HAZELNUT (*Corylus avellana* 'Ennis')
Eastern Filbert Blight; *Anisogramma anomala*

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Efficacy of eradicant fungicides on sporulation of the eastern filbert blight pathogen, 2008.

Objectives in this study were to evaluate if spray lime or lime sulfur might reduce the number of spores produced from EFB cankers.

Effect of lime sulfur and spray lime (in the laboratory).

A progressive group of growers found that when EFB cankers were allowed to sit in suspensions of spray lime fewer spores were detected in the solution. We were asked to confirm this observation. For the first experiment, EFB cankers were collected 7 Jul 08 from 2-year-old greenhouse grown hazelnuts (Ennis x Butler nuts) inoculated the previous year. Cankers were from main stems 0.25 to 0.5 inches in diameter and had 15 to 20 stroma. For the second experiment, similar sized cankers were collected 10 Jan 07 from a group of infected 'Ennis' hazelnut trees located at the North Willamette Research and Extension Center, Aurora, OR. Cankers were frozen prior to use on 25 Jul 08. Frozen cankers were allowed to thaw for 4 hours at room temperature prior to use. Cankers from both sources were submerged in 30 ml sterile distilled water, 1 or 9 % Tetrasul 4s5 29 F (29% lime sulfur), or 0.5% or 4% hydrated lime for 96 hours. After vortexing, a 20 ul sample was placed on a hemacytometer for counting spores. The number of spores per ml was evaluated. Cankers soaked in hydrated lime in experiment 2 were washed with water and then allowed to soak for another 96 hours in sterile distilled water. Spores were again evaluated using the same methods.

When cankers were soaked for 96 hours in any of the solutions, significantly fewer spores were detected than if cankers were soaked only in water (Table 1). Both rates of hydrated lime or Tetrasul were effective at reducing spore discharge into the solutions. This effect seems to be maintained even if cankers were washed and soaked again in just water.

Table 1. Amount of spores detected in various solutions after a 96 hour soak.

Treatment and Rate	Spores/ml solution		
	Experiment 1	Experiment 2	Exp 2 after water wash
Water……..	1.4 a	21.1 a	1.2 a
Hydrated Lime 90 WP at 0.5%..	0.5 b	0.9 b	0.2 b
Hydrated Lime 90 WP at 4%.....	0.2 b	0.0 b	0.3 b
Tetrasul 4s5 at 1%.....	0.4 b	5.5 b	---
Tetrasul 4s5 at 9%.....	0.0 b	1.1 b	---

* Means followed by the same letter do not differ significantly based on Fisher's protected LSD (P=0.05).

Effect of pH in the laboratory.

To determine if pH had an effect on spore release, EFB cankers were collected 7 Jul 08 from 2-year-old greenhouse grown hazelnuts (Ennis x Butler nuts) inoculated the previous year. Cankers were from main stems 0.25 to 0.5 inches in diameter and had 15 to 20 stroma. Cankers were submerged in 30 ml sterile distilled water at either pH 4, 7 or 10 for 96 hours. After vortexing, a 20 ul sample was placed on a hemacytometer for counting spores. The number of spores per ml was evaluated. The experiment was repeated 3 times.

There was no significant difference in spore counts when cankers were soaked in any of the pH solutions (Table 2).

Table 2. Amount of spores detected in water of various pH levels after a 96 hour soak.

Treatment	Spores/ml solution		
	Experiment 1	Experiment 2	Experiment 3
pH 4……..	5.6	21.8	2.5
pH 7……	2.9	23.7	1.9
pH 10…….....	3.0	29.6	3.1

* Means without letters do not differ significantly based on Fisher's protected LSD (P=0.05).

Effect of fall application of lime sulfur and spray lime (in the field).

A group of infected 3-year-old 'Ennis' hazelnut trees located at the North Willamette Research and Extension Center, Aurora, OR were selected for field work with spray lime materials. Each tree had at least one EFB canker. Cankers were sprayed with Hydrated Lime 90 WP (at 4% weight to volume), Tetrasul 4s5 29 F (at 9% volume to volume) or left non-treated on 9 Nov 07. Chemical suspensions were applied to runoff using a Solo backpack sprayer. A total of 10 cankers were collected from each treatment on each of the following dates: 11 Nov 07, 10 Dec 07, 8 Jan 08, 15 Feb 08, and 3 Mar 08 (close to budbreak). Cankers were selected from 0.25 to 0.5 in diameter branches and had 15 to 20 stroma. Samples were placed in plastic bags and refrigerated overnight before processing the next day. Each canker was submerged in 30 ml sterile distilled water for 96 hours. After vortexing, a 20 ul sample was placed on a hemacytometer for counting spores. The number of spores per ml was evaluated.

For each evaluation date, spore counts from cankers treated with lime sulfur or hydrated lime were not significantly different from cankers left nontreated (based on Fisher's protected LSD, P=0.05, of raw or Log transformed data). The use of hydrated lime or lime sulfur after harvest does not seem to be an effective way to reduce sporulation from EFB cankers.

Figure 1. Number of spores from cankers treated with lime sulfur or hydrated lime in the fall of 2007.