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NEWSLETTER

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USE IT OR LOSE IT!

I used that statement during my presentation on citrus irrigation during the recent Texas Citrus Mutual Mid-Year Meeting at the TAMU-K Citrus Center. Both print and broadcast media quoted it during subsequent days–but that wasn't all that I said in that context.

Ray Prewett had asked me to address when to use it if a grower had only one irrigation allocation. I pointed out that most growers had already used that one, there having been no significant rainfall since mid-November, so we proceeded on the assumption that another irrigation was available.

The most critical time for irrigation water is during pre-bloom through the end of the fruit set period–which normally ends about the 20th of May. Irrigation after that time is necessary to develop fruit size and to support tree growth for the next year's crop. Thus, my recommendation is to use the irrigation as soon as the trees need it during this critical fruit set period and to let the future take care of itself, for now.

Because some growers had expressed the thought of saving that water until much later, I tried to convey the idea that such was not a good idea, both from the standpoint of the need for water to set the crop and also from the point of view of what may happen in the future, given the present water supply situation and what happened in 1998. Irrigation districts do not save your water for you–when they nearly exhaust their current allocation, they'll quit pumping. Any water that you still have coming will not be delivered–at least not until the district receives sufficient new allocations to start the pumps again.

Contrary to my statement, you won't actually lose the water–you will just lose the ability to use it when you want it. That's what happened in several districts during the summer of 1998–growers who still had a water balance in their accounts could not get it while the district pumps were shut down. In some cases, that included all of July and August. Even so, the 1998-99 crop was a good one, since we had adequate water to set a heavy crop–and fruit size wasn't all that bad, considering the total number of fruit and a hot, dry summer with inadequate or no water until September.

As of the end of March, 2002, the water supply is down 12 percent from a year ago. Without abundant rainfall–here and/or in the watershed–in the next two months, some districts may be forced to stop delivery of irrigation water as early as June. So, whether it rains (and it will, someday) or not, use your remaining irrigation water when your trees need it and hope that the situation improves before the soil moisture from you last irrigation is depleted.

Julian W. Sauls, Ph.D.
Professor & Extension Horticulturist

BUDWOOD PROGRAM UPDATE

The first foundation block trees which were planted in 1998 began producing fruit this year, and recently a committee of "experts" (Julian Sauls, John Fucik, Donald Thompson, Clay Everhard, Heino Brash, Eliezer Louzada, John da Graca, and Craig Kahlke) inspected the trees and fruit for true-to-type properties. Those examined included Rio Red grapefruit, Marrs orange, navels and Valencias, and so far all appear to be normal. They will be examined annually. This is an important step as we move towards the program becoming mandatory.

Budwood cutting will begin soon. Some budwood is ready now, and by early May more will be available. Approximately 50 virus-free cultivars are available in good quantities, and another 2 newly acquired cultivars will be available in limited numbers. In all we have 7 grapefruit varieties, 14 navels, 6 Valencias, 5 blood oranges, over 20 mandarins, as well as tangors, tangelos, limes, lemons, pummelos, kumquats and hybrids, and calamondin.

Nurseries are asked to contact Craig Kahlke 956-968-2132 for their orders.

Craig Kahlke and John da Graca

FACTORS INFLUENCING GRAPEFRUIT PRICES

In the last newsletter article I discussed that after accounting for the 2 years following the big freezes of 1983 and 1989 grapefruit prices have been flat at an average of $4.97/box at the packing house door. Since then I have been working on a statistical model of the supply and demand for south Texas grapefruit. The model is a preliminary model that includes only the years 1987-1997, but it does start to point towards the forces driving prices, or maybe more accurately in this case holding them steady. One of the major factors seem to be the yield responses of the orchard after freezes. Once a freeze has killed off the trees and growers top-work the limbs with new buds it sets the stage for yield increase which will last for years (Figure 1). Then once the trees start expanding their canopies yield increases follow each year and this puts downward pressure on prices. Besides this as a factor, there are two other interesting things in the figure. Note 2001 had the highest yield in the figure and also on record. This appears to be related to a slow but steady increase in tree densities. In 1978 there were an average of 117 trees/acre by 1993 it had increased to 140/acre. This is almost a 20% increase. This also helps to explain why the yields increased faster in the last two freezes compared to the 1962-1971 path. In the next article I will discuss what this means from a management standpoint, which will take us back to the Strategic Thinking Sessions that Melinda Goodman held back in January.

