

NEW DISTRIBUTIONAL RECORDS OF SCOLIID WASPS (INSECTA: HYMENOPTERA: SCOLIIDAE) FROM INDIA

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INTRODUCTION

The family Scoliidae, belonging to the Superfamily Vespoidea of the order Hymenoptera, is a group of most primitive solitary aculeate wasps. They are commonly known as hairy wasps. Adults are stoutly bodied, densely hairy, often predominantly black, commonly marked with yellow, orange or red and extensively modified for fossorial habit. Their wings are hyaline, yellowish hyaline or dark with metallic reflections. The hair varies from entirely black or black mixed with white to entirely golden or reddish. Size may vary in length from 5 mm to 36 mm, rarely up to 50 mm. They are usually very fast moving wasps. Males and females usually show higher degree of sexual dimorphism. They have the biological characteristics of the more primitive parasitic Hymenoptera, and the morphological characteristics of the more advanced “stinging wasps”. The larvae of scoliid wasps are ectoparasitoides on white grubs usually Scarabaeoidea larva. Because of their parasitic habits, it is possible to exploit some of these wasps for biological control of insect pests.

The members of this family are separated from

other wasps by the following combination of characters: tripartite propodeum, wing membrane beyond the cells closely striolate and the meso and the metasternum form a flat plate overlying the bases of the middle and hind coxa.

Distributed throughout the World but predominantly found in tropical countries, the scoliid wasps consist of about 560 species, 220 subspecies distributed among 43 genera, 28 subgenera in two subfamilies viz., Proscoliniinae and Scoliinae (Osten, 2005). The subfamily Proscoliniinae is represented by a single genus *Proscolia* Rasnitsyn, endemic to Armenia and Greece. The subfamily Scoliinae is distributed throughout the World. 79 species in 14 genera have been reported from India so far (Gupta & Jonathan, 2003; Girish Kumar & Kazmi, 2008, 2012; Girish Kumar, 2009a, 2009b, 2011; Schulten *et al.*, 2011; Girish Kumar & Sharma, 2013; Manoj Jadhav *et. al.*, 2014; Manoj Jadhav & Gaikwad, 2014).

MATERIAL AND METHODS

This study is based on the unidentified collections of scoliid wasps deposited in the Hymenoptera section of the Zoological Survey of India, Kolkata collected from various localities

of the country. All the specimens studied here are properly registered and added to the 'National Zoological Collections' of the Hymenoptera Section, Zoological Survey of India, Kolkata (NZC).

The following abbreviations used in the text for the Museums: BMNH = The Natural History Museum, London, U.K.; IARI = Department of Entomology, Indian Agricultural Research Institute, New Delhi, India; MNHN = Muséum National d'Histoire Naturelle, Paris, France; NZC = Zoological survey of India, Kolkata, India; RMNH = National Natuurhistorisch Museum (formerly Rijksmuseum van Natuurlijke Historie), Leiden, Netherlands; ZMUC = Universitets København, Zoologisk Museum, København, Denmark.

The following abbreviations used in the text for the terms: S = Sternum; T = Tergum.

SYSTEMATIC LIST

Family SCOLIIDAE

Subfamily SCOLIINAE

Tribe CAMPSOMERINI

Genus *Colpacampsomeris* Betrem, 1967

1. *Colpacampsomeris indica indica* (de Saussure, 1855)

Genus *Campsomeriella* Betrem, 1941

Subgenus *Annulimeris* Betrem, 1967

2. *Campsomeriella (Annulimeris) annulata annulata* (Fabricius, 1793)

Genus *Phalerimeris* Betrem, 1967

3. *Phalerimeris phalerata phalerata* (de Saussure, 1858)

Genus *Megacampsomeris* Betrem, 1928

4. *Megacampsomeris binghami khasiensis* (Betrem, 1928)
5. *Megacampsomeris shillongensis* (Betrem, 1928)

