Study on wasps species (Hymenoptera: Vespidae) recorded from district Shikarpur Sindh

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Abstract- The family Vespidae comprises wasps. The larvae of Vespidae (wasps) prey on caterpillars and other insects, making them an effective biological control agent in terrestrial ecosystems. These wasps are also important pollinators for a wide variety of fruit and vegetable plants. The majority of their habitats are in forests, fields of vegetables and fruit orchards. It is well known that wasps play a vital part in ecosystems around the world, and some species are used as pesticides for cultivated plants as well as for the beekeeping sector. The study was conducted on the different fauna of wasp family of district Shikarpur Sindh, Pakistan. The specimens were captured during the 2021 - 2022. 189 specimens were collected and identified. Total five species were identified, belonging to the Vespidae family are Vespa orientalis, Polistes indicus, Polistes wattii, Polisres olivaceous, Delta dimidiatipenne. Morphological characters along with digital images are given. Definitely this study will form a base line for future researchers.

Keywords: -Species Hymenoptera, Distribution, Systematics, Vespidae.

I. INTRODUCTION

'I he family Vespidae comprises wasps. There are over 5,500 species of Vespidae in 250 genera and six subfamilies in the order Hymenoptera, which has a worldwide distribution. In addition to Vespinae, Polistinae, Euparagiinae, Eumeninae, Masarinae, and Stenogastrinae, there are several other groups [1]. The larvae of Vespidae (wasps) prey on caterpillars and other insects, making them an effective biological control agent in terrestrial ecosystems. These wasps are also important pollinators for a wide variety of fruit and vegetable plants [2].

A wasp is a member of the Apocrita suborder, which includes insects that are neither bees nor ants. Wasps can be found all throughout the world, excluding the Polar Regions [3] [4]. In the family of Vespidae, social wasps are an overlooked group of insects. The majority of their habitats are in forests, fields of vegetables, and fruit orchards. It is well known that wasps play a vital part in ecosystems around the world, and some species are used as pesticides for cultivated plants as well as for the beekeeping sector [5]. Honeybee nectar and ripe fruit juice are both consumed by some [6]. Wasp stings are a common source of irritation for people, especially in the late summer and early fall, when the wasp colony is at its greatest. Wasps face major dangers around the world due to growing deforestation and urbanization [7].

Wasps paralyse their prey by continuously stinging the victim, wasp females employ the stinging behaviour of male wasps. They are insectivorous and carnivores. Over 5,000 species of social wasps comprise the Vespidae family, which is extensively spread throughout tropical Asia and Africa, as well as in temperate Eurasia and North America [8] [9] [10] [11].

The current state of knowledge about the wasp biodiversity around the world is only fair, with regions like Pakistan, for instance, lacking exact information [12]. Eight species from Pakistan were mentioned by [13] [14]. listed 23 taxa of Eumeninae, the majority of which were found in Baluchistan and in the Karachi metropolitan area of Pakistan (Sindh) [12]. included 21 species from Khyber Pakhtunkhwa and Baluchistan in his list.

Thirty different species of Vespinae Eumeninae, and Polistinae subfamilies have been discovered in Khyber Pakhtunkhwa Province Pakistan [15]. For the first time, [16] [17] identified three Delta de Saussure species from the Punjab Province of Pakistan, including D. pyriforme (Fabricius) and D. esuriens (Fabricius). Of the 23 species of eight genera described by [18] seven of these species were previously unknown in Pakistan [19]. collected 39 specimens' of family vespidae and sphecidae. They identified 8 species from Tandojam Sindh [20]. conducted work on wasps and reported 17 species belonging to three subfamilies of Vespidae from Sindh excluding Shikarpur district [21]. reported 05 genera and 10 species of subfamily Eumeninae from Sindh except Shikarpur district. The Shikarpur district in Pakistan is home to a large number of species that have yet to be discovered. In terms of latitude and longitude, the district may be found at 25°57'N and 68°39'E, with an altitude of about 43ft (13m). At a distance of 16.41 mi, the city's entire area is 2640 km2. The goal of this research project is to find out about the Vespidae species in Shikarpur, Sindh, Pakistan.

II. MATERIAL AND METHODS

A. Sample collection, Killing and preservation of Wasp specimens

District Shikarpur Sindh was the site of a survey to gather wasps in the Vespidae family. Spot catching and aerial netting were used to collect wasps. Chloroform was used to kill any remaining samples. The killed specimens were stretched out on setting boards and tagged with pertinent information, such as the date of collection, collector's name and location (latitude and longitude). Two days of deep freezing (-21°C) were applied to purge the specimens of any fungus infection. The specimens were then stored in naphthalene balls in a collecting box at the Shah Abdul Latif University in Khairpur.

