



UNIVERSITY OF
FLORIDA

EXTENSION

Institute of Food and Agricultural Sciences

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

Flatwoods Citrus



Vol. 7, No. 4

April 2004

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



UPCOMING EVENTS

Immokalee IFAS Center

Tuesday, April 20, 2004, **9:00 AM – 3:00 PM**

MECHANICAL HARVESTING DAY

2 CEUs for Certified Crop Advisors

Sponsor: University of Florida and Florida Department of Citrus

To reserve a seat and a free lunch, pre-registration is required prior to April 15th.

For details and registration, see enclosed information



**If you want to 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**

Tuesday, May 18, 2004, 10:00 AM – 12:00 Noon

Seminar title: The citrus leafminer, the citrus psyllid, the citrus rust mite, and greasy spot

Speakers: **Drs. Carl Childers, Phil Stansly and Pete Timmer**

2 CEUs for Pesticide License Renewal

2 CEUs for Certified Crop Advisors

Sponsor: **Bob Gregg, Syngenta**

To reserve a free lunch, call 863 674 4092 no later than Friday, 14 May 2004.

Workshop on Compost (7:45 AM – 4:45 PM)

Why and how to use compost?

How to make compost?

Date: Wednesday, 5 May 2004

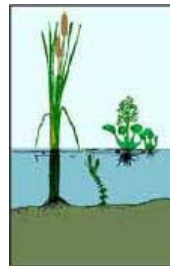
Location: Immokalee IFAS Center

Aquatic Weed Control Short Course

www.conference.ifas.ufl.edu/aw

Date & Location: May-3-7, 2004,
Fort Lauderdale Marriott North.

To qualify for the reduced, early registration fee, payment must accompany your registration on or before March 19, 2004.



FARM SAFETY DAY

Saturday, June 5, 2004, Immokalee IFAS Center

Coordinator: Mongi Zekri

117th Annual Meeting of the Florida State Horticultural Society (FSHS)

June 6-8, 2004

Sheraton World Resort, Orlando, Florida

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

CITRUS EXPO
IN FORT MYERS

**Wednesday, August 25 &
Thursday, August 26, 2004**



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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 116 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 161059

Altamonte Springs, FL 32716-1059

Phone: (407) 261 5420, FAX: (407) 261 5424, E-mail: fshsoffice@aol.com, web site: www.fshs.org

Membership application

Please check the type of membership:

[] Annual member \$50

[] International member \$60

[] 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

FROM THE 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 of chemicals 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, orangedog, 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.



DIAPREPES

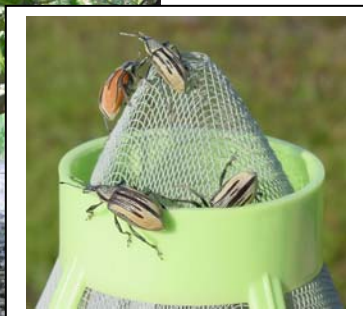
Notching along the margins of the most recent leaf flush is the best way to determine the presence of root weevils.



It is best to look for a sign, such as the pest doing the damage.

Weevils are found on the outer portion of the tree in the early morning or late evening hours.

Adults generally hide within the tree canopy during the heat of the day. When the adults are disturbed or the tree is shaken, the weevils will fall to the ground faking death.



Tedder's traps placed under the tree canopy have been used to capture adults and determine time and intensity of seasonal adult emergence from the soil. The larvae channel on the outer bark tissue into the cambium layer to the woody portion of the root and often girdle

the taproot causing its death and impeding the ability of the tree to take up water and nutrients resulting in tree mortality. In addition, this type of injury provides an avenue for pathogen invasion such as *Phytophthora*. Although adults can emerge year round, their primary emergence period in SW Florida was found to be mid April to mid May. Larval entry into the soil begins about 20 days after adult emergence begins. Two applications of parasitic nematodes at 4 and 12 weeks after adult emergence begins may give satisfactory root protection. In SW Florida, nematode applications are generally recommended with first summer rains. Diaprepes long distance dispersal is through the movement of contaminated soil and nursery plants and trees containing potentially all life stages of the weevil. In addition, soil residues on vehicles and grove equipment may be contaminated with larvae and can move this pest from one grove to another.

