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Survey of Container Breeding Mosquito Larvae in Jalna City (M.S.) India

Kisan D. Thete* and Laxmikant V. Shinde*
**Department of Zoology, J.E.S. College Jalna, (M.S.) India*

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ABSTRACT: A survey on container breeding sites of mosquito larvae was conducted in the Jalna city. Survey was carried out during rainy season in June 2012 to December 2012. Sampling was carried out by dipping using pipette or dipper depending on container types. All breeding sources of mosquito larvae were examined different container types: indoor and outdoor *i.e.* plastic container, earthen pot, natural container, tiers, coconut shell, vase, can and concrete tank. Containers were identified as potential breeding sites. Survey was carried out in outdoors and indoors were found containing larvae. Among all types of containers of total surveyed containers were positive with mosquito larvae, followed by plastic containers, concrete tanks, vases, bottles, cans and earthen pots. A total of 1893 mosquito larvae were collected of which morphological identification of the larvae by use of microscopy yielded, we identified four species those of *Aedes aegypti* n = 1514 (79.98%), *Aedes albopictus n = 9(1%), Culex quinquefasciatus* n = 265(14%), *Culex vishnui* n = 95(5.02%). This study indicated that *Aedes and Culex* was capable of breeding in a wide range of container types. To control these mosquitoes, the elimination of artificial and natural containers or alteration of breeding sites in city should be taken into consideration.

Key words: Mosquito larvae, container, *Aedes, Culex.*

INTRODUCTION

Mosquito-borne diseases remain the leading health problem and it is estimated that at least 500 million people suffer from mosquito-borne diseases and more than 1.1 million people die of malaria and dengue annually (Madhumathy *et al.,* 2007). These diseases have accounted for huge economic loss, mortality, low productivity and social discrimination in many developing countries (Adeleke *et. al.,* 2010) and to a significant health burden in developed countries via travelers who have not taken sufficient precautions and prophylactic medications before travelling. Larval control (source reduction or suppression) has been identified as one of the most effective methods for the control of mosquito borne diseases (Singh *et. al.,* 2006). This control strategy has proved indispensable as the key to mosquito borne eradication efforts in most developed countries such as the United State of America and some countries in Europe such as Turkey (Kitron and Spielman, 1989; Mwangangi *et. al.,* 2009). Prior to launching the anti-mosquito larval measures, there is a need for a full understanding of the considerable diversity of the breeding habitats available for the ovipositing mosquitoes in different localities. Jalna is one of the endemic cities in Maharashtra state.

