

ON GERRIDAE AND NOTONECTIDAE  
(HETEROPTERA HEMIPTERA : INSECTA)  
FROM THE SILENT VALLEY, KERALA

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(With 6 Text-figures)

INTRODUCTION

The faunistic material involved in the present studies was collected during the multi-disciplinary expeditions to the Silent Velly undertaken in April-May, 1980 and December, 1980. The author was a member of the team on both occasions.

Of the eight families of Gerridae, four namely the Gerrinae, Eotrechinae, Ptilomerinae and Halobatinae were represented in the collections. The study elicited the occurrence of five new species under three new genera, with one genus hitherto unrecorded in the country, namely *Pleciobates* Esaki. The family Notonectidae was represented by two species of the genus *Enithares* Spinola of the sub family Notonectinae.

ABBREVIATION

- A. Anal vein
- Ap. Apical plate
- Cu. Cubitus
- Dp. Dorsal plate.
- Ds. Ductus seminis
- L<sub>1</sub> First pair of lateral plates
- L<sub>2</sub> Second pair of lateral plates
- L<sub>3</sub> Third pair of lateral plates
- M. Median
- Ra. Radius
- Sc. Subcosta
- Vp. Ventral plate

## SYSTEMATIC ACCOUNT

## Family GERRIDAE

## Sub family GERRINAE

Genus *Tenogogonus* Stal

1. *Tenogogonus (Limnometra) anadyomene* (Kirkaldy)
2. *Tenogogonus (Limnometra) longispinulus* sp. nov.

## Subfamily EOTRECHINAE

Genus *Onychotrechus* Kirkaldy

3. *Onychotrechus rhexenor* Kirkaldy

## Subfamily PTILOMERINAE

Genus *Ptilomera* Amyot and Serville

4. *Ptilomera (Ptilomera) agroides* Schmidt

Genus \**Pleciobates* Esaki

5. *Pleciobates indicus* sp. nov.
6. *Pleciobates nostras* sp. nov.

## Subfamily HALOBATINAE

Genus *Metrocris* Mayr

7. *Metrocoris malabaricus* sp. nov.
8. *Metrocoris variegans* sp. nov.

Genus *Ventidius* Distant

9. *Ventidius (Ventidius) aquarius* Distant

## Family NOTONECTIDAE

## Subfamily NOTONECTINAE

Genus *Enithares*

10. *Enithares fusca* Brooks
11. *Enithares hungerfordi* Books

## Family GERRIDAE

## Subfamily GERRINAE

1. *Tenogogonus (Limnometra) anadyomene* (Kirkaldy)

1901. *Gerris anadyomene* Kirkaldy, *Entomologist*, 34 : 117.

1903. *G. anadyomene* Kirk., : Distant, *The fauna of British India including Burma and Ceylon*, 2 : 117.

1915. *Tenogogonus anadyomene* (Kirk.) : Bergroth, *Zool. Meded.*, Leiden, 1 (2) : 122.

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\* Genus new to the Country. All the measurements are in mm.

1928. *G anadyomene* Kirk., : Dover : *J. Bombay nat. Hist. Soc.*, 32 (3) : 614.  
 1934. *Limnometra anadyomene* (Kirk.) : Lundblad, *Arch. Hydrobiol. Suppl.*, 12 : 371.  
 1958. *Limnometra anadyomene* (Kirk.) : Hungerford and Matsuda, *Kans. Univ. Sci. Bull.*, 39 (9) : 402.  
 1960. *Tenogogonus anadyomene* (Kirk.) : Hungerford and Matsuda, *Kans. Univ. Sci. Bull.*, 41 (1) : 206.  
 1969. *Limnometra anadyomene* (Kirk.) : Cheng and Fernando *Oriental Ins.*, 3 (2) : 105.

This species can be easily indentified by the second tarsal segment of front leg longer than first ; middle femur longer than the total body in male and about equal in female ; the abdominal connexival spines in males surpass the first genital segment and not the abdominal tip and never do so in females.

*Material examined* : Two apterous ♂♂ and one apterous ♀ collected from Valiyaparathodu, alt. 910 metres, coll. *R. S. Pillai* 26. IV 1980 ; one apterous ♀ collected from Karaimalaitodu, alt. 900 metres, coll. *R. S. Pillai* ; 29. IV 1980 ; apterous two ♂♂, seven ♀♀, one macropterous ♀ and four nymphs collected from Damsite, 870 alt. metres, coll. *R. S. Pillai*, 4. XII. 1980.

*Distribution* : BURMA ; INDIA : Tamilnadu ; Coimbatore, Kerala ; Silent Valley ; PHILIPPINES ; SRI LANKA ; MALAYA and SINGAPORE.

*Remarks* : *L. anadyomene* was first described from Pundaloya, Sri Lanka (Kirkaldy, 1901) and subsequently recorded from Sri Lanka and Philippine Islands (Distant, 1903), India (Dover, 1928), Sri Lanka (Lundblad, 1934), Sri Lanka and Southern Shan States (Hungerford and Matsuda, 1958) Malayasia and Singapore (Cheng and Fernando, 1969). During the present survey, 14 adults and 4 nymphs were collected, thus reported from Western Ghats after 63 years of gap.

