

ON A COLLECTION OF AQUATIC AND SEMI-AQUATIC BUGS (HEMIPTERA: HETEROPTERA) FROM CHHATTISGARH, INDIA

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INTRODUCTION

Aquatic Heteroptera occupy a broad spectrum of aquatic habitats, have a multitude of shapes, and are adapted to a broad variety of niches (Spencer and Andersen, 1994). The aquatic and semi aquatic groups of insects represent a significant level of diversity in India (Ghosh, 1996). Aquatic hemipterans stand out as an important group of aquatic insects, which are considered important in environmental reclamation of aquatic habitats and are often used to gauge toxins in an environment (Jansson 1987; Papacek 2001; Wollmann 2001). The true bugs practice extra-oral digestion and may be predaceous, phytophagous, granivorous, or ectoparasitic, or they may use combinations of several modes of feeding (Haddad *et al.*, 2010). Williams (1996) have pointed out that invertebrates inhabiting temporary streams can have high diversity similar to permanent streams, therefore they should be considered in conservation plans designed to protect species and their habitats. Thirumalai (2002, 2007) reported 128 species of Gerromorpha and 153 species of Nepomorpha from India respectively. Since, there is no comprehensive account on aquatic Heteroptera of Chhattisgarh, the present study is undertaken.

Infraorder GERROMORPHA Popov, 1971

Family **Hydrometridae** Billberg, 1820

Subfamily Hydrometrinae Esaki, 1927

Genus **Hydrometra** Latreille, 1796

1. **Hydrometra greeni** Kirkaldy, 1898

1898. *Hydrometra greeni* Kirkaldy, *Entomologist*, 31: 2.

2005. *Hydrometra greeni* Kirkaldy: Yang & Zettel., *Raff. Bull. Zool.*, 53(1): 84.

Material examined: Bilaspur Dist., 5 mac. , 2 mac. exs., Karidongri Rest House, 19.ix.2012; Durg Dist., 1 ex., Balod Beat, 25.ix.2012; Kabirdham Dist., 1 ex., Rengakhar RH, 6.vi.2012; 1 mac. ex., Kawardha Range, Saroda Dam, 22.ix.2012, Coll. A. Raha & Party; Korba Dist., 1 ex., Sericultural Farm, 1.vi.2012., 1 , 2 exs., Bijakhara Nala, 1.vi.2012, Coll. K. Chandra & Party; Raipur Dist., 8 , 1 exs., Dullibahal, 1.xi.2011, Coll. A. Sarsavan & A. Gangopadhyay; 1 mac. , 1 mac. , Barnawapara WLS, 7.vii.2011, Coll. S.K. Gupta & Party; Surguja Dist., 1 mac , 1 mac , Tara Range, Lekhutdand, 15.ix.2012; 2 mac. , 4 mac. exs., Ambikapur Range, Bilgumpha, 14.ix.2012; 4 mac. , 4 mac. exs., Tara FRH, 16.ix.2012; 9 mac. , 2 mac. , Tara, Abhay nala, 17.ix.2012, Coll. A. Raha & Party.

Diagnosis: (Fig. 1A), Body elongate with thread-like legs; head longer than pronotum; eyes far from anterior margin of pronotum; antenna 4-segmented. 1st segment very short, 2nd and 4th subequal, 3rd segment longest; pronotum long; hemelytra shorter than abdomen. The hemelytra extends upto the 5th abdominal segment in both sexes. Seventh abdominal sternum of male depressed. Sixth and seventh sternum of male with dispersed hairs.

Distribution: Andaman and Nicobar Islands, Arunachal Pradesh, Assam, Bihar, Chhattisgarh, Gujarat, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Puducherry, Rajasthan,

Tamil Nadu, Uttar Pradesh and West Bengal. *Elsewhere*: Myanmar, Japan, Malay Peninsula, Philippines, Sri Lanka, Thailand and Vietnam.

Remarks: The species is widely distributed all over India and is also reported to have been attracted towards light.

Family **Gerridae Leach, 1815**

Subfamily Gerrinae Bianchi, 1896

2. ***Aquarius adelaidis* (Dohrn, 1860)**

1860. *Aquarius adelaidis* Dohrn., *Stettin. ent. Ztg.*, **21**: 408.

2002. *Aquarius adelaidis* (Dohrn): Thirumalai., *Rec. zool. Surv. India*, **100**(1-2): 60.

Material examined: Durg Dist., 18 (6 mac., 12 brachy.), 54 (17 mac., 37 brachy.) exs., Balod Range, Borid Gaon, 26.ix.2012, Coll. A. Raha & Party.

Diagnosis: (Fig. 1B), Length male 12.3 mm, female 15 mm; head and anterior lobe of pronotum black; base of the head ochraceous, centroapical half of head with furrow, lateral and apical region with dense grayish white pubescence; antennae 1st segment longer, 2nd and 4th subequal in length, 3rd segment shorter; apex of fore and mid femora with two spines; rostrum reached upto the fore coxa; scent orifice with a transverse sulcus; 8th sternum of female with a median longitudinal slit; connexival spines surpassing the tip of abdomen in females and in males it is not surpassing the tip of abdomen; between 7th and 8th abdominal sternum of male with an excavation; 8th abdominal sternum of male depressed; wings pale brown.

Distribution: Andhra Pradesh, Bihar, Chhattisgarh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal. *Elsewhere*: Bangladesh, China, Indonesia, Myanmar, Nepal, Philippines, Sri Lanka, Thailand and Vietnam.

Remarks: This species is confined to lentic ecosystem.

Genus *Limnogonus* Stål, 1868

Subgenus *Limnogonus* Stål, 1868

3. ***Limnogonus (Limnogonus) fossarum* fossarum** (Fabricius, 1775)

1775. *Cimex fossarum* Fabricius, *Syst. Ent.*, 727.

2002. *Limnogonus (Limnogonus) fossarum* (Fabricius): Thirumalai, *Rec. zool. Surv. India*, **100**(1-2): 62.

Material examined: Kabirdham Dist., 1 mac, 1 mac exs., Kawardha Range, Saroda Dam, 22.ix.2012, Coll. A. Raha & Party.

Diagnosis: (Fig. 1C), Body of moderate size; antennae 4-jointed, 2nd and 3rd joints shortest and nearly subequal in length; 4th antennal joint slightly smaller than the 1st joint or subequal; pronotum with the mid-longitudinal carination moderately prominent, posterior tip of pronotum remarkably angular; 7th abdominal segment with connexival spines. Pronotal lobe with median longitudinal yellow stripe and anterior region with two oblong spots.

