Field testing of N-Hibit™ seed treatment in 2007 for management of SCN in Iowa

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N-Hibit™ is a seed-treatment that contains harpin protein, a compound that can stimulate plant defense responses. N-Hibit™ is now being sold in the United States for management of the soybean cyst nematode (SCN). Iowa State University evaluated the effects of N-Hibit™ seed treatment on soybean yield and SCN population densities in experiments at nine locations throughout Iowa. Experiments were conducted in Albert City, Mason City, and Manchester in northern Iowa; Cambridge, Farnhamville, and Urbana in central Iowa; and Council Bluffs, Crawfordsville, and Melrose in southern Iowa. The work was supported by the soybean checkoff through funds from the Iowa Soybean Association.

At each experiment, an SCN-susceptible and an SCN-resistant variety were grown. Seeds of each of the two varieties were either untreated or treated with N-Hibit™ at a rate recommended by Plant Health Care Inc., the distributors of the product. Plots were four 17-foot-long rows spaced 30 inches apart and were planted at a rate of 10 seeds per foot. There were four replicate plots per variety-seed treatment combination, and 16 plots total per experiment. All plots were end trimmed to 14 feet during the first three weeks of September. When plants in all plots at an experiment were mature, the center two rows of each four-row plot were harvested with a plot combine, total seed weight per plot and seed moisture were determined, and total plot seed weights subsequently were converted to bushels per acre.

At the beginning of the growing season, each plot was sampled for the presence of SCN. Ten 1-inch-diameter, 6- to 8-inch-deep soil cores were collected from the center 14 feet of the center two rows immediately after planting. The soil cores comprising each soil sample were mixed thoroughly, SCN cysts were extracted from a 100-cc subsample (a little less than a half cup), 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 in an identical manner.

The effect of N-Hibit™ on soybean yields in the nine experiments varied. There was no significant difference in yield of the SCN-resistant soybean varieties treated with N-Hibit™ or left untreated in any of the experiments. Overall, yields of the resistant varieties were significantly greater than those of the susceptible varieties in eight of the nine experiments.

With the SCN-susceptible varieties, plots treated with N-Hibit™ yielded significantly greater than untreated plots at the Urbana experiment in central Iowa and at the experiment in Melrose in southern Iowa (see Table 1). There was no significant difference in yield of untreated and N-Hibit™-treated, SCN-susceptible soybean varieties at the other seven experimental locations. At all nine experimental locations, there was no significant difference in final SCN egg population densities in plots with SCN-resistant or SCN-susceptible varieties with untreated seed versus seed treated with N-Hibit™.

The yield data from individual experimental locations also were combined by district (north = Albert City, Manchester, and Mason City experiments; central = Cambridge, Farnhamville, and Urbana experiments; and south = Council Bluffs, Crawfordsville, and Melrose experiments) for analysis. No significant effects were detected for the SCN-susceptible or the SCN-resistant varieties in the combined data (see Table 2).

It is not known why yields were significantly greater in plots with N-Hibit™ than in untreated plots at the experiments in Urbana and Melrose, Iowa, but not at the other seven experimental locations. Also, it is interesting that there were no statistical differences in final SCN egg population densities at any experiment, including the two in which significant differences in yield of SCN-susceptible varieties were detected. Additional experiments will be conducted in 2008 to obtain more information about the effects of N-Hibit™ on soybean yields and SCN egg population densities in Iowa.

Table 1. Locations, soybean yields, and SCN egg population densities of an SCN-susceptible soybean variety with and without N-Hibit™ seed treatment in nine experiments in Iowa in 2007.

Location	Initial SCN Egg Density (eggs/100 cc)	Yield (bu/acre)		Final SCN Egg Density (eggs/100 cc)	
		Untreated	N-Hibit™ Treated	Untreated	N-Hibit™ Treated
Northern Iowa district					

Albert City	2,500	51.7	52.5	NA	NA
Manchester	431	65.5	66.3	NA	NA
Mason City	5,819	39.4	36.6	2,050	1,975
Central Iowa district					
Cambridge	3,869	55.6	57.6	2,650	2,650
Farnhamville	4,925	47.9	44.7	NA	NA
Urbana	4,338	54.7 b	57.7 a	NA	NA
Southern Iowa district					
Council Bluffs	613	64.5	67.1	3,275	4,025
Crawfordsville	681	58.3	57.1	NA	NA
Melrose	4,756	54.9 b	57.0 a	9,100	8,275

Numbers presented for yield and final SCN egg population density are means of four replicate plots. Numbers followed by different letters within a row (within an experimental location) for yield and final SCN egg population density are significantly different; "NA" indicates data were not available at time of publication.

Table 2. Soybean yields and SCN egg population densities of an SCN-susceptible soybean variety with and without N-Hibit™ seed treatment from three combined experiments in each of three Iowa districts in 2007.

District	Initial SCN Egg Density (eggs/100 cc)	Yield (bu/acre)	
		Untreated	N-Hibit™ Treated
North	2,917	52.2	51.8
Central	4,386	52.7	53.3
South	2,017	59.2	60.4

Numbers presented for yield are means of 12 replicate plots.

Locations of experiments in 2007 where N-Hibit™ seed treatment was evaluated for effects on soybean yields and SCN population densities in Iowa.

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