Tribe SCOLIINI

Genus *Megascolia* Betrem, 1928

Subgenus *Regiscolia* Betrem & Bradley, 1964

6. *Megascolia (Regiscolia) azurea christiana* (Betrem & Guiglia, 1958)

Genus *Scolia* Fabricius, 1775

Subgenus *Discolia* de Saussure, 1863

7. *Scolia (Discolia) binotata binotata* Fabricius, 1804
8. *Scolia (Discolia) clypeata rufohirta* Betrem, 1928
9. *Scolia (Discolia) cyanipennis* Fabricius, 1804
10. *Scolia (Discolia) fasciatopunctata dunensis* Betrem, 1928
11. *Scolia (Discolia) rugifrons* Betrem, 1928

SYSTEMATIC ACCOUNT

1. *Colpacampsomeris indica indica*

(de Saussure)

(Image 1)

1855. *Scolia (Lacosi) indica* Saussure, 46, fig., 10, ♀, "Indes Orientales" (Lectotype in MNHN).
1974. *Colpacampsomeris indica indica*; Betrem in Bradley, 445.

Diagnosis: *Male:* Forewing with a single recurrent vein; genitalia with parameres slender and volsellae with small, sparse hairs on the basal portion.

Colour: Body entirely black. Vestiture black mixed with white. Wings relatively light brown, anterior margin of forewing dark with bluish reflections.

Length: 22 mm.

Material examined: Maharashtra, Sindudurg district, Maratamandal, 1♂, 28.vi.2014, Coll. M. E. Hassan & Party, NZC Regd. No. 16021/H3.

Distribution: India: Arunachal Pradesh,

Chhattisgarh, Himachal Pradesh, Maharashtra (new record), Meghalaya, Sikkim, Uttarakhand.
Elsewhere: Bangladesh, Myanmar.



Fig. 1. *Colpacampsomeris indica indica* (de Saussure)
Male

2. *Campsomeriella (Annulimeris) annulata annulata* (Fabricius)

(Image 2)

1793. *Tiphia annulata* Fabricius, 225, ♀, China (ZMUC).

1972. *Campsomeriella (Annulimeris) annulata annulata*;
Tsuneki, 18-19, ♀, ♂, Taiwan, Japan and Korea.

Diagnosis: Male: Head broader than high in frontal view; frontal spatium distinctly defined posteriorly by a somewhat curved groove, surface impunctate posteriorly at the middle; front largely impunctate and with a large, flat, triangular area in front of anterior ocellus; declivity of vertex very slopping; temples receding; anterior slope of S2 not steep but distinct; apical sternites without densely punctate areas and copulatory brushes; genitalia with parameres slender, angular in circumference and their apex thickened, basal part of volsellae not with dense hairs.

Colour: Body black with the following yellow markings: mandibles at the base; clypeus broadly at sides; callosity; pronotum broadly at posterior area; a moderately broad stripe, narrowly interrupted at the middle, anteriorly on scutellum; disc of metanotum almost entirely; a small apical stripe on inner side of fore femur; apical half on the outer side of all femora; outer surface of fore and mid tibiae; outer surface of first and last fore

tarsal segments; apical bands on T1-T5, that on T1 narrow and covering one-fourth of the surface, that on T2 and T3 broad and covering about half of the surface, broadly emarginate anteriorly at the middle, that on T4 and T5 narrow; apical narrow bands on S2-S5, widely interrupted at the middle, sometimes absent on S5.

Length: 13-18 mm.

Material examined: Delhi, Delhi University Campus, 5♂, 22.i.1953–10.ii.1977, Coll. V. K. Gupta & Party, NZC Regd. Nos. 10276/H3–10280/H3.



Fig. 2. *Campsomeriella (A.) annulata annulata* (Fabricius)
Male

Distribution: India: Arunachal Pradesh, Assam, Bihar, Delhi (new record), Himachal Pradesh, Jammu & Kashmir, Manipur, Meghalaya, Sikkim, Tripura, Uttarakhand, Uttar Pradesh, West Bengal.
Elsewhere: China, Indonesia, Japan, Korea, Malaysia, Myanmar, Nepal, Taiwan.

