Biodiversity and relative abundance of Mosquito in Prince Abu bakar Audu University campus of Nigeria

ABSTRACT

This study was focused on the determination of Mosquito diversity and relative abundance in Prince Abubakar Audu University, Anyigba, Kogi State, North Central Nigeria. Mosquitoes were collected for four weeks (4) on a weekly basis indoors at dawn from female hostel of Prince Abubakar Audu University, Anyigba, Kogi State, Nigeria. The spray catch involved the use of insecticide (Mortein), sprayed in the room and after 10 - 15 minutes, adult mosquitoes were collected on a white cloth spread on the floor. Samples were collected from three different blocks (A, B and C) of the study area. They were later placed on a petri-dishes which was labelled according to the blocks they were collected. The samples were later taken to the laboratory, examined with the aid of microscope and identified. The samples were identified clearly based on their visible morphological features up to genera levels using routine methods. The data obtained were analyzed using descriptive statistics making use of SPSS version 20. The resulting outputs were presented in tables. The weekly mosquito genera and relative abundance in block A of the study area showed that the total mosquito genera recorded were Anopheles 72 (40%), Culex 73 (40.6%) and Aedes 35 (19.4%). Mosquito was most abundant in week 4 (31.1%) and least abundant in week 1 (18.9%) in block A of the study area. The weekly mosquito genera and relative abundance in block B of the study area showed that the total mosquito genera recorded were Anopheles 71 (39.7%), Culex 73 (40.8%) and Aedes 35 (19.6%). Mosquito was most abundant in week 4 (30.2%) and least abundant in week 1 (21.2%) in block B of the study area. The weekly mosquito genera and relative abundance in block C of the study area showed that the total mosquito genera recorded were Anopheles 47 (37.6%), Culex 45 (36%) and Aedes 33 (26.4%). Mosquito was most abundant in week 1 (25.6%) and least abundant in week 2 (21.6%) in block C of the study area. The total number of anopheles in the study area were 190 (40.9%), followed by Culex at 181 (39%) and Aedes at 93 (20%). The most abundant mosquito genera was Anopheles and the least Aedes. The number of Anopheles, Culex and Aedes species observed in this study is of grave epidemiological apprehension for the residents of Anyigba, Kogi state Nigeria. Consequently, public health education on mosquito species control are urgently needed.

Keywords: Mosquito, Diversity, Abundance, *Anopheles, Culex, Aedes, Anyigba*

1.INTRODUCTION

Mosquitoes are slender and fairly small insects, typically about 3 - 6 mm in length, nevertheless, a lot of species can be as small as 2 mm while many might be as long as 19 mm [1]. The lengthy antennae have several whorls of hair, short in the females but long and bushy in the males. In a lot of mosquito species, the mouthparts of the female are long, modified for piercing and sucking blood whereas the males feed on nectar as they have basic mouthparts. Females feed on the blood of warm-blooded animals, once they bite, they introduce some of their salivary fluid into the wound, producing swelling and irritation. Many mosquitoes transfer infectious micro-organisms and parasites of diseases such as yellow fever, malaria, dengue and filariasis [2]. There are about 3300 species of mosquitoes belonging to 41 genera, all confined in the family Culicidae [1]. This family is put into three sub-families: Toxorhynchitinae, Anophelinae and Culicinae. Mosquitoes have a global spread; they are seen all over the tropics, temperate zones and extends northward to the Arctic Circle. The single area where they are absent are Antarctica and some islands; they are seen at altitudes of 5500m and at depths of 1250m beneath sea level [1]. The major vector genera are *Anopheles, Culex, Aedes, Ochlerotatus, Psorophora, Haemagogus* and *Sabethes. Anopheles* species transmit malaria and filariasis and a few arbo-viruses whereas many Culex species transfer *Wuchereria bancrofti* and different arbo-viruses. *Aedes* species are vital vectors of yellow fever, dengue, encephalitis viruses and some other arbo-viruses. Species in the very closely related genus Ochlerotatus likewise transmit filariasis and some encephalitis viruses [4]. *Mansonia* species spread *Brugia malayi* and occasionally *Wuchereria bancrofti*, and a few arbo-viruses. *Haemagogus* and *Sabethes* mosquitoes are vectors of yellow fever and a few other arbo-viruses in America, while *Psorophora* contains some difficult pest species in America and transmit a few arbo-viruses [1]. Most species, though not

