

**SCOLIID WASPS (HYMENOPTERA: VESPOIDEA)
OF JALDAPARA WILDLIFE SANCTUARY,
WEST BENGAL, INDIA**

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ABSTRACT: Five scoliid wasp species are reported for the first time from Jaldapara Wildlife Sanctuary, West Bengal, India. Necessary diagnosis of the recorded taxa is furnished. Keys to their tribes, genera and species are also provided.

KEY WORDS: Scoliidae, Jaldapara Wildlife Sanctuary, Scoliinae, *Campsomeriella*, *Phalerimeris*, *Megascolia*, *Scolia*.

Family Scoliidae, one of the rare groups of wasps is known by 300 extant species only (Resh & Carde, 2004). This represents 1.21 % of the global vespoid fauna. Even though Indian scoliids has a history of 235 years, very few have worked on the group. It was Fabricius (1775) who first dealt with the Indian scoliids and Bingham (1897) was the first to provide a consolidated account of Scoliidae of the Indian subcontinent. This was followed by Betrem's (1928) monograph on Indo-Australian Scoliidae. Later contributors are Gupta (1997 a, b), Gupta & Jonathan (2003), Jonathan & Gupta (1999 a, b; 2003), Girish Kumar (2009 a, b; 2010). Till date, Indian fauna is known by 79 species which includes 30 species of West Bengal. However, none of these works ever included study on the protected areas of Northeast India, more so of West Bengal.

During our study on the vespoids of Jaldapara Wildlife Sanctuary, Jalpaiguri, West Bengal during 2001-04, we have recorded 5 scoliid wasps namely *Campsomeriella* (*Campsomeriella*) *collaris collaris* (Fabricius), *Campsomeriella* (*Annulimeris*) *annulata annulata* (Fabricius), *Phalerimeris phalerata phalerata* (Saussure), *Megascolia* (*Regiscolia*) *azurea christiana* (Betrem & Guiglia) and *Scolia* (*Discolia*) *affinis* Guérin.

Taxonomy of the mentioned species are provided hereunder.

MATERIALS AND METHODS

Scoliid wasps were collected between 8 am- 12 noon from different beats of JWLS by sweep net. Collection and preservation of the samples were done following Alfred and Ramakrishna (2004). The wasps were studied and illustrated under stereo microscope Zeiss (SV6). All scales of measurement are in 1 mm if not

otherwise stated. The materials are in the deposition of Entomology Laboratory, Department of Zoology, University of Calcutta.

Abbreviations used: TL=Total Length; WL=Wing Length (Fore wing/hind wing).

TAXONOMY

Key to Tribes

1. Fore wing with 2 recurrent nervures (Fig.3), 2nd one running from subdiscoidal to cubital vein; 1st abdominal segment without any mid basal tubercle, 2nd and 3rd segments often with subapical row of setae bearing punctures; volsella divided into basal and apical part by a transverse suture.....*Campsomerini* Betrem
 - Fore wing with 1 recurrent nervure (Fig. 23), 2nd recurrent nervure when present coalescing with the 1st recurrent nervure before reaching cubital vein; 1st abdominal segment often with a basomedial tubercle, 2nd and 3rd segments never with subapical row of setae bearing punctures; volsella not divided into basal and apical part.....*Scoliini* Latreille

Tribe *Campsomerini*

Key to Genera

1. Upper plate of metapleuron impunctate, sometimes with fine, sparse punctures above; transition between its vertical and dorsal areas straight, marked with an entirely or partly distinct carina below base of hind wing.....*Campsomeriella* Betrem
 -. Upper plate of metapleuron punctate above: transition between its vertical and dorsal areas gradual or straight, usually straight anteriorly and gradual posteriorly.....*Phalerimeris* Betrem

Genus *Campsomeriella*

Key to Species

1. Wings black brown with a violaceous tint; abdomen not petiolate (Fig. 1); vestiture on legs, propodeum, margins of abdominal segments black; spurs of hind tibia black or testaceous; lateral carina of propodeum short, not extending upto spiracle.....*Campsomeriella (Campsomeriella) collaris collaris* (Fabricius)
 -. Wings clear, hyaline; abdomen subpetiolate (Fig. 9); vestiture dense creamy white; spurs on hind tibia white; lateral carina of propodeum long, extending somewhat beyond spiracle.....*Campsomeriella (Annulimeris) annulata annulata* (Fabricius)

***Campsomeriella (Campsomeriella) collaris collaris* (Fabricius)**

(Figs. 1-4)

1775. *Tiphia collaris* Fabricius, Syst. Ent.,:354.

