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RATIONALE AND OBJECTIVES

- Soybean cyst nematode (SCN) is found in all soybean production areas in North America. Industry reliance on one source of genetic resistance (PI88788) for SCN management has resulted in selection for SCN populations capable of parasitizing and reproducing on soybean varieties with PI88788 resistance. The PI88788 source of resistance no longer adequately controls SCN in many fields today and the use of other sources of genetic resistance and nematicide seed treatments are needed.
- In fields with SCN populations capable of reproducing on varieties with PI88788 resistance, research was conducted in 2017 and 2018 across a wide swath of the soybean growing region of the U.S. to:
 - Evaluate the integration of native resistance with a nematicide seed treatment for SCN management.
 - Determine whether the addition of a nematicide seed treatment to varieties with PI88788 resistance can protect yield and allow them to perform at parity with varieties containing the Peking source of SCN resistance.

STUDY DESCRIPTION

- Research locations were randomly selected for testing across the maturity group 3 soybean growing region, an area where SCN has been common for more than 20 years (Figure 1).
- Yield data were collected from 47 trial locations.
- SCN egg count samples were collected at the beginning of the season to identify locations with medium or high SCN numbers.
 - 19 locations had low SCN pressure (<100 eggs/100 cc soil)
 - 10 locations had moderate SCN pressure (100-1000 eggs)
 - 18 locations had high SCN pressure (>1000 eggs)
- For locations with moderate or high SCN pressure, all plots were then sampled at the end of the season, to quantify SCN level for each SCN genetic resistance and seed treatment combination.
- A pair of 3.4 RM highly isogenic soybean lines were developed, with either the PI88788 or Peking genes that provide resistance. These isolines were >99% identical genetically, only different at the genomic locations for the genes for SCN resistance.
- The two varieties were compared in each trial, in combination with four different seed treatments:
 - Base fungicide/insecticide seed treatment (FST/IST)
 - Base + ILEVO® nematicide: SCN rate (0.60 fl oz/140k unit)
 - Base + ILEVO nematicide: SDS rate (1.18 fl oz/140k unit)
 - Non-treated
- Trials were arranged in a randomized complete block design with 6 replications at each trial location.

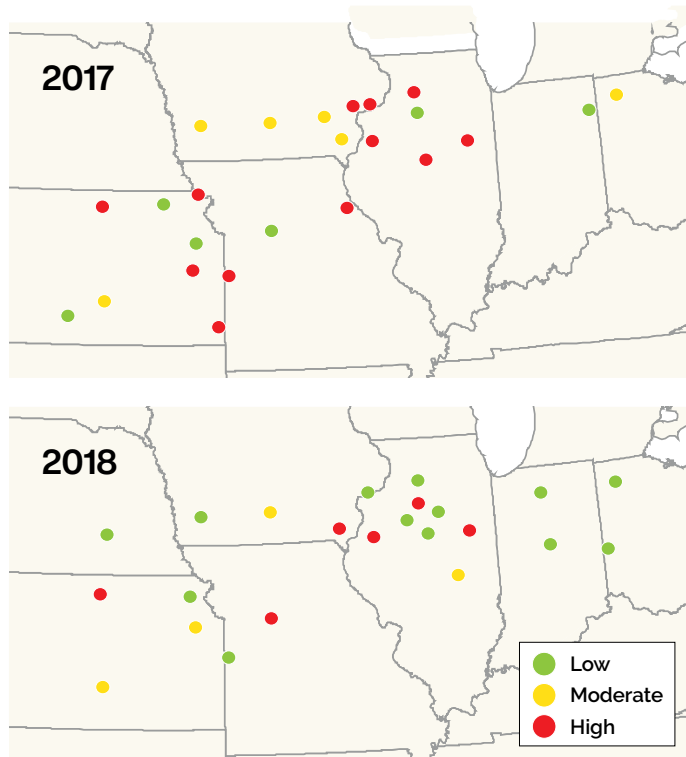


Figure 1. SCN management field trial locations in 2017 and 2018.

