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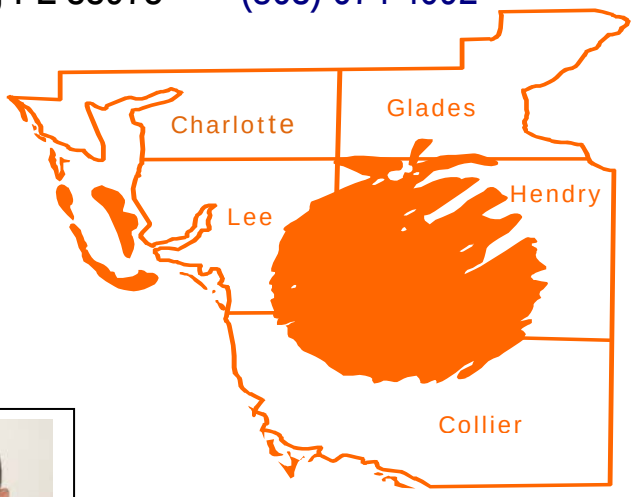
Flatwoods Citrus



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EL NIÑO/SOUTHERN OSCILLATION (ENSO) DIAGNOSTIC DISCUSSION

issued by

CLIMATE PREDICTION CENTER/NCEP/NWS
and the International Research Institute for Climate and Society
9 July 2020

ENSO Alert System Status: La Niña Watch

Synopsis: ENSO-neutral is favored to continue through the summer, with a 50-55% chance of La Niña development during Northern Hemisphere fall 2020 and continuing through winter 2020-21 (~50% chance).

During June 2020, sea surface temperatures (SST) were near average in the east-central equatorial Pacific and below average in the eastern Pacific (Fig. 1). The Niño-4 and Niño-3.4 indices were near zero during the latest week, while the Niño-3 and Niño-1+2 indices were negative (Fig. 2). Negative equatorial subsurface temperature anomalies (averaged across 180°-100°W) weakened from May through June (Fig. 3). However, below-average subsurface temperatures continued in the eastern equatorial Pacific (Fig. 4). Also during the month, low-level wind anomalies were easterly across the east-central Pacific, while upper-level wind anomalies were westerly over parts of the far western and eastern Pacific. Tropical convection was suppressed over the western and central Pacific, and near average over Indonesia (Fig. 5). Overall, the combined oceanic and atmospheric system is consistent with ENSO-neutral.

The models in the IRI/CPC plume (Fig. 6) are roughly split between La Niña and ENSO-neutral (Niño-3.4 index between -0.5°C and +0.5°C) during the fall and winter. Based largely on dynamical model guidance, the forecaster consensus slightly favors La Niña development during the August-October season, and then lasting through the remainder of 2020. In summary, ENSO-neutral is favored to continue through the summer, with a 50-55% chance of La Niña development during Northern Hemisphere fall 2020 and continuing through winter 2020-21 (~50% chance; click CPC/IRI consensus forecast for the chance of each outcome for each 3-month period).

This discussion is a consolidated effort of the National Oceanic and Atmospheric Administration (NOAA), NOAA's National Weather Service, and their funded institutions. Oceanic and atmospheric conditions are updated weekly on the Climate Prediction Center web site (El Niño/La Niña Current Conditions and Expert Discussions). Forecasts are also updated monthly in the Forecast Forum of CPC's Climate Diagnostics Bulletin. Additional perspectives and analysis are also available in an ENSO blog. The next ENSO Diagnostics Discussion is scheduled for 13 August 2020. To receive an e-mail notification when the monthly ENSO Diagnostic Discussions are released, please send an e-mail message to: ncep.list.enso-update@noaa.gov.

Climate Prediction Center
National Centers for Environmental Prediction
NOAA/National Weather Service
College Park, MD 20740

RESETTING IN CITRUS GROVES

For maximum efficiency of a production unit or grove, it is essential that every tree space is occupied by a healthy and productive tree. The average annual tree loss across the Florida citrus industry is currently around 6%. However, the extent of tree loss among individual groves can vary from 2 to 12% or more. Prompt replacement of unproductive trees means higher average long-term returns from the grove. If the declining trees remain in the grove, they keep getting weaker and yield less fruit each year and therefore the potential production capacity for the grove keeps declining even though production costs remain the same or even increase. It is very important to remove and replace such trees once it is clear that they are declining and they are no longer economically profitable. However, the reason for the decline should be determined and the condition should be corrected so that the replacement tree does not suffer the same fate.

