UNIVERSITY OF FLORIDA
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Institute of Food and Agricultural Sciences

Hendry County Extension • P.O. Box 68 • LaBelle, Florida 33975-0068 • (941) 674-4092

Flatwoods Citrus

Vol. 6, No. 3 **March 2003**

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

UPCOMING EVENTS

Seminars at the Hendry County Extension Office, LaBelle

Tuesday, March 18, 2003, 10:00 AM – 12:00 Noon
Irrigation scheduling, maintenance, plugging problems and solutions
Speakers: Drs. Larry Parsons, Brian Boman, and Tom Obreza
1 CEU for Pesticide License Renewal
2 CEUs for Certified Crop Advisors
Sponsor: John Coley, Citrus Maintenance & Service, Inc.
Following the seminar, we are planning a free lunch (Compliments of Citrus Maintenance & Service, Inc.) for only who call 863 674 4092 no later than 17 March.

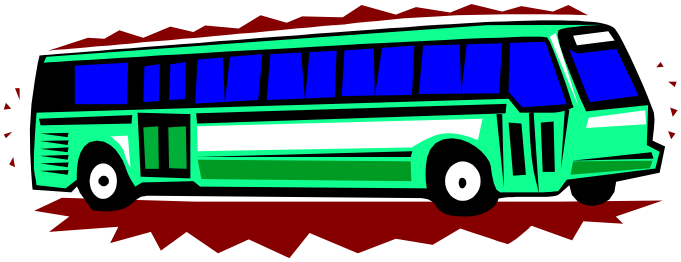
Tuesday, April 15, 2003, 10:00 AM – 12:00 Noon
Citrus leafminer and citrus psyllid management for resets and non-bearing trees
Speaker: Dr. Phil Stansly
2 CEUs for Pesticide License Renewal
2 CEUs for Certified Crop Advisors
Sponsor: Jay Hallaron, Uniroyal Chemical/Crompton Corporation

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

Tuesday, May 20, 2003, 10:00 AM –12:00 Noon
Greasy spot and possible contaminants from pesticides and fertilizers
Speaker: Cathleen Osgood and Drs. Tom Obreza, Pete Timmer and Pam Roberts
2 CEUs for Pesticide License Renewal
2 CEUs for Certified Crop Advisors
Sponsor: Bobbitt Jenkins, BASF Corporation

Tuesday, June 17, 2003, 10:00 AM –12:00 Noon
Record keeping software for grove practices and how to find citrus information
(Pest Management Guide, Fact Sheets, Labels, etc.) on the Internet
Speakers: Rick Montney, Diana Hagan and Drs. Mark Ritenour and Richard Buker
Sponsor: Aglime Sales, Inc., Babson Park, FL

COLLIER COUNTY EXTENSION AG TOURS



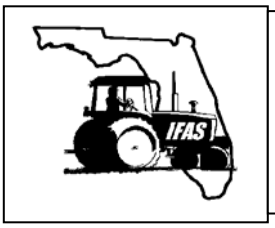
Dates: Wednesday 19 March and Friday 21 March 2003
For more information, call the Collier County Extension Office at 239 353 4244.

Indian River Citrus Seminar at Ft. Pierce

Tuesday March 4 & Wednesday March 5, 2003

Florida Agricultural Conference & Trade Show (FACTS)

Date: April 29-30, 2003, Location: Lakeland Center, Lakeland



FARM SAFETY DAY

Saturday, June 7, 2003, Immokalee IFAS Center

Coordinator: Mongi Zekri

CITRUS EXPO
IN FORT MYERS

Wednesday, August 27 and
Thursday, August 28, 2003

CITRUS EXPO

Special Thanks to the following 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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Mobile: 239 707 1198
E-mail:
rachel.walters@bayercropscience.com

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BASF Corporation
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Fort Myers, FL 33913
Phone: 239 561 2812
Fax: 239 561 6985
Mobile: 239 707 1603 AGNET #6652

CITRUS SCAB

This fungal disease affects grapefruit, Temple orange, Murcott, tangelos, and some other tangerine hybrids. If leaves from the previous season are heavily infected by citrus scab, 3 applications should be scheduled to control this disease. The first spray should be applied at about ¼ expansion of the spring flush leaves, the second at petal fall and the third about 3 weeks later. Fruit becomes resistant to scab about 2 months after petal fall. Benlate, Ferbam, and Abound, Gem, or Headline are good choices for the first application because they are able to kill the fungus in old lesions and thus reduce the inoculum and protect the foliage. Whichever of these products was not used in the first spray may then be used in the petal fall spray. Copper fungicides, Abound, Gem, or Headline are good choices for the third spray since they will protect fruit from early melanose as well as from scab. On tangelos and Murcott, Alternaria brown spot and scab occur together. Under this circumstance, either copper fungicides, Ferbam, Abound, Gem, or Headline should be selected for the 3 sprays. Benlate is ineffective against Alternaria. If used more than once a year, resistance of the scab fungus to Benlate, Abound, Gem, or Headline may develop. **DO NOT APPLY BENLATE, ABOUND, GEM, or HEADLINE IN NURSERIES.**

