

WHY DO WE NEED CONTINUED EFFORTS IN AVOCADO SCION AND ROOTSTOCK IMPROVEMENT

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The California avocado industry is dominated by a single variety, 'Hass'. Although this variety has some excellent attributes such as good eating quality, relatively high yields under favorable conditions and reliable postharvest attributes the variety is also has a number of problems. Some of these problems include small fruit size (especially as the tree ages); intolerance to extreme climactic conditions, alternate bearing and sensitivity to certain insect pests (greenhouse thrips, *Persea* mite and avocado thrips). The introduction of more reliably producing varieties should help to stabilize production swings. Consistently heavier yields per acre can lower production costs per pound. The biodiversity resulting from a multi-variety industry should slow the spread of diseases and pests like *Persea* mite, avocado thrips and others that may well appear in the future. Two new avocado cultivars, 'Lamb Hass' and 'Sir Prize' have been recently patented and released by the University of California. The 'Lamb Hass' in particular shows promise as a new variety for the California industry. The tree has an upright growth habit, possibly conducive to high density plantings and/or intensive canopy management. It has also demonstrated some apparent tolerance to the *Persea* mite. The fruit is 'Hass'-like in appearance and matures later in the season than 'Hass'. We know less about the 'Sir Prize', but this cultivar may show potential as an alternative to the 'Zutano' for San Joaquin Valley growers. Additionally, several of other potentially interesting selections: 'Nobel' (BL 667), 'GEM', 'Harvest', 'Marvel', '5-552', '5-186', 'OA184' and 'BL312' have been identified. Much more information needs to be collected on these selections; however, all these selections show some sort of improved characteristic over the 'Hass'. One interesting sidelight to these new selections is the possible utility of these varieties as pollenizers for 'Hass'. The efficiency of these new selections as pollen donors to the 'Hass' will be evaluated by Dr. Clegg's lab at UCR (Clegg et al., 1998).

Other avocado producing countries are now actively searching for improved varieties (Bergh and Lahav, 1996; Bijzet et al., 1997a, 1997b; Lahav and Lavi, 200_; Sippel et al., 1997a, 1997b; A. Blumenfeld and E. Lahav, Volcani Research Institute, Israel, personal communication). Many of these countries have used material from the California avocado breeding project to build their plant improvement program. As we move ahead in looking for improved plant material, it is critically important to maintain open ties with researchers developing new cultivars so that we may introduce this material into California for evaluation under our conditions. We also need to re-examine older plant material in California for potential development of both regional and national niche markets. We should not be blinded by the mentality that only "black" sells, but rather that we could market any cultivar as long as it has desirable and reliable quality. The success of the CA deciduous fruit industry which markets literally hundreds of varieties in a span of only 16 weeks should serve as a reminder that we can also market multiple varieties.

Phytophthora root rot continues to spread, with no fully satisfactory control measures available. Even if more effective fungicidal treatments are developed, concerns regarding their cost and the eventual development of fungal resistance still favor improved rootstock ge-

netic tolerance. There has been extensive research conducted by the University of California to identify rootstocks which are tolerant to *Phytophthora cinnamomi* and *P. citricola*, but little evaluation of the horticultural attributes of these selections have been made. Part of this research program is designed to assess the horticultural attributes of promising clonal rootstocks. The results from this study will help to provide guidelines for distinguishing between avocado clonal rootstocks beyond the criteria of disease resistance (Arpaia et al., 1991; Barrientos-Priego et al., 1991; Ben-Ya'acov et al., 1991; Oster and Arpaia, 1991; Mickelbart and Arpaia, 200_).

We also need to be constantly vigilant for new rootstock material which may be more tolerant to environmental stresses, such as salinity, drought stress and which may be dwarfing. In California we are actively pursuing collaborative ties with Dr. Crowley (UCR, Dept. of Soil and Environmental Sciences), Dr. A. Ben-Ya'acov (Emeritus, Volcani Institute, Israel), Dr. Miriam Zilberstaine (Volcani Institute, Israel) and Dr. Grant Thorp (Hort Research, New Zealand) in order to maximize the genetic material available for testing.

The genus *Persea* and its near relatives are largely indigenous to Central and South America. Much of the germplasm in the wild is threatened by deforestation and land development. An integral component of any plant improvement program should be the preservation of the genetic resources for the species, genus and family. Dr. Scora over the last few years has successfully moved a large portion of the *Persea* germplasm collection at the UC South Coast REC to a non-*Phytophthora* infested section of the Center. Funding is needed to maintain and expand this collection as well as maintaining cooperative ties with other international researchers committed to germplasm conservation (Barrientos-Priego et al., 1991; Ben-Ya'acov et al., 1991a, 1991c, 1991d; Bowman and Scora, 1991; Smith, 1992).

Finally, all the information gathered in plant improvement needs to be disseminated back to the source of this research funding, namely the California avocado grower. Information generated in this effort is disseminated through grower meetings, UC Cooperative Extension publications (Subtropical Fruit News), CAC, trade and California Avocado Society publications and a UC Avocado Improvement Home Page (www.ucavo.ucr.edu).

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