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# IDENTIFICATION OF MOSQUITO SPECIES IN DHAKA CANTONMENT

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## Abstract

The present study was carried out from 1st August 2011 to 31 January 2012 to identify mosquito species inhabiting in and around the Dhaka Cantonment. In all 5632 samples size were collected from 88 different spots. Important three genera such as *Anopheles, Culex* and *Aedes* were found and distribution was as *Culex* 5581 (99.09%), *Aedes* 30 (0.53%) and *Anopheles* 21 (0.37%). Among the *Culex* species *C. quinquefasciatus* dominated and having 69.37% of *Culex* family. Other identified species were *C. fuscocephala* (14.89%), *C. tritaeniorhynchus* (09.07%) and *C. vishnui* (06.67%). The sex distribution of the sampled mosquitoes revealed that female dominated and male female ratio was 34:66. There was predominance of *C. quinquefasciatus* in all collection points. *Anopheles* was identified 21 (12 female) in number of which *An. philipinensis* was 17 and *An. aconitus* only 04 and they were collected from four spots of Zia colony and COD areas. *Ae. aegypti* was identified 30 (22 female) in number of which *Ae aegypti* were 23 and the rest 07 were *Ae. albopictus* and they were collected from seven spots of COD, Senapolli, Moinul Road and DOHS Mohakhali but its density is very insignificant and below the critical level of disease transmission.

Key words: Mosquito, *Anopheles, Culex, Aedes,* Dhaka Cantonment

## Introduction

Correct identification of vector mosquitoes is essential for the effective control and prevention of some of the most dangerous tropical diseases: Malaria, Dengue, Japanese encephalitis, and Filariasis. The species of Bangladeshi mosquitoes incriminated in the transmission of each of the most important tropical diseases (Rattanarithikul and Prachong 1994). Historically, vector suppression has been viewed as a more economical and effective public health measure than medical therapy because it can be applied on a wide area basis without locating and treating each individual human patient (Macdonald 1960). There are no vaccines for malaria and drug prophylaxis of malaria has become increasingly difficult, specially in Southeast Asia. Identifying the vector is the first step in the control strategy for any arthropod borne diseases. Often, the simple knowledge that a vector species is present at a high density is sufficient to warn public health authorities that there has been an increase in the risk of transmission and that appropriate action should be planned (Rattanarithikul and Prachong 1994).

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A revised list had been presented which includes 113 species, including 34 anophelines and 79 culicines (Ahmed 1987a and 1987b. Currently 412 mosquito species are recognized, but most of them are of little practical significance in disease transmission, either because they are not biologically susceptible to human pathogens or, more usually, do not have habits that bring them into sufficient contact with man. Therefore, these keys identified only 34 species (Rattanarithikul and Prachong 1994).

Out of 34 *Anopheles* species recorded in Bangladesh, only 7 (seven) Spp. has been incriminated as malaria vector, these are: *An. dirus, An. minimus, An. philipinensis, An. sundaicus, An. aconitus, An. anularis, and An. vagus.* The *An. dirus* and *An. minimus* are the main vectors in the forested hill and forest fringe areas. *An. sundaicus* is the main vector of coastal area of Cox's Bazar. *An. Philipinensis* is the main vector of plain rural areas. *An. aconitus, An. anularis, and An. vagus* are the main vector of the border belt epidemic prone areas. From recent entomological observation *An. maculatus* group is strongly suspected to be a new vector in certain areas of northern border districts (DGHS 2010).

The key issues in the present investigation have two intended purposes. First, although the mosquito fauna of Bangladesh has not yet been completely described, much of the work done during the last 30 years has appeared in scattered publications not readily available to field workers (Reinert 1990, Harrison *et al.* 1990 and Benjaphong *et al.* 1991). The Bionomics of the common mosquitoes of Dhaka and last checklist of the mosquitoes of Bangladesh were published 35 years ago (Ameen and Moizuddin 1973 and Ahmed 1987a and 1987b). Since that time no pragmatic research in this field had been carried out except few to collect pertinent information on all vector species prevailing in Bangladesh. The second purpose is to provide preventive medicine workers with a quick, accurate reference. The keys were designed to be used with intact specimens collected in Bangladesh. Southeast Asian users beyond the borders of Bangladesh should realize that the keys may not include all the medically important species in their countries.

