

HG-Type testing of SCN — NW Minnesota

Cooperator: Dave Matz, Steve Kahlbaugh, Mitch Hoekstra, Kurt Krueger, and Ray Delorme
 Nearest Town: Kent, Ogema, Twin Valley, Rothsay, Red Lake Falls and Wolverton, MN

Purpose of Study: Determine the HG-type from multiple sites in NW MN to assess the range of variability present at SCN variety test sites and their neighboring fields.

What are Soybean Cyst Nematode HG types?

SCN field populations vary in their ability to develop and reproduce on soybean lines that differ in their resistance to SCN. The variability of SCN virulence is described by HG Type schemes, in which the virulence phenotypes of SCN populations are determined by the number of females that develop on seven indicator lines as compared with susceptible Lee 74 or other suitable susceptible soybean varieties.

The soybean lines and varieties are inoculated with nematode eggs and maintained in the greenhouse under favorable conditions for about one month. The females formed on the soybean roots are collected and counted. Based on the number of females, Female Index (FI) is calculated: $FI = (\text{number of females on indicator line}) \times 100 / (\text{number of females on Lee 74})$. If the FI is less than 10, the response of the soybean line is "-", and if = 10, the response is "+". The description of HG Type indicates the positive response of a population on the individual lines. If no FI is more than 10 on any of the indicator lines, the population is described as HG Type 0.

Table 1. Percentage of SCN populations from Minnesota with Female Index more than 10 on the indicator soybean lines. *Source:*

| Soybean lines | 1997-1998 | 2002 | 2007-2008 |
|---------------|-----------|------|-----------|
| Peking | 3.4 | 1.1 | 15.3 |
| PI 88788 | 13.6 | 17.0 | 72.4 |
| PI 90763 | 3.4 | 0 | 8.2 |
| PI 437654 | 2.1 | 0 | 0 |
| PI 209332 | 3.7 | 14.9 | 77.6 |
| PI 89772 | | 0 | 8.2 |
| PI 548316 | | 33.3 | 94.9 |

Which HG Types are found in Minnesota?

The frequency distribution of HG Types (percentage of fields with an HG Type) varies in different regions in the United States. In two previous surveys conducted in 1998 and 2002, SCN populations in most Minnesota fields were HG Type 0 or 7 (**Table 1**), which have a low level of virulence on the current commercial resistant varieties. The frequency of virulent populations in the state may change over time in response to planting SCN-resistant soybean varieties.

HG Typing from Locations in NW Minnesota

Type testing was conducted in NW MN for samples collected in 2012 from six (6) sites. The results from these collections are summarized in the following tables, going from northern to southern locations.

The results from Kent, Ogema and Red Lake Falls point out that populations of SCN in northwest MN are not susceptible to all resistant lines, but actually share population traits more similar to those characterized from other areas of the state. However, the other locations (Twin Valley, Rothsay and Wolverton) are generally susceptible to the resistance lines.

As infestations of SCN spread further into NW MN, varietal selection from resistant varieties will be important. Rotation of resistance sources will be important to manage development of resistance. Unfortunately, current populations already are displaying some level of resistance, likely associated with their origin from other regions.

For Additional Information:
 Phillip Glogoza, Jim Orf and Art Killam

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HG_Type testing of SCN *continued*— NW Minnesota

Ogema: HG Type 2, 5, 7

| Line # | Ind. Line Name | # plants | # cysts | Female/plant | FI (%) | HG Type |
|--------|--------------------|----------|---------|--------------|-------------|----------|
| 1 | PI 548402 (PEKING) | 5 | 3 | 0.6 | 0.4 | |
| 2 | PI88788 | 5 | 306 | 61.2 | 42.4 | 2 |
| 3 | PI90763 | 5 | 0 | 0 | 0.0 | |
| 4 | PI437654 | 5 | 0 | 0 | 0.0 | |
| 5 | PI209332 | 5 | 531 | 106.2 | 73.6 | 5 |
| 6 | PI89772 | 5 | 0 | 0 | 0.0 | |
| 7 | PI548316 (CLOUD) | 5 | 470 | 94 | 65.2 | 7 |
| 8 | LEE | 5 | 721 | 144.2 | | |

