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New records of the subfamily Harpactorinae (Reduviidae: Heteroptera: Hemiptera) from Karnataka

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Abstract

Examination of 629 specimens collected from various localities of Karnataka revealed the presence of relatively 17 new records from the quite known, highly specious and diverse subfamily Harpactorinae viz., *Coranus carinata* Livingstone and Ravichandran, *Endochus cingalensis* Stål, *Henricohahnia gallus* (Distant), *Lanca kandyensis* Distant, *Lopocephala guerini* Laporte, *Macracanthopsis hamptoni* Distant, *Macracanthopsis nigripes* Distant, *Platerus bhavani* Livingstone and Ravichandran, *Polididus armatissimus* Stål, *Rhaphidosoma atkinsoni* Bergroth, *Scipinia horrida* (Stål), *Serendiba pundaluoyae* Distant, *Sphedanolestes nigrocephala* Livingstone and Ravichandran, *Sphedanolestes stigmatellus* Distant, *Sycanus indagator* Stål, *Sycanus versicolour* Dohrn and *Vesbius perpurius* Thunberg. Diagnosis, illustrations of the habitat, morphometry and check list of the previously recorded species were provided to facilitate the clear documentation and identification.

Keywords: Harpactorinae, diagnosis, morphometry and Karnataka

1. Introduction

Harpactorinae are the largest subfamily of Reduviidae with 2800 described species under 320 genera ^[1]. These bugs are economically important as predators of insect pests, whose prey consumption ranges from stenophagy (specific predators) to euryphagy (generalist predators). A few species of Harpactorinae are successfully utilised in integrated pest management system which include *Pristhesancus plagipennis* Walker against cotton and soybean ^[2], *Zelus longipes* L. against *Spodoptera frugiperda* (J.E. Smith) ^[3], *Endochus albomaculatus* Stål, *Epidaus bicolor* Distant, *Euagoras plagiatus* Burmeister, *Irantha armipes* Stål, *Panthous bimaculatus* Distant and *Sphedanolestes signatus* Distant against tea mosquito bugs (*Helopeltis* spp.) in Cashew ^[4].

In India, earliest work ^[5, 6] on the fauna of Reduviidae was by Distant in the monumental "Fauna of British India" series, in this fauna, he dealt with few species from Karnataka. During 1919, again Distant added few more species of reduviids from Karnataka ^[7]. Later on, few decades ago Livingstone, Ravichandran, Murugan and Ambrose described and documented an array of species from India. Most of their faunastic records were concentrated to Tamil Nadu. Even though Karnataka is rich in diversity of flora and fauna with 20 per cent of the forest area and it has western ghats which is in the tentative list of Worlds Biodiversity Hotspot, the faunastic studies of many taxa are unexplored. So, basic taxonomic studies were attempted for the highly specious and diverse subfamily Harpactorinae for the documentation of species.

2. Material and methods

2.1 Collection techniques

Reduviids occur in a variety of habitats depending on the occurrence of their prey, therefore, diverse methods were followed for their collection. Generally, field collections were done by sweeping on various vegetation using an insect net and few species that are specifically adopted to dwell on tree trunks, under bark, between cracks and crevices, under large boulders and leaf litter were also carefully searched and picked by forceps when found. Since a few bugs are attracted to light, collections were also made at light and from light traps. In addition to field collection, rich collections of Reduviidae present in the insect repository of the Department of Agricultural Entomology, University of Agricultural Sciences, GKVK, Bengaluru (UASB), were extensively used for the study.

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2.2 Identification of specimen

Identification of genera and species were made using the various available literature especially the Distant's Rhynchota volumes in the Fauna of British India Series ^[5, 6]. A few of the species were identified in consultation with various experts working on the fauna of Reduviidae. After identification, colour photographs of dorsal habitus of small bugs were made using Leica M205A stereomicroscope with DFC 420 camera attachment and by using the software Auto montage[®]. Larger specimens measuring more than 1 cm were taken with Nikon camera fitted with SLR lens.

2.3 Measurements

Five specimens of male and female of all the species were used for the measurements. Measurements of various morphological structures were made using Leica Application Suite (LAS) software installed in Leica M205A stereomicroscope with DFC 420 camera attachment. All measurements are expressed in millimetres.

3. Results

3.1 Diagnosis of newly recorded species:

Examination of 629 specimens collected from various localities of Karnataka revealed the presence of 17 new records in the subfamily Harpactorinae, which includes:

1. *Coranus carinata* Livingstone and Ravichandran, 1989

Diagnosis: Body stramineous; posterior lobe of pronotum and sculptures on anterior lobe of pronotum covered with greyish sericeous hairs; head oblong, porrectly produced in front of antenna; posterior pronotal lobe roughly hexagonal with obscure carination; humeral angles strongly amplified; scutellum with median longitudinal snow white carinae upwardly curved at apex (Fig. 1).

Measurements (n=4): Body length: 13.41-13.93; length of head: 3.31-3.38; interocular distance: 0.90-0.92; interocellar distance: 0.62-0.65; length of scape: 3.14-3.27; length of pedicel: 1.22-1.34; length of anteocular: 1.30-1.36; length of postocular: 1.36-1.48; length of labial segment II: 1.42-1.49, III: 1.71-1.88, IV: 0.43-0.52; length of anterior pronotal lobe: 1.31-1.42; length of posterior pronotal lobe: 1.39-1.56; width of anterior pronotal lobe: 1.62-1.69; width of posterior pronotal lobe: 4.21-4.47; length of scutellum: 1.26-1.41; width of abdomen: 4.01-5.33.

