Louisiana
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Management Conference
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LSU AgCenter
Research · Extension · Teaching

The Guava Root-Knot Nematode in Louisiana

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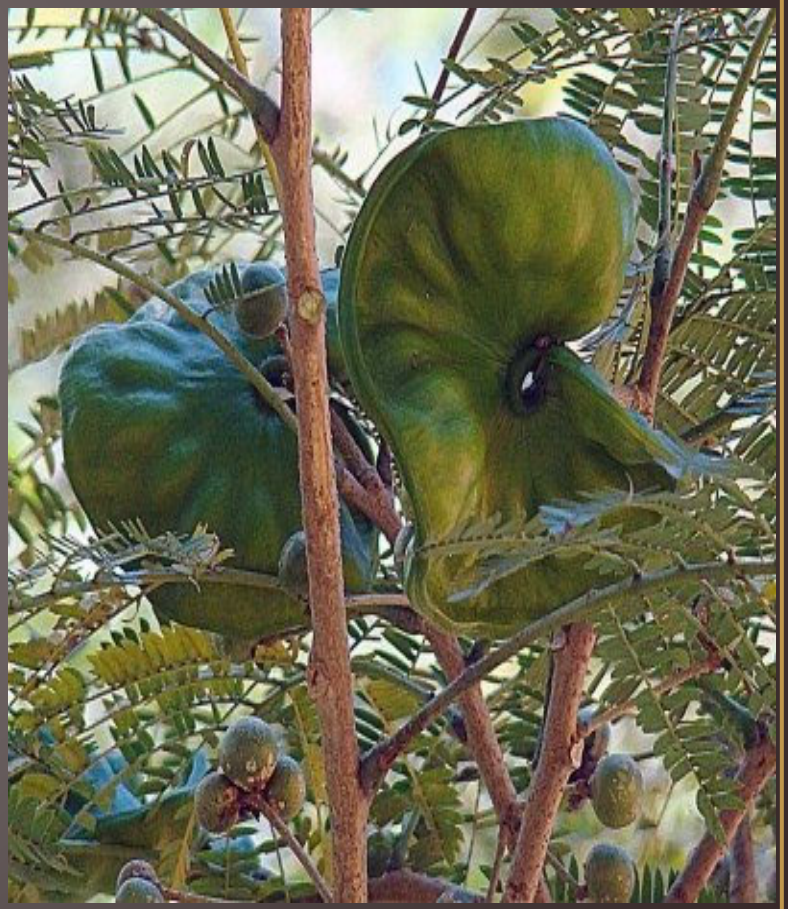
Historical Background of the Guava Root-knot Nematode

- First described on the pacara earpod tree in China in 1983 and named *Meloidogyne enterolobii*
- Second description on eggplant in Puerto Rico in 1988 and named *Meloidogyne mayaguensis*



