

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

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Evaluation of fungicides for control of eastern filbert blight, 2005 - 2006.

Healthy appearing two-year-old 'Ennis' hazelnut trees were planted on 31 Jan 05 and 7 Feb 05 at the North Willamette Research and Extension Center, Aurora, OR. Limbs with EFB cankers were cut from a heavily diseased 'Ennis' orchard near Keiser, OR on 22 to 23 Nov 04. A total of 500 cankered limbs were placed on top of chicken wire, supported by a 6 wire horizontal trellis, above test trees on 22 Feb 05. Additional limbs were placed on the wire 8 and 30 Mar 05 and 26 Apr 05. Treatments were arranged in a randomized complete block design. Each treatment consisted of 8 single tree replicates. Fungicide suspensions were applied on two sides of the tree to runoff using a Solo-Pump-Style backpack sprayer. Approximately 0.8 gal of a spray suspension was used per 8 trees. Fungicide treatments were applied on 2 Mar 05 (bud break), 16 and 30 Mar 05, and 19 Apr 05 for a total of 4 applications. Roundup ULTRAMAX (2% solution) was applied to control weeds between trees on 6 Jul 05 and 7 Sep 05. Trees were fertilized with Urea (46-0-0) at a rate of 2 lb/6 trees on 3 May 05. Supplemental irrigation was provided as needed during the 2005 growing season. The number of EFB cankers on the main tree trunk and total length of these cankers/tree was determined on 10 and 14 Jul 06.

A PVC trough spore trap was used in plots starting on 23 Feb 05. 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 2, 16 and 30 Mar 05, 26 Apr 05, 11 and 25 May 05 and 9 Jun 05 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: 0.09 in from 23 Feb 05 to 2 Mar 05, 0.13 in from 2 Mar 05 to 16 Mar 05, 5.00 in from 16 Mar 05 to 30 Mar 05, 3.15 in from 30 Mar 05 to 26 Apr 05, 2.21 in from 26 Apr 05 to 11 May 05, 2.98 in from 11 May 05 to 25 May 05, and 1.42 in from 25 May 05 to 9 Jun 05.

Spore counts peaked during the last half of March during a "pineapple express" weather system and again in mid-May (Fig 1). The later peak may have been due to the new practice of placing cankered limbs above trees during early spring growth. This seems to have artificially pushed spore production past the end of fungicide applications. The number of cankers on trees treated with the high rate of Procure or the low rate of V-10116 was not significantly different than the number of cankers found on nontreated trees. All other fungicide treated trees had significantly fewer cankers than nontreated trees. Lowest number of cankers was found on trees treated with Cabrio. The number of cankers found on trees treated with Bravo, Orbit, Elite, higher rates of V-10116 Gem, and USF 2010 was not significantly different from those found on Cabrio treated trees. Treating trees with a tank mix of Bravo and Orbit did not improve disease control over each fungicide alone. However, using half rates of each fungicide did not significantly change disease control from that observed on trees treated with the full rate of each fungicide.

Treatment and Rate/100 gal water	Ave Number of Cankers/Tree*	Total Canker Length/Tree* (cm)
Nontreated	4.9 a	127.3 a
Bravo Weather Stik at 32 fl oz.....	0.8 e	9.1 e
Orbit 3.6 EC at 2.5 fl oz	1.6 bcde	23.6 bcde
Elite 45 WP at 2 oz.....	2.0 bcde	35.6 bcde
Procure 480 SC at 4 oz.....	2.4 bcd	38.9 bcd
Procure 480 SC at 8 oz.....	2.4 bc	40.1 abc
V-10116 at 2.5 oz plus Regulaid at 1 pt.....	2.8 ab	51.8 ab
V-10116 at 3.5 oz plus Regulaid at 1 pt.....	1.6 bcde	24.4 bcde
V-10116 at 4 oz plus Regulaid at 1 pt.....	0.8 e	9.7 e
Cabrio 20 EG at 4.75 oz plus Silwet L-77 at 6.4 fl oz.....	0.6 e	9.9 de
Flint 50 WG at 1 oz	2.6 bcd	54.1 bc
Gem 500 SC at 1.5 oz.....	0.9 de	16.0 bcde
USF 2010 at 2.5 fl oz.....	1.5 bcde	22.9 bcde
Tetrasul 4s5 at 2 gal.....	2.8 bc	47.2 bc
Bravo Weather Stik at 32 fl oz plus Orbit 3.6 EC at 2.5 fl oz	0.9 de	11.7 cde
Bravo Weather Stik at 16 fl oz plus Orbit 3.6 EC at 1 fl oz	1.1 cde	15.0 bcde

* 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. NWREC ascospore counts from bud-swell through shoot elongation, 2005 growing season.

