

Avocado Breeding Program At a Crossroad



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The California avocado industry has had a long history of involvement with the University of California aimed at developing rootstocks and cultivars that meet the industry's needs. Plant breeding, by nature, is time consuming and costly. Traditional breeding programs rely on thousands of plantings from which selections are made for specific traits, and screened material must then be evaluated with replicated field trials to determine if a promising scion or rootstock will perform as required.

Given the development time for an avocado tree to progress from seedling to one that bears fruit, the entire process may take years if not decades. Marker-assisted selection — a technique that utilizes molecular markers to identify favorable traits at an early stage of tree development — potentially accelerates the selection process, but trials must still be conducted under field conditions before new plant material is ready for release.

In today's environment, the California Avocado Commission (CAC) is challenged to deliver the most it can for every grower assessment dollar collected. It may seem that a \$16 million operating budget should more than provide for a robust production research effort, sustained advocacy on an endless list of issues, and enough marketing muscle

to keep our product competitively positioned and growers profitable, but it is just not the case. Some would argue that the entire budget, if spent solely on marketing, would still fall short of what is needed to keep our "premium" edge as Mexico's advertising and promotion spend for the United States approaches \$30 million annually. Others would opine that we cannot risk inaction when it comes to the polyphagous shot hole borer, lest we find ourselves with no fruit to market if the pest takes hold in commercial avocado orchards. The middle position (which is often where the CAC Board finds itself) calls for a rational allocation of resources across functions, marketing and non-marketing alike, to protect and advance the industry's interests without burdensome increases in the assessment rate.

What this demands of the industry's plant breeding program, then, is simple: focused research and — where possible — shortened time horizons. Water availability and water quality count among the largest threats to California avocado growers and the problem is no longer limited by geography. Southern groves, fed with imported water from the salinity-laden Colorado River have long been under siege. Now, their ranks are joined by northern growers who face water supply challenges because

of the protracted drought and those whose wells are producing ever-increasing loads of total dissolved solids. What both groups of growers need is a rootstock that is drought and salinity tolerant, to help trees adapt to environmental stresses that are becoming more commonplace across the growing region each year. And they cannot wait long, if at all.

The current scrutiny that is being placed on the industry's plant breeding program by the Commission board of directors and its production research committee is, in my view, warranted. It is born of need and urgency rather than criticism of efforts past. The industry is fortunate to have some of the foremost avocado researchers in the world at the University of California, Riverside (UCR) working on its most difficult challenges. We need these individuals and we need some fresh thinking about how to fast-track our program while squeezing the most efficiency out of finite resources and constrained budgets.

All options should be on the table, from the conventional to the unthinkable. Some of these options, which could be as dramatic as privatization of all or a portion of the plant breeding program, may require shifting risk to the growers in order to shorten delivery times for new, and less-than-fully-tested material.



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Others — such as identifying every potential rootstock regardless of who owns it and where it is located — may require significant outreach and networking, collection of performance data and, ultimately, international licensing agreements and the movement of plant material through quarantine to California. Why not start with a comprehensive review of data available on existing rootstocks already in the ground at university facilities, which have already been screened for root rot tolerance?

In the end, the best way forward may prove to be a combination approach that utilizes laboratory testing, genomics, and semi-commercial field trials to increase the likelihood of success and get rootstocks into the hands of growers as quickly as possible.

UCR is presently conducting a

faculty search for an assistant professor in the Department of Plant Pathology and Microbiology. The focus of the position is resistance to biotic stress in subtropical crops. There is no question that additional talent at the university would be welcome by the California avocado industry. The Commission, too, will be bringing new scientific expertise aboard, as our current Research Project Manager Dr. Tim Spann is moving to California State University-Fresno in late July. These changes should be viewed as opportunities.

As we stand at the crossroad and consider the future of the avocado breeding program, the industry should embrace all comers, harnessing their newfound enthusiasm for avocados. The diversity of ideas that is likely to emerge may be just what the doctor ordered. 🥑

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