EFAO 2018: Organic sparys for black walnut

Do organic sprays differ in their efficacy against disease in black walnut?

DISEASE & PEST CONTROL

Farmer-Researchers

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Project Timeline:
May 2018 - October 2019

In A Nutshell

Joseph and Jazmin compared organic sprays for managing disease in their young orchard, with the goal of discovering the best organic approach to care for their black walnuts.

Key Findings

- Disease and insect pressure was low on the young trees measured this year.
- While there was no statistical difference between the two treatments (neem oil vs copper and biological insecticide). They will continue measurements for a second year.
- The most significant indicator of fungal infection is early defoliation in the fall. Therefore, observations next year at the end of the season could strengthen their overall conclusions.

METHODS

Design

Joseph and Jazmin divided four rows of their young orchard, each with ~ 50 trees, into two sections each, with the middle 5 trees in each row left as a no-spray buffer.

Each section was randomly assigned one of two spray regimes. They chose sprays that are allowable under organic standards, readily available and economical:

- **Neem oil** (4 tsp per gallon)
- **Green Earth® BORDO Copper Spray** (4 tsp per gallon) **+ Safer's BTK™ (Bacillus thuringiensis) Biological Insecticide** (10 ml per gallon)

They sprayed on July 2 and September 3, 2018.

Figure 1. Jazmin and Joseph's experimental design for the two spray treatments in their black walnut orchard. Numbers at the bottom are total tree count per row, with a no spray buffer in the centre of the rows.

Row 1	Row 2	Row 3	Row 4
Neem	Cu + BTK	Neem	Neem
5	5	5	5
Cu + BTK	Neem	Cu + BTK	Cu + BTK
57	49	54	54

Tree health

To assess disease, Jazmin and Joseph developed a tree assessment tool and categorized the 10 middle black walnut trees in each section (**Table 2**).

Table 1

Ratings used to categorize the health of black walnut trees. Healthy is defined as no visual presence of disease or insect pressure, i.e. black dots, yellow leaves or blight; and leaf is intact.

Rating	Category
1 (worst)	> 75% unhealthy
2	75% < > 50% unhealthy
3	50% < > 25% unhealthy
4 (best)	< 25% unhealthy

RESULTS

- It was a good year for tree health and the black walnut trees showed little signs of infection.
- Because the scores were high overall, there is a 14% chance (P=0.14) that the small difference observed was due to chance and not the sprays. Therefore, there was **no statistical difference between the sprays** (**Figure 2**).

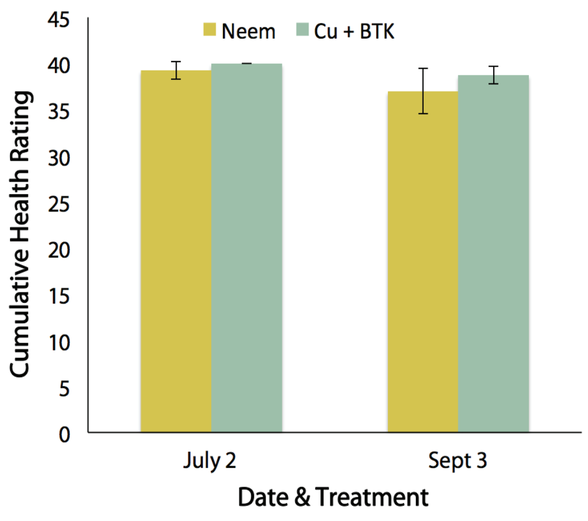

Figure 2. Average cumulative tree health score for young black walnut trees treated with either neem oil or a combination of copper and a biological insecticide (BTK).

- Although there was no statistical difference between the health scores, Jazmin and Joseph's observations lead them to suspect that the combination of copper and BTK provides better defence against disease. This motivates them to continue collecting data in future years.

The study site with young black walnut trees at Seven Fields Farm & Orchard.

Example of a healthy black walnut tree.

Example of unhealthy black walnut leaves.

TAKE HOME MESSAGE

- Overall tree health was good and there was no clear difference between the organic sprays (neem oil and a combination of copper and a biological insecticide) tested on young black walnut trees.
- Joseph and Jazmin will continue the study for a second year in order to collect a more comprehensive dataset that they can use to inform orchard management.
- The most significant indicator of fungal infection is early defoliation in the fall. Therefore, more frequent observations during the end of the growing season will strengthen their overall conclusions.

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