Resetting should be considered if the tree is affected by an incurable disease such as blight, tristeza, or citrus greening. The resetting program should be conducted regularly rather than being delayed until serious losses in production have occurred. Resets should be planted with the same cultivar already in the block. Usually, it is more economical to keep resetting and not to push the entire block unless the cultivar and/or the tree spacing between rows is an undesirable one. Replanting in a mature grove seems justified only when a minimum of 8 ft between canopy driplines, (not from trunk-to-trunk), is available for canopy development of the new trees.

Replacement of dead, diseased, and declining trees in Florida citrus groves should always be an important part of the total production program. Today, tree replacement is more important than ever since overhead and production costs are dramatically increasing and a full stand of productive trees is essential to maximize production and profits. Freezes, blight, tristeza, Phytophthora, Diaprepes, and other pests and diseases have been particularly troublesome to Florida citrus growers for the last two decades. Citrus canker and greening have been devastating citrus groves since their introduction to Florida. Extensive tree losses coupled with the economic necessity of regular resetting have caused many growers to investigate ways to achieve new efficiencies in reset management.

NOT AN EASY TASK

Caring for young citrus trees is always troublesome because they require far more attention than larger, established trees. Florida's sandy soils, high summer temperatures, possible low winter temperatures, and scattered rainfall patterns complicate young tree care by forcing growers to protect, fertilize, and weed young trees regularly or face extensive losses. Young trees are more sensitive and more attractive to pests than mature trees due to high levels of vegetative growth. Therefore, special care is needed to insure pests are adequately controlled. Resets often present an even greater problem because trees are usually scattered throughout a block of larger trees, where they compete with large, full-grown trees for limited supplies of water, nutrients, and sometimes sunlight. Scattered resets frequently have serious weed problems since removal of the previous tree allows the area to receive more sunlight and provides more favorable conditions for weed growth. Since resets are usually scattered throughout a block of much larger trees, they are often difficult to locate and may be accidentally overlooked, resulting in inadequate care. Researchers, growers, and production managers are continually developing and improving methods of dealing with reset care.

PLANNING THE RESET PROGRAM

Grove managers should include tree removal and resetting as a routine part of the production program and assign special crews to deal specifically with young tree care. Planning ahead is very important because there is often a lag period between the time when replacement trees are ordered and when they are received. The wait time for the most desired rootstock and scion combination may be as great as 1 to 2 years, so replacement tree needs should be anticipated (when possible) and orders placed so they can be obtained when needed.

PURCHASING TREES

High quality reset trees are essential for maximum young tree growth. These young trees will be placed in an intensely competitive situation and may sometimes receive less than ideal care, so there is no room for compromising tree quality. Only healthy and properly sized trees from registered sources should be purchased since the initial cost is only a small fraction of the total cost of bringing such a tree into production.

SITE PREPARATION

The planting site should be well prepared. Weeds should be removed before planting. At a minimum, a non-residual herbicide should be applied to the reset area to get weeds under control before the young tree is planted.

Planting sites should be prepared well in advance of receipt of the trees. Ideally, trees should be planted on the same day they are received. Under no circumstances should trees be allowed to dry out. To minimize root desiccation and damage, they should be kept cool and moist until they are planted.

PLANTING THE TREES

Trees should be removed from the container and inspected for evidence of pot-binding. Make several vertical slashes about one inch deep through the root ball to encourage root branching. These slashes also allow the potting soil and roots to interface more closely with the soil in the planting site. It may be easier to cut some of the roots with pruning shears and pull them so they protrude from the ball.

A common problem with nursery trees is that the potting mixture is often highly organic. Such materials form areas, which are difficult to permeate with water after the young tree is planted in sandy soils and irrigated. The outer third of the organic ball should be removed so that the outer roots are exposed and can extend into the soil in which the tree is planted. Otherwise, the tree may not grow off quickly and satisfactorily.

