PRELIMINARY REPORT OF PLANT PARASITIC NEMATODES ASSOCIATED WITH IMPORTANT CROPS IN TRINIDAD [INFORME PRELIMINAR DE NEMATODOS FITOPARASITOS ASOCIADOS CON CULTIVOS DE IMPORTANCIA EN TRINIDAD]

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ABSTRACT

A survey was undertaken to investigate the plant parasitic nematodes associated with important crops in Trinidad. A total of 214 soil and root samples from 29 plant species contained mixed populations of 23 plant nematode genera. The average number of nematodes per 200 ml soil plus 10 gm root sample ranged from 336 to 15,580 with an overall average of 3,060. The most common plant nematode genera were *Aphelenchus, Pratylenchus, Helicotylenchus, Meloidogyne, Rotylenchulus, Tylenchus* and *Tylenchorhynchus.* The plant nematode species identified were also listed.

INTRODUCTION

Plant parasitic nematodes are being recognized in Trinidad as important limiting factors in crop production. Previous work on plant parasitic nematodes in the Eastern Caribbean has been reviewed by a number of workers (2, 3, 6, 7). However, knowledge of the occurrence and prevalence of plant nematodes associated with the important agricultural crops in Trinidad is still fragmentary. Preliminary work in this direction was attempted quite recently by Brathwaite (4) and Singh (16) in a few selected crops. It is therefore difficult to estimate current losses since there is no information on nematode population levels or their distribution.

The purpose of this study was to investigate the plant parasitic nematodes associated with important crops in Trinidad.

MATERIALS AND METHODS

Soil and root samples were collected from the major crop producing areas of Aranguez, St. Augustine, St. Joseph, Centeno, Central Trinidad, Talparo, Piarco and La Brea. The methods employed for soil sampling were similar to the procedures of Kleyburg and Oostenbrink (11). Each soil sample was made up of approximately one kilogram of soil collected with a one-centimeter borer from around the roots of plants. A sub-sample was then taken for processing by modified Cobb's decanting and sieving method (9). Duplicate samples of ten per cent of each nematode suspension were examined under the stereomicroscope and generic counts made. About 50 grams of feeder roots were collected from which a sub-sample of ten grams was then used for processing with the Waring blender (9). The mean of the combined totals of soil and root counts for each plant species was then taken. Species identifications were done under a compound microscope with specimens fixed in triethanolamine - formalin mixture (9).

RESULTS

A total of 214 soil and root samples collected from 29 important plant species contained mixed populations of 23 plant parasitic nematode genera (Table 1). The average number of nematodes per 200 ml soil plus 10 gm root sample ranged from 336 to 15,580 with an overall average of 3,060. There were qualitative and quantitative differences in the nematode populations associated with the different crops.

The most widely distributed plant nematode genera were *Aphelenchus, Pratylenchus, Helicotylenchus, Meloidogyne, Rotylenchulus, Tylenchus* and *Tylenchorhynchus.*

The important plant nematode species identified were *Aphelenchus avenae* Bastian, 1965; *Helicotylenchus dihystera* Cobb, 1893; Sher, 1961; *Helicotylenchus erythrinae* (Zimmermann, 1904), Golden, 1956; *Helicotylenchus lobus* Sher, 1966; *Hoplolaimus galeatus* (Cobb, 1913) Thorne, 1935; *Macroposthonia curvatus* Raski, 1952; *Macroposthonia onoensis* Luc, 1959; *Meloidogyne incognita* (Kofoid and White, 1919) Chitwood, 1949; *Pratylenchus penetrans* (Cobb, 1917) Filipjev and Stekhoven, 1941; *Pratylenchus brachyurus* (Godfrey, 1929) Filipjev and Stekhoven, 1941; *Pratylenchus zeae* Graham, 1951; *Rotylenchulus reniformis* Linford and Oliveira, 1940; *Rotylenchus robustus* (de Man, 1880) Filipjev, 1936; *Scutellonema bradys* (Steiner and Le Hew, 1933) Andrassy, 1958; *Trichodorus minor* Colbran, 1956;

TABLE 1.

