



First Record of Five Species and Two Subspecies of Subfamily Eumeninae (Hymenoptera: Vespidae: Eumeninae) from Khyber Pakhtunkhwa, Pakistan

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ABSTRACT

The present study was conducted to document the biodiversity of potter wasps (subfamily *Eumeninae*, family *Vespidae*) from Malakand District, Khyber Pakhtunkhwa, Pakistan. Specimens were collected from various localities using active search with a hand net and subsequently preserved, pinned, and identified to species level based on standard taxonomic literature. A total of twelve species and five subspecies were recorded, among which five species—*Knemodynerus excellens* (Perez, 1907), *Oreumenoides edwardsi* (de Saussure, 1852), *Eumenes placens* (Nurse, 1903), *Euodynerus semisaecularis* (Dalla Torre, 1889), and *Delta campaniforme* (Fabricius, 1775)—and two subspecies—*Anterhynchium abdominale abdominale* (Illiger, 1802) and *Rhynchium brunneum brunneum* (Fabricius, 1793)—are newly reported from Khyber Pakhtunkhwa. The identified species were measured, photographed, and compared with previously published descriptions, with distributional data also documented. Earlier studies in Pakistan reported Eumeninae primarily from Punjab, Sindh, and Gilgit-Baltistan, but data from Khyber Pakhtunkhwa remained scarce. This study highlights the unexplored diversity of potter wasps in the region and expands the known distribution range of several species and subspecies. The findings further emphasize the ecological significance of Eumeninae, as they act as natural regulators of insect populations, with larvae feeding on various pest species and adults utilizing nectar resources. By documenting new records from Khyber Pakhtunkhwa, this work provides baseline data that will facilitate future taxonomic, ecological, and conservation studies of solitary wasps in Pakistan. Such research is essential to understand regional biodiversity patterns and to enhance the role of natural enemies in integrated pest management programs.

INTRODUCTION

Eumeninae is the largest and most diverse subfamily of the family Vespidae. This subfamily contains more than 3750 species and distributed throughout the world. Only 1000 species are present in the Palaearctic region (Fateryga *et al.*, 2019). The vespids wasps belonging to the subfamily Eumeninae are commonly known as Potter wasps (Pannure *et al.*, 2016). Potter wasps are solitary wasps, some species show primitive social behavior. Eumeninae is economically very important because their representatives are predators of many pests. Larvae of these wasps feed on other insect larvae while the adults of this subfamily feed on nectar (Nidup *et al.*, 2018).

Rauf *et al.* (2018) recorded two species *Delta pyrifforme*, *Allorhynchium argentatum* of subfamily Eumeninae from Khyber Pakhtunkhwa, Pakistan. Rasool *et al.* (2017) also

worked on the Eumeninae wasps of Khyber Pakhtunkhwa, Pakistan, reported *Rhynchium quinquecinctum*, *Rhynchium brunneum*, *Rhynchium carnaticum* *Delta esuriens*, *Delta dimidiatipenne* *Antodynerus flavescens*, *Antepipona deflenda*, and *Antepipona sibilans*. Three species *Delta esuriens*, *Delta pyrifforme* *pyrifforme* and *Delta dimidiatipenne* were described from the Punjab, Pakistan, by Bodlah *et al.* (2012). Siddiqui *et al.* (2015) also worked on the Vespidae of Punjab, Pakistan. They recorded six genera and nine species *Eumenes punctatus*, *Eumenes papillarius*, *Delta esuriens*, *Delta dimidiatipenne*, *Delta pyrifforme*, *Antepipona sibilans*, *Anterhynchium abdominale* *Allorhynchium argentatum* *Rhynchium brunneum* of Subfamily Eumeninae from Punjab. Khan *et al.* (2018) reported *Delta dimidiatipenne*, *Delta campaniforme*, *Delta esuriens*, *Antepipona sibilans* and *Antodynerus limbatus*



from Sindh Pakistan. *Allorhynchium argentatum*, *Euodynerus fastidiosus*, *Symmorphus crassicornis*, *Delta dimidiatipenne* and *Delta viatrix* were recorded by Faiz *et al* (2016) from Baltistan, Pakistan. Mahmood *et al* (2012) reported *Rhynchium cyathiformis*, *Anterhynchium flavomarginatum*) and *Ancistrocerus gazella*) from Pakisatn.

