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Abstract

Cold and wet planting conditions predispose corn seedlings to infection with soil-borne pathogens like *Rhizoctonia solani*, *Fusarium spp.*, and *Pythium spp.* Corn fungicide seed treatments are known to reduce soil-borne pathogen infection, and thus increase corn seedling vigor. Field performance of corn grown from seed treated with experimental fungicide seed treatment packs was evaluated.

Keywords

Plant Pathology

Disciplines

Agricultural Science | Agriculture | Plant Pathology

Benefits of Fungicide Seed Treatment on Corn Establishment, Vigor, and Yield

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Introduction

Cold and wet planting conditions predispose corn seedlings to infection with soil-borne pathogens like *Rhizoctonia solani*, *Fusarium* spp., and *Pythium* spp. Corn fungicide seed treatments are known to reduce soil-borne pathogen infection, and thus increase corn seedling vigor. Field performance of corn grown from seed treated with experimental fungicide seed treatment packs was evaluated.

Material and Methods

This experiment was planted at the Northeast Research Farm on May 1, 2007. Soil temperature at 4-in. depth was 60°F. Soil was chisel plowed in the fall of 2006 and field cultivated before planting. Nitrogen fertilizer (180 lb/acre N) was applied (urea ammonium nitrate 28-0-0) on May 6, 2007. Weed control was done with preemergence herbicide (Harness, 2.75 pt/acre), and postemergence control was done with herbicide (Marksman, 2.5 pt/acre) and also cultivation. Furadan insecticide was applied June 13 for corn rootworm insect control. Corn seed samples (Garst® Hybrid G-8545) were treated with fungicide seed treatment slurries (7 g slurry/kg seed). Samples were treated with either Cruiser Extreme 250® (12.5 g a.i./100 kg seed), A14918E (25.5 g a.i./100 kg seed), and Trilex® (10 g ai/100 kg seed) + Allegiance® (1.34 mg a.i. per kernel) + Vortex® (2.5 g ai/100 kg seed). The experiment was planted with a plot planter (35,000 plants/acre) and experimental design was a randomized block design with 4 treatments and 5 blocks for a total of 20 plots. Plant stand, plant height, and yield were assessed. Corn was harvested with a plot

combine and yield was adjusted to 15.5% moisture.

Results and Discussion

Cold (60°F) and wet soil conditions at planting severely impacted corn establishment. The plant population of corn grown from fungicide treated seed at 21 days after emergence (dae) was greater (31,400 to 31,900 plants/acre) ($P < .001$) than the plant population of corn grown from untreated seed (30,000 plants/acre) at 21 dae (Table 1), and there was no difference ($P > .05$) in the plant population between the three fungicide seed treatments. A difference in plant height was recorded on corn grown from fungicide treated corn seed ($P = .01$). Corn seedlings vigor was more uniform in seedlings grown from seed treated with A14918E (St dev = 2.2) and Cruiser extreme 250® (St dev = 2.5) compared with Vortex®-Trilex®-Allegiance® (St dev = 2.8). Corn grown from untreated seed yielded less than treated corn seed and no differences in yield within corn grown from treated/untreated seed was recorded. None of the plants grown from treated seed showed symptoms of phytotoxicity.

All fungicide seed treatments had a beneficial effect on stand, plant vigor, and yield of corn. The results presented in this report are a continuation of a laboratory-growth chamber study to determine the efficacy of A14918E and Vortex®-Trilex®-Allegiance® experimental compounds against *Fusarium verticillioides* colonization of roots and mesocotyl tissues of corn.

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Table 1. Stand counts (plants/acre) at 7, 14, and 21 dae, plant height (cm) at 21 dae and yield (adjusted @ 15.5% moisture) of corn grown from seed treated with Cruiser Extreme 250®, A14918E, Vortex®-Trilex®-Allegiance® or left untreated.

| | Plant Stand | | | Plant height | Yield |
|-----------------------------|--|-------------------|-------------------|--------------|-------|
| | 7 dae | 14 dae | 21 dae | 21 dae | |
| Untreated | 17,900 (4,083.5) ¹ a ² | 29,000 (1,000) a | 30,000 (866) a | 12.1 (2.7)a | 178a |
| Cruiser Extreme 250® | 25,100 (3,697.6)b | 31,800 (447.2)b | 31,900 (547.7.2)b | 13.9 (2.5)b | 188a |
| A14918E | 23,800 (2,636.3)b | 30,000 (1,193.7)b | 31,400 (418.3)b | 13.9 (2.20)b | 187a |
| Vortex®-Trilex®-Allegiance® | 27,600 (3,911.5)b | 31,800 (273.9)b | 31,900 (418.3)b | 14 (2.8b) | 180a |

¹Standard deviation is in parentheses.

²Values followed by the same letter are not statistically different; according to the Tukey-Kramer multiple comparisons test ($P < .05$).