Distribution: Andaman & Nicobar Islands, Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Chhattisgarh, Delhi, Goa, Haryana, Himachal Pradesh, Jammu & Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Puducherry, Rajasthan, Tamil Nadu and West Bengal. *Elsewhere*: Bangladesh, China, Hong Kong, Indonesia, Japan, Malay Peninsula, Myanmar, Philippines, Singapore, Sri Lanka, Taiwan, Thailand and Vietnam.

Remarks: This is an uncommon species of the genus *Limnogonus* in Madhya Pradesh. This species is attracted towards light.

4. ***Limnogonus (Limnogonus) nitidus*** (Mayr, 1865)

1865. *Hydrometra nitida* Mayr, *Verh. Zool.-bot. Ges. Wien*, **15**: 443.

2002. *Limnogonus (Limnogonus) nitidus* (Mayr): Thirumalai, *Rec. zool. Surv. India*, **100**(1-2): 62.

Material examined: Kabirdham Dist., 1 ex., Bhoramdev WLS, Suuwahi Forest, 8.xi.2011, Coll. S.K. Gupta & Party.

Diagnosis: (Fig. 1D), Piceous; baso-central region of head ochraceous, anterior pronotal lobe with two linear yellow stripes, near to which suppressed; lateral margin of pronotum with yellow fascia; males connexival spines short and not reaching the apex of abdomen, but in female

very prominent connexival spines and surpassing the abdomen; scent orifice not pigmented.

Distribution: Andaman & Nicobar Islands, Arunachal Pradesh, Assam, Bihar, Chhattisgarh, Delhi, Karnataka, Kerala, Madhya Pradesh, Odisha, Rajasthan, Tamil Nadu, Tripura, Uttar Pradesh and West Bengal. *Elsewhere:* China, Indonesia, Malaysia, Maldives Islands, Myanmar, Nepal, Singapore, Sri Lanka, Thailand and Vietnam.

Remarks: Large number of this species gets attracted towards light. This species is also inhabited both lentic and lotic ecosystems and is distributed throughout India.

Genus *Limnometra* Mayr, 1865

5. *Limnometra fluviatorum* (Fabricius, 1798)

1798. *Cimex fluviatorum* Fabricius, *Ent. Syst. Suppl.*, 543.

2002. *Limnometra fluviatorum* (Fabricius): Thirumalai, *Rec. zool. Surv. India*, **100**(1-2): 63.

Material examined: Kabirdham Dist., 2 , 5 exs., Borhamdev WLS, Jaljala Forest, 23.xi.2011, Coll. A. Sarsavan & A. Gangopadhyay.

Diagnosis: (Fig. 1E), Length: 11-12.5 mm; Body brown colour; 1st antennal segment long, 2nd, 3rd and 4th segments more or less subequal in length; head with two ochraceous stripes; pronotum with a black median stripe and lateral margin with black continuous fascia; lateral margin of mesonotum with a black fascia; middle coxa with a dorsolateral spine like projection; wings dark brown.

Distribution: Chhattisgarh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Puducherry, Tamil Nadu and West Bengal. *Elsewhere:* Philippines and Sri Lanka.

Remarks: It is found in almost all freshwater ecosystems. This species can be differentiated from other known species of this genus by the presence of a spine like projection on the dorsolateral margin of the middle coxa.

Genus *Neogerris* Matsumura, 1913

6. *Neogerris parvulus* (Stål, 1859)

1859. *Gerris parvula* Stål, *Zoology*, **4**: 265.

2002. *Neogerris parvula* (Stål): Thirumalai., *Rec. zool. Surv. India*, **100**(1-2): 61-62.

Material examined: Bilaspur Dist., 1 ex., Hasdeo River, 18.ii.979, Coll. K. Reddiah & Party.

Diagnosis: (Fig. 1G), Body elongate; anterior pronotum with a single yellow spot; 1st antennal segment longest and as long as or little longer than the 2nd and 3rd segments together; 4th antennal segment remarkably smaller than the 1st segment; mid longitudinal carination of pronotum indistinct and present on anterior half, male abdomen narrow but female abdomen stout, scent orifice with reddish brown spot.

Distribution: Andhra Pradesh, Assam, Bihar, Chhattisgarh, Kerala, Madhya Pradesh, Odisha, Tamil Nadu, Uttar Pradesh and West Bengal. *Elsewhere:* Bangladesh, China, Iran, Japan, Java, Malay Peninsula, Myanmar, New Guinea, Oman, Philippines, Pakistan, Singapore, Sri Lanka, Solomon Islands, Taiwan and Vietnam.

Remarks: This species is widely distributed in India and present in both lentic and lotic ecosystem. Very few were attracted towards light.

Subfamily *Cylindrostethinae* Matsuda, 1960

Genus *Cylindrostethus* Mayr, 1865

7. *Cylindrostethus productus* (Spinola, 1840)

1840. *Gerris productus* Spinola, Esaki. *Sur less insectes hemipteres rhynchotes on heteropteres*, 64.

2002. *Cylindrostethus productus* (Spinola): Thirumalai, *Rec. zool. Surv. India*, **100**(1-2): 58.

Material examined: Jashpur Dist., 4 , 3 exs., Badalkhol WLS, Kharanala, 27.v.2012, Coll. A. Raha & Party; Kabirdham Dist., 4 , 5 exs., Borhamdev WLS, Suuwahi Forest, 18.xi.2011, Coll. S.K. Gupta & Party; 7 , 9 exs., Jamunpani Forest, 22.xi.2011, Coll. A. Gangopadhyay; Surguja Dist., 9 , 10 exs., Munakhand village, Baharaghat Nala, 16.i.975, Coll. S.K. Mishra & Party; 27 , 21 exs., Surguja Forest RH, 15.i.1975, Coll. D.S. Mathur.

Diagnosis: (Fig. 1F), First antennal segment longer than the combined length of 2+3+4 antennal segments; 4th antennal segment slightly bended; lateral margin of thorax with a silvery white fascia, which is surrounded by black bands forming a sand-witch appearance; rostrum short, not surpassing 1st sternum; meta sternum just above its apex with a distinct groove; connexival

spines are convergent in female, but in male connexival spines are divergent.

Distribution: Chhattisgarh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Punjab, Tamil Nadu, Uttar Pradesh and West Bengal. *Elsewhere:* Sri Lanka.

Remarks: This is the largest species of the genus so far known from the eastern Hemisphere.

