



# CITRUS NOTES

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## Citrus Growers' Educational Seminar

Sponsored by: University of California Cooperative Extension and Citrus Research Board

**When:** Friday, October 30, 2009

**Where:** Chico Masonic Family Center

1110 W. East Avenue, Chico, California

**Cost:** \$15.00 per person includes lunch and course materials.

Please use attached Advance Registration Form

**8:30** Registration Opens

**9:00** Introductions & Seminar Sessions Begin

*Bill Krueger, UC Farm Advisor, Glenn County*

**9:05** Unprecedented New Threats to the Citrus Industry: Asian Citrus Psyllid and HLB Disease

*Beth Grafton-Cardwell, UCCE Extension Specialist/Entomology and Director, Lindcove Research and Extension Center*

**10:05** Citrus yield, fruit size and pruning

*Craig Kallsen, UC Farm Advisor, Kern County*

**10:45** Break

**11:00** Citrus Root Diseases

*Joe Connell, UC Farm Advisor, Butte County*

**11:30** Citrus Nutrition

*Joe Connell, UC Farm Advisor, Butte County*

**12:00** Catered Lunch – pre-registration required

**12:30** Agricultural Commissioner's Update and Pesticide Training

*Butte County Agricultural Commissioner's office*

**1:30 pm** Adjourn

**Continuing  
Education  
Credit  
has been  
requested**

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University of California, and the United States Department of Agriculture, Cooperating with Butte County

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### mandarins

By J.E. Adaskaveg

Dept. of Plant Pathology, Univ. of Calif., Riverside

Pre-harvest rind decay of mandarins in California generally occurs shortly after rain falls and is most severe on Satsuma mandarins. Although some

researchers have associated the problem with fungi such as *Alternaria* species, our isolations from affected fruit were inconsistent. Re-inoculations with the isolated fungi (e.g., species of *Alternaria*, *Fusarium*, *Macrophomina*, *Ulocladium*, and *Cladosporium*) only sometimes reproduced disease symptoms and only on water-soaked fruit. Furthermore, in preliminary field trials that were conducted in Butte Co. in the fall of 2002 and 2003, fungicide treatments that included Topsin-M®, Pristine®, and Abound® only reduced the incidence of disease from 99% in the control to approximately 90%. These data suggested that mandarin rind breakdown is a physiological, abiotic disorder of fruit rather than a pathological problem and the fungi isolated are rather secondary causes of rind decay than primary pathogens.

Rind breakdown of citrus was previously reported by Fawcett and others in the 1930s. Wet weather combined with a sudden decrease in temperature was shown to result in liberation of rind oil and collapse of cells just under the cuticle. In our laboratory studies with Satsuma mandarins, symptoms could be reproduced by water soaking of

the fruit. In laboratory and preliminary field trials in 2003 fruit treatments with water repellants (e.g., postharvest fruit coatings, an agricultural anti-transpirant, or a summer oil) reduced the incidence of rind breakdown to very low levels. Field trials were again conducted in the fall of 2004 in Butte County. Fungicide treatments were ineffective in the Butte Co. trial and in all trials, applications of Vapor-Gard or Omni oil significantly reduced the disorder (Table 1). In all programs with Vapor-Gard and Omni Oil, a first application was made at the end of October and there was no significant difference in efficacy when additional applications were done. When trees were protected from rainfall using a tent, in both 2003 and 2004 (Table 1), the disorder could not be detected indicating the rind breakdown is correlated to rainfall.

In summary, results from our trials support previous findings by Fawcett and others that mandarin rind disorder is an abiotic, weather-related problem of mature fruit that has undergone a green to orange color change. Furthermore, we developed economical treatments that can significantly reduce the disorder.

Table 1. Effect of fungicides and rain protecting materials on mandarin rind disorder in Butte Co. 2004

No.	Treatment*	Product Rates (/200gals/A)	Application Dates				Incidence of MRD (%) & LSD
			Oct. 22	Nov. 9	Nov. 19	Nov. 26	
1	Check	---	---	---	---	---	33.67 A
2	Abound	12.8oz	@	---	@	---	31.25 A
4	Vapor Gard	1gal	@	@	---	@	5.85 B
5	Vapor Gard	1gal	@	---	---	---	4.00 B
7	Omni Oil	6qt-0.75%	@	@	---	@	1.25 BC
8	Omni Oil	6qt-0.75%	@	---	---	---	1.96 BC
9	Vapor Gard/Nordox	1 gal/6 lb	@	---	---	---	5.80 B
10	Tent Protected	---	---	---	---	---	0 C

\* - Treatments were applied using an air-blast sprayer calibrated to 200 gal/A.

\*\* - Incidence of mandarin rind disorder (MRD) is based on the evaluation of 100 fruit per tree.

## **Citrus blast**

Blast is caused by the bacterium *Pseudomonas syringae* and is severe only in the northern

California counties of Butte, Glenn, and Tehama. Heavy rains, strong winds, and low temperatures are ideal conditions for citrus blast development. The blast organism usually enters through injured

tissues or wounds. Winds that tatter leaves and crack leaf petioles contribute to blast damage. Thorn, hail or insect injuries to leaves are other avenues of entry for the disease organism.

Blast lesions often start at the leaf petiole. Leaves affected by blast wilt rapidly and dry on the tree. The dried leaves may fall leaving the leaf petiole behind or the entire leaf may remain stuck on the tree. In severe attacks, twigs are girdled and killed. If the twig isn't killed, callus will form at the edge of the twig lesion and the diseased spot will be covered by a reddish brown scab or crust. Blast is most severe on the exposed sides of the tree. In our area, usually the south side and the tree tops are most seriously affected.

The most effective control is a spray before the first rain in late October to early November of a 10-10-100 Bordeaux mixture. Complete coverage using 10-25 gallons of spray per mature tree is the recommended rate. Bordeaux 10-10-100 is made by mixing 10 lbs. copper sulfate (bluestone)

containing 25% metallic copper and 10 lbs. fresh hydrated lime in 100 gallons of water. If you hesitate to spray because Bordeaux is hard to get off the fruit (sometimes a problem with pebbly-skinned mandarins), harvest first and then spray. Commercially available fixed copper materials are not as persistent as a Bordeaux spray. However, they are much easier to use and are readily available.

Sprays applied in fall will help protect leaves and shoots from winter storms. In years with heavy rainfall, a second spray in late January is appropriate. Remember, a spray application has to be applied before blast injury occurs in order to protect the tissues. Cultural practices that harden off growth in the fall before wet, cold weather comes will help reduce the severity of blast damage. Avoid late season fertilization....the last nitrogen should be applied in late May. Using these cultural and chemical controls will help reduce citrus blast and the severity of blast damage to the tree.

## Citrus Growers' Educational Seminar Reservation Form

Advance Reservations are Required

To register, mail coupon no later than October 23rd

or Phone (559) 738-0246, or fax the coupon below to (559) 738-0607

or e-mail to [Anne@citrusresearch.org](mailto:Anne@citrusresearch.org) by October 26<sup>th</sup>. (You may pay at the door.)

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Please make \_\_\_\_\_ reservations @ \$15.00 each for the Citrus Growers Educational Seminar to be held on October 30, 2009 in Chico, California:

Name: \_\_\_\_\_

Address: \_\_\_\_\_

Phone: \_\_\_\_\_ Fax: \_\_\_\_\_ E-Mail: \_\_\_\_\_

Enclosed is my check in the amount of \$ \_\_\_\_\_. **Make check payable to Citrus Research Board** with this form to: Citrus Research Board, P.O. Box 230, Visalia CA 93279.