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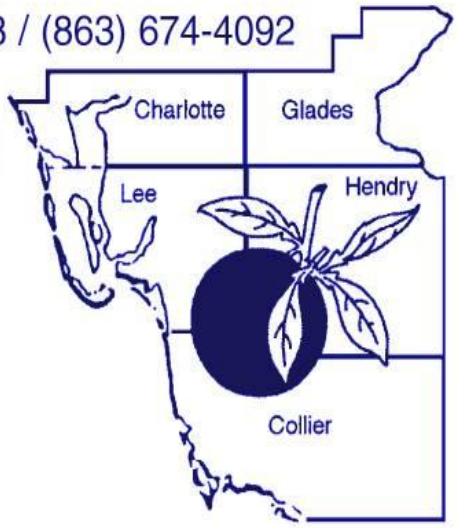
Flatwoods Citrus



Vol. 10, No. 8 **August 2007**

Dr. Mongi Zekri
Multi-County Citrus Agent, SW Florida

U P C O M I N G E V E N T S

FLORIDA'S CERTIFIED PILE BURNER TRAINING

August 7th, 2007 (details on pages 7&8)

CITRUS EXPO

IN FORT MYERS

Wednesday, August 22 &
Thursday, August 23, 2007

Managing Today's Risks for Tomorrow's Profits

PESTICIDE LICENSE TRAINING/TESTING

Monday, 10 September & Tuesday, 11 September 2007
Location: University of Florida, IFAS, Hendry County Extension Office, LaBelle
For more information and/or registration, call 863 674 4092

If you want to see or print a color copy of the Flatwoods Citrus Newsletter, get to the Florida Citrus Resources Site at http://flcitrus.ifas.ufl.edu/ You can also find all you need and all links to the University of Florida Citrus Extension and the Florida Citrus Industry

Mark Your Calendars

Forty-Sixth Annual Citrus Packinghouse Day	Indian River Postharvest Workshop
Thursday, September 6, 2007 Citrus Research and Education Center 700 Experiment Station Road, Lake Alfred, FL 33850	**Thursday, September 13, 2007** Indian River Research and Education Center 2199 S. Rock Rd. Ft. Pierce, FL 34945
Lunch Sponsor: DECCO Includes exhibits by more than 20 companies Great door prizes!	Lunch Sponsor: FMC FoodTech

Mark your calendars for Citrus Packinghouse Day on September 6th, and the Indian River Postharvest Workshop on September 13th. Both programs begin at 9:30 AM.

This year both programs will again focus on presentations, discussions, and workshops of how to successfully ship fresh citrus under changing citrus canker regulations.

Presentations include:

- Changing regulations for the new season
- The latest research results from leading pathologists
- Update on work to improve electronic grading of canker
- Argentine trip report on canker-related pre- and postharvest practices

Training sessions, with certificates of completions, will also be available covering:

- Canker identification on fresh fruit
- Good worker health and hygiene practices

For more information contact Dr. Mark Ritenour at (772) 468-3922, ext. 167 (mritenour@ifas.ufl.edu), or visit the University of Florida Postharvest Resources Website (http://postharvest.ifas.ufl.edu).

Special Thanks to all the sponsors of the Flatwoods Citrus newsletter for their generous contribution and support. If you would like to be among them, please contact me at 863 674 4092.

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Organic vs. GM

Organic foods are often considered the "gold standard" of safety and healthfulness to which all other foods should aspire. This carefully crafted perception is used by the organic food industry to justify the higher price of organic produce. This industry has also campaigned against genetically-modified crops, using terms like "Frankenfoods" - claiming that they are unnatural creations of technology, dangerous for human health and bad for the environment. An increasing number of scientific studies have established that these claims have little merit.

For example, Bt-type GM corn, which resists insect infestation, has been demonstrated to be safer for people than traditionally and organically grown corn. Bt-corn has been discovered to contain on average 900 percent less cancer-causing mycotoxins than the non-GM corn varieties grown by organic and traditional farmers. Pathogenic fungi, such as Fusarium molds, make mycotoxins when they infect grain crops. In laboratory experiments, the fungal mycotoxins cause a variety of cancers (brain, liver, kidney) and other illnesses. In 1989, high levels of mycotoxins in the U.S. corn crop resulted in large-scale field outbreaks of brain tumors in horses and lethal lung edemas in pigs. The most recent research has found truly dangerous levels of fumonisin-type mycotoxins in organic corn products, and fumonisins have now also been shown to produce spina bifida birth defects in humans and liver toxicity in mice and humans. Sadly, most food processing treatments do not reduce the toxic affect. Fusarium-derived mycotoxins have been found in food products as diverse as corn flakes and beer. Three large international studies have reported on the mycotoxin content of hundreds of corn samples collected in eighteen countries. In one study, the average content of just one type of mycotoxin in non-GM corn samples was about 12 micrograms per gram of seed, whereas the content in GM corn samples was only 1.3 micrograms per gram of seed. Why does Bt-corn contain far lower levels of mycotoxins? Fusarium molds primarily enter corn plants through holes and tunnels produced by insects known as corn borers. Higher corn borer infection rates lead to greater potential for fungal infections. Because Bt-corn is equipped to fight corn borers directly, corn borers that attack Bt-plants are quickly killed and do not replicate and bore significant holes, which means fewer Fusarium infections and lower mycotoxin production.

