

RESEARCH/INVESTIGACIÓN

INFLUENCE OF PLANT-PARASITIC NEMATODES ON GROWTH OF ST. AUGUSTINE AND CENTIPEDE TURFGRASSES

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ABSTRACT

Plaisance, A. P., E. C. McGawley, and C. Overstreet. 2015. Influence of plant-parasitic nematodes on growth of St. Augustine and centipede turfgrasses. *Nematropica* 45:288-296.

During the spring, summer and fall (May-November) of 2011 and 2012, 100 residential lawns in East Baton Rouge Parish, LA, were sampled to document the incidence and abundance of plant-parasitic nematode communities. Genera of nematodes associated with St. Augustine and centipede turfgrasses included *Criconemella*, *Helicotylenchus*, *Meloidogyne*, *Pratylenchus*, *Tylenchorhynchus*, and *Tylenchus*. Damage potentials of *Meloidogyne incognita* and *Pratylenchus zaei* individually were evaluated in subsequent greenhouse trials. Across nematode infestation levels of 200 and 2,000 individuals, reductions in final plant weight below controls for St. Augustine and centipede averaged 24% and 28%, respectively, for *M. incognita* and 37.0% and 39.3% for *P. zaei*; indicating that overall, *P. zaei* was more damaging to both turfgrasses than *M. incognita*.

Key words: centipede, *Criconemella*, *Eremochloa ophiuroides*, *Helicotylenchus*, *Meloidogyne incognita*, pathogenicity, *Pratylenchus zaei*, soil type and texture, St. Augustine, *Stenotaphrum secundatum*, turfgrass, *Tylenchorhynchus*.

RESUMEN

Plaisance, A. P., E. C. McGawley, y C. Overstreet. 2015. Influencia de nematodos parásitos de plantas en el crecimiento de los pastos de San Agustín y Ciempiés. *Nematropica* 45:288-296.

Durante la primavera, verano y otoño (Mayo-Noviembre) de 2011 y 2012, 100 céspedes residenciales en East Baton Rouge Parish, LA, se muestrearon para documentar la incidencia y abundancia de comunidades de nematodos parásitos de plantas. Los géneros de nematodos asociados a los pastos de San Agustín y Ciempiés incluyeron *Criconemella*, *Helicotylenchus*, *Meloidogyne*, *Pratylenchus*, *Tylenchorhynchus*, y *Tylenchus*. Los daños potenciales de *Meloidogyne incognita* y *Pratylenchus zaei* se evaluaron en ensayos en invernadero. Niveles de infestación de nematodos entre 200 y 2,000 individuos causaron reducciones en el peso de las plantas comparadas con los controles, en torno al 24% y 28% para el pasto de San Agustín y el Ciempiés, respectivamente, en caso de *M. incognita* y del 37.0% and 39.3% en el caso de *P. zaei*; indicando que en general, *P. zaei* era más dañino para ambos céspedes que *M. incognita*.

Palabras clave: Pasto Ciempiés, *Criconemella*, *Eremochloa ophiuroides*, *Helicotylenchus*, *Meloidogyne incognita*, patogenicidad, *Pratylenchus zaei*, tipo y textura del suelo, pasto de San Agustín, *Stenotaphrum secundatum*, césped, *Tylenchorhynchus*.

INTRODUCTION

There are approximately 24.3 million hectares of residential property in the U.S. (Lubowski *et al.*, 2002). Most residences allocate approximately half their property to landscape, much of which is turfgrass, the most widely grown ornamental crop in the United States (Bruneau *et al.*, 2007). The use of turfgrass in urban environments increases the aesthetic quality of the landscape and helps to mitigate heat, provide proper water drainage, and contributes to soil carbon sequestration (Milesi *et al.*, 2005).

Turfgrass species produced for residential lawns in the southern U.S. include centipede (*Eremochloa ophiuroides*), St. Augustine (*Stenotaphrum secundatum*) and zoysia (*Zoysia japonica*). Bermudagrass (*Cynodon dactylon*) and creeping bentgrass (*Agrostis stolonifera*) are most commonly used for sports fields and golf courses (Dunn and Diesburg, 2004). Approximately half of Louisiana's estimated 3,377 km² of turfgrass is utilized in residential environments while the other half is growing on state, commercial, and recreational properties (Milesi *et al.*, 2005).