WEED CONTROL

Keeping weeds under control during the establishment period of the reset is very important. Weeds compete with young citrus trees for water, nutrients, soil applied pesticides, and sunlight and they must be properly controlled. Weed control around a reset site should be considered at pre-plant, early post-plant, and after the tree is established. Control of weeds prior to planting should be provided. If residual herbicides are used, they should be used at proper rates and at least 30 days in advance of planting so that residues do not impact reset growth. Prior to planting, contact or growth regulating herbicides may be preferred since they do not leave residual effects in the soil.

Weed control during the establishment period or approximately the first year is frequently quite difficult. Hand labor is scarce and expensive. Trunk damage by hoes or other cultivation equipment further compounds the problem. Chemical weed control provides at least a partial solution to the problem during this establishment period. There is now a fairly wide selection of residual herbicides available, which can be used around young trees. These materials should be applied at reduced rates. Be sure to read labels carefully for restrictions on the use of herbicidal materials around young trees.

After the reset has been planted for a year or more, modifications of the weed control program can be considered. Labels of materials under consideration should be checked carefully for restrictions prior to use. Some herbicides require reduced rates around young trees to minimize potential damage to resets planted among older trees. Specially modified herbicide applicators are available which enable the equipment operator to deliver reduced rates or a different herbicide mix around young trees.

To minimize herbicide contact to young trees, many growers apply a wrap or guard around the lower 12 to 16 inches of the tree trunk. When using these wraps be sure to monitor the protective structure for ants or other pests that may damage the tree trunk.

SPROUTING

Resets require periodic sprout removal. The use of tree wraps usually reduces the need for sprout control. Wraps often stay in place for up to 3 years. They should, however, be checked periodically for the presence of ants or fungal diseases. Reduced sprouting may be enough to justify their use. There are no simple answers to the use of wraps. Each situation is different and requires careful horticultural and economic consideration to arrive at the best procedure of maintenance, inspection, and management.

IRRIGATION & DRAINAGE

Young citrus trees require frequent but moderate water application for survival and proper growth. Competition for water is accentuated by nearby older trees or if weeds are allowed to grow close to the young trees. Anything that can be done to discourage competition for available water should be beneficial to the young tree. Irrigation systems should be in place before planting trees. Special modifications to the irrigation pattern by inverting the micro-sprinkler so that the surface wetting area is reduced or by increasing irrigation frequency can be good strategies to supply water for resets. However, the irrigation frequency necessary to sustain a mature grove is rarely adequate for good growth of newly-set trees, and young trees should be checked frequently to be certain they are receiving sufficient water. Drainage is as important as irrigation. Excess water must be removed from the rootzone. The concept of total water management must be practiced. If either system -irrigation or drainage- is not designed, operated, and maintained properly, then the maximum profit potential of a grove cannot be achieved. In Florida, both surface and subsoil drainage is necessary to obtain adequate root systems for the trees.

FERTILIZATION

Reset fertilization requires an extra effort beyond the needs of the bearing grove. Frequent application of water-soluble fertilizers with irrigation water (fertigation) can increase overall fertilizer

use efficiency. If the grove is under a fertigation program, there is no need for special care in terms of nutrition for resets. Great care must be taken to ensure that proper rates of fertilizer materials are dispensed to prevent nutritional deficiencies or toxicities. Frequent light applications usually produce best results and lessen the danger of leaching but these practices need to be evaluated for cost effectiveness. The use of controlled-release fertilizers for resets is a better option than making multiple trips throughout the year to scattered resets throughout large blocks.

PEST CONTROL

Because young trees have more frequent flushing cycles than mature trees, they are more attractive and sensitive to pests. Therefore, special care is needed to keep the citrus psyllid and leafminer under control to reduce their damage to new leaves and to reduce the severity of citrus canker and the spread of citrus greening. Relying solely on foliar contact insecticides for resets is not a good strategy. Soil-applied systemic insecticides (neonicotinoids) which provide 6-8 weeks of control are the most effective tool for managing psyllids and leafminers on resets. Currently, three neonicotinoid products are registered for use in citrus: imidacloprid (Admire, Alias, Couraze, Nuprid), thiamethoxam (Platinum), and clothianidin (Belay). Various generic formulations are also available. Resets should also benefit from foliar contact pesticides and from foliar nutrition used on mature trees.