3. *Phalerimeris phalerata phalerata* (de Saussure)

(Image 3)

1858. *Elis (Campsomeris) phalerata* Saussure, 233, ♀, Java (ZMUC).

1974. *Phalerimeris phalerata phalerata*; Bradley, 460.

Diagnosis: Female: Front with a group of deep punctures in front of anterior ocellus; scapulae without shallow longitudinal grooves; lateral carina of propodeum extended beyond the spiracle; carina along lateral margins of propodeal dorsum

distinct, but not high; forewing with submarginal cell almost entirely setose.

Colour: Body black, except tibiae and tarsi pale red; T1-T3 with narrow yellow apical bands. Erect vestiture predominantly golden to reddish golden, except on T6 and pygidium black; tomentum golden. Wings yellowish, forewing with a dark well defined subapical mark.

Length: 15 mm.

Material examined: Mizoram, Lunglei, 1 ♀, 25.ix.1993, Coll. A. R. Lahiri & Party, NZC Regd. No. 10096/H3.

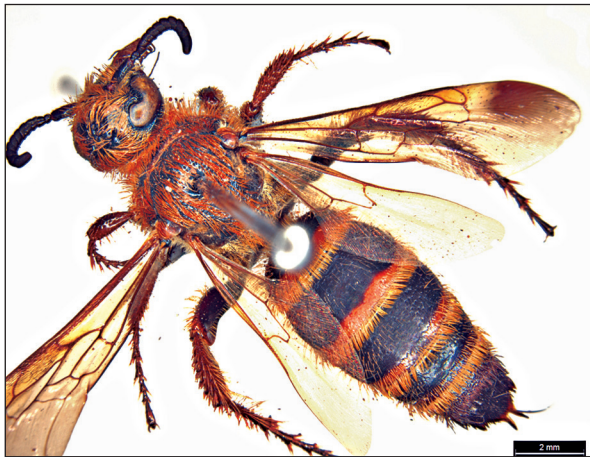


Fig. 3. *Phalerimeris phalerata phalerata* (de Saussure)
Female

Distribution: India: Arunachal Pradesh, Assam, Himachal Pradesh, Jharkhand, Meghalaya, Mizoram (new record), Sikkim, Tripura, Uttarakhand, Uttar Pradesh, West Bengal.
Elsewhere: China, Indonesia, Malaysia, Myanmar, Nepal, Taiwan, Thailand.

4. *Megacampsomeris binghami khasiensis*
(Betrem)

(Image 4)

1928. *Campsomeris* (*Megacampsomeris*) *binghami khasiensis* Betrem, 143, ♀, India: Shillong, Khasi Hills (holotype in IARI; paratypes in NZC and RMNH).

1972. *Megacampsomeris binghami khasiensis*; Betrem in Betrem & Bradley, 164.

Diagnosis: Female: Clypeus impunctate at the middle, at sides with contiguous punctures; upper front impunctate at the middle; dorsomedian

area of propodeum with small, subcontiguous punctures, dorsolateral areas similarly punctate except for a small impunctate area anteriorly; T1 at its anterior half impunctate; T2 and T3 broadly impunctate at the middle.

Colour: Body black, sometimes T2 with narrow yellow posterolateral stripes. Vestiture reddish yellow on head, mesosoma, T1 anteriorly and S2; and black on rest of metasoma, except for a few scattered reddish yellow setae. Wings yellowish hyaline with forewing dark anteriorly.

Length: 23-27 mm.

Material examined: Delhi, Delhi University Campus, 1 ♀, 28.ix.1977, Coll. V. K. Gupta & Party, NZC Regd. No. 10264/H3. Manipur, Moirang, 1 ♀, 6.x.1976, Coll. Kuldjo, NZC Regd. No. 10263/H3.