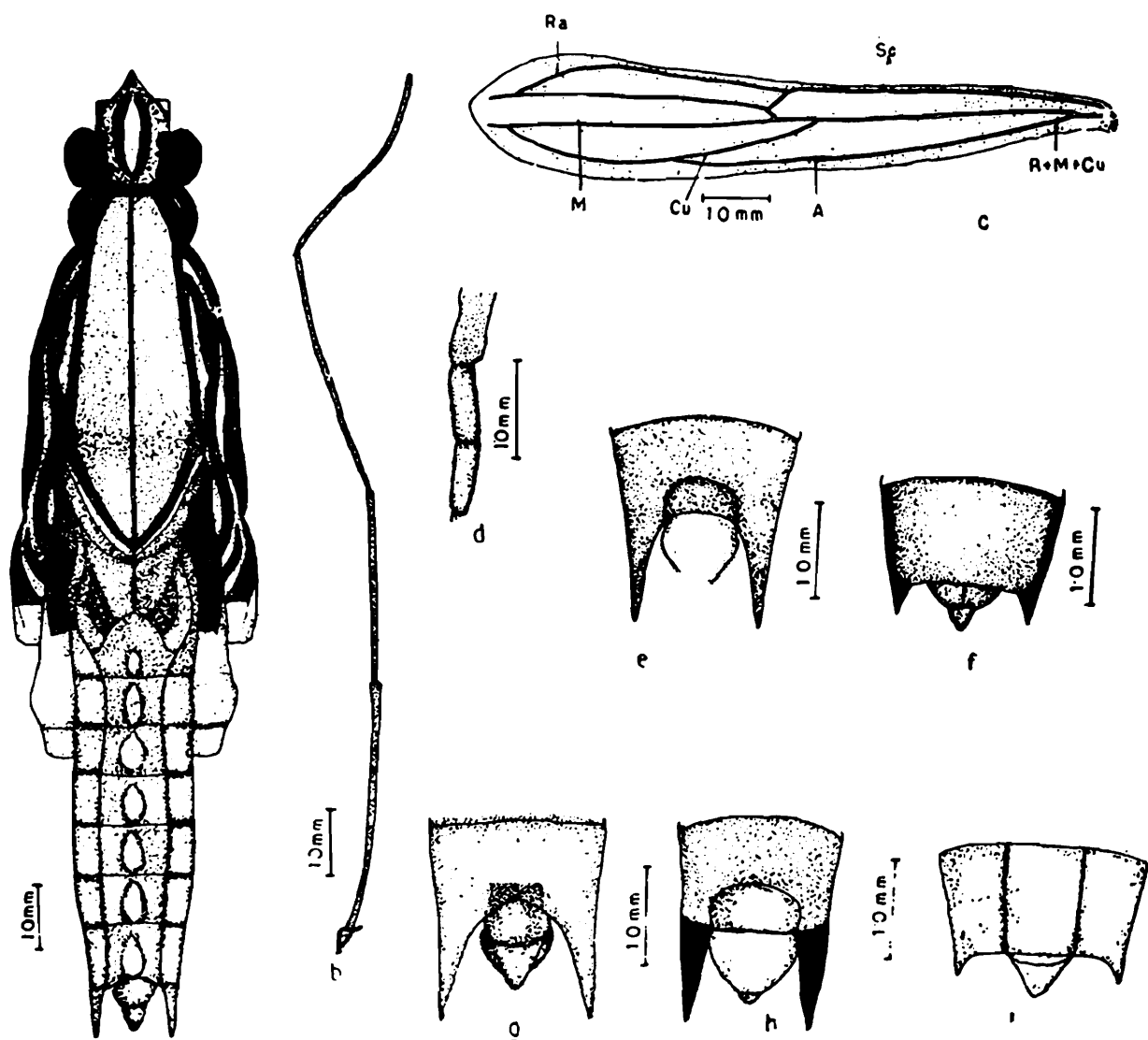
## 2. *Tenogogonus (Limnometra) longispinulus* sp. nov.

(Text-fig. 1, a-i)

*Size* : Apterous male : 14.6 long ; width across mesoacetabula : 4.2. Apterous female : 11.1 ; width across mesoacetabula : 3.4. Macropterous male : 12.2 ; width across mesoacetabula : 3.97. Macropterous female ; 11.6 ; width across mesoacetabula 3.2.

**Colour :** Reddish brown. Pronotum dark orange yellow. Antennae and legs uniform in colour. Venter light.

**Text Fig.1** *Tenagonus (Limnometra) longispinulus* Sp. nov



**Text-fig. 1.** *Tenagonus (Limnometra) longispinulus* sp. nov.

a. Apterous male dorsal view. b. Male antenna. c. Fore wing. d. Male fore tarsus. e. Apterous male apical abdominal segments ventral view. f. Female apical abdominal segments ventral view. g. Macropterous male apical abdominal segments dorsal view. h. Macropterous male apical abdominal segments ventral view.

**Apterous male :** 14.6 long ; width across the mesoacetabula 4.2, brown and black markings (Fig. 1a). Head with an irregular diamond marking and two lateral stripes, the lateral stripes in front of eyes black ; venter pale ; head protruding well beyond the eyes ; anterior lobe of pronotum expanded laterally. Antenna shorter than body, II<sup>nd</sup> shortest and IV<sup>th</sup> longest. The relative length of antennal segments I-IV, 3.3 ; 2.3 ; 3.2 ; 3.4. Head including eyes wider than long. Eyes with inner margin emarginate. Rostrum slender, long,

extending anterior one third of mesonotum, third segment five times as long as the last segment.

*Thorax* : Pronotum a little wider than head including eyes, posterior margin broadly rounded. Pronotum with a dark median and two sublateral lines, the median band continuous over the humeri. Mesonotum about four and half times as long as second sternite. Omphalium distinct. Front leg with femur not stouter than second femur, tarsal segments are equal in length and lined with minute hairs, claws arising near apex of inner side, first tarsus slightly longer than second. Hind leg with first tarsus more than two and half times as long as second. Measurement of leg segments ; Fore leg : 5.4, 4.9, 0.7, 0.7 ; Middle leg : 17.3, 14.8, 2.0, 1.6 ; Hind leg : 16.9, 11.4, 1.8, 0.7. Colour dark brown.

*Abdomen* : Abdomen elongate, connexival spines well developed, dark brown dorsally, with tips black, posteriorly black, surpassing tip of abdomen and pointed tips (Fig. 1e). Eighth segment well developed with apical margin concave. Each dorsal abdominal segment with crescent shaped dark bands, embracing a paler spot, underside of connexivum dark, venter light.

