

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

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### **Evaluation of fungicides for control of eastern filbert blight, 2006 - 2007.**

Healthy appearing two-year-old 'Ennis' hazelnut trees were planted on 24 Jan 06 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 15 Nov 05 and 5 Dec 05. A total of 400 cankered limbs were placed above test trees on chicken wire, supported by a 6 wire horizontal trellis, on 27 Feb 06. 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 0.8 gal of a spray suspension was used per 8 trees. Fungicide treatments were applied on 18 Mar 06 (bud break), 30 Mar 06, 13 Apr 06 and 27 Apr 06 for a total of 4 applications. Roundup ULTRAMAX (2% solution) was applied to control weeds between trees on 28 Mar 06 and 5 May 06. Trees were fertilized with Urea (46-0-0) at a rate of 1 lb/8 trees on 22 May 06. Supplemental irrigation was provided as needed during the 2006 growing season. The number of EFB cankers on the main tree trunk and total length of these cankers/tree was determined on 10, 11 and 23 Jul 07.

A PVC trough spore trap was used in plots starting on 27 Feb 06. 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 18 and 30 Mar 06, 13 and 27 Apr 06, 11 and 23 May 06 and 9 Jun 06 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: 3.76 in from 27 Feb 06 to 18 Mar 06, 1.44 in from 19 Mar 06 to 30 Mar 06, 1.46 in from 31 Mar 06 to 13 Apr 06, 1.36 in from 14 Apr 06 to 27 Apr 06, 0.33 in from 28 Apr 06 to 11 May 06, 1.66 in from 12 May 06 to 23 May 06, and 1.84 in from 24 May 06 to 9 Jun 06.

Spore counts were low during March and April but began to rise during May (Figure 1). Typically we see lower spore counts later in the spring. High spore counts well after the last fungicide application may explain, in part, why there were high canker numbers even on fungicide treated trees. Lowest number of cankers was found on trees treated with Echo 720. The number of cankers found on trees treated with other Echo formulations, higher rates of Orbit plus Abound or Cabrio was not significantly different from those found on Echo 720 treated trees. Although trees treated with the low rate of Procure had significantly fewer cankers than non-treated trees, trees treated with the middle and high rates of Procure did not have significantly fewer cankers. It was not possible to separate the various rates of Procure from one another. The number of cankers on trees treated with Scala, Orbit alone, Gem, USF 2010 and all the numbered "V" materials were not significantly different from those found on non-treated trees.

Treatment and Rate/100 gal water	Ave Number of Cankers/Tree*	Total Canker Length/Tree* (cm)
Nontreated .....	4.8 a	112.0 a
Echo 720 at 32 fl oz.....	0.8 e	8.1 e
Echo 90 DF at 1.63 lb.....	1.1 de	11.9 de
Echo Ultimate at 1.82 lb.....	1.5 cde	21.1 cd
Scala 60 SC at 9 fl oz.....	2.6 abc	38.9 abc
Orbit 3.6 EC at 2.5 fl oz .....	2.5 abc	42.9 abc
Orbit 3.6 EC at 3 fl oz plus Abound 2.08 F at 6 fl oz.....	2.8 abcd	39.1 bcd
Orbit 3.6 EC at 5 fl oz plus Abound 2.08 F at 10 fl oz.....	1.6 de	23.1 de
Procure 480 SC at 4 oz.....	2.0 bcd	28.7 bcd
Procure 480 SC at 6 oz.....	3.3 ab	45.5 abc
Procure 480 SC at 8 oz.....	3.6 ab	53.6 abc
Gem 500 SC at 1.5 fl oz.....	3.6 ab	58.7 ab
USF 2010 at 3 fl oz.....	3.0 abc	40.1 abc
Cabrio 20 EG at 4.75 oz plus Silwet L-77 at 6.4 fl oz.....	1.0 e	13.7 e
V-10135 at 0.5 lb .....	3.8 ab	67.1 ab
V-10135 at 0.72 lb.....	3.4 ab	52.3 ab
V-10116 at 0.25 lb.....	4.1 ab	63.8 abc
V-10135 at 0.5 lb plus V-10116 at 0.25 lb .....	4.1 ab	58.2 abc

\* Analysis of variance is based on log<sub>10</sub> (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, 2006 growing season.

