

New Records of some Pests of the Coconut Inflorescence and Developing Fruit and Their Natural Enemies in Sri Lanka

L. C. P. FERNANDO and P. KANAGARATNAM

Coconut Research Institute, Lunuwila, Sri Lanka.

ABSTRACT

A survey was carried out at Bandirippuwa Estate, Kirimetiya Estate and at Isolated Seed Garden, Rajakadaluwa for the pests of coconut inflorescence and developing fruits.

The mite, *Dolichotetranychus* sp. (Tenuipalpidae) which lives beneath the perianth and feeds on the epicarp, causes considerable damage to the developing fruit. Bi-monthly observations on the intensity of infestation of nuts among different forms of coconut indicated a significant difference among forms in their susceptibility to mite damage.

Pseudococcus cocotis (Maskell) (Pseudococcidae), *Pseudococcus citriculus* Green (Pseudococcidae) and *Planococcus lilacinus* (Cockerell) (Pseudococcidae), when feeding in large numbers on the peduncle, cause button nut shedding and drying up of the inflorescence. The parasitoids and predators of these mealybugs recorded for the first time in Sri Lanka are *Promuscidea unfasciiventris* Girault (Aphelinidae) *Platygaster* sp. (Platygastridae), *Anagyrus* sp. nr. *pseudococci* (Girault) (Encyrtidae) *Coccodiplosis* sp. (Cecidomyiidae), *Cryptogonus bryanti* Kapur (Coccinellidae) and *Pseudoscymnus* sp. (Coccinellidae).

Several species of scale insects namely, *Coccus hesperidum* (Linnaeus) (Coccidae) *Aulacaspis* sp. (Diaspididae), *Pseudaulacaspis cockerelli* (Cooley) (Diaspididae), *Aonidiella orientalis* (Newstead) (Diaspididae), and *Pinnaspis strachani* (Cooley) (Diaspididae) are recorded as minor pests of the developing fruits of coconut. *Coccophagus silvestrii* Compere (Aphelinidae), *Scymnus* sp. (Coccinellidae), *Pseudoscymnus* sp. (Coccinellidae) *Telsimia ceylonica* (Weise) (Coccinellidae), *Cryptogonus bryanti* Kapur (Coccinellidae) and *Cybocephalus* sp. (Nitidulidae) are recorded as their parasitoids and predators.

These natural enemies are probably responsible for the control of these pests in the field.

INTRODUCTION

The coconut palm produces a large number of female flowers in each inflorescence but not all of them develop into mature fruits. Many drop prematurely due to nutritional, physiological or genetic factors or because of pest damage. Several important pests that cause damage to developing coconut fruits have been recorded in various countries. The caterpillars of *Batrachedra arenosella* Walker (Lepidoptera, Gelechiidae) and *Tirathaba* spp. (Lepidoptera, Pyralidae), the bugs *Pseudothrips wayi* Brown (Hemiptera, Coreidae), *Amblypelta cocophaga* China (Hemiptera, Coreidae) and *Axiagastus cambelli* Distant (Hemiptera, Pentatomidae) and the mite *Eriophyes gurreronis* (Acarina, Eriophyidae) are the best known pests of the inflorescence and nuts.

Caterpillars of *B. arenosella* and *Tirathaba* spp. feed on the young flowers of the newly opened inflorescence causing button nut shedding. *B. arenosella* and *Tirathaba* spp. occur in South East Asia and the Pacific. The feeding punctures made by the bugs, *Pseudotheraptus wayi*, *Amblypelta cocophaga* and *Axiagastus cambelli* cause deformity and premature nut fall. *P. wayi* is a serious pest of coconut in Tanzania, Kenya and Zanzibar (Lever, 1969). *A. cocophaga* causes about 10% crop loss in the Solomon Islands (Brown, 1959). It has several host plants other than coconut. *A. cambelli* feeds on both the male and female flowers and is found in the Solomon Islands and New Guinea. The eriophyid mite which lives under the perianth of developing fruits causes deformity and immature nut fall. It has been recorded from Ivory Coast, West Africa and Central and South America.

In Sri Lanka preliminary work on the survey and identification of mites, mealybugs and moths associated with the coconut inflorescence was carried out in 1981 (Kanagaratnam *et al.*, 1981). This stimulated further studies with regard to the distribution of pests, degree of damage and the occurrence of natural enemies. This study was carried out in the North Western Province at three selected locations: Bandirippuwa Estate, Lunuwila, Kirimetiyan Estate, Lunuwila and Isolated Seed Garden, Rajakadalawa.

THE TEXT

A Tetranychid mite, mealybugs and scale insects were found on the inflorescence and the developing fruits.

