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CARIBBEAN FOOD CROPS SOCIETY

PROCEEDINGS



**ELEVENTH ANNUAL
MEETING**

PLANT PARASITIC NEMATODES ASSOCIATED WITH VEGETABLE CROPS IN ANTIGUA

by

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ABSTRACT

A survey of nematodes associated with vegetable crops on seven estates in Antigua revealed 15 genera of plant parasitic nematodes. These included reniform nematodes *Rotylenchulus* spp., root knot nematodes *Meloidogyne* spp., lance nematodes, *Hoplolaimus* spp., stylet nematodes *Tylenchorhynchus* spp., and spiral nematodes *Helicotylenchus* spp., all of which are known to be economically important in crop production in other parts of the world. Moreover, the population density at which the nematodes occur in soil samples suggest that they could be limiting factors in vegetable production in Antigua.

INTRODUCTION

Antigua is one of the chain of islands enclosing the Caribbean Sea. For many years, agricultural production in the island has been based primarily on the production of sugarcane and cotton. However, because of the rapid increase in population and in tourism and the associated demand for additional food supplies, attention is now being paid to local vegetable production.

Because plant parasitic nematodes have been recognised as major pests of vegetable crops in many parts of the world (5) a survey was

carried out to determine whether plant parasitic nematodes were associated with vegetable crops in the major vegetable-producing areas of the island.

MATERIALS AND METHODS

Soil and root samples were collected from tomato (*Lycopersicon esculentum*), sweet peper (*Capsicum annum*), egg plant (*Solanum melongena*), cabbage (*Brassica oleracea* var. *capitata*), carrot (*Daucus carota*), cucumber (*Cucumis sativus*) and okra (*Hibiscus esculentus*) on the following estates:— Bethesda, Cassada Gardens, Claremont, Diamond, Collins, Green Castle and Parham (Fig. 1.) An area planted with a specific crop was sampled by collecting rhizosphere soil and small feeder roots from five to ten plants selected at random. Soil sub-samples were combined to give a composite sample. If a crop represented a large acreage on an estate or where several cultivars of the same crop were planted on an estate, 2 or 3 composite samples were taken. Samples were maintained in an ice-cooled container during sample collection. The nematodes were extracted from 200 cc of the soil samples by a combination of Cobb's sieving method and a modified Baermann Funnel technique (6). Root samples (10 gm) were blended with 100 cc of water and extracted in the modified Baermann Funnels. The nematode suspensions were collected after 24hr. and fixed in TAF (2). Nematodes were identified as to genus with the assistance of the taxonomic keys of Mai et al. (4) and Throne (7). The populations of the various genera in soil samples were expressed as a numerical index in which 1 = 10 or fewer specimens per 100 cc soil, 2 = 10–100, 3 = 100–1000, 4 = 1000–2000 and 5 = 2000 or more. Indices of 1 or 2 were considered to represent low population densities while indices of 3, 4 or 5 were considered to represent high population density of the particular genus. The occurrence of a genus in root samples was expressed by an asterisk (*) over the index. Roots were examined in the field and the degree of galling was expressed as a root-knot index on a 0-5 basis (6).

RESULTS

The results are presented in Table 1. Fifteen genera of plant parasitic nematodes were associated with vegetable crops in Antigua.

Reniform nematodes (*Rotylenchulus* spp.) occurred most frequently in both root and soil samples and were usually the most abundant nematodes in soil samples. The widespread occurrence of *Rotylenchulus* spp. in Antigua supports the increasing importance being attached to this genus in tropical crop production. Root knot nematodes, (*Meloidogyne* spp.) were second in abundance while other genera occurred less abundantly. Population density of the various genera were usually higher for tomato than for other crops. Severe galling of roots was not widespread except on tomato. However, stubby-root symptoms were commonly observed and the presence of a severe form of this symptom on eggplant and pepper at Green Castle and Collins, respectively, may be associated with the presence of stilet nematodes, (*Tylenchorhynchus* spp.) in these areas.

CONCLUSION

The results indicate that plant parasitic nematodes occur in the major vegetable-producing areas of Antigua. Various species of the genera encountered have been reported as pests of vegetable crops in other parts of the tropics (1, 3). Consequently there is need for the implementation of nematode control measures in vegetable production in the island to determine *inter alia* the profitability of nematode control in vegetable production.

