Research Article

Wasp fauna of (Eumeninae, Vespinae and Polistinae) in forests of Gilgit-Baltistan (Pakistan)

Aruj Faiz¹, Muhammad Ather Rafi², Ahmed Zia²*, Arif Shah³, Syed Waqar Shah¹, Riffat ullah Khan⁴ and Muhammad Saeed⁵

1. PARC Institute of Advance Studies in Agriculture, NARC Islamabad, Pakistan
2. National Insect Museum, Department of Plant and Environmental Protection, NARC Islamabad, Pakistan
3. Baluchistan Agriculture College, Quetta, Pakistan
4. Punjab Forest Department, Swan Camp –Rawalpindi, Pakistan
5. Department of Agriculture, University of Haripur, Haripur Hazara, KPK, Pakistan

*Corresponding author’s email: saiyyedahmed@gmail.com

Citation

Received: 26/05/2016 Revised: 02/06/2016 Accepted: 06/06/2016 Online First: 17/06/2016

Abstract
The present paper is an attempt to report vespidae fauna of northern Pakistan recorded during 2010-2011 by conducting thorough field surveys in areas under administrative boundaries of Gilgit-Baltistan. As a whole 14 species in eight genera belonging to three sub-families of family Vespidae i.e. Eumeninae, Polistinae and Vespinae were recorded. Among recorded fauna, five species under two genera were recorded for subfamily Polistinae. However subfamily Vespinae was represented by four species in two genera while five species in four genera falls under subfamily Eumeninae. Explored fauna includes one species (Delta viatrix) as new record for Pakistan while seven species were reported first time from Gilgit-Baltistan.

Keywords: Vespidae; Gilgit-Baltistan; Pakistan

Introduction
Tropical forests are areas that include most assorted and composite ecosystems of world, inhabiting a high range of the world biota [1]. With the passage of time, these lands have been malformed into small fragments because of agricultural expansion and urbanization. These natural resources, that decades earlier seemed indefinite, are today limited and at risk [2] making every inhabiting biota vulnerable. Representatives of family Vespidae include wasps that are fascinating insects, generally black or brown often bearing predominantly yellow or white markings [3]. Among Vespidae, social wasps are an important but neglected group of Neotropical insect [4]. They inhabit forested habitats, fruit orchards and vegetable fields as well. They play an important role in functioning of ecosystems nearly everywhere around the globe [5]. Some species are taken as pests of cultivated and ornamental plants [5, 6] and even for beekeeping industry [7]. Some consume juice of ripened fruits and grasp nectar from honeybees [8]. Wasps are normally annoying to humans because of their stings especially during late summer and fall when
their colony enlarges to maximum in size [9]. Due to rapid deforestation and increased urbanization, wasps are facing serious threats around the globe.

Wasps are widely distributed in tropical Asia, Africa, Australia, and South Africa and through temperate Eurasia and North America to Central South America [10] but with particular species richness in tropics [11]. Despite the fact that vespid fauna of the world is well studied, their speciation in Pakistan is very less explored and overlooked. Among major work carried out in Pakistan, [12] reported 08 species from Pakistan. [13] documented 23 species including five new records of subfamily Eumeninae from Balochistan and Sindh. In another study [14] reported 18 species from Pakistan including twelve (12) species from Gilgit-Baltistan. [15] reported 21 species for Pakistan with most of them recorded from Khyber Pakhtunkhwa and Baluchistan. [16] studied vespid fauna of Khyber Pakhtunkhwa and reported 30 species. Recently [17] reported 23 species from Pakistan and [18] reported 19 species from Pothwar region of Punjab, Pakistan.

The administrative boundaries of northern Pakistan encompass Gilgit-Baltistan and Chitral. Among these, Gilgit-Blatistan is surrounded by China on its north end and Indian held Kashmir on its eastern side. Here are found densely forested valleys and climate here varies from region to region which is greatly influenced by the presence of world's highest mountain ranges. Climatically the Karakoram and Hindukush create a barrier between the monsoon-dominated lands of South Asia to their South and the vast deserts of Central Asia to their North. The Pamir Mountains are to the North, and the Hindu Kush lies to the West. Topography and climate of northern areas thus supports wide species diversity of wasps, if concentrated and explored. The wasp fauna of this important region has been badly neglected and overlooked in past. The area truly has a unique ecology with great deal of variation in flora and fauna that obviously attract broad spectrum of wasp species. The areas under Gilgit-Baltistan of Pakistan are rich in flora and fauna because of varied climatic conditions and ecosystems. However, due to the destruction of habitats wildlife population of Gilgit-Baltistan is decreasing rapidly (Anonymous, 2016). Keeping in view the importance of wasps and of the area as well, present study was aimed to explore wasp species of family Vespidae from Gilgit-Baltistan.

