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A study of mosquito fauna of Amin Khel district Karak, Khyber Pakhtunkhwa, Pakistan

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Abstract
A research plan was conducted to determine the mosquito fauna of District Amin Khel District Karak during 2013 to 2016. The mosquito species collected and identified belongs to one Class Insecta; one Order Diptera; one Family Culicidae; three genera Culex, Anopheles and Aedes; five species respectively. The five species were *Culex quinquefasciatus, C. theileri, Anopheles maculates, A. annularis* and *Aedes albopictus respectively.*
The results revealed that Genus Culex and Anopheles comprising two species each, while the Genus Aedes consisting only one specie. The present results might be helpful in devising pest management techniques against the mosquito species of Amin Khel District Karak.

Keywords: Amin Khel, mosquito, fauna, identification, family, vector, malaria

1. Introduction
Mosquitoes are wide spread and diversified group of insects. More than 3500 species of mosquitoes belonging to 42 genera have been recorded under three subfamilies, Anophelinae, Culicinae and Toxorhynchites [1]. They are prominent blood suckers that annoying, mammals, birds, reptiles, amphibians and fishes. Mosquitoes biting human blood feeding habits and ability to transmit pathogens causing fatal diseases including filariasis, malaria, dengue fever etc. [2]. Biodiversity of mosquitoes is an important aspect of medical science and is destined to emerge as a new significant and integral aspect of human life. Among the insects, mosquitoes are most important since they are related to health and survival of man. The diversity of mosquito species varies among different geographical regions of the world. Mosquito biodiversity has been studied by several researchers, where they identified and classified different species of mosquitoes [3-6]. In recent years, the distribution range of both mosquitoes and mosquito borne diseases are proliferating in large number everywhere due to rapid urbanization, excessive deforestation and resistance among mosquitoes to insecticides [7]. Despite several attempts have been made to control them, these remarkably adapted insects continue to coexist with man, feeding on humans and animals [8]. According to Harbache (2013) [9], a total of 3539 species of mosquitoes belonging to 112 genera have been recorded. In general, mosquitoes stand out most among the numerous species of blood sucking arthropods that co-exist with human. Most of these species act as vectors of different pathogens that cause malaria, dengue fever, yellow fever, lymphatic filariasis, Japanese encephalitis and other serious disease to humans [10]. The present study was aimed to find out the mosquito Fauna of Amin Khel District Karak, Khyber Pakhtunkhwa, Pakistan.

2. Materials and Methods
Study Area
Amin Khel Area is situated in District Karak Khyber Pakhtunkhwa Pakistan. This zone is rich of green trees and fields. Majority part of this area is sandy and loamy soil. This area is naturally productive. Here a variety of vertebrates and invertebrates exist. This part of the study area is popular for its natural beauty. Plenty of water is present, which is used for drinking and irrigation as well. Summer season remains very hot, especially in the months of June and July. Most part of the area is plain.

Fig 1: Map of Amin Khel sampling site of District Karak KP, Pakistan.

2.1 Mosquito collection and identification

Mosquitoes were collected from the selected site during different seasons from March 2013 to February 2016. The catching of adult and larval mosquitoes was carried out according to standard entomological surveillance guidelines [11-12]. While entering in the house purpose of the investigation was explained to the head of each of the households selected. Collected adults and larval forms of mosquitoes were brought to the laboratory. The larvae were reared up to emerge. All the adult mosquitoes were identified using standard identification keys of each genus [13, 14].

