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THE SURVEY OF INDOOR DAY-RESTING ADULT MOSQUITOES IN CHITTAGONG

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Abstract: A total of 11 species under five different genera was collected from November 1997 to October 1998 from the two locations of Chittagong, viz. Chittagong University campus and Chittagong Metropolitan city representing rural and urban environment, respectively. The mosquito species were: *Aedes albopictus, Ae. aegypti, Culex quinquefasciatus, Cx. mimulus, Cx. hutchinsoni, Cx. vishnui, Anopheles kochi, An. barbirostris, Mansonia annulifera, Mn. uniformis* and *Armigeres subalbatus. Ae. aegypti* was the most predominant species in the urban area of Chittagong city, while in the rural environment of Chittagong University campus *Ae. albopictus* appeared to be the pre-dominant. *Ae. albopictus* was 63.2% among the total indoor day-resting adult mosquitoes in CU campus, whereas in the city in similar collection, *Ae. aegypti* was predominant with 50% of the total population. In CU campus the other mosquitoes in this type of collection formed 36.8% of the total mosquitoes; on the other hand in Chittagong city the collection was 50%. The number of *Ae. albopictus* and *Ae. aegypti* collected per man hour were 16.9 and 10.8, respectively.

mvi-ms‡¶ct 1997 mv‡ji b‡f¤i n‡Z 1998 mv‡ji A‡±vei chš PUMv‡gi `BwU wfb cwi‡ewkK GjvKv, ‡hgb PUMvg wekwe`¨vjq K¨v¤úvm (MvgxY cwi‡ek) Ges PUMvg kni (kû‡i cwi‡ek) n‡Z D³ mg‡q 11 (GMvi) cRwZi gkv msMn Kiv nq| gkvi cRwZ¸‡jv n‡jv: *Aedes albopictus, Ae. aegypti, Culex quinquefasciatus, Cx. mimulus, Cx. hutchinsoni, Cx. vishnui, Anopheles kochi, An. barbirostris, Mansonia annulifera, Mn. uniformis* and *Armigeres subalbatus*. D‡jL¨ †h, D³ mg‡q PUMvg kni GjvKvq *Ae. aegypti* gkvi cv`fve †ekx wQj, hv w`‡b wekvgiZ me cYv½ gkvi g‡a¨ 50% Ges PUMvg wekwe`¨vj‡qi g‡Zv MvgxY GjvKvq *Ae. albopictus* Gi cv`fve kZKiv 63.2 fvM| ZvQvov PUMvg wekwe`¨vjq GjvKvq msMnxZ Ab¨vb¨ gkvi kZKiv nvi wQj 36.8fvM; Ab¨w`‡K PUMvg kn‡i wQj kZKiv 50 fvM| cwZ gbl¨ N›Uvq msMnxZ *Ae. albopictus* Ges *Ae. aegypti*-Gi msL¨v h_vµ‡g 16.9 Ges 10.8|

Key word: Adult, way resting, *Aedes*, *Culex*, *Mansonia*, Chittagong.

INTRODUCTION

Mosquitoes are the sole vectors of the pathogens causing malaria, yellow fever, dengue and encephalitis, and they are of prime importance spreading filariasis. Besides sucking blood, they inflict irritating bites. Thus the mosquitoes play an important role in medical entomology (Herms 1969). Mosquito borne diseases are existent in Bangladesh (Huda and Banu 1987). The entomological investigations of these diseases are far less compared to their clinical reports. While some information are available on the vectors of malaria (Elias *et al.* 1982) and filariasis (Wolfe and Aslam Khan 1971), nothing is known

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about those of Japanese encephalitis and dengue in Bangladesh. In the Asian continent, *Aedes* mosquitoes are more related with dengue fever. *Aedes aegypti* and *Ae. albopictus* are established vectors of dengue in Southest Asian countries (Chan *et al.* 1971, Sallehudin and Jeffery 1986).While describing the vectorial role of *Ae. aegypti* in transmitting dengue in the Indian subcontinent, Barraud (1928) emphasized its positive role in the united Bengal.

Huda and Banu (1987) have traced the history of dengue in the land of Bangladesh. Their report documents the existence of dengue in this land since a long time. Now, it is known that dengue is becoming prevalent in Bangladesh. The issue of vector control in the control of vector borne diseases has often been emphasised (Ameen and Moizuddin 1973). To face the upcoming challenge of the problem of dengue outbreaks in Bangladesh, the control of the probable vectors of *Ae. aegypti* and *Ae. albopictus* is of paramount importance.

To that aim, the present work was taken up to assess the dengue vectors status in Chittagong.

OBJECTIVES

a) To observe the monthly prevalence of vector mosquitoes in Chittagong.

b) To identify the dengue vector status.

