Texas A&M University-Kingsville

Citrus Center

Weslaco, Texas

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Seasons Greetings

Dr Rasmussen addresses the gathering

Dedication Ceremony for the New Building

On December 15, over 100 guests joined faculty, staff and students for the Dedication Ceremony for the new building which took place on the lawn in front of it. After a welcome from the Center Director Dr John da Graca, Dr Allen Rasmussen (Dean of the Dick & Mary Lewis Kleberg College of Agriculture, Natural Resources & Human Sciences) introduced the speakers - Chancellor Mike McKinney of the Texas A & M University System, Texas Agriculture Commissioner Todd Staples, President Steven Tallant of Texas A & M University-Kingsville, State Senator Eddie Lucio Jr., State Representative Armando Martinez, Advisory Committee Chair Paul Heller and Mr Josue Reyes, Senior Project Manager of Skanska construction.

Senator Lucio read out a proclamation for the occasion, and presented President Tallant with a ceremonial flag of Texas.

Amongst the guests present were Dr Richard Hensz, former Director of the Citrus Center and developer of the Star Ruby and Rio Red grapefruits, former Congressman Kika de la Garza and his wife, State Representative Ryan Guillen, Salomon Torres (District Director for Congressman Ruben Hinojosa), Assistant Vice Chancellor for Government Relations Greg Garcia, Vergel Gay (Chief A&M System Facilities Planning & Construction Officer), Dr Jose Amador (retired Center Director), almost the entire administrative leadership from Kingsville, and many representatives of the Texas citrus industry.

Everyone then proceeded to the auditorium in the new building for a citrus-flavored luncheon sponsored by Texas Citrus Mutual (TCM) and TexaSweet. Ray Prewett, President of TCM, moderated a short program during which Becky Bonham (TCM Chair) presented a poster to the Center representing the Texas grapefruit family tree, Salomon Torres presented a ceremonial US flag on behalf of Congressman Hinojosa, and Paul Heller recognized all present and former members of the Advisory Committee. The highlight of the program was the presentation of a check from Barbara and Jimmie Steidinger to President Tallant for an endowment to provide scholarships to Citrus Center graduate students.

Commissioner Staples, Ray Prewett, Becky Bonham and Jean Prewett

Chancellor McKinney

Armando Martinez, Eddie Lucio Jr, Todd Staples and Ryan Guillen

Senator Eddie Lucio presentinhg proclamation and flag to President Tallant and Chancellor Mckinney

Guests enjoying lunch

Becky Bonham presenting Grapefruit Family Tree poster

Barbara and Jimmie Steindinger handing scholarship check to President Tallant

Dr Richard Hensz (signing a grapefruit) visiting with faculty and student

Drip Irrigation Line Placement for Adequate Soil Moisture in Citrus Production Systems

Shad D. Nelson, Associate Professor, Texas A&M University-Kingsville
Juan Enciso, Associate Professor, Texas Agrilife Research and Extension, Weslaco
Mac Young, FARM Assistance Program Specialist, Texas Agrilife Extension, Corpus Christi

Proper placement of drip irrigation lines and the number of lines to place under mature citrus trees is a concern for growers considering drip systems. During periods of extensive drought, many growers using single-line drip irrigation find it challenging to apply sufficient water to trees in South Texas to meet crop water demand. However, for perennial tree crops like citrus water stress can be a problem regardless of drought as trees can experience water stress throughout the year even when rains in Texas are at average rainfall levels. This has to do with way in which citrus trees grow and where the 'feeder roots' are primarily located for crop water uptake. A large majority of feeder roots for citrus reside within the upper 12 inches of the soil, with major stability roots anchoring the tree in place below this depth. Furthermore, a large majority of roots actively involved in water uptake are located along the 'dripline' of the tree canopy. These roots have adapted to rainfall cascading down and off of the tree leaves and landing on the outer perimeter of the tree. Using low-volume irrigation systems, like drip irrigation, must take this into root growth pattern into consideration so as not to stress these actively growing feeder roots. One way to monitor soil moisture is through the use of soil moisture sensors equipped to a data logging device. When sensors are placed below a single drip line that is located near the tree truck at various depths in tandem with sensors located laterally away from the drip tubing that extend to the drip line of the tree canopy (Figure 1) growers can observe the lateral and downward movement of water after irrigation. Figure 2 shows what commonly occurs to mature citrus trees under single line drip systems as water does not move laterally enough through the upper 12 inch soil depth to meet the water needs of most feeder roots. This results in zones of dry soil at the outside of the tree canopy, and more especially on the side of the tree furthest away from the drip irrigation tubing. The solution to this problem is simple, but does increase the cost of the drip irrigation system installation. Installing a 'dual-line' drip irrigation system (Figure 3) with the drip tubing located mid-way between the tree trunk and outer tree canopy dripline will provide for sufficient lateral movement to supply the water needs of the tree. A dual-line system can lead to better water management as well as growers will avoid the need to run irrigation systems for an extended period of time to try and irrigate the entire root zone of the tree.

