

## **SURVEILLANCE OF DENGUE VECTOR MOSQUITOES AND THEIR ABUNDANCE IN THE KELANIYA UNIVERSITY PREMISES**

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### **Introduction**

*Aedes aegypti* is reported as the major vector of dengue fever in Sri Lanka. The presumed secondary vector is *Ae. albopictus* (Amarasinghe, 2001). Hapugoda *et.al* in 2004 reported that there is a high density of *Ae. albopictus* mosquitoes and that *Ae. albopictus* is the major vector species found in the Kurunegala District. The authors further reported that the detection of dengue virus for the first time in *Ae. albopictus* in Sri Lanka is contrary to the earlier belief that *Ae. aegypti* is always the major vector of dengue. *Ae. albopictus* in absence of *Ae. aegypti* prefers to lay eggs in the field in containers with conditioned water that is left outside for a long period, with a stable flora together with immature stages of the same species (Thavara *et. al*, 2003).

The present study was carried out at the Kelaniya University premises from July 2005 to January 2006. The objectives of this study were to find out the abundance of dengue vector mosquito species in selected indoor and outdoor habitats in the Kelaniya University premises, correlate the population dynamics with rainfall, determine the most effective concentration of hay infusion that can be used for ovitraps, determine the viability of *Ae. albopictus* eggs after a prolonged period under dry conditions and identify the breeding sites and distribution of *Aedes* mosquito species in the university premises.

### **Materials and Methods**

The effect of rainfall and temperature on population dynamics and oviposition of the dengue vector mosquito was studied at five selected sites, two indoor and three outdoor within the study area. Population studies were carried out by human diurnal collection and by using ovitraps. To find the egg laying preference of female *Aedes* mosquitoes, a 10%, 20%, 30% hay infusion and aged water were used. Viability of *Aedes* eggs was determined under prolonged storage in laboratory conditions. A survey was carried out in the University premises to find the possible breeding sites and distribution of the dengue vector mosquito species.

### **Results**

Dengue vector mosquitoes present in all the study sites were only *Ae. albopictus*. *Ae. aegypti* was absent. This was evident during human diurnal collection, ovitrap collection

and the vector surveillance study. There was an increasing trend in the number of mosquitoes collected outdoors and indoors by human diurnal collection with rainfall. In outdoor sites the mean number of mosquitoes were highest after peak rainfall. The number of eggs laid in ovitraps was positively correlated with rainfall. There was a peak observed in the number of eggs at outdoor sites after a lag period of one month after the highest rainfall.

There was an increasing trend in the number of eggs laid in hay infusion during the first six days. From the seventh day onwards the number of eggs laid in water increased compared to hay infusion in both indoor and outdoor sites. Overfermentation of hay after 6 days and increased female mosquito attraction for water may be the reasons for this. One way ANOVA shows that there was a significant difference of egg laying in between concentrations ( $p=0.000$ ,  $F= 20.24$ ) Preference was greater in 20% hay infusion in relation to water and other concentrations of hay infusion used. The viability of eggs decreased with the age of the eggs in dry conditions. The maximum viability period for *Ae. albopictus* in absence of water was seven weeks. Positive breeding sites of *Aedes* mosquitoes were found uniformly distributed throughout the Kelaniya University premises and the container index was 48.83%. Other than the containers and leaf axils larvae were recorded from water accumulated fallen leaf surfaces. During this study, only the water holding plant axils of *Bromelia* were found to serve as a good source for *Aedes* breeding. This indicates that *Ae. albopictus* breeds only in selected plants.

### **Discussion**

According to the results the only available *Aedes* species in the university premises is *Ae. albopictus*. This is the first recorded document stating that *Ae. aegypti* was not the dominant dengue vector species in the Kelaniya university premises. The number of *Ae. albopictus* eggs laid were greater at outdoor sites than indoor sites because of the availability of natural water accumulated sites outdoors. The lowest number of eggs was recorded in unconditioned water and proves that *Ae. albopictus* prefers to lay eggs in conditioned water. The maximum viability period for *Ae. albopictus* in absence of water was seven weeks which is less than for *Ae. aegypti* This may be due to species difference.

### **Conclusion**

*Ae. albopictus* is the only dengue vector mosquito species found in the Kelaniya university premises. There may be a risk of *Ae. albopictus* acting as a dengue vector although it has been recorded only as a secondary vector in the past. Egg laying and the adult population of *Aedes* mosquitoes were positively correlated with rainfall. Rate of egg laying and number of mosquitoes were higher in outdoor sites than in indoor sites. *Ae. albopictus* prefers to lay eggs in ovitraps filled with hay infusion than in aged water. Most sensitive concentration was 20% hay infusion for ovitrap studies.

**References:**

Amarasinghe, F.P. (2001). Ecology of mosquito vectors of disease in Sri Lanka. *Seminar and workshop on Insecticide Resistance and Future Trends* held at The Open University of Sri Lanka, 8pp.

Hapugoda, M.D., De Silva, N.R., Abeyewickreme, W., Senarathne, H., Chandrasena U.A. & Rajamanthri, S. (2004). Geographical Information System (GIS) based Risk Mapping and Warning System for Monitoring of Transmission of Dengue in Kurunegala District. *Sri Lankan Journal of Geo - Informatics*, 1-11.

Thavara, U., Tawastin, A. & Chomposri, J. (2003). Evaluation of attractants and egg-laying substrate preference for oviposition by *Aedes albopictus* (Diptera:Culicidae). *National Institute of Health, Department of Medical Sciences, Ministry of Health, Thailand*. Available at: [http://www.sove.org/Journal pdf/202004 pdfs/Thavara.pdf](http://www.sove.org/Journal%20pdf/202004%20pdfs/Thavara.pdf)