

Response of resistant cultivars to various doses of *Anisogramma anomala*, 2018 - 2019.

Jefferson hazelnut trees planted next to orchards heavily infected with eastern filbert blight have developed cankers at low rates. The cultivars ‘Ennis’ and ‘Jefferson’ were inoculated with various doses of *A. anomala* ascospores to see if high doses were more infective than lower doses. Both cultivars were propagated by tie-off layering at the Botany and Plant Pathology Field Laboratory, Corvallis, OR. Rooted suckers were cut in Dec 2017 and healed into sawdust prior to potting. All trees were potted into 1 gal pots and all cultivars were placed in a warm (60 to 70° F) greenhouse (for 2 to 4 weeks) to force bud growth.

Inoculum was prepared from frozen cankers that were warmed under a stream of tap water, then stroma were excised, crushed and ascospore ooze was pipetted into a small watch glass. The concentration of ascospores was determined with a hemocytometer and adjusted accordingly through dilution with sterile distilled water. Doses at or above 10^7 ascospores per ml were extremely viscous.

Trees at bud break and/or early shoot growth were selected periodically from Mar to April 2018 for inoculation (Table 1). All cultivars were inoculated at concentrations of 0, 10^5 , 10^6 , and 10^7 ascospores per ml. Ennis was also inoculated at 10^4 ascospores per ml. A total of 10 trees were inoculated at each concentration on each of 6 inoculation dates for a total of 60 inoculated trees for each cultivar at each concentration. Ascospores were sprayed onto 4 to 5 open buds and/or shoots using a hand held pump-style sprayer. Inoculation at a dose of 10^7 ascospores per ml was done with an eyedropper due to the viscous and granular nature of the preparation. Individual trees were then placed in a mist chamber with intermittent misting for 10 sec out of every 15 min during daylight hours for 72 hours then held in a greenhouse at 50°F for several weeks. Trees were then held in greenhouse facilities at outside ambient air temperatures for 1.5 years. Trees were watered and fertilized as needed during this time. The number of trees with EFB cankers on the main tree trunk and total length of these cankers/tree was determined during August 2019.

‘Ennis’ trees became infected when the concentration was at least 10^4 ascospores per ml and the percentage of trees infected increased as the concentration increased to 10^6 but declined at 10^7 ascospores per ml (Figure 1). ‘Jefferson’ trees became infected only when the concentration was at least 10^7 ascospores per ml. The highly susceptible ‘Ennis’ cultivar had more trees infected and longer cankers (Table 2) than the resistant ‘Jefferson’ cultivar. In general, the higher the dose of ascospores the more trees become infected. Highest doses may not have diluted an anti-germination factor, found in perithecia (Stone), enough to allow all spores to germinate. Any new orchards planted next to or downwind of a heavily diseased orchard should be protected with fungicide during bud break and early shoot growth.

Table 1. Date of cultivar inoculation in 2018.

Inoculation Replication	Ennis*	Jefferson**
1	Mar 27	Mar 27
2	Apr 3	Apr 3
3	Apr 6	Apr 6
4	Apr 13	Apr 13
5	Apr 18	Apr 18
6	Apr 27	Apr 27

*10 trees were inoculated each date at each of 5 concentrations.

**10 trees were inoculated each date at each of 4 concentrations.

Figure 1. Dose response curve for 'Ennis' and 'Jefferson' inoculated with various concentrations of *A. anomala* ascospores.

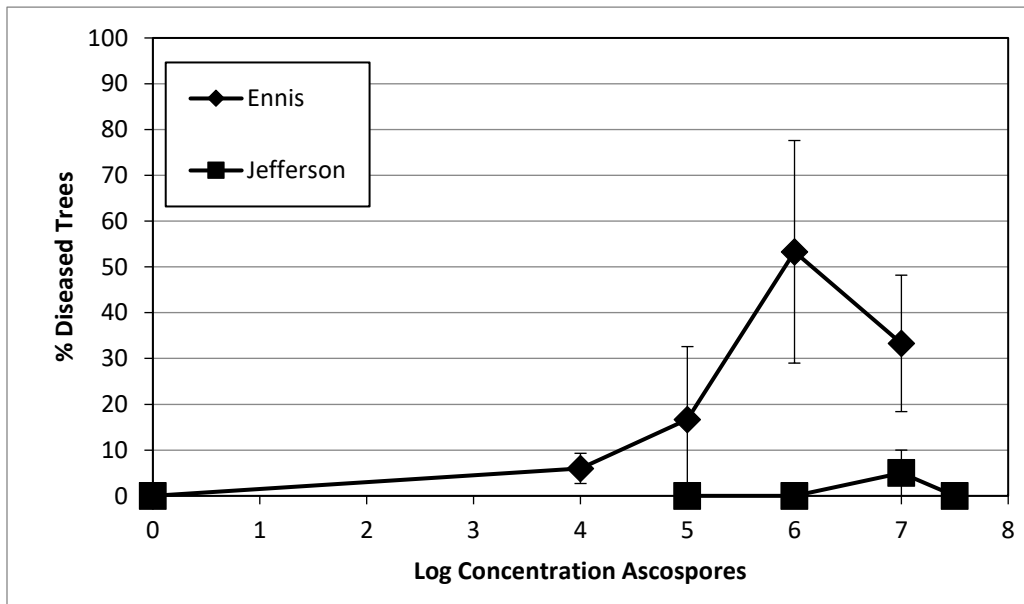


Table 2. Average canker length (cm) for trees with cankers*.

Cultivar	Concentration of Ascospores							Ave canker length (cm)
	10 ⁰	10 ²	10 ⁴	10 ⁵	10 ⁶	10 ⁷	10 ⁸	
Ennis	0	---	4 n=6	17.6 n=27	20.9 n=73	10.4 n=35	---	16.9
Jefferson	0	---	---	0	0	3 n=3	---	3

*Too few cankers developed for a statistical analysis of the data.