RESEARCH PAPERS - TRABAJOS DE INVESTIGACION

NEMATODES FROM AN ESTUARINE HABITAT NEAR CEDAR KEY, FLORIDA [NEMATODOS DE UN ESTERO EN LA CERCANIA DE CEDAR KEY, FLORIDA]

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ABSTRACT

A survey of nematode fauna in estuarine habitats in the Gulf of Mexico was conducted in the area of Cedar Key, Florida. Emphasis was placed upon the recovery of free living marine nematodes and plant parasitic nematodes. In general, more nematodes were recovered when tap water rather than sea water was used in the second centrifugation. *Haliplectus* spp. were the most common nematodes found; also some dorylaimids and tylenchids were recovered in the sample from the beach area. *Helicotylenchus, Hoplolaimus, Dolichodorus* n.sp. and tylenchidae were recovered from other samples and are very tolerant to the highly saline habitat.

INTRODUCTION

World food supplies for the fast growing human population have been a serious problem for the last decade, a problem which can become worse in the future if more and more agricultural land is used for nonagricultural purposes.

Brackish water areas in Asia are being utilized as fish and shrimp farms, and the vast areas of brackish water in the United States may be put to a similar use in the future. To provide knowledge for future needs, the position of some free living marine nematodes in the lower food chain, and the tolerance of plant parasitic nematodes to the high salt concentration and how these nematodes affect their host plants, are necessary information for developing and utilizing the brackish land such as the area around Cedar Key, Florida. The purpose of this investigation was to determine what nematodes were present in the Cedar Key area.

MATERIALS AND METHODS

Ten soil samples from estuarine or beach habitats and 1 water sample from the Gulf of Mexico were collected at the following locations in or near Cedar Key, Florida.

Sample No:

1. Marsh land along dirt road 1.4 km from the Cedar Key sanitary land fill area on state road 24.
   1a. 10 m from Sample No. 1 but not under tidal influence.
2. Marsh land on state road 24 west of first concrete bridge southwest of Summer, Florida.
   2a. 15 m from Sample No. 2 but not under tidal influence except at extremely high tides.

3. Marsh land 75 m from Cedar Key school on state road 24 toward Cedar Key airport.
   3a. 15 m from Sample No. 3 but under less tidal influence.
4. Marsh land, 450 m west of Cedar Key airport on Gulf Boulevard.
5. Soil from edge of channel behind the Cedar Key State Museum.
6. Sandy beach, 500 m away from "Beach Front Motel" toward the Gulf.
   6a. Sea water collected from the shore.
7. Marsh land of Ludlow Creek in old Cedar Key sanitary land fill area.

Nematodes were removed by a sugar-flotation centrifugation technique (1). During the second centrifugation to remove nematodes, either a 1M sucrose solution in tap water or a 1M sucrose solution in Gulf sea water was used.

There were 3 replications per method and 100 cm^3 of soil was used per replicate. All specimens were preserved using Esser (3) or Tarjan (4) techniques, which have lactophenol and glycerine, respectively, as their final medium; and then mounted on Cobb's metal slides.

The pH and salinity of all samples were determined by the Soil Science Department, University of Florida, Gainesville.

RESULTS

Soil Tests

Soil pH ranged from 6.9 in Sample 5 to 9.4 in Sample 1a. The salinity was lowest from the latter sample and highest from sea water (Sample 6a). Salinities and pH readings are shown in Table 1.

Nematodes

A new species of *Dolichodorus* (2) was found in Sample 1 where *Juncus roemerianus* Scheele was the only host plant in the habitat. A few other tylenchids also were recovered in Sample 1. About 85% of the nematodes recovered in Sample 2 were tylenchids. Two males of a *Heterodera* sp. but no females or larvae were observed in this sample; females of *Heterodera* were recovered in Sample 2a.

Metachromadora and *Camacolaimus* were the predominant genera in Sample 3. *Hoplolaimus* and *Helicotylenchus* were recovered in large numbers from Samples 4,5 and 7 while tylenchidae were numerous in Samples 5, 6, and 7. In Sample 6, *Haliplec-*

Table 1. pH and salinity of samples

Sample No.	pH	Salinity (parts per thousand)
1	7.00	6.50
1a	9.40	0.59
2	7.15	6.86
2a	7.25	5.04
3	7.30	3.65
3a	7.30	3.36
4	7.75	4.76
5	6.90	14.84
6	8.30	1.12
6a	7.85	28.00
7	7.65	5.46

Table 2. Nematodes recovered from 600 cm³ of soil.

