

ON A FURTHER COLLECTION OF AQUATIC RHYNCHOTA FROM
THE RAJMAHAL HILLS, SANTAL PARGANAS, BIHAR, WITH A
DESCRIPTION OF *MICROVELIA SANTALA*, SP. NOV.

By H. A. HAFIZ, *Ph.D. (London), D.I.C. (London), Assistant Superintendent*, and S. RIBEIRO, *Entomological Assistant, Zoological Survey of India, Calcutta*.

INTRODUCTION.

A former paper¹ dealt with the Aquatic Rhynchota collected mainly from the Rajmahal Sub-division of the Santal Parganas, Bihar. The present paper deals with a further collection of Aquatic Rhynchota from an area comprising the Pakur, Dumka and Deogarh Sub-divisions of the Santal Parganas which, at the instance of the Director, Zoological Survey of India, was surveyed by the senior author during the months of October, November and December 1938, in connection with investigations on the fauna of the Rajmahal Hills. The collections from this area are much more extensive than those from the Rajmahal area, and consist of twenty-two species as against thirteen found in the Rajmahal area. A new species of *Microvelia* Westw. is described in this paper under the name *Microvelia santala*, sp. nov. We have also included records of distribution for the various species dealt with in this paper based on the collections of the Zoological Survey of India. Most of the species have not been recorded before from the Santal Parganas.

The names of some of the small streams and less important rivers referred to in this paper were not to be found in any of the gazetteers or maps available and were mostly obtained by the senior author in the field from the Santals inhabiting the area.

We have to acknowledge our grateful thanks to Dr. Bains Prashad, Director, Zoological Survey of India, for his usual courtesy in helping us to prepare this paper for the press.

SYSTEMATIC ACCOUNT.

Family HYDROMETRIDAE.

Subfamily *MESOVELIINAE*.

***Mesovelia vittigera* Horváth.**

1895. *Mesovelia vittigera*, Horváth, *Rev. Entomologie* XIV, p. 160.
1904. *Mesovelia mulsanti*, Distant (*nec* Buchanan-White), *Faun. Brit. Ind., Rhyn.* II, p. 169, fig. 122.
1905. *Mesovelia orientalis*, Breddin, *Mitt. Naturh. Mus. Hamburg* XXII, p. 129.
1909. *Mesovelia mulsanti*, Lefroy, *Rec. Ind. Mus.* III, p. 328.
1910. *Mesovelia mulsanti*, Distant, *Faun. Brit. Ind., Rhyn.* V (Appendix), p. 137.
1915. *Mesovelia vittigera*, Horváth, *Ann. Hist.-nat. Mus. Nat. Hungar.* XIII, pp. 550-552, fig. 6.

¹ Hafiz, H. A. and Mathai, G., *Rec. Ind. Mus.* XL, pp. 207-210 (1938).

1918. *Mesovelgia mulsanti*, Paiva, *Rec. Ind. Mus.* XIV, p. 20.
 1918. *Mesovelgia vittigera*, Bergroth, *Philippine Journ. Sci.* XIII, D, p. 121.
 1918. *Mesovelgia vittigera*, Annandale, *Rec. Ind. Mus.* XIV, p. 207.
 1918. *Mesovelgia mulsanti*, Paiva, *Rec. Ind. Mus.* XV, p. 8.
 1928. *Mesovelgia vittigera*, Dover, *Treubia* X, p. 66.

We refer to this species two winged specimens from Jhobbo Stream, about a mile from Litipara Inspection Bungalow, Santal Parganas (4.xi.1938, collected along with three apterous forms of the new species of *Microvelia* West. described in this paper).

Horváth in his *Monographie des Mésovéliides* (1915, p. 550) drew attention to the fact that Distant's identification (*supra*, 1904, p. 169 and 1910, p. 137) of an Indian species as the American *Mesovelgia mulsanti* Buch.-White is incorrect and he proposed to call them *M. vittigera*. The specimens in the collections of the Zoological Survey of India named as the latter species by Distant are therefore *Mesovelgia vittigera* Horv.

This very common species is widely distributed, being known from the Philippines, New Guinea, the Indo-Malayan Region, India, Palestine, Syria, Egypt and Africa.

The species is represented in the collections of the Zoological Survey of India from the United Provinces : Naini Tal, 6,400 ft., Kumaon ; Bihar : Pusa ; Orissa : Barkuda Island, Chilka Lake ; Madras Presidency : Chikkaballapura ; Burma : Inlé Lake, Yawngwe State ; Andamans : Röss Island.

Subfamily VELIINAE.

Rhagovelgia nigricans (Burmeister).

1936. *Rhagovelgia nigricans*, Lundblad, *Ark. Zool.* XXVIII, No. 21, pp. 44-47.
 1938. *Rhagovelgia nigricans*, Hafiz and Mathai, *Rec. Ind. Mus.* XL, p. 207.

We provisionally refer to this species twelve winged adults and a nymph collected from Gukulpur River, about a mile and a half from Kunjbona Inspection Bungalow, Santal Parganas (1.xi.1938).

Genus **Microvelia** Westwood.

1904. *Microvelia*, Distant, *Faun. Brit. Ind., Rhyn.* II, p. 174.
 1910. *Microvelia*, Distant, *Faun. Brit. Ind., Rhyn.* V (Appendix), p. 138.
 1921. *Microvelia*, Bueno, *Bull. Brooklyn Ent. Soc.* XVI, pp. 87 and 92¹.
 1925. *Microvelia*, Bueno, *Spolia Zeylanica* XIII, pp. 229, 230.
 1926. *Microvelia*, Hale, *Rec. S. Austral. Mus.* III, pp. 202 and 206-208.
 1934. *Microvelia*, Lundblad, *Arch. Hydrobiol. u. Plankton* XII (Supplement), pp. 285-287, 307-364 and 368-370.

