Original Research Article

Diversity of mosquito species (Diptera: Culicidae) at Irinjalakuda, Thrissur with special reference to their breeding habitats

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ABSTRACT

Larval breeding habitats were investigated in Irinjalakuda municipal area during 2012 July to 2013 June. Larval samples were collected from various habitats in 25 selected spots in study area. Collected samples were identified using systematic keys. Altogether 30 different species belonging to 5 different genera were recorded during study period. Constant studies on biology and larval ecology of mosquitoes have been observed as important tool in mosquito control. Such studies will help to determine the existing and disappearing mosquito species and extent of their distribution. Result of this study revealed the abundance of mosquito species in the study area and which may helps vector control associated with management of breeding habitats.

Introduction

Mosquitoes are connected with aquatic habitats and water impoundments, have long been recognized as pests and public health problem (Richard, et. al., 1985). Mosquitoes exploit almost all types of lentic aquatic habitats for breeding (Gautam, et.al., 2006). Composition of organism depends upon size and type of aquatic water bodies and these habitats influences the selection of oviposition sites by the mosquitoes there by limiting the mosquitoes to breed (Eitam, et. al., 2002). Mosquitoes are widely distributed throughout the world and they utilize different water bodies for their breeding (WHO, 1982).

In natural breeding habitats mosquito larvae play an important role in food chain. Mosquito larvae provide food for predators while assisting nutrient recycling. They feed on detritus and other organic materials in the water, and are food source for aquatic organisms including fish and some micro invertebrates. Larvae of some mosquito species (eg: Ae. alternans and Cx. halifaxii) have specialized mouthparts and are predatory on other mosquito larvae and various aquatic invertebrates. As well as providing prey for aquatic predators, mosquito larvae may be an important source of food for wading birds. Many
species of wading birds have been observed undertaking feeding behaviour within known mosquito habitat. Adult mosquitoes provide food for wide range of terrestrial invertebrates, birds, mammals, reptiles and amphibians, as well as playing a role in the pollination in some plants (Cameron and Richard, 2007).

Many species breed in both natural and artificial containers such as pools, gutters, coconut shells, tree holes, bamboo stumps, leaf axils, septic tanks and so on (Mafiana, 1989, Aigbodion and Anyiwe, 2005). Mosquito control except chemical treatment usually requires knowledge of location of aquatic habitat in which mosquito larvae are breeding (Richard, et.al., 1985). Constant studies on biology and larval ecology of mosquitoes have been observed as important tool in mosquito control. Such studies will help to determine the existing and disappearing mosquito species and extent of their distribution (Mafiana et. al., 1998, Anyawu et.al., 1999). This study therefore designed to investigate the larval habitats of existing fauna and its possible public health implication in the Irinjalakuda municipal area.

Materials and Methods

Study site

Irinjalakuda is a municipal town in Thrissur district of Kerala, India (10.33° N 76.23°E), is an important cultural, educational and commercial centre. 25 different spots were randomly selected with an intention to cover entire topography of the municipality.

Methodology

Larvae of mosquito were collected from 25 different habitats both natural and artificial using plankton nets, dippers, and pipettes. Dippers and plankton nets were used in open sources and pipettes used in tree holes for sampling. All the sampling sites were visited periodically. Collections from each site were maintained separately in suitable containers and allowed them to emerge. Adult specimens first of all narcotized with petroleum ether and identified using systematic keys and catalogues of Barraud (1934) and Christophers (1933), catalogue of Stone and Knight (1959 and Rao (1981).

Results and Discussion

Mosquito survey was conducted in Irinjalakuda municipal area for one year (2012 July to 2013 June). Larvae were collected from various habitats in 25 selected spots of the study area. Altogether 30 species belonging to 5 genera were identified and recorded. Culex was the most predominant genus with 12 species followed by Aedes (8), Anopheles (6), Mansonia (3), and Armigeres (1) respectively.

The study area was rich in mosquitoes, the breeding of mosquitoes was observed virtually in all habitats sampled. Ground pools, domestic containers, cemented tanks, tyres and manmade containers were the main breeding sites for mosquitoes. Every mosquito species have its their preference on oviposition sites and aquatic larval habitat.

