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ORCHARD NOTES

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PEST TRACKER

We will post the pest tracker in the front of our office as in the past and update degree days weekly on Fridays. Oriental fruit moth, peach twig borer, codling moth, San Jose scale and navel orangeworm will be tracked from the beginning of the flight in Yuba City and District 10.

FINAL CHILLING HOURS

The chilling hours in Davis as of February 22, 1997 are 1154. Last year the season ended at 703 and the 50-year average is 1434. This last season I started keeping chilling hours here at our office in Yuba City. The chilling hours were 773 from November 1, 1996 to February 28, 1997, which were closer to the 626 measured at the

Wolfskill Experimental Orchards in Winters. I will need several years of local data before comparisons can be made.

FLOOD DAMAGE AND DISEASE PROBLEMS

The two main concerns with flooded orchards are Phytophthora diseases and waterlogging (see January 1997 "Orchard Notes"). With *Phytophthora*, many species of this water mold fungus are found in surface water sources such as rivers and canals, and in infested soils. Because of this, in early February USDA Plant Pathologist Greg Browne and I sampled flood waters in several orchards in the Arboga area and Meridian. Using pear fruit to "bait" the *Phytophthora*, we found that every orchard location had virulent species of *Phytophthora* present. Greg presented these findings at our February walnut meeting.

By mid-February, the first symptoms of aerial infections by *Phytophthora* were evident on peaches and soon after on prunes. By aerial infections we mean that cankers form in the scaffolds, branches, limbs, and hangers from *Phytophthora* in the flood waters as opposed to crown and root infections caused by *Phytophthora* in the soil. On peaches and prunes amber colored gum indicates an infection. Cutting into the tissue below the gumming reveals reddish brown cankers. Many of these cankers, more on peach than on prune, continue to look active. We have taken many samples and Greg is trying to identify the species of *Phytophthora* involved. This will help us know whether we are dealing with a "cool-temperature" fungus like *P. syringae* (which ceases development in hot weather) or another species. With peaches in the flood zone and the river bottoms, there are multiple aerial Phytophthora infections on every tree in every orchard I have looked at no matter what age. Many of these orchards were flooded less than a week. I was surprised to see so much infection on trees that were dormant and flooded for a short period in January. This is very different from 1986, where we saw aerial Phytophthora on walnuts and prunes flooded for 45 days from late February through mid-April.

Recently, we found symptoms of aerial Phytophthora on apples also. Instead of gum forming, the bark splits and peels where the aerial cankers are on branches and trunks. To date, we have not seen aerial Phytophthora in flooded walnuts. Look for bleeding in limbs and branches and please call me if anything looks suspicious.

The aerial cankers in peaches have girdled hangers and small limbs. We do not know yet how much damage these aerial cankers will cause. The two fungicides registered for *Phytophthora* are Ridomil and Aliette. Ridomil is registered for nonbearing and bearing stonefruit, walnuts and apples. Aliette is registered for nonbearing stonefruit and nonbearing and bearing pome fruit (apples and pears). The last week of March a Section 18 or 24°C will possibly be issued that will allow the use of Aliette on bearing stonefruit, walnuts and kiwifruit **but** the crop will have to be destroyed. To test the effectiveness of these products on aerial Phytophthora, I have field trials using Ridomil on bearing peaches and Aliette on nonbearing peaches.

The other problem now starting to show is waterlogging on peaches, again even on some that were not flooded for very long. Those orchards on heavier soil are starting to show symptoms of collapse. The root and crown tissue is brown on these trees and nothing can be done to save them.

Now that the flood waters have receded, we can now assess the acres of trees uprooted and broken. As the weather warms up, we can begin to assess the losses from waterlogging and *Phytophthora* diseases. Please notify me of any losses since we are trying to do an economic analysis of flood impacts on agriculture. The handouts and computer program we have on calculating the value of an individual tree for peaches, prunes and walnuts will be very helpful for those with tree losses for income tax purposes.

