

2009

Comparing Yields and Nematode Control of Soybean Varieties with Different Sources of SCN Resistance in Strip Trials

Gregory L. Tylka

Iowa State University, gltylka@iastate.edu

Christopher C. Marett

Iowa State University, cmarett@iastate.edu

Follow this and additional works at: http://lib.dr.iastate.edu/farms_reports



Part of the [Agricultural Science Commons](#), [Agriculture Commons](#), and the [Plant Pathology Commons](#)

Recommended Citation

Tylka, Gregory L. and Marett, Christopher C., "Comparing Yields and Nematode Control of Soybean Varieties with Different Sources of SCN Resistance in Strip Trials" (2009). *Iowa State Research Farm Progress Reports*. 574.

http://lib.dr.iastate.edu/farms_reports/574

This report is brought to you for free and open access by Iowa State University Digital Repository. It has been accepted for inclusion in Iowa State Research Farm Progress Reports by an authorized administrator of Iowa State University Digital Repository. For more information, please contact digirep@iastate.edu.

Comparing Yields and Nematode Control of Soybean Varieties with Different Sources of SCN Resistance in Strip Trials

Abstract

The primary method of managing yield loss due to the soybean cyst nematode (SCN) is through the use of resistant soybean varieties. Most SCN-resistant varieties available in Iowa have the PI 88788 source of SCN resistance. There are concerns that over time, SCN will be able to overcome the PI 88788 resistance.

Keywords

Plant Pathology

Disciplines

Agricultural Science | Agriculture | Plant Pathology

Comparing Yields and Nematode Control of Soybean Varieties with Different Sources of SCN Resistance in Strip Trials

Gregory Tylka, professor
Chris Marett, assistant scientist
Department of Plant Pathology

Introduction

The primary method of managing yield loss due to the soybean cyst nematode (SCN) is through the use of resistant soybean varieties. Most SCN-resistant varieties available in Iowa have the PI 88788 source of SCN resistance. There are concerns that over time, SCN will be able to overcome the PI 88788 resistance.

Small plots (two or four rows wide and up to 20 ft long) often are used to evaluate yields and nematode control of SCN-resistant soybean varieties. Yield results are more variable in small plots than in larger strip plots, but data from soil samples in small plots more accurately represent SCN population densities from the areas in which yield data are being collected.

In this experiment, varieties with SCN-resistance from PI 88788, Peking, and PI 437654 (CystX[®]) were compared. We attempted to capture the strengths of strip plots and small plots by growing the varieties in strips and taking multiple soil samples from each strip.

Materials and Methods

Four replications of seven soybean varieties were planted in randomly ordered strips on May 24, 2008. Each strip had six rows, 200 ft long, spaced 30 in. apart. Five of the varieties were resistant to SCN and two were susceptible. Two varieties had SCN resistance from PI 88788, two varieties had Peking SCN resistance, and one variety had PI 437654

(CystX[®]) SCN resistance. Each 200-ft-long strip was sampled in 25-ft increments; eight different soil samples were collected per strip. Each soil sample consisted of 10 soil cores from the center two rows of the 25-ft increment. Spring soil samples were taken on May 28, the plots were harvested on October 10, and soil samples were collected a second time on October 21, 2008. A greenhouse HG type test was performed on the SCN population obtained in the spring soil samples.

Results and Discussion

In the tables, nematode reproduction is indicated by a reproductive factor (RF) value, which is calculated by dividing the number of SCN eggs in a plot in the fall by the number that were present in the spring. RF values > 1.0 indicate SCN numbers increased during the growing season; RF values < 1.0 indicate that SCN numbers declined. Initially, there were 2,069 SCN eggs/100 cc soil in the field overall, and the HG type of the SCN population was 2.5.7, with 10 percent reproduction on PI 88788.

In this experiment, all of the varieties with Peking and CystX[®] resistance, and one of the varieties with PI 88788 resistance, significantly reduced SCN population densities compared with the susceptible varieties (Table 1). One of the Peking varieties yielded more than the susceptible varieties, but the CystX[®] variety yielded significantly less than the susceptible varieties (Table 1). When results were combined by source of SCN resistance, all three sources either prevented increases in SCN population densities or actually reduced SCN numbers

during the season (Table 2). Only the varieties with Peking SCN resistance had yields greater than the susceptible varieties. The yield of varieties with PI 88788 SCN resistance was numerically greater than the susceptible, but the difference was not statistically significant. The CystX[®] variety reduced SCN numbers, but it also was the lowest-yielding variety in the experiment. The SCN RF value of varieties with PI 88788 SCN resistance was numerically greater than the RF values of the other sources of SCN resistance, which makes sense because the HG type test results indicated that the SCN population in the field had 10 percent reproduction on PI 88788.

These results illustrate that SCN-resistant soybean varieties may need to be selected

based on the conditions in each field. Growers seeking to reduce SCN numbers may do best by growing varieties with Peking or CystX[®] SCN resistance. The results also show that varieties with PI 88788 resistance can yield well even in fields with SCN populations with 10 percent reproduction on PI 88788 (like HG type 2.5.7).

Acknowledgements

We thank Dave Rueber and the staff of the ISU Northern Research and Demonstration Farm for their help with this study. This work was funded by the soybean checkoff through a grant from the North Central Soybean Research Program.

Table 1. Soybean yield and SCN reproduction by variety (Kanawha 2008).

Soybean variety	Source of SCN resistance	Yield (bu/acre)	SCN RF ¹
Latham E2658R	PI 88788	39.2 a b	1.0 c
Latham L2620RX	Cyst X	34.5 c	0.5 c
Latham L2646R	None	37.2 b c	2.5 a b
Pioneer 92M11	Peking	40.3 a	0.7 c
Pioneer 92M53	Peking	39.2 a b	0.7 c
Pioneer 92M54	PI 88788	39.2 a b	1.5 b c
Pioneer 92M91	None	36.7 b c	3.3 a

Numbers in columns followed by the same letter are not statistically different (P = 0.10).

¹RF, fall SCN population ÷ spring SCN population.

Table 2. Soybean yield and SCN reproduction by resistance source (Kanawha 2008).

Source	Yield	RF ¹
None	36.9 b c	2.9 a
PI 88788	39.2 a b	1.2 b
Peking	39.8 a	0.7 b
Cyst X	34.5 c	0.5 b

Numbers in columns followed by the same letter are not statistically different (P = 0.10).

¹RF, fall SCN population ÷ spring SCN population.