



Research Article

Newly Reported Species of Genus *Enicospilus* (Hymenoptera; Ichneumonidae; Ophioninae) from Pakistan

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Abstract | Pakistan is rich with entomo-fauna but very little is known about genus *Enicospilus* due to lack of taxonomic work and expertise. Based on recent collected specimens of *Enicospilus* from District Swat Khyber-Pakhtunkhwa, Pakistan, the species *Enicospilus adustus* and *Enicospilus ramidulus* are newly recorded for the fauna of Pakistan. Morphological descriptions and digital images of the recorded species are provided.

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Keywords | Taxonomy, Ophioninae, *Enicospilus*, *Enicospilus adustus*, *Enicospilus ramidulus*, New Record, Pakistan



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Introduction

Enicospilus Stephens, 1835 is the most specious and one of the largest genera of the sub-family Ophioninae (Gauld, 1985; Bordera *et al.*, 1987; Graia, 2011). It comprises of 700 described species in all bio-geographical regions of the world except in that of Arctic regions and Antarctica (Broad and Shaw, 2016; Yu *et al.*, 2012). The genus *Enicospilus* is species-rich in tropical and subtropical regions (Gauld and Mitchell, 1978; 1981; Townes, 1971) with few species found in North temperate regions where *Ophion* Fabricius, 1798 is the largest genus (Broad and Shaw, 2016).

Enicospilus species are pale yellow colored wasps, generally slender with slightly twisted and strongly tapered mandibles (Rousse *et al.*, 2016). Size varies from moderate to large having enlarged eyes with

long antennae. Moreover, the disco-sub marginal cell present below the base of radial cell bears hairless area known as fenestra having alar sclerites of great taxonomic importance (Gauld and Huddleston, 1976).

The Ichneumonidae fauna of Pakistan is very diverse (Usman and Ahmad, 2020) but has not yet been studied regarding the sub-family Ophioninae. In the present study three species *Enicospilus adustus*, *Enicospilus pallidus* and *Enicospilus ramidulus* of the genus *Enicospilus* are reported in which *Enicospilus adustus* and *Enicospilus ramidulus* are reported for the first time from Pakistan.

Materials and Methods

Insect collection was done through sweeping method and Malaise trap from different areas of District Swat, Khyber Pakhtunkhwa, Pakistan during 2019.

Specimens were observed under trinocular stereo microscope Nikon SMZ 745T mounted with Nikon DS-Fi2 digital camera. Layer of photos were taken and combined to get sharp image through Helicon Focus 6.22. Final images were cleaned with Adobe Photoshop for similar composition.

Results and Discussion

Genus *Enicospilus* Stephens, 1835

Enicospilus Stephens, 1835: 126.

Type species: *Ophion merdarius* Gravenhorst, by subsequent designation (Viereck, 1914: 51).

Allocamptus Forster, 1869: 150.

Type species: *Ophion undulates* Gravenhorst, 1829, by subsequent designation (Thomson, 1888).

Banchogastra Ashmead, 1900: 87.

Type species: *Banchogastraniger* Ashmead, 1900, by original designation.

Ceratospilus Szépligeti, 1905: 28.

Type species: *Ceratospilus biroi* Szépligeti, 1905, by monotypy.

Eremotyloides Perkins, 1915: 530.

Type species: *Eremotyloides orbitalis* Ashmead, 1901, by monotypy.

Schizospilus Seyrig, 1935: 79.

Type species: *Schizospilus divisus* Seyrig, 1935, by original designation.

Host: The species of genus *Enicospilus* use many lepidopterous families as their host like Noctuidae, Notodontidae and Lasiocampidae (Gauld, 1988; Gauld and Mitchell, 1981; Broad and Shaw, 2016).

Distribution: Australasia, Afrotropical, Neotropical, Nearctic, Palaearctic, Oceanic and Oriental Regions (Yu *et al.*, 2012).

Enicospilus adustus Haller, 1885: new record to Pakistan (Figure 1)

Ophion adustus Haller, 1885: 200.

Enicospilus merdarius – auctt., misidentification (Gauld and Mitchell, 1981; Horstmann, 1997).

Diagnostic characters

Metasoma not black, tipped abruptly; head with tem-

ples posteriorly weakly narrowed; scutellum sparsely punctate, with sides posteriorly distinctly converging; antenna with 58-69 flagellomeres; mesosoma without dark patches.