Fig. 4. *Megacampsomeris binghami khasiensis* (Betrem)
Female

Distribution: India: Delhi (new record), Manipur (new record), Meghalaya.

5. *Megacampsomeris shillongensis* (Betrem)
(Image 5)

1928. *Campsomeris* (*Megacampsomeris*) *shillongensis* Betrem, 155-156, ♀, India: Shillong, Khasi Hills (holotype in IARI; paratype in RMNH).

1972. *Megacampsomeris shillongensis*; Betrem in Betrem & Bradley, 164.

Diagnosis: Male: Head not broader than high in frontal view; frontal spatium densely punctate, with a small impunctate area posteriorly at the middle; T1 longer than broad; genitalia with basal

part of volsellae for a greater part covered with long setae.

Colour: Body black with yellow markings as follows: mandible at basal half; clypeus entirely; scrobe; a large spot on each gena; scapulae; paired very small spots at posterior corners of mesoscutum; paired spots on scutellum; fore coxae; mark on outer surface of all femora; fore and mid tibiae on outer surface; apical bands on T1-T4 and S2-S4. Vestiture golden except black on fifth to last abdominal segments. Wings yellowish hyaline.

Length: 18 mm.

Material examined: Uttarakhand, Champawat district, Dhura, 1 ♂, 15.ix.2004, Coll. B. Mitra & Party, NZC Regd. No. 10026/H3.



Fig. 5. *Megacampsomeris shillongensis* (Betrem) Male

Distribution: India: Manipur, Meghalaya, Sikkim, Uttarakhand (new record), West Bengal. **Elsewhere:** Myanmar, Nepal.

6. *Megascolia (Regiscolia) azurea christiana* (Betrem & Guiglia, 1958)

(Image 6)

1892. *Scolia (Triscolia) rubiginosa* Fabricius: Magretti, 236.

1958. *Scolia (Triscolia) azurea christiana* Betrem & Guiglia, in Guiglia & Betrem, 96.

1964a. *Megascolia (Regiscolia) azurea christiana*; Betrem & Bradley, 444.

Diagnosis: Female: Anterior rim of clypeus subtruncate at the middle; clypeal disc not raised at the middle, flat, a subapical strip of small and

dense punctures, at sides with close punctures, centre of the disc smooth or rugulose; scapulae without any tubercle in front of tegulae; forewing with three submarginal cells; T1 with a very strong tubercle anteriorly at the middle.

Colour: Body black with the following red or yellowish red markings: frontal spatium along its upper margin; front; vertex entirely including ocular sinuses; paired large oval spots on T3, T3-T6 usually with reddish tinge. Vestiture black except yellowish red or red on third to last metasomal segments including pygidium. Wings dark brown with violaceous reflections.

Male: Colour: Body black with the following reddish yellow colour. Ocular sinuses entirely or partly, paired large oval spots on T3, T4-T7 almost entirely. Vestiture black except reddish yellow on T3-T7 and S3-S7. Wings dark brown with violaceous reflections.

Length: Female 30-42 mm; Male 23 mm.

Material examined: Andaman & Nicobar Islands, Andaman Islands, Port Blair, 1 ♀, iii.1909, Coll. H. Weskin, NZC Regd. No. 16552/H3; Port Blair, 1 ♀, 15.ii-15.iii.1909, Coll. H. Kemp, NZC Regd. No. 16553/H3; Andaman Island, 1 ♀ & 1 ♂, date of collection and name of collector unknown, NZC Regd. Nos. 16554/H3 & 16555/H3. Nagaland, Naga Hills, 3 ♀, date of collection unknown, Coll. Roberts & Butler, NZC Regd. Nos. 16549/H3-16551/H3.



Fig. 6. *Megascolia (R.) azurea christiana* (Betrem & Guiglia) Female

Distribution: India: Andaman & Nicobar Islands (new record), Arunachal Pradesh, Assam, Himachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland (new record), Odisha, Sikkim, Tripura, Uttarakhand, West Bengal. *Elsewhere:* Bangladesh, Myanmar, Nepal.