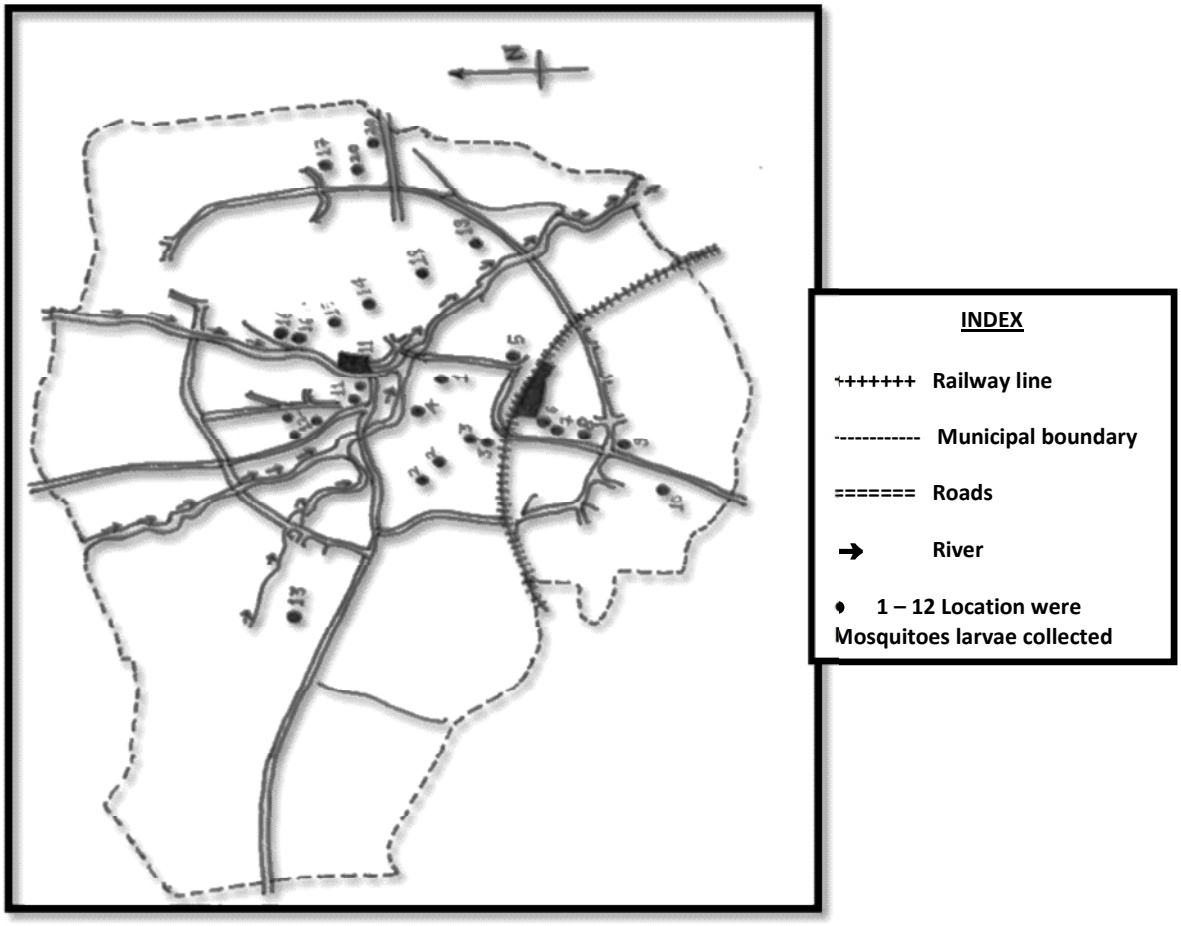
The recent report attempt has been made to study the indoor and out breeding habits of mosquitoes and the diversity of the species between outdoor and indoor ovipositing mosquitoes. This study was therefore under taken to determine the species diversity and density in container preferences of breeding mosquitoes. With regards to vector proliferation human ecology is responsible for the creation of a mosquitogenic environment; man is directly or indirectly creating such a situation (Dutta 2006). Containers are probably the most important factor determining the breeding of *Aedes* spp. since artificial containers are the major larval habitats in and near human habitation. The outbreaks of dengue are always reported in the city, no larval surveys, if any, are conducted in these city, and because of this very little information on the prevalence larval mosquito breeding is available.

Now day's Indian scenario of all regions are epidemic for mosquito borne diseases like malaria and dengue, which are regulated by climate. Dengue and chikungunya are the most common wide spread diseases in Marathwada since 2005-2006 (Laxmikant Shinde 2011). The objective of this study was describing mosquito aquatic habitats, to determine larval abundance, density and habitat types of Jalna city.

The present study was therefore conducted to determine the container breeding preferences of mosquitoes by larval survey in the Jalna city (M.S.). Such information can be used to design an effective control programmed for mosquito control in city.

