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

J.W. Pscheidt and S.A. Cluskey
Dept. of Botany and Plant Pathology
Oregon State University
Corvallis, OR 97331-2903

Evaluation of fungicide tank mixes for control of eastern filbert blight, 2009 - 2010.

Healthy appearing two-year-old 'Ennis' hazelnut trees were planted on 23 Jan 09 at the North Willamette Research and Extension Center, Aurora, OR. Limbs with EFB cankers were cut from heavily diseased 'Ennis' 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 6 single tree replicates. Fungicides were applied to trees from two directions until runoff using a Solo-Pump-Style backpack sprayer. Approximately 0.2 gal of a spray suspension was used per 6 trees. Fungicide treatments were applied on 26 Mar 09 (bud break), 7 Apr 09, 21 Apr 09 and 5 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, 18 Jun 09 and 24 Aug 09 for weed control. 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 28 May 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 13 Jul 10.

Several cankers developed on nontreated trees in comparison to last year when almost no cankers developed despite similar spring weather. Nontreated trees had significantly more cankers than any of the various fungicide treated trees. There were no significant differences among any of the various fungicide tank mix treatments. Orbit treated trees tended to have elevated plant growth regulation (PGR) effects. Trees treated with both Orbit and Cabrio had the highest PGR rating. After 3 years of similar data it is becoming clear that tank mixes of Orbit plus Bravo or Strobilurins (such as Flint or Carbrio) plus Bravo are as effective at half rates as full rates.

Bravo alone at 16 oz/100 gal water has resulted in inconsistent control of EFB in past trials (an average of 73% control and effective in only 3 out of 5 trials). In comparison, Bravo alone at 32 oz/100 gal water was consistently effective in the same set of 5 trials (an average of 88% control). Fungicide resistance theory would hypothesize that *Anisogramma* would have polygenic resistance mechanisms toward DMI (group 3) chemistry such as Orbit but monogenic resistance to strobilurin (group 11) chemistry such as Cabrio or Flint. For tank mixes then we would recommend that DMI's (group 3) such as Orbit remain at full rates while tank mixing with a half rate of Bravo. We could recommend that strobilurins (group 11) such as Flint or Cabrio could be used at half rates while tank mixing with half rates of Bravo.

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 ……...……...…	9.8 a	152.3 a	0.0 e	0.0
Bravo Weather Stik at 32 fl oz plus Orbit 3.6 EC at 4 fl oz …….…….....	2.5 b	42.7 b	1.0 bc	0.0
Bravo Weather Stik at 32 fl oz plus Orbit 3.6 EC at 2 fl oz …….……..	1.8 b	23.2 b	0.2 de	0.0
Bravo Weather Stik at 16 fl oz plus Orbit 3.6 EC at 4 fl oz …….……..	2.0 b	20.2 b	1.2 ab	0.0
Bravo Weather Stik at 16 fl oz plus Orbit 3.6 EC at 2 fl oz …….……..	1.3 b	16.0 b	0.7 bcd	0.0
Bravo Weather Stik at 32 fl oz plus Cabrio 20 EG at 4.75 oz …….……...	1.2 b	21.5 b	0.2 de	0.0
Bravo Weather Stik at 16 fl oz plus Cabrio 20 EG at 4.75 oz …….……...	1.7 b	17.5 b	0.3 de	0.0
Bravo Weather Stik at 32 fl oz plus Cabrio 20 EG at 2.4 oz …….…….....	1.7 b	21.2 b	0.0 e	0.0
Bravo Weather Stik at 16 fl oz plus Cabrio 20 EG at 2.4 oz …….…….....	3.3 b	41.8 b	0.5 cde	0.0
Orbit 3.6 EC at 4 fl oz plus Cabrio 20 EG at 4.75 oz …….……...	3.2 b	49.5 b	2.0 a	0.0

* 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 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, leaf necrosis and/or possible dead shoots.