Colusa Orchard Newsletter

Tree Crops and Nickels Soils Lab

University of California Cooperative Extension

Colusa County

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Mystery Solved

Almonds in Colusa County and up and down the state have shown unusual brown lesions on immature hulls as seen in this photo.

Symptoms were visible in April as superficial, irregular, brown spots on hulls. Only the surface skin of the hull was affected. Viewing the cross-section showed little, if any, deeper impacts, the inner hull, shell and kernel tissues were not damaged except in rare exceptions. Microscopic and disease culture techniques at UC Davis and UC Riverside have shown these spots to be harboring **powdery mildew.** (species yet to be determined) Although very common in many plant diseases, this fungus is quite rare in almonds. Only two old citations were found for almonds in the literature (1941 & 1954) and most observers were perplexed by the symptoms.

The hull symptoms resemble fruit infections that are often seen in peaches, but no leaf symptoms were observed in almonds like those typically found in many crops including; apple, strawberry, grape and rose. As the season progressed, the hull spots became dry and corky and eventually developed cracks as the nutlets enlarged.

Orchards that received fungicides effective against powdery mildew (i.e. Abound®, Flint®, Pristine® and Laredo®) late in bloom or at petal fall, show only a few symptoms. Others, sprayed with only Vanguard®, Rovrol®, and Ziram seem to have the most. The prevalence of orchard symptoms fits with the disease spectrum of activity for these fungicides.

It appears that these disease-like symptoms are of little consequence to almond tree/crop health. But, some spur death was found alongside the hull lesions, but no direct link to powdery mildew has been made. Other diseases may have affected these spurs. Investigations are continuing, so new information should become available. Hopefully, this situation is temporary and simply due to our unusual rainfall pattern this spring , we certainly don't need another disease.

Verticillium Wilt widespread in young almonds

Verticillium infections (*Verticillium dahliae*) were the highest ever-encountered in Colusa County this season following a prolonged, mild, wet spring. Moderate soil temperatures and moist conditions favor this soil fungus that infects via roots. Symptoms first appear on top shoot growth as wilting and browning of foliage in 2nd to 4th year trees. Usually, whole scaffold limbs are affected as the xylem becomes plugged by fungal activity. (See photo) The plugging restricts water movement up the xylem so wilting and necrosis occurs as warm weather increases evaporative demand. Diagnosis can be determined by cutting into affected wood and checking the outer xylem rings for brown discoloration. Both a crosscut and shaved cut can reveal this darkening.

Samples submitted to a pathology lab can provide confirmation. Historic almond areas rarely show this disease. Most all infections are in former row-crop fields once planted to susceptible crops i.e. tomatoes, vine seeds and cotton. The longer the history of these crops the worse the problem.

Management of the problem involves waiting to see the extent of limb sunburn damage, very little can be done now to help. Removing damaged limbs now insures the loss of branches. Waiting to prune until fall allows the tree to reveal the extent of damage and indicates where cuts should be made. Painting or spraying affected limbs with whitewash may provide a marginal benefit by reducing sunburn. Some might think that carefully maintaining ideal soil moisture levels could also help, but unfortunately, cool, wet soil conditions favor continued invasion by the fungus. In the south state where infections are sometimes severe, growers are advised to delay spring irrigation to reduce infections. Here in the north, rainfall precludes this strategy. High summer temperatures stop new infections and may kill the fungus in the tree, so, normal summer irrigations are okey.

Ultimately, careful pruning next winter to rebalance tree structure followed by vigorous regrowth will suffice to rebuild canopies. Some loss in productvity can be expected in affected trees. If repeated infections occur, then replanting hot spots with Marianna 2624 rootstock or soil solarization will help reduce the problem.

Leaf Rust Problems Increasing

Leaf rust has become a significant threat to local almonds in recent years and the problem seems to be increasing. This is the same disease as in peaches and prunes, only a different pathovar. The disease overwinters on twigs, so may be building up yearly. Defoliation is the primary problem from this disease. If heavy mid-season, it can greatly interfere with harvest and debilitate trees. Leaf litter in the windrows followed by rain can create severe harvest problems and potentially reduce crop quality. Summer defoliation limits tree carbohydrate reserves which reduces vigor and tree productivity.

Re-leafing or even flowering can occur late in the season after defoliation adding more to the problem. High orchard humidity favors rust development and excessive le nitrogen levels are known to increase disease suscetibility. Outbreaks appear first on water sprout growth or in young trees. Sprays should be applied, as outlined below, before much infection occurs but sprays now will help greatly.

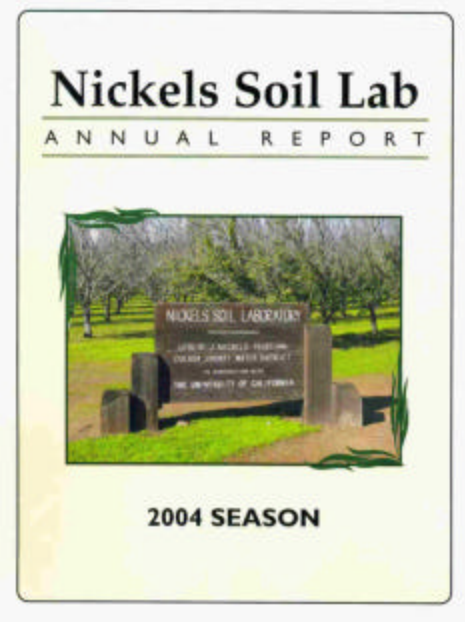
Disease symptoms appear first as yellowish angular spots on upper leaf surfaces. Eventually, rusty spores are produced directly below the yellowing on the undersides of affected leaves.(see photo) Once spores are widespread in the orchard the disease becomes very difficult to control and defoliation is likely.

Research by Dr Jim Adaskaveg, UC Riverside Plant Pathologist, has developed an effective rust preventative spray program. The sprays schedule starts with an application of Manex® at five weeks after petal- fall followed by an application of a strobilurin fungicide (Abound ®or Flint®) 4 to 5 weeks later. This program uses materials with two different modes of action and has proven very effective in replicated field tests. Sulfur products can also be effective, but require numerous re-applications to be effective.

Opinions differ concerning irrigation management following defoliation. Generally, we do recommend that adequate water be applied to defoliated orchards. The energy consuming affects of re-leafing are less detrimental to tree health/productivity than imposing severe water stress in an attempt to avoid leafing and flowering.

The 2004 report of the Nickels Soils Lab is available summarizing all sixteen research and demonstration projects. Included this year are color photos of key features and other useful information on lab cultural practices, weather and insect data.

Copies are available at 100 Sunrise Blvd. Ste E, Colusa, (530) 458-0570.



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