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INSECT FAUNA OF DISTRICT BATTAGRAM KHYBER PAKHTUNKHWA USING MALAISE TRAPPING SYSTEM

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Abstract- As the largest animal category, insects are collected using a number of sampling techniques. Among several methods of sampling for the collection of various insect groups, sweep nets, light traps, pitfall traps, Winkler sampling, and malaise traps are common and very effective. Coleoptera is the largest order of class insecta and have more than 400,000 known species. The most popular nonattractant, static insect traps are Malaise trap, which are big, tent-like structure made of fine mesh netting. District Battagram were selected for the installation of Malaise trap. Malaise trap were installed in five different sites (Biland kot, Kuza banda, Meran, Pirhari, Ajmera) for five months (4 April 2022 to 29 August 2022). Total 192 samples were trapped of Order Coleoptera which were further identified to seven families and to 12 genera. Out og these families, the family Scarabaeidae were founded with the highest number of specimens and the family Carabidae, family Chrysomelindae and family Coccinellidae were founded with the lowest number of specimens.

Index Terms- Animal, Coleoptera, Diversity, Insects, Malaise trap,

INTRODUCTION

The most populous taxon in the animal kingdom are insects [1]. As the largest animal category, insects are collected using a number of sampling techniques. Among several methods of sampling for the collection of various insect groups, sweep nets, light traps, pitfall traps, Winkler sampling, and malaise traps are common and very effective [2]. There are around 7,51000 recognized species of insects on the universe, which is almost one-fourth of all animal species [3]. The Coleoptera, which comprises 3,87,100 species and represents for about 38% of all insect orders, which is the most effective one [4, 5].

MALAISE TRAP

The most popular, static insect traps are Malaise trap, which are big, tent-like structure made of fine mesh netting. Rene Malaise invented them when he observed insects in a tent that provided the first inactive method for observing and gathering a large number of flies. Several bug species will climb up when they encounter a barrier, which is advantageous for Malaise trap. The mesh walls of the traps stop flying insects, particularly Diptera and Hymenoptera, although they also catch a variety of ground-dwelling species [6, 7]. Malaise traps can be set up everywhere there are likely to be flying insects, such as woodlands, open grasslands, prairies, and windy summits, but care must be taken to secure them in the event of strong winds. The placement of the traps has an impact on the biodiversity collection [8]. The traps can be used for general gathering, biodiversity surveys, and research into the migration of insects, and both nocturnal and diurnal patterns of abundance, as well as vertical stratification. The species that are gathered are affected by numerous variables. Abiotic variables like the weather and season can have a variety of consequences on the behavior of the target taxa and the species that are trapped. The species that are trapped will depend on the design, placement, and orientation of the trap as well as the addition of various lures. The kind and amount of plants nearby as well as species-specific behavior are biological factors that affect trap catch. Taxon-specific factors determine whether Malaise traps are superior or inferior to other trap types in terms of their ability to trap specific groups. Because they have the least taxon overlap with Malaise traps, pitfall traps and leaf litter extraction are good choices to couple with Malaise traps to enhance the amount of arthropod diversity tested while putting out the least amount of effort. Yet, there are certain drawbacks to using malaise traps. Commercially available traps cost a lot of money and are easily damaged by large mammals like bears or by high winds. Also, because Malaise traps frequently gather enormous quantities of arthropods, there may be concerns about the trapped and demise of non-target by catch [9].

MATERIALS AND METHODS

STUDY SITE

District Battagram were selected for the installation of Malaise trap. Battagram is situated in the western part of Khyber Pakhtunkhwa, Pakistan, with a total surface area of 1301 square kilometres, between 34° 33 and 34° 47° N and 72° 54 and 73° 15° E [10]. Mansehra district, Kohistan district, district of Torghar, and Shangla district are its borders on the east, north,

south, and west, respectively. The Battagram district has a population of 476,612 as per the 2017 Census. Green, luscious mountains may be found at Battagram. At Thakot and Sukaisar, the altitude is above 4690 m, respectively, with an altitude of 525 m. A variety of climatic conditions exist, ranging from subtropical to "alpine" climates. There are many agricultural fields, wastelands, forests, and meadows in Battagram [10]. Agriculture is the most common form of living for most people, which is followed by the farming of animals. They grow wheat, red beans, vegetables, rice, corn and rice [11].

