Walnut Blight Control

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Depending upon weather conditions, pathogen population size and walnut variety, walnut blight caused by the bacterium *Xanthomonas campestris* can cause significant crop loss. During the 2007 season in Tehama County, untreated trees under simulated plus natural rainfall had 32% blighted walnuts in the mid-canopy and almost 70% damage on walnuts reachable from the ground.

Research funded by the California Walnut Board has resulted in a good understanding of the disease and how to protect walnuts from infection. Walnut blight bacteria over-winter on dormant buds primarily under the outer bud scales or cataphylls. Bud population evaluations have shown that the inner buds where the immature walnut flowers are located are relatively free of bacteria. When buds break in the spring, cataphylls open and young shoots extend past them. During favorable weather conditions, blight bacteria are splashed onto and can infect any green tissue. Early infections usually occur at the flower end of developing walnuts. Once inside the walnut, bacteria grow toward the center of the nut, destroying the developing kernel resulting in nut abortion. So-called “end blight” occurs early in the season compared to later infections that are randomly distributed over the hull and are referred to as “side blight.” Side blight may or may not result in kernel damage depending upon when infection occurs. Successful blight control relies upon decreasing bacterial populations and preventing new infections.

We have tested almost all of the available spray materials and mix combinations and found that copper mixed with Manex is currently the most effective spray choice. Tests have repeatedly shown that any good-quality copper product mixed at the label rate with Manex will provide good protection. Pest Control Advisors (PCA) can help select which copper product to use. The section 18 registration for Manex has been approved for the 2008 season for listed counties and a PCA recommendation is required for Manex use.We continue to seek full registration of Manex and other ethylene bis-dithiocarbamates (EBDCs) such as Manzate for the coming seasons. Additionally, we are evaluating new bacteriacides that could potentially be used in future rotation programs with copper/EBDC bactericides to avoid the over-use of any one single material.

Once the material and rate have been selected, spray timing and coverage are the remaining two elements in a successful walnut blight control program. Timing the first first spray when 40% of the buds are at the “prayer” stage has the greatest effect on reducing bacteria populations and protecting walnuts. A good-quality adjuvant will wet cataphylls and encourage the copper/Manex mix to penetrate between bud scales and kill over-wintering bacteria. Following the first application, decisions are made based upon weather conditions and damage history. Warm, wet (rainfall or leaf wetness from dew) weather favors disease epidemics and severe damage compared to relatively low infection risk if weather is dry. Under severe walnut blight pressure, a second application 7-10 days following the first spray will protect any remaining shoots that have emerged following the first application. Additional spray applications are based upon the weather and the risk of infection. A disease prediction model, XanthoCast, developed by Jim Adaskaveg at UC Riverside is available in some areas. If XanthoCast is not an option, watch weather forecasts and treat before rainfall. Blight treatments work by protecting walnuts from infection and will not control the disease if applied after infection has already occurred.

Copper/Manex treatments result in a protective barrier on the tissue surface. If coverage is poor or bacteria are exposed to a sub-lethal dose, sprays will not work well. In addition, spray failures increase the risk of developing copper/Manex resistant bacteria.

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Additional walnut blight information is available at http://walnut.research.ucdavis.edu

Examples of walnut shoots at or close to prayer stage.

Blight incidence (percent infected walnuts) over time on untreated Chandler walnuts in Tehama County under environmental conditions with natural and simulated rainfall. Disease symptoms first occurred after April 27 and increase until May 21. The graph represents a disease progress curve over the spring season and demonstrates the disease potential under very favorable conditions for walnut blight.