7. *Scolia (Discolia) binotata binotata*

Fabricius

(Image 7)

1804. *Scolia binotata* Fabricius, 244, ♀, Tranquebar (ZMUC).

1978. *Scolia (Discolia) binotata binotata*; Krombein, 41-43.

Diagnosis: Female: Dorsomedian area of propodeum with moderately large, deep punctures, dorsolateral area impunctate at its inner half; T1 with a prominent anteromedian tubercle; S2 with a weak basal tubercle.

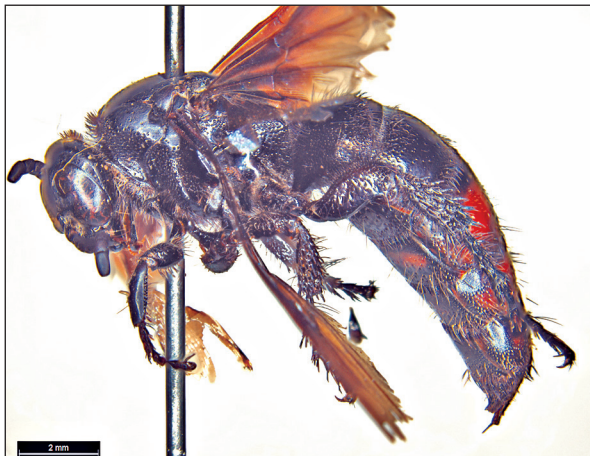


Fig. 7. *Scolia (D.) binotata binotata* Fabricius Female

Colour: Body black, T3 and T4 with paired, large rounded red spots. Vestiture black, except white on occiput. Wings medium to dark brown, forewing anteriorly darker with bluish reflections.

Length: 14-20 mm.

Material examined: Himachal Pradesh, Kinnaur district, Kalpa, 2 ♀, 1.ix.2009, Coll. N. Sharma & Party, NZC Regd. Nos. 12372/H3 & 12373/H3; Kullu district, Banjar, 1 ♀, 5.ix.2009, Coll. N. Sharma & Party, NZC Regd. No. 12374/H3; Kullu district, Seobag, 1 ♀, 6.ix.2009, Coll. N. Sharma & Party, NZC Regd. No. 12375/H3; Kullu

district, Dehar, 1 ♀, 6.ix.2009, Coll. N. Sharma & Party, NZC Regd. No. 12376/H3.

Distribution: India: Andhra Pradesh, Arunachal Pradesh, Assam, Delhi, Himachal Pradesh (new record), Karnataka, Kerala, Maharashtra, Manipur, Rajasthan, Sikkim, Tamil Nadu, Tripura, Uttarakhand, West Bengal. *Elsewhere:* Sri Lanka.

8. *Scolia (Discolia) clypeata rufohirta* Betrem

(Image 8)

1928. *Scolia (Scolia) vollenhoveni rufohirta* Betrem, 290, ♀, India: Kumaon, Kousanie (NZC).

1964b. *Scolia (Discolia) clypeata rufohirta*; Betrem & Bradley, 92.

Diagnosis: Female: T1 densely punctate, with a keel-like structure anteriorly at the middle; median area of clypeus strongly raised and impunctate; dorsomedian area of propodeum with moderately large, deep contiguous to confluent punctures.

Colour: Body black, with the following reddish yellow markings: median area of clypeal disc; front; antenna except scape; frontal spatium except frontal laminae; vertex; temple except below; scapulae. Vestiture black except on head, scapulae, mesoscutum anteriorly, fore leg, mesopleuron, and ventral side of mesosoma reddish yellow or golden hair. Wings dark brown, forewing darker anteriorly, with coppery reflections.

Length: 25 mm.



Fig. 8. *Scolia (D.) clypeata rufohirta* Betrem Female

Material examined: Meghalaya, East Khasi Hills district, Malki, 1 ♀, 11.vii.1973, Coll. R. S. Giri & Party, NZC Regd. No. 10252/H3.

