

# CITRUS CENTER

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WESLACO, TEXAS 78596

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## NEWSLETTER

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### A TEXAS PERSPECTIVE ON CITRUS CANKER ERADICATION EFFORTS IN FLORIDA

Citrus canker is a serious bacterial disease caused by *Xanthomonas axonopodis* pathovar *citri*. It was eradicated once from Florida around 1920, at a cost of over \$6 million at that time. However, the disease reappeared there in October 1995. The current outbreaks are in seven counties: Dade, Broward, Collier, Hendry, Palm Beach, Manatee, and Hillsborough. A major eradication effort is being conducted in residential areas, and in commercial lime and grapefruit orchards. The estimated eradication cost this year alone is over \$175 million.

Recently, I talked to eight scientists who are familiar with citrus canker. Based on those discussions and the principles of plant disease management, I have no doubt that eradication is the most important aspect of the disease control strategy. This would be the strategy that we would need to adopt, should the canker bacterium ever be detected in the state of Texas. However, there are several obstacles and important factors that play major roles in the success of any eradication program, and they are:

**Money, personnel, and time.** Eradication of well established trees is an expensive process. It requires much manpower, equipment, and time. Timing is a very important factor in controlling the disease spread. Eradication works best if the process can be done sooner and faster. The earlier the better, and cooperation among all parties involved would make disease control an achievable process. If cooperation is lacking, then regulatory agencies will have to use their authority and legal resources. These take time and in the meantime, the canker bacterium multiplies, and spreads especially in the rainy season. Another important question is, are funds available for more eradication efforts in the future, if needed? Proper remuneration and job satisfaction are important factors that govern the re-

See Canker page 4

### FIRST OF VIRUS-FREE CITRUS BUDWOOD AVAILABLE FOR SALE

The first major cutting of virus-free budwood from the Citrus Center's Increase Block (IB) was sold in March and April. Over 14,000 buds were cut and sold, with the next major cutting going on now. The IB is set up to produce over 100,000 buds per year starting in 2001. This should be enough to supply the entire Texas Citrus Industry with high-yielding sources of the main commercial cultivars produced here. As sufficient budwood of each cultivar becomes available, the Texas Department of Agriculture will make it mandatory to plant only virus-free trees with budwood originating from the Citrus Center.

The commercial varieties in which budwood is available now include 'Rio Red', 'Star Ruby', and 'Henderson' grapefruit; 'N-33' and 'Everhard' navel oranges; and 'Marrs' and 'Valencia' sweet oranges. Over 13,000 buds of 'Rio Red' are now available. In addition, over 3,000 buds each of 'Marrs', 'N-33', and 'Valencia' are available. Currently, about 300 buds of each are currently available of the 'Everhard', 'Henderson', and 'Star Ruby'. There are much smaller numbers of non-commercial budwood available, from over 40 cultivars. The non-commercial or

See Budwood page 2

### NEW CITRUS PEST CONTROL GUIDE AVAILABLE

The new Citrus Center Pest Control Guide for 2000-2001 is now available to citrus growers. Also, available for the first time is a Spanish version of the Guide. Four newly registered chemicals have been added to the Guide—Danitol 2.4 EC®, Esteem 0.86 EC®, Micromite 25WS® and Enable 2F®. I gave information on Esteem and Micromite in recent Citrus Center Newsletters—February and April 2000 Issues,

See Pest Control page 3

## THE TEMIK® PROBLEM?

Until recently, Temik® has been a reliable pesticide for Texas citrus growers, having experienced relatively few problems over the years. Most of the prior problems could be attributed to lower-than-label rates, intense weed competition, inadequate rainfall or irrigation for activation—the latter in microsprayer blocks—or very late application (e.g., June).

The current round of apparent failures or early breakdown of Temik® seems to have coincided with the change in application systems. You no doubt remember a few years back when a wet spring precluded irrigation, Rhone-Poulenc suggested that Temik® to “knifed” into wet ground. I saw a number of “failures” that season—4-5 or more trees in adjacent rows with rusty fruit, a pattern that was repeated several times across a grove. Surely, both sides of the applicator didn’t stop up—or unplug!—simultaneously, especially not several times across the grove.