The use of horticultural oils to separate leaves that have been stuck together to protect eggs may reduce Diaprepes population. When leaves are separated, eggs desiccate or are more subject to parasitism. Oils also prevent females from gluing eggs to leaves. Just after peak trap captures, foliar sprays of Danitol, Kryocide or Orthene, or Guthion, Micromite or Sevin plus at least one gallon of petroleum oil. Capture 2EC can be applied as a soil barrier treatment to control young (neonate) larvae. There are some restrictions and disadvantages for applying some chemicals. **Always READ CAREFULLY THE LABEL before using any chemical.** It should be kept in mind that frequent use of insecticides against adults could affect non-target organisms including biological controls.

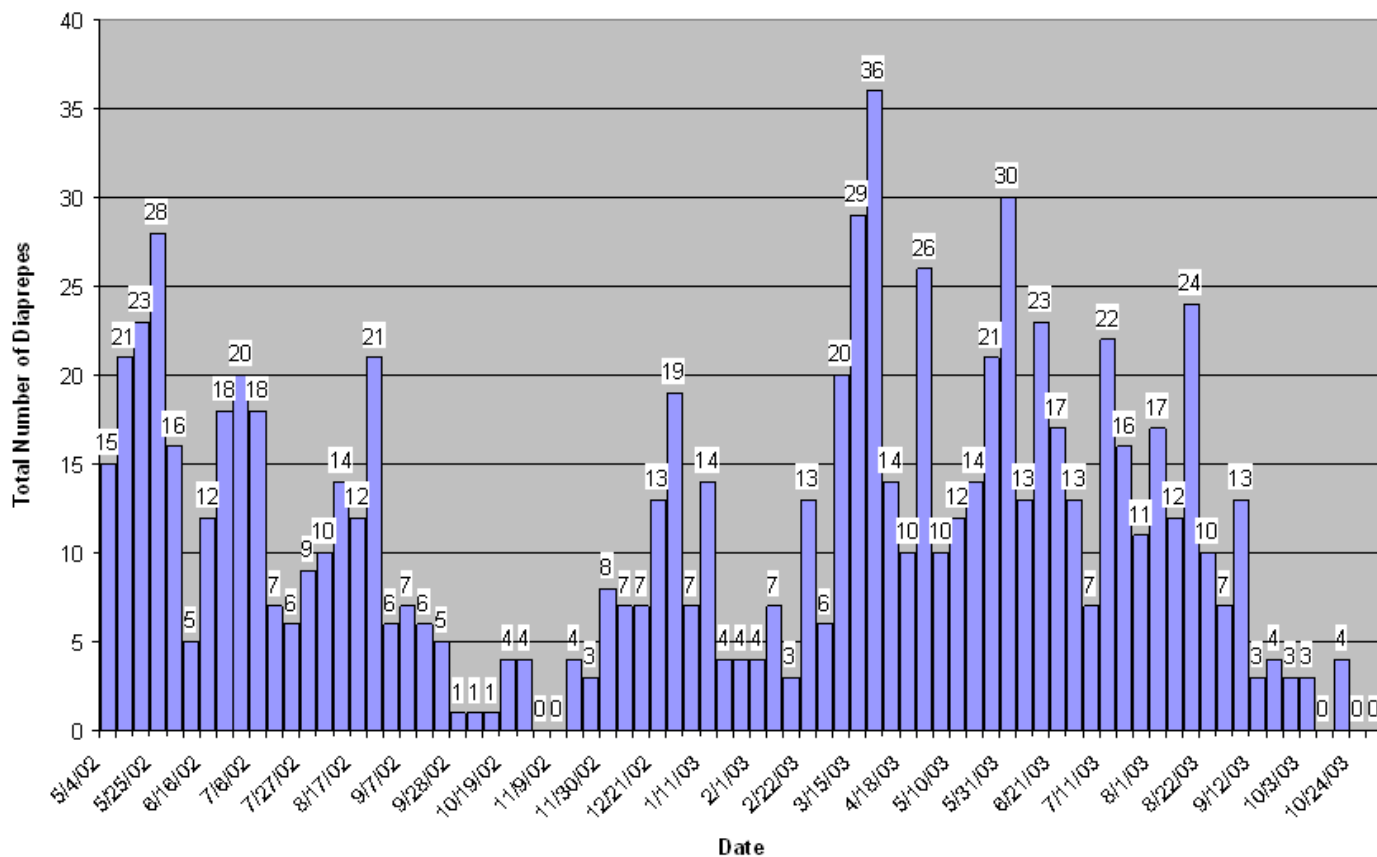
For more detailed information on this pest and other citrus pests, **GET YOUR COPY OF THE 2004 FLORIDA CITRUS PEST MANAGEMENT GUIDE.**