Materials examined: INDIA: Karnataka, 1♀, Bengaluru, 01.viii.1982, Sreedhar; 1♀, 12.v.1992, Pit fal trap, Student collection; 1♂, 25.iii.2011, on *Casurina*, H. M. Yeshwanth; 1♂, Chikkaballapura, Bagepalli, 13.xii.1997, K. D. Pratapan; 1♀, Chintamani: Nandigana, 22.iii.2011, Sweep net, C. Latha; 1♀, 1♂, Devanahalli: Vijayapura, 10.vi.2010, S. Murthy.

Distribution elsewhere in Karnataka: Tamil Nadu

2. *Endochus cingalensis* Stål, 1861

Diagnosis: *Sexually dimorphic in coloration:* Male: golden yellow coloured; labium, antennae, membrane, posterior abdominal sternites and tarsi blackish with slight brownish ting; membrane brownish black; body sericeous with golden yellowish hairs intermixed with short and long setae, denser in fore legs and scutellum. Female: dark cinnamon brown coloured, head excluding gula, labium, mandibular and maxillary plates, antenna, transverse fasciae on posterior margin of posterior pronotal lobe, humeral spine, antepical

annulations on femora, apex of meso and metatibia, spots on connexivum, sublateral spots on abdomen (sometimes absent) black; moderately setose; body densely sericeous with golden yellowish hairs, clustered on pronotum, thoracic pleura and corium.

Structure: scape nearly 1.5 times longer than pedicel, subequal in length to head pronotum and scutellum together and to anterior femora; anterior pronotal lobe shorter than posterior pronotal lobe, sculptured by shallow fizzy ridges, posteriorly medially foveate (Fig. 2a and b).

Measurements (n=5): Body length: 23.01-21.29; length of head: 3.65-4.09; interocellar distance: 0.78-0.82; interocular distance: 0.56-0.60; length of scape: 6.08-7.11; length of pedicel: 4.35; length of anteocular: 1.35-1.44; length of postocular: 2.06-2.14; length of anterior pronotal lobe: 1.58-1.53; length of posterior pronotal lobe: 2.51-2.61; width of anterior pronotal lobe: 1.61-1.62; width of posterior pronotal lobe: 4.27-4.53; length of scutellum: 1.46-1.50; width of abdomen: 4.77-4.78.

Material examined: INDIA: Karnataka, 1♂, Bengaluru, 14.xii.1995, Student collection; 1♂, Kodagu: Mandalpatti, 27.ix.2009, H. M. Yeshwanth; 7♂, 1♀, Chikkamagaluru: Mudigere, 06.v.2016, Sweep net, H. M. Yeshwanth.

Distribution elsewhere in Karnataka: Kerala and Tamil Nadu.

3. *Henricohahnia gallus* Distant, 1904

Diagnosis: Body brownish; anteocular region of the head shorter than postocular, tuberculate, clypeus anteriorly subacutely produced, laterally compressed and slightly truncate; scape short, thick and tuberculate, as long as clypeus; thorax slightly longer than wide, tuberculate; anterior pronotal lobe with erect and suberect irregularly arranged tubercle and four longitudinal carinae, medially obscurely foveate; posterior lobe medially impressed, humeral angles with short subconical process; posterior margins slightly concave; forefemur spinous; veins on corium raised (Fig. 3).

Measurements (n=1): Body length: 9.96; length of head: 2.56; interocular distance: 0.55; interocellar distance: 0.35; length of scape: 0.79; length of pedicel: 1.70; length of anteocular: 1.08; length of postocular: 1.21; length of labial segment II: 0.65, III: 1.14, IV: 0.32; length of anterior pronotal lobe: 0.92; length of posterior pronotal lobe: 1.14; width of anterior pronotal lobe: 0.87; width of posterior pronotal lobe: 2.62; length of scutellum: 0.65; width of abdomen: 2.96.

Material examined: INDIA: Karnataka, 1♂, Bengaluru: GKVK, 12.ix.1977, Viraktamath, S.

Distribution elsewhere in Karnataka: Tamil Nadu.

4. *Lanca kandyensis* Distant, 1906

Diagnosis: Body linear, elongated, pale fuscous brown; antenniferous tubercles castaneous; pronotum mottled with ochraceous pile, denser on posterior lobe; anterior lobe shorter than posterior, medially sulcate, indistinctly sculptured; posterior lobe with two moderately erect discal and long humeral spine (Fig. 4).

Measurements (n=1): Body length: 22.29; length of head: 3.86; interocular distance: 0.73; interocellar distance: 0.62; length of scape: 10.29; length of pedicel: 3.95; length of anteocular: 2.74; length of postocular: 3.88; length of labial segment II: 3.84, III: 5.17, IV: 1.26; length of anterior pronotal lobe: 2.03; length of posterior pronotal lobe: 3.44; width of anterior pronotal lobe: 1.52; width of posterior pronotal lobe: 3.80; length of scutellum: 1.32; width of abdomen: 1.28.

Material examined: India: Karnataka, 1♂, Bengaluru, 31.i.1954, G. P. Channabasavanna.

Distribution elsewhere in Karnataka: Tamil Nadu.

5. *Lopocephala guerini* Laporte, 1833

Diagnosis: Bright red coloured, medium sized insects; postocular region of head attenuated and subcylindrical; anteocular anteriorly porrect; scapo-pedicellar structure bent, C- shaped, pedicel and flagellomere ventrally placed and directed posterior; eyes inserted exactly at mid of anteocular; labium straight with indistinct segmentation, segment III more than five times longer than segment IV (Fig. 5).