carriers of some diseases, can nonetheless be troublesome due to the severe biting irritations they cause. Mosquito have come to be recognized by humans predominantly in homes because of their bites which provokes the production of antibodies. It is able to cause sharp-pains with certain allergic tendencies, though they also cause nuisance by causing uneasiness to their hosts as a result of irritating sound they make especially at night [3]. Mosquitoes are extensively spread because of their high adaptability, higher reproductive rate, and wings that make them to travel long distances. Mosquitoes lay their eggs in locations where there are stagnant water [2]. Mosquitoes are malicious biters and their bites create biting nuisance, allergies, skin reactions, scratching, restiveness and wakeful nights [4]. Mosquitoes have continued to be the main vector of killer diseases globally and Nigeria is not an exclusion. Nevertheless, they play a major ecological role as their larvae, pupae and adults are vital food supply for insects, fishes, bats, birds, bats and frogs [5]. Given the epidemiological importance of mosquito species as vectors of a lot of diseases, this study was designed to determine the mosquito diversity and relative abundance in Prince Abubakar Audu University, Anyigba, Kogi State.

2. MATERIALS AND METHODS

2.1 Study Area

Anyigba is a town in Dekina Local Government Area in Kogi State, Nigeria (Figure 1, 2). It is located between latitudes 7^{o}15N – 7^{o}29N and longitude 7^{o}11E-735E with an average altitude of 385 meters above sea level (Figure 1, 2). Anyigba has a total land mass area of 420 Sq^{2}/km with an estimated population of 189,976 person [6]. Anyigba town is characteristized by the wet and dry seasons, the wet season begins in April and ends October while the dry season starts in November and ends in March. Agriculture is the main occupation of the people from this town because they are blessed with vast arable land [7]. Their main agricultural activities include peanuts, millet, rice, cowpeas, cotton and palm oil farming plus livestock such as domestic birds, fowls, cattle and goats.