MATERIALS AND METHODS

The container survey was conducted from June 2012 to December 2012 in the Jalna city the (N $19^0 51'$ and E $076^0 17'$). During the survey, all the containers, vessels and coconut shells were examined. Larvae collection was carried out indoors and outdoors by dipping method, using pipette or dipper depending on container type and location. In this study, "indoors" refers to the interior of the building while "outdoors" refers to the outside of the building. Between June 2012 and December 2012, we collected the larvae of four species of mosquitoes in Jalna City. Habitat from which collections were made included water storage tanks, plastic containers/vessels, metal vessels, ceramic vessels, tucker box, tires, coconut shell and an abandoned cement tank. We visited 12 stations, many more than once in month and collected 1893 specimens. These locations are Kanhaiya nagar, Hanuman ghat, Hamalpura, Modikhana, College road, Shri Krishana nagar, Sambhaji nagar, Ram nagar, Karwa nagar, Chaman, Railway station area and Ambad choufully. These locations cover whole the area of city, the Jalna divided in to two parts old Jalna and New Jalna. Collected larvae were preserved in 70% ethanol for identification. These larvae were identified morphologically using standard keys of S.R. Christopher 1933, P.J. Barraud 1934, and Bina Pani Das 1990.



Map shows Study area (Jalna city) and collection sites.

RESULTS

A total of 1893 mosquito larvae comprising four species were collected in city during the study period. *Aedes aegypti* was the predominant species accounting for n = 1514 (79.98%) of the larvae collected followed by *Culex quinquefasciatus* n = 265(14%), *Culex vishnui* n = 95(5.02%), and *Aedes albopictus* n = 9(1%) (Table 2, Fig. 1). Out of total collected larvae indoor density n = 739(39.04%) and outdoor n = 1154(60.96%) (Table 2). Plastic containers shows the highest number of larvae (indoors 80% and outdoor 68%) followed by clay pots and tiers, metal tins, cement tank etc. *A. aegypti* and *Cx.quinquefasciatus* breed in all the outdoor containers while *A. albopictus* only breed in outdoor coconut shell and some observed in tier. However only *A. aegypti* breed in all the containers indoor as well as outdoor. In all *Cx. vishnui* breed in turbid water or cement tank. The averagely high number of larvae (n = 293) collected in the month August because of the rainfall (Table 1, Fig. 2). All of the twelve localities in which the Ramnagar area shows the highest number of specimens (n = 201) due to this area have the poor sanitation and slum area of the city (Table 1, Fig. 2).

Table 1. Mosquito larvae collected in different localities in Jalna city during Jun-Dec 2012.

SR.NO.	LOCALITIES	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	TOTAL
1	Kanhaiya nagar	22	15	31	25	26	19	24	162
2	Hanuman ghat	12	21	23	22	22	24	23	147
3	Hamalpura	20	22	27	26	19	28	21	163
4	Modikhana	25	23	29	33	28	22	26	186
5	College road	28	12	23	21	27	25	17	153
6	ShriKrishana nagar	32	14	22	20	09	24	23	144
7	Sambhaji nagar	22	16	21	19	22	22	12	134
8	Ramnagar	34	21	28	16	32	38	32	201
9	Karwa nagar	15	10	15	22	12	05	25	104
10	Chaman	18	23	26	14	26	18	22	147
11	Railway station	24	27	30	25	29	27	21	183
12	Ambad choufully	22	26	18	21	31	24	27	169
TOTAL		274	230	293	264	283	276	273	1893

Table 2. Numbers and proportions of the mosquito larvae collected in Jalna city.

Species	Indoor collection	Outdoor collection	Total (%)
Aedes aegypti	695	819	1514 (79.98)
Aedes albopictus	03	16	19(1)
Culex quinquefasciatus	25	240	265(14)
Culex vishnui	16	79	95(5.02)
Total	739(39.04)	1154(60.96)	1893(100)

