HAZELNUT (*Corylus avellana* 'Jefferson')   J. W. Pscheidt[1], V. Stockwell[2], J. Bassinette[1],
  Bacterial Blight; *Xanthomonas arboricola* pv. *corylina* S. Heckert[1], D. Kroese[1] and N. DiManno[1]
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Preliminary field inoculation trial with *Xanthomonas* on hazelnut, 2019 - 2023.

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, 2022 and 2023. The number of dead buds/shoots per row was determined for Jefferson trees on 11 May 2020, 18 May 2021, 12 May 2022 and 18 May 2023. 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 the prior year's shoot growth where 1 to 3 developing shoots would wilt, turn necrotic and die. Very few of the prior year's shoot growth (stems/trunks) was girdled and died back completely. Non-inoculated trees had few if any symptoms (Tables 1 and 2). 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 the expansion of EFB cankers from previous experiments so they were abandoned.

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 was less shoot dieback in 2021 on Badge treated trees (Tables 1 and 2).

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 (Table 2). Whole stem/trunk collapse and dieback was observed starting on 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 (Table 3).

Rainfall during the dormant season 2022-23 was 3.18 inches below normal. Symptoms of bacterial blight started to develop on 9 May 2023 on Jefferson trees as random dieback of buds and a few shoots. As in previous years, there was less symptom development on trees treated with Badge back in 2019 (Table 2). Whole stem/trunk collapse and dieback was observed starting 18 May 2023. By 3 Aug 2023, non-treated trees had 37 collapsed stems while there were only 6 collapsed stems on Badge treated trees.

Although trees were only inoculated in 2019, bacterial blight was observed each year. There was a lingering effect from the 2019 Badge X2 application with less shoot or branch collapse on treated trees than on non-treated trees.

Table 1. Dead shoots per section of **west** Jefferson row.

Treatment	Dead shoots per section of west Jefferson row.	
	2019-2020	2020-2021
Non-inoculated and non-treated ……...	0	19
Inoculated but non-treated ……............	85	138
Inoculated and treated with Badge X2...	78	55

Table 2. Dead shoots per section of **east** Jefferson row.

Treatment	Dead shoots per section of east Jefferson row.			
	2019-2020	2020-2021	2021-2022	2022-2023
Non-inoculated and non-treated ……...	3	0	---	---
Inoculated but non-treated ……............	461	141	646	505
Inoculated and treated with Badge X2...	280	14	560	270

Table 3. Dead branches per section of **east** Jefferson row.

Treatment	Dead branches per section of east Jefferson row.	
	2021-2022	2022-2023
Inoculated but non-treated ……...,,,,,,,,,	41	37
Inoculated and treated with Badge X2...	13	6