

Deciduous Orchard Diseases—Chemical Control

Fungicide Timing Trial for Control of Eastern Filbert Blight

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One-yr-old potted hazelnut seedlings grown from open pollinated seed of cv. 'Royal' were exposed to inoculum of *Anisogramma anomala* in winter and spring of 1990. The experiment was located on the SW Washington State University Experiment Station located in Vancouver, WA. Experimental design was a randomized block design with 15 treatments, 6 replications, and 5 trees per plot. Inoculum exposure was accomplished by randomizing the potted trees under wooden frames (3 m x 4 m) that were elevated 2 m above the ground. The frames were topped with wire fencing and diseased hazelnut nut branches (20 per m²) that were collected in early winter from an orchard heavily infested with eastern filbert blight. The diseased branches were approximately 1 m in length and 2 to 5 cm in diameter. Two systemic chemicals (Nustar and Rubigan) and one protectant (Bravo) were evaluated. Each treated plot was sprayed to runoff on one to four dates with a backpack sprayer equipped with a hand wand. Nufilm 17 was used with all treatments at a rate of 1 tsp/3.17 gal. Treatment dates were 18 October 1989 (before leaf drop and placement under the inoculum structures, systemics only), and 27 February (pre-bud break, Bravo only), 12 March (partial leaf emergence), 27 March (full leaf expansion), and 13 April 1990 (shoot elongation). Trees were placed under the wooden frame structures in December 1989 and removed on 30 April 1990. After removal, the trees were planted in an irrigated field and grown until symptoms developed in spring/summer of 1991. Tree mortality, incidence of cankers, and number and total length of cankers per tree were recorded from 11-15 July 1991.

Many of the experimental trees died before cankers developed. Data were analyzed by first performing an ANOVA on the proportion of trees that died in each treatment. Subsequent ANOVAs to evaluate effects of treatments on disease incidence, number of cankers, and total canker length were done with data from which dead trees had been removed. Tree mortality was significantly affected by treatment ($P=0.05$) with the highest proportions of dead trees occurring in the nontreated control and treatments that received only one or two fungicide applications. Three and four applications of Bravo significantly ($P=0.05$) reduced tree mortality, incidence of cankers, cankers per tree, and total canker length compared to the nontreated control. In other studies, Bravo, Rubigan and Nustar each have been effective fungicides for control of EFB. Recent research indicates that European hazelnut is susceptible in the period from mid-March to late May. Because trees in this study were exposed to a relatively high dose of ascospores of *A. anomala* for 17 days beyond the last fungicide treatment, the superior results obtained with Bravo may be due to longer persistence of this chemical on trees compared to the Rubigan and Nustar.

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Treatment and rate/100 gal	Timing of fungicide application ¹	Percentage dead/tree ^{2,3}	Incidence of cankers ^{2,3}	No. of cankers/tree ^{2,4}	Total canker length ^{2,4}
Nontreated	None	46.6abc	92.5ab	11.5ab	122.2ab
Bravo 720F 32 fl oz	Spring 1	42.6abc	93.3ab	11.3b	95.5ab
	Spring 1,2	35.5bc	93.3ab	13.1ab	95.5ab
	Spring 1,2,3	9.3de	97.6bc	4.6c	30.7c
	Spring 1,2,3,4	1.8e	75.3c	3.4c	31.8c
Nustar 20DF 2.0 oz	Fall	65.4a	98.3a	13.7ab	152.4a
	Spring 2	47.9abc	97.3ab	18.7a	127.9ab
	Spring 2,3	39.7abc	95.3ab	13.0ab	111.4ab
	Spring 2,3,4	2.1cd	100.0a	11.4ab	74.5b
Rubigan 1EC 4.0 fl oz	Fall	54.5ab	96.4ab	15.7ab	100.7ab
	Spring 2	53.8ab	93.5ab	14.9ab	97.1ab
	Spring 2,3	42.5abc	100.0a	15.1ab	109.1ab
	Spring 2,3,4	34.5bc	100.0a	13.1ab	95.1ab
Bravo 720F 32.0 fl oz/ Rubigan 1EC 4 fl oz	Spring 1/2,3	29.2bcd	96.0ab	11.0b	100.7ab
	Spring 1,2/3,4	32.6bcd	97.3ab	11.7ab	102.3ab

¹Fall=18 October 1989, Spring 1=27 February 1990, Spring 2=12 March 1990, Spring 3=27 March 1990, Spring 4=13 April 1990.

²Treatment means followed by the same letter are not significantly different at the 5% level (P=0.05) according to Duncan's Multiple Range Test.

³Analysis of Variance was based on arcsine (square root (x)). Values presented as back transformed means.

⁴Analysis of Variance was based on log (x+1). Values presented as back transformed means.

This report contains information concerning experimental use of nonlabeled fungicides on hazelnuts. The results should not be interpreted as recommendations for use. Use of fungicides on commodities for which they are not labeled is against both federal and state law.