



A New Species of Parasitoid Wasp *Euderus* (Eulophidae: Chalcidoidea: Hymenoptera) from Uttarakhand, India on Dainha Shoot Weevil

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A new species of the eulophid genus *Euderus* Haliday (*Euderus pantnagarensis* sp.nov) was described from Pantnagar, Uttarakhand, India. It was reared from the stem galls induced by shoot weevil, *Alcidodes bubo* Fabricius (Coleoptera: Curculionidae) on daincha, *Sesbania bispinosa*. It was compared with closely related species, *Euderus alcidodes* Singh in detail. Key to the oriental species of *Euderus* Haliday based on females is also given.

Key words: *Euderus*, *pantnagarensis*, *Alcidodes bubo*, *Sesbania bispinosa*, Eulophidae, New species

Gall-inducing insects are cosmopolitan group of herbivores. Close to 150 species of Coleoptera are known to be associated with plant galls. In Coleoptera, major gall-inducing species fall under Buprestidae, Cerambycidae, Chrysomelidae, and Curculionidae. Of these, the curculionids are the most diverse with close to 70 species (Ramamurthy, 2007). Among curculionids, shoot weevil *Alcidodes bubo* Fabricius is the most abundant gall inducing pest of green manure crop, *Sesbania bispinosa*. Adult weevils dig series of holes in the branches of the host and lay the eggs singly. The grubs emerging from egg start to feed inner content and over the period, stem thickenings are induced around the feeding site resulting in bizarre galls formation. These galls are in the phytophagous guild, which has the greatest number of parasitoid species. Thus, attempt has been made to determine the identity of eulophid parasitoid species associated with stem galls of *Sesbania bispinosa*.

Materials and Methods

Sesbania bispinosa branches with galls were collected from field in Pantnagar, Uttarakhand, India and brought to the laboratory. Portions of branches with galls were chopped and maintained in jars closed with fine muslin cloth. Emerging parasitoids were collected with the help of aspirator, killed with methyl acetate fume. Specimens were studied for colour and sculptural patterns under stereoscopic microscope. Later, the specimens were dissected and mounted on glass slides for detailed studies. Diagrams were drawn from the slides using camera lucida. All the measurements in the description are in millimeters. The type material was deposited at Biocontrol laboratory, GBPUA&T, Pantnagar and transferred to the national collection at Division of Entomology, IARI, Pusa Campus, New Delhi.

Abbreviations used in the description: POL- Postocellar line; OOL- Ocellocular line; FS- Funicle segment(s); SMV- Submarginal vein; MV- Marginal vein; PMV- Post marginal vein; SV- Stigmal vein

Euderus Haliday

Euderus (Haliday, 1844): Type species *Entedon amphis* Walker, by monotypy.

It is a cosmopolitan genus found in all the zoogeographical regions of the world. Boucek (1988) estimated about 100 species under it but presently, 78 species are known under it (Noyes, 2003). In Oriental region ten species were described of which, following eight are reported from India: *E. agromyzae* (Gangrade, 1961); *E. carpomyiae* (Bhatnagar, 1950); *E. gossypii* (Ferriere, 1931); *E. lividus* (Ashmead, 1886); *E. natadae* (Kurian, 1954); *E. pempheriphila* (Ayyar and Mani, 1937); *E. torymorides* (Ferriere, 1931) and *E. alcidodes* (Singh 2005). Other two oriental species are *E. malayensis* (Ferriere, 1930) and *E. masoni* (Yoshimoto, 1971; Noyes, 2003). Genus can easily be recognized by the presence of distinct lines of setae radiating from the base of stigmal vein, presence of complete and deep parapsidal furrows and similar type of antennae in both male and female.

Description of new species

Euderus pantnagarensis Mahendran, sp.nov (Figures 1-18)

Female

(Fig.1): Body length 1.75 mm; general body colour dark brownish black with bluish green metallic lustre dorsally. Gaster compressed laterally with well exerted ovipositor.

Head

Oval and wider than high in frontal aspect (0.40:0.36) (Fig.2); head frontal forks forming more

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or less straight horizontal line medially touching the median ocellus; ocelli arranged in obtuse angled triangle; POL:OOL(0.15:0.02); antennal toruli situated well above the lower level of eye margin, both inter and intra scrobal lines present; malar sulcus present; malar space longer than eye width (0.12:0.10); mandibles (Fig.3) tridentate, maxillary (Fig.4) and labial (Fig.5) palpi 2 segmented; lower margin of clypeus broad, straight. Antennae (Fig.6) 11 segmented including 2 anelli; apical tip of antenna pointed, antennal formula 1,1,2,4,3; scape cylindrical, as long as club (0.14); pedicel longer than wide(0.05:0.04) and longer than FS1; funicle 4 segmented and all funicle segments slightly longer than wide, FS1 is the shortest of all funicle segments, FS2 shorter than FS3(0.045:0.049) and equal to the length of FS4; club 3 segmented, 2.3x times as long as wide (0.14:0.06), longer than preceding two funicle segments combined.