Close to six million farmers around the world plant GM crops and nearly three quarters of them are in developing countries. The advantage of GM crops for resource-poor farmers is illustrated by a study of Bt-cotton-growing farmers in the Lang Fang Prefecture in Hebei, China. During the five years in which they have grown Bt-cotton, their incomes have risen 30 percent due to spending less on pesticides. Their health and the health of their families have improved due to the reduced exposure to pesticides. Finally, the quality of their drinking water has improved due to the decreased contamination of their wells from pesticide runoff. (American Council on Science and Health, 5/9/07).

Agri-Mek is capable of controlling citrus rust mite, citrus leafminer and citrus psyllid with a single application.

APPLICATION TIMING

To control Asian citrus psyllid, citrus leafminer and citrus rust mite simultaneously, target the application between May and August. Delay of miticide applications until later in the summer can result in high rust mite populations at the time of treatment. For the control of citrus leafminer or Asian citrus psyllid, **time the Agri-Mek application based on flush emergence.**

MITE AND INSECT TREATMENT THRESHOLDS

Agri-Mek is not an effective citrus rust mite ovicide. Excessive mite populations at treatment will ensure an excessive number of mite eggs. This will accelerate the rate of reinfestation and reduce the length of residual control. To obtain optimal mite control, **Agri-Mek should be applied before mite populations reach an average of one mite per lensfield.**

SPRAY COVERAGE

Thorough spray coverage is essential for satisfactory rust mite control with Agri-Mek. Poor spray coverage results in reduced contact and residual control. To obtain optimal control of citrus rust mites, **Agri-Mek should be applied using a spray volume of 150–300 gallons per acre (GPA) and a ground speed of 1 – 1.5 mph.** For citrus leafminers and Asian citrus psyllid, timing is more critical than absolute spray coverage. **Higher sprayer ground speeds and lower spray volumes will be adequate.** In this instance, the potential for reduced rust mite control can be mitigated by maintaining lower overall rust mite thresholds.

USE RATES

A 5 fl. oz./A application of Agri-Mek can provide control of citrus rust mites for up to 45 days. Rates of 6-9 fl. oz./A typically control citrus rust mites for up to 60 days. For citrus rust mite control of up to 90 days, use of 10 fl. oz./A is required. A 5-10 fl. oz./A application of Agri-Mek will provide up to 14 days of control for citrus leafminer. A 10-20 fl. oz./A application will control Asian citrus psyllid adults and nymphs present at the time of application. To achieve effective knockdown of the Asian citrus psyllid, Agri-Mek must be applied at a minimum of 10 fl. oz./A. **Growers must choose the appropriate rate for the targeted pest and desired length of residual control. Do not apply more than 40 fl. oz./A of Agri-Mek or any other abamectin containing product in any growing season. Do not make more than three applications of Agri-Mek or any other abamectin containing product in any growing season. Do not apply Agri-Mek or any other abamectin containing product within 30 days of the last treatment.**

HORTICULTURAL OIL

The addition of horticultural oil is required with all Agri-Mek applications. Commercial observations indicate that the use of less than three gallons of horticultural oil per acre can result in erratic control of citrus rust mites and the use of higher oil rates improves residual control. Therefore, to optimize rust mite control with Agri-Mek, **a minimum of three gallons of horticultural oil per acre is advised.** Recent research indicates improved residual control of citrus rust mites when Agri-Mek is pre-mixed with horticultural oil prior to adding it to the spray tank. To obtain maximum residual control, **Agri-Mek can be pre-mixed with the horticultural spray oil immediately before adding it to the spray tank.** The pre-mixing of Agri-Mek and oil should be done **on an as needed basis,** as bulk mixing will result in the separation of the Agri-Mek and horticultural oil.

RESISTANCE MANAGEMENT

Agri-Mek is a Group 6 insecticide containing the active ingredient abamectin. Because of the inherent risks of pests developing resistance to any product, it is strongly advised that Agri-Mek be used in a sound resistance management program. Treatment may not be effective against labeled pests if insect or mite tolerant strains develop. When applying Agri-Mek to plants that are hosts of labeled pests with multiple generations per crop per year, use resistance management practices.

Resistance management practices may include but are not limited to:

- Rotating Agri-Mek with other products with different modes of action.
- Avoiding treatment of successive generations with Agri-Mek.
- Using labeled rates at specified spray intervals.
- Using a non-chemical alternative such as beneficial arthropods.
- Using various cultural practices.

For additional information consult your Syngenta representative.

CERTIFIED PILE BURNERS COURSE

The training will be held from 8:30 am till 4:30 pm at the Immokalee IFAS Center 2686 State Road 29 North, Immokalee, FL 34142-9515, Phone: 239-658-3400