GROVE PLAT

Since resets are usually scattered throughout a block of much larger trees, they are often difficult to locate and may be accidentally overlooked, resulting in inadequate care. An annually updated grove plat is probably the best method for assessing general grove condition and productivity. Plats can be prepared by hand or with the assistance of a computer. This can help determine the number of trees which will be needed and where they should be placed. Reset plats can be prepared to later help equipment operators locate newly-planted trees for periodic care.

Scattered resets in a citrus grove.

PHYTOPHTHORA

Foot rot results from infection of the scion near the ground level, producing bark lesions, which extend down to the budunion on resistant rootstocks.

Crown rot results from infection of the bark below the soil line when susceptible rootstocks are used. Root rot occurs when the cortex of fibrous roots is infected, turns soft and appears water-soaked.

Fibrous roots slough their cortex leaving only white thread-like stele.

When managing Phytophthora-induced diseases, consider integration of cultural practices (e.g., disease exclusion through use of Phytophthora-free planting stock, resistant rootstocks, proper irrigation practices) and chemical control methods.

Cultural practices. Field locations not previously planted with citrus are free of citrus-specific *P. nicotianae*. Planting stock should be tested free of Phytophthora in the nursery and inspected for fibrous root rot in the nursery or grove before planting. In groves with a previous history of foot rot, consider use of Swingle citrumelo for replanting. Swingle citrumelo is resistant to foot rot and roots do not support damaging populations once trees are established.

Cleopatra mandarin should be avoided because it is prone to develop foot rot when roots are infected in the nursery or when trees are planted in flatwoods situations with high or fluctuating water tables and fine-textured soils. Trees should be planted with the budunion well-above the soil line and provided with adequate soil drainage. Overwatering, especially of young trees, promotes buildup of populations in the soil and increases risk of foot rot infection. Prolonged wetting of the trunk, especially if tree wraps are used on young trees, should be avoided by using early to midday irrigation schedules. Control of fire ants prevents their nesting under wraps and causing damage to tender bark.

Sampling for *P. nicotianae*. Population densities of the fungus in grove soils should be determined to assist in decisions to treat with fungicides. Soil samples containing fibrous roots should be collected during the spring through fall (March to November) from under-canopy within the tree dripline. Individual small amounts of soil from 20 to 40 locations within a 10-acre area are composited into one resealable plastic bag to retain soil

moisture. Samples must be kept cool but not refrigerated for transport to the analytical laboratory. Currently, populations in excess of 10 to 15 propagules per cm^3 soil are considered damaging. The same soil sample could be tested for populations of nematodes, to assess whether they occur at damaging levels.

Chemical control.

Use of fungicides in young groves should be based on rootstock susceptibility, likelihood of Phytophthora infestation in the nursery, and history of Phytophthora disease problems in the grove. For susceptible rootstocks, such as Cleopatra mandarin and sweet orange, fungicides may be applied to young trees on a preventive basis for foot rot. For other rootstocks, fungicide treatments should commence when foot rot lesions develop. The fungicide program for foot rot should be continued for at least one year for tolerant rootstocks, but may continue beyond for susceptible stocks.

In mature groves, the decision to apply fungicides for root rot control is based on yearly soil sampling to indicate whether damaging populations of *P. nicotianae* occur in successive growing seasons. Time applications to coincide with periods of susceptible root flushes in late spring and late summer or early fall.

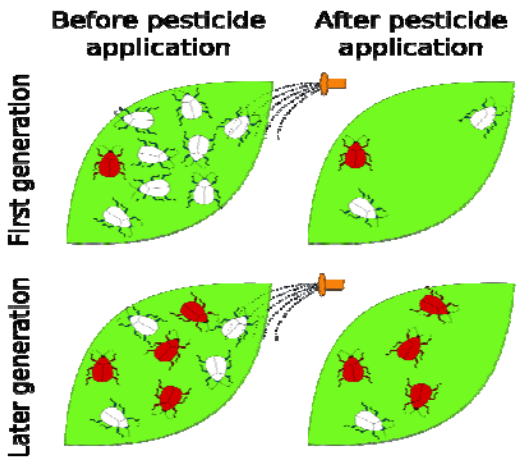
Soil application methods with fungicides should be targeted to under canopy areas of highest fibrous root density. To avoid leaching from the root zone, soil-applied fungicides should not be followed by excessive irrigation.