Subfamily Ptilomerinae Bianchi, 1896

Genus *Ptilomera* Amyot & Serville, 1843

Subgenus *Ptilomera* Amyot & Serville, 1843

8. *Ptilomera (Ptilomera) agroides* Schmidt, 1926

1926. *Ptilomera agroides* Schmidt, *Ent. Mitt.*, **15**(1): 63.

2002. *Ptilomera (Ptilomera) agroides* Schmidt: Thirumalai, *Rec. zool. Surv. India*, **100**(1-2): 69.

Material examined: Kabirdham Dist., 1 ex., Bolda, 8.vi.2012, Coll. A. Raha & Party; Korba Dist., 1, 4 exs., Lemru Range, Telemanala, 3.vi.2012, Coll. K. Chandra & Party; Surguja Dist., 4, 1 exs., Forest RH, 15.i.1975, Coll. D.S. Mathur.

Diagnosis: (Fig. 1H), Apex of frontoclypeus trilobed, from the lateral lobe antennae arises and from the central lobe rostrum arises; vertex of head bulged, having a slanting brown band inner to the eyes; lateral margin of meso and metanotum with silvery white fascia; first antennal segments longer than the combined length of 2+3+4 segments; basal fore tarsal segment very long; fore tibial process well developed in females and poorly developed in males; hind coxa with lateral spines; inner margin of mid femur in males fringed with hairs but it is devoid in females; dorso-lateral projection of pygofer in males extends beyond lateral wings of suranal plate.

Distribution: Chhattisgarh, Karnataka, Kerala, Madhya Pradesh, Maharashtra and Tamil Nadu.

Remarks: It is a very common gerrid found in flowing mountain streams, rivers etc.

Subfamily Halobatinae Bianchi, 1896

Tribe Metrocorini Matsuda, 1960

Genus *Metrocoris* Mayr, 1865

9. *Metrocoris communis* (Distant, 1910)

1910. *Euodus communis* Distant, *Ann. Mag. nat. Hist.*, **5**(8): 151.

2002. *Metrocoris communis* (Distant): Thirumalai, *Rec. zool. Surv. India*, **100**(1-2): 65-66.

Material examined: Bilaspur Dist., 3 exs., Tan River, 12.ii.1979, K. Reddiah & Party; Kabirdham Dist., 2, 5 exs., Bhoramdev WLS, Kudai Dhona Forest, 15.xi.2011; 5, 4 exs., Suuwahi Forest, 18.xi.2011, Coll. S.K. Gupta & Party; 3, 4 exs., Loop Forest, 20.xi.2011, Coll. A. Sarsavan & A. Gangopadhyay; Korba Dist., 13, 14 exs., Lemru Range, Telemanala, 3.vi.2012, Coll. K. Chandra & Party; Raipur Dist., 4, 5 exs., Hardipathar, 5.xi.2011, Coll. A. Sarsavan & A. Gangopadhyay; Surguja Dist., 2, 3 exs., Kamaleshwarpur, 15.i.1975, Coll. H. Khajuria & Party; 5 apt., 5 apt., Sankarghat, Mainpath Range; 14 (1 mac, 13 apt), 13 (1 mac, 12 apt), Mainpath FRH, 12.ix.2012, Coll. A. Raha & Party.

Diagnosis: (Fig. 1I), Female 4.1 mm (5.4 mm including wings); fore femur not stout; 1st antennal segment long, 2nd and 3rd subequal in length, 4th segment smaller; inner margin of hind trochanter fringed with hairs; apex of pronotal lobe very acute; head and thorax with black marking; the pronotum of wingless forms with T-shaped black marking and the winged form with a black longitudinal stripe almost reaching tip with a pair of lateral black stripes on posterior lobe. The 7th ventral segment of female with a tuft of dark brown hairs on either side laterally.

Distribution: Chhattisgarh, Karnataka, Madhya Pradesh, Maharashtra, Rajasthan, Tamil Nadu and Uttar Pradesh. *Elsewhere:* Afghanistan, Iran, Iraq and Oman.

Remarks: It is a common species in Northwestern and central India.

Infraorder NEPOMORPHA Papov, 1968

Superfamily NEPOIDEA Latreille, 1802

Family **Belostomatidae** Leach, 1815

Subfamily Belostomatinae Leach, 1815

Genus *Diplonychus* Laporte, 1833

10. *Diplonychus annulatus* (Fabricius, 1781)

1781. *Nepa annulata* Fabricius, *Carol. Ernest. Bokhni. Hamburgi et Kiloni*, 333.

2007. *Diplonychus annulatus* (Fabricius): Thirumalai, *Rec. zool. Surv. India, Occ. Paper No. 273*: 11-12.

Material examined: Bastar Dist., 1 ♂, 2 ♀s., Jagadapur, 12.i.1974, Coll. R.K. Singh & Party; Bilaspur Dist., 3 ♀s., Khutaghat, 7.iii.1992; Korba Dist., 2 ♂, 1 ♀s., 8.iii.1992, Coll. U.A. Gajbe & Party; Raipur Dist., 2 ♀s., Khosi Nala, 5.xii.1991, Coll. H.S. Sharma & Party; Surguja Dist., 1 ♀, Ambikapur, 9.i.1975, Coll. H. Khajuria & Party.

Diagnosis: (Fig. 2A), Body broad and oval, maximum width of hemelytra together is almost equal to their length; head as long as the interocular space; anterior tarsus with two segments; hemelytra devoid of any shining spot beyond the middle of the inner margin. Body more than 20 mm long.

Distribution: Andhra Pradesh, Assam, Bihar, Chandigarh, Chhattisgarh, Delhi, Gujarat, Kerala, Madhya Pradesh, Maharashtra, Odisha, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal. *Elsewhere:* Bangladesh and Pakistan.

Remarks: This is the larger species of the genus *Diplonychus* in India. Sometimes it feeds on dragonfly nymphs.

11. *Diplonychus molestus* (Dufour, 1863)

1863. *Appasus molestum* Dufour, *Ann. Soc. Ent. France*, 4(3): 395.

2007. *Diplonychus molestus* (Dufour): Thirumalai, *Rec. zool. Surv. India, Occ. Paper No. 273*:12.

Material examined: Bilaspur Dist., 1 ♂, 3 ♀s., 8.iii.1992, Rajnandagon Dist., 1 ♀, Shanti Nagar, 22.xii.1983, Coll. U.A. Gajbe & Party; Raipur Dist., 2 ♀s., Baloda Bazar, 7.xii.1991, Coll. H.S. Sharma & Party; Rajgarh Dist., 1 ♂, Newas River, 8.x.1995, Coll. Y.N. Gupta & H.S. Sharma.

