

Whole orchard evaluation of fungicides for control of eastern filbert blight, 2009.

The goal of this trial is to evaluate yield protection and fungicides for EFB control on mature, commercial sized hazelnut trees (rather than 2 to 3 year old transplants). A 1 acre block of Ennis hazelnuts with Butler pollenizers (every 3rd tree in every 3rd row) planted in 1986 was selected at the Botany and Plant Pathology Field Laboratory. Trees had been planted on a 10 x 20 foot spacing but every other tree was removed in Dec 99 for a final spacing of 20 x 20 feet. This block was selected since it had been sprayed 2 to 3 times each year with chlorothalonil since 2000 for EFB before any known infections had occurred. EFB cankers discovered during the 2004 growing season in a nearby block planted at the same time with identical stock indicate that these trees have been exposed to ascospores each year since 2001 or 2002. In the spring of 2004, a fungicide trial was established in this block. Treatments were arranged in a randomized complete block design. Each treatment consisted of 4 blocks (replicates) containing a group of 9 trees, (8 Ennis and 1 Butler). Each set of 9 trees was composed of 3 consecutive trees in a row and in 3 consecutive rows. Fungicide treatments consisted of nontreated trees, trees treated with 4 applications of Bravo Weather Stik at 64 fl oz/A, and trees treated with the Best Management Practice. For 2009, the best management practice consisted of an application of Bravo Weather Stik (64 fl oz/A) at bud break, then Bravo Weather Stik at 32 fl oz/A plus Gem 500 SC at 8 fl oz/A, 2 weeks after bud break, then Bravo Weather Stik at 32 fl oz/A plus Orbit 3.6 EC at 8 fl oz/A, 4 weeks after bud break, then Bravo Weather Stik at 32 fl oz/A plus Cabrio EG at 8 oz/A, 6 weeks after bud break. Past fungicide treatments can be found in Table 2. Fungicides were applied using a hydraulic handgun sprayer at 110 psi and at a rate of 120 to 144 gal water/A such that approximately 10-12 gal of a spray suspension were applied per set of 9 trees depending on the time of year and amount of foliage present. Fungicide treatments were applied on 26 Mar (bud break), 10 Apr, 22 Apr and 4 May. Suckers were controlled with Rely (4 qt/A) applied on 8 May. Weeds were sprayed with Honcho Plus (2%) plus Diuron 4L (1.5 qt/A) on 26 Mar. Envirod 2SC (22.5 oz/A) was applied on 21 Apr for control of big bud mite. Asana XL (16 oz/A) was applied on 3 Jul 09 for filbert worm control. Trees were pruned, from Jan 12 to Feb 9, by selectively removing the tallest branches and water sprouts from the center of each tree. Urea fertilizer (46-0-0) was applied on 24 Apr at a rate of 235 lb/A. No irrigation was applied in 2009. Individual trees were scouted for EFB cankers on 12 Jan 09. Scouting for flagging branches or cankers was also accomplished during the 2009 summer growing season. Plots were harvested on 1 Oct 09 by raking nuts into windrows, then placed in wooden tote boxes using a Flory Hazelnut Harvester. The harvester was designed to allow soil and dirt to fall between conveyor belt chains and to blow or suck away leaves, husks and some blank nuts. Nuts were then conveyed into large wooden bins and weighed using a Vishay Celtron model Digital Summit 3000 scale.

Cankers of eastern filbert blight have not yet been observed in this block. Cankers were found in a nearby block of identical trees during the summer of 2004. An increasing number of cankers have been found in that block each year since and tree removal due to blight occurred in 2009. Growth regulation activity of Orbit was first observed in late Apr 08. Data were normalized for moisture content to make year to year comparisons. Average yield per tree was higher for 2009 but not significantly different among the various treatments (Table 1). Field run weight was 52, 51 and 53 lb/tree for the nontreated, Bravo Weather Stik and BMP treatments, respectively.

Table 1. Fungicide treatments and clean dry weight yield for 2008 and 2009.

Treatment	Ave Yield/Tree 2008* (lbs)	Ave Yield/Tree 2009* (lbs)	Ave. change from 08 to 09* (%)
Non-treated	34.5	38.2	9.3
Bravo Weather Stik (4 applications).....	34.7	36.3	4.0
Best Management Practice.....	33.8	37.6	8.8

*Means without letters are not significantly different.

Table 2. Best Management Practice used each year.

Year	Best Management Practice	Year	Best Management Practice
2004	Bravo Weather Stik at 32 fl oz/100 gal then Flint 50 WG at 1 oz/100 gal then Orbit 3.6 EC at 4 fl oz/100 gal (1 application each)	2008	Bravo Weather Stik at 32 fl oz/100 gal then Gem 500 SC at 3 fl oz/A then Orbit 3.6 EC at 8 fl oz/A then Cabrio EG at 8 oz/A plus Silwet L-77 at 6.4 oz/100 gal (1 application each)
2005	Bravo Weather Stik at 32 fl oz/100 gal then Flint 50 WG at 2 oz/100 gal then Orbit 3.6 EC at 4 fl oz/100 gal then Cabrio EG at 4.3 oz/100 gal (1 application each)	2009	Bravo Weather Stik at 64 fl oz/A then Gem 500 SC at 8 fl oz/A plus Bravo Weather Stik at 32 fl oz/A then Orbit 3.6 EC at 8 fl oz/A plus Bravo Weather Stik at 32 fl oz/A then Cabrio EG at 8 oz/A plus Bravo Weather Stik at 32 fl oz/A
2006	Bravo Weather Stik at 32 fl oz/100 gal then Flint 50 WG at 4 oz/A then Orbit 3.6 EC at 8 fl oz/A then Cabrio EG at 9.5/A plus Break-Thru at 4 oz/100 gal (1 application each)		
2007	Bravo Weather Stik at 32 fl oz/100 gal then Gem 500 SC at 8 fl oz/A plus Silwet L-77 at 6.4 oz/100 gal then Orbit 3.6 EC at 8 fl oz/A then Cabrio EG at 8 oz/A plus Silwet L-77 at 6.4 oz/100 gal (1 application each)		

Hazelnut mean yield from 2004-2009

