

Kill Tropical Spiderwort and Starve a Nematode

OR: Tropical spiderwort as a host for plant-parasitic nematodes

Richard F. Davis

USDA-ARS

Tifton, GA



Nematode Biology

- Perhaps a dozen nematode genera have economic importance in the Southeast
- Plant-parasitic nematodes are obligate parasites
- Most nematode species have fairly wide host ranges, but the host ranges do differ
- Differences in host ranges are the reason that crop rotation can be used to manage nematode problems

Important Nematode-Crop Associations

- Cotton: southern root-knot (*Meloidogyne incognita*)
reniform (*Rotylenchulus reniformis*)
- Peanut: peanut root-knot (*Meloidogyne arenaria*)
- Corn: southern root-knot (*Meloidogyne incognita*)



Effect of weeds on nematode population levels

- Some weeds are excellent hosts for specific nematodes, some weeds are non-hosts, and most weeds are somewhere in the middle
- Weed density (plants/m²) and root mass will affect how much nematode reproduction occurs
- When and for how long is the weed present?

Nematode Action Threshold Levels

(soil counts at harvest the previous season)

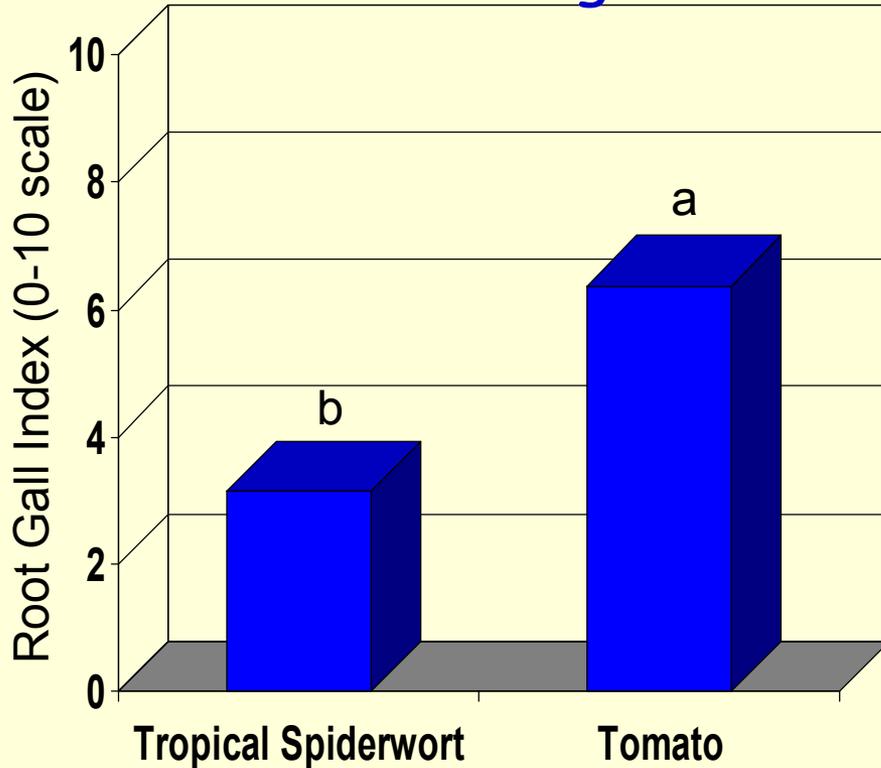
➤ Cotton: *Meloidogyne incognita* = 150/150 cm³

