

2012 Evaluation of SCN Resistant Soybean Varieties in Nebraska

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Soybean cyst nematode (SCN) is the pest that causes the single largest loss to soybean producers in both Nebraska and the U.S. each year. Chemical treatment of soil and/or soybean seed to control SCN has achieved inconsistent economic success. Resistant varieties are the most effective way to maintain high yields in SCN infested soybean fields. This report summarizes soybean variety testing from three SCN infested locations in Nebraska. All of the soybean varieties in these tests were resistant to SCN with the exception of four susceptible "standards." The majority of varieties have the PI 88788 source of SCN resistance. However, additional varieties with Cyst-X and Peking resistance were also included in the trials.

The three locations used for testing were all on producers' fields located throughout Nebraska. Sites in or near the towns of Bellwood, Plattsmouth, and Waterloo were selected based on geographical location in the state and adequately high populations of SCN. A non-infested control site was also planted near Mead, NE to test soybean yields in the absence of SCN. All entries in the trial were replicated 4 times at each location. Each individual plot was 4 rows wide by 17 feet long. The spacing between rows was 30 in. Soil samples were collected from each plot in the spring shortly after soybean emergence. These samples were then processed in the lab to determine the number of SCN eggs per 100 cc soil. These spring samples established the initial SCN count for each plot. Soil sampling was repeated in the fall following harvest to determine the final SCN population density. By comparing the final (fall) SCN population to the initial (spring) population a Reproduction Factor (RF) was calculated. The RF is calculated by dividing the final SCN count (plus minimum detectable level) by the initial SCN count (plus minimum detectable level). This number will indicate how much the population increased (or decreased) during the growing season. An RF of 1.0 means there was no change in the SCN population. Any RF value above 1 indicates the population increased, and any value below 1 means it decreased. The graphs below, which report soybean yield (bu/A) and SCN reproduction (RF), indicate SCN reproduction in terms of the RF.

Bellwood

The Bellwood site was located on a center pivot irrigated field with loamy sand soils. Rainfall totaled 5.42 inches throughout the growing season. Bellwood had the highest initial SCN population with an average of 3,029 eggs per 100 cc soil (Table 1). SCN varieties with PI 88788 resistance were effective, only allowing an average RF of 4.1. Varieties with Peking resistance had a RF of 2.6 and Cyst-X had an RF of 2.5. Latham L3238R2 was the variety that exhibited the best control with an RF of 1.0. The average RF for susceptible varieties was 6.5. There was statistical variance exhibited between RF values yielding an LSD of 6.9. Yields were good with the highest yield being NK S29-V2 with 58.3 bu/A. The lowest yielding variety was Renze R83151RR2cn with 41.2 bu/A. The average yield was 50.9 bu/A. The 5 top yielding varieties in

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descending order were NK S29-V2, Pioneer 93Y13, Latham 3058R2, Asgrow 3131 and NK S34-N3. There was statistical variance exhibited between yields producing an LSD of 9.5.

Plattsmouth

The Plattsmouth site was non-irrigated with silty clay loam soils. Rainfall totaled 8.23 inches throughout the growing season. Plattsmouth had the lowest initial SCN population with an average of 93 eggs per 100 cc soil (Table 1). SCN varieties with PI 88788 resistance were not effective, allowing an average RF of 13.7. Varieties with Peking resistance had a RF of 0.9 and Cyst-X had an RF of 21.4. Pioneer 92Y53 with Peking resistance was the variety that exhibited the best control with an RF of 0.9. Average RF for susceptible varieties was 26.8. There was statistical variance exhibited between RF values yielding an LSD of 15.7. Yields were fair with the highest being Asgrow 3432 with 51.6 bu/A. The lowest yielding variety was LG C2688R2 which yielded 30.2 bu/A. The average yield for this location was 40.6 bu/A. The 5 top yielding varieties in descending order were Asgrow 3432, LG C2835R2, LG C3220R2, Latham L3238R2 and NK S34-N3. There was statistical variance exhibited between yields producing an LSD of 5.9.