1895. *Colpa parvula* Lepelletier, Hist. nat. Ins.: Hym., 3: 584.

1967. *Campsomeriella (Campsomeriella) collaris collaris* (Fabricius); Betrem, Ent. Ber., Amst., 27: 29. (*Campsomeriella* raised to generic rank and *collaris* placed in subgenus *Campsomeriella*, section *Campsomeriella*).

1978. *Campsomeriella (Campsomeriella) collaris collaris* (Fabricius); Krombein, Smithsonian Contr. Zool., 283: 18-19.

Diagnosis (Female): Measurements: TL: 22; WL: 19/ 13. Black; vestiture on back of head, pronotum, scutum dense silky fuscous white, on legs, propodeum, margins of abdominal segments metallic black; punctures on head sparse, more

dense on thorax, sparse on abdomen; frons transverse, convex, rugosely punctate, with a midlongitudinal sulcation ending between antennal bases, frontal lamina convex, round; antennae downwardly placed, slightly above clypeal margin; scrobe depressed; clypeus convex, apical margin curved, carinate and transversely striate, laterally lamellate; mandibles broad, sickle shaped, surface strongly grooved, apical margin with brown stiff bristles; pronotum broad, band like; scutum subquadrate; scutellum broad, transverse; metanotum narrow, transverse, band like; propodeum apically broadly emarginate, medially subtuberculate; abdomen elongate, broad, margins ciliate, apical segment with dense, stiff setae; wings blackish brown with violaceous tint; with 2 submarginal cells, 2nd receiving 2 recurrent nervures at base; discoidal cell subpentagonal, jugal lobe of hind wing elongate, crossing anal cell.

Material Examined: 1 female, 27.iv.02, Bendaki; Jalpaiguri; West Bengal; coll. Samrat Bhattacharjee.

Distribution: India (Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Delhi, Goa, Gujarat, Haryana, Himachal Pradesh, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra, Meghalaya, Orissa, Sikkim, Tripura, Uttarakhand, Uttar Pradesh, West Bengal), Nepal, Sri Lanka (Jonathan & Gupta, 2003; Girish Kumar, 2009a, 2010).

Campsomeriella (Annulimeris) annulata annulata (Fabricius)

(Figs. 5- 10)

1793. *Tiphia annulata* Fabricius, Ent. Syst., 2: 225.

1845. *Campsomeris servillei* Lepelletier, Hist. nat. Ins., Hym., 3: 501.

1901. *Elis aglaea* Cameron, Proc. zool. Soc. London, 2:19.

1967. *Campsomeriella (Campsomeriella) annulata* (Fabricius); Betrem, Ent. Ber., 27: 25-

29. (*Campsomeriella* raised to generic rank and *annulata* placed in subgenus *Annulimeris*).

1979. *Campsomeriella (Campsomeriella) annulata annulata* (Fabricius); Krombein, Cat. Hym. North Mexico, 2: 1317.

Diagnosis (Male): Measurements: TL: 19; WL: 12/ 9. Metallic black, clypeus except a diamond spot in the middle and a vertical line above it, a transverse band medially on pronotum, tegula, 2 transverse spots on scutellum, a spot on metanotum, a broad, transverse band on the apical margin of abdominal segments 1-5, not so pronounced on the 5th segment, apical half of femur and whole of outer surface of tibia yellow; vestiture dense creamy white; pubescence silvery; body densely punctate, these sparse on abdomen; head oval, transverse, frons transverse, medially rising and then descending down on clypeus, with a faint midlongitudinal sulcation; clypeus convex, pentagonal, apical margin arched, lamellate; mandibles elongate, narrow; thorax broad, elongate, slightly convex; pronotum anteriorly margined; scutum quadrate, very slightly convex, scutellum transverse, rectangular; metanotum narrow, transverse, sides expanded; propodeum broad, apically shallowly truncate, truncate surface rather obliquely sloping; orifice round; abdomen subpetiolate, excluding petiole parallel sided; petiole apically sloping; 1st segment with an anterior collar; wings clear, hyaline, upper margin and apical area pubescent; with 2 submarginal cells, 2nd receiving 2 recurrent nervures about middle of base; discoidal cell subquadrate; jugal lobe of hind wing crossing anal vein; male genitalia as in figure 10.

Material Examined: 1 male, 08.xi.01, Jaldapara; Jalpaiguri; West Bengal; coll. Sumana Saha.