Description

Body length: 19.28mm

Body Color: Orange brown

Head: Head with temples in lateral view narrow, about 0.4x width of eye; face in anterior view narrow, usually with yellow markings; mandibles usually twisted; labial palp 4 and maxillary palp 5 segmented; clypeus in profile flat; malar space 0.52 x as long as basal width of mandibles; occipital carina dorsally completely present; ocelli large, posterior ones adjacent to compound eyes; antenna with 58-69 flagellar segments, pre-apical segment of flagellum slender; head with temples weakly narrowed posteriorly.

Mesosoma: Mesosoma completely testaceous; propodeum, mesopleuron, mesoscutum and pronotum without dark patches; scutellum sparsely punctate, posteriorly curved smoothly, with sides distinctly converging posteriorly; notauli absent; propodeum usually punctate, slightly rounded and convex dorsally.

Wings: Wings densely hairy; disco-submarginal cell of forewing with fenestra, often with distinct and pigmented proximal and central sclerites; central sclerite somewhat D-shaped; vein R-Rs thickened more than half of its length, marginally sinuous; hind wing with vein R1 slightly curved.

Legs: Hind leg with tarsal claw not curved conspicuously, usually with 10 teeth; fore tibial spur lacking membranous flange; hind and mid leg with trochantelli unspecialized.

Metasoma: Metasomal tergites not abruptly black tipped; tergites 1st and 2nd long and slender; tergite-I 0.88x as long as tergite-II; ovipositor straight and short.

Material Examined: Pakistan: Khyber Pakhyunkhwa; Swat, Malam Jabba 2♀, 2♂. 34° 47' 45" N, 72° 34' 17" E. 15.vi.2018. Adnan Ihsan.

Distribution: England, Ireland, Scotland (Broad and Shaw, 2016); Rio de Janeiro, Brazil (Townes and Townes, 1960).

Remarks: The species *Enicospilus adustus* Haller, 1885



Figure 1: *Enicospilus adustus*. **A:** front view of head; **B:** mesoscutum, dorsal view; **C:** mesosoma, lateral view; **D:** metasomal tergites, ovipositor; **E:** wings; **F:** lateral view **G:** Propodeum, dorsal view.

is testaceous and large without dark areas. It is similar to *Enicospilus ramidulus* but the metasomal segments not abruptly tipped black with longer antenna, usually with 58-69 flagellomeres (Broad and Shaw, 2016) (identified specimen, 65 segmented).

The specimens were collected by using hand net and malaise trap from Malam Jabba with an elevation of 2804m. This species is reported for the first time from Pakistan.

Enicospilus pallidus Taschenberg, 1875 (Figure 2)
Ophion pallidus Taschenberg, 1875: 436.

Henicospitus pallidus (Taschenberg) Szepliget, 1905: 26.
Enicospilus pallidus (Taschenberg) Townes and Townes, 1973: 182.

Diagnostic characters

Forewing with central sclerite crescent shaped,



Figure 2: *Enicospilus pallidus*. **A:** front view of head; **B:** lateral view; **C:** mesosoma, dorsal view; **D:** mesosoma, lateral view; **E:** metasomal tergites; **F:** wings.

proximally weakly sclerotized; proximal sclerite roughly triangular; mesosoma without ivory markings and uniformly coloured; antenna with more than 55 flagellar segments; pale yellow species.

Description

Body Length: 20-21 mm; forewing 12-15 mm

Body color: Pale yellow.

Head: Antenna with 60-65 flagellomeres; first segment of flagellum 1.7-1.8x as long as 2nd segment;

mandibles narrowed, twisted about 15° with outer surface flat and hairy; malar space 0.1-0.2x as long as basal width of mandibles; clypeus flat in profile, occipital carina usually present; ocelli present close to eyes posteriorly.

Mesosoma: Pronotum moderately long with transverse furrow; rounded mesoscutum in profile; short notauli; punctate and polished mesopleuron; scutellum weakly convex in profile with lateral carina; metapleuron narrowly punctate; propodeum rounded in profile, slightly convex dorsally; transverse carina anteriorly complete; epicnemial carina reach above lower corner of pronotum.

Wing: Vein Cu-a proximal to vein Rs and M; hind wing with vein R usually with 6-8 hamuli; vein 1A proximally straight.

Leg: Tibia of front leg slightly flattened and hairy; hind coxa deep in profile; hind leg's tarsal claw symmetrical and pectinate.

Metasoma: Long and stout; sternite 2 with posterior margin behind spiracle of 2nd tergite; sternites 6-8 in male with scattered, erect, long hairs and short pubescence.