MALAISE TRAP DESIGN AND SETUP

Four wooden rods were burried in the ground in a square shape at a distance of 4 feets from each other. All the rods were covered with black cloth by three sides and one side was left opened. Black cloth attracts insects more than other cloths, so it is important to use black cloth in the trap. While the upper part of the trap were covered with white net like cloth. The four rods connect with each other by four wooden rods at the upper portion. A wooden rod turned into a cone structure and a bottle was attached to the cone and this bottle contained ethanol. Insects used to fly on the trap. Insects kept falling in the ethanol filled bottle when they move upward. All the insects were collected through this trap.

SAMPLING, PRESERVATION AND IDENTIFICATION

Forceps were used to remove all of the insect samples from the Malaise trap, and they were stored in small bottles. The trapped specimens were kept in 70% ethanol in small bottls. The trapped samples were kept in 70% ethanol in small bottles. The same species of insects were preserved in same one bottle. All the bottles were labelled with Order name, date and locations. The bottles were labelled with order name, date and locality. The specimens were further stored in fridge at 21°C in the Zoological Laboratory of Hazara University Mansehra. The trapped samples were first identified with the help of microscope. Up to Order levels in the Zoological Museum of Hazara University Mansehra. Up to species level, the specimens were identified in National Insect Museum (NIM) in National Agriculture Research Center (NARC) Islamabad.

RESULTS

During the current study Malaise trap were used for the insect diversity in the District Battagram. A total of 459 insects were trapped and classified into 5 Orders, 16 Families, 26 Genera, and 35 Species.

ORDER WISE EFFECTIVENESS OF TRAPPED INSECTS

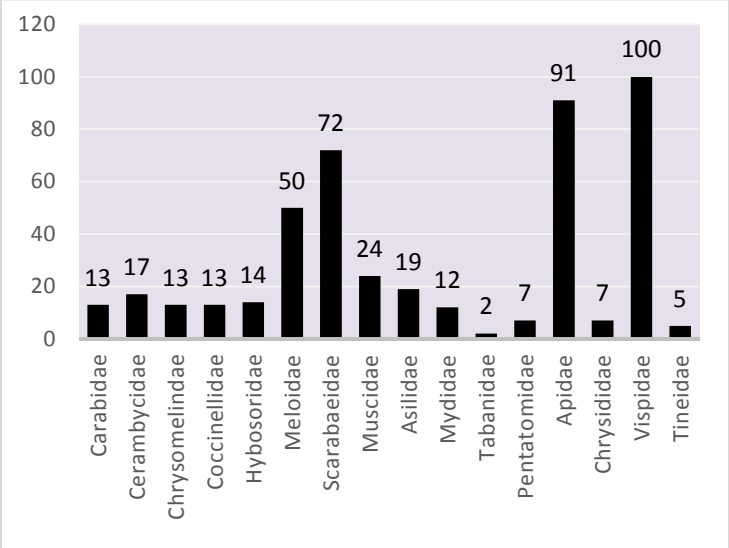
A total of 459 specimens were trapped by using Malaise trap representing to five Orders. These orders are Coleoptera, Diptera, Hemiptera, Hymenoptera and Lepidoptera. Order Hemiptera and Lepidoptera were recorded with lowest number of specimens while Order Hymenoptera recorded with highest number of specimens.

Graphical representation of Order wise effectiveness

Order Wise Richness

FAMILY WISE EFFECTIVENESS OF TRAPPED INSECTS

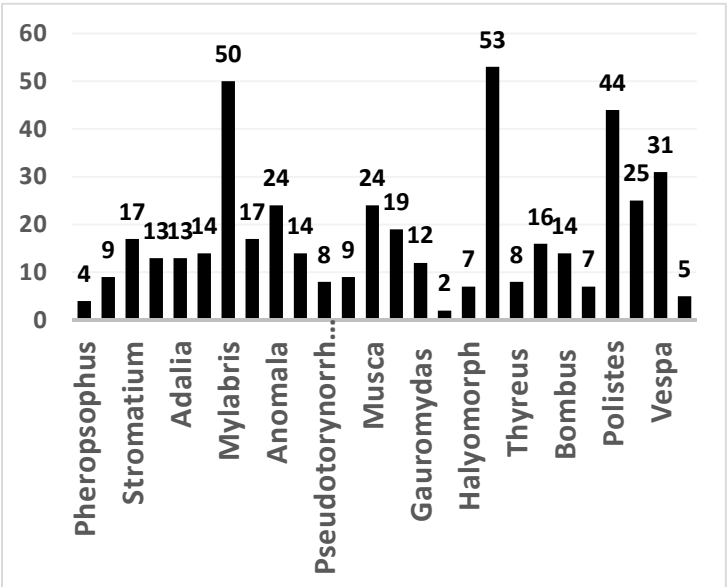
A total of 459 specimens were trapped by using Malaise trap representing to 16 various families. These families are Cerambycidae, Carabidae, Coccinellidae, Hybosoridae, Chrysomelidae, Muscidae, Scarabaeidae, Meloidae, Pentatomoidae, Apidae, Asilidae, Chrysididae Mydidae, Vespidae, Tineidea and Tabanidae. Among all Family Vespidae reported with highest number of specimens and the family Tabanidae was reported with lowest number of specimens.



