**GLOBE RESEARCH PROJECT (IVSS) : MOSQUITO LAEVAE IDENTIFICATION**

Abstract

Mosquitoes are vectors of several diseases for humans. To eradicate mosquitoes, information regarding breeding place of mosquito larva along with the knowledge and role of cleaning service are required. This study was aimed to identify water container as breeding sites for mosquitoes and as well as to discover knowledge, attitude and practice of cleaning service in relation to mosquitoes eradication at Ifako Ijaiye LGEA Lagos State, Nigeria. This study used a qualitative descriptive approach. The samples were all mosquito larva taken from the water containers. The Informants were taken with quota sampling and the information was obtained by in-depth interviews. Of the 108 containers, 30 (27.78%) indoor containers entirely contain clear water and meanwhile in 78 (72.22%) outdoor containers, 13 containers contain turbid water and 65 containers contain clear water. There were 431 mosquito larva found in five indoor containers (60 larva) and 26 outdoor containers (431 larva). Larva Free Rate (LFR) was 83.33%, House Index (HI) 16.67%, Container Index (CI) 28.70%, and the Breteau Index (BI) 41.67%. The species of mosquitoes found were *Aedes aegypti, Aedes albopictus* and *Culex*. Cleaning services have a good knowledge and attitude about mosquito breeding and practice in eradicating mosquitoes according their responsibility as cleaning service.

**IDENTIFICATION OF MOSQUITO LARVA IN WATER CONTAINERS IN LINE WITH THE KNOWLEDGE, ATTITUDE AND PRACTICE OF CLEANING SERVICE IN RELATION TO MOSQUITO BREEDING IN IFAKO IJAIYE LGEA LAGOS STATE NIGERIA**

***A RESEARCH PROJECT REPORT SUBMITTED TO THE GLOBE / NASA***

***DATE: 19TH JANUARY, 2021***

**STUDENTS:**

1. **SANNI ALIYAH AYOMIDE**
2. **IDRIS RAHMAN**
3. **IDRIS RAHEEM**
4. **RAFIU AZEEZAT**
5. **DOTO SEKINAT**
6. **BAMGBOYE SAMUEL**

**SCHOOL / ORGANIZATION:**

***EBENEZER AFRICAN CHURCH PRIMARY SCHOOL 1, IFAKO IJAIYE, LAGOS STATE, NIGERIA***

**GLOBE TEACHER:**

***MR. NOJEEM OLANREWAJU SANNI***

**INTRODUCTION**

Mosquito is a vector or a disease transmitter for humans. The incidence of the disease that its transmitted is due to the high density of mosquito vectors, especially in tropical country such as Indonesia. Indonesia is endemic territory to mosquito-borne diseases such as dengue fever, malaria and filariasis. Female mosquitoes usually choose specific types of water to lay eggs such as clean clear water, dirty water, water brackish or other types of natural containers. Mosquito eggs hatch in water and then become larva. The life cycle of mosquito which ideal and effective way as vector control is at the larval stage.

**Materials and Methods**

**Study Area**

This was a descriptive qualitative research. The data were collected by direct observation on water reservoirs and in-depth interviews to cleaning services at Ifako Ijaiye LGEA Lagos State, Nigeria. The population in this study was the unit of water reservoir and the larvae as the population variation per unit of analysis. Mosquito larvae sampling was done by full sampling technique which all mosquito larvae in the water reservoir were taken as research sample, while the respondents sampling were chosen with the sampling quota technique.

**Sampling of Mosquitoes**

The water reservoir data (TPA), the number and types of larvae found were presented in the table and described in narrative form, while the respondents’ knowledge-attitudes-practice were presented verbatim and presented in tabular form to draw conclusion.

**Results and Discussions**

There were 108 TPAs inside and outside the room with potential for mosquito breeding, 30 (27.78%) and 78 (72.22%) indoor and outdoor respectively. 31 TPAs were found with mosquito larvae, 5 (16.13%) and 26 (83.87%) indoor and outdoor respectively. Table 1 shows location and TPA number.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **LOCATION OF TPA** | **N** | **%** | **POSITIVE LARVA** | | **NEGATIVE LARVA** | |
| N % | | N % | |
|  |  |  |  |  |  |  |
| Indoor | 30 | 27.78 | 5 | 16.13 | 22 | 32.47 |
| Outdoor | 78 | 72.22 | 26 | 83.87 | 52 | 67.53 |
| Total | 108 | 100.00 | 31 | 100.00 | 77 | 100.00 |

Below are the Larva Free Rate (ABJ), House Index (HI), Container Index (CI), and Breteau Index (BI).

|  |  |
| --- | --- |
| **PARAMETERS** | **INDICATORS** |
| Larva free rate (%) | 83.33 |
| House Index (%) | 16.67 |
| Container Index (%) | 28.70 |
| Breteau Index | 41.67 |