Diagnosis: (Fig. 2B), Length: 13.5 mm to 17.5 mm; colour: ochraceous with ash tincture; posterior pronotal angles obtuse; respiratory straps without cluster of setae; spiny wing patch almost round; pubescent stripe of abdominal sternum broad and obscure; well developed wing membrane.

Distribution: Andhra Pradesh, Bihar, Chandigarh, Chhattisgarh, Delhi, Himachal Pradesh, Jammu & Kashmir, Kerala, Madhya

Pradesh, Maharashtra, Manipur, Odisha, Punjab, Tripura, Uttar Pradesh and West Bengal.

Remarks: This species attracted towards light. The colour of this species varies depend on the habitat the live.

12. *Diplonychus rusticus* (Fabricius, 1781)

1781. *Nepa rustica* Fabricius, *Species insectorum*, 2: 333.

2007. *Diplonychus rusticus* (Fabricius): Thirumalai, *Rec. zool. Surv. India, Occ. Paper No. 273*:12-13.

Material examined: Korba Dist., 1 ♂, 4 ♀s., 8.iii.1992, Coll. U.A. Gajbe & Party; Surguja Dist., 6 ♂, 9 ♀s., Ambikapur, 9.i.1975, Coll. H. Khajuria & Party.

Diagnosis: (Fig. 2C), Length: 15 mm to 16 mm. Colour: ochraceous brown; posterior pronotal angles acute; respiratory straps with cluster of setae; spiny wing patch almost oblong; pubescent stripe of abdominal sternum linear and prominent; wing membrane very small.

Distribution: Andaman & Nicobar Islands, Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Chandigarh, Chhattisgarh, Delhi, Goa, Gujarat, Himachal Pradesh, Jammu & Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Odisha, Puducherry, Punjab, Rajasthan, Tamil Nadu, Tripura, Uttar Pradesh and West Bengal. *Elsewhere:* Australia, Austria, China, Formosa, Indonesia, Japan, Malay Peninsula, Myanmar, New Zealand, Philippines, Sri Lanka, Thailand and New Guinea.

Remarks: This species enormously reduce mosquito larvae. It is also a voracious feeder and has been reported to attack fish fry and fingerlings.

Subfamily Lethocerinae Lauck & Menke, 1961

Genus *Lethocerus* Mayr, 1853

Subgenus *Lethocerus* Mayr, 1853

13. *Lethocerus indicus*

(Lepeletier & Serville, 1825)

1825. *Belostoma indica* Lepeletier & Serville, *Encycl. Meth.*, X: 272.

2007. *Lethocerus indicus* (Lepeletier & Serville): Thirumalai, *Rec. zool. Surv. India, Occ. Paper No. 273*:13-14.

Material examined: Bilaspur Dist., 2 exs., Kota, Kora Sagar, 10.ii.1979, Coll. K. Reddiah & Party; Bilaspur Dist., 2 exs., Atariya forest, 18.vi.2004, 1 ex., Lamni forest, 27.vi.2004., 1 ex., 28.vi.2004, Coll. A. Singh & Party; Jashpur Dist., 1 ex., Badalkhol WLS, 26.v.2012, Coll. A. Raha & Party; Kabirdham Dist., 1 ex., Chilpi Forest, 14.xi.2011, Coll. Sunil & Party; Raipur Dist., 2 exs., Khosi Nala, 5.xii.1991; Raipur Dist., 1 ex., Dhamtari, Mahanadi River, 29.xi.1991, Coll. H.S. Sharma & Party.

Diagnosis: (Fig. 2F), Body dorsoventrally flattened with large size. Head between eyes with parallel sides; pronotum with a transverse fascia at the basal end and a fine longitudinal carination in the middle; thick sets of swimming hairs on intermediate and posterior legs on the ventral side.

Distribution: Andaman & Nicobar Islands, Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Chandigarh, Chhattisgarh, Delhi, Goa, Gujarat, Himachal Pradesh, Jammu & Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Mizoram, Odisha, Puducherry, Punjab, Rajasthan, Tamil Nadu, Tripura, Uttar Pradesh and West Bengal. *Elsewhere:* Indonesia, Malay Peninsula, Myanmar, Pakistan and Philippines.

Remarks: This is the largest species of aquatic Hemipteran recorded from all wet land ecosystem. It has been reported to kill even a full-grown frog, while some are known to feed on snails.

Family Nepidae Latreille, 1802
Subfamily Nepinae Latreille, 1802
Tribe Nepini Latreille, 1802
Genus *Laccotrephes* Stål, 1866
Subgenus *Laccotrephes* Stål, 1866
14. *Laccotrephes griseus*
(Güerin-Méneville, 1844)

1844. *Nepa griseus* Güerin-Méneville, *Iconoogr. Regne. Anim. Ins.*, 352.

2007. *Laccotrephes griseus* (Güerin-Méneville): Thirumalai, *Rec. zool. Surv. India, Occ. Paper No. 273*: 5-6.

Material examined: Bilaspur Dist., 1 ex., Ratanpur, Jagdev Ban, 10.xii.1991, Coll. H.S. Sharma & Party; 1 ex., Karidongri RH,

19.ix.2012, Coll. A. Raha & Party; Raigarh Dist., 1 , 1 exs., 26.ix.1991, Coll. H.P. Agrawal & Party; 1 , 1 exs., Newaj River, 8.x.1995; 1 , 4 exs., Chhapi River, Jeerapur, 10.x.1995, Coll. Y.N. Gupta & H.S. Sharma; Surguja Dist., 3 exs., Ambikapur, 9.xi.1975, Coll. H. Khajuria & Party; 2 exs., Barnawapara WLS, Fatehpur Talab, 17.ix.2012, Coll. A. Raha & Party.

Diagnosis: (Fig. 2E), Abdomen above with light bluish tinge; anterior area of prosternum provided with a strong acute spine-like structure; abdominal appendages distinctly shorter than the body; parameres symmetrical and slightly hooked.

Distribution: Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Chandigarh, Chhattisgarh, Delhi, Gujarat, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Nagaland, Odisha, Puducherry, Punjab, Rajasthan, Tamil Nadu, Tripura, Uttar Pradesh and West Bengal. *Elsewhere:* Malaysia, Myanmar, Seychelles, Sri Lanka and Thailand.