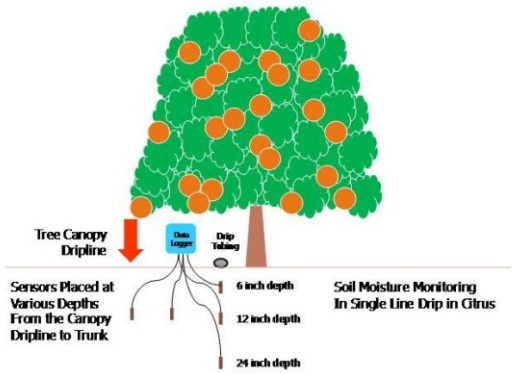

Figure 1. Placement of soil moisture sensors under the citrus tree canopy using single-line drip irrigation to monitor downward and lateral movement of water upon irrigation.

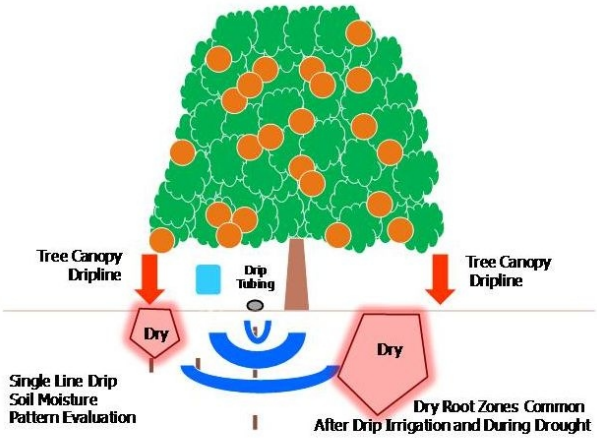

Figure 2. Single-line drip irrigation pattern leads to poor lateral movement to the tree canopy edge in mature citrus groves.

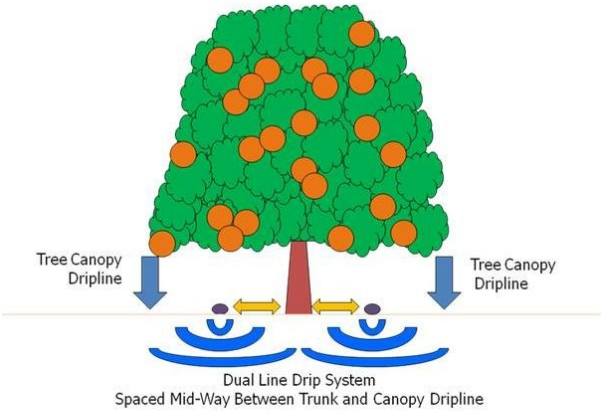

Figure 3. Placement of soil moisture sensors under the citrus tree canopy using dual-line drip irrigation will provide adequate downward and lateral movement of irrigation water to the tree canopy edge.

Study on Psyllid Host Range Leads to Another Masters Student Graduation

John da Graca and Mamoudou Setamou

At the December 2010 commencement ceremony in Kingsville, Jose Luis Sandoval II received his masters degree. The title of his thesis was " Host preference and suitability of North American rutaceous species for the development of the Asian citrus psyllid", and the research was funded by the Florida Citrus Research and Development Foundation.

We were interested to learn if any of indigenous relatives of citrus could serve as hosts of the psyllid, and described the project in our April 2009 newsletter. We acquired plants from different nurseries of 9 indigenous species, and initially carried out experiments to determine if psyllids could survive and reproduce on any in no-choice tests (i.e. if no other suitable plants were available). Three species, namely *Helietta parvofolia* (Baretta), *Choisya ternata* and *Choisya arizonica (*Mexican oranges), were found to be suitable for psyllid reproduction. These are new host records for this pest. While the Mexican oranges do not grow naturally in the citrus growing regions of Texas, they are propagated for ornamental reasons in many places, while Baretta is native to Starr county in South Texas. Lime prickly ash *(Zanthoxylum fagara*), and two torchwood species (*Amyris madrensis and A. texana*), were found to support feeding, egg laying and hatching, but the nymphs died soon after. Adults could feed on sapote and hop tree, but did not lay eggs. *Esenbeckia berlandier*i appears to be unsuitable for psyllids.

