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The Citrus BIFS

Biologically Integrated Farming Systems

Newsletter

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COOPERATIVE EXTENSION

UNIVERSITY OF CALIFORNIA

THE FIRST GROWER DAY OF 2001

The Fresno County BIFS Project held their first grower's day of 2001 on April 17th, at the Kearney Agricultural Center. The event was well attended, and the comments received were all positive. Dr. Thomas Chao, Extension Specialist, UC Riverside, opened the meeting with a few comments and then introduced Robert Martin, the new BIFS Project Coordinator. Dr. Carol Lovatt, Dept. of Botany and Plant Sciences, UC Riverside, spoke on foliar vs. soil application of Nitrogen fertilizer. After a lively question and answer period, Dr. Beth Grafton-Cardwell, UCCE Citrus Entomology Specialist, spoke about the Citrus peelminer, an increasingly common pest in the San Joaquin Valley. After a break to stretch and enjoy some of the refreshments, Mr. John Pehrson, Subtropical Horticulturist Emeritus, spoke on citrus irrigation. He presented some new research on emitter placement and tree usage. Following Mr. Pehrson's presentation, Jim Chandler, Manager of the Orange Cove Irrigation District, spoke on the competitive demands for California's water. The last speaker of the day was Mr. Jim Carter, of Pacific Gas and Electric, who gave us an update on energy issues and some thoughts on the future of California's energy situation. This was just the first of several grower days we are planning for the near future. If you have any suggestions for topics, please call Robbie Martin at (559) 646-6539, or rgmartin@uckac.edu. We hope to see you at future events!

WINTER OR SUMMER FOLIAR APPLICATIONS OF LOW-BIURET UREA OR POTASSIUM PHOSPHITE: WHICH ONE AND WHEN?

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Winter pre-bloom foliar applications of low-biuret urea (46-0-0; $\leq 0.25\%$ biuret) or potassium phosphite (0-28-26) have been shown to increase yield (Ali and Lovatt, 1992; Ali and Lovatt, 1994; Albrigo, 1999). Lovatt (1999) demonstrated that summer applications of either fertilizer increased fruit size. Proper timing is important to achieve the desired outcome. The winter pre-bloom spray is designed to increase flower number and yield (Lovatt et al., 1988; Ali and Lovatt, 1994; Albrigo, 1999) without reducing fruit size (Ali and Lovatt, 1994). The most effective application time is around irreversible commitment to flowering. In California, the period from December 15 to February 15 seems to be appropriate in most years. However, it is important to note that this window was extrapolated from research conducted in southern California. The timing of the winter pre-bloom fertilizer applications might be improved by determining experimentally when irreversible commitment to flowering occurs in orchards from the Arvin-Edison area to Madera. (Research conducted to determine the time of maximum peel thickness in California to properly time applications designed to increase fruit size has improved our success.) Later applications (March and April) are better than those that are too early (October and November). This is because once the opportunity to increase flower number has passed; late applications of either fertilizer will increase the retention of abscising reproductive organs. However, as time progresses from flowering through early fruit set to June drop more and more flowers and fruit abscise. Hence, yield potential decreases and the contribution that either fertilizer can make to increasing yield diminishes. When used as a winter pre-bloom foliar spray, low biuret urea (46-0-0, $\leq 0.25\%$ biuret) is applied at the rate of 50 lb. in 200 gallons water per acre. (Lower volumes can be used as long as tree coverage is good, but high volumes, 500-700 gallons per acre, show greater incidence of tip burn. The potassium phosphite formulation that has been used in all research trials reported in the literature thus far is Nutri-Phite (Biagro Western Sales, Inc., Visalia, Calif., 0-28-26). Nutri-Phite applied for the winter pre-bloom spray is at the rate of 2.6 quarts (0.64 gallons) in 200 gallons water per acre.

Summer applications of either low-biuret urea or potassium phosphite are designed to increase fruit size without increasing yield (Lovatt, 1999). Time of application is important. The treatments are designed to extend the cell division stage of fruit development to achieve an increase in fruit size. The end of the cell division stage of fruit development is characterized by maximum peel thickness. We experimentally determined that in California, this period is between approximately June 15 and July 31. Low-biuret urea is most effective when applied between July 1 and July 31. Applications of low-biuret urea that are too early (May and June) increase fruit retention and thus, are less effective in increasing fruit size. Potassium phosphite is more effective in increasing fruit size when applied two times. We target May 15 \pm 7 days and July 15 \pm 7 days. How long after the end of July low-biuret urea or potassium phosphite applications would still be effective in increasing fruit size is not known. When applied in the summer at maximum peel thickness, low biuret urea (46-0-0, \leq 0.25% biuret) is applied as a single spray targeting July 15 \pm 7 days at the rate of 50 lb. in 200 gallons water per acre. To increase fruit size potassium phosphite [Nutri-Phite (Biagro Western Sales, Inc., Visalia, Calif.) 0-28-26] is applied in two sprays at the rate of 2 quarts (0.49 gallons) in 200 gallons water per acre for each application. The first targets May 15 \pm 7 days and the second targets July 15 \pm 7 days.

All applications should be made to give good canopy coverage, much like applying a pesticide or plant growth regulator. Solutions should be between pH 5.5 and 6.5. Applications of low-biuret urea or potassium phosphite should be made when the air temperature is below 80 °F. Taking into consideration the potential maximum daytime temperature, applications should be made early morning or late afternoon to early evening. The information below is designed to help guide you in deciding whether to use foliar applied low-biuret urea or potassium phosphite as part of your production management strategy. Please keep in mind that our research is ongoing. The information provided below is our best interpretation of our results to date. They are, however, subject to modification as the research progresses.