Material Examined: Pakistan: Khyber Pakhtunkhwa; Swat, Malam Jabba, 1♀, 2♂. 34° 47' 45" N, 72° 34' 17" E. 16.vi.2018. Adnan Ihsan.

Distribution: Chad, Democratic Republic of Congo, Ethiopia, Kenya, Pakistan, South Africa and Sudan (Yu *et al.*, 2012), Tanzania (Rousse and Noort, 2014) and Saudi Arabia (Gadallah *et al.*, 2017).

Remarks: *Enicospilus pallidus* can be distinguished from other species of the same genus by following characteristics: forewing with proximal sclerite triangular, central sclerite crescent shaped and sclerotized weakly; meosoma with yellowish coloration. This species was witnesses from different oriental countries including Pakistan (Yu *et al.*, 2012). In the present study species is reported from District Swat, Pakistan.

Enicospilus ramidulus, Linnaeus, 1758: new record to Pakistan (Figure 3)

Ichneumon ramidulus Linnaeus, 1758: 566.

Sphex truncatus Poda, 1761: 107.

Henicospilus instabilis Kokujev, 1907: 174.

Diagnostic characters

Metasoma posteriorly black tipped abruptly from 5th tergite; forewing with central and proximal sclerite distinct and pigmented.

Description

Body Length: 17-22mm

Body color: Usually reddish yellow; metasoma with tergites 5-8 entirely black; frontal orbits white; mandibles with teeth black.

Head: Antenna 57 segmented; 1st flagellar segment 2x as long as 2nd flagellar segment; mandibles distally tapered; labrum 4x as wide as long; clypeus 1.44x as wide as long; malar space 4x as long as basal mandibular width; ocelli nearly adjacent to eyes, separated from compound eye by width of posterior and anterior sulcus of sternum; occipital carina present completely; temple in lateral view 0.66x as wide as transverse diameter of compound eye.

Mesosoma: Mesosoma testaceous uniformly, without dark patches; anterior transverse carina of propodeum strong; propodeum rounded, rugose, with anterior groove broad and shallow; mesoscutum smooth, rounded; scutellum concave, punctate; post pectal carina clear and complete; mesosomal venter with posterior transverse carina present.

Wings: Wing surface with dense and long hairs; 1M+1R1 cell of forewing with fenestra close to R-Rs vein; vein R-Rs somewhat sinuous; disco-submarginal cell of forewing in glabrous area with pigmented and distinct central and proximal sclerites; proximal sclerite somewhat triangular, central sclerites not completely rounded; hind wing with 7-8 distal and 3 basal hamuli.

Legs: Hind leg with tarsal claw curved conspicuously; hind leg with coxa 2x as long as wide, basitarsus 16x as long as wide, trochantellus 1.74x as long as wide.

Metasoma: Metasoma abruptly tipped with tergites 5-8 entirely black; metasomal tergites 1 and 2 long and slender; tergite 1 with spiracle present at posterior 3rd of tergite; tergite 2 smooth, without sub-triangular or semicircular area at base.

Material Examined: Pakistan: Khyber Pakhtunkhwa; Swat, Malam Jabba, 2♀, 1♂. 34° 47' 45" N, 72° 34' 17" E. 14.vi.2018. Adnan Ihsan.