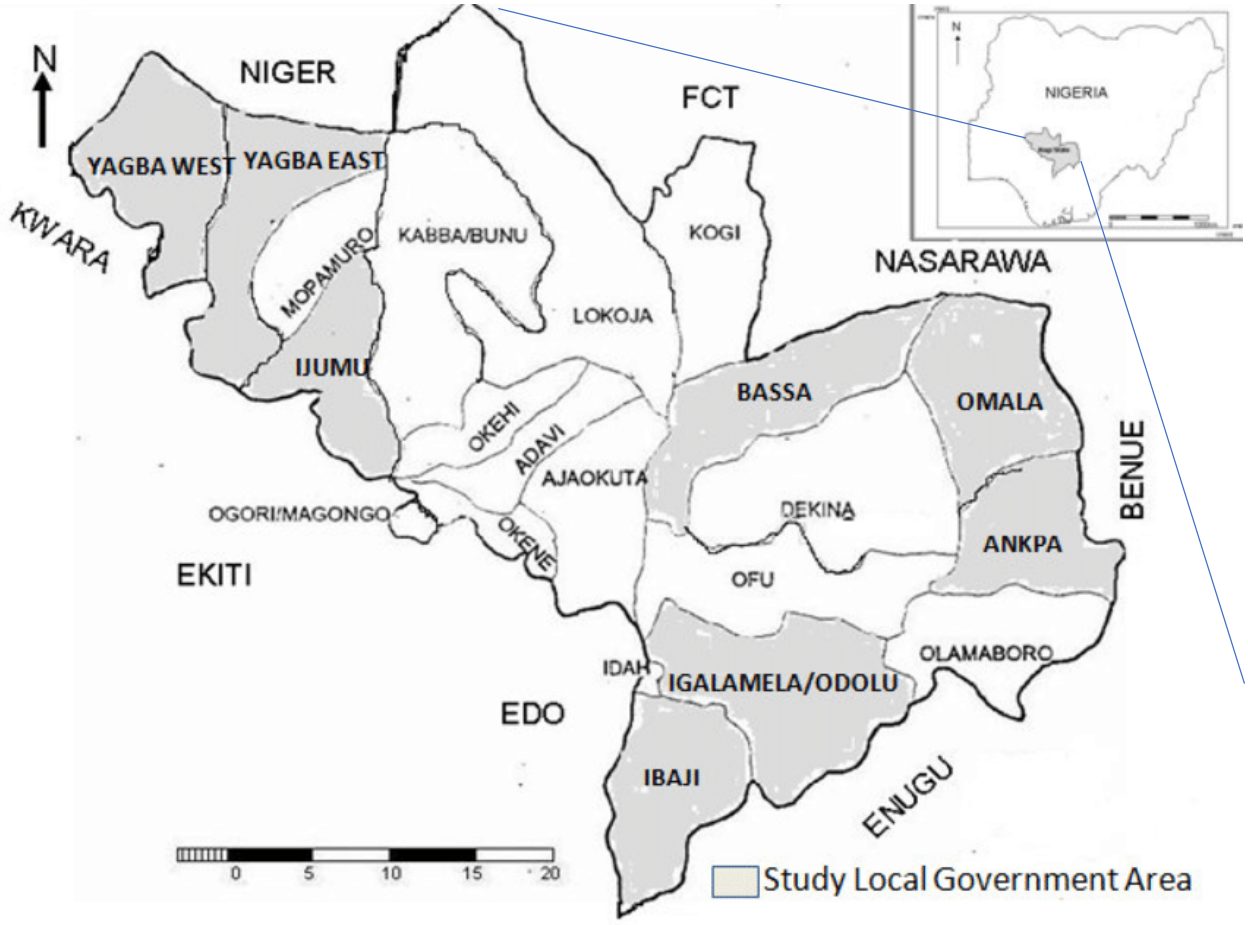

Figure 1: Map of Kogi State, Nigeria

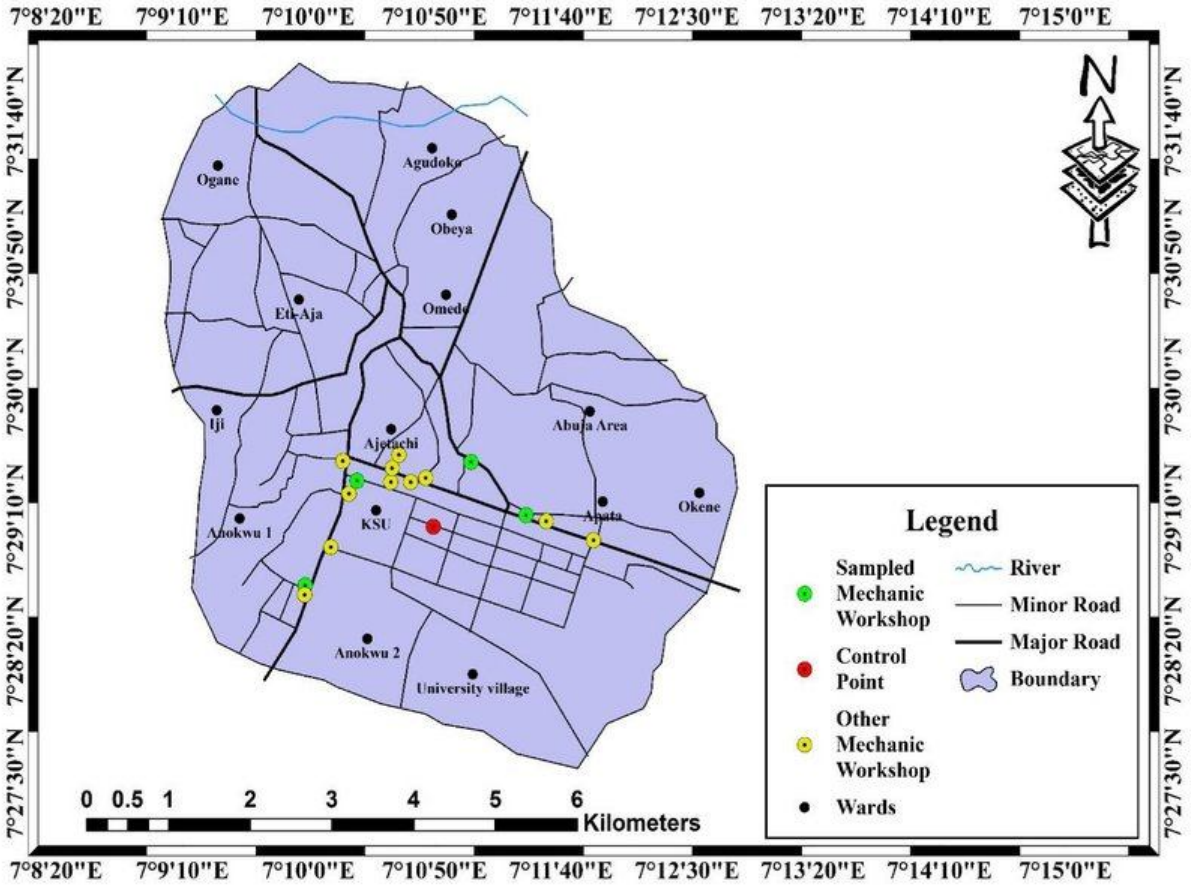

Figure 2: Map of Anyigba, Kogi State

2.2 Mosquito Collection

Mosquitoes were collected for four weeks (4) on a weekly basis indoors at dawn from female hostel of Prince Abubakar Audu University, Anyigba, Kogi State, Nigeria. The spray catch involved the use of insecticide (Mortein), sprayed in the room and after 10 - 15 minutes, adult mosquitoes were collected on a white cloth spread on the floor. Samples were collected from three different blocks (A, B and C) of the study area. They were later placed on a petri dishes which was labelled according to the blocks they were collected. The samples were later taken to

the laboratory, examined with the aid of microscope and identified. The samples were identified clearly based on their visible features of morphology up to genera levels [8].

2.3 Statistical Analysis

The data obtained were pooled together and analyzed via descriptive statistics using SPSS version 20. The resulting output was presented in a tables.

3. RESULT

Table 1 below shows the weekly mosquito diversity and relative abundance in block A of the study area. In week 1, mosquito abundance recorded in this study was 34 (18.9%), the mosquito genera recorded were Anopheles 34, Culex 6 and Aedes 8. Similarly, in week 2, mosquito abundance recorded was 41 (22.8%), the mosquito genera recorded were Anopheles 15, Culex 15 and Aedes 11. Also, for week 3, mosquito abundance recorded was 49 (27.2%), the mosquito genera recorded were Anopheles 19, Culex 24 and Aedes 6 (Table 1). Finally, for week 4, mosquito abundance recorded was 56 (31.1%), the mosquito genera recorded were Anopheles 18, Culex 28 and Aedes 10. Mosquito was most abundant in week 4 (31.1%) and least abundant in week 1 (18.9%) in block A of the study area. Overall in block A, the mosquito genera recorded were Anopheles 72 (40%), Culex 73 (40.6%) and Aedes 35 (19.4%).

Table 1: Weekly diversity and relative abundance of mosquito in block A

Weeks	*Anopheles*	*Culex*	*Aedes*	Abundance	% Abundance
Week 1	20	6	8	34	18.9
Week 2	15	15	11	41	22.8
Week 3	19	24	6	49	27.2