Thorax

Longer than wider with integument reticulate and punctate sculpture; (Fig.8). Pronotum(Fig.9) is hidden by the mesoscutum in dorsal view with well developed reticulate punctate sculpture on the lateral side, anterior margin flat, postero-lateral margins with projected corners; mesoscutum wider than long; mesoscutum having 3 pairs of setae, notauli complete, axilla not advanced; scutellum longer than mesoscutum, posterior tip projected and hiding the post scutellum dorsally; scutellum longer than wider (0.24:0.19), slightly wider posteriorly with reticulate- punctate sculpture; posterior sculpture size larger than anterior and 2 pairs of setae situated on scutellum; metanotum broad with numerous fine carinae on the surface. Propodeum (Fig.10) with fine reticulate- punctate sculpture, well grooved median carina and without paraspiracular carinae; propodeal spiracles well separated from the anterior margin of propodeum. In lateral view (Fig. 1), metanotum and propodeum slant from the scutellum. Fore wings (Fig.11) hyaline, SMV with 3 setae directed upwards; costal cell bare; MV more than 1.5 times as long as SMV(0.32:0.19) and bearing 1 pair of admarginal setae; PMV longer than SV; SV with 4 uncus and single strong setae near uncus; 10 rows of setae extend beyond the stigma to the apex of the wing. Hind wings (Fig.13): more than 4.5 times as long as wide (0.74:0.16) with blunt apex; vein length (0.45) more than one half the length of wing. Legs (Fig.15, 16 &17) hairy, brownish except †three tarsal segments whitish; slight metallic lustre on the coxae, femur, tibiae. Apical tip of the middle and hind tibiae whitish.

Gaster

Laterally compressed; last tergal segment well elongated, tubular, densely setose and cover more than 2/3rd of the exerted ovipositor sheath; exerted length of ovipositor sheath is longer than thorax; length of ovipositor more than 1.75 times as long as head and thorax combined; first valvifer elongated and slightly curved posteriorly; second valvifer very large and much curved and forming sickle shaped;

third valvulae distinctly present with strong spines on the ventral surface; cercal setae long.

Male

(Fig.7, 12 &14). Similar to that of female except for its smaller size and genitalia.

Comments

Presently described species resembles *Euderus alcidodes* Singh possess elongated tubular last gastral segment covering 2/3rd of the long exerted ovipositor. It differs from the latter in having 1. Mandible with three teeth; (in *E.alcidodes* mandible with two teeth and truncation), 2. Antennal pedicel more or less conical in shape; (in *E.alcidodes* antennal pedicel oval in shape), 3. Antenna with two transverse annelli; (in *E.alcidodes* antenna with single annellus), 4. Lateral side of the pronotum with reticulate-punctate sculpture; (in *E.alcidodes* lateral side of the pronotum with regulose sculpture with prominent knob), 5. Mesoscutum with 3 pairs of setae; (in *E. Alcidodes* mesoscutum with 4 pairs of setae), 6. Scutellum wider posteriorly; (in *E. Alcidodes* scutellum wider anteriorly).

Etymology

Species name is derived from locality Pantnagar, from where stem galls were collected.