DIAPREPES ROOT WEEVIL EMERGENCE

The University of Florida and seven grower/cooperators conducted a 3-year-long survey to determine the weekly emergence patterns for Diaprepes root weevils. At each location, 100 Tedder’s traps are surveyed weekly to determine the number of weevils collected in the traps. From this data, graphs are being developed to provide growers with average number of weevils per traps as well as total weevils collected during the weekly intervals. From the collected data, growers can get a feel for the emergence patterns over time which have occurred at each of the seven locations. With knowledge of emergence patterns, growers can then determine when the best time to apply sprays to reduce Diaprepes injuries. The locations for the surveyed groves are in the following six counties: Lake, Polk, DeSoto, Hendry, Indian River, and Dade.

The information is posted to a web site maintained at the Citrus Research & Education Center in Lake Alfred at: <http://www.lal.ufl.edu> Once at the web site, click on the “Extension” Section and then click on “Diaprepes Survey” or try to go directly to it at: <http://www.lal.ufl.edu/Diaprepes/diaprepesemergence.htm>. At this site, you can choose the county location closest to your grove to estimate the emergence pattern that represents your area. At this site, you can also find other information related to Diaprepes control.

**Total Number of Diaprepes Found in 100 Tedders Traps
Hendry County, Florida -- 2002-2003**



FACTS FROM YOUR PHARMACIST:

A Handout for Patients

This patient education handout is brought to you by an unrestricted educational grant from the Florida Department of Citrus

Putting Drug Interactions with Grapefruit Juice in Perspective

L. Kendall Shaw, PharmD

Pharmacy Times **February 2003**, PATIENT EDUCATION

Introduction

The safety and effectiveness of a drug may be affected by other medications, foods such as dairy products, vitamin supplements, antacids, and even herbal remedies. These are called drug interactions. Problems caused by interactions between certain prescription medications and grapefruit juice have gotten a great deal of media attention lately, and some of this coverage has caused people to mistakenly assume that grapefruit juice should be avoided with any medication. In reality, the problems with grapefruit juice actually affect very few patients.

What You Should Know

It is important to recognize that most prescription drugs are not affected by grapefruit juice at all. In addition, no interactions have been observed with nonprescription medications and grapefruit juice. For those medications that are affected, the interaction can result in higher levels of such drugs in the blood, which may lead to adverse reactions. If your medication interacts and you do not wish to comply with a grapefruit juice restriction, your doctor or pharmacist can generally suggest a non-interacting, alternative medication to treat your condition with no need to avoid grapefruit juice. This option is on a case-by-case basis.

Talk to Your Physician and Pharmacist

It is wise to ask your physician or pharmacist about the potential for any medicine to interact with food, other prescriptions, or common nonprescription remedies.

Have him or her explain any potential interactions and side effects as well as the expected benefits of the medicine. Most pharmacists will make sure you understand such potential interactions and exactly how to take your medication to maximize the benefit and minimize side effects. That's their job. And be sure to read any information that accompanies your prescriptions, which usually addresses potential interaction problems.

Chances are very good that if grapefruit juice is not mentioned either by your pharmacist or in the materials he or she provides you about your medication, then it has no effect on the medication you are taking.



Will I Experience a Reaction?

Whether a patient will experience drug interactions is hard to predict. People react to drugs with great individual variability due to individual genetics. Even medications known to be affected by grapefruit juice may not produce an interaction in a given individual because of his or her genetic makeup. Thus, blood levels of a drug may be perfectly normal despite drinking grapefruit juice every day.

Which Medications Should I Be Concerned About?

