

Citrus Notes

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Dear Growers,

There will be the mechanical harvesting workshop and field day in April at the Southwest Florida Research and Education Center in Immokalee. Enclosed in the newsletter is a post card for renewing your subscription to "Citrus Notes" please read the associated article about future subscriptions before sending back the card. The deadline for early registration to the 2009 Annual Meeting of the Florida State Horticultural Society is April 15, 2009. There is also a short article on resistance management related to events here in Florida with citrus. As drier weather approaches we have reviewed some of the more important information on the scheduling of citrus irrigation.

*Enjoy the issue,*

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Citrus Mechanical Harvesting Field Day and Workshop



A spring citrus mechanical harvesting field day and workshop will be held in Immokalee on Wednesday, April 22, 2009. The topic of this year's workshop is "Addressing Processors' Questions", along with a trip to the grove to view citrus mechanical harvesting systems in action. For more information contact Barbara Hyman at 239-658-3400 or hymanb@ufl.edu.



2009 Annual Meeting of the Florida State Horticultural Society

The 2009 annual Florida State Horticultural Society meeting will be held June 7 - 9, 2009 at the Wyndham Riverwalk Hotel in Jacksonville, Florida. This year as Citrus Section Vice-president I received a number of high quality submissions for the annual meeting. Early registration ends on April 15, 2009 after this date registration increases \$50.00 so don't delay. A registration form and meeting information can be found at: <http://www.fshs.org/meetings.htm>

Citrus Notes Subscription

Times are a changing and one of these changes affects the delivery of "Citrus Notes". We have been transitioning the deliver of "Citrus Notes" to a number of formats over the past



few years. These include the standard hard copy through the mail, email delivery of a pdf file version and a copy available by visiting the citrus extension agents website at <http://citrusagents.ifas.ufl.edu/>. We have even attempted to make an audio version available from the citrus agents website. I have been instructed to transition the delivery of "Citrus Notes" from a printed mailed version to a digital format delivered through email or the internet. This month we will be updating our mailing list by sending out postcards that will request an email address, if you have one please print that information on the card on the appropriate line. If you do not have an email address or wish to receive a printed mailed copy leave the email address blank. In addition, make any changes to your mailing label directly on the card. At this point our intention is to continue to provide the newsletter free of charge to all citrus growers who request it. Having said this it might be delivered in a format other than a printed mailed version. If you have any questions or concerns please feel free to contact me at the office by phone at 863-519-8677. I must stress that when you receive the postcard you must return it or you will be removed from the mailing list. Don't forget to add postage to the postcard.

Pesticide Resistance Management

All right, you knew this one was coming, I have over the past few years made a concerted effort to raise your awareness of the potential for insect and disease resistance to pesticides used in citrus production. This has become extremely important with the increase in pesticide applications to target the Asian citrus psyllid. This is not intended as a sermon to have you stop your cur-



rent pesticide application program but, it is intended to have you carefully review your pesticide selection, especially if you have inadvertently made consecutive applications of materials with the same “mode of action” (MOA). I know that the majority of you have heeded previous warnings, label restrictions and are considering pesticides based on efficacy, MOA, and the MOA of the previously applied pesticide.

In February, at our last OJ Break and last month (March) at the Citrus Roundtable, Dr. Megan Dewdney presented documentation on the apparent resistance of *alternaria* brown spot to **one** of the strobilurins labeled for Florida Citrus. The *alternaria* brown spot that showed resistance was from a local tangerine block.

In the last section of the 2009 Florida Citrus Pest Management Guide are tables that list the pesticides labeled for Florida citrus along with a column indicating the pesticides MOA. This is where you should refer when formulating your citrus spray program taking into account the pesticides MOA. This information is also available in the individual recommendation tables in each of the chapters. Remember the last section in the spray guide is for all pesticides labeled for Florida citrus. The individual tables in each chapter list only the materials currently recommended by the University of Florida for control of the referenced pest.

Important Concepts in Citrus Irrigation Scheduling



This winter has been extremely dry and microsprinkler irriga-

tion has been scheduled to minimize citrus tree stress and prevent fruit drop. Now that we are in bloom and fruit set irrigation scheduling is of utmost importance in setting the 2009 - 2010 citrus crop. The latest citrus irrigation research results have again confirmed the yield increasing benefits of properly scheduled irrigation applications during this time of the year.

There are a number of critical parameters that need to be met for irrigation to provide for profitable yield increases. These include knowing the soil moisture depletion level when irrigation should be started, sufficient irrigation coverage of the grove and the proper amount of water applied.

The current recommendation is that soil moisture depletion levels should not exceed 25% during bloom and fruit set. This is one of the most critical factors in citrus irrigation today. You may have remembered years ago the 1/3 - 2/3 soil moisture depletion level for overhead and sprinkler pipe citrus irrigation (yes I have dated myself) with rough lemon and



sour orange as the most common rootstocks. The adoption of the 25% depletion level is based exclusively on microsprinkler irrigation systems and the prominent rootstocks (Swin-gle citrumelo and

Carrizzo citrange) used today in Florida. When soil moisture depletion levels exceed 25%, factors related to water stress will begin to affect fruit set and growth. It has been demonstrated through research that soil depletion values greater than this optimum level can affect fruit yields. One study cited from the Conserv research farm in Orange County

showed that significant yield increases were attained at the 25% depletion level but, irrigation scheduled at the 50% depletion level was not statistically different than no additional irrigation. The take home message is that the scheduling of irrigation is critical and there is very little room for error.