Materials examined

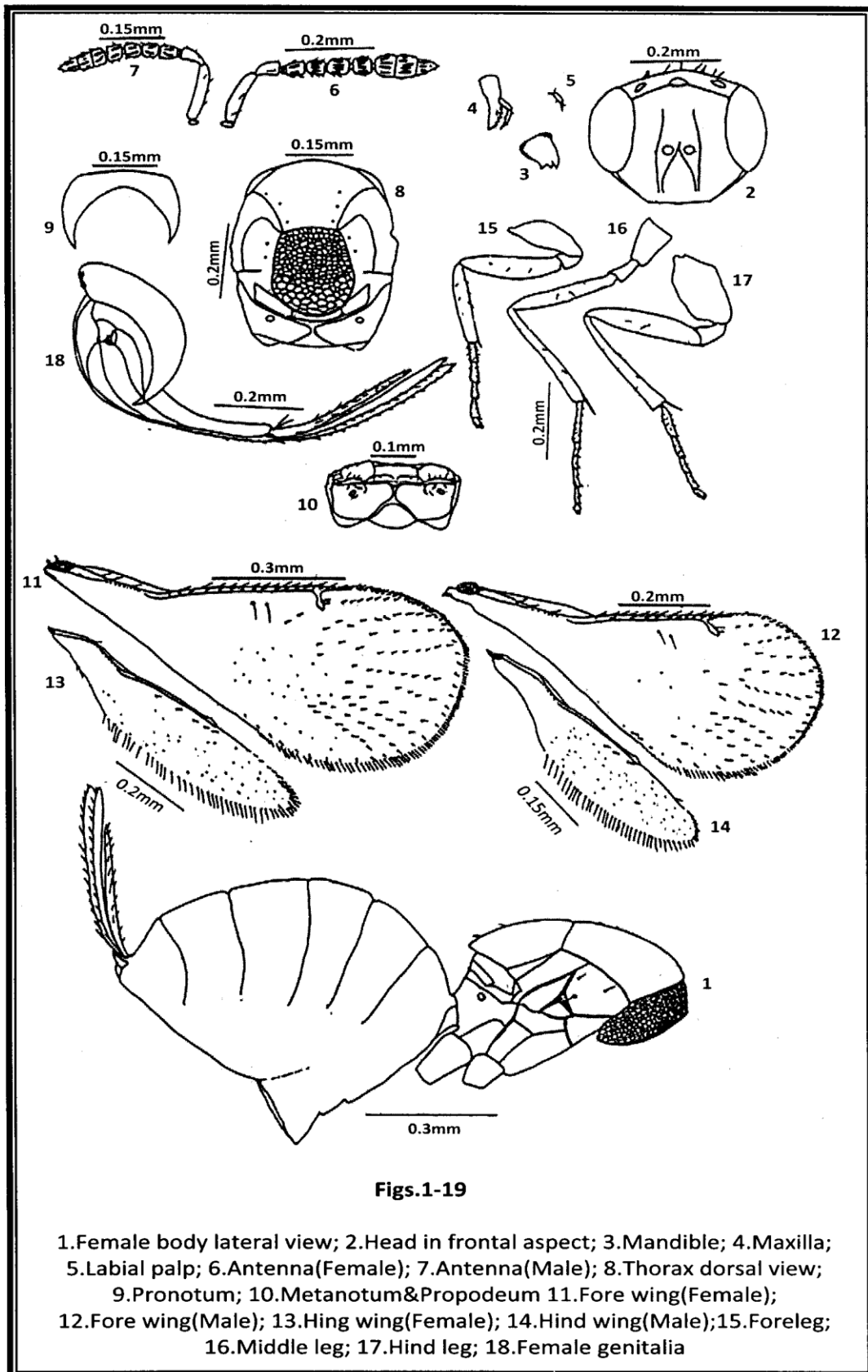
Holotype

Female, one dissected and mounted on slide. India, Uttarakhand, U.S.Nagar, Pantnagar, Host: reared from stem galls induced by stem weevil, *Alcidodes bubo* F. (Curculionidae: Coleoptera) on *Sesbania bispinosa*, 14-10-2010, Hym. Eulo. Nr.10 (Mahendran).

Paratype. 2 ♂♂, same data as holotype.

Key to the oriental species of *Euderus* Haliday based on females (Modified from Singh (2005) to include new species)

1. Ovipositor protruding greatly, as long as or longer than two-thirds of the gaster2
- Ovipositor short less than one-fifth of gaster length.....4
2. Last gastral segment elongated, tubular and covering 2/3rd of the long exerted ovipositor, funicle segments squarish or slightly longer than wide.....3
- Last gastral segment is not elongated, all funicle segments clearly longer than wide, pedicel conical, scape 3x pedicel*torymoides*
3. Antennal pedicel conical with 1 transverse annellus, scutellum wider anteriorly*alcidodes*
- Antennal pedicel oval with 2 anelli, scutellum wider posteriorly*pantnagarensis* sp.nov



4. Three lines of setae arising from the base of the stigmal vein, first forming a narrow radial cell, II curved and reaching towards the tip of wing, and III directed to the base of the wing; other lines are also5
5
 - Lines of setae not as mentioned above

agromyzae
5. First funicle segment equal or shorter than pedicel in length6
6
 - First funicle segment longer than8
8
6. First funicle segment equal to pedicel in h.....7
7
 -First funicle segment shorter than dicel.....

gossypii
7. First funicle segment shorter than second; 4 long setae under the marginal vein; ovipositor slightly

carpomyiae
- First funicle segment equal to second;
 below marginal vein more than 8 long setae

pempheriphila
8. First funicle segment shorter than second funicle segment; 3 to 4 long setae under marginal vein; gaster two times as long as thorax; antenna brown scape yellowish on the ventral side, flagellum

malayaensis
- Second funicle segment equal to first segment;
 about 8 long setae under the marginal vein; scape yellow to yellowish orange, flagellum fuscous; gaster not as long.....

masoni

(Two species, i.e., *lividus* and *natadae* could not be included in the key as relevant description could not be found for the former, and latter is based on male only).

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