Gary McBryde

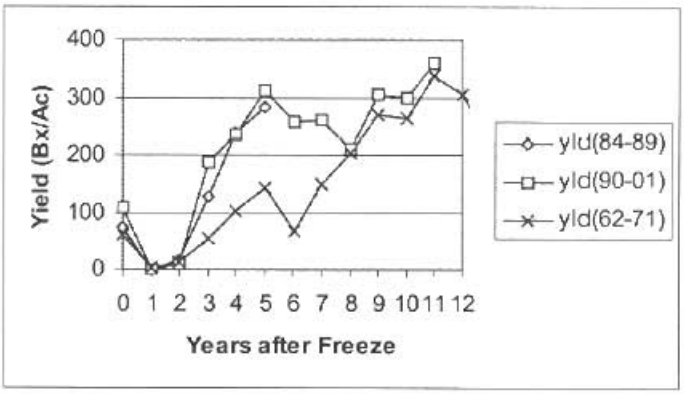

Figure 1. Yields in boxes per acre in the years following freezes for 1962-1963, 1983-1984, 1989-1990.

IN SEARCH OF A REPLACEMENT FOR SOUR ORANGE ROOTSTOCK

The quick decline of citrus on sour orange rootstock caused by *Citrus tristeza virus* (CTV) is one of the most devastating disease of this crop. Sour orange is a highly desirable rootstock because it induces excellent fruit quality of the scion, it is adaptable to a variety of soils, and it is tolerant to most pathogens other than CTV. Because CTV is endemic in Asia, Africa and Australia, sour orange has never been used there, but it became the dominant rootstock in Mediterranean countries, and the Americas. In Texas, over 98% of all trees are still grafted on sour orange. When the efficient virus vector, the brown citrus aphid (BrCA), and severe CTV were introduced into South America from South Africa in the 1920s, the virus spread killing millions of trees in Argentina and Brazil in th 1930s. The aphid and virus eventually spread throughout South and Central America and the Caribbean. In 1995 it appeared in Florida, and that state is now experiencing increasing decline of trees on sour orange. With BrCA presence in southern Mexico being confirmed in early 2000, it is only a matter of time before it reaches Texas. Fortunately, the current level of CTV in the Valley is very low, and most isolates appear to be non-decline ones. Nevertheless, we need to find alternative rootstocks, and we are now getting some data from some trials planted in 1997 in which 12 varieties have been grafted with Rio Red grapefruit. Three of them, all the result of a cross between Sunki mandarin and Swingle trifoliate in California and called C-22, C-57 and C-146, are looking promising. Trees on C-22 produce most of the fruit inside the tree canopy, and for the second year has produced higher yields than all the others including sour. In addition, the fruit quality as measured by sugar, acid content and juice volume is indistinguishable from that of fruit from trees on sour orange. While it is still somewhat premature to make reliable predictions, these results are promising. We are currently multiplying the seed sources of these hybrids for future seed production.

Eliezer Louzada, John da Graca and John Watson

ON THE TRAIL OF THE TEXAS LEAF-CUTTING ANT

One of the keynote speakers at the recent Texas Citrus Mutual Mid-Year Meeting was Dr. Don Grosman, Entomologist with the Texas Forest Service, at Lufkin, TX. He gave a most informative report on the Texas leaf-cutting ant (TLCA) or *Atta texana*, destructive pest of young pine plantations in east Texas and west-central Louisiana. Don not

only described the pest, its biology and damage to pine, but presented preliminary data from chemical control trials that he recently conducted against TLCA. Herein, is a short critique of some of the information given in his talk, together with a few of my own observations of TLCA on citrus in South Texas.

TLCA range is limited to areas with deep sandy soils and occur in 112 Texas counties and 13 Louisiana parishes. TLCA forage on many plant species, but are a significant pest on pine seedlings, citrus, agricultural crops and ornamentals—especially in winter months. TLCA casts are comprised of: winged or alate reproductives (female queens and male drones) and workers. The queen (3/4 inch long) is the reproductive center of the colony, with 5 or more in some colonies. Most eggs laid by the queen develop into sterile female workers. The workers very greatly in size (1/16-1/2 inch) and are comprised of—large workers (soldiers) that protect the nest; medium sized that forage for plants and construct tunnels and chambers ; and minute workers that maintain the fungal gardens and care for the young brood ants. TLCA workers have 3 pairs of prominent spines on the thorax and a distinct pair of spines on the back of the head which distinguishes from other ant species.