At the time, I concluded that the drive wheel must have come off the ground or slipped a chain, thereby not dispensing Temik® along several trees until the operator recognized and corrected the problem. At typical spacings, a 4-tree skip in application with a double-sided rig amounts to about a pound of Temik®, so even if such an event occurred 10-20 times in a 20-acre grove, the application would still be close to the targeted rate for the entire grove.

Since that time, however, recurring reports of poor control or shortened residual control—even when properly applied—forced me to rethink the situation. Since the formulation hasn’t changed nor are there any indications of resistance, let’s go back to basics.

Temik® is incorporated into the soil, activated by water (dissolved into the soil moisture), absorbed by the roots and translocated throughout the tree where it

kills rust mites. Working backwards, if Temik® isn’t killing rust mites, it follows that Temik® isn’t in the tree (at least not in the necessary concentration). Further, it can’t be translocated if it isn’t absorbed by the roots. So, why aren’t the roots absorbing Temik®?

Before these problems started, before positive displacement and before “knifing” it in, most of the applicators that I saw or used involved paired disks to open a shallow “V” slit for incorporation, with a compression wheel and drag chain to close the slit and seal it. Those devices (I don’t know what they were called) did not penetrate more than an inch or so into the soil.

Contrast that to the current knives or chisel points or whatever that rip the soil and have a strong tendency to “dig in”. Is it possible that our current applicators are actually breaking most of the feeder roots as compared to the rolling disk openers? Typically, the applicator rips two furrows at or near the drip line on both sides of the tree row—where a lot of feeder roots exist. Broken roots do not absorb anything and they take weeks to regenerate. Because Temik® doesn’t move laterally very well—mostly downward—by the time the feeder roots are regenerated at the application site, the Temik® has moved below the absorptive root zone. Ergo, rust mite damage occurred and there is no residual.

Grasping at straws? Maybe, but the logic is sound. What do you think?

**Julian W. Sauls, Ph.D.**

Professor & Extension Horticulturist

### **Budwood from Page 1**

dooryard budwood is imported from California’s virus-free budwood program.

The next major cutting of budwood from the IB is occurring as this goes to print. If you are a citrus grower interested in obtaining budwood and want to be placed on the call list, or would like a list of the cultivars available for future use, please contact me at the Citrus Center. The cost of the budwood is 10 cents per bud. All budwood being released now is designated as early release, in which the Citrus Center cannot guarantee the trueness to type of each cultivar, since the mother or Foundation Block (FB) trees have not come into fruit yet and thus have not been horticulturally evaluated. Budwood can also be sent out of the Rio Grande Valley (mainly along the Gulf Coast areas of Texas) for an additional shipping and handling charge.

It is now even more important to use virus-free budwood, as the presence of the brown citrus aphid (BrCA) has been confirmed in Mexico. The BrCA is the most efficient vector of the citrus tristeza virus (CTV). Citrus in Texas is very susceptible to possible disease problems, as the major rootstock is the CTV-susceptible sour orange. CTV has been detected in nursery and dooryard trees in the Lower Rio Grande Valley and along the Texas Gulf Coast.

On a side note, the installation of the irrigation system for the virus-free field blocks has been recently completed. The FB trees are being irrigated with microsprinklers, which will also be used for freeze protection. The IB is on a drip system, and will continue to be freeze protected with plastic.

**Craig J. Kahlke**

respectively. Earlier I reported that Micromite was given a Section 18 Special Needs Registration. It has now received a full Federal Section 3 Registration and can now be applied up to three times per season. Enable 2F Fungicide, product of Rohm and Haas Company, recently received a Section 18 Registration from EPA for Greasy Spot fungus control (use on bearing & nonbearing grapefruit only). Dr. Mani Skaria, Citrus Center Plant Pathologist, gave a very favorable report on his field evaluations with Enable for Greasy Spot disease control (see the April 1999 issue of the Citrus Center Newsletter). Enable's compatibility in tank mixes with a wide range of insecticides and miticides has high priority in spray trials this season.

Danitol 2.4EC (Fenprothrin), insecticide-miticide product of Valent USA Corp., also recently received a Federal Section 3 Registration. It is labeled at rates of 16 to 21½ fluid ounces per acre to control: citrus blackfly and citrus thrips; and the mite complex of—citrus flat mite, citrus red mite, citrus rust mite and Texas citrus mite. Danitol was included in Citrus Center spray trials for several sea-

sons. Best results (both insect and mite knock down and residual control) are achieved when Danitol is tank mixed with Narrow Range 435 Petroleum Oil (1-5 gal/Acre).

