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## Variety Trial Results Show Differences in SCN Control Among Varieties

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# Variety Trial Results Show Differences in SCN Control Among Varieties

## **Abstract**

The soybean cyst nematode (SCN) is one of the most damaging pests of soybean in Iowa and throughout the Midwest. The amount of yield loss that occurs is directly related to the SCN egg population densities (numbers) in the soil. Keeping SCN egg population densities from increasing to high levels is needed to maintain profitable soybean production in SCN-infested fields. An effective way to produce high soybean yields and keep SCN egg population densities in check is to grow SCN-resistant soybean varieties.

## **Keywords**

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## **Disciplines**

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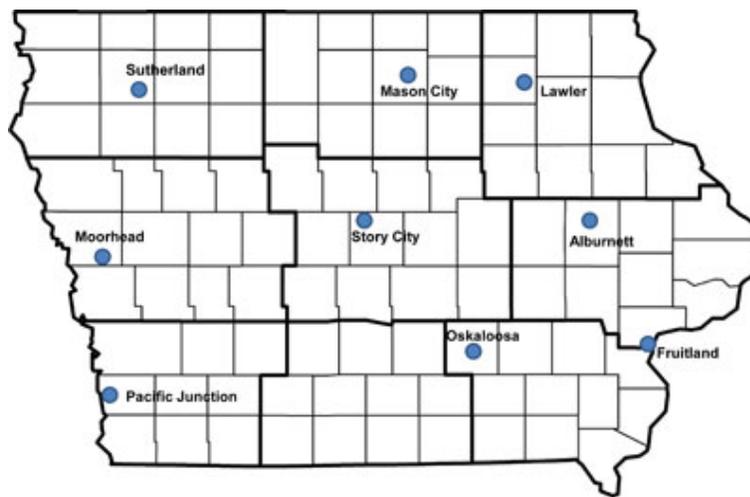
By Greg Tylka, Department of Plant Pathology and Microbiology

The soybean cyst nematode (SCN) is one of the most damaging pests of soybean in Iowa and throughout the Midwest. The amount of yield loss that occurs is directly related to the SCN egg population densities (numbers) in the soil. Keeping SCN egg population densities from increasing to high levels is needed to maintain profitable soybean production in SCN-infested fields. An effective way to produce high soybean yields and keep SCN egg population densities in check is to grow SCN-resistant soybean varieties.

Iowa farmers can choose from more than 800 soybean varieties described as resistant to SCN ([recently discussed in ICM News](#)). SCN resistance is never 100 percent effective, but varieties that allow less than 10 percent SCN reproduction meet the scientific definition of SCN resistance.

Soybean varieties vary greatly in yield and in ability to control the nematode. Differences in nematode control among resistant varieties is because there are at least four different genes involved in conferring resistance to SCN in soybean, and not every SCN-resistant soybean variety has all of the genes in the same combination. Soybean varieties with fewer SCN resistance genes will allow more SCN reproduction than varieties with the full complement of resistance genes. The amount of SCN reproduction that a variety allows is not provided in the description of the variety.

Iowa State University annually evaluates SCN-resistant soybean varieties at multiple locations throughout Iowa (figure 1). Each variety is studied in replicated plots to determine how well the variety yields and how well it controls the nematode pest in the soil. A few widely grown SCN-susceptible soybean varieties are included in each experiment for comparison purposes. The results of the 2011 experiments were finalized in December 2011 and distributed in ISU Extension publication IPM 52, "[Evaluation of Soybean Varieties Resistant to Soybean Cyst Nematode in Iowa - 2011](#)", in the Jan. 21, 2012 issue of the Iowa Farmer Today magazine. The publication also can be downloaded from the [ISU Extension's online store](#) and the Iowa Soybean Association's [production research library](#).



**Figure 1. Locations of ISU SCN-resistant Soybean Variety Trial Program experiments in 2011.**

A new graph style adopted for the 2011 report shows yield and magnitude of SCN reproduction in the same bar graph (figure 2). Almost all of the resistant varieties evaluated in 2011 had SCN resistance from PI 88788. Four varieties for northern Iowa and three for central Iowa had Peking SCN resistance and a single variety with PUSCN14 SCN resistance was evaluated in all three regions of Iowa.