Roots of turfgrass parasitized by plant-parasitic nematodes are usually shortened and appear dark or necrotic (Crow and Welch, 2004). They may also exhibit knots or galls or display excessive branching (Blake and Doubrava, 1999). When nematode community densities reach high levels, and environmental stresses such as high temperatures or drought occur, above-ground symptoms are usually manifested as irregular and thinning patches of chlorotic to brown foliage (Cheng and Grewal, 2009). Other foliar symptoms of damage include wilting and poor response to fertilization and irrigation.

More than 20 species of plant-parasitic nematodes are known to actively parasitize turfgrass (Dunn and Diesburg, 2004). Of these species, *Belonolaimus longicaudatus* (Bekal and Becker, 2000a, 2000b), *Hoplolaimus galeatus* (Giblin-Davis *et al.*, 1995), *Criconemella* (Crow *et al.*, 2009), *Meloidogyne marylandi* (Starr *et al.*, 2007), *M. graminis* (McClure *et al.*, 2012), and *M. graminicola* (Nelson, 1995) are most common. To a lesser extent, *M. incognita* (Faske and Starr, 2009), *Paratrichodorus* and *Trichodorus* (Crow and Welch, 2004), *Helicotylenchus* (Subbotin *et al.*, 2011), and *Tylenchorhynchus* (Mai and Lyon, 1975) are known parasites of turfgrass.

Most research evaluating the impact of nematodes on turfgrass pertains to recreational ecosystems that include golf courses and sports fields (Crow *et al.*, 2003; Starr *et al.*, 2007; Cheng and Grewal, 2009). Few studies have evaluated the influence of nematodes on turfgrass species employed in

residential environments. Of 34 research articles on turfgrass pathology incited by nematodes published in three major nematological journals to date, seven pertain to *B. longicaudatus*, 10 focus on golf course turf species such as creeping bentgrass and bermudagrass, and 11 are studies of soil-food webs. Only five publications (Ratanaworabhan and Smart, 1969; Johnson, 1970; Giblin-Davis *et al.*, 1992, 1995; Crow and Welch, 2004) contain information on the influence of nematodes on St. Augustine and centipede turfgrasses, the types most widely utilized in residential landscapes in the southeastern United States. Our objectives were to conduct a census of plant-parasitic nematodes associated with urban turfgrass species in the metropolitan Baton Rouge, LA, area and to evaluate the impact of selected species on growth of St. Augustine and centipede turfgrasses.

MATERIALS AND METHODS

Survey of residential lawns in East Baton Rouge Parish, LA

An urban area of Baton Rouge that encompasses low-, middle-, and high-income residences, with a total area of 12,646 ha, was selected for sampling. A grid composed of 256 squares (sample areas), each 49.4 ha in size, was superimposed over a map of this area with horizontal and vertical designations of 1-16 and A-P, respectively. Twenty of these squares were randomly selected for sampling. Preliminary work indicated that each 195.9-ha square contained an average of 66 residences with lawns suitable for sampling. Five lawns in each of the 20 sample areas, referred to hereafter as "sites," were chosen for the collection of soil and root samples during May-September of 2011 and 2012.

Twenty-five cores (2.5-cm-diam. × 15-cm-deep) containing soil and roots were collected from 65 residences having St. Augustine lawns and 35 with centipede lawns. Samples were collected from weed-free, visually uniform stands of each grass type. A 250-g composite subsample of soil from each site was utilized for nematode community analysis, and a 20-g subsample was used to determine soil texture. Soil type and texture (percentages of sand, silt, and clay) for each sample was determined in the nematology laboratory utilizing the soil hydrometer method (Day, 1965; American Society for Testing and Materials, 1985). Root material from each site was visually inspected for damage and (or) galling by *Meloidogyne* spp., and a 3-g (fresh weight) subsample was placed on Baermann funnels (Hooper *et al.*, 2005) and inspected for nematodes after 24 and 48 hr.

