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

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Progression of eastern filbert blight cankers on 'Jefferson' hazelnuts, 2011 - 2012.

The objective of this trial was to document the progression of symptoms in a newly planted 'Jefferson' hazelnut orchard infected with *Anisogramma anomala*. The 'Jefferson' cultivar has a single dominant gene for resistance to EFB. Cankers have been observed on other selections that carry this gene. These cankers occur at a very low rate, are smaller than cankers found on susceptible cultivars, do not develop stromata and heal over in subsequent growing seasons.

A 25 acre orchard of 'Jefferson' was planted on a 20x20 foot spacing first in 2007 and again between trees in 2008 for a final 10x20 foot spacing. The trees were self-propagated in a traditional way as sucker sprouts from older trees. The orchard was located near Newburg OR, with a heavily infected 'Ennis' orchard across the highway to the west and adjacent to a heavily infected 'Barcelona' orchard to the east. The 'Ennis' orchard was removed in 2009.

Cankers were first observed during the fall of 2010 on widely scattered trees. Preliminary surveys in Jan 11 found some cankers with stromata confirming eastern filbert blight. A few cankers with and without stromata were thin sectioned, stained with 0.05% trypan blue (1:1 water to lactic acid) and examined for the presence of mycelia. Stromata were sectioned and stained with a 0.05% trypan blue in lactoglycerol (1:1:1 of water, lactic acid, and glycerol) to look for viable ascospores.

All 6,097 trees were inspected for EFB cankers on 22 Feb 11, 1 Mar 11and 14 Apr 11 with notes taken on missing and replanted trees. Prominent cankers on 143 trees were marked with red spray paint for further evaluation. Cankers on these trees were measured on 30 Mar 11 and compared with measurements taken on 15 Sep 11 and 8 Nov 12. A few trees with multiple cankers were not used in the final analysis.

A variety of cankers were found that resembled those caused by *Anisogramma anomala*. Cankers found prior to the 2011 growing season averaged slightly over 7 cm (Table 1) and were characterized by longitudinal cracks, flat and/or slightly sunken areas on the trunks. Some of these cankers had stromata which were smaller and less numerous than on susceptible cultivars. Host tissues around stromata were discolored but individual mycelia were not observed. Viable ascospores were observed. None of the cankers were typical of a multi-year perennial cankers suggesting they had all developed during the 2010 growing season.

Only 1.8% of the trees planted in 2007 were found to have cankers while 5% of the 2008 trees had cankers (Table 1). Figures 1 and 2 show the pattern of infected trees found among trees planted in 2007 and 2008. The pattern for the older trees is consistent with a distribution one might get from natural spread of the pathogen. However, Figure 2 has many north/south runs of consecutively infected trees indicating that some infections may have occurred before being planted in this location.

A majority of the cankers (90%) increased in size during the 2011 growing season to an average of 21 cm for older trees and 18 cm for the younger trees (Table 1). Three cankers were observed to develop new stromata by Aug 11 but most cankers did not develop any stroma during the 2011 growing season and those that did produced only one or two. Only one canker was observed to produce the typical perennial canker shape typical of susceptible cultivars. Although cankers were longer by Sep 11 they appeared to have substantial callus formation indicating a strong wound healing response. There were 11 cankers that developed weeping or oozing symptoms by Sep 11. This was not observed in Aug 11. Weeping cankers are not normal EFB symptoms but are indications of a wound response. Long sunken weeping cankers are more typical of bacterial blight (*Xanthomonas* sp.) on older trees and limbs. It is not known if any of these cankers were originally incited by bacterial blight but occurrence of these cankers without affecting growth distal to the canker is not consistent with bacterial blight.

A majority of the cankers (75%) decreased in size during the 2012 growing season to an average of 15 cm for older trees and 13.5 cm for the younger trees (Table 1). Several cankers (21%) had healed over completely while many others could only be recognized by superficial cracks, indentations or scar tissue. The degree of canker healing appeared related to site and vigor. Several other cankers (22%) increased in size, continued to weep, impacted tree growth and would need to be removed in the future.

Recommendations are developing for planting Jefferson trees in high inoculum conditions. This includes fungicide applications for the first year or two and removal (replacement) of those few trees where cankers show stroma or the typical oval perennial canker shape.

