GUAVA ROOT-KNOT NEMATODE:
A Potentially Serious New Pest in Louisiana

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Pest Status

The guava root-knot nematode (*Meloidogyne enterolobii*) was recently introduced into Louisiana by accident on sweet potato seed roots shipped from North Carolina. Steps have been taken to eradicate this nematode in the one field where it was detected, and it is not clear at this time if this nematode is actually established in our state. The guava root-knot nematode has the distinction of being one of the most damaging root-knot nematodes in the world. This nematode is particularly destructive to a number of important crops in Louisiana, including tomatoes, cotton, soybeans, peppers, and sweet potatoes, and has been known to cause complete yield loss. This nematode has a very high rate of reproduction and can reach extremely high population levels in soil in a short period of time. This nematode also is known to induce very large galls on plants when compared with those of our common Southern root-knot nematode, *M. incognita* (Figures 1 and 2). One of the greatest distinctions of the guava root-knot nematode is the ability to reproduce and damage crops with resistance against the Southern root-knot nematode. Crops grown in Louisiana that have resistance against the Southern root-knot nematode include tomatoes, cotton, soybeans and sweet potatoes.

Distribution, Biology and Movement

The guava root-knot nematode is found in tropical to subtropical areas of the world, including Central and South America, Africa and Asia. It has also been found previously in Florida and North Carolina and very recently in South Carolina. This nematode is similar to other root-knot nematode species in which young juveniles of the nematode hatch from eggs in the soil and migrate toward root tips of susceptible plants. The nematode enters the roots, sets up a permanent feeding site and begins developing into a mature female. During this process, large galls, or swellings, of the root tissue may form in association with the developing female. A single female (Figure 3) will produce as many as

Figure 1. Galling on soybean roots from the Southern root-knot nematode.

Figure 2. Galling on tomato roots from the guava root-knot nematode.

Figure 3. A mature female of the guava root-knot nematode.

Figure 4. Egg masses of the guava root-knot nematode visible on a sweet potato root.

Figure 5. Egg masses of the guava root-knot nematode visible inside storage roots of sweet potatoes.

400 to 600 eggs, and the life cycle can be completed in just four weeks during warm weather. Large numbers of egg masses may be visible on small roots (Figure 4) or found within storage roots of sweet potatoes (Figure 5). Although the nematode itself cannot move very far in the soil, it can easily spread by any outside force that moves soil, such as farm equipment, irrigation or heavy rainfall. The nematode can easily be disseminated on plant materials such as the storage roots of sweet potatoes or ornamental plants.

Damage

The guava root-knot nematode is very similar to our common Southern root-knot nematode in the type of damage it causes and its host range and morphology. Both nematodes can cause severe damage to plants, reducing yields and causing early death. Stunting, yellowing of plant foliage and early wilting during drought are also characteristic symptoms of both nematodes. One of the best ways for producers or gardeners to recognize that the guava nematode is present is when crops resistant to the Southern root-knot nematode display serious galling of the root system. Crop varieties that have been developed with resistance to our common root-knot nematode rarely display more than a few small galls, and plants normally do well even in the presence of that nematode. At the present time, the sweet potato is one of the crops with significant problems associated with this nematode in the United States. Sweet potato storage roots are severely deformed, with large cracks and knots and unsightly dark spots in the flesh of the root (Figures 6 and 7). If you peel the skin away from the storage root, you can also see the developing females and egg masses in the tissue below (Figure 8).

Figure 6. Cracking and large knots or bumps associated with the guava root-knot nematode on unwashed storage roots of a Covington sweet potato.

Figure 7. Washed roots showing pronounced bumps and cracking associated with the guava root-knot nematode on a Covington sweet potato.

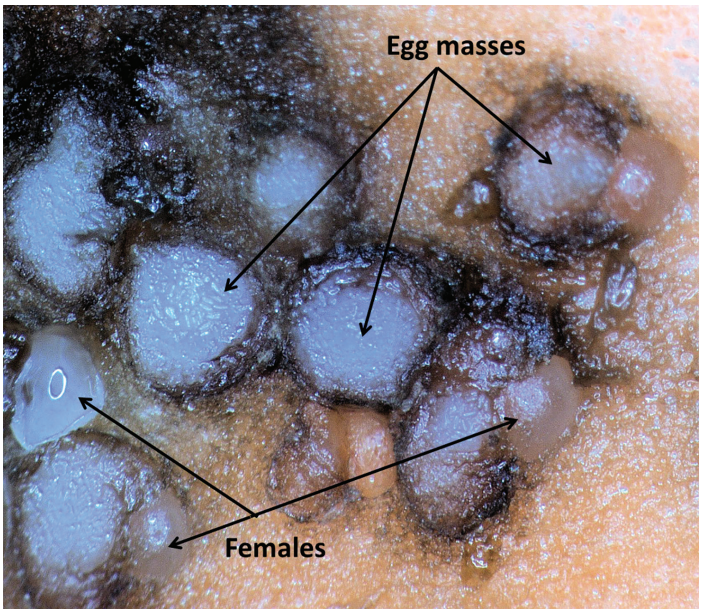

Figure 8. Close-up of egg masses and females of the guava root-knot nematode inside a storage root under one of the bumps of a Covington sweet potato.

