

Assessment of damage caused by the coconut bug *Pseudotheraptus wayi* (Brown) (Hemiptera: Coreidae) on guavas.

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ASSESSMENT OF DAMAGE CAUSED BY THE COCONUT BUG
PSEUDOTHERAPTUS WAYI (BROWN) (HEMIPTERA :
COREIDAE) ON GUAVAS.

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ABSTRACT - Damage caused by the coconut bug, *Pseudotheraptus wayi* on guavas was studied in the Nelspruit Area. Three orchards, and 10 trees per orchard, were monitored weekly, from fruit drop until harvest. None of these orchards were sprayed with insecticides. Average of 30 per cent of the aborted fruits and 26 per cent of the ripe fruits were damaged.

EVALUATION DES DEGATS CAUSES PAR LE PARASITE DES
COCOTIERS, *PSEUDOTHERAPTUS WAYI* (BROWN)
(HEMIPTERA : COREIDAE) SUR GOYAVES.

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RESUME - Sur goyaves, les dégâts causés par *Pseudotheraptus wayi*, parasite du cocotier, ont été étudiés dans la région de Nelspruit. Dans trois vergers, dix arbres par verger ont été observés chaque semaine, de la nouaison à la récolte. Aucun de ces vergers n'a subi de traitements insecticides. En moyenne, 30 p. 100 des fruits avortés et 26 p. 100 des fruits parvenus à maturité ont été endommagés.

INTRODUCTION

The coconut bug, *Pseudotheraptus wayi* (Brown) (Hemiptera: Coreidae) indigenous to East-Africa on coconuts (Mariau, 1969) was reported for the first time in South-Africa during 1977 on mangoes as well as guavas (De Villiers and Wolmarans, 1980 a, 1980 b). At present it is known as a pest of macadamia (De Villiers, 1986), avocado (De Villiers and Van den Berg, 1984), mango (De Villiers and Wolmarans, 1980 a), and guava (De Villiers and Wolmarans, 1980 b).

The life cycle of the coconut bug is shown in Figure 1. According to Lever (1969) the description and biology of the coconut bug on coconuts is as follows: The adult is reddish brown above; beneath it is paler, with pink spots. The male is 12-14 mm long, the female 13-15,5 mm. The period of development (egg plus nymphal instars) is 26-40 days, of which 6-9 days is the incubation period. The adult life of the male is 84 days, and that of the female 73. The female lays, on average, 74 eggs. The first-instar nymphs have not been found on the coconut palm; the damage done to the tissues begins to be serious when the nymphs are about half-grown. Adults of both sexes take wing

readily when disturbed. Each individual makes about 200 punctures in the course of its existence. The insect lives in the crown of the palm throughout its life and the nymphs are found only on or near the spadix. Few can be found during the day because they shun direct sunshine and heavy rain. Feeding takes place in late afternoon and early morning, and the insects are most active on cloudy but not heavily overcast days. The density of population varies greatly from tree to tree, but is always low and the average per tree is only about one individual.

Damage to guava fruits are caused by both adults and nymphs that extract sap from the fruits with piercing-sucking mouth parts (De Villiers and Wolmarans, 1980 a). Producers often confuse the damage caused by the coconut bug with hail damage. No insecticide is registered for the control of the coconut bug on guavas in South-Africa (Vermeulen *et al.*, 1990). The aim of this trial was to determine the economic importance of the coconut bug as a pest on guavas in the Nelspruit area (South Africa).

MATERIALS AND METHODS

Three guava orchards (CV. Fan Retief) in the Nelspruit area, were used in the study. The sites were the Citrus and Subtropical Fruit Research Institute (CSFRI) (30°58'E,

