



United States Department of Agriculture  
Animal and Plant Health Inspection Service

**Plant Protection and Quarantine**



# **Golden Nematode Program History, Successes, Lessons Learned**

**United States Department of Agriculture  
Animal and Plant Health Inspection Service  
Plant Protection and Quarantine**

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# Cooperative Golden Nematode Program



- USDA APHIS PPQ



- New York State Department of Agriculture and Markets



- Cornell University



- USDA Agricultural Research Service

# Potato Cyst Nematode

## Who cares?

- **Potato Industry**
- **Trading partners**
- **Exporting Industry**
- **Horticultural Industries**



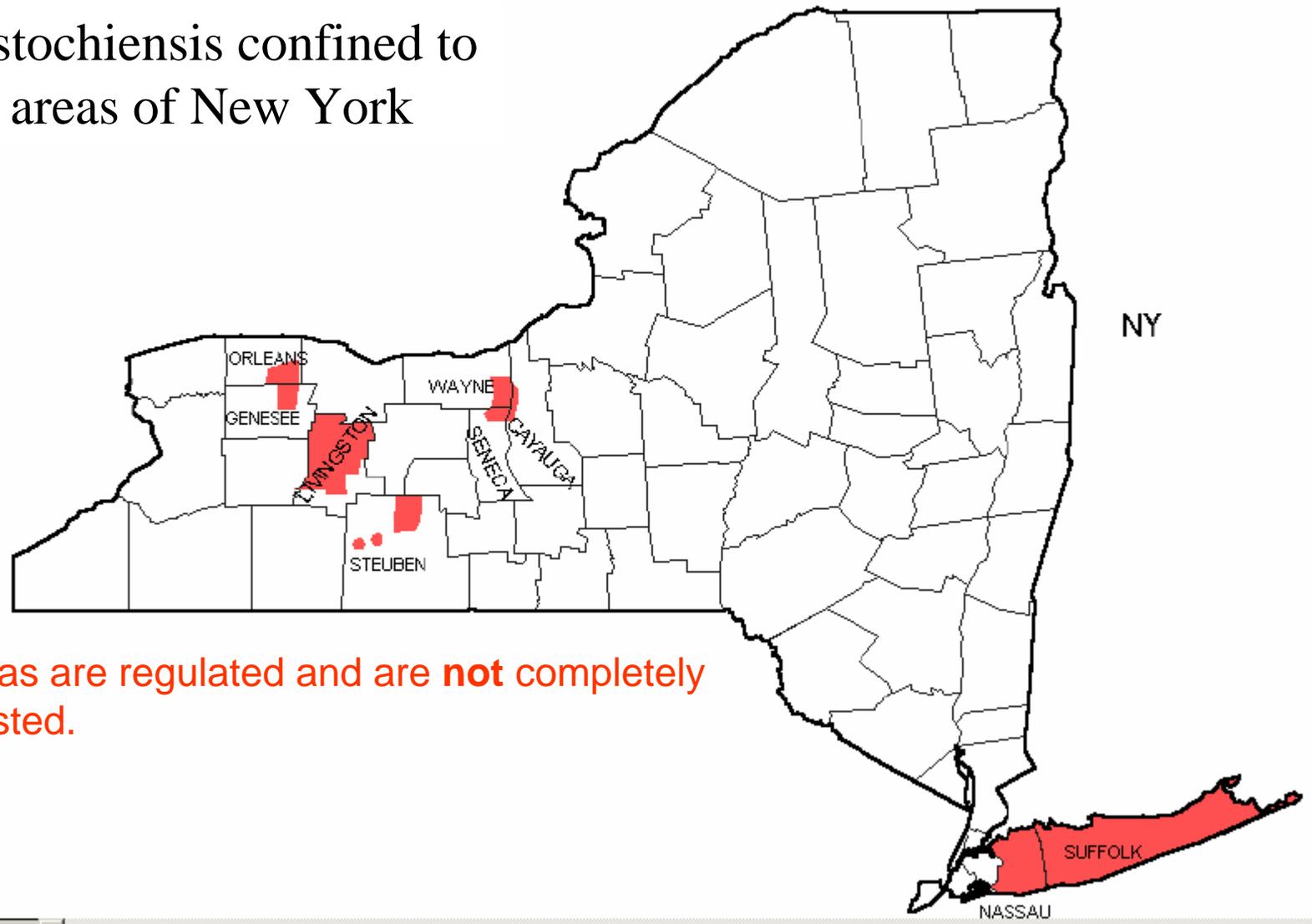
## Golden Nematode damage to British potato field