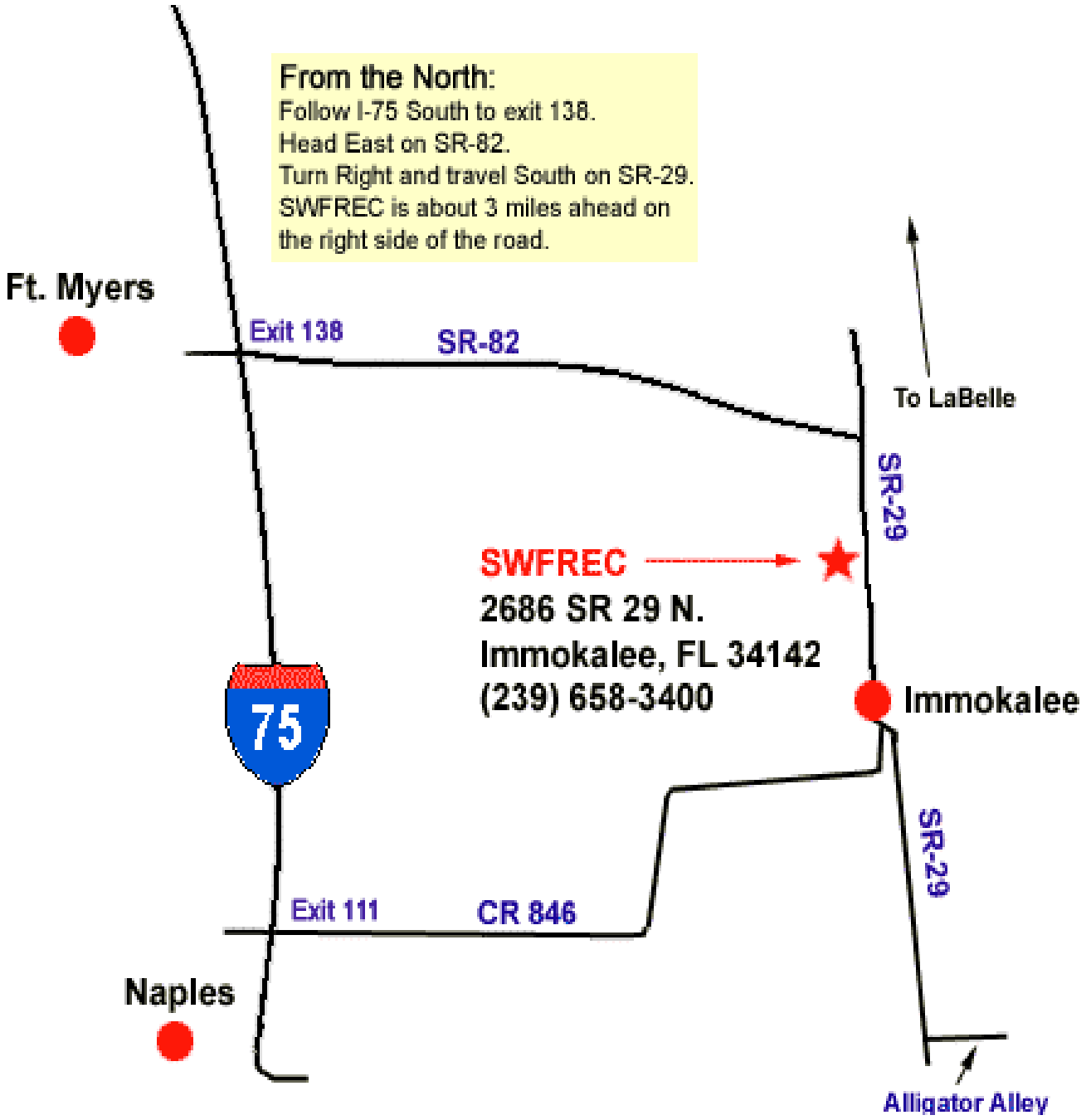
There will be a test at the end of the session. Enclosed are the agenda and directions. This class is still open; if you know of someone who would be interested in attending please have them contact my office. There is a $50.00 cost to attend, please make checks payable to Lake County Citrus Extension Program. Please send checks to the Lake County Extension office care of Ryan Atwood at 1951 Woodlea Rd., Tavares, FL 32778. If you have any other questions please feel free to contact Ryan at raatwood@ufl.edu

Extension Agent-Multi County Fruit Crops
Lake County Extension/UF/IFAS
1951 Woodlea Rd, Tavares, FL 32778
Phone: 352-343-4101
Fax: 352-343-2767 or Maggie Jarrell (mjarrell@ufl.edu) or myself (Mongi Zekri) at maz@ifas.ufl.edu or at 863 674 4092.

Florida's Certified Pile Burner Training
August 7th, 2007

1. Opening Comments and Introduction	08:30 – 09:10
2. Smoke Management	09:10 – 10:30
3. BREAK	10:30 – 10:40
4. Fire Weather	10:40 – 11:20
5. Planning and Implementation	11:20 – 12:15
6. LUNCH (provided)	12:15 – 01:15
7. Open Burning Regulations	01:15 – 02:30
8. Safety	02:30 – 03:10
9. BREAK	03:10 – 03:20
10. Public Relations	03:20 – 04:00
11. Wrap Up & Test	04:00 – 04:30

Travel Directions to the Immokalee IFAS Research & Education Center



From Naples:
From I-75, take exit 111 (CR 846) East.
Turn left onto SR-29 and travel through Immokalee, staying on SR-29.
SWFREC is about 2 mile North of Immokalee on the left.

From the East:
Head West on I-75 (Alligator Alley).
Exit on SR-29 (Exit 80) and head North.
Pass through Immokalee, staying on SR-29.
SWFREC is about 2 miles North of Immokalee on the left.