The medications that may interact with grapefruit juice are listed in the Table. If you are concerned about the possibility of a reaction or have already experienced a reaction between your medicine and grapefruit juice, other choices of drugs are available in all classes of medications. Thus, even the potential for an interaction need not spell the end of the enjoyment of a healthful glass of grapefruit juice.

FACTS FROM YOUR PHARMACIST: *A Handout for Patients*

Pharmacy Times February 2003 PATIENT EDUCATION

This handout for patients will be available online at www.pharmacytimes.com.

Table

Summary of Known and Anticipated Drug Interactions with Grapefruit juice			
Magnitude of Interaction:	Large	Moderate	Small or Negligible
Calcium-channel antagonists		Felodipine Nicardipine Nifedipine Nimodipine Nisoldipine Isradipine	Amlodipine Diltiazem Verapamil
HMG-CoA reductase inhibitors (statins)	Lovastatin Simvastatin	Atorvastatin Cerivastatin	Fluvastatin Pravastatin
Immunosuppressants		Cyclosporine Tacrolimus Sirolimus	
Sedative-hypnotic and anxiolytic agents	Buspirone	Triazolam Midazolam Diazepam Zaleplon†	Alprazolam Clonazepam† Zolpidem† Temazepam† Lorazepam†
Other psychotropic agents		Carbamazepine Trazodone† Nefazodone† Quetiapine†	SSRI antidepressants† Clozapine Haloperidol
Antihistamines	Terfenadine Astemizole†	Loratadine†	Fexofenadine† Cetirizine† Diphenhydramine†
Human immunodeficiency virus protease inhibitors		Saquinavir Ritonavir† Nelfinavir† Amprenavir†	Indinavir
Hormones		Ethinyl estradiol Methylprednisolone	Prednisone Prednisolone
Other drugs	Amiodarone	Sildenafil† Cisapride	Clarithromycin Erythromycin Quinidine Omeprazole

*HMG-CoA = 3-hydroxy-3-methylglutaryl coenzyme A; SSRI = selective serotonin reuptake inhibitor.
 †Interactions or noninteractions that have not been studied, but can be reasonably predicted based on available data.
 Source: Greenblatt DJ, Patki KC, von Moltke LL, Shader RI. Drug interactions with grapefruit juice: an update [editorial]. *J Clin Psychopharmacol.* 2001;21(4):357-359.

Of particular concern are interactions with some heart or blood pressure medications that might cause irregularities in heartbeat, called arrhythmia, with unusually high blood levels. Certain cholesterol-lowering medications, called statins, are similarly affected and can increase the likelihood of painful muscle disorders. A few of the medications used to treat serious psychiatric illnesses can also cause such problems.

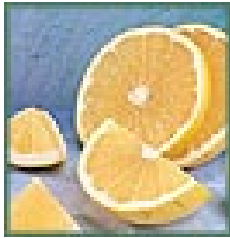
The important point to understand is that you do not necessarily need to avoid grapefruit juice when taking most medications, and if you have already been taking one of the

affected medications and have not experienced any problems, then talk to your doctor or pharmacist about whether or not it is safe to conclude that you need not change anything.

For new prescriptions, tell your physician of your grapefruit juice intake, so that he or she can select an appropriate medication. In some cases, a doctor might recommend grapefruit juice in order to increase levels of a medication when the patient has difficulty absorbing enough of the drug to make it effective.

The Facts About Potential Drug Interactions With Grapefruit Juice

Suggested Patient-Healthcare Professional Q & A



P: *Is it true that drinking grapefruit juice while taking my medications is dangerous?*

HCP: Grapefruit juice is safe to drink while taking most drugs, though it is true that certain prescription medications may interact. We can assess this potential with your medication(s) and determine whether an alternative, non-interacting medication is a viable solution if you'd like to continue drinking grapefruit juice.

P: *Does fresh grapefruit also interact with certain medications?*

HCP: The components in grapefruit juice responsible for suppressing the CYP3A enzyme are also found in fresh grapefruit, and may cause interactions with the same medications affected by grapefruit juice.