Remarks: This species was recorded in moderate numbers from all types of wetlands. It inhabits the bottom littoral weedy zone of stagnant water. It is very common in Peninsular India and occurs in permanent pond near the edges.

15. *Laccotrephes ruber* (Linnaeus, 1764)

1764. *Nepa ruber* Linnaeus, *Mus. Lud. Ulr.*, 165.

2007. *Laccotrephes ruber* (Linnaeus): Thirumalai, *Rec. zool. Surv. India, Occ. Paper No. 273*: 7.

Material examined: Bilaspur Dist., 1 ex., Ratanpur, Nawa Talab, 20.ii.1979; 1 ex., Haf River, 5.ii.1979; 1 ex., Tan River, 12.ii.1979, Coll. K. Reddiah & Party; 1 ex., Sakri, 9.iii.1992, Coll. U.A. Gajbe & Party; 2 exs., Ratanpur, Jagdev Ban, 10.xii.1991; 1 , 1 exs., Harpa River, 9.xii.1991, Coll. H.S. Sharma & Party; Raigarh Dist., 1 , 1 exs., Dharinjoygarh, 2.x.1991, Coll. H.P. Agrawal & Party; Raipur Dist., 1 , 1 exs., Mahanadi River, 6.xii.1991; 1 , 1 exs., Shivnath River, 7.xii.1991, Coll. H.S. Sharma & Party; 1 ex.,

Latadadar Tara, 8.vii.2012, Coll. S.K. Gupta & Party; Surguja Dist., 1 , 1 exs., Murakhand Village, 16.i.1975, Coll. S.K. Mishra & Party; 2 , 2 exs., Kamaleshwarpur, 18.i.1975; 1 ex., Champerma Village, 21.i.1975, Coll. S.K. Mishra & Party; 1 , 2 exs., Ambikapur, Forest RH, 9.i.1975; 1 , 1 exs., 15.i.1975; 1 ex., 6.ii.1975, Coll. H. Khajuria & Party.

Diagnosis: (Fig. 2D), The abdominal appendages are distinctly longer than the body; prosternum is convex in the middle; male paramere curved and hook shaped.

Distribution: Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Chandigarh, Chhattisgarh, Delhi, Gujarat, Himachal Pradesh, Jammu & Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Nagaland, Odisha, Punjab, Sikkim, Tamil Nadu, Tripura, Uttar Pradesh and West Bengal. *Elsewhere:* China, Japan, Nepal, Pakistan and Taiwan.

Remarks: It is a common species with wide distribution in the Indo-Australian region and is found in almost all freshwater ecosystem.

Subfamily Ranatrinae Douglas & Scott, 1865

Tribe Ranatrini Douglas & Scott, 1865

Genus *Cercotmetus* Amyot & Serville, 1843

16. *Cercotmetus fumosus* Distant, 1904

1904. *Cercotmetus fumosus* Distant, *Entomologist*, **37**: 278.

2007. *Cercotmetus fumosus* Distant: Thirumalai, *Rec. zool. Surv. India, Occ. Paper No. 273*: 8.

Material examined: Bilaspur Dist., 1 ex., Haf River, 5.ii.1979, Coll. K. Reddiah & Party.

Diagnosis: (Fig. 3A), Length: 48 mm; Colour: dark fuscous; vertex of head with a tubercle; hemelytra not reaching the apex of 5th abdominal segment; pronotum as long as mid femur.

Distribution: Bihar, Chhattisgarh, Himachal Pradesh, Madhya Pradesh, Punjab, Tamil Nadu and Uttar Pradesh. *Elsewhere:* Sri Lanka.

Remarks: Species belonging to this genus is poorly known in India (Thirumalai and Sharma, 2008).

Genus *Ranatra* Fabricius, 1790

Subgenus *Ranatra* Fabricius, 1790

17. *Ranatra elongata* Fabricius, 1790

1790. *Ranatra elongata* Fabricius, *Skrif. Nat. Selesk.*, **1**: 228.

2007. *Ranatra elongata* Fabricius: Thirumalai, *Rec. zool. Surv. India, Occ. Paper No. 273*: 9.

Material examined: Raipur Dist., 1 ex., Jail Road, 30.vi.2011, Coll. K. Chandra & Party; Surguja Dist., 1 ex., 15.i.1975, Coll. D.S. Mathur; 1 , 5 exs., Murakhand Village, 16.i.1975, Coll. S.K. Sharma & Party.

Diagnosis: (Fig. 3B), Length: 40-60 mm; vertex flat; basal portion of eyes ochraceous and remaining part black; pronotum with a central longitudinal furrow; head, pronotum and legs fulvous; fore tarsus very short; fore femur with two pairs of spines, one on sub-apex and another bigger beyond middle; metasternal process with sulcation; respiratory longer than the body.

Distribution: Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Chandigarh, Chhattisgarh, Delhi, Himachal Pradesh, Jammu & Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Puducherry, Punjab, Rajasthan, Tamil Nadu, Tripura, Uttar Pradesh and West Bengal. *Elsewhere:* Australia, Nepal and Sri Lanka.

Remarks: This species feeds on frog tadpole and immature of aquatic insects.

18. *Ranatra filiformis* Fabricius, 1790

1790. *Ranatra filiformis* Fabricius, *Skrif. Nat. Selesk.*, **1**: 228.

2007. *Ranatra filiformis* Fabricius: Thirumalai, *Rec. zool. Surv. India, Occ. Paper No. 273*: 9-10.

Material examined: Jashpur Dist., 1 ex., Badalkhol WLS, Kharanala, 27.v.2012, Coll. A. Raha & Party.

Diagnosis: (Fig. 3C), Body elongated, about 27-28 mm long with abdominal appendages about 23 mm; head occasionally with a distinct tubercle on the vertex; metasternal process posteriorly triangle with a distinct mid-longitudinal ridge; interocular space slightly greater than the diameter of an eye.

Distribution: Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Chandigarh, Chhattisgarh, Delhi, Gujarat, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Odisha, Puducherry, Punjab, Rajasthan, Tamil Nadu, Tripura, Uttar Pradesh and West Bengal. *Elsewhere:* China, Malay Peninsula, Nepal, Pakistan, Philippines, Sri Lanka and Thailand.

Remarks: The species mostly occurs shallow region of water bodies where it clings to the submerged vegetation.

Superfamily Notonectoidea Latreille, 1802

Family Notonectidae Latreille, 1802

Subfamily Anisopinae Hutchinson, 1929

Tribe Anisopini Hutchinson, 1929

Genus *Anisops* Spinola, 1837

19. *Anisops barbatus* Brooks, 1951

1951. *Anisops barbata* Brooks, *Kans. Univ. Sci. Bull.*, **34**: 387.