From The 2007 Florida Citrus Pest Management Guide, SP-43

Huanglongbing (Citrus Greening)

By Drs. Brlansky, Chung, and Rogers
UF-IFAS, Citrus Research & Education Center

Huanglongbing (HLB), commonly called citrus greening disease, is caused by the bacterium, *Candidatus* Liberibacter spp. The name huanglongbing means "yellow shoot" which describes the symptom of a bright yellow shoot that commonly occurs on a sector of infected trees. HLB is a serious disease of citrus because it affects all citrus cultivars and causes decline of trees. HLB has seriously affected citrus production in a number of countries in Asia, Africa, the Indian subcontinent and the Arabian Peninsula, and was discovered in August 2005 in south Florida. Since that time, multiple residential and commercial citrus sites have been found infected with HLB.

The blotchy mottle symptom is the most diagnostic symptom of the disease. Leaves might be small and upright with a variety of chlorotic patterns that often resemble mineral deficiencies such as those of zinc. Often some of the leaves may be totally devoid of green or with only islands of green spots. The blotchy mottle symptom also may be confused with other diseases such as Phytophthora. The early symptoms of yellowing may appear on a single shoot or branch. Affected trees may show twig dieback and the productivity may decline in a few years.

Fruit are often few in number, small, may be lopsided with a curved central core and fail to color properly remaining green at the stylar end. The affected fruit often contain aborted seeds and have a salty bitter taste.

Symptoms are severe on sweet orange, mandarins and mandarin hybrids and are moderate on grapefruit, lemon and sour orange. Lime, pummelo and trifoliate orange are listed as more tolerant. However in south Florida, the symptoms were severe on pummelo, lime, and grapefruit.

When psyllids are abundant and conditions are favorable, HLB can spread, destroying existing groves and preventing the commercial production of citrus. Infected mature trees may decline and become non-productive and young trees that become infected never come into full production.

Recommended Practices

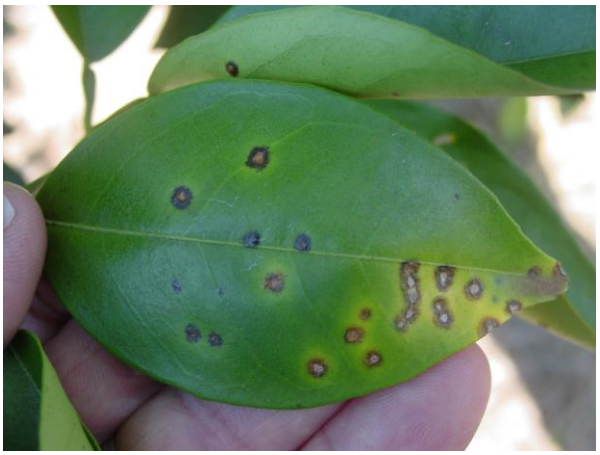
1. HLB is difficult to manage and continued production of citrus has proven difficult and expensive in areas where it is widespread. HLB is transmitted by the Asian citrus psyllid which is well established in Florida
2. The Asian citrus psyllid feeds on many rutaceous plant species. The psyllid has a preference for the landscape ornamental, orange jessamine (*Murraya paniculata*). It has recently been found to be a host of the HLB bacterium, and can serve as a multiplication host for the psyllid. Another rutaceous ornamental, *Severinia buxifolia* or orange boxwood, is also a host for the bacterium as well as the psyllid. Movement of these ornamentals is restricted under state compliance agreements and should not be moved from areas where the disease occurs.
3. Removal of infected trees is the only way to ensure that they will not serve as a source of the bacteria for psyllid acquisition and subsequent transmission. Prior to removal, the infected tree should be treated with a foliar insecticide (such as Danitol, fenpropathrin) to kill all adult psyllids feeding on that tree.
4. Integrated pest management strategies should focus on the following: use of disease-free nursery trees, reduction of the inoculum by frequent disease surveys, removal of symptomatic trees, and suppression of Asian citrus psyllid populations through chemical, biological and cultural controls.

From The 2007 Florida Citrus Pest Management Guide, SP-43

Citrus Canker

By Drs. Timmer, Graham, Chung and Schubert

Citrus canker, caused by the bacterium *Xanthomonas axonopodis* pv. *citri*, is a leaf, fruit, and stem spotting disease that affects citrus. Grapefruit, Mexican lime, and some early oranges are highly susceptible to canker. Navel, Pineapple, and Hamlin sweet oranges, lemons and limes are susceptible. Valencia orange, tangors, tangelos, and other mandarin hybrids are moderately susceptible and tangerines are moderately tolerant.



Major outbreaks of citrus canker occur when new shoots are emerging or when fruit are in the early stages of development. Frequent rainfall in warm

weather, especially during storms, contributes to disease development. Citrus canker is mostly a leaf-spotting and fruit rind-blemishing disease, but when conditions are highly favorable for infection, it causes defoliation, shoot die-back, and fruit drop. When feeding galleries of Asian leafminer on leaves, stems, and fruit become contaminated with the bacterium, the number and size of individual lesions greatly increases and results in tremendous inoculum production.

Most spread of canker bacteria by wind and rain is for short distances, i.e., within trees or to neighboring trees. Canker is more severe on the side of the tree exposed to wind-driven rain. Spread over longer distances, up to miles, can occur during severe tropical storms, hurricanes, and tornadoes. Workers can carry bacteria from one location to another on hands, clothes, and equipment. Grove equipment spreads the bacteria within and among plantings, especially when trees are wet. Growers have to use their best judgment in management of citrus canker. The entire state of Florida is now under quarantine, and fruit movement is subject to specific regulations based on market destination.

