

# 2013 Seed Treatments for SCN

George W. Bird, Professor  
Michigan State University

# 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

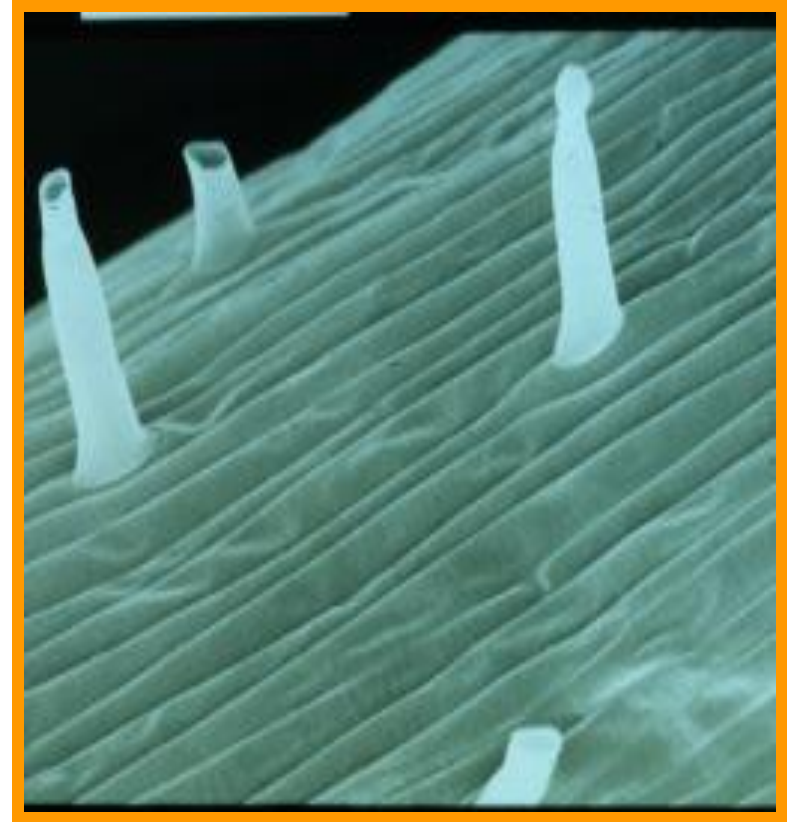
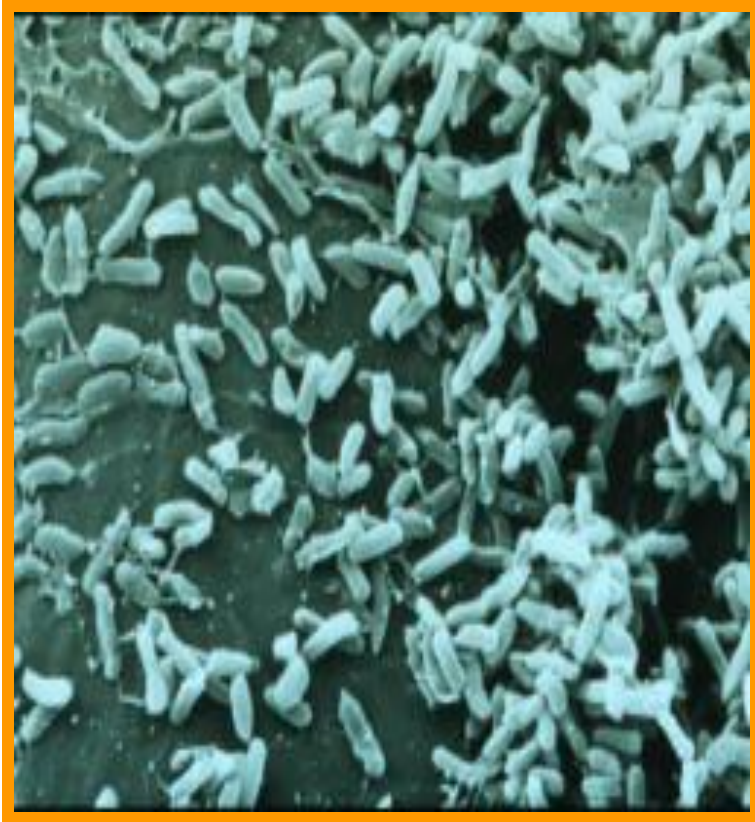
# Avicta Complete Beans (Syngenta)

