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Gregory L. Tylka

Iowa State University, gltylka@iastate.edu

Chris Marrett

Iowa State University

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Effects of N-Hibit™ Seed Treatment on Soybean Yields – 2008 Iowa Research

By Greg Tylka and Chris Maret, Department of Plant Pathology

Harpin protein is a natural plant compound that can stimulate plant defense responses. And N-Hibit™ is a seed-treatment containing harpin protein that is sold in the United States for management of the soybean cyst nematode (SCN). Iowa State University Extension evaluated the effects of N-Hibit™ seed treatment on soybean yield and SCN population densities in nine field experiments located throughout Iowa in 2007 and in nine different field experiments in 2008. The work was supported by the soybean checkoff through funds from the Iowa Soybean Association.

In 2008, the experiments were conducted in Laurens, Mason City and Winthrop in northern Iowa; Gowrie, Nevada, and Urbana in central Iowa; and Council Bluffs, Hills, and Malvern in southern Iowa.

Figure 1. 2008 Experiment Locations



In both years, an SCN-susceptible and an SCN-resistant variety were grown at each experiment, and the seeds of each of the two varieties were either left untreated or were treated with N-Hibit™ at a rate recommended by Plant Health Care Inc., the distributors of the product. All of the plots were four 17-foot-long rows spaced 30 inches apart. There were four replicate plots per variety-seed treatment combination, and 16 plots total per experiment. 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 were converted to bushels per acre.

Soil samples were collected from the plots to determine the SCN population

densities. Ten soil cores were collected from the center two rows of each plot immediately after planting and again at the time of harvest. SCN cysts were extracted from a 100-cc subsample (a little less than a half cup) of each soil sample, and SCN eggs were extracted from the cysts and counted.

The yield results from all experiments and the end-of-season SCN egg population densities from three of the nine locations are presented in the table below.

Table 1. 2008 Results - N-Hibit™ seed treatment experiments in nine Iowa locations.

Location	Soybean variety	Yield (bu/ac)		Final SCN Egg Density (eggs/100 cc)	
		Untreated	N-Hibit™ Treated	Untreated	N-Hibit™ Treated
<i>----- northern Iowa district -----</i>					
Laurens	resistant	59.6	61.9	NA	NA
	susceptible	58.8	57.1	NA	NA
Mason City	resistant	64.0	63.1	NA	NA
	susceptible	53.2	55.9	NA	NA
Winthrop	resistant	41.4	43.4	200	350
	susceptible	42.4	44.4	4,225	2,375
<i>----- central Iowa district -----</i>					
Gowrie	resistant	43.0	40.1	700	625
	susceptible	44.0	44.3	4,150	4,750
Nevada	resistant	58.0	56.1	NA	NA
	susceptible	54.0	54.3	NA	NA
Urbana	resistant	54.1	54.7	NA	NA
	susceptible	46.2	47.8	NA	NA
<i>----- southern Iowa district -----</i>					
Council Bluffs	resistant	50.5	50.0	NA	NA
	susceptible	43.3	43.9	NA	NA
Malvern	resistant	60.4	55.3	NA	NA
	susceptible	49.5	48.4	NA	NA
Hills	resistant	35.2	39.4	550	600
	susceptible	37.8	40.6	9,425	6,575

Numbers presented for yield and final SCN egg population density in this table are means of four replicate plots. Numbers followed by different letters within a row (for a resistant or susceptible variety 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 of this article.

In 2008, N-Hibit™ did not significantly affect the yield of the SCN-resistant or the SCN-susceptible soybean variety at any of the nine experimental locations. But overall, yields of the SCN-resistant varieties were significantly greater than the SCN-susceptible varieties in the experiments at Council Bluffs, Malvern, Mason City, and Urbana.

At this time (early December 2008), the final (end-of-season) SCN population densities are available only for three of the experiments (Gowrie, Hills, and Winthrop) conducted in 2008. In those experiments, there was no significant difference in final SCN egg population densities in plots of SCN-susceptible or SCN-resistant soybean varieties left untreated or treated with N-Hibit™. However, at all three locations, there were significantly greater final SCN population densities on the SCN-susceptible soybean varieties than the

resistant varieties.

In the [experiments conducted in 2007](#), N-Hibit™ had no effect on yield of the SCN-resistant soybeans at any of the experiments and no effect on yield of the susceptible soybean varieties at seven of the nine locations. Yields of N-Hibit™-treated susceptible soybean varieties were 2.1 and 3.0 bushels per acre greater than yields of untreated soybeans at the Melrose and Urbana experiments, respectively, in 2007.

When the end-of-season SCN egg population density data are obtained for all nine of the experiments conducted in 2008, a revised report of this work will be published in Integrated Crop Management News that will include all nematode data from 2008 and also a combined analysis of yield and SCN egg population density data from all 18 experiments conducted throughout Iowa in 2007 and 2008.

Greg Tylka is a professor of plant pathology with extension and research responsibilities in management of plant-parasitic nematodes. Chris Marett is an assistant scientist with responsibilities for research on the biology and management of the soybean cyst nematode.

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