

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

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Evaluation of fungicides for control of eastern filbert blight, 2010 - 2011.

Healthy appearing two-year-old 'Ennis' hazelnut trees were planted on 21 Jan 10 to 3 Feb 10 at the Botany and Plant Pathology Field Laboratory, Corvallis, OR. Limbs with EFB cankers were cut from a heavily diseased 'Ennis' orchard near Keizer, OR from 30 Nov 09 to 4 Dec 09. A total of 400 cankered limbs were placed above test trees on chicken wire, supported by a 6 wire horizontal trellis, on 23 Feb 10 and 2 Mar 10. Treatments were arranged in a randomized complete block design. Each treatment consisted of 8 single tree replicates. Fungicides were applied to trees from two directions until runoff using a Solo-Pump-Style backpack sprayer. Approximately 0.25 gal of a spray suspension was used per 8 trees within each treatment. Fungicide treatments were applied on 14 Mar 10 (bud break), 26 Mar 10, 7 Apr 10, and 21 Apr 10 for a total of 4 applications. Sucker shoots were sprayed using Rely (60 oz/A) on 14 May 10 and 9 Jul 10. Rely (60 oz/A) and Roundup (120 oz/A) plus surfactant was applied to control weeds between trees on 23 Apr 10 and 31 Aug 10. Rely (60 oz/A) and Maddog plus surfactant was applied to control weeds between trees on 6 May 10 and 26 Jul 10. Preen (6 lb/1,000 sq ft, with fertilizer 9-17-9) was used on 30 Apr 10. Trees were fertilized with 29-5-5 at a rate of 1 lb/8 trees on 19 Jul 10. Supplemental irrigation was provided as needed during the 2010 growing season. The number of EFB cankers on the main tree trunk and total length of these cankers/tree was determined on 17 Aug 11.

A PVC trough spore trap was used in plots starting on 23 Feb 10. The spore trap consisted of a 2.3 meter long 1/2 inch PVC pipe split in half lengthwise, supported by 2 metal posts, and angled at 20 degrees to drain into a covered 16 liter collection bucket. Each bucket contained 200 ml of 50% copper sulfate v/v as a spore preservative and germination inhibitor. Rainwater from the traps was collected on 10 and 24 Mar 10, 7 and 21 Apr 10, 6 and 25 May 10, and 8 Jun 10 by swirling the contents and pouring into a volumetric cylinder to measure the total volume of rainwater collected. Approximately 500 ml of the rainwater was collected for laboratory analysis and the copper sulfate solution was replenished after each collection. The rainwater was filtered through a 20 um sieve then through a cellulose nitrate filter with 0.8 um pore size. This filter paper was placed on a microscope slide, stained with 0.05% (v/v) trypan blue in lactoglycerine. The number of ascospores on filters was determined using a light microscope at 400X. Rainfall during the spore trapping periods were as follows: 1.41 in from 23 Feb 10 to 10 Mar 10, 1.22 in from 11 Mar 10 to 24 Mar 10, 5.49 in from 25 Mar 10 to 7 Apr 10, 1.41 in from 8 Apr 10 to 21 Apr 10, 1.61 in from 22 Apr 10 to 6 May 10, 2.49 in from 7 May 10 to 25 May 10, and 2.61 in from 26 May 10 to 8 Jun 10.

Although bud break was similar to previous years, the weather was cold and wet resulting in delayed tree development during the spring. Spore counts were low (Fig 1) but were steady throughout the infection period. The number of cankers on trees treated with Cueva, Evito, PhD, Luna Privilege, Regalia or Sil-Matrix was not significantly different from the number of cankers on nontreated trees. The number of cankers on trees treated with Gem, Luna Sensation or Unicorn was not significantly different from the number of cankers on trees treated with the consistent standard Bravo Weather Stik. These results indicate that the active ingredient in the combination product Luna Sensation (fluopyram plus trifloxystrobin) that is effective against EFB is only the trifloxystrobin (Gem) and not the fluopyram (Luna Privilege). The tebuconazole in the product Unicorn (tebuconazole plus sulfur) has been shown to be effective against EFB in the past but it is unknown what effect sulfur has alone. No phytotoxicity was observed on any of the fungicide treated trees.

Treatment and Rate/100 gal water	Ave Number of Cankers/Tree*	Total Canker Length/Tree* (cm)
Nontreated	3.8 a	154.8 a
Bravo Weather Stik at 2 pt.....	1.0 cd	19.7 cd
Evito 480 SC at 5.7 fl oz plus Kinetic at 6 fl oz.....	2.3 ab	62.3 ab
PhD 2.5 WP at 0.5 lb plus Tactic at 8 fl oz.....	3.2 a	148.7 a
TopGuard 125 SC at 6 fl oz.....	1.7 bc	31.3 bc
Luna Privilege 500 SC at 6.84 fl oz plus Silwet L-77 at 1.3 fl oz.....	3.0 a	136.8 a
Luna Sensation 500 SC at 5 fl oz plus Silwet L-77 at 1.3 fl oz.....	0.7 d	18.2 de
Gem 500 SC at 3 fl oz Silwet L-77 at 1.3 fl oz.....	0.3 d	8.0 e
Unicorn DF at 3 lb.....	0.5 d	9.0 de
Sil-Matrix at 1 gal.....	3.5 a	136.7 a
Regalia at 128 oz.....	3.5 a	195.7 a
Cueva at 2 gal plus Nu-Film-P at 6 fl oz.....	2.5 ab	67.3 ab

* Analysis of variance is based on log₁₀ (x+1) transformation. Means followed by the same letter do not differ significantly based on Fisher's protected LSD (P=0.05).

Figure 1. B&PP ascospore counts from bud-swell through shoot elongation, 2010 growing season.