Measurements (n=5): Body length: 16.01-17.48; length of head: 3.14-3.56; interocular distance: 0.82-0.85; interocellar distance: 0.62-0.71; length of scape: 2.12-2.53; length of pedicel: 1.11-1.89; length of anteocular: 1.67-1.96; length of postocular: 1.01-1.08; length of labial segment II: 0.40-0.55, III: 3.38-3.40, IV: 0.46-0.49; length of anterior pronotal lobe: 1.02-1.15; length of posterior pronotal lobe: 2.00-2.27; width of anterior pronotal lobe: 1.28-1.39; width of posterior pronotal lobe: 3.92-4.13; length of scutellum: 1.48-1.30; width of abdomen: 4.49-4.90.

Material examined: INDIA: Karnataka, 1♂, Belgaum, 1-2.viii.2008, S. Murthy; 1♂, GKVK, 03.ix.2012, Light trap, H. M. Yeshwanth; 1♂, 26.vi.2008, C. M. Kalleshwara Swamy; 1♂, Hesaraghatta, 02.vii.2009, on *Croton bonplandianum*, H. M. Yeshwanth; 7♂, 06.iii.2012, H. M. Yeshwanth; 2♀, Pavagada, 25.ix.2008, C. M. Kalleshwara Swamy.

Distribution elsewhere in Karnataka: Bengal, Kashmir, Kerala, Odisha and Tamil Nadu.

6. *Macracanthopsis hampsoni* Distant, 1909

Diagnosis: Body honey coloured; small sized, oblong, sparsely setose; spines at the antennal base obliquely long and erect; scape three times longer than pedicel, subequal to head, pronotum and scutellum together; pronotum with broad lateral black fasciae; forefemora nodulous (Fig. 6).

Measurements (n=5): Body length: 12.09-12.78; length of head: 3.11-3.28; interocular distance: 0.87-0.88; interocellar distance: 0.53-0.54; length of scape: 6.23-6.41; length of pedicel: 1.71-1.86; length of anteocular: 0.98-1.01; length of postocular: 1.06-1.22; length of labial segment II: 1.21-1.36, III: 1.66-1.71, IV: 0.34-0.37; length of anterior pronotal lobe: 1.09-1.25; length of posterior pronotal lobe: 1.77-1.81; width of anterior pronotal lobe: 1.31-1.46; width of posterior pronotal lobe: 2.97-3.09; length of scutellum: 1.01-1.28; width of abdomen: 3.07.

Material examined: INDIA: Karnataka, 1♀, Bengaluru: GKVK, 10.x.1987, J. B. N. Kumar; 1♀, Chikkamagaluru:

Mudigere, 22.v.1976, C. A. Viraktamath; 1♀, 26.ix.1993, Gurudat; 1♀, 05.x.2006, C. A. Viraktamath; 1♀, 10.x.1993, A. Yogesh; 1♂, ZAHRS, 10.v.2014, Sweep net, S. R. Hiremath; 1♀, Dakshina Kannada: Puttur, 31.xi.2013, on *Anacardium occidentale*, P. S. Bhat; 1♀, Kodagu: Galibeedu, 11.iv.2011, Sweep net, A. N. Reddy; 1♂, Thadiyandamal hills, 12.iv.2011, Sweep net, A. N. Reddy; 1♂, Shivamogga: Jog Falls, 09.v.1976, on *Forest*, B. Mallik; Uttara Kannada, 1♂, Yellapur: Idagundi, 06.xii.2011, At light, A. N. Reddy.

Remarks: Individuals of this species collected in same geographical region differs in pronotal colouration, some individuals have broad lateral black fasciae on pronotum and its faded in other individuals which resemble *M. nodipes*, but can be distinguished by pale stramineous legs, abdomen and connexivum.

Distribution elsewhere in Karnataka: Tamil Nadu.

7. *Macracanthopsis nigripes* Distant, 1909

Diagnosis: Body yellow coloured; connexivum and abdomen pale stramineous; abdomen black with sublateral fasciae; forefemur and tibia ventrally clothed with thick setae, mid and hind femora moderately setose, forefemur nodulous and moderately incrassated at apex; apex of mid and hind femora nodulous (Fig. 7).

Measurements (n=1): Body length: 12.22-12.64; length of head: 3.01-3.08; interocular distance: 0.76-0.75; interocellar distance: 0.36-0.37; length of scape: 6.97-7.35; length of pedicel: 1.77-1.89; length of anteocular: 0.99-1.08; length of postocular: 1.06-1.21; length of labial segment II: 1.33-1.37, III: 1.64-1.73, IV: 0.32-0.35; length of anterior pronotal lobe: 1.00-1.14; length of posterior pronotal lobe: 1.45-1.56; width of anterior pronotal lobe: 1.33-1.48; width of posterior pronotal lobe: 0.01-0.39; length of scutellum: 1.32-1.45; width of abdomen: 2.86-3.01.

Material examined: INDIA: Karnataka, 1♂, Mandya: V. C. farm, 08.10.2014, on *Field bean*; Student collection.

Distribution elsewhere in Karnataka: Kerala, Western Ghats and Tamil Nadu.

8. *Platerus bhavani* Livingstone and Ravichandran, 1991

Diagnosis: Body brown to blackish brown coloured; medium sized, elongated, grayish sericeous; head elongated, anteocular four times shorter than postocular, declivent, medially with Y shaped, smooth, brown streak posteriorly confluent with transverse fissure; spines behind antennal base acutely pointed, longer than antenniferous tubercle; pronotum longer than broad, posterior lobe armed with discal and humeral spine, sericeously punctate; connexivum angularly explanate between V and VI abdominal segments and moderately at segment VII (Fig. 8).