Twin Valley: HG Type 0

| Line # | Ind. Line Name | # plants | # cysts | Female/plant | FI (%) | HG Type |
|--------|--------------------|----------|---------|--------------|--------|---------|
| 1 | PI 548402 (PEKING) | 5 | 0 | 0 | 0.0 | |
| 2 | PI88788 | 5 | 16 | 3.2 | 1.6 | |
| 3 | PI90763 | 5 | 0 | 0 | 0.0 | |
| 4 | PI437654 | 5 | 0 | 0 | 0.0 | |
| 5 | PI209332 | 5 | 34 | 6.8 | 3.4 | |
| 6 | PI89772 | 5 | 0 | 0 | 0.0 | |
| 7 | PI548316 (CLOUD) | 5 | 53 | 10.6 | 5.3 | |
| 8 | LEE | 5 | 999 | 199.8 | | |

Rothsay: HG Type 7

| Line # | Ind. Line Name | # plants | # cysts | Female/plant | FI (%) | HG Type |
|--------|--------------------|----------|---------|--------------|-------------|----------|
| 1 | PI 548402 (PEKING) | 5 | 0 | 0 | 0.0 | |
| 2 | PI88788 | 5 | 6 | 1.2 | 1.0 | |
| 3 | PI90763 | 5 | 0 | 0 | 0.0 | |
| 4 | PI437654 | 5 | 0 | 0 | 0.0 | |
| 5 | PI209332 | 5 | 19 | 3.8 | 3.3 | |
| 6 | PI89772 | 5 | 0 | 0 | 0.0 | |
| 7 | PI548316 (CLOUD) | 5 | 122 | 24.4 | 21.2 | 7 |
| 8 | LEE | 5 | 575 | 115 | | |

Wolverton: HG Type 7

| Line # | Ind. Line Name | # plants | # cysts | Female/plant | FI (%) | HG Type |
|--------|--------------------|----------|---------|--------------|-------------|----------|
| 1 | PI 548402 (PEKING) | 5 | 0 | 0 | 0.0 | |
| 2 | PI88788 | 5 | 6 | 1.2 | 2.2 | |
| 3 | PI90763 | 5 | 0 | 0 | 0.0 | |
| 4 | PI437654 | 5 | 0 | 0 | 0.0 | |
| 5 | PI209332 | 5 | 14 | 2.8 | 5.1 | |
| 6 | PI89772 | 5 | 0 | 0 | 0.0 | |
| 7 | PI548316 (CLOUD) | 5 | 60 | 12 | 22.0 | 7 |
| 8 | LEE | 5 | 273 | 54.6 | | |

HG_Type testing of SCN *continued*— NW Minnesota

Red Lake Falls: HG Type 2, 5, 7

| Line # | Ind. Line Name | # plants | # cysts | Female/plant | FI (%) | HG Type |
|--------|--------------------|----------|---------|--------------|-------------|----------|
| 1 | PI 548402 (PEKING) | 5 | 3 | 0.6 | 0.3 | |
| 2 | PI88788 | 5 | 378 | 75.6 | 33.6 | 2 |
| 3 | PI90763 | 5 | 1 | 0.2 | 0.1 | |
| 4 | PI437654 | 5 | 0 | 0 | 0.0 | |
| 5 | PI209332 | 5 | 787 | 157.4 | 70.0 | 5 |
| 6 | PI89772 | 5 | 0 | 0 | 0.0 | |
| 7 | PI548316 (CLOUD) | 5 | 727 | 145.4 | 64.6 | 7 |
| 8 | LEE | 5 | 1125 | 225 | | |

Kent: HG Type 2, 3, 5, 6, 7

| Line # | Ind. Line Name | # plants | # cysts | Female/plant | FI (%) | HG Type |
|--------|--------------------|----------|---------|--------------|-------------|----------|
| 1 | PI 548402 (PEKING) | 5 | 28 | 5.6 | 8.0 | |
| 2 | PI88788 | 4 | 33 | 8.25 | 11.8 | 2 |
| 3 | PI90763 | 5 | 82 | 16.4 | 23.4 | 3 |
| 4 | PI437654 | 5 | 0 | 0 | 0.0 | |
| 5 | PI209332 | 5 | 41 | 8.2 | 11.7 | 5 |
| 6 | PI89772 | 5 | 46 | 9.2 | 13.1 | 6 |
| 7 | PI548316 (CLOUD) | 5 | 129 | 25.8 | 36.9 | 7 |
| 8 | LEE | 5 | 350 | 70 | | |