Week 4	18	28	10	56	31.1
Total	72	73	35	180	100
% species	**40%**	**40.6%**	**19.4%**	**-**	**-**

Table 2 below shows the weekly mosquito genera and relative abundance in block B of the study area. In week 1, mosquito abundance recorded in this study was 38 (21.2%), the mosquito genera recorded were Anopheles 16, Culex 20 and Aedes 2. Similarly, in week 2, mosquito abundance recorded was 45 (25.1%), the mosquito genera recorded were Anopheles 20, Culex 18 and Aedes 7. Also, for week 3, mosquito abundance recorded was 42 (23.5%), the mosquito genera recorded were Anopheles 20, Culex 15 and Aedes 7. Finally, for week 4, mosquito abundance recorded in this study was 54 (30.2%), the mosquito genera recorded were Anopheles 15, Culex 20 and Aedes 19 (Table 2). Mosquito was most abundant in week 4 (30.2%) and least abundant in week 1 (21.2%) in block B of the study area. Overall in block B, the mosquito genera recorded were Anopheles 71 (39.7%), Culex 73 (40.8%) and Aedes 35 (19.6%).

Table 2: Weekly mosquito diversity and relative abundance in block B

Weeks	Anopheles	Culex	Aedes	Abundance	% Abundance
Week 1	16	20	2	38	21.2
Week 2	20	18	7	45	25.1
Week 3	20	15	7	42	23.5
Week 4	15	20	19	54	30.2
Total	71	73	35	179	100
% species	**39.7%**	**40.8%**	**19.6%**	**-**	**-**

Table 3 below shows the weekly mosquito diversity and relative abundance in block C of the study area. In week 1, mosquito abundance recorded in this block was 32 (25.6%), the mosquito genera recorded were Anopheles 10, Culex 16 and Aedes 6. Similarly, in week 2, mosquito abundance recorded was 27 (21.6%), the mosquito genera recorded were Anopheles 12, Culex 10 and Aedes 5. Also, for week 3, mosquito abundance recorded in this study was 35 (28.0%), the mosquito genera recorded were Anopheles 15, Culex 10 and Aedes 10. Finally, for week 4, mosquito abundance recorded was 31 (24.8%), the mosquito genera recorded were Anopheles 10, Culex 9 and Aedes 12 (Table 3). Mosquito was most abundant in week 1 (25.6%) and least abundant in week 2 (21.6%) in block C of the study area. Overall in block C, the mosquito genera recorded were Anopheles 47 (37.6%), Culex 45 (36%) and Aedes 33 (26.4%).

