University of California Cooperative Extension

The Pomology Post

Madera County

Volume 38, July 2002

Almond Leaf Scorch Found in Madera County!

by Brent Holtz, UCCE Madera

Almond Leaf Scorch or golden death, has been observed in a few orchards in Chowchilla. The bacterium that is responsible for almond leaf scorch, *Xyella fastidiosa*, also causes Pierce's Disease in grapes and alfalfa dwarf. The bacteria lives in the xylem tissues of the tree and is spread from plant to plant by spittlebugs and sharpshooter leafhoppers that feed in the xylem. The spittlebugs can vector the bacterium from infected weeds and trees to healthy trees. Leaves of infected trees appear normal in spring, but develop symptoms in early to mid-July. Tips and margins of leaves turn yellow, then brown, and a golden yellow band forms between the green and brown leaf areas. Leaves with salt burn will not have a gold band between the brown leaf tip and the green base of the leaf.

Newly infected trees typically have one terminal branch that is affected. But if you examine the trees closely, several developing infections on the same or nearby scaffolds may be apparent. As the disease progresses from year to year, trees have reduced terminal growth, large numbers of dead spurs and small branches, and terminal shoot die back. Within 3-8 years the disease can spread over the entire tree, yields are greatly reduced, and the tree will eventually die.

Annually inspect your orchards in mid-to late July. Prune out all infected limbs in newly infected trees, 2 to 3 feet below symptoms. Do this as soon as infected shoots are detected. Cultivars such as Padre, Carmel, Butte, and Fritz, have shown resistance. Susceptible cultivars include Nonpareil, Ne Plus Ultra, Jordanolo, and Peerless.

Red Imported Fire Ant Found in Merced County!

by Brent Holtz, UCCE Madera

Red Imported Fire Ant (Solenopsis invicta) has been found in Madera County, as if we didn't have enough to worry about with Glassy Winged Sharpshooters and bacterial diseases. The red imported fire ant (RIFA) is unique among exotic pests since it may impact so many facets of the state's population and economy. RIFA poses a threat to agriculture, to urban and suburban lifestyles, and to

many California ecosystems. RIFA is a pest because of its sting to humans, its direct damage to crops and livestock, its interference with electrical and irrigation equipment, and its ability to misplace native species of ants.

Red imported fire ants have been found to actually plug up irrigation systems when they need to find water in times of drought. They also have been know to chew through irrigation lines to reach water. RIFA is also attracted to electrical fields around bare wire; once they contact the wire they are killed, but not before setting off an alarm pheromone that attracts other which can cause them to mass on the wire and ultimately cause the equipment to short out.

RIFA can also inflict damage to ground nesting birds and mammals. Immobilized animals such as penned livestock or young newborns and hatchlings are at greatest risk since RIFA are attracted to there mucus membranes causing blindness and potential suffocation. Animals which have learned to avoid RIFA may become malnourished or dehydrated when the ants have infested their food or water.

The red imported fire ants arrival in the US occurred around 1940, probably on infested soil used as ballast on ships coming from South America. It is native to lowland areas of Argentina and Brazil. From its introduction point in Alabama it has spread outward at rates of over 100 miles per year. Its current geographic distribution includes the entire south from Florida to California and as far north as Virginia, Tennessee, and Oklahoma.

The life cycle of a fire ant colony begins with a newly-mated queen searching for a suitable next site in soil. During this search the queen is most vulnerable predators such as their mortal enemies, the Argentine ant. The Argentine ant and the red imported fire ant, both exotic pest ants from South America, are mortal enemies and fight to the death on contact. If the queen is lucky, she survives and finds a suitable next site where she snaps off her wings, burrows in the ground and seals herself off rom the outside to lay her first batch of eggs (Information provided by John H. Klotz, Extension urban entomologist specialist, Department of Entomology, UC Davis).