Special Thanks to the following 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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ALTERNARIA BROWN SPOT

Alternaria fungal disease can cause severe leaf and fruit drop particularly in Minneola (Honeybell) and Orlando tangelos, Dancy tangerine, and Murcott (Honey tangerine). Alternaria must be controlled on these cultivars to obtain high yields of good quality fruit. The spores of this disease are air borne, but require moisture for germination and infection. Leaf tissue is susceptible until it is fully expanded and fruit is susceptible for about 3 months after bloom. When new groves of the above cultivars are planted, only disease-free nursery stock should be used. Trees should be spaced more widely than oranges to promote rapid drying of the canopy. It is best to locate susceptible varieties in high areas where air drainage and ventilation are good so that leaves dry more rapidly. Irrigation, fertilization, hedging, topping, and skirting should be carefully monitored so that excessive vegetative growth is minimized. Copper fungicides, Abound, Gem, Ferbam, Headline, and Trilogy are the materials registered for the control of this disease. The first spray should be applied when the spring flush leaves are ¼-1/2 expanded. In severe cases, another spray should be applied when the leaves are near full expansion to reduce the infection on the fruit. Another spray should be scheduled shortly after petal fall. Abound, Ferbam, Gem or Headline may be the best choice for one or two applications especially if the grove has problems with both scab and Alternaria. From April though June, spray applications may be needed as often as every 10 days or as infrequently as once a month depending on the frequency and amount of rainfall and the rate of infection in the grove. Copper fungicides can be used from April through May, but can produce fruit blemishes if applied during hot weather. Therefore, Abound, Gem, Ferbam, Headline, and Trilogy may be substituted for copper in June or July applications. Abound, Gem, and Headline are strobilurin fungicides and Alternaria has the potential to develop resistance to these products. Strobilurin should not be used for Alternaria control more than 3 times in a season and never more than 2 applications in a row. Gem is not highly effective for control of Alternaria. Trilogy and Ferbam are less effective for Alternaria control than copper, Abound or Headline.

DO NOT APPLY BENLATE, ABOUND, GEM, or HEADLINE IN NURSERIES.

For more information, get your copy of the 2003 Florida Citrus Pest Management Guide.

FROM THE 2003 FLORIDA CITRUS PEST MANAGEMENT GUIDE

MANAGEMENT OPTIONS FOR CITRUS GROWERS

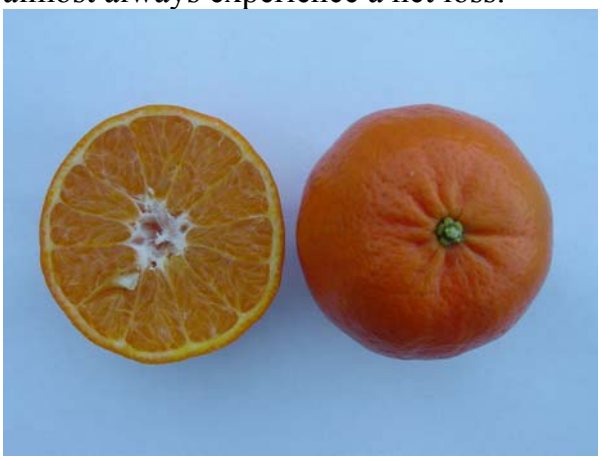
Fresh vs. processed fruit

Citrus growers must maximize profits and reduce expenses to stay competitive. Basic horticultural input to increase production efficiency includes optimization of fertilization, irrigation, weed control and pest management. A fundamental working assumption to maximizing grower profits is that the cost of any input should be matched by an increased return of greater value.

Florida citrus is marketed either for the fresh market or processed market. Irrigation, fertilizer and pest management strategies employed by growers for fruit destined for these different markets must differ considerably. It is a waste of money to seek to achieve fresh market fruit quality in a processing fruit production operation.

In the production of fresh market fruit, good fruit size and a high level of control of external blemishes are needed to achieve maximum profitability. A great input of pesticides and a high level of pest scouting can be economically justified. If pest or windscar damage occurs early in the season, the grove can be switched to a processing program without suffering severe economic loss.

Grapefruit, navel oranges, tangerines, and tangerine hybrids have high values as fresh fruit and relatively low value for processing. These varieties are also more severely affected by diseases such as scab, melanose, Alternaria brown spot, and greasy spot rind blotch than are round orange cultivars. They must be monitored very closely and timely applications must be made to control rust mites and fruit blemishing fungal diseases. If a high degree of control is not achieved and the fruit must be processed, the producer will almost always experience a net loss.



In the production of fruit for processing, yields and internal quality must be maintained with minimal input. Irrigation, fertilizer, and weed control should be maintained but control of foliar diseases and arthropod pests should be reduced or omitted. When the protection of foliage and fruit are considered, only a few diseases and pests are of primary importance, namely greasy spot fungus on foliage and citrus rust mite on fruit. High mite populations over time can lead to reduced fruit size and productivity. Root weevils and Phytophthora should be monitored and controlled when population levels dictate because they can noticeably reduce tree vigor and fruit productivity.