Distant, in the works quoted above, did not publish any key for the Indian species of the genus but this was supplied by Bueno (1925, pp. 229, 230). Bueno's key included the following species of *Microvelia* as understood by the author : *M. albomaculata* Dist., *M. annandalei* Dist., *M. atromaculata* Paiva, *M. burmanica* Paiva, *M. diluta* Dist., *M. kumaonensis* Dist.², *M. lineatipes* Paiva, *M. repentina* Dist., *M. sexualis* Paiva, *M. singalensis* Kirk. and *M. longicornis* Bueno. With the exception of

¹ This work is unfortunately not available in Calcutta.

² In Bueno's key to the species (1925, p. 230) the specific name is spelt *kumaonensis*. This is apparently a *lapsus calami* for *kumaonensis*.

M. sexualis Paiva from Siam and *M. longicornis* Bueno from Ceylon, all the species mentioned above were known from macropterous forms only.

Lundblad, in his studies on the aquatic and semi-aquatic Hemiptera of Sumatra, Java and Bali (1934) recorded the Indian *M. diluta* Dist. (pp. 307-315, text-fig. 97), *M. annandalei* Dist. (pp. 318-320, text-fig. 99) and *M. douglasi* Scott (pp. 347-357 and 476, text-figs. 111-114) from these areas, and under *M. douglasi* Scott he definitely included *M. repentina* Dist., and with some doubt *M. singalensis* Kirk. and *M. kumaonensis* Dist. as synonyms.

Lundblad, in the latest revision of the genus *Microvelia* Westw. (1934, p. 285), recognises the following Indian species:—*M. albomaculata* Dist., *M. annandalei* Dist., *M. atromaculata* Paiva, *M. burmanica* Paiva, *M. diluta* Dist., *M. douglasi* Scott, *M. lineatipes* Paiva and *M. longicornis* Bueno. Apterous forms only are known in the case of *M. diluta* Dist. (♂ ♀), *M. douglasi* Scott (♂) and *M. longicornis* Bueno (♂ ♀). We give below a revised key of the male apterous forms of the Indian species including the new species, *M. santala* described in this paper.

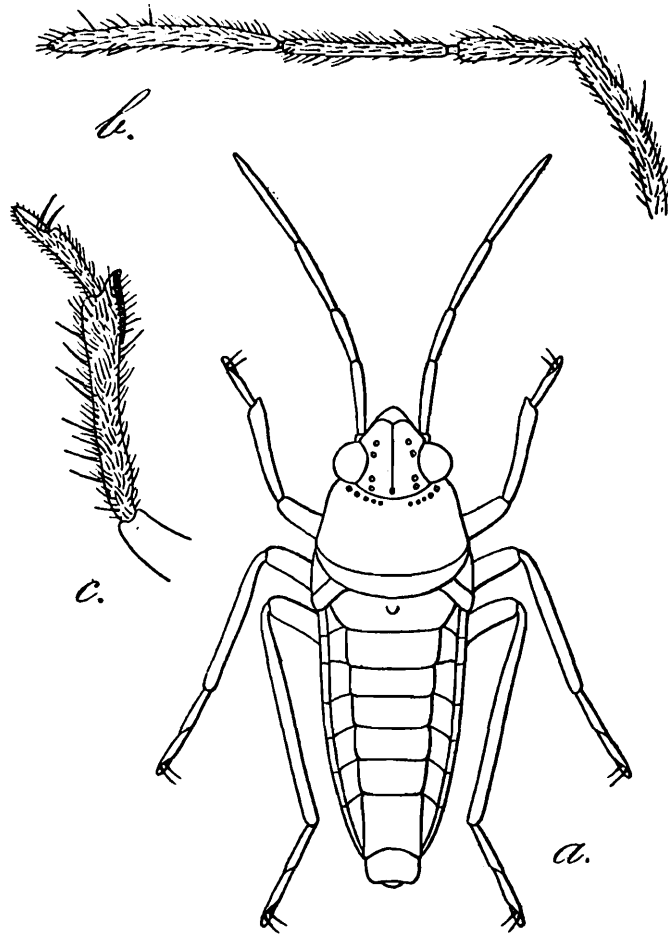
- | | |
|--|---------------------------|
| A. Intermediate tibiae distinctly smaller than femora | <i>douglasi</i> Scott. |
| Intermediate tibiae distinctly longer than femora | <i>longicornis</i> Bueno. |
| B. Intermediate tibiae slightly smaller than femora ; anterior legs only with tibial combs | <i>santala</i> , sp. nov. |
| Intermediate tibiae slightly longer than femora ; anterior and middle legs with tibial combs | <i>diluta</i> Dist. |

***Microvelia santala*, sp. nov.**

This species is readily distinguished by the presence of the tibial combs which are found only on the anterior pair of legs.