2007. *Anisops barbatus* Brooks: Thirumalai, *Rec. zool. Surv. India, Occ. Paper No.* **273**: 37.

Material examined: Raipur Dist., 2 exs., Barnawapara WLS, 11.xi.2011, Coll. S.K. Gupta & Party.

Diagnosis: (Fig. 3D), Length: 8.0-9.3 mm; tylus of males having a pair of tufts of bristles which reaches the base of labrum, which is absent in females; tylus swollen in both male and female; stridulatory comb of fore tibia having 20-25 broad teeth.

Distribution: Andhra Pradesh, Bihar, Chandigarh, Chhattisgarh, Haryana, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal. *Elsewhere:* China, Indonesia, Malaya, Myanmar, Sri Lanka, Taiwan and Vietnam.

Remarks: This is the largest species of the genus reported from India (Thirumalai, 2001), presently it was collected through light trap.

20. *Anisops kuroiwaie* Matsumura, 1915

1915. *Anisops kuroiwaie* Matsumura, *Ent. Mag. Kyoto*, **1**: 109.

2007. *Anisops kuroiwaie* Matsumura: Thirumalai, *Rec. zool. Surv. India, Occ. Paper No.*, **273**: 39.

Material examined: Durg Dist., 3 , 9 , Balod Beat, 25.ix.2012, Coll. A. Raha & Party.

Diagnosis: (Fig. 3E), Length male, 5.6-6.4, female 5.4-6.3; width, male 1.5-1.6, female 1.3-1.8. Interocular space anteriorly produced into a cephalic projection; in dorsal view cephalic projection rounded at apex, in lateral view extending in front of eye less than half the total length of the frons; frons diverging ventrally. Tylus and frons are excavate with two carinae on each in frontal view. Males are easily recognized by the structure of the cephalic projection and the frons (Fig. 3F).

Distribution: Arunachal Pradesh, Assam, Chhattisgarh, Delhi, Madhya Pradesh, Manipur, Sikkim, Tripura, Uttar Pradesh and West Bengal. *Elsewhere:* Widespread in Australasia from southern China to Australia, Southeastern Palaearctic (Japan) and West Malaysia.

SUMMARY

So far, 65 species (see Thirumalai and Sharma, 2008, Thirumalai *et al.*, 2007, Chandra and Jehamalar, 2011, Chandra *et al.*, 2010 and Chandra *et al.* 2012) of aquatic bugs are reported from Madhya Pradesh, the mother state of Chhattisgarh. But, only 20 species belonging to 5 families and 14 genera are recorded from nine districts (Fig. 4) of Chhattisgarh in the present study, this number is quite low. More species of aquatic bugs are expected to occur from Chhattisgarh, if intensive surveys are undertaken.

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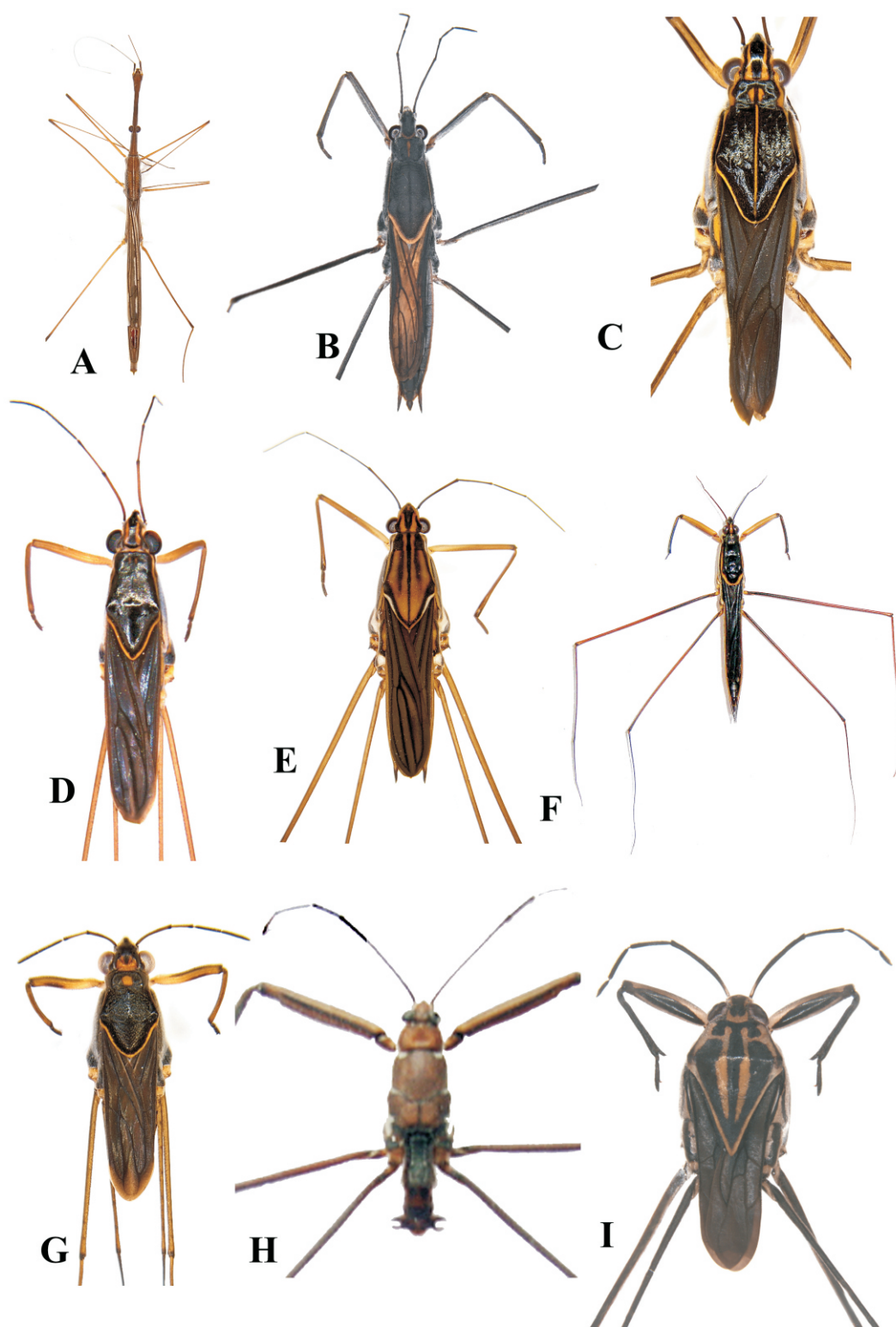


Fig. 1 : A-I. Semi-aquatic Heteroptera of Chhattisgarh. A- *Hydrometra greeni*; B- *Aquarius adelaidis* (Female); C- *Limnogonus (Limnogonus) fossarum*; D- *Limnogonus (Limnogonus) nitidus*; E- *Limnometra fluviarium*; F- *Cylindrostethus productus*; G- *Neogerris parvulus*; H- *Ptilomera (Ptilomera) agroides*; I- *Metrocoris communis*.

