A STUDY ON SAMPLING OF MOSQUITOS USING ECO-FRIENDLY MOSQUITO TRAP IN AND AROUND JIWAJI UNIVERSITY CAMPUS (INDIA)

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ABSTRACT: Mosquitoes are the most important among all arthropod vectors that causes human disease in the tropical conditions. In order to reduce the mosquito nuisance and risk of diseases caused by them it is essential to reduce mosquito populations. All Iinn Mosquito Trap/Killer was placed in four different outdoor locations. Out of total insects trapped, the percentage of mosquitoes was 36 %, 45 %, 35 % and 36 in case of Backyard of animal house, Backyard of Aryabhatt boys hostel, Front part and Fish pond area of School of Studies in Zoology, Jiwaji University, Gwalior respectively.

KEY WORDS: Gwalior, Mosquito, trap, sampling.

Mosquitoes are the most important among arthropod vectors of human disease in the tropics and are notoriously responsible for causing much greater misery to mankind than all other insects. Mosquitoes are considered "Public Enemy Number One" for humans owing to their biting and blood feeding habits. In order to reduce the mosquito nuisance and risk of diseases caused by them it is essential to reduce mosquito populations. Successful mosquito control requires detailed information about their diversity, distribution, seasonal variations etc. A large number of control programmes have been launched from time to time against mosquitoes such as chemical treatments, smoking, bio-pesticides and biological organisms. In addition to chemical insecticides other methods of mosquito control like window screens, mosquito nets, and mosquito repellents are being used. But all these control measures have got one or more drawbacks. Furthermore, mosquitoes are becoming resistant to different insecticides. So mosquito traps are much better option for controlling them, estimation of species abundance and composition. A large number of traps have been developed by Sudia & Chamberlain (1962), Odetoyinbo (1969), Service (1970), Davis et al. (1995), Mathenge et al. (2002), Hoel et al. (2007), Brown et al. (2008), Kaufman et al. (2008), Ritchie et al. (2008) and Kweka & Mahande (2009). But a significant success in mosquito control has yet to be achieved. In the present study, a new commercially available mosquito trap has been used. The device involves a number of attractive cues, UV light, heat, moisture (humidity) and carbon dioxide with creation of an atmosphere mimicking human skin, for female mosquitoes. The system does not involve any hazardous chemical and is perfectly eco-friendly. In India no studies have been conducted to demonstrate effectiveness of such mosquito traps, therefore the present study has been taken up with objectives of installing mosquito traps in different locations (outdoor) during different times (day, night) and different durations so as to observe the abundance of various mosquito species.

MATERIAL AND METHODS

Four pieces of All Iinn Mosquito Trap/Killer, model Terminator – I were procured from market. The device works on the principle of attraction of mosquitoes, particularly the females, with creation of an atmosphere imitating / mimicking human skin. All Iinn Terminator – I is fitted with small fluorescent (UV) tube and its inner walls are coated with titanium dioxide (TiO_2) - a natural oxide of the earth mineral that is non-toxic and is widely used in paints and to combat environment pollution worldwide.

Specifications of Device were as follow: Gross Weight: ~ 620 g/piece, UV fluorescent tubular lamp (200-400 nm), Air Blower (Exhaust Fan): Low noise, ultra-quiet fan, Transparent layer of TiO_2 is coated on the inner surface of the dome, Input Voltage: 220V AC, 50 Hz, Power Consumption: 6W, Approximate Monthly Power Consumption: 1.5 units.

A photo-catalytic reaction takes place when UV rays radiate TiO_2 resulting in generation of heat, moisture and CO_2, in the presence of organic carbon (bacteria). Thus hungry female mosquitoes are attracted towards Terminator – I through capture windows on upper part of the system. The attracted mosquitoes are sucked in a cage, at lower part, by vacuum created by a small exhaust fan. The trapped mosquitoes cannot fly upwards because of strong air flow of the ventilator. In few hours they die out due to dehydration under the influence of air blown onto them. The system does not involve any hazardous chemicals and is perfectly eco-friendly.