Ant Control

Control of Red Imported Fire Ant (RIFA), our native Southern Fire Any (*Solenopsis xyloni*), and the Pavement Ant (*Tetramorium caespitum*) will revolve around the use of Lorsban and the highly effect baits Esteem (pyriproxyfen) and Clinch (abamectin). Foraging workers fan out from a centally located nest and locate food. With pheromones, they recruit their nest mates to newly found food so they can collect it quickly before other ants get it. Once they have collected this food, they share it with the entire colony and the queen and her brood. The baits are selective for oil feeding ants which are the ones that feed on almonds while not harming beneficial ants like the native gray ant which can feed on peach twig borer. A big advantage of the ant baits is that their use will most likely prevent a Red Imported Fire Ant infestation from becoming established in your orchard–which you do not want!!!

Fight this Pistachio Pest NOW!

by Craig Kallsen, UCCE Kern

Navel orangeworm, *Amyelois transitella*, wreaked havoc on the economic returns of many growers in the San Joaquin Valley this season. This pest is particularly insidious in that not only does it directly reduce yield by reducing the number of harvested nuts, but infested nuts that are missed during processing end up in consumer packaging.

During the past season, it was common for growers to find 2% or more of their nuts arriving at the huller infested with navel orangeworm. Levels of 5% or more of infested nuts will probably result in the entire load of nuts being processed as shelling stock or lesser products instead of being packaged as the more valuable in-shell nuts that consumers associate with pistachios.

Early-season infestations in an orchard can be determined based on the use of egg traps baited with mixtures of almond press cake and almond oil. The first generation of moth egg-laying activity usually peaks in late April and early May and the second generation in late June or early July. Generally, however, only the third generation is treated with chemicals. If populations are high early in the season, appropriate insecticides (azinphosmethyl, phosmet, carbaryl, permethrin) are applied approximately 300 to 400 degree-days after third-generation egg laying beings, usually in early August. If third generation egg-traps lose their effectiveness, treating 1300 degree-days after the onset of second generation egg laying will approximate the appropriate time for treating third

generation navel orangeworms.

Treatment is Key

Frequently navel orangeworm populations do not reach damaging levels until late in the season. In early to mid-August, if the orchard has not yet been treated, nuts can be collected from the field and examined with a magnifying glass. The greater the number of early split nuts the more likely it will be that navel orangeworm is a problem.

Usually a sample of 100 to 200 randomly collected nuts from the orchard are inspected, and if 3% to 4% of the nuts have eggs, the orchards will be treated with a registered insecticide. In an untreated field, the percent infestation of the nuts can climb by 1% a week. Generally the later in the year that pistachios are harvested, the greater the number of infested nuts. As many growers discovered this past year, chemical control may not be adequate to reduce infestations sufficiently.

Navel orangeworm does not over-winter in the egg, so it is dependent for survival as a larva in unharvested nuts left on the tree or on the ground during the winter in the San Joaquin Valley. The pest has the ability to fly inter-orchard distances, so effective control is dependent on measures conducted on an area-wide basis. Adequate control in pistachio orchards involves both insecticide application and winter sanitation.

In an isolated orchard, the primary source of infestation is from last year's nuts. Most growers are shaking or poling the old unharvested nuts from the tree sometime during the period from November through February. The sooner the old nuts are on the ground and blown off the berm into the middles between tree rows for destruction or burial, the sooner navel orangeworms will lose overwintering sites. Some data suggest that nuts left on the berm provide a more favorable habitat for survival than those left in the tree, so destruction of the nut is necessary for control.

The harvest results are in and the message is clear. The navel orangeworm is a pest with significant potential to seriously damage the pistachio industry. Beating the navel orangeworm will require vigilance at home, an unusual degree of cooperation among neighbors, and a multifaceted control strategy involving monitoring, targeted insecticide treatment, orchard sanitation, and further research.

