Prevalence of *Aedes aegypti* in DHF Outbreak Areas in Panipat City, Haryana State, India

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Abstract
Entomological investigations carried out in DHF-affected localities in Panipat city revealed widespread prevalence of *Aedes aegypti* mosquito, the vector of dengue/DHF. The breeding of *Aedes* mosquito was mainly found in cement tanks, clay jars, drums, coolers, ornamental plant bottles, etc. The cement tanks was found to be the most preferred container for *Aedes* breeding. The proportional positivity rates of various types of containers calculated were: cement tanks 50%, followed by drums 20.5%, clay jars 14.7%, coolers 11.7% and ornamental plant bottles 2.9%. An analysis of data revealed that the larval house, containers and breteau indices in the three localities surveyed were estimated at 42.8%, 33.6% and 53.9% respectively. The adult *Aedes aegypti* indoor resting density in one of the affected localities was found to be appreciably high, i.e. 16.0 per man/hour.

Keywords: *Aedes aegypti*, dengue fever, dengue haemorrhagic fever, Panipat, Haryana, India.

Introduction
In India, dengue/dengue haemorrhagic fever (DF/DHF) has been restricted to urban and semi-urban areas of the country\(^1,2\). However, over the years, large-scale development activities, viz. rapid growth of the transport system through networks of railways and roads, industrial and building activities, provision of safe piped drinking water, electricity, overall improvement in civic amenities and socioeconomic conditions of rural masses, have resulted in the establishment and proliferation of _Aedes aegypti_ mosquito in urban and rural areas alike\(^3,4\). During 1996, large-scale outbreaks of dengue/DHF were reported in the capital city of Delhi and in Faridabad and Hissar districts of Haryana State and Ludhiana city in Punjab State\(^5,6\).

During September 1997, a number of cases of fever showing the characteristic signs of DHF, i.e. high fever, abdominal pain, headache, rash in a few cases accompanied by bleeding in vomits, stools or from gums, were detected. Serological tests using Immunoblot and HI tests detected IgM and IgG antibodies to dengue virus. To supplement these findings, an entomological survey was organized in three affected localities to detect the extent and intensity of _Aedes aegypti_ breeding and to institute control measures.

**Methodology**

Panipat is an upcoming industrial town in Haryana State and is well-known for its textile industry and handicrafts. The city is having a scarce and intermittent piped water supply, forcing the inhabitants to resort to water storage practices for use in the textile and other industries and for household purposes.

Entomological surveillance was carried out in three affected localities (Pop. 30 000) in Panipat city during September 1997, viz. Ward No.8, Jain Mohalla, and Sethi Chowk. House-to-house searches were made in order to detect _Ae. aegypti_ breeding in all containers in domestic/peridomestic areas of dwelling units by standard (WHO) entomological techniques. Besides, adult _Ae. aegypti_ mosquitoes were also collected from indoors in Jain Mohalla, using the aspirator tube and torch, and per man/hour density was recorded.
Results and discussions

During the survey, a total of 63 houses/ premises and 101 containers were searched for *Aedes* breeding in the affected localities (Tables 1 and 2).

**Table 1.** Locality-wise House, Container and Breteau indices of *Aedes aegypti* recorded in Panipat city during September 1997

<table>
<thead>
<tr>
<th>Name of Locality</th>
<th>House Index (%)</th>
<th>Container Index (%)</th>
<th>Breteau Index (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Ward No.8</td>
<td>50.0</td>
<td>37.8</td>
<td>63.6</td>
</tr>
<tr>
<td>2. Jain Mohalla</td>
<td>37.8</td>
<td>33.3</td>
<td>50.0</td>
</tr>
<tr>
<td>3. Sethi Chowk</td>
<td>33.3</td>
<td>29.4</td>
<td>47.6</td>
</tr>
</tbody>
</table>

**Table 2.** Infestation of *Aedes aegypti* by containers

<table>
<thead>
<tr>
<th>Types of container</th>
<th>Number checked</th>
<th>% positive</th>
<th>Proportional positivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cement storage tank</td>
<td>44</td>
<td>38.6</td>
<td>50.0</td>
</tr>
<tr>
<td>Metal drum</td>
<td>16</td>
<td>43.7</td>
<td>20.5</td>
</tr>
<tr>
<td>Clay jar</td>
<td>22</td>
<td>22.7</td>
<td>14.7</td>
</tr>
<tr>
<td>Desert (evaporation) cooler</td>
<td>17</td>
<td>23.5</td>
<td>11.7</td>
</tr>
<tr>
<td>Ornamental plant bottle</td>
<td>2</td>
<td>50.0</td>
<td>2.9</td>
</tr>
</tbody>
</table>

The average larval House Index, Container Index and Breteau Index calculated in respect of the three localities surveyed ranged from 33.3% to 50%, 29.4% to 37.8% and 47.6% to 63.6% respectively, which was much higher than the critical index reported for causing the outbreaks of dengue/DHF\(^7\). Maximum House, Container and Breteau indices were recorded in ward No.8, i.e. 50.0%, 37.8% and 63.6, followed by Jain Mohalla – 37.8%, 33.3% and 50.0%, and Sethi Chowk – 33.3%, 29.4% and 47.6% respectively. Rapid building–up of the *Ae. aegypti* population during the wet season in north India, including Panipat city, has earlier been reported\(^8\).

Cement tanks were found to be the primary containers for *Aedes* breeding because water in these containers was never emptied and was replenished periodically, making them the perennial breeding sites. Besides, other containers like clay jars, drums, coolers and ornamental plant bottles were also found to be positive for *Aedes* breeding.
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The adult Ae. aegypti collected in Jain Mohalla yielded a density of 16.0 per man/ hour. In view of the appreciably high larval House, Container and Breteau indices and adult density of Ae. aegypti in Panipat, it is felt that there is a need for regular entomological surveillance in the city to keep the vector density below the critical level in order to contain any future outbreak of DHF and its spread to adjoining areas, especially during July–September, which is the period when vector breeding is the highest.

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References