Distribution: China, India (Arunachal Pradesh, Assam, Bihar, Himachal Pradesh, Jammu & Kashmir, Manipur, Meghalaya, Sikkim, Tripura, Uttarakhand, Uttar Pradesh, West Bengal) (Jonathan & Gupta, 2003; Girish Kumar, 2010).

***Phalerimeris phalerata phalerata* (Saussure)**

(Figs. 11- 14)

1858. *Elis* (*Campsomeris*) *phalerata* Saussure, Ann. Soc. ent. France, (3) 6: 233.

1897. *Elis* (*Dielis*) *iris* Lepelitier; Bingham, Fauna British India, Hym., 1: 94.

1911. *Campsomeris albopilosa* Rohwer, Proc. U.S. Natn. Mus., 39: 480.

1972. *Campsomeris* (*Phalerimeris*) *phalerata* (Saussure); Tsuneki, Etizenia, 62: 15-16.

1974. *Phalerimeris phalerata phalerata* (Saussure), Bradley, Revue Suisse Zool., 81: 460.

Diagnosis (Female): Measurements: TL: 13; WL: 11/ 8. Black, apical margin of 1st, 2nd and 3rd abdominal segments yellow, the same on 2nd segment medially broad; vestiture dense on the front, disc of scutum and vertex brownish, these on the back of head, pronotum, metanotum, abdomen and legs metallic yellowish brown; punctures coarse, these on frons and vertex and abdomen sparse, on pronotum at the sides, scutum, scutellum, metanotum and propodeum dense; frons convex with a midlongitudinal sulcation (frontal fissure) reaching above frontal area; scrobe depressed, divergent; frontal lamina raised, broad, narrowly covering base of antenna; eyes convex, medially inwardly incised; clypeus flat, transverse, laterally lamellate with silky golden pubescence, basal margin straight, apical margin broad, carinate, transversely striate; mandibles long, sickle shaped, crossing each other to reach almost the base, apical margin setose; pronotum broad, band like; scutum subquadrate; tegula convex, polished, laterally expanded, apical margin convex; scutellum transverse, bowl-like; metanotum narrow, transverse, below level of scutellum; propodeum small, apically shallowly truncate, median area apically narrowed; abdomen elongate, sides nearly parallel, slightly narrowing, apical segment truncate, wings flavohyaline, with a broad subapical fuscous spot; upper margin including 2nd submarginal cell with small hairs; with 2 submarginal cells, 2nd one receiving both recurrent nervures; discoidal cell subrectangular, sides oblique.

Material Examined: 1 female, 08.xi.01, Jaldapara; Jalpaiguri; West Bengal; coll. Samrat Bhattacharjee.

Distribution: China, India (Arunachal Pradesh, Assam, Himachal Pradesh, Jharkhand, Meghalaya, Sikkim, Tripura, Uttarakhand, Uttar Pradesh, West Bengal) Indonesia, Malaysia, Myanmar, Nepal, Taiwan, Thailand (Jonathan & Gupta, 2003; Girish Kumar, 2010).

Tribe Scoliini

Key to genera

1. Body large (19-50 mm); distance from eyes to hind margin of head in female equal to about twice the diameter of the upper lobe of an eye; fore wing with 3 submarginal cells; 1st abdominal segment with a strong basomedian tubercle, pointed in male..... *Megascolia* Betrem

-. Body small to moderate (5-25 mm); distance from eyes to hind margin of head in female slightly more than the diameter of the upper eye lobe; fore wing with 2 submarginal cells; 1st abdominal segment sometimes with a small to moderate basomedian tubercle..... *Scolia* Fabricius

***Megascolia (Regiscolia) azurea christiana* (Betrem & Guiglia)**

(Figs. 15-19)

1892. *Scolia (Triscolia) rubiginosa* Fabricius; Magretti, Ann. Mus. civico Stor. nat. Geneva, 32: 236.
1958. *Megascolia (Regiscolia) azurea christiana* Betrem & Guiglia, Ann. Mus. civico Stor. nat. Genova, 70: 96.
1964. *Megascolia (Regiscolia) azurea christiana* (Betrem & Guiglia); Betrem & Bradley, Zool. Meded., 39: 444.