Thus the present study aims to identify and classify the mosquito species according to prevalence in Dhaka Cantonment. Detection of such vectors might be crucial information to implement control measures for eradication. It will also facilitate the Medical and Health authority to achieve meaningful information about the causation of febrile illness in Dhaka Cantonment.

**Materials and Methods**

This study was carried out jointly by Infectious Disease Department of Combined Military Hospital (CMH) Dhaka and Community Medicine of Armed Forces Medical College (AFMC). The mosquitoes were collected in the morning and evening between 600-700 hrs and 1700-1800 hrs from 88 different spots of Dhaka Cantonment including its surrounding bushy areas. The data collection period was from 1st Aug. 2011 to 31 Jan. 2012.

Mosquito collection, Instrument and procedures: The Instruments/ Equipments used for mosquito collection were mosquito aspirator with sucking tube. Afterwards the collected

mosquitoes were transferred to paper cups, mosquito nets and test tubes by gently blowing for preservation. Cotton soaked in sugar solution was kept on netting which provided food for the captive insects.

Species, identification, procedures: The collected mosquitoes were sent to Community Medicine Departmental Laboratory of AFMC for identification. Insect collectors of SHO Dhaka Cantonment were engaged for collection of mosquito, its preservation and transportation. In the laboratory genera of mosquitoes which were identified by the naked eye subsequently were knocked down by using chloroform. These mosquitoes were then placed in the slides for mounting. In this case Balcon mount was used. All identified species were entered in the check list. The species was identified by entomologist of AFMC and the findings were subsequently confirmed by Entomologist of IEDCR. Manuals on medical entomology (Service 1996) were used to identify the mosquitoes at species level.

**Results and Discussion**

The study revealed that out of total 5632 mosquito specimens examined for identification of genus and species *Culex* species were 5581 (99.09%), *Aedes* were 30 (0.53%) and *Anopheles* were 21 (0.37%) (Table 1).

Table 1. Distribution of mosquitoes by genus.

| Generic names of mosquito | Number found | Percentage |
|---|---|---|
| *Anopheles* | 21 | 0.37 |
| *Culex* | 5581 | 99.09 |
| *Aedes* | 30 | 0.53 |
| Total | 5632 | 100.00 |

Sex distribution of mosquito revealed that males were 1892 (33.59%) and the rest 3740 (66.41%) were female. Male Female ratio was 34: 66 approximately (Table 2).

Table 2. Distribution of mosquitoes by sex.

| Generic names of mosquitoes | Male | Percentage | Female | Percentage |
|---|---|---|---|---|
| Anopheles | 9 | 42.86 | 12 | 57.14 |
| Culex | 1875 | 33.60 | 3706 | 66.40 |
| Aedes | 8 | 26.67 | 22 | 73.33 |
| Total | 1892 | 33.59 | 3740 | 66.41 |

Species distribution of *Culex* revealed that *Culex quinquefasciatus* occupied 69.37%. Chronologically the other species are fuscocephala 14.89%, tritaeniorhynchus 09.07% and vishnui 06.67% (Table 3).

Species distribution of Aedes reveals that *Ae. aegypti* were 23 and the rest 07 were *Ae. albopictus*. Similarly out of 21 *Anopheles*, An. Philiphinensis were 17 and the rest 04 were An. aconitus (Table 4).

Month wise distribution of mosquitoes shows that their density was the highest 1888 (33.52%) in the month of November followed by August 1376 (24.43%). (Table 5).

Species diversity of mosquitoes in Dhaka city has decreased from 27 species in 1970 to only 5 in 1997, but the population of *quinquefasciatus* has increased dramatically (Ameen *et al.* 1999). Its proportion in the total mosquito population of Dhaka city increased from 18.2% in 1970 to 57.2% in 1979 and 69.6% in 1997 (Ameen and Moizuddin 1973 and Ameen *et al.* 1982 and 1984 and Nazneen 1997) which is consistent with this study. Sex distribution shows predominance of female over male. Female male ratio was 66: 34 (Table 2). The findings are also consistent with the study of Ameen 1985, Nazneen 1997 and Russel *et al.* 1943.

