International Journal of Current Microbiology and Applied Sciences
ISSN: 2319-7706 **Volume 3 Number 2 (2014) pp. 536-541**
http://www.ijcmas.com

Original Research Article

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

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A B S T R A C T

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.

Keywords

Larval breeding; Irinjalakuda municipal area ; mosquito control.

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 recyclying. 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 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. fascanus, 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

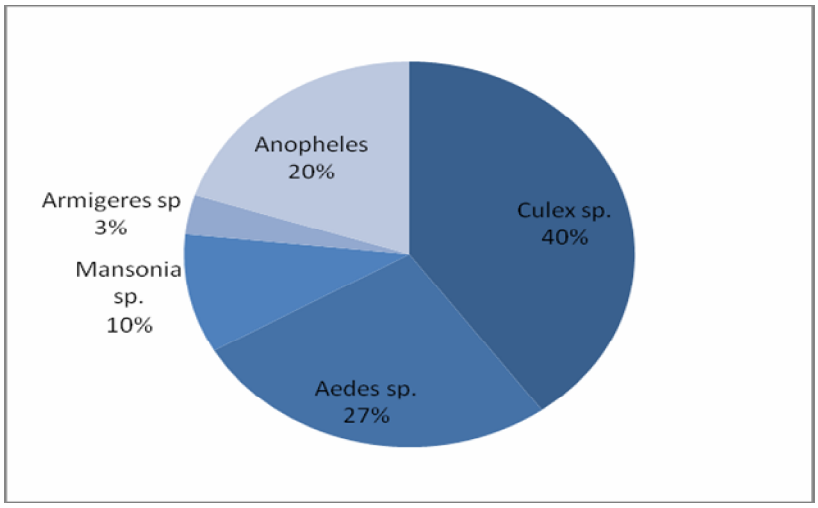
Table.1 List of Mosquito Species present in study area

SL. No.	GENERA	SPECIES
1	*Anopheles*	*stephensi*
		barbirostris
		culicifacies
		subpictus
		vagus
		nigerrimus
2	*Mansonia*	*crassipes*
		uniformis
		indiana
3	*Aedes*	*scatophagoides*
		pseudotoeniatus
		longirostris
		aegypti
		vittatus
		albopictus
		walbus
		vexanus
4	*Armigeres*	*subalbatus*
5	*Culex*	*fascanus*
		quinquefasciatus
		gelidus
		univittatus
		fuscocephala
		tritaenorhynchus
		whitmorei
		vishnui
		sinensis
		bitaeniorhynchus
		infula
		pseudovishnui

Table.2 Species Composition of Collected Mosquitoes

Sl. No.	Genus	No of species
1	*Culex*	12
2	*Aedes*	8
3	*Anopheles*	6
4	*Mansonia*	3
5	*Armigerers*	1

Figure.1 Species Composition of Study Area



drainages (Chaves, *et. al.*, 2010, Gardener, *et. al.*, 2009, Vonesh and Kraus, 2009). In 1998 Gupta suggested that *Cx. quinquefasciatus* breed in almost all kind of habitats and stagnant drains suitable for its regeneration. Rice fields are inhabited by *Cx. gelidus* and *Cx. tritaenorhynchus* (Sunahara, *et. al.*, 2002, Carlson, *et. al.*, 2004).

A total of 8 different species present in genus *Aedes, Ae. scatophagoides, Ae. pseudotoeniatus, Ae. longirostris, Ae. aegypti, Ae. vittatus, , Ae. albopictus, Ae. walbus, 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 muncipal area. This would be helpful for the sustainable management of vector mosquitoes and to take precautionary measures against mosquito borne diseases.

Acknowledgement

Authors are thankful to the Principal, St. Joseph's College, Irinjalakuda for facility provided.

References

Aigbodion, F. I. and Anyiwe, M. A. 2005. Mosquitoes and environments: some economic costs of malaria in Nijeria. Nijerian journal of entomology. 22. 93-107.

Anyanwu, I. W., Agbede, R. I. S., Ajanusi, O. J. and Umoh, J. U. 1999. A survey of culuicids (mosquitoes) in northern Guinea Savannah town of Zaria, Kaduva state, Nigeria. Journal of Parasitology. 20: 136-143.