*Apterous female* : 11.1 long ; width across mesoacetabula 3.4 ; similar to apterous male in colouration, except connexiva paler with connexival spines not surpassing the abdominal tip. The relative length of antennal segments I-IV, 2.3, 1.5, 2.2, 2.6, shorter than the total body length. Fore tarsal segments equal in length ; second femur shorter than the body. Measurements of leg segments : fore leg : 3.7, 3.3, 0.5, 0.5 ; middle leg : 9.9, 9.1, 2.2, 1.6 ; hind leg : 9.6, 6.2, 0.9, 0.6.

*Macropterous male* : 12.2 long ; width across the mesoacetabula 3.2 ; similar to apterous male in size and colouration. The relative length of antennal segments I-IV, 2.3, 1.5, 1.9, 2.5. Measurements of leg segments ; fore leg : 3.8, 3.2, 0.5, 0.5 ; middle leg : 10.8, 8.3, 2.9, 0.7 ; hind leg : 9.9, 6.3, 1.1, 0.6.

*Macropterous female* : 11.6 long ; width across the mesoacetabula 3.2 ; similar to apterous female in colour and size. The relative length of antennal segments I-IV, 2.3, 1.5, 1.9, 2.5. Measure-

ments of leg segments ; fore leg : 3.8, 3.2, 0.5, 0.5 ; middle leg : 10.8, 8.3, 2.9, 0.7 ; hind leg : 9.9, 6.3, 1.1, 0.6.

*Material examined* : *Holotype*, apterous ♂ on pins, collected from Damsite, alt. 871 metres, *R. S. Pillai* ; 4.xii.1980 ; *paratypes* on pins, one apterous ♂, one macropterous ♂, three macropterous ♀ ♀ and one apterous ♀ collected from Damsite, alt. 871 metres, coll. *R. S. Pillai* ; 4. xii. 1980 ; one macropterous ♂ on pins collected from Kumattamthodu, alt. 871 metres, coll. *R. S. Pillai* ; 3. v. 1980.

*Distribution* : India : Kerala ; Silent Valley.

*Remarks* : The species is close to *Tenagogonus anadyomene* (Kirkaldy) but can be readily be differentiated by the male connexival spines surpassing the tip of abdomen, front tarsal segment equal in length, middle femur in female shorter than the body.

#### Subfamily EOTRECHINAE

### 3. *Onychotrechus rhexenor* Kirkaldy

1903. *Onychotrechus rhexenor* Kirkaldy, *Entomologist*, 36 : 44.  
 1903. *O. rhexenor* Kirk., : Distant, *The Fauna of British India Including Burma and Ceylon*, 2 : 183.  
 1919. *O. rhexenor* Kirk., : Annandale, *Rec. Indian Mus.*, 16 (1) : 120.  
 1919. *O. rhexenor* Kirk., : Pavia, *Rec. Indian Mus.*, 16 (1) : 154.  
 1928. *O. rhexenor* Kirk., : Esaki, *Ann. Mag. nat. Hist.*, 10 : 509,  
 1980. *O. rhexenor* Kirk., : Anderson, *Steenstrupia*, 6 (10) : 128.

This species can be differentiated by the presence of short sub-lateral light stripes in mesonotum (in wingless form), usually not surpassing middle of mesonotum. The front femur of male with elongate patch of dark spinules on inferior surface.

*O. rhexenor*, a hygropetric water stridder, mainly found in Western Ghats, at altitudes between 900 to 1200 metres above sea level (Anderson, 1980). They were found in a spring area an cliffs, resting, running & jumping on rock surface covered by algal growth and a thin sheet of trickling water. The developmental stages of winged and wingless forms were also collected and mating pairs were also seen. This species was also found on wet cliffs much away from the water surface, seemingly a rather ephemeral type of habitat. Anderson (1980) reported that this species has been recorded as taken at light in Southern India. It is also interesting that the record of the

species from the Island of Socotra, just east of the African Continent and the Red Sea, probably due the introduction by man (Anderson, 1980).

*Material examined*: Macropterous one ♂, two ♀♀ from Valiyaparathodu, alt. 910 metres, coll. *R. S. Pillai*; 25. iv. 1980; one macropterous ♀ from Valiyaparathodu, alt. 910 metres, coll. *R. S. Pillai*; 26. iv. 1980; one macropterous ♀ from Kumattamthodu, alt. 871 metres, coll. *R. S. Pillai*; 3. v. 1980; macropterous four ♂♂, three ♀♀, apterous two ♂♂ and three ♀♀ from Damsite, alt. 870 metres, coll. *R. S. Pillai*; 4. xii. 1980, macropterous twenty one ♂♂, four ♀♀, apterous four ♂♂, one ♀ and three nymphs collected from Road to Valiyaparathodu, alt. 1000 metres. coll. *R. S. Pillai* 10. xii. 1980.

*Distribution*: INDIA; Karnataka, Kerala, Maharashtra, Rajasthan and Tamilnadu; AFRICA; Socorta.

#### Subfamily PTILOMERINAE

#### 4. *Ptilomera (Ptilomera) agroides* Schmidt

1926. *Ptilomera agroides* Schmidt, *Ent. Mitt.*, **15** (1) : 63.  
 1927. *P. agroides* Schmidt : Esaki, *Eos. Madr.*, **3** (3) : 259.  
 1934. *P. agroides* Schmidt : Lundblad, *Arch. Hydrobiol. Suppl.*, **12** : 371, 373, 421.  
 1960. *P. agroides* Schmidt : Matsuda, *Kans. Univ. Sci. Bull.*, **41** (1) : 267.  
 1965. *P. agroides* Schmidt : Hungerford and Matsuda, *Kans. Univ. Sci. Bull.*, **45** (5) : 431.  
 1926. *Ptilomero lachne* Schmidt, *Ent. Mitt.*, **15** (1) : 64.  
 1927. *P. lachne* Schmidt : Esaki, *Eos, Madr.*, **3** (3) : 259.  
 1934. *P. lachne* Schmidt : Lundblad, *Arch. Hydrobiol. Suppl.*, **12** : 372, 373, 419.  
 1960. *P. lachne* Schmidt : Matsuda, *Kans. Univ. Sci. Bull.*, **41** (2) : 267.

