

Evaluation of fungicides for control of eastern filbert blight, 2007 - 2008.

Healthy appearing two-year-old 'Ennis' hazelnut trees were planted on 25 to 26 Jan 07 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 6 Dec 06. A total of 400 cankered limbs were placed above test trees on chicken wire, supported by a 6 wire horizontal trellis, on 23 Feb 07. 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 0.8 gal of a spray suspension was used per 8 trees. Fungicide treatments were applied on 16 Mar 07 (bud break), 30 Mar 07, 12 Apr 07 and 26 Apr 07 for a total of 4 applications. Sucker shoots on treatment trees were sprayed with Rely (60 oz/A) on 15 May and 10 Aug 07. Roundup ULTRAMAX (1.5 qt/A) plus Oryzalin (2 qt/A) plus GoalTender (3 qt/A) was applied to control weeds between trees on 30 Apr 07. Roundup ULTRAMAX (1.5 qt/A) plus GoalTender (3 qt/A) was applied to control weeds on 7 May 07. Preen (1 oz/10 sq ft) was used 17 and 23 May 07 for weed control as well as Roundup ULTRAMAX (1.5 qt/A) plus Dual (6 oz/A) on 9 Aug 07. Trees were fertilized with 16-16-16-7 at a rate of 40 oz/8 trees on 23 May 07 and 19 Jun 07. Supplemental irrigation was provided as needed during the 2007 growing season. Plant growth regulation effects on shoots were evaluated on 3 and 31 May 07 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 10 and 11 Jul 08.

A PVC trough spore trap was used in plots starting on 23 Feb 07. 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 13 and 29 Mar 07, 12 and 26 Apr 07, 10 and 23 May 07 and 19 Jun 07 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: 3.11 in from 23 Feb 07 to 13 Mar 07, 1.71 in from 14 Mar 07 to 29 Mar 07, 1.56 in from 30 Mar 07 to 12 Apr 07, 0.87 in from 13 Apr 07 to 26 Apr 07, 0.58 in from 27 Apr 07 to 10 May 07, 0.32 in from 11 May 07 to 23 May 07, and 0.47 in from 24 May 07 to 19 Jun 07.

Spore counts were high during the first two weeks of April but declined after that time (Figure 1). Many treatments were effective at limiting canker development. The standard treatment of Echo 720 (chlorothalonil) averaged 0.3 canker/tree while treatments of Quash, Procure, TopGuard, Cabrio, Gem, Adament, Orbit, both formulations of Inspire and the experimental product A15909A were not significantly different. Trees treated with DPX-LEM 17, Serenade or Evito had significantly fewer cankers than nontreated trees but significantly more cankers than trees treated with Echo. Growth regulation effects measured one week after the last application of fungicides were highest for trees treated with Orbit, however, trees treated with A15909A were not significantly different. Trees treated with Quash alone or Inspire XT had noticeable growth regulation effects but would not be of concern to growers. All trees treated with fungicide had little to no observable growth regulation effects 4 weeks after the last fungicide application. Data for DPX-LEM 17 (penthiopyrad) is consistent with other group 17 materials used in the past. Testing of Serenade should be expanded as there are no registered organic treatments for EFB other than copper based materials.

Treatment and Rate/100 gal water	Ave Number of Cankers/Tree*		Total Canker Length/Tree* (cm)		Growth Regulation Effect **		
					3 May 07	31 May 07	
Nontreated	5.3	a	83.8	a	0.0	d	0.0
Echo 720 at 2 pt.....	0.3	d	6.8	ef	0.0	d	0.0
DPX-LEM 17 at 20 fl oz.....	2.8	b	43.5	b	0.4	d	0.1
Quash 50 WDG at 4 oz.....	0.8	cd	10.4	cde	1.5	bc	0.0
Quash 50 WDG at 4 oz plus Regulaid at 1 pt.....	0.1	d	1.1	ef	0.8	cd	0.0
Procure 480 SC at 4 oz.....	0.6	d	6.6	ef	0.5	d	0.0
TopGuard 125 SC at 13 oz.....	0.1	d	1.6	ef	0.3	d	0.0
Cabrio 20 EG at 4.75 oz plus Silwet L-77 at 6.4 fl oz.....	0.1	d	0.8	ef	0.1	d	0.3
Gem 500 SC at 1.5 fl oz plus Silwet L-77 at 6.4 fl oz.....	0.3	d	2.1	ef	0.3	d	0.0
Adament at 3 fl oz plus Silwet L-77 at 6.4 fl oz.....	0.6	cd	9.6	cdef	0.8	cd	0.0
Orbit 3.6 EC at 4 fl oz	0.3	d	1.9	ef	3.3	a	0.1
A15909A SE at 10.5 fl oz.....	0.1	d	2.1	ef	2.9	a	0.1
A15909A SE at 14 fl oz.....	0.0	d	0.0	f	3.0	a	0.1
A15909A SE at 17.5 fl oz.....	0.1	d	1.8	ef	3.1	a	0.0
Inspire 250 EC at 7 fl oz.....	0.3	d	3.5	ef	0.8	cd	0.0
Inspire XT at 5 fl oz.....	0.3	d	4.6	def	1.9	b	0.0
Serenade ASO at 6 qt.....	1.9	bc	23.6	bc	0.3	d	0.0
Evito 480 SC at 5.7 oz plus Kinetic at 6 oz.....	1.5	bc	16.6	bcd	0.3	d	0.1

* 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). Means without letters are not significantly different.

** 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, 2007 growing season.