**Materials and methods**

Wasps were collected from forested habitats in Gilgit-Baltistan during two consecutive years (2010-2011). Localities visited includes; Skardu (Lat. 35°-17°, Long. 74°-14°, Alt. 2279m), Ghizer (Lat. 36°-17°, Long. 73°-26°, Alt. 2600m), Jaglot (Lat. 36°-54°, Long. 74°-28°, Alt. 1988m), Hunza (Lat. 36°-17°, Long. 74°-36°, Alt. 2323m), Sher Qila (Lat. 36°-13°, Long. 73°-38°, Alt. 1801m), Doyan (Lat. 35°-32°, Long. 74°-23°, Alt. 2700m), Gakhkuch (Lat. 36°-11°, Long. 73°-46°, Alt. 1850m), Chalt (Lat. 36°-07°, Long. 74°-14°, Alt. 2100m), Gakhkuch (Lat. 36°-11°, Long. 73°-46°, Alt. 1850m), Hussain Abad (Lat. 35°-45°, Long. 75°-24°, Alt. 2202m), Muhammad Abad (Lat. 35°-55°, Long. 74°-14°, Alt. 1473m), Gulapur (Lat. 36°-15°, Long. 73°-35°, Alt. 1801m), Gilgit city (Lat. 35°-55°, Long. 74°-17°, Alt. 1500m), Gorikot (Lat. 35°-31°, Long. 74°-36°, Alt. 2500m), Gitch (Lat. 36°-10°, Long. 73°-35°, Alt. 1801m), Shigar (Lat. 35°-25°, Long. 75°-25°, Alt. 2279m). Collected specimens were brought to National Insect Museum (NIM), National Agriculture Research Centre, Islamabad for taxonomic identification. Data was recorded for altitude and coordinates of localities, number of male/female caught, previous records from Pakistan and world distribution for each recorded species. Specimens were identified.
up to lowest possible taxa. Help in identification was also taken from housed reference collection of NIM. Identified specimens are housed at National Insect Museum (NIJM) for future reference and studies.

**Results and discussion**

A total of 82 specimens yielding 14 species under eight genera of three sub-families i.e. Eumeninae, Polistinae and Vespinae were collected during present study. Among recorded fauna, subfamily Eumeninae represented five species in four genera with two species first time recorded from the area and one as new country record. Subfamily Vespinae included four species under two genera with two new records for the area. While subfamily Polistinae represented five species in two genera with two new to area records. Details for the recorded fauna is provided as below,

**Allorhynchium a. argentatum** (Fabricius, 1804)

Material Examined: Skardu (Lat. 35’-17°, Long. 74’-14°, Alt. 2279m), 24.iii.10, 01♂, leg. Aruj; Ghizer (Lat. 36’-17°, Long. 73’-26°, Alt. 2600m), 06.iii.10, 01♀, leg. Aruj. Remarks: First time reported from Gilgit-Baltistan.

Previous records from Pakistan: This subspecies has been reported from Sindh: Halaji Lake, Punjab (Islamabad) by Gusenleitner (2006). Global Distribution: This species was reported from Europe, Crete, Crimea, the South of Russia, Turkey, Caucasus, Iran, van der Vecht and Fischer (1972) and from Pakistan (Gusenleitner, 2007). Gusenleitner (2013) also reported it from Pakistan, Iran, Oman, Afghanistan and China.

Geographic affiliation: Oriental.

**Euodynerus fastidiosus** (Saussure, 1853)

Material Examined: Gilgit (Lat. 35’-55°, Long. 74’-17°, Alt. 1500m), 05.vi.10, 03♀♂, leg. Aruj; Gilgit: Jaglot (Lat. 36’-54°, Long. 74’-28°, Alt. 1988m), 06.vi.10, 01♀, leg. Aruj; Ghizer (Lat. 36’-17°, Long. 73’-26°, Alt. 2600m), 16.iii.10, 02♀♂, leg. Aruj. Previous records from Pakistan: Gusenleitner (2007)

reported this species from Gilgit-Baltistan (Ghizer valley and Thiee).

Global distribution: This species was reported from Europe, Crete, Crimea, the South of Russia, Turkey, Caucasus, Iran, van der Vecht and Fischer (1972) and from Pakistan (Gusenleitner, 2007). Gusenleitner (2013) also reported it from Pakistan, Iran, Oman, Afghanistan and China.

Geographic affiliation: Afro-oriental and Palearctic.

