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Description of a new species of *Dendrocerus halidayi* group (Hymenoptera: Ceraphronoidea: Megaspilidae) from India

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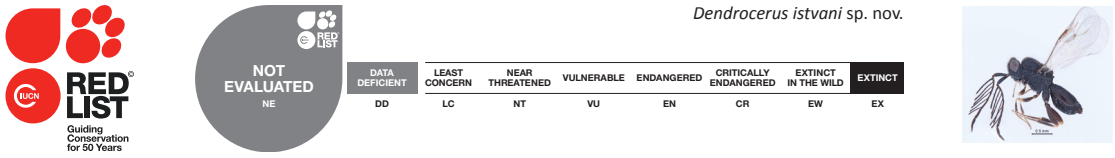
Abstract: *Dendrocerus istvani* sp. nov. is described from males with ramose antennal funicle. This species belongs to the *halidayi* species-group of *Dendrocerus* (Hymenoptera: Megaspilidae). A key to the oriental species of the *halidayi*-group is also given.

Keywords: *Dendrocerus halidayi,* India, Megaspilidae, new species, species-group.

Abbreviations: DFIm - Minimal Interocular Facial Distance; OOL - Ocellar-ocular Length (minimum distance between a posterior ocellus to the eye margin); POL - Post-ocellar Length (minimum distance between inner margins of posterior ocelli); LOL - Lateral-ocellar Length (minimum distance between a posterior ocellus and an anterior ocellus); A3–A11 - Antennal segments 3-11; ra_1–ra_6- branches of ramose antennal segments 1–6; T3 - Largest metasomal tergite.

The genus *Dendrocerus* Ratzeburg, 1852 (Hymenoptera: Megaspilidae) was described with *Dendrocerus lichtensteinii* Ratzeburg as the type species (by monotypy), a synonym of *Ceraphron halidayi* Curtis, 1829. This was later designated as a type of *Lygocerus,* a genus proposed as new by Förster (1856). But Dessart (1966) synonymised *Lygocerus* with *Dendrocerus,* and *D. lichtensteinii* with *C. halidayi* and the generic transfer of the latter with *D. halidayi.* Dessart (1995) proposed a division of the species (especially males), based on some antennal characters, into five species-groups like *halidayi, carpenteri, serricornis, punctipes* and *penmaricus.*

The species of the genus *Dendrocerus* are either primary parasitoids of Neuroptera and Diptera or



Dendrocerus istvani sp. nov.

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hyperparasites upon Homoptera and Coleoptera through Hymenoptera (Takada 1973). It is cosmopolitan in distribution with 118 world species. But only 15 species are known from the oriental region so far (Johnson & Musetti 2004). The Indian fauna is represented by six species (Rondani 1877; Mani 1939; Dessart 1973, 1999; Sharma 1983) of which one species, *D. mucronifer* Dessart belongs to the *D. halidayi* group. The males of the *D. halidayi* species group are characterised by their ramose antennae, and by the long branches on proximal 4, 5 or 6 flagellomeres. There are 22 species of this group worldwide (Pezzini et al. 2014).

In continuation with our pioneering taxonomic studies on the superfamily Ceraphronoidea of India, a new species under *Dendrocerus halidayi* group, viz., *D. istvani* is hereby described and illustrated. A key to distinguish the Oriental species of the *D. halidayi* group is also provided.

Materials and Methods

The specimens under study were collected using a sweep net. They were mounted on point-cards. Photographs were taken with a Leica M205A stereomicroscope, with 1x objective and Leica DFC-500 digital camera, with extended focusing software. Morphological terminology follows Fergusson (1980), Dessart (1999) and Miko & Deans (2009). Measurements are given in microns. Slide of male genitalia was prepared using the method given by Polaszek & Kimani (1990). Genitalia terminology follows Hymenoptera Anatomy Consortium (2014). The preparation was examined and photographed using Leica DM 2000 compound microscope with Leica DFC-500 digital camera.