Table 3: Weekly mosquito diversity and relative abundance in block C

Weeks	*Anopheles*	*Culex*	*Aedes*	Abundance	% Abundance
Week 1	10	16	6	32	25.6
Week 2	12	10	5	27	21.6
Week 3	15	10	10	35	28
Week 4	10	9	12	31	24.8
Total	47	45	33	125	100
% species	**37.6%**	**36%**	**26.4%**	**-**	**-**

Table 4 below shows the abundance and distribution of Mosquito genera in the study area. From the study 73 Culex, 72 Anopheles and 35 Aedes were recorded in block A. This implied that

Culex species are the most common in block A of the study Area. The table also revealed that 71 Anopheles, 63 Culex and 25 Aedes were found in block B. This indicated that Anopheles genera is the most common in Site B of the study Area. Finally, in block C, anopheles were 47, closely followed by Culex at 45 and Aedes at 33. The total number of anopheles in the study area were 190 (40.9%), followed by Culex at 181 (39%) and Aedes at 93 (20%). The most abundant mosquito genera was Anopheles and the least was Aedes.

Table 4: Abundance and Distribution of Mosquito genera in the different blocks of study area

Mosquito Genera	**Mosquito abundance**				**Percentage Abundance**
	Block A	**Block B**	**Block C**	**Total Abundance**	
Anopheles	72	71	47	190	40.9%
Culex	73	63	45	181	39.0%
Aedes	35	25	33	93	20.0%
Total Distribution	180	159	125	464	100.0%
Percentage Distribution	38.8%	34.3%	26.9%	-	-

4. DISCUSSIONS

This study discovered three genera of mosquito in the study area. In general, it was observed that for block A of the study area, the mosquito genera recorded were Anopheles 72 (40%), Culex 73 (40.6%) and Aedes 35 (19.4%). Mosquito was most abundant in week 4 (31.1%) and least abundant in week 1 (18.9%) in block A of the study area. Anopheles was the most abundant genera whereas Aedes was the least. Overall in block B, the mosquito genera recorded were Anopheles 71 (39.7%), Culex 73 (40.8%) and Aedes 35 (19.6%). Mosquito was most abundant in week 4 (30.2%) and least abundant in week 1 (21.2%) in block B of the study area. Overall in block C, the mosquito genera recorded were Anopheles 47 (37.6%), Culex 45 (36%) and Aedes 33 (26.4%). Mosquito was most abundant in week 1 (25.6%) and least abundant in week 2 (21.6%) in block C of the study area. The total number of anopheles in the study area were 190 (40.9%), followed by Culex at 181 (39%) and Aedes at 93 (20%). The most

abundant mosquito genera was Anopheles and the least Aedes. These findings are comparable to those reported by a lot investigators from many areas in Nigeria [9, 10, 11]. The high abundance of different mosquito's genera could be due to the high anthropogenic actions associated to school where there are many peridomestic things like cans and plastics [12, 13]. These may assist as habitats for breeding mosquitoes particularly in raining season, which favored Anopheles most in this study. Blocks with relatively lower abundance may be due proper sanitation and drainage system. These reason may have contributed to lower abundance of mosquito gotten in some blocks of the study area [14, 15]. The differences in social events within the blocks of the study areas may have boosted or reduced the breeding of mosquito [16, 12]. Therefore, blocks with elevated anthropogenic events might have greater mosquito's abundance whereas blocks with reduced anthropogenic events might have reduced mosquito abundance [16].

5. CONCLUSIONS

The three mosquito genera: *Anopheles, Culex, and Aede*s were observed in abundance at Prince Abubakar Audu University Anyigba, Kogi State, Nigeria. These are recognized vectors of parasites which aid the transmission of diseases like malaria, filariasis and yellow fever which have high mortality rate when unchecked. Therefore, a workable community health enlightenment on vector control should be used in the University to control these vectors.

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