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**SURVEY ON PINEAPPLE  
PESTS AND DISEASES  
IN THE  
LESSER ANTILLES**

**FINAL REPORT**

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IICA OFFICE IN TRINIDAD AND TOBAGO

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**SURVEY ON PINEAPPLE  
PESTS AND DISEASES  
IN THE  
LESSER ANTILLES**

**FINAL REPORT**

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March 1995

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3. CARDI - Dominica
4. IICA - St Lucia

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## TABLE OF CONTENTS

Survey on Pineapple Plant and Diseases in the Lesser Antilles/Executive Summary .....	1
Trinidad.....	3
St Lucia.....	7
St Vincent.....	10
Grenada.....	13
Barbados.....	16
Antigua.....	18
St Kitts.....	21
Dominica.....	24
App.1:Mission Report .....	28
App.2:Report on Pineapple Field Survey in Trinidad and Tobago .....	33
App.3:Report on Assessment of Nematode Populations in Pineapple Production at two Locaions.....	36



## **ACRONYMS AND ABBREVIATIONS**

<b>CARDI</b>	<b>Caribbean Agricultural Research and Development Institute</b>
<b>CES</b>	<b>Central Experiment Station Centeno. Ministry of Agriculture, Land and Marine Resources. Trinidad and Tobago</b>
<b>CIRAD-FLHOR</b>	<b>Centre de Coopération Internationale en Recherche Agronomique pour le Développement - Département des Productions Fruitières et Horticoles (Martinique France)</b>
<b>DED</b>	<b>Deputy Executive Director</b>
<b>FIT</b>	<b>Floral Induction Treatment</b>
<b>IICA</b>	<b>Inter-American Institute for Cooperation on Agriculture</b>
<b>MoA</b>	<b>Ministry of Agriculture</b>
<b>OECS</b>	<b>Organization of Eastern Caribbean States</b>





## **ACKNOWLEDGEMENT**

This survey on Pests and Diseases of Pineapples in the Lesser Antilles was co-funded by two regional projects of the Inter-american Institute for Cooperation on Agriculture (IICA), based in Trinidad and Tobago: the regional fruit project "Supporting the Development of Tropical fruits in the Caribbean" and the "Caribbean Animal and Plant Health Information Network (CARAPHIN)".

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G rard Barbeau  
Fruit Crops Specialist  
IICA Office in Trinidad and Tobago



# **SURVEY ON PINEAPPLE PESTS AND DISEASES IN THE LESSER ANTILLES**

## **EXECUTIVE SUMMARY**

### **Survey objective**

During a technical meeting on pineapple cultivation, held in March 1994 in Martinique, a survey on pineapple pests and diseases in the Lesser Antilles was identified as a priority in order to avoid pest and disease expansion through vegetative planting material exchanges.

Control of traditional planting material (suckers) transfers can be easily understood: plant health protection is the primary concern when developing a crop production programme in a country. If a risk exists, introduction of a new variety must be done using tissue-cultured plants. Then, traditional rapid multiplication techniques can be used.

This survey was aimed at identifying, for each country visited (Trinidad, St Lucia, St Vincent, Grenada, Barbados, Antigua, St Kitts and Dominica), the main pests and diseases in local pineapple fields.

### **Methodology**

The survey was conducted by CIRAD-FLHOR and IICA, with the participation of the ministry of agriculture in each country, and CARDI in Antigua, St Kitts and Dominica.

Although time was short in each country, as many of the more representative local production plots as possible were visited. At each site, a form was filled out concerning environmental conditions, cultural practices and field observations. A rough assessment was given for each pest and disease (see Tables 1 to 8).

### **Summary of the results**

- ❑ In all the countries visited, **wilt disease** (associated with wilt mealy bugs and ant populations) was observed. This disease is the most important phytosanitary constraint for pineapple cultivation in the Lesser Antilles. Its effect on yield can cause losses of more than 50%.

Impact on production can be reduced by adapting cultivation practices – spiny-leaved varieties, which are usually grown in these countries, are less sensitive than the Smooth Cayenne variety. Systemic insecticides (e.g. disulfoton) should be used to control the wilt mealy bug population. Insecticide treatment of suckers before planting should be systematic. Ant control must also be carried out by using baits or suitable pesticides. However, the virus that causes this disease, cannot be eradicated.

- ❑ **Black spot (or fruitlet core rot) and leathery pocket diseases** were also noticed in all the countries. Spiny-leaved varieties are more sensitive than Smooth Cayenne.

In each country, according to the extreme variability of the disease expression, it is advised that several observations be made (all year round if possible) in order to obtain a good evaluation of the impact on production, and to better define the effect of seasonal variations on infection development (climate effect).

Unfortunately, there is not yet an effective way to control these fruit infections, which are known over the world in all areas producing pineapple.

- ❑ Damage to root systems due to **symphilids** and **nematodes** were often observed. Damage level depends on environmental conditions (soil in particular) and cultural practices – intensive cultivation (density in particular) increases risk of proliferation. Adequate chemical treatments can control these pest populations.
- ❑ Fungus infections (*Phytophthora* sp. and *Thielaviopsis paradoxa*) were also observed in the different countries. Impact is very variable according to soil conditions (a pH above 5 is very favourable to phytophthora development) and/or to cultural practices (fungicide treatment of planting material before or just after planting greatly reduces damage at planting time, especially during rainy seasons).
- ❑ Coleoptera damage was observed, especially on plots situated close to the forest. These pests can be easily controlled by insecticide applications.
- ❑ Damage due to *Thecla basilides* (Lepidoptera) was only seen in Trinidad. This pest, which is mainly present in South America (and in particular in Guyana), can have a serious effect on yield; attacked fruits are disformed and cannot be marketed. Controlling this pest requires numerous insecticide applications at flowering time. **The economic consequence of the presence of *Thecla* on an island is very serious – that is why all material (even treated) transfers from South America and Trinidad to Caribbean islands must be forbidden.**
- ❑ The survey showed that, except for *Thecla basilides*, the same main pineapple pests and diseases are present in all the different islands, but with different levels of infestation.

Economic impact of these pests and diseases is generally high. A proper crop protection strategy could significantly increase productivity in many cases. A study on pesticide availability should be done.

## **TRINIDAD**

### **SURVEY TEAM**

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### **DATE OF SURVEY**

27-29 June 1994

### **FIELD VISITS**

Cumana	P Lee Wing's plot
Mundo Nuevo	K Gosyne's plot
Orange Grove	Orange Grove National Company
Maracas	H Fredericks's plot
Chatham	G Persad's plot
	C Jones's plot
Penal	S Guyadeen's plot
Prince's Town	A Pallackdharry's plots
	C Maharaj's plot
	R Ramgoolam's plot
Mausica	V Maharaj's plot

### **PEST AND DISEASE OBSERVATIONS (see Table 1)**

#### **DISEASES**

##### **Wilt disease**

In all fields visited, symptoms of this disease were observed. Nevertheless, the plots were affected to different degrees:

- the whole of the Cumana plot was affected
- spots of limited number of plants at Orange Grove were affected
- few symptoms were observed at Chatham.

The expression of the disease depends on climatic conditions, plant nutrition status and varietal sensibility. The Deltada variety seems to be less sensitive to the wilt disease than Smooth Cayenne.

The virus responsible for the wilt disease is transmitted by pineapple mealy bugs (*Dysmicoccus brevipes*), which are carried about by ants. Both were found in Trinidad. In some situations (Chatham) the

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population of mealy bugs was very high; they were mainly situated at the leaf bases or on the fruit. The presence of mealy bugs on the roots under the ground (found at Mundo Nuevo) must be reported; the control of this mealy bug is difficult and requires an efficient systemic insecticide (e.g. disulfoton).

