

Management of Phoma black stem with fungicide

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Introduction

Phoma black stem, caused by *Phoma macdonaldii* (syn. *Leptosphaeria lindquistii*), was identified in 66% of North American sunflower (*Helianthus annuus*) fields surveyed in 2013 and 80% of fields surveyed in 2015. *P. macdonaldii* infects leaves through wind or rain-splashed spores and/or transmittal by insects. As the disease progresses through the petioles to the stem, multiple large, jet-black lesions centered over the senescing petioles can form. Preliminary data suggested that FRAC 11 fungicides may reduce disease severity, but the economic return and timing of fungicide application was unclear. The objective of this study was to evaluate the most efficacious timing of pyraclostrobin application on two oil-type sunflower hybrids under natural infection.

Materials and Methods

In May 2017, two adjacent fungicide trials of two oil-type sunflower hybrids were established in Davenport, North Dakota. Both trials were planted in four-row plots and arranged in a randomized complete block design with four replicates. Pyraclostrobin (Headline, BASF, Research Triangle Park, NC at 6 fl oz/A) was applied to the middle two rows of plots with a three nozzle boom at 40 PSI with a spray volume of 20 GPA singly and in combination at V8 (eight true leaves), R1 (bud initiation) and R4-R5.1 (inflorescence opens to early flowering).

The eight treatments were non-treated control, V8, R1, R4-R5.1, V8 + R1, V8 + R4-R5.1, R1 + R4-R5.1, and V8 + R1 + R4-R5.1. A natural epidemic of Phoma black stem developed in both trials with 100% incidence in the non-treated control plots. A disease severity index was calculated by multiplying incidence (number of stems infected) and severity (mean number of stem lesions) on ten arbitrarily selected plants in each plot.

Results and Conclusions

Disease severity with a single application of Headline at R1 was significantly ($P \leq 0.05$) lower than a single application at V8, R4-5.1 or the non-treated control for Hybrids A and B (Figures 1 and 2). For hybrid A, a single application of Headline at V8 reduced disease severity significantly ($P \leq 0.05$) over the single application at R4-5.1 and the non-treated control. For Hybrid B, the R4-5.1 application reduced disease severity significantly ($P \leq 0.05$) over the V8 application and the non-treated control. All four Headline fungicide timing combinations significantly ($P \leq 0.05$) reduced disease severity for both hybrids. No significant yield differences were observed across treatments for Hybrid A (Figure 3). For Hybrid B, yield was significantly ($P \leq 0.05$) higher than the non-treated control for all four fungicide timing combinations and a single application at R1, but not single applications at V8 or R4-5.1 (Figure 4). Under high disease pressure, Headline applied prior to flowering may improve yield on some hybrids. R1 appears to be the most effective fungicide timing.

Acknowledgement

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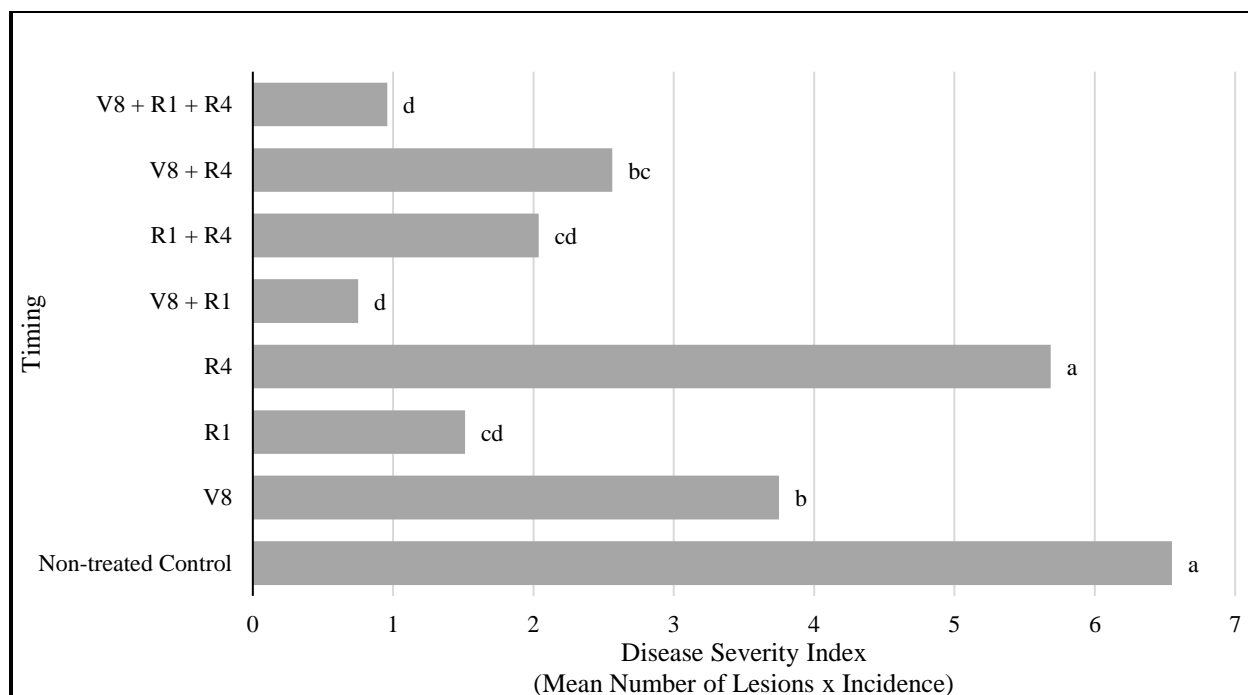


