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Soybean Cyst Nematode Resistant Soybean Trial

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Abstract
Soybean cyst nematode (SCN) was identified in Iowa less than 30 years ago and is now recognized as a major pest of soybeans, particularly in sandy soil regions such as the Muscatine Island. Effective management has relied on crop rotation and the use of resistant varieties. Recently, some SCN resistant varieties have not been performing to expectations in certain fields. The reason for this is thought to be the repeated use of varieties obtaining their resistance from a single source, PI 88788, which has led to the development of SCN populations resistant to PI 88788. This project was initiated to help identify soybean varieties with different and effective sources of SCN resistance to provide management choices that will maintain soybean profitability.

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Plant Pathology, Agronomy

Disciplines
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Introduction

Soybean cyst nematode (SCN) was identified in Iowa less than 30 years ago and is now recognized as a major pest of soybeans, particularly in sandy soil regions such as the Muscatine Island. Effective management has relied on crop rotation and the use of resistant varieties. Recently, some SCN resistant varieties have not been performing to expectations in certain fields. The reason for this is thought to be the repeated use of varieties obtaining their resistance from a single source, PI 88788, which has led to the development of SCN populations resistant to PI 88788. This project was initiated to help identify soybean varieties with different and effective sources of SCN resistance to provide management choices that will maintain soybean profitability.

Materials and Methods

The trial was planted on May 18, 2006 on a coarse sandy soil infested with SCN at the Muscatine Island Research Farm, Fruitland, IA. Plots were four 17-ft-long rows spaced 30 in. apart and were planted at rate of 10 seeds/ft, with three replications/variety. Plots were irrigated as needed with overhead sprinklers. Roundup herbicide was applied on June 15 and again on June 29. A spider mite outbreak resulted in a Lorsban 4E application on July 26. The center two rows of each plot were harvested on October 6.

All plots were sampled for the presence of SCN at planting on May 18. 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. 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, October 6, in an identical manner.

Results and Discussion

Twelve varieties were planted in an area of the research farm highly infested with SCN to evaluate yield performance and effect on SCN egg numbers (Table 2). A good stand was achieved in all plots and the soybeans grew surprisingly well considering the high levels of SCN in the soil. The soybeans didn't grow overly tall on the coarse sandy soil so lodging was not a problem for any variety. Maturities ranged from September 15 for NK S26-V6 to September 28 for Pioneer 93M95. Plot yields were generally good, even for the early-maturing group II entries.

SCN egg counts at planting averaged 19,407 eggs/100cc soil and counts at harvest averaged 19,939 eggs/100 cc soil (Table 1). This indicated that even though all entries carried resistance to SCN, they didn't, as a group, decrease soil SCN numbers. Egg counts for individual plots were highly variable and although the average egg counts in Table 1 vary greatly between varieties they were not statistically different. The goal of this trial was to identify varieties with good yield potential and the ability to decrease soil SCN numbers. While several varieties showed merit, one entry in particular, Pioneer 92M75, stood out with both high yield and low SCN egg counts in the fall. It is reported to derive its SCN genetic resistance from the Peking source.

Acknowledgements

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Table 1. Soybean variety maturity, plant height, average yield, and SCN egg counts.

Cultivar	Relative maturity	Observed maturity[1]	Plant height (in.)	Yield (bu/acre)	Spring SCN eggs (no./100 cc)	Fall SCN eggs (no./100 cc)
Pioneer 92M75	2.7	9-23	31	66.7	25,133	9,633
NK S29-J6	2.9	9-18	30	55.5	14,533	19,967
Asgrow AG 2801	2.8	9-21	27	54.3	18,267	24,000
Asgrow AG 3101	3.1	9-23	28	54.3	21,400	12,100
Asgrow AG 3203	3.2	9-23	28	53.6	18,133	31,833
Pioneer 93M42	3.4	9-25	34	53.1	18,767	20,467
NK S26-V6	2.6	9-15	26	52.0	18,100	15,867
NK S37-N4	3.7	9-27	32	49.5	28,200	15,700
Pioneer 93M95	3.9	9-28	31	48.9	21,900	15,967
Latham L2611RX	2.6	9-16	26	46.9	11,550	20,100
Latham L2811RX	2.8	9-17	26	46.7	14,700	23,733
Latham L2620RX	2.6	9-16	26	45.7	22,200	29,900
Average			29	52.3	19,407	19,939
LSD[2]			6	16.9	ns	ns

[1]Date on which over 90% of pods had turned brown.
[2]Least significant difference: values are from Fisher's least-significant difference test (P=0.05), ns=no significant differences among the egg counts.

Table 2. Soybean variety SCN resistance source and reported race resistance.

Cultivar	Resistance source	Reported SCN race resistance
Pioneer 92M75	Peking	1,3,5
NK S29-J6	PI 88788 & Peking	3,14
Asgrow AG 2801	PI 88788	3,14
Asgrow AG 3101	PI 88788	3
Asgrow AG 3203	PI 88788	3
Pioneer 93M42	PI 88788	3,14
NK S26-V6	PI 88788 & Peking	3,14
NK S37-N4	PI 88788 & Peking	3,14
Pioneer 93M95	PI 88788	3,14
Latham L2611RX	CystX®	All
Latham L2811RX	CystX®	All
Latham L2620RX	CystX®	All