Shodh Sari-An International Multidisciplinary Journal

2024, Vol. 03, Issue 03, 163-180
ISSN: 2959-1376
DOI: https://doi.org/10.59231/SARI7726

Mosquito Vector of Human Diseases Associated with Artificial Containers in The Surrounding of Imo State Polytechnic Omuma, Oru East L.G.A, Nigeria

Ugagu, Gerald M.[1], Alisi, Goodluck E.[2], Umejiego, Ikenna B.[1], Opara, Nnaemeka K.[1], Ezike, Monica N.[2], Ochuba, Emmanuel E.[1] and Okorie, Celestine C.[1]

[1]Department of Science Laboratory Technology, Imo State Polytechnic, Omuma, Oru East Nigeria

[2]Department of Animal and Environmental Biology, Imo State University, Owerri, Nigeria

ABSTRACT

Mosquito vector of human diseases associated with artificial containers in the Surrounding of Imo State Polytechnic Omuma, were studied between the months of May 2023 to August 2023. The collection of larvae of mosquitoes from the artificial breeding sites identified in the study area were done using dipper (ladle) constructed locally. Eight different sites designated (A- H) were used for the study. A total of 712 mosquitoes were identified, after larvae collected from the sites were reared to adult stage. They belong to three (3) genera of four (4) Species. They include Anopheles species 161 (22.6%), *Aedesaegypti*, 168 (23.6 %), *Aedesalbopictus* 148 (19.9 %) and *Culexquinquefaciatus*241 (33.8%). Site G recorded the highest percentage occurrence of species 131(18.4%) while Site A recorded the least with 63 (8.8%) mosquitoes. Results from different sites was not significantly different when compared for species abundance at p value >0.05. Species abundance was also compared among the months used for the study to statistically determine the month that has the highest abundance of species in the study area. Public health implication of different species encountered in the study area were determined using standardized keys. Considering the abundance of the anthropophilic mosquitoes in the study area, regular surveillance and preventive measure on these disease vectors should be encourage, hence there is need for further study on the mosquitoes found in the study area for control and prevention of possible disease outbreak.

@2024 International Council for Education Research and Training
2024, Vol. 03, Issue 03, 163-180
ISSN: 2959-1376
DOI: https://doi.org/10.59231/SARI7726

Keywords: Mosquito vectors, artificial breeding sites, anthropophilic, disease outbreak

1.0 INTRODUCTION

Anopheles, Aedes, and Culex mosquito species that are suited for urban environments and have a broad range of environmental tolerances have benefited from human-induced environmental change. With recent range expansion across Europe, species like Aedesalbopictus have been able to rapidly expand their worldwide range through the exploitation of human settings. Mosquito-borne human illness epidemics in other regions of the world are also made easier by the close proximity of humans and mosquitoes in metropolitan settings. The recent wave of West Nile Virus (WNV) outbreaks in several sections of the USA, which were vectored by Culex species, is an example of this.

A growing number of residential gardens in the UK have water butts—containers that collect and store rainwater for household use. This trend is partly due to a changing climate and weather patterns that put more strain on the country's water supplies. Gutter-collecting water butts are cylindrical wooden or plastic containers. There were inflated sales of water butt containers in Southern and Eastern England during the spring of 2012 due to a severe drought and the hose-pipe ban that followed. These containers, representing possible new mosquito habitats, were probably filled over the next wet summer. Mosquito larvae use water butts as a home and food source when they gather rainwater from roof gutters together with vegetation, animal waste, and heterotrophic microorganisms (bacteria, fungus, and protozoa). Because of their height and intended purpose of storing water, they are inaccessible to fish, amphibians, and dragonflies, among other vertebrate and invertebrate predators of mosquito larvae. Even though each water butt only holds 50–250 liters of water, when multiple containers are used, they can represent a sizable habitat and build a network of prime mosquito larval habitat that is easily accessible. Several mosquito species, including Culexpipiens, Culextorrentium, Culiseta annulata, and Anopheles plumbeus, are documented to use water butt habitats in Imo State Polytechnic. Although it is anticipated that the Imo State Polytechnic's increased use of