3. Results and Discussion

A total of five species of mosquito were collected from Amin Khel District Karak Khyber Pakhtunkhwa, Pakistan. Duration of the study was 3 years i.e. March 2013 to February 2016. All the identified species of the mosquitoes were properly arranged into a systematic position. The mosquito species collected and identified belongs to one Class Insecta; one Order Diptera; one Family Culicidae; three genera Culex, Anopheles and Aedes; five species respectively. The five species were *Culex quinquefasciatus, C. theileri, Anopheles maculates, A. annularis and Aedes albopictus* respectively. A research study was conducted by Khan *et al.* in (2015), conducted survey to determine the species composition, relative abundance and seasonal variation of mosquito fauna of District Upper Dir in 2014. The mosquito species recorded were *Culex quinquefasciatus, Culex mimeticus, Culex theileri, Anopheles maculates, Anopheles stephensi, Anopheles annularis, Aedes albopictus, Aedes shortii and Culiseta longiareolata* respectively [15]. In the present study conducted on Amin Khel District Karak, some species were found matching with the previous work. The results of both the study reviled that these both area having some common climatic factors due to which some species were found common in the both study area after comparison. Another study was conducted by Ali *et al*. (2013) on Swat Ranizai Sub Division of Malakand and recorded fifteen species of mosquitoes belonging to five genera*; Culex, Anopheles, Aedes, Culiseta and Armigeres were identified. The species were Cx. Quinquefasciatus* Say (79.43%), *Cx. Tritaeniorhynchus* Giles (4.43%), *Cx. Tritaeniorhynchus* Giles (0.59%), *Cx. theileri* Theobald (2.14%), *Cx. Mimecticus* Noe (2.14%), *Cx. Vishnui* Theo bald (0.22%), *An. Stephensi* Liston (6.22%), *An. Fluviatilis* James (0.39%), *An. Maculates* Theobald (1.34%), *An. Culicifacies* Giles (0.32%), *An. Subpictus* Grassi (0.17%), *An. Lindesayi* Giles (0.02%), *Ae. Vittatus* Bigot (3.93%), *Cu. Longiareolata* Macquart (0.59%) and *Ar. Subalbatus* Coquillett (0.04%). *Cx. Quinquefasciatus* (79.4%) and *An. Stephensi*(6.2%) were the dominant and constant species, regarding relative abundance and distribution recorded in most of the months and from the majority of the habitats [16]. In the present study conducted in Amin Khel only five species of the mosquitoes were recorded shown in Table.1 which show a great variation after comparison both area results.

There was no published data available on the mosquito fauna of Amin Khel District Karak. The present research was the first of its kind to investigate the mosquito fauna of the study area.

Table 1: Mosquitoes fauna in Amin Khel District Karak Khyber Pakhtunkhwa Pakistan.

S. No	Class	Order	Family	Genus	Species
1	Insecta	Diptera	Culicidae	*Culex*	*Quinquefasciatus*
3	Insecta	Diptera	Culicidae		*Theileri*
4	Insecta	Diptera	Culicidae	*Anopheles*	*Maculatus*
6	Insecta	Diptera	Culicidae		*Annularis*
7	Insecta	Diptera	Culicidae	*Aedes*	*Albopictus*
Total	01	01	01	03	05

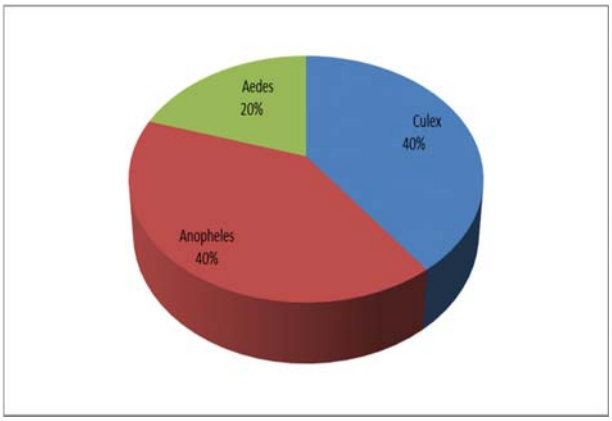

Fig 1: Genus wise percentage of mosquito fauna in Amin Khel KP, Pakistan.

4. Conclusion

From the current study it was concluded that this site is suitable for fish fauna. Furthermore, maximum fauna of the mosquito was collected from damp soil, standing water and tires filled with water. In the tires and standing eggs of the mosquito were found during the survey in Amin Khel site of District Karak.

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