Distribution of mosquitoes showed that more or less all collection spots having *Culex, Aedes* and *Anopheles* varieties. *Culex* was predominated i.e., 99.09% of the vector population among them *quinquefasciatus* occupying 69.37%. *Aedes* mosquitoes were found only 30 out of 5632 collected samples and its percentage was only 0.53% of prevailing vector population. *Aedes aegypti* were collected from eight spots of general area of COD, Moinul road, Senapolli and DOHS mohakhali. Total 21 *Anopheles* mosquitoes were collected from general area of Zia colony and COD area. In all collection spots *Culex* was predominated i.e., 99.09% of the vector population among them *quinquefasciatus* occupying 69.37%. Chronologically the other species occupying are *fuscocephala* 14.89%, *tritaeniorhynchus* 09.07% and *vishnui* 06.67% (Table 3) and all the findings are consistent with the various studies of Bangladesh (Ameen *et al.* 1973 and 1999, Ameen 1985, and Elias *et al.*1987).

Table 3. Distribution of *Culex* species (n=5581).

| Name of the species | Number | Percentage |
|---|---|---|
| *Cx.quinquefasciatus* | 3872 | 69.37 |
| *Cx.foscocephala* | 831 | 14.89 |
| *Cx.tritaeniorhynchus* | 506 | 9.07 |
| *Cx.vishnui* | 372 | 6.67 |
| Total | 5581 | 100.00 |

*Aedes* mosquitoes were found only 30 out of 5632 collected samples and its percentage was only 0.53% of prevailing vector population (Table 1). Among 30, 22 were female and the remaining 8 were male (Table 2). The proportion of genus *Aedes* mosquitoes is very less (0.53%) in contrast to the total number collected, which is much below than the critical level for disease transmission because the chance of man vector contact is very less.

Amongst 21, twelve were female and remaining were male. The identified species *An. Philipinensis* were 17 and the rest 4 were *An. aconitus*. Similarly the genus *Anopheles* mosquitoes is also very less (0.37%) in contrast to the total number collected which is much below than the critical level for disease transmission as a result the chance of man vector contact is also very less (Table 4).

Table 4. Distribution of *Aedes* and *Anopheles* species.

| Generic names of mosquitoes | Species | Number | Percentage |
|---|---|---|---|
| Aedes | Aedes aegypti | 23 | 0.40 |
| | Aedes Albopictus | 07 | 0.13 |
| Anopheles | An. Philiphinensis | 17 | 0.30 |
| | An. Aconitus | 04 | 0.07 |

Table 5. Month wise distribution of mosquitoes.

| Month | Number | Percentage |
|---|---|---|
| August | 1376 | 24.43 |
| September | 1181 | 20.97 |
| October | 1187 | 21.08 |
| November | 1888 | 33.52 |
| Total | 5632 | 100.00 |

Since the study was conducted for 6 months and data collection was limited for 4 months hence seasonal variation could not be analysed. Genus distribution shows that all genera were prevalent during monsoon (Table 6).

Table 6. Month wise distribution of mosquitoes by genus.

| Generic names of mosquitoes | August | September | October | November | Total |
|---|---|---|---|---|---|
| *Culex* | 1359 | 1168 | 1169 | 1885 | 5581 |
| *Aedes* | 14 | 05 | 08 | 03 | 30 |
| *Anopheles* | 03 | 08 | 10 | - | 21 |
| Total | 1376 | 1181 | 1187 | 1888 | 5632 |

Genus distribution depicts that all genus were prevalent during monsoon.

*Culex* was prevalent throughout the study period but *Aedes* and *Anopheles* were prevalent during monsoon. The findings are consistent with studies of Ameen and Moizuddin and others (Ameen and Moizuddin 1973, Hossain and Elias *et al.* 1992 and Ameen *et al.* 1999).

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