Recommended Chemical Controls for Phytophthora Foot Rot and Root Rot include Aliette, Phostrol, ProPhyt, Ridomil, UltraFlourish, and Copper.

For more details, go to:
http://edis.ifas.ufl.edu/pdffiles/CG/CG00900.pdf

Pesticide Resistance and Resistance Management

L.M. Diepenbrock and M.M. Dewdney



Populations of animals, fungi, bacteria, and plants possess the ability to respond to sustained changes or stresses in their environment in ways that enable the continued survival of the species. Such environmental stresses include physical factors (e.g., temperature or humidity), biological factors (e.g., predators, parasites, or pathogens) and environmental contaminants. In any population, a small percentage of individuals will be better able to respond to new stresses because of unique traits or characteristics that they possess. Consequently, those individuals will survive, reproduce, and become more common in a population. This phenomenon is commonly referred to as "survival of the fittest."

Many pest species, such as the citrus rust mite, are exceptionally well-equipped to respond to environmental stresses because of their short generation time and large reproductive potential. The use of chemical sprays to control insect, mite, and fungal diseases of citrus creates a potent environmental stress. There are now many examples of pests and pathogens that have responded by developing resistance to one or more pesticides. Pesticide-resistant individuals are those that have developed the ability to tolerate doses of a toxicant that would be lethal to the majority of individuals. The resistance mechanisms can vary according to pest species and/or the class of chemical to which the pest is exposed. Resistance mechanisms include an increased capacity to detoxify the pesticide once it has entered the pest's body, a decreased sensitivity of the target site that the pesticide acts upon, a decreased penetration of the pesticide through the cuticle, or sequestration of the pesticide within the organism. The main resistance mechanism for pathogens is a change in the target site so that the pathogen is less susceptible or fully resistant. A single resistance mechanism can sometimes provide defense against different classes of chemicals and this is known as *cross-resistance*. When more than one resistance mechanism is expressed in the same individual, this individual is said to show *multiple resistance*.

Because the traits for resistance are passed from one generation to the next, continued stress from a pesticide may, over time, create resistance in the majority of individuals in a population. From an operational perspective, this process would be expressed as a gradual decrease and eventual loss of effectiveness of a chemical. Resistance to a particular chemical may be stable or unstable. When resistance is stable, the pest population does not revert to a susceptible state even if the use of that chemical is discontinued. When resistance is unstable and use of the chemical is temporarily discontinued, the population will eventually return to a susceptible state, at which time the chemical in question could again be used to manage that pest. However, in this situation, previously resistant populations may eventually show resistance again.

Of the factors that affect the development of resistance—which include the pest's or pathogen’s biology, ecology and

genetics—only the operational factors can be manipulated by the grower. The key operational factor that will delay the onset of pesticidal resistance and prolong the effective life of a compound is to assure the survival of some susceptible individuals to dilute the population of resistant individuals. The following operational procedures should be on a grower's checklist to steward sound pesticidal resistance management for acaricides, insecticides, fungicides, and herbicides:
Never rely on a single pesticide class. Integrate chemical control with effective, complementary cultural and biological control practices.
Always use pesticides at recommended rates and strive for thorough coverage.
When there is more than one generation of pest, alternate different pesticide classes.
Do not use tank mixtures of products that have the same mode of action.
If control with a pesticide fails, do not re-treat with a chemical that has the same mode of action.
Reports of resistance have been documented for certain acaricides used to control citrus rust mite and fungicides used to combat diseases in Florida. Resistance to Benlate developed in the greasy spot fungus shortly after the product was introduced about 30 years ago and is still widespread. Benlate resistance also occurs in the scab fungus in isolated situations and is stable. Resistance has been detected in tangerine groves with Alternaria brown spot to strobilurin fungicides (Abound, Gem, and Headline and contained in the mixtures Pristine and Quadris Top) but no resistance has developed to ferbam. Dicofol resistance in citrus rust mite was detected throughout the citrus industry about 10 years ago, but resistance proved to be unstable and usage of dicofol has continued. Agri-mek tolerance in citrus rust mite is of concern and growers should follow sound resistant management practices when using this product.
The following tables are provided to aid in the rotation of pesticides with different modes of action within a season or from year to year. There is a separate table for insecticides/acaricides, fungicides, and herbicides. The information in these tables was derived from information produced by the Insecticide Resistance Action Committee (IRAC) (http://www.irac-online.org/), Fungicide Resistance Action Committee (FRAC) (http://www.frac.info/), and the Herbicide Resistance Action Committee (HRAC) (http://hracglobal.com/pages/classificationofherbicidesiteofaction.aspx). Each table lists the number (or letter in the case of herbicides) of the group code for each pesticide class, the group name or general description of that group of pesticides, the common name of pesticides used in citrus production that belong to each group, and examples of trade names of pesticides for each common name listed. When using the table to rotate between using products with different modes of action, choose products with a different group code than previously used in the grove during the current growing season. In the case of insecticides/acaricides, many of these pesticides are broken into subgroups. It is unclear whether cross resistance will occur between these subgroups. When possible, it is recommended to rotate with an entirely different group. (Note: The IRAC and FRAC mode of action systems both use a similar numbering system. There is no cross-resistance potential between the insecticides and fungicides.) Products with broad-based activity such as sulfur, copper, and oil are not included in this list because the development of resistance to them is not likely.
For more details, go to: http://edis.ifas.ufl.edu/pdffiles/CG/CG02600.pdf