EPA's granting of four new chemical pest control registrations for citrus in a single season is highly unusual. These new insecticides-miticides will be a definite asset to Texas citrus growers in planning and implementing their pest management programs this season. We are indebted to Nora S. Gracia, Research Associate in Plant Pathology, translator for the Spanish Version of the new Pest Control Guide. The 2000/2001 Pest Control Guide will be sent on request or can be picked up at the Citrus Center Library.

**J. Victor French**

## **VISITORS TO THE CENTER**

Two regional directors in the Ministry of Agriculture from the African state of Eritrea, Mohamed Ali Osman and Abraha Garza have been spending two months in Texas learning about various aspects of agriculture, including citrus. They are being hosted by Dr. Juan Anciso (Hidalgo County Extension IPM specialist), and they spent some time visiting the Citrus Center. Eritrean citrus cultivation is still on a small scale, but expansion is planned; interestingly, sour orange is largely used as rootstock there.

In April, Dr. Rosamaria Lopez and her graduate student, Jose Manuel Moran, from the Centro Biotecnologia, Monterrey Tec, Mexico visited Dr. Eliezer Louzada at the center to discuss cooperative research into the use of lazer tweezers in chromosome transfer. Dr. Lopez gave a talk on this technique. Mr. Moran will be spending three weeks with Dr. Louzada in June.

Two representatives from Dupont Agricultural Products in Delaware, Ken Peebles and Dave Marsden, visited the valley in May, and spent time in wide ranging discussions with center scientists. Drew Palrang from Bayer Corp. visited Victor French to plan testing of chemicals for mite control. Also visiting Victor French were Drs. John Braun, Robert Bozsa and Mr. Scott Mitchell, from Valent Corporation to discuss citrus trials with Esteem and Danitol—newly registered chemical for scale and mite control. The center also had a South African

visitor in May, Banie Swart, a sugarcane extension officer from Mpumalanga province where both sugarcane and grapefruit are extensively grown.

Near the end of May a group of six citrus growers from Tamaulipas, Mexico, led by Ing. Sebastian Acosta (INIFAP) and Ing Juan Rodriguez (President, Fundacion Produce) visited the Center.

### **Visiting Scientists**

Ms. Miao Hongqin from the Plant Protection Institute in Baoding, Hebei Province, China is in Weslaco working with Dr. Mani Skaria and Dr. Bob Vlasik of USDA on the canker and tristeza survey project. This is her second visit to Weslaco; she worked here from 1992 to 1994 on characterizing citrus viroids, ringspot and tristeza.

Ms. Celeste Clark from the University of Natal, South Africa will be spending June and July in Weslaco with Dr. John da Graca and Dr. Erik Mirkov on the molecular characterization of citrus vein enation project. She is a technician at Natal University, and is also a graduate student of Dr. da Graca's, and plans to complete her research during her visit.

Dr. Qingguo Tian from China has also just arrived at the Center. He will be working as a research associate for the next two years with Dr. Patil.

**John da Graca**



tion of good quality, properly trained people for continuous survey efforts.

**Cooperation:** The eradication efforts are to protect the citrus industry - mainly the orchards that produce fruit for the fresh market. However, a major effort of current eradication is in dooryard citrus. There are homeowners who do not have any attachment to the citrus industry. For them, they are being taxed and deprived of the joy of raising attractive and tasty fruit in their own backyards. Some might consider canker eradication efforts an encroachment of their rights. There are situations in which owners have sentimental attachment to their trees. For example, I know of a young computer engineer in Texas who has a personal fondness for a lemon tree given to him by his grand father who came to this country from Argentina. He even went through a considerable amount of bureaucratic red tape to have his tree tested for pathogens in order to legally take the tree with him when he was transferred out of Texas to another citrus growing state. After discussions with this man and admiring his dedication, I came to appreciate the sentimental values we humans can get attached to a plant. Such situations no doubt complicate and delay Florida's backyard eradication efforts. If such is the case, a new, disease-free tree can be propagated from the condemned but sentimentally valued tree(s).