Waterloo

The Waterloo site was located on a center pivot irrigated field with sandy loam soils. Rainfall totaled 9.51 inches throughout the growing season. Waterloo had an intermediate initial SCN population with an average of 110 eggs/100 cc soil (Table 1). SCN varieties with PI 88788 resistance were effective, only allowing an average RF of 3.3. Varieties with Peking resistance had a RF of 11.3 and Cyst-X had an RF of 2.9. Renze R83151RR2cn and Renze R82833RR2cn exhibited the best control with an RF of 1.1. Average RF for susceptible varieties was 9.7. There was statistical variance exhibited between RF values yielding an LSD of 6.3. Yields were good with the highest being Renze R83151RR2cn with 66.0 bu/A. The lowest yielding variety was Latham L2983R2 which yielded 44.8 bu/A. The average yield for this location was 58.3 bu/A. The 5 top yielding varieties in descending order were Renze R83151RR2cn, Renze R83382RR2cn, Mycogen 5N284R2, LG C3111R2 and Channel 3303R2. There was statistical variance exhibited between yields producing an LSD of 8.8.

Statistics

A statistical analysis was performed on the SCN reproduction factor (RF) and yield (bu/A) at each location. LSD's were calculated at the 90% confidence level. An LSD (Least Significant Difference) indicates how much difference there has to be between two entries before they are considered statistically different from each other and not due to natural variations in the test data. The 90% confidence level means there is a 90% probability the difference between two yields or reproductive factors was significant and only a 10% chance the difference was due to random variability. Lower confidence levels will result in smaller differences required for significance while higher confidence levels will make the LSDs larger. The LSDs in the charts below are intended to help visualize differences between varieties.

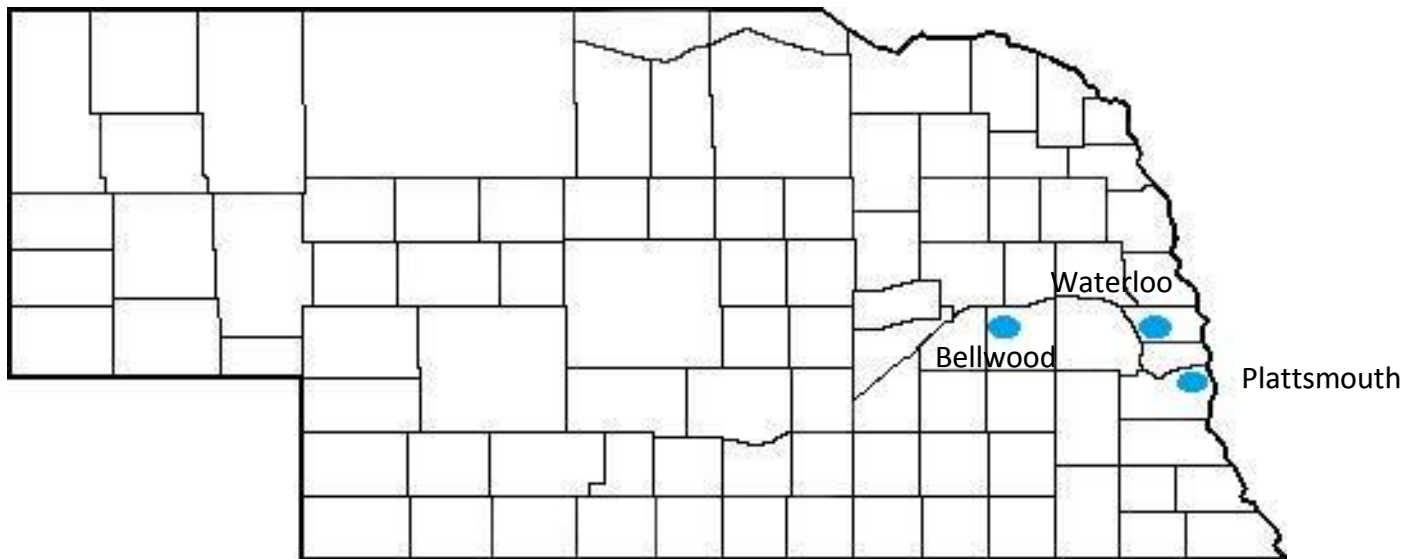
Table 1: Miscellaneous trial information.