Figure 1. Phoma Black Stem Disease Severity Index Results for Hybrid A – Davenport, North Dakota. A disease severity index was calculated by multiplying incidence (number of stems infected) and severity (mean number of stem lesions) on ten arbitrarily selected plants in each plot.

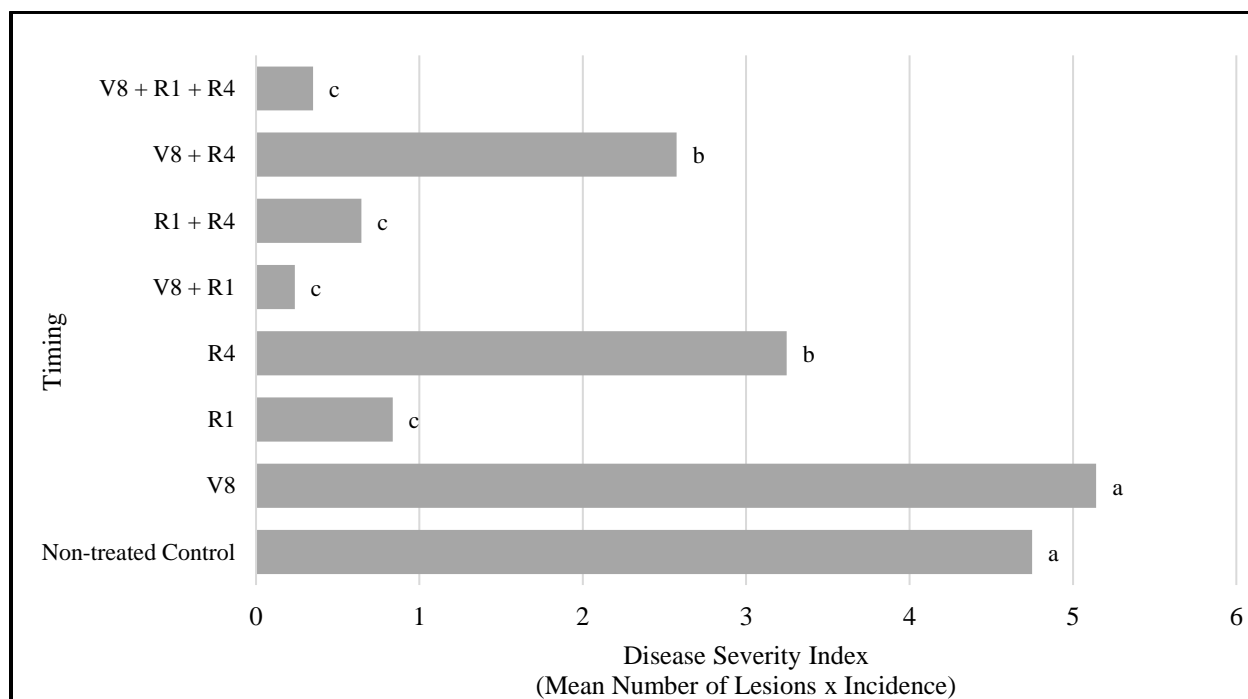


Figure 2. Phoma Black Stem Disease Severity Index Results for Hybrid B – Davenport, North Dakota. A disease severity index was calculated by multiplying incidence (number of stems infected) and severity (mean number of stem lesions) on ten arbitrarily selected plants in each plot.

