Potential of Rubber Plantations as Breeding Source for Aedes albopictus in Kerala, India

by

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Introduction

Ever since the major outbreak of DF/DHF during 1996 in Delhi\(^1\), dengue fever has been receiving manifold attention from health authorities and researchers all over India. For the first time, one imported dengue case was reported in Wayanad district of Kerala and a death due to suspected dengue haemorrhagic fever in the neighbouring Kannur district in June 2002. Vector surveys in localities associated with these cases indicated that the dominant breeding site for Aedes albopictus, the second most important dengue vector\(^2\), was artificial containers used for collecting rubber sap. During the south-western monsoon (June-September) season, it is a practice to suspend tapping temporarily in some plantations leading to accumulation of rainwater in these containers, thus providing ideal breeding sites for mosquitoes. Against this backdrop a systematic study to substantiate the potential of rubber plantations as sources for the proliferation of Aedes albopictus was conducted in three villages each in Kannur and Wayanad districts from July to September 2002.

Kannur and Wayanad are two neighbouring districts in north Kerala. Kannur district has 57,823 rubber plantations of different sizes occupying a total area of 33,944 hectares, while Wayanad has 10,244 rubber plantations occupying 6,450 hectares. The two districts receive on an average 300 mm of annual rainfall.

Two categories of rubber plantations were selected for the study. They were (i) with active tapping using rain guards; and (ii) where tapping was suspended with sap-collecting containers intact but without rain guards. Ten plantations each were selected under each category from both districts. In each plantation, 100 trees were surveyed at random for mosquito breeding. Immature stages of mosquitoes were collected in plastic containers and transported to the laboratory for emergence and identification.

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Results and discussions

In both districts the plantations with active rubber tapping, no sap-collecting containers were found to be having rainwater. However, in the plantations where tapping had been suspended, sap-collecting containers had rainwater collection and also mosquito breeding (Table). In Kannur district, of the 1,000 trees surveyed, 802 (80.2%) had sap-collecting containers with rainwater. A total of 788 (98.3%) of these containers were positive for Aedes albopictus breeding in association with other Aedine sp. This species constituted 23.2% of the adult mosquitoes that emerged in the laboratory. In Wayanad district, 917 out of 1,000 trees surveyed had sap-collecting containers with water. However, only 807 (88.0%) supported mosquito breeding. Breeding of Aedes albopictus was found only in 534 (58.2%) containers. The percentage of Aedes albopictus adults that emerged in the laboratory was 12.8%. On an average, each hectare of rubber plantations had 330 trees. The capacity of a sap-collecting container was 500 ml.

<table>
<thead>
<tr>
<th>District</th>
<th>No. of trees surveyed</th>
<th>No. of trees with containers having water (%)</th>
<th>No. of containers with mosquito breeding (%)</th>
<th>No. of containers with Aedes albopictus breeding (%)</th>
<th>Percentage of Aedes albopictus to total emergence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kannur</td>
<td>1,000</td>
<td>802 (80.2)</td>
<td>788 (98.3)</td>
<td>788 (98.3)</td>
<td>23.2</td>
</tr>
<tr>
<td>Wayanad</td>
<td>1,000</td>
<td>917 (91.7)</td>
<td>807 (88.0)</td>
<td>534 (58.2)</td>
<td>12.8</td>
</tr>
</tbody>
</table>

This study emphatically indicates the potential of rubber plantations as important sources for the proliferation of Aedes albopictus. In view of the fact that rubber plantations play a significant role in the economy of the region, increased contact of the human population with Aedes albopictus acquires greater epidemiological importance. The study also revealed that those plantations where tapping was not abandoned during the rainy season did not have any potential for mosquito breeding. This is a positive aspect of the entire issue, as encouraging rubber tapping during the rainy season using rain guards could be one of the most plausible solutions for the problem.

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References