Rotylenchulus reniformis = 375/150 cm³

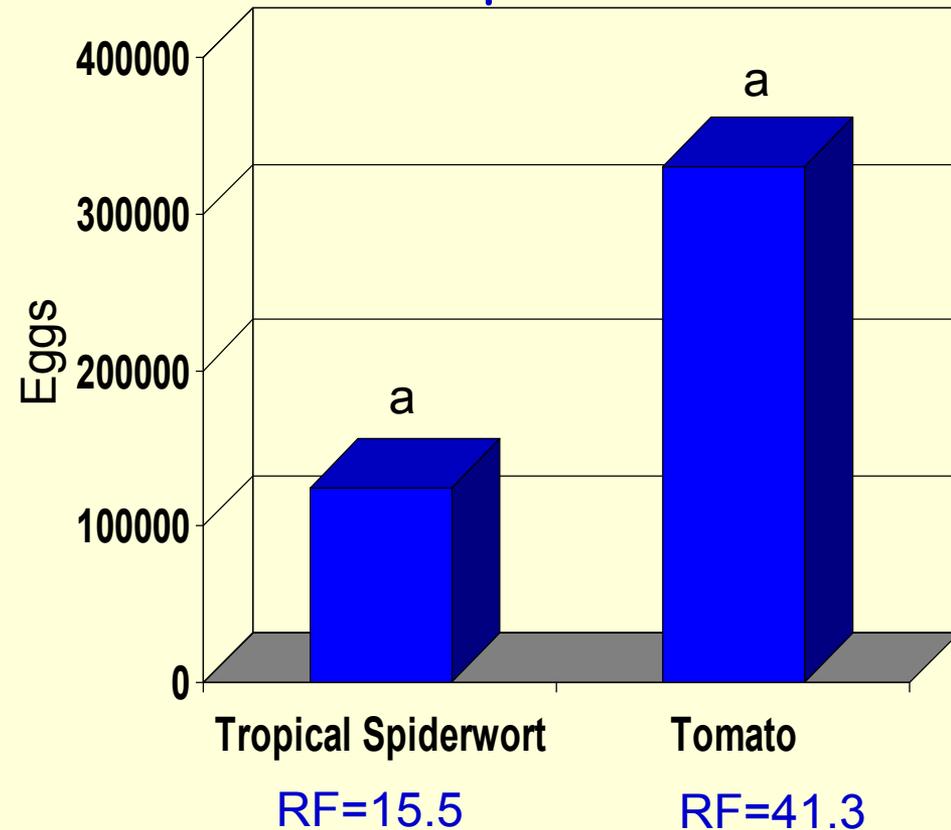
➤ Peanut: *Meloidogyne arenaria* = 15/150 cm³

Southern Root-Knot Nematode (*M. incognita*)

