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A study on diversity of mosquitoes in Rajathanikottai village, Dindigul District, Tamil Nadu, India

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ABSTRACT

A study on diversity of mosquito was conducted in a foot hill village of Sirumalai Hills for a year. Both immature and adult forms of mosquitoes were collected by standard WHO method. A total number of 1440 mosquitoes that belongs to 4 genera and 17 species were collected . The most dominant species was Culex quinquefasciatus (19.58%) followed by Aedes albopictus (12.91%), Anopheles vagus (12.29%), Anopheles subpictus (12.01%), Culex triteaniorhynchus (10.69%), Culex vishnui (9.76%) and Armigeres subalbatus (6.66%) and least species were Anopheles fluviatilis (3.9%), Anopheles culicifascies (3.3%).

Key words: Biodiversity, Anopheles, Culex, Aedes, Armigeres.

INTRODUCTION

Biodiversity encompasses the variety of all living organisms on the earth. India has rich biological diversity and one of the 12 mega diverse countries of the world (1). Diversity of insects is of great importance to the environmentalist as they are bioindicators. Among the insects, mosquitoes are medically important group of insects and they transmit diseases like malaria, dengue, filariasis and JE in India. In the recent years, the distribution range of both mosquitoes and mosquito borne diseases are proliferating in large number everywhere due to rapid urbanization, excessive deforestation, and resistance among mosquitoes to pesticides, construction of dams and development of new agro ecosystem (2). Despite several attempts to control them, these remarkably adapted insects continue to coexist with man, feeding on him and his domesticated animals (3). Hence it is essential to make an inventory of the diversity of mosquitoes in different places periodically (4) to prevent the outbreak of mosquito borne diseases. Dindigul district is endemic for malaria and the control activities are mainly carried out in the municipal areas. In last few years in many foot hill villages of Sirumalai Hills cases of

chikungunya and viral fever has been reported and hence in the present study an attempt has been made to find out the diversity of mosquitoes in the foot hill village- Rajathanikottai.

MATERIALS AND METHODS

Study area:
This study was carried out from October 2010 to September 2011. The study village is at foot hill, on the western side of Sirumalai hills and lies between 10°4'35''N and 77°45'22''E the annual rainfall 550mm and temperature 23°C - 34°C. The village has 200-250 houses and the main occupation of the people is agriculture, bricks making and cattle rearing. The main source of irrigation to the field is from a check dam at distance of 2km from the village.

Only outdoor collections were made in the present study. Both immatures and adults were collected randomly at different sites in the villages. Resting and biting adult mosquitoes were collected in the evening between 6.00 to 8.00 pm near cattle shed and human dwellings using mechanical aspirator and human landing method. A total of 4 man hours were employed in each month for the collection (WHO, 1975). The collected specimens were preserved in plastic vials for later identification. Immature forms of mosquitoes were collected by dipper method (6) and reared in enamel trays in the laboratory. The emerged adults were collected and stored in vials and all the collected mosquitoes were identified in Center for Research in Medical Entomology, Madurai using the standard keys Barraud (7) and Christopher (8).

RESULTS AND DISCUSSION

A total of 1440 mosquitoes that belongs 4 genera and 17 species were collected at different sites in the village during October 2010 to September 2011. (Table.1) Among the 17 species, the most dominant species was *Culex quinquefasciatus* (19.58%) followed by *Aedes albopictus* (12.91%), *Anopheles vagus* (12.29%), *Anopheles subpictus* (12.01%), *Culex tritaeniorhynchus* (10.69%), *Culex vishnui* (9.76%) *Armigeres subalbatus* (6.66%) and least collected species were *Anopheles fluviatilis* (3.9%) and Anopheles *culcifascies* (3.3%). The results showed maximum diversity of mosquitoes during the study period which may due to the availability of permanent and temporary breeding places, resting places, suitable rainfall, temperature and humidity. Kazemi *et al* (9) observed a rich diversity of mosquitoes in five rural villages of Chabahar country, Sistan and Baluchistan Province; they collected a total number of 3824 adults and 5031 larvae of culicine mosquitoes in three months which belong to 5 genera and 17 species. Thenmozhi and Pandian (10) collected 17 species of mosquitoes belong to 6 genera in two months in forest fringe of Alagar hills, Madurai