Florida may have the money to cover the eradication programs now and in the future, but if cooperation is lacking and infected tree removals are put on hold while the issue is deliberated, the purpose of the eradication program is defeated.

**Bacterial spread by rain, personnel, equipment, and other factors:** The canker bacterium can be spread by rain splashes and hurricanes. The bacterium is also known to be spread by contaminated yard equipment and by people who inadvertently carry the bacterium. Moreover, citrus leaf miner has been found to create situations in which the bacte-

rium multiplies faster in the tunnels created by the leafminer. This increases the amount of bacterium available for spread by either natural or human activities. New research information developed in Brazil on the association of citrus leaf miner and citrus canker may be useful as a guideline for proper decision making on canker eradication under Florida conditions.

**How long should the eradication program continue?** Scientifically, there is a simple and straight forward answer- until the disease is 'gone' and if that is an achievable process. However, if any of the limiting factors listed above are working against or slows down the eradication efforts, then the industry will have to make a major decision on when to stop. Is the eradication efforts staying ahead of disease progression? If the answer is 'yes', then there is merit in continuing the effort. If the answer is 'no', it is time to look at alternative approaches, such as an active suppression in highly infected commercial orchards with emphasis given to more susceptible cultivars such as grapefruit and fruit destined for fresh market.

This year is going to tell us much about the status and future of the canker eradication program in Florida. If the worst comes, Florida may have to adjust to living with that bacterium. Agriculture has faced several such calamities and people have overcome or adjusted to living with plant disease problems. We have survived major diseases like potato blight and we manage fire blight in apples and pears. One thing for sure, canker is applying so much pressure on the scientific community and policy makers, that it will probably help us find ways to better manage this bacterium. After all, canker does not kill citrus trees, while some other citrus pathogens and freezes do.

**Mani Skaria**

## TEXAS GRAPEFRUIT VOLUME DOWN, ORANGES UP

The May 1, 2000, Texas grapefruit production forecast is 5.7 million boxes for the 1999-2000 season, seven percent less than last year's 6.1 million boxes.

All orange production is estimated at 1.7 million boxes, up 19 percent from last year, with early and midseason oranges accounting for 1.5 million boxes and Valencias at 200,000 boxes. The production of all oranges was 1.43 million boxes last year.

Late season rain delayed the final harvest of grapefruit and Valencias. Harvest of early and

midseason oranges is complete. Growers say overall yield of citrus is slightly below last season. There should only be a few trees left to harvest and the season will be closed.

United States grapefruit production is forecast at 63.7 million boxes, up four percent from last year. All oranges production is forecast at 297.6 million boxes, up 33 percent from last year.

**Texas AgriNEWS-June 5, 2000**

## GENETICALLY MODIFIED CITRUS IN FIELD TESTS

The USDA recently granted permission for genetically-modified grapefruit to be planted out in a test plot in Texas - this is the first time such permission has been obtained for citrus in the US. Rio Red grapefruit has been transformed separately with two genes, and the purpose of the field test is to see if the transformation has in any way affected the properties of the Rio Red grapefruit (eg growth habits, fruit characteristics). The one gene is the coat protein gene of citrus tristeza virus. Work with other plants has shown that when they are transgenic for virus coat protein genes the plants are resistant to virus infection. The second gene is from the snow drop lily, and produces a protein which is toxic to a wide range of insect pests. It has no harmful effects on birds or mammals, but its effects on beneficial insects is as yet unknown. While transgenic citrus has been produced in other labs in the US, Spain and Mexico, this is the first time transgenic grapefruit has been obtained.

**Erik Mirkov**  
Texas Agricultural

Experiment Station

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## KRGV-CHANNEL 5 VISITS THE CITRUS CENTER

Ms. Rachel Bianco, KRGV Channel 5 Newscaster and crew visited the Center to interview Dr. French and to do a TV special on Fire Ants (Imported and Native) plaguing Valley dooryards and agricultural crop land. Rachel quickly learned the need for effective ant control when she stepped too close to a colony (mound) of aggressive Red Imported Fire Ants and received several very painful 'stings'. She presented a very informative segment about Fire Ants on KRGV's 5pm newscast.

**J. Victor French**

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