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Abstract

Use of resistant soybean varieties is a very effective strategy for managing soybean cyst nematode (SCN). Numerous SCN-resistant soybean varieties are available for Iowa soybean growers. Each year, public and private SCNresistant soybean varieties are evaluated in SCN-infested fields throughout Iowa. The research described in this report was performed to assess the agronomic performance of SCNresistant soybean varieties and to determine the effects of the varieties on SCN numbers or population densities.

Disciplines

Agricultural Science | Agriculture | Plant Pathology

Evaluation of Soybean Varieties Resistant to Soybean Cyst Nematode

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Introduction

Use of resistant soybean varieties is a very effective strategy for managing soybean cyst nematode (SCN). Numerous SCN-resistant soybean varieties are available for Iowa soybean growers. Each year, public and private SCN-resistant soybean varieties are evaluated in SCN-infested fields throughout Iowa. The research described in this report was performed to assess the agronomic performance of SCN-resistant soybean varieties and to determine the effects of the varieties on SCN numbers or population densities.

Materials and Methods

Plots were four 17-ft-long rows spaced 30 in. apart and were planted at 10 seeds/ft, with four replications/variety. All plots were end trimmed to a length of 14 ft on September 9. Maturity was recorded as the number of days after August 31 that a variety was considered mature. A variety was considered mature when 95% of the pods had turned brown. Just prior to harvest, average plant height and lodging (1=all plants fully erect, 5=all plants flat) were assessed in each plot. For each location, the center two rows of each four-row plot were harvested with a plot combine, total seed weight/plot and seed moisture were determined, and total plot seed weights subsequently were converted to bushels/acre. Resistant varieties and susceptible check varieties are grouped separately and are listed in the report in order of descending yield. At the beginning of the growing season, plots were sampled for the presence of SCN. Soil samples, consisting of ten 1-in.-diameter, 6- to 8-in.-deep soil cores, were collected from the center 14 ft of the center two rows of each plot immediately after planting. SCN cysts were extracted from each soil sample, and SCN eggs were extracted from the cysts and counted. SCN egg population densities also were determined for each plot at the end of the growing season in an identical manner.

All varieties also were field tested for tolerance to iron deficiency chlorosis (IDC). Each variety was planted in a hill plot consisting of five seeds/hill, with two replications/variety, at two high pH field locations. Notes were taken for IDC symptoms at each location approximately four weeks after planting and again at five weeks after planting. Varieties were rated on a scale of 1 to 5 with a 1 indicating no symptoms of IDC present and a 5 indicating plant death due to IDC. The scores from each location then were averaged together and an overall rating was assigned to each variety.

Results and Discussion

The results of the experiments convincingly illustrate the benefits of using SCN-resistant soybean varieties for management of this important soybean pest. All of the soybean varieties with SCN resistance had greater yields than susceptible varieties, and end-of-season SCN population densities were significantly greater in plots where susceptible varieties were grown relative to plots planted with resistant varieties.

Acknowledgements

Table 1. Agronomic performance and SCN reproduction data of Roundup Ready$^{®}$ soybean varieties.