The Iowa State SCN-resistant Soybean Variety Trial Program is the largest and most comprehensive of its kind in the nation. The research is funded by Iowa soybean farmers through a grant from the Iowa Soybean Association.

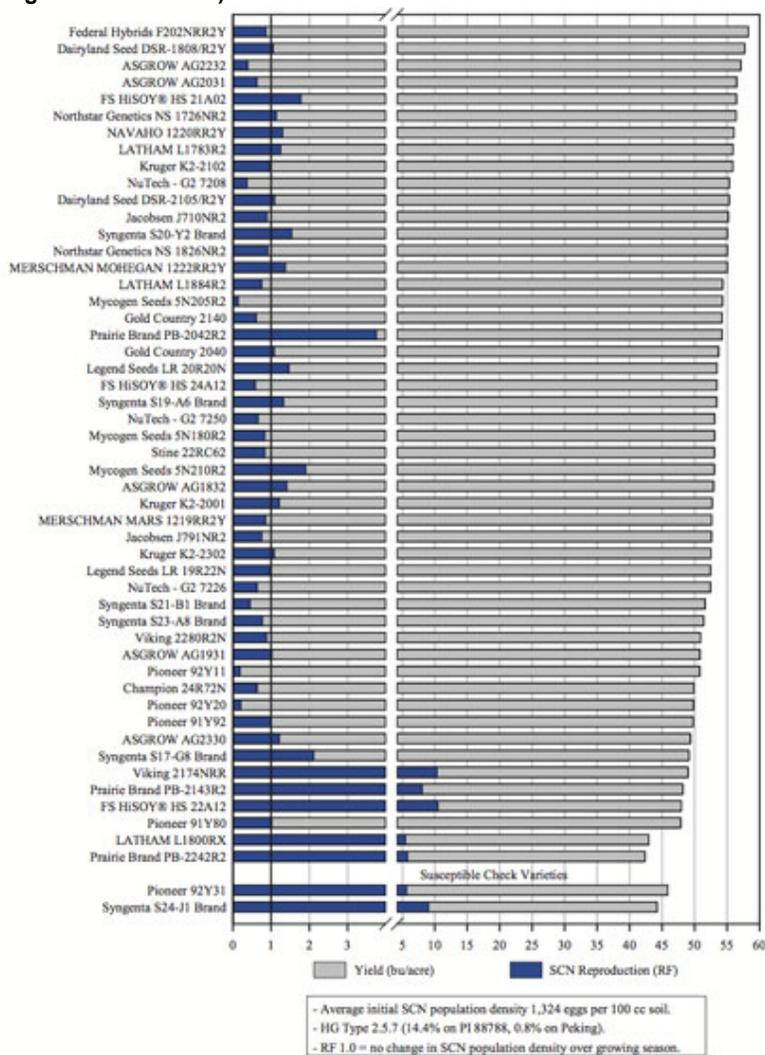
Some highlights of the results from the experiments conducted in 2011 are:

- Greatest differences in yields of SCN-resistant and susceptible varieties were at experiments across northern and southern Iowa in 2011 (figure 3). The publication contains yield data for individual soybean varieties.
- The highest yields of SCN-resistant soybean varieties in 2011 were in the experiment near Sutherland, in the northwest, and the lowest yields were in the experiment near Moorhead, in west central Iowa (figure 3).
- SCN populations in the fields varied greatly in reproduction on the PI 88788 source of SCN resistance (measured by the SCN HG type test). The SCN population in the field used near Sutherland had the lowest reproduction on PI 88788, 1.2 percent, and the SCN population in the field near Story City had the greatest amount of SCN reproduction on PI 88788, 31.8 percent.
- Overall, SCN-resistant varieties kept SCN egg population densities from increasing throughout the season whereas egg numbers increased 2 to 20 fold on susceptible varieties in all but one location (figure 4).
- SCN egg population densities increased on some SCN-resistant soybean varieties as much or more than on the widely grown SCN-susceptible soybean varieties (figure 2). The publication contains SCN reproduction data for individual soybean varieties.
- Some resistant varieties allowed high SCN reproduction in a single experiment, and some allowed high SCN reproduction at multiple locations.
- Yields of resistant varieties that supported high SCN reproduction were among the lowest in some experiments (figure 2), but not in all of the experiments.
- SCN-resistant soybean varieties with the Peking source of SCN resistance yielded among the best at Moorhead, Iowa, and Story City, Iowa.

