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Effectiveness of Foliar Fungicides on Hybrid Corn in Iowa

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Effectiveness of Foliar Fungicides on Hybrid Corn in Iowa

Abstract

This project was designed to study 1) the effect of foliar fungicide application on gray leaf spot and common rust disease development on hybrid corn, and 2) the yield response of hybrid corn to foliar fungicide application.

Keywords

Plant Pathology

Disciplines

Agricultural Science | Agriculture | Plant Pathology

Effectiveness of Foliar Fungicides on Hybrid Corn in Iowa

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Introduction

This project was designed to study 1) the effect of foliar fungicide application on gray leaf spot and common rust disease development on hybrid corn, and 2) the yield response of hybrid corn to foliar fungicide application.

Materials and Methods

Nine fungicide treatments were applied to two hybrids, Dekalb DKC61-66 RR2, with good resistance to GLS and common rust, and Dekalb DKC60-18 RR2, which is susceptible to GLS but has very good rust resistance. The experimental design was a randomized split plot design. Hybrid served as the main plot factor and fungicide treatments as subplot factors. Each main plot was four rows wide (30-in. row spacing) by 385 ft long; sub plots were 35 ft long by four 30-in. spaced corn rows. Corn was planted with an Almaco 4-row planter calibrated to plant @ 35,000 seeds/acre on corn following corn tilled field on April 24. Fungicides were applied with a modified Hagie high clearance sprayer at either VT (tasseling) July 11; or at VT and two weeks later at R2 (blister). Spray solutions were applied in a volume of 20 gallons/acre with Tee Jet hollow cone spray nozzle TXVS-3 at 50 psi. Foliar disease assessments of gray leaf spot (GLS) and common rust were done at VT, and every two weeks thereafter for a total of four assessments. Disease severity was assessed as the number of

lesions on the ear leaf of five plants, except for the final assessment date when GLS severity was assessed as the % ear leaf diseased. At R6, stalk rot incidence was assessed by pinching the stalks of 10 plants. The inner two rows of each plot were harvested with a John Deere 4400 on October 4.

Results and Discussion

Common rust was observed at VT (mid July), but rust severity remained low throughout the season (Table 1 and 2). No difference in susceptibility to common rust was observed between the hybrids. In contrast, GLS severity was greater on hybrid DKC61-66 RR2 compared with hybrid DKC60-18 RR2 (Table 1 and 2). Gray leaf spot was first observed on the ear leaf about the end of July (R2) and severity increased as the season progressed. All fungicide treatments reduced GLS severity. Two applications (at VT and R2) of Quilt, Quadris, or Headline further reduced ($P < 0.05$) GLS compared with all other treatments on the more susceptible hybrid DKS 61-66 RR2 (Table 1). Stalk rot in hybrid DKC 60-18 RR2 only was reduced by fungicide applications (Table 2). Fungicide applications did not improve yields (Table 1 and 2).

Studies on the efficacy of foliar fungicides for GLS management and yield response are expected to continue in 2008.

Acknowledgements

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Table 1. Mean number of lesions of common rust, gray leaf spot, stalk rot incidence, and yield of DKC61-66 RR2 planted at the Southeast Research Farm.^z

Treatment, fl oz/acre, surfactant ^y , timing	Common rust ^a			Gray leaf spot ^b			Stalk rot ^d	Yield (bu/A @ 15.5%)
	Jul 11	Jul 25	Aug 8	Jul 25	Aug 8	Aug ^c 22		
Untreated	2.5 bc	7.25 ab	15.5 ab	10 a	59.75 a	12.63 a	3.25 a	197.57 a
Quilt, 14, NIS, VT	2 c	6 b	10.5 ab	0 b	12 b	6.37 b	4.5 a	192 ab
Quilt, 14, NIS, VT, R3	3 bc	3.5 b	6 b	2.25 b	4.25 b	1.87 cd	2.25 a	181.78ab
Quadris, 9.2, COC, VT	7.25 a	7.25 ab	18.5 a	0.5 b	20.75 b	7.37 b	4 a	188.84 ab
Quadris, 9.2, COC, VT, R3*	4.25 abc	13.25 a	14 ab	0.25 b	9 b	5.88 bc	4.5 a	176.4 1ab
Quadris, 9.2, COC, VT, R3	3 bc	3.75 b	7 b	0.5 b	5.25 b	1.87 cd	3.75 a	168.73 b
Headline, 6, COC, VT	4.75 abc	7 ab	9 ab	1 b	10.75 b	6.38 b	5.25 a	179.61 ab
Headline, 6, COC, VT, R3	4.75 abc	3.5 b	5.25 b	1.25 b	3.25 b	1.63 d	3.5 a	167.29 b
Stratego, 10, NIS, VT	6.5 ab	7.5 ab	20.25 a	0.5 b	6 b	6.25 b	4.75 a	169.02 b
Stratego, 10, NIS, VT, R3	3.25 abc	6 b	6.5 b	0.25 b	8.75 b	4.12 bcd	3.5 a	168.1 b
Quilt + Warrior, 14,NIS,A	2 c	7.25 ab	12.5 ab	2 b	4.5 b	4.37 bcd	4.75 a	170.52 b
LSD (P ≤ 0.05)	4.17	6.31	11.31	3.75	22.84	4.23	4.15	25.88