P: *Which drugs interact with grapefruit juice?*

HCP: Prescribed drugs known to interact are mostly limited to *certain* immunosuppressant, statin, calcium-channel blocker, HIV, hormone, antihistamine and psychiatric medications. In most cases, we can consider non-interacting, alternative medications within each drug class that should offer appropriate, safe treatment. In addition, it is safe to consume grapefruit and grapefruit juice while taking any over-the-counter medication.

P: *Can drinking grapefruit juice with over-the-counter medications, like cold pills or aspirin, cause bodily harm?*

HCP: No. It is safe to consume grapefruit and grapefruit juice while taking any over-the-counter medication.

P: *Should I completely avoid grapefruit juice since I'm taking an interacting medication?*

HCP: Before making changes to your diet, we can assess the potential for an interaction, which varies by individual, the medication and its prescribed dosage. I can possibly recommend an alternative, non-interacting medication if you'd like to continue drinking grapefruit juice.

P: *My prescription medication states I should avoid grapefruit juice, but I do not want to follow this dietary restriction. What are my options?*

HCP: I can possibly recommend an alternative, non-interacting medication for your consideration that will allow you to continue drinking grapefruit juice.

P: *Does grapefruit juice affect medications given by injection?*

HCP: No. A potential interaction occurs primarily in the small intestine with affected medications that are taken orally.

P: *How does grapefruit juice interact with certain medications?*

HCP: Simply, grapefruit juice contains a number of natural substances that suppress an intestinal enzyme (CYP3A) responsible for metabolizing certain medications. This may increase the absorption of some orally administered medications in the bloodstream and, as a result, may increase the risk of potential side effects from the drug.

P: *What happens when grapefruit juice interacts with an affected drug?*

HCP: More of the drug could be absorbed into the bloodstream if a drug interacts with grapefruit juice, which may lead to an increased risk of side effects from the drug. We know that many factors, such as individual health and prescription type, can influence the potency of the medication and potential effects of an interaction.

P: *How much grapefruit juice would a person have to drink to cause a problem?*

HCP: The amount of grapefruit juice necessary to cause an interaction can vary by individual and affected medication – from ordinary servings to very large quantities, such as a quart a day.

P: *Will an interaction only occur if I swallow an affected medication along with grapefruit juice?*

HCP: Research to-date indicates that an interaction may occur for up to 72 hours after consuming grapefruit juice, though the degree of the interaction may diminish over this time period. Many factors, such as individual health and prescription type, can influence the potency of the medication and potential effects of an interaction

P: *Is it safe to drink grapefruit juice if a certain amount of time elapses between medication doses?*

HCP: Research to-date indicates that grapefruit juice can inhibit the CYP3A enzyme in the body for up to 72 hours after consumption. We do know that once a person is no longer taking an affected drug, they can resume drinking grapefruit juice.

P: *If I've been drinking grapefruit juice with affected medications for some time with no ill effects, should I heed the warnings and stop drinking grapefruit juice now?*

HCP: No, continue drinking grapefruit juice. Your medication may be stabilized, in which case the sudden elimination of grapefruit juice may create an imbalance. We can assess the potential for an interaction, which varies by individual, the medication and its prescribed dosage, and determine whether switching to an alternative, non-interacting medication that offers appropriate, safe treatment is necessary.

P: *Is a grapefruit juice interaction with medication potentially fatal?*

HCP: There is no evidence that drinking grapefruit juice while taking an interacting medication has ever led to a fatality. We do know that many factors, such as individual health and prescription type, can influence the potential effects of interactions between medications and food, including grapefruit juice. Research is underway to better understand the potential effects.

Mechanical Harvesting Field Days, April 20 & 22



The University of Florida's Extension Service and the Florida Department of Citrus will be hosting two mechanical harvesting field day events. The purpose of these events is to see Valencia oranges being mechanically harvested. The first of the field days will be held in Immokalee at the Southwest Florida Research & Education Center with the tour beginning at 9:00 A.M. and returning to the Center around noon with lunch and a seminar program on various aspects of mechanical harvesting. The full program is scheduled to conclude around 3:00 P.M. The second event will be in Polk County, departing from the Polk County Extension Service Office in Bartow on April 22 at 9:00 A.M. and returning prior to noon.