Among the mosquitoes collected during the study period, the genus Culex was the most dominant one (41.87%). *Culex quinquefasciatus* was recorded as the predominant species and they are the principal vector of bancrofitian filariasis, predominantly found in the tropics and temperate regions (Sharma, 2001). It is known as "house mosquito" and anthropophilic in nature. The larvae of this mosquito were collected in open ditches, paddy fields, ponds and they thrive abundantly in stagnant dirty water (12,13). The lack of adequate waste water disposal and poor sanitation provide a rich source of breeding places of this mosquito.

Table 1: Percentage of mosquitoes collected in the Rajathanikottai village during October 2010 to September 2011

S. No	Name of the species	Total number of mosquitoes collected	Percentage of total collection	Inter generic variations of collected mosquitoes (%)	Intra generic variations of collected mosquitoes (%)
1.	*Anopheles culicifascies*	47	3.3	33.68	9.69
2.	*Anopheles fluviatilis*	56	3.9		11.55
3.	*Anopheles vagus*	177	12.29		36.5
4	*Anopheles subpictus*	173	12.01		35.67
5	*Anopheles moghulensis*	17	1.18		3.5
6	*Anopheles maculatus*	12	0.83		2.47
7	*Anopheles theobaldi*	3	0.20		0.61
8	*Aedes aegypti* (Linnaeus, 1762)	58	4.02	17.77	22.65
9	*Aedes albopictus*(Skuse, 1894)	186	12.91		72.55
10	*Aedes walbus*	8	0.55		3.12
11	*Aedes vittatus*	4	0.27		1.56
12	*Armigeres subalbatus*	96	6.66	6.66	100
13	*Culex vishnui*	141	9.79	41.87	23.38
14	*Culex triteaniorhynchus*	154	10.69		25.53
15	*Culex pseudovishnui*	24	1.66		3.98
16	*Culex quinquefasciatus*	282	19.58		46.76
17	*Culex (Lutzia) fuscanus*	2	0.13		0.33
	Total	1440			

The next predominant species was *Aedes albopictus* and *Aedes aegypti*. The larvae were collected in coconut shell, plastic cups; cement tanks, tyre and grinding stones and the adults were collected in early evening hours near human dwellings. The Asian tiger mosquito *Aedes (Stegomyia) albopictus* and *Aedes (Stegomyia) aegypti* are to date the main vectors of dengue and dengue haemorrhagic fever in the tropical and subtropical regions (14, 15). Chen *et al.* (16) observed mixed breeding of *Ae. aegypti* and *Ae. albopictus* in the same container both in outdoors and indoors in Selangor. In the present study also similar observation was made in grinding stones near the houses. *Aedes albopictus* generally inhabits forest area and breeds in tree holes in mountainous area but in rural and urban areas they breed in artificial outside containers. (17).

The *Culex triteaniorhynchus*, Culex *vishnui*, *Culex pseudovishnui*, *Anopheles vagus* and *Anopheles subpictus* larvae were collected more number in paddy fields, and the adults were collected in and the around cattle shed and human dwellings. The agro ecosystem favors high degree of diversity of mosquitoes. These mosquitoes are regarded as JE vectors in India (18). Kanojia *et al* (19) and Mukhtar (20) reported that the irrigation system and the paddy cultivation provide a perennial source of breeding place for these mosquitoes. Rice fields are the main larval habitats for JE vector mosquitoes and the expansion of rice growing areas has facilitated an increase of JE vectors in India (21).

Anopheles are most dangerous amongst the four genera and are responsible for spreading of malaria. Among Anopheles, *Anopheles fluviatilis* and *Anopheles culicifascies* adults were collected near cattle shed and these two species are major rural malarial vectors in India. There is acute need of action to reduce the breeding sites of mosquitoes and public awareness regarding mosquitoes and the diseases caused by them.

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