**Delta dimidiatipenne** (Saussure, 1852)


Global distribution: Afghanistan, Algeria, Egypt, Ethiopia, Israel, India, Iran, Jordan Madagascar, Saudi Arabia, Pakistan, Palestine, Somalia, South Africa, North Africa, Syria, Yeman, Turkey and the Arabian Peninsula to India (Gusenleitner, 2006; Srinivasan and Kumar 2010; Yilderim and Gusenleitner, 2012; Siddiqui et al., 2015).

Geographic affiliation: Afro-oriental and Palearctic.

**Delta viatrix** (Nurse, 1903)

Material Examined: Astore: Doyan (Lat. 35’-32°, Long. 74’-23°, Alt. 2700m), 09.vi.10, 01♂, leg. Aruj; 06.vi.07, 01♀, Leg; Zia. Previous records from Pakistan: Gusenleitner (2007)

Remarks: This species is a new record for Pakistan.
Global distribution: Turkey (Yilderim & Gusenleitner, 2012) and Pakistan.

Geographic affiliation: Palearctic.

**Symmorphus crassicornis** Panzer, 1798

Material Examined: Gilgit Baltistan: Astore Gorikot (Lat. 35° 31' o, Long. 74° 36' o, Alt. 2500m), 07.vi.07, Leg. Awais. 01♀, 09.vi.10, 02♂♂, leg. Saeed.

Remarks: This species is first time reported form Gilgit-Baltistan as well as Pakistan.

Global distribution: Nepal, China, Korea, Netherland and Germany (Kim & Lee, 2005). Also reported from Turkey (Yilderim & Gusenleitner, 2012) and Pakistan

Geographic affiliation: Palearctic.

**Vespa orientalis** (Linnaeus, 1771)

Material Examined: Ghizer: Gahkuch (Lat. 36° -11' o, Long. 73°-46', Alt. 1850m), 02♀♂, 16-iii-10, leg. Aruj; Astore: Doyan (Lat. 35°-32', Long. 74°-23', Alt. 2700m), 01♀, 13.vi.10, leg. Aruj.


Global distribution: This species is widespread from Italy, including Sicily, Malta, Albania, Romania, Greece, including Crete, Bulgaria, Turkey, Cyprus, Syria, Lebanon, Iraq, Israel, Jordan, Saudi Arabia, Bahrein, Yemen, Oman, U. A. E., Algeria, Libya, Egypt, Ethiopia, Somalia, Russia, Turkmenistan, Uzbekistan, Tajikistan, Iran, Afghanistan, Pakistan, India, Nepal, China, Madagascar (Das and Gupta, 1983; 1989; Gusenleitner 2010; Carpenter and Kojima,1997).

Geographic affiliation: Afro-oriental as well as Palearctic.

**Vespa velutina** (Lepeletier, 1836)

Material Examined: Hunza-Nagar: Chalt (Lat. 36°-07°, Long. 74°-14°, Alt. 2100m), 12.iii.10, 06♀, leg. Aruj; Ghizer: Gahkuch (Lat. 36°-17°, Long. 73°-26°, Alt. 2600m), 26-iii-10, 01♀, leg. Aruj, Gahkuch (Lat. 36°-11°, Long. 73°-46°, Alt. 1850m), 25-iii-10, 09♀♂, leg. Aruj. Gilgit; Muhammad Abad (Lat. 35°-55°, Long. 74°-14°, Alt. 1473m), 05♀, 20.iii.10, Aruj; Skardu: Hussain Abad (Lat. 35°-25°, Long. 75°-24°, Alt. 2202m), 06♀, 22.iii.10, leg. Aruj.

Previous records from Pakistan: From Pakistan: Aziz (2008) reported it from Khyber Pakhtun Khwa (Abbotabad).

Remarks: First time recorded from Gilgit-Baltistan.


Global distribution: Pakistan, Bhutan, Vietnam, China, Indonesia, Taiwan Laos, Thailand, Malaysia, Myanmar and India, introduced into France, Spain and Portugal (Carpenter & Kojima, 1997; Dvorak, 2007; Mahmood et al., 2012).

Geographic affiliation: Paleoriental.

**Vespula germanica** (Fabricius, 1793)

Material Examined: Ghizer: Gahkuch (Lat. 36°-11°, Long. 73°-46°, Alt. 1850m), 25-iii-10, 06♀♂, Aruj; Skardu: Hussain Abad (Lat. 35°-25°, Long. 75°-24°, Alt. 2202m), 22.iii.10,
Previous records from Pakistan: New record for Gilgit-Baltistan.

Global distribution: Iran in the West to Japan and the Philippines (van der Vecht 1966) and Turkey (Yilderim & Gusenlietner, 2012).

Geographic affiliation: Paleoriental.