Diagnosis (Male): Measurements: TL: 26; WL: 20/ 14. Black, with a metallic coppery tint, dorsal half of face, 2 broad, oval marks on 3rd abdominal segment, the same on the 4th segment (not so pronounced) orange; vestiture dense, on body metallic black, on 1st and 2nd abdominal segments black and succeeding segments orange brown; punctures on head coarse, sparse, dense on sides of pronotum, sparse on scutum, with a gradual increase in density towards propodeum, on abdomen irregular, basal margins with small dense punctures; head round, dorsally broadly convex; frons broad, transverse, medially strongly ridged, frontal lamina strongly ridged, curved; supraclypeal area longitudinally carinate, coarsely punctate; clypeus flat, transverse, medially weakly raised, margins lamellate, apical margin finely, transversely striate in the middle, surface with punctures and large depressions; scrobe depressed; mandibles broad, sickle shaped, surface with thin sulcation running from middle of base; malar space very narrow; thorax long, broad, slightly convex; pronotum anteriorly recurved, sides sloped; scutum subquadrate; scutellum broad, laterally sloped; metanotum broad, transverse, bandlike, laterally expanded; propodeum apically roundly truncate, shallow, dorsomedian area broadly convergent below; abdomen long, posteriorly broadly narrowing; 2nd segment broad, wings dark brown, with coppery effulgence; with 3 submarginal cells, 2nd receiving only 1 recurrent nervure about middle at base; jugal lobe of hind wing broad, crossing anal cell; discoidal cell subquadrate, apex pointed; claws simple; male genitalia as in figure 19.

Material Examined: 1 male, 01.v.03, Hollong; Jalpaiguri; West Bengal; coll. Dinendra Raychaudhuri.

Distribution: Bangladesh, India (Arunachal Pradesh, Assam, Himachal Pradesh, Manipur, Meghalaya, Mizoram, Orissa, Sikkim, Tripura, Uttarakhand, West Bengal), Myanmar, Nepal (Jonathan & Gupta, 2003; Girish Kumar, 2009b, 2010).

***Scolia (Discolia) affinis* Guérin**

(Figs. 20-24)

1838. *Scolia affinis* Guérin, Voy. Coq.: 254.
1855. *Scolia (Lacosi) jurinei* Saussure, Mem. Soc. Phys. Hist. nat. Geneva, 14: 45.
1864. *Scolia (Discolia) aureipennis* Lepelletier; Saussure and Sichel, Cat. Spec. Gen. Scolia: 109.
1978. *Scolia (Discolia) affinis* Guérin; Krombein, Smithsonian Contr. Zool., 283: 31-33.

Diagnosis (Male): Measurements: TL: 23; WL: 15/10. Black, with a beautiful metallic reflection all over, flagellum orange brown; vestiture at the back of head, sides of pronotum, abdomen, legs dense black; punctures on vertex small, scattered on frons, pronotum dense, comparatively lesser on scutum and abdomen; head oval, convex; frons broad, convex, midlongitudinally sulcate, sulcation between the antennae well marked; antennae downwardly placed, narrowly separated from clypeus; clypeus transverse, medially raised, apical margin lamellate, curved, reflexed; mandibles long, sickle shaped, surface

grooved, margin with stiff brown hairs; thorax broad, elongate, convex; pronotum anteriorly slightly curved; scutum subquadrate; scutellum subquadrate, laterally sloping; metanotum transverse, band like; propodeum posteriorly narrowing, rather shallowly truncate towards apex, orifice round; abdomen elongate, convex, parallel sided; basal segment basomedially subtuberculate; except the apical segment which is rounded posteriorly; wings fuscous, with bluish metallic effulgence; 1st submarginal cell receiving 1 recurrent nervure about middle of base; jugal lobe in hind wing elongate, crossing anal cell; male genitalia as in figure 24.

Material Examined: 1 male, 02.vi.03, Sissamara; Jalpaiguri; West Bengal; coll. Samrat Bhattacharjee.

Distribution: Bangladesh, India (Arunachal Pradesh, Assam, Bihar, Chattisgarh, Delhi, Himachal Pradesh, Jharkhand, Jammu & Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Meghalaya, Nagaland, Orissa, Pondicherry, Sikkim, Tamil Nadu, Tripura, Uttarakhand, Uttar Pradesh, West Bengal), Nepal, Pakistan (Jonathan & Gupta, 2003; Girish Kumar, 2010).

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Resh, V. H. & Carde, R. T. (Ed.) 2004. Encyclopedia of Insects. Academic Press, California USA: 536-537.