The long dorsolateral projection of pygofer which is extending half their length beyond lateral wings of suranal plate as seen from above separates this species from all other known species of this genus (Hungerford and Matsuda, 1965). It has been reported for the first time from Kerala.

*Material examined*: Apterous two ♂♂, one ♀ from River Kunthipuzha, alt. 870 metres, coll. *R. S. Pillai*; 17. i. 1979; apterous one ♂, three ♀♀ and one nymph collected from a jungle stream on the way to Mukkali Camp, coll. *R. S. Pillai*; 18. i. 1979; one apterous ♂ collected from Damsite, alt. 870 metres, coll. *R. S. Pillai*;

21 iv. 1980 ; apterous four ♂♂, three ♀♀ from Halfway to Valiyaparathodu, alt. 1060 metres, coll. *R. S. Pillai* ; 26. iv. 1980 ; macropterous one ♂, one ♀, from Kumattamthodu, alt. 871 metres, coll. *R. S. Pillai* ; 3. v. 1980 ; apterous three ♂♂ and six ♀♀ from Kumattamthodu, alt. 871 metres, coll. *R. S. Pillai* ; 7. xii. 1980 ; apterous two ♂♂, eight ♀♀ from Road to Valiyaparathodu, alt. 910 metres, coll. *R. S. Pillai* ; 10. xii. 1980.

*Distribution* : INDIA : Tamilnadu, Tiruchy, Tarangambadi (Tranquebar), Shevaroy Hills, Yercaud, Anamalai Hills, Cinchona, Nilgiri Hills ; Kerala : Silent Valley.

### Genus *Pleciobates* Esaki

The genus *Pleciobates* Esaki was first described from a single apterous female, *P. tuberculatus* Esaki, collected from Klang River, near Klang Gates, Selangor, Malaya (Esaki, 1930). Later, Cheng and Fernando (1969) while studying the taxonomy of Malayan Gerridae, described apterous and macropterous males. However, in the present study, it is interesting to note that *Pleciobates*, a malayan genus, has been reported from India for the first time and two new species are described.

#### 5. *Pleciobates indicus* sp. nov.

(Text-Fig. 2 a-j)

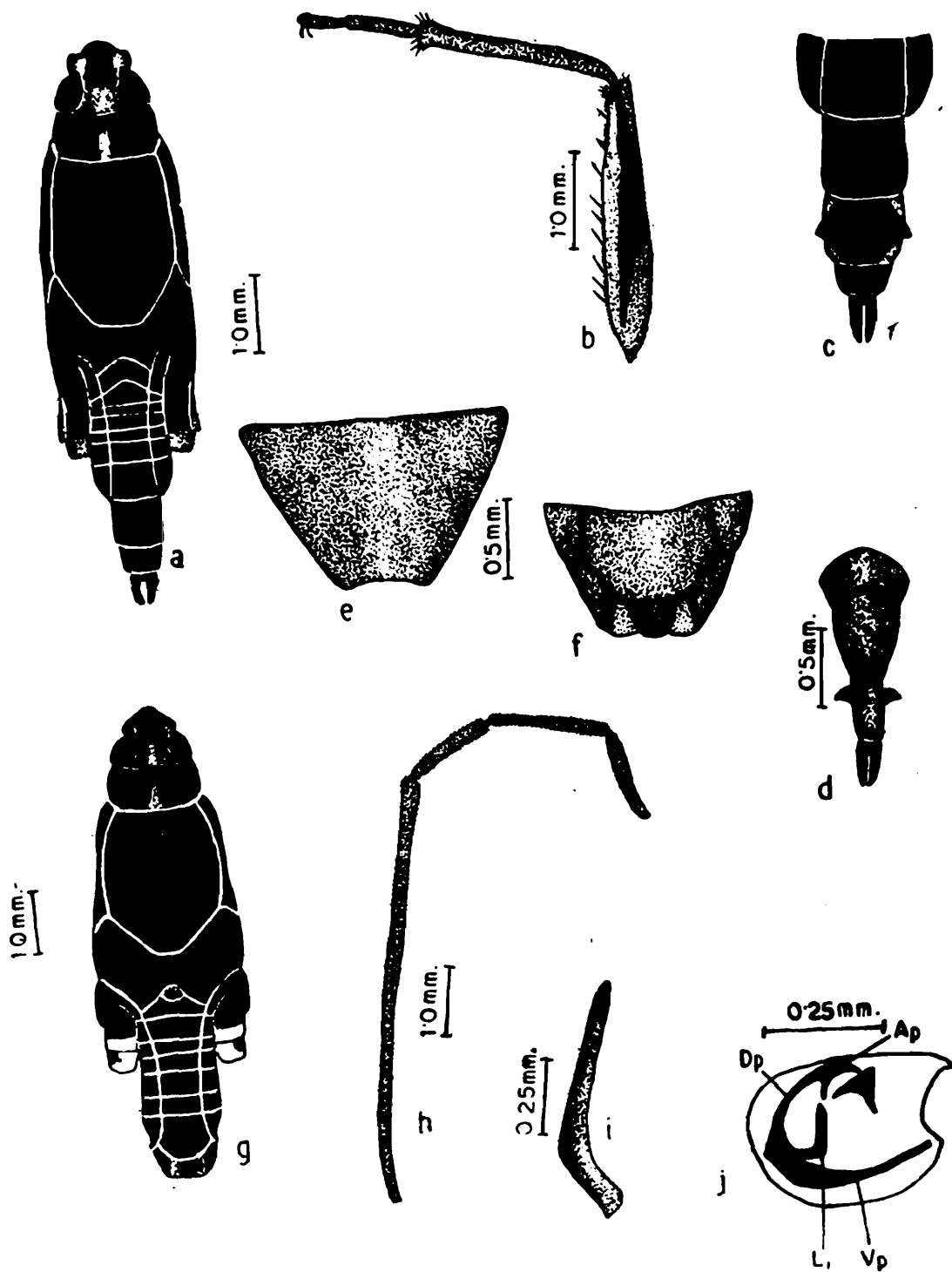
*Size* : Apterous male : length 6.31—6.81 ; maximum width across the body 1.63—1.69. Apterous female 6.38—6.81 ; maximum width across the body 2.13—2.19.