@2024 International Council for Education Research and Training
2024, Vol. 03, Issue 03, 163-180
ISSN: 2959-1376
DOI: https://doi.org/10.59231/SARI7726

container habitats may boost mosquito populations, little is known about the species makeup, abundances, and seasonal fluctuations of mosquitoes that use both urban and rural habitats. Certain mosquito species, such as those that cause nuisance bites to humans or have the potential to spread diseases to people or animals, such WNV or the avian pox virus (Poxviridae), may flourish in urban settings where they will have frequent interaction with people and birds. The Imo State Polytechnic terrain is becoming more urbanized, which affects many facets of mosquito biology and the consequences of future land use and climate change scenarios for the dynamics of mosquito populations.

2.0 MATERIALS AND METHOD

2.1 DESCRIPTION OF STUDY AREA

The study was carried out in the environment of Imo state polytechnic Omuma, Oru East L.G.A.

2.2 LOCATION OF STUDY AREA

Polytechnic Imo State Omuma is situated in the Local Government Area of Oru East. The Polytechnic is located in Omuma, which also serves as the headquarters of Oru East L.G.A.

The following are towns that make up Oru East: Akatta, Akuma, Amagu, Amiri, Awo-Omamma, and Omuma.

Njaba LGA, Mbaitolu, Orlu, Oguta, Orsu, and Oru West Local Government Area form the boundaries of Oru East. Oru East is home to 195,743 people according to the 2006 census, and it is 136 km2 (53 sq. metre) in size. The border between the communities of Amazu and Amaebu and Akatta, Awo idemili and Akuma and Amagu, Orlu and Oru East at Obor town, and Okporo and Akatta are shared. In the northern portion of the communities of Akabor, Mgbele, Awa, and Abiaziem, Oru West shares a boundary with Oguta LGA. The Local government area is rich in oil and gas amongst its neighboring towns such as Oru West and Oguta LGA.

Omuma lies between Latitude 5.75658° or 5° 45' 24" north and Longitude 6.94574° or 6° 56' 45" east of the equator having an elevation of about 30m above the sea level.

RELIGION

Oru East people are mainly Christians but good number are also heathens

2024, Vol. 03, Issue 03, 163-180
ISSN: 2959-1376
DOI: https://doi.org/10.59231/SARI7726

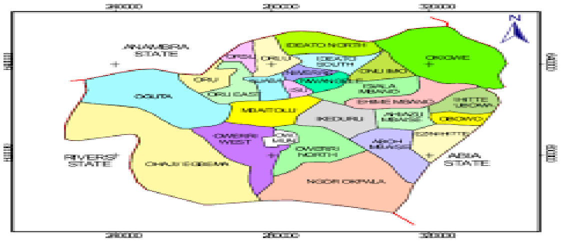

Fig 1: Map Imo State showing Oru East Local Government Area

2.3 HUMAN RELATED ACTIVITIES AND BREEDING SITE

This refers to all human activities going on in and around living places in the Polytechnic. During this time, several sites were located for the breeding of mosquitoes, lot of human activities that contributed to the breeding were observed and investigated. From the area of human habitation in the polytechnic, different object which retain water for mosquito breeding were investigated. They include abandoned vehicles with back buckets, some broken and discarded butter around the premises, improperly disposed of containers around the hostel, condemned water butters within the Science Laboratory Technology block, and broken and discarded plastic containers at various locations that were also of different sizes, such as paint buckets or containers that were used in painting at different construction sites in the institution. Open water-retaining tanks that are utilized, among other things, in the construction of new buildings.

2.4 ETHICAL CONSIDERATION

The medical centre of the institution provided ethical approval. Prior to commencing any work, the chief potters of both the male and female hostels, along with the security personnel, were informed to avoid damaging artificial containers that were positioned in specific areas for mosquito oviposition of eggs. This was especially important in areas that were initially recognized as breeding sites but had been demolished by trespassers. Our supervisor gave us instruction on how to handle the specimen due to its delicate nature, particularly the embryonic phases of the insect.