### **Black spot and leathery pocket**

These diseases, which are due to a fungi complex (especially *Penicillium funiculosum* and *Fusarium moniliforme*), were observed on fruits at Mundo Nuevo (variety: Mundo Nuevo), at Chatham (mainly leathery pocket; variety: Deltada) and at Prince's Town (Pallackdharry's farm; variety: hybrid = Deltada x Sugar Loaf).

The variability of the disease expression is very high; lots of fruits must be observed during the whole year to obtain a precise evaluation of the impact of these diseases.

## **PESTS**

### *Thecla basilides*

Damage due to the Lepidoptera, *Thecla basilides*, were seen in all the fields visited (except at Orange Grove and at Pallackdharry's farm where treatments had been given), but it was particularly important at Mundo Nuevo (varietal aspect?).

This Lepidoptera lays eggs on pineapple flowers. Gumming is induced during fruit development as a reaction against the pest attacks. When the worm is growing, it digs big galleries in the fruit which becomes deformed and cannot be marketed.

*Thecla basilides* can be easily controlled with regular insecticide treatments during the flowering phase. It has been noticed that, in Trinidad, damage was more severe on plots situated close to the forest, which is a natural environment for the butterfly (high infestation level).

### **Symphilids (Hanseniella sp.)**

The symphilids are small miriapods which eat root tips; this provokes an excessive root ramification and a root disfunction which can greatly decrease the plant growth rate.

'Witches' brooms' on the root system, which are symptoms of symphilid attacks, were seen at Orange Grove (despite of the use of a correct insecticide; applications should be more frequent) and at Pallackdharry's farm. The type of soil and the high density of planting can explain this infestation.

Insecticides (mainly contact organophosphorus compounds), mixed with the soil before planting, or applied on banks during the growth cycle, can control symphilid populations.

### **Coleopteras**

At Chatham, damage on fruits and/or on plants due to several coleopteras was seen. Some of these insects were identified: *Trachideresa succinctis* (Cerambycidae) which feeds on fruit, and *Strategus* sp. or rhinoceros beetle (Scarabidae) which can burrow into the soil next to the plant to feed on roots and leaf bases, killing the entire plant. Another coleoptera (Curculionidae) was found in fruits.

The same damage as that caused by the rhinoceros beetle has been seen at Toco.

These coleopteras can be controlled with insecticide applications (such as diazinon). Risk of damage is higher in fields located at the edge of the forest.

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Table 1 Status of pineapple pests and diseases in Trinidad, July 1994

Farmers Name	Location	Variety	Cultivation System	Wilt Disease	Symphyliids	Nematodes	Phytophthora	Thielaviopsis	Black Spot & Leathery Pockets	Thecia basillides	Others/comments
P Lee Wing	Cumana	Deitada Sugar Loaf Hybrid?	Extensive (low density) intercropping with citrus, flowers, cassava	Strong symptoms; presence of mealy buds & ants	Not seen	Not seen	Not seen	Not seen	No mature fruit	Deformed fruits	
K Goayne	Mundo Nuevo	Green and Red Mundo Nuevo	Extensive pure culture (low level of inputs, no F.I.T.)	Few symptoms; mealy bugs also on roots; ants	Not seen	Not seen	Not seen	Not seen	Yes	Larvae and gummosis on fruits; very severe damage	
Caroni Ltd	Orange Grove	Deitada	Intensive pure culture (45000 pl/ha) inputs; mechanization; F.I.T.)	Symptoms on fruits spots; mealy bugs on fruits & roots	Yes, seen; Presence of 'witches' brooms	Suspected	Not seen	Not seen	Not seen	Not seen	
H Fredericks	Maracas	Deitada	Extensive intercropping with fruit trees, banana, etc.,	Few symptoms; low ant & mealy bugs population	Not seen	Not seen	Not seen	Not seen	No mature fruit	Deformed fruits	
G Persad	Chatham	Deitada + 1 unknown	Extensive pure culture (low level of inputs, no F.I.T.)	Few symptoms mealy bugs on pits & fruits; ants	Not seen	Not seen	Not seen	Suspected	Yes; mainly leathery pockets observed	Deformed fruits	Insects (coleoptera) feed on fruits and burrow soil and plant bases, seeds
C Jones	Chatham	Deitada	Semi-extensive intercropping with banana & fruit trees	Very few symptoms mealy bugs & ants at base of plants	Not seen	Not seen	Not seen	Not seen	Yes	Deformed fruits; important damage	Insects (coleoptera) feed on fruits and burrow soil and plant bases
A Pallockthary	Princes Town	Deitada Sugar Loaf Smith hybrid	Intensive pure culture (50000 pl/ha) inputs; mechanization; F.I.T)	Few symptoms; very low mealy bug population	Witches' brooms	Suspected	Yes; on a few plants	Not seen	Yes	Damage only seen on a few fruits	Treatments against Thecia basillides
V Maharaj	Mausica	Smith hybrid	Intensive pure culture	Few symptoms; very low level of mealy bug population	Witches' brooms	Suspected	Not seen	Not seen	Not seen	Not seen	

\*FIT: Floral Induction Treatment



## **ST LUCIA**

### **SURVEY TEAM**

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P John, Extension officer, MoA, St Lucia  
G Maturin, Crop protection officer, MoA, St Lucia  
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### **DATE OF SURVEY**

11–12 July 1994

### **FIELD VISITS**

Fond Estate    Fernand's farm  
River Dorée    Hofdal's farm

### **PEST AND DISEASE OBSERVATIONS (variety: Smooth Cayenne; see Table 2)**

#### **ON PLANTS**

##### **Wilt disease**

Symptoms of wilt disease were found in all the fields visited .

At Fond Estate, wilt disease is the main constraint of production; the symptoms were very severe, particularly on the ratoon crops (high level of mealy bugs and ant infestations). Here, the lack of water, which was very severe (dry weather since October 1993), greatly increased the adverse impact on yield – a large percentage of small fruits with sharp eyes and high acidity which could not be marketed.

At River Dorée wilt disease was less important, but young plantations showed a real infestation potential – the first symptoms were seen: reddening of the leaf centres, leaf tips start to curl. Regular insecticide applications should control mealy bug populations and maintain the infestation at a low level. A drip irrigation system, even if used only during the fruiting stage, helps the plants to withstand the dry season.

##### **Symphilids (*Hanseniella* sp.)**

Symptoms of symphilid attacks were observed on roots, especially at River Dorée. Symphilids eat the root tips which induces a ramification of the roots ('witches' brooms'). This infection provokes a decrease in the root system's efficiency, and subsequently the plant growth.

## Nematodes

Soil and root samples were collected from each location (Fond Estate and River Dorée Estate) in order to determine population densities of plant parasitic nematodes.

Nematodes of economic significance detected at the two production sites were the spiral nematodes (*Helicotylenchus multicinctus*) and the reniform nematode (*Rotylenchulus reniformis*). The lesion nematode (*Pratylenchus* sp.) was detected at River Dorée Estate.

Population densities were relatively low (see Tables) at the sampling time. Nevertheless, the nematodes detected could contribute to growth reduction and bad yields, especially the semi-endoparasitic species (*Rotylenchulus reniformis*). The presence of *Pratylenchus* sp. should be confirmed: this endoparasitic nematode is the more dangerous nematode for pineapple production: it can destroy the whole root system very quickly.

Both symphilitids and nematodes can explain the bad sanitary state and the poor development of root systems observed during this survey at St Lucia. Application of a nematicide/insecticide (Mocap, Rugby) mixed with the soil before planting is essential; re-treatment a few months after may be useful.

## Fungus attacks

Symptoms of phytophthora (*Phytophthora* spp.) attacks were observed at River Dorée Estate. These attacks occurred a few weeks after planting, on young plants. Phytophthora provoked heart rot and plant death.