In most cases, there is no way to predict on a seasonal basis the incidence

and severity of pests. However, based on grove history and some within-season observations, you can reasonably assess the situation and look at available options. In the final economic evaluation, net savings in pest management can be considered as profit to the extent that they do not cause loss through fruit drop, reduced fruit size, and lower internal quality. With most citrus pests, the pressure must be extremely high before economic damage levels on the processing fruit crop are experienced. Thus, there is considerable latitude in taking measures to suppress most pests. Close observations, informed decision-making, and pesticide application only on an as-needed basis should reduce the level of input and associated costs in most seasons.

Bearing vs. non-bearing trees

Managing pests on non-bearing citrus trees (< 4 yr old), either as a new planting or as resets, is essential to the subsequent development of a healthy, highly productive, mature grove. Young tree care differs somewhat from mature grove care, in that, management expenditures should focus on maximizing the protection of rapidly produced foliage and roots; fruit is not a factor. Therefore, a citrus grower's goal should be to maximize the production of leaves and roots of young trees through the optimization of fertilization, irrigation, weed control, and management of various foliar and root pests.

The various foliar and root pests, comprised of insects, mites, nematodes and diseases, that infest nonbearing citrus trees differ widely in distribution and abundance compared to those found on mature trees. Differences in tree size and canopy density alone result in changes in microclimate that will affect pest and natural enemy population dynamics and injury thresholds for various pests. Frequent leaf and root flushing patterns typical of young trees supply a continuous source of food that stimulates rapid pest development and injury. Foliar insects such as aphids, citrus leafminer, citrus psyllid, orange dog, grasshoppers and the little leaf notcher weevil can severely damage new leaf flushes regularly without appropriate control while these same insects are incidental pests of mature trees. By contrast, greasy spot, a major economic disease of mature trees, is of much less importance in nonbearing citrus groves. Rust mites and spider mites, important defoliators or fruit pests of mature trees, can also be damaging to nonbearing trees, particularly those trees with open canopy. Judicious use of pesticides is highly recommended for young tree care, even though the need for pesticides can be greater than for mature groves. Scouting should be intensified on young trees and treatments applied only when necessary. Spot treatment is encouraged when pests are localized within the grove.

PFD

Postbloom fruit drop (PFD) fungal disease can attack all citrus varieties. It is more of a problem on Navels and Valencias. The fungus attacks flowers and causes the fruitlets to drop leaving persistent calices or buttons.

Millions of spores per button can survive to the next season. Most spores are produced directly on the surface of infected petals. The spores are splash-dispersed by rains to healthy flowers where they can cause infections in 24 hours. Extended bloom periods, frequent rains, and warm weather are favorable conditions for disease development. Once the bloom begins, groves with a history of PFD or with buttons from previous years should be inspected twice weekly. Apply Benlate at 2 lbs/acre or Benlate at 1.5 lbs/acre plus 5 lbs of Ferbam to reduce the risk of resistance to Benlate. Ferbam is not effective to be used alone, but can be combined with Abound, or Gem to maximize protection and reduce the risk of resistance development. Neither Abound nor Gem should be used alone more than once per season. A model has been developed and is being improved to assist growers and production managers to determine the need and timing of fungicide applications. For more information, get your copy of the Florida Citrus Pest Management Guide and call your citrus extension agent to provide you with the PFD Hotline number. It is always advisable to remove weak and declining trees and put resets to maintain good yield per acre. Furthermore, the off-season bloom from declining trees within a block can provide a site for fungal spore buildup and can be a major contributor to PFD.

EPA GRANTS FLORIDA SECTION 18 FOR TOPSIN M WSB FUNGICIDE ON CITRUS

On 30 January 2003, Cerexagri, Inc. announced that the EPA has granted another Section 18 Emergency Exemption to the Florida Department of Agriculture & Consumer Services for use of Topsin(R) M WSB fungicide. The Section 18 applies specifically to use on citrus crops within the state to suppress Postbloom Fruit Drop (PFD). The effective period of the Section 18 is February 22, 2003 to February 22, 2004. The EPA initially granted a Section 18 Exemption in 2002 based on the emergency created by the withdrawal of Benlate(R) (benomyl) fungicide from the marketplace by DuPont. According to the Section 18 Use Directions, Topsin may be applied via ground or air equipment at 1.5 to 2 lb/acre. Two applications are allowed.

Citrus growers must have the EPA exemption letter or Cerexagri's Sec. 18 Use Directions in their possession at the time of application. For more information and a copy of the Section 18 Use Directions, call 1-800-438-6071.

IRRIGATION

Despite our large yearly rainfall of 50-60 inches, which exceeds the citrus water requirement or evapotranspiration (ET), Florida citrus growers and production managers should keep in their mind that they can't grow citrus successfully and competitively without supplemental irrigation. Through research and field experience, we know that irrigation is necessary because of the non-uniform distribution of the rainfall and the very limited water holding capacity of Florida sandy soils.