RESULTS

- Approximately 38% of the randomly selected fields were found to have high SCN pressure. In these fields, the PI88788 source of resistance was being overcome by SCN.
- Across the 19 locations with low SCN populations (<100 eggs), the Peking and PI88788 isolines yielded within an average of 0.1 bu/acre of one another (statistically not different).
- The Peking isolate out-yielded the PI88788 isolate by 1.1 bu/acre and 3.5 bu/acre under moderate and high SCN pressure, respectively.
- In moderate SCN environments, the addition of ILEVO nematicide seed treatment to the PI88788 isolate resulted in significant yield recovery, performing near parity with the Peking isolate (Figure 2). ILEVO seed treatment on the PI88788 isolate provided a 2.4 to 4.0 bu/acre yield increase above the base FST/IST treatment.
- In high SCN environments, egg counts were 4-fold lower by utilizing Peking rather than PI88788 (Figure 3). On the PI88788 isolate, ILEVO nematicide seed treatment reduced egg counts by 15% and recovered 1.6 bu/acre above the base FST/IST treatment. While pairing ILEVO with PI88788 isolate increased yield in the high SCN environments, it did not bring it to parity with the Peking + ILEVO seed treatments.

High Pressure Locations



Moderate Pressure Locations

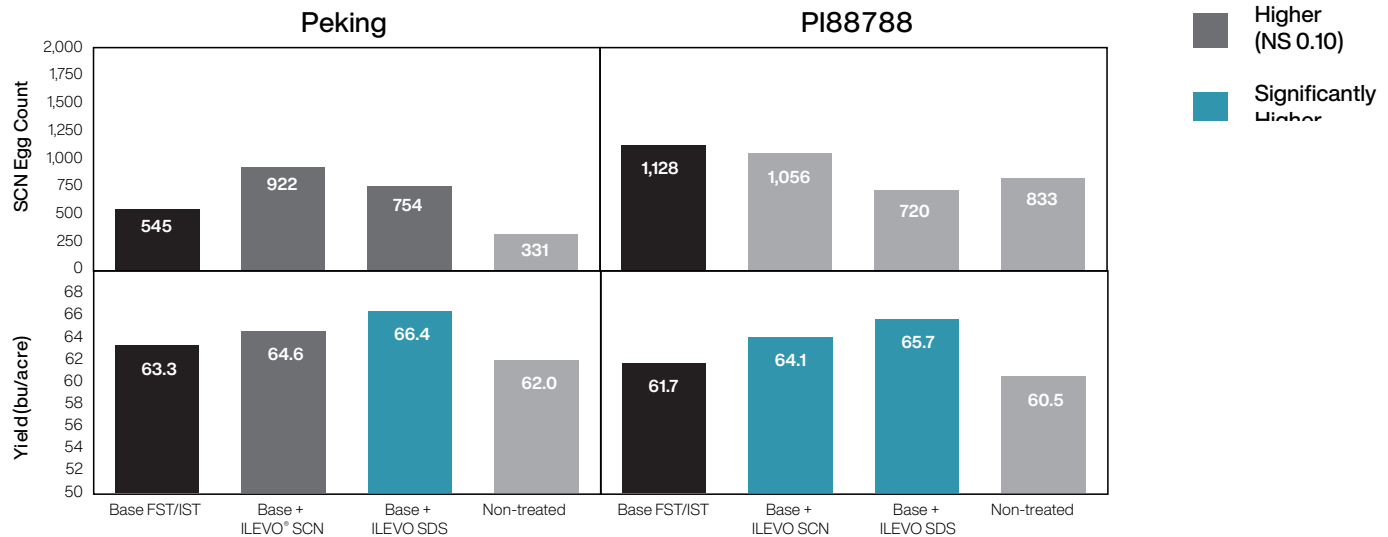


Figure 3. Average SCN egg counts and yield in locations with high SCN pressure.

DISCUSSION

- This study further demonstrates that SCN populations capable of reproducing on PI88788 varieties are becoming more common and are found in many fields across the RM 2 thru 4 growing region. The use of varieties with different sources of genetic resistance and the use of nematocide seed treatments are critical for limiting yield loss from SCN parasitism.
- In fields where PI88788 performance may be challenged due to resistant SCN populations, ILEVO® nematocide seed treatment can provide significant yield recovery under moderate pressure. In these environments, the PI88788 isolate with ILEVO seed treatment yielded statistically the same (within 0.5 bu/acre) as the Peking isolate with ILEVO seed treatment.
- ILEVO nematocide seed treatment provided benefit to PI88788 genetics under high SCN pressure as well but selecting varieties with the Peking source of resistance will be a key management tactic in these environments.

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