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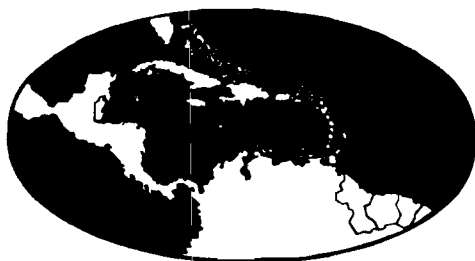
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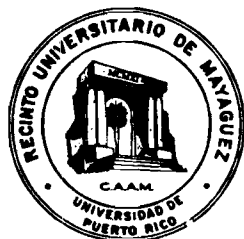
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A PRELIMINARY SURVEY OF PLANT PARASITIC NEMATODES ASSOCIATED WITH SOME CULTIVATED CROPS IN ST. KITTS AND NEVIS

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ABSTRACT

Plant parasitic nematodes occur at high population densities in samples from crop plants in St. Kitts and Nevis. The species found are recognised throughout the tropics as major pests of the respective crops. Among these are reniform nematodes, *Rotylenchulus* spp. on vegetable crops, *Pratylenchus brachyurus* and *Helicotylenchus dihystrera* on sugarcane, *Radopholus similis* on banana and cabbage and root-knot *Meloidogyne* spp. on all crops. The data suggest that plant parasitic nematodes may be partly responsible for the low crop yields in St. Kitts and Nevis.

A programme of nematode control should be formulated and carried out in these islands if losses due to plant parasitic nematodes are to be curtailed.

INTRODUCTION

The Caribbean islands of St. Kitts and Nevis are part of the Leeward Islands of the Lesser Antilles. The agricultural economy of both islands was once based on the production of sugar from sugarcane; in recent times sugarcane is grown commercially only in St. Kitts. The current emphasis on agricultural diversification throughout the Caribbean has resulted in increased attention to the production of local fruits, vegetables and root crops. The importance of plant parasitic nematodes in crop production in these islands has not been determined. The objective of this survey was to obtain qualitative and quantitative information on the occurrence of plant parasitic nematodes in the major crop-producing areas of each island.

MATERIALS AND METHODS

Soil and root samples from ten species of crop plants occurring on eleven estates in St. Kitts and nine species from seven estates in Nevis were collected and examined for plant parasitic nematodes by the methods previously described. The number of the various genera of plant parasitic nematodes in soil samples was expressed as a numerical

index in which 1 = 10 or fewer specimens/100 cc soil, 2 = 10 - 100, 3 = 100 - 1000, 4 = 1000 - 2000 and 5 = 2000 and above. Indices of 1 and 2 were considered to represent low population densities, while indices of 3, 4 or 5 were considered to represent a high population density of the particular genus.

ST. KITTS

RESULTS

The results obtained for St. Kitts are shown in Table 1, and those for Nevis in Table 2. Twelve genera of plant parasitic nematodes were present in samples from St. Kitts. Although different genera occurred at different population densities in samples from various crops, *Rotylenchulus* spp. was the most abundant genus encountered and it occurred at high population density in a large number of samples. Root-knot nematode, *Meloidogyne* spp., and spiral nematode, *Helicotylenchus* spp., were also commonly found.

High population densities of plant parasitic nematodes were associated with tomato at Shadewell, Fountain and Fahies estates, with sweet potato at Wingfield estate, with sugarcane at Lodge Estate, with pepper at Fountain, with okra and eggplant at Mt. Pleasant and with cabbage at Fahies and Mt. Pleasant. The total nematode population per 100 cc of soil for the island varied from 120 to 4400 with an average of 873.

Nematodes occurring on specific crops

(a) Vegetables

Reniform nematode, *Rotylenchulus reniformis* Linford and Oliveira, 1940, was found at high population density in all tomato-growing areas. Root-knot nematode also occurred in all areas but the average population density was less than that for reniform nematode. The widespread occurrence of root-knot nematode in samples was evidenced in the field by severe knotting of roots, especially at Fountain and Estridge's estates. Cabbage at Bayford's and Mt. Pleasant was parasitised by burrowing nematode *Radopholus similis* (Cobb, 1893) Thorne 1949. Burrowing nematode is a recognised pathogen of banana and citrus and, this may be the first report of its occurrence on cabbage. Other vegetable crops were parasitised mainly by spiral nematode, *Helicotylenchus* spp., root-knot nematode *Meloidogyne* spp. and reniform nematode, *Rotylenchulus* spp.

(b) Sweet Potato

Reniform nematode was most abundant in samples from Wingfield estate. Reniform nematode has been reported on sweet potato in other Caribbean countries and in the Southern United States. Its control has resulted in increased yield and quality of tubers. Consequently, this pathogen may be contributing to poor yield of sweet potato in St. Kitts.