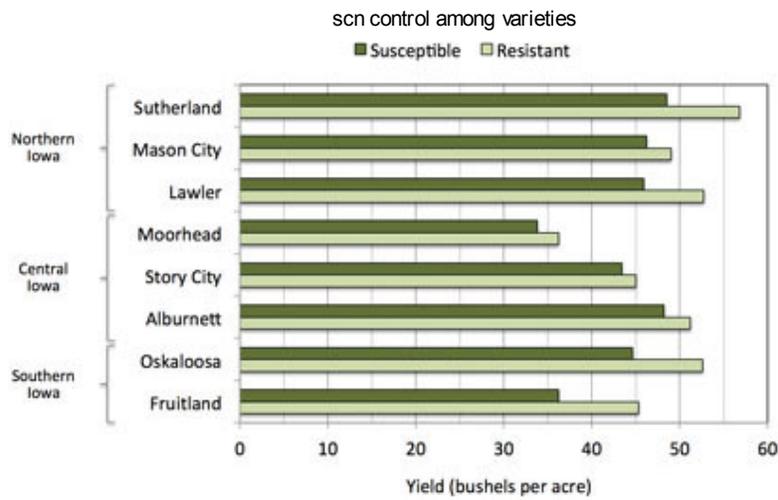
Although many thousand plots are established and intensively studied

throughout Iowa each year in the Iowa State SCN-resistant Soybean Variety Trial Program, the data are from a relatively limited number of locations and many other factors in addition to SCN can affect the yields of the varieties. The results of these experiments should be one of several types of information Iowa farmers and agronomists consider when developing an SCN management program for any specific field. Results from all variety trial locations from 1997 through 2011 can be found at [www.isusctrials.info](http://www.isusctrials.info). Also, more information about the biology and management of SCN can be found at [www.soybeancyst.info](http://www.soybeancyst.info).

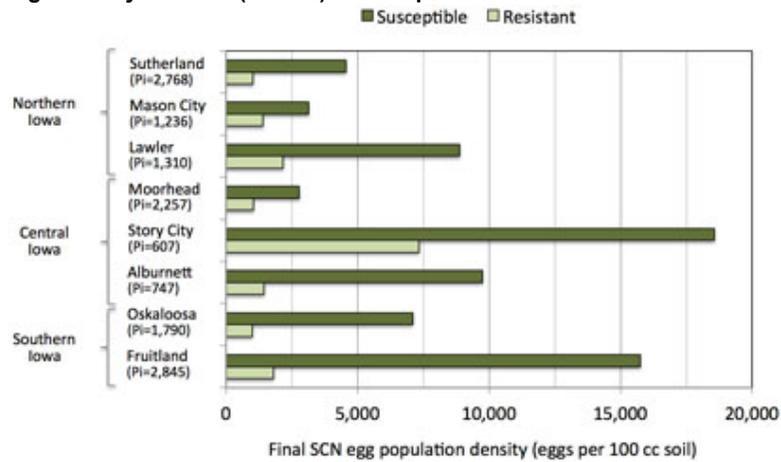
**Figure 2. New format of results graph with yield (total length of each gray bar) and in-season change in SCN egg population densities (length of blue segment of each bar).**



**Figure 3. Average yields of SCN-resistant versus susceptible soybean varieties at each location in 2011. Average yields were significantly different ( $P \leq 0.05$ ) at all experimental locations except Mason City and Story City.**



**Figure 4. Average final SCN egg population density of SCN-resistant versus susceptible soybean varieties at each location in 2011. Initial SCN population densities (eggs per 100 cc soil) are indicated in parentheses under location name. Average final SCN egg population densities were significantly different ( $P \leq 0.05$ ) at all experimental locations.**



**Greg Tylka is a professor of plant pathology with extension and research responsibilities in management of plant-parasitic nematodes.**

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