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## Biodiversity of wasps species collected from district Karak, KP, Pakistan

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### Abstract

Wasps are present throughout the world, mostly in tropical regions. The present research work is conducted in various region of district Karak including Mithakhel, Esakhuntra, Palosa, Sabirabbadto find out wasp fauna. The fauna of wasp were observed during summer season, mostly from April-September 2017. During the research survey 24 species of wasps were collected from open fields, gardens and houses and are preserved in 70% ethanol, which belongs from 1 order *Hymenoptera*, 3 families *Vespidae*, *Pompilidae*, *Ichneumonidae* and 11 genera *Polistes*, *Vespa*, *Dolichovespula*, *Vespula*, *Ropalidia*, *Cryptocheilus*, *Hemipepsis*, *Priocnemis*, *Anoplius*, *Arochnospila*, *Megarhyssa*. Family *Pompilidae* was the most abundant family having 12 species, family *Vespidae* has 11 species, while family *Ichneumonidae* have 1 species. The present research survey suggests that District Karak has a diverse wasp fauna. Similar research study is recommended on large scale to find out the remaining wasp species in District Karak and its surrounded areas.

**Keywords:** wasp, fauna, family, region, district, Karak

### Introduction

In the present research study, fauna of wasp are observed in different areas of Karak to find out the pre-existing species of wasp. A wasp is any insect that belongs from order *Hymenoptera* and suborder *Apocita* that's neither a bee nor an ant <sup>[1]</sup>. These are the stinging flying insect that shows resemblance with *Hornit*. They have some ecological role in nature, i.e. they act as a predator and also help in pollination. Some of them also act as a Biological Pest Control which protects our crops from pest attack. They are originated in *Jurassic Period* <sup>[2]</sup>. Wasps are present all over the world except the Polar Regions <sup>[3m, 4]</sup>. Wasps are very diverse group, have hundred thousand species are discovered while most of them are not yet discovered <sup>[5]</sup>. Wasps are mostly carnivores which feed on different insects while there are some other species of wasps which feed on nectars <sup>[6]</sup>. Many wasp species are *Parasitoids*; which deposit their eggs in or on the host Arthropod on which the larvae then feed. In some species, the eggs are laid directly into plant tissues and form Gall, which protect the developing larvae from predators. In some species, the developing larvae act as a predator which feed on the eggs of other insect <sup>[7]</sup>. Some species of social wasps construct their nest by using plant fiber, mud and resin, while in some cases, they construct multiple fibrous brood cells that are arranged in a honeycomb pattern, which are often surrounded by a large protective envelope <sup>[8]</sup>. Some species of wasp like to make nests in cavities to make a hole in the ground, walls while some species of wasps have nests with single or multiple comb <sup>[9]</sup>. Some species of wasps make their nests only for their own offspring <sup>[10]</sup>. Wasps have an exoskeleton which protects their three body parts, i.e. head, mesosoma and metasoma. *Petiole joins their first and second segment of the abdomen*. Female have a rigid *ovipositor* which are retractable and having the ability to inject venom to paralyze their prey. They also used ovipositor as a defensive organ <sup>[11, 12]</sup>. They have compound eyes, while some wasps have several simple eyes called *Ocelli*. They have *Mandibles* used for cutting and biting, but their other mouth parts are modified into a *Suctorial Proboscis*, which helps them to suck nectar <sup>[13]</sup>. Some species of wasps avoid mating with their sibling through Kin recognition <sup>[14]</sup>. The length of their reproductive cycle depends on latitude <sup>[15]</sup>. The aim of the current research work was to find out the biodiversity of Wasps Species collected from district Karak, KP, Pakistan.

## Materials and Methods

The present research survey is conducted in district Karak which is situated in Khyber Pakhtunkhwa (Pakistan), 150 km away from Peshawar on Indus highway (from Karachi to Peshawar). All the survey was conducted during daytime mostly from 9:00 am to 4:00 pm in April-September 2017. The purpose of the research was to find out the pre-existing species of wasp in Mithakhel, Esakchuntra, Palosa and Sabirabad of district Karak. All the species of wasps were firstly observed in these areas and are then trapped from open fields, gardens and houses by using various techniques such as pitfall trap and sweeping net. These trapped species of wasps were then preserved in 70% ethanol in plastic bottles.

## Results

The research survey was achieved to find out pre-existing species of wasp fauna in Mithakhel, Esakchuntra, Palosa, Sabirabad of district Karak. Such type of research was not performed by someone in these regions of district Karak. The present research survey was conducted in April-September 2017. During the research survey a total of 24 species of wasps was collected, preserved and are then identified up to