Nematode	Sample Number									
	1	1a	2	2a	3	3a	4	5	6	7
Acrobeloides	1	---	1	---	---	---	1	---	---	---
Bathylaimus	---	---	3	---	35	---	---	---	---	4
Camacolaimus protherchi	---	---	17	---	116	---	---	---	---	---
Criconemoides	---	66	---	---	---	---	---	---	---	---
Cyatholaimidae	---	---	---	24	28	---	---	2	---	---
Dolichodorus	38	---	---	---	---	---	---	---	---	---
Doruaimus	6	---	2	---	10	---	---	3	350	8
Haliplectus spp.	---	12	---	---	---	---	---	5	---	23
H. bickneri	---	---	---	---	---	---	3	---	1256	---
H. dorsalis	---	---	---	---	---	---	4	---	---	---
H. floridanus	---	---	---	---	---	18	---	---	---	---
Helicotylenchus	---	192	---	54	---	96	238	95	---	818
Hemicycliophora	---	---	---	---	---	---	---	1	---	---
Heterodera (male)	---	---	2	---	---	---	---	---	---	---
Heterodera (cyst)	---	---	---	36	---	---	---	---	---	---
Hoplolaimus	---	---	---	---	---	252	69	16	---	322
Linhomoeidae	---	---	---	---	1	---	---	---	---	---
Metachromadora	3	---	8	12	266	24	16	---	---	15
Neotylenchidae	1	---	---	---	---	---	---	---	---	---
Peltamigratus	---	126	---	---	---	---	---	---	---	---
Pratylenchus	---	---	---	---	---	---	---	---	---	2
Quadricoma	---	---	---	---	---	---	---	---	1	---
Rhabditis	---	12	---	12	---	---	2	4	---	10
Theristus	---	---	2	---	---	---	2	---	---	---
Tylenchidae	13	---	342	---	---	---	4	112	321	165
Xiphinema	---	---	---	---	---	---	---	1	---	1
Viscosia papillata	---	---	2	12	10	---	---	---	---	---
Unidentified	10	24	2	66	42	36	8	16	50	40

tus and *Dorylaimus* were recovered in very high numbers. Genera and numbers of nematodes recovered are shown in Table 2.

Differing numbers of nematodes were obtained from duplicate samples when tap water versus sea water was used for the second centrifugation (Table 3). In general, greater numbers were recovered using tap water.

Both preservation methods used were satisfactory.

RESUMEN

Se hizo un examen de los nematodos marinos y fitoparásitos en muestras tomadas de un estero cerca de Cedar Key, Florida. Además, se compararon técnicas de recolección y métodos de preservación. Se encontró que *Haliplectus* spp. es la especie más común de nematodos, aunque también se hallaron Dorylaimids y Tylenchids en las

Table 3. Nematodes recovered using tap water or sea water during the second centrifugation.

		2nd centrifugation 1 M sucrose solution in tap water				2nd centrifugation 1 M sucrose solution in Gulf sea water			
		Replicate				Replicate			
Nematode	Sample No.	1	2	3	Total	1	2	3	Total
Dolichodorus	1	9	10	5	24	4	6	4	14
Haliplectus	4	---	---	---	---	2	1	4	7
	5	---	---	1	1	1	1	2	4
	6	800	150	108	1058	150	21	27	198
	7	6	9	2	17	---	4	2	6
Tylenchidae	1	4	4	4	12	1	---	---	1
	2	62	87	39	188	37	56	61	154
	4	1	---	---	1	3	---	---	3
	5	31	20	45	96	12	4	---	16
	6	50	78	27	155	20	67	79	166
	7	42	41	24	107	21	20	17	58
Helicotylenchus	4	4	18	14	36	37	94	71	202
	5	12	7	16	35	31	13	16	60
	7	98	151	109	358	251	112	97	460

muestras de la playa. Se notó la presencia de *Helicotylenchus, Hoplolaimus,* Tylenchids y *Dolichodorus* n.sp. en otras muestras, ya que al parecer estas especies son tolerantes al alto contenido de sal característico de este ambiente.

LITERATURE CITED

1. Caveness, F.E., and H.J. Jensen. 1955. Proc. Helminthol. Soc. Wash. 22: 87-89; *2.* Chow, F.H., and A.L. Taylor. 1978. J. Nematol, In Press; *3.* Esser, R.P. 1973. Plant Dis. Report, 57: 1046-1047; *4.* Tarjan, A.C. 1973. Proc. Helminthol. Soc. Wash. 40: 296-297.

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MATING OF BRITISH AND PERUVIAN POPULATIONS OF POTATO CYST-NEMATODES *Globodera* spp. [CRUZAMIENTO DE POBLACIONES BRITANICAS Y PERUANAS DEL NEMATODO DE QUISTE DE LA PAPA]. J. Franco P.* and K. Evans, Rothamsted Experimental Station, Harpenden, Herts, England.

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ABSTRACT

The compatibility of populations of *G. rostochiensis* (Ro 1) and *G. pallida* (Pa 3) from the United Kingdom and Peru were studied by making single male-female crosses. Reciprocal crosses within and between populations showed that British and Peruvian populations of the same species interbreed and produce many eggs. Although interspecific matings occur, fewer eggs are produced and F1 progeny rarely survive. *G. pallida* males tended only to mate with their own females, whereas *G. rostochiensis* males mated with *G. pallida* females more frequently. *G. rostochiensis* females preferred their own males. This may operate to the disadvantage of *G. pallida* when both species occur together.

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INTRODUCTION

Species are usually identified on morphological characters but sometimes morphological and ecological data conflict and difficulty arises in deciding their