Usually, the losses can be particularly high when plantings during the wet season. This infection can be controlled very easily by chemical treatment (Aliette) applied at planting time. Lack of water at Fond Estate prevented high losses from phytophthora damage.

Thielaviopsis (*Ceratocystis paradoxa*) infection was suspected at the two sites; symptoms on leaves (papery spots with brown margins) were seen, but the effect on growth rate and yield was not important.

## ON FRUIT

Several fruits were observed at Fond Estate and at River Dorée estate; few symptoms of black spot and leathery pocket were observed but these diseases did not seem to be very important, at least at the time of observation. To have an exact idea of the impact level, hundreds of fruits in each situation should be observed at different times during the year.

Fruits from another variety (the type is close to Pernambucco) were observed at Millet Estate (a small farm). On these fruits, the level of infestation was much higher; black spots and leathery pockets were found in large quantities (12 leathery pockets on one fruit). This is more evidence of the difference in sensitivity according to the varieties.

No sign of *Thecla basilides* was found.

Table 2 Status of pineapple pests and diseases in St Lucia, July 1994

Name	Location	Variety	Cultivation System	With Disease	Symphylids	Nematodes	Phytophthora	Thielaviopsis	Black Spots and Leathery Pockets	Thecia Basillides	Others/Common
Mr Fernand	Ford estate	Smooth Cayenne	Intensive pure culture (42500 pls/ha) inputs floral induction	Very severe symptoms; mealy bugs on leaves & roots	Witches brooms	Yes (cf. analysis)	Not seen	Suspected	Not seen	No	Very dry conditions; high expression of wilt disease
Mr Hoidal	River Dovee	Smooth Cayenne	Intensive pure culture (50000 pls/ha) inputs irrigation, F.I.T.)	Strong symptoms; mealy bugs on suckers & slips	Witches brooms	Yes (cf. analysis)	Yes; on few plants	Suspected	Not seen	No	
	Millet	Unknown	Extensive culture	Few symptoms; presence of ants & mealy bugs	Not seen	Not seen	Not seen	Not seen	Important internal damage mainly due to leathery pocket	No	Local variety close to Pernambuco group

## *ST VINCENT*

### **SURVEY TEAM**

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M Richards, Crop protection assistant, MoA, St Vincent  
M Dalton, Extension officer, MoA, St Vincent

### **DATE OF SURVEY**

13 July 1994

### **FIELD VISITS**

Richmond Vale	I Browne's plot L Collins's plot S Tucker's plot
Belmont	G Lewis's plot
Wallilabou	Mrs Pipe's plot
Gomea	R Minors's plot
Dumbarton	MoA's plot

### **PEST AND DISEASE OBSERVATIONS (see Table 3)**

#### **ON PLANTS**

##### **Wilt disease**

Wilt disease is an important constraint for pineapple cultivation in St Vincent. Ants and mealy bugs were seen in all fields visited. Symptoms were more or less severe according to the cultural practices (chemical treatments) and to the variety. At I Browne's farm, three different varieties are grown in the same field: 'Montserrat' (from Guy:na) was less susceptible than 'Bouteille Pineapple' (from Guadeloupe), which is less sensitive than 'Smooth Cayenne' (from Martinique).

Mealy bugs were usually very numerous, and it was quite usual to observe several colonies at the base of the harvested fruit and/or on the crown. Such observations were also found in the market.

##### **Symphilids (*Hanseniella* sp.)**

Several symptoms of symphilid attacks were observed at Richmond Vale where the soil is light. Impact on productivity did not seem very important (growth of new roots), but this infection contributed to increase the heterogeneity in the plot.

## **Nematodes**

No analysis was done; root systems seemed to be in good health, particularly at Richmond Vale where the soils are well adapted to pineapple cultivation. Moreover, in this region, pineapple is associated with other crops, after a first production of vegetables.

## **Scales (*Diaspis bromeliae*)**

Scales on leaves (round yellow spots) were detected at Belmont; the impact of this infection is not important, such as the symptoms of thielaviopsis (*Ceratocystis paradoxa*) attack on leaves which were observed in the same field.

## **Phytophthora (*Phytophthora spp.*)**

On Mrs Pipe's plot, about 5% of the plants were destroyed by phytophthora after planting: the stem apex and leaf bases were rotted, with a nasty odour (heart rot).

Phytophthora can be efficiency controlled with a preventive fungicide treatment (Aliette). This treatment is particularly necessary when planting in the rainy season and when the risk of soil getting into the plant heart is high.

## **ON FRUITS**

### **Black spot and leathery pocket**

Several fruits, directly harvested from fields or bought at the market, were observed. A few spots were detected but infestation did not seem to be very high at that period of the year.

### ***Thecla basilides***

Although suckers (variety: Montserrat) were introduced from Guyana in 1989, no sign of *Thecla basilides* damages was seen or reported.

*Thecla basilides* is present in Guyana and causes a lot of losses at harvest time. Importation of planting material from infested regions constitutes a risk of expanding the infestation.

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Table 3

## Status of pineapple pests and diseases in St Vincent, July 1994

Name	Location	Variety	Cultivation System	Wilt Disease	Symphyctids	Nematodes	Phytophthora	Thielaviopsis	Black Spots and Leathery Pockets	Thecia Basilliae	Others/Comments
J Browne	Richmond Vale	Smooth Cayenne "Boussier" pineapple Montserrat	Semi-intensive culture intercropping with tomatoes, onion, etc.	Strong symptoms on Smooth Cayenne/Mealy bugs & ants	Witches' brooms	Not seen	Not seen	Not seen	Not seen	No	Very good soil structure
L Collins	Richmond Vale	Montserrat	Semi-intensive pure culture (20000 p/ha) inputs, F.I.T.)	No symptoms on young plants but mealy bugs & ants	Not seen	Not seen	Not seen	Not seen	Not seen	No	This new plot was free from wilt symptoms. Very good soil structure
S Tucker	Richmond Vale	Montserrat	Semi-intensive culture intercropping with onion, etc. (on banks)	Few symptoms High infestation of mealy bugs & ants	Few signs of witches brooms	Not seen	Not seen	Not seen	Few internal symptoms	No	Very good soil structure
G Lewis	Belmont	Smooth Cayenne "Boussier" pineapple Montserrat	Semi-intensive pure culture (20000 p/ha) inputs, F.I.T.)	Symptoms on plants; mealy bugs on plants & fruits	Few signs of witches brooms	Not seen	Not seen	Few symptoms on leaves	Few internal symptoms	No	Scales on leaves
Mrs Pipe	Wallisbour	Montserrat	Intensive pure culture on a small plot (high density; organic fertilizers)	No symptoms but mealy bugs on plants & fruits	Not seen	Not seen	On young plants after planting (about 5%)	Not seen	Not seen but reported	No	
P Morris	Garnes	Anigua Black Sugar Leaf Smooth Cayenne Montserrat	Intensive pure culture (37500 p/ha) inputs F.I.T.)	Few symptoms on plants; mealy bugs on plants & fruits with ants	Few signs of witches brooms	Not seen	Not seen	Few symptoms on leaves	Not seen but reported	No	

## **GRENADA**

### **SURVEY TEAM**

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E Ambrose, Phytopathologist, IICA, St Lucia  
I Baldeo, Technical officer, MoA, Grenada  
A Calliste, Technical officer, MoA, Grenada

### **DATE OF SURVEY**

14 July 1994

### **FIELD VISITS**

St Patrick's	L Mark's plot
St David's	C Winsborrow's plot
	A Arnold's plot
St George's	P Oscar's plot
River Sallee	R Buddy's plot
	H Curry's plot
St Mark's	G Bholas plot

Most of visited plots were planted with Smooth Cayenne, introduced by the pineapple development project initiated in 1986 by the French mission and the ministry of agriculture.

After these visits, the main conclusion on this project was that Smooth Cayenne is not, at the present time, adapted to Grenada's conditions: soil generally too heavy with poor drainage; low level of farmers' technology; difficulty in getting inputs.