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TABLE I

Plant Parasitic Nematodes Associated with Vegetable Crops in Antigua

Crop	Estate	Cultivar	Genera of Plant Parasitic Nematodes													Root Knot Index		
			Aphelenchoides	Aphelenchus	Citronenoides	Helicotylenchus	Hoplaimus	Longidorus	Meloidogyne	Paratylenchus	Paratylenchus	Rotylenchulus	Rotylenchus	Tylenchorhynchus	Tylenchus		Trichodorus	Xiphinema
Tomato	Collins	Indian River	-	-	3	-	-	-	3*	-	-	-	-	-	-	-	1	5
"	Green Castle	"	-	-	1	1	1	2*	-	-	-	-	-	2	-	-	-	2
"	Cassada Gardens	Manalucie	-	1	2	-	3*	-	-	-	-	-	-	-	1	-	-	4
"	Parham	Indian River	1	-	-	-	1*	-	-	-	-	-	-	-	1	-	-	1
"	Bethesda	"	1	-	-	-	2*	-	-	-	-	-	-	-	-	-	-	2
"	Diamond	Tropi-Gro	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	0
"	"	Indian River	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	0
"	"	Better Boy	-	-	1	1	-	-	-	-	-	-	-	-	1	-	1	0
"	Claremont	Indian River	-	-	-	-	2*	-	-	-	-	-	-	-	-	1	-	22
Sweet Pepper	Cassada Gardens	Yolo Wonder	1	-	-	-	-	-	-	-	-	-	-	2	1	-	-	0

TABLE 1 -- Cont'd

Plant Parasitic Nematodes Associated with Vegetable Crops in Antigua

Crop	Estate	Cultivar	Genera of Plant Parasitic Nematodes													Root Knot Index	
			Aphelenchoides	Aphelenchus	Cricenemoides	Helicotylenchus	Hoplaimus	Longidorus	Meloidogyne	Paratylenchus	Paratylenchus	Rotylenchulus	Rotylenchus	Tylenchorhynchus	Tylenchus		Trichodorus
Sweet Pepper	Parham	Yolo Wonder	-	1	-	-	1	-	-	-	-	-	-	-	-	-	0
"	Collins	"	-	1	-	3	-	-	-	1*	-	-	-	1	-	-	0
"	Bethesda	"	-	1	-	-	-	-	-	2*	-	-	2	1	-	-	0
"	Claremont	"	-	-	-	-	1	1	2*	-	-	-	-	-	-	-	0
"	Diamond	"	-	-	-	-	-	-	2*	-	-	-	-	-	1	-	0
Egg Plant	Cassada Gardens	'Freetown White' #	-	-	-	-	-	-	2*	-	-	-	-	-	-	-	1
"	Green Castle	'Purple and White' #	-	-	-	2	-	1	-	-	-	-	1	1	-	-	0
"	Parham	'Local' #	-	-	1	-	-	-	-	-	1	3*	-	-	1	1	0
"	Bethesda	"	-	2	-	-	-	-	3*	-	-	3*	-	1	-	-	2

Local Names

TABLE 1 — *Cont'd*
 Plant Parasitic Nematodes Associated with Vegetable Crops in Antigua

Crop	Estate	Cultivar	Genera of Plant Parasitic Nematodes																
			Aphelenchoides	Aphelenchus	Criconemoides	Helicotylenchus	Hoplolaimus	Longidorus	Meloidogyne	Paratylenchus	Pratylenchus	Rotylenchulus	Rotylenchus	Tylenchorhynchus	Tylenchus	Trichodorus	Xiphinema	Root Knot Index	
Egg Plant	Diamond	'Purple and White' #	-	-	-	-	1	-	-	-	-	3*	-	-	-	-	-	-	0
Cabbage	Cassada Gardens	All seasons	-	-	-	1	-	2*	-	-	-	2*	-	1	-	-	-	-	1
"	Parham	"	-	-	1	1	-	2*	1	-	-	3*	-	1	-	-	-	-	2
"	Claremont	"	-	-	-	-	1	1*	1	-	-	3*	-	1	-	-	-	-	1
Carrot	Cassada Gardens	Danvers half long	1	-	-	-	-	2*	-	-	-	1*	-	1	-	-	-	-	1
"	Green Castle	Chantenay red core	-	-	-	-	1	-	-	-	-	2*	-	-	-	-	-	-	0
"	Parham	"	-	1	-	-	-	2*	-	-	-	1*	-	-	-	-	-	-	1
Cucumber	Green Castle	Ashley	-	-	-	1	-	-	-	1	-	-	-	2	1	-	-	-	0

Local Names

TABLE 1 — Concluded

Plant Parasitic Nematodes Associated with Vegetable Crops in Antigua

Crop	Estate	Cultivar	Genera of Plant Parasitic Nematodes														Root Knot Index
			Aphelenchoides	Aphelenchus	Criconemoides	Helicotylenchus	Hoplolaimus	Longidorus	Meloidogyne	Paratylenchus	Pratylenchus	Rotylenchulus	Rotylenchus	Tylenchorhynchus	Tylenchus	Trichodorus	
Cucumber	Parham	Ashley	-	-	1	-	-	-	2*	-	1	-	-	-	-	-	2
"	Bethesda	'Local' #	-	-	-	-	-	1*	-	-	-	-	-	-	-	-	0
"	Diamond	Ashley	-	1	-	-	-	1*	-	-	1	-	-	-	-	1	0
Okra	Cassada Gardens	Clemsons Spineless	-	-	2	-	-	2*	-	-	-	-	-	-	-	1	2
"	Parham	"	-	-	2	-	-	2*	-	-	-	-	-	-	-	1	1

Local Names