

CITRUS CENTER

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WESLACO, TEXAS 78596

October 2000

NEWSLETTER

Vol.18 No.5

LOSS OF CITRUS TREES ASSOCIATED WITH ROOT WEEVIL AND PHYTOPHTHORA FUNGUS

Since early August we have been trying to identify the cause(s) of the rapid decline and death of orange trees in several Valley orchards. Affected trees first appear stressed—typically showing severe leaf wilt, rolling and yellowing, with defoliation and subsequent death of the tree often within 4-5 weeks. Because most of the trees didn't show trunk lesions typical for *Phytophthora* footrot, and ELISA tests for citrus tristeza were negative, we began to pull out trees to examine the root system. The roots of dead, declining, and healthy-appearing trees away from affected ones, were washed using a high pressure handgun sprayer. Almost immediately we observed insect feeding injury in the form of extensive channeling on both primary and secondary roots, together with severe root rot. The channels varied from 1/2 inch to often more than a foot in length, and 1/4-1/2 inch wide. Fresh feeding channels were light colored while older channels appeared brown, often with a defined dark stripe in the middle.

In sifting through the soil we found an occasional legless white larvae (ca. 1/4-3/4 inch long). While a species of the citrus root weevil (*Curculionidae*) complex is suspected, several of the larvae have been sent for identification to a weevil expert at the

Division of Plant Industry, Gainesville, Florida. Thus far, no adult weevils have been captured, but larvae are being reared in the laboratory and hopefully will mature to adults for species confirmation. Also, a special 'Tedders Trap' developed and used in Florida to capture adult weevils will soon be placed in some affected orchards. A limited number of pyramid cage traps to capture emerging adults have already been placed under declining trees in an orchard near McAllen by The USDA-APHIS Plant Protection and Quarantine Unit, Moore Air Base, Mission, Texas.

Laboratory analysis of the soil and roots also definitely showed the presence of the *Phytophthora* fungus. The larval root channeling and *Phytophthora* root rot were consistently found on trees pushed out

See Root Weevil Page 3



Root channeling caused by root weevil larvae (See insert upper right)



A declining tree (right) and a 'healthy' tree (left)

TOMAS BANDA

On September 1 we lost one of our retirees. Tomas Banda, who worked as Farm Worker I from January 1980 until he took retirement at the end of June 1990, passed away suddenly. He is warmly remembered by staff at the center who send their condolences to his wife, Victoria, and family.

PROPOSED NEW CITRUS CENTER FACILITIES

General Marc Cisneros, President of Texas A&M University-Kingsville has made building a new Citrus Center a main initiative in his vision of future involvement of the University in the Valley. Dean Charles de Young asked a special study committee to develop a proposal for a new facility for the Citrus Center. A comprehensive assessment of the present and future needs was assembled and a report compiled. In addition to the required needs to support research, education and training in citrus production, President Cisneros wants to add classrooms onto the proposed new center to create a two-story building designed to offer courses to Valley students from all the colleges in Kingsville. The proposed new center will be placed before the State Legislature next year with a request for funding via tuition revenue bonds.

The Weslaco Citrus Center was established in 1947. Most of the present buildings presently used are World War II structures acquired as surplus from the Harlingen Air Force Base when it closed after the war. The buildings were moved to Weslaco to use as offices, laboratories, dormitory, workshop and farm supervisor's house. Major renovations and extensions were made in 1973, and again in 1997. However, because of age the structures are in bad shape and the cost of maintenance and operation is increasing.

The committee proposed the construction of a new 34,000 sq. ft. building, with additional screenhouses and greenhouses, to be located adjacent to the Experiment Station and the new USDA facilities. This will foster closer cooperation and increase synergism between the various units. The demolition of antiquated structures was recommended, while retaining newer buildings. Hopefully, additional student apartments will be built in the future on the site of the old building.