*Colour* : Pitch black, shining with dark brown markings. Antennae and legs black, venter grey with silvery pubescence.

*Apterous male* : Head brown, a large broad black spot at the anterior part of head, black. Head protruding well beyond the eyes, basal margin of head brown, antenniferous tubercles, extreme apex of frons black, with minute brown pubescence. Head including eyes 1.4 times wider than long. Eyes dark brown, shiny. Antenna black with a brown tinge, longer than body, segment I longest, longer than the rest of antennal segments together. IV shotest, III segment one and half times longer than II, II and IV equal in length, the relative length of antennal segments are 6.0, 1.25, 1.69, 1.25.



Text Fig. 2. *Pleciobates indicus* Sp. nov.



Text-fig. 2. *Pleciobates indicus* sp. nov.

- a. Apterous male dorsal view. b. Fore leg of apterous male. c. Apterous male apical abdominal segments dorsal view. d. Apterous male apical abdominal segments ventral view. e. Apterous female apical abdominal segments ventral view. f. Apterous female apical abdominal segments dorsal view. g. Apterous female dorsal view. h. Male antenna. i. Male paramere. j. Endosoma lateral view.

Rostrum pilose, dark brownish black, IV segment shining black, extending upto the basal portion of prosternum, IVth segment twice as long as the second.

*Thorax* : Dorsal surface pitch black, shiny, a conspicuous central longitudinal brown marking arising from posterior margin of pronotum, not reaching the anterior part, lateral sutures of meso and meta-nota with silvery pubescence. Pronotum transverse, twice as wide as long, anterior and posterior margins straight, finely pubescent; prosternum brown, adpressed with silvery setae. Mesonotum long, twice as long as pronotum, moderately curved; mesosternum greyish black, adpressed with thick silvery pilosity. Metanotum about one third of mesonotum in length; metasternum very pale brown, thickly covered with silvery setae. Fore leg with two black longitudinal stripes, one on each side, a very short tubercle at apex towards inner margin, a constriction towards the inner margin near the apex on which tubercle is situated, setose; tibia shorter than femur, with a row of minute tubercles towards the inner side; tarsi two segmented, first longest, one and half as long as the second, claws arising near the apex of second. Middle leg long, slender, black, tinged coxae and trochanter brown, femur longer than body, a row of short curved spines on ventral side; tibia thin, half as long as femur, lined with long hair like setae along entire length; tarsi two segmented, brownish black, first very much longer than second. Hind leg with coxae, trochanter brown, femur long, slender, as long as middle femur; tibia short, four times as short as femur; tarsi two segmented, segments very short, first shorter than second. Measurements of leg segments; fore leg : 3.5, 2.5, 1.0, 0.63; middle leg : 9.81, 4.25, 1.69, 0.25; hind leg : 9.81, 2.69, 0.13, 0.19.

*Abdomen* : Dorsal surface pitch black, shiny covered with minute silvery hair like setae, apex of last genital segment dark brown with a central broad black marking, shorter than thorax; connexivum well developed, without spine. Parameres long, dark brown, curved, hairy, well protruding from IXth segment, tip pointed. Pygofer small (Fig. 2c). Endosoma with tip of apical plate broad, bifid; lateral plates paired, curved 'C' shaped; a small triangular paired plates in between apical part of dorsal plate and lateral plates (Fig. 2j).

*Apterous female* : General colour pattern and markings same as that of apterous male; differs from male in that the connexival spines

well developed beyond the the VIth abdominal tergum, connexiva black, shiny, spines brown and pointed. The female with a conspicuous tubercle like process in the middle of the ridge at the posterior margin of metanotum ; other structures of female are similar to male. Antennal segments I-IV measure : 3.0, 0.81, 0.88, 0.69. Measurements of leg segments ; fore leg 2.81, 2.34, 0.97, 0.72 ; middle leg : 8.78, 4.72, 1.81, 0.34 ; hind leg : 8.97, 2.59, 0.13, 0.19.

*Material examined* : *Holotype* apterous ♂ on pin, from a jungle stream of Aravankadu, alt. 860 metres, coll. R. S. Pillai ; 28.iv.1980.

*Paratypes* : Two apterous ♂♂, three ♀♀ and one nymph on pins, data same as holotype.

*Distribution* : INDIA ; Kerala : Silent Valley.

*Remarks* : This species is quite unique in the presence of the connexival spines not as long as the last two dorsal abdominal segments taken together and not directed inwardly without crossing with each other at apex in the females. The males are also different in the structure of fore femur and by the presence of indistinct connexival spines.