The types are deposited in the National Zoological Collection, Western Ghat Regional Centre, Zoological Survey of India, Kozhikode.

Dendrocerus istvani sp. nov.

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(Images 1–8)

Material examined

Holotype: ZSI/WGRC/IR/INV. 2975, 13.ix.2008, Male, Kaddu Khal, Tehri District, Uttarakhand, India, 30^{0}24’27.28”N & 78^{0}17’18.16”E, elevation 2,529m (field dominated with tree species like *Quercus dilatata*, *Cedrus deodera* and *Rhododendron arboretum*), collected in a sweep net, coll. Dr. Sudhir Singh.

Paratypes: ZSI/WGRC/IR/INV. 2976 and 2977, two males, with same data as that of the holotype.

Diagnosis

Male antennae ramose with six long and slender branches; ra_1 1.5x times as long as scape; ra_6 longer than the following segment A9 and its axial body A8; A8 with a small spur; A9 longer than the A8; head transverse; DFIm 53% of the total head width; ocellar triangle isosceles and broad based; POL more than twice the length of LOL; fore wing hyaline; radius and stigma subequal in length; metasoma compressed (width/height = 0.60) with clear notaulices which is diverging and parallel to median groove; apex of the scutellum without mucron; large metasomal tergite with fine punctuation in posterior half dorsally; volsella with five and four solid setae on right and left parossiculi.

