FIRST APPLICATIONS FOR WALNUT BLIGHT CONTROL

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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 retreated 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 Terminal bud break	In Season Sprays							Percent blight
	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 Breakthru 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.

Date	% Buds Open to Prayer Stage	
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.