Distribution: India: Manipur, Meghalaya (new record), Uttarakhand. *Elsewhere:* Nepal.

9. *Scolia (Discolia) cyanipennis* Fabricius

(Image 9)

1804. *Scolia cyanipennis* Fabricius, 244, ♀, Tranquebar (ZMUC).

1864. *Scolia (Discolia) cyanipennis*; Saussure & Sichel, 103, ♀.

Diagnosis: Male: Upper plate of metapleuron mostly with contiguous to subcontiguous punctures, except impunctate narrowly along the lower margin; antennal flagellum short, distinctly clavate towards apex, segments towards apex almost as broad as long.

Colour: Integument and vestiture black, metasoma with bluish reflections. Wings dark brown.

Length: 15 mm.

Material examined: Jharkhand, Gumla district, Basia, 1♂, 26.xii.1967, Coll. Raj Tilak & Party, NZC Regd. No. 10251/H3.

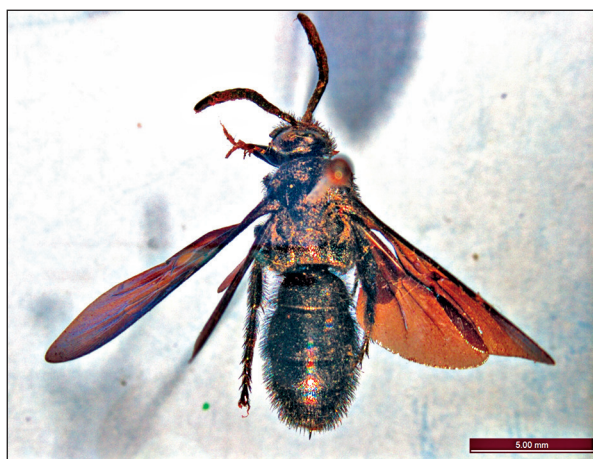


Fig. 9. *Scolia (D.) cyanipennis* Fabricius Male

Distribution: India: Himachal Pradesh, Jammu & Kashmir, Jharkhand (new record), Maharashtra, Sikkim, Tamil Nadu, West Bengal. *Elsewhere:* Sri Lanka.

10. *Scolia (Discolia) fasciatopunctata dunensis*

Betrem

(Image 10)

1928. *Scolia (Scolia) dunensis* Betrem, 251, ♀, Dehra Dun, India (NZC).

1964b. *Scolia (Discolia) dunensis*; Betrem & Bradley, 92.

Diagnosis: Female: Front almost impunctate with a few fine punctures along ocellar area; scapulae and mesoscutum with close to subcontiguous punctures; scutellum with dense punctures at anterior half, posterior half almost impunctate; raised clypeal disc impunctate.

Colour: Integument and vestiture black; metasoma with faint bluish reflections; T3 with light to dark red band which may be narrow to broad, sometimes the band interrupted or constricted at middle. Wings dark brown with predominant bluish reflections.

Length: 16-22 mm.

Material examined: Chhattisgarh, Raipur district, Barnawapara Wildlife Sanctuary, Dullibahal forest, 1♀, 10.xi.2011, Coll. Anil & Party, NZC Regd. No. 14854/H3. Jharkhand, Koderma district, Koderma Reserve Forest, 1♀, 2.xii.2010, Coll. R. Babu & Party, NZC Regd. No. 12696/H3.



Fig. 10. *Scolia (D.) fasciatopunctata dunensis* Betrem Female

Distribution: India: Chhattisgarh (new record), Delhi, Himachal Pradesh, Jharkhand (new record), Maharashtra, Odisha, Uttarakhand, Uttar Pradesh, West Bengal.

11. *Scolia (Discolia) rugifrons* Betrem

(Image 11)

1928. *Scolia (Scolia) rugifrons* Betrem, 273, ♀, Khasi Hills, Ranjit Valley, India; Pegu Hills, Myanmar (BMNH).

1964b. *Scolia (Discolia) rugifrons*; Betrem & Bradley, 93.