Galling



Reproduction

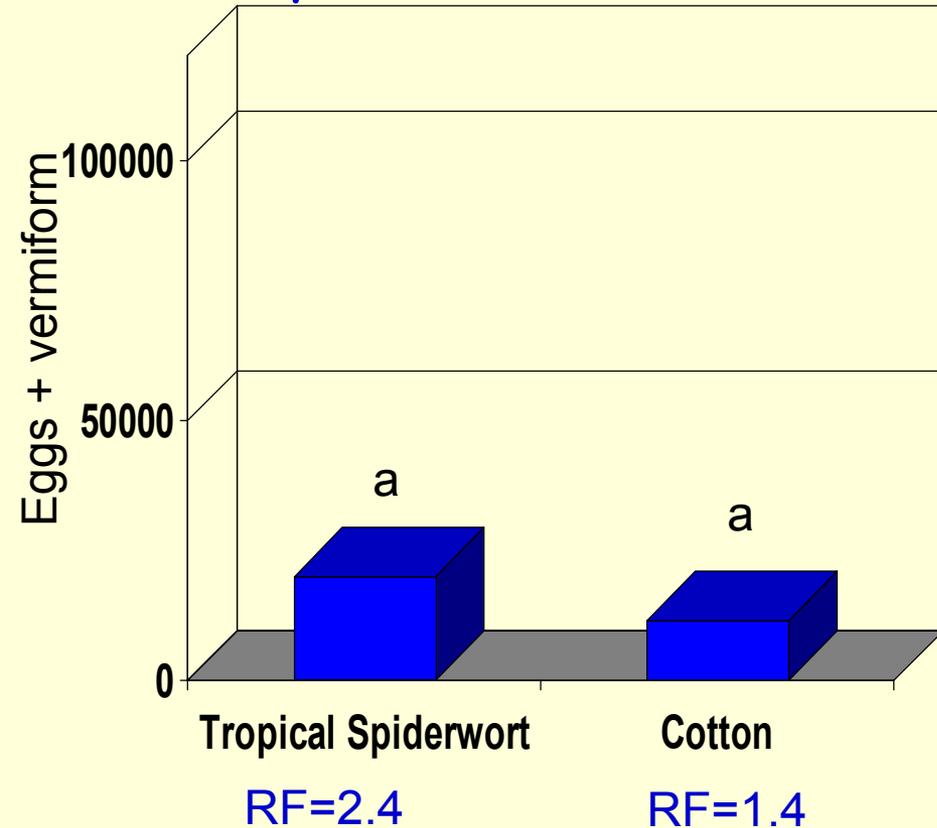


RF = Reproductive Factor = Final population / Initial population

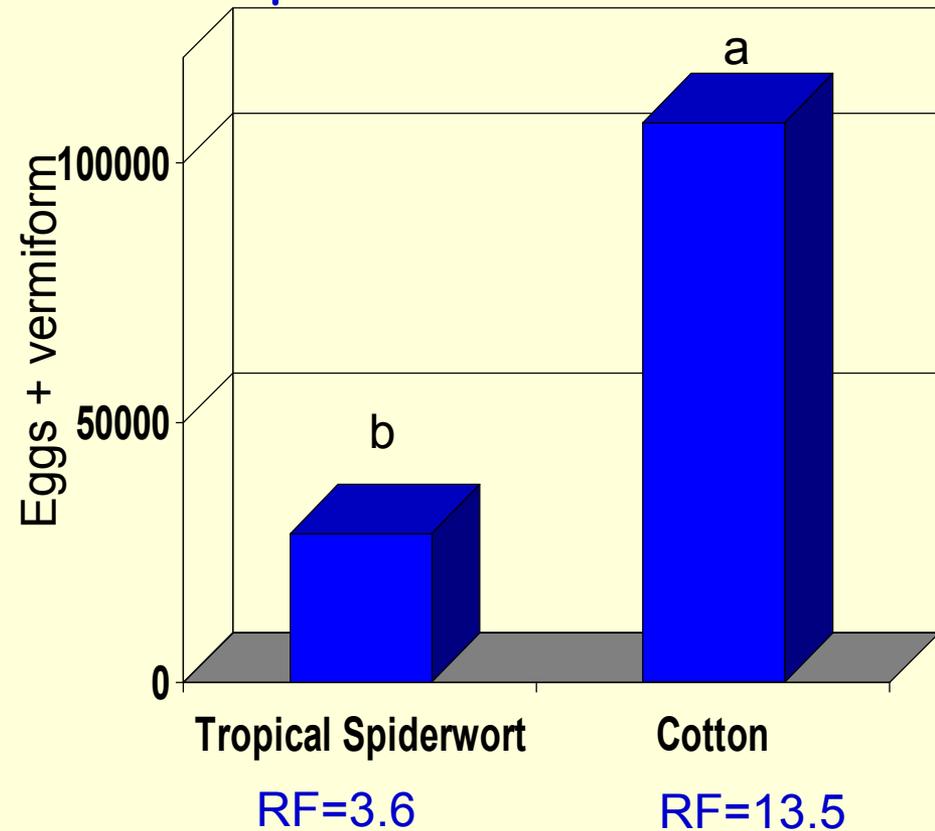
Data combined from two trials

Reniform Nematode (*R. reniformis*)

