

### Evaluation of fungicides for control of eastern filbert blight, 2008 - 2009.

Healthy appearing two-year-old 'Ennis' hazelnut trees were planted 16 to 17 Jan 08 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 12 Dec 07. A total of 400 cankered limbs were placed above test trees on chicken wire, supported by a 6 wire horizontal trellis, on 28 Feb 08. 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 backpack pump style sprayer. Approximately 0.8 gal of a spray suspension was used per 8 trees. Fungicide treatments were applied on 19 Mar 08 (bud break), 1 Apr 08, 15 Apr 08 and 28 Apr 08 for a total of 4 applications. Sucker shoots were killed on treatment trees using Rely (60 oz/A) on 8 May 08 and 12 Jun 08. Roundup ULTRAMAX (2 qt/100 gal) plus Oryzalin (1 qt/100 gal) plus Rely (4 qt/A) was applied to control weeds between trees on 6 May 08. Rely (4 qt/A) was used 14 May 08 for weed control followed by Preen (6 lb/1,000 sq ft, with fertilizer 9-17-9) on 4 Jun 08. Last application of herbicide for the year was Roundup ULTRAMAX (2 qt/100 gal) plus Rely (4 qt/A) on 7 Aug 08. Trees were fertilized with 46-0-0 at a rate of 1.07 lb/8 trees on 19 Jun 08. Supplemental irrigation was provided as needed during the 2008 growing season. Plant growth regulation effects on shoots were evaluated on 8 May 08 and 4 Jun 08 where 0 = no effect, 1 = slight effect that is not obvious, 2 = obvious darker green leaves and shortened internodes, 3 = Deep green leaves and shortened shoots but no necrosis, 4 = intense symptoms with marginal burning and possible dead shoots. The number of EFB cankers on the main tree trunk and total length of these cankers/tree was determined on 6 Oct 09.

A PVC trough spore trap was used in plots starting on 14 Mar 08. 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 19 Mar 08, 1, 15 and 28 Apr 08, 12 May 08, 4 and 19 Jun 08 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: 1.03 in from 14 Mar 08 to 19 Mar 08, 1.68 in from 20 Mar 08 to 1 Apr 08, 0.97 in from 2 Apr 08 to 15 Apr 08, 1.4 in from 16 Apr 08 to 28 Apr 08, 0.34 in from 29 Apr 08 to 12 May 08, 2.19 in from 13 May 08 to 4 Jun 08, and 0.18 in from 5 Jun 08 to 19 Jun 08.

There were no significant disease differences between any of the various treatments. This does not allow us to make any conclusions regarding these treatments for disease management this year. Products with propiconazole (Orbit, Tilt, Statego and QuiltXcel) had significant growth regulation effects at the end of the application period (8 May) which was not apparent within 4 weeks of the last application. Canker numbers were slow to develop and uncharacteristically low even for nontreated trees. Although spore counts were considered low (Figure 1) the amount was similar to last year when check trees had several cankers per tree. An evaluation of 51 nontreated trees, which did not have cankers the previous year, found only 5 trees with EFB, one canker each. Some of these trees were adjacent to former check trees that had 2 to 6 EFB cankers in 2008. Since 'Ennis' trees are susceptible the weather may have had an influence on infection levels. The spring was characterized as cold with most crops, including hazelnuts, 2 weeks later than normal in growth and development throughout the growing season. Further analysis is warranted since the only other year a similar result occurred was during the 1999 infection season.

Treatment and Rate/100 gal water	Ave Number of Cankers/Tree*	Total Canker Length/Tree* (cm)	Growth Regulation Effect **	
			8 May	4 Jun
Nontreated .....	0.5	5.9	0.0 d	0.0
Echo 720 at 2 pt.....	0.3	3.3	0.8 bc	0.0
Orbit 3.6 EC at 6 fl oz .....	0.3	2.0	2.8 a	0.0
Tilt at 6 fl oz .....	0.3	4.5	2.6 a	0.0
TopGuard 125 SC at 13 oz.....	0.1	2.1	0.1 d	0.0
Evito 480 SC at 5.7 oz plus				
Kinetic at 6 oz.....	0.0	0.0	0.0 d	0.0
Cabrio 20 EG at 4.75 oz plus				
Silwet L-77 at 6.4 fl oz.....	0.0	0.0	0.4 cd	0.0
Gem 500 SC at 1.5 fl oz				
Silwet L-77 at 6.4 fl oz.....	0.0	0.0	1.1 b	0.0
Adament at 3 fl oz				
Silwet L-77 at 6.4 fl oz.....	0.3	4.1	0.5 cd	0.0
Statego at 2.5 fl oz				
Silwet L-77 at 6.4 fl oz.....	0.0	0.0	2.9 a	0.0
Luna Privilege 500 SC				
(USF 2015) at 2 oz.....	0.1	1.8	0.0 d	0.0
DPX-LEM 17 at 14.4 fl oz.....	0.3	2.6	0.3 cd	0.0
DPX-LEM 17 at 20.6 fl oz.....	0.0	0.0	0.0 d	0.0
PhD at 0.5 lb.....	0.1	1.6	0.1 d	0.0
A13703G at 14 fl oz.....	0.1	1.1	0.0 d	0.0
Inspire Super EW				
(A16001) at 16 fl oz.....	0.1	1.5	0.0 d	0.0
Inspire Super EW				
(A16001) at 20 fl oz.....	0.4	9.1	0.3 d	0.0
Quilt Xcel				
(A15909) SE at 21 fl oz.....	0.1	1.0	3.0 a	0.0

\* 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). Means without letters did not differ significantly.

\*\* Plant growth regulation effects of shoots where 0 = no effect, 1 = slight effect that is not obvious, 2 = obvious darker green leaves and shortened internodes, 3 = Deep green leaves and shortened shoots but no necrosis, 4 = intense symptoms with marginal burning and possible dead shoots.

Figure 1. NWREC ascospore counts from bud-swell through shoot elongation, 2008 growing season.