The Immokalee event will view the OXBO continuous canopy shaker and the Coe-Collier trunk shaker at two different grove sites. The Bartow event will view only the tractor-pulled continuous canopy shaker. Bus transportation will be provided for all participants to get to the field sites. Transportation into the groves will not be permitted in personal vehicles.

If you wish to participate in the mechanical harvesting events, please contact the following:

- 1) Immokalee, contact Mongi Zekri at Hendry County Extension Service in LaBelle at 863-674-4092.
- 2) Bartow, contact Chris Oswald at Polk County Extension Service in Bartow at 863-519-8677, ext. 108 or Steve Futch at the Citrus Research & Education Center in Lake Alfred at 863-956-1151.

Pre-registration is required for either event prior to April 15th.

Seminar program for the Immokalee site (12:00 Noon - 3:00 PM)

Free lunch will be served at Noon

- Nursery and Grove Preparation for Mechanical Harvesting, Dr. Bob Rouse
- Tree Response to Mechanical Harvesting, Dr. Jim Syvertsen
- Late Season Harvesting of Valencia, Dr. Richard Buker
- Current Hand Harvesting Costs, Mr. Ron Muraro
- Economical Case Study of Mechanical Harvesting, Dr. Fritz Roka

MECHANICAL HARVESTING VS. HAND PICKING

To be competitive in an increasingly global marketplace, Florida citrus growers must reduce production and harvesting costs. This fact has pushed the Florida Department of Citrus (FDOC) and the University of Florida to re-examine the feasibility of mechanical harvesting for citrus crops. For the last few years, the FDOC has been supporting, testing, and evaluating several mechanical harvesting devices.



has been skirted (lower branches removed). Not all citrus crops can be mechanically harvested. Current mechanical harvesting devices are not well adapted to 'Valencia' because of the presence of 2 crops (one mature and another that will be mature next season) on the tree. Furthermore, at the present time for the fresh market, citrus fruit must be hand-harvested.



Leaf and flower drop caused by a trunk shaker in March with no significant reduction in fruit set and production.

About 20,000 acres were mechanically harvested last season. It is expected that 30,000 acres will be harvested this season and that most processed fruit will be harvested mechanically 10 years from now. Crop removal by mechanical harvesting ranges from 90 to 95%. Mechanical harvesting was demonstrated to be more cost effective (25-75% potential cost savings) than hand labor, but groves need to be prepared for mechanical harvesting. For example, trunk shakers can only operate where the trees have clear, tall trunks and the canopy



Sixteen more copies of the 140-page book entitled “*WORKER PROTECTION STANDARD FOR AGRICULTURAL PESTICIDES – HOW TO COMPLY*” are available for sale at the Hendry County Extension Office (only \$3.00/copy).

MORE ON MECHANICAL HARVESTING VS. HAND PICKING



The current Florida Department of Citrus (FDOC) Harvesting Program was restarted in January 1995. The University of Florida, the FDOC, and the USDA's Agricultural Research Service conducted a prior cooperative research and development program for about 25 years (1959 - 1984) at the Lake Alfred Citrus Research Center. Inventors, growers, and equipment manufacturers also participated in this program.

The Canopy Area Shake and Catch System is potentially very versatile and should be capable of mechanically harvesting 80 to 95% of the fruit from any citrus grove in Florida. When a hand gleaning crew follows the harvester, the 5 to 20% of the crop that remains on the tree or ground can be recovered, so none of the crop needs to be abandoned. The hydraulically powered shaker head has plastic probes

that are pushed into the fruiting canopy to a depth of about 30 to 36 in. A 5 second shake will remove about 95% of the fruit. The shaker head is positioned into successive areas of each tree or hedgerow of trees.

An effective fruit catching and handling machine is also a necessity if this harvesting system is to be economically successful. The trees must be skirted to 24 in., but special hedging and topping are not required.

The Trunk Shake and Catch

Harvesting Systems offer complete trunk shake and catch harvesting systems that are compatible with the grove conditions in the Florida citrus industry. These harvest systems require that the groves be prepared for mechanical harvesting. This generally amounts to selecting only those groves in which the clear trunk height to the first branches is 15 in. or more, the average trunk diameter is 9 in. or less, the spacing between trees down the row is uniform at 11 to 15 ft, tree age is similar (not a rehabilitated grove having a mixture of survivor and replacement trees), headlands are adequate for quick machine turn-around, swales are graded uniform from the trunk line, and that the yield/acre is good.