Nematodes were extracted from soil samples by wet-sieving through nested 250- μm -pore (60 mesh) and 38- μm -pore (400 mesh) sieves followed by sugar floatation and centrifugation (Jenkins, 1964). Nematodes recovered from soil were enumerated and sorted according to genus (Mai and Lyon, 1975; McGawley *et al.*, 2011) at 40 \times using an inverted microscope.

Pratylenchus and *Meloidogyne* collected from soil and root samples of both turfgrass types were separated from community mixtures and propagated separately in axenic culture for 6 mo under greenhouse conditions. *Pratylenchus* was subcultured on corn (Saccharata) and both turfgrasses. *Meloidogyne* was increased on tomato (cv. Rutgers PS; Seedway, Hall, NY) and both turfgrasses.

Species identification of the lesion nematode to *P. zae* was accomplished using the key and diagnostic compendium by Handoo and Golden (1989). The root-knot nematode was identified as *M. incognita* using keys of Eisenback and Triantaphyllou (1991) based on morphology of the perineal pattern, heads and stylets of males, morphology of stylets of females, and distance of the excretory pore to the head. Vital nematode body measurements (25 per character) for both nematodes were made using a compound microscope and the Spot Image Analysis software (<http://www.spotimaging.com/software/>) for Macintosh. Additionally, for the root-knot nematode, reproduction on 'Rutgers' tomato was evaluated.

Evaluation of pathogenicity under greenhouse conditions

Experiments with *P. zae* and *M. incognita*, each repeated once, were conducted to evaluate their individual impact on the growth of St. Augustine and centipede turfgrasses. Duration of each of the four experiments was 71 d. In each experiment, 72 clay pots (each with a top diam. of 10.2 cm and holding 1.2 kg of steam-sterilized soil) were arranged as a randomized block on stainless steel mesh benches to represent three nematode infestation levels (0, 200, and 2,000 vermiform life stages of either *P. zae* or *M. incognita*), three soil types (clay, loam, and sandy loam) two turf types (St. Augustine and centipede established as 5 cm x 5 cm sod squares), and four replications. Prior to establishment in pots, the sod squares that had been purchased from a commercial source (Woerner Sod, Baton Rouge, LA) were rinsed free of soil, dipped in a 0.8% NaOCl solution for 20 sec and rinsed. Rinse water was analyzed for active nematodes, and none were observed. At 11 d after establishment, nematodes collected from stock cultures were pipetted from

aqueous suspension into a 5.0-cm deep depression in the center of each turfgrass square, thereby placing the nematodes in the area of active root growth. Turf was fertilized twice monthly with 1.25-g of water-soluble Scotts Turf Builder fertilizer (12% urea nitrogen, 4% available phosphate, 8% soluble potash, 0.10% chelated iron, 0.05% chelated manganese, and 0.05% chelated zinc) and watered daily. Foliage in each pot was trimmed to a height of 5 cm every 2 wk, and trimmings were placed into paper bags, dried at 30°C for 72 hr and weighed. At the conclusion of each experiment, a 150-g subsample of soil was collected from each pot and used to determine nematode population density in soil. A 3-g subsample from each root system was placed on a Baermann funnel for 24 hr and used to estimate levels of endoparasitic nematodes. Root systems were examined for galling and root lesions typical of the two nematode species.

Data were examined by analysis of variance (ANOVA) for a 3 \times 3 \times 2 (soil type \times inoculum level \times turfgrass species) factorial design using the "Fit Model" module of SAS JMP, version 10.0. Means were separated by Tukey's HSD ($P \leq 0.05$) test. There was no significant trial by treatment interaction, so statistics were calculated based on eight replications from two combined runs of like experiments.

RESULTS

Survey of residential lawns in East Baton Rouge Parish, LA

Thirteen genera of nematodes, with community totals ranging from 6 to 2,673 and from 45 to 2,185 individuals per 250 g of soil, were found in soils from lawns of St. Augustine and centipede turfgrasses, respectively (Table 1). Both the frequency of occurrence and population density of individual genera as well as nematode community totals were similar for both turfgrasses and averaged 496 for St. Augustine and 618 per 250 g of soil for centipede.

