

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

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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 the last year 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 are initiating further cooperator trials at the following sites: San Luis Obispo, Santa Paula, Moorpark, Fallbrook and Highland Valley. These trials will have the most promising selections topworked onto existing field trees in replicated trials and include BL667 (Nobel), BL516 (Marvel), RT5176, BL1058, 3-29-5 (Gem), N4 (-) 5 (Harvest), OA184. The Moorpark site will be designed as a pollinizer site to test the usefulness of some of the new selections as pollinizer varieties for 'Hass' and 'Lamb Hass'. We are also expanding the plantings at the UC South Coast Research and Extension Center (SCREC) in Irvine. These expansion plantings will allow us to evaluate a number of the new selections similar to the new cooperator trials. In October 1997 we began collecting dry weight information at 2 to 3 week intervals on the following varieties: 'Marvel', 'Nobel', 'Gem', 'Harvest', 'Hass', 'Lamb Hass', 'Pinkerton', 'Regal', OA184 and 'Sir Prize'.

With the assistance of Dr. Allan Dodds (Dept. of Plant Pathology, UCR) we have initiated a sunblotch testing protocol on trees at the SCREC. Samples from all fields assigned to this program have been tested. Priority is being given to trees that are used as a budwood source. A second priority is the testing of trees that were suspect due to growth habit. Forty-nine trees have been tested so far and only 2 trees have tested positive (suspect trees). In another field which we are using for budwood, we have tested 18 trees (all negative). We have tested at least 3 trees for each unreleased variety represented in Field 4 at South Coast and will continue to test until all the trees have been cleared.

A major effort during this last year has been the establishment of a database that includes all trees at SCREC and UCR. Each tree has been given its own unique identification number and a way to track budwood from individual trees has been included in the database. The notes and observations which Mr. Martin left upon his

departure have also been incorporated into the database as well as the notes taken by the Volunteers assisting the program.

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.

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 1998, we will be topworking 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 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. A clonal rootstock trial will be planted in Spring 1998 in the San Joaquin Valley. This trial will use the 'Sir Prize' as the scion variety. Three sites will be used, UC Lindcove Research and Extension Center in Exeter, Cutler-Orosi and Porterville. We continue to collaborate with Dr. Crowley in his salinity research. An interstock trial using Colin V-33 will be planted in Fallbrook in Spring 1998. The trees will not be grafted to a scion variety until Spring 1999. We are considering at this time to use the 'Lamb Hass' when the trees are grafted.

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

As noted above, one of the new experimental sites being established this spring will be a pollinizer study. 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.

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. Dr. Xuan Liu, however, has initiated preliminary studies to compare the photosynthetic activity of the 'Lamb Hass' (tolerant to Persea mite) to the 'Hass' variety.

F. 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. We have purchased a pole pruner and plan to begin a block rejuvenation by topping all trees to approximately 15 feet. This will allow us to manage the block more efficiently. Additionally we have decided to maintain only 2 trees of each variety. This will allow us to continue to expand the collection within the allotted space. We are also 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 which is planted elsewhere at SCREC.

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

Mr. Stottlemyer is working on the development of a web site for the breeding program. This web site will include information on varieties and rootstocks. We have requested a number of avocado growers to preview the web site to provide suggestions prior to releasing the address for general use.