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RESUMEN

Los nemátodos fitoparásitos, especialmente *Pratylenchus coffeae*, se concentran mayormente en los 6 mm de tejido más cercanos a la superficie, pero penetran hasta 15 mm en los tubérculos del ñame de Guinea. La mayor concentración de especímenes ocurrió en la región adyacente al tallo, mientras se recobraron menos de la porción distal del tubérculo.

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PRELIMINARY INVESTIGATIONS ON THE PARASITIC NEMATODES ASSOCIATED WITH TOBACCO IN TRINIDAD [INVESTIGACIONES PRELIMINARES SOBRE LOS NEMATODOS PARASITOS ASOCIADOS CON EL TABACA EN TRINIDAD]. N. D. Singh. Department of Crop Science, The University of the West Indies, St. Augustine, Trinidad, W. I.

ABSTRACT

One hundred and eighty-four soil and root samples taken from 92 tobacco fields in Central Trinidad were analyzed for plant parasitic nematode populations.

The results showed qualitative and quantitative differences according to soil texture, nematicides applied and varieties planted. Average mean number of plant parasitic nematodes per 200 cc of soil + 10 g root sample ranged from 55 to 5,220 with an overall mean of 1,000. Eleven plant parasitic nematode genera were recovered of which the most frequently encountered were *Pratylenchus*, *Meloidogyne* and *Tylenchus*. Population densities of *P. zaeae*, *M. incognita* and *Rotylenchulus reniformis* were high in spite of the low moisture content of soil during the growing period of the crop.

INTRODUCTION

Plant parasitic nematodes have been recognized as important pests of tobacco in Trinidad. In many areas the yield has declined during the past few years. Previous studies have shown that parasitism by *Meloidogyne* is or can be a limiting factor in tobacco production in Trinidad (1, 4, 7). Preliminary investigations in 1972 by the author revealed high populations of *Meloidogyne* and *Pratylenchus* associated with low tobacco yields (6).

MATERIALS AND METHODS

The investigation was carried out during the months of April to May, 1973. The soils investigated, Arena series and Las Lomas series, have been mapped and described by Brown and Bally (2). A typical particle size analysis for the Arena series at 0 to 17 cm depth would be 56% coarse sand (2-0.2mm), 37% fine sand (0.2-0.05mm), 7% silt (0.05-0.002mm) and 11% clay (< 0.002mm) and for the Las Lomas series at the same depth 10% coarse sand, 64% fine sand, 11% silt and 17% clay. However, wide textural variations existed between soils sampled from different fields within the same soil series. Clays, loams, sandy loams and fine sands were represented in the samples obtained.

Most of the fields were initially treated with nematicides. Liquid Ethoprop (Mocap) 6% emulsifiable concentrate (EC) and granular Ethoprop 10% were applied at the rate of 6.7 kg/ha (active ingredient). Liquid Ethoprop was applied 10 cm deep with chisel applicators spaced 0.3 m apart attached to tractor-mounted cultivators. The chisel furrows were sealed immediately behind the applicator. Granular Ethoprop 10% was spread with a fertilizer spreader on the soil surface and incorporated with a rototiller 10 to 12 cm deep. The crop was watered by natural rainfall which was less than 2.5 cm for the entire growing period. Data were collected on the variety of tobacco, fertilizers used and symptoms of nematode root damage.

Soil and root samples were collected from 92 different tobacco fields from central Trinidad. Soil samples were taken from each field with a garden fork at about 15 to 17 cm depth. Each sample was made up of one litre soil collected from around the roots of 10 to 12 tobacco plants, randomly selected. A sub-sample of 200 cc was processed by modified Cobb's decanting and sieving method (3). About 50 g tobacco roots were also collected from which a sub-sample of 10 g was used for processing with the Waring Blender (3). Duplicate samples consisting of 10% of each nematode suspension were examined under the stereo-microscope and generic counts made. Specific identifications were done under the compound microscope. The mean of the combined totals of soil and root counts was then taken.

The purpose of this study was to determine the plant parasitic nematodes associated with tobacco and their relationships with a few ecological factors.

TABLE 1. Occurrence and constitution of nematode populations in soil (200 cc) and root (10 g) samples of tobacco in Trinidad.