Location	Soil Type	Average Initial SCN Population (eggs/100 cc soil)	Average Final SCN Population (eggs/100 cc soil)	HG Type	Planting Date	Harvest Date
Bellwood	Loamy Sand	3029	9301	2.7	5/22/20 12	10/8/2012
Plattsmouth	Silty Clay Loam	93	2234	0	5/23/20 12	9/28/2012
Waterloo	Sandy Loam	110	409	7	5/23/20 12	10/11/2012

Table 2: HG Types and sources of resistance. (ie, if SCN is HG type 1 then it will reproduce on soybeans with Peking resistance)

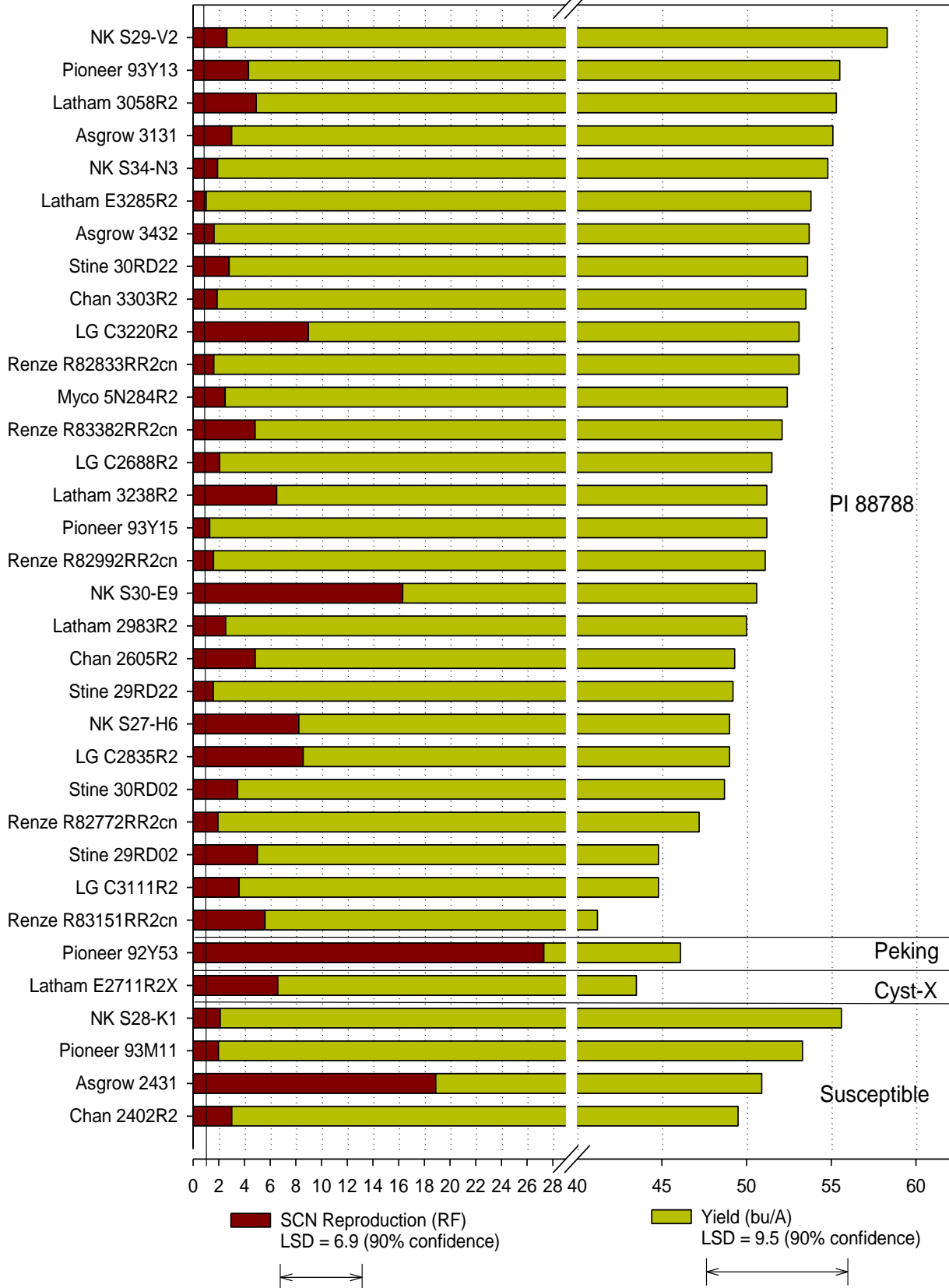
HG Type	Source of Resistance
1	PI 548402 (Peking)
2	PI 88788
3	PI 90763
4	PI 437654
5	PI 209332
6	PI 89772
7	PI 5484316 (Cloud)

Figure 1. Locations of UNL SCN-resistant Soybean Variety Trial Program experiments in 2012.