AVERAGE NUMBER AND FREQUENCY OF OCCURRENCE[a] OF PLANT PARASITIC NEMATODE GENERA ASSOCIATED WITH VARIOUS CROPS IN TRINIDAD

CROP	No. of Samples	Nematode genera[b] per 200 ml soil+10 gm root													
		Pratylenchus	Helicotylenchus	Rotylenchus	Tylenchus	Tylenchorhynchus	Rotylenchulus	Aphelenchus and Aphelenchoides	Criconema and Macroposthonia	Meloidogyne	Other Tylenchida	Xiphinema Trichodorus and Longidorus	Saprophytic	Tylenchulus	TOTAL
Avocado (Persea americana)	11	292 (10)	209 (11)	- (0)	- (0)	19 (5)	98 (11)	7 (6)	52 (7)	374 (11)	77 (8)	- (0)	670 (11)	- (0)	1798
Banana (Musa sapientum)	5	- (0)	20 (5)	- (0)	- (0)	22 (2)	13 (2)	48 (5)	- (0)	38 (5)	7 (2)	- (0)	278 (5)	- (0)	426
Cabbage (Brassica oleracea var. capitata)	6	12 (4)	93 (6)	- (0)	126 (5)	121 (5)	761 (6)	47 (5)	90 (5)	112 (6)	54 (6)	- (0)	428 (6)	- (0)	1844
Cauliflower (Brassica oleracea var. botrytis)	2	- (0)	150 (2)	- (0)	- (0)	30 (1)	300 (2)	40 (2)	1050 (2)	403 (2)	173 (2)	- (0)	1268 (2)	- (0)	3414
Citrus (Citrus sinensis)	6	3 (2)	493 (6)	83 (5)	515 (6)	44 (6)	- (0)	62 (5)	97 (5)	- (0)	68 (6)	- (0)	416 (6)	493 (6)	2274
Cocoa (Theobroma cacao)	1	125 (1)	195 (1)	140 (1)	300 (1)	55 (1)	- (0)	- (0)	25 (1)	530 (1)	50 (1)	50 (1)	585 (1)	- (0)	2055
Coffee (Coffea robusta)	1	5 (1)	220 (1)	65 (1)	455 (1)	30 (1)	- (0)	- (0)	15 (1)	55 (1)	10 (1)	- (0)	195 (1)	- (0)	1050
Corn (Zea mays)	5	22 (4)	4 (4)	- (0)	82 (5)	- (0)	23 (4)	24 (4)	81 (3)	- (0)	15 (2)	1 (1)	84 (5)	- (0)	336

CROP	No. of Samples	Nematode genera[b] per 200 ml soil+10 gm root													TOTAL
		Pratylenchus	Helicotylenchus	Rotylenchus	Tylenchus	Tylenchorhynchus	Rotylenchulus	Aphelenchus and Aphelenchoides	Criconema and Macroposthonia	Meloidogyne	Other Tylenchida	Xiphinema Trichodorus and Longidorus	Saprophytic	Tylenchulus	
Cucumber (Cucumis sativus)	1	65 (1)	1095 (1)	55 (1)	510 (1)	290 (1)	1925 (1)	210 (1)	590 (1)	500 (1)	100 (1)	10 (1)	2290 (1)	- (0)	7640
Eggplant (Solanum melongena)	3	- (0)	247 (3)	23 (1)	117 (1)	282 (2)	12 (2)	35 (3)	442 (2)	503 (3)	118 (3)	- (0)	692 (3)	- (0)	2471
Groundnut (Arachis hypogaea)	1	60 (1)	750 (1)	45 (1)	460 (1)	245 (1)	1015 (1)	255 (1)	1150 (1)	180 (1)	110 (1)	85 (1)	880 (1)	- (0)	5235
Lettuce (Lactuca sativa)	1	- (0)	15 (1)	- (0)	- (0)	- (0)	130 (1)	30 (1)	5 (1)	125 (1)	40 (1)	- (0)	230 (1)	- (0)	575
Mango (Mangifera indica)	1	15 (1)	585 (1)	45 (1)	1480 (1)	110 (1)	30 (1)	5 (1)	1505 (1)	- (0)	30 (1)	5 (1)	475 (1)	- (0)	4285
Mustard (Brassica juncea)	1	- (0)	1580 (1)	150 (1)	380 (1)	340 (1)	620 (1)	20 (1)	760 (1)	680 (1)	50 (1)	- (0)	1600 (1)	- (0)	6180
Ochro (Hibiscus esculentus)	1	40 (1)	130 (1)	- (0)	- (0)	75 (1)	490 (1)	80 (1)	660 (1)	1190 (1)	125 (1)	- (0)	595 (1)	- (0)	3385
Onion (Allium cepa)	2	- (0)	180 (2)	40 (1)	68 (1)	188 (2)	523 (1)	45 (1)	348 (2)	198 (2)	115 (2)	5 (1)	280 (2)	- (0)	1990
Papaya (Carica papaya)	27	19 (9)	73 (24)	1 (7)	2 (2)	61 (13)	1171 (27)	33 (22)	123 (19)	566 (27)	64 (27)	1 (1)	350 (27)	- (0)	2464
Patchoi (Brassica chinensis)	1	- (0)	4510 (1)	280 (1)	250 (1)	210 (1)	430 (1)	30 (1)	1070 (1)	250 (1)	70 (1)	10 (1)	800 (1)	- (0)	7910
Pepper (Hot) (Capsicum frutescens)	2	- (0)	65 (2)	8 (1)	- (0)	10 (2)	115 (1)	13 (1)	3 (1)	65 (2)	33 (2)	- (0)	80 (2)	- (0)	392