Potassium Deficiency in Almonds

by Roger Duncan, UCCE Stanislaus

I have seen several almond orchards this spring exhibiting signs of potassium deficiency, especially in the shallow soils of the Sierra foothills. I am sure this has been exasperated by the very heavy set in most of these orchards. Symptoms of potassium deficiency normally begin in the tops of trees but can be distributed throughout the tree when deficiencies are more severe. Symptoms include leaves that are often pale and smaller than normal. Leaf tips and edges burn and often roll upward like a canoe or "Viking's prow".

Many growers are cutting back these days due to the small profit margin in almond production. However, potassium is an important nutrient and should not be neglected. Producing an almond crop requires approximately the same amount of potassium as nitrogen. A good guide to follow is approximately 10 pounds of potassium for every 100 pounds of nutmeats produced. That means a 2000-pound per acre crop will need approximately 200 pounds of potassium. However, unlike nitrogen, potassium is released slowly from soil particles and is not readily leached. Many soils in Stanislaus County naturally have adequate amounts of potassium and we rarely see potassium deficiencies in even unfertilized blocks, especially in virgin soil.

From our research trial located in Salida, we have learned potassium deficiency does not decrease fruit set and does not result in smaller nuts except under extremely deficient conditions. Yield loss results from the death of fruiting spurs, a lack of spur renewal and overall reduced growth of the tree. Therefore potassium deficiency results in long-term losses that may not show up the first year you see leaf symptoms. Along the same lines, recovery from potassium deficiency is also a long-term process as it takes time to renew fruiting spurs. Keep in mind, once you see leaf symptoms, trees are already deficient and you are already setting yourself up for yield losses.

The bottom line is that growers need to monitor potassium (and other nutrient) levels with leaf analyses to prevent deficiencies from occurring. Current UC recommendations are to keep potassium levels at least 1.4% in July sampled leaves. Some folks in the almond industry suggest potassium levels should be 2% or higher, although there is no scientific evidence to support this, including our trial in

Salida.

Potassium deficiency can be corrected fairly easily in light-textured soils. However, massive does are often necessary in heavy clay soils. Dry formulations of sulfate of potash or potassium chloride should be applied in concentrated bands to prevent the potassium from being tied up to soil colloids. In clay soils, growers may consider applying double-concentrated bands every other row. Fertilize the skipped rows with double-concentrated bands in future years. Potassium chloride is best applied in the fall when winter rains can leach chloride out of the root zone. Potassium chloride should not be used in areas with water table problems or other soil conditions that prevent chloride leaching.

Foliar potassium sprays can alleviate symptoms more quickly, but these are relatively expensive and effects are short lived. Liquid potassium fertilizer may correct deficiencies more quickly than dry formulations, but these are also more costly. In the long-term, it is cheaper to monitor potassium levels and fertilize when and only when necessary.

Table 1.

Critical Nutrient Levels (Dry Weight Basis) for Fruit and Nut Trees Sampled in July.

	Almonds	Apples	Pistachios	Peaches/Nect	Prunes
Nitrogen (N) %					
deficient below	2.0	1.9	2.3	2.3	2.2
adequate	2.1 to 2.6	2.2-2.4	2.5-2.9	2.4-3.3	2.3-2.8
Potassium (K) %					
deficient below	1.0	1.0	1.0	1.0	1.0
adequate over	1.4	1.2	1.6-2.0	1.2	1.3
Calcium (Ca) %					
adequate over	2.0	1.0	1.3	1.0	1.0
Magnesium (Mg) %					
adequate over	0.25	0.25	1.2	0.25	0.25
Sodium (Na) %					
excess over	0.25	–	?	0.2	0.2
Chloride (Cl) %					
excess over	0.3	0.3	0.1-0.3	0.3	0.3
Boron (B) ppm†					
deficient below	25	20	90	18	25
adequate	30-65	25-70	120-150	20-80	30-80
excess over	85	100	–	100	100
Zinc (Zn) ppm					
adequate over	18	18	10-15	20	18
Copper (Cu) ppm					
adequate over	4	4	6-10	4	4
Manganese (Mn) ppm					
adequate over	20	20	30-80	20	20
Phosphorus (P) %					
adequate between	0.1-0.3	0.1-0.3	0.1-0.3	0.1-0.3	0.1-0.3