2.5 METHODOLOGY AND DATA COLLECTIONS

Butters of different sizes, locally constructed ladle (dipper), vials of different sizes, small plastic cups, net, writing material for recording the time of collections and emergence of adult during rearing etc. Buckets was also used to constructs a cage; the mouth was covered

@2024 International Council for Education Research and Training
ISSN: 2959-1376
2024, Vol. 03, Issue 03, 163-180
DOI: https://doi.org/10.59231/SARI7726

with nylon netting of a very tiny mesh size of about 0.1mm. These cages were constructed according to prescription for the rearing of the larvae and pupae to adult stage.

SETTING OF CONTAINERS: the containers were filled with water and positioned according to the selected sites for possible oviposition of the eggs by mosquito. All the containers were given the inscription (KEEP OFF PROJECT WORK) with the use of masking tape and a permanent marker. The sites were visited three (3) times in a week to check for containers which are positive for the mosquito larvae while those that are not positive were left out. The collection was made with ladle that was locally prepared and used in the supping out of the larvae and pupae from their breeding site. All the larvae collected from the sites were transferred into the control site containers which were positioned in the laboratory for rearing to adult stage for proper identification to species level. The larvae were fed with properly grinded materials like the chick-feed and cabin biscuit. Constant checks were made on the bucket used for the rearing of the mosquito till their emergency to adult stage. Upon emergency, the rearing cage (bucket) were gently taped for the mosquito resting close to the water in the bucket to move to the space created with the net used to cover the cage to avoid escape. The net is removed and the mosquito collected in the net sprayed with a pyrethrum (insecticide) in order to kill them to avoid escape during sorting and identification.

2.6 IDENTIFICATION OF MOSQUITO.

The mosquito was separated into Anopheles and Culicine group using the length of the palps, antennae, spotted wings and speckled legs according to the identification keys from other workers such as service (1980), De. Millian (1930), Evans (1938), Edward (1941), Hoskins (1952), Chardler (19565) Matting (1961), Gillet (1971, 1972) and with the help and assistance of our supervisor Dr. Ugagu, Gerald M who is a doctor of Medical Entomology. The mosquitoes in the culicine group were divided into two groups: Aedes, which had a dark and white silvery pattern on its thorax and abdomen, and Culex, which had a pale brown color without any obvious ornamentation. The

@2024 International Council for Education Research and Training
2024, Vol. 03, Issue 03, 163-180
ISSN: 2959-1376
DOI: https://doi.org/10.59231/SARI7726

identification and confirmation of individual species were done with the help and assistance of taxonomist from the National Arbovirus Centre Enugu, Enugu State Nigeria.

Adult Mosquitoes

• Slender body

• Scaled wings

• Long legs

• Typically, less than 1 inch in length

Immature Mosquitoes or larva

• Thin worm like body

Noticeable head

Color

Adult Mosquitoes

• Range in color from light gray to black with white striped legs

A lengthy proboscis, scales on the wing veins, wing edges, and much of the body identify adult mosquitoes from other flies.

Resting Stance:

Culicin Male mosquitoes are characterized by plumose, or bushy, antennae and palpi that are clubbed at the end and as long as the proboscis. Male Anopheles

There are fewer, shorter hairs on the antennae of female Culicine mosquitoes. While the palps of female Culicine are significantly shorter than those of female Anopheles, they are both as long and straight as the proboscis.

Resting Stance:

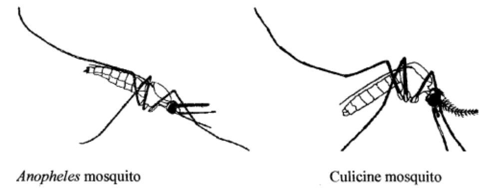

Fig 2: Male Anopheles Male Culicine (Source: Gillet, J.D (1957))

The hairs of female mosquito antennae are shorter and less numerous. While the palps of female Culicine are noticeably shorter than those of female Anopheles, they are both long and straight like the proboscis.

