

The maxillary palps of *Culex* are clubbed shaped and are shorter than its proboscis while that of *Anopheles* were as long as its proboscis and pointed.

Sex differentiation

Male mosquitoes have plumose or feathery antennae while females have none. Engorged female *Anopheles* were selected by observation of the protruded abdomen. These were those that have already received a blood meal.

Statistical analysis

Chi square χ^2 was used to determine differences between species set at 5% level of significance.

Dissection of mosquitoes

The engorged females were dissected transversely between the first and third pairs of legs under the dissecting microscope. This severed the head and thorax from the abdomen.

Malariometric Indices

Human host preference

The abdomens severed were placed in flat bottomed Enzyme Linked Immunosorbent Assay (ELISA) plates and grinded to release the bloodmeal for analysis, this is to detect the source of the bloodmeal, whether human or not. Direct ELISA was used based on the procedure of Beier et al [8]. Anti peroxidase conjugate (anti human IgG) was used to identify human blood meal. A total of 29 bloodmeals were assayed.

Negative controls were triturated male mosquitoes. Samples were considered positive 30 minutes later when colour changes to green (visually) before the addition of substrate ABTS (2,2-azino-diol-3-ethyl benzothiazoline). The samples were read with a Labystem Mulkiens multisoft type Elisa reader for confirmation.

Sporozoite detection

The corresponding heads and thoraxes were separately triturated in specimen bottles containing 50 μ l grinding buffer. Sandwich ELISA was used for *Plasmodium falciparum* detection based on the method of Wirtz et al. [1]. Pf 2A10 monoclonal antibody and peroxidase conjugated antibody were used with the triturates added in between.

This assay was carried out in U-shaped ELISA plates [9] Male mosquitoes were used as negative control. Samples were considered positive 60 minutes later when colour changes to green (visually) before the addition of substrate ABTS. The samples were read with a Labystem Mulkiens multisoft type Elisa reader for confirmation.

Results

Abundance and distribution of the outdoor caught mosquitoes

A total of 264 mosquitoes were caught outdoors. 211 (80%) were *Anopheles* while 53 (20%) were *Culex*. This was statistically significant $P < 0.05$. 175 (82.5%) of the *Anopheles* were female while 36 (17%) were males. This was statistically significant $P < 0.05$. Seven (13.2%) of the

Culex were male while 46 (86%) were females. This was statistically significant $P < 0.05$ (Table 1).

Month	Anopheles		Total N (%)	Culex		Total N (%)	Overall total N (%)
	Male N (%)	Female N (%)		Male N (%)	Female N (%)		
February	7 (19)	10 (5.7)	17 (8.0)	1 (14.2)	8 (17.3)	9 (17)	26 (21.8)
March	5 (14)	30 (17.1)	35 (16.5)	1 (14.2)	12 (26)	13 (24.5)	48 (18.1)
April	6 (16.6)	30 (17.1)	36 (17)	2 (28.5)	11 (24)	13 (24.5)	49 (18.5)
May	6 (16.6)	42 (24)	48 (22.7)	1 (14.2)	9 (9.5)	10 (18.8)	58 (21.9)
June	12 (33.3)	63 (36)	75 (30%)				

Sporozoite detection

5 out of 29 engorged *Anopheles* female tested positive. The sporozoite rate is 17.2%.

Discussion

To complete their gonotrophic cycle, female mosquitoes require a second blood meal one day after the first to mature the first egg batch. Bites are taken at night between 18hrs to 6hrs. Mosquitoes that have fed outdoors do go in for more blood meals. In this study mosquitoes were caught outdoors while trying to bite. Such mosquitoes could find their way inside the houses in the absence of human baits. There has been an increased number of infected mosquitoes in nature of which many are exophilic [10]. Behaviour and ecological determinants to which mosquito respond is of great interest to vector control. Diverse epidemiological situations have to be taken into account to control mosquitoes [11]. Malaria vector control in Africa has been mainly based on use of Insecticide treated nets and indoor residual spraying but control of mosquitoes and breeding sites outside homes is equally important and advocated.

References

1. Wirtz R, Zavalla F, Charoenut Y, Burkot TR (1987) Comparative testing of Mabs against *P.falciparum* sporozoite. *Am JTrop Med* 36: 459-468

2. Cup cake (ed) (2009) Polar animals' dictionary: an A-Z of polar creatures