*Polistes (Polistes) gallicus* (Linnaeus, 1767)

Material Examined: Gilgit: Jaglot (Lat. 36°-54°, Long. 74°-28°, Alt. 1988m), 06.vi.10, 02♀, leg. Aruj; Gilgit city, 06.vi.10, 01♀, leg. Aruj; Jalal Abad (Lat. 35°-54°, Long. 74°-23°, Alt. 1501m), 01.vi.10, 02♀, leg. Aruj; Ghizer: Gulapur (Lat. 36°-10°, Long. 73°-35°, Alt. 1801m), 02.vi.10, 02♀, leg. Aruj; Hunza-Nagar: Chalt (Lat. 36°-07°, Long. 74°-14°, Alt. 2100m), 02.vi.10, 02♀, leg. Aruj.


Geographic affiliation: Paleartic, Australian, Nearctic and Neotropical

*Polistes indicus* (Stolfa, 1934)

Material Examined: Astore: Doyan (Lat. 35°-32°, Long. 74°-23°, Alt. 2700m), 08.iii.10, 01♀, leg. Aruj; Gilgit (Lat. 35°-55°, Long. 74°-17°, Alt. 1500m), 06.vi.10, 01♀, leg. Rafi.

Previous Records from Pakistan: Das & Gupta (1983; 1989) reported this species from Punjab: (Khewra). Carpenter (1996)

Global distribution: Central and southern Europe; Turkey; northern Africa; Israel; Syria; Afghanistan; Russia; Iran; Uzbekistan; Turkmenistan; Pakistan; India: Jammu and Kashmir; Mongolia; China; Australia, Chile; Argentina and USA. (Liu, 1937, Guiglia 1972, Day, 1979, Hathaway 1981, Das and Gupta, 1984, Cardale 1985,Yildrim and Özbek, 1993, Carpenter (1996); Dvorak, (2007); Gusenleitner, 2007; Ebrahimi and Carpenter (2008); Abbasi et al. (2008); Kumar and Kishore, 2010).

Geographic affiliation. Palearctic, Afrotropical, Australian, Nearctic and Neotropical.

**Polistes rothneyi carletoni** (Vecht, 1968)

Material Examined: Gilgit: Ghizer (Lat. 36°-17°, Long. 73°-36°, Alt. 2600m ) , 05.vi.10, 01♀, leg. Aruj; Gonar Farm, 02.vi.10, leg. Aruj, 01♂; Astore: Gilgit, 01♀, 07.vi.10, leg. Aruj.

Remarks: This species is a new record for Gilgit-Baltistan.


Geographic affiliation: Palearctic. Oriental

**Polistes wattii** (Cameron, 1900)

Material Examined: Hunza-Nagar: Hunza (Lat. 36°-17°, Long. 74°-36°, Alt. 2323m), 12.iii.10, 01♀, leg. Aruj; Gilgit city (Lat. 35°-35°, Long. 74°-17°, Alt. 1500m), 18.iii.10, 01♀, leg. Aruj; Ghizer: Gahkuch (Lat. 36°-11°, Long. 73°-46°, Alt. 1850m), 25.iii.10, 01♀, leg. Aruj; Ghizer: Gulapur (Lat. 36°-10°, Long. 73°-35°, Alt. 1801m), 25.iii.10, 02♀, leg. Aruj; Ghizer: Gitch (Lat. 36°-10°, Long. 73°-35°, Alt. 1801m), 25.iii.10, 01♂, leg. Aruj; Ghizer: Hitch (Lat. 36°-10°, Long. 73°-35°, Alt. 1801m), 25.iii.10, 01♀, leg. Aruj; Hunza-Nagar: Chalt (Lat. 36°-07°, Long. 74°-14°, Alt. 2100m), 26.iii.10, 01♀, leg. Aruj; Skardu: Shigar (Lat. 35°-25°, Long. 75°-25°, Alt. 2279m), 10.iv.10, 01♀, leg. Aruj; Skardu: Hussain Abad (Lat. 35°-25°, Long. 75°-24°, Alt. 2202m), 22.iv.10, 01♀, leg. Aruj.

Global distribution: Afghanistan, Iran, Iraq, Saudi Arabia, Oman, Pakistan, India, China (Gusenleitner, 1972; Richards, 1985; Das and Gupta, 1989).

Geographic Status: Palearctic and Afrotropical.

Conclusion

The study came up with new and important information on wasp fauna of northern Pakistan. Reporting many new records emphasize that the area has a lot of potential for exploring more important wasp fauna, if thoroughly explored and searched out.

Authors’ contributions

Conceived the idea and conducted collections and surveys: A Faiz, MA Rafi & M Saeed, Identification of collected specimens by: A Zia, SW Shah & A Shah, Write up of manuscript: A Zia, MA Rafi & RU Khan.

References