MATERIAL AND METHODS

Only adult mosquitoes were collected in the present study. The mosquitoes were collected from Chittagong city (Goachi Bagan and Chawkbazar) and Chittagong University (CU) campus (New Samsunnahar Hall). Chittagong is a first growing city with all modern developments in its housing, commercial and industrial sectors. On the other hand, Chittagong Univercity campus located 15 km off the city represents a scenic rural environment. Surrounded by hills on three sides the campus has rural characters of having paddy fields, forests, canals, ditches etc. Thus, the city provides urban habitats, while the University campus has rural environment.

Goachi Bagan: It is situated along the Chatteshwari Road on the western side of the men's hostel of the Chittagong Medical College and Hospital. This is a piece of land of Medical College where the employees of the hospital live in heavily congested condition. There are self- made semi-pucca houses on a lease basis. The low-income group of employees could not afford to have continuous supply of pipe water and were bound to stock water for their domestic uses. Most houses of the area built pucca with the roof made of tin. Although congested and densely populated, the area is more or less clean and has good

drainage system. Goachi Bagan area is surrounded by the posh area of Chittagong city.

Chawkbazar: It is an old residential area situated at the southern side of the city. It is inhabitated by middle class people. Most houses are pucca but very densely located. Shopping centers and market places have made the area a bit dirty. The drainage system is very poor. Car repairing shops and few other business shops in this area need to keep different types of containers for water stockings.

New Shamsunnahar Hall: This is a four storied building located in between the Vice-Chancellar-hill and a small hillock on the eastern side. It accommodates the woman students of the University. The main building has two blocks with an extension of single storied tin shed. The hall has an open space in front and overall atmosphere is clean and has good drainage system.

Procedure of mosquito collection: Adult mosquitoes were collected from inside the houses in the afternoon during the period from November'97 to October'98. Collections were made twice a month, for an hour before sunset (in between 5 p.m. to 6 p.m.) at each occasion and were collected from a particular room of a fixed house in each area. Only those mosquitoes which were resting on the walls, ceilings, tables, bookshelves and on hanging objects were collected. Mosquitoes were collected with the help a mouth aspirator and a torch light. The collected mosquitoes were narcotized by chloroform in the field and were taken into a dry test tube. The test-tubes were properly labeled. They were brought to laboratory for further studies and were identified by following Barraud (1934), Christophers (1933), and Bram (1967).

RESULTS AND DISCUSSION

The results of indoor day resting adult mosquitoes in two locations (CU campus and Chittagong city) of Chittagong are given in Table 1. All six genera, including the species of *Aedes* were present in both the locations (Table 2). In CU only one species of *Aedes,* namely *Ae. albopictus* was identified. The other mosquito species under the identified genera were *Culex quinquefasciatus*, *Cx. mimulus*, *Cx. vishnui, Cx. hutchinsoni, Armigeres subalbatus, Anopheles kochi and An. barbirostris* (Table 2). It is also seen from the Table 2 that a total of 185 specimens of the mosquitoes was collected in 11 hours in 11 months that makes the count of mosquitoes as 16.96 per man-hour. Out of this, *Ae. albopictus* was 117 which formed 63.2% of the total population. The per man hour collection rate of *Ae. albopictus* was 10.6. The non adenine mosquitoes in this type of collection formed 36.8% of the total mosquitoes. Table 1 further reveals that the

maximum number (19) of *Ae. albopictus* was collected in August followed by June(17). The least number of *Ae. albopictus* was collected in December (3). Among the other mosquitoes, *Cx. quinquefasciatus* and *Ar. subalbatus* were predominant.

It is evident from the Table 1 that only *Ae. aegypti* was collected in Chittagong city area. The other mosquitoes were *Cx. quinquefasciatus*, *Cx. vishnui, Ar. subalbatus, Mn. uniformis, Mn. annulifera.* Among them *Ar. subalbatus* and *Cx. quinquefasciatus* were predominant. *Mansonia* species were in third position. A total of 260 mosquitoes was collected in twelve hours in the whole year (Table 2). Out of this, *Ae. aegypti* was 130 which was 50% of the total collection. Table 2 shows that the number of mosquitoes collected per man hour was 21.6 and the number of *Ae. aegypti* per man hour was 10.8. It is shown

Table 1. Indoor day-resting adult *Aedes* species and other mosquitoes collected from CU campus and Chittagong city.

Period	Area	*Aedes aegypti*	*Aedes albopictus*	*Culex* species	*Armigeres* species	*Anopheles* species	*Mansonia* species	Total
Nov. 97	CU	0	0	4	2	0	0	6
	City	4	0	5	4	0	1	14
Dec. 97	CU	0	3	11	0	0	0	14
	City	5	0	7	2	0	4	18
Jan. 98	CU	0	5	10	0	0	0	15
	City	7	0	4	6	0	2	19
Feb. 98	CU	0	8	5	0	1	0	14
	City	8	0	8	4	0	0	20
Mar. 98	CU	0	9	6	O	2	0	17
	City	13	0	5	3	0	2	23
Apr. 98	CU	0	11	7	2	0	0	20
	City	14	0	10	2	0	0	26
May. 98	CU	0	15	1	1	1	0	18
	City	13	0	3	8	0	3	27
Jun. 98	CU	0	17	9	0	0	0	26
	City	14	0	11	0	0	0	25
Jul. 98	CU	0	14	4	2	0	0	20
	City	17	0	3	0	0	2	22
Aug. 98	CU	0	19	0	0	0	0	19
	City	13	0	10	0	0	0	23
Sep. 98	CU	0	16	0	0	0	0	16
	City	12	0	3	7	0	0	22
Oct. 98	CU	*	*	*	*	*	*	
	City	10	0	7	4	0	0	21