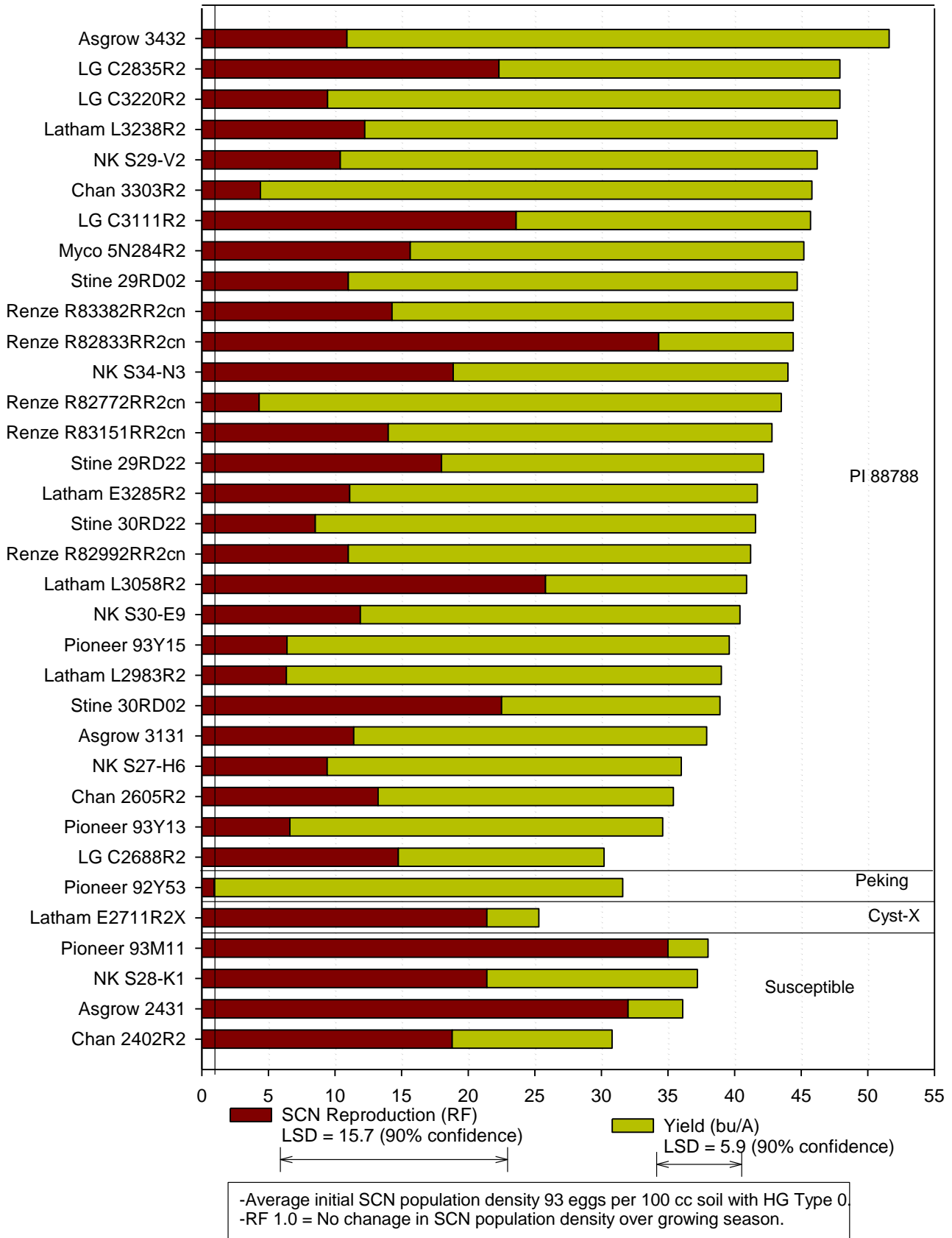
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Bellwood, NE SCN Plot Results