Apterous male (text-fig. a).—General colouration dull black; body clothed with pale yellowish-brown pubescence; apex of head shining black, general outline of head and body viewed from above narrowly obovate, tapering posteriorly and broadest at the prothorax; a little more than thrice as long as wide. Head depressed at apex and subconically produced in front of eyes; inner margins of eyes lined by fine silvery shining hairs which are wanting at the apex. Face of brown colour, clothed with a shining silvery pilosity. Rostrum yellowish-brown with a median longitudinal darker streak, black at apex. Vertex almost twice as long as the width between eyes, with two pairs of black punctae submarginally arranged on either side and bearing in the middle a fine shining black longitudinal line ending in a puncta near posterior margin of vertex. Antennae slender, shorter than insect by about half its length, four-jointed and clothed with pale brown pubescence intermixed with a few longer hairs of the same colour. Basal joint of antennae slightly curved, nearly one and one-third as long as the third joint and a little longer than the second (counted from the base); apical joint the longest (text-fig. b). Pronotum about twice as broad as long, convexly rounded posteriorly and prominently narrowed in front, dull black in colour and clothed with a pale yellowish-brown pubescence, with a few stout hairs along the sides; dorsal surface with scattered small punctae, which are more prominent

along the anterior margin, but absent on the disc and at the middle of the anterior margin; anterior margin of pronotum with a shining silvery



a. Dorsal view: $\times 20$; b. Antenna: $\times ca. 47$; c. Left anterior leg: $\times ca. 47$.

pilosity which is interrupted in the middle but thicker at the anterior angles and extends over the sides. Posterior angles of metanotum with patches of shining silvery pilosity. Dorsum of abdomen dull black, clothed with a yellowish-brown pubescence. Lateral margins of abdominal segments, particularly the first segment and joints of the dorsal plates of connexivum covered with patches of shining silvery pilosity. Seventh tergite longer than broad. Both connexivum and genital segments furnished around their apices with sparsely arranged stiff hairs. Venter of abdomen shining black and sparsely clothed with a brownish pubescence. Legs long and slender, clothed with a pale pubescence intermixed with longer hairs. General colouration of legs brown but of coxae, trochanters, basal extremities of femora and apices of anterior tibiae pale yellowish. Intermediate tibiae slightly smaller than femora. Posterior femora a little less than half as long as tibiae and reaching apex of abdomen. Tibial combs present only on the anterior pair of legs and situated on the inner side of tibiae, extending to about a third of its length from the distal ends of tibiae (text-fig. c).

Length.—2.3 mm. Width of thorax at the broadest part 0.7 mm.

Holotype specimen.—No. 5831/H7, Zoological Survey of India (*Ind. Mus.*), Calcutta.

We refer to this new species three pinned male apterous specimens. In one of the specimens other than the Holotype the shining silvery

pilosity is not so perceptible on the abdomen ; this is probably due to the specimen having been originally preserved in spirit.

Locality.—Jhobbo Stream, about a mile from Litipara Inspection Bungalow, Santal Parganas (4.xi. 1938, collected along with two winged specimens of *Mesovelina vittigera* Horv.).

Subfamily GERRINAE.

Limnogonus nitidus (Mayr).

1904. *Gerris nitida*, Distant, *Faun. Brit. Ind., Rhyn.* II, p. 178.
 1908. *Limnogonus nitidus*, Kirkaldy, *Sjostedt: Wissenschaftl. Ergebn. der schwed. zool. Exped. nach dem Kilimandjaro etc.* XII, *Hemiptera, Upsala*, pp. 21, 22.
 1909. *Gerris nitida*, Lefroy, *Rec. Ind. Mus.* III, p. 328.
 1910. *Gerris nitida*, Distant, *Faun. Brit. Ind., Rhyn.* V (Appendix), p. 142.
 1918. *Gerris nitida*, Paiva, *Rec. Ind. Mus.* XIV, p. 23.
 1928. *Gerris nitida*, Dover, *Treubia* X, p. 68.
 1934. *Limnogonus nitidus*, Lundblad, *Arch. Hydrobiol. u. Plankton* XII (Supplement), pp. 371 and 387, 388, fig. 122.

We refer to this species six specimens collected in the Santal Parganas from the following localities :—One specimen from Jhobbo Stream, about one mile north of Litipara Inspection Bungalow (4.xi.1938, collected along with an example of *Metrocoris stål*i (Dohrn)] ; one specimen from Mondhaboun Stream, about two miles south-west of Litipara (5.xi.1938) ; one specimen from a stream about one mile from Amrapara on the way to Dumarchir (13.xi.1938) ; one specimen from Brahmani River, about one and a half miles from Saldaha (22.xi.1938) ; one specimen from a stream, near Masanjor Inspection Bungalow [2.xii.1938, collected along with two examples of *Limnogonus parvulus* (Stål)] ; one specimen from Bhamri River, about three miles south-west of Dumka Inspection Bungalow [5.xii.1938, collected along with an example of *Limnogonus parvulus* (Stål)].

The species is already known from Darjeeling, 6,900 ft. and Kurseong, 5,000 ft., Eastern Himalayas ; Pusa, Bihar ; Balighai near Puri, Orissa ; Trivandrum, Travancore ; Inlé Lake, Yawnghwe State and Rangoon, Burma ; Peradeniya, Ceylon ; Buitenzorg, Java ; Banau, Sumatra.

The species is represented in the collections of the Zoological Survey of India from Orissa : Gantasila, near Rambha, Chilka Lake, Satpara, Puri, between Khurda Road and Cuttack and Barkul ; Bihar : Katihar, Purneah district ; Bengal : Calcutta, Garia, Port Canning and Rajshahi ; Assam : Mangaldai and Cherrapunji, 4,400 ft., Khasi Hills.

Limnogonus parvulus (Stål).

