

Effect of a Foliar Fungicide Application on Standability of Hybrid Corn

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Introduction

Many farmers have observed that hybrid corn to which a fungicide was applied at flowering (VT to R1) stayed greener longer after physiological maturity and had reduced lodging compared with corn not sprayed with a fungicide. Consequently, a field trial was established in 2016 and 2017 to test the effect of a foliar fungicide applied at R1 on lodging at harvest. This article does not include 2018 data.

Materials and Methods

The corn hybrid Pioneer P0407AMXT, with a resistance rating of four for grey leaf spot (GLS) and northern corn leaf blight (NCLB) and six for stalk strength (1-9 scale, 9 = outstanding), was planted following soybean in a minimum tillage system April 27, 2016. The corn hybrid Pioneer P0157AMX, with a resistance rating of four for GLS, five for NCLB and stalk strength, was planted May 6, 2017. The experimental design was a 5 x 2 factorial in a randomized complete block design with four blocks. Treatments were harvest date (corn harvested at weekly intervals for up to five weeks) and foliar fungicide application (with or without). Each plot was four rows wide (30-in. row spacing) by 78 ft long in 2016 and 100 ft long in 2017. All plots were bordered by two rows on either side. Headline Amp fungicide (10 fl oz/ac) was applied at flowering July 22, 2016, and July 25, 2017. A CO₂ pressurized 10-ft hand boom was used to spray the plots, fitted with

Tee Jet flat fan sprayer nozzles (XR11003VS), spaced 20 in. apart and delivering 20 gal/acre at 24 psi. Disease severity (percent leaf area diseased) in the canopy of each plot was assessed at dent (September 8, 2016, and August 25, 2017). All four rows of each plot were harvested with a John Deere 9450 combine fitted with an Avery Weigh-Tronix weigh scale and Shivvers 5010 moisture meter. Harvest dates in 2016 were October 5, 15, 23, and 30, and November 6. Harvest dates in 2017 were October 10, 17, 24, 31, and November 7. Immediately prior to harvest, the push test was done on 100 plants in each plot being harvested to assess percent lodging. Percent lodging data were square root transformed. Data were analyzed using PROC GLIMMIX and the t-test was used to test pairwise differences ($\alpha = 0.05$). When interactions were detected, the SLICE option in SAS was used to examine the interaction at the level of main effect.

Results and Discussion

Several interactions were detected on percent lodging. When data were analyzed using SLICE, an effect was detected of both harvest date and fungicide application on lodging (Table 1). In each year, percent lodging increased at later harvest dates. In 2017, application of fungicide reduced lodging. In 2016, an application of fungicide had no effect on percent lodging. Yields varied by year and fungicide application (Table 2). Yields in 2016 were greater than those in 2017. Application of fungicide resulted in a positive yield response of 7.1 bushels/acre and 4.3 bushels/acre in 2016 and 2017, respectively. No effect of harvest date on yield was detected. These data support observations that an application of fungicide at tasseling contributes to standability at harvest.

Table 1. Effect of fungicide application at tasseling on percent lodging and yield of corn at Nashua, Iowa, in 2016 and 2017.

Year	Fungicide application	Percent lodging ^w	Yield ^x (bu/ac)
2016	Yes	21.8 A ^y	192.6
	No	19.9 A	185.4
2017	Yes	13.6 a	236.7
	No	7.0 b	232.4
P value		<0.1304; <0.0001 ^z	<0.0001

^wPercent lodging (back transformed data); data were sliced by year.

^xCorrected to 15.0% moisture content.

^yMeans followed by same letter do not significantly differ (t-test, $\alpha = 0.05$).

^zData were sliced by year.

Table 2. Effect of harvest date on percent lodging and yield of corn at Nashua, Iowa, in 2016 and 2017.

Year	Harvest date	Percent lodging ^w	Yield ^x (bu/ac)
2016	Oct. 5	2.2 d ^y	192.7
	Oct. 15	22.0 c	190.2
	Oct. 23	27.5 b	186.3
	Oct. 30	35.1 a	189.6
	Nov. 6	30.3 a	186.1
	Oct. 10	3.6 c	234.9
2017	Oct. 17	3.8 c	238.2
	Oct. 24	8.2 b	232.9
	Oct. 31	19.0 a	232.5
	Nov. 7	22.4 a	234.4
P value		<0.0001; <0.0001 ^z	0.1130

^wPercent lodging (back transformed data); data were sliced by year.

^xCorrected to 15.0% moisture content.

^yMeans followed by same letter do not significantly differ (t-test, $\alpha = 0.05$).

^zData were sliced by year.