Because of Smooth Cayenne's susceptibility to bad environmental conditions and parasitism (wilt disease), productivity is very low, resulting in a decrease of the cultivated area.

### **PEST AND DISEASE OBSERVATIONS (see Table 4)**

#### **ON PLANTS**

##### **Wilt disease**

Symptoms were particularly severe on Smooth Cayenne plants, due to the susceptibility of this variety, but also due to the dry season which was very strong at the time of the visit. Symptoms were also severe on 'Sugar Loaf' plants on St David's plots.

Both ants and mealy bugs (on plants and on fruits) were observed in all plots. Particular high levels of ant and mealy bug populations were noticed on St David's farms. Wilt disease is by far the main phytosanitary problem in Grenada.

### **Symphilids (*Hanseniella sp.*)**

Although the soil was compact, several symptoms of symphilid attacks ('witches' broom') were seen on the St George's plot. However, the low density of planting is not favourable to the quick proliferation of this insect, which is not predominant in Grenada.

### **Nematodes**

Generally, the pineapple roots observed in Grenada were not well developed, but this seemed to be due more to physical soil constraints and bad drainage than to parasitism.

## **ON FRUITS**

### **Black spot and leathery pocket**

Observations made on one Smooth Cayenne fruit, from Mr Oscar's plot, revealed that black spot and leathery pocket both exist in Grenada. On this half-yellowish fruit, six black spots and five developed leathery pockets were counted. The presence of black spot disease was confirmed at St David's, where others fruits were observed.

The number of observed fruits was too low for making any conclusions on this point. The intensity level of infection must be confirmed at different periods of the year.

### ***Thecla basilides***

No sign of *Thecla basilides* damages was seen in Grenada.



Table 4 Status of pineapple pests and diseases in Grenada, July 1994

Farmers Name	Location	Variety	Cultivation System	Wilt Disease	Symphylids	Nematodes	Phytophthora	Thielaviopsis	Black Spot & Leathery Pockets	<i>Thecia basillides</i>	Others/comment
C. Winsborrow	St David's	Smooth Cayenne Sugar loaf	Extensive pure culture	Very high infestation of ants & mealy bugs; very strong symptoms	Not seen	Not seen	Not seen	Not seen	No fruit	No	Dry season; heavy soil. Bad root system
A Arnold	St David's	Smooth Cayenne	Extensive pure culture	Very high infestation of ants & mealy bugs; very strong symptoms	Not seen	Very bad root system	Not seen	Not seen	A few symptoms on one small mature fruit	No	Dry season; heavy soil. Heavy weed infestation
P Oscar	St George	Smooth Cayenne	Extensive pure culture	Strong symptoms; presence of ants & mealy bugs on plants	Signs of witches brooms	Suspected	Not seen	Not seen	Important symptoms on big mature fruits	No	
R Buddy	River Salle	Smooth Cayenne	Extensive pure culture	Very strong symptoms. High infestation of mealy bugs	Not seen	Not seen	Not seen	Not seen	Not seen	No	Heavy weed infestation
L Mark	St Patrick's	Smooth Cayenne; a local unknown	Extensive pure culture	Symptoms on Smooth Cayenne; mealy bugs on plants	Not seen	Not seen	Not seen	Not seen	No mature fruit	No	
H Curry	St Patrick's	Two unknown local varieties	Garden (several plants)								Rustic, vigorous and very spiny varieties close to Spanish group
G Brola	St Mark	Smooth Cayenne	Extensive pure culture	Few symptoms on plants; mealy bugs at plant bases	Signs of witches brooms	Suspected	Not seen	Not seen	No mature fruit	No	Bad root system development

## **BARBADOS**

### **SURVEY TEAM**

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M. Chandler, Entomologist, MoA, Barbados

### **DATE OF SURVEY**

15 July 1994

### **FIELD VISITS**

St Thomas                      M Fenty's farm

It was only possible to visit one farm. No more precise information was available on pineapple cultivation in Barbados (do other significant farms exist?) It seems that pineapple production is very poor in Barbados. Most of the marketed fruits are imported from Guyana.

### **PEST AND DISEASE OBSERVATIONS (variety: Smooth Cayenne; see Table 5)**

On the visited farm, where Smooth Cayenne is grown, the main problem is the wilt disease: symptoms were seen on ratoon crops. Even young plants from a new plot showed the first symptoms of the disease.

Mealy bugs were observed on suckers. No particular infestation of ant populations was detected.

A few symptoms of symphylid attacks were seen, and the presence of nematodes has been reported by the ministry of agriculture. Unfortunately, it was not possible to get a precise identification of these nematodes. The poor root system development could also be explained by the high soil pH (close to neutral) which is not conducive to good root growth, especially for the Smooth Cayenne.

No phytophthora attack was seen on the young plot in spite of the very favourable pH level. Dry conditions at the time of visit could explain this fact.

Populations of unidentified red mites (same type as *Dolichotetranychus floridanus* observed in Australia) were noticed at the base of the leaves on suckers. This infection should not have a high impact on production.

On fruits no symptoms of black spots, leathery pockets or thecla damage were observed.

**Table 5** Status of pineapple pests and diseases in Barbados, July 1994

Farmers Name	Location	Variety	Cultivation System	Wilt Disease	Symphyllids	Nematodes	Phytophthora	Thielaviopsis	Black Spot & Leathery Pockets	<i>Thecia basillides</i>	Others/comment
Mr Fenty	St Thomas	Smooth Cayenne	Intensive pure culture (50000 pits/ha) inputs irrigation; F.I.T.)	Witches brooms	Reported	Not seen despite pH level but dry season	Not seen	No mature fruit	No	No	Presence of mites under leaves of suckers. Bad soil conditions: the soil pH is above 8

## ANTIGUA

### SURVEY TEAM

F Marie, Pineapple agronomist, CIRAD-FLHOR, Martinique  
U Martin, Plant protection specialist, IICA, Dominica  
L Rhodes, Entomologist, CARDI, Dominica  
L Samuels, Extension officer, MoA, Antigua  
N Roberts-Samuels, Plant protection officer, MoA, Antigua

### DATE OF SURVEY

18–19 July 1994

### FIELD VISITS

Falmouth	Edwards's plot
Claremont	Dalma Brown's plot
Cades Bay	MoA agricultural station
	M Hampson's plot

### PEST AND DISEASE OBSERVATIONS (variety: Antigua Black; see Table 6)

#### ON PLANTS

##### Wilt disease

Wilt disease was present, but to different degrees, in all the plots. The most important infestation was seen at Cades Bay farm, where even planting material (suckers) already showed wilt symptoms at planting time. Sucker production plots should be treated to avoid the disease spreading.

Mealy bugs and ant colonies were often visible at the leaf bases, being more or less important according to the insecticide treatments given (Furadan, Basudin, Malathion). Contact pesticides are not efficient enough to eradicate these populations, especially when the colonies are located on roots or below the leaf bases. The use of a systemic product (disulfoton) is strongly advised.

##### Symphilids (*Hanseniella* sp.)

Attacks due to these small miriapods seem to be very common in Antigua: typical symptoms ('witches' brooms') were seen in all visited fields.

Systematic preplanting treatment is necessary to protect the first roots' emission. Use of Mocap (mixed with soil) is advised. Another treatment can be applied a few months after planting, if needed.

### **Phytophthora (*Phytophthora spp.*)**

Symptoms were particularly visible at Claremont, where a large part of a field was affected by phytophthora. Symptoms consist of leaves turning yellow to light brown with a red tinge, and root rot.

In the field at Claremont bad drainage increased the effect of phytophthora and roots were collapsed with the presence of numerous white mycelial growths.