1904. *Gerris tristan*, Distant, *Faun. Brit. Ind., Rhyn.* II, pp. 179, 180.
 1905. *Gerris ysolt*, Breddin, *Mitt. Naturh. Mus. Hamburg* XXII, p. 130.
 1910. *Gerris tristan*, Distant, *Faun. Brit. Ind., Rhyn.* V (Appendix), p. 144.
 1915. *Gerris tristan*, Bergroth, *Zool. Meded. Leiden* I, p. 120.
 1918. *Gerris tristan*, Paiva, *Rec. Ind. Mus.* XIV, p. 23.
 1918. *Gerris tristan*, Paiva, *Rec. Ind. Mus.* XV, p. 8.
 1919. *Gerris tristan*, Paiva, *Rec. Ind. Mus.* XVI, p. 364.
 1925. *Gerris tristan*, Bueno, *Spolia Zeylanica* XIII, p. 227.
 1928. *Gerris tristan*, Dover, *Treubia* X, pp. 68, 69.
 1934. *Limnogonus parvulus*, Lundblad, *Arch. Hydrobiol. u. Plankton* XII (Supplement), pp. 371, 372 and 384-387, fig. 121, pl. xi.

We refer to this species six specimens from the following localities in the Santal Parganas :—One specimen from Gukulpur River, near Kunjbona Inspection Bungalow [1.xi.1938, collected along with an example of *Metrocoris stali* (Dohrn)]; one specimen from tributary of Tribani River, two miles east of Rajapokhar (28.xi.1938); two specimens from a stream, near Masanjor Inspection Bungalow [2. xii. 1938, collected along with a specimen of *Limnogonus nitidus* (Mayr)]; one specimen from Nunbil River, near Kendghata (3.xii.1938); one specimen from Bhamri River, about three miles south-west of Dumka Inspection Bungalow [5.xii.1938, collected along with an example of *Limnogonus nitidus* (Mayr)].

Lundblad, in the work cited above, has considered *Gerris tristan* Kirk. from Ceylon and *Gerris ysolt* Bredd. from Java as synonyms of *Limnogonus parvulus* (Stål) from China.

This species is already known from Naini Tal, United Provinces; Dhappa, Port Canning and Rajshahi, Bengal; Sur Lake, Puri district, Orissa; Moulmein, Burma; Kandy and Pundaluoya, Ceylon; Java; China; Formosa.

The species is represented in the collections of the Zoological Survey of India from the Punjab: Lahore; United Provinces: Bhim Tal, 4,460 ft., Malwa Tal, 3,600 ft., Sat Tal, 4,500 ft. and Kathgodam, 1,200 ft.; Bengal: Alipore, Calcutta, Garia, Berhampore Court and Murshidabad; Assam: two miles east of Mangaldai; Orissa: Barkul, Puri, Gantasila, near Rambha and Barkuda Island, Chilka Lake; Cochin State: Parambikulam, 1,700-3,200 ft.; Burma: Kawkareik, Amherst district; Malay Peninsula: Selangor.

***Cylindrostethus productus* (Spinola).**

1904. *Cylindrostethus productus*, Distant, *Faun. Brit. Ind., Rhyn.* II, p. 184, fig. 132.
 1910. *Janias elegantulus*, Distant, *Faun. Brit. Ind., Rhyn.* V (Appendix), pp. 148, 149, fig. 80.
 1925. *Cylindrostethus productus*, Bueno, *Spolia Zeylanica* XIII, p. 228.
 1925. *Janias elegantulus*, Bueno, *op. cit.*, p. 228.
 1929. *Cylindrostethus ? scrutator* Kirk. (= *Janias elegantulus*), Esaki, *Ann. Mag. Nat. Hist.* (10) IV, p. 416.

We refer to this species five specimens from Gukulpur River, near Kunjbona Inspection Bungalow, Santal Parganas (1.xi.1938).

Bueno (1925, p. 228) in his study of the third or fourth instar nymphs of *Cylindrostethus productus* (Spin.) pointed out that the description of the nymphs of this species agreed in every respect with that of *Janias elegantulus* Dist. He, therefore, considered Distant's *J. elegantulus* to be a nymph of the former species. Esaki (1929, p. 416), apparently unaware of Bueno's work and only considering Distant's figure of *J. elegantulus* opined that Distant's species was an immature form of a species of *Cylindrostethus* Fieb. and very likely *C. scrutator* Kirk. We have no doubt about the identity of the specimens before us, which are all adult forms. In the light of the synonymy given above, the distribution of this species would now be Kulattupuzha, western base of Western Ghats, Travancore; Bombay; Kandy and Suduganga River, Matale, Ceylon.

The species is represented in the collections of the Zoological Survey of India from Bihar: Manbhum and Chakradharpur; Travancore: Manoor River, Pallode, 20 miles north-east of Trivandrum, Quilon and Tenmalai, western side of Western Ghats; Bombay Presidency: Neckal, ca. 2,000 ft., Satara district and Castle Rock, North Kanara district; Ceylon: Haragama and Peradeniya.

Metrocoris stáli (Dohrn).

1904. *Metrocoris stáli*, Distant, *Faun. Brit. Ind., Rhyn.* II, p. 190 (description of apterous form).
 1910. *Metrocoris stáli*, Distant, *Faun. Brit. Ind., Rhyn.* V (Appendix), p. 158 (description of macropterous form).
 1926. *Metrocoris stáli*, Esaki, *Ann. Hist.-nat. Mus. Nat. Hungar.* XXIV, pp. 123, 124.
 1929. *Metrocoris ? stáli* (= *Gerastratus foveatus* Dist.), Esaki, *Ann. Mag. Nat. Hist.* (10) IV, p. 417.

We refer to this species nine specimens taken from the following localities in the Santal Parganas:—One specimen from Gukulpur River, near Kunjbona Inspection Bungalow [l.xi.1938, collected along with an example of *Limnogonus parvulus* (Stål)]; one specimen from Jhobbo Stream, about one mile north of Litipara Inspection Bungalow [4.xi.1938, collected along with an example of *Limnogonus nitidus* (Mayr)]; three specimens from Bansloi River, Amrapara (10.xi.1938); three specimens from Ikri River, near Dumarchir (15.xi.1938); one specimen from Yarow River, about two miles from Katikund Inspection Bungalow (26.xi.1938).