Irrigation is of particular importance during the dry period (February-May), which coincides with the critical stages of leaf expansion, bloom, fruit set, and fruit enlargement. Proper irrigation scheduling is defined as the application of water when needed and in the amounts needed. Citrus production managers should accurately determine when and for how long to irrigate. With proper irrigation scheduling, tree growth and fruit yield will not be limited by water stress or water excess. Over-watering will waste water and pumping energy, will leach nutrients and other chemicals below the rootzone, and will contribute to contamination of the groundwater.

Because of the high water table in southwest Florida, citrus trees have over 90% of their feeder roots within the top foot of soil. For this situation, irrigating for long duration can lead to loss of water below the rootzone. Therefore, it is recommended to increase the frequency and reduce the length or duration of irrigation. Irrigating every other day is better than irrigating once or twice a week. Research work in Florida has shown the importance of the area wetted by irrigation systems. When managed properly, greater area coverage by irrigation emitters provides higher yield than very limited coverage.

Because of the relatively high annual rainfall in Florida, roots of mature trees are spread throughout the grove and are not restricted to the wetted area by the irrigation system emitters. Roots are commonly found in the middles between tree rows and outside the wetted zone by microirrigation systems. Therefore, it is important to have the irrigation system cover most of the area under the tree canopy and even slightly outside the canopy dripline.

Drip systems may not provide enough water to mature citrus trees in Florida because of the limited horizontal distribution of water on poor fine sands. Irrigating with drip systems for too long will neither provide more coverage nor reduce water stress and wilting, but will drive most of the water below the shallow rootzone. Increasing irrigation frequency rather than duration with microirrigation systems is one of the most important factors improving water use efficiency. Raising the water table in the ditches or water furrows will certainly help the trees recover from water stress. When the water requirement is relatively high and water stress is severe, it is recommended to irrigate daily or even twice a day with microirrigation systems.

Good water management practices should include precise irrigation scheduling and well-designed, uniform irrigation systems to minimize waste. Non-uniform irrigation will cause excess water to be applied in some areas while other areas will not get enough. Production managers should not only be aware of the losses resulting from irrigation systems that apply water and chemicals non-uniformly, but should adopt the recommended ways to minimize these losses.

BASIC IRRIGATION SCHEDULING

Proper irrigation scheduling is the application of water to crops only when needed and only in the amounts needed; that is, determining when to irrigate and how much water to apply. With proper irrigation scheduling, crop yields will not be limited by water stress from droughts, and the waste of water and energy used in pumping will be minimized. Other benefits include reduced loss of nutrients from leaching as a result of excess water applications, and reduced pollution of groundwater or surface waters from the leaching of nutrients.

Irrigation is practiced to provide water when rainfall is not sufficient or timely to meet water needs of a crop. For most agricultural crops, yield or quality reductions result from water stress. Therefore, if water is available and if it is relatively low in cost, as is the case in Florida, irrigations are normally scheduled to avoid plant water stress.

Determining when to irrigate

One indicator of plant water stress is the visual appearance of the plant. However, yield reduction has already occurred by the time crops show wilt symptoms. Growth ceases in many crops before visual wilting occurs, and yield reduction may have occurred for some time before wilting is seen.

When to irrigate can also be determined by calendar methods (for example every 3 days), by crop growth stage (for example, every 4 days during early vegetative growth stage, and every other day during peak growth stage), or by similar methods based on long-term average irrigation requirements. However, these methods fail to consider the effects of climatic variability on daily crop water use. Therefore, the use of long-term average values may not be adequate during periods of hot, dry days, while over-irrigation may occur during periods of cool, overcast days, especially if rainfall is not considered. Day-to-day climatic conditions are highly variable during much of the year because of cloud cover and the random nature of rainfall.

Irrigations are most often scheduled based on the soil water status. Three procedures may be used: 1) a water balance procedure based on the estimated crop water use rate and soil water storage, 2) a direct measurement procedure based

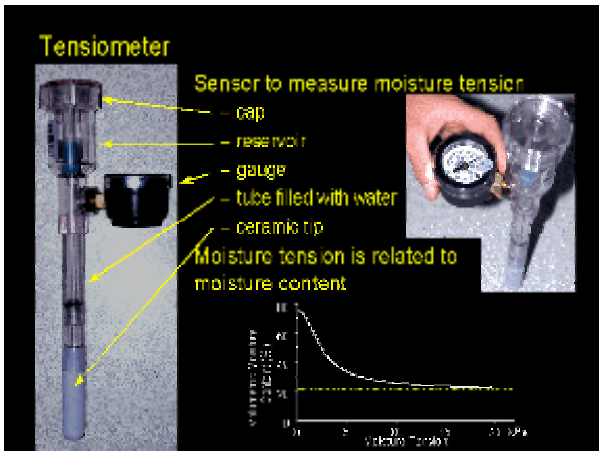
on instrumentation to measure the soil water status, and 3) a combination of the above two methods in which soil water status instrumentation is used with a water balance procedure. These procedures require knowledge of the crop water requirements, effective root-zone, soil water-holding capacity, and irrigation system capabilities in order to schedule irrigations effectively.