Table 1. Average EFB canker size on 'Jefferson" hazelnuts.

Tree Planting	Trees Infected	Ave. Canker Size (cm)		
		30 Mar 11	15 Sep 11	8 Nov 12
2007	1.8 %	7.2	21.1	14.9
2008	5.0 %	7.3	18.1	13.5

Figure 1. Location of trees, planted in 2007, with EFB-like symptoms. Orchard was planted with 37 rows west to east (x-axis) and 76 to 93 trees south to north (y-axis). The first 15 rows from the west had 93 trees per row while the next 22 rows had 76 trees per row. Additional trees were inter-planted in 2008 for a total of 185 trees in the first 15 rows and 151 trees in the next 22 rows.

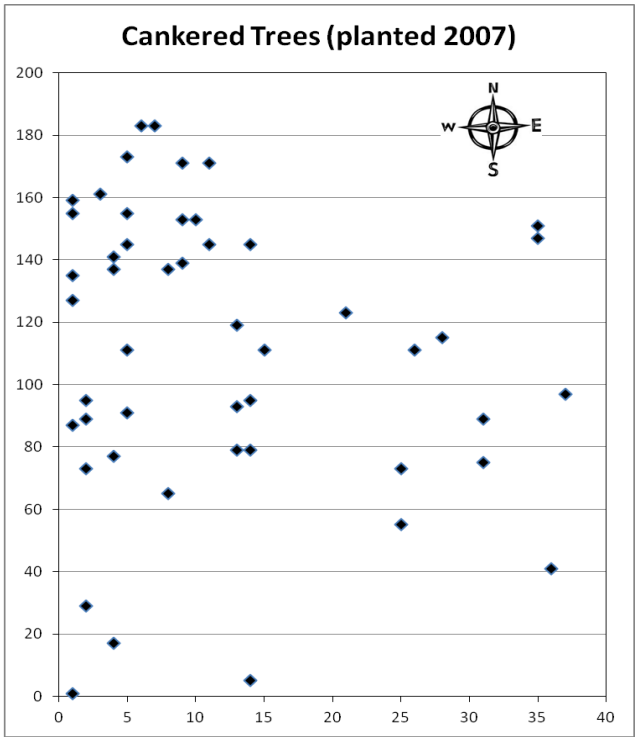
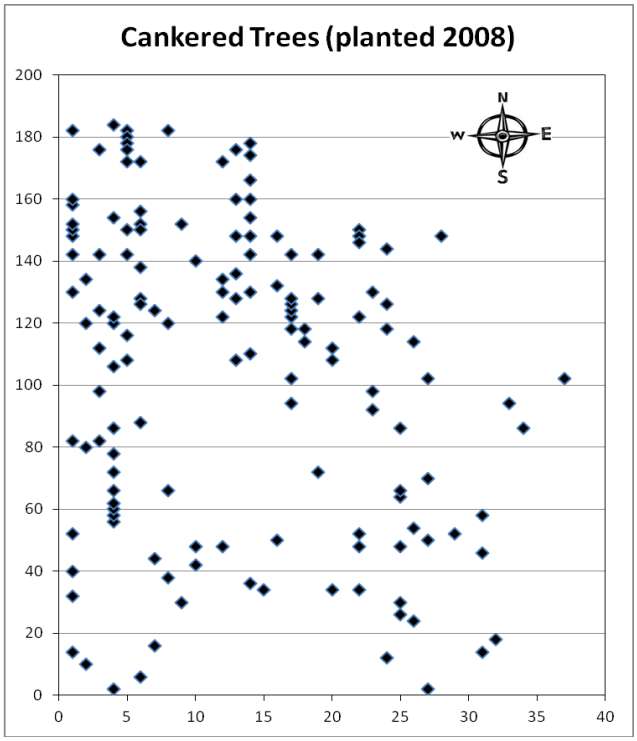


Figure 2. Location of trees, inter-planted in 2008, with EFB-like symptoms. Orchard was inter-planted with 37 rows west to east (x-axis) and 75 to 92 trees south to north (y-axis). The first 15 rows from the west had a final count of 185 trees per row while the next 22 rows had a final count of 151 trees per row.



Note: Write up is the same as found in last year's booklet except for the addition of the canker size data for 2012.