CROP	No. of Samples	Nematode genera[b] per 200 ml soil + 10 gm root													TOTAL
		Pratylenchus	Helicotylenchus	Rotylenchus	Tylenchus	Tylenchorhynchus	Rotylenchulus	Aphelenchus and Aphelenchoides	Criconema and Macroposthonia	Meloidogyne	Other Tylenchida	Xiphinema Trichodorus and Longidorus	Saprophytic	Tylenchulus	
(Sweet) Pepper (*Capsicum annuum* var. *grossum*)	10	16 (8)	200 (9)	29 (2)	129 (9)	272 (9)	238 (9)	70 (9)	67 (9)	236 (10)	79 (9)	8 (3)	356 (10)	- (0)	1700
Pigeon Pea (*Cajanus cajan*)	2	- (0)	683 (2)	95 (1)	113 (2)	458 (2)	103 (1)	20 (2)	365 (1)	100 (2)	100 (2)	- (0)	235 (2)	- (0)	2272
Plantain (*Musa paradisiaca*)	4	10 (1)	4 (2)	- (0)	38 (3)	9 (2)	4976 (4)	14 (2)	- (0)	194 (2)	54 (2)	- (0)	438 (2)	- (0)	5737
Pumpkin (*Cucurbita pepo*)	1	- (0)	15 (1)	- (0)	- (0)	55 (1)	1245 (1)	25 (1)	- (0)	65 (1)	10 (1)	- (0)	95 (1)	- (0)	1510
Soybean (*Glycine max*)	4	- (0)	107 (4)	7 (2)	271 (3)	56 (4)	- (0)	28 (3)	4 (1)	22 (1)	58 (4)	3 (2)	191 (4)	- (0)	747
Spinach (*Spinacia oleracea*)	1	- (0)	30 (1)	- (0)	- (0)	- (0)	35 (1)	20 (1)	- (0)	70 (1)	45 (1)	- (0)	185 (1)	- (0)	385
Sugarcane (*Saccharum officinarum*)	1	540 (1)	4420 (1)	340 (1)	970 (1)	1880 (1)	60 (1)	30 (1)	4770 (1)	270 (1)	160 (1)	20 (1)	2120 (1)	- (0)	15580
Tobacco (*Nicotiana tabacum*)	101	161 (83)	39 (61)	45 (18)	172 (95)	46 (90)	14 (19)	29 (97)	8 (28)	941 (101)	50 (100)	- (0)	728 (101)	- (0)	2233
Tomato (*Lycopersicon esculentum*)	10	1 (1)	122 (9)	2 (1)	62 (2)	105 (9)	561 (10)	20 (8)	45 (7)	96 (8)	45 (10)	- (0)	262 (10)	- (0)	1321
Watermelon (*Citrullus lanatus*)	1	- (0)	685 (1)	50 (1)	380 (1)	75 (1)	350 (1)	45 (1)	30 (1)	165 (1)	45 (1)	- (0)	1235 (1)	- (0)	3060

a = Numbers in parenthesis denote frequency of occurrence of the nematode genus.

b = Nematode genera rarely found were *Hemicycliophora*, *Hemicriconemoides*, *Scutellonema*, *Hoplolaimus*, *Peltamigratus*, *Paratylenchus*, *Psilenchus* and *Trophurus*.