The species is represented in the collections of the Zoological Survey of India from the Punjab: Kalka, Ambala district and Pinjore, Patiala State; United Provinces: Bhim Tal, 4,450 ft.; Bombay Presidency: Mahabaleshwar, ca. 4,200 ft., and Medha, ca. 2,200 ft., Satara district and Datar Hill near Junagadto, Kathiawar.

Esaki (1929, p. 417) doubtfully considered *Gerastratus foveatus* Dist. to be a synonym of this species. We have examined the poorly preserved type of the latter species and are inclined to agree with Esaki's conclusions.

Family NEPIDAE.

Laccotrepes ruber (Linné).

1906. *Laccotrepes ruber*, Distant, *Faun. Brit. Ind., Rhyn.* III, pp. 18, 19.
 1917. *Laccotrepes ruber*, Paiva, *Mem. Asiat. Soc. Bengal* VI, p. 80.
 1924. *Laccotrepes ruber*, Hale, *Rec. S. Austral. Mus.* II, p. 507, pl. xxxiv, figs. 4, 5.
 1938. *Laccotrepes ruber*, Hafiz & Mathai, *Rec. Ind. Mus.* XL, p. 208.

We refer to this rather common species forty-two adults and one nymph from the following localities in the Santal Parganas:—One specimen from a hill-stream, about six miles north of Litipara (3.xi.1938); one specimen from a sluggish stream, about one mile from Amrapara on the way to Dumarchir (13.xi.1938); seven specimens from Ikri River, very near its source, close to Dumarchir (15.xi.1938, one example was found with its proboscis inserted into the mid-ventral line of a small prawn, *Caridina* sp.); eight specimens from Gumra River, about two miles

north-east of Katikund Inspection Bungalow (20.xi.1938); three specimens from Brahmani River, about one and a half miles from Saldaha (22.xi.1938); two specimens from a dirty muddy drying-up pond, about three miles west of Katikund Inspection Bungalow (25.xi.1938); one specimen from Yarow River, about one and a half miles due south of Katikund on the road to Jhilimili (26.xi.1938); two specimens from Darua River, about half a mile from Deoghar Inspection Bungalow (30.xi.1938); two specimens from Ajay River, near Sarath (1.xii.1938); two specimens from a stream, close to Masanajor Inspection Bungalow (2.xii.1938); three specimens (two adults and one nymph) from Nunbil River, near Kendghata (3.xii.1938); five specimens from Dwarka River, near Sikaripara (4.xii.1938).

The species is represented in the collections of the Zoological Survey of India from Bihar : Chapra and Pusa ; Madras Presidency : Nilgiri Hills ; Bombay Presidency : Igatpuri and Medha.

Laccotrephes griseus (Guérin).

1910. *Laccotrephes griseus*, Distant, *Faun. Brit. Ind., Rhyn.* V (Appendix), p. 314.
 1917. *Laccotrephes griseus*, Paiva, *Mem. Asiat. Soc. Bengal* VI, p. 80.
 1938. *Laccotrephes griseus*, Hafiz & Mathai, *Rec. Ind. Mus.* XL, p. 208.

We refer to this species nine examples collected from the following localities in the Santal Parganas :—One specimen from a hill-stream, about six miles north of Litipara (3.xi.1938); two specimens from Jhobbo Stream, about one mile north of Litipara Inspection Bungalow (4.xi.1938); one specimen from Karla River, about one and a half miles south of Litipara Inspection Bungalow (8.xi.1938); one specimen from Brahmani River, about one and a half miles from Saldaha (22.xi.1938); four specimens from a stream, near Masanajor Inspection Bungalow (2.xii.1938).

Ranatra filiformis Fabricius.

1906. *Ranatra filiformis*, Distant, *Faun. Brit. Ind., Rhyn.* III, pp. 21, 22.
 1907. *Ranatra filiformis*, Montandon, *Ann. Soc. Ent. France* LXXVI, p. 57.
 1909. *Ranatra filiformis*, Montandon, *Ann. Hist.-nat. Mus. Nat. Hungar.* VII, p. 66.
 1912. ? *Ranatra filiformis*, Nowrojee, *Mem. Dept. Agric. Ind., Ent. Ser.* II, pp. 165-168, pl. xx, figs. 1-4.
 1917. *Ranatra filiformis*, Paiva, *Mem. Asiat. Soc. Bengal* VI, p. 80.
 1924. ? *Ranatra filiformis*, Hale, *Rec. S. Austral. Mus.* II, p. 520.
 1934. *Ranatra filiformis*, Lundblad, *Arch. Hydrobiol. u. Plankton* XII (Supplement), pp. 36-38, text-fig. 7.
 1938. *Ranatra filiformis*, Hafiz & Mathai, *Rec. Ind. Mus.* XL, p. 209.

We refer to this species four specimens from the following localities in the Santal Parganas :—Two specimens from Karla River, about two miles north of Litipara Inspection Bungalow (4.xi.1938); one specimen from Bansloi River, near Amrapara (11.xi.1938); one specimen from a stream, near Masanajor Inspection Bungalow (2.xii.1938).

The species is represented in the collections of the Zoological Survey of India from Bihar : Pusa,

Ranatra longipes Stål.