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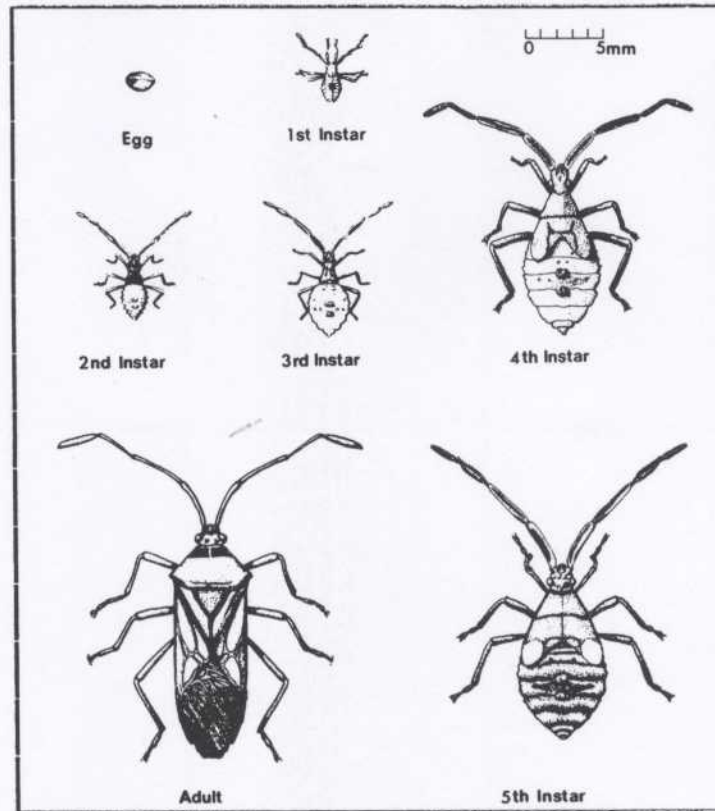


FIGURE 1 - Lifecycle of the coconut bug.

25°27'S) planted in 1979, H.L. Hall and Sons Estates (30°57'E, 25°26'S) planted in 1975 and Mananga (30°50'E, 25°19'S) planted in 1973. The latter is 1020 m above sea level and the other two 660 m. The tree spacing in all orchards were 6.1 m x 4.6 m. Ten trees in each orchard were chosen at random and served as sampling trees throughout the study. To facilitate the collection of aborted fruits, the area under each tree was raked to remove old leaves and debris. All the fruits that dropped during the first two months after fruit set (07/03/89 - 09/05/89) were collected on a weekly basis to monitor for coconut bug damage, with the exception of fruits that dropped directly after fruit set, when they were too small (5 mm in diameter and smaller). The ripe fruits were harvested once a week for the rest of the cropping season from 23/05/89 to 08/08/89. These fruits were examined to determine the effects of the coconut bug.

RESULTS

Coconut bug damage on guavas (Figure 2) manifested as follows : approximately two days after feeding, a lesion (\pm 8 mm in diameter) visible as a slightly darker patch than the rest of the peel, appeared on the fruit. Within about 7 days, this lesion developed into a protruding knob above the surface of the fruit. As the developing fruit became larger the lesion became depressed below the surface and eventually formed a round, indented, brown lesion - the so called «pencil damage». When the fruit was stung in an early stage and did not abort, it was totally malformed.

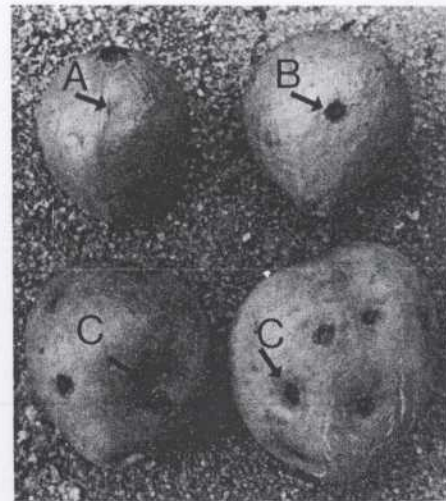


FIGURE 2 - Damage caused by the coconut bug on guavas. A : initial stage \pm 2 days after the fruit was stung, B : Protruding knob, C : Indented lesions on malformed fruits.

Internally the lesions on mature fruits were brown or black and could be up to 10 mm deep in the fruit flesh. The lesions then developed into hard, woody knobs, with or without air spaces. The size of the knobs could be up to 10 mm in diameter, depending on the size of the fruits. No fruit rotting occurred and most fruits were still edible and

TABLE 1 - Total counts of dropped fruits and yielded fruits with percentage of coconut bug damage in every orchard (data collected from ten trees in each orchard).

	Locality							
	Mananga		CSFRI		H.L. Hall and Sons		Total	
	AF*	HF**	AF	HF	AF	HF	AF	HF
Number of fruits examined	3 688	7 211	12 281	2 267	11 432	1 995	27 401	11 473
Damaged fruits	725	877	4 896	1 189	2 658	892	8 279	2 958
Average damage (per cent)	19.7	12.2	39.9	52.4	23.3	44.7	30.2	25.8

* AF : aborted fruits collected HF : harvested ripe fruits.