Nematodes in the genera *Criconebella*, *Helicotylenchus*, and *Tylenchus* were commonly associated with both turfgrasses, having frequencies ranging from 91 to 94% for St. Augustine and from 78 to 92% for centipede. Similarly, densities ranged from 150 to 180 per 250 g for St. Augustine and from 132 to 290 per 250 g for centipede. Genera less frequently encountered, with frequencies ranging from 25 to 69%, included *Meloidogyne*, *Pratylenchus*, and *Tylenchorhynchus* for St. Augustine and *Meloidogyne*, *Pratylenchus*, and *Hoplolaimus* for centipede. Densities of these genera ranged from 8 to 59 per 250 g of soil. *Xiphinema* was

Table 1. Nematode incidence and density in residential lawns of St. Augustine and centipede turfgrasses in East Baton Rouge Parish, LA.

Nematode genera (spp.)	St. Augustine ^v			Centipede ^v		
	Frequency ^w	Density ^x	Range ^y	Frequency ^w	Density ^x	Range ^y
<i>Aphelenchoides</i>	2	6	n/a	6	26	n/a
<i>Criconemella</i>	91	159	6-1,760	86	290	6-2,052
<i>Gracilicus</i>	3	20	17-22	0	0	n/a
<i>Helicotylenchus</i>	94	180	6-2,585	78	186	6-836
<i>Hemicycliophora</i>	2	11	n/a	0	0	n/a
<i>Hoplolaimus</i>	5	8	6-11	25	18	6-61
<i>Meloidogyne</i>	46	54	6-220	25	52	6-303
<i>Pratylenchus</i>	35	29	6-127	69	59	6-297
<i>Scutellonema</i>	2	11	n/a	3	25	n/a
<i>Trichodorus</i>	3	14	6-22	14	9	6-17
<i>Tylenchorhynchus</i>	25	28	6-88	19	32	6-88
<i>Tylenchus</i>	92	150	6-804	92	132	33-386
<i>Xiphinema</i>	15	11	6-22	6	14	5-22
Community ^z	100	496	6-2,673	94.4	618	45-2,185

^vSoil samples (250 g) were collected from 65 and 35 lawns containing St. Augustine and centipede, respectively, between March and October, 2011 and 2012.

^wFrequency is the number of times each genus was identified for each turfgrass expressed as a percentage.

^xDensity is the average number of individuals per 250 g of soil for each genus.

^yRange is the minimum and maximum density for each genus; n/a indicates presence in only a single sample and therefore not applicable.

^zRefers to plant-parasitic nematodes only.

found in only 15% of the samples from St. Augustine while *Trichodorus* spp. and *Tylenchorhynchus* were found, respectively, in 14% and 19% of the samples from centipede. Population densities for these genera were low and averaged 11, 9, and 32 per 250 g, respectively. *Aphelenchoides*, *Gracilicus*, *Hemicycliophora*, and *Scutellonema* were rarely detected, occurring at frequencies of less than 10% and densities ranging from 6 to 26 individuals.

Evaluation of pathogenicity under greenhouse conditions

Meloidogyne incognita had a significant negative effect on growth of both grasses (Table 2). There was a significant reduction in final weights of plants of both turfgrasses as inoculum concentration increased from 0 to 2,000 nematodes per pot. Final weights of plants for the 0, 200, and 2,000 inoculum levels

averaged 43.9 g, 38.9 g, and 28.2 g for St. Augustine and 45.0 g, 37.3 g, and 27.3 g for centipede. Weights for clippings and roots of both turfgrasses followed a similar pattern. Soil type influenced clipping weights for both grasses significantly. The clipping weight of St. Augustine grown in clay soils, 25.2 g, was significantly greater than those for loam and sand, which averaged 22.6 g and 21.4 g, respectively. Similarly, weights of clippings of centipede grown in clay and loam, 27.1 g and 25.7 g, respectively, were significantly greater than that for sandy loam (25.5 g). There was no significant inoculum by soil type interaction. Figure 1 illustrates the nematode population density from soil and roots of each of the two turfgrasses that resulted from the two inoculum levels of *M. incognita*. Populations at 71 d that resulted from the low level (200 nematodes per pot) did not differ significantly across both soil types and turfgrass species. At the 10-fold greater inoculum