Water budget irrigation scheduling

The crop root zone can be visualized as a reservoir where water is temporarily stored for use by the crop. Inputs to that reservoir occur from both rainfall and irrigation. If the capacity of the soil-water reservoir (the volume of water stored in the crop root zone) and the daily rates of evapotranspiration (ET) extraction from that reservoir are known, the date of the next irrigation and the amount of water to be applied can be determined. Thus, ET and soil-water storage capacity in the plant root zone are the basic information needed to use the water-budget method for irrigation scheduling.

A practical lower limit of soil water may be defined as the soil-water content below which severe crop water stress and permanent wilting occurs. This lower limit has been defined as the permanent wilting point (PWP). In fact, yield reduction typically occurs long before PWP is reached. The upper limit of water storage in the soil is called field capacity (FC).

The difference between FC and PWP is called the available water capacity (AWC). Most of the major irrigated soils in Florida are in the top category (sands and fine sands). Available water capacity may also be estimated in the field by applying a known amount of water to the soil when the profile water content is near PWP, observing the volume of soil wetted, and calculating the volume of water stored per unit volume of soil.



Once AWC is known, the total depth of water available (AW), and thus the capacity of the soil-water reservoir, can be obtained by multiplying AWC by the crop effective root zone depth. For layered soils, AW is calculated by adding the multiples of AWC and depths of all soil layers contained in the crop root zone.

Soil-moisture indicators for irrigation scheduling

Devices for monitoring soil moisture have been available for many years. Among them, are tensiometers, neutron probes, and capacitance probes. When placed in the plant root zone, they indicate the soil water status that the plants are experiencing. Disadvantages of soil moisture sensors include their cost, labor requirements for reading and servicing, and the need for periodic calibration. They also measure soil water status at a point rather than for the whole field, thus many instruments or sensors may need to be installed to accurately represent a given field.

FROM THE 2003 Florida Citrus Pest Management Guide

PLANT GROWTH REGULATORS (PGR)

Plant growth regulator sprays can provide significant economic advantages to citrus growers when used in appropriate situations. Many citrus growers routinely use PGRs to enhance crop profitability. Depending on variety and timing, PGRs may improve fruit set, increase fruit size by reducing cropload, extend the harvest season by delaying rind aging, reduce preharvest fruit drop, or reduce hand-suckering by controlling trunk sprout growth in young citrus trees. Excessive rates, improper timings, untested surfactants or tank mixes, and inappropriate environmental conditions can result in phytotoxicity, erratic results, and/or greatly reduced cropping. Growers are urged to become familiar with PGRs through application to small plots before treating significant acreage. To avoid drift onto susceptible crops in surrounding areas, products containing 2,4-D (2,4-Dichlorophenoxyacetic acid) have stringent requirements for application conditions. Consult with your County Extension Office.

Since PGRs function by directly influencing plant metabolism, plant response can vary considerably with concentration, making sprayer calibration and accurate material measurement especially important. Studies show that variability in spray deposition increases as spray volume is reduced below 250 gallons/acre in mature citrus groves. At lower water rates, canopy closest to the sprayer manifold tends to retain much more material than other plant surfaces. Because material concentration is especially important in PGR use, water volumes below 125 gallons/acre are not generally recommended.

Unlike most agrichemicals applied to crop, efficacy of PGRs depends on entry of materials into plant tissues. Uptake is influenced by a number of factors: amount of PGR applied, concentration of PGR, presence of surfactants, solution pH, environmental conditions during and after application, foliage condition, and plant stress level. Application of PGRs is recommended only on healthy citrus blocks. Leaf Curling. Even when properly applied, some PGRs may cause leaf curling, especially when sprayed on young leaves.

GIBBERELLIC ACID (GA_3) is recommended to be used on citrus hybrids that are weakly parthenocarpic and without sufficient cross-pollination to improve fruit set. Applied from full bloom to two-third petal fall, GA can effectively set and produce an excellent crop of seedless Robinson, Nova, Orlando, Minneola, or other self incompatible mandarin hybrids. Use Gibeerellic acid (GA_3, 4.0% liquid concentrate) at the rate of 10-20 oz/acre. Products marketed include: Pro-Gibb, GibGro, and Gibbex. Because material concentration is important in plant growth regulators, water volumes below 125 gallons/acre are not recommended. Do not use in water above pH 7.5 because uptake will be reduced. Care should also be exercised in not exceeding the recommended GA dosage or concentration because it can cause severe leaf drop.

READ THE LABEL

FOR MORE INFORMATION & DETAILS, GET YOUR COPY OF THE 2003 Florida Citrus Pest Management Guide.

VISIT the EDIS Web site at http://edis/ifas.ulf.edu
You will find important publications and useful information relevant to your agricultural management and production needs.

PRIORITIZING CITRUS NUTRIENT MANAGEMENT DECISIONS (EDIS document # SL199)

By ***Dr. Thomas A. Obreza***

Introduction

Citrus nutrient management can be divided into four components: Monitoring, program development, application, and evaluation. Monitoring can be qualitative (visual observations of tree performance), or quantitative (laboratory analysis of soil and/or leaf tissue samples). In program development, the grove manager decides what type of fertilizer sources will be used, and the rate, timing, and frequency at which nutrients will be applied. The application phase centers on methods used to place the nutrients (e.g. spreading dry fertilizer, applying suspension fertilizers with a herbicide boom, injecting solution fertilizers into the irrigation system, or spraying soluble nutrients on leaves). Following fertilizer application, the evaluation step determines whether the desired crop response was achieved, usually by evaluating tree growth, fruit yield, and fruit quality.