B. Identification of the sample

[22] [23] keys to the vespid fauna of the world were used to identify all of the Vespidae up to species level [8]. keys for endangered species of Vespidae were used. The wasp specimens in the entomology lab at Shah Abdul Latif University Khairpur Sindh were compared to keys on hand for identification.

C. Description

The species that is discovered for the first time in Pakistan were have distinctive characteristics that set it apart from previously known specimens. The colour of a species body were recognised with other characteristics. The species discovered for the first time in Pakistan's District Shikarpur Sindh were described in great detail [5].

D. Morphometry of the sample

Physical morphometric measurements of the wasp body were taken with a digital calliper for this purpose. The length of the body was measured from the anterior margin of the head to the end of the gastral tergite along the mid dorsal line. Thus including the head, Pronotum, and Abdomen segments. The length of forewing and antennae were measured from the base to the tip of the antennae [9].

E. Microscopy and photography, Data analysis

The stereoscope were used to examine the specimens under investigation.. Photographs of the specimens with their wing venations were taken with a digital camera to document the research process. [15].

III. RESULTS

The study was conducted Morphological characteristics of different wasps species (Hymenoptera: Vespidae), recorded from district Shikarpur Sindh. The specimens were captured during the month of April 2021 to March 2022. 189 specimens were collected and identified. Total five species identified these are, *Vespa orientalis, Polistes indicus, Polistes wattii, Polistes olivaceous*, and *Delta dimidiatipenne*.

Species description

Vespa orientalis Linnaeus, 1771

Length: Body: 23-24.5 mm; fore wing length: 19-20 mm; head length: 2-3 mm; Protonum Length: 6-7 mm; Abdomen length:

11-12 mm; Antennae length: 6-8 mm; body yellow and orangish brown; clypeus yellow with regular and sparse punctured, bilobed and emarginated anteriorly; head and thorax not black but orangish brown colouration, hair on the head and thorax brown, head and thorax have irregular sparse punctures; malar space short; scutellum and postscutellum prominent; tergum I narrowly above, a yellow line present anteriorly; tergum II brown; tergum III and IV yellow having two brown dots each (Fig. 1 a)

Vespa indicus Stolfa, 1934

Length: Body: 15-17 mm; fore wing length: 14-16 mm; head length: 2-3 mm; Protonum Length: 6-7 mm; Abdomen length: 7-9 mm; Antennae length: 15-16 mm; body is yellowish brown with silvery pubescence; clypeus with strong hairs, sparse punctures; abdomen brown, apical margin of the clypeus rounded in the middle; frons yellow, vertex black with two yellow spots, pronotum yellow with brown patches; pronotal fovea present; malar space is large; scape black; pedicel short with black spot dorsally. (Fig. 1 b)

Polistes wattii Cameron, 1900

Length: Body: 20-23.5 mm; fore wing length: 17-19 mm; head length: 3-5 mm; Protonum Length: 6-7 mm; Abdomen length: 11-12 mm; Antennae length: 6-8 mm, brown in colour; complete occipital carina is present in females, ocellocellar distance greater then inter-cellar. (Fig. 1 c)

Polistes olivaceous DeGeer, 1773

Length: Body: 21-22.5 mm; fore wing length: 17-19 mm; head length: 3-4 mm; Protonum Length: 7-8 mm; Abdomen length: 10-12 mm; Antennae length: 6-8 mm, body yellow and orangish brown; clypeus yellow with regular and sparse punctured, bilobed and emarginated anteriorly; head and thorax not black but orangish brown colouration, hair on the head and thorax brown, head and thorax have irregular sparse punctures; malar space short; scutellum and postscutellum prominent; tergum I narrowly above, a yellow line present anteriorly; tergum II brown; tergum III and IV yellow having two brown dots each. (Fig. 1 d)

Delta dimidiatipenne (de Saussure, 1852)

Length: Body: 28-29.5 mm; fore wing length: 21-23 mm; head length: 2-3 mm; Protonum Length: 8-9 mm; Abdomen length: 16-17 mm; Antennae length: 11-12 mm, light brown turning to black towards apically; antenna light brown; clypeus convex, oval; body reddish brown in color black marking at posterior end of abdomen, female bearing brownish ovipositor; abdomen flat and glittery. (Fig. 1 e)

IV.CONCLUSION

Present study reveals the finding of 03 genera and 5 species of family Vespidae.

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Fig.1 a, Vespa orientalis; b, Vespa indicus; c, Polistes wattii; d, Polistes olivaceous; e, Delta dimidiatipenne

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