Fig. 1

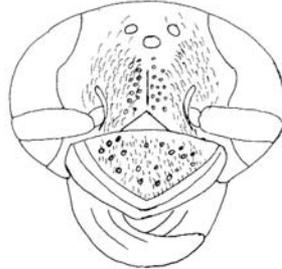


Fig. 2

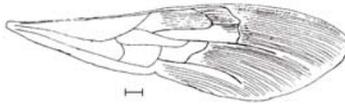


Fig. 3

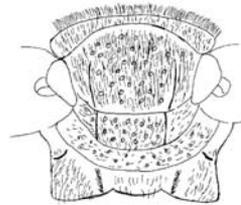
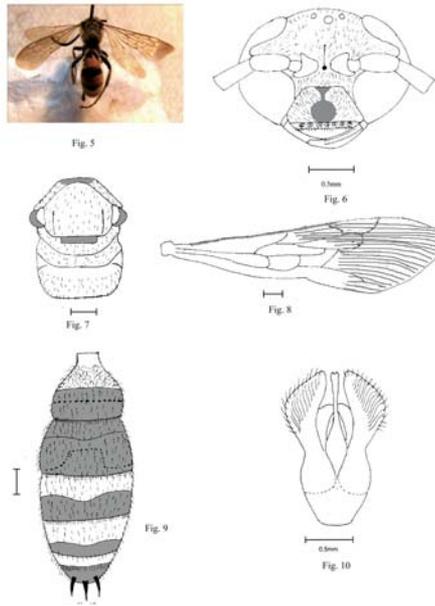
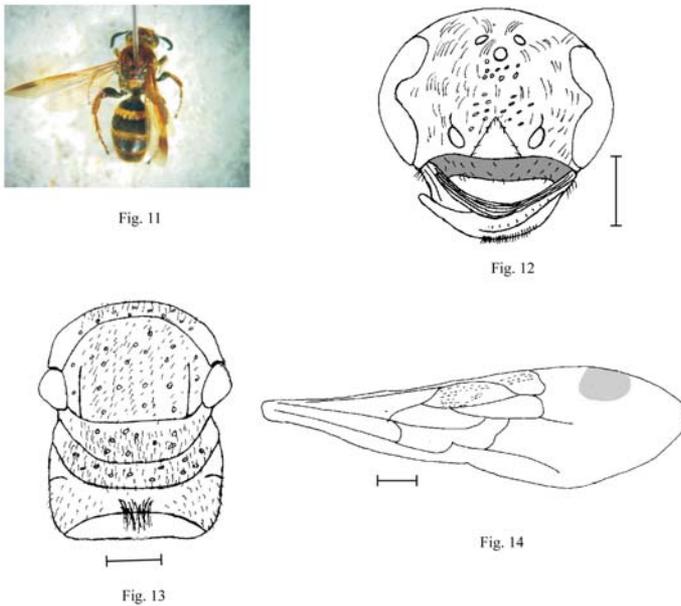


Fig. 4

Figures 1-4. *Campsomeriella (Campsomeriella) collaris collaris* (Fabricius): 1. Photographic image, 2. Face: frontal view, 3. Fore wing: dorsal view, 4. Thorax: dorsal view.



Figures 5-10. *Campsomeriella (Annulimeris) annulata annulata* (Fabricius): 5. Photographic image, 6. Face: frontal view, 7. Thorax: dorsal view, 8. Fore wing: dorsal view, 9. Abdomen: dorsal view, 10. Male genitalia: dorsal view.



Figures 11-14. *Phalerimeris phalerata phalerata* (Saussure): 11. Photographic image, 12. Face: frontal view, 13. Thorax: dorsal view, 14. Fore wing: dorsal view.



Fig. 15

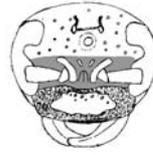


Fig. 16



Fig. 17

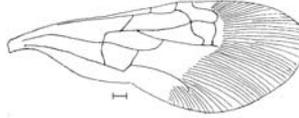


Fig. 18



Fig. 19

Figures 15-19. *Megascalotia (Regiscalotia) azurea christiana* (Betrem & Guiglia): 15. Photographic image, 16. Face: frontal view, 17. Thorax: dorsal view, 18. Fore wing: dorsal view, 19. Male genitalia: dorsal view.



Fig. 20

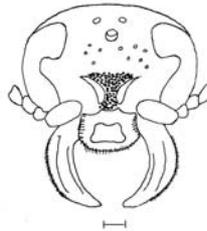


Fig. 21

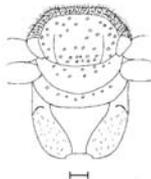


Fig. 22

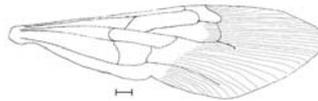


Fig. 23



Fig. 24

Figures 20-24. *Scolia (Discolia) affinis* Guérin: 20. Photographic image, 21. Face frontal: view, 22. Thorax: dorsal view, 23. Fore wing: dorsal view, 24. Male genitalia: dorsal view.