

NEW RECORD OF SUBFAMILY CHARMONTINAE (BRACONIDAE: HYMENOPTERA) IN PAKISTAN WITH THE DESCRIPTION OF A NEW SPECIES

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ABSTRACT:- Subfamily Charmontinae is recorded for the first time from Pakistan. Charmontinae is a small but widely distributed group of braconids. A cosmopolitan braconid species, *Charmon extensor* (Linnaeus), is first time recorded from Chitral area of Pakistan. A new species, *Charmon ovchinnikovi*, is described, illustrated and compared with its closely related species *Charmon extensor*. The new species is different from *C. extensor* because of different sculpture of metasomal tergum 1 and shape of pterostigma. Pterostigma is 3X longer than broad in this new species, while it is 5X longer than broad in *C. extensor*. The addition of the new species raises the number of *Charmon* species to eight in the world. Species of Charmontinae are larval and pupal endoparasitoids of lepidopterous insect pests and their recorded hosts belong to 16 families of Lepidoptera.

Key Words: *Charmon*; *Charmontinae*; *Braconidae*; *Hymenoptera*; *New Species*; *Endoparasitoids*; *Lepidoptera*; *Pakistan*.

INTRODUCTION

Charmontinae is a distinct subfamily of braconids which is characterized by the presence of a row of teeth on the lower margin of clypeus, occipital carina present, terminal flagellomere with a spine and vein 1Rs on forewing absent. Other characters helpful in their separation from other braconids include the absence of vein r-m on fore wing, short malar space, long antenna, long and longitudinally ridged ovipositor and hind wing with anal cross vein present. As is true of other braconids, these wasps lack costal cell on the fore wing and metasomal segments 2 and 3 are

immovably jointed.

Species of Charmontinae are larvo-pupal endoparasitoids of concealed caterpillars of Lepidoptera and according to Yu et al. (2012) their recorded hosts belong to 16 families of Lepidoptera.

The recognition of Charmontinae as a subfamily of Braconidae is controversial and is still debated in literature. Achterberg (1979) treated the group as a tribe of the subfamily Homolobinae. Tobias (1986) treated genus *Charmon* under subfamily Orgilinae. Later, Quick and Achterberg (1990) raised the group to the rank of subfamily. These wasps also are similar to subfamily Macrocentrinae due to the longitudinally

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ridged ovipositor (Rousse, 2013). Wahl and Sharkey (1993) placed this group as a tribe of subfamily Macrocentrinae. Achterberg (1993) in his key to the subfamilies of Braconidae of the world recognized this group as a subfamily. Wharton et al. (1997) placed the two charmontine genera: *Charmon* Haliday and *Charmontia* Achterberg under subfamily Microtypinae. However, more recent works Ashkan (2010), Rousse (2013) and Beyarslan and Aydogdu (2013) recognize the group as a subfamily. In the present article the group is treated as a subfamily. Charmontinae is a small group with eight described species from the world belonging to two genera: *Charmontia* Achterberg (one described species) and *Charmon* Haliday (seven species); nevertheless it is a widely distributed group recorded from all bio-geographical regions except Antarctica (Yu et al., 2012).

Diagnostic Characters of Genus *Charmon* Haliday

Among the two described genera of subfamily Charmontinae, genus *Charmon* can be easily separated by the presence of very short third labial segment, absence of vein 1 Rs on fore wing (Achterberg, 1979) and the presence of an apical spine on terminal flagellomere.

Other Species of *Charmon*

Haliday (1833) described the genus *Charmon* and designated *Charmon cruentatus* as the type species. Achterberg (1979) described a new species *brevinervis* and provided a key to all the three described species of the genus known till that time. Rousse (2013) while describing a new species of the genus provided the

distinguishing characteristics of all the seven *Charmon* species in a tabulated form. The species he recognized under genus *Charmon* include *Charmon kozyrevskii* Belokobylskij, *C. paloratus* Papp, *Charmon taiwanensis* Chou and Hsushorter, *Charmon brevinervis* van Achterberg, *Charmon extensor* (L.), *Charmon ramagei* Rousse, *Charmon cruentatus* Haliday and *Charmon rufithorax* Chen and He. The author also provided a key to all the known species of the genus.

In the present paper the occurrence of *Charmon extensor* (L) from the northern Pakistan is being reported for the first time and a new species, *Charmon ovchinnikovi* is also described. A key for the separation of both the species is provided. The addition of this species raises the number of *Charmon* species to eight and that of *Charmontinae* to nine in the world. Both the species were caught at light near Shandur Pass of district Chitral.