Mosquito traps were installed at various locations, as mentioned below, in Jiwaji University, campus. Outdoor locations selected for the study were, Backyard of animal house, Backyard of Aryabhatt Boys Hostel, Front part and Fish pond area of School of Studies in Zoology. Mostly they were installed for nocturnal survey for a period of 12 hours from 6 PM to 6 AM.

Trapped and killed insects were collected in Petri dishes. The Petri dishes were placed in an oven at 60°C for 12 hours to remove moisture of the insects and then they were stored in air-tight plastic containers, for further study. The trapped insects were sorted out according to their orders. Identification of mosquitoes up to genus level was carried out. Data obtained was tabulated and subjected to statistical analysis (Mean ± S. E.).

RESULTS

The results of present study have been depicted in figure I - IV. The number of mosquitoes and other insects trapped in different locations were observed and recorded. The range of number of mosquitoes caught per day at the backyard of animal house (good place for breeding and hiding of mosquitoes) was 45-81. In total 5360 insects were caught in one month, the maximum number (1979) and percentage (37%) of insects caught at this point were of psycodids, while mosquitoes were the next with total number of 1936 and percentage share of 36%. Other dipteran insects of the catch included houseflies, sand flies and chironomids and some non-dipteran insects (small moths, bugs, beetles, grasshoppers) in small numbers (Fig. 1).

The results obtained from 2nd location, backyard of Aryabhat Hostel, were more or less similar with some difference in the total number, daily average and percentage share of over-all catch. At this location mosquitoes dominated the catch and psycodids were at second place. The number of mosquitoes caught per day at this location ranged from 45-81 (Fig. 2).

The results obtained from 3rd location, Front part of School of Studies in Zoology, were more or less similar with some difference in the total number, daily average and percentage share of over-all and differential catch (Fig. 3). At this location psycodids dominated the catch and mosquitoes were at second place. The total number of insects caught during this period was 4826 with daily average of 155.68 per day. The number of mosquitoes caught per day at this location ranged from 24-94. The range of number of insects caught per day at the Fish pond area of School of Studies in Zoology was 94-192. The range of number of mosquitoes caught per day at this location was 32-78 (Fig. 4).

Results of present studies are more or less similar to that of studies conducted by Moree et al. (2001) reported that UV light traps caught more mosquitos than the traps with incandescent bulbs. Also, Hoel et al. (2009) reported maximum collection of Ae. Albopictus using commercial mosquito traps. Octenol trap is known to be an attractant for most *Aedes* and some *Culex* mosquitoes (Kline et al., 1991a,b; Kline, 1994; Kline & Mannm, 1998). Krockel et al. (2006), Maciel-de-Freitas et al. (2006) and Williams et al. (2006) compared the efficacy of BG-Sentinel™ mosquito trap (BGS) to other traps or active collection methods and reported the trap as an effective tool for capturing adult *Ae. aegypti* in the outdoor environment.

On the basis of observations of the present study it is concluded that trap used in the study acts as a good eco-friendly device for the control and sampling for the mosquitoes and the use of these traps do not cause any environmental pollution.

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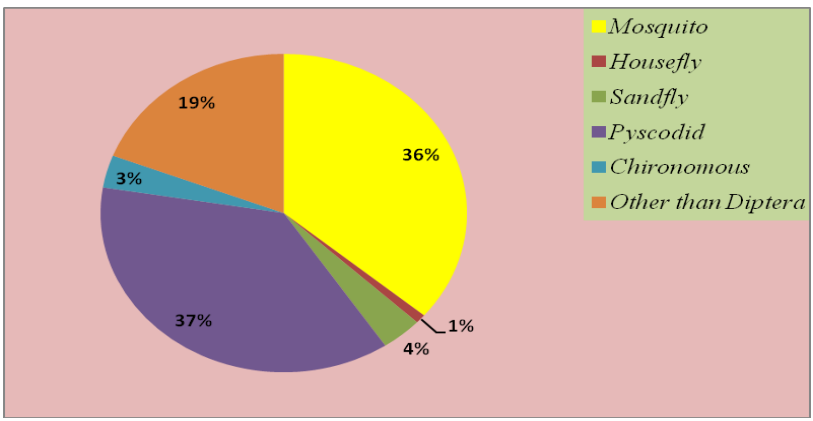

Figure 1. Showing percentage of insects trapped at backyard of animal house.