**No visible crop  
damage seen in U.S.  
since 1940's.**



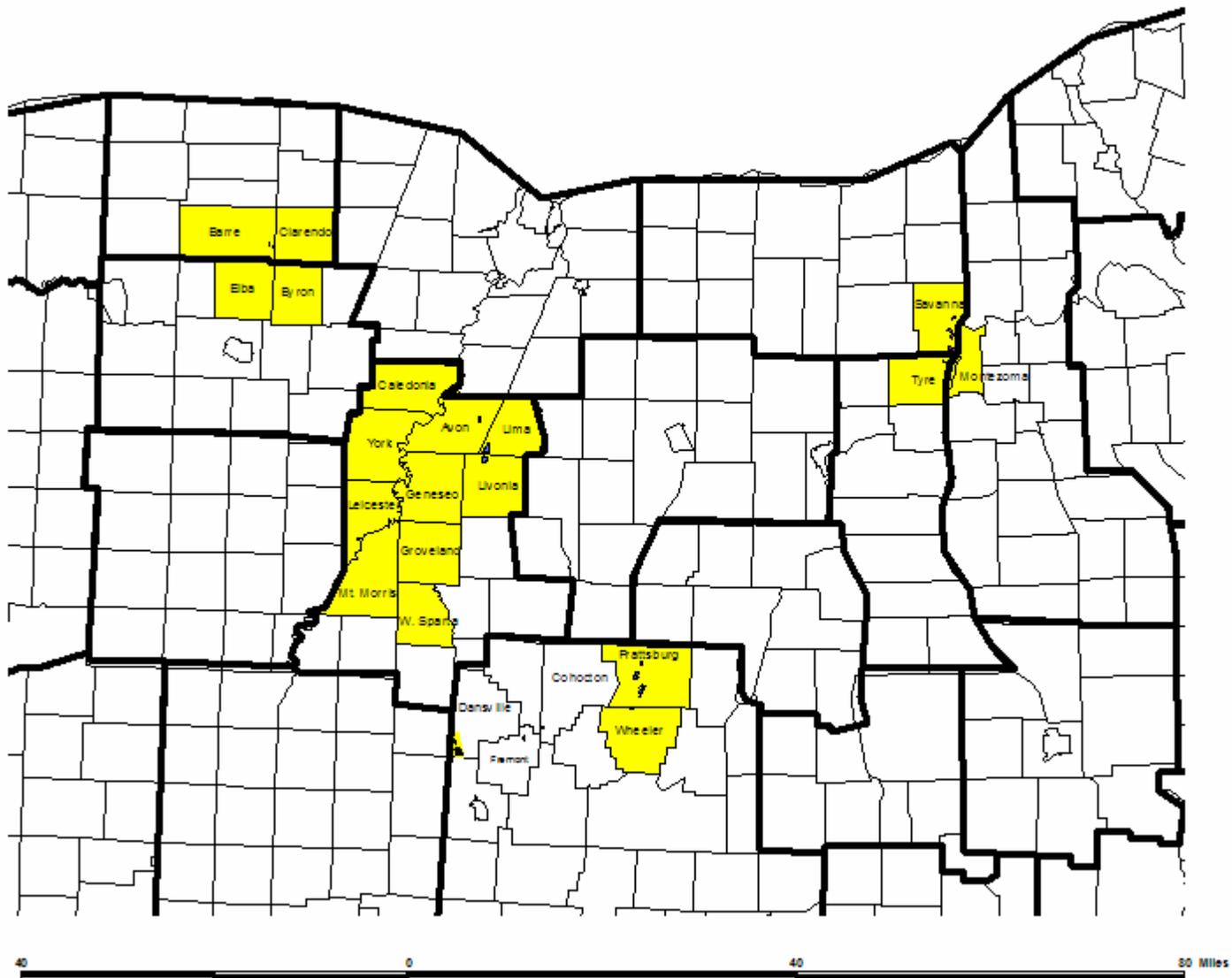
# Golden Nematode Quarantines

*G. rostochiensis* confined