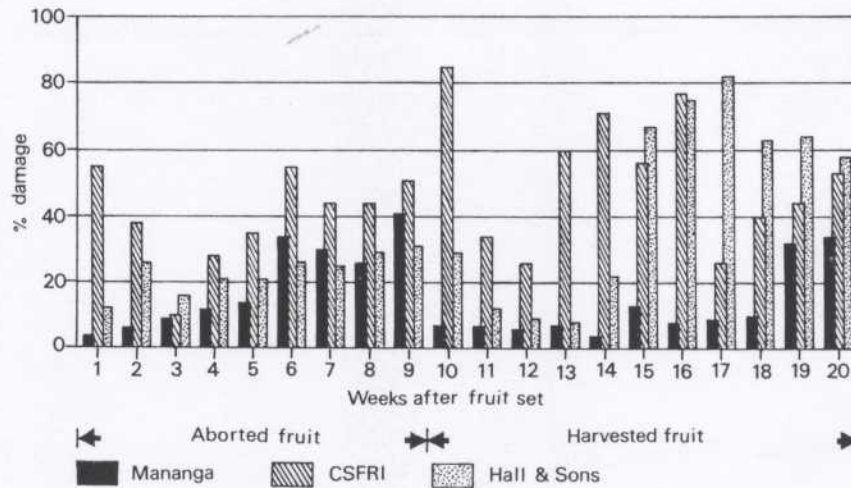


FIGURE 3 - Damage caused by the coconut bug, given as a percentage of the total fruits collected on a weekly basis in each orchard.

good enough to liquidize, but not marketable for the fresh market. The damage caused by the coconut bug is often confused with hail damage, the difference being that fruit are not internally damaged by hail.

The total number of fruits monitored i.e. aborted fruits and ripe fruits harvested as well as the number of coconut bug damaged fruits are given in Table 1. Percentages of damage due to coconut bug are given as an average per orchard for the whole season. The average coconut bug damage at Mananga was much lower than in the other two orchards.

The number of aborted and harvested fruits damaged by coconut bug, given as a percentage of the total number of fruits collected weekly in each orchard, are presented in Figure 3. Due to the possible effect of the higher altitude and lower temperature, resulting in later fruit set and ripening at Mananga, the initial number of fruits as well as the percentage of coconut bug damage was less in this orchard than in the other two.

DISCUSSION

During the present study it has been found that the total average damage due to coconut bug on harvested fruits varied between 12.2 per cent at Mananga up to 44.7

per cent at H.L. Hall and Sons Estates, however, losses of up to 80 per cent on individual trees were recorded at the latter. No other studies of this nature, on any of the other crops mentioned, has been done in South Africa. Although it is impossible to try and correlate these results with damage caused by the coconut bug to coconut palms it is worthwhile to mention the work done by other authors in East Africa. In a study by Way (1953) in East Africa it was found that under specific conditions up to 98 per cent of the coconut crop in certain areas could be destroyed by the coconut bug. Studies by Vanderplank (1958) in the same areas confirm these results when he found that 70-90 per cent damage occurred when no insecticide was sprayed. The damage on harvested guavas observed in this study was much smaller than the results obtained by above mentioned authors, but taking into account that the coconut bug is present in South Africa only for a relative short time, it is possible that the percentage of damage will rise in due course.

A recent extensive study has shown that stinkbugs cause fruit drop on macadamias (Bruwer, pers. com.). Waite (1990) working on the fruitspotting bugs *Amblypelta* spp. in Australia on litchis, gives evidence of green fruit drop caused by these bugs. On guavas, however, the present study did not reveal such proof, but the possibility exists that stinkbugs could have a similar effect on guavas. It is therefore assumed that at least a proportion of the

aborted fruits with coconut bug damage, which varied between 19.7 and 39.9 per cent, dropped due to coconut bug damage *per se*, rather than due to natural fruit drop. The damaged fruits however do not reach the packing-houses, and therefore most producers are unaware of the problem. The results of this study show that the damage caused by the coconut bug on the harvested fruits was

without doubt quite severe. If it is accepted that pest status is reached when there is a 5 per cent loss in marketable yield on any particular crop, as suggested by Edwards and Heath (1964), then it can be stated that the coconut bug has become a pest of economic importance on guavas in South Africa.

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EVALUACION DE LOS DANOS PROVOCADOS POR EL PARASITO DE LOS COCOTEROS, *PSEUDOTHERAPTUS WAYI* (BROWN) SOBRE GUAYABAS.

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RESUMEN - En guayabas, los daños provocados por *Pseudotheraptus wayi*, parásito del coco, fueron estudiados en la región de Nelspruit. En tres huertos, diez árboles por huerto fueron observados cada semana, del cuajado-pegue hasta la cosecha. Ninguno de estos huertos tuvo tratamientos con insecticidas. En promedio, 30 p. ciento de los frutos abortados y 26 p. ciento de los frutos que alcanzaron la maduración fueron dañados.