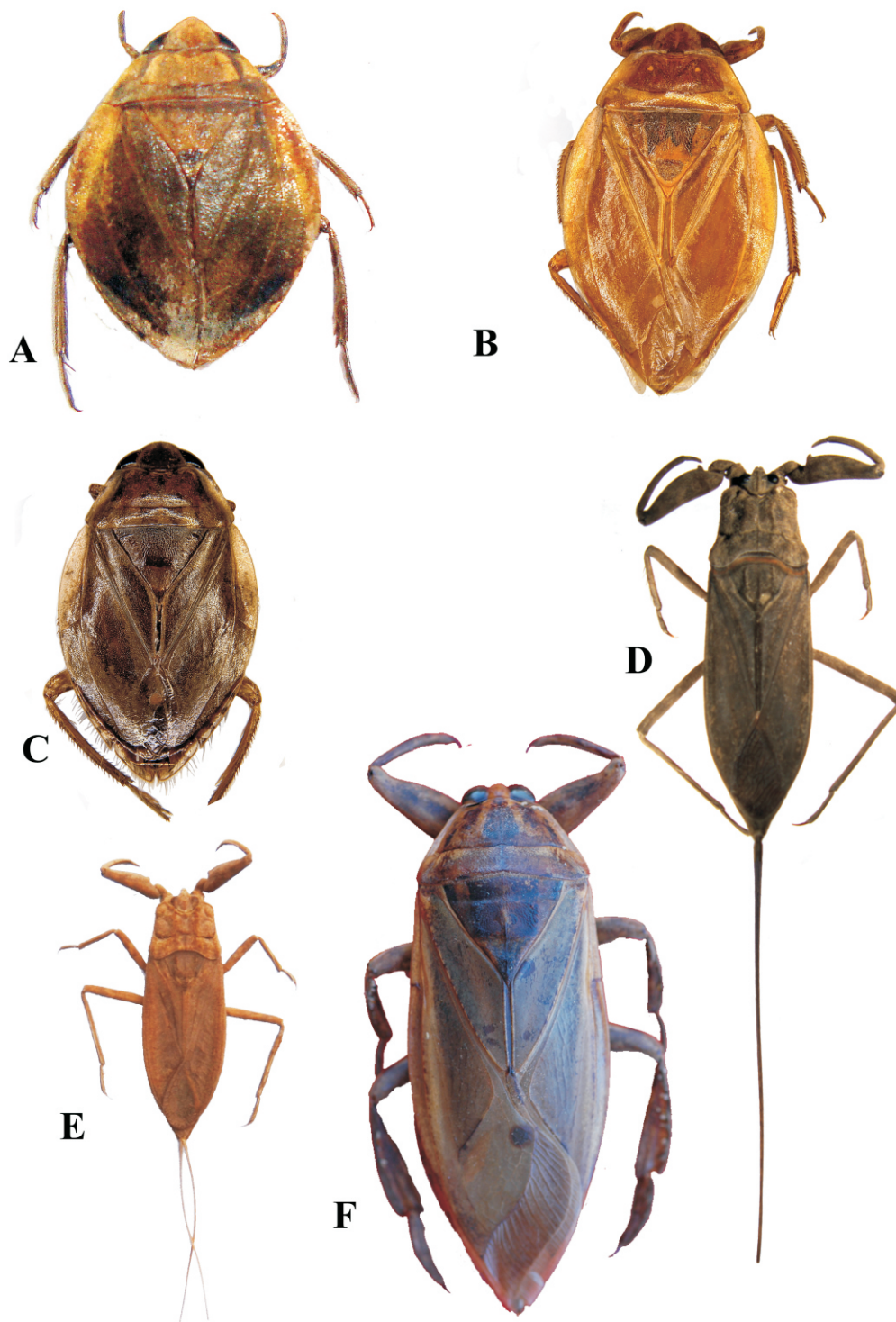


Fig. 2: A –F. Aquatic Heteroptera of Chhattisgarh. A- *Diplonychus annulatus*; B- *Diplonychus molestus*; C- *Diplonychus rusticus*; D- *Laccotrephes (Laccotrephes) ruber*; E- *Laccotrephes (Laccotrephes) griseus*; F- *Lethocerus (Lethocerus) indicus*.