Trichodorus christiei Allen, 1957; *Tylenchorhynchus martini* Fielding, 1956; *Tylenchus costatus* de Man, 1921; *Tylenchulus semipenetrans* Cobb, 1913; *Xiphinema americanum* Cobb, 1913; *Xiphinema diversicaudatum* (Micoletzky, 1927) Thorne, 1939; *Peltamigratus luci* Sher, 1963; *Trophurus longimarginatus* n. sp.

DISCUSSION

The data showed that improtant crops in Trinidad harbor a mixed population; of plant parasitic nematodes. Many of the nematode species are known to be important pathogens while many others are suspected to be of economic significance in "soil tiredness" or "soil sickness" problems. The significance is suggested by previous soil desinfection studies, inoculation experiments and by field observations (14, 15, 17). Particularly noteworthy also is the occurrence of many unknown nematode species of the genera *Helicotylenchus, Heterodera, Rotylenchulus, Pratylenchus, Trichodorus* and *Tylenchulus.* These genera include some of the world's most damaging nematode pests.

The presence of *P. penetrans* and *P. zeae* is interesting for they are generally known to be restricted to the temperate and sub-tropical regions. The presence of the other nematode species in Trinidad has also been reported from other tropical areas (1, 5, 8, 10, 12, 13). The frequency of occurrence for many plant nematode genera compared favourably with the data reported from Guyana by the author (13).

In general the data provide a basis for further work in soil sterilization, populations studies, crop rotation and inter-relationship with other soil organisms.

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RESUMEN

Se llevó a cabo un reconocimiento para determinar los nematodos fitoparásitos asociados con cultivos de importancia en Trinidad. Un total de 214 muestras de suelo y raíces de 29 especies de plantas contenían mezclas de 23 géneros de nematodos fitoparásitos. El promedio de nematodos por 200 ml de suelo y 10 g de raíces varió de 336 a 15,580 con un promedio general de 3,060. Los géneros mas comunes fueron: *Aphelenchus, Pratylenchus, Helicotylenchus, Meloidogyne, Rotylenchulus, Tylenchus* y *Tylenchorhynchus.* También se da una lista de las especies de nematodos identificados.

NEMATODOS ASOCIADOS CON EL CULTIVO DE LA CAÑA DE AZUCAR *(SACCHARUM OFFICINARUM* L.) EN EL VALLE DEL CAUCA, COLOMBIA [NEMATODES ASSOCIATED WITH SUGARCANE *(SACCHARUM OFFICINARUM* L.) IN THE CAUCA VALLEY, COLOMBIA] . Francia H. Varón R., H. Castro M. y H. Ramírez A. Instituto Colombiano Agropecuario, Palmira Valle, Colombia.

Se considera en unas 90.000 hectáreas la extensión dedicada al cultivo de la caña de azúcar en el Valle del Cauca, Colombia.

Trabajos pendientes a conocer la población de nematodos asociados con este cultivo permitieron determinar, en su orden de importancia y prevalencia, los siguientes géneros: *Tylenchorhynchus* sp., *Xiphinema* sp., "Espirales" *(Rotylenchus* sp. y *Helycotylenchus* sp.), *Pratylenchus* sp,. *Meloidogyne* sp., *Criconemoides* sp., *Tylenchus* sp. y *Trichodorus* sp.

Pruebas de parasitismo realizadas con los géneros *Tylenchorhynchus, Xiphinema* y el grupo " Espiral ", inoculados individualmente y en combinación sobre las variedades comerciales POJ 2878 y CP 3834, dieron los siguientes resultados: Con los géneros *Tylenchorhynchus* y *Xiphinema,* se observó incremento en las poblaciones originalmente inoculadas, ocasionando además, el primero de ellos, reducción en el tamaño y en el número de macollas. El grupo "Espiral" permaneció más o menos constante, reduciéndose su población en algunos casos.