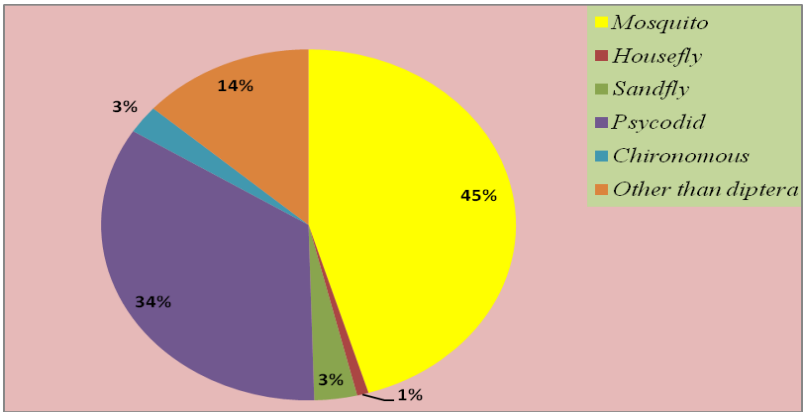

Figure 2. Showing percentage of insects trapped at backyard of Aryabhatt Boys Hostel.

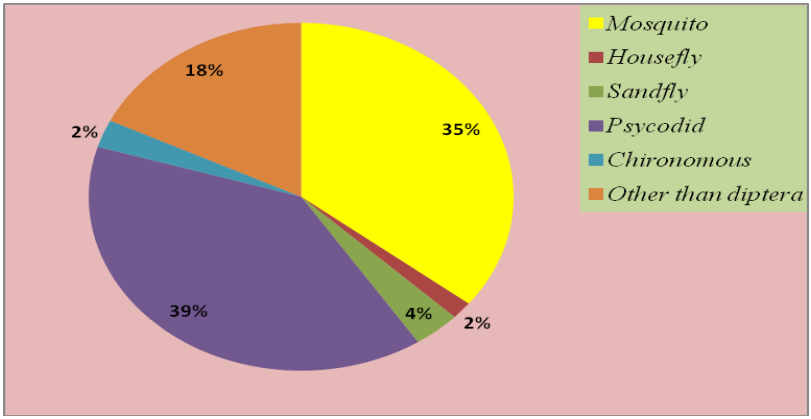

Figure 3. Showing percentage of insects trapped at front part of S.O.S. in Zoology, Jiwaji University, Gwalior.

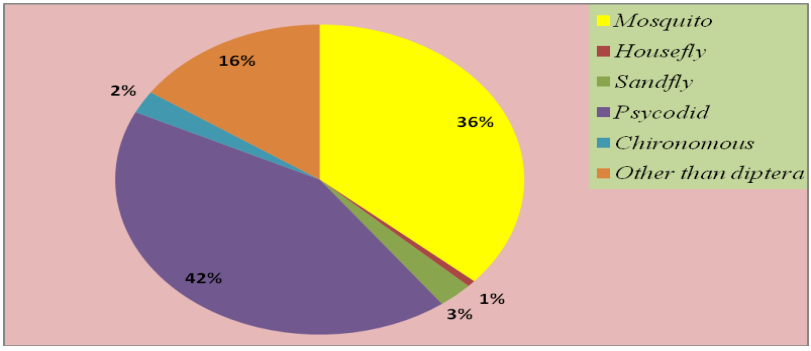

Figure 4. Showing percentage of insects trapped at fish pond area of S.O.S. in Zoology, Jiwaji University, Gwalior.