Danger of Heat Stress

Be alert to early warnings of heat stress, both in yourself and in your co-workers.

Heat stress needs to be taken seriously.

Working in a hot environment puts stress on the body's cooling system. When heat is combined with other stresses like hard physical work, loss of fluids, or fatigue it may lead to heat-related illness. Individuals over 40 years of age need to take extra care when the weather is hot because their ability to sweat declines as they age. However, heat stress can also affect individuals who are young and fit.

POINTS TO EMPHASIZE:

●Drink plenty of water to keep body fluid levels up

●Get out of the heat occasionally

Water is crucial to help the body adjust to high temperatures. The rate of water intake must be equal to the rate of water loss by perspiration to keep body temperature normal. **When it's hot, drink plenty of water!**

Your body must work even harder to get rid of excess heat when conditions are both hot and humid. Unfortunately, water can't evaporate as readily under muggy conditions. The process is easier if the surrounding air is moving. That's why we welcome a cool breeze, or turn on a fan when the air is "sticky".

Sickness and accident rates increase when heavy work is done at temperatures above 86 F.

Don't push yourself beyond your limits. It could be harmful to your health, and could put you at increased risk of having an accident.

Heat stress hazards

1. **Heat cramps:** Heavy sweating drains the body of salt, which cannot be replaced by simply drinking water. Painful cramps occur in the arms, legs, or stomach while on the job, or later at home. Move to a cool area at once if cramping is experienced. Loosen clothing and drink cool, commercial fluid replacement beverage. Seek medical aid if the cramps are severe, or don't go away.

2. Heat exhaustion: Inadequate water and salt intake causes the body's cooling system to break down. Symptoms include heavy sweating, cool, moist skin, body temperature over 100 F, weak pulse, and normal or low blood pressure. The victim is likely to be tired, weak, clumsy, upset, or confused. He will be very thirsty, and will breathe rapidly. His vision may be blurred. **Get medical help immediately!** Heat exhaustion can lead to heat stroke, which can kill. Move the person to a cool, shaded area. Loosen or remove excess clothing. Provide cool, lightly-salted water. Fan and spray the victim with cool water.

3. Heat stroke can kill a person quickly! Once the body uses up all its water and salt, sweating ceases. Temperature can rise quickly. You can assume a person is suffering from heat stroke if their body temperature is over 105 F, and any of the following symptoms are present:

- ●weakness, confusion, distress, strange behavior
- ●hot, dry, red skin
- ●rapid pulse
- ●headache or dizziness
- ●In later stages of a heat stroke, a victim may pass out and have convulsions

Call an ambulance immediately if heat stroke is suspected. The victim's life may be on the line! Until help arrives, move the victim to a cool area and remove excess clothing. Fan and spray them with cool water. Offer sips of water if the victim is conscious.

Heatwave guidelines

The following measures should help prevent the development of heat-related illnesses.