#### 6. *Pleciobates nostras* sp. nov.

(Text-fig. 3 a-g)

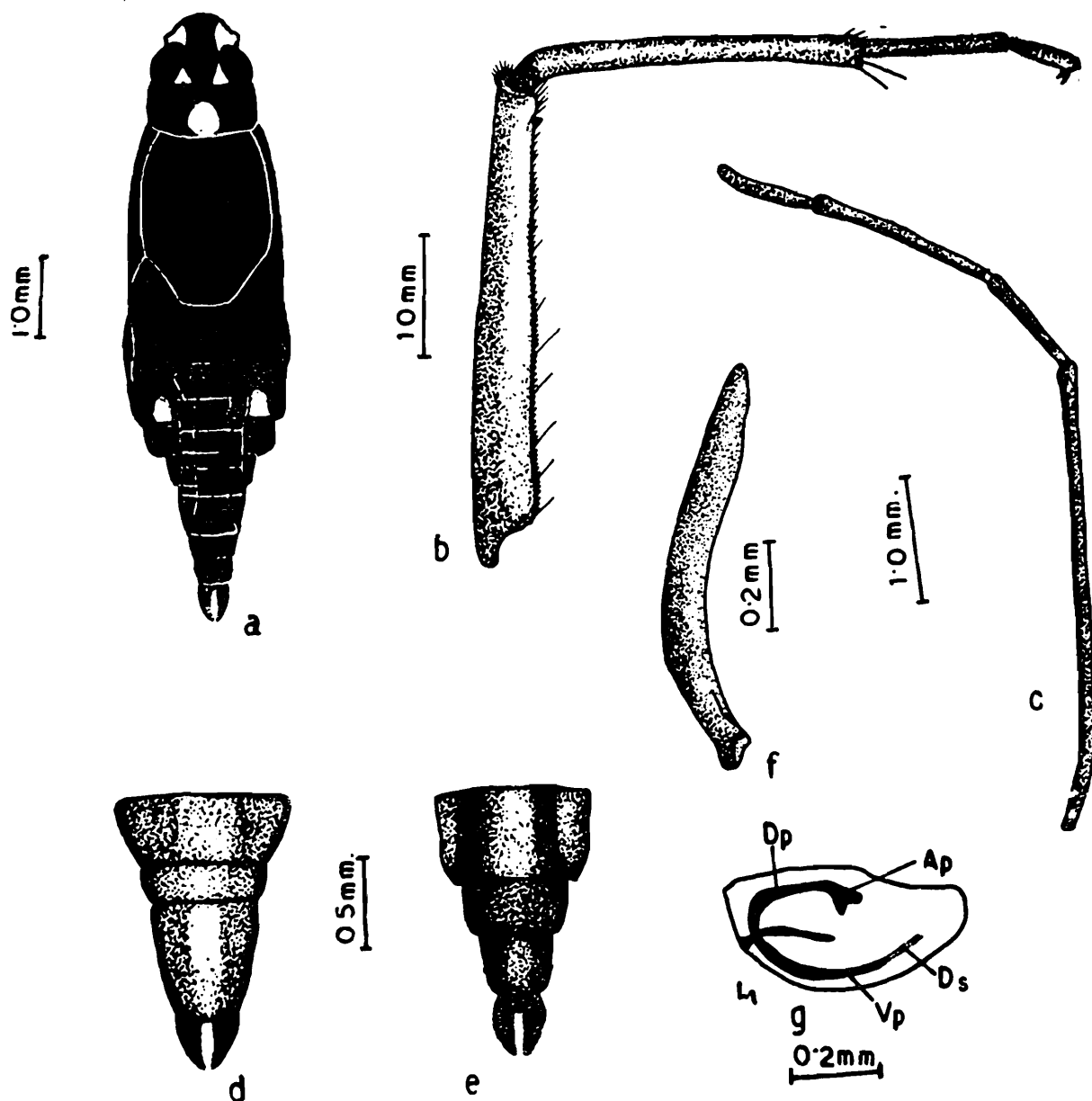
*Size* : Apterous male : length 7.06 ; maximum width across the body 2.19 ; body fusiform.

*Colour* : Shining black with light brown markings. Antennae and legs dark brownish black. Venter grey with silver pilosity.

*Apterous male* : Head brown, a large black fascia in the middle of the vertex anteriorly, a pair of black longitudinal streaks in front of eyes near the inner margin of eyes. Head protruding well beyond eyes. Basal margin of head, antenniferous tubercles, extreme apex of frons black, with brownish pubescence. Head including eyes 1.8 times wider than long. eyes dark brown, shiny. Antenna dark blackish brown, shorter than body, 1st segment longest, longer than the rest of antennal segments together, IVth shortest, IInd segment distinctly shorter than third, IIIrd segment 1.6 times longer than the second, the relative length of antennal segments are, 3.25, 0.88, 1.44,

0.69. Rostrum pilose, brown, not surpassing the prosternum, segment III about three times as long as the IVth, latter black.

Text Fig 3 *Pleciobates nostrus* Sp.nov.



Text-fig. 3 *Pleciobates nostrus* sp. nov.

a. Apterous male dorsal view. b. Male fore leg. c. Male antenna. d. Apterous male apical abdominal segments ventral view. e. Apterous male apical abdominal segments dorsal view. f. Male paramere. g. Endosoma lateral view.

*Thorax*: Dorsal surface of thorax pitch black, shiny, a conspicuous broad brown marking in the middle of the pronotum, lateral sutures of meso-and meta-nota with silvery pubescence. Pronotum transverse, twice as wide as long, anterior and posterior margins slightly curved, lateral margins concave with greyish pubescence,

prosternum brown, pubescent. Mesonotum very large, about three times as long as the pronotum, moderately convex, a little widened posteriorly; metasternum grey, covered with silvery pubescence. Front leg brownish black with brown femur, a row of small spines on the inner side to the entire length, a short black pointed tubercle at the inner margin of the apical portion, a pair of black longitudinal stripe along its longitudinal axis, finely setose; tibia shorter than femur, the apical part slightly enlarged; tarsi two segmented, first segment one and half times longer than second, claws arising near the apex of the second. Middle leg long, slender, coxae and trochanter pale brown, rest of the leg dark brownish black, femur longer than body, a row of short curved spines on the ventral side towards the inner margin; tibia thin, lined with long hair like setae along its entire length; tarsi two segmented, first much longer than second. Hind legs with coxae and trochanter pale brown, rest dark brown with black tinge, femur long, thinner than second femur; tibia very short, less than one third the length of the femur; tarsi two segmented, segments very short, not easily separable, first shorter than second. Measurements of leg segments; fore leg : 3.5, 2.5, 1.0, 0.63; middle leg : 9.8, 4.25, 1.69, 0.25; hind leg : 9.8, 2.69, 0.13, 0.19.