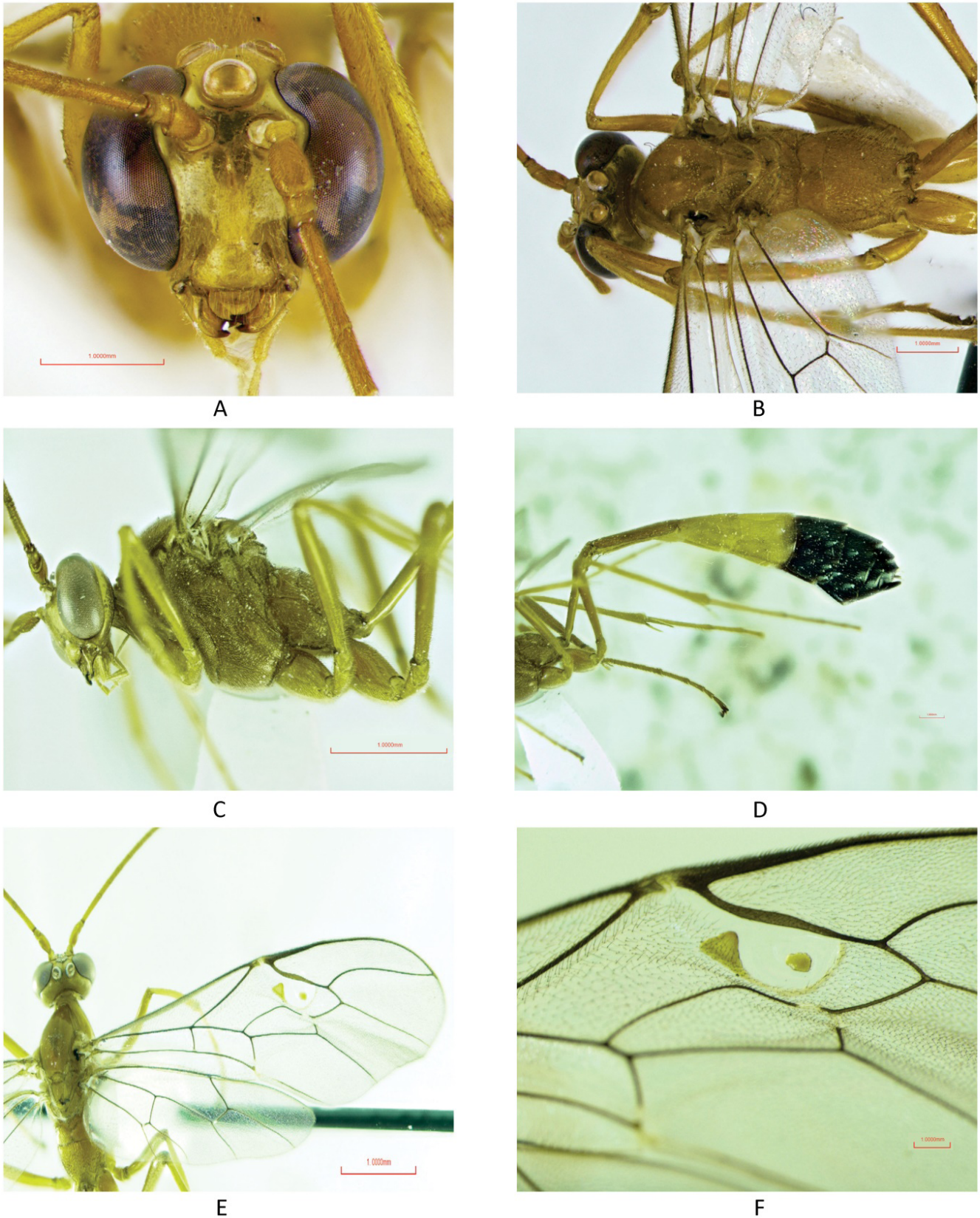


Figure 3: *Enicospilus ramidulus*. **A:** front view of head; **B:** mesosoma, dorsal view; **C:** mesosoma, lateral view; **D:** metasomal tergites; **E:** wings; **F:** Forewing, alar sclerites.

Distribution: Palearctic, Afrotropical and Oriental region (Yu et al., 2012); England, Scotland, Ireland (Broad and Shaw, 2016); Iran (Amiri et al., 2016).

Remarks: This species *E. ramidulus* was described in 1758 by Linnaeus for the first time and then synonymized by Poda (1761), Kokujev (1907) and different other authors. It has two discrete and pigmented

sclerites in the glabrous area of forewing; Metasoma sharply black apically; mesosoma completely testaceous. This species is structurally very similar to *E. adustus* but the metasomal segments 5-8 abruptly black tipped and antenna short, 54-60 segmented (Broad and Shaw, 2016) (identified specimen, 57 segmented).

This species was collected from Malam Jabba with an elevation of 2408m by using hand net and malaise trap. In the current study, the species is reported for first time from District Swat as well as from Pakistan.

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Novelty Statement

The study is novel in describing an Ichneumonidae parasitoid group from District Swat, Khyber Pakhtunkhwa; Pakistan. Two species *E. adustus* and *E. ramidulus* were newly recorded for the Fauna of Pakistan

Author's Contribution

Adnan Ihsan: Described the species and wrote the paper.

Syed Fahad Shah, Jawad Sarwar and Najeeb Ullah: Provided technical support.

Muhammad Usman: Helped in insect identification.

Misbahullah and Riaz Hussain: Helped in relevant literature and proofreading.

Conflict of interest

The authors have declared no conflict of interest.

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