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PREFACE

STUDIES OF BOOPHILIDS IN SRI LANKA

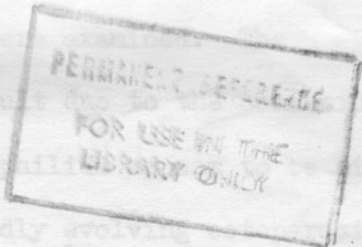
This Thesis presented for the degree of
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Summary

The morphological and biological studies of the boophilids present in Sri Lanka and their response to five acaricides, have been reported. The Boophilus ticks used in these morphological studies were collected from different climatic areas, namely; Hill-country, Mid-country, and low-country dry zone.

The ticks from the different areas resembled each other in the important morphological characters of the capitulum, scutum and coxae. These ticks were noted to possess certain morphological characters of B. annulatus and others of B. microplus. The boophilids from Sri Lanka resembled B. annulatus in not having a caudal appendage in the male, and in the greater width of the basis capitulum of male and female which was twice as wide as long in both sexes; the hypostomal dentition of male and female which had 7 - 8 and 9 - 10 teeth per file respectively, and the scutum of the female which had a wider posterior angle. However, these ticks also resembled B. microplus in that the coxa I of the male had a deep 'V' shaped cleft separating the internal and external spurs and coxae II and III of the male and female had ^{weak} internal and external spurs.

Even though the boophilids from Sri Lanka had some of the characters of B. annulatus and others of B. microplus, as a group they possessed uniform characters among themselves. Therefore, these were considered to belong to one species, and as they resembled more closely B. annulatus than B. microplus they were identified as B. annulatus (sensu lato).

The non-parasitic stages and parasitic stages, of the life cycle of this tick were studied. The non-parasitic stages were observed to be influenced by temperature. The oviposition commenced after a period of days, depending on the environmental temperature. The female deposited 2447 ± 406.4 eggs, when kept under laboratory conditions. The deposition of eggs was spread over 7 - 15 days, under laboratory conditions.

The number and the weight of eggs deposited per twenty-four hour period rises to a peak within the first three to four days and then falls to a minimum. The eggs deposited during the early part of oviposition produced a better hatch than those deposited later. B. annulatus (sensu lato) eggs hatched into larvae in 24.6 ± 0.7 days, at $28^{\circ} - 30^{\circ}\text{C}$ and 75 - 80 per cent relative humidity. This period was observed to be influenced by temperature, as eggs kept at 34°C hatched into larvae in 19 days while those kept at 8°C failed to hatch.

It was noted that the period necessary for hatching did not depend on the day on which eggs were laid in relation to the egg laying cycle. The hatchability was 65 to 85 per cent when maintained in the laboratory at 25° to 30°C and 75 to 80 per cent relative humidity. Low humidity was detrimental to larvae. However, larvae could be kept upto 80 days in incubation tubes, if adequate humidity was provided. Engorged females were better adapted to changes in temperature. The females survived temperatures as low as 8°C for periods upto 6 days and retained the capacity to lay eggs, when transferred to a warmer environment.

Studies were done on the parasitic life cycle of this tick on cattle and on unnatural hosts like goats and rabbits. On cattle larvae

moulted into nymphs in 7 days and the adults appeared in 16 to 17 days, post application. The engorged females commenced to fall by the twenty-third day. Successful development into adults also occurred on rabbits, the different stages requiring slightly longer periods than on cattle. However, hypersensitive reactions with sloughing off of the skin of the ear were observed in the rabbits. The engorged females that dropped off the rabbits laid viable eggs, which hatched into larvae in 30 days, under laboratory conditions. B. annulatus (sensu lato) larvae did not develop on goats and died in 3 to 5 days. Hypersensitive reactions such as papular eruptions and reddening of the skin were observed on goats.

The susceptibilities of B. annulatus (sensu lato) ticks from Ambewala and Bopatalawa farms in Sri Lanka, to common acaricides, namely; toxaphene, coumaphos, dioxathion, ethion and Dursban, were studied using unfed larvae by the method described by Stone and Haydock (1962). The susceptibilities of these were compared with those of ticks from Gannoruwa and Wirawila farms which were treated as 'control' strains. The Bopatalawa strain of larvae showed resistance to coumaphos, ethion and dioxathion. The factors of resistance for these three acaricides were 2.04, 2.29 and 4.18 respectively.

The Ambewala strain showed a higher factor of resistance to coumaphos (2.98) but was susceptible to the other two acaricides. The Bopatalawa strain of larvae was highly susceptible to Dursban.