MATERIALS AND METHODS

The wasps belonging to the subfamily Eumeninae were collected from different localities of Malakand, Khyber Pakhtunkhwa, Pakistan, through active search with the use of a hand net. The captured specimens were then killed by spraying insecticides (Black Cobra) in the hand nets. The killed specimens were transferred to bottles having 95% ethanol, cyanide, and ethyl acetate. The specimens were then placed in freezer for 1 or 2 days to prevent any fungal contamination. The entomological pins were used for the pinning of dead specimens. The dried wasps (specimens) were labeled and transferred to insect boxes. Naphthalene balls were present in each insect box as a preservative. Specimens were observed through a stereomicroscope (Nikon, Japan) to record taxonomically important structures of specimens. Pictures of the specimens were captured through a Canon camera. The measurements of the specimens were done through a digital calliper. The specimens were identified up to the species level using published latest literature, i.e. Pannure *et al.* (2016); Ebrahimi and Carpenter (2008); Kumar *et al.* (2017); Siddiqui *et al.* (2015); Gawas *et al.* (2019); Bodlah *et al.* (2012); Kumar and Sharma (2015); Nidup *et al.* (2018).

RESULTS.

In the current study a total of twelve species and five subspecies were collected. Among the collected wasps five species and two subspecies are newly reported from Khyber Pakhtunkhwa, Pakistan.

Order Hymenoptera

Family: Vespidae

Subfamily: Eumeninae Genus *Knemodynerus* Bluthgen, 1940

1. *Knemodynerus excellens* (Perez, 1907)

Material Examined: Kowarjaba 1 ♀ 26.v 2018.

Body Measurements: The body length is 11.3 mm while the length of the fore wing is 8 mm.

Distribution: Turkmenistan, Pakistan, India, Saudi Arabia, Iran, UAE, Qatar, and Oman (Rahmani *et al.*, 2020).

Remarks: This species is for the first time reported from Khyber Pakhtunkhwa, Pakistan. Earlier from Pakistan it was recorded from Sindh: Dokri, Jacobabad, Khipro and Shahddpur (Tariq *et al.*, 2018). It was reported by Qasim *et al.* (2018) from Azad Jammu and Kashmir: Muzaffarabad. It was recorded from Punjab: Multan and Baluchistan: Quetta (Gusenleitner, 2006). It was also reported by Rafi *et al.* (2017) from Punjab: Multan.

Genus *Oreumenoides* Giordani Soika, 1961

2. *Oreumenoides edwardsi* (de Saussure, 1852)

Material Examined: Chenar Gar 1 ♀ 9.v 2018, Korjaba 1 ♀ 19.v 2018, Agra 2 ♀ 24.v 2018, Meshta Hills 1 ♀ 26.v 2018,

Matkani Hills 3 ♀ 2.vi 2018, Qulangi Hills 3 ♀ 3.vi 2018, Patak 1 ♀ 12.vi 2018, Totakan Hills 2 ♀ 21.vi 2018, Agra Hills 2 ♀ 23.vi 2018, Tangi Hills 1 ♀ 29.vi 2018, Meshta Hills 2 ♀ 1.vii 2018, Pirkhel Hills 3 ♀ 19.vii 2018, Matkani 1 ♀ 29.vii 2018, Bosaq Road 1 ♀ 4.viii 2018, Jalawanan 1 ♀ 19.viii 2018.

Body Measurements: Body length is 11.2-17 mm and fore wing length is 8.7-10.3 mm.

Distribution: India, Sri Lanka, Pakistan, Nepal, West Bengal, Thailand and Myanmar (Rafi *et al.*, 2017).

Remarks: During this study *Oreumenoides edwardsi* was collected from Tehsil Dargi and Tehsil Batkhela, District Malakand, Khyber Pakhtunkhwa, Pakistan. This species was mostly collected from Hilly Areas of District Malakand. In Pakistan this species was only reported from Gilgit Baltistan: Jaglot (Gusenleitner, 2007). In the current study it is first time recorded from Khyber Pakhtunkhwa, Pakistan.

