SURVEY OF CONTAINER BREEDING MOSQUITO LARVAE IN SOLAPUR CITY (M.S.) INDIA

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Abstract:

A survey on container breeding sites of mosquito larvae was conducted in the Solapur city. Survey was carried out during rainy season in June 2015 to December 2015.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 w e r e 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 Aedesaegypti n = 1514 (79.98%), Aedesalbopictus n = 9(1%), Culexquinquefasciatus n = 265(14%), Culexvishnui 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 travellers 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. Solapur 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 (LaxmikantShinde 2011). The objective of this study was describing mosquito aquatic habitats, to determine larval abundance, density and habitat types of Solapur cityThe present study was therefore conducted to determine the container breeding preferences of mosquitoes by larval survey in the Solapur 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 2015 to December 2015in the Solapur city. 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 2015 and December 2015, we collected the larvae of four species of mosquitoes in Solapur 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 cover whole the area of city, the Jalna divided in to two parts old solapur and julesolapur. 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-Solapu city.

RESULTS

A total of 1893 mosquito larvae comprising four species were collected in city during the study period. Aedesaegypti was the predominant species accounting for n = 1514 (79.98%) of the larvae collected followed by Culexquinquefasciatus n = 265(14%), Culexvishnui n = 95(5.02%), and Aedesalbopictus 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 Ramwadi area shows the highest number of specimens (n = 201) due to this area have the poor sanitation and slum area of the city Table no.1

Table 1. Mosquito larvae collected in different localities in Solapur city during Jun-Dec 2015

Sr.no	Localities	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	TOTAL
1	**Navipet**	22	15	31	25	26	19	24	**162**
2	**Bale**	12	21	23	22	22	24	23	**147**
3	**Tulajapurves**	20	22	27	26	19	28	21	**163**
4	**Mitranagar**	25	23	29	33	28	22	26	**186**
5	**Sambhaji**	28	12	23	21	27	25	17	**153**

	lake								
6	**Lashkar**	32	14	22	20	09	24	23	**144**
7	**Sidhheswar lake**	22	16	21	19	22	22	12	**134**
8	**Ramawadi**	34	21	28	16	32	38	32	**201**
9	**Rajashvnagar**	15	10	15	22	12	05	25	**14**
10	**Jule Solapur**	18	23	26	14	26	18	22	**147**
11	**Railway sation**	24	27	30	25	29	27	21	**183**
12	**Kondhanagar**	22	26	18	21	31	24	27	**169**
	TOTAL	274	230	293	264	283	276	273	**1893**

Collection sites -The containers and empty coconut


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

SPECIES	**OUTDOOR**	**INDOOR**	**TOTAL(%)**
Aedesaegypti	**819**	**695**	**1514(79.98)**
Aedesalbopictus	**16**	**03**	**19(1)**
Culexquinquefasciatus	**240**	**25**	**265(14)**
Culexvishnu	**79**	**16**	**95(5.02)**
Total	**1154(60.96%)**	**739(39.04%)**	**1893()**

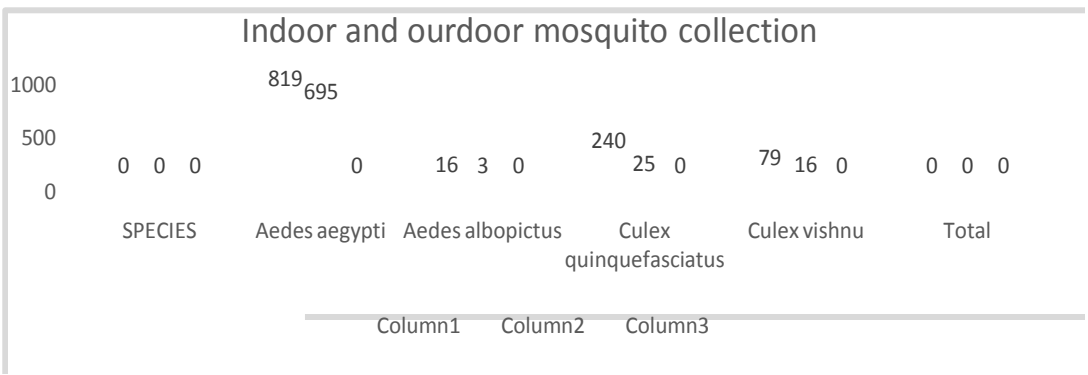

Fig.1. Indoor and Outdoor collection of mosquito larvae**.**

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 in Solapur city. 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 (Aedesaegypti and Aedesalbopictus) 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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