1910. *Ranatra longipes*, Distant, *Faun. Brit. Ind., Rhyn.* V (Appendix), pp. 315, 316.
 1913. ? *Ranatra maculipes*, Matsumura, *Thousand Insects of Japan* I, p. 93.
 1924. ? *Ranatra longipes*, Hale, *Rec. S. Austral. Mus.* II, pp. 518-520, fig. 386a, pl. xxxiv, fig. 8.
 1926. ? *Ranatra longipes*, Esaki, *Ann. Hist.-nat. Mus. Nat. Hungar.* XXIV, p. 186.
 1928. *Ranatra longipes*, Dover, *Treubia*, X, p. 70.
 1934. *Ranatra longipes*, Lundblad, *Arch. Hydrobiol. u. Plankton* XII (Supplement), pp. 30-34, text-fig. 5.

We refer to this species two specimens collected from the following localities in the Santal Parganas:—One specimen from Ajay River, near Sarath (1.xii.1938); one specimen from Nunbil River, near Kendghata (3.xii.1938).

The species is recorded from Lucknow, United Provinces; Calcutta and Rajshahi, Bengal; Malay Peninsula; Java; Borneo; China; Fiji Islands; Australia.

Family NAUCORIDAE.

Heleocoris vicinus Montandon.

1910. *Heleocoris vicinus*, Distant, *Faun. Brit. Ind., Rhyn.* V (Appendix), pp. 322-323, fig. 183.
 1938. *Heleocoris vicinus*, Hafiz & Mathai, *Rec. Ind. Mus.* XL, pp. 209, 210, text-fig. nymph.

We refer to this species four adults and two nymphs collected from the following localities in the Santal Parganas:—One nymph from Gukulpur River, near Kunjbona Inspection Bungalow (1.xi.1938); two adults and one nymph from Bansloi River, near Amrapara (10.xi.1938); one adult from Gumra River, about four miles north of Kati-kund Inspection Bungalow (23.xi.1938); one adult from Dwarka River, near Sikaripara (4.xii.1938).

Family BELOSTOMATIDAE.

Sphaerodema annulatum (Fabricius).

1906. *Sphaerodema annulatum*, Distant, *Faun. Brit. Ind., Rhyn.* III, pp. 35, 36.
 1934. *Sphaerodema annulatum*, Lundblad, *Arch. Hydrobiol. u. Plankton* XII (Supplement), p. 62.
 1938. *Sphaerodema annulatum*, Hafiz & Mathai, *Rec. Ind. Mus.* XL, p. 210.

We refer to this rather common species seven specimens from the following localities in the Santal Parganas:—Four specimens from a stream, about three and a half miles east of Pakur Inspection Bungalow (25.x.1938); one specimen from Harinduba-Jharna Stream, about six and a half miles south-west of Pakur Inspection Bungalow (27.x.1938); two specimens from Karla River, about two miles north of Litipara Inspection Bungalow (4.xi.1938).

The species is represented in the collections of the Zoological Survey of India from Bengal: Burdwan; Bihar: Pusa.

Lethocerus indicus (Lepeletier & Serville).

1906. *Relostoma indicum*, Distant, *Faun. Brit. Ind., Rhyn.* III, pp. 38, 39, fig. 24.
 1909. *Lethocerus indicus*, Montandon, *Bull. Soc. Sci. Bucharest* XVII, p. 138.
 1909. *Belostoma indicum*, Lefroy, *Rec. Ind. Mus.* III, p. 336.
 1910. *Belostoma indica*, D'Abreu, *Journ. Bombay Nat. Hist. Soc.* XX, p. 883.
 1934. *Lethocerus indicus*, Lundblad, *Arch. Hydrobiol. u. Plankton* XII (Supplement), pp. 52-55, text-fig. 15, pl. xvi, fig. 3, 4.

We refer to this species two specimens collected from the following localities in the Santal Parganas :—One specimen from a stream, about three and a half miles east of Pakur Inspection Bungalow (25.x.1938); one specimen from Darua River, about half a mile from Deoghar Inspection Bungalow (30.xi.1938).

It is recorded from Kurseong, 6,000 ft., Darjeeling district, Eastern Himalayas; Mokameh and Pusa, Bihar; Asansol, Bengal; Trivandrum, Travancore; Bombay and Bhowani River, Malabar Coast, Bombay Presidency; Sind; North-West district, North Chin Hills and Karennee Teinzo, Burma; Malewoon, Tenasserim; Ceylon; Province Wellesley, Malay Peninsula; Sumatra; Java; Philippines.

The species is represented in the collections of the Zoological Survey of India from the United Provinces: Hamirpur Road; Bengal: Calcutta and Serampore; Assam: Nazeerahi and Silchar; Orissa: Barkul, Puri district and Satpara, Chilka Lake, Ganjam district; Madras Presidency: Bangalore and Madras; Seistan; Burma: Tharrawaddy division; Upper Tenasserim; Ceylon: Kandy; Sinkip Island.

Family NOTONECTIDAE.

Subfamily NOTONECTINAE.

Anisops (Anisops) sardea (Herrich-Schäffer).

1906. *Anisops sardea*, Distant, *Faun. Brit. Ind., Rhyn.* III, p. 45, fig. 27.
 1929. *Anisops (Anisops) sardea*, Hutchinson, *Ann. South Afric. Mus.* XXV, pp. 381-384.
 1938. *Anisops sardea*, Hafiz & Mathai, *Rec. Ind. Mus.* XL, p. 210.

