STUDIES ON THE VECTORS OF JAPANESE ENCEPHALITIS IN THE HILL COUNTRY OF SRI-LANKA

By

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SUMMARY

An ecological study on the major potential vector mosquitoes of Japanese encephalitis was carried out during the period September 1986 to December 1987 in the hill country of Sri Lanka. A total of 76,783 mosquitoes belonging to 10 genera and 51 species were collected using CDC light traps hung in pig pens during the survey. Culex was the dominant genus at all sites, followed by Anopheles and Aedes.

Kandy (530 m elevation) was the main study area where detailed investigations were carried out. Collections were done weekly at 4 sites; Pilimathalawa (a low lying area with a large number of rice fields), Udaperadeniya (hilly area with rice fields), Ampitiya (hilly area with few rice fields) and Bahirawakanda (hilly area with no rice fields). A total of 73,968 mosquitoes in 10 genera and 45 species were collected from these sites. Four major potential vectors of Japanese encephalitis (ie. Cx. tritaeniorhynchus, Cx. gelidus, Cx. pseudovishnui and Cx. fuscocephala) were predominant at these collections. Significant site-related differences in the prevalence of these species were observed. Two population peaks of these mosquitoes were observed in May-June and October - December periods coinciding with the onset of monsoonal rains and rice cultivation cycles. Correlation tests, carried out between the densities of these species and climatic factors showed that significant correlations were present only in the relationships of Cx. tritaeniorhynchus and Cx. gelidus with rainfall and relative day humidity. Time segregated catches showed that all 4 vectors were highly active throughout the night; a distinguishable dusk peak and a dawn peak were observed in the nocturnal periodicities of Cx. pseudovishnui and Cx. gelidus respectively.

In addition to Kandy collections, mosquitoes were collected monthly from other areas at different elevations in the hill country of Sri Lanka. A total of 721 female mosquitoes in 6 genera and 19 species were collected from Hatton (1270 m), 1024 females in 5 genera and 21 species from Bogahawatta (1330 m), 735 females in 5 genera and 19 species from Bopaththalawa (1800 m) and 317 females in 4 genera and 14 species from Nuwara Eliya (2070 m). Statistical analysis showed that the presence of the major potential vectors of Japanese encephalitis was significantly lower in these areas than in Kandy.

A study on the mite larvae parasitizing the 4 major vectors, collected from Kandy sites, was also done during the survey. A total of 1830 mite larvae parasitizing 1245 mosquitoes were collected. All the parasites belonged to the genus Arrenurus. The number of mite larvae per parasitized mosquito ranged from 1 to 13. Parasitized mosquitoes were always females. Statistical analysis of mite larvae at different sites revealed that these were abundant in the areas with a large number of paddy fields. The rate of infestation was highest among Cx. pseudovishnui followed by Cx. tritaeniorhynchus, Cx. fuscocephala and Cx. gelidus. Infestations were always observed on the inter-segmental membrane areas of the host, which could be easily pierced. The pattern of distribution of mite larvae on the mosquito body was also observed. Most of the parasites were found on the abdomen, followed by the thorax, with very few on the head (cervical membrane). More than 90% of the parasites found on the thorax were attached to the sterna, whereas most of the abdominal parasites were found on the tergal region. Parity status studies of these parasitized mosquitoes showed that the presence of Arrenurus mite larvae on the

mosquito body was significantly associated with the nulliparity of the host.