When do you use a winter pre-bloom foliar application of low-biuret urea or potassium phosphite?

- When your production goal for the year is to increase yield
- When your current harvest is a heavy on-crop and you anticipate the next crop to be an off-year
- When you hang your fruit late and suspect a low return bloom
- If we have a mild winter with insufficient chilling to induce a good bloom
- If we have cold wet soils, especially into February and March (late fertilizer applications in this case are beneficial.)
- When you wish to increase total soluble solids in your fruit or lbs. TSS per acre

When do you use summer (maximum peel thickness) applications of low-biuret urea or potassium phosphite?

- When your production goal for the year is to increase fruit size
- When you are carrying a heavy on-crop

When should you use low-biuret urea vs. potassium phosphite?

- When your production goal is to increase fruit size, do not use either fertilizer as a winter pre-bloom spray; the increased yield will make it more difficult to increase fruit size. Use low-biuret urea or potassium phosphite as summer applications only.
- When cost is your overriding consideration, low-biuret urea is the less expensive fertilizer and only a single application is required to increase fruit size; however, potassium phosphite provides the secondary benefit of controlling *Phytophthora*
- If you wish to harvest early, use potassium phosphite as a summer spray (May and July)
- If you wish to increase peel thickness, use potassium phosphite as a summer spray (May and July)
- For Valencia oranges, if the time of application is close to harvest, use potassium phosphite, NOT low-biuret urea, to prevent regreening
- If you have crease, use potassium phosphite
- If your fruit have rough, thick peels do not use low-biuret urea as a winter pre-bloom spray when your current crop is still on the tree or as a summer maximum peel thickness spray
- When soils are cold and wet in spring but the air temperature is warm periodically, use potassium phosphite to reduce the potential for crease
- When soils are cold and wet and trees are yellow, use low-biuret urea after considering all the above

I hope the above information proves useful in planning your production management strategy for a given year. For additional information, you may contact me by e-mail at carol.lovatt@ucr.edu.

Literature Cited

- Albrigo, L. G. 1999. Effects of foliar applications of urea or Nutri-Phite on flowering and yields of Valencia orange trees. *Proc. Fla. State Hort. Soc.*
- Ali, A. G. and C. J. Lovatt. 1992. Winter application of foliar urea. *Citrograph* 78: 7-9.
- Ali, A. G. and C. J. Lovatt. 1994. Winter application of low-biuret urea to the foliage of 'Washington' navel orange increased yield. *J. Amer. Soc. Hort. Sci.* 119: 1144-1150.
- Lovatt, C. J. 1999. Timing citrus and avocado foliar nutrient applications to increase fruit set and size. *HorTechnology* 9:607-612.
- Lovatt, C. J., Y. Zheng, and K. D. Hake. 1988. Demonstration of a change in nitrogen metabolism influencing flower initiation in citrus. *Israel J. Bot.* 37: 181-188.

SOME USEFUL WEBSITES

UC Riverside Dept. of Botany & Plant Sci.
www.cnas.ucr.edu/CNASDept.html

Links to academic departments, Cooperative Extension Specialists, Glassy Winged Sharpshooter info, etc.

UC Fruit and Nut Center

<http://fruitsandnuts.ucdavis.edu>

UC Davis's Fruit & Nut Research and Information Center homepage. Links to publications, crop info, research, extension, weather, and events.

Kearney Agricultural Center www.uckac.edu

Homepage of Kearney Ag Center, located in Parlier, CA. Links to weather data, events & meetings, research projects and contact people.

Kearney Agricultural Center Citrus Homepage

www.uckac.edu/citrusent/

A sub page of KAC's homepage. Degree-Day info, Thrip, Vedalia Beetle, pesticide info, and links to other citrus sites.

UC Statewide IPM Project www.ipm.ucdavis.edu

Pest info, treatment guidelines, a weed gallery, Degree-day info, weather data, pesticide data, publications. If it has to do with IPM, it's at this site!

Citrus Research Board Homepage

www.citrusresearch.com

CRB's Homepage, pest infestation & eradication updates, management & physiology, plant pathology, & nematology, entomology, post-harvest handling publications. Be sure to check out the 1999 Annual report.

CDFA Biological Control Program

<http://plant.cdfa.ca.gov>

California Department of Biological control's Homepage. Pest

fact sheets including the Glassy Winged Sharpshooter and Citrus Peel Miners. Bio-Control Projects and many biological related links.

UC Sustainable Ag Research

www.sarep.ucdavis.edu/biocontrol

Publications, newsletters, public policy, community development information. Descriptions of Sustainable Agriculture and the BIFS Program. Information on alternatives to Methyl Bromide, many links.

UC Sustainable Ag Network www.sare.org

Sustainable Ag Network and Sustainable Ag Research & Education's website. Publications, Resources, books, free bulletins. Info on funded projects, education, news and events. Links to Sustainable Agriculture websites.

Cover Crop Index

www.sare.org/htdocs/pubs/mccp/

Tons of information on cover crops, selection, planting varieties and challenges in growing them. Methods to evaluate your program and reach your goals.

Ca. Irrigation Mgt. Information System (CIMIS)

<http://www.dpla.water.ca.gov/cimis.html>

Weather station info for all over California. Historical data, links for irrigation management, irrigation scheduling, crop specific info, evapotranspiration, contact info and weather links.

CATI <http://cati.csufresno.edu/webs/index.html>

California Agricultural Technology Institute's page of links, over 100 Ag related links. Also, link to the CATI homepage, based at California State University Fresno, provides access to research, reports and projects funded by the center.