Sixty five natural or manmade containers were acknowledged to be filled with clear water or cloudy water. The clear water containers are: eight glasses of used mineral water, a food box, four plastic cups, three puddles of air conditioning, two buckets, 13 flower pots, a piggy bank, three used bottles, one jar cap, 18 flower vases, one vase cap, three fish ponds, one used bowl, two drum lids, and three armpit leaves. While the cloudy water containers are: six sewers, two open pipes, one can, two ground water puddles and two ponds. Table 2 lists Type of Natural and Manmade containers.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| LIST OF TPA | N | % | POSITIVE LARVA | | NEGATIVE LARVA | |
| N % | | N % | |
|  |  |  |  |  |  |  |
| Buckets | 13 | 12.04 | 1 | 3.23 | 12 | 17.65 |
| Bath tube | 19 | 17.59 | 5 | 16.13 | 11 | 16.18 |
| Water mineral plastic | 8 | 7.41 | 3 | 9.68 | 5 | 7.35 |
| Food box | 1 | 0.93 | 1 | 3.23 | 0 | 0.00 |
| Plastic cups | 4 | 3.70 | 4 | 12.90 | 0 | 0.00 |
| Sewers | 6 | 5.55 | 2 | 6.45 | 0 | 0.00 |
| Open pipe | 2 | 1.85 | 2 | 6.45 | 0 | 0.00 |
| Bread used can | 1 | 0.93 | 0 | 0.00 | 1 | 1.47 |
| AC puddles | 3 | 2.78 | 0 | 0.00 | 1 | 1.47 |
| Vase cap | 13 | 12.03 | 3 | 9.68 | 10 | 14.70 |
| Ground water | 2 | 1.85 | 0 | 0.00 | 2 | 2.94 |
| Piggy bank | 1 | 0.93 | 1 | 3.23 | 0 | 0.00 |
| Used bottles | 3 | 2.78 | 3 | 9.68 | 0 | 0.00 |
| Jar cap | 1 | 0.93 | 1 | 3.23 | 0 | 0.00 |
| Bread plastic | 1 | 0.93 | 1 | 3.23 | 0 | 0.00 |
| Flower vases | 18 | 16.67 | 0 | 0.00 | 18 | 26.47 |
| Park ponds | 2 | 1.85 | 0 | 0.00 | 2 | 2.94 |
| Fish ponds | 3 | 2.78 | 0 | 0.00 | 3 | 4.41 |
| Used bowls | 1 | 0.93 | 1 | 3.23 | 0 | 0.00 |
| Drum lids | 2 | 1.85 | 2 | 6.45 | 0 | 0.00 |
| Vase lid | 1 | 0.93 | 1 | 3.23 | 0 | 0.00 |
| Leaves armpit | 3 | 2.78 | 0 | 0.00 | 3 | 4.41 |
| Total | 108 | 100.00 | 31 | 100 | 68 | 100.00 |

Through microscope, the characteristics of: *Aedes* larvae are short and thick siphon, a pair of siphon feathers, and comb tooth with lateral spine (no lateral for *Aedes albopictus*); in contrast with the *Culex* larvae are slim and long siphon, anal segment with closed saddle. *Culex* larvae were collected from the two sewers. Table 4 lists genus of larva collected from the containers.



**Fig. 1*.****Comb Scale* of larva *Aedes albopictus* (magnification 40x10)



**Fig. 2*.*** *Comb Scale* of *Aedes aegypti* larvae (magnification 40x10)

The water reservoirs (TPA) found in this study were potential for *Aedes* genus breeding. Most of the sites were the clear water places[9.11]. *Aedes* mosquitoes prefere artificial/manmade containers for breeding. Container size and the amount of water contained therein affect the number of larvae. The study showed *Aedes albopictus* larvae were more outdoors compare to *Aedes aegypti* which were found indoors. This is consistent with the life habits of *Aedes aegypti* which is living and resting inside the house such as home furnishings. By contrast, *Aedes albopictus* habits were outdoors while a forest species can adapt to the environment in rural, semi urban and urban areas. Nonetheless, *Culex* larvae are found in dirty sewer condition where lots of organic and inorganic waste can support its breading process.

House Index (HI) 16.67%, Container Index (CI) 28.71% and Breteau Index (BI) 258.3, means category 3 that the area has medium density of larvae, category 5 which means the area has medium density of larvae, category 9 which means the area has high vector density respectively. 11 Areas with an HI of more than 5% and BI more than 20% are prone and sensitive areas of DHF.