ORIENTAL FRUIT MOTH AND PEACH TWIG BORER

The first oriental fruit moths (OFM) were caught in Live Oak and Marysville on February 26, but the biofix was set on March 7 when we had a sustained moth catch at our Yuba City location. Generally no insecticide is applied to the first generation because of erratic emergence and egg-laying caused by variable weather. For growers using OFM mating disruption (pheromone confusion) however, the pheromone dispensers needed to be applied to trees at biofix (which varied from late February through mid-March). The three OFM pheromone dispenser products available - Hercon's Disrupt OFM, Consep's Checkmate OFM and Biokontrol's Isomate-M, last for 90 days. Consep has a new dual OFM/PTB dispenser. We (not the company) recommend it be hung at OFM biofix rather than waiting for PTB biofix. It may be best used at the second hang in June.

If planning to control OFM with sprays, monitor shoot strikes during the first flight to decide if a spray will be needed during the second flight to reduce OFM population levels. When about 920-1010 degree-days (DD) have accumulated, the second flight should begin. Once started (in May), begin accumulating DD from zero and apply spray treatments 500-600 DD from the beginning of the second flight for the best control.

For peach twig borer (PTB), pheromone indicator traps should be placed in orchards by **April 1st** to detect first moth emergence. For mating disruption, there are two PTB pheromone dispenser products available - Consep's Checkmate PTB and Hercon's Disrupt PTB that lasts 90 days. PTB pheromone dispensers should be placed in orchards around April 1 or when the first moth is caught. If planning to spray, applications should be made between 400 DD to 500 DD after biofix.

The last two years we have had demonstration plots with several peach growers in our area and Butte County who used a complete mating disruption (MD) program to control both OFM and PTB. Overall the results were quite good with only a few problems in certain orchards. The drawback is the cost - about $100.00 more/acre for the complete MD program than a spray program (3x + a miticide). Two pheromone applications (i.e. OFM-March, PTB-April) followed by a spray in the summer brings the cost down to only about $10.00 more than a spray program.

This year's program is aimed at reducing insecticides during the **dormant and growing season**. Peach growers participating in the program used Bt at bloom instead of a dormant insecticide for overwintered PTB control. This will be followed with either a complete MD or combination MD/spray program for in-season OFM and PTB control. We have grant support from the Department of Pesticide Regulation and Smith-Lever to help defray costs of monitoring, traps and educational meetings.

CLING PEACH RUST

Based on research since 1995, optimal conditions for cling peach rust development are 68°F and 24 hours of wetness. Temperatures between 59-77°F increases or delays symptoms but high temperatures (77°F) inhibit disease. The fungus overwinters in perennial twig cankers that allow a one to two year mechanism of survival. From early April to early May, urediniospores are produced from these cankers that start the disease cycle. From 1996 data, spring fungicide applications were the most effective

treatments. Sulfurs, Rally, Break, and Elite were all effective. None will eradicate peach rust and none have long residuals, 10-14 days at the most. Late April or May applications were the most effective timing in reducing leaf rust in 1996.

WALNUT BLIGHT

Blight bacteria survive the winter primarily in dormant buds. Bacteria are spread to unprotected tissue by rain, heavy dew or irrigation. To control blight, apply sprays to the bloom, nutlets and foliage **before** it rains to prevent the bacterium from being spread by moisture. The overall goal of a walnut blight program is to either keep blight out of your orchard or at low populations.

Following is a summary of the main points and most recent research on blight:

Blight is mainly a problem on early leafing varieties. Later leafing varieties like Chandler, Howard and Hartley will usually only need a few protective sprays since there is usually less rain during their bloom. Blight was very bad on Hartley last year because of some late rains on unprotected orchards. All new plant tissue must be sprayed **before** it rains.

Start your spray program just before the first female flower appears and be prepared to apply sprays through May. Very few new infections take place late in the season (June-August) so spraying is not economical then.

Plan to treat weekly but watch the weather forecasts. During wet weather spray at least every seven days and during dry weather spray every 10 days.

Research trials have consistently shown that a tank mix of Manex and copper enhances blight control in orchards with copper-resistant and copper-sensitive bacterial strains. Manex received a Section 18 in February allowing its use for blight control.

The usual rate of copper is 4 lbs. of metallic copper per acre when using wettable powdered materials. A ratio trial comparing 4, 6, and 8 lbs. of Kocide 101/acre with Manex at 1, 2 or 3 quarts/acre, found that the rate of Kocide could be reduced to 6 lb/acre and still provide the same control as the 8 lb. rate with the addition of the two quart rate of Manex.

Addition of spreader/stickers did not improve blight control compared with a Manex/copper application alone.