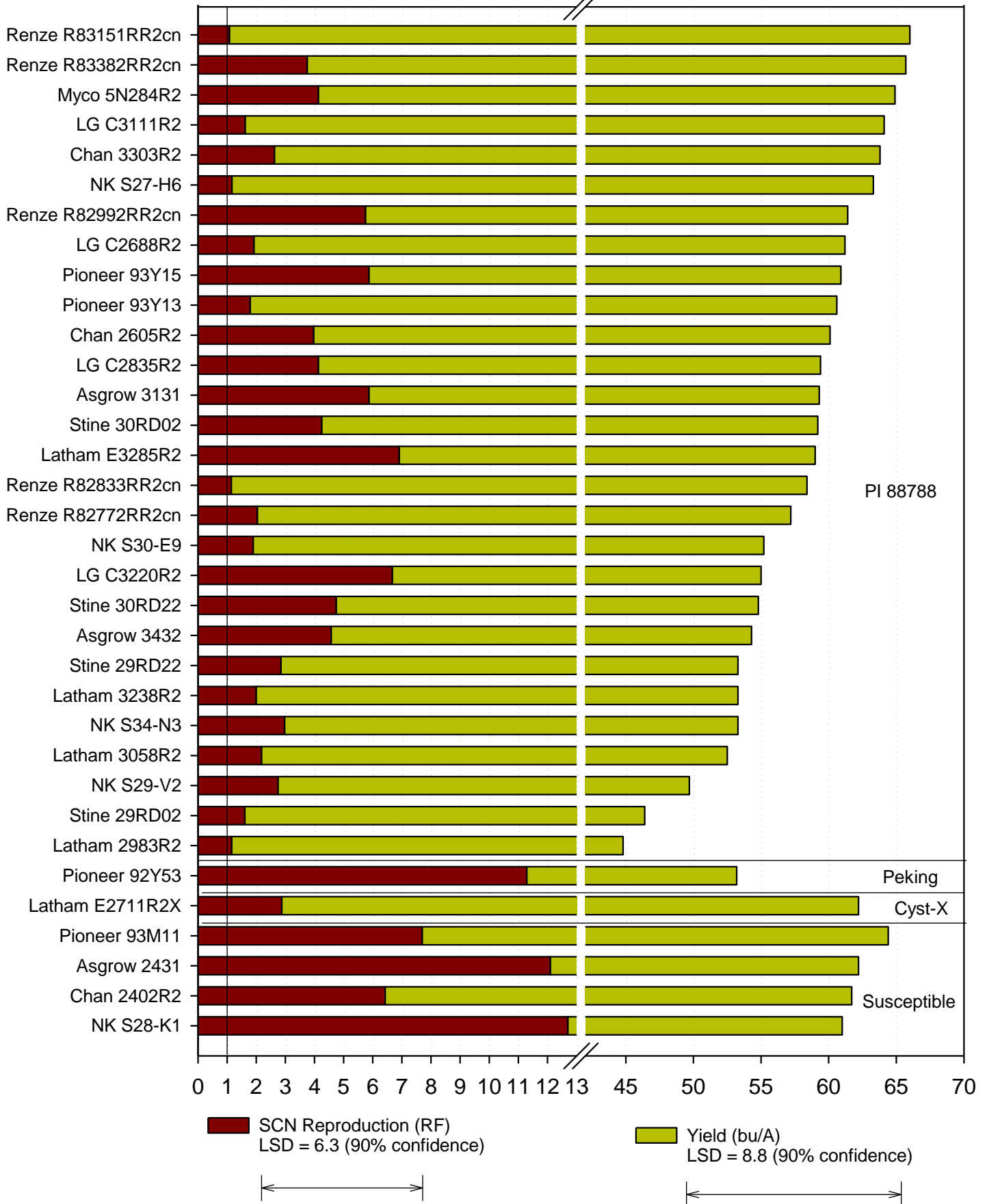
-Average initial SCN population density 3029 eggs per 100 cc soil with HG Type 2.7
 -RF 1.0 = No change in SCN population density over growing season.

