2013 Seed Treatments for SCN

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What We Know

• 48% of MI soybean acreage infested with SCN
• Most growers use PI 88788 derived resistant soybean varieties for control of SCN
• Some SCN populations have become aggressive Types and are no longer controlled by PI 88788 varieties
• In these cases PI 548401 and PI 437654
• An now seed treatments are available for use on SCN resistant varieties to enhance bean yields.
Seed Treatments

- **Avicta Complete Beans**
  - Syngenta

- **VOTiVO**
  - Bayer

- **N-Hibit Seed Treatment**
  - Plant Health Care
Avicta Complete Beans (Syngenta)

- Abamectin (a.i.)
- Fermentation (*Streptomyces avermitilis*)
- Known as a nematicide since the 1970s
- Interferes with the nematode nervous system
- Moves on root surfaces
- Must come in contact with SCN
- Provides early-season SCN protection
VOTiVO (Bayer)

- Biological \((Bacillus firmus)\)
- Does not appear to kill the nematode
- Mode of action
  - Repellant, barrier or Induced systemic resistance
- Grows on root surface
- SCN must come in contact with the bacterium
- Provides early-season SCN protection
Root Bacteria for SCN Protection
N-Hibit Seed Treatment
(Plant Health Care)

- Harpin protein (a.i)
- Natural product of (*Erwinia amylovora*)
- Stimulates natural plant defense mechanisms
- Impacts SCN juveniles that enter roots
- Formerly marketed as Messenger
- Also marketed as ProAct (foliar application)
Seed Treatments\SCN Insurance Policy

Chemical

• AVICTA Complete Beans
  – Twenty NC trials with 17 having bean yield increases of 0.5 to 8.0 bu per acre

• N-Hibit (PHR protein)
  – Nine NC trials with 6 having bean yield increases of 0.8 to 8.0 bu per acre

Biological

• VOTiVO (*Bacillus firmus*)
  – Twenty NC trials with 14 having bean yield increases ranging from 0.5 to 7 bu/acre
Relationship to SCN Pressure

**Chemical**

- AVICTA Complete Beans
  - Greatest yield increases associated with high and moderate SCN population densities.

- N-Hibit (PHR protein)
  - Positive Responses with low, moderate and high SCN pressures.

**Biological**

- VOTiVO (*Bacillus firmus*)
  - Greatest yield increases associated with high and moderate SCN population densities
PI 88788 Resistant Variety Observation

2011 (second-year beans)
- 3,000 SCN at-planting
- 5 SCN at mid-season
- 3,000 SCN at-harvest
- 43.2 bu/acre bean yield
  - With seed treatment
- Analysis
  - OK yield
  - Variety failed to prevent late season SCN reproduction
  - SCN Type possibly changing from Type 0 to Type 2

2012 (third-year beans)
- 2,500 SCN at-planting
- 2,000 SCN at mid-season
- 3,500 SCN at-harvest
- 11 bu/acre bean yield
  - With seed treatment
- Analysis
  - PI 88788 resistant variety did not provide SCN control
  - SCN had evolved into an aggressive Type 2 population
  - Need rotation/alt. res. source
## 2011 Seed Treatment Research

<table>
<thead>
<tr>
<th>Variety</th>
<th>Decatur</th>
<th>East Lansing</th>
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<tbody>
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<tr>
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Other Seed Treatment Information

• Avicta N-Hibit and VOTiVO are available also available for corn.
• Avicta and VOTiVO always stacked with other seed treatments
• Some seed companies offer only nematicide treated seed.
• Likely to be several additional nematicide seed treatments in the near future
Cost and Non-Target Concerns

• Seed Treatment Cost
  – > 1 bu soybeans per acre

• Non-target organism impacts
  – Non known
Suppressive Soils/Soil Health

• **Cyst Nematode Suppressive Soil**
  – SCN present and bean yields high
  – SCN population densities remain low
  – Biologically mediated by beneficial fungi/bacteria

• **Soil Health**
  – Healthy soils resists degradation
  – Health soils respond to management in a predictable manner
  – Cornell University Soil Health Analysis System