*Aedes aegypti* mosquito larva has a characteristic of having a short, thick and black siphon, open saddle and laterally spiny comb, can be distinguishes from *Aedes albopictus* which has no lateral spines. The Culex larva has a siphon with a ratio of width and length of approximately 1: 6, has tuft on siphon > 1 pair, has acus on the base of siphon and has a closed saddle. Larvae genera of the *Aedes* Genus (*Aedes aegypti* and *Aedes albopictus*) and *Culex* genus larvae were both found in the study.

Cleaning services at Ifako Ijaiye LGEA generally have good knowledge and attitude about mosquito breeding. Unfortunately, the practices on mosquito breeding are very lacking. Numbers of mosquito larvae collected were still high. Furthermore no counseling nor promotion regarding vector borne disease has being performed. Chief of cleaning services has no primary role on mosquito control, simply cleaning up the workplace without considering burying artificial used containers surrounding the office

**Conclusion**

One hundred eight containers of TPA water reservoirs have the potential to become mosquito breeding habitat. Four hundred thirty one larva were collected, with the genus of *Culex* and *Aedes* (*Aedes aegypti* and *Aedes albopictus*).

Cleaning services have good knowledge and attitude about mosquito breeding, albeit it did not affect the high number of mosquito larvae found in the area of Ifako Ijaiye LGEA, Lagos Nigeria..

**Acknowledgments**

The authors would like to thank Mrs. Aminulai Modupe, general coordinator, GLOBE NIGERIA for the timely review of the paper and her useful suggestions as well as Mr. Adeyemi Olamilekan Jongbo Education Secretary, Ifako Ijaiye LGEA, Mr. Idris Ajakore, the H.O.S School Services Support and Mr. Peter Kazeem B. of Ifako Ijaiye LGEA Lagos State, Nigeria. Furthermore, The entire members of Ebenezer African Church Mission Primary School 1, Ifako Ijaiye LGEA and The Lagos State Universal Basic Education Board (LSUBEB) Maryland Complex, Maryland, Ikeja Nigeria are gratefully thanked for the use of project facilities and technical backstopping support, and the Ifako Ijaiye mini Health Centre for the execution of the laboratory works.

**References**

1. Elyazar I R F, Sinka M E, Gething P W, Tarmidzi S N, Surya A, Kusriastuti R, Winarno, Baird J K, Hay S I and Bangs M J. **83** (2013)

2. Yoshikawa M J and Kusriastuti R 2013 Surge of Dengue Virus Infection and Chikungunya Fever in Bali in 2010. Med. Health **41** (2010)

3. Indriani C, Ahmad R A, Wiratama B S, Arguni E, Supriyati E, Sasmono R T, Kisworini F Y, Ryan P A, Neill S L O, Simmons C P, Utarini A and Anders K L (2018)

4. Hasyim H, Nursafingi A, Haque U, Montag D, Groneberg D A, Dhimal M, Kuch U and Müller R*.* J*.* **17** (2018)

5. Boesri H. Spirakel (2012)

6. Hamid P H, Prastowo J, Ghiffari A, Taubert A and Hermosilla C. **12** (2017)

7. Harbach R E and Knight K L, *Taxonomists glossary of mosquito anatomy*, (1980)

8. Donnelly B, Berrang-Ford L, Ross N A and Michel P. J. **14** (2015)

9. Susanto T, Sulistyorini L, Wuryaningsih E W and Bahtiar S. Int. J. Nurs. Sci **3** (2016)

10. Patz, Graczyk T K, Geller N and Vittor A Y. Int J. Parasitol **30** (2000)

11. Freeman M C, Chard A N, Nikolay B, Garn J V., Okoyo C, Kihara J, Njenga S M, Pullan R L, Brooker S J and Mwandawiro C S. Parasites and Vectors **8** (2015)

12. Hiscox A, Kaye A, Vongphayloth K, Banks I, Piffer M, Khammanithong P, Sananikhom P, Kaul S, Hill N, Lindsay S W and Brey P T*.* J. Trop. Med. Hyg **88** (2013)

13. Mardihusodo S J, Satoto T B T. Dengue Bulletiin **35** (2011)

14. Aji R. Int. Res. J. Public Environ. Heal **3** (2016)

15. Wijayanti S P M, Sunaryo S, Suprihatin S, McFarlane M, Rainey S M, Dietrich I, Schnettler E, Biek R and Kohl A. PLoS Negl. Trop. Dis **10** (2016)

16. Leta S, Jibat T, Clercq E M De, Amenu K, Kraemer M U G and Revie C W. Int. J. Infect. Dis **67** (2018)

17. Lambrechts L, Scott T W and Gubler D J. PLoS Negl. Trop. Dis **4** (2010)

18. Tsunoda T, Cuong T C, Dong T D, Yen N T, Le N H, Phong T V and Minakawa N. *PLoS One* **9** (2014)

19. Lambrechts L, Paaijmans K P, Fansiri T, Carrington L B, Kramer L D, Thomas M B