Diagnosis: Female: Mesoscutum entirely punctate except for a V-shaped impunctate area posteriorly at the middle; propodeal dorsum, at its median area, with small to large, close to subcontiguous punctures.



Fig. 11. *Scolia (D.) rugifrons* Betrem Female

Colour: Body black with the following red markings: antenna; frontal spatium; front; vertex except ocellar triangle. Vestiture black except the fringes on mandible reddish brown. Wings dark brown with purplish golden effulgence.

Length: 20 mm.

Material examined: Arunachal Pradesh, Dibang Valley district, Mishmi Hills, 1 ♀, 19.ix.2000, Coll. A. R. Lahiri & Party, NZC Regd. No. 10263/H3.

Distribution: India: Arunachal Pradesh (new record), Meghalaya, Sikkim. *Elsewhere:* Myanmar.

SUMMARY

In this paper, the following new distributional records of various scoliid wasps are reported for the first time from various states of India: *Colpacampsomeris indica indica* (de Saussure) from Maharashtra; *Campsomeriella (A.) annulata annulata* (Fabricius) from Delhi; *Phalerimeris phalerata phalerata* (de Saussure) from Mizoram; *Megacampsomeris binghami khasiensis* (Betrem) from Delhi and Manipur; *Megacampsomeris shillongensis* (Betrem) from Uttarakhand; *Megascolia (R.) azurea christiana* (Betrem & Guiglia) from Andaman Islands and Nagaland; *Scolia (D.) binotata binotata* Fabricius from Himachal Pradesh; *Scolia (D.) clypeata rufohirta* Betrem from Meghalaya; *Scolia (D.) cyanipennis* Fabricius from Jharkhand; *Scolia (D.) fasciatopunctata dunensis* Betrem from Chhattisgarh and Jharkhand; and *Scolia (D.) rugifrons* Betrem from Arunachal Pradesh.

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REFERENCES

- Betrem, J. G. 1928. Monographie der Indo-Australischen Scoliiden mit zoogeographischen Betrachtungen. *Treubia*, **9** (suppl.): 1-388, 5 plates.
- Betrem, J. G. and Bradley, J. C. 1964a. Annotations on the genera *Triscolia*, *Megascolia* and *Scolia*. *Zool. Meded.*, **39**: 433-444 (First Part).
- Betrem, J. G. and Bradley, J. C. 1964b. Annotations on the genera *Triscolia*, *Megascolia* and *Scolia* (Hymenoptera: Scoliidae) (Second Part). *Zool. Meded.*, **40**: 89-96.
- Betrem, J. G. and Bradley, J. C. 1972. The African Campsomerinae (Hym., Scoliidae). *Mon. Ned. Ent. Ver.*, **6**: 1-326, 55 figures, 6 plates and 47 maps.
- Bradley, J. C. 1974. The types of Scoliidae (Hymenoptera) described by Henri de Saussure or by Jules Sichel, or by them jointly. *Revue Suisse Zool.*, **81**(2): 417- 485.