^aMean number of pustules (5 ear leaves were assessed in each plot ; N=20/treatment)

^bMean number of lesions (5 ear leaves were assessed in each plot ; N=20/treatment)

^cMean disease severity % (5 ear leaves were assessed in each plot ; N=20/treatment)

^dIncidence of stalk rot (10 plants in each plot were assessed using the « pinch test »)

^ySurfactant “NIS” non ionic surfactant 0.25% v/v. Surfactant “COC” crop oil concentrate 1.0% v/v.

^zValues in the same column with different letters differ.

*Tilt, 4 fl oz/acre, NIS was sprayed at R3.

Table 2. Mean number of lesions of common rust, gray leaf spot, stalk rot incidence and yield of DKC60-18 RR2 planted at the Southeast Research Farm.^z

Treatment, fl oz/acre, surfactant ^y , timing	Common rust ^a			Gray leaf spot ^b			Stalk rot ^d	Yield (bu/A @ 15.5%)
	Jul 11	Jul 25	Aug 8	Jul 25	Aug 8	Aug ^c 22		
Untreated	3.5 a	5.25 ab	8.75 ab	35.75 a	143 a	85.25 a	6.25 a	193.58 ab
Quilt, 14, NIS, VT	1.5 a	5 ab	5 ab	8 cd	27 c	21.5 b	4 bc	191.55 ab
Quilt, 14, NIS, VT, R3	3.25 a	4 ab	7 ab	3.5 d	5.5 c	11 b	4 bc	191.54 ab
Quadris, 9.2, COC, VT	5.75 a	7.75 a	9 ab	19.75 b	104.5 b	61.25 a	5 abc	185.75 ab
Quadris, 9.2, COC, VT, R3*	3.25 a	4.5 ab	11 a	10.5 bcd	37.25 c	16.25 b	4 bc	175.65 ab
Quadris, 9.2, COC, VT, R3	3 a	4.25 ab	7.25 ab	15.5 bc	32.25 c	18.5 b	4 bc	189.65 ab
Headline, 6, COC, VT	2 a	3.25 b	4 b	5 d	35.75 c	22.38 b	7.25 a	184.98 ab
Headline, 6, COC, VT, R3	2.25 a	6 ab	8.25 ab	4.75 d	12 c	3.88 b	3.5 c	175.33 ab
Stratego, 10, NIS, VT	3.25 a	7.25 ab	7.5 ab	4 d	23.25 c	26 b	5 abc	180.56 ab
Stratego, 10, NIS, VT, R3	2 a	4.75 ab	5.5 ab	8.5 cd	20.5 c	13.63 b	6.75 a	172.93 b
Quilt + Warrior, 14,NIS,VT	2.5 a	4.25 ab	8.5 ab	3.5 d	24.75 c	19 b	5.25 abc	200.6 a
LSD (P ≤ 0.05)	4.66	4.17	6.7	9.98	37.51	28.94	2.61	25.49

^aMean number of pustules (5 ear leaves were assessed in each plot ; N=20/treatment)

^bMean number of lesions (5 ear leaves were assessed in each plot ; N=20/treatment)

^cMean disease severity % (5 ear leaves were assessed in each plot ; N=20/treatment)

^dIncidence of stalk rot (10 plants in each plot were assessed using the « pinch test »)

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