Genus Culex represents 12 species, Cx. farscanus, Cx. quinquefasciatus, Cx. gelidus, Cx. univittatus, Cx. fuscocephala. Cx. tritaenorhynchus, Cx. whitmorei, Cx. vishnui, Cx. sinensis, Cx. bitaeniorhynchus. Cx. infula, Cx. pseudovishnui. Genus Culex mainly found in highly polluted urban habitats such as
### Table 1 List of Mosquito Species present in study area

<table>
<thead>
<tr>
<th>SL. No.</th>
<th>GENERA</th>
<th>SPECIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Anopheles</td>
<td>stephensi barbistrostris culicifacies subpictus vagus nigerrimus</td>
</tr>
<tr>
<td>2</td>
<td>Mansonia</td>
<td>crassipes uniformis indiana</td>
</tr>
<tr>
<td>3</td>
<td>Aedes</td>
<td>scatophagoides pseudotoeniatus longirostris aegypti vittatus albopictus walbus vexanxus</td>
</tr>
<tr>
<td>4</td>
<td>Armigeres</td>
<td>subalbatus fascanus quinquefasciatus gelidus univittatus fuscocephala tritaeniorhynchus whitmorei vishnui sinensis bitaeniorhynchus infula pseudovishnui</td>
</tr>
</tbody>
</table>

### Table 2 Species Composition of Collected Mosquitoes

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Genus</th>
<th>No of species</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Culex</td>
<td>12</td>
</tr>
<tr>
<td>2</td>
<td>Aedes</td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td>Anopheles</td>
<td>6</td>
</tr>
<tr>
<td>4</td>
<td>Mansonia</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>Armigeres</td>
<td>1</td>
</tr>
</tbody>
</table>
Figure 1 Species Composition of Study Area

A total of 8 different species present in genus *Aedes*, *Ae. scatophagoides*, *Ae. pseudotoeniatus*, *Ae. longirostris*, *Ae. aegypti*, *Ae. vittatus*, *Ae. albopictus*, *Ae. waltus*, *Ae. vexanus* were identified. According to Gautam, *et al.*, 2006 the major breeding habitats of *Aedes* mosquitoes are temporary pools, cemented tanks, stream pools etc. Campos and Launibos 2000 demonstrated that tyres and tree holes are more likely to support more kind of complex communities. In 2012 Kristen, *et al.*, suggested that artificial containers such as tyres, buckets, trashcans, planter dishes, traps, and natural tree holes are the major breeding habitats of *Aedes* mosquitoes.

Genus *Anopheles* in Irinjalakuda represented with 6 species, *An. stephensi*, *An. barbirostris*, *An. culicifacies*, *An. subpictus*, *An. vagus*, *An. nigerrimus*. According to Seid, *et al.*, 2013, temporary water bodies such as farm ditches, rain pools, open pits were the most preferred habitats for *Anopheline* larvae. These habitats are either man made or associated with anthropogenic activities. In 1989 Yadav, *et al.*, discussed that temporary (hoofprint, riverbed pools), semi permanent (small pools, paddy fields, irrigation canals and channels), and permanent (pond, river, wells, and intradomestic sources) are the major breeding habitats of *Anopheles* mosquitoes.

Altogether 3 species present in Genus *Mansonia*, *M. crassipes*, *M. uniformis*, *M. indiana*. *Mansonia* eggs are laid on or under the surface of floating leaves of aquatic plants (Lee, *et al.*, 1988). He also suggested that larvae are found in association with many types of water plants both floating and fixed to the bottom. Larval habitats are usually permanent and semi permanent swamps and water holes. *Armigeres subalbatus* was the single member in the Genus *Armigeres* recorded.
from the present study. According to Pramanic, et. al., 2012, suitable breeding habitats for Armigeres are water bodies often polluted and closely associated with human habitation. In 2006 Gautam, et. al., showed that cemented tank is one of the breeding habitats for Armigeres subalbatus.

This study has provided information about diversity and breeding habitats of different mosquitoes in Irinjalakuda municipal area. This would be helpful for the sustainable management of vector mosquitoes and to take precautionary measures against mosquito borne diseases.

Acknowledgement

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References


Cameron, E, Webb. and Richard, C, Russel. 2007. Living with mosquitoes on the coast region of NSW.


Australian government publishing service. vol 9.