Reproduction - Trial #1



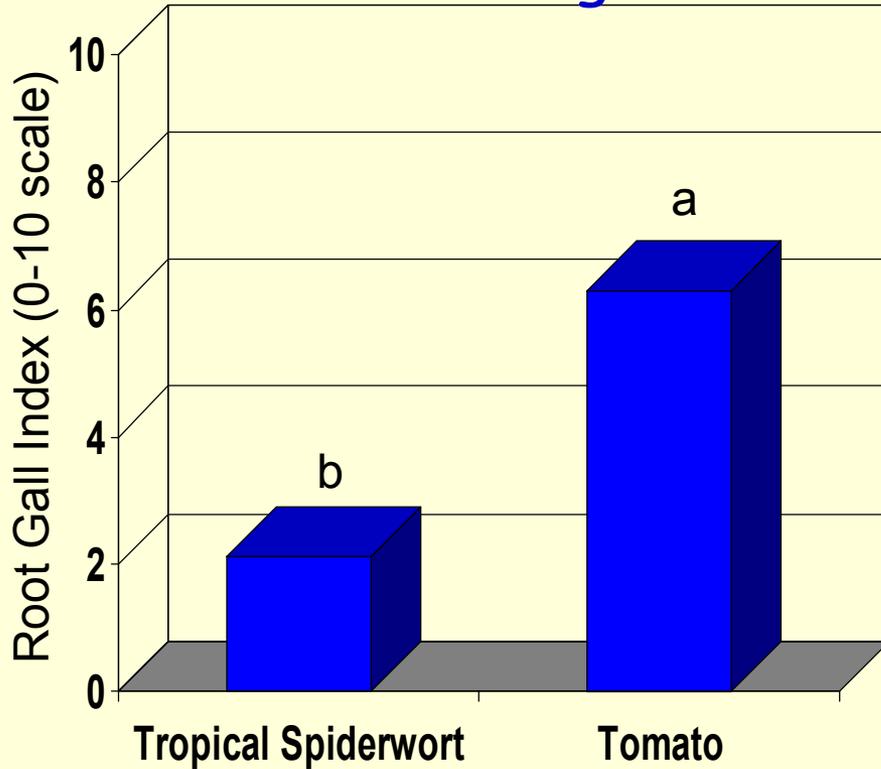
Reproduction - Trial #2



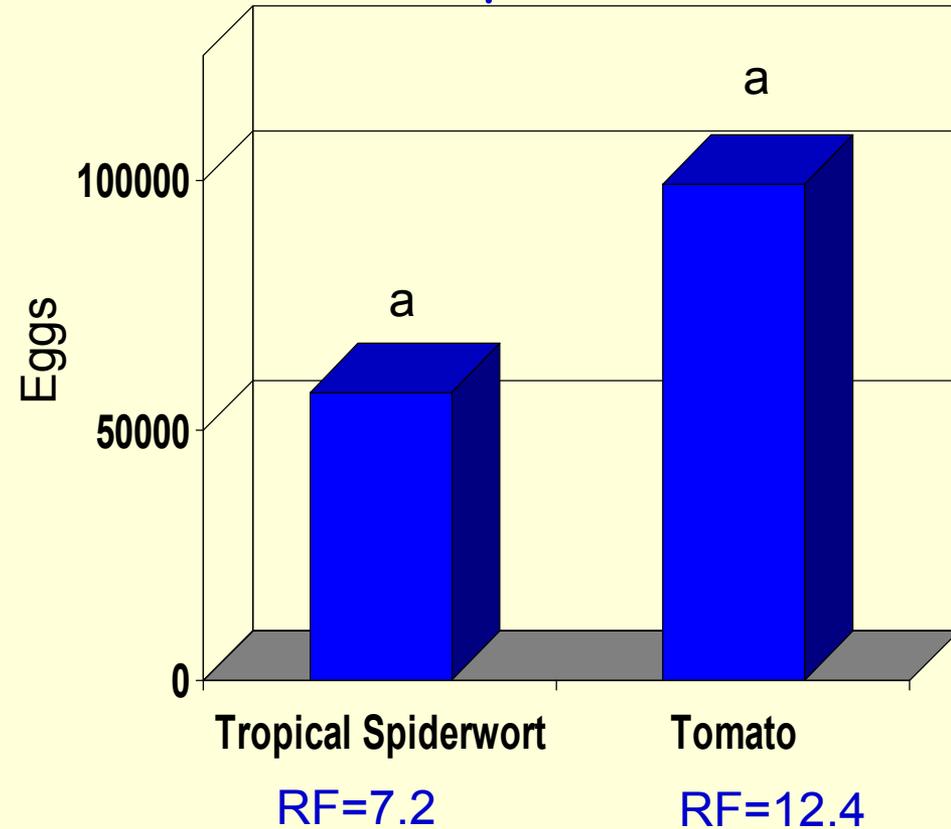
RF = Reproductive Factor = Final population / Initial population

Peanut Root-Knot Nematode (*M. arenaria*)

Galling



Reproduction



RF = Reproductive Factor = Final population / Initial population

Data combined from two trials

Summary of Host Status for Nematodes

- Tropical spiderwort is a good host for the southern root-knot nematode, it is a moderate host for the reniform nematode and the peanut root-knot nematode
- Tropical spiderwort is probably a good enough host to significantly reduce the effectiveness of crop rotations or host-plant resistance as a nematode management tactic

Soil-Borne Fungal Diseases of Peanut

Southern Stem Rot (= white mold) - *Sclerotium rolfsii*

Cylindrocladium Black Rot (CBR) - *C. parasiticum*

Primary reason for a three-year rotation cycle in peanut

What effect does tropical spiderwort have on these fungi?

Southern Stem Rot (white mold)

➤ Trial #1 - mean disease rating (0-10 scale):

Peanut = 4.0

Tropical Spiderwort = 1.4

(40% of tropical spiderwort showing signs of pathogen)

➤ Trial #2 - mean disease rating (0-10 scale):

Peanut = 10.0

Tropical Spiderwort = 5.0

(100% of tropical spiderwort showing signs of pathogen)

Southern Stem Rot (white mold)

This pathogen is normally lethal to susceptible plants under these conditions, but...

Conclusions:

1. Tropical spiderwort will probably cause some increase in *S. rolfsii* inoculum levels
2. The fungus will have little of no effect on the weed

Cylindrocladium Black Rot (CBR)

- Two trials, but poor disease development even on peanut
- Not a definitive test of tropical spiderwort's susceptibility to *Cylindrocladium*, but the fungus appears to be weakly pathogenic

Conclusions:

1. Tropical spiderwort would probably have little effect on *Cylindrocladium* inoculum density
2. *Cylindrocladium* would probably have little effect on tropical spiderwort

Conclusion

Tropical spiderwort will serve as a host for nematodes and other pathogens and will reduce the effectiveness of crop rotations and host plant resistance in reducing pathogen levels

