GUAVA ROOT-KNOT NEMATODE- A POTENTIALLY SERIOUS NEW PEST IN LOUISIANA

Charles Overstreet[1], Edward C. McGawley[1], Chris Clark[1], Josielle Rezende[1], Tara Smith[2], and Myrl Sistrunk[3]
[1]Department of Plant Pathology and Crop Physiology, [2]Regional Director Central Region, [3]Sweet Potato Research Station

Pest Status

The guava root-knot nematode (*Meloidogyne enterolobii*) was recently accidently introduced into Louisiana on sweetpotato seed roots shipped from North Carolina. Steps have been taken to prevent establishment of this nematode in the one field where it was introduced, 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 tomato, cotton, soybean, pepper, and sweetpotato 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 & 2). One of the greatest distinctions of the guava root-knot nematode is the ability to reproduce and damage crops with resistance against Southern root-knot nematode. Crops grown in Louisiana that have resistance against the Southern root-knot nematode include tomato, cotton, soybean, and sweetpotato.

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

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

Distribution, Biology and Movement

The guava root-knot nematode is found in tropical to sub-tropical 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 where 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 will produce as many as 400-600 eggs and the life cycle can be completed in just four weeks during warm weather (Figure 3).

Figure 3. Mature female of the guava nematode.

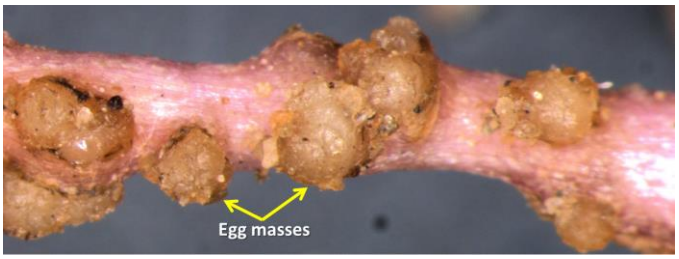

Figure 4. Egg masses of the guava root-knot nematode visible on a sweetpotato root.

Large numbers of egg masses may be visible on small roots (Figure 4) or found within storage roots of sweetpotato (Figure 5). Although the nematode itself cannot move very far in the soil, it can easily spread by any means that moves soil such as farm equipment, irrigation, or heavy rainfall. The nematode can easily be disseminated on plant material such as the storage roots of sweetpotato or ornamental plants.

Figure 5. Egg masses visible inside a storage root of a sweetpotato.

Damage

The guava root-knot nematode is very similar to our common Southern root-knot nematode in the types of damage it causes, host range, and morphology. Both nematodes can cause severe damage to plants, reducing yields and causing early death on some plants. 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, sweetpotato is one of the crops with significant problems associated with this nematode in the United States. Sweetpotato 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).

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 and 2 list some of the known host reactions to this nematode. This 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 which 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. Nematicides and crop rotation are potential management options that can be used against this nematode. However, at this time there are no resistant varieties available for some of the most susceptible crops.

Figure 6. Cracking and large knots or bumps associated with the guava root-knot nematode on unwashed storage roots of ‘Covington’ sweetpotato.

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

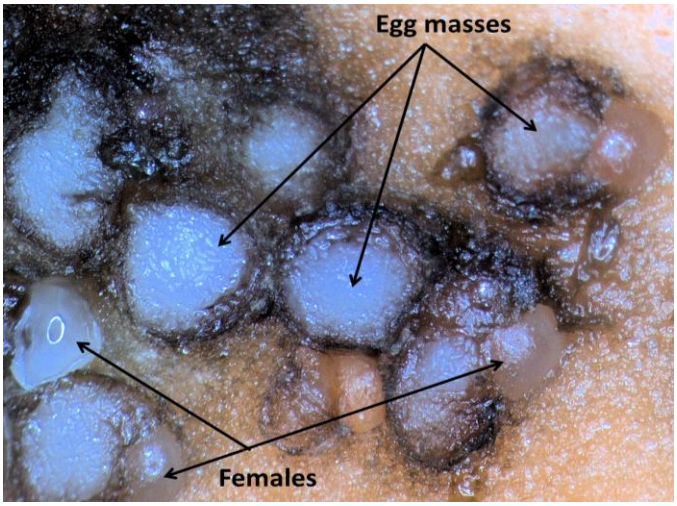

Figure 8. Close-up of egg masses and females of the guava root-knot nematode inside a storage root under one of the bumps of 'Covington' sweetpotato.

Table 1. Host plant reactions reported in literature of a number of 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	Garlic
Sweetpotato	Cowpea (S-R)	Rapeseed	Leeks
Tobacco	Cucumber	Rice	Lettuce
	Eggplant	Rye	Parsley
	Garden beet	Sorghum	Thyme
	Irish potato	Sunn Hemp (S-R)	
	Mustard	Velvet bean	
	Okra	Wheat	
	Squash (all types)		
	Sweet basil		
	Tomato		

*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. Weed hosts that have reported for the guava root-knot nematode.

American nightshade	Ground cherry	Redroot pigweed	Wild mustard
Bristly hawkbit	Hairy beggarticks	Sicklepod	Wild poinsettia
Bull nettle	Hairy crabweed	Smooth pigweed	Yellow nutsedge
Common purslane	Pokeweed	Spiny amaranth	
Dichondra	Purple nutsedge	Three-lobed morning glory	