Ideally, a citrus nutrient management plan will provide maximum citrus yield and quality while minimizing the potential for water quality impairment. Nutrient management can become a complex task as a citrus grove manager considers the many factors that affect the choices of nutrient rate, source, placement, form, and application timing. In economic conditions that require maximum efficiency of grove operations, managers are required to accomplish more tasks with fewer people, reduced resources, and less time. Activities must be prioritized, but when faced with a multitude of decisions to make, how does a manager decide where to place the most emphasis?

Citrus Sensitivity to Individual Nutrients

Citrus tree sensitivity to shortages or excesses of individual nutrients differs depending on the nutrient. For example, observations of mature citrus trees in the field tell us that manganese deficiency does not affect production nearly as much as nitrogen deficiency. Similarly, an excess of boron affects fruit quality more than an excess of magnesium. For the purpose of this discussion, water is also considered as a nutritional factor because nutrient and water management cannot be separated. The task then becomes one of ranking the importance of different nutritional factors to determine how to prioritize their management.

In the 1960s, Dr. R. C. J. Koo and Dr. R. L. Reese of the UF-IFAS Citrus Research and Education Center in Lake Alfred grew Pineapple orange trees on a previously non-fertilized deep sandy soil and implemented a set of treatments where they omitted single essential mineral nutrients from the fertilizer program. The twelve nutrients they studied were macronutrients nitrogen (N), phosphorus (P), and potassium (K); secondary nutrients calcium (Ca), magnesium (Mg), and sulfur (S); and micronutrients manganese (Mn), zinc (Zn), copper (Cu), boron (B), and molybdenum (Mo). The N omission treatment was not zero N, but was half of full N fertilization. They found that citrus yield was most sensitive to omission of N, P, and K, and least sensitive to omission of micronutrients (Figure 1). One of the most

important aspects of this study was that even on a sandy soil with poor native fertility, it took 7 years for omission of micronutrients to show negative effects.