Table 2. Main and interaction effects (*P* values) of *Meloidogyne incognita* inoculum level and soil type on growth of St. Augustine and centipede turfgrasses at 71 d after inoculation in a greenhouse environment^x.

Source	DF	Clipping weight		Root weight		Plant weight		Nematode density	
		St. August.	Centipede	St. August.	Centipede	St. August.	Centipede	St. August.	Centipede
I ^y	2	<0.001**	<0.001**	<0.001**	<0.001**	<0.001**	<0.001**	<0.001**	<0.001**
S ^z	2	<0.001**	<0.001**	0.111	0.888	0.169	0.913	0.7912	0.6105
I × S	4	0.963	0.475	0.263	0.370	0.232	0.346	0.9824	0.7551

^xData are combined over two trials with four replications per treatment and are weights of foliar clippings collected at six intervals, roots and weights of roots plus weights of clippings. Plant material was dried at 30°C for 72 hours. Data were analyzed as a 3 × 3 × 2 factorial with ANOVA ($P \leq 0.05$); * and ** indicate *P* values significant at the 0.05 and 0.01% level, respectively.

^yInoculum (I) levels were 0, 200, or 2,000 freshly collected juveniles per pot.

^zSoils (S) were clay (25% sand, 35% silt, 40% clay), loam (50% sand, 25% silt, 25% clay), or sandy loam (75% sand, 15% silt, 10% clay).

Table 3. Main and interaction effects (*P* values) of *Pratylenchus zeae* inoculum levels and soil type on growth of St. Augustine and centipede turfgrasses at 71 d after inoculation in a greenhouse environment^x.

Source	DF	Clipping weight		Root weight		Plant weight		Nematode density	
		St. August.	Centipede	St. August.	Centipede	St. August.	Centipede	St. August.	Centipede
I ^y	2	<0.001**	<0.001**	<0.001**	<0.001**	<0.001**	<0.001**	<0.001**	<0.001**
S ^z	2	<0.001**	0.030*	0.172	<0.001**	0.229	<0.001**	0.7844	0.0428*
I × S	4	0.717	0.753	0.561	<0.001**	0.646	<0.001**	0.9878	0.0046**

^xData are combined over two trials with four replications per treatment and are weights of foliar clippings collected at six intervals, roots and weights of roots plus weights of clippings. Plant material was dried at 30°C for 72 hr. Data were analyzed as a 3 × 3 × 2 factorial with ANOVA ($P \leq 0.05$); * and ** indicate *P* values significant at the 0.05 and 0.01% level, respectively.

^yInoculum (I) levels were 0, 200, or 2,000 freshly collected juveniles per pot.

^zSoils (S) were clay (25% sand, 35% silt, 40% clay), loam (50% sand, 25% silt, 25% clay), or sandy loam (75% sand, 15% silt, 10% clay).

level of 2,000 nematodes per pot, nematode reproduction was significantly greater in each soil with St. Augustine than in soil with centipede. At this high inoculum rate, reproduction was not influenced significantly by soil type for either of the grasses. Soil type did, however, impact weights of dry clippings of both turfgrasses. The weight of clippings of St. Augustine grown in clay soils (25.2 g) was significantly greater than those for loam and sandy loam (22.6 g and 21.4 g, respectively). Similarly, weight of clippings of centipede grown in clay (27.1 g) and loam (25.7 g), were significantly greater than that of sandy loam, which was 25.5 g.

