEM', 2 'Nobel', 2 'Harvest', 3 'Marvel', 2 'BL312'

1998 Trial: Provided budwood for 40 trees each of 'GEM' and 'Harvest' and 20 trees of 'Lamb Hass' with the plan of having 10 replicates. Actual field grafting was not done according to UC request.

Topworked trials at UC South Coast REC

'Lamb Hass' trial; used 'Gwen' rootstock trial; G755A, G755B, G755C, Toro

Canyon, Borchard, Duke 7, D9, Thomas, Topa Topa; 12 replicates

Nobel' trees at South Coast REC

20 clonal trees: 8 planted in Field 4; 12 planted in Field 46. Purpose of trees is a) budwood and b) fruit source.

Topworked trees at UC, Riverside Campus

Replacement trees in Field 10

Our plans for 1998 - 1999 include:

De Luz Canyon (San Diego County)

100 GEM trees
Pollinizer Trials

Oxnard (Ventura County)

New trees; 'Ettinger', 'Fuerte', 'Bacon', 'Zutano', 'Harvest', 'SirPrize', 'Nobel' and 'Marvel'; 60 trees of each, design not established

San Joaquin Valley Variety Trial

All on Thomas Rootstock; 'SirPrize' 'Lamb Hass', 'Harvest', 'GEM', 'Nobel', 'Marvel', 'Pinkerton', 'Fuerte', and 'Zutano'; 3 sites, will approximate same design as trials established in 1998

UC South Coast REC Field 46

Field graft Duke 7 trees with unreleased varieties in Spring 1999

With the assistance of Dr. Allan Dodds (Dept. of Plant Pathology, UCR) we initiated a sunblotch testing protocol on trees at the SCREC in 1997. Samples from all fields assigned to this program have been tested. Priority is being given to trees that are used as a budwood sources. A second priority is the testing of trees that were suspect due to growth habit. A section of field 46 suspected of having sunblotch has tested positive. Several trees unique to this section have tested negative and budwood will be removed in order to save these varieties for further variety evaluations. As soon as this is done, the trees in this section of field 46 will be removed. In field 4, we have checked 73 trees and all have tested negative for the sunblotch viroid.

We have also continued to supply material to Dr. Richard Litz's program in Florida on an on-going basis during early fruit development. We are also supplying fruit and plant material to other researchers when requested.

B. To collaborate with other researchers worldwide in evaluating and exchanging

promising plant material.

We have initiated discussions with other avocado selection programs regarding receiving interesting and promising material. We are planning visits to Israel in Spring 1999 and to South Africa in Summer 1999.

C. To collaborate with Dr. Menge (Dept. of Plant Pathology, UCR), and Dr. Crowley on rootstock selection and evaluation for both root rot resistance and salinity tolerance. Collaborate with Dr. Menge and Dr. Thorp on identification and evaluation of dwarfing material.

In Spring 1999 we topworked trees of various clonal rootstocks to the 'Lamb Hass' variety. This will allow us to assess its performance on selected rootstocks. We are planning a new clonal rootstock trial (to be planted in Spring 1999) that will be planted at SCREC with Dr. Menge. The 'Hass' and the 'Lamb Hass' will be included in this trial on selected clonal rootstocks ('Hass' on Day, Duke7, Dusa, Evstro, G755A, Parida, PP4, Spencer, Thomas, Toro Canyon; 20 replicates 'Lamb Hass' on Day, Duke 7, Evstro, Thomas, Toro Canyon; 20 replicates).

A clonal rootstock trial was planted in Spring 1999 in the San Joaquin Valley. This trial used the 'Sir Prize' as the scion variety. Three sites were planted: UC Lindcove Research and Extension Center in Exeter, Cutler-Orosi and Porterville. Unfortunately these research sites were greatly affected by the December 1998 freeze. Although the trees are still in the ground, we anticipate that we will terminate the Cutler-Orosi site and possibly the Lindcove REC site. The trees in Porterville appear to have survived and we hope to collect reasonable information from this site.

We continue to collaborate with Dr. Crowley in his salinity research. An interstock trial using Colin V-33 was planted in Fallbrook in Spring 1998. The trees will be grafted to a scion variety ('Hass') in Spring 1999.

D. To assist Dr. Mike Clegg on coordination of pollinizer research plots.

We in conjunction with Ben Faber are establishing a pollinizer site in Ventura County (Oxnard) in Spring 1999. We have also established a site in Ventura County (Somis) looking at the distance from the pollinizer row vs. yield. We hope to have fruitlets analyzed from this site (pending Year 2000 funding from the Hansen Trust). We continue to discuss with Dr. Clegg ways to incorporate the B flower type selections into an organized research program to evaluate the value of outcrossing and which pollinizers to utilize and to discuss future directions for the breeding program.

E. To assist Drs. Morse and Hoddle on identifying plant material tolerant to Persea mite and the avocado thrips.

We have not initiated any activities with this objective. Mr. Stottlemeyer has coordinated some activities with Dr. Hoddle, namely providing plant material for Dr. Hoddle's laboratory testing.

D. To maintain and improve the CAS variety block and the *Persea* germplasm block located at the UC South Coast Research and Extension Center.

An accurate plot map has been generated for the CAS Variety Block. Any changes to the planting are being recorded in the master data base maintained by David Stottlemeyer. Several new and/or historical varieties have been grafted onto rootstock material. We purchased a pole pruner in 1998 and are beginning to top trees in both Field 44 (CAS Variety block) and Field 46 (Breeding Block) to approximately 15 feet. This will allow us to manage the block more efficiently. We are still planning, in conjunction with Dr. Menge, to include representative trees of major rootstock varieties. This over time will serve as a source of budwood and identification material for growers. The volunteers have been instrumental in maintaining this block.

We are continuing our efforts to expand and improve the *Persea* germplasm block. Part of this effort includes the repropagation of material collected by Dr. Zentmyer that is planted elsewhere at SCREC. We are also maintaining some plant material at UCR in the greenhouse. Some of this material will be planted at SCREC, others will be maintained on campus.

G. To insure the timely and effective dissemination of information developed from this research program.

The avocado web site at: www.ucavo.ucr.edu has been on-line since June 1998. The site continues to be updated with new information and photographs of different varieties. Questions sent via e-mail are answered on an ongoing basis.