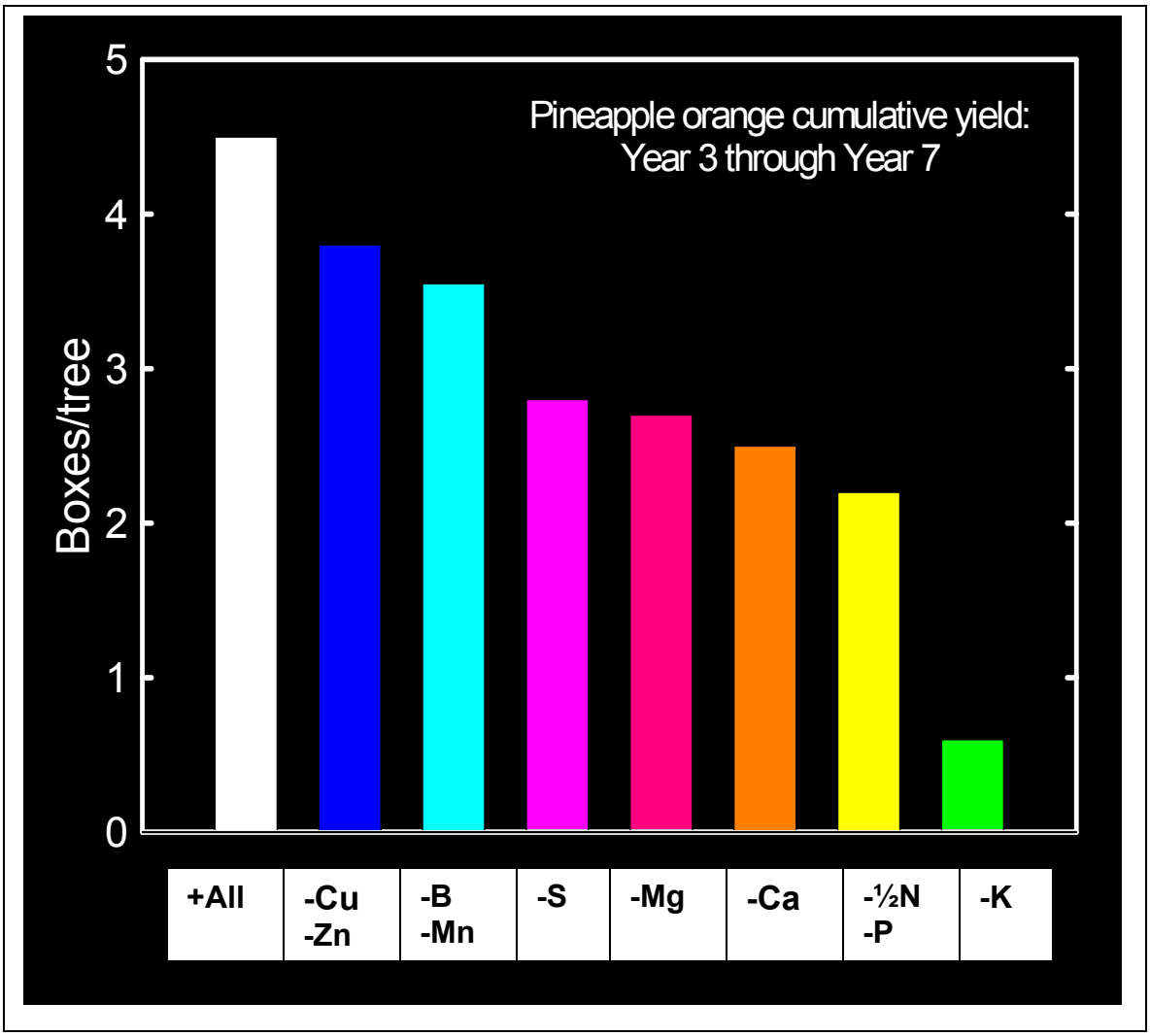


Figure 1. ***Sensitivity of pineapple orange trees planted on a native ridge sand to omission of single nutrient elements. The "+All" treatment received all essential nutrients; the N omission treatment was half of the N applied in the "+All" treatment. (From Koo and Reese, Proc. Fla. State Hort. Soc., 1971).***

Nutrient Accumulation and Loss

As a young citrus grove gets older, some nutrients applied in fertilizers and soil amendments will tend to accumulate in the soil, while others will mostly leach out of the root zone with rain or irrigation water if not taken up by the trees. The extent to which soil nutrient accumulation takes place will depend on the nutrient, its application rate, and the characteristics of the soil. For sandy Florida soils, the following are rules of thumb regarding nutrient accumulation or leaching:

- Cu, Zn, and Mn will accumulate in the root zone as a result of fertilizers applied to the soil or tree foliage. Soil accumulation of Cu resulting from frequent Cu-based fungicide applications can be particularly high.

●Ca and Mg will accumulate in the root zone as a result of calcitic or dolomitic limestone applications, or soil-applied fertilizers.

●As the amount of organic matter or clay in the soil increases, the accumulation of S applied as a component of many fertilizers will increase.

●P will normally accumulate in the root zone unless the soil is extremely sandy and low in organic matter.

●N, K, and B are nutrients that are poorly held by sandy soils and will be leached by rainfall or excessive irrigation. Thus, they usually must be applied as fertilizer every year.

Nutrient accumulation in the soil is one of several factors that determine the availability of nutrients to plants. Just because the concentration of a nutrient has increased in the soil does not mean that its availability has concurrently increased. Other factors including soil pH, water management, and root system health can significantly influence plant nutrient uptake.

Fertilization Experiments in the Flatwoods

During the last decade, fertilization experiments with mature flatwoods citrus trees that were well fertilized in their non-bearing years showed that good water management alone provided about 30% to 40% of maximum yield. When sufficient amounts of N and K fertilizer were combined with good water management, production reached or surpassed 90% of its maximum. Thus, the remaining 10% or less of a grove's yield potential was attributed to the combined effect of the remaining essential elements. It is important to reiterate that the groves where N and K experiments were conducted had lime, P, and micronutrient fertilizers applied to them when the trees were young.

Prioritizing Decision-Making

If citrus is most sensitive to water, N, and K, then nutrient management decisions should concentrate on improving their management before considering other factors. For example, if a grove is watered using a micro-irrigation system, how uniform is the water distribution from emitter to emitter? Are there any plugged sprinklers or drippers? If a grove manager chooses to fertigate a significant portion of the N and K (typically considered as a Best Management Practice for nutrients), it is important to frequently check the irrigation system for water distribution uniformity. The Mobile Irrigation Laboratories operated by the USDA-NRCS can measure irrigation system performance. If the system tests below 80% emission uniformity, corrective action should be implemented to even out and improve the nutrient distribution.

What about N and K2O fertilizer rates? In citrus fertilization research conducted on southwest Florida flatwoods soils, maximum yield has been obtained using N rates within the currently recommended range of 160 to 240 lbs N per acre per year. When coated, controlled-release fertilizers were applied in place of standard, water-soluble materials, rates could be lowered because nutrient use efficiency increased. Additional work with P and K fertilizer rates suggests that K influences citrus yield on the same order of magnitude as N. However, citrus is not very sensitive to P fertilization on flatwoods soils, especially if P has accumulated in the soil from previous fertilizer applications.

Summary

When prioritizing nutrient management decisions, grove managers should recognize the relative sensitivity of citrus to various nutritional factors in their groves and concentrate on improving the most sensitive ones first. Doing so will allow more time to deal with other citrus management issues.

INFORMATION ABOUT FSHS

http://www.lal.ufl.edu/fshs/

The Florida State Horticulture Society is one of the oldest organizations of its kind. Founded in 1888, it has been in existence and active for 113 years. FSHS serves as an open forum for growers, researchers, producers, urban gardeners, landscapers and associated industries to discuss, debate and resolve current problems of mutual concern. FSHS distributes this information at its annual meeting, and publishes the information in the Proceedings of the Florida State Horticultural Society. FSHS requires the support of many individuals and companies it benefits, and is maintained solely by membership dues. The Society receives no state or federal assistance.