Fig 3: Antennae of Anopheles and Culicine Mosquito (Source: Gillet, J.D (1957))

Among the Culicine mosquitoes, Culex and Culiseta have blunt abdomens (Fig 10), while Aedes, and Psorophora have pointed

@2024 International Council for Education Research and Training
ISSN: 2959-1376
2024, Vol. 03, Issue 03, 163-180
DOI: https://doi.org/10.59231/SARI7726

abdo

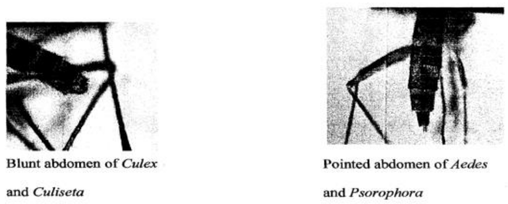

Fig 4: Abdomen of Culicine Mosquitoes (Source: Gillet, J.D (1957))

2.7. Data Analysis

One Way Anova was used to compare species abundance in the sampling sites based on the gathered data.

3.0 RESULT

3.1 RESULTS.

Over the course of this study, the artificial breeding site provided by human-related activities in the polytechnic was used to investigate the mosquito vector of human disease associated with artificial containers. A total of eight sites designated (A-H) were used for the study while four (4) species of three (3) genera were collected after identification.

Table 1. Overall prevalence of mosquito species identified in the study area.

Species identified	Number encountered	% of occurrence
Anopheles species	161	22.6
Aedesaegypti	168	23.6
Aedesalbopictus	148	19.9
Culexquinquefaciatus	241	33.8
Total	712	100%

From the above table, a total of 712 mosquitoes (table 1) consisting of 161 Anopheles species representing (22.60%) *Aedesaegypti* 168 (23.6%), *Aedesalbopictus* 142 (19.9%) and *Culexquinquefaciatus* 241 (33.8 %) of the total mosquito population recorded in the study area

Table 2a. Types of species found at different sites in the study Area and their percentage (%)

Sites	*Anopheles* species	*Aedesaegypti*	*Aedesalbopictus*	*Culexquinquefasciatus*	Total

@2024 International Council for Education Research and Training
ISSN: 2959-1376
2024, Vol. 03, Issue 03, 163-180
DOI: https://doi.org/10.59231/SARI7726

Site A	27 (16.8)	16 (9.5)	4 (2.8)	16 (6.6)	63 (8.8)
Site B	30 (18.6)	18 (10.7)	22 (15.5)	18 (7.5)	88 (12.4)
Site C	20 (12.4)	9 (5.4)	27 (19.0)	8 (3.3)	64 (9.4)
Site D	10 (6.2)	9 (5.4)	12 (8.5)	36 (14.9)	67 (9.4)
Site E	30 (18.6)	24 (14.3)	30 (21.1)	16 (6.6)	100 (14.0)
Site F	21 (13.0)	31 (18.5)	2 (1.4)	28 (11.6)	82 (11.5)
Site G	13 (8.1)	28 (16.7)	19 (13.4)	71 (29.5)	131 (18.4)
Site H	10 (6.2)	33 (19.9)	26 (18.3)	48 (19.9)	117 (16.4)
Total	**161 (22.6)**	**168 (23.6)**	**142 (19.9)**	**241 (33.8)**	**712 (100.0)**

Keys: Site A =Behind Admin Block (B) = Science Block (C) = Forestry Department (D) Love Garden (E) = Nursery Section (F) Back of SLT Lab (G) Female Hostel and (H) Male Hostel.

Table 2b Comparing if there is a significant difference between the sites that has the highest abundance of species in the study area at

p value > 0.05

Sites	***Anopheles* species**	***Aedesaegypti***	***Aedesalbopictus***	***Culexquinquefasciatus***	**Total**	**p Value**

@2024 International Council for Education Research and Training
ISSN: 2959-1376
2024, Vol. 03, Issue 03, 163-180
DOI: https://doi.org/10.59231/SARI7726

Site A	27	16	4	16	15.75±9.39	
Site B	30	18	22	18	22.00±5.66	
Site C	20	9	27	8	16.00±9.13	
Site D	10	9	12	36	16.75±12.89	**0.561**
Site E	30	24	30	16	25.00±6.63	**ns**
Site F	21	31	2	28	20.50±13.03	
Site G	13	28	19	71	32.75±26.23	
Site H	10	33	26	48	29.25±15.78	

Ns – Not significant at $p>0.05$.