Zinc has been shown to have activity against blight but is not registered for this use. Since repeated zinc sprays can cause serious leaf burn, more research is needed on how to use zinc safely for blight control.

To reduce leaf burn associated with Bordeaux and the powdered fixed coppers, use one quart of summer oil emulsion/100 to safen the copper spray.

Full coverage is needed for the most effective blight control. Spraying by ground is recommended, but if spraying by air, research showed that using a large helicopter gave better control than using either small helicopters or fixed wing aircraft.

U.C. Berkeley plant pathologist Dr. Steve Lindow, found copper-resistant bacterial strains in about half of all orchards sampled in surveys of northern and central California walnut orchards. However, the majority of strains in most orchards were copper-sensitive. Generally, the proportion of copper-resistant strains in a given orchard did not increase during the growing season even where multiple copper sprays were applied. These findings suggest that copper-resistant strains of the walnut blight bacterium are less fit than copper-sensitive strains.

CODLING MOTH

Monitoring codling moth with pheromone traps is critical to management of this pest. Codling moth activity and population size are measured with these traps that monitor the male moth flight. From research we know that female moths emerge about the same time as male moths. Pheromone traps should be hung in early March to detect the first moth. The different pheromone lures vary in how often they need to be changed. Be aware of the pheromone type and change it according to instructions throughout the season. Once 30 moths have been caught, change trap bottoms and continue to do this throughout the season. Growers may benefit from placing traps higher in the tree if they are not getting enough moths to delineate peaks.

A biofix is set with the first sustained moth catch. From this date, start accumulating degree-days (DD). Biofix is often around the end of March in our area but varies year to year. We set our biofix in a District 10 orchard March 16 in 1996 and April 2 in 1995. The

other factor to consider when setting a biofix is sunset temperature. Codling moth needs sunset temperatures of 62°F to mate successfully. Usually a 75°F maximum temperature is needed for a sunset temperature of 62°F. With first trap catches, determine the sunset temperatures before setting a biofix. This year we caught our first moth on March 11 in District 10. We set the biofix on March 19 when sunset temperatures were 62°F. At our Yuba City location we set the biofix on March 21. Local weather can be found and degree days calculated through UC IPM on the world wide web (http://www.ipm.ucdavis.edu). Other environmental factors affecting codling moth are wind speed and rain. They won't fly with winds more than 1½ miles per hour. Rainfall of just 1/10 inch in the evening period is enough to wet the leaf surface to prevent egg laying.

When do you apply the first spray? That depends on the material and the variety. If using an organophosphate like Guthion, Imidan or Lorsban or a pyrethroid like Ambush or Asana, then target when most of the larvae have hatched. This corresponds to a spray timing of 300 DD from biofix or at 3/8 to ½ inch nut size, whichever is later, on early leafing varieties like Ashley and Serr. Last year ½ inch nut size occurred much later than 300 DD, but these events generally coincide in Ashley. The insect growth regulators Confirm or Dimilin that have different spray timings than conventional insecticides, are not recommended for this first spray because the foliage is expanding too rapidly to get the necessary coverage. More will be said in the May issue of "Orchard Notes" on using insect growth regulators for the second and third flights.

In some years there is a second peak of the first flight. I will call this second peak 1B and the first peak 1A. Codling moth damaged nuts from the 1A flight will drop to the ground but infested nuts from the 1B flight will not all drop but will be blows at harvest. These damaged nuts can make a good home for navel orangeworm to build up in over the season. If a 1B peak is seen, then plan to spray again especially if a short residual material was used for the 1A peak. The spray timing for this second peak often occurs around 600-700 DD. With varieties like Chandler or Hartley, this 1B peak is also of concern.

This year most of our local surface water sources will be monitored by the Regional Water Quality Control Board for insecticides. They are targeting organophosphates, especially Lorsban, applied for codling moth control. It is very important that

best management practices be used when applying all insecticides and that irrigation water is managed to avoid runoff.

NAVEL ORANGEWORM (NOW)

Reduce overwintering NOW populations as soon as possible by shredding or chopping all remaining mummy nuts in walnut orchards. Discing mummy nuts into the soil will reduce NOW but not eliminate it. Also remove and destroy all waste from hullers, bins, hulling and drying equipment and buildings.

