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SCN-Resistant Soybean Variety Trial

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Abstract
Soybean cyst nematode (SCN) was first found in Iowa 30 years ago and it has quickly spread throughout the state and is a major threat to soybeans. SCN management involves growing non-host crops and SCN-resistant soybean varieties. There are hundreds of SCN-resistant varieties available, but almost all have PI 88788 as the source of resistance. Some SCN-resistant varieties have not performed well in certain fields, and SCN populations that can reproduce on PI 88788 may be developing due to frequent use of varieties with resistance from PI 88788. This research effort was designed to identify SCN-resistant varieties that will perform well in these problem areas and help manage SCN populations for long-term soybean profitability.

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Plant Pathology, Agronomy

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Introduction

Soybean cyst nematode (SCN) was first found in Iowa 30 years ago and it has quickly spread throughout the state and is a major threat to soybeans. SCN management involves growing nonhost crops and SCN-resistant soybean varieties. There are hundreds of SCN-resistant varieties available, but almost all have PI 88788 as the source of resistance. Some SCN-resistant varieties have not performed well in certain fields, and SCN populations that can reproduce on PI 88788 may be developing due to frequent use of varieties with resistance from PI 88788. This research effort was designed to identify SCN-resistant varieties that will perform well in these problem areas and help manage SCN populations for long-term soybean profitability.

Materials and Methods

The trial was planted on April 30, 2007, in field J of the Muscatine Island Research Farm. Field J has a coarse sandy soil and results of initial sampling indicated an average SCN population density of 10,675 eggs/100 cc soil. Plots were four, 17-ft-long rows spaced 30 in. apart and were planted at a rate of 10 seeds/ft, with four replications/variety. Plots were irrigated with overhead sprinklers as needed. Roundup® herbicide was applied on May 28, June 21, and again on July 14 to control weeds. A spider mite outbreak resulted in a Lorsban 4E application on July 6. The center two rows of each plot were harvested on September 27.

Soil samples, consisting of ten 1-in.-diameter and 6- to 8-in.-deep soil cores, were collected from the center 14 ft of the center two rows of each plot at 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 from soil samples collected in an identical manner from each plot at the end of the growing season, September 27.

Results and Discussion

Most of the highest-yielding varieties and the only varieties that reduced SCN population densities through the season in this experiment were those with resistance from Peking or CystX® (Table 1). Specifically, Pioneer 92M53, Pioneer 92M75, Kruger 294, and Latham CY963127 produced high yields and low reproductive factor (RF) values. The RF value indicates the change in SCN population density throughout the growing season. RF is calculated by dividing the SCN population density (# eggs/100 cc soil) in each plot at harvest by the SCN density in each plot at planting. A reproductive factor < 1.0 indicates SCN had difficulty reproducing on the soybean variety causing the population to decrease whereas a RF > 1.0 indicates the SCN population increased during the season. Because of the variability in sampling soil for SCN, the differences between RF values in Table 1 are not highly significant statistically.

Maintaining profitable soybean production in SCN-infested fields requires growing consistently high-yielding SCN-resistant varieties that also reduce SCN population densities or keep them in check. Results (yield and SCN control) obtained with individual varieties evaluated in this trial may vary in other fields infested with different SCN populations. Growers are encouraged to evaluate SCN-resistant varieties and monitor SCN population densities in their own fields to determine which varieties are best for their farms.

Acknowledgements

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Table 1. Soybean variety maturity, plant height, average yield, and effect on SCN population.

Cultivar	SCN resistance source	Relative maturity	Observed maturity[1]	Plant height (in.)	Yield (bu/acre)	RF[2]	SCN Reproduction[3]
Pioneer 92M53	Peking	2.5	9-5	28.8	66.5	0.90	No change
Kruger 294	Peking	2.9	9-10	31.8	66.5	0.32	Reduced
Latham CY963127	CystX®	3.2	9-11	33.8	62.7	0.55	Reduced
Asgrow AG3101	PI 88788	3.1	9-12	28.5	61.1	1.45	Increased
Pioneer 92M75	Peking	2.7	9-7	27.8	60.0	0.52	Reduced
Asgrow AG3205	PI 88788	3.2	9-14	27.0	55.1	0.97	No change
Pioneer 93M42	PI 88788	3.4	9-16	31.0	48.7	2.36	Increased
NK S32-F2	PI 88788	3.2	9-12	27.8	48.5	1.15	No Change
NK S37-F7	PI 88788	3.7	9-19	25.0	48.1	1.28	Increased
NK S29-J6	PI 88788	2.9	9-10	27.0	46.4	1.62	Increased
NK S33-T4	PI 88788	3.3	9-16	25.8	41.9	1.47	Increased
Latham L2620RX	CystX®	2.6	9-7	25.3	40.9	1.76	Increased
Asgrow AG2802	PI 88788	2.8	9-8	26.5	38.0	1.46	Increased
Latham L2611RX	CystX®	2.6	9-6	23.3	31.2	1.10	No change
DeKalb DKB26-53	None	2.6	9-7	18.5	17.3	2.38	Increased
Average				27.2	48.8	1.29	
LSD[4]				4.1	9.8	1.26	

[1]Date on which at least 90% of pods had turned brown.

[2]RF: reproductive factor was obtained by dividing SCN population (# eggs/100 cc soil) at harvest by SCN population at planting for each plot and averaging the four replications per variety. A RF value of 2.0 indicates the SCN population doubled over the growing season while a RF value of 0.5 indicates the population was reduced by half during the growing season.

[3]SCN Reproduction: derived from reproductive factor assuming guideline of RF 0.0–0.75 SCN population numbers reduced; RF 0.76–1.25 SCN population not changed; RF 1.26 or greater SCN population increased. Average initial SCN population was 10,675 eggs/100 cc soil, HG Type 0.

[4]Least significant difference: values are from Fisher's least-significant difference test (P = 0.05).