Table 2c Comparing if there is a significant difference between the species that has the highest abundance amongst themselves at p value > 0.05

Sites	***Anopheles* species**	***Aedesaegypti***	***Aedesalbopictus***	***Culexquinquefasciatus***
Site A	27	16	4	16
Site B	30	18	22	18
Site C	20	9	27	8
Site D	10	9	12	36
Site E	30	24	30	16
Site F	21	31	2	28

@2024 International Council for Education Research and Training
ISSN: 2959-1376
2024, Vol. 03, Issue 03, 163-180
DOI: https://doi.org/10.59231/SARI7726

Site G	13	28	19	71
Site H	10	33	26	48
Total	**20.13±8.44**	**21.00±9.44**	**17.75±10.65**	**30.13±20.92**
p Value	**0.286ns**			

Ns – Not significant at p>0.05.

Table 2 a, b and c shows the result of the types of species found at different sites in the study area. From the result, site G recorded the highest percentage prevalence of the species 131 (18.4%) among others but were not significantly different at p value >0.05 when compared with other sites. This was followed by site H, 117 (16.4%) percentage prevalence and did not also show any significant difference at p value >0.05. when also compared statistically with other sites used for the study. This was followed by site E, 100 (14.0 %), site B, 88 (12.4%), site F, 82 (11.5%), site D, 67 (9.4%), site C, 64 (9.0 %) and the least percentage prevalence was recorded at site A, 68 (8.8 %) and all these sites were not significantly different from each other when compared for level of significance at p value >0.05.

Table 3a: Mosquito sampled as larvae using ladle method and reared to adult stage in the months of the study and percentage (%) of species sampled.

Mosquito species	May	June	July	August	Total
***Anopheles* species**	58 (93.4)	43 (25.6)	35 (20.8)	25 (14.9)	161 (22.6)
Aedesaegypti	34 (20.2)	56 (33.3)	49 (29.2)	29 (17.3)	168 (23.6)
Aedesalbopictus	30 (21.1)	61 (43.0)	28 (19.7)	23 (16.2)	142 (19.9)
Culexquinquefasciatus	81 (33.6)	58 (24.1)	60 (24.9)	42 (17.4)	241 (33.8)
Total	203 (28.5)	218 (30.6)	172 (24.2)	119 (16.7)	712 (100.0)

Table 3b. Comparing if there is a significant difference between the species that has the highest abundance of species in the months used for the study at p value > 0.05

@2024 International Council for Education Research and Training
ISSN: 2959-1376
2024, Vol. 03, Issue 03, 163-180
DOI: https://doi.org/10.59231/SARI7726

Species	May	June	July	August	Mean±S.D	p Value
Anopheles species	58	43	35	25	40.25±13.94	
Aedesaegypti	34	56	49	29	42.00±12.62	**0.157ns**
Aedesalbopictus	30	61	28	23	35.50±17.25	
Culexquinquefasciatus	81	58	60	42	60.25±16.01	

Ns – Not significant at p>0.05.

Table 3c Comparing if there is a significant difference between the months that has the highest abundance of species in the study area at p value > 0.05

Species	May	June	July	August
Anopheles species	58	43	35	25
Aedesaegypti	34	56	49	29
Aedesalbopictus	30	61	28	23
Culexquinquefasciatus	81	58	60	42
Total	**50.75±23.66**	**54.50±7.94**	**43.00±14.31**	**29.75±8.54**
p Value	**0.150ns**			

Ns – Not significant at p>0.05.