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

Campos, R. E. and L. P, Lounibos. 2000. Life tables of Toxorhynchites rutilus (Diptera: Culicidae) in nature in southern Florida. J. Med. Entomol. 37: 385-392.

Carlson, J., keating, J., Mbogo, C. M., Kahindin, S. and Beier J. C. 2004. Ecological limitations on the aquatic mosquito predator colonization in the urban environment. Journal of Vector Ecology. 29:331-339.

Chaves, L. F., Keogh, C. L, Vazquiz., Prokopec, G. M., Kitron, U. D. 2009. Combined sewage enhance oviposition of Culex quinquefasciatus (Diptera.Culicidae) in urban area. J Med entamology. 46: 220-226.

Eitam, A., Blaustein, L., Mangel, M. 2002. Effects of Anispos sardea on oviposition habitat selection by mosquitoes and other dipterans and on community structure in artificial pools. Hydrologia. 485:183-9.

Gardner, A. M., Anderson, T. K., Hamer, G. I., John, D. E., Varela, K. E. et al. 2013 Terrestrial vegetation and in catch basins, Chicago USA. Parasite vector. 6:9.

Gautam, Aditya., Mihir, K, Premanik. and Gautam, K, Saha. 2006 Larval habitats and species composition of mosquitoes in Darjeeling Himalayas ,India. J.Vect Borne d is. 43: pp 7-15.

Gupta, A. S. 1998. Studies the bionomics of common mosquitoes in Chittagong city. Msc thesis. Department of zoology Chittagong university.169.

Kristen, Bartlett-Healy., Isik, Unklu., Peter, Obenatuer., Tony, Hugehes., Sean, Healy., Taryn, Crepeau., Ary, Farajollahi., Banu, kesavaraju., Dina, Fonseca., George, schoeler., Randy, Gaugler. and Danel, Strickman. 2012. Larval mosquito habitat utilization and community dynamics of Aedes albopictus and Aedes japonicas (Diptera: Culicidae) J.Med.Entomol. 499(4):813-834

Lee, D. J., Hicks, M. M., Debenham, M. L., Griffiths, M., Brayan, J. H. and Marks, E. N. 1988. The culicidae of the Australian region Canberra.

Australian government publishing service. vol 9.

Mafiana, C. F. 1989. Observations of mosquito species breeding in open drains and test container lagos in Nigeria. Bioscience Research communications. 1: 95-102.

Mafiana, C. F., Anaeme, L. and Olatunde, G. O. 1998. Breeding site of larval mosquitoes in Abeokuta Nigeria. Nigerial journal of entomology. 15,136-143.

Pramanik, M., Indranil Bhattacharjee. and Chandra, G. 2012. Studies on breeding habitats and density of post embryonic immature filarial vector in filarial endemic area. Asian Pac J Biomed. 2.51869-s 1873.

Richard, O, Hayes., Eugenes, L, Maxwell., Carl, J, Mitchchell., Thomas, L, Woodzick. 1985. Detection, identification and classification of mosquito larval habitats using remote sensing scanners in earth-orbiting satellites. Bulletin of the world health organization. 63(2): 361-374.

Seid, Tiku, Mereta., Delenasaw, Yewhalaw., Peter, Boets., Abdulhakim, Ahmed., Luc, Duchateau., Niko, speybroeck., Sophie, O, Vanwambeke., Worku, Legesse., Luc, De, Meester. and Peter L. M ,Geothals. 2013. Physico-chemical and biological characterization of Anophiline mosquito larval habitats (Diptera : Culicidae): Implications of malaria control. Parasites and vectors.cm/content. 6; 1. 320.

Sunahara, T., Ishizaka, K. and Mogi, M. 2002. Habitat size a factor for determining the opportunity for encounters between mosquito larval and aquatic predators. Journal of vector ecology. 27:8-20.

Vonesh, J. R., Kraus, J. M. 2009. Pesticide alters habitat selection and aquatic community composition. Occologia. 160:379-385.

WHO 1982. Manual on vector control management for mosquito control with special emphasis in malaria vectors. WHO offset publication. 66: 40-148.

Yadav, R. S., R. C. Sharma., R. M. Bhatt. and V. P, Sharma. 1989. Studies on the Anophiline Fauna of Kheda District and species specific breeding habitat. Indan journal of malariology. vol 26 pp 65-74.