- Fabricius, J.C. 1793. *Entomologia Systematica Emendate et acuta. Secundum, Classes, Ordines, Genera, Species, Adiectis Synonymis, Locis, Observationibus, Descriptionibus 2. Hafniae*, viii+519pp.
- Fabricius, J.C. 1804. *Systema Piezatorum Secundum, Ordines, Genera, Species, Adiectis Synonymis, Locis, Observationibus, Descriptionibus. Brunschweig*, XIV+[15]-[440]+[1]-30pp.
- Girish Kumar, P. 2009a. Taxonomic notes on hairy wasps (Hymenoptera: Scoliidae) of Andhra Pradesh, India. *Rec. zool. Surv. India*, **109**(1): 97-103.
- Girish Kumar, P. 2009b. New record of *Megascolia (Regiscolia) azurea Christiana* (Betrem & Guiglia) (Hymenoptera: Scoliidae) Mizoram, Orissa and Sikkim, India. *Rec. zool. Surv. India*, **109**(1): 105-107.
- Girish Kumar, P. 2011. New distributional record of *Scolia (Discolia) binotata binotata* Fabricius (Hymenoptera: Scoliidae) from Assam and Tripura, India. *Bugs R All, Newsletter of the Invertebrate Conservation & Information Network of South Asia*, **17**: 37.
- Girish Kumar, P. and Kazmi, S.I. 2008. New record of *Megacampsomeris prismatica* (Smith) (Hymenoptera: Scoliidae) from Delhi and Nagaland, India. Short Communication. *Rec. zool. Surv. India*, **108**(1): 101-103.
- Girish Kumar, P. and Kazmi, S.I. 2012. Insecta: Hymenoptera: Scoliidae. *Zool. Surv. India, Fauna of Maharashtra, State Fauna Series*, **20**(Part-2): 619- 625.
- Girish Kumar, P. and Sharma, G. 2013. Scoliid fauna (Insecta: Hymenoptera: Scoliidae) of Chhattisgarh. *Bugs R All, Newsletter of the Invertebrate Conservation & Information Network of South Asia*, **20**: 31-35.
- Guiglia, D. and Betrem, J.G. 1958. The identity of the Scoliidae described by J.L. Christ. *Ann. Mus. Civico stor. Nat. Genova*, **70**: 92-99.
- Gupta, S.K. and Jonathan, J.K. 2003. *Fauna of India and the adjacent countries*, Hymenoptera: Scoliidae, 1-277 (Published by the director, *Zoological Survey of India*, Kolkata).
- Krombein, K.V. 1978. Biosystematic studies of Ceylonese wasps, II: A monograph of the Scoliidae (Hymenoptera: Scoliioidea). *Smithsonian Contr. Zoology*, **238**: 1-56.
- Magretti, P. 1892. Imenotteri; Viaggio de Leonardo Fea in Birmanicae Regioni vicini 43, parte prima Mutilledei Scollidei Tiphidae. *Ann. Mus. Civico Stor. Nat. Genova*, **12**: 97-266.
- Manoj Jadhav and Gaikwad, S.M. 2014. *Megacampsomeris cochinchensis* (Betrem, 1928) (Insecta: Hymenoptera: Scoliidae): First record from North Western Ghats of Maharashtra, India. *J. Entomology and Zoology Studies*, **2**(6): 261-263.
- Manoj Jadhav, Girish Kumar, P. and Gaikwad, S.M. 2014. A new record of *Scolia (Discolia) fasciatopunctata dunensis* Betrem (Insecta: Hymenoptera: Scoliidae) from the Western Ghats of Maharashtra. *J. Threatened Taxa*, **6**(14): 6715-6718. <http://dx.doi.org/10.11609/JoTT.o3704.6715-8>
- Osten, T. 2005. Checkliste der Dolchwespen der Welt (Insecta: Hymenoptera, Scoliidae), **62**. *Bericht der Naturf. Gesellsch. Augsburg*: 1-62.
- Saussure, H. De. 1855. Mélanges Hyménoptérologiques. *Mém. Soc. Phys. Hist. Nat. Genève*, **14**: 1-67, 1 plate.

- Saussure, H. De. 1858. Description de diverses especes nouvelles ou peu connues du genre *Scolia*. *Ann. Soc. Ent. France*, **6**(3): 193-249.
- Saussure, H. De. and Sichel, J. 1864. Catalogue des specierum de l'ancien generic *Scolia* (*Genève et Paris*): 350 pages, 2 plates.
- Schulten, G.G. M., Feijen, H.R. and Feijen, C. 2011. The genus *Bellimeris* Betrem (Hymenoptera: Scoliidae, Campsomerinae). *Zool. Meded., Leiden*, **85**: 887-903.
- Tsuneki, K. 1972. Studies on the scoliid wasps of Eastern Asia (Hymenoptera). *Etizenia*, **62**: 1- 41.