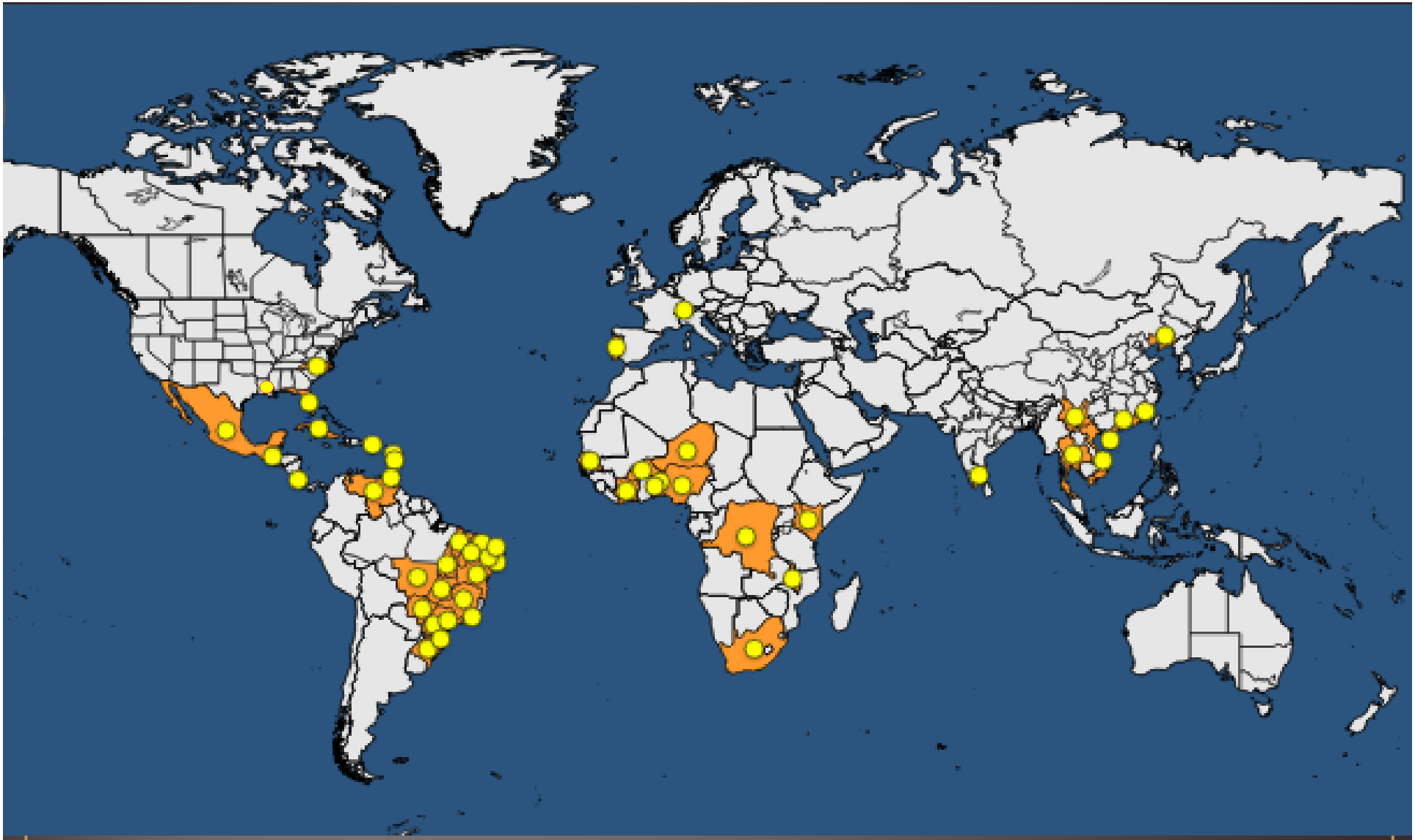
Pacara Earpod Tree

Historical Background of the Guava Root-knot Nematode

- In 2012, comparisons were made from the original sites of both species and root-knot nematodes were found to be identical.
- The species name of *Meloidogyne enterolobii* is correct.
- 2012 - First report of *M. enterolobii* in Florida
- 2017 was first mention of the common name "Guava root-knot nematode".

Why is the guava root-knot nematode such a problem?

- Wide geographic distribution



Distribution around the world of the guava root-knot nematode

Why is the guava root-knot nematode (GRKN) such a problem?

- Wide geographic distribution
- Wide host range

Why is the guava root-knot nematode (GRKN) such a problem?

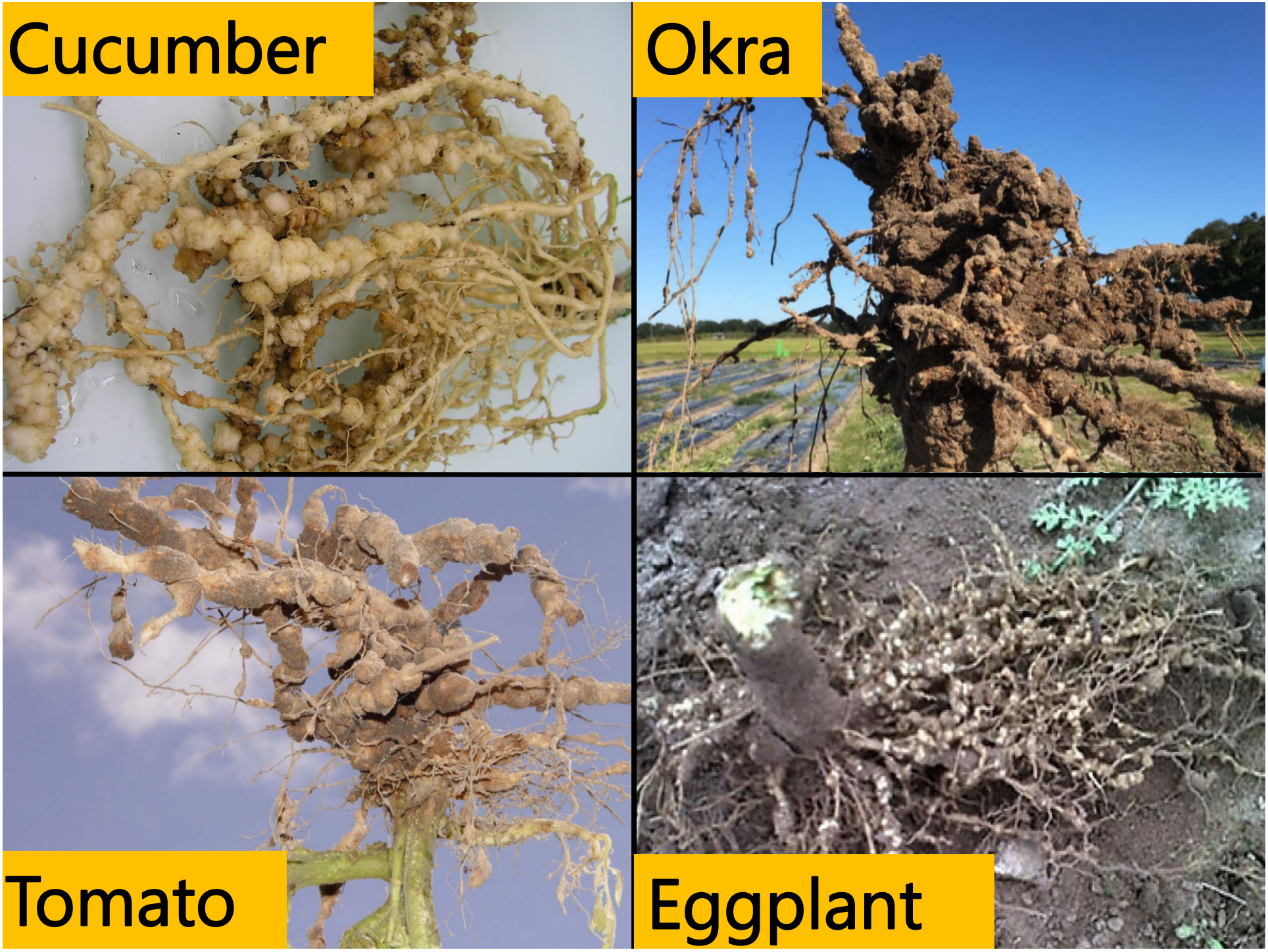
- GRKN damaging
  - cotton, soybean, and sweet potato in the United States (Ye et al. 2013; Rutter et al. 2019)
  - watermelon in Mexico (Ramirez-Suarez et al. 2014)
  - potato and leafy vegetables in Africa (Onkendi and Moleleki 2013; Chitambo et al. 2016)
  - ornamentals in Portugal (Santos et al. 2019)
  - medicinal herb in China (Lu et al. 2019)
  - bananas in Brazil (Luquini et al. 2018)