to small areas of New York

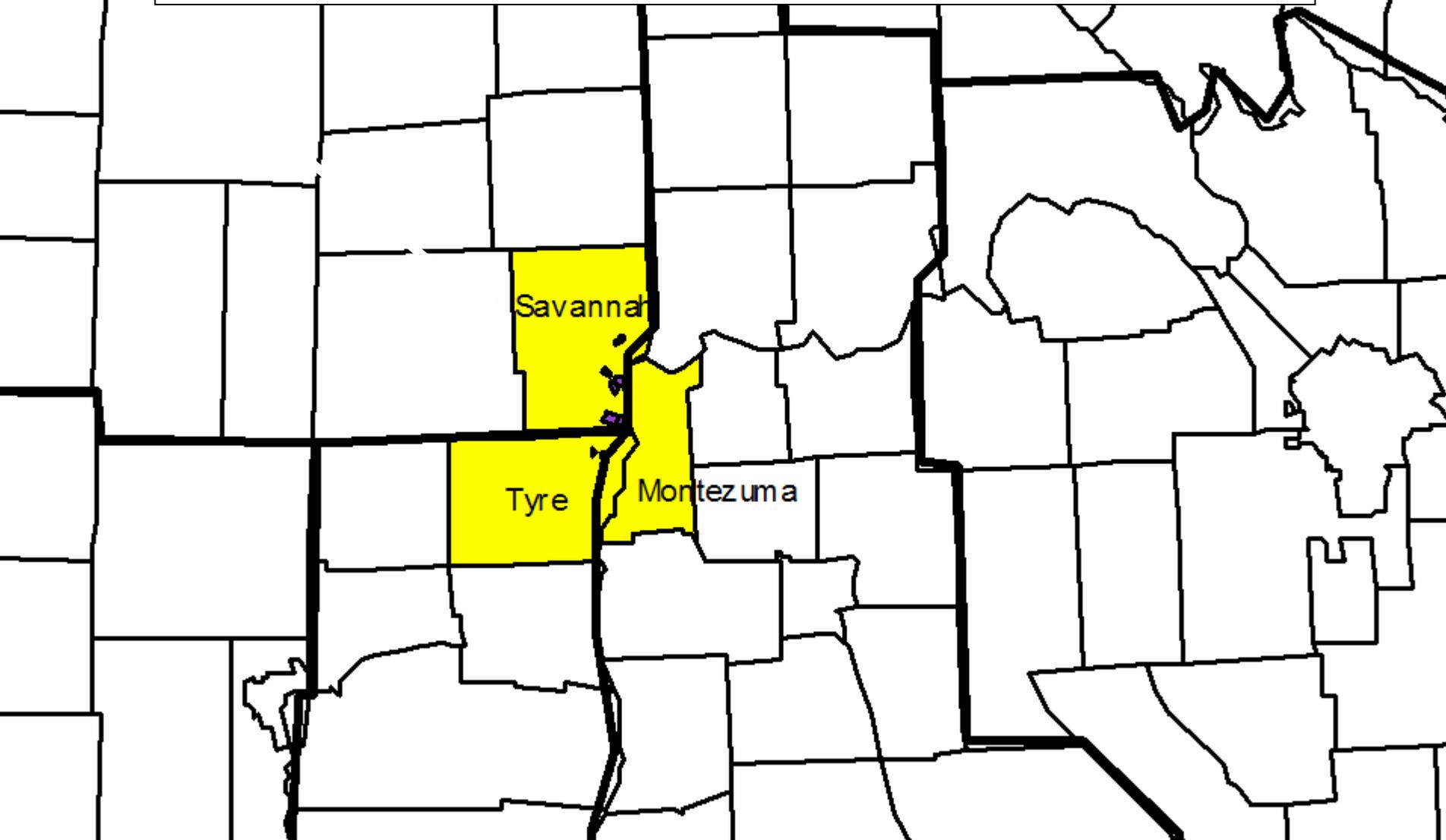


Red areas are regulated and are **not** completely GN infested.