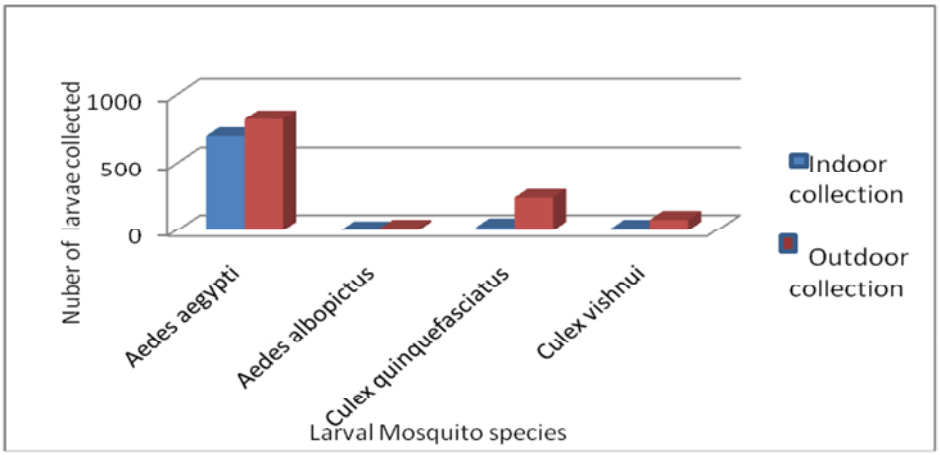


Fig.1. Indoor and Outdoor collection of mosquito larvae.

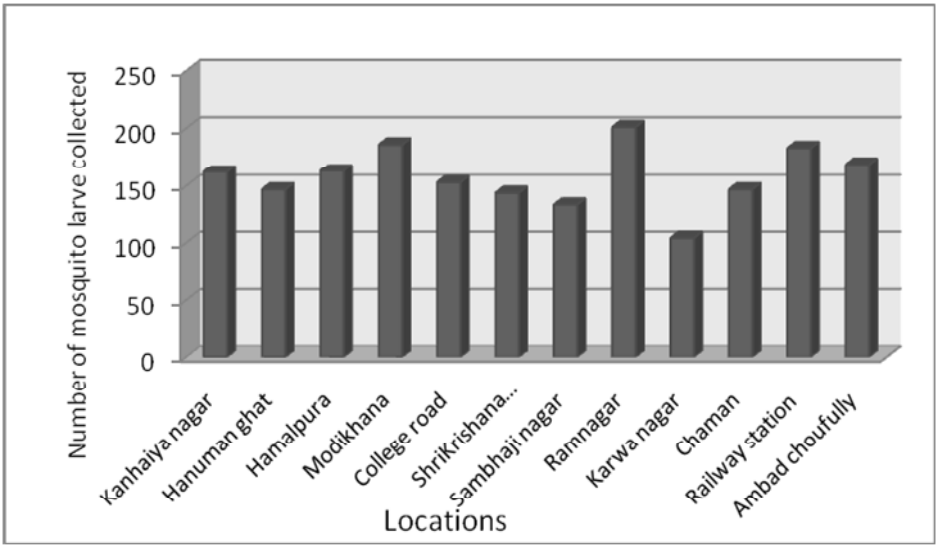


Fig. 2. Frequency of mosquito larvae in all localities.

DISCUSSION

The results of this study raise a number of public health concerns that need to be addressed. The recent year the rain fall in study area was very low that's why the people facing the problem of water shortage. The dry season is normally characterized with acute water shortage when most residents usually resort into mass water storage in different containers. These containers, if not properly covered, could serve as breeding sites for disease vectors as two (*Aedes aegypti and Aedes albopictus*) out of the three species encountered indoors are potential vectors of deadly and life threatening diseases such as yellow fever, dengue and chikungunya. On the other hand, the prolific breeding of the mosquitoes outdoors signals the danger associated with indiscriminate disposal of unwanted containers, the act that is common in many areas of the town (Adeleke *et. al.,* 2008). There is, therefore, a need for public health education campaigns that focus on the dangers inherent in the indiscriminate disposal of containers and storage of water inside the house as this serves as a potential breeding sites for the mosquito vectors. In general, larval predation of mosquitoes is less prevalent in temporary habitats than it is in large, permanent habitats (Service 1977, Sunahara *et. al.,* 2002).There is also need for further studies to evaluate the knowledge and awareness of the residents on mosquito-borne diseases and possible barriers that could be encountered during public health education on vector borne diseases at the study area. The mosquito species present in this area predisposes the inhabitants of this area to the risk of infections of mosquito-borne diseases. This calls for an accelerated campaign of mosquito control in this area especially during the Rainy season encompassing the integrated vector management approaches.

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