Soybean

Galling of soybean roots caused by GRKN

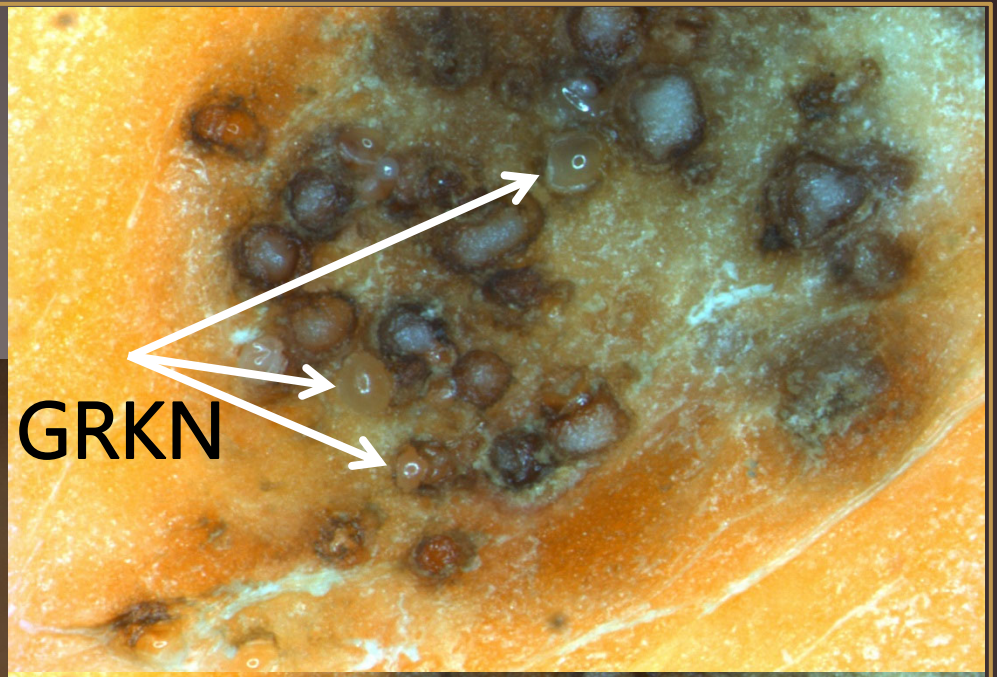
Stunting of soybean plants caused by GRKN


Cotton
Guava


Cucumber
Okra
Tomato
Eggplant

Sweet potato

Sweet potato



Why is the guava root-knot nematode (GRKN) such a problem?

- Wide geographic distribution
- Wide host range
- Can overcome the resistance of important crop plants

Meloidogyne enterolobii Found Infecting Root-Knot Nematode Resistant Sweetpotato in South Carolina, United States

W. B. Rutter ✉, A. M. Skantar, Z. A. Handoo, J. D. Mueller, S. P. Aultman, and P. Agudelo

- Crops grown in Louisiana that have resistance against the Southern root-knot nematode

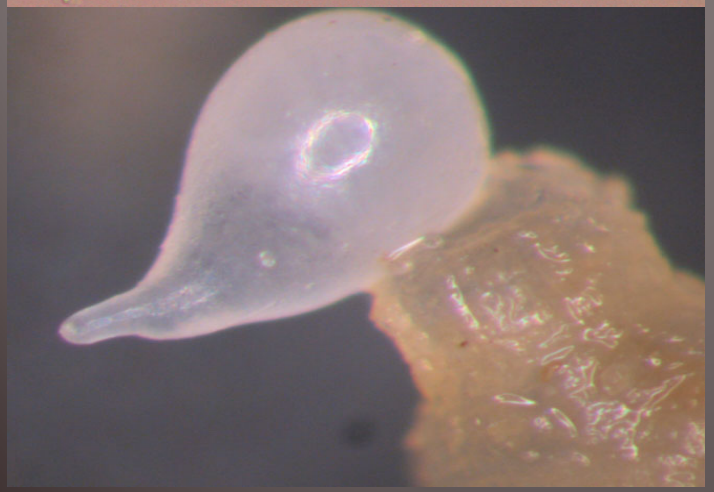
Why is the guava root-knot nematode such a problem?