Measurements (n=5): Body length: 15.37-16.60; length of head: 3.07-3.20; interocular distance: 0.54-0.62; interocellar distance: 0.36-0.45; length of scape: 6.84-7.00; length of pedicel: 3.07-3.42; length of anteocular: 0.70-0.80; length of postocular: 1.70-1.77; length of labial segment II: 1.67-1.72, III: 1.04-1.06, IV: 0.54-0.55; length of anterior pronotal lobe: 1.00-1.09; length of posterior pronotal lobe: 1.60-1.81; width of anterior pronotal lobe: 0.54-0.62; width of posterior pronotal lobe: 0.36-0.45; length of scutellum: 1.33-1.41;

width of abdomen: 2.74-4.59.

Material examined: INDIA: Karnataka, 1♀, Bengaluru: Bettanagere, 14.vi.2008, on *Brinjal*, B. P. Raghavendra; 1♀, GKVK, 15.x.1978, C. A. Viraktamath; 1♀, 04.xi.1009, Mukunda; 1♀, 10.xii.1994, Harikrishna; 1♀, 11.v.1980, A. R. V. Kumar; 1♀, White Field, 16.iv.1978, on *Tamarind*, A. R. V. Kumar; 1♀, Hassan: Arsikere, 04.viii, 1977, C. A. Viraktamath.

Distribution elsewhere in Karnataka: Tamil Nadu.

9. *Polididus armatissimus* Stål, 1859

Diagnosis: Body elongated; bark coloured; head, pronotum, scutellum, femora, connexival margins and apex of abdomen armed with long and erect spines; postocular little longer than anteocular, marginally rounded; hemelytra fully covering the abdomen, membrane narrow and elongated; spiracles placed on raised tubercle, dorsally visible (Fig. 9).

Measurements (n=5): Body length: 14.66-15.01; length of head: 2.44-2.61; interocular distance: 0.90-0.91; interocellar distance: 0.50; length of scape: 6.03-6.45; length of pedicel: 2.88-2.98; length of anteocular: 0.81-0.89; length of postocular: 1.00-1.09; length of labial segment II: 1.59-1.68, III: 0.90-0.92, IV: 0.44-0.50; length of anterior pronotal lobe: 1.51-1.56; length of posterior pronotal lobe: 1.71-1.78; width of anterior pronotal lobe: 1.33-1.48; width of posterior pronotal lobe: 3.33-3.40; length of scutellum: 1.46-1.51; width of abdomen: 3.55-3.76.

Materials examined: INDIA: Karnataka, 1♀, Belgaum: Dandeli, 10.xi.2012, Light trap, A. R. V. Kumar; 2♀, 2♂, Jamboti, 10.xi.2012, A. R. V. Kumar; Bengaluru: GKVK, 1♂, 18.vi.2009, Sweep net, Nayana, E. D.; 1♀, 23.viii.2009, Light trap; 1♂, 19.iv.2011, Light trap, E. D. Nayana; 1♀, Hesaraghatta, 09.ix.2009, At light, H. M. Yeshwanth; 1♀, Chikkaballapura, 22.viii.2010, At light, P. Nirmala; 2♀, 1♂, 19.ix.2010, At light, P. Nirmala; Koppal, 1♂, 20.x.2005, P. V. Patel; Mysore: 1♀, Chinnamballi, 10.xi.2012, Bee bowl, C. Prashanta; Uttara Kannada, 1♀, Sirsi, 23.xi.2012, Light trap, A. N. Reddy; 2♂, Raichur, 03.i.2011, Light trap, A. N. Reddy; 1♂, 03.i.2011, Light trap, R. Girish; 2♀, 1♂, Yellapur, Bellamane, Light trap, T. Vinayaka; 1♂, 22.xi.2012, Light trap, A. N. Reddy.

Distribution elsewhere in Karnataka: Madhya Pradesh, Maharashtra, Tamil Nadu and West Bengal.

10. *Rhaphidosoma atkinsoni* Bergroth, 1893

Diagnosis: Black clay coloured, elongated, parallel sided, linear body; head and pronotum tuberculate; ventral surface of body from metasternum to nearly VI abdominal segment densely covered with blanket of white hairs; pronotum globose; anterior and posterior lobe indistinct; mesonotum longer than metanotum, posterior margins with V-shaped projections; prosternal groove deep, surpassing anterior margins of coxa (Fig. 10).

Measurements (n=4): Body length: 34-36.88; length of head: 5.72-6.09; interocular distance: 0.69; length of scape: 10.38; length of pedicel: 4.52-4.66; length of anteocular: 4.33-4.67; length of postocular: 2.70-3.11; length of labial segment II: 1.11-1.23, III: 5.01-5.86, IV: 0.54-0.66; width of abdomen: 2.73-2.88.

Material examined: INDIA: Karnataka, 1♂, Bengaluru: Bannerghatta, 20.iv.1978, A. R. V. Kumar; 1♂, GKVK, 10.iv.1985, Student collection; 1♂, 18.iv.1987, T. S. Subramanian; 1♂, 19.xi.1991, B. S. Basavaraj; 2♂, 13.v.1992, P. Jayamohan; 1♂, 12.iv.1996, Student collection; 1♂, 18.iv.2006, on *Mango*, D. K. Nagaraj; 1♂, 25.xi.2013, Vasudev; 1♂, 25.xi.2013, Vasudev; 1♂, 09.iv.2010, P. Nirmala; Hebbal, 1♂, 5.ix.1882, T. A. K. Raju; 1♂, Melukote, 16.v.2006, C. A. Viraktamath.

Distribution elsewhere in Karnataka: Kerala and Tamil Nadu.