Phytophthora is an important problem for pineapple cultivation in Antigua: soil pH (close to neutral) is very favourable to fungus development. Prevention treatment with Aliette controls this infection.

### **Thielaviopsis (*Ceratocystis paradoxa*)**

Two kinds of thielaviopsis manifestation were seen in Antigua: attacks on leaves, which are generally limited without a strong effect on yield, and root rots which can kill the plant or at least retard growth. Infection on fruits (water blisters) was not noticed.

### **Scales**

Symptoms (long, round yellow spots on leaves) of scales (*Diaspis bromeliae*) were observed, especially at Cades Bay farm. Effect on productivity was not important.

## **ON FRUITS**

### **Black spot and leathery pocket**

Although soil pH is not favourable for one of the fungi (*Penicillium funiculosum*) which are responsible for this disease, several leathery pockets were observed on fruits from Cades Bay. It seems that leathery pocket is more prevalent than black spot in Antigua (cf. characterization of Black Antigua made by M A Siroy). Populations of mites (*Steneotarsonemus ananas*), which are suspected to be involved in the epidemiology of the leathery pocket disease, could be evaluated at flowering time. This fungal infection does not seem to have a strong economic effect in Antigua.

### ***Thecla basilides***

No symptoms of *Thecla basilides* damage were seen.

Table 6 Status of pineapple pests and diseases in Antigua, July 1994

Farmers Name	Location	Variety	Cultivation System	Wilt Disease	Symphylids	Nematodes	Phytophthora	Thielaviopsis	Black Spot & Leathery Pockets	<i>Thecia basillodes</i>	Others/comment
Mr Edwards	Falmouth	Antigua Black	Intensive pure culture (50000 pfts/ha); inputs; pesticides; F.I.T.)	Few wilted plants; mealy bugs at plant bases, ants	Important signs of 'witches' brooms	Suspected	Not seen	Spots on leaves	Not seen	No	Heavy soil compaction; high pH (around 7); dry season
D Browne	Claremon	Antigua Black	Intensive pure culture (37500 pfts/ha); inputs; pesticides; F.I.T.)	Symptoms even on young suckers; mealy bugs; ants	Important signs of 'witches' brooms	Suspected	On developed plants and on roots	On young plants	Not seen	No	Bad drainage; important problems due to fungi development
Cades Bay Agricultural Station		Antigua Black	Intensive pure culture (37500 pfts/ha); inputs; pesticides; F.I.T.)	Symptoms more or less important; mealy bugs; ants	Signs of 'witches' brooms	Suspected	Mainly on young plants	Spots on leaves	Few signs; mainly leathery pockets	No	Presence of numerous scales on leaves
Mr Hampson		Antigua Black	Intensive pure culture (37500 pfts/ha); inputs; pesticides; F.I.T.)	Very few symptoms; low level of mealy bugs	Signs of 'witches' brooms	Not seen	Not seen	Spots on leaves	Not seen	No	Homogeneous plot without severe sanitary problems

## ***ST KITTS***

### **SURVEY TEAM**

F Marie, Pineapple agronomist, CIRAD-FLHOR, Martinique  
U Martin, Plant protection specialist, IICA, Dominica  
L Rhodes, Entomologist, CARDI, Dominica  
T Jackson, Extension officer, MoA, St Kitts  
E Thomas, Plant protection officer, MoA, St Kitts

### **DATE OF SURVEY**

20 July 1994

### **FIELD VISITS**

	CARDI's field station
Fountain	Huggin's farm
St Peters	T Petes's plot
Green Hill	Armstrong's farm
Tabernacle area	Walwyn's farm

### **PEST AND DISEASE OBSERVATIONS (see Table 7)**

#### **ON PLANTS**

##### **Wilt disease**

Except on Armstrong's plot, ants, mealy bugs (on plants and fruits) and wilt symptoms were observed in all plots. The Armstrong plot was recently established (6 weeks) using suckers (Smooth Cayenne) from cut stems as planting material. This rapid multiplication allowed production of plants free from mealy bugs. The use of a plastic mulch maintains good conditions for plant growth.

In other plots, the intensity of the disease was variable according to environmental conditions and cultural practices.

Wilt disease remains the main phytosanitary problem on the island.

##### **Symphilids (*Hanseniella sp.*)**

Some symptoms of symphilid presence were seen at Walwyn's farm. As the soil structure in the pineapple production area is well adapted to the biology of this insect, damage could be important.

## **Nematodes**

Visual signs of nematodes were suspected in two different places: at Petes's farm (St Peter) and at Huggin's farm (Fountain). Economic impact evaluation of these infections is difficult.

## **ON FRUITS**

### **Black spot and leathery pocket**

Black spots on the fruit base were observed at Mr Walwyn's plot: numerous small spots were present (variety: Antigua Black). Moreover, numerous external cracks were observed on the fruits, which can facilitate fungus penetration.

On this plot, it should be noted that there were many signs of salt toxicity on the leaves (the plot is located just near the sea).

No symptoms of black spot or leathery pocket were seen in the other plots, but only few fruits were observed.

### ***Thecla basilides***

As in St Vincent, suckers of 'Montserrat' were introduced from Guyana. The plot seen at the CARDI station did not show any signs of thecla presence. A few plants were distributed to several farmers; no damage due to thecla had been reported.



Table 7

## Status of pineapple pests and diseases in St Kitts, July 1994

Farmers Name	Location	Variety	Cultivation System	Wilt Disease	Symphyllids	Nematodes	Phytophthora	Thielaviopsis	Black Spot & Lethery Pockets	<i>Thecia basillides</i>	Others/comment
Mr Huggin	Fountain	Anigua Black; Smooth Cayenne; 2 local varieties	Extensive pure culture (12500 pits/ha)	Strong symptoms on a few plants; mealy bugs; ants	Not seen	Suspected	Not seen	Spots on leaves	Not seen	No	High weed infestation
T Peters	St Peters	Smooth Cayenne	Extensive pure culture	Symptoms on a few plants; mealy bugs on fruit & plant	Signs of 'witches' broom	Suspected	Not seen	Not seen	Not seen	No	Very small plot (about 200 plants)
Mr Armstrong	Green Hill	Smooth Cayenne (from Taiwan)	Extensive pure culture	No symptom on these young plants; no mealy bugs	Not seen	Not seen	Not seen	Not seen	No fruit	No	6 week old plot; pits from stems; insecticides & plastic mulch used
Mr Walwyn	Tabernacl	Anigua Black	Intensive pure culture (37500 pits/ha); inputs pesticides; F.I.T.)	Light symptoms on plants; mealy bugs & numerous ants	Signs of 'witches' broom	Not seen	Suspected on roots	Not seen	Numerous spots at the bases of fruits; external cracks	No	Numerous signs of salt toxicity; damage due to rats and crabs?

## **DOMINICA**

### **SURVEY TEAM**

F Marie, Pineapple agronomist, CIRAD-FLHOR, Martinique  
U Martin, Plant protection specialist, IICA, Dominica  
L Rhodes, Entomologist, CARDI, Dominica  
P Grell, Extension officer, MoA, Dominica  
E Constance, Extension officer, MoA, Dominica  
B Sanderson, Extension officer, MoA, Dominica  
C Lenford, Extension officer, MoA, Dominica  
P Hill, Plant protection assistant, MoA, Dominica

### **DATE OF SURVEY**

21–22 July 1994

### **FIELD VISITS**

Atlee	Government station's plot
Pont Casse	E Daniel's plot
Sylvinia area (Corona)	C Wade's plot
Fond Malle	N Esprit's plot
Castle Bruce Estate	A Prevost's plot
Tranto	J B Constance's plot
Crayfish River	S Charles
	J Garnet's plot

### **PESTS AND DISEASE OBSERVATIONS (see Table 8)**

#### **ON PLANTS**

##### **Wilt disease**

As for a large majority of the plots visited during this survey, populations of ants and wilt mealy bugs were observed in Dominica, but they were not important. Only few symptoms were noticed, even if no treatment had been done.