Plattsmouth, NE SCN Plot Results



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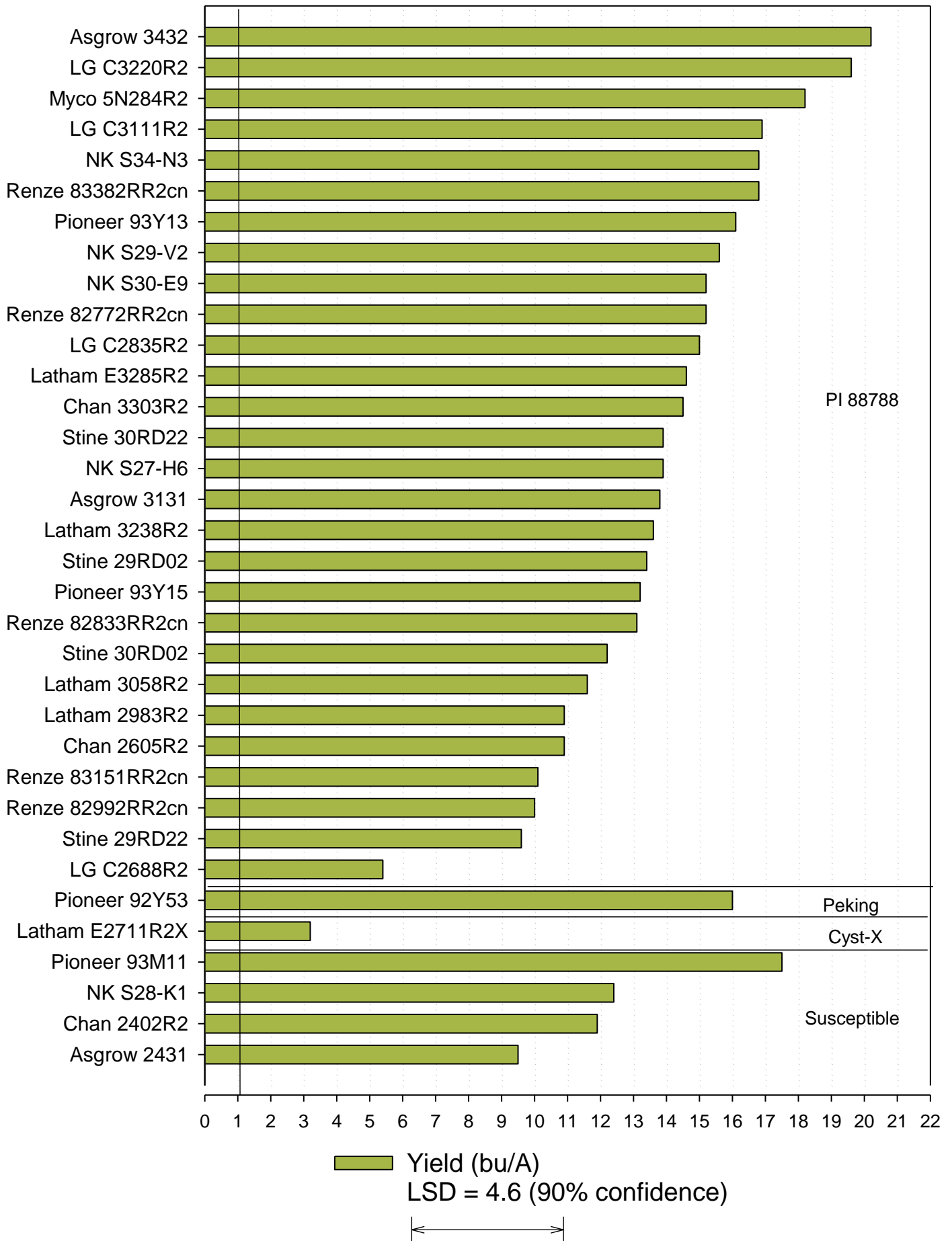
Waterloo, NE SCN Plot Results



-Average initial SCN population density 110 eggs per 100 cc soil with HG Type 7.
 -RF 1.0 = No change in SCN population density over growing season.

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Mead, NE Non-Infested SCN Plots



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