

Can We Develop Nematode Resistant Turfgrasses?

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Outline

- Important plant-parasitic nematodes in turf
- Challenges for turfgrass breeders
- New methods
- Future efforts in Tifton



Plant-Parasitic Nematodes

- Do you know how many different kinds of plantparasitic nematodes can damage warm-season turfgrasses?
- The Nematode Assay Laboratory at the University of Florida looks for 12 different species
 - Phone: (352) 392-1994
 - eMail: nemalab@ifas.ufl.edu



Plant-Parasitic Nematodes

Ectoparasites

- Sting
- Spiral
- Stubby-Root
- Stunt
- Ring
- Sheath
- Awl

Endoparasites

- Lance
- Lesion

 Sedentary Endoparasites
Root-knot



- Sting Nematode (Belonolaimus)
 - Bermudagrass growing with between 10 and 25 Sting per 100cc of soil is considered to be at Moderate to High risk of damage



http://cisr.ucr.edu/sting_nematode.html



- Spiral Nematode (Helicotylendhus)
 - Bermudagrass growing with between 700 and 1500 Spiral per 100cc of soil is considered to be at Moderate to High risk of damage



http://nematode.unl.edu/Helicotylenchusspecies.html



- Stubby-Root Nematode (Trichodorus)
 - Bermudagrass growing with between 40 and 120 Stubby-Root per 100cc of soil is considered to be at Moderate to High risk of damage





- Stunt Nematode (Tylenchorhynchus)
 - Bermudagrass growing with between ? and ? Stunt per 100cc of soil is considered to be at Moderate to High risk of damage



http://www.ipm.iastate.edu/ipm/icm/node/611



- Ring Nematode (Mesocriconema)
 - Bermudagrass growing with between 500 and 1000 Ring per 100cc of soil is considered to be at Moderate to High risk of damage



http://www.apsnet.org/Education/K-12PlantPathways/TeachersGuide/Activities/Nematode/text/Figure5.htm



- Sheath Nematode (Hemicycliophora)
 - Bermudagrass growing with between 150 and 300 Sheath per 100cc of soil is considered to be at Moderate to High risk of damage



http://www.apsnet.org/education/instructorcommunication/teachingarticles/RileyNematode/images/fig15.htm



- Awl Nematode (Dolichodorus)
 - Bermudagrass growing with between 10 and 15 Awl per 100cc of soil is considered to be at Moderate to High risk of damage



http://edis.ifas.ufl.edu/LyraEDISServlet?command=getImageDetail&image_soid=FIGURE%201&document_soid=IN397&document_version=46095



Migratory Endo-Parasitic

- Lance Nematode (Hoplolaimus)
 - Bermudagrass growing with between 40 and 120 Lance per 100cc of soil is considered to be at Moderate to High risk of damage





Migratory Endo-Parasitic

- Lesion Nematode (*Pratylenchus*)
 - Bermudagrass growing with between ? and ? Lesion per 100cc of soil is considered to be at Moderate to High risk of damage



http://www.apsnet.org/Education/lessonsPlantPath/LesionNema/default.htm



Sedentary Endo-Parasitic

- Root-Knot Nematode (Meloidogyne)
 - Bermudagrass growing with between 80 and 300 Root-Knot per 100cc of soil is considered to be at Moderate to High risk of damage



http://www.lsuagcenter.com/mcms/webtools/image.aspx?Watermark=ZABIAGYAYQB1AGwAdAA=&ResourcePath=/NR/rdonlyres/DCBCF5C8-7E80-4564-8BEF-2088A0AEE974/4938/cukeonrootresizeandincreaseto200.jpg



Challenges for Turf Breeders

- Nematode interactions
- Consistent measurements
 - Nematode reproduction
 - Root damage
 - Visual symptoms
- Sensitivity to greenhouse conditions



The Sting Nematode

• Belonolaimus longicaudatus





Working in the Greenhouse

• Conetainers vs. Pots





Root Damage Analysis

• Root weights vs. Root lengths





Results

Table 1. Fine* Root Lengths of six turfgrasses 90 days afterinoculation with 50 Sting Nematodes in Conetainers.

Genotype	Uninoculated	Inoculated	% Reduction
		cm	
UFZ-10	996	988 a‡	-1
Empire	1091*	893 a	-18
Cavalier	802**	596 b	-26
Emerald	843*	616 b	-27
Floratam	372**	227 d	-39
TifEagle	670**	438 c	-35

[†]Fine (diameter < 0.125 mm) root length.

*, **Uninoculated controls significantly different from inoculated treatments within establishment method at the 0.05 and 0.01 probability levels, respectively, according to orthogonal coefficient analysis. *Means within a column followed by the same letter are not different at *K* = 100 (approximates *P* = 0.05) according to Waller-Duncan LSD.



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Questions