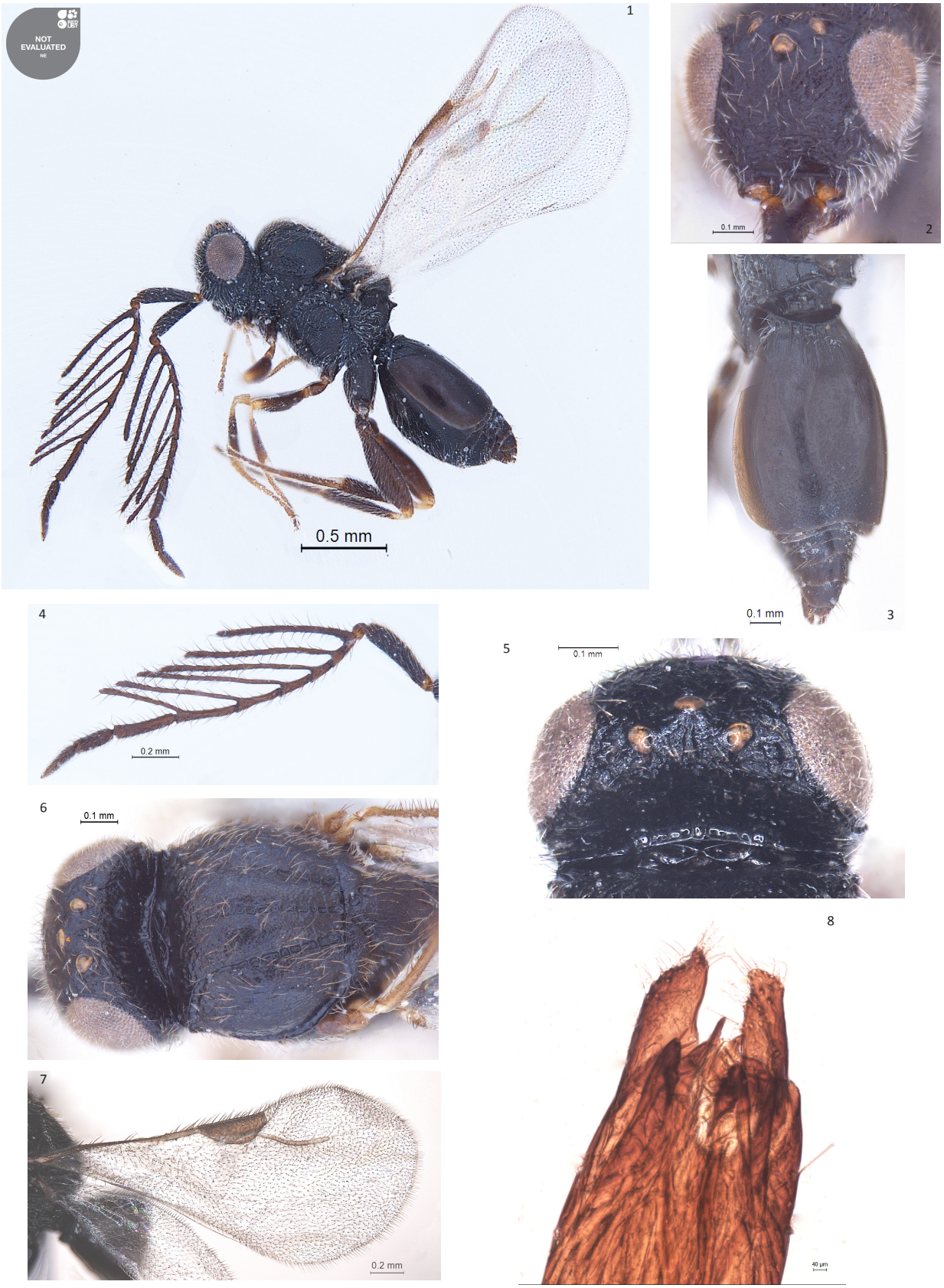
Description

Coloration: Black body with darker head and mesosoma; eyes silvery with a bronze tinge; ocelli brownish yellow; scape and hind coxa black with brownish yellow basal area in former; pedicel brownish-yellow; A3 and following segments chocolate brown; fore and mid coxa along with femur and tibia chocolate brown with brownish-yellow joints; large metasomal tergite, T3, chocolate brown (Image 1); pterostigma and costal vein brown; radial vein pale brown (Image 7); body pubescence white; marginal fringes of wings brown.

Body: length: 2.25mm.

Head: Head width 2.28x head length (length/width/height = 252/576/660); eye: eyes 1.2x longer than wide (length/width = 290/238); transverse in dorsal view, preoccipital crescent well marked, separated from hind ocelli and merging laterally into eye margin (Image 6); temple strongly carinated; preoccipital furrow present; ocellar triangle isosceles, short, broad and elevated; posterior ocelli separated from anterior ocellus by a distance of a little more than 2x post ocellar length; hind ocelli remote from eye margin; depressions near lateral ocelli shallow and that in front of median ocellus (supraoccipital groove) deep and conspicuous; POL/LOL/OOL: (111/52/62) (Image 5). DFIm 53% of head width; facial sulcus absent (Image 2); lower frons with strip of irregular transverse scattered striae denser more towards lateral ocular suture interspersed with fine granulate sculpture; supraclypeal depression absent; intertorular carina distinct (Image 2); ocular suture prominent and foveolate; eyes pubescent (Image 2); frons with sparse hairs; densely pubescent at gena.

Antenna: (Image 4). Ramose with six branches; pubescence more than two times longer than width of branches; scape nearly four times longer than wide; pedicel small and almost globular; ra_1 1.5x times longer



Images, 1-8. *Dendrocerus istvani* sp. nov. Male:
1- habitus; 2 - head, frontal view; 3 - metasoma, dorso-lateral view; 4 - ramose antenna; 5 - head, dorsal view; 6 - mesosoma, dorsal view; 7 - forewing; 8 - genitalia, apical part. © WGRC, ZSI, Calicut

than scape; ra_6 distinctly longer than its axial body (A8) and immediate segment following (A9); A8 proximally narrow and distally wide, with a small indistinct spur apically; branches decreasing their width from ra_1 to ra_6 respectively; ra_3 being longest branch (1.75x scape length); length/width measurements of antennal segments: scape (378/81), pedicel (64/59), A3 (60), ra_1 (580), A4 (95), ra_2 (640), A5 (114), ra_3 (660), A6 (134), ra_4 (630), A7 (203), ra_5 (540), A8 (258), ra_6 (360), A9 (268/52), A10 (176/63), A11 (198/53).