*Abdomen* : Dorsal surface of abdomen pitchy black, covered sparsely with silvery pubescence, shorter than thorax, apex of last genital segments dark brown; connexivum well developed, with an inconspicuous spine. Paramere long, curved, well protruding from ninth segment, tips pointed. Endosoma with tip of apical plate bifid, lateral plates paired, partially sclerotized. Apterous females and macropterous forms are not known.

*Material examined* : *Holotype* : apterous ♂ on pins, collected from a jungle stream of Aravankadu, alt. 860 metres, coll. *R. S. Pillai*; 28. iv. 1980. *Paratypes* : on pins, one apterous ♂ collected from Kariamalaithodu, alt. 871 metres, coll. *R. S. Pillai*; 3. v 1980; two apterous ♂♂ from Kumattamthodu, alt. 871 metres, coll. *R. S. Pillai*; 7. xii. 1980.

*Distribution* : INDIA ; Kerala : Silent Valley.

*Remarks* : *P. nostrus* is close to *P. indicus* sp. nov. in general appearance, but distinctly differs from it, in the nature of antenna which

is shorter than body ; ornamentation of the fore femora and structure ; the structure of endosoma and parameres and other characters mentioned in the description.

Subfamily : HALOBATINAE

7. *Metrocoris malabaricus* sp. nov.

(Text-fig. 4 a-i)

*Size* : Apterous male : 5.63—5.75 long ; maximum width across the body 3.19—3.25 ; apterous female : 5.81—6.13 long ; maximum width across the body 3.25—3.38 ; macropterous male ; 6.06 long ; maximum width across the body 3.25 ; macropterous female : 5.25 long ; maximum width across the body 3.0—3.38.

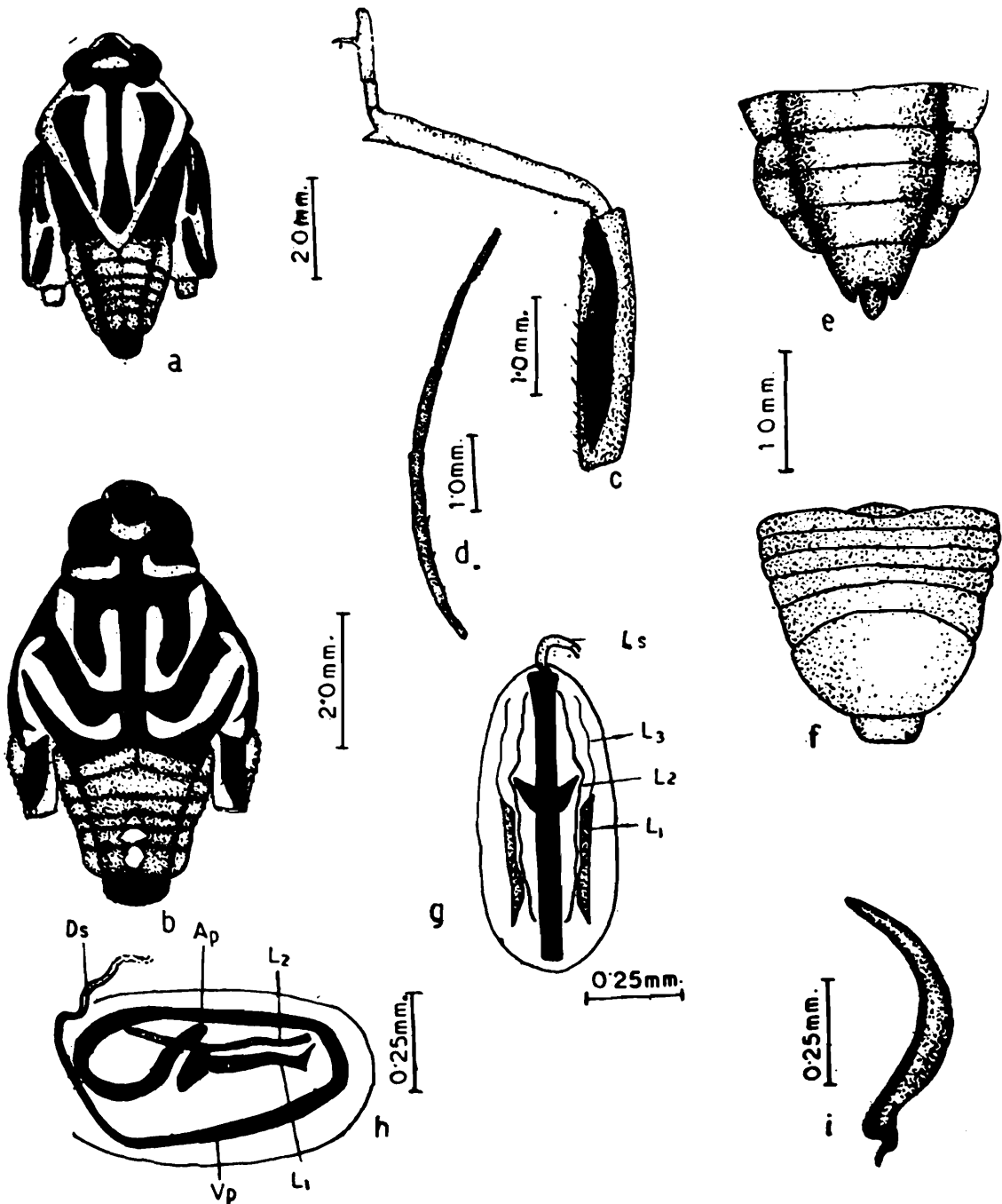
*Colour* : Dully yellow with black markings. Antennae and legs fuscous. Venter pale.