Next, Jose conducted choice-tests where adult psyllids were placed in chambers with young shoots of the different rutaceous plants, including two known hosts as controls, orange jasmine and curry leaf. The curry leaf was selected overwhelmingly by adult psyllids as the most favored host for feeding over all others. This was followed by orange jasmine, lime prickly ash, the choisyas and baretta. Orange jasmine and curry leaf had the highest numbers of eggs deposited, followed by *Choisya arizonica,* lime prickly ash, and *C. ternata*. No eggs were laid on baretta, even though it will support psyllid reproduction in no-choice situations. Lime prickly ash was between the two choisyas in egg deposition, even though the life cycle is not completed on it.

There is still more research needed to explain these differences, but it is interesting to note that despite never encountering these species in its native Asia, the insect can feed on most, lay eggs on several, and complete the life cycle on three. Although they were not selected over the two Asian plant species, some could serve as alternative hosts, especially in dooryard settings. It will also be important to know if any could be hosts of the bacteria which cause greening disease.

SOS, PCR-SOS, Pseudo-scab, Windscar Scab

Julian W. Sauls, Professor & Extension Horticulturist, Texas AgriLife Extension Service

There have been various monikers proposed for the sweet orange scab that is bedeviling growers, packers, shippers, importers, customers, regulatory agencies and industry personnel. The USDA refers to it as SOS, which certainly seems appropriate, given that SOS means "HELP!", a lot of which is needed to figure this thing out.

Dr. Mani Skaria proposed PCR-SOS, since his testing does not produce a significant correlation between PCR test results and the growth of *Elsinoe*-like fungi in cultures. I like pseudo-scab, since the present version of the disease often does not produce the normal symptomology of either species of *Elsinoe*. The term "windscar scab" might be apropos, since it is most commonly detected on late season windscar lesions (and a few others, such as lesions caused by thrips feeding and other mechanical injuries).

Drs. Skaria and Kunta did an extensive study of grapefruit and orange fruits having the same windscar symptoms that have tested positive for SOS by PCR. Each windscar lesion was divided in half, one side to be tested by PCR, the other to be cultured for the fungus—with the cultures completed before the PCR results were known.

Of 111 fruit pulled in various stages between harvest and shipment, 53 were PCR positive (48%). Moreover, only 9 of the PCR positives developed *Elsinoe*-like spores (17%), while 8 PCR negative fruits developed *Elsinoe*-like spores (14%).

Problems abound—probably all 111 fruit should have tested positive, since all the samples looked the same, yet half were not SOS, according to PCR results. That only 17% of the PCR positive samples developed *Elsinoe*-like spores suggests that perhaps the other 83% of PCR positives were not, in fact, *Elsinoe*. That suggestion is bolstered by the fact that 14% of the PCR negatives developed *Elsinoe*-like spores, which is too many "misses" for such a test.

What is going on at present? Mostly a whole lot of waiting to see what APHIS-PPQ is going to do and what inspectors have found in California orchards—or maybe the former is waiting on the latter? Meanwhile, it appears that citrus from Mexico will be allowed entry through Texas ports for shipment to non-citrus producing states.

We are still voluntarily staying out of California, which is a huge market for our fruit. While we wait, we are beginning to implement the necessary research to test Koch's Postulates. That requires that the fungal organism be isolated from infected fruit, inoculated onto young fruit, cause the same symptoms of the disease, and finally be re-isolated from these fruit. Once

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that is concluded, we can move on to the necessary risk assessments as to whether standard packinghouse procedures will kill the fungus or otherwise prevent it from being a source of infection, i.e., that washed, chlorinated, fungicide-treated, waxed fruit will not be a threat to another citrus-producing state.

The problem is just not going to go away, though there are many who hope it will. The fact that fruit with these same symptoms of late season windscar have been shipped into California for years is somewhat irrelevant. It is apparently equally irrelevant that California OroBlanco and navel oranges (and maybe lemons by the time this is published) have tested positive for SOS, which means that California already has the problem.

It is highly unlikely that a previously unknown disease could almost simultaneously occur in so many places (15 Louisiana parishes, 3 Mississippi counties, 11 Texas counties, citrus fruits coming from several locations in Mexico, and citrus fruit coming from parts of California), which suggests that it has been around awhile without detection. Too, the diversity of climates in which it now appears belies belief—from the humid regions of Mississippi, Louisiana and east Texas (where one might expect *Elsinoe* to thrive) to the hot and dry conditions of Laredo and Del Rio.

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