Mesosoma: (Image 6). Mesosoma fairly narrow (1.7x longer than wide) (Length/width/height = 1016/606/660); coriaceous in sculpture, densely pubescent; mesoscutum: (Length/width = 437/568); mesoscutum 1.3x wider than long, with more or less straight anterior margin; anterior corners of mesoscutum sharply angled; mesoscutal humeral sulcus evident; coarsely foveolate notaulices angled sharply, running parallel to median furrow and meeting at transscutal articulation (Image 6); scutellum 1.5x longer than wide, narrowed at apex with densely setose lateral margin; lateral scutellar carina evident; scutellum convex and highly sculptured with numerous hairs; metanotum and propodeum carinated; anterior margin of propodeum with a median spur.

Wing: (Image 7). Total wing length 1.94mm. Hyaline. Pterostigma (Length/width = 352/137) elliptical, 2.6x longer than wide; distal edge of pterostigma truncated; Radius (367mm), curved a little in the middle and nearly subequal (1.04x) to pterostigma; wing densely pubescent and marginal fringes numerous; hindwing without venation.

Metasoma: (Image 3) Mesosoma 1.7x longer than wide (Length/width/height = 962/503/507); metasoma smooth, but with numerous pit like punctuations in posterior one fourth of largest tergite, T3; eight strong transverse gastral carinae present in basal portion of metasoma; gastrocoeli not evident; T3 occupying 67% of metasomal length; five terminal segments visible dorsally with numerous hairs; genitalia with short basal ring, volsella with five prominent lateral setae on each left parossiculi and four on each right parossiculi (Image 8); harpe with numerous terminal long and slender setae.

Female: Unknown.

Biology: Unknown.

Etymology

The species is named 'istvani'; in honour of Dr. Istvan Miko, for his tremendous support and encouragement throughout our studies.

Discussion

The new species is morphologically similar to the African species, *D. incertissimus* Dessart, 1999, in the antennal features - long slender six branches, ra_1 longer than scape, A8 with a spur and with scutellar carina, but differs mainly in ocellar triangle ratio. *D. istvani* sp. nov. has its OOL greater than LOL, but in *D. incertissimus* it is just the opposite. Forewing of *D. istvani* sp. nov. is hyaline, while in *D. incertissimus* it is infuscate under radius; ra_2 6.7x as long as its axial body (A4) in *D. istvani* sp. nov., while in *D. incertissimus* it is 8.6x as long as its axial body. A9 is longer than A8 in the new species, but it is reverse in *D. incertissimus.*

Both the species being high altitude species they share a degree of relatedness in their ecology. *D. istvani* sp. nov. can be distinguished from the Indian species,

Key to the species of *Dendrocerus* Ratzeburg of *D. halidayi* group from Oriental Region (Based on males)

1	Ramose antenna with four branches; largest metasomal tergite, T3 unpunctuated ..... *Dendrocerus sergii* Alekseev 1994 (Vietnam)
-	Ramose antenna with five or six branches; largest metasomal tergite, T3 punctuated 2
2	Ramose antenna with five branches 3
-	Ramose antenna with six branches 4
3	Head globular; abnormally compressed mesosoma with mesoscutum longer than scutellum ..... *Dendrocerus angustus* Dessart 1999 (Taiwan & Kenya)
-	Head transverse; mesosoma normal with mesoscutum shorter than scutellum ..... *Dendrocerus ornatus* (Dodd) 1914 (Australia and Indonesia)
4	Scutellum with a mucron ..... *Dendrocerus mucronifer* Dessart 1999 (India)
-	Scutellum without mucron 5
5	LOL smaller than OOL; forewing hyaline; intertorular carina prominent ..... ***Dendrocerus istvani* sp. nov.** (India)
6	LOL longer than OOL; forewing fuscous; intertorular carina absent .....*Dendrocerus katmandu* Dessart 1999 (Nepal)

D. mucronifer and other Oriental species as per the key given.

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