The Canopy Penetrate Pull and Catch Harvester

does not shake, beat, or twist the tree to get the fruit off. It simply pulls each fruit away from the stem. To do this on the present harvester, 900 hollow metal arms (each 8 ft long) mounted on a 10 ft long by 15 ft high panel are pushed into the fruiting canopy to a depth of 8 to 9 ft (the trunk line) then withdrawn. Spaced along each vertical side of the arms are three spring-loaded plastic fingers that hook the fruit stems and pull the fruit off as the arms are withdrawn from the canopy. This harvester will require the trees to be topped at a fixed height (probably 17 ft), to be skirted at about 2 ft to accommodate the fruit collection system, and to be hedged at a maximum canopy depth of 8 ft from the trunk centerline. Close-planted, hedged, topped, and skirted trees will allow this harvester to operate with its best productivity. Worker productivity would be about 4 times that of hand harvesters. If 2 gleaners could keep up with the machine and recover the remaining 10% of the crop, worker productivity would be reduced to 3 times that of hand harvesters.

The Continuous Travel Canopy Shake and Catch Harvest Systems appear to be capable of cutting harvesting cost by up to 75% and increasing labor productivity by 12 to 25 times. The trunk shake and catch harvest systems are capable of cutting harvesting cost by up to 50% and increasing labor productivity by 5 to 8 times. The Canopy Area Shake and Catch system appears to be capable of cutting harvesting cost by up to 30% and increasing labor productivity by 2 to 3 times.



Hedging, topping, and skirting for mechanical harvesting

Hedging to maintain an 8 ft wide equipment alley, or row middle, between rows is a standard industry practice no matter how wide or narrow the spacing between rows may be. Topping at 14 to 18 ft was a rule-of-thumb, until the 1998-99 season when some harvesters (pickers) started refusing to pick groves that were over 14 ft tall. Skirting to remove the low canopy foliage between the ground and 12 or 18 in. above the ground seems to be on the increase, versus letting the low foliage touch the ground. Most nurseries only offer trees that begin branching at 12 to 15 in. above the ground. The efficient mechanical harvesting systems require 24 to 30 in. of clear trunk height. Data from many commercial groves shows that total yield/acre is not decreased permanently when groves are skirted for mechanical harvesting. A 5 to 15% yield loss will occur the first year, but yield returns to normal in 2 years.



FOLIAR POTASSIUM APPLICATIONS TO ENHANCE FRUIT SIZE

BRIEF SUMMARY FROM A
POWERPOINT PRESENTATION

By Dr. Brian Boman, IFAS

Indian River Research & Educ. Center

Potassium (K) in Citrus

- A primary component in cell walls
- K accounts for over 40% of ash from fruit
- 70% of fruit size is related to number of cells
- Cell division ceases by late April
 - Size changes after April is mainly from cell enlargement
 - Post-bloom K (applied in April) may increase cell numbers plus help cell enlargement
- Absorption of K into leaves after foliar application is very rapid

Grapefruit Summary

- Trials on Marsh, Star, Ruby Red, Flame
- Post bloom most important
- Late summer/fall applications successful in half of years
- 8 lb K₂O per acre per application

- Little change in acid, Brix, juice volume, ratio
- 1/2 to 1 size increase due to foliar K applications
- Smaller fruit increased more than larger fruit

Foliar K Advantages on Valencia

- 25% more fruit
- 28% more boxes/acre
- 33% more size 80 and larger fruit
- 28% higher gross returns for packed fruit
- 23% more TSS/acre

SUMMARY

Foliar K applications can increase fruit size and help return higher \$\$

- K source is not critical
- Salt index should be considered when using low gal/ac applications (MKP or DKP)
- Coverage is not as critical as for fungicides or insecticides
- At least 8 lb/ac K₂O per application recommended
- Foliar applications not a substitute for good nutrition program
- Potential results:
 - Grapefruit: 1/2 to 1 size increase
 - Valencia: Significantly more solids/acre
 - Sunburst: More larger-sized fruit