Many studies related to irrigation over the years have looked at the relationship between grove area covered and yield. Early studies done on citrus irrigation looked at water applied using sprinkler pipe and overhead.

These studies indicated that optimum yield increases were attained when 100% of the grove area was covered by irrigation. Grove area coverage of percentages less than 100% resulted in a decrease in optimum yields.

Many of these early studies were done on the ridge where rough lemon was the most common rootstock at that time. The freezes of the 1980's demonstrated the benefits of microsprinkler irrigation as a method of cold protection. This led the industry to adopt low volume microsprinklers for not only cold protection but also for irrigation. During this same period the industry moved from the use of rough lemon and sour orange as common rootstocks to Carrizo citrange and Swingle citrumelo.

The coverage/yield relationship still exists today but in practical terms, microsprinkler irrigation does not achieve 100% coverage and allowances (the recommendation of a irrigation threshold of 25% depletion) have been made based on this information. It has been shown that a minimum of 50% coverage is needed to attain adequate yields and growth using microsprinkler irrigation.



The third critical factor in citrus irrigation is the amount of water applied during any given irrigation cycle. This value is important in preventing the leaching of irrigation applied water past the root zone of the tree. The amount of water applied in gallons and the size of the wetted zone covered by the microsprinkler are the factors that determine the precipitation rate in inches of water. Most soils on the ridge are well drained sands that have very low water holding capacities. Excessive irrigation can easily leach past the root system of the tree resulting in a waste of not only money spent on irrigation costs but, the water used would not result in a corresponding increase in yields. The following (table 1) demonstrates the precipitation rate in inches per hour (0.5" and 1.0") and depth of water movement using a 10 gallon per hour emitter irrigating at 3 different percentage soil water depletion levels on a Candler sand with an effective tree rooting depth of 4 feet.

Irrigation Amount (ins)					
<u>0.5</u>			<u>1.0</u>		
<u>Soil Water Depletion (%)</u>					
<u>16</u>	<u>33</u>	<u>67</u>	<u>16</u>	<u>33</u>	<u>67</u>
<u>Depth of Wetting (ft)</u>					
4.7	2.3	1.13	9.47	4.59	2.26

Table 1. Effect of irrigation amount and soil water depletion on depth of wetting (L.R. Parsons, K.T. Morgan and T.A. Wheaton, CREC).

From the above table if the microsprinkler delivers 0.1" of water per hour for 5 hours (5 hours * 0.1"/hour = 0.5" of water) at 16% soil water depletion the irrigation applied would reach a depth below the soil surface of 4.7 feet. Now if you run the same system for 10 hours using 0.1" of water per hour and a 16% soil water depletion the applied water would

reach a depth of more than 9 feet. Growers need to determine the optimum amount of water to apply during any given irrigation cycle to reduce and prevent excessive irrigation below the root zone of citrus trees. Where can a grower find information on citrus irrigation scheduling? At the Florida Automated Weather Network (FAWN) website at: <http://fawn.ifas.ufl.edu/> under the tools tab of the home page. Click on “citrus irrigation” and select “citrus microsprinkler irrigation scheduler”. There you will be able to create your grove specific irrigation schedule based on your grove site, irrigation system and local weather measurements.

In closing the three components for successful citrus irrigation need to be considered in achieving increases in yields and growth. First, understand and determine what the 25% soil water depletion level is for your grove and use this threshold during the bloom, fruit set and early fruit enlargement (February to June). Second, make sure that your irrigation system provides for adequate grove area coverage using an approximate minimum level of 50% of the grove acre. Lastly make sure that your irrigation schedule (frequency and duration) will apply the right amount of water that does not leach past the citrus root zone based on the characteristics of the soil, soil moisture content and depth of the citrus root system.



Pesticide News and Information

Greening Almost Sequenced

Researchers have a new tool to combat citrus greening or Huanglongbing (HLB), a disease threatening the nation's \$2.2 billion citrus industry. Scientists at the USDA's Agricul-

tural Research Service have sequenced the genome of the bacterium *Candidatus liberibacter asiaticus*, which causes HLB. The bacterium resides in the plant's phloem tissue, affecting the passage of nutrients and eventually killing the plant. Plant pathologist Yong-Ping Duan and research leader David Hall have sequenced more than 95 percent of the bacterium's genome and have posted results in GenBank, an online database of genetic resources. They are currently sequencing the remaining five percent and plan to publish a paper describing what the genome reveals about the bacterium's taxonomy, evolution and some of its enzymatic pathways.



Sequencing the genome should allow scientists to decipher the bacteria's genetic code, study its biological features more closely and unlock mysteries about how it spreads disease. Researchers also should be able to identify genes that play roles in disease development to help design control strategies. The bacterium is transmitted from plant to plant by the Asian citrus psyllid (*Diaphorina citri*), a tiny brown insect that feeds on all kinds of citrus crops. Duan and Hall found sufficient target bacterial DNA for sequencing by searching among infected psyllids. The disease occurs in Asia, India, Africa and South America, and was discovered in Florida in 2005. Plants can be infected for two years before characteristic yellow shoots and mottled leaves begin to appear. Infected trees produce unmarketable, bitter fruit and usually die in five to seven years. (USDA, 2/12/09).