

### **Evaluation of fungicides for control of eastern filbert blight, 2009 - 2010.**

Healthy appearing two-year-old 'Ennis' hazelnut trees were planted on 22-23 Jan 09 at the North Willamette Research and Extension Center, Aurora, OR. Limbs with EFB cankers were cut from heavily diseased 'Ennis' trees at NWREC from Nov to Dec 08. A total of 400 cankered limbs were placed above test trees on chicken wire, supported by a 6 wire horizontal trellis, on 23 Feb 09. 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 sprayer. Approximately 0.25 gal of a spray suspension was used per 8 trees. Fungicide treatments were applied on 26 Mar 09 (bud break), 8 Apr 09, 22 Apr 09 and 7 May 09 for a total of 4 applications. Sucker shoots were killed on trees using Rely (60 oz/A) on 18 May 09. Honcho (2 qt/100 gal) plus Goal Tender (3 oz/100 gal) was applied to control weeds between trees on 15 Apr 09 and 30 Apr 09. Honcho (2 qt/100 gal) alone was used on 18 May 09 and 18 Jun 09 for weed control while Rely (4 qt/A) was used alone 24 Aug 09. Preen (6 lb/1,000 sq ft, with fertilizer 9-17-9) was used on 13 May 09 and 18 Jun 09. Trees were fertilized with 16-16-16 at a rate of 1 lb/8 trees on 16 Apr 09, 23 Jun 09 and 16 Apr 10. Supplemental irrigation was provided as needed during the 2009 growing season. Plant growth regulation effects on shoots and phytotoxicity were evaluated on 13 May 09 and 27 May 09 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, leaf necrosis and/or possible dead shoots. The number of EFB cankers on the main tree trunk and total length of these cankers/tree was determined on 12-13 Jul 10.

A PVC trough spore trap was used in plots starting on 23 Feb 09. 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 26 Mar 09, 8 and 22 Apr 09, 7 and 19 May 09, and 18 Jun 09 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: 5.37 in from 23 Feb 09 to 26 Mar 09, 1.03 in from 27 Mar 09 to 8 Apr 09, 1.36 in from 9 Apr 09 to 22 Apr 09, 3.31 in from 23 Apr 09 to 7 May 09, 1.04 in from 8 May 09 to 19 May 09, and 0.34 in from 20 May 09 to 18 Jun 09.

Several cankers developed on nontreated trees in comparison to last year when almost no cankers developed despite similar spring weather. Spore counts were significantly higher than the previous year (Fig 1) and may account in part for this effect. Nontreated trees has the highest number of cankers but the number of cankers on trees treated with PhD, Luna Privilege or Fontelis (LEM 17) were not significantly different. This data is consistent with the same or similar products tested in the past. The fewest number of cankers developed on trees treated with DPX-YT669 although the number of cankers that developed on trees treated with Echo, Tilt, Proline, Cabrio, Gem, Quilt Xcel, Quadris Top, or Stratego were not significantly different. Growth regulation effects were subtle for most fungicides but elevated for trees treated with formulations that contained propiconazole such as Tilt, QuiltXcel and Stratego. Growth regulation effects had all but disappeared by 27 May 09 about 3 weeks after last application. Severe and lasting phytotoxicity was observed on trees treated with Proline although trees did survive the treatment.

Treatment and Rate/100 gal water	Ave Number of Cankers/Tree*		Total Canker Length/Tree* (cm)		Growth Regulation Effect and/or phytotoxicity**			
					13 May		27 May	
Nontreated .....	10.5	a	157.3	ab	0.0	g	0.0	b
Echo 720 at 2 pt.....	1.8	ef	22.4	fg	0.3	efg	0.0	b
Tilt at 5 fl oz .....	2.4	bcdef	29.6	defg	1.4	c	0.0	b
Quash 50 WDG at 4 oz plus Regulaid at 1 pt .....	3.1	bcd	40.8	cde	0.9	cd	0.0	b
Proline 480 SC at 5 fl oz plus Silwet L-77 at 6.4 fl oz.....	2.9	bcdef	22.0	fg	4.0	a	3.6	a
TopGuard 125 SC at 6 fl oz.....	4.1	b	73.3	abc	0.0	g	0.0	b
PhD 2.5 WP at 0.5 lb plus*** Tactic at 8 oz.....	9.4	a	187.4	a	0.1	fg	0.0	b
Cabrio 20 EG at 4.75 oz plus Silwet L-77 at 6.4 fl oz.....	2.1	def	34.3	efg	0.1	fg	0.0	b
Gem 500 SC at 3 fl oz Silwet L-77 at 6.4 fl oz.....	1.5	f	19.9	g	0.0	g	0.0	b
Quilt Xcel (A15909) SE at 14 fl oz.....	1.8	ef	23.6	efg	2.0	b	0.0	b
Quilt Xcel (A15909) SE at 14 fl oz plus Regulaid at 1 pt .....	2.4	bcdef	34.8	defg	1.3	c	0.0	b
Quadris Top (A13703) at 14 fl oz. Inspire Super	2.3	bcdef	33.1	cdefg	0.1	fg	0.0	b
(A16001) at 16 fl oz.....	3.5	bc	48.9	bcd	0.0	g	0.0	b
Stratego 250 EC at 5 fl oz Silwet L-77 at 6.4 fl oz.....	1.5	f	22.5	efg	2.8	b	0.0	b
Luna Privilege (USF 2015) 500 SC at 6.84 fl oz.....	10.0	a	173.8	a	0.5	def	0.0	b
Fontelis (LEM 17) at 20 fl oz plus Induce at 32 oz.....	9.6	a	177.8	ab	0.1	fg	0.0	b
DPX-YT669 at 16 fl oz plus Induce at 32 oz.....	1.4	f	16.0	g	0.6	de	0.0	b
DPX-Q8Y78 at 24 fl oz plus Induce at 32 oz.....	3.1	bcd	44.5	cdef	0.3	efg	0.0	b

\* 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).

\*\* 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, leaf necrosis and/or possible dead shoots.

\*\*\*The first application of PhD at bud break did not include Tactic.

Figure 1. NWREC ascospore counts from bud-swell through shoot elongation, 2009 growing season.

