



COOPERATIVE EXTENSION ... UNIVERSITY OF CALIFORNIA

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Richard

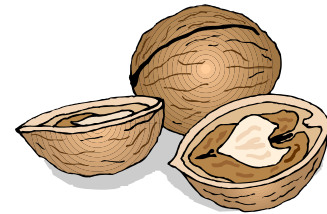
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SECTION 18 REGISTRATION for MANEX

The Manex Section 18 has been approved for Walnut Blight (*Santhormonors compestris* pv *juglandis*) in Butte, Calaveras, Colusa, Glenn, Merced, Placer, Sacramento, San Benito, San Joaquin, Santa Clara, Shasta, Solano, Stanislaus, Sutter, Tehama, Tulare, Yolo and Yuba Counties. The approved rate is 58 fluid ounces of product per acre tank mixed with a fixed copper product registered for use on walnuts in California.

1. Applications can only be made upon a written recommendation by a licensed Pest Control Advisor or local Farm Advisor documenting the weather is favorable to disease development and/or disease is present.
2. Do not feed the crop or crop by-products to livestock. Do not graze livestock in treated orchards.
3. All applicators, handlers, mixers, and loaders of DuPont™ Manex / Manex (maneb) and fixed copper products must follow the required protective clothing and equipment statements on the Section 3 product label.
4. In order to protect federally listed threatened and endangered species from potentially harmful exposure to maneb, applicators must ascertain whether there are any listed species which could be exposed through their use of this product. If uncertain whether there are any listed species in a particular area, user/applicator must contact the county agricultural commissioner's office to determine whether currently occupied habitat for any listed species is located on or adjacent to the property to be treated with maneb. To protect federally listed species, follow the use limitations in the "Endangered Species Interim Measures Bulletin for Fungicides", available from your county agricultural commissioner.
5. The U.S. EPA has determined that applications made in accordance with the above provisions are expected to result in residues of maneb (manganous ethylenebisdithiocarbamate), calculated as zinc ethylenebisdithiocarbamate and its metabolite ethylenethiourea, in or on walnuts in excess of 0.05 ppm.
6. Do not apply through any type of irrigation system.

FIRST APPLICATIONS FOR WALNUT BLIGHT CONTROL

Richard Buchner, Bill Olson, Carolyn Pickel, Steve Lindow and Jim Adaskaveg



Over the years considerable time and energy has been invested in discovering when to apply the first walnut blight (*Xanthomonas campestris pv juglandis*) spray. Conventional wisdom suggested that copper worked as a protectant and needed to be on flowers and developing nuts to prevent infection. As a result, first sprays were often applied at 1-2% bloom and re-treated every 7 to 10 days depending upon weather conditions. Walnut growers recognized the value of early treatments but it was not clear how early sprays should start.

In 2003, walnut blight research technology significantly improved with the installation of rainfall simulators in the Tehama and Butte county research plots. The ability to manage rainfall and leaf wetness made it possible to conduct more controlled experiments and look more accurately at walnut blight bacteria. Experiments were designed to investigate spray timing versus walnut blight control under simulated plus natural rainfall. The results (figure 1) clearly showed the value of sprays applied 7 days after what was described as terminal bud break. At this timing, about 50 percent of the buds would have started to open. Under severe disease pressure, associated with frequent rains after bud break, additional sprays would be necessary to protect developing walnuts but the early sprays clearly had value in the walnut blight disease control program.

Steve Lindow at UC Berkeley began sampling walnut buds and shoots to look more closely at the distribution of walnut blight bacteria within buds. By carefully dissecting buds, Lindow discovered that almost all of the walnut blight bacteria can be found in the outer bud scales (cataphylls) and the inner flowers are relatively bacteria free. The next question was how do walnut blight bacteria get from the outer bud scales to the inner flower parts and could that process be interfered with. To answer that question, thousands of buds were individually tagged when they reached the prayer stage (figure 2) of development. Using the tagged buds, blight treatments were applied at different stages of leafing. Sprays applied closest to the prayer stage of bud development had the largest effect on reducing populations of walnut blight bacteria. Sprays applied even a few days after the prayer stage achieved much lower control of walnut blight bacteria. Rainfall and/or leaf wetness are most likely moving bacteria from the outer bud scales toward developing walnuts. Sprays applied as the first leaves unfold (prayer stage) are decreasing bacterial populations and preventing flower and nut infection.

A reasonable spray strategy would be to apply the first blight spray when 30- 40% of the buds reach prayer stage (figure 2) and apply a second spray 7-10 days later. The second spray would cover the remaining bud break (figure 3). Any additional sprays can be timed using weather predictions. The XanthoCast spray prediction model is available to help with spray decisions. Copper tank mixed with Manex remains the best available spray material.

SPRAY APPLICATION TIMING – TEHAMA COUNTY

	7 days after	In Season Sprays							Percent blight
	Terminal bud break								
	3/19/04	3/24	4/5	4/12	4/21	4/28	5/6	5/17	
1	—	X	X	X	X	X	X	X	12.77 a
2	X	X	X	X					12.03 a
3	X	X	X						11.22 a
4	X	X							14.28 a
5	X								13.45 a
6	Untreated								30.39 b

Figure 1. Tehama County walnut blight spray timing experiment. The 3/19/04 spray included 64oz/100 gal Break-thru with the Kocide / Manex. Remaining sprays were Kocide 2000 plus Manex at 6 lbs + 58 oz/Ac.

Figure 2. Prayer stage example of walnut bud development. First applications are suggested when 30-40% of the buds open to the prayer stage.

<u>Date</u>	<u>% Buds Open to Prayer Stage</u>
4/8/06	5.0%
4/13/06	25.9%
4/18/06	33.5%
4/25/06	59.3%
4/28/06	72.8%
5/5/06	73.2% (full bloom)
5/12/06	77.5%

Figure 3. Bud break timing for Tehama County Chandler walnuts.



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Cooperative Extension Work in Agriculture and Home Economics, U.S. Department of Agriculture, University of California, and County of Tehama Cooperating.

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