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COCONUT MITE AND ITS NATURAL ENEMIES IN ST. VINCENT

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ABSTRACT

Eriophyes guerreronis is a serious pest of coconuts in the Central and South America and the Caribbean. The pest attacks newly fertilized flowers and move under bracts surrounding nutlets. During early attack, the infested nuts show browning at the outer margins of the bracts. It gradually spreads and sometimes covers 2/3 of the nut surface. Heavily infested nuts are deformed, smaller in size with reduced kernel yield. In some areas, the losses may reach up to 50%.

In St. Vincent, the pest is widely distributed in the island. Nuts on the first two bunches do not show external damage, but it increases progressively from bunch No. 3 onwards. It was also observed that nutlets on bunch No. 1 were always free of mites. A small number was observed on bunch No. 2, and from Nos. 3 to 7, the population increased rapidly. On older bunches, the number of mites was relatively lower, and this was due to the hard surface of nuts, which becomes unsuitable for pest feeding.

Some coconut varieties are more susceptible to mite damage than others. In St. Vincent, on average 44% uuts of Jamaican Tall and 35% of Malayan Dwarf were damaged by the pest, showing that the former variety is more susceptible to mite damage. These observations are supported by other workers in Benin (Mariau, 1977) and in Togo, Sao Tome, Ivory Coast and Brazil (Mariau and Julia, 1979); who reported that Tall West African, the Yellow and Yellow-green Malayan dwarf were more susceptible than Tall Malayan, Hybrid PB 121, Tall Tahitian and Red Cameroun dwarf.

In this study, three species of parasitic fungi, Aspergillus sp., Mucor sp. and Trichophyton sp. were recorded attacking mites under bracts. In St. Lucia, in May 1984, the author recorded two species of Coccinellids (Stethorus sp. ?utilis and Sukunahikona sp.) and a predatory thrips, Aleurodothrips fasciapennis. It is possible that further investigations in these and other Caribbean islands may provide additional natural enemies, some of which could be used for the control of coconut mite(s).

INTRODUCTION

Coconut mite [Eriophyes guerreronis (Keifer)] is a serious pest of coconuts in Central and South America (Martyn, 1949); and the Caribbean (Oriz and

Aluia, 1975); Hussey, 1975. It probably attacks only newly fertilized flowers and moves under the external bracts surrounding the embryo nuts (Mariau and Julia, 1970). Breeding colonies establish and feed under the bracts at the centre of one of the flat faces of the nut. The first signs of mite damage are brownish patches which appear near the outer margins of the bracts when the nuts are 5 to 7 cm in size. When examined under high magnification, very minute feeding scars can be seen under the bracts. The brownish patches later extend in size as the nuts develop, eventually covering up to a third of the surface.

Nature of damage: The cells on which the mites feed loose vigour and cease to multiply while those that are unaffected proliferate. Because of the heavy attack, large numbers of longitudinal fissures, bisected by irregular transverse cracks appear on the coconut surface which make that area of the nut unsuitable for mites to continue feeding. Consequently they move to new areas on the same nut or other nuts. The mites migrate with the aid of wind, rain water and/or by walking.

Economic losses: The losses of nuts, and the decrease in nut size and kernel yield due to severe mite infestations, suggest that farmers may suffer reductions in income from copra sales of 50% or more. Data on copra purchases in St. Vincent and St. Lucia show substantial reductions in quantities. Losses due to Eriophyes damage, vary widely in different parts of the world. Branch (unpublished report, 1979) claimed 25% copra loss in Grenada, 30% in Mexico (Hernandez, 1977), 16% in Ivory Coast (Mariau and Julia, 1970), 10% in Benin (Mariau and Julia, 1970), and 11-28% in St. Lucia (Moore and Alexander, unpublished report, 1984). There can be little doubt however, that Caribbean farmers suffer considerable losses of income, due to coconut mite damage.

Coconut mite in St. Vincent: The coconut palm (Cocos nucifera) is an important tree crop in St. Vincent, but productivity has decreased annually over the last decade in spite of replanting programmes. Many factors are responsible for the decrease, chief among them is the coconut mite. The losses in copra could reach a 60% level due to the reduction in fruit size (Griffith, 1984). However, neither the incidence of the mite infestations nor the level of damage have previously been determined for St. Vincent. A survey was therefore carried out to record the incidence of mite infestation in the country and level of damage caused to the industry.

METHODS AND MATERIALS

For examination of external coconut mite damage, trees were selected randomly and bunches numbers 1 to 10 were removed and lowered down the plant with a rope. The nuts on each bunch were counted and examined individually for external damage, and based on the extent of damage, they were arranged on a scale 1 to 5.

Scale	Description
1	Nuts with no damage.
2	Nuts with superficial mite damage.
3	Nuts with significant mite damage but not generally reduced.
4	Nuts with significant mite damage, showing diminished size and deformation.
5	Nuts heavily damaged, reduced in size and greatly distorted.

Between July 21-24, 1987 and October 6-9, 1987 surveys were conducted in the Windward and Leeward sides of the island. Cocunut varieties examined were Jamaican Tall and Malayan Dwarf.

To assess the mite population per nut, bunch numbers 1 to 9 were removed from the trees and transported to the laboratory. The bracts/caps of each nut were removed with a kinfe and the uut surface and the cap examined under high power stereoscopic microscope. The types of mites and their populations were recorded. Because of the exceedingly small size (i.e. 200 to 260 microns in length) and great number of the pest, it was not possible to record the exact number of mites per nut. As such, the mite populations were expressed in the following categories: 0, 1-10, 11-25, 26-50, 51-100, 101-150, 151-1000, 1001-9,999, over 10,000 which provided a good estimate for general damage. Predatory insects, mites and parasitic fungi associated with mites were also recorded.