11. *Scipinia horrid* (Stål, 1861)

Diagnosis: Body orange to yellowish brown coloured; head cylindrical, armed with 3 + 3 long series of spines on each side and many small obscure spines in between them; length and width of anterior pronotal lobe subequal, armed with 2 + 2 long and many short spines in between and around them, medially posteriorly with deep foveation; posterior pronotal lobe reticulate, rugose, posterior margins wavy; legs long, forefemur swollen with four whorls of spines, mid femur nodulose (Fig. 11).

Measurements (n=1): Body length: 10.5; length of head: 2.17; interocular distance: 0.61; interocellar distance: 0.23; length of scape: 2.28; length of pedicel: missing; length of anteocular: 0.66; length of postocular: 1.08; length of labial segment II: 0.99, III: 0.95, IV: 0.30; length of anterior pronotal lobe: 0.87; length of posterior pronotal lobe: 1.66; width of anterior pronotal lobe: 0.87; width of posterior pronotal lobe: 2.57; length of scutellum: 0.38; width of abdomen: 2.84.

Materials examined: INDIA: Karnataka, 1♀, Mudigerae, 02.vi.1978, C. A. Viraktamath.

Distribution elsewhere in Karnataka: Bihar, West Bengal, Sikkim and Tamil Nadu.

12. *Serendiba pundaluoyae* Distant, 1906

Diagnosis: Body elongated, orange red to pale brown coloured; head subcylindrical with long scape; thorax longer than wide; posterior pronotal lobe pitted, humeral angles spinously produced; corium surpass the abdominal apex (Fig. 12).

Measurements (n=5): Body length: 10.86-10.20; length of head: 1.888-2.00; interocular distance: 0.47-0.53; interocellar distance: 0.34-0.38; length of scape: 6.60-6.68; length of pedicel: 2.31-2.36; length of anteocular: 0.44-0.52; length of postocular: 0.84-1.01; length of labial segment II: 1.14-1.18, III: 0.62-0.64, IV: 0.37-0.40; length of anterior pronotal lobe: 0.78-0.83; length of posterior pronotal lobe: 1.31-1.32; width of anterior pronotal lobe: 0.81-0.86; width of posterior pronotal lobe: 1.89-1.96; length of scutellum: 0.67-0.84; width of abdomen: 1.79-2.07.

Materials examined: INDIA: Karnataka, 2♂, 1♀, Mudigere, 02.vi.1978, Mysore entomology collection; 2♂, 02.vi.1978, C. A. Viraktamath.

Distribution elsewhere in Karnataka: Tamil Nadu.

13. *Sphedanolestes nigrocephala* Livingstone and Ravichandran, 1989

Diagnosis: Smooth, shining, ovate and golden yellow coloured body; antennae, apex of labium, dorsal surface of postocular in between and around ocelli, antenniferous tubercle, scape, eyes, two ventral annulations on femur, tibia, apex of clavus, membrane, dorsum of abdomen behind middle and ventral surface of genital segments black; scape subequal in length to basiflagellomere and fore femur, four times longer than pedicel; femora slightly incrassated, nodulous; hemelytra passing the apex of abdomen (Fig. 13).

Measurements (n=1): Body length: 10.11; length of head: 2.65; interocular distance: 0.70; interocellar distance: 0.43; length of scape: 2.61; length of pedicel: 0.90; length of anteocular: 0.93; length of postocular: 1.20; length of labial segment II: 1.05, III: 1.44, IV: 0.22; length of anterior pronotal lobe: 0.88; length of posterior pronotal lobe: 1.43; width of anterior pronotal lobe: 1.78; width of posterior pronotal lobe: 2.89; length of scutellum: 2.90; width of abdomen: 2.59.

Material examined: INDIA: Karnataka, 1♂, Bengaluru: Hesaraghatta, 28.xi.2015, on *bark*, H. M. Yeshwanth; 1♂, Mandya: V. C. farm, 08.10.2014, on *Field bean*; Student collection.

Distribution elsewhere in Karnataka: Tamil Nadu.

14. *Sphedanolestes sigmatellus* Distant, 1903

Diagnosis: Black coloured; anterior margin of posterior pronotal lobe and anterior margin of corium sanguineous; scape three times shorter than pedicel, subequal in length to meso femur; labium strongly curved, segment III, 1.7 times longer than segment II, slightly passing anterior margin of pronotum, segment II passing mid of eyes; posterior pronotal lobe finely granulate (Fig. 14).

Measurements (n=2): Body length: 10.90-11.13; length of head: 2.66-2.86; interocular distance: 0.51-0.53; interocellar distance: 0.31; length of scape: 3.14-3.57; length of pedicel: 1.14-1.17; length of anteocular: 1.07-1.10; length of postocular: 1.05-1.07; length of labial segment II: 1.27-1.34, III: 1.58-1.63, IV: 0.36-0.44; length of anterior pronotal lobe: 1.02-1.08; length of posterior pronotal lobe: 1.31-1.38; width of anterior pronotal lobe: 1.23-1.29; width of posterior pronotal lobe: 2.76-2.88; length of scutellum: 0.86-0.91; width of abdomen: 2.55-2.62.

Materials examined: INDIA: Karnataka, 1♀, Bengaluru: Hesaraghatta, 03.ii.1979, A. R. V. Kumar; 1♂, Biligirirangan Hills, 13.viii.1997, S. Viraktamath; 1♂, Nandi Hills, 27.i.2006, N. Kengegowda.

Distribution elsewhere in Karnataka: Tamil Nadu.

15. *Sycanus indagator* Stål, 1863

Diagnosis: Black coloured, oblong, large sized; posterior pronotal lobe, corium, connexivum reddish; pronotum bicolorous; scutellum spinously produced not bifid; connexivum well exposed beyond the abdomen and upcurved (Fig. 15).