Rules for decontamination are still in place and should be followed. In moving equipment and personnel from grove to grove, every effort should be made to make sure that plant material is not moved inadvertently and that all equipment has been thoroughly decontaminated. Decontamination is especially important in harvesting operations, hedging and topping, and in any other practices involving extensive contact with foliage.

***Tree removal*.** If canker is detected in areas previously free of the disease, removal and burning of trees on site can slow the establishment of the disease. For tree removal to be effective, canker has to be localized and limited to a small number of trees. Tree removal is not likely to be effective if canker is already present within a mile of the grove. Before tree removal is attempted as a control measure, blocks should be thoroughly inspected to be sure that canker is not more widespread than initially thought. At some point, tree removal will no longer be economically sustainable and should be discontinued.

***Defoliation*.** There are currently no registered defoliants, but it is possible to defoliate trees using high concentrations of legal copper or fertilizer products. However, no rates or spray volumes have been established for this practice. Chemical defoliants may be available at some point in the near future. Defoliation should only be used during dry times of the year and in conjunction with an intense inspection program. Defoliation or even buckhorning of known canker-infected trees is not likely to eliminate the disease. Following defoliation or buckhorning, the new growth flush should be treated with copper products once the growth is half expanded to protect it from new infections.

Windbreaks. Windbreaks are highly effective in reducing the spread of canker, but more importantly, they reduce the severity of the infection in endemic situations. The vast majority of the infection occurs by wind-blown rains. Winds of 18 to 20 mph are needed to actually force bacteria into the stomates on leaves and fruit. Windbreaks are the single most effective means of dealing with canker. To be effective for canker control, windbreaks need not to be dense. All that is required is to reduce wind speed to less than 20 mph. The need for and the distance required between windbreak rows will depend on the destination of the fruit, fresh or processed, and the susceptibility of the variety. With grapefruit for the fresh market in Florida, it is likely that each 5- to 10-acre block will need to be surrounded by a windbreak. In many groves of less susceptible varieties, a windbreak down the row about every 300 ft may be sufficient. In some situations where some protection exists and tolerant varieties are grown for processing, additional windbreaks may be unnecessary. Additionally, not topping outside rows of citrus will also serve as a viable, harvestable windbreak. Currently, we recommend that growers plant windbreaks along fence lines, ditches, around wetlands, or wherever they can plant without removing citrus trees. If it becomes obvious that more windbreak protection is needed, rows of citrus or end trees can be removed to accommodate windbreaks.

Copper sprays. Over the last 30 years, IFAS has evaluated dozens of products for canker control in several projects in Argentina and Brazil. Products such as antibiotics, compounds that induce resistance in plants, and disinfectants often provide limited canker control, but no material has proven more effective than copper products.

Copper products are quite effective in preventing infection of fruit, less effective for reducing leaf infection, and have limited value in reducing spread of the disease. Application of copper to young leaves protects against infection, but protection is soon lost due to rapid expansion of the surface area. Fruit grows more slowly and is easier to protect. Fruit is susceptible to infection after the stomates open when the fruit is about 1/2- to 1-inch in diameter until they develop resistance in mid to late July. Infection through wounds can occur at any stage. Programs needed for effective control of canker in Florida have not been determined. However, we believe that most of the infection will occur during June and July here. With endemic canker, we suggest that three copper sprays be used for early oranges grown for processing, one in mid-May, a second in mid-June, and a third in mid-July. If canker continues to be very severe, another application of copper in August may be justified. Two applications should be sufficient for Valencias, in early June and in early July.

Programs for fresh fruit are more complex, but many copper sprays are already used on these varieties. For fresh market grapefruit, a low rate of copper should be added to the spray of spring flush for scab. Subsequently, the copper

spray program used for melanose control should also control canker, but additional applications may be needed in late June and July. Copper may need to be added to applications of fungicides or petroleum oil.

Most tangerines are fairly tolerant to canker. Programs used for control of Alternaria should also protect against canker, but copper will have to be used in each spray. Navel oranges are highly susceptible to canker and will probably need to be sprayed every 3 weeks from late April through July. Fallglo is more tolerant and probably three sprays in May, June, and July should suffice.

Spray programs will have to be adjusted as we develop experience. The rates needed depend on the length of protection expected and the weather. As little as 0.5 to 1.0 lb of metallic copper will protect spring flush growth or fruit during the dry spring season. However, in the rainy season, 2 lb of metallic copper will be required to protect fruit for 3 to 4 weeks. Copper usage should be minimized since this metal accumulates in soil and may cause phytotoxicity and creates environmental concerns.

Leafminer control. Leafminers do not spread canker, but extensive infestation by leafminer greatly increases canker inoculum levels making the disease difficult to control. Leafminers are not usually a problem on the spring flush and no control is needed at that time. Leafminer control on the first summer flush can reduce disease pressure considerably. If properly timed, applications of petroleum oil, Agri-mek, Micromite, Spintor, or Assail will reduce damage by leafminer. Late summer flushes tend to be erratic and effective control at that time will probably be difficult.