- Wide geographic distribution
- Wide host range
- Can overcome the resistance of important crop plants
- Difficult to identify in the field or even in the laboratory without extensive effort

Nematode Identification

Microscopy

Southern root-knot
Meloidogyne incognita

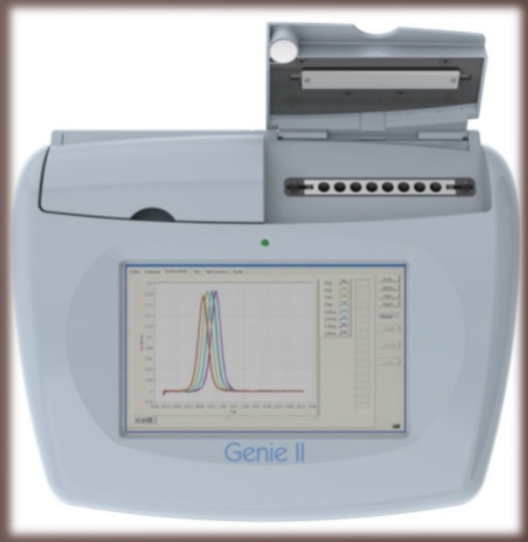


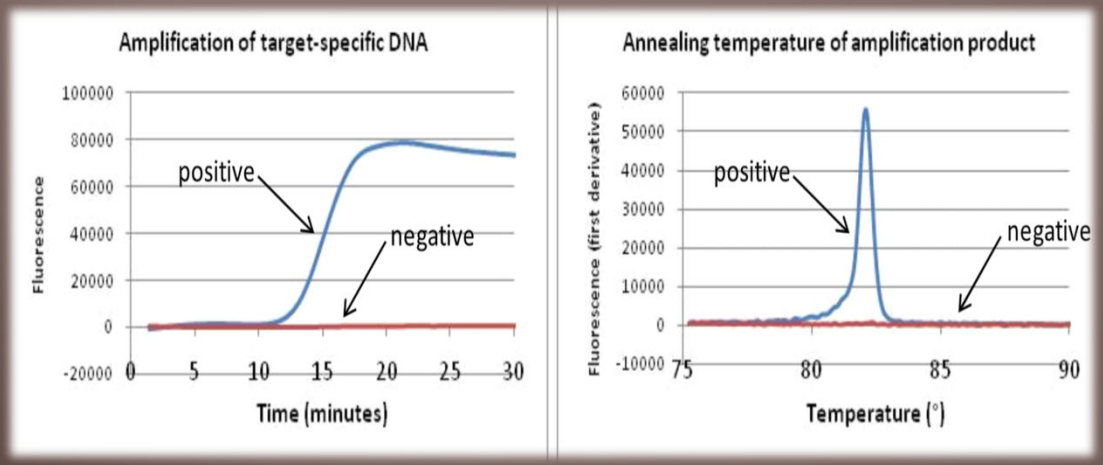
Guava root-knot
Meloidogyne enterolobii

Nematode

DNA extraction

Molecular Tool





M. enterolobii specific primers vs *M. incognita* specific primers

Why is the Guava root-knot nematode such a problem?

- Wide geographic distribution
- Wide host range
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- Difficult to identify in the field or even in the laboratory without extensive effort

Guava root-knot nematode *Meloidogyne enterolobii*

- In 2010, *M. enterolobii* was added to the European Plant Protection Organisation (EPPO) A2 list and is now recommended for regulation as a quarantine species (Castagnone-Sereno 2012)

- Several countries now have designated *M. enterolobii* as a quarantine pest (Elling 2013; Kiewnick et al. 2014)