Genus *Eumenes* Latreille, 1802

3. *Eumenes placens* (Nurse, 1903)

Material Examined: Plandara 1 ♂ 15.iv 2018, Chenar gar 3 ♂ 9.v 2018, Meshta Hills 1 ♂ 9.v 2018, Agra Hills 1 ♀ 5.viii 2018.

Body Measurements: The length of the female is 12.1 mm and fore wing length of the female is 9 mm while the body length of the male is 10.5 mm and its fore wing length is 6.7 mm

Distribution: India and Pakistan (Rafi *et al.*, 2017).

Remarks: This species is for the first time reported from Khyber Pakhtunkhwa, Pakistan. Only five specimens were collected from Tehsil Dargi and Tehsil Batkhela, District Malakand, Khyber Pakhtunkhwa, Pakistan. Earlier from Pakistan *Eumenes placens* was reported from Azad Jammu and Kashmir: Muzaffarabad: Punjkot (Qasim *et al.*, 2018). It was also recorded from Punjab (Nurse, 1903).

Genus *Euodynerus* Dalla Torre, 1904

4. *Euodynerus semisaecularis* (Dalla Torre, 1889)

Material Examined: Chenar gar 2 ♀ 9.v 2018, Meshta Hills 2 ♀ 20.v 2018, Toti Hills 3 ♀ 21.v 2018, Dehri Hills 1 ♀ 22.v 2018, Agra Hills 3 ♀ 24.v 2018, Makhband Hills 4 ♀ 25.v 2018, Bica Hills 3 ♀ 25.v 2018, Meshta Hills 5 ♀ 26.v 2018, Malakand Hills 2 ♀ 27.v 2018, Matkani Hills 1 ♀ 10.vii 2018.

Body Measurements: The body length is 9.5-11.2 mm while the length of the fore wing is 6-7 mm.

Distribution: China, Iran, UAE, Pakistan, Uzbekistan, Kazakhstan, Tajikistan, Turkey and Turkmenistan (Rahmani *et al.*, 2020) Greece, Armenia, Azerbaijan, Syria, and Lebanon (Fateryga *et al.* 2021),

Remarks: This species is newly reported from Khyber Pakhtunkhwa, Pakistan. The specimens were collected from Tehsil Batkhela, District Malakand, Khyber Pakhtunkhwa. From Pakistan it was earlier reported from Gilgit Baltistan: Jaglot (Gusenleitner, 2007).

Genus *Delta* de Saussure, 1855

5. *Delta campaniforme* (Fabricius, 1775)

Material Examined: Tana 1 ♀ 15.iv 2018, Warterr 1 ♀ 18.iv 2018, Matkani Hills 1 ♀ 10.vii 2018, Pirkhel Hills 2 ♀ 15.vii 2018, Mekhband Hills 2 ♀ 19.vii 2018, Pirano Hills 1

♀ 22.vii 2018.

Body Measurements: The length of the body is 12.7-16 mm and the length of the fore wing is 12-13 mm.

Distribution: Pakistan, China, Myanmar, Malaysia, Australia, India, Cambodia, Guangdong, Laos, Indonesia, Nepal, Philippines, Hawaii, Papua New Guinea, Vietnam, Nepal, Iran, Thailand and Singapore (Rahmani *et al.*, 2020).

Remarks: This species is first time reported from Khyber Pakhtunkhwa, Pakistan. Previously from Pakistan *Delta campaniforme* was described from Sindh: Ghotki (Khan *et al.*, 2018). Bodlah *et al.* (2012) reported *Delta campaniforme* from Punjab.

Genus *Anterhynchium* de Saussure, 1863

6. *Anterhynchium abdominale abdominale* (Illiger, 1802)

Material Examined: Sakhakot 1 ♀ 12.ix 2018.

Body Measurements: The female body length is 16.1 mm and its fore wing length is 14 mm. **Distribution:** Myanmar, Pakistan, Vietnam, India, Sri Lanka and Pakistan (Rafi *et al.*, 2017).