As with *M. incognita*, *P. zae* also had a significant negative effect on the growth of both turfgrasses (Table 3). There were significant reductions in plant growth parameters as nematode inoculum level was increased. Respectively, final dry weights for clippings, roots, and plants of St. Augustine averaged 28.7, 45.6, and 49.8 g for the control, 24.4, 31.0, and 34.2 g for the 200 *P. zae* per pot inoculum level, and 21.3, 25.7, and 28.2 g for the 2,000 level. For centipede, weights averaged 27.7, 42.3, and 46.7 g for the control, 24.0, 30.1, and 33.4 g for the 200 level, and 24.7, 20.6, and 23.5 g for the 2,000 level.

Soil type impacted the weights of dry clippings for St. Augustine and averaged 26.4 g in clay and 5 to 6.5% less in loam and sandy loam soils. For centipede, each of the three growth parameters was influenced significantly by soil type. Weights for plants in clay soil were greatest, and averaged 26.2 g, while those for sandy loam were least, and averaged 23.0 g. Weights for clippings and roots followed a similar pattern.

With *P. zae*, there were significant inoculum level by soil type interactions for centipede grass that influenced both root and plant dry weights and nematode population density. At both inoculum levels, the weights of plants grown in sandy loam were reduced significantly below those of plants grown in either loam or clay soils (Fig. 2). Individual treatment means across soil types, turfgrass, and inoculum levels are shown as Fig. 3. At the low inoculum level, final populations on each of the grasses in each of the 3 soil types were not significantly different, ranging from approximately 4,700 to 6,200 individuals per pot (soil plus roots). From the high inoculum level, 2,000 per pot, final population density of *P. zae* ranged from approximately 13,500 to 25,400 and, except for the loam soil \times centipede combination, did not differ significantly across soil types and turfgrasses. Across inoculum levels, soil types, and turfgrass species, numbers of endoparasitic *P. zae* ranged from about 1,600 to 2,300 individuals per root system and were

not significantly different for any treatment.

DISCUSSION

Criconemella and *Helicotylenchus* were the genera identified most frequently and in the greatest abundance in home lawns in Baton Rouge, LA, during 2011 and 2012. Ye *et al.* (2012) indicated that ring and spiral nematodes were among the most commonly encountered on centipede in North and South Carolina; and Kelsheimer and Overman (1953) found that ring nematode was frequently associated with St. Augustine in Florida.

Stylet nematodes, *Tylenchus* spp., were found in 92% of the samples at densities that averaged 141 per 250 g of soil. Although only a single report (Good *et al.*, 1959) associates nematodes in this genus with residential lawns, the frequency of occurrence and population totals found in our survey may warrant further study. Both the incidence and density of populations of the 13 genera of nematodes detected in the survey, as well as the community structure as a whole, were remarkably similar for both turfgrasses. The obvious and characteristic galling and root lesion symptoms of *Meloidogyne* spp. and *Pratylenchus* spp., which were visible on a great many root samples from both turfgrasses during the survey, prompted the subsequent evaluation of their individual damage potentials.

Greenhouse trials with *M. incognita* and *P. zae* tested the hypothesis that these two nematodes caused significant root damage to St. Augustine and centipede turfgrasses. Although the root-knot nematodes *M. graminis*, *M. graminicola*, and *M. marylandi* have been more commonly reported from and associated with turfgrasses, there is a report associating *M. incognita* (Faske and Starr, 2009) with St. Augustine and indicating that reproduction of *M. incognita* on St. Augustine was equal to that of *M. marylandi*. In addition to morphological observations and measurements, the identification of this root-knot nematode as *M. incognita* is further supported by the fact that it reproduced on and caused marked galling on 'Rutgers' tomato. *Pratylenchus zae* has also been reported from St. Augustine (Inserra *et al.*, 2005).