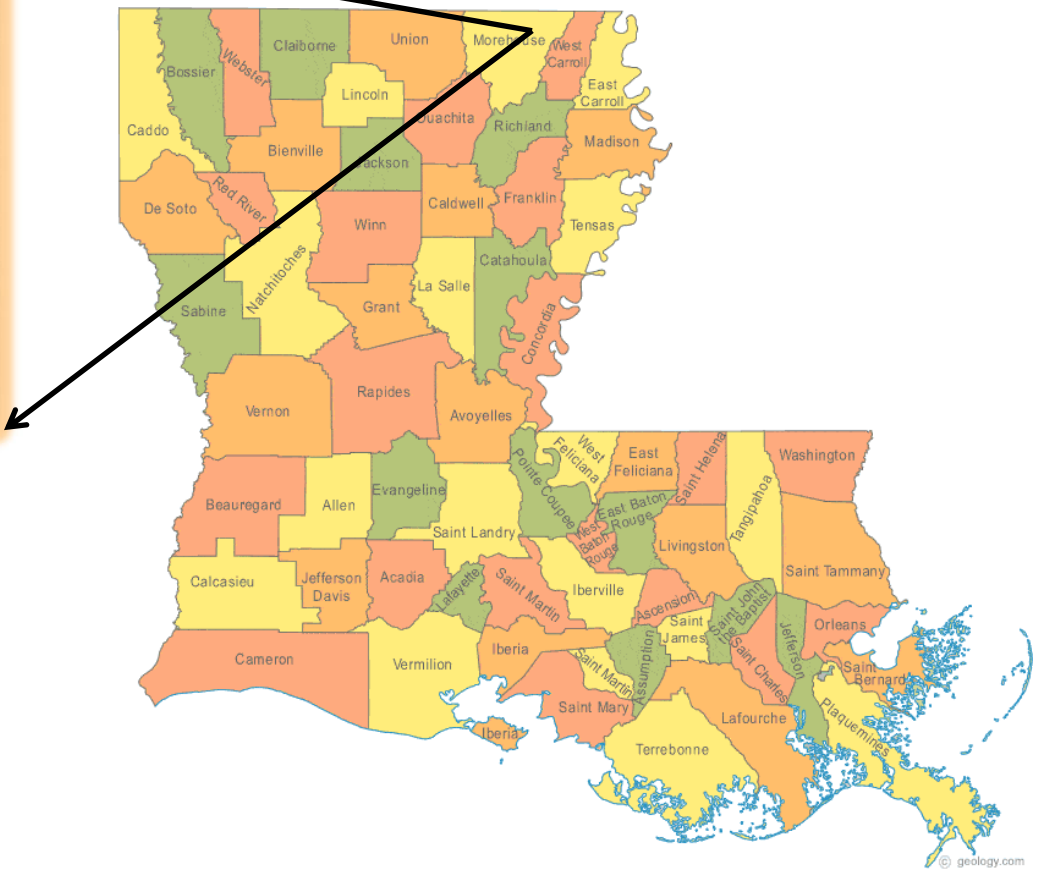
Declaration of Emergency

Louisiana Department of Agriculture & Forestry
Office Agricultural and Environmental Sciences
Horticulture and Quarantine Programs

Guava Root Knot Quarantine
(LAC 7:XV.171)

- States of FL, NC, and SC
- Sources would be sweet potatoes, soil, commercial planting/or harvesting equipment, nursery crops.

Guava root-knot nematode
Meloidogyne enterolobii



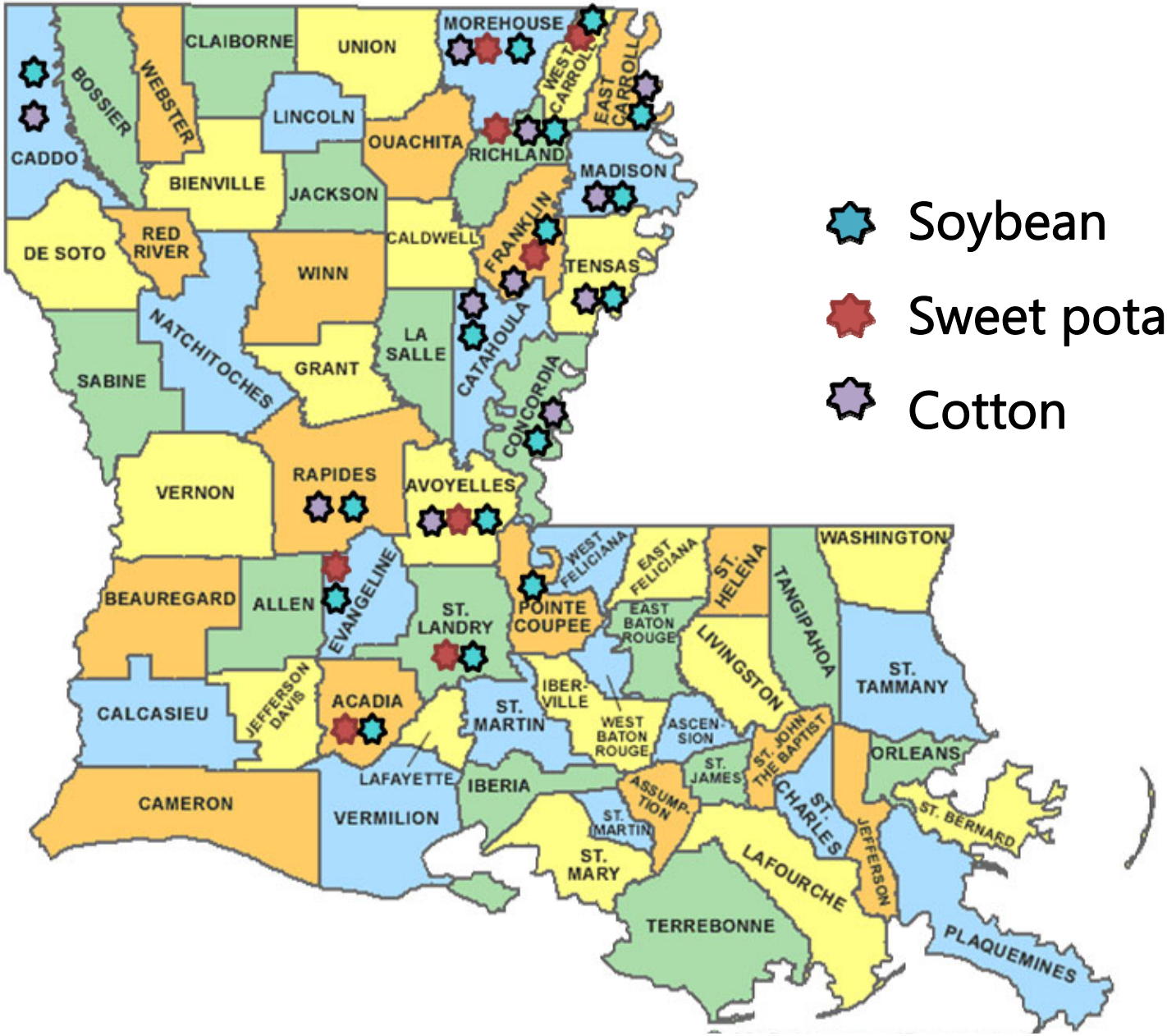
Morehouse Parish, Northeast Louisiana - 2018