(c) Sugarcane

Rotylenchus spp., *Meloidogyne* spp., *Pratylenchus brachyurus* (Godfrey, 1929) Filipjev and Stekhoven 1941 and *Helicotylenchus dihystris* (Cobb, 1892) Sher 1961, were present in samples from sugarcane at Lodge estate. These nematode species have been associated with decline in sugarcane yields in other parts of the world. Lesion nematodes, *Pratylenchus* spp., have been associated with the occurrence of stunted roots containing many dark brown lesions while infection by spiral nematodes, *Helicotylenchus* spp. result in the production of blunt irregular roots and a significant reduction in growth. In view of these reports, nematodes may be partly responsible for the low yield of sugarcane obtained in St. Kitts.

(d) Pangola Grass

Pangola grass is used extensively in the Caribbean as pasture for grazing cattle. The sample collected from Pangola grass contained high populations of *Helicotylenchus* spp. but other genera occurred at low population levels.

(e) Plant Parasitic Nematodes in Seedbeds

Rotylenchulus spp. and *Meloidogyne* spp. were found in seedbeds at Fountain estate and La Guerite Experimental Station. Seedlings produced at these areas are sometimes distributed to other parts of the island. A rigidly enforced programme of routine fumigation of all seedbeds is necessary to prevent the spread of dangerous plant parasitic nematodes in this manner.

(f) Saprophytic Nematodes

All samples from St. Kitts contained a large number of saprophytic nematodes. Although little attention was given their taxonomy, the genera, *Pangrolaimu*, *Rhabditis*, and *Mononchus* were frequently observed.

NEVIS

Ten genera of plant parasitic nematodes were associated with soil and root samples from Nevis (Table 2). Reniform nematode, *Rotylenchulus* spp., was the most abundant nematode present in soil samples usually at high population density. Root-knot nematodes, *Meloidogyne* spp. and lesion nematodes, *Pratylenchus* spp. were also common. The total plant parasitic nematode population varied from 195 to 2155 per 100 cc soil with an average of 1112. High infestations of plant parasitic nematodes were associated with tomato at Hamilton and Hermitage estates, with sweet potato at Rawlins, with banana and eggplant at Hardtimes and with carrot at Prospect. In addition, banana at Hardtimes was parasitised by *Radopholus similis* and *Rotylenchulus reniformis*, two of the most severe pathogens of this crop.

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TABLE 1. Plant parasitic nematodes associated with some economic crops in St. Kitts

Sample No**	Crop	Estate	Plant parasitic nematodes per 100 cc soil	Plant Parasitic Nematode Genera *										
				Aph. 1	Aph. 2	Cric. Hel.	Mel.	Prut.	Rad.	Roty.	Rotyln.	Tylenchor.	Tylen.	Xiph.
4	Cabbage	Bayfords	375	1	1	-	2	1	-	1	-	2	1	1
16	"	Mt. Pleasant	966	-	1	1	1	3	2	2	-	2	3	-
24	"	Fahies	1150	-	-	-	1	-	-	-	-	3	-	1
7	Carrot	Fountain	130	-	-	-	1	1	-	-	-	2	-	-
21	Eggplant	Mt. Pleasant	1370	-	2	-	3	3	-	-	-	2	-	1
20	Okra	"	2530	-	1	-	2	3	-	-	-	5	2	-
18	Onion	"	150	-	1	-	1	2	-	-	-	2	-	2
3	Pangola grass	Bayfords	310	-	-	1	3	1	-	-	-	2	-	1
2	Pepper	Shadewell	390	-	1	1	1	3	-	-	-	1	-	2
10	"	Fountain	4400	1	2	-	-	-	5	-	-	2	-	-
17	"	Mt. Pleasant	187	-	1	1	1	2	1	-	-	1	1	-
11	Sugarcane	Lodge	1240	-	2	1	3	2	-	-	3	1	2	-
22	"	Belmont	240	-	2	-	2	2	-	-	2	1	-	2
25	"	Bourk's	120	-	-	2	2	-	-	-	1	1	-	-

TABLE 1. Continued

Plant Parasitic Nematode Genera*														
Sample No.**	Crop	Estate	Plant parasitic nematodes per 100 cc soil	Aph. ¹ Aph. ² Cric. Hel. Mel. Prat. Rad. Roty. Tylenchor. Tylen. Xiph.										
				Aph. ¹	Aph. ²	Cric.	Hel.	Mel.	Prat.	Rad.	Roty.	Tylenchor.	Tylen.	Xiph.
27	Sugarcane	Camps	250	-	-	-	3	-	2	-	2	1	1	-
26	Sweet Potato	Wingfield	1780	-	1	1	2	3	-	-	-	4	2	3
1	Tomato	Shadewell	1310	-	2	1	2	3	1	-	-	3	-	2
5	"	Bayfords	1153	-	1	-	1	1	-	-	-	3	-	-
9	"	Fountain	1139	-	1	-	2	3	-	-	-	3	1	1
14	"	Estridge's	445	1	1	2	2	3	-	-	-	3	1	1
19	"	Mt. Pleasant	562	2	2	1	2	2	-	-	-	3	2	2
23	"	Fahies	1360	-	-	-	2	2	-	-	-	3	-	1
6	Nursary soil	Fountain	190	-	2	-	2	2	-	-	-	1	2	-
2	"	La Guerite	210	-	2	-	-	2	-	-	-	2	-	-
Average			873											