Table 3a shows the Mosquito sampled as larvae using ladle method and reared to adult stage in the months of the study and percentage (%) of species sampled, while **Table 3b** compared the species that has the highest abundance of species in the months used for the study and **Table 3c**. Compared the months that has the highest abundance of species in the study area. Out of the four (4) species of mosquito belonging to the three (3) genera of Anopheles, Aedes and Culex, the highest percentage prevalence

@2024 International Council for Education Research and Training
ISSN: 2959-1376
2024, Vol. 03, Issue 03, 163-180
DOI: https://doi.org/10.59231/SARI7726

was recorded in the month of June with an average percentage of 218 (30.6%) and standard mean of 54.50 ±7.94 but was not significantly different at p Value >0.05. The months that were used for the study did not significantly differ from one another, despite a slight difference in the percentage prevalence that is not statistically significant at p Value >0.05. May had the highest number of mosquito species recorded in the study area, with 203 (28.5%), followed by July with 172 (24.2%), and August with the fewest, with 119 (16.7%).

Table 4: Risk indices/Public health Implication of Different Species Encountered in the Study Area.

Mosquito Species	Public health implication	Number of mosquito collected	Percentage of abundance	Reference
Anopheles Species	MPV	161	22.6	Service 1980
Aedes aegypti	DHFV, VYF	168	23.6	Service1980
Aedes albopictus	VYF	148	19.9	Gillet 1972
Culex quinquefaciatus	BFF	241	33.8	Chandler 1961

Key: PHI-PUBLIC Health Implication
MPV — Malaria Parasite Vector
DHFV — Dengue Hemorrhagic Fever Vector
VYF — Vector of Yellow Fever
BFFV — Bancroftianfilariasis and Filarial Worm Fever

Table four (4) shows the public health implication of different species encountered in the study area, the possible

@2024 International Council for Education Research and Training
ISSN: 2959-1376
2024, Vol. 03, Issue 03, 163-180
DOI: https://doi.org/10.59231/SARI7726

disease they cause and the evidence of such report based on the reference from previous work cited. Of the three (3) genera of the four species encountered in the cause of the study (Table 1) all of the encountered species are of public health concern and this call for further study to really ascertain if there is any relationship between the species abundance and some health-related issue recorded in recent times among students especially those living in the school hostel of Imo State Polytechnic Omuma, Oru East Local Government Area.

4.0 DISCUSSION

In Imo State Polytechnic surroundings, the study of mosquito vectors of human diseases in the study area was necessary because there have been increasing reports of mosquito bites by students living in the school hostel. This poses a severe public health problem, which is why Omuma, a new site owned by the state, was chosen for the study. According to the study's findings, manufactured freshwater habitats like broken and abandoned butters and plastic containers harbour a variety of mosquito populations with noticeably greater larval densities, which may also contribute to species richness in educational settings. The general findings of this study provide credence to the idea that the environment at Imo State Polytechnic affects a number of aspects of mosquito biology, such as the variety and density of mosquito species and the timing of peak larval abundances.

All of the mosquito species that were studied in this study are known to use artificial container habitats and are prevalent and ubiquitous in the Imo State Polytechnic. The differences in the diversity of aquatic habitats at each sampling site may be the cause of the disparity in species distribution that was discovered. Since the school environment is a brand-new place for students to live and has several new construction sites made of materials that can hold water, it is likely to have a wider variety of natural larval habitats. These habitats support more species-rich and diverse populations that can use containers for breeding but aren't dependent on them. Conversely, it is likely that the quantity and variety of natural larval habitats have decreased due to past and ongoing urban development. Anopheles species preyed on the container habitat in the study area, mostly using

@2024 International Council for Education Research and Training 2024, Vol. 03, Issue 03, 163-180
ISSN: 2959-1376 DOI: https://doi.org/10.59231/SARI7726

butter for building projects and rainwater collection among the hostels.

However, of the entire 712 mosquitoes collected in the study area, the presence of Aedes species, Anopheles species and Culex species were of great public health concern and of apparent health danger. Since then, it has been established that members of the Aedes group, including Aedes aegypti and Aedes albopictus, feed on humans and other animals and are responsible for the spread of various viruses, with Aedes aegypti serving as the primary vector for viruses like dengue fever, encephalitis, and hemorrhagic fever (Gillet, 1972, Service 1980) (Table 2). Aedes aegypti's capacity to accomplish this is based on its capacity to consume almost any moving animal for food (Snow and Bookham 1978). This evidence may explain why *Aedesaegypti* were collected almost from all the sites. Elephantitis is caused by the nocturnally periodic form of the filarial worm Wuchereria bancrofti, which is transmitted by the cosmopolitan and nocturnal mosquito Culex quinquefaciatus, which is collected in the study area (Chandler and Real, 196 1.Gillet, 1972, Gorden and Lavoipierre, 1979, Ugagu, G.M 2015).