NITROGEN MANAGEMENT

Developing a sound nitrogen program involves several steps. First, make an estimate of the orchard's nitrogen removal rate and nitrogen needs. Then estimate nitrogen supplied by other sources such as irrigation water, cover crops and soil organic material. An approximate fertilization rate is developed using this information. Then fine-tune the rates annually using leaf tissue analysis, yield records and general vigor of the trees. The efficiency of nitrogen applications is influenced by fertilizer materials, timing and placement, irrigation application efficiency and fertilization techniques. Nitrogen assessment, increasing use efficiency, choosing fertilizer materials and determining specific nitrogen fertilizer rates are clearly explained in a new video/handbook on nitrogen management in stone fruit. (See video section).

Nitrogen Application Timing:

Walnuts
For greater efficiency, apply a part of your nitrogen (N) fertilizer in the spring. The remainder should be applied at the end of summer or early September while the roots are still active. The springtime N application will be used by the tree during the growing season, and the N applied late summer goes into storage and is used during the following bloom. On sandy soils, consider splitting nitrogen into three or more applications.

Peaches
During the spring growth flush period, usually early April, apply between 30-70% of the total annual amount of nitrogen depending on the variety. Apply higher rates to the late-season varieties. Apply the remainder during the second application in late summer, usually August to September. Early season varieties should have higher rates at this timing.

KIWIFRUIT

Check your vineyards now for the presence of snails to help reduce Botrytis (gray mold) in storage. Fruit with sepals removed by snails can have about four to five times more Botrytis than fruit with intact sepals (without snail damage). The snails increase Botrytis in three main ways:

1) Snails remove sepals that create wounds around the stem end.
2) More spores of Botrytis can stick on snail slime.
3) Snail slime itself enhances Botrytis germination.

Besides increasing Botrytis in storage, snails can reduce yields by eating the floral buds. Get a handle on snails now before there is fruit in the vineyard. Controlling weeds may help keep the snail population down.

VIDEOS

All videos available on a two-day checkout. Some videos can be purchased.

New Videos:
Walnut Husk Fly - Biology, Monitoring & Control Strategies.
This is the video shown at our walnut meeting in February that shows our new spray timing recommendations. It can be ordered for $20.00.

The Fruits of Their Labor: Nitrogen Management in Stone Fruit and Almond Production.
Nitrogen assessment, orchard specific rate determination and timing, soil and tissue monitoring, fertilizer selection, and irrigation practices are discussed. Sample calculations and accompanying video handbook make information understandable and practical. Information also applies to walnuts. Video and handbook can be ordered for $10.00.

Other Videos:
-Grafting Walnut Trees
-Ground Squirrel Management, A Better Understanding of Your Options
-Pesticide Handlers and the Worker Protection Standard

NEW PUBLICATIONS

Available from the Cooperative Extension Office.

Soil Solarization: A Nonpesticidal method for Controlling Diseases, Nematodes, and Weeds. Thoroughly revised, with ten black-and-white and seven color illustrations. 12 pp- $5.00.

Micro-Irrigation of Trees and Vines (revised edition). This manual covers all the various types of micro-irrigation systems-micro-sprinkler, surface drip, and subsurface drip-as they are used by growers of tree and vine crops. It includes accurate information on emitters, pumps, valves, and flowmeters; how to design the best system for your needs; wetting patterns and pressure loss; and routine maintenance, clogging, and root intrusion. 138 pp- $25.00.

WORKSHOPS

AgTech'97 - May 21, 1997, 9 am - 5 pm, U.C. Davis. The goal of this workshop is to actively demonstrate new technologies in fruit and nut production. More than 75 demonstrations are planned on production topics such as composting and mulches, GPS and mapping, IPM, subsurface and microirrigation, new variety breeding, precision spray equipment and world wide web technology. The event will be in the teaching orchards on Hutchinson Drive in Davis, just west of Highway 113. No preregistration is required, but a $10 admission fee is requested at the event. Registration for up to eight hours of PCA and CCA credit is an additional $15. For more information, call Naomi Hirsch at (916) 754-9708, e-mail at fruitsandnuts@ucdavis.edu or website at http://pom44.ucdavis.edu/agtech97.html.

Postharvest Technology Short Course - June 16-27, 1997, University Extension, U.C. Davis. A short course designed to showcase principles and technological procedures for handling fresh horticultural crops. For more information contact (916)757-8899.

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