

The Latest Avocado Research Results

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For those of you not at the annual Avocado Research Symposium at Riverside this year, here's a synopsis of the event. A total of 10 researchers presented their results of new and on-going studies in the areas of plant management, pathology and entomology.

Guy Witney and Gray Martin gave results on the avocado breeding program that was initiated by Bob Bergh. Data is being obtained on the precocity, production, fruit quality, maturity season, relative fruit size, flower type and tree form of a number of promising new varieties. To date there are two cultivars, 'BL122' and 'Sir Prize', that have been patented and released for commercial production. 'BL122' is an "A" flower type that has fruit very similar to Hass, but matures six to eight weeks later than Hass. 'Sir Prize' is a thin-skinned fruit that resembles Hass and is a "B" flower type which could make a good pollinator for 'Hass'. There are nine other selections that show promise, as well, but further testing is necessary before their release.

Mike Clegg's lab is trying to ascertain the value of pollinators in 'Hass' production. They are measuring the effect of 'Bacon', 'Zutano' or 'Fuerte' as a pollen source for Hass pollination. Their preliminary work indicates that the farther the pollinator is from the target tree, the value it has as a pollinator diminishes. A grower last week told me that his father had said the same thing 40 years ago. The objective of this work is to identify good pollinators and determine an optimum spacing for them.

Mary Lu Arpaia reported on a number of studies she is involved with. One is evaluating the productivity of clonal rootstocks in root rot-free soil. After eight years, 'Hass' on G755 A,B, and C, Toro Canyon, Topas Topa, Borchard, Duke 7, D9, Thomas and G1033, the Borchard and Duke 7 are the highest producing rootstocks. Borchard, though, is not root rot tolerant. The Toro Canyon, D9 and Topa Topa are performing comparably and surpass the G755 rootstocks. The Thomas and G1033 are a year younger than the other trees and are yielding as well as the G755 rootstocks.

Mary Lu also spoke on the growth study of 'Hass'. They are evaluating the different periods of growth for root, shoot and fruit to better determine the timing and quantity of such things as irrigation, fertilization and pesticides. This is a long term study and should significantly improve our understanding of avocado culture.

Another study she reported on was the effect of the three rootstocks, Thomas, Toro Canyon and Duke 7 on the salt uptake of 'Hass'. It appears that Duke 7 and Toro Canyon are much better able to handle high salinity levels than Thomas. The Toro Canyon has overall greater vigor than the other two rootstocks when exposed to 4.5

and 6 dS.m⁻¹ of salinity. These levels of salinity are not uncommon in some of the coastal growing areas, especially towards the end of the irrigation season. A related study on irrigation that she is doing with others, shows that daily irrigation compared with weekly irrigation, with the same total amount of water, results in higher leaf sodium and chloride.

The third year of our irrigation trial in Camarillo has resulted in bigger trees as more water is applied, but to date, there has been little effect on tree yield. The trees are irrigated once a week with one of fifteen different amounts of water, the highest gets four times the amount of the lowest. The effect of different irrigation amounts on salt burn is significant. Those treatments with the lowest amounts of water show considerable salt burn.

David Crowley shared the results of two years of work on zinc nutrition, evaluating sources of zinc and methods of application. Working with soils that have considerable disseminated lime (pH Ca. 7.8), soil and irrigation applied zinc sulfate appears to be the cheapest, yet still effective method of correcting zinc deficiency. Although foliar application is presently the most common technique, there is not any rigorous evidence that it is an effective method of correcting zinc deficiency in avocado.

Bill Casale is exploring ways to manage root rot with biocontrol agents, such as beneficial bacteria and fungi. The team is looking at understanding how effective populations can be maintained in the field and what the mechanisms are for increasing the antagonism to the root rot fungus. They are working with mulches to improve the survival of the beneficials.

John Menge and his group have been screening rootstocks for their effectiveness against root rot. Through numerous trials in the greenhouse and the field, new rootstocks are being identified which can outperform some of the clones currently available. The testing involves extensive data collection in different environments and the results will slowly be brought to market.

Howard Ohr and his folks have seven trials on-going evaluating different chemical controls for root rot. Using mulches in conjunction with chemicals has reduced the amount of fungicides required and has produced tree growth and yield surpassing chemicals or mulches alone. In a related study of collar rot, they have concluded that chemical treatment and resistant rootstocks are the management techniques of choice for control of this disease.

Gary Bender presented data gleaned by Jim McMurtry on the biological control of perseia mite. They have concluded that the beneficial *Galendromus helveolus* will establish itself after releases, but the native *G. annectens* increases sooner and to higher numbers than *helveolus*. Another native, *Euseius hibisci* also increases its population early in the spring and helps suppress colonization of perseia mite. When *hibisci* populations begin to decline, then *annectens* and *helveolus* populations build and suppress perseia. There are some indications that the perseia mite peaks from the initial years are declining.

Finally, Carol Lovatt presented data on foliar sprays to control time of flowering and yield of 'Hass'. It appears that there can be a transient deficiency in avocado flowers of

such nutrients as boron, phosphorous, nitrogen and potassium. This is because the flower is not as competitive as leaves at obtaining these nutrients. It is thought that a foliar spray to coincide with flowering can relieve the temporary deficiency which does not show up in a leaf analysis. To date, foliar applications of these nutrients have not had conclusive results and it will be necessary to learn more about application times and amounts.