TLCA nest area consists of 'crater-like' mounds generally varying from 5-14 inches high and 1-2 ft in diameter. Each mound surrounds an entrance hole. Above ground the nest consists of a central mound area (5 or more mounds/ yd) and satellite foraging mounds. Nest size varies from a single mound (starter colony) to more than 1000 mounds occupying up an acre in a pine plantation. Often clearly defined trails mark the route of travel taken by TLCA workers between the nest and the foraging site. Since the leaf tissue is carried overhead, TLCA are at times called 'Parasol Ants.' The workers often accumulate leaf tissue at the mound entrance before it is taken into the underground chambers.

Underground, tunnels extend from the mound entrance holes to other tunnels or chambers extending as deep as 25 ft below the soil surface. Four types of chambers have been observed: garden chambers—where plant material is incorporated into fungal gardens and where the immature brood ants develop; detritus chambers —where waste materials are stored; central chamber—where queen (s) are located; and dormant chambers—function unknown.

In the Valley, the largest TLCA colony I have seen covered an area of ca. 1,200 sq. ft. and consisted of nearly 200 mounds. The colony was located in a wood lot near a citrus orchard, and was most unusual in that the TLCA mounds immediately adjacent to hackberry trees were 3-4 ft high (Figure). In the nearby orchard the trees were being stripped of foliage and the citrus grower was forced to wage an intensive chemical control campaign against the marauding TLCA.

Methyl bromide has long been the standard chemical treatment for

TLCA in pine plantations, but is to be phased out by 2005. For TLCA control in citrus orchards, Lorsban (chlorpyrifos) granules or applied as a spray drench to mounds is the standard treatment.

Currently, two new chemical baits are being tested by Dr. Grosman, and here in South Texas by Dr. Stormy Sparks, Texas Cooperative Extension Agent, and myself. These are—sulfluramid bait (Volcano/Patron), product of Griffin Co., and fipronil bait (Blitz), product of Aventis

CropScience. Both are slow-acting toxicants formulated in citrus pulp granules, which are retrieved and carried by the worker ants into their underground nests, subsequently causing mortality of TLCA queen(s) and workers.

Dr. Grosman conducted trials in 2001 to determine: preference for Volcano vs Blitz baits; rate of bait retrieval; and efficacy of each chemical bait in halting TLCA activity. In the initial preference trial—Volcano bait (0.5% sulfluramid ai), Blitz bait (0.03% fipronil ai), and plain citrus pulp, were put in separate petri dishes (5 grams each) which were then placed on TLCA foraging trails. Dishes with the preferred baits were emptied by workers in 3-4 hrs. Attractiveness of each bait calculated on percent of bait removal were: Volcano 32%; Blitz 78% and plain citrus pulp 65%.

In an efficacy trial conducted during the winter of 2001, the following bait treatments were applied to separate large active TLCA nests: Volcano (0.5% ai) granules broadcast loose at 4-10 g/m over the central nest area (CNA); Blitz (0.03% ai) granules broadcast loose or in bait bags at 10 g/m spread over the CNA; and an untreated control nest. The nests were checked at weekly intervals post-treatment and the percent of inactive colonies determined. At 2 weeks post-treatment, 50% of the colonies in the Blitz loose granule treatment were inactive, while colonies in all other treatments were still active. But by 8 weeks, all (100%) of the colonies in both Blitz and Volcano loose granule treatments were inactive, while only 30% of the colonies in the Blitz bag treatment were inactive. In the final check at 16 weeks post-treatment all ant colonies were inactive in the Blitz bait bag treatment. Mean while, TLCA colonies in the untreated control nest maintained a high level of activity throughout the trial duration.

Based on these data, Dr. Grosman concluded that Blitz was better than Volcano for TLCA control because it was more attractive in both ant preference and retrieval trials, and halted colony activity 1-2 weeks faster—with the exception of Blitz bait bags which were much slower in halting ant activity, but protects the bait against rain and high moisture. Aventis CropScience has tentatively agreed to seek registration of the Blitz formulation in the United States.

J. Victor French and Don Grosman

VISITING SCIENTIST IN THE FUNCTIONAL FOOD AND POSTHARVEST LAB

Dr. Girija Raman, a post doctoral research associate, joined the Center on April 5, 2002. She will be working in Bhimu Patil's lab and her project will involve isolation, purification and characterization of citrus functional components for four years. She completed her Ph.D. in University of Mumbai and she also has five years of experience in industry working on purification and identification of natural compounds. She is interested in meeting with citrus industry representatives. Her husband Dr. Ananthkrishnan Sankar is accompanying her. He has completed a masters in chemistry and Ph.D. in chemical technology and worked in antioxidant research.

Bhimu Patil

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