The Citrus Psyllid

From The 2007 Florida Citrus Pest Management Guide, SP-43

By Drs. Rogers & Stansly

Psyllid Management

With citrus greening disease (Huanglongbing) now present in Florida, management of the Asian citrus psyllid (*Diaphorina citri* Kuwayama) has become very important. In other regions of the world where citrus is grown and greening disease is present, use of insecticides to control the psyllid vector has been a major component of greening management strategies.

Factors Affecting Psyllid Populations

The two main factors that affect the abundance of psyllids are 1) presence of new flush and 2) temperature. New flush is required for psyllid females to lay eggs as well as for subsequent development of the psyllid nymphs. When no new flush is present, psyllids populations do not continue to increase.

Temperature is also closely linked to the abundance of psyllids in the field. The ideal temperature conditions for psyllids are between 68-86°F. At these temperatures, a single female psyllid lives for 30-50 days and can lay between 300 and 800 eggs. When the daily temperatures are above 90°F, the average lifespan of a female psyllid decreases to less than 30 days with an average of fewer than 70 eggs produced per female. Thus, under Florida conditions, psyllid populations will be substantially lower during the mid summer months due to both high temperatures and a reduced amount of new flush available for egg laying.

Psyllid Feeding Damage and Disease Transmission

While it is unlikely that pesticide application and other management strategies targeting psyllids will provide complete control of greening, efforts to manage psyllid populations (together with removal of trees that are visibly infected with greening) will be necessary to slow the spread of the disease in groves where present.

Much of the information on transmission of the citrus greening pathogen by the Asian citrus psyllid is still uncertain. Previous studies on psyllid-pathogen transmission suggests that a healthy psyllid feeding on a greening infected plant may be able to pick up the pathogen with as little as 30 minutes of feeding. After picking up the bacteria, a latent period which may last up to 25 days is required before the psyllid can transmit the pathogen. Transmission of the pathogen is thought to occur through salivary secretions, requiring 1-7 hours of feeding for successful transmission to occur.

To effectively maintain psyllids at low levels throughout the year, it will be necessary to incorporate chemical, cultural and biological control into a comprehensive management strategy for psyllid suppression. No one management strategy alone is likely to be able to provide the results desired in terms of reducing psyllid populations. Thus, managing psyllids will involve targeting control measures at appropriate times depending on the particular growing situation.

Nonbearing Trees

Young trees that produce multiple flushes throughout the year are at greater risk of greening infection than mature trees because of the attraction of adult psyllids to the new flush. Even without greening, young trees in the field need to be protected for about 4 years from psyllids and leafminers to grow optimally. Soil-applied systemic insecticides will provide the longest lasting control of psyllids with the least impacts on beneficials. Drenches are best applied once in the spring and again in the fall, when the trees are flushing and rainfall is less likely to move the material past the root zone before it can be taken up by the plant. Foliar sprays with different modes of action can be used during the rainy season if psyllids are observed on the new flush of young trees. When making multiple foliar insecticide applications within a season, rotation between products with different modes of

action is recommended to reduce the likelihood of pesticide resistance development.

Bearing Trees

Currently, the only soil-applied insecticide that has been shown to provide any reduction in psyllid numbers on large trees is aldicarb. If aldicarb is applied to bearing trees as part of a program for psyllid management, application should be made at least 30 days prior to the initiation of flushing. This timing will allow for the material to move from the roots up to the tree canopy.

At present, the only other chemical control option for suppressing psyllids on bearing trees is the use of broad-spectrum foliar insecticide applications. If greening is present in a grove or nearby, the best timing of foliar sprays for psyllid control is during the early season flush periods when temperatures are at or below 90°F and psyllids are most abundant. Foliar sprays should be timed to the presence of feather-leaf flush. Successfully controlling psyllids with foliar sprays on large trees is difficult because of the unsynchronized sporadic flushing patterns within a grove and the short-residual effects of these foliar sprays. Successful suppression of psyllids during the early part of the year may result in lower populations throughout the rest of the summer when psyllids populations do not develop rapidly due to the higher temperatures, limited availability of new flush and a greater abundance of natural enemies.

Biological Control

Foliar insecticide applications should be used sparingly to minimize the impact on natural enemies that maintain psyllids at lower levels later in the year. While a single female psyllid can lay as many as 800 eggs, studies in Florida and Puerto Rico have shown that over 90% of psyllids that hatch in the field do not survive to become adults. Many are consumed by predaceous insects such as ladybeetles. The parasitic wasp, *Tamarixia radiata*, has been released in Florida and also contributes to some mortality.

Other Management Considerations

In groves where citrus greening has been confirmed, trees showing signs of infection should be removed quickly. Foliar insecticides that provide quick knockdown of psyllids should be sprayed on the infected tree(s) prior to removal to prevent further spread of the pathogen by psyllids.

Management practices used within a grove can also affect psyllid populations, especially those practices that promote new flush such as hedging and topping and fertilization.

The Citrus Leafminer

From The 2007 Florida Citrus Pest Management Guide, SP-43

By Drs. Rogers & Stansly

Leafminer populations decline to their lowest levels during the winter, due to cool temperature and the lack of flush for

larval development. Populations of leafminer build rapidly on the spring flush, although their presence is not apparent until late spring as populations increase while the amount of new foliage decreases. The summer period of high leafminer damage coincides with the rainy season when canker spread is most likely.