* Aph.¹ = *Aphelenchoides*, Aph.² = *Aphelenchus*, Cric. = *Cricenemoides*, Hel. = *Helicotylenchus*, Mel. = *Meloidogyne*, Prat. = *Pratylenchus*, Rad. = *Radopholus*, Roty. = *Rotylenchus*, Rotyln. = *Rotylenchulus*, Tylenchor. = *Tylenchorhynchus*, Tylen. = *Tylenchus*, Xiph. = *Xiphinema*, Long. = *Longidorus*.

1 = 10 specimens per 100 cc soil, 2 = 10 - 100, 3 = 100 - 1000, 4 = 1000 - 2000, 5 = 2000 or more

** for identification purposes only

TABLE 2. Plant parasitic nematodes associated with some economic crops in Nevis

Plant Parasitic Nematode Genera															
Sample No.	Crop	Estate	Plant parasitic nematodes per 100 cc soil	Aph. ² Cric. Hel. Long. Mel. Prat. Rad. Roty. Rotyln. Tylenchor. Tylen. Xiph.											
8	Banana	Hardtimes	1545	-	-	1	-	1	3	2	-	3	1	1	-
5	Cabbage	Zetland	125	-	-	2	-	2	-	-	2	2	-	-	-
4	Carrot	"	135	-	-	-	-	2	-	-	-	2	-	-	-
11	"	Prospect	1850	-	3	-	-	2	-	-	-	3	-	-	-
10	Eggplant	Hardtimes	1100	-	2	1	-	1	2	-	-	3	1	-	1
9	Pepper	"	195	-	-	2	-	-	2	-	-	2	-	1	-
1	Sweet Potato	Hamilton	1220	-	2	-	-	1	-	-	-	3	-	1	-
7	"	Rawlins	1245	-	-	1	-	2	-	-	-	3	-	-	-
12	Tannia	Seahaven	300	-	-	-	-	-	-	-	-	3	-	1	-
2	Tomato	Hamilton	2155	-	-	-	-	1	3	-	-	4	-	1	-
3	"	Hermitage	1570	-	-	2	-	3	1	-	1	3	1	1	-
6	"	Hardtimes	1900	-	-	1	-	3	1	-	-	4	1	1	-
Average			1112												

See Table 1. for legend

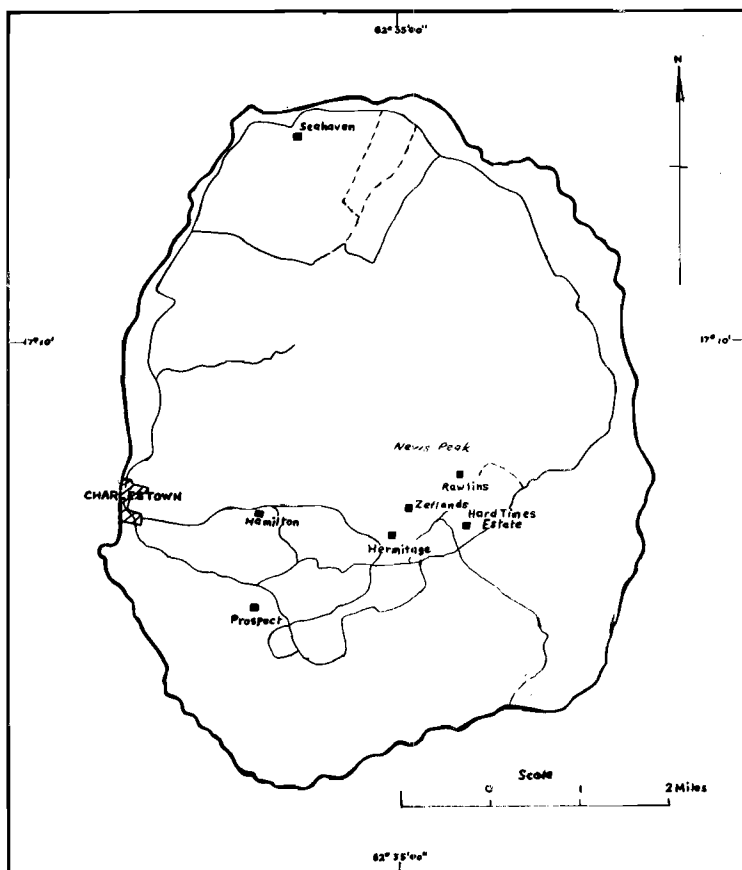


FIG. 1 MAP OF NEVIS SHOWING ESTATES FROM WHICH SAMPLES WERE TAKEN FOR THE NEMATODE SURVEY