Management Options

There is limited information about the reaction of most of plants in Louisiana to the guava root-knot nematode. However, there have been a number of reports from other states or countries of many plant types that are considered either susceptible or resistant. Tables 1-3 list some of the known host reactions to this nematode. The nematode does have a wide host range, including many agronomic, vegetable, ornamental and weed species. There are some conflicting reports within plant types, which could be due to different populations or races of this nematode. Additionally, there may be different plant varieties being evaluated that could further explain the differences. We will have a better idea of the reaction of this nematode in the future on our plant species if this nematode becomes established in Louisiana. Preliminary experiments conducted at LSU with multiple varieties of corn, cotton, grain sorghum, soybean and sugarcane indicated that only cotton and soybeans were susceptible to the population of guava root-knot nematodes that was introduced into our state. Also, preliminary data from several sweet potato lines that are currently being evaluated for future varieties also appeared to be fairly resistant. These preliminary experiments do indicate that we will have crops that are very poor hosts to the nematode and can be used in the future to help manage this nematode. Nematicides and crop rotation to non-hosts or resistant hosts are potential management options that can be utilized by our producers if this nematode develops into a problem in our future.

Table 1. Host plant reaction of several crops and their reaction to the guava root-knot nematode, *Meloidogyne enterolobii*.

Susceptible plants		Resistant plants	
Agronomic or cover crops	**Vegetable crops**	**Agronomic or cover crops**	**Vegetable crops**
Common vetch	Bell pepper	Annual ryegrass	Broccoli (S-MR)
Cotton	Broccoli (S-MR)	Black oats	Cabbage (S-R)
Peanut*	Celery	Millet	Carrot
Soybean	Cabbage	Corn	Cauliflower
Sugarcane (S-R)**	Chili pepper	Oats	Chive
Sunn hemp (S-R)	Common bean	Radishes	Cowpea (S-R)
Sweet potato	Cowpea (S-R)	Rapeseed	Garlic
Tobacco	Cucumber	Rice	Leeks
	Eggplant	Rye	Lettuce
	Garden beet	Sorghum	Parsley
	Irish potato	Sugarcane (S-R)**	Thyme
	Mustard	Sunn hemp (S-R)	
	Okra	Velvet bean	
	Parsley	Wheat	
	Squash (all types)		
	Sweet basil		
	Tomato		

**The peanut supports development of females but not eggs and is considered a potential host.*

***Crop has been reported susceptible or resistant, and the reaction is likely due to different populations of the nematode, races of the nematode or different varieties.*

Table 2. Horticultural or fruit crops and their reaction to the guava root-knot nematode, *Meloidogyne enterolobii*.

Susceptible plants		Resistant plants	
Horticultural crops	**Fruit crops**	**Horticultural crops**	**Fruit crops**
Ajuga	Banana	Chinaberry	Avocado
Albutilon	Fig	Croton	Citrus
Angelonia	Grape	Eucalyptus	Mulberry
Bottlebrush	Guava	Evening primrose	Olive
Brugmansia	Jujube	Firespike	Passion fruit
Butterfly bush		Hyacinth bean	Pineapple
Caladium		Pittosporum	Strawberry
Candle bush			
Cape honeysuckle			
Common ginger			
Crape myrtle			
Gardenia			
Heavenly blue morning glory			
Hibiscus			
Lantana			
Ligustrum			
Liriope			
Luffa			
Pentas			
Princess flower			
Salvia			
Willow			

Table 3. Weed hosts that have been reported as susceptible or resistant against the guava root-knot nematode, *Meloidogyne enterolobii*.

Susceptible plants		Resistant plants
American nightshade	Purple nutsedge	Barnyardgrass
Bristly hawkbit	Redroot pigweed	Beggarweed
Bullnettle	Sicklepod	Coffeeweed
Common purslane	Smooth pigweed	Crabgrass
Dichondra	Spiny amaranth	Evening primrose
Ground cherry	Three-lobed morningglory	Fall panicum
Hairy beggarticks	Wild mustard	Johnsongrass
Hairy crabweed	Wild poinsettia	Showy crotolaria
Morningglory	Yellow nutsedge	Yellow foxtail
Pokeweed		

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