the species level. All the collected species belong from one order *Hymenoptera*, 3 families *Vespidae*, *Pompilidae*, *Ichneumonidae* and 11 genera *Polistes*, *Vespa*, *Dolichovespula*, *Vespula*, *Ropalidia*, *Cryptocheilus*, *Hemipepsis*, *Priocnemis*, *Anoplius*, *Arochnospila*, *Megarhyssa*. Genus *Polistes* have four species *Polistes indicus*, *Polistes instabilis*, *Polistes gallicus*, *Polistes dominula*, genus *Vespa* have three species *Vespa orientalis*, *Vespa velutina*, *Vespa tropica*, genus *Dolichovespula* have two species *Dolichovespula media*, *Dolichovespula sylvestris*, genus *Vespula* have one specie *Vespula germanica*, genus *Ropalidia* have one specie *Ropalidia marginata*, genus *Cryptocheilus* have one specie *Cryptocheilus d iscolor*, genus *Hemipepsis* have five species *Hemipepsis acer*, *Hemipepsis elizabethae*, *Hemipepsis indica*, *Hemipepsis lusca*, *Hemipepsis veda*, genus *Priocnemis* have one specie *Priocnemis perturbator*, genus *Anoplius* have one species *Anoplius nigerrimus*, genus *Arochnospila* have four species *Arochnospilaanceps*, *Arochnospilatrivialis*, *Arochnospilaconsobria*, *Arochnospilaminutula*, genus *Megarhyssa* have one specie *Megarhyssa macrurus*.

**Table 1:** Taxonomic representation of wasp species of district Karak.

S/N	Class	Order	Family	Genus	Species
1	Insecta	Hymenoptera	Vespidae	Polistes	<i>P. indicus</i>
2	Insecta	Hymenoptera	Vespidae	Polistes	<i>P. instabilis</i>
3	Insecta	Hymenoptera	Vespidae	Polistes	<i>P. gallicus</i>
4	Insecta	Hymenoptera	Vespidae	Polistes	<i>P. dominula</i>
5	Insecta	Hymenoptera	Vespidae	Vespa	<i>V. orientalis</i>
6	Insecta	Hymenoptera	Vespidae	Vespa	<i>V. velutina</i>
7	Insecta	Hymenoptera	Vespidae	Vespa	<i>V. tropica</i>
8	Insecta	Hymenoptera	Vespidae	Dolichovespula	<i>D. media</i>
9	Insecta	Hymenoptera	Vespidae	Dolichovespula	<i>D. sylvestris</i>
10	Insecta	Hymenoptera	Vespidae	Vespula	<i>v. germanica</i>
11	Insecta	Hymenoptera	Vespidae	Ropalidia	<i>R. marginata</i>
12	Insecta	Hymenoptera	Pompilidae	Cryptocheilus	<i>C. discolor</i>
13	Insecta	Hymenoptera	Pompilidae	Hemipepsis	<i>H. acer</i>
14	Insecta	Hymenoptera	Pompilidae	Hemipepsis	<i>H. elizabethae</i>
15	Insecta	Hymenoptera	Pompilidae	Hemipepsis	<i>H. indica</i>
16	Insecta	Hymenoptera	Pompilidae	Hemipepsis	<i>H. lusca</i>
17	Insecta	Hymenoptera	Pompilidae	Hemipepsis	<i>H. veda</i>
18	Insecta	Hymenoptera	Pompilidae	Priocnemis	<i>P. perturbator</i>
19	Insecta	Hymenoptera	Pompilidae	Anoplius	<i>A.nigerrimus</i>
20	Insecta	Hymenoptera	Pompilidae	Arachnospila	<i>A.anceps</i>
21	Insecta	Hymenoptera	Pompilidae	Arachnospila	<i>A.trivialis</i>
22	Insecta	Hymenoptera	Pompilidae	Arachnospila	<i>A.consobria</i>
23	Insecta	Hymenoptera	Pompilidae	Arachnospila	<i>A.minutula</i>
24	Insecta	Hymenoptera	Ichneumonidae	Megarhyssa	<i>M. macrurus</i>

## Discussion

During the present research survey a total of 24 species of wasps was collected from different sites of district Karak including Mithakhel, Esakchuntra, Palosa and Sabirabad which are identified up to their species level by using Taxonomic keys. All the collected species of wasps belong from 1Class, 1 Order, 3 families and 11 genera as shown in detail in Table 1. In these 24 species of wasp, many are predator while other feed on the nectar of crops. Afshan Khaliq Khan *et al.* Identified 11 species in three genera of wasps in District Poonch, Azad Jammu Kashmir (Pakistan) which belong from 3 sub-families of family Vespidae. e. Eumeninae, Polistinae and vespinae [16]. Shahmshad A. Khan *et al.* Work on the *Polistesflavusto* test that what type of woody trees they select to build nests [17]. Philip T. Stacks & Stefano Turillazzi works on a model ‘‘*Polistes paper wasps:*

*emergence of a model genus*’’ to position *Polistes*wasps as a model genus within the biological sciences [18]. From the above study it was concluded that district Karak, have rich insect fauna.

## Conclusion

From the present research survey, it can be concluded that the climatic factors of district Karak are suitable for wasp fauna. Furthermore, the same research on a large scale is recommended to find out the remaining wasp fauna in the whole district of Karak. For the conservation of wasp fauna in these areas of district Karak it is necessary to grow those crops and flowers which are rich in nectar because some species of wasps feed on nectar but mostly wasps are carnivores which feed on different insects.

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