Overall, in these 71 d-duration trials with *M. incognita* and *P. zae*, more nematodes were recovered from soil than from roots. It is plausible that damage due to nematode feeding reduced the root mass to the point where there was insufficient substrate to support the endoparasitic life stages, resulting in population accumulation in soil. This greenhouse-based and relatively short duration research provides impetus for further investigation and confirmation of the pathogenicity of *M.*

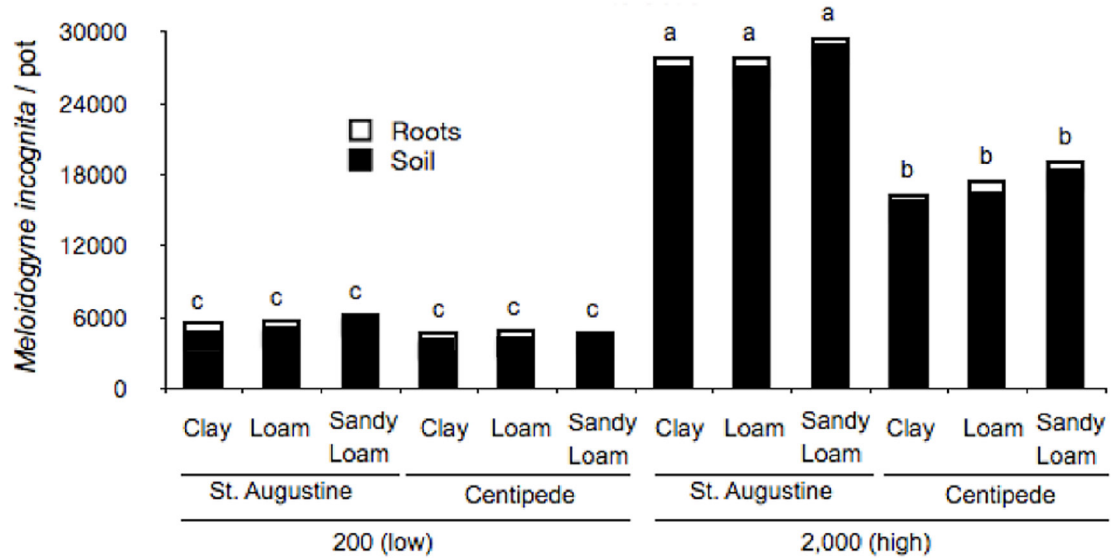


Fig. 1. Vermiform life stages of root-knot nematode (*Meloidogyne incognita*) recovered from soil (1.2 kg) and roots of St. Augustine and centipede turfgrasses grown in clay (25% sand, 35% silt, 40% clay), loam (45% sand, 25% silt, 25% clay), or sandy loam (75% sand, 15% silt, 10% clay) soils infested with 200 (low level) or 2,000 (high level) nematodes. No nematodes were recovered from the non-infested controls, and therefore, data are not presented as a part of this figure. Data are means of eight replications per treatment combined over two 71-d-duration trials conducted in a greenhouse environment. Bars with common letters are not significantly different based on Tukey's HSD ($P \leq 0.05$).