Measurements (n=5): Body length: 18.40-19.62; length of head: 3.62-3.42; interocular distance: 0.74-0.76; interocellar distance: 0.43-0.44; length of scape: 8.69-8.64; length of

pedicel: 2.19-3.32; length of anteocular: 1.28-1.63; length of postocular: 1.85-2.42; length of labial segment II: 1.88-2.07, III: 1.01-1.22, IV: 0.49-0.56; length of anterior pronotal lobe: 1.20-1.51; length of posterior pronotal lobe: 2.13-2.19; width of anterior pronotal lobe: 1.23-1.42; width of posterior pronotal lobe: 4.25-3.06; length of scutellum: 1.37-1.48; width of abdomen: 4.96-3.32.

Material examined: INDIA: Karnataka, 1♂, Bengaluru: GKVK, 13.x.1985, Pushpa; 1♂, 22.ix.1988, Nataraj; 1♂, 25.xi.2013, K. Basavaraj; 1♀, Hebbal, 14.ix.1987, Student collection; 1♀, 06.xi.1987, Student: 1♀, Hesaraghatta, 11.vi.2011, At light, H. M. Yeshwanth; 1♀, Chintamani: Agricultural College, 14.v.2011, Student collection.

Distribution elsewhere in Karnataka: India Orientalis and Tamil Nadu.

16. *Sycanus versicolour* Dohrn, 1859

Diagnosis: Black coloured with bullishly iridescent; head excluding base, postocular, anterior lobe of pronotum, scutellum, coxa, anterior abdominal sternites, connexivum reddish; pedicel 2X longer than basiflagellomere; labium slightly curved, surpassing fore coxa when stretched; bicolorous pronotum; posterior pronotal lobe rugose, wrinkled; scutellar spine long, acute, which is anteriorly reddish and posteriorly black (Fig. 16).

Measurements (n=5): Body length: 19.34-17.97; length of head: 4.97-5.33; interocular distance: 0.60-0.64; interocellar distance: 0.29-0.36; length of scape: 5.99-6.77; length of pedicel: 2.54-2.56; length of anteocular: 1.89-1.90; length of postocular: 2.41-2.68; length of labial segment II: 0.94-1.18, III: 3.52-3.87, IV: 0.68-0.70; length of anterior pronotal lobe: 1.98-2.21; length of posterior pronotal lobe: 2.40-3.05; width of anterior pronotal lobe: 1.30-1.53; width of posterior pronotal lobe: 4.43-5.68; length of scutellum: 1.40-1.69; width of abdomen: 5.02-8.12.

Material examined: INDIA: Karnataka, 1♀, Bengaluru: GKVK, 12.vii.1987, Thyagaraj; 1♀, 22.ix.1992, Student collection; 1♀, 20.iv.1994, Student collection; 1♂, 24.v.1994, Student collection; 1♀, 01.vii.1994, Student collection; 1♀, 01.viii.1994, Student collection; 1♀, 15.xi.1994, Student collection; 1♀, 03.v.1996, Student collection; 2♀, 1♂, 14.v.2011, Student collection; 1♀, 1♂, 14.x.2013, Student collection; 1♀, 2♂, Chintamani: Agriculture College, 04.iv.2010, Student collection; 1♂, 1♀, 14.v.2011, Student collection; 1♀, 17.iii.2013, Student collection; 1♀, 1♂, 14.iii.2015, Student collection; 1♀, Chitradurga: Hiriya, 28.i.2007, Shylaja.

Distribution elsewhere in Karnataka: Bengal, Tamil Nadu.

17. *Vesbius perpureus* (Thunberg, 1783)

Diagnosis: Small sized, oblong, shining, reddish coloured; head tumid, anteocular nearly five times shorter than post ocular and eyes tuberculately placed, inserted at the apex of head; II and III labial segment subequal in length; 1/4th of membrane passing abdominal apex (Fig. 17).

Materials examined: INDIA: Karnataka, 2♀, Dakshina Kannada: Puttur, 31.xi.2013, on *Anacardium occidentale*, P. S. Bhat; 1♂, Bengaluru, GKVK, 23.vi.2013, Student collection; 1♀, 06.xi.2014, S. N. Bhagyasree; 1♀, Kodagu: Makuta, 31.iv.2005, on *Vateria indica* Canopy collection, Y.

B. Srinivas; 1♂, Kundapur, 30.viii.1887, Student collection.

Measurements (n=5): Body length: 11.11-12.14; length of head: 2.43-2.86; interocular distance: 0.63-0.69; interocellar distance: 0.31-0.34; length of scape: 3.24-3.76; length of pedicel: 1.23-1.56; length of anteocular: 0.34-0.41; length of postocular: 1.24-1.38; length of labial segment II: 1.07-1.12, III: 1.18-1.36, IV: 0.30-0.39; length of anterior pronotal lobe: 1.00-1.89; length of posterior pronotal lobe: 1.77-2.00; width of anterior pronotal lobe: 1.44-1.79; width of posterior

pronotal lobe: 2.81-3.41; length of scutellum: 0.33-0.47; width of abdomen: 2.66-2.92.