Plots visited were generally located more than 250 m above sea level. At this altitude, climatic conditions (temperature in particular) are not favourable to wilt disease development.

##### **Symphilids**

Some damage was seen (at Atlee and at Castle Bruce), but this pest does not seem to be predominant in Dominica (poor soil preparation, soil compaction).

## **Nematodes**

The presence of nematodes was suspected (at Atlee), but no analyses were done to confirm it.

## **White grubs**

Damage supposed to be due to white grubs (Coleoptera larvae) was seen at Atlee; holes were dug at the base of stems, with secondary proliferation of fungi. This infection can kill the plant.

Some Cicada nymphs were observed at Corona: they were resident in some old canes but not in actively growing plants.

## **ON FRUITS**

### **Black spot and leathery pocket**

No black spot or leathery pocket was seen on the observed fruits, but this type of infection was reported by several consumers.

The low intensity of the disease can be explained by the high altitude of the pineapple growing areas, and the low sugar and high acidity contents in the observed fruits (mainly local varieties).

### **Damage due to insect(s)**

Some damage on fruit due to an insect was reported at Pont Casse. It was not possible to identify this insect but it seems to be able to cause serious damage. Close proximity to the forest and/or association with other crops (citrus), and the light use of chemicals, create favourable conditions for insect proliferation, and damage to plant and/or fruits is frequent.

The characteristics of pineapple cultivation in Dominica are specific:

- local varieties (vigorous, rustic, acid)
- extensive cultivation (low density, poor cultural practices)
- high altitude (low temperatures)
- fields close to forest

This explains why damage due to insects or other animals seems to be one of the main problems of pineapple cultivation in Dominica.

This problem can be controlled with regular insecticide applications (diazinon, parathion) and good weed control.

Table 8: Status of pineapple pests and diseases in Dominica, July 1994

Farmers Name	Location	Variety	Cultivation System	Wilt Disease	Symphylids	Nematodes	Phytophthora	Thielaviopsis	Black Spot & Leathery Pockets	<i>Thecia basilides</i>	Others/comment
E. Daniel	Atlee	Black Antigua; Smooth Cayenne	Extensive intercropping with citrus and other crops	Few symptoms; Few mealy bugs	Strong signs on roots of 'witches' broom	Not seen	Not seen	Not seen	No fruit	No	Damage on roots and basal portions due to grubs (not seen)
D Wade	Pont Casee	Local variety close to Spanish	Extensive intercropping with citrus and other crops	Few symptoms; few mealy bugs; presence of ants	Not seen	Not seen	Not seen	Spots on leaves	Not seen (fruit was highly acid)	No	High weed infestation
N Esprit	Sylvina	Local variety close to Spanish	Extensive intercropping with citrus and other crops	No symptoms on plant; mealy bugs on roots	Not seen	Not seen	Not seen	Not seen	Not seen	No	Presence of Cicada nymphs in old canes
A Prevost	Fond Malle	Local variety close to Spanish	Extensive pure culture	No symptoms; few mealy bugs on suckers & fruits	Not seen	Not seen	Not seen	Not seen	Not seen	No	Rat damage
J B Constance	Castle Bruce	Local variety	Semi-extensive pure culture	No symptoms; few mealy bugs on suckers	Suspected	Suspected	Not seen	Not seen	Not seen	No	High altitude; low temperature
S Charles	Tranto	2 Local Varieties	Semi-extensive pure culture	No symptoms; few mealy bugs on leaf bases	Not seen	Suspected	Not seen	Not seen	Not seen	No	Cutting leaves due to solid fertilizer or to a pest
J Gamet	Crayfish River	Local variety Smooth Cayenne	Semi-extensive pure culture	Very few symptoms; few mealy bugs on plants	Suspected	Not seen	Not seen	Not seen	Not seen	No	Good weed control

# **APPENDIX 1**

## MISSION REPORT

**REPORTING OFFICER:** Llewellyn Rhodes

**COUNTRIES VISITED:** Antigua, St Kitts, (Dominica)

**PERIOD OF VISIT:** 18–22 July 1994

**PURPOSE OF VISIT:** To participate in a survey of pineapple pests and diseases.

**PERSONS CONTACTED:**

Mr F Marie, CIRAD-FLHOR, Martinique  
Mr U Martin, IICA representative, Dominica  
Mr I Ameen, CARDI representative, Antigua  
Ms J Maynard, IICA representative, Antigua  
Mr F Henry, Director of Agriculture, Antigua  
Mr L Samuels, Extension officer, MoA, Antigua  
Mrs N Roberts-Samuels, Plant protection officer, MoA, Antigua  
Mr S Weekes, CARDI representative, St Kitts  
Mr E Thomas, Plant protection officer, MoA, St Kitts  
Mr T Jackson, Extension officer, MoA, St Kitts  
Mr P Hill, Plant protection assistant, MoA, Dominica  
Mr P Grell, Extension officer, MoA, Dominica  
Mr E Constance, Extension officer, MoA, Dominica

### BACKGROUND TO VISIT

At a recent technical meeting on pineapple production held in Martinique, participants expressed the need for a pest and disease survey to be conducted in the OECS countries as a matter of urgency. Mr Franck Marie of CIRAD-FLHOR led the survey. Although approval for my participation had been given by the DED on 1 July, internal misunderstandings prevented my joining the survey on 11 July when it was initiated. I therefore did not participate in the survey of St Lucia, Grenada, St Vincent and Barbados. Mr Urban Martin and I joined Mr Marie in Antigua on July 18.

This is a preliminary report on the incidence of various pests on the farms which were inspected. A comprehensive report on the entire survey is to be prepared under the leadership of Mr Marie.

### ITINERARY

18–20 July	Antigua
21 July	St Kitts
22–23 July	Dominica

## **FINDINGS**

### **ANTIGUA**

#### **Farm of Ralph Edwards at Falmouth**

This farm is being operated primarily for the production of planting material rather than for fruit. Pre-plant applications of Furadan and Basudin are made to the soil and planting material respectively. Subsequent applications of Malathion and/or Basudin are made at monthly intervals. Despite these pesticide applications however, an infestation of pineapple mealy bug, *Dysmicoccus brevipes*, was apparent on about 5% of the plants. There were no indications of mealy bug wilt. Root deformities (witches' broom) associated with symphilitid damage occurred on a few plants.

#### **Brown's Farm at Cades Bay**

This a large field (about 1–1.5 ha) for fruit production. Details on pest management practices were unavailable due to the absence of the farmer. Pineapple mealy bug was present on about 5% of the plants, particularly in the basal areas of the plants and at the fruit bases. Many patches of chlorotic plants were present in this field but on examination, most were affected by white mycelial growth, tentatively identified as *Sclerotia*. There were apparent drainage problems in this field. Phytosanitary conditions were poor with a large quantity of discarded plants dumped alongside the edges of the field.

#### **Cades Bay Agricultural Station**

This is a large field with about 4 ha of pineapple in various stages of growth and production. The original purpose of this facility was to produce planting material, but the focus has now apparently shifted to fruit production. Pre-plant treatments of soil and planting material are not routinely carried out due to reported problems of inputs supply, but some post-planting applications of Basudin have been made. Mealy bug infestations and associated wilt were observed on approximately 10% of the plants and were particularly evident at the fruit bases. symphilitid damage on roots occurred on approximately 1% and infestation by the pineapple scale, *Diaspis bromeliae*, on occasional plants. Fungal mycelium (*Sclerotia*) was evident on the roots of a few plants. Less than 1% of fruits were damaged by donkeys.

## ST KITTS

### **CARDI field station**

This plot was established for the production of planting material but will soon be rotated so was in a semi-abandoned state. Mealy bug infestations were evident.

