

BIOECOLOGY, MORPHOMETRICS AND REGULATORY ROLE OF SOME
ARTHROPOD NATURAL ENEMIES OF *Helopeltis antonii* Sign.
(Heteroptera: Miridae). A PEST OF CASHEW (*Anacardium occidentale* L.)
IN SRI LANKA

By

PERUMBULI MUDALIGE AJITH PRIYANTHA KUMARA WIJETUNGE

Thesis

Submitted in partial fulfillment of the requirements

for the degree of

MASTER OF PHILOSOPHY

in the

POSTGRADUATE INSTITUTE OF AGRICULTURE

of the

UNIVERSITY OF PERADENIYA

PERADENIYA

JUNE 2005

REF 632.9

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ABSTRACT

Cashew (*Anacardium occidentale* L.) is extensively cultivated in semi-drier and drier parts of Sri Lanka. However, except northern districts, Kurunegala, Puttalam, Gampaha and Hambantota are the major cashew producing districts. National average yield in Sri Lanka is approximately 4 to 5 kg/ tree/ year, which is far below the potential yield (10-15 kg/tree) and yield obtained by many other cashew growing countries. This decline in yield is reported to be caused due to several factors of which insects play a vital role. Sap sucking bugs *Helopeltis antonii* Signort, 1858 (Heteroptera: Miridae) being the most serious pest of cashew causes around 30% yield loss in all cashew- growing areas of Sri Lanka. The tea mosquito (*Helopeltis antonii*) is considered to be the most serious pest of cashew in India, which resulting in yield losses of nearly 25% shoots, 30% of inflorescence and 15% of tender nuts. In Australia, the tea mosquito bug, *H. pernicialis* causes over 60% reductions in cashew yield while *H. theobromae* and *Helopeltis spp.* has been the major insect pest in Malaysia and in Hainan Island of China.

Detailed studies on biology of *H. antonii* and its arthropod natural enemies, incidence and severity of damage and the effects of flushing stage during fruiting season were carried out. Biology of *H. antonii* was studied under laboratory and field conditions. Life cycle of *H. antonii* includes 5 nymphal instars with durations of 2.6, 2.3, 1.7, 2.2, 3.1 days respectively. Mean duration of the developmental period was 26.9 days for males and 28.2 days for females. Mean duration of mating was 1 h and 15 minutes and resulted in a

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fecundity of 15 – 42 eggs with an oviposition period of 6 days under $31^{\circ} \pm 2^{\circ}$ C and 75% RH. Mean pre- oviposition period of 5 days was recorded. Females were predominant in the field with a female to male ratio 2: 1.

Eggs were embedded singly in the epidermal tissues of the tender shoots, leaf stalks, and inflorescence axes and rarely in the nuts and mid ribs of leaves. Two unequal silvery processes arise laterally on either side of the anterior end of the eggs. Mean incubation period of eggs was 7 days (n= 150). Feeding habits of adults and nymphs were similar. Nymphs congregated, most often on the feeding site while adults were solitary. Both nymphs and adults inserted their rostrum into the tender shoots, leaf petioles, developing nuts and apples and sucked the sap continuously. As a result of feeding, shoots were eventually dried up, inflorescence became blight in appearance and nuts shrank and ultimately fell down.

Red ants *Oecophylla smaragdina*, when provided as a nest inside cages/bags, fed on nymphs and adults of *H. antonii* under field and laboratory conditions. Nymphs of *H. antonii* were effectively reduced by red ants than adults. Praying mantises fed vigorously on nymphs and adults of *H. antonii* under laboratory conditions. Adults were preferred by mantises than nymphs.

Incidence, severity of *H. antonii* damage and the effect of flushing stage on these were studied during a fruiting season. The linear logistic model gave the best fit for the

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progress of the damage ($G^2 = 2.38$, $P = 0.6662$). The Kendall's correlation coefficients for severity against time and severity against flushing stage were 0.46 ($P < 0.0001$) and 0.42 ($P < 0.0001$) respectively. The significant correlation of severity against time indicates that the severity of the damage has progressed steadily through the season. The significant correlation of severity against flushing stage indicates the fact that progress of the severity corresponds to the progress of the flushes.