MATERIALS AND METHOD

The study is based on specimens collected during an expedition to district Chitral of Khyber Pakhtunkhwa province of Pakistan. The specimens were washed with detergent and then rinsed with clean water and identified by using Achterberg (1979) and Rousse (2013) keys to species of genus *Charmon*.

The specimens were examined under stereo-zoom trinocular microscope (Nikon SMZ 745T) with 350X magnification. Photographs of important diagnostic characters and measurements were taken by 5.01 MP digital camera attached to the stereo-microscope. Terminology used

in this paper is that of Achterberg (1988). T_1 and T_2 are abbreviations for metasomal segment 1 and 2, respectively.

The material has been deposited in the Insect Museum of the Department of Entomology, The University of Agriculture, Peshawar, Pakistan.

Biogeography of the Area of Collection

Chitral is situated 35 50' 21.71" N 71 46' 48.19" E. It is the northern district of Khyber Pakhtunkhwa Province of Pakistan stretching at the extreme North West sharing border with Afghanistan to the North West.

The district is situated in the rain shadow of mountains, therefore, does not receive the monsoon rains. The mean rainfall is about 500 mm to 650 mm received mainly in spring and winter. Summer and autumn are dry, barely receiving 10-25mm rainfall per month. In upper Chitral, the annual precipitation is about 200mm with snow at higher elevations. Chitral is a mountainous region with 76% mountains, and only 4% cropland/orchards. The rest is mainly grazing land. Elevation of the area ranges from 1538 m to 1700 m.

RESULTS AND DISCUSSION

Two species have been recorded from Pakistan. These include an already described and widely distributed species, *Charmon extensor* (L.) and a new species, *Charmon ovchinnikovi*. These species can be separated by the following key:

1 Pterostigma 5X longer than broad (Figure 1); metasomal tegum 1 lightly longitudinally striated (Figure

2); color yellow *Charmon extensor* (L.)

1' Pterostigma 3X longer than broad (Figure 4); metasomal tergum 1 with irregular thick longitudinal ridges and rugosities (Figure 5); colour dark brown
Charmon ovchinnikovi new species

Charmon extensor (L.)

Linnaeus, Syst. nat. Ed. 10, 564 (as Linnaeus)

Provancher Naturaliste can. 12:171 (*Eubadizon gracilis*).
Synonymy by Achterberg.

Shenefelt, Hym. Cat. (Nov. Ed) 5(2): 234, 237, 238.

Capick 1970, Can. Ent. 102:853, Figure. 15.

Tobias 1971. Tr. Vsesoyuzn ent. Obshch. 54:231.

Capick 1972, Ento. Problemy 10: 133, 136. (according to Achterberg (1979) re-identification needed)

Mason, 1974. Proc. Ent. Soc. Wash. 76: 237, 238.

Tobias, 1976, Ope. SSSR, 110: 136. (according to Achterberg (1979) re-identification needed).

Fitton, 1978, Biol. J. Linn. Soc. 10:377.

The above synonymy is that of Achterberg (1979).

Material examined

, Pakistan: Khyber Pakhtunkhwa, Chitral, Shandur pass;

4.viii.2004 (collector: Sergey Ovchinnikov), on light.

Remarks

Charmon extensor is distributed worldwide. Achterberg (1979) examined specimens from Nearctic, Neotropical, Palearctic and oriental regions, re-described the species and stated that variations within the species are considerable. Present

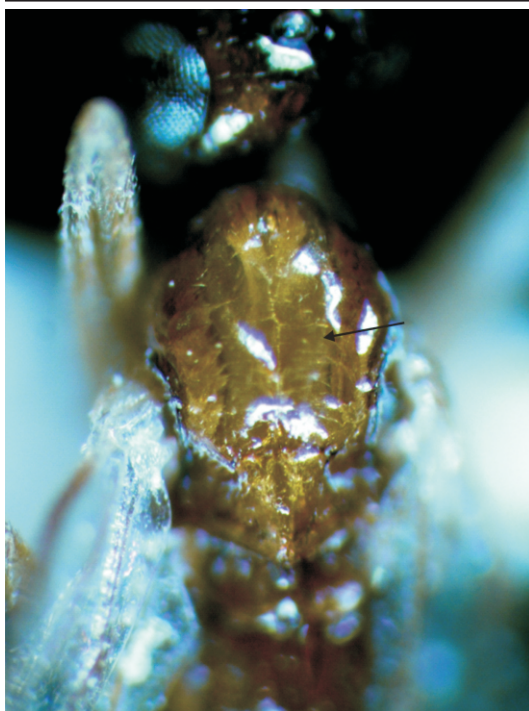


Figure 1. *Charmon extensor* (L.), arrow pointing to smooth mesoscutum, without notaulices

specimen does not fully tally with the published description, especially the colour. Published descriptions showed that the colour is predominantly dark brown. The examined specimen is completely yellow. According to Achterberg (1979) Afro-tropical specimens are yellowish. He further stated that colour is a character which is easily influenced by temperature. Based on this, the examined specimen can be safely placed as *Charmon extensor* (L.). The species is recorded for the first time from Pakistan.