### **Tracey Petes' farm at St Peters**

This is a small plot mainly of a Taiwanese variety established to propagate planting material for the farmer. Mealy bug infestation and associated wilt was noted on a few plants. Symptoms of nematode damage were evident and samples of affected roots left at CARDI St Kitts for diagnosis.

### **Huggins' farm at Fountain**

With about 0.3 ha established for fruit production, this farm was badly overgrown with weeds. Mealy bug infestation on roots and fruit bases and apparent nematode damage on roots were observed. The main problem for the farmer however, is praedial larceny.

### **Armstrong's farm**

A recently established field of about 0.4 ha, this plot was in excellent condition. Adequate pre- and post-planting applications of nematicides and insecticides have been made. No pest infestations at all were observed.

### **Walwyn's farm**

This is a fairly large farm of about 1 ha for fruit production. It is fairly well maintained except for some problems of soil erosion and apparent mineral deficiency. Mealy bug infestation was noted on roots, plant bases and fruit bases. A more consistent approach to mealy bug control is required. Some indication of symphylid damage was observed on the roots of a few plants and damage by birds and crabs? to the fruit was reported by the farmer.



## **DOMINICA**

### **Hillsborough Agricultural Station**

A small plot has been established for demonstration purposes and the production of planting material by the Chinese Technical Mission. The cultural history of the plot was not known by the extension officer. However, it was essentially free of pest infestation with only a trace of pineapple mealy bug on a few plants.

### **Edman Daniel's farm at Atlee**

This plot is interplanted among citrus and other crops. The history of insecticide use was not known, but only a few plants were infested with very small mealy bug colonies. Pineapple scale occurred on the leaves of three plants. The roots and the basal portions of two plants were damaged by what appeared to be white grubs but the pests were not present.

### **Wayde Christopher's farm at Pont Casse**

This plot is spread out over half a hectare but is planted at a very wide spacing. There was a serious weed overgrowth. A few plants had very light mealy bug infestations, particularly at the fruit bases. The farmer complains of an insect boring into the fruits but no sign of this damage or of possible causal agents were seen despite a diligent search.

### **Nicholson Esprit's farm at Corona**

This plot is interplanted among citrus and banana. No specific pest control measures are practiced. There was a light infestation of mealy bugs but no indication of wilt. Cicada nymphs had tunnelled into and were resident in some old canes but not in actively growing plants.

### **Augustus Prevost's farm at Fond Malle**

No specific pest control measures are practiced, but there was no indication of any pest presence in this plot.

### **J B Constance's farm at Castle Bruce**

No specific pest control measures are practiced in this plot. A light infestation of mealy bug on the roots of a few plants and indications of damage by symphilids were present in this plot.

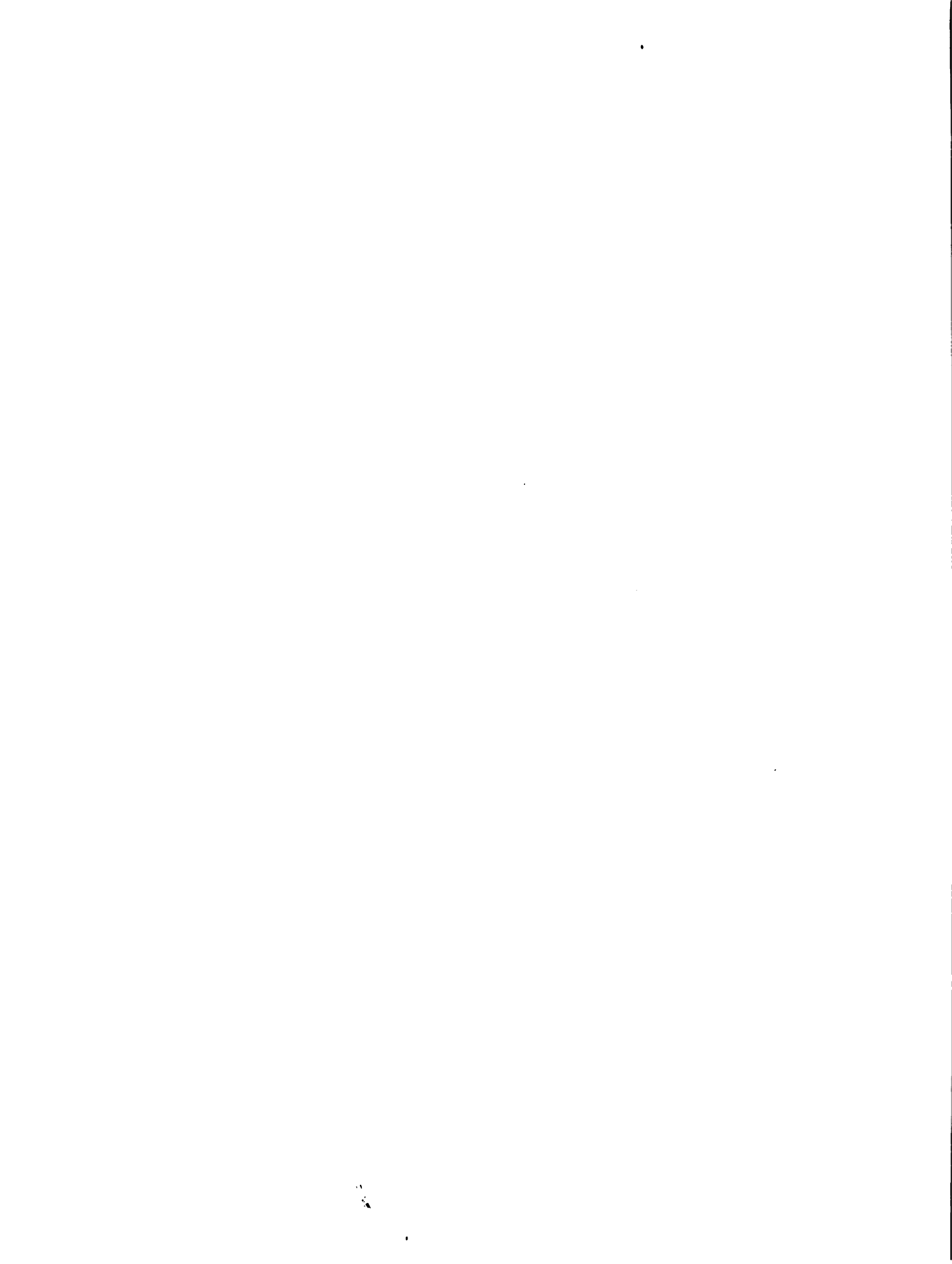
### **Stephen Charles' farm at Tranto**

No pest infestation or indication of pest damage was present in this plot although no specific pest control measures are practised.

### **Garnet Joseph's farm at Crayfish River**

No specific pest control measures are practised in this plot. A light mealy bug infestation on the basal portions of a few plants was observed.

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# APPENDIX 2

# REPORT ON PINEAPPLE FIELD SURVEY IN TRINIDAD AND TOBAGO

## PEST PROBLEMS

by Lilory D McComie

### Lepidoptera

#### *Thecla basilides*

- location: Mundo Nuevo; there were complaints from other areas but little evidence of damage seen elsewhere.
- damage: base of inflorescences and young fruits; induces gumming during fruit development; damaged fruits predisposed to secondary infection by pathogenic organisms.
- comments: his field was visited on 6 June 1994 when 100% fruit damage was observed; inadequate field management and field location at the edge of the forest contributed to the high infestation levels

### Symphyla

#### Symphilids (*unidentified*)

- location: Orange Grove
- damage: damage to young roots causing branching to produce a broom effect; symphilids seen.
- comments: no known records of symphilid damage to pineapple in Trinidad.