- ●Slow down in hot weather. Your body's temperature regulating system faces a much greater workload when temperature and humidity are high.
- ●Heed early warnings of heat stress, such as headache, heavy perspiration, high pulse rate, and shallow breathing. Take a break immediately and get to a cooler location. **Watch for heat stress signs among your co-workers.**
- ●Dress for hot weather. Lightweight, light-colored clothing reflects heat.
- ●**Drink plenty of water.** Don't let yourself "dry out".
- ●Try to get used to warm weather gradually. Take it easy for those first three hot days. Your body will have a better chance to adjust if you take it slow.
- ●Get out of the heat occasionally. Physical stress increases with time in hot weather. Take breaks in a cool, shady location.
- ●Wear a hat and long-sleeved shirt to prevent burning (which can increase the risk of skin cancer.)

"Do's" and "Don'ts" of preventing heat-related illnesses

DO:	**DON'T:**
Drink plenty of water Take breaks in a cool, shady area Watch for symptoms of a heat stress, both in yourself and co-workers	Ignore symptoms of heat stress Try to "keep up" with the rest of the crew, even though you feel ill

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**.

Citrus Spray Programs

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Asian citrus psyllid (ACP) control has been the main objective of Florida citrus growers for more than 10 years. While some may question the value of controlling ACP in trees with high HLB incidence, replicated field studies have shown the economic benefit of maintaining young flush pathogen free. Good ACP control starts with effective dormant sprays that will control ACP when populations are low, reducing ACP infestation and thus HLB infection of the all-important spring flush. Pyrethroids (Danitol, Baythroid or Mustang) and organophosphates (dimethoate, chlorpyrifos,or Imidan) provide great winter season control of ACP. Best not to use pyrethroids or OPs again during the year except for border sprays which will reduce the need for whole block applications. Follow up with bloom sprays of labeled products to clean up stragglers. Subsequent whole block sprays should target ACP as well as other pests like rust mites and leafminers that may be problematic.

The table below offers alternative products for different months, depending on which pests are of major concern at the time. Neonicotinoids like imidacloprid, thiamethoxam or clothianidin have not been included as spray options due to their importance for controlling ACP in young trees. Superscripts after the pesticide name are now in sequential order to facilitate use and correspond to superscripts after pests controlled. Make choices based on: (1) effectiveness against ACP and other pests that may be problematic, (2) avoiding repetition of any insecticide mode of action in the interest of resistance management, and (3) rebuilding and maintaining an effective natural enemy complex in the grove. Confining the broad-spectrum insecticides (pyrethroids and organo-phosphates) to the winter season and border sprays during growing season will help conserve these products as well as populations of beneficial insects and mites.

Spray Options for Citrus Pest Management

Dormant Season — **Growing Season**

Months	Nov-Dec	Jan	Feb-Mar	Apr	May - June	July - Aug	Sep-Oct
Products *** Labeled for bloom**	OP[1] (e.g. Imidan, Dimethoate, chlorpyrifos)	Pyrethroid[2] (Mustang Danitol Baythroid)	*Sivanto[3] *Movento[4] *Portal[5] *Micromite[6] Intrepid[7] Exirel[8]	Portal[5] Micromite[6] Exirel[8] Apta[9] Sivanto[3] Oil[13]	Movento[4] Delegate[11] Abamectin[12] Knack[14] Exirel[8] Apta[9] Sivanto[3] Oil[13] MinectoPro[10]	Sivanto[3] Apta[9] OP[1] MinectoPro[10] Oil[13]	Movento[4] Delegate[11] Apta[9] Sivanto[3] Oil[13]
Pests	ACP Weevils	ACP Weevils	ACP Mites Leafminer Weevils Scales Aphids	ACP Mites Leafminer Weevils Aphids	ACP Rustmite Leafminer Scales	ACP	ACP Rustmite Leafminer

ACP[+++ 1,2,3,4,8,9,10] ACP[++ 5,11] ACP[+ 6,12] Leafminer[6,7,8, 9,11, 12] Rustmite[4, 12]
Scales[4,13] Aphids[3,4] Mealybugs[3,4] (+++ excellent, ++ good,+ fair)

Flatwoods Citrus

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Racial-Ethnic Background

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

Gender

__Female __Male