RESULTS AND DISCUSSION

The findings of the survey are summarised in Tables 1 aud 2.

Table 1. The incidence of coconut mite damage on bunches 1 to 10, of Malayan Dwarf trees, in St. Vincent.

Bunch Number	No. of nuts examined	Percent of scarified nuts based on the scale 1 to 5.				
		1	2	3	4	5
1	428	100	0	0	0	0
2	402	100	0	0	0	0
3	196	100	0	0	0	0
4	131	76	24	0	0	0
5	119	81	18	0	0	1
6	101	61	24	13	0	1
7	92	35	32	26	5	2
8	100	22	67	8	1	1
9	48	33	58	8	0	0
10	15	0	80	0	20	0

Table 2. The incidence of coconut mite damage on bunches 1 to 9 of Jamaican Tall tree, in St. Vincent.

Bunch Number	No. of nuts examined	Percent of scarified nuts on the scale 1 to 5				
		1	2	3	4	5
1	430	100	0	0	0	0
2	469	100	0	0	0	0
3	155	92	8	0	0	0
4	96	33	53	11	0	3
5	79	4	57	32	0	7
6	61	0	10	52	21	17
7	54	0	0	13	65	22
8	58	0	26	0	68	6
9	51	0	0	25	75	0

Nuts on the first two bunches did not show any external scarification, only 1% nuts showed external damage on bunch No. 3, whereas 24% of the nuts on bunch number four had superfical damage, which increases progressively from bunch number five onwards.

Varietal Susceptibility

The levels of mite damage varied considerably on different varieties of coconut. The present study indicated that on average 44% nuts of Jamaican Tall and 35% of Malayan Dwarf were damaged. (Tables 1 and 2). Generally from bunch 4 to 9, the damage increased rapidly, resulting in both reduction in size and deformation of nuts. These observations suggest that the Jamaican Tall is more susceptible to mite damage than the Malayan Dwarf.

The level of mite damage on Jamaican Tall and Malayan Dwarf on the Windward side (Orange Hill) range from 4 to 44% with an average of 22%, and on the Leeward side (Peter's Hope Estate) 14 to 35%, with an average of 23% respectively. The data shows that there was no significant difference on the average levels of mite infestation on the two sides of the island.

Mite Species

Under microscopic observations, two species of mites, the coconut mite, E. guerreronis, and an unidentified species (light brown in colour, body flat and quicker in movements) were found feeding under the bracts. The total populations of the two species were recordedtogether (Table 3).

Table 3. Number of coconut mites and an unidentified species of mite, on bunch No's 1 to 9, on coconuts, in St. Vincent.

Bunch Number	No. of nuts examined	Estimated number of mites per nut								
		0	1-10	11-25	26-50	51-100	101-150	151-1000	1001-9999	over 10,000
1	110	110	0	0	0	0	0	0	0	0
2	73	69	3	1	0	0	0	0	0	0
3	58	40	8	8	2	0	0	0	0	0
4	63	42	5	2	4	7	1	1	1	0
5	51	21	12	3	2	3	3	3	4	0
6	68	21	10	1	0	8	0	2	18	8
7	51	12	7	1	2	7	2	2	12	6
8	56	10	6	1	0	12	9	11	6	1
9	31	13	1	2	0	5	1	4	4	1

It was also noted that bunch No. 1 was always free from mites. A small number was observed on bunch No. 2. From bunch Nos. 3 to 7, the population increased rapidly. On older bunches (i.e. 8 to 10) the mite population was relatively lower.

Natural Enemies

During these observations, a number of mite colonies were found dead, some of which were infected by parasitic fungi. Some predatory mites and spiders were also recorded on infested coconuts.

The fungi infecting the coconut mites were identified as: Aspergillus sp., Mucor sp. and Trichophytou sp., which are all primary parasitic species.

DISCUSSION

In the present study, the nutlets on bunch No. 1 are always free from mites. The population starts from bunch No. 2 and increase rapidly on bunch Nos. 3 to 7. The numbers of mites are relatively lower on Nos. 8 to 10, which is due mainly to the badly damaged nut surface becoming unsuitable for feeding. This supports the observation that the longer the nuts are exposed to the mite infestation, the worse the damage becomes, so that by the time the nuts reach maturity, every nut shows severe mite damage (Moore and Alexander, 1984, unpublished report).

The difference in varietal susceptibility observed in the present study is similar to the observations made by other workers in Benin (Mariau, 1977) and in Togo, Sao Tome, Ivory Coast and Brazil (Julia and Mariau (1979)). The latter workers found that the susceptible varieties were Tall West African, the Yellow and Yellow-green Malayan dwarfs, and the less susceptible ones were Tall Malayan Hybrid PB121, Tall Tahitian and Red Cameroun dwarf.

In St. Vincent, the pest is causing heavy economic losses. To control it, chemical and biological control are the two options. So far chemical control has shown its limitations. The biological control seems to be more appropriate. A parasitic fungus, Hirsutella thompsonii was used against coconut mites in St. Lucia, where only one application was made on infested coconut trees (Moore, 1985). The recovery survey did not show the establishment of the fungus. It was also reported that there were no indigenous parasitic fungi in St. Lucia.

In this study, three species of parasitic fungi, Aspergillus sp., Mucor sp. and Trichophyton sp. were found attacking mites under bracts. In St. Lucia, in May 1984, the author recorded two species of coccinellids (Stethorus sp. ?utilis (Horn) and Sukunahikona sp.) and a predatory thrips (Aleurodothrips fasciapennis (Franklin) (Phaleothripidae) on coconut surface damaged by mites. It is possible that further investigations in these and other Caribbean Islands may provide additional natural enemies, some of which may be used for mass multiplication and field releases against these pests.

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