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

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Drench application of flutrifol (TopGuard) for protection against eastern filbert blight, 2022 - 2023.

Healthy appearing two-year-old 'Ennis' hazelnut trees were planted early Jan 2022 at the Botany and Plant Pathology Field Laboratory, Corvallis, OR. Trees were planted in 3 rows in an area 10 x 172 ft and 3 ft apart from each other. Limbs with EFB cankers were cut from heavily diseased trees during Jan and Feb 2022 and placed above test trees on chicken wire frames supported by a wooden trellis. An additional source of spores included 3 brush piles of EFB cankered branches placed approximately 4 m west of the trellis area. Treatments were arranged in a randomized complete block design. Each treatment consisted of 8 single tree replicates. All treatments were initiated on 22 Mar 2022 (bud break) while trees that were on a 2 week application schedule were also drenched (or simulated dripped) with 500 ml solution of TopGuard (14 fl oz/100 gal or 28 fl oz/100 gal) or received a foliar spray (14 fl oz/ 100 gal) on 7 Apr 2022, 22 Apr 2022, and 3 May 2022 for a total of 4 applications. Foliar applications were applied to trees from two directions, until runoff, using a Stihl SG20-Pump-Style backpack sprayer equipped with a brass hollow cone nozzle where 0.25 gal of a spray suspension was used per 8 trees. Weeds were managed in 2022 with Roundup ProMax (3%) applied alone as a general and/or spot treatment on 27 Apr, Mad Dog (3%) tank mixed with Forfeit (1.7 oz/gal) applied as a general and/or spot treatment on 8 Jun, Forfeit (1.7 oz/gal) applied on 22 Jul and 1 Sep. Herbicides applied in 2023 included Mad Dog (3%) applied as a general and/or spot treatment on 24 Jan, Casuron 4G applied as a general pre-emergent on 8 Mar, GlyStar Plus (3%) applied on 7 Jul, and Rely 280 (1.7 fl oz/gal) applied on 17 Jul as general and/or spot treatment. Trees were fertilized with 46-0-0 at a rate of 0.5 lb/6 trees on 8 Apr 2022, 26 Jul 2022, 29 Mar 2023, and 1 May 2023. Suckers were managed by hand cutting on 15 May 2023 and 3 Aug 2023. Supplemental irrigation was provided as needed during the 2022 and 2023 growing season. Plant growth regulation effects on shoots and phytotoxicity were evaluated on 16 May 2022 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 8 Aug 2023 and again on 12 Sep 2024.

Spring 2022 weather conditions were very wet with the second wettest spring on record. Rainfall from bud break to mid-May was 8.99 inches. Subtle plant growth regulation effects (PGR) were observed late spring 2022 but there was no significant difference in ratings among the various treatments (Table 1). No other phytotoxicity was observed on any of the treated trees. Symptom development was first noticed on 20 June 2023 as slightly sunken cankers with emergence of white stroma. The most EFB cankers were found on non-treated trees, however, the number of cankers on trees drenched once with the lower rate of TopGuard was not significantly different. Cankers did not develop on any of the trees in any of the other treatments including trees treated with 4 foliar sprays, 4 drenches, 4 simulated drips or a single drench at the higher TopGuard rate.

Table 1. Cankers found on trees during the 2023 growing season.

Treatment and Rate/100 gal water	Application Method [X]	Growth Regulation Effect [Y Z]	Ave Number of Cankers/Tree [Y]		Total Canker Length/Tree [Y] (cm)	
Non-treated …….	None	0.4	1.1	a	12.4	a
TopGuard SC at 14 fl oz…	4 foliar sprays	0.9	0.0	b	0.0	b
TopGuard SC at 14 fl oz	4 drenches	1.4	0.0	b	0.0	b
TopGuard SC at 14 fl oz…	4 simulated drip	0.9	0.0	b	0.0	b
TopGuard SC at 14 fl oz…	1 drench	1.3	0.4	ab	2.6	b
TopGuard SC at 28 fl oz…	1 drench	1.9	0.0	b	0.0	b

[X] Fungicide drench or foliar treatments were applied on 22 Mar 2022 (bud break), 7 Apr 2022, 22 Apr 2022, and 3 May 2022 for a total of 4 drench or spray applications. The application to trees drenched once occurred on 22 Mar 2022.

[Y] Analysis of variance is based on log (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 do not differ.

z 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.

Unfortunately, cankers that developed on these trees during the 2023 season were collected (removed) to provide inoculum for a new set of experiments in 2024. Thus the data cannot be analyzed for significance. Some trees that did not have cankers in 2023 developed cankers in 2024. Trees treated in 2022 with 4 drenches at the low rate or 1 drench at the high rate did not develop cankers in 2024. Note that these trees were under low inoculum conditions since cankers were not suspended above these trees but were placed 10 feet upwind.

Table 2. New cankers found on trees during the 2024 growing season.

Treatment and Rate/100 gal water	Application Method [X]	Ave Number of Cankers/Tree [Y]	Total Canker Length/Tree [Y] (cm)
Non-treated ……	None	≥0.6	>10.6
TopGuard SC at 14 fl oz…	4 foliar sprays	0.5	5.9
TopGuard SC at 14 fl oz	4 drenches	0.0	0.0
TopGuard SC at 14 fl oz…	4 simulated drip	0.3	5.3
TopGuard SC at 14 fl oz…	1 drench	≥0.3	>3.1
TopGuard SC at 28 fl oz…	1 drench	0.0	0.0

[X] Fungicide drench or foliar treatments were applied on 22 Mar 2022 (bud break), 7 Apr 2022, 22 Apr 2022, and 3 May 2022 for a total of 4 drench or spray applications. The application to trees drenched once occurred on 22 Mar 2022.

[Y] No analysis due to removal of cankers prior to the 2024 growing season.