The prevalence of Anopheles species can be explained by the fact that they preferentially select habitat for oviposition, hence the occurrence in container other than ground pool.

From the result of the overall species of mosquitoes identified in the study area, *Culexquinquefaciatus* recorded the highest percentage prevalence of 241 (33.8%) though statistically not significant from other species collected in the study area at **p Value** >0.05**.** The higher species abundance of *Culexquinquefaciatus* in the study area may be traced to the fact that Culex has preference to polluted water for oviposition of their eggs, since most of artificial breeding sites found in the study area were filled with decomposing leaves and other debris. Comparing other species encountered in the study area statistically using one way analysis of variance to test the level of significance at p Value >0.05, all the result shows no significant difference (at p value >0.05) amongst themselves but the percentage prevalence shows slight difference among the individual species abundance. Though the

@2024 International Council for Education Research and Training 2024, Vol. 03, Issue 03, 163-180
ISSN: 2959-1376 DOI: https://doi.org/10.59231/SARI7726

species abundance was not statistically different at p value >0.05, all the species encountered has been incriminated to pose public health danger and the need for its control especially from biting the students is very necessary and important.

The fact that the Polytechnic community supports human activities, the abundance of vector populations supported by favorable ecological conditions, and the continuously growing student population all point to the urgent need for ongoing mosquito surveillance and control in order to ensure the safety of staff and students at the Polytechnic, particularly those residing in the residence halls.

Mosquitoes collected in the study area not only carry the potential to spread public health diseases, but they also pose a significant nuisance due to their frequent and menacing bites. Additionally, the majority of the species encountered in the area bite at night, making it difficult for students to comfortably sit outside in the evening.

The possible perpetuation of these mosquito in most of the breeding sites as shown in the present study supported by numerous aspects of natural and human activities and the transmission of various human diseases need not to be over-emphasized. The situation requires a lot of caution in the polytechnic community where disease is endemic.

The expansion of human settlements and population growth, as well as the increased utilization of habitats by Anopheles species, have significant implications for human health. This particular species of mosquito is active during the day and has a strong tendency to bite humans. It has been reported that the female mosquitoes of this species are capable of transmitting Plasmodium falciparum, thereby confirming their role as a bridge vector for tropical malaria.

This study demonstrates that Culex mosquitoes used an earlier seasonal niche in the Polytechnic environment, resulting in much higher numbers of larvae and pupae in containers in the Polytechnic environment. Elevated temperatures in metropolitan regions have the potential to prolong the mosquito breeding season, hence amplifying the frequency of reproductive cycles and host contacts. Warmer weather in the preceding winter and early spring is positively correlated

@2024 International Council for Education Research and Training
ISSN: 2959-1376
2024, Vol. 03, Issue 03, 163-180
DOI: https://doi.org/10.59231/SARI7726

with enhanced spring Culex abundance, and it also influences the termination of diapause and the start of gonotrophic activity. Thus, the phenology of Culex mosquitoes can be altered by climate change and its impacts, resulting in early female exodus from hibernation places, higher female abundances, and the possibility of early season disease outbreaks in nations where they are a source of disease transmission.