Citrus leafminer greatly exacerbates the severity of citrus canker caused by *Xanthomonas axonopodis* pv. *citri*. This insect is not a vector of the disease. Nevertheless, leafminer tunnels are susceptible to infection much longer than mechanical wounds. Tunnels infected by canker produce many times the amount of inoculum than in the absence of leafminer. Control of leafminer should be optimized in areas where infection by canker is high. Natural enemies already present in Florida have responded to leafminer infestations, causing in excess of 50% mortality of larvae and pupae in some areas. The introduced parasitoid *Ageniaspis citricola* has established throughout most of Florida, with rates of apparent parasitism reaching 90% or more. However, these high rates of parasitism are not seen until late in the year.

Leafminer Management

Nonbearing Trees

On young trees, use of the soil-applied systemic insecticide imidacloprid is the most effective means of preventing mining damage on the new flush and has little direct effect on natural enemies. Soil drenches directly to the base of the tree with imidacloprid have been shown to provide at least 8 weeks control of leafminer.

Soil applications of imidacloprid should be made about 2 weeks prior to leaf expansion to allow time for the pesticide to move from the roots to the canopy. Avoid applications 24 hours prior to significant rainfall events which will result in movement of the product out of the root zone before it can be taken up by the plant. Because of limits on the amount of imidacloprid that may be applied on a per acre basis each season, only one application in the spring and possibly one in the fall are recommended. When the residual effects of the spring application have worn off, typically during the mid-summer rainy season, foliar sprays can be used on small trees to reduce leafminer damage.

Bearing Trees

If canker is present in a grove (or in a nearby grove), healthy trees with leafminer damaged leaves are more likely to become sites for new canker infection. The only products currently available for leafminer control on large trees are foliar insecticide sprays. Soil applications of imidacloprid are not effective for leafminer control on large trees due to use rate restrictions that limit the usefulness of the product on trees greater than 6-8 feet in height. It should also be noted that aldicarb (Temik®), which has been demonstrated to suppress psyllid populations on large trees, does not provide control of leafminers. While there are a number of products that are effective for controlling leafminer, achieving control of leafminer using foliar sprays on large trees is difficult due to the unsynchronized flush typically encountered during the summer period when leafminer populations are at their highest levels.

Since leafminers affect only developing leaves, coverage of peripheral leaves in the canopy should be adequate to exert suppression when applying foliar pesticides.

Florida Department of Agriculture & Consumer Services

CHARLES H. BRONSON, Commissioner

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July 30, 2007

MEMORANDUM

To: Florida Producers of orange jasmine (*Murraya paniculata*)

From: Richard A. Clark, Chief

Subject: **Notice of Intent to Add Orange jasmine to the Citrus Greening Host List**

As a follow up to the notice addressed to all Florida Nurserymen dated March 2007, the Division of Plant Industry will now move forward to place orange jasmine, *Murraya paniculata* on the list of plants that serve as a host for citrus greening. This action is necessary due to recent research findings presented to both the Florida Department of Agriculture and Consumer Services and the United States Department of Agriculture that demonstrates orange jasmine is capable of serving as a host for the citrus greening disease.

The result of adding orange jasmine to the Citrus Greening Host List will mean that all orange jasmine must be grown in a screen house structure designed to exclude the Asian citrus psyllid. These screened structures must be approved by the Division of Plant Industry.

The Division of Plant Industry will allow growers and distributors of orange jasmine until December 31, 2007 to liquidate any current inventories of orange jasmine. After that time, the production of orange jasmine in unapproved structures will be prohibited.

For information concerning requirements for approved screen house structures, interested parties should call Mr. Richard A. Clark or Mr. Tyson Emery at (352) 372-3505.

LIVING WITH CITRUS CANKER AND CITRUS GREENING

What has been working in Brazil in reducing the spread of citrus greening and citrus canker and in coping with these and other exotic diseases?

Successful strategies:

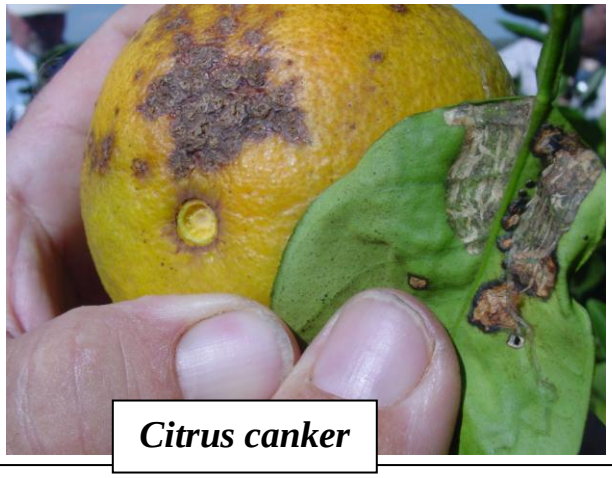
Nurseries

- Isolated citrus nurseries surrounded with windbreaks
- Nursery stock protection in enclosed structures including screenhouses to exclude the citrus psyllid, the citrus leafminer, other insect pests and insect vectors
- Frequent (weekly) sprays for insect control