We refer to this species twenty-seven specimens (5♂ and 22♀) collected from the following localities in the Santal Parganas :—One ♀ specimen from Harinduba-Jharna Stream, about six and a half miles south-west of Pakur Inspection Bungalow (27.x.1938); one ♀ specimen from tank used as fish hatchery, Taljhari Village, about five miles east of Litipara (6.xi.1938); two ♂ and four ♀ specimens from Bansloi River, Amrapara [11.xi.1938, collected along with three ♂ examples of *Anisops (Anisops) varia* Fieb.]; one ♂ and two ♀ specimens from a dirty muddy drying-up pond, about three miles west of Katikund Inspection Bungalow [25.xi.1938, collected along with one adult and three nymphs of *Anisops (Anisops) nivea* (Fabr.)]; two ♂ and three ♀ specimens from Yarow River, about one and a half miles due south of Katikund, on the road to Jhilimili (26.xi.1938); ten ♀ specimens from a stream, near Masanjor Inspection Bungalow [2.xii.1938, collected along with two examples of *Anisops (Anisops) breddini* Kirk.]; one ♀ specimen from Bhamri River, about three miles south-west of Dumka Inspection Bungalow (5.xii.1938),

This species appears to be very common in the Santal Parganas. It is recorded by Hutchinson (1929, pp. 382-384) from the Cape, Natal, Transvaal and South-West Africa. According to the same author the species is also found in Mediterranean countries and in Western Asia.

Anisops (Anisops) nivea (Fabricius).

1906. *Anisops niveus*, Distant, *Faun. Brit. Ind., Rhyn.* III, p. 46.
 1908. *Anisops nivea*, Kirkaldy, *Sjostedt: Wissenschaftl. Ergebn. der schwed. zool. Exped. nach dem Kilimandjaro etc.* XII, *Hemiptera*, Upsala, p. 24.
 1926. *Anisops niveus*, Esaki, *Ann. Hist.-nat. Mus. Nat. Hungar.* XXIV, p. 187.
 1927. ? *Anisops niveus*, Bueno, *Bull. Brooklyn Ent. Soc. (N. S.)* XXII, p. 30.
 1928. *Anisops niveus*, Esaki, *Insects of Samoa and other terrestrial Arthropoda* II, London, p. 76, footnote 2.
 1929. *Anisops (Anisops) nivea*, Hutchinson, *Ann. South Afric. Mus.* XXV, p. 385.
 1934. *Anisops nivea*, Lundblad, *Arch. Hydrobiol. u. Plankton* XII (Supplement), pp. 163-166, fig. 56.

We refer to this species seven adults and three nymphs collected from the following localities in the Santal Parganas:—six adults from a tank used as fish hatchery, Taljhari Village, about five miles east of Liti-para (6.xi.1938); one adult and three nymphs from a dirty muddy drying-up pond, about three miles west of Katikund Inspection Bungalow [25.xi.1938, collected along with three examples of *Anisops (Anisops) sardea* (Herr.-Schäff)].

This species is recorded here for the first time from the Santal Parganas and does not appear to be common in this area.

Distant recorded it from Bombay and from Bhamo in Burma. He remarked that it is probably generally distributed throughout British India and widely distributed in the Ethiopian Region but Lundblad (1934, p. 166) remarked that all these localities were doubtful and gave for the habitat of the species "India" and Sumatra.

The species is represented in the collections of the Zoological Survey of India from Bengal: Calcutta (tanks); Orissa: Barkuda Island, Chilka Lake, Ganjam district; Burma: Heho, 3,800 ft., Yawnghwe State, Southern Shan States.

Anisops (Anisops) varia Fieber.

1910. *Anisops varius*, Distant, *Faun. Brit. Ind., Rhyn.* V (Appendix), pp. 332, 333, fig. 193.
 1913. *Anisops varius*, Distant, *Trans. Linn. Soc. London* XVI (2), p. 189.
 1928. *Anisops varius*, Dover, *Treubia* X, p. 71.
 1929. *Anisops (Anisops) varia*, and varieties, Hutchinson, *Ann. South Afric. Mus.* XXV, pp. 393-399.

We refer to this species five male specimens from the following localities in the Santal Parganas:—Three specimens from Bansloi River, Amrapara [11.xi.1938, collected along with four ♀ examples of *Anisops (Anisops) sardea* (Herr.-Schäff.)]; and two specimens from a rocky hill-stream, south-west of Amrapara (14.xi.1938).

It is recorded from Travancore; West Java; Seychelles; North Africa; Eastern Palaearctic Region; Philippines.

Remarks.—The species is very variable in colour, and detailed study of material from different localities is necessary for defining the range

of variation. In the specimens before us the markings on the scutellum are not so prominent as shown in the figure given by Distant (1910, p. 332, fig. 193). Moreover, the hemelytra in these specimens are transparent and shining greyish-white in colour; the black dorsal surface of the abdomen giving one the impression of the hemelytra (which are folded over it) being blackish-grey in colour.

Anisops (Anisops) breddini Kirkaldy.

1910. *Anisops ? breddini*, Distant, *Faun. Brit. Ind., Rhyn.* V (Appendix), p. 333, fig. 194.
 1928. *Anisops breddini*, Dover, *Treubia* X, p. 71.
 1929. *Anisops (Anisops) breddini*, Hutchinson, *Ann. South Afric. Mus.* XXV, pp. 376 and 380.

We refer to this species two specimens collected from a stream, near Masanjor Inspection Bungalow, Santal Parganas [2.xii.1938, collected along with ten examples of *Anisops (Anisops) sardea* (Herr.-Schäff.)].

Anisops (Anisops) breddini Kirk. is recorded here for the first time from this area.

It is recorded from Port Canning, Dhappa and Calcutta, Bengal; Malay Peninsula; Java; Celebes.

The species is represented in the collections of the Zoological Survey of India from Orissa: Rambha and Chilka Lake, Ganjam district.