5.0. CONCLUTION AND RECOMMENDATION

5.1 CONCLUSION

The environment is altered by urbanization, and this has a significant impact on polytechnic mosquito populations. Particularly in metropolitan locations, the changing climate and weather patterns that promote human activity related to household water storage also led to an abundance of container breeding habitats. Urban environments seem to limit colonization to species that can withstand the appropriate environmental conditions. This could lead to a change in the habitat niche occupied by Anopheles species, making Culexquinquefaciatus populations more prevalent and thriving. These modifications enhance the risk of disease transmission to humans and wildlife and make mosquito populations a greater nuisance to people. Changes in the climate combined with additional storage of water for residential use will probably modify the dynamics of mosquito populations. Anopheles mosquito have been represented to be most efficient malaria vector worldwide, and Aedes mosquito also reported to be the most efficient yellow fever vector worldwide, hence people living in the polytechnic environment should try as much as possible in wearing cloth that can cover their legs, hands and those living in the school hostel are advised to be sleeping with insecticide treated mosquito net as mosquito will always prefer biting them in the open body especially legs and hands. The elimination of these disease vector and their allies is quite difficult due to the activity of man in creating an artificial environment for the breeding of these vectors.

5.2. RECOMMENDATION

Taking into cognizance the public health importance of these mosquitoes associated with the artificial breeding sites identified in the study area, there is need for combined

@2024 International Council for Education Research and Training
ISSN: 2959-1376
2024, Vol. 03, Issue 03, 163-180
DOI: https://doi.org/10.59231/SARI7726

effort by government, school management and private individual for sound environmental management and protection policies aimed at controlling the breeding of mosquito and other ecological friendly approach should be adopted. Control strategies should be adopted such as regular cleaning of the environment to get rid of the possible breeding sites of mosquito. The habit of dumping some hollow cans and butters used in the school without proper disposal or covering should be avoided. Occasionally, fumigation of areas associated with human habitation such as the hostel and offices should be adopted as this may even kill most of them at larval stages. Simple containers and old used tyres should be discarded properly or turned upside down to ensure that they accommodate no water. Finally drugs and vaccination against the disease caused by these vectors should be administered to the students especially those living in the hostel. The implementation of these management measures may have a favorable impact on lowering mosquito populations that pose a threat to public health and may even reduce the diseases that these mosquitoes carry.

RFERENCES

1. Burkett-Cadena, N. D., McClure, C. J. W., Ligon, R. A., Graham, S. P., Guyer, C., Hill, G. E., Ditchkoff, S. S., Eubanks, M. D., Hassan, H. K., & Unnasch, T. R. (2011). Host reproductive phenology drives seasonal patterns of host use in mosquitoes. *PloS One*, 6(3), e17681. https://doi.org/10.1371/journal.pone.0017681
2. Chandler, & Real. (1961). *Gille, (1972), Gorden and Lavoipierre, (1979). Mosquito Identification keys*.
3. Ciota, A. T. (2011), Drummond cl, drobnack j, ruby ma and Kramer LD Emergence of CulexPipiens from Overwintering Hibernacula. *Journal of the American Mosquito Control Association*, *27*, 27–29.
4. Dawson, A., Moss, S. R., Hinsly, S. A., & Bellamy, P. E. (2003) Serological evidence of

@2024 International Council for Education Research and Training
ISSN: 2959-1376
2024, Vol. 03, Issue 03, 163-180
DOI: https://doi.org/10.59231/SARI7726

West Nile Virus, Usutu virus and Sindbis virus infection of bird in *UK Journal of General Virology*. Bulker a, *84*, 2807–2817.

5. Gillet, J. D. (1957). *Common African mosquito and their medical competence: Willians*. Heinemann Medical Books Limited.
6. Gillet, J. P. (1975). Mosquito borne disease. A strategy of the future science pregame. *Oxford*, *62*, 395–414.
7. Gillies, Mt., & Gubbins, S. J. (1982). *Culextorrentiun*Martiri and *Culex pipiens* L. in a Southern English country, 1974–1975. *Mosquito Systematics*, *14*, 127–130.
8. Gordin, R. M., & Lavoipiere, M. M. (1979). *Entomology for student of malaria. Fourth printing*. Blackwell Scientific Publications oxford.
9. Snow, & Bookham. (1978). The abilities of AedesAegypti. *UK Journal of General Virology*, *84*, 2807–2828 17.
10. Ugagu, G. M. (2015). *Mosquito of Nekede zoological garden Nekede, Imo State* [Unpublished MSc thesis]. Imo State University.

Received on Apr 12, 2024
Accepted on May 31, 2024
Published on Jul 01, 2024