Sweet potato seed roots shipped from NC

Guava Root-Knot Nematode Survey

Objective:

- conduct surveys of major agronomic areas of the state to accurately determine the current distribution of the guava root-knot nematode.

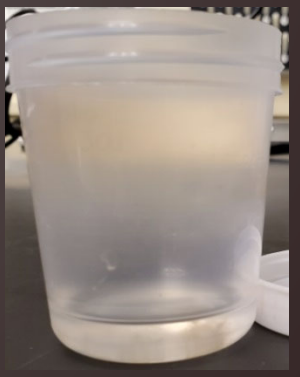


Louisiana Parish map showing the major producing areas for soybean, sweet potato, and cotton.

Soil sampling

Elutriation

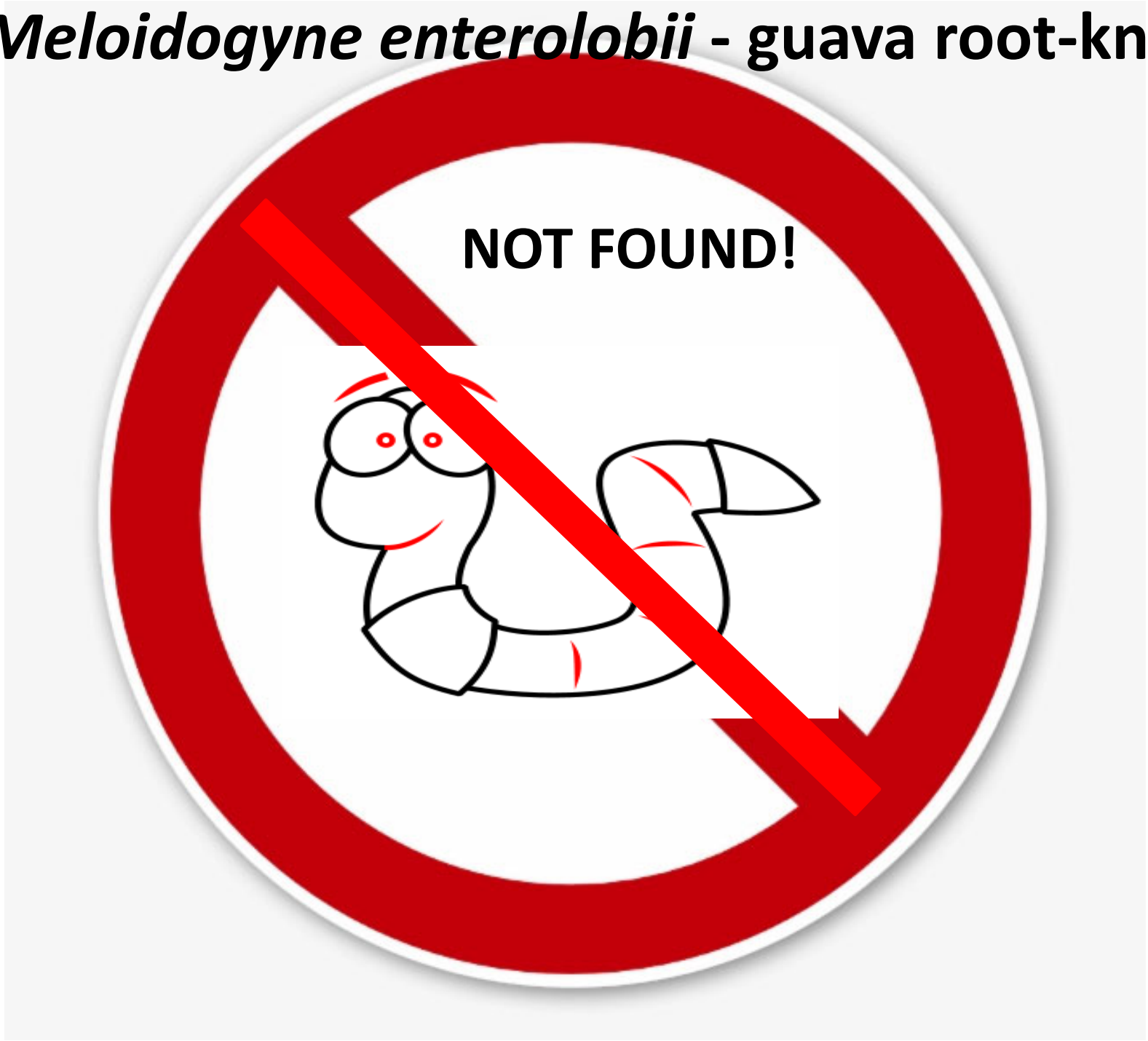
Centrifugation
(Sucrose-flotation)