Family wise richness

GENERA WISE EFFECTIVENESS OF TRAPPED SPECIMENS

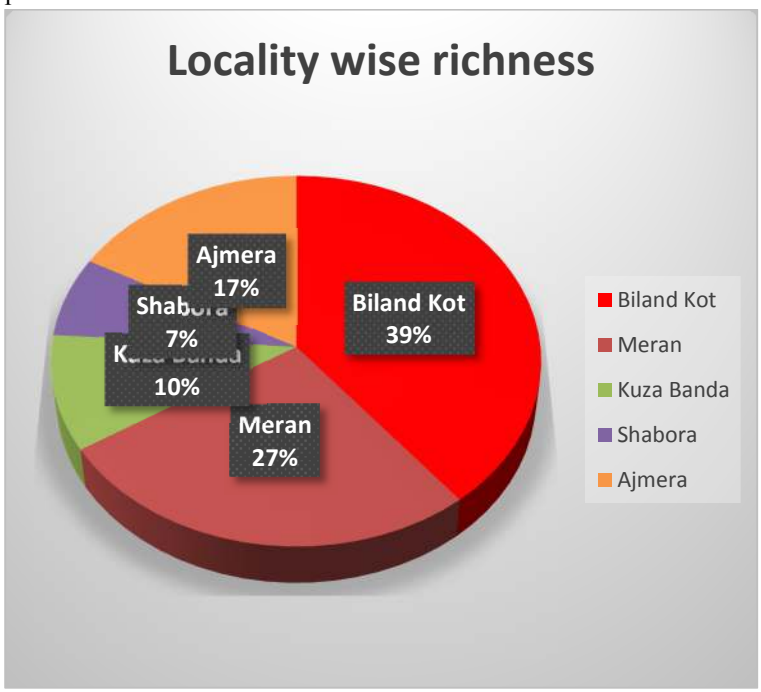
The trapped specimens represent to 26 Genera. The following genera are listed: Genus Pheropsophus, Genus Scarities, Genus Stromatium, Genus Calligrapha, Genus Adalia, Genus Hybosorus, Genus Mylabris, Genus Anomala, Genus Copris, Genus Pseudotorynorrhina, Genus Gymentis, Genus Musca, Genus Philoliche, Genus Philonicus, Genus Gauromydas, Genus Polistes, Genus Polistini, Genus Vespa, Genus Apis, Genus Tineola, Genus Primeuchroeus, Genus Halyomorph, Genus Cyphochilus, Genus Thyreus, Genus Xylocopa, and Genus Bombus Genus Philoliche has the least number of specimens



among these Genera, whereas Genus Apis had the most number of specimens.

LOCALITY WISE EFFECTIVENESS OF TRAPPED SPECIMENS

The Malaise trap were installed in selected localities of District Battagram i.e, (Biland kot, Meran, Kuza banda , Shabora and Ajmera). Biland kot were found richer in the insect diversity through Malaise trap. The coordinates of the selected localities is presented in the table below.



Locality wise richness

CONCLUSION

- The recent reserach on "Biodiversity of insect fauna at selected localities of district Battagram through Malaise Trapping System" has been conducted for the first time in District Battagram from 4 April 2022 to 29 August 2022.
- It is concluded that the District Battagram has very large scale of insect fauna (Biodiversity).
- A total of 459 specimens were trapped through Malaise trapping system from 5 locations, and they were identified into 5 Orders 16 families 26 genera and 35 species.
- All species are new to study area while 1 species i.e Philoliche longirostris were discovered for the first time from Pakistan.

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