

## SPECIES COMPOSITION AND SEASONAL ABUNDANCE OF MOSQUITO VECTORS IN A RICE GROWING COMMUNITY IN KWARA STATE, NORTH CENTRAL, NIGERIA

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**ABSTRACT:** Studies were carried out to determine the species composition and seasonal abundance of mosquito fauna in Lafiagi, a swampy rice growing community in Kwara State, Nigeria. Adult mosquitoes were collected weekly by both indoor and outdoor methods using human landing catches and residual spray techniques between August 2009 and July 2010. Four species of mosquitoes namely, *Anopheles gambiae sensu lato*, *Culex quinquefasciatus*, *Mansonia africana* and *Aedes aegypti* were caught during the study. *Anopheles gambiae* s.l accounted for the highest number of mosquitoes caught (39.61%). Though, there was no significant difference in species abundance ( $p > 0.05$ ), the seasonal abundance showed significant variation with more mosquitoes during the wet season than the dry season. The preponderance of the mosquito vectors (most importantly the malaria vector) in the community signifies the need for planning effective mosquito control measures to maintain the healthy living of the residents at the study area towards ensuring food security.

**KEY WORDS:** mosquitoes, seasonal abundance, rice growing community, Nigeria.

Mosquitoes are important vectors of most deadly and life threatening diseases such as malaria, lymphatic filariasis, yellow fever and many others (Lindsay et al. 1998; Mbanugo & Okpalaonuju, 2003). Malaria and other mosquito-borne diseases still remain the challenging public health problems in Africa. The continued transmission of the mosquito borne-diseases was perhaps due to the vast larval habitats available for mosquito vectors which ensure prolific and continuous breeding of the vectors (Amusan et al., 2003).

Food security constitutes one of the cardinal programmes of Kwara State Government, and the programme has been receiving boost from both Government and International organizations. Lifiagi is a major rice growing community in Kwara state with swampy areas. Mutero et al. (2000) reported that the swampy areas are conducive for the cultivation of rice and sugar canes. Previous study in Southwestern Nigeria indicated that the swampy environment in Mokoloki (a rice growing area) usually support the breeding of different species of mosquito vectors (Amusan et al., 2005). It however, becomes imperative to investigate the impact of the rice cultivation on species composition and seasonal abundance of mosquito fauna in Lafiagi and its environs with the underlying aim of planning effective mosquito control strategies and ensuring healthy leaving of the rice-growing farmers towards realization of the food security.

### MATERIALS AND METHODS

#### Study area

Lifiagi is the headquarters of the Edun Local Government Council in Kwara State. It is located on the South bank of the Niger River with a population of about

30,976 inhabitants. The town serves as production point for rice, sugar cane and many other farm produce due to the flooding plane of the area. For research convenience, the town was divided into three zones namely;

- i. The College of Education (Technical) campus/Tsodo/Gbugbu zone.
- ii. Taiwo area/Egua river area/ Likpata zone, and
- iii. Abiola farm area/Bindofu area zone.

Each of the zones covers an area of about 8 kilometers. Each area also has an expanse of land for swampy rice and sugar cane cultivation. Ten houses were however selected in each zone.

#### **Sampling of mosquito fauna**

Adult mosquitoes were collected once per week indoor between 5:30hr and 7:00 hr and at night between 20:00hr and 22:00hr in each of the selected houses using human landing collectors and insecticide spray technique. Mosquitoes from the knock down effect were collected, kept in paper cups and labeled accordingly. The collection was carried out for twelve (12) months between August 2009 and July 2010. All adult mosquitoes collected were identified using the keys described by Gillet (1972).

#### **Statistical analysis**

The data were subjected to chi-square using SPSS version 17.0

### **RESULTS AND DISCUSSION**

A total of 9,910 and four species of mosquitoes namely *Anopheles gambiae* complex, *Culex quinquefasciatus*, *Mansonia africana* and *Aedes aegypti* were collected during the study. There was a preponderance of *An. gambiae* complex (39.61%) over other four species, even though the difference was not significant ( $p > 0.05$ ) (Table 1). The dominance of *An. gambiae* complex may be due to the fact that the species thrives in shallow pools in rice fields during tilling, transplanting and growing period of rice plant (Dolo et al., 1997; Mutero et al., 2000; Klinkenberg et al., 2003). The appreciable number of *A. aegypti* (29.78 %) may also be due to its indiscriminate breeding habit (Mafiana et al., 1998; Adeleke et al., 2008).

However, there was significant difference in the population of the mosquitoes collected with higher abundance during the wet season. The highest peak of mosquito abundance was recorded in the month of August (*Anopheles* spp., 502; *Culex* spp. 205; *Mansonia* spp. 101 and *Aedes* spp. 401) followed by September and October (Table 2). Earlier studies have shown that the population of mosquitoes has positive correlation with rainfall, and wet season usually creates avalanche of breeding sites conducive for mosquito breeding and survival (Amusan et al., 2005; Adeleke et al., 2010). The tilling of the land for rice cultivation usually creates shallow pools that retain sufficient amount of water during rainfall (Klinkenberg et al., 2003).

It should be stressed that all the four species of mosquitoes collected in the present study are known vectors of deadly and life threatening diseases. *An. gambiae* complex is an efficient transmitter of malaria and filariasis in Africa (Gillet, 1972; Adeleke et al., 2013). Its dominance at the study area signifies that the residents at the study area are at high risk of malaria and bancroftian filariasis coupled with the abundance of *Cx. quinquefasciatus* and *M. africana* which are known as transmitters of filariasis. The entrant of *A. aegypti* in the transmission of bancroftian filariasis aside arboviruses which is known for gave impetus for the urgent surveillance of malaria and bancroftian filariasis in the study communities. Neglect of these community can in-turn impede productivity and life span of the

residents and causes food shortage in the area and in Kwara State in general. Therefore, efforts should be made by all stakeholders for the utilization of all available strategies to stem the man-mosquito contact in the area.

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Table 1. Abundance of Mosquito Species collected at Lafagi during the study.

Mosquito species	No of adult collected	% Occurrence
<i>Anopheles gambiae</i> complex	3925	39.61
<i>Culex quiquefascitans</i>	1694	17.09
<i>Mansonia africana</i>	1340	13.52
<i>Aedes aegypti</i>	2951	29.78
Total	9910	100.0

Table 2. Monthly Seasonal Abundance of Mosquito Species in the study area between August 2009 and July 2010.

Mosquito sp	AUG	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MARCH.	APRIL	MAY	JUN.	JULY	TOTAL
<i>An. gambiae complex</i> Gambiae	502	603	742	580	331	46	50	101	111	115	324	420	3925
<i>Culex quiquefas citans</i>	205	258	310	215	180	08	20	50	58	66	134	190	1694
<i>Mansonia africana</i>	101	210	243	281	115	06	14	45	49	54	102	120	1340
<i>Aedes aegypti</i>	401	480	550	490	311	08	18	35	60	71	228	299	251
Total	1209	1551	1845	1566	937	68	102	231	278	306	788	1029	9910