***Charmon ovchinnikovi* new species**

1, Pakistan:- Khyber Pakhtunkhwa, Chitral, Shandur pass;

4.iii.2004 (collector: Sergey Ovchinnikov), on light.

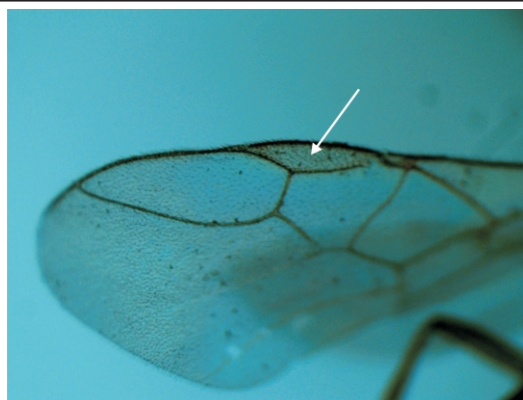


Figure 2. *Charmon extensor* (L), forewing (arrow pointing to 5X longer than broad pterostigma)

Description of Holotype female

Measurements

Body length, 5.5 mm; Ovipositor length, 7 mm; Fore wing length, 5 mm.

Colour

Antennae, reddish brown, Scape, yellowish brown; Face, vertex reddish brown; Mandibles, yellow, apices, black; Pronotum, reddish brown; Mesonotum, light reddish yellow; Legs, yellow for the most part; tibiae distally and tarsi infuscated; propodeum, dark brown with reddish tinge; remaining mesosoma and legs yellow. T_1 brownish black with reddish tinge posteriorly. Remaining metasoma brownish black.

Head

Antenna 41 segmented, first flagellomere 1.2X longer than second, 6X longer than broad, all segments cylindrical and longer than broad, F_2 and F_3 5.8 and 5.7X longer than broad respectively, all segments covered with setae, setae more thick on distal segments, last 7 flagellomeres flattened, except terminal flagellomere somewhat spindle

shaped and 3X longer than broad, apical spine on terminal flagellomere distinct. Occipital carina complete. Face almost smooth except with few sparsely scattered minute punctures; few longitudinal carinae below antennal sockets present. *Clypeus* situated at the level of lower margin of eyes, distinctly convex, with sparse punctures, 1.5X longer than high; fronto-clypeal suture distinct. Tentorial pits deep and distinct, Intertentorial distance 1.8X tentorio-ocular distance. Malar space 0.4X basal width of mandible; mandible almost parallel sided. Eyes large; frons and vertex smooth and shining, with minute and sparse setae; frons flat, smooth, head narrowed behind eyes. Ocello-ocular distance 2.3X inter-ocellar distance.

Mesosoma

1.5X longer than high, pronotum narrow, smooth, prosternum smooth and shining; with mid-longitudinal



Figure 3. *Charmon extensor* (L). Metasoma (arrow pointing to striated tergum 1)

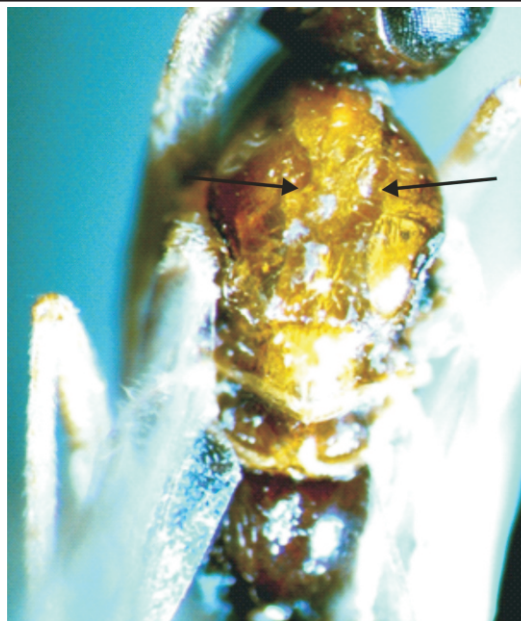


Figure 4. Mesosoma of *Charmon ovchinnikovi* sp.n. (arrow pointing to weakly impressed notaulices)

ridge; notauli represented by sub-equal irregular indistinct shallow depressions at anterior half (Figure 3); mesoscutum slightly overhanging anteriorly over pronotum. Scutellar sulcus smooth, scutellum smooth and shining; mesopleurom and mesosternum smooth, propodeum smooth and shining, with indistinct punctures medio-anteriorly.