Remarks: During this study, only one specimen was captured in Tehsil Dargi, District Malakand, Khyber Pakhtunkhwa, Pakistan. This subspecies is for the first time reported from Khyber Pakhtunkhwa, Pakistan. In Pakistan this subspecies was previously reported from Islamabad: Margalla Hills (Rafi *et al.*, 2017). It was reported from Punjab: Attock and Rawalpindi (Siddiqui *et al.*, 2015). Dover and Rao (1922) recorded it from Punjab: Faisalabad and Sindh: Karachi.

Genus *Rhynchium* Spinola, 1806

7. *Rhynchium brunneum brunneum* (Fabricius, 1793)

Material Examined: Dargi 1 ♀ 29.iv 2018, Agra Kabir hills 1 ♀ 4.vii 2018, Totakan 1 ♀ 22.vii 2018.

Body Measurements: The length of the female body is 18.3-19 mm and the length of the fore wing of the female is 13.5-14 mm.

Distribution: Nepal, India, Vietnam Pakistan, Iran, Malaysia, Taiwan, Iraq, Thailand, China, Afghanistan, Indonesia, New Britain, Laos, Bangladesh, West Bengal, Myanmar, Guam, Sri Lanka, Afghanistan, Cambodia and Malaysia (Rafi *et al.*, 2017).

Remarks: During this study only 4 specimens of *Rhynchium brunneum brunneum* were collected from Dargi and Batkhela Tehsils of District Malakand, Khyber Pakhtunkhwa, Pakistan. This subspecies is for the first time reported from Khyber Pakhtunkhwa, Pakistan. Earlier *Rhynchium brunneum brunneum* was reported from Punjab (Siddiqui *et al.*, 2015). It was also recorded from Pakistan by Kumar and Sharma (2013).

Figure 1

Knemodynerus excellens



Figure 2

Oreumenoides edwardsi



Figure 3

Eumenes placens



Figure 4

Euodynerus semisaecularis

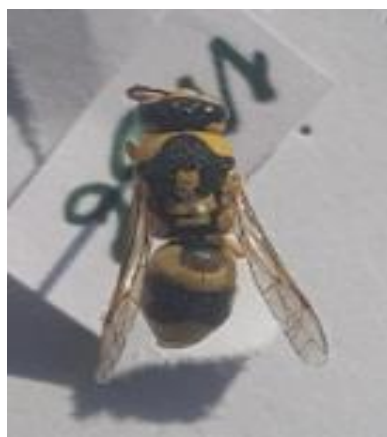


Figure 5

Delta campaniforme



Figure 6*Anterhynchium abdominale***Figure 7***Rhynchium brunneum***DISCUSSION**

The present study was done in, Khyber Pakhtunkhwa, Pakistan. This study was conducted to record the biodiversity of subfamily Eumeninae in Khyber Pakhtunkhwa. The specimens were collected from diverse localities of Malakand through active search with the use of hand net. The captured specimens were then killed by spraying insecticides in the hand nets. A total of twelve species and five subspecies were collected. Among the collected wasps 5 species and 2 subspecies were first time recorded from Khyber pakhunkhwa Pakistan. The new recorded species and subspecies are *Knemodynerus excellens*, *Oreumenoides edwardsi*, *Eumenes placens*, *Euodynerus semisaecularis*, *Delta campaniforme*, *Anterhynchium abdominale* and *Rhynchium brunneum brunneum*. Earlier from Pakistan *Knemodynerus excellens* was recorded from Sindah (Tariq *et al.*, 2018) Muzaffarabad (Qasim *et al.* 2018) Punjab and Baluchistan (Gusenleitner, 2006). *Oreumenoides edwardsi* was only reported from Gilgit Baltistan (Gusenleitner, 2007). *Eumenes placens* was reported from Punjab (Nurse, 1903) Azad Jammu and Kashmir (Qasim *et al.*, 2018). From Pakistan *Euodynerus semisaecularis* was earlier reported from Gilgit Baltistan (Gusenleitner, 2007). Previously from Pakistan *Delta campaniforme* was described from Sind (Khan *et al.*, 2018) and Punjab (Bodlah *et al.* 2012). *Anterhynchium abdominale* was previously reported from Islamabad (Rafi *et al.*, 2017) Punjab (Siddiqui *et al.*, 2015) and Sindh (Dover and Rao 1922). Earlier *Rhynchium brunneum brunneum* was reported from Punjab (Siddiqui *et al.*, 2015)..

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