Groves

1. ***Greening***
    - Frequent survey/inspection of trees (up to 4 times/year)
    - Frequent spray of pesticides for psyllid control (up to 6 times/year)
    - Soil applied systemic pesticides (up to 2 times/year)
    - Immediate removal of trees showing visual leaf symptoms

Citrus greening



Citrus canker

Citrus canker

2. ***Canker***
    - Personnel and equipment decontamination
    - Restrictions in planting canker sensitive cultivars such as Hamlin
    - Frequent copper sprays in combination with windbreaks
    - Frequent sprays for leafminer control
    - Pruning infected branches

MANAGING HEAT STRESS

By Dr. Norman Nesheim, UF-IFAS

Heat stress is caused by working in hot conditions and when the body builds up more heat than it can cope with. Several factors work together to cause heat stress. Before beginning a task, think about whether any of these factors are likely to be a problem. Consider making adjustments in the task itself or in the workplace conditions, including: heat factors--temperature, humidity, air movement, and sunlight; workload--the amount of effort a task takes; drinking water intake; and scheduling.

High temperatures, high humidity, and sunlight increase the likelihood of heat stress. Air movement, from wind or from fans, may provide cooling. Because hard work causes the body to produce heat, a person is more likely to develop heat stress when working on foot than when driving a vehicle. Lifting or carrying heavy containers or equipment also increases the likelihood of overheating. Use fans, ventilation systems (indoors), and shade whenever possible. A work area or vehicle sometime can be shaded by a tarp or canopy or provided with fans or air conditioners. Consider wearing cooling clothes that help keep the body cool.

People who have become used to working in the heat are less likely to be affected by heat stress. To become adjusted to hot work environments, do about two hours of light work per day in the heat for several days in a row; then gradually increase the work period and the workload for the next several days. An adjustment period of at least seven days is recommended. If the warm weather occurs gradually, workers may adjust naturally to working in hot conditions.

Whenever it is practical, choose coveralls that allow air to pass through. Woven fabrics (cotton, or cotton-polyester blends) allow air to pass through fairly easily. Rubberized or plastic fabrics and fabrics coated with chemical-resistant barrier layers allow almost no air to pass through.

Perspiration or evaporation of sweat cools the body. Under the conditions that lead to heat stress, the body produces a large amount of sweat. Unless the water lost in sweat is replaced, body temperature will rise. Drink plenty of water before, during, and after work during heat stress conditions. Do not rely on thirst alone to guide you. A person can lose a dangerous amount of water before feeling thirsty, and the feeling of thirst may stop long before fluids are replaced. Be sure to keep body weight fairly constant. All weight lost because of sweating should be regained every day.

When the combination of temperature, sunlight, humidity, and workload is likely to lead to overheating, use scheduling to avoid heat stress. Schedule tasks requiring the heaviest workload during the coolest part of the day. When heat stress risk is high, schedule frequent breaks to allow the body to cool. Anyone who gets dangerously hot should stop work immediately and cool down. If necessary, shorten the time between breaks.

The above steps will prevent most heat stress problems. But under extremely hot conditions when cooling devices cannot be used, it may be necessary to stop work until conditions improve.

Signs and Symptoms of Heat Stress

Heat stress, even mild heat stress, makes people feel ill and impairs their ability to do a good job. They may get tired quickly, feel weak, be less alert, and less able to use good judgment.

Severe heat stress (heat stroke) is a serious illness. Unless victims are cooled quickly, they can die. Severe heat stress is fatal to more than 10 percent of its victims--even young, healthy adults. Victims may remain sensitive to heat for months and be unable to return to the same work.

Learn the signs and symptoms of heat stress and take immediate action to cool down if you observe:

- fatigue (exhaustion, muscle weakness),
- headache, nausea, and chills,
- dizziness and fainting,
- loss of coordination,
- severe thirst and dry mouth,
- altered behavior (confusion, slurred speech, quarrelsome or irrational attitude).

Heat cramps can be painful. These are muscle spasms in the legs, arms, or stomach caused by loss of body salts through heavy sweating. To relieve cramps, drink cool water or "sports drinks." Stretching or kneading the muscles may temporarily relieve the cramps.

First Aid for Heat Stress

It is not always easy to tell the difference between heat stress illness and pesticide poisoning. The signs and symptoms are similar. **Don't waste time trying to decide what is causing the illness. Get medical help right away.**

- Get the victim into a shaded or cool area.
- Cool victim as rapidly as possible by sponging or splashing skin, especially face, neck, hands, and forearms, with cool water or, when possible, immersing in cool water.
- Carefully remove clothing that may be making the victim hot,
- Have the victim, if conscious, drink as much cool water as possible.
- Keep the victim quiet until help arrives.
- **Severe heat stress (heat stroke) is a medical emergency! Cool victim immediately. Brain damage and death may result if treatment is delayed**.

Flatwoods Citrus

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☐ If you wish to be removed from our mailing list, please check this box and complete the information requested below.

Please send: Dr. Mongi Zekri
Multi-County Citrus Agent
Hendry County Extension Office
P.O. Box 68
LaBelle, FL 33975

Subscriber's Name:_____

Company:_____

Address:_____

City:_____State:_____Zip:_____

Phone:_____

Fax:_____

E-mail:_____

Racial-Ethnic Background

__American Indian or native Alaskan
__Asian American
__Hispanic
__White, non-Hispanic
__Black, non-Hispanic

Gender

__Female __Male