*No collection

from Table 1 that the highest number of *Ae. aegypti* was observed in July(17), where the total number of mosquitoes collected was 22. The lowest number of *Ae. aegypti* was collected in November (4). It is seen from Table 2 that *Ae. aegypti* had the highest percentage of population (29.24%) followed by *Ae. albopictus* (26.29%), *Cx. quinquefasciatus* (18.65%) and *Ar. subalbatus* (10.65%). The least percentages of mosquitoes were *An. barbirostris* (0.22%), *Cx. mimulus* (1-12%) and *Mn. uniformis* (1.12%).

Table 2. The number of adult mosquitoes collected from Chittagong city and CU campus.

Mosquito species	No. collected from Chittagong city	No. collected from CU campus	Total no. of mosquitoes (%)
Aedes albopictus	-	117	117 (26.29)
Ae. aegypti	130	-	130 (29.24)
Culex quinquefasciatus	51	32	83 (18.65)
Cx. mimulus	-	5	5 (1.12)
Cx. vishnui	25	3	28 (6.29)
Cx. hutchinsoni	-	17	17 (3.82)
Armigeres subalbatus	40	7	47 (10.56)
Anopheles kochi	-	3	3 (0.67)
An. barbirostris	-	1	1 (0.22)
Mansonia annulifera	9	-	9 (2.02)
Mn. uniformis	5	-	5 (1.12)
Total	260	185	445

It was seen from this study that in CU campus *Ae. albopictus* formed the highest percent (63.2) of the total population. The man per hour collection rate of *Ae. albopictus* was 10.6. There was no *Ae. aegypti* in this station. *Ae. albopictus* prefers to breed out side of human dwellings (Clements 1999). On the other hand, in Chittagong city station *Ae. aegypti* formed 50% of the total collection and man per hour collection rate was 10.8 (Table 2). Huang (1979) collected *Ae. aegypti* from urban areas from Thailand. There was no *Ae. albopictus* in this station. It is evident from this study that *Ae. aegypti* population was higher than the *Ae. albopictus* population among the respective total mosquito population in there respective areas. In a survey of Dhaka city, *Ae. aegypti* was found to form the highest percent of total mosquito populations on day time man–biting type (Ameen and Maizuddin 1973). In a recent bionomical work on Chittagong city mosquitoes, no *Aedes* species was recorded (Gupta 1998). Ameen and Moizuddin (1973) and Ameen *et al.* (1982) reported on the bionomics of the common mosquitoes *Ae. aegypti* and *Ae. albopictus* from Dhaka city. They collected day resting, man biting and cattle biting types of mosquitoes and Gupta (1998) collected outdoor and indoor post and pre-dusk types. One thing can be concluded from the present study that *Ae. albopictus* is

predominant in the rural areas and *Ae.aegypti* is predominant in the urban areas of Chittagong. The breeding of *Aedes* species closely followed the fluctuation of rainfall in Chittagong city areas in the present study. This phenomenon was also observed in Dhaka city (Khan 1980) and Singapore city (Ho *et al.* 1971). It is observed from this study that *Ae. aegypti* was the topmost with 29.2% of the total populations followed by *Ae. albopictus* (26.29%), *Cx. quinquefasciatus* (18.5%) and *Ar. sulbalbatus* (10.56%). These show that *Aedes* species had close associations with *Cx. quinquefasciatus* in the late afternoon day resting collection in Chittagong area. *Ae. aegypti* and A*e. albopictus* are the probable vectors of dengue, while *Cx. quinquefasciatus* is an established filariasis vector in Bangladesh (Huda and Banu 1987). *Armigeres subalbatus* is a crepuscular species that can inflict painful bites. The association of these four species of medical importance, therefore, poses a serious threat to public health in Bangladesh.

CONCLUSION

In this study *Aedes* mosquitoes were found throughout the year and the association with other vector mosquitoes (specially *Culex quinquefasciatus*) may help in the transmission of vector born diseases. A survey for a long period may result more diversified.

SUMMARY

A total of 11 species from five genera (e.g. *Aedes, Culex, Armigeres, Mansonia and Anopheles)* were collected from Chittagong area. In relation to the abundance of mosquitoes in the studied areas the order of the genera follows: *Aedes> Culex> Armigeres> Mansonia> Anopheles. Aedes albopictus* was 63.2% among the total indoor day resting adult mosquitoes in Chittagong University campus and in the city *Ae. aegypti* predominated with 50% of the total population.

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