Brand	Variety	Relative maturity	Resistance	IDC	Maturity date	Height (in.)	Lodging (1-5)	Yield (bu/acre)	Yield rank	SCN (/100cc soil)[1]	RF[2]
NK	S37-F7 Brand	3.7	PI 88788	4.0	14	33.5	1.5	65.4	1	1,450	6.5
Latham	E3148R2	3.1	PI 88788	3.4	19	33.3	2.0	64.0	2	600	1.0
Willcross	2350N	3.5	PI 88788	3.1	19	33.3	2.4	62.8	3	1,200	1.9
Pioneer	92Y80	2.8	PI 88788	3.1	17	29.3	2.0	62.6	4	1,025	1.4
Willcross	2379N	3.7	PI 88788	3.7	18	32.8	1.9	62.0	5	2,275	2.9
Channel	3200R2	3.2	PI 88788	3.4	15	33.8	1.8	61.3	6	1,675	4.0
NK	S35-T9 Brand	3.5	PI 88788	3.6	18	37.0	1.9	60.2	7	1,725	3.3
Asgrow	AG3430	3.4	PI 88788	3.4	18	30.8	1.9	60.0	8	1,900	3.1
NK	S34-R2 Brand	3.4	PI 88788	3.1	15	32.3	1.6	59.8	9	2,275	3.9
Prairie Brand	PB-3239NRR2	3.2	PI 88788	3.4	15	32.0	1.5	59.6	10	1,400	1.1
Latham	E3285R2	3.2	PI 88788	3.3	18	30.8	1.5	58.3	11	1,825	4.0
Prairie Brand	PB-3739NRR2	3.7	PI 88788	3.4	20	37.8	2.0	57.0	12	1,425	1.1
Channel	3002R2	3.0	PI 88788	3.3	21	30.5	2.0	56.4	13	2,100	2.4
Pioneer	93Y13	3.1	PI 88788	3.2	17	27.5	1.5	56.1	14	775	0.6
Asgrow	AG3539	3.5	PI 88788	2.8	23	34.3	1.8	55.8	15	5,650	6.3
Willcross	2R2330N	3.4	PI 88788	3.6	15	31.8	1.8	54.7	16	775	0.8
NK	S31-H9 Brand	3.1	PI 88788	3.0	14	32.3	2.3	54.5	17	1,250	1.1
Prairie Brand	PB-3139NRR2	3.1	PI 88788	2.8	16	30.5	1.9	54.5	17	875	3.8
Prairie Brand	PB-3428NRR2	3.4	PI 88788	2.2	17	34.3	1.9	54.3	19	1,200	1.3
Latham	E3128R2	3.1	PI 88788	2.8	17	29.8	1.8	53.0	20	1,550	2.1
Willcross	2320N	3.2	PI 88788	3.8	18	31.3	1.9	52.4	21	1,925	1.8
Asgrow	AG3130	3.1	PI 88788	3.1	20	29.5	1.6	52.1	22	1,825	3.2
Mycogen	5N311RR	3.1	PI 88788	2.6	20	27.8	1.9	50.5	23	1,425	0.9
	Average	3.3	-	3.2	17	32.0	1.8	57.7	-	1,658	2.5
	LSD[3] (P = 0.05)	-	-	-	-	2.6	0.3	7.9	-	1,742	NS
	LSD[3] (P = 0.10)	-	-	-	-	2.2	0.3	6.6	-	1,456	NS
Pioneer	*92M91*	*2.9*	*None*	*2.3*	*19*	*24.8*	*1.5*	*43.8*	*24*	*18,500*	*63.0*
NK	*S33-K5 Brand*	*3.3*	*None*	*3.4*	*24*	*29.5*	*2.0*	*40.2*	*25*	*15,250*	*53.8*
Pioneer	*93M11*	*3.1*	*None*	*2.9*	*23*	*25.0*	*1.4*	*38.3*	*26*	*11,950*	*12.0*
NK	*S36-B6 Brand*	*3.6*	*None*	*3.4*	*21*	*26.5*	*1.9*	*22.7*	*27*	*10,800*	*12.3*
	Average	3.2	-	3.0	22	26.4	1.7	36.2	-	14,125	35.3

Values presented in tables are means. Entries are listed in decreasing order of yield.

Italicized entries are widely grown SCN-susceptible varieties entered by Iowa State University for comparison purposes.

[1]Final SCN egg population density (eggs/100 cc soil); there were no statistically significant differences among initial SCN population densities; initial SCN population of 963 eggs/100 cc soil; HG Type 5.7.

[2]Final SCN egg population density/initial SCN egg population density.

[3]Least significant difference: values are from Fisher's least significant difference test, NS = no significant differences among the varieties.