

HAZELNUT (*Corylus avellana* ‘Jefferson’)
 Bacterial Blight; *Xanthomonas arboricola* pv. *corylina*

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Preliminary field inoculation trial with *Xanthomonas* on hazelnut, 2019 - 2022.

In the fall of 2019, a few rows of water stressed young hazelnuts (Jefferson and Ennis) were inoculated with two isolates of *Xanthomonas arboricola* pv. *corylina*. Inoculum was prepared using 0.5 g of freeze-dried cells of JL2005 (phylogroup of type strain) and 0.5 g of JL2600 (phylogroup 2) suspended and rehydrated in 1 liter of water for 45 minutes. This suspension and water was then added to a solo backpack sprayer to 10 liters for a final concentration of about 1×10^8 cfu/ml. The cell suspension was applied to multi-stemmed trees on 16 Nov 2019 during a foggy morning. Two 80 ft hedge rows of multi-stemmed Jefferson hazelnuts used for propagating trees were sprayed with 12 liters inoculum until bark was visibly damp or wet. The western row had already lost leaves while the eastern row had many young suckers with leaves still attached. Two other hedge rows of Jefferson were left non-inoculated. Another 3 rows of Ennis used for EFB trials were sprayed with 8 to 9 liters of inoculum on the same morning in the same way. The north half of all inoculated rows were sprayed with Badge X2 (1.6 oz/gal) on 25 Nov 2019 using a Stihl SR 450 backpack mist blower. Rows were monitored for symptoms of bacterial blight during the spring of 2020, 2021 and 2022. The number of dead buds/shoots per row was determined for Jefferson trees on 11 May 2020 and 18 May 2021 and 12 May 2022. Statistical analysis was not implemented due to lack of replication.

After half the normal rainfall during the 2019-20 dormant season, spring weather conditions were considered normal to wet. Symptoms of bacterial blight started to develop on 4 May 2020 on Jefferson trees as random dieback of buds and a few shoots. Symptoms were primarily in the middle of last year’s shoot growth where 1 to 3 developing shoots would wilt, turn necrotic and die. Very few of last year’s shoot growth (stems/trunks) was girdled and died back completely. Non-inoculated trees had few if any symptoms. Inoculated trees treated with Badge X2 tended to have fewer symptoms of bacterial blight than non-treated trees. Symptoms on Ennis trees were indistinguishable and/or complicated by expansion of EFB cankers from previous experiments. The use of these Jefferson hedge rows is recommended for further bacterial blight testing but not a similar set of Ennis trees. Also, inoculation should occur prior to leaf fall.

Rainfall during the dormant season 2020-21 was close to normal but spring weather conditions were abnormally dry. Symptoms of bacterial blight started to develop on 7 May 2021 on Jefferson trees as random dieback of buds and a few shoots. Although trees were not inoculated again in 2020, bacterial blight developed on previously inoculated trees during the spring of 2021. There seemed to be a lingering effect from the 2019 Badge X2 application with less shoot dieback in 2021.

Rainfall during the dormant season 2021-22 was 5.4 inches below normal but spring weather conditions were very wet with the second wettest spring on record. Symptoms of bacterial blight started to develop on 2 May 2022 on Jefferson trees as random dieback of buds and a few shoots. There was less symptom development on Badge treated trees. Whole stem/trunk collapse and dieback was observed starting 6 Jun 2022. By 29 Jul 2022, non-treated trees had 41 collapsed stems while there were only 13 collapsed stems on Badge treated trees. Although trees were only inoculated and treated in 2019, symptoms of bacterial blight continued to progress in 2022. There was a lingering effect from the 2019 Badge X2 application with less shoot or stem collapse on treated trees than in non-treated trees.

Treatment and Rate/100 gal water	Dead shoots per section of west Jefferson row.		Dead shoots per section of east Jefferson row.		
	2019-2020	2020-2021	2019-2020	2020-2021	2021-2022
Non-inoculated and non-treated	0	19	3	0	---
Inoculated but non-treated	85	138	461	141	646
Inoculated and treated with Badge X2...	78	55	280	14	560

Bacterial blight symptoms on newly planted Jefferson trees, 2021- 2022.

During the summer of 2021, a stool bed of Jefferson hazelnut trees was managed for tie-off layering to produce new trees. Sucker shoots were thinned out and hog rings were placed at the base of shoots in June of 2021. Roofing tar paper (9 inches wide) was placed around a set of sucker shoots in a circle 1 to 2 feet wide. Tarpaper circles were filled with sawdust and watered frequently during the growing season. Trees were not inoculated nor treated with copper-based bactericides in the fall of 2021. Tarpaper and sawdust was removed in mid-December, new trees were harvested above hog rings and then heeled in to sawdust. New trees were planted out from 10 to 11 Feb 2022. The number of trees with symptoms of bacterial blight was determined on 7 June 2022.

Symptoms of bacterial blight were observed in the first week of June as random dieback of buds. A total of 24.7% of the 243 new trees had symptoms of bacterial blight.