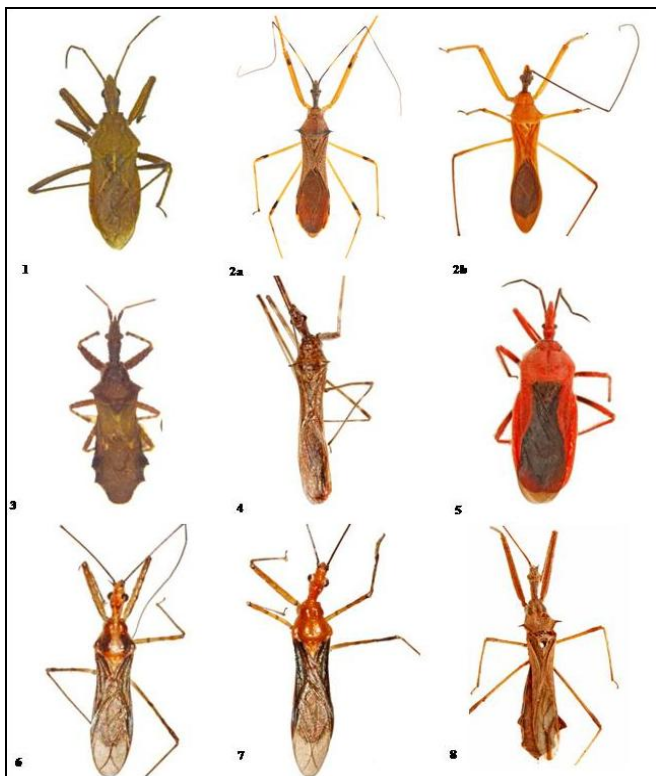
Distribution elsewhere in Karnataka: Meghalaya.

3.2 Checklist

The checklist of previously known Harpactorinae which are listed in zoological record are provided with the localities and references in the following table for the purpose of clear documentation.

Table 1: Check list of the species which are previously reported in the subfamily Harpactorinae from Karnataka

Sl. No.	Species	Distribution
1	<i>Brassivola hystrix</i> Distant, 1904	Chikkaballapura ^[7]
2	<i>Coranus fuscipennis</i> Reuter, 1881	Bengaluru and Chikkaballapura ^[9]
3	<i>Coranus militaris</i> Distant, 1919	Chikkaballapura ^[7]
4	<i>Coranus vitellinus</i> Distant, 1919	Chikkaballapura ^[7]
5	<i>Cydnocoris gilvus</i> (Burmeister, 1837)	Dakshina Kannada ^[8]
6	<i>Endochus albomaculatus</i> Stål, 1859	Chikkaballapura ^[7]
7	<i>Endochus campbelli</i> Distant, 1919	Chikkaballapura ^[7]
8	<i>Endochus inornatus</i> Stål, 1866	Bengaluru, Chikkaballapura, Dakshina Kannada and Kolar ^[9]
9	<i>Endochus parvispinus</i> Distant, 1919	Chikkaballapura ^[7]
10	<i>Epidaus bicolor</i> Distant, 1903	Dakshina Kannada ^[4]
11	<i>Euagorus plagiatus</i> (Burmeister, 1834)	Dakshina Kannada ^[4]
12	<i>Irantha armipes</i> (Stål, 1855)	Dakshina Kannada ^[4]
13	<i>Isyndus heros heros</i> (Fabricius, 1803)	Bengaluru ^[5]
14	<i>Isyndus reticulatus reticulatus</i> (Stål, 1868)	Chikkaballapura ^[7]
15	<i>Occamus typicus</i> Distant, 1909	Bengaluru, Dakshina Kannada and Shivamogga ^[9]
16	<i>Panthous bimaculatus</i> Distant, 1903	Dakshina Kannada ^[4]
17	<i>Rhynocoris fuscipes</i> (Fabricius, 1787)	Chikkamagaluru ^[10]
18	<i>Rhynocoris marginatus</i> (Fabricius, 1794)	Bengaluru, Chintamani ^[9]
19	<i>Rhirbus trochantericus</i> Stål, 1861	Dakshina Kannada ^[11]
20	<i>Sphedanolestes aurescens</i> Distant, 1919	Chikkaballapura ^[7]
21	<i>Sphedanolestes pubinotum</i> Reuter, 1881	Chikkaballapura ^[7]
22	<i>Sphedanolestes rubecula</i> Distant 1909	Bengaluru ^[10]
23	<i>Sphedanolestes signatus</i> Distant, 1903	Dakshina Kannada ^[4]
24	<i>Sphedanolestes variabilis</i> Distant, 1904	Bengaluru ^[10]
25	<i>Sycanus galbanus</i> Distant, 1906	Dakshina Kannada ^[12]



Habitus of 1. *Coranus carinatus* Livingstone and Ravichandran; 2a. ♀ *Endochus cingulatus* Stål; 2b. ♀ *Endochus cingulatus* Stål; 3. *Hemicokuknia gyllis* (Distant); 4. *Lunca henryensis* Distant; 5. *Lopocophala guerinii* Laporte; 6. *Macruscutopsis henryi* Distant; 7. *Macruscutopsis nigripes* Distant and 8. *Pitarus bhavani* Livingstone and Ravichandran.