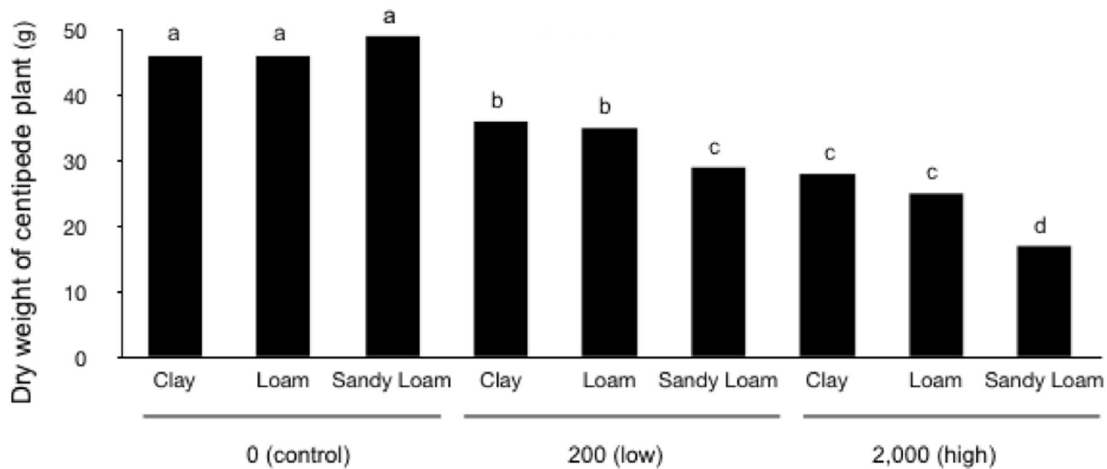


Fig. 2. Weights of dry plants of centipede turfgrass grown in clay (25% sand, 25% silt, 40% clay), loam (45% sand, 25% silt, 25% clay) or sandy loam (75% sand, 15% silt, 10% clay) soils infested with 0 (control), 200 (low), or 2,000 (high) lesion nematodes (*Pratylenchus zaeae*). Data are means of eight replications per treatment combined over two 71-d-duration trials conducted in a greenhouse environment. Bars with common letters are not significantly different based on Tukey's HSD ($P \leq 0.05$).

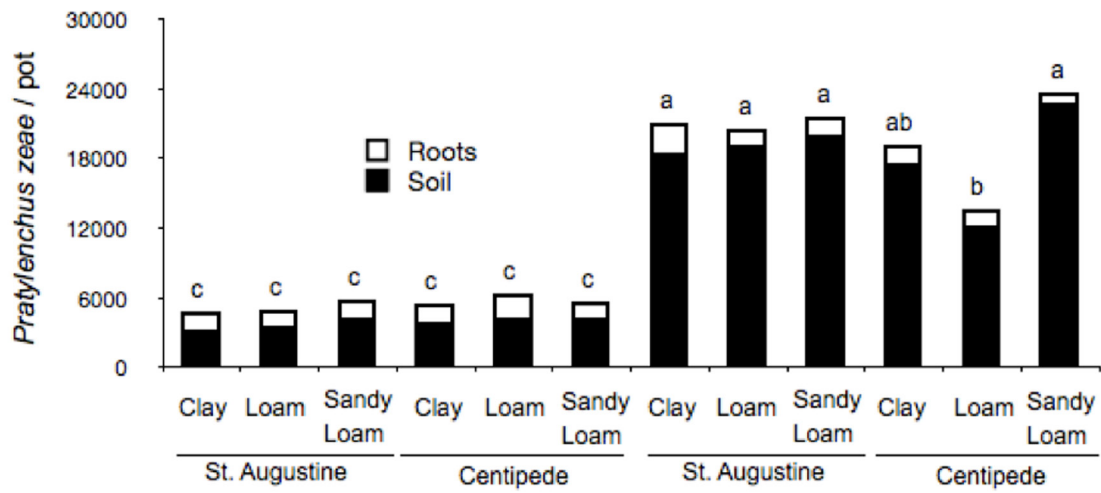


Fig. 3. Vermiform life stages of lesion nematode (*Pratylenchus zaeae*) recovered from soil (1.2 kg) and roots of St. Augustine and centipede turfgrasses grown in clay (25% sand, 35% silt, 40% clay), loam (45% sand, 25% silt, 25% clay), or sandy loam (75% sand, 15% silt, 10% clay) soils infested with 200 (low level) or 2,000 (high level) nematodes. No nematodes were recovered from the non-infested controls, and therefore, data are not presented as a part of this figure. Data are means of eight replications per treatment combined over two 71-d-duration trials conducted in a greenhouse environment. Bars with common letters are not significantly different based on Tukey's HSD ($P \leq 0.05$).

incognita and *P. zaeae* on St. Augustine and centipede turfgrasses. Such studies are now in progress.

Notable conclusions from the research reported herein include: i) communities composed of 12 to 13 genera of nematodes are associated with residential lawns of St. Augustine and centipede turfgrasses in the Baton Rouge, LA area, ii) *M. incognita* and *P. zaeae* can cause significant damage to St. Augustine and centipede turfgrasses, and iii) nematode reproduction was greatest in sandy loam, least in clay, and intermediate in loam soil.

A companion manuscript, to be submitted shortly, describes full season, microplot-based studies of the impact of these nematode communities on these turfgrasses over a period of 2 years.

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