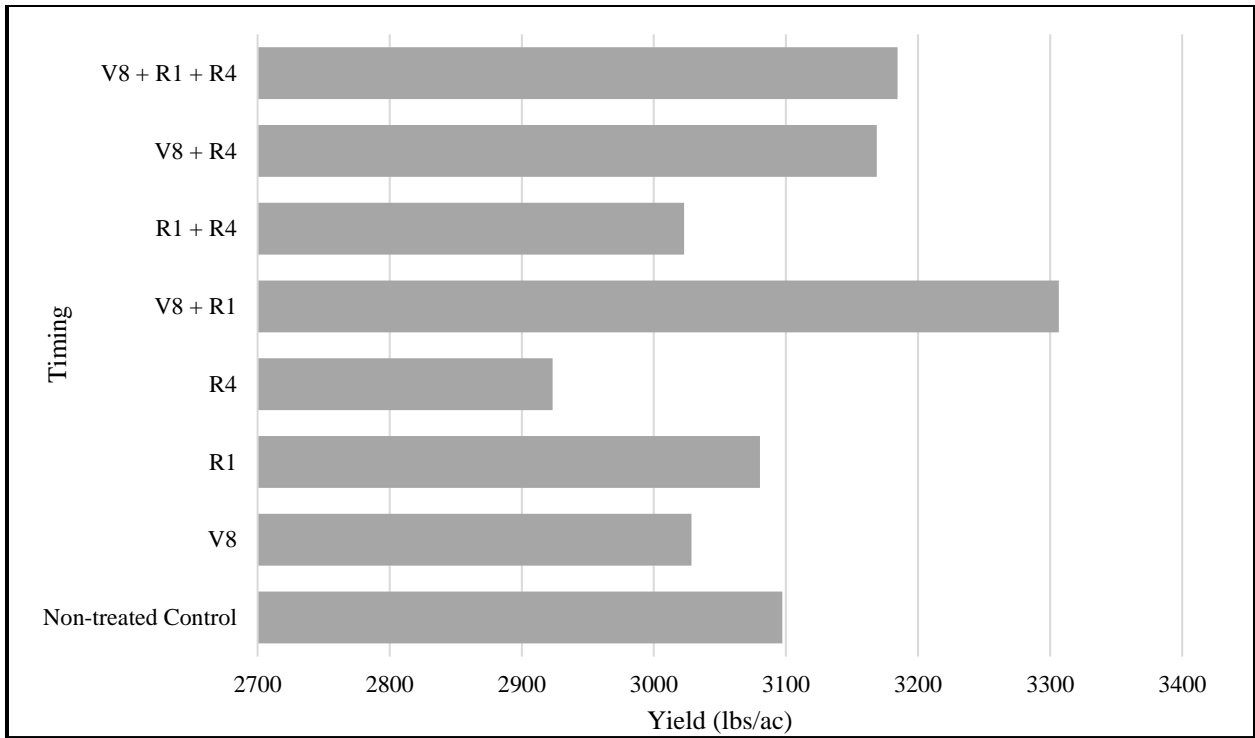


Figure 3. Yield Data for Hybrid A for Davenport, North Dakota Headline Fungicide Trial – Phoma Black Stem

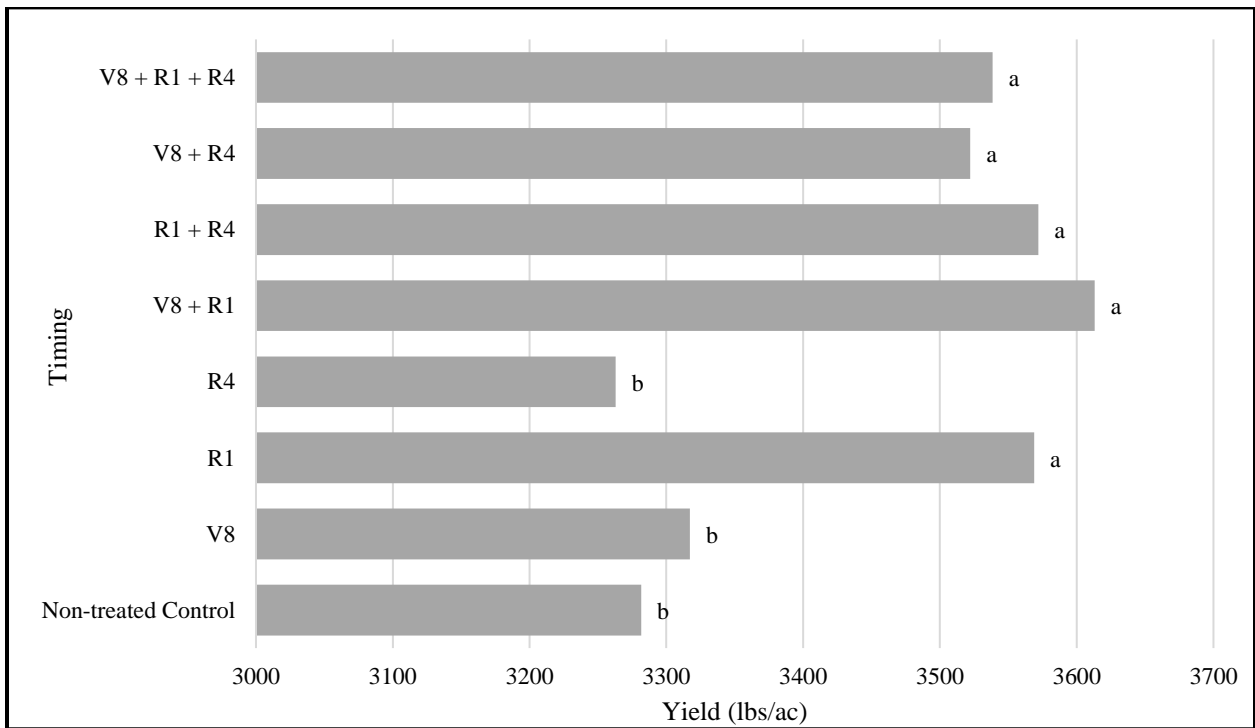


Figure 4. Yield Data for Hybrid B for Davenport, North Dakota Headline Fungicide Trial – Phoma Black Stem

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