Microscopy

Nematode Identification

Meloidogyne enterolobii - guava root-knot



Objectives for 2020:

- Expand the search area and collect samples from different fields located at major agronomic parishes.

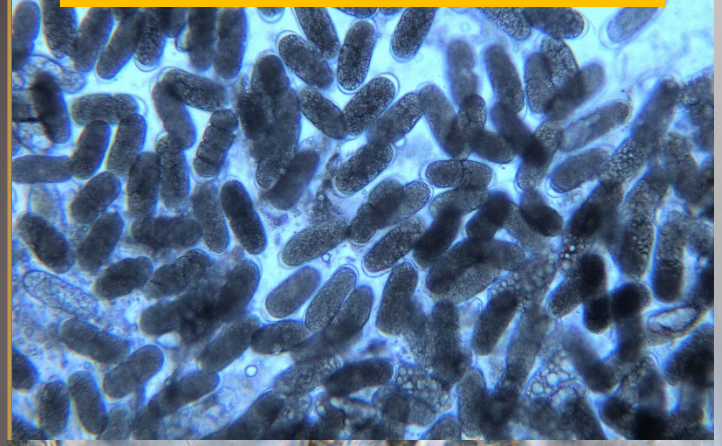
SCREENING CROPS FOR POTENTIAL GUAVA ROOT-KNOT NEMATODE RESISTANCE

- There have been several reports from other states or countries of many crops that are considered either susceptible or resistant.
- Limited information about the reaction of most agronomic, vegetable, and cover crops in Louisiana to the GRKN.
- Screening plant varieties of different crops grown in Louisiana could identify potential sources of resistance to GRKN.

SCREENING CROPS FOR POTENTIAL GUAVA ROOT-KNOT NEMATODE RESISTANCE

SCREENING CROPS FOR POTENTIAL GUAVA ROOT-KNOT NEMATODE RESISTANCE

Egg counts



Gall ratings

Guava root-knot nematode

- These data can help identify crops / varieties that are very poor hosts and can help manage this nematode if this species develops into a problem in our future.

Management Options

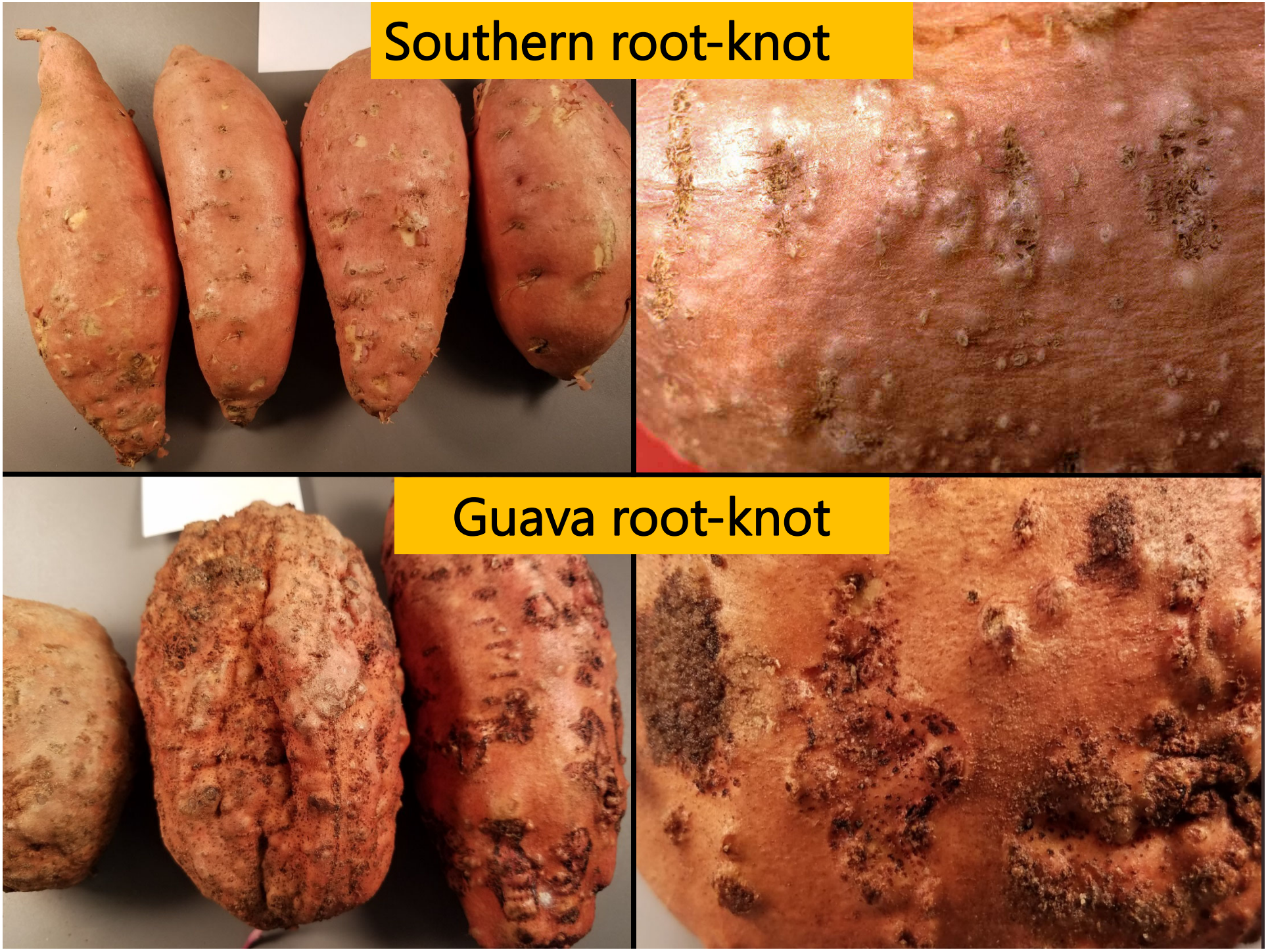
- Crop rotation
- Resistant varieties
- Weed control
- Certified seeds ; disease-free plant materials