FSHS encourages all individuals who have an interest in horticulture to become a member! Membership entitles you to receive a personal copy of The Proceedings of the Florida State Horticultural Society!

Sections in FSHS

CITRUS:

Topics discussed in the Citrus section include development and characteristics of rootstocks, cultivar improvement, insect, disease and weed control, fertilization, irrigation, cultivation and cold protection.

GARDEN AND LANDSCAPE:

The Landscape and Garden section provides information on new plants, cultivars and cultivar selection, landscape design and management. Cultural practices, pest control and conditions for optimal production are discussed.

HANDLING AND PROCESSING:

Topics discussed in the Handling and Processing section include practices that affect postharvest quality, quality and safety issues of lightly processed and processed products, and product, by-product and waste utilization.

KROME MEMORIAL INSTITUTE:

The Krome section provides information on requirements of tropical and subtropical crops in Florida. Topics discussed include cultural practices, harvesting and management of these unique crops.

ORNAMENTAL:

Topics discussed in the Ornamentals section include culture, management and production of Florida ornamentals. This section also provides information on maintenance and sales of ornamental plants.

VEGETABLE:

Information provided in the Vegetable section includes cultivar characteristics, cultivar selection, cultivar improvement, cultural practices and harvesting methods, and insect, disease and weed control.

INFORMATION ABOUT MEMBERSHIP (Dr. Mongi Zekri)

The Florida State Horticulture Society encourages all individuals who enjoy horticulture to become a member. Print this page and complete the membership application, then mail, FAX or e-mail directly to:

Florida State Horticultural Society
P. O. Box 2247
Goldenrod, FL 32733-2247
Phone: (407) 673-7595, FAX: (407) 678-6494, E-mail: fshsociety@aol.com

Membership application

Please check the type of membership:

[ ] Annual member $50

[ ] International member $50

[ ] Patron member $150

[ ] Horticulture student* $10 *professor's signature required:

Total amount enclosed $

Name:

Address:

Phone: ( ) - FAX: ( ) -

E-mail address:

Please check your affiliation:

[ ] federal government

[ ] state agency

[ ] grower

[ ] academic

[ ] industry

[ ] urban gardener

[ ] landscaper

[ ] other (please specify

CITRUS TARIFF MUST BE PROTECTED AT ALL COSTS

From FLORIDA CITRUS MUTUAL
For more information, contact Casey Pace at (863) 698-8977

LAKELAND, Fla. (Feb. 13, 2003) - On Feb. 12, Florida Citrus Mutual's (FCM) board of directors approved an aggressive and strategic plan to protect Florida citrus growers during the upcoming trade negotiations. Loss of the U.S. citrus tariff would mean an immediate devaluation of grove land and a loss of $0.20 per pound solids for all processed orange growers. The world market for orange juice is unique as there are only two producers in the world: Florida and Brazil. A citrus tariff reduction would eliminate Florida as a competitor; Brazil would then have an orange juice monopoly and all consumers would suffer.

"This is undoubtedly the largest challenge the Florida citrus industry has ever faced," said FCM President Squire Smith. "Without the tariff, Florida citrus growers will be put out of business and Florida residents will lose an industry that generates $9.1 billion in economic impact each year, employs nearly 90,000 people and provides more than 800,000 acres of green space throughout the state."

The strategy will include efforts in three distinct arenas: trade policy, political and public relations. On Feb. 3, Smith appointed a Citrus Tariff Oversight Committee, which is comprised of citrus growers from across the state who will oversee all industry-coordinated efforts. Smith states that the board's proposal will be presented at the Feb. 19 Florida Citrus Commission (FCC) meeting for approval. The Citrus Tariff Protection Plan approval comes at a crucial time, as the Bush Administration released its plan for the Free Trade Area of the Americas negotiation on Feb. 11, which includes eliminating all tariffs.

"These negotiations are happening as we speak and we must have the resources available to protect Florida citrus growers," said Andy LaVigne, FCM's executive vice president/CEO.

According to FCC member and Polk County grower John R. Alexander, retention of the citrus tariff means the difference between life and death for Florida citrus growers. "I firmly believe in the importance of the Florida Department of Citrus (FDOC) and its mission. However, the industry's expenditures for generic advertising and research both relate to the future of our industry," Alexander said. "We must focus our efforts on protecting the citrus tariff now or we may not have a need to spend money on research or generic advertising in the future - without this tariff, we won't even have an industry."

LaVigne reminded the board that this is an industry effort and that he and Bob Crawford, executive director of the FDOC, are working very close to ensure a victory for Florida citrus growers.

"Clearly, the tariff is the biggest issue facing the citrus industry. Florida Citrus Mutual is going to play an important role in defending the tariff, and I feel the FCC will consider very seriously any proposals Mutual takes to the Commission," Crawford said.

Florida Citrus Mutual, founded in 1948, is the state's largest citrus grower's organization with more than 11,000 members.