Subfamily *PLEINAE*.

Plea (Paraplea) pallescens Distant.

1906. *Plea pallescens*, Distant, *Faun. Brit. Ind., Rhyn.* III, p. 48.
 1910. *Plea pallescens*, Distant, *Faun. Brit. Ind., Rhyn.* V (Appendix), p. 336, fig. 196.
 1928. *Plea (Paraplea) pallescens*, Esaki & China, *Eos* IV, p. 166.¹

We refer to this species one specimen from a stream, near Masanjor Inspection Bungalow, Santal Parganas [2.xii.1938, collected along with an example of *Plea (Paraplea) frontalis* (Fieb.)].

It is recorded from Lucknow, United Provinces; Calcutta and Rajshahi, Bengal; Ernakulam, Cochin State.

This species is represented in the collections of the Zoological Survey of India from the United Provinces: Bhim Tal, 4,450 ft., Kumaon; Orissa: Barkuda Id., Chilka Lake, Ganjam district.

Plea (Paraplea) frontalis (Fieber).

1910. *Plea pelopea*, Distant, *Faun. Brit. Ind., Rhyn.* V (Appendix), pp. 336, 337, fig. 197.
 1934. *Plea (Paraplea) frontalis*, Lundblad, *Arch. Hydrobiol. u. Plankton* XII (Supplement), pp. 138-140, text-fig. 44.

We refer to this species three examples from the following localities in the Santal Parganas:—One specimen from a stream, near Masanjor Inspection Bungalow [2.xii.1938, collected along with an example of *Plea (Paraplea) pallescens* Dist.]; two specimens from Nunbil River, near Kendghata (3.xii.1938).

¹ This publication is unfortunately not available in Calcutta.

Lundblad, in the work referred to above, considers *Plea pelopea* Dist. as a synonym of *Plea frontalis* Fieb¹.

It was previously known from Calcutta, Bengal; Madhupur, Bihar; Pondicherry, Madras Presidency; Burma; Cochin China; Java; Sumatra; Formosa.

The species is represented in the collections of the Zoological Survey of India from the United Provinces: Malwa Tal, 3,600 ft., Bhim Tal, 4,400 ft., Sat Tal, 4,500 ft. and Kathgodam, 1,200 ft., Kumaon and Hazratgunj, Lucknow.

Family CORIXIDAE.

Micronecta quadristrigata Breddin.

1910. *Micronecta minthe*, Distant, *Faun. Brit. Ind., Rhyn.* V (Appendix), pp. 347, 348, fig. 208.

1934. *Micronecta quadristrigata*, Lundblad, *Arch. Hydrobiol. u. Plankton* XII (Supplement), pp. 87-91, text-figs. 26, 27, pl. xix, fig. 1.

We refer to this species thirty-seven examples from the following localities in the Santal Parganas:—Two specimens from Gukulpur River, near Kunjbona Inspection Bungalow (1.xi.1938); sixteen specimens from Jhobbo Stream, about one mile north of Litipara Inspection Bungalow (4.xi.1938); one specimen from Mondhaboun Stream, about two miles south-west of Litipara Inspection Bungalow (5.xi.1938); one specimen from Bansloi River, Amrapara (11.xi.1938); five specimens from Ikri River, very near its source, close to Dumarchir (15.xi.1938); one specimen from Yarow River, about two miles from Katikund Inspection Bungalow (26.xi.1938); three specimens from a stream, near Masanjor Inspection Bungalow [2.xii.1938, collected along with an example of *Micronecta haliploides* (Horv.)]; eight specimens from Nunbil River, near Kendghata (3.xii.1938).

Lundblad has considered *Micronecta minthe* Distant as a synonym of *Micronecta quadristrigata* Breddin².

The species is recorded from Calcutta, Rajshahi, Sara Ghat and Tinpahar near Rajmahal, Bengal; Puri district, Orissa; Western Ghats, Vembanaad Lake and Quilon, Travancore; Dikwela, Hambantola, Peradeniya, Tangalle and Weligama; Ceylon; Java; Sumatra; Philippines.

Micronecta haliploides Horváth.

1910. *Micronecta merope*, Distant, *Faun. Brit. Ind., Rhyn.* V (Appendix), pp. 351, 352, fig. 213.

1917. *Micronecta merope*, Paiva, *Mem. Asiat. Soc. Bengal* VI, p. 82.

1934. *Micronecta haliploides*, Lundblad, *Arch. Hydrobiol. u. Plankton* XII (Supplement), pp. 104-109, text-fig. 35, pl. iv and pl. xviii, fig. 3.

We refer to this species a single specimen from a stream, near Masanjor Inspection Bungalow (2.xii.1938, collected along with three examples of *Micronecta quadristrigata* Bredd.).

¹ Fieber, F. X., *Entom. Monog. Leipzig*, p. 18, pl. i, figs. 36-39 (1844).

² Breddin, G., *Soc. Entom. Zurich* XX, p. 57 (1905). This publication is unfortunately not available in Calcutta.

Lundblad (1934, p. 104) considers *Micronecta merope* Dist. as a synonym of *Micronecta haliploides* Horv¹.

The species is recorded from Port Canning and Rajshahi, Bengal; Colombo, Ceylon; Patalung River, Lampam, Talé Şap, Siam; Java; Sumatra.

It is represented in the collections of the Zoological Survey of India from Bengal: Calcutta; Orissa: Puri; Lower Burma; Kawkareik, Amherst district; Malay Peninsula: Selangor.

¹ Horváth, G., *Ann. Hist.-nat. Mus. Nat. Hungar* II, pp. 594, 595 (1904).