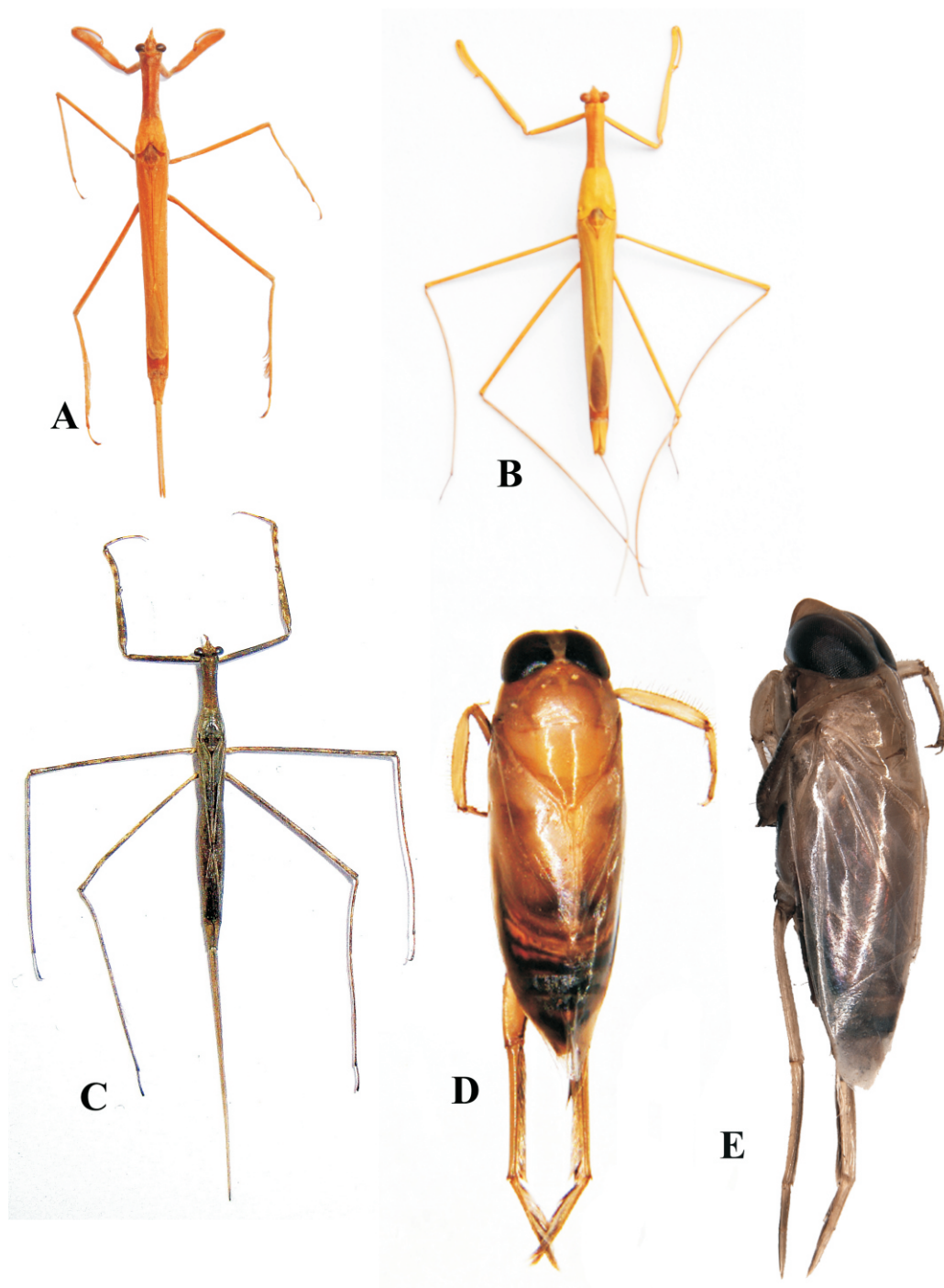


Fig. 3: A-D. Aquatic Heteroptera of Chhatisgarh. A- *Cercotmetus fumosus*; B- *Ranatra (Ranatra) elongata*; C- *Ranatra (Ranatra) filiformis*; D- *Anisops barbatus*; E- *Anisops kuroiwae*.

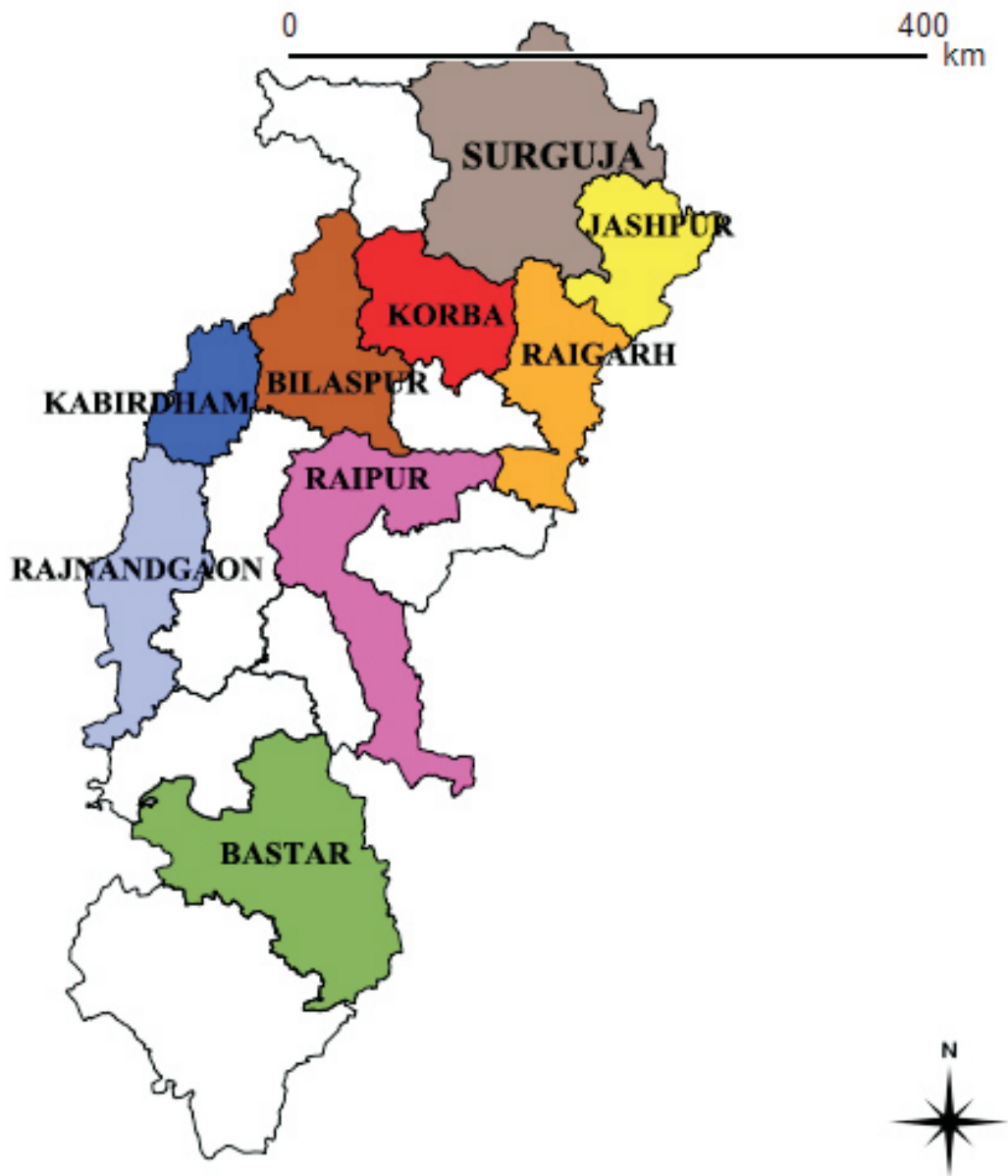


Fig. 4.: Map of Chhattisgarh. The colour area of the map showing the records of aquatic Heteroptera.