# Upstate New York GN Infested Fields in Regulated Areas



Close-up view of GN positive fields to illustrate actual size in relation to size of regulated area.



# GN Lab Avoca NY



# Mechanical Soil Sampling



# Disinfecting Farm Equipment

1400 regulatory treatments of used farm and construction equipment conducted in 2005



11/13/2003

Pressure washing  
equipment for  
sanitation



# Farm Equipment Sanitation prevents spread of Golden Nematode



# Improvement of sanitation areas



# Sanitation using pressure washing to remove soil to prevent GN spread.



# Prevention of Golden Nematode Spread



# Track-style equipment is difficult to clean free from soil.



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Nice!



**Good Sanitation Practices**

**Some operations have ideal clean-off areas conducive to good sanitation.**



**Dr. Brodie  
& GN Heat Treatment  
Equipment**



# Regulatory Treatment Set-up.





**Regulatory Treatment of used potato planter on Long Island using steam heat process.**

# Comprehensive Statewide GN Survey

- Potato Seed Production Areas
- Commercial Potato Production areas
- Exposed Land
- Non-Exposed Land
- Post Treatment Confirmation



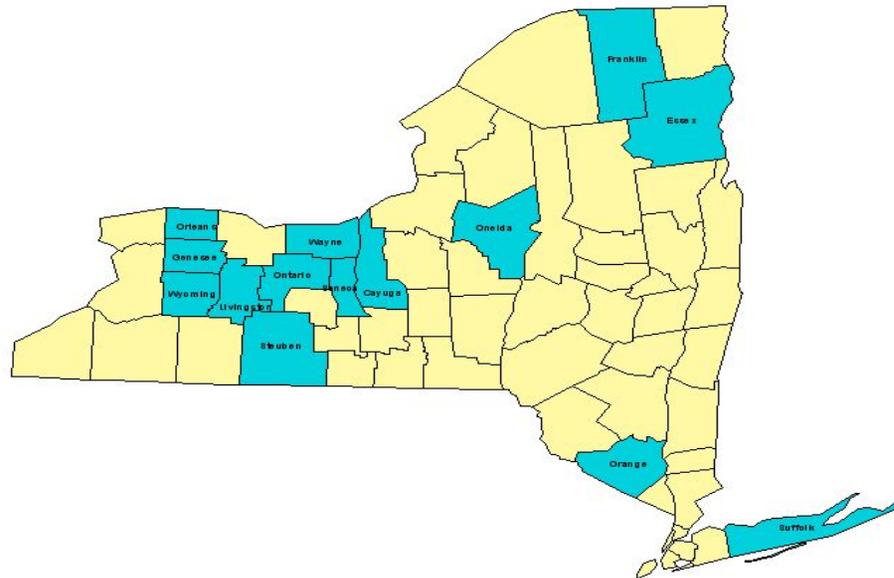
•14 counties surveyed

•6,167 acres surveyed

•10,554 samples

•1 new detection

### Golden Nematode Survey 2004



USDA APHIS PPQ  
Golden Nematode Program  
Avoca, N.Y.

# Golden Nematode Program Accomplishments

- Statewide annual survey proves vast majority of New York is free from GN.
- GN program and survey data enable certification of agricultural commodities for interstate movement and export.
- Assures other countries GN is not becoming a problem in other parts of USA.



# CANADA IMPORT REQUIREMENTS FOR POTATOES

## **FROM THE STATE OF NY ----sub part---**

- Potatoes are prohibited from areas infested with the Golden Nematode.
- Potatoes from areas not infested with the Golden Nematode.