†Boron sample hulls at harvest (30-80 ppm in hulls is deficient; 80-200 ppm is sufficient, >200 ppm is excessive)

2002 Pistachio Meeting

Monday, July 22, 2002

Madera County Conference Center, 700 E. Yosemite Ave, Madera

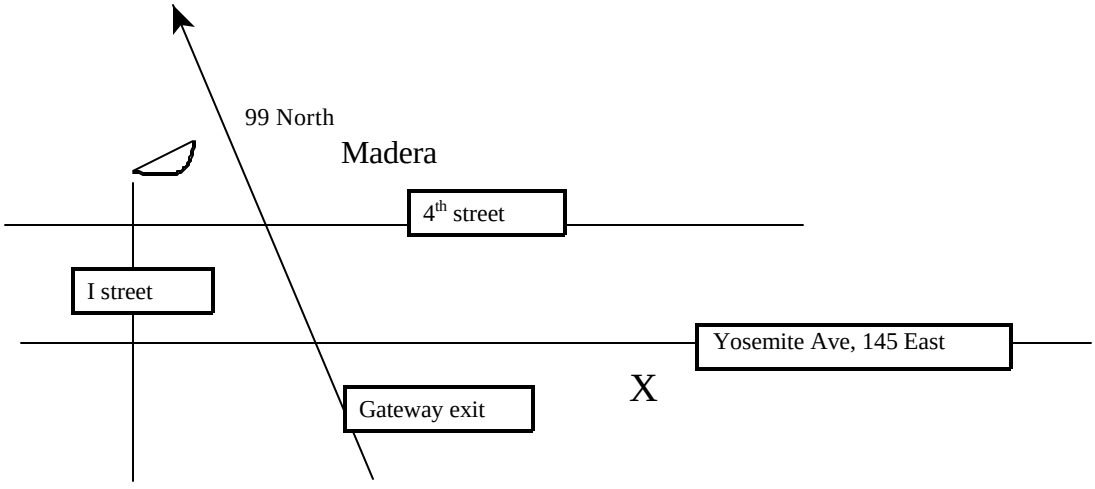
8:00 AM-12:00 Noon

8:00 a.m.	PCA and continuing education credits sign-up
8:20 a.m.	***Alternaria*** **update and resistance management** *Dr. Brent Holtz, UCCE Farm Advisor, Madera County*
8:30 a.m.	***Botryosphaeria*** **update and disease modeling** *Dr. George Driever, Post-Doctoral Scientist, KAC*
9:00 a.m.	**Grower receipt statements that better reflect NOW incidence** *Dr. Bob Klein, Research Director, California Pistachio Commission*
9:30 a.m.	**Virgin female NOW traps and their use in the orchard** *Kevin Olsen, S&J Ranch & Paramount Farms*
9:45 a.m.	Break
10:00 a.m.	**NOW biology and how it effects control strategies** *Dr. Kent Daane, Entomology Extension Specialist, UC Berkeley/KAC*
11:00 a.m.	**NOW control from now to harvest** *Bob Beede, UCCE farm advisor, Kings County*
11:30 a.m.	**Timing and materials for NOW control** *Walter Odus Bentley, Area wide IPM Entomology Advisor, KAC*
	Noon– Adjourn

3.5 hours of PCA, CCA and Private Applicators Credit have been requested.

Madera County 4-H will serve lunch at approximately $6.00 per person, please RSVP Sandra at 559-675-7879 ext 201.

Sponsored by the University of California, California Pistachio Commission, Syngenta, Bayer, Gowen



From the north take 4th street exit, go south on I st., and east on Yosemite, 145 East
From the south, take Gateway exit, go north until Yosemite 145, then go east.