### Homoptera

#### Mealy bugs, *Dysmicoccus brevipes* (Ckll.)

- location: found in all fields visited
- damage: found mainly in leaf bases and roots but sometimes on fruits also; farmed by ants which are nuisance pests that distribute these mealy bugs; viral wilt disease spread by mealy bugs seen at Orange Grove and Toco.
- comments: no current management practised; Caroni (1975) Ltd known to treat with diazinon in the past.

## Coleoptera

### Cerambycidae, *Trachyderesa succinctis* (L)

location: Chatham  
damage: feeds on fruit  
comments: no management

### Curculionidae (unidentified)

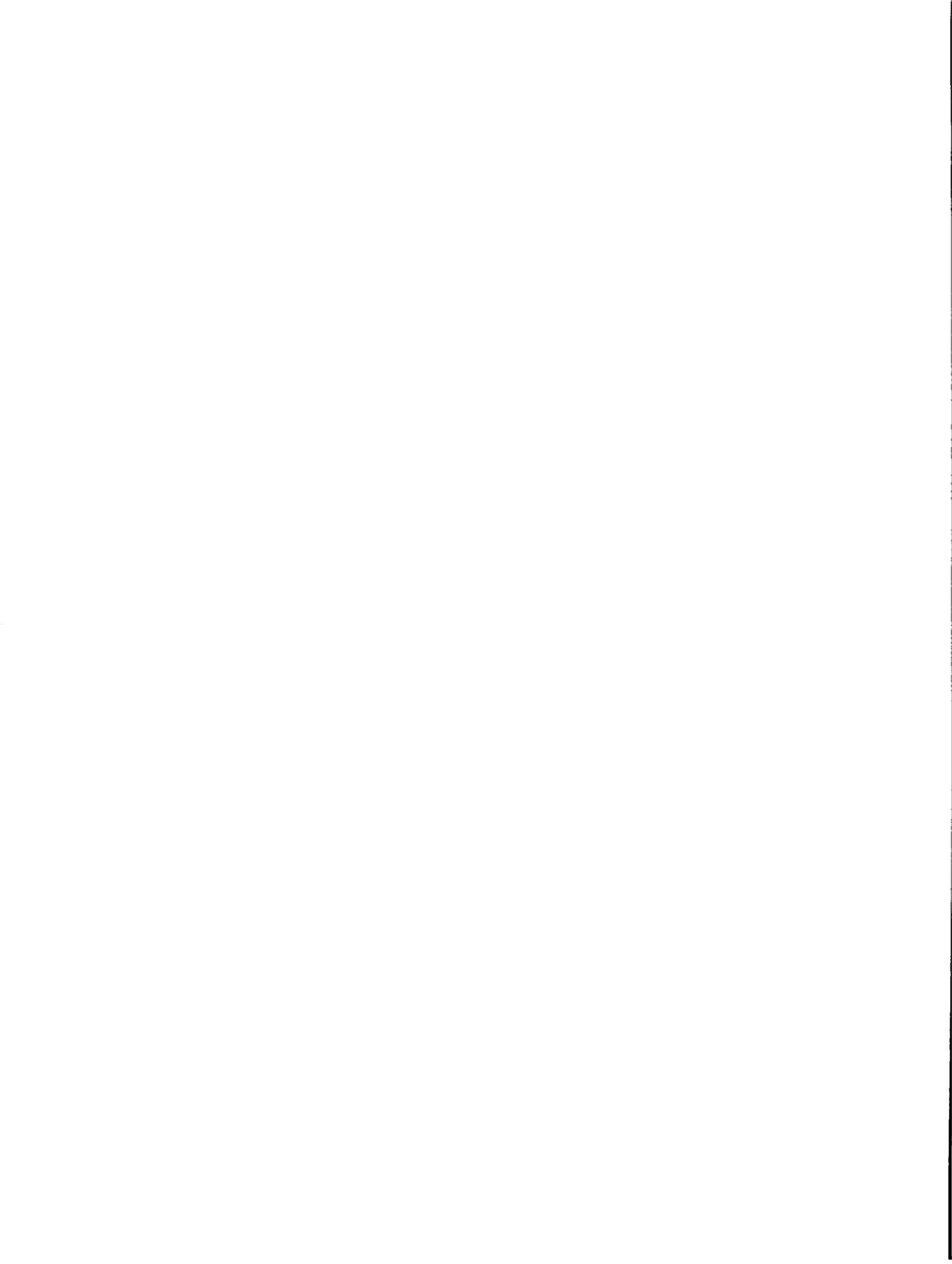
location: Chatham  
damage: feeds on fruit  
comments: no management

### Scarabidae *strategus* sp. (rhinoceros beetle)

location: Chatham  
damage: burrow into soil next to the plant to feed on roots and leaf bases, killing the entire plant

location: Toco  
damage: burrowing and plant damage consistent with that caused by rhinoceros beetle seen in Toco, but no beetles found.

comments: field at Chatham treated with diazinon the day before field visit; treatment effective; large numbers of dead adult beetles seen. No treatment in Toco If left untreated this pest could be a serious constraint to pineapple production in areas where it occurs. *Strategus anachoreta* (Klug) and *Strategus julianus* (Burn) previously reported on pineapple from Chatham/Cedros.



# APPENDIX 3





# **APPENDIX 3**

# REPORT ON ASSESSMENT OF NEMATODE POPULATIONS IN PINEAPPLE PRODUCTION AT TWO LOCATIONS

E Ambrose  
IICA, St Lucia

A survey was conducted to determine population densities of plant parasitic nematodes associated with pineapples at two production sites – Fond Estate and River Dorée Estate.

Soil and root samples were collected from each location. Nematodes were extracted using the Baermann technique.

## Results

The results indicated that the nematodes of economical significance detected at the two production sites were the spiral nematode (*Helicotylenchus multicinctus*) and the reniform nematode (*Rotylenchulus reniformis*) (Tables A1 and A2)

The lesion nematode (*Pratylenchus* sp.) was detected only at one location – River Dorée Estate (Table A2).

The population densities of plant parasitic nematodes were relatively low ranging from 5 to 200 per 100 cc soil at one production site – Fond estate (Table A1).

Population densities at the other production site (River Dorée Estate) were also low ranging from 25 to 45 per 100 cc soil, except for one sample site where population densities were higher at 425 per 100 cc soil.

The nematodes detected could contribute to reduction in growth and yield of the pineapple crop, especially the semi-endoparasitic species – *Rotylenchulus reniformis*.

The lesion nematode can cause significant damage to pineapple root systems and thereby cause reduction in growth and yield of pineapples, however the densities detected at the production site were relatively low at the time of sampling.

In order to reduce risk of nematode damage and reduction in yields, a crop rotation production system should be practised using crops which are poor hosts of the nematodes detected in the pineapple production systems. Producers should also try to obtain pineapple cultivars with resistance to the specific nematodes detected in the production systems.

**Table A1**

**Plant parasitic nematodes associated with pineapple production at Fond Estate, St Lucia**

Sample	Population Density/100 cc soil and 25 g roots			
	<i>Helicotylenchus multincinctus</i>		<i>Rotylenchulus reniformis</i>	
	Soil	Roots	Soil	Roots
1	60	170	13	0
2	25	10	200	0
3	90	10	125	0
4	85	5	165	0
X	65	49	126	0
SE of difference between two means = 48.4				

**Table A2**

**Plant parasitic nematodes associated with pineapple production at River Dorée Estate, St Lucia**

Sample	Population Density/100 cc soil and 25 g roots					
	<i>Helicotylenchus multincinctus</i>		<i>Rotylenchulus reniformis</i>		<i>Pratylenchus sp.</i>	
	Soil	Roots	Soil	Roots	Soil	Roots
1	25	425	5	25	5	0
2	45	0	15	0	0	0
3	30	15	0	0	0	0
X	34	147	7	9	2	0
SE of difference between two means = 88.4						





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