Determining if guava root-knot nematode is present in your fields

- Look for damage on roots of plants and particularly storage roots of sweet potato

- One of the greatest distinctions of the GRKN is the ability to reproduce and damage crops with resistance against the SRKN.

How does the GRKN compare with the SRKN on sweet potato?	
Southern Root-knot	Guava Root-knot
Small to large galls on roots of susceptible varieties	Large galls on roots of all varieties
Storage roots rarely cracked	Storage roots cracked
Small raised areas (pimples or blisters) on storage roots	Large raised areas (knots) on storage roots
Resistant varieties available	No resistance at the present time

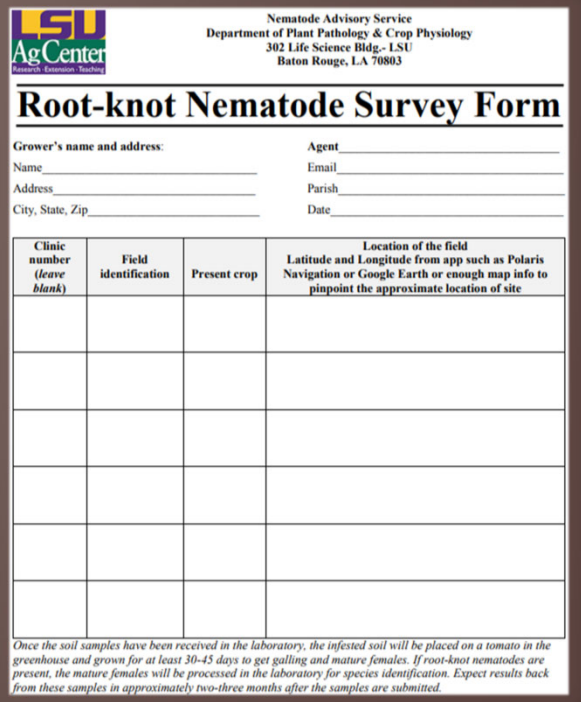

Southern root-knot
Guava root-knot

Send plant material or soil samples for nematode identification to:

Nematode Advisory Service
Root-knot Nematode Survey
Department of Plant Pathology &
Crop Physiology
302 Life Science Bldg. LSU
Baton Rouge, LA 70803

- Form can be downloaded from our website

www.lsuagcenter.com/nas



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Nematode Advisory Service
Department of Plant Pathology & Crop Physiology
302 Life Science Bldg.- LSU
Baton Rouge, LA 70803

Root-knot Nematode Survey Form

Grower's name and address:
Name_____
Address_____
City, State, Zip_____

Agent_____
Email_____
Parish_____
Date_____

Clinic number (*leave blank*)	Field identification	Present crop	Location of the field Latitude and Longitude from app such as Polaris Navigation or Google Earth or enough map info to pinpoint the approximate location of site

Once the soil samples have been received in the laboratory, the infested soil will be placed on a tomato in the greenhouse and grown for at least 30-45 days to get galling and mature females. If root-knot nematodes are present, the mature females will be processed in the laboratory for species identification. Expect results back from these samples in approximately two-three months after the samples are submitted.

Acknowledgement

- LA Farmers
- Dr. Clark
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  - Richard Letlow
  - Vince Deshotel
- Louisiana Soybean and Grain Research and Promotion Board
- Louisiana Sweet Potato Commission
- Cotton Inc.

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