A USDA "Certificate of Inspection for Canadian Destinations" (AMS Form FV- 205) is required. Additionally, the following statement | as to origin must appear on the AMS Form FV-205: "Based on documentation, the potatoes in this shipment were grown in (list State here)." The applicant's written, signed and dated documentation must remain on file at the AMS inspection office.

**A Phytosanitary Certificate is required with an AD stating,**

**"Potatoes were grown in an area free of the golden nematode (*Globodera rostochiensis*); this declaration is made on the basis of official soil surveys**



## Successes:

- *G. rostochiensis* confined to small areas of NY.
- Chemical control replaced with resistant variety based control
- 40+ resistant potato varieties developed
- Program deemed biologically sound and cost effective by Science Review Panel 1996
- Phytosanitary certification of NY potatoes for export
- Program reviewed and accepted by Canada, Japan.
- New Steam Heat Treatment developed, replaced methyl bromide fumigation regulatory treatment.
- Mechanical soil sampling equipment improved

# GN Program Successes

- Ro2 resistant variety development begun by Cornell in anticipation of Ro2 emergence.
- Technical Work Group with grower, university, federal and state participation.
- New GN Program Manual written, interim edition now online at [http://www.aphis.usda.gov/ppq/manuals/domestic/pdf\\_files/GNPM.pdf](http://www.aphis.usda.gov/ppq/manuals/domestic/pdf_files/GNPM.pdf)
- Fenwick Can sample processing proven effective and efficient.
- GIS /ISIS Technology implemented.

# GN Program Successes

- Use of improved GIS mapping technology and GPS units.
- New York State Dept. of Agriculture and Markets enforces a mandated resistant variety crop rotation as control method.
- Practical implementation of USDA ARS / Cornell University research.
- Excellent State-University-Federal-Grower interaction

## Shortcomings

- Allowing “field splitting” where nematode infested portion of field was regulated; years later other portion found infested, spread occurred.
- Allowing exposed land to be planted with susceptible potato varieties.
- State regulatory agency did not implement recommendation to treat both infested and exposed properties with same restrictions.
- Science Panel Recommendation to treat all of Long Island as infested was not adopted.
- In early years, decision should have been made to prohibit host crop production on infested land following chemical treatment.

## Shortcomings

- Grower sanitation has not been of uniform quality. Improvement of areas used for equipment sanitation has been slow in development.
- Sanitation enforcement should have been more strictly enforced. (PPQO reported grower violation to state, state legal dept. called it hearsay.)
- Fines assessed for violations were not enough to deter further violations.
- State authority for PPQ does not have authority within state.

NY potato field was found infested with *G. rostochiensis* in 1968.

Following chemical treatment, from 1968 to 1993 the field had 7 years of non-host crop and 17 years of potato production with negative survey. It was found re-infested with *G. rostochiensis* in 1993 and has been in the resistant variety crop rotation control program to today.

Chemical control followed by host crop production failed to keep *G. rostochiensis* from re-establishing itself.

## Canadian PCN Experience

In 1965 *G. rostochiensis* was found in Saanich B.C.

Following nematicide treatments, host crop production was allowed  
Additional nematode infestation was detected.

Host crop production in this area was prohibited in 1970's.

In 1995 bioassay of soil from Saanich area yielded viable  
*G. rostochiensis*. Decision made to continue prohibition of host crops  
indefinitely.

## LESSONS LEARNED:

In both the U.S. and Canada it has been observed that PCN can “return” to a field even after chemical treatment when host crops are planted

### New York Experience:

Canadian experience: In 1965 *G. rostochiensis* infested land in Saanich B.C. was taken out of host crop production. In 1995 bioassay using soil from this land yielded *G. rostochiensis* reproduction.

# Recommendations

- Any field in which PCN is detected should be treated with nematicides and taken out of host crop production indefinitely until research determines better solutions.
1. New PCN infestation treated with nematicide.
  2. Prohibit Host Crop production
  3. Enforce strict sanitation to prevent soil movement.