- 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

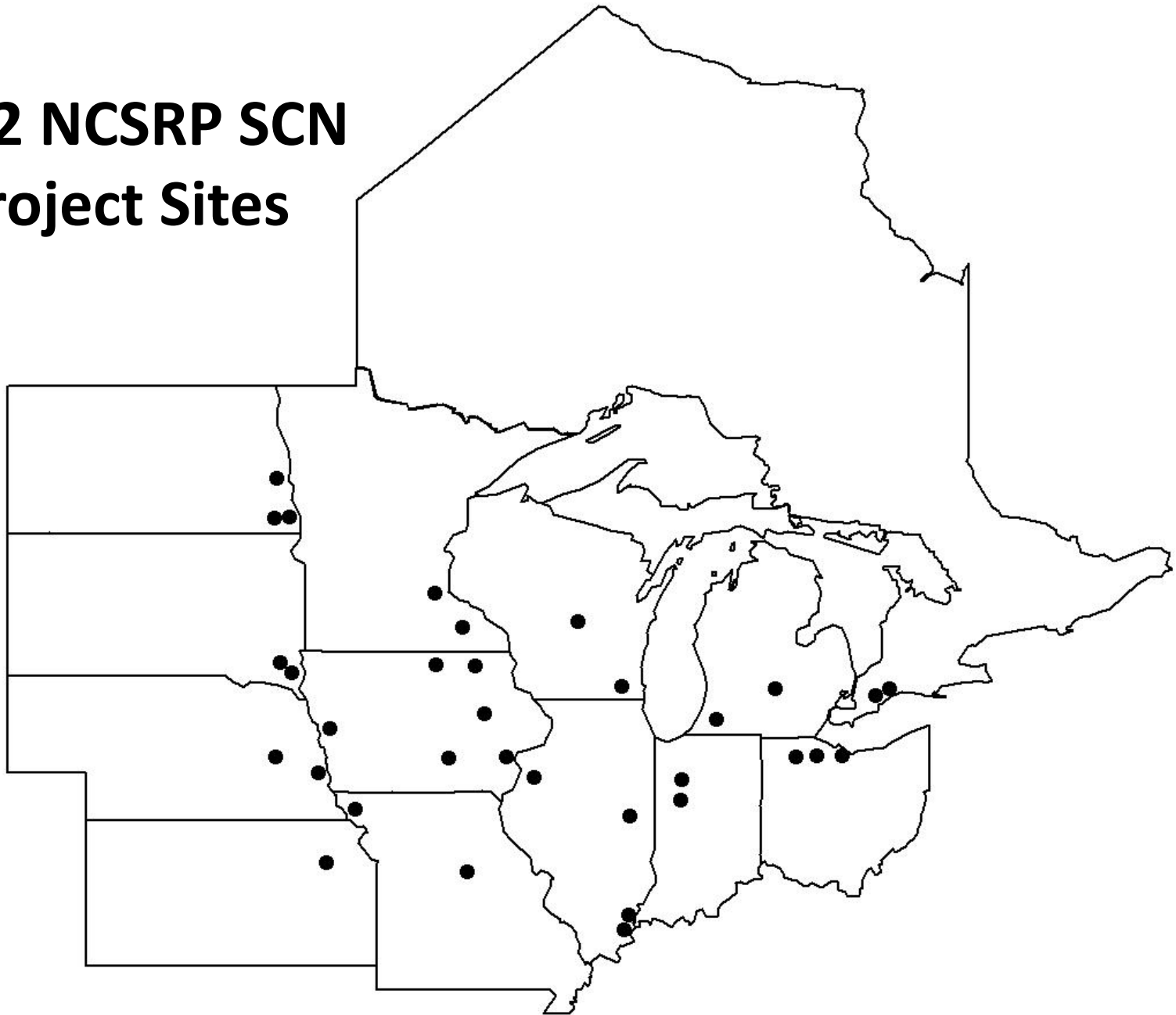
# Root Bacteria for SCN Protection



# 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)

# 2012 NCSRP SCN Project Sites





# 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

| Variety            | Decatur      | East Lansing |
|--------------------|--------------|--------------|
| Seed Treatment     | High SCN     | Medium SCN   |
| Susceptible        | 16.6 bu/acre |              |
| PI 88788           | 39.8 bu/acre |              |
| PI 88788<br>Avicta | 43.2 bu/acre |              |
| PI 88788<br>VOTiVO | 40.5 bu/acre |              |

# 2011 Seed Treatment Research

| Variety            | Decatur      | East Lansing |
|--------------------|--------------|--------------|
| Seed Treatment     | High         | Medium       |
| Susceptible        | 16.6 bu/acre | 40.1 bu/acre |
| PI 88788           | 39.8 bu/acre | 50.3 bu/acre |
| PI 88788<br>Avicta | 43.2 bu/acre | 50.7 bu/acre |
| PI 88788<br>VOTiVO | 40.5 bu/acre | 55.8 bu/acre |

# 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 a predictable manner
  - Cornell University Soil Health Analysis System