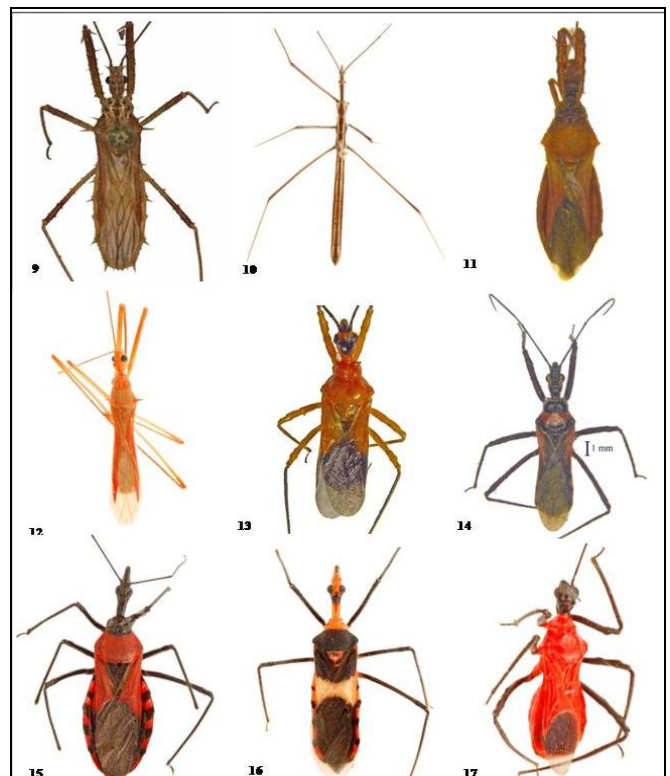


Plate 2: Habitus of 9. *Polidius armatus* Stål; 10. *Rhaphidosoma sthiosomi* Bergroth; 11. *Scipius horrida* (Stål); 12. *Serenibia pumilio* Distant; 13. *Sphedanolestes nigrocephala* Livingstone and Ravichandran; 14. *Sphedanolestes stigmatellus* Distant; 15. *Sycanus indagator* Stål; 16. *Sycanus varicolor* Dehra and 17. *Venius purpurinus* Thunberg.

4. Discussion

Critical taxonomic examination of 629 specimens collected from various localities of Karnataka revealed the presence of 17 new records in the subfamily Harpactorinae. All the species of Harpactorinae which belongs to Karnataka were only briefly described and documented by Distant in his fauna of British India during 1904 and 1910. Since 10 decades this group has been greatly neglected due to the taxonomic impediments. Therefore, it is affecting the proper biodiversity documentation and creating difficult to give their taxonomic identity as well. With this backdrop, basic taxonomic studies were done for documentation and to facilitate easy identification. Species identification of this subfamily is done by the variations in colour patterns, armatures on various parts of their body along with their angle, setation and morphometric observation like ratio of anteocular and post ocular, scape and pedicel, anterior and posterior lobe of pronotum and also by comparing the lengths of head, pronotum, scutellum and femora to the various parts of the body. So, these characters were extensively used in the diagnosis part for identification of species. Along with new records, checklist of previous records (Table 1) have also been provided to facilitate the proper documentation.

5. Conclusion

Despite of the wide diversity and economic importance of the subfamily Harpactorinae as a generalist predator, less work has been done on taxonomy of which is creating a gap between the fundamental aspect and applied biology. To overcome these gap basic taxonomic studies were conducted, here we could able to record 17 species from Karnataka. Possibilities of species documentation of this subfamily may further increase in Karnataka, if we undertake more intensive studies.

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7. References

- Weirauch C, Bérenger JM, Berniker L, Forero D, Forthman M, Frankenberg S *et al.* An illustrated identification key to assassin bug subfamilies and tribes (Hemiptera: Reduviidae). *Canadian Journal of Arthropod Identification*. 2014; 26(2):1-15.
- Grundy P, Maelzer D. Assessment of *Pristhesancus plagipennis* (Walker) (Hemiptera: Reduviidae) as an augmented biological control in cotton and soybean crops. *Austral Entomology*. 2000; 39(4):305-9.
- Cogni R, Freitas AV, Amaral Filho BF. Influence of prey size on predation success by *Zelus longipes* L. (Het., Reduviidae). *Journal of Applied Entomology*. 2002; 126(2-3):74-8.
- Srikumar KK, Bhat PS, Raviprasad TN, Vanitha K, Saroj PL, Ambrose DP. Biology and Behavior of Six Species of Reduviids (Hemiptera: Reduviidae: Harpactorinae) in a Cashew Ecosystem. *Journal of agricultural and urban entomology*. 2014; 30(1):65-81.
- Distant WL. The fauna of British India including Ceylon and Burma. Rhynchota. Taylor and Francis, London. 1904; 2:503.
- Distant WL. The fauna of British India including Ceylon and Burma. Rhynchota. Taylor and Francis, London. 1910; 5:112-362.
- Distant WL. Descriptions of new species and genera of the Heteropterous family Reduviidae from British India. *Journal of Natural History*. 1919; 4(20):71-9.
- Srikumar KK, Bhat PS, Raviprasad TN, Vanitha K. Biology, behaviour and functional response of *Cydnocoris gilvus* Brum. (Heteroptera: Reduviidae: Harpactorinae) a predator of Tea Mosquito Bug (*Helopeltis antonii* Sign.) on cashew in India. *Journal of Threatened Taxa*. 2014; 6(6):5864-70.
- Bhagyasree SN, Taxonomic studies of Assassin Bugs (Reduviidae: Hemiptera) of south India. Ph. D. Thesis, University of Agricultural sciences, Bengaluru. 2017.
- Usman S, Puttarudraiah M. A list of the insects of Mysore including the mites. *Bulletin, Department of Agriculture, Mysore State, Entomology Series*. 1955; (16).
- Bhat PS, Srikumar KK, Raviprasad TN, Vanitha K, Rebijith KB, Asokan R. Biology, behavior, functional response and molecular characterization of *Rihirbus trochantericus* Stal var. luteous (Hemiptera: Reduviidae: Harpactorinae) a potential predator of *Helopeltis* spp. (Hemiptera: Miridae). *Entomological news*. 2013; 123(4):264-77.
- Nitin KS, Bhat PS, Raviprasad TN, Vanitha K. Biology, Behaviour and predatory efficiency of *Sycanus galbanus* Distant. Hemiptera: Reduviidae: Harpactorinae recorded in Cashew plantations. 2017; 5(2):524-530.