The Center has provided the citrus growers of Texas with excellent advice over the past 53 years, conducting research projects to solve local problems and offering continuing education courses to update growers on new developments. It is most widely recognized for the development of the red grapefruit varieties, Star Ruby and Rio Red, but its scientists are also recognized for identifying, rearing and releasing beneficial insects to control pests, testing new pesticides and fungicides, developing orchard and cultural practices that result in more efficient production, and more recently offering a budwood certification program to provide nurseries with disease-free buds.

Jose Amador
Center Director

TAMUK RECOGNIZES BLAINE HOLCOMB

In April this year, Blaine Holcomb (right) of Sharyland Orchards, Mission, stepped down from the Citrus Center Advisory Committee after 32 years service. At the August meeting of the committee, the Dean of Agriculture & Human Sciences, Dr Charles de Young, (left) presented him with a plaque from the University recognizing his long time support for and contributions to the Citrus Center.

John da Graca



GRAPEFRUIT'S HIGH LEVELS OF GLUCARIC ACID, A POTENTIAL DISEASE PREVENTING COMPOUND

Grapefruit contain several functional chemical components including carotenoids, flavonoids, and vitamin C and limonoids. The growing importance of lycopene in human health and its higher levels in red colored grapefruits makes it an important part of the diet. Researchers are always looking for new functional components from fruits and vegetables which have potential benefits to human health.

D-glucaric acid (GA), its lactones and salts such as calcium D-glucarate and potassium hydrogen D-glucarate, are naturally available functional chemicals which are excreted in urine. GA is produced in small quantities by both mammals, including humans, and plants. Although more research is needed to establish strong evidence that GA and its salts could be used just like vitamins in humans, animal studies have shown no toxic effects when rats received up to 2g/kg of a solution of potassium hydrogen D-glucarate solution.

Recently, researchers at the University of Texas M.D. Anderson Cancer Center reported that that GA salts may control different stages of the carcinogenic process by altering the hormonal environment and/or the proliferative status of the target organ.

VISITORS TO THE CENTER

Dr Cheruvu Sankar, an associate professor in horticulture from the Acharya N.G.Ranga Agriculture University in Hyderabad, India arrived at the Center in September for a three-month visit in Dr Patil's lab. He is particularly interested in the distance education methods used by Dr Patil, and also hopes to learn about the research on the health benefits of citrus phytochemicals.

Dr Shoba Sriharan from West Virginia State University paid a short visit to the Center to discuss possible collaborative research with Dr Patil.

Ing.Juan Jose Rodriguez Flores, President of the Citrus Experiment Station in Ciudad Victoria, Mexico together with three colleagues visited the center, their second visit in recent months. They met with Dr da Graca and Dr French and discussed possible collaboration in problems of mutual concern, especially the brown citrus aphid and tristeza virus; there was also interest in the root weevil problem which has recently been observed in both the Valley and in Tamaulipas.

John da Graca

Because of lack of toxicity and antiproliferative properties, GA derivatives may be considered as new or adjuvant cancer-preventive agents. In addition, GA has been found regulate levels of cholesterol and steroids, possibly by altering cholesterol synthesis and its metabolism to steroid hormones and bile acids as well as their disposal.

Grapefruit has the highest D-glucaric acid (GA) among 33 fruits and vegetables studied. The range of GA in fruits and vegetables vary from 10 mg/100g in lettuce to 360 mg/100g in grapefruit. I strongly believe that several functional components work synergistically for disease prevention. It would be interesting to investigate the variation in levels of GA among citrus species and among different cultivars and also changes in postharvest storage of grapefruit.

Bhimu Patil

Root Weevil from Page 1

from orchards in the McAllen, Edinburg, Pharr, Mission, Weslaco, La Feria, and Los Fresnos areas. To date, orange varieties have been mainly affected, but 3 grapefruit orchards have also been found with this type of damage. One grower has already removed 145 dead orange trees from his orchard. The complexity of developing effective management strategies not only for *Phytophthora* root rot, but also for this new root invading insect pest, presents a challenge that we have not faced heretofore. A positive identification of this pest should be forth coming in the very near future. Meanwhile, Alette® and Ridomil® are the chemicals recommended for *Phytophthora* control on Texas citrus.

Mani Skaria and J. Victor French



Exposed citrus roots

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