The *Dolichotetranychus* sp. (Acarina, Tenuipalpidae) was first recorded on coconut by Kanagaratnam *et. al.* in 1981. The same mite was reported infesting the nuts of the areca palm in Kerala, (Mariamma and Kumar, 1976). This mite lives and multiplies under the perianth of the nut. It feeds on the sap of the epicarp around the point of attachment of the nut. The first symptom of attack is a brown patch at the base of the young nut at the level of the perianth. At this stage, when the perianth is lifted up, several aggregations of orange coloured mites, at all stages of development can be seen. Later these patches enlarge, the epidermis cracks, and occasionally deep fissures develop. Malformation of nuts, or immature nut drop, occurs if the infestation is severe.

The susceptibility of fifteen different forms of coconut to mite damage was observed from October 1984 to December 1985. The observations indicated that the association of mite damage among some forms were highly significant ($P < 0.001$) in comparison to other forms. The variety Nawasi showed the highest damage while Bodiri showed the lowest (Table 1).

Mealybugs

The mealybugs *Pseudococcus cocotis* (Maskell) (Hemiptera, Pseudococcidae), *Planococcus lilacinus* (Cockerell) (Hemiptera, Pseudococcidae) and *Pseudococcus citriculus* Green (Hemiptera, Pseudococcidae) are recorded for the first time on coconut inflorescence. These mealybugs mostly colonize the peduncle and stalk of the inflorescence, sometimes causing the inflorescence to dry up. *Pseudococcus cocotis* was the most common species observed in the two sites. *Planococcus lilacinus* has been recorded in

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Table 1. Percentage of harvested nuts damaged by mites in various varieties/forms of coconut from October 1984 to December 1985

Name of varieties/forms	Percent of nuts with mite damage
Bodiri ..	10.20
Ranthambili, Pora pol Dwarf yellow, Gon thambili ..	20.30
Kamandala, Rath ran thambili, Dwarf red, Tall x Dwarf—hybrid ..	30.40
Nawasi thambili, Ordinary tall, King coconut, San Ramon ..	40.50
Nawasi, West African Form ..	50

Sri Lanka on *Anona muricata* and *Theobroma cacao* (Le Pelley, 1942). *Pseudococcus citriculus* was recorded from the leaves of coconut (Kanagaratnam *et.al.* 1981). The parasitoid *Anagyrus sp. nr. pseudococci* (Girault) (Hymenoptera: Encyrtidae), *Promuscidia unfasciiventris* Girault (Hymenoptera, Aphelinidae) and *Platygaster sp.* (Hymenoptera, Platygastridae) emerged from the mealybug, *Pseudococcus cocotus* brought into the laboratory from the field. *P. unfasciiventris* was the most common parasitoid. *Coccodiplosis sp.* (Diptera; Cecidomiidae), *Cryptogonus bryanti* Kapur (Coleoptera, Coccinellidae) and *Pseudoscymnus sp.* (Coleoptera, Coccinellidae) were found to be predators of these mealy bugs. Larvae of *Coccodiplosis sp.* pupate under the mealybug, or in close vicinity in a silken cocoon. The larvae were observed feeding on adult mealybugs. The host range of some of these natural enemies is very wide.

Known host range of the natural enemies of some mealybugs

Parasitoid/Predator	Hosts
<i>Anagyrus pseudococci</i>	<i>Planococcus citri</i> , <i>Rastrococcus iceryoidea</i> <i>Antonnia graminis</i>
<i>Promuscidea unfasciiventris</i>	<i>R. iceryoidea</i> , <i>Coccus viridis</i>
<i>Pseudoscymnus sp.</i>	<i>Aspidiotus destructor</i>
<i>Cryptogonus bryanti</i>	None.

Scales

Scale insects cause damage by sucking the sap of the palm and may be found on the leaves, nuts, and inflorescence. The scales *Coccus hesperidum* Linnaeus (Hemiptera, Coccidae), *Aulacaspis sp.* (Hemiptera, Diaspididae), *Pseudaulacaspis cockerelli* (Hemiptera; Diaspididae) and *Aonidiella orientalis* (Hemiptera, Diaspididae) were observed on the developing fruits and inflorescence of coconut. These scales are newly recorded in Sri Lanka.

Coccus hesperidum is yellow with an oblong shield and infests the nuts. It was heavily parasitised by *Coccophagus silvestrii* Compere (Hymenoptera, Aphelinidae). *Aulacaspis sp.* and *Pseudaulacaspis cockerelli* (Hymenoptera;) are characterised by a white papery irregular shield. *Cybocephalus sp.* (Coleoptera, Coccinellidae) was observed preying on *Aulacaspis sp.*, *Aonidiella orientalis* is orange with a round shield. It has a wide host range and has already been recorded from the fruits in India (Kapadia, 1981).

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The beetles *Scymnus (Pullus)* sp. (Coleoptera, Coccinellidae), *Cryptogonus bryantii* Kapur (Coleoptera, Coccinellidae), *Telsimia ceylonica* (Coleoptera, Coccinellidae) and *Pseudoscymnus* sp (Coleoptera, Coccinellidae) were observed preying on these scale insects.

During the period of the survey, though mealybug and scale infestations were common at all the locations, they were not found on large number of palms. It is likely that the parasitoids and predators of these pests keep them under control.

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