Wings

Almost hyaline, pterostigma 3X longer than broad (Figure 1); r: SR1+3SR:2-SR = 3:4:14, 1-SR+M almost straight, 2-R1 distinct and slightly shorter than r; cu-a longer than 1-cu1, distinctly inclivuos.

Legs

Long, femur 5.9X longer than broad, tibia 11X longer than broad, spur 0.38X of basitarsus;

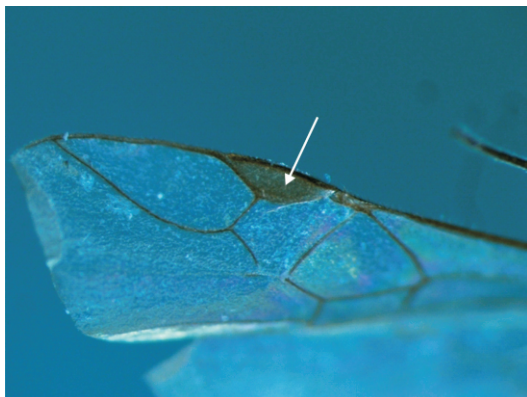


Figure 5. Forewing of *Charmon ovchinnikovi* sp.n. (arrow pointing to 3X longer than broad pterostigma)

Metasoma

T_1 1.6x longer than its apical width, somewhat convex, its surface irregularly longitudinally carinate with some rugosities, dorsal carinae present (Figure 5). T_2 and the following segments smooth; hypopygium short, not reaching tip of metasoma. Ovipositor 1.3X longer than body; sheath covered with setae.

Remarks

The new species, *Charmon ovchinnikovi*, is very much similar to *Charmon extensor* L. Both species have almost the same colour, smooth face, similar number and shape of antennal segments and wing venation. *Charmon ovchinnikovi* differs from *C. extensor* in two main characters: Tergum 1 (T_1) of *C. extensor* is finely longitudinally striate, without any rugosities, dorsal carinae present and the colour is yellow (Figure 2), while T_1 in this new species is strongly sclerotized, with irregular longitudinal striations and

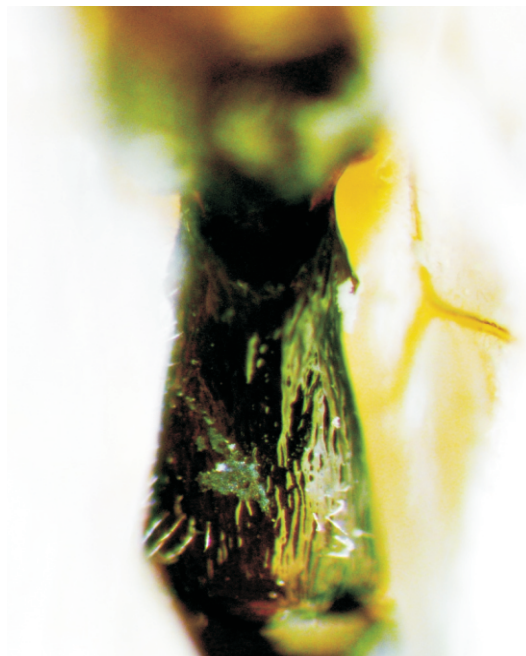


Figure 6. Metasomal Tergum 1 of *Charmon ovchinnikovi* sp.n. showing sculpture

with some dorso-lateral rugosities and distinct dorsal carinae and the colour is dark brown with reddish tinge (Figure 5). Another important difference between the two species is the shape of pterostigma. In *C. extensor* the pterostigma is 5X longer than broad (Figure 2), while it is only 3X longer than broad in this new species (Figure 4). The shape of pterostigma of this new species is similar to that other species of *Charmon* like *C. luteus* (Cameron) and *C. cruentatus* (Haliday). Other characters useful in separation of the two species are: the presence of weakly impressed notaulices anteriorly in this new species. Although the notaulices are not distinct, but represented by weakly impressed and sparsely pitted lines anteriorly; the impressed lines are more visible anteriorly and do not reach or meet

posteriorly, while in *C. extensor* notaulices are completely absent and mesoscutum is smooth and shining (Figure 6).

Etymology

The species is named after the late Sergey Ovchinnikov who collected the type specimen.

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