

Evaluation of Ziram for management of eastern filbert blight, 2019 - 2020.

Healthy appearing two-year-old ‘Ennis’ hazelnut trees were planted from 29 to 31 Jan 2019 at the Botany and Plant Pathology Field Laboratory, Corvallis, OR. Limbs with EFB cankers were cut from heavily diseased trees during Jan and Feb 2019. A total of 275 cankered limbs were placed above test trees on chicken wire frames supported by a wooden trellis on 7 Mar 2019. Treatments were arranged in a randomized complete block design. Each treatment consisted of 8 single tree replicates. Fungicides were applied to trees from two directions, until runoff, using a Stihl SG20-Pump-Style backpack sprayer equipped with a brass hollow cone nozzle. Approximately 0.26 gal of a spray suspension was used per 8 trees within each treatment. Fungicide treatments were applied on 27 Mar 2019 (bud break), 13 Apr 2019, 24 Apr 2019, and 8 May 2019 for a total of 4 applications. Makaze (3%) was applied alone as a general and/or spot treatment on 22 Apr and 10 May, then tank mixed with Forfeit 280 (1.7 oz/gal) on 12 Jun, 3 Jul, and 26 Jul 2019 for management of weeds. Trees were fertilized with 46-0-0 at a rate of 0.5 lb/6 trees on 8 Apr 2019, 3 Jun 2019, 8 Jul 2019 and 26 Mar 2020. Suckers were managed by hand cutting on 29 Jun 2020. Supplemental irrigation was provided as needed during the 2019 growing season. The number of EFB cankers on the main tree trunk and total length of these cankers/tree was determined on 28 to 30 Jul 2020.

Rainfall for the Oct 2018 to Sep 2019 growing season was approximately 5 inches below the 115 yr average but temperatures were at the average of 59.2°F. March precipitation was 3 in below normal while April was 3 in above normal which led to localized flooding from April 9 to 11 near but not in the experimental area. Hazelnut growth started later than normal but unusually warm and dry weather at the end of April through mid-May accelerated tree growth. Symptom development was early and first noticed on 22 Jun 2020 as sunken cankers with a few white stroma emerging. Highest number of cankers per tree were found on non-treated trees which was significantly more than the number of cankers found on fungicide treated trees. Cankers did not develop on trees treated with either Ziram at 4 lb/100 gal or the Ziram/Tilt tank mix, however, the number of cankers on trees treated with other Ziram rates or Tilt alone were not significantly different. Phytotoxicity in the form of smaller greener leaves and internodes was observed 22 Apr 2019 on trees treated with Tilt. This plant growth regulation response has not been a problem for commercial production in the past.

Treatment and Rate/100 gal water	Number of Applications *	Ave Number of Cankers/Tree**	Total Canker Length/Tree** (cm)
Non-treated	0	1.8 a	24.4 a
Ziram 76 DF at 3 lb plus Induce at 16 fl oz.....	4	0.3 b	3.4 b
Ziram 76 DF at 4 lb plus Induce at 16 fl oz.....	4	0.0 b	0.0 b
Ziram 76 DF at 6 lb plus Induce at 16 fl oz.....	4	0.4 b	8.8 b
Ziram 76 DF at 3 lb plus Tilt at 5 fl oz plus Induce at 16 fl oz	4	0.0 b	0.0 b
Tilt at 5 fl oz plus Induce at 16 fl oz	4	0.5 b	7.3 b

* Fungicide treatments were applied on 27 Mar 2019 (bud break), 13 Apr 2019, 24 Apr 2019, and 8 May 2019 for a total of 4 applications.

** 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 ($P=0.05$).