Nematode genera	SOIL		ROOTS	
	Mean number per sample	% Occurrence in 92 samples	Mean number per sample	% Occurrence in 92 samples
<i>Pratylenchus</i>	24	65	174	73
<i>Helicotylenchus</i>	34	58	1	3
<i>Rotylenchus</i>	51	60	0	0
<i>Rotylenchulus</i>	229	37	53	24
<i>Tylenchus</i>	94	88	1	1
<i>Tylenchorhynchus</i>	28	64	3	11
<i>Aphelenchus</i>	13	47	6	27
<i>Macroposthonia</i>	6	23	0	0
<i>Meloidogyne</i>	292	98	517	85
<i>Xiphinema</i> } <i>Scutellonema</i>	2	10	0	0
Other Tylenchida	21	59	8	37
Saprophytic	261	100	82	87
Mean Total	1156		842	

RESULTS AND DISCUSSION

184 soil and root samples collected from 92 tobacco fields in Central Trinidad contained mixed populations of 11 plant parasitic nematode genera (Table 1). The number of nematodes per 200 cc soil + 10 g root sample ranged from 55 to 5,220 with an overall mean average of 1,000. These figures were lower than those previously reported for tobacco in 1972 (6). This reduction in nematodes may have been due partly to the effect of the drought and partly to the nematicides applied to the soil. However, populations of *P. zae* Graham, 1951, *M. incognita* (Kofoid & White, 1919) Chitwood, 1949 and *Rotylenchulus reniformis* Linford and Oliveira, 1940 were high. In fact, *Meloidogyne* was found in almost all soil samples. On the other hand, populations of *Helicotylenchus dihystra* (Cobb, 1892) Sher, 1961; *Rotylenchus robustus* (de Man, 1880) Filipjev, 1936 and *Tylenchorhynchus* spp. were less frequently encountered, but in several instances their population densities were also high.

It was observed that nematodes were associated with root abnormalities including galls, lesions, stunted growth, swollen or decayed roots.

The data showed that clay soils harboured considerably less nematodes than loam, sandy loam or sandy soils (Table 2). Similar results were obtained in previous studies (6). *Tylenchus* spp. and *Aphelenchus avenae* Bastian, 1865 were found to be well distributed in all soil types. However, *P. zae*, *M. incognita*, *R. reniformis* were more common in lighter soils than in heavy clay soils. Particularly noteworthy also was the occurrence of high numbers of *M. incognita* in clay soils of Arena and Depot areas.

A greater number of plant nematodes was found on the roots of "Speights G28" variety than "NC-95" variety. "NC-95" resistance to *M. incognita* has already been reported (5).

Table 2. The distribution of selected nematodes associated with tobacco in Trinidad by soil texture.

SOIL TEXTURE	No. of Samples	<i>Pratylenchus</i> <i>zae</i>	<i>Tylenchus</i> spp.	<i>Aphelenchus</i> <i>avenae</i>	<i>Meloidogyne</i> <i>incognita</i>	<i>Rotylenchulus</i> <i>reniformis</i>
Fine Sand	27	145 ^a	50	10	360	91
Sandy Loam	24	120	50	9	452	198
Loam	30	70	47	9	616	190
Clay	11	16	32	10	255	14

a = Mean number per 200 cc soil + 10 g root sample.

Table 3. Nematode populations of tobacco in relation to nematicide in Trinidad.

Nematicide and rate / ha (active ingredient)	No. of Samples	Nematode genera												
		<i>Pratylenchus</i>	<i>Helicotylenchus</i>	<i>Rotylenchus</i>	<i>Rotylenchulus</i>	<i>Tylenchus</i>	<i>Tylenchorhynchus</i>	<i>Aphelenchus</i>	<i>Macroposthonia</i>	<i>Meloidogyne</i>	<i>Xiphinema</i>	Other Tylenchida	Saprophytic	TOTAL
Liquid Ethoprop 6% EC 6.7 kg	82	110 ^a	16	26	151	48	16	10	3	472	1	16	170	988
Granular Ethoprop 10% 6.7 kg	3	2	5	2	67	8	12	8	3	75	0	5	73	260
Control	7	11	34	30	64	51	18	2	0	1004	5	3	231	1453

a = Mean number per 200 cc soil + 10 g root sample.

It was found that soil application of the nematicide Ethoprop considerably reduced *Meloidogyne* spp. compared with the control (Table 3). However, granular Ethoprop 10%, applied only to three fields, was found to be more effective in controlling the various nematode populations than liquid Ethoprop 6% EC.

It was difficult to establish the influence of the previous crops or fertilizers on the nematode populations. The relationship was obscured because of the nematicides applied to the soil at planting time.

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RESUMEN

Se analizaron 184 muestras de suelo y raíces provenientes de 92 campos de tabaco en Central Trinidad para determinar las poblaciones de los nematodos fitoparásitos. Los resultados indicaron diferencias cualitativas y cuantitativas según la textura del suelo, los nematicidas aplicados y las variedades sembradas. El número promedio de nematodos fitoparásitos por 200 cc de suelo + 10 g de raíces varío de 55 a 5,220 con un promedio general de 1,000. Se encontraron 11 géneros de nematodos parásitos de los cuales los más frecuentemente encontrados fueron *Pratylenchus*, *Meloidogyne* y *Tylenchus*. Las densidades poblacionales de *P. zaeae*, *M. incognita* y *Rotylenchulus reniformis* fueron altas a pesar del bajo contenido de humedad en el suelo durante el período de crecimiento del cultivo.

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