*Apterous male* : Head with a central broad black marking, frontal part of face dull yellow with a small thin longitudinal black fascia ; head protruding well beyond the eyes. Antenna shorter than body, black, basal part of 1st segment yellow ; segment I longest, IVth shortest, IIIrd shorter than IIInd, 1st about two and half times as long as the IIInd ; the relative length of antennal segments are, 2.25, 0.94, 0.88, 0.69. Head including eyes 2.2 times wider than long. Eyes overlapping one third of lateral part of pronotum. Rostrum yellow, apical of third and fourth segments black, short, surpassing slightly prosternum, third segments thrice as long as fourth.

*Thorax* : Pronotum a little wider than head including eyes, lateral margins concave, width of pronotum 3.2 times longer than its median length, finely setose and with black markings as shown in fig. 4a. Mesonotum yellow, black or brownish markings, adpressed with minute brown setose, about 4.3 times as long as metanotum ; metacetabular suture with black fasciae, covered with brownish hairs. Omphalium distinct. Fore leg with femur twice as stouter as tibia, dark brown and with longitudinal black stripe, base and lateral portions yellow without any prominent teeth or spines along inner margin ; tibia pitch black armed with a conspicuous tooth at distal end ; tarsi black, two segmented, second longest, four times as long as first, claws arising from half of apex of second. Middle leg black or brownish black, femur stouter than tibia ; tarsic urved, first 1.3 times as long as

second. Hind leg black, femur twice as long as tibia ; tarsi short and segments subequal. Measurements of leg segments ; fore leg : 2.44,

Text Fig.4. *Metrocoris malabaricus* Sp.nov.



Text-fig. 4. *Metrocoris malabaricus* sp. nov.

- a. Macropterous male dorsal view (wings removed) b. Apterous male dorsal view. c. Male fore leg. d. Male antenna. e. Apterous female apical abdominal segments dorsal view. f. Apterous female apical abdominal segments ventral view. g. Endosoma dorsal view. h. Endosoma lateral view. i. Male paramere.

2.13, 0.19, 0.81 ; middle leg : 6.69 5.38, 0.44, 0.34 ; hind leg : 6.5, 3.88, 0.38, 0.31.

*Abdomen* : Abdomen short without connexival spine, black, seventh segment well developed. Endosoma with apical part of dorsal plate curved, with a small extension directed ventrolaterally ; ventral plate with ductus seminiacus ; lateral plates paired, first pair distinct, partially sclerotized ; second pair clearly visible, thin and wavy. A small but well developed sclerite present between the apical part of dorsal plate and the first pair of lateral plates. Parameres thin, curved, sickle shaped.

*Apterous female* : 5.81-6.13 long ; maximum width across the body 3.25 ; similar to apterous male in colouration pattern. Abdominal segments as in fig. 4e & f. Antenna shorter than the body, segment IV shortest, IInd and IIIrd equal in length, segments I-IV measure, 2.06, 0.81, 0.81, 0.69. Measurement of leg segments ; front leg : 2.31, 1.94, 0.13, 0.44 ; middle leg : 6.5, 4.5, 1.63, 0.31 ; hind leg : 6.13, 4.06, 0.31, 0.25.

*Macropterous male* : Length to the tip of abdomen 6.06 ; maximum width across the body 3.25. Colour pattern differs from apterous forms ; head with a central black triangular speck. Pronotum 0.85 times as broad as its median length, markings as shown in fig. 4a, a central broad black fascia extending upto tip, a pair of curved black fasciae on either side of central one. Wings dark brown, extending well beyond the tip of abdomen. Antenna shorter than total body length, IVth segment shortest, segments I-IV measure, 2.25, 0.94, 0.88, 0.69. Measurement of leg segments ; fore leg : 2.44, 2.13, 0.19, 0.81 ; middle leg : 6.63, 5.38, 0.44, 0.38 ; hind leg : 7.25, 3.81, 0.38, 0.31. Endosoma, parameres and other structural details similar to apterous male.

*Macropterous female* : Length to the tip of abdomen 5.19-5.25 ; maximum width across the body 3.0-3.38. Colour pattern and markings similar to macropterous male. Antenna shorter than body, segments I-IV measure, 1.94, 0.81, 0.88, 0.72. Measurements of leg segments ; fore leg : 2.06, 1.81, 0.13, 0.44 ; middle leg : 6.0, 4.88, 1.56, 0.31 ; hind leg : 6.06, 3.75, 0.31, 0.38.



*Material examined* : *Holotype* : apterous ♂ on pin (endosoma and parameres on slides) collected from Half way to Valiyaparathodu, alt. 1060 metres, coll. *R. S. Pillai* ; 26.iv.1980. *Paratypes* : on pins (endosoma and parameres on slides), apterous one ♂, two ♀♀ from Road to Valiyaparathodu, alt. 1000 metres, coll. *R. S. Pillai* ; 23. iv. 1980 ; apterous one ♂, one ♀ and one macropterous ♀ from Half way to Valiyaparathodu, alt. 1060 metres, coll. *R. S. Pillai* ; 26. iv. 1980 ; one macropterous ♂ from Kumattamthodu, alt. 871 metres, coll. *R. S. Pillai* ; 30. iv. 1980 ; one apterous ♂ from Kariamalaithodu, alt. 871 metres, coll. *R. S. Pillai* ; 3. v. 1980 ; apterous two ♂♂ and four ♀♀ from way to Valiyaparathodu alt. 100 metres, coll. *R. S. Pillai* ; 5. xii. 1980 ; one macropterous ♀ from Kumattamthodu, alt. 871 metres, coll. *R. S. Pillai* ; 7. xii. 1980.

*Distribution* INDIA ; Kerala Silent Valley.

*Remarks* : The species is close to *M. lituratus* Esaki in the nature of colour markings and in the general appearance. It can be readily differentiated, however, in the markings of macropterous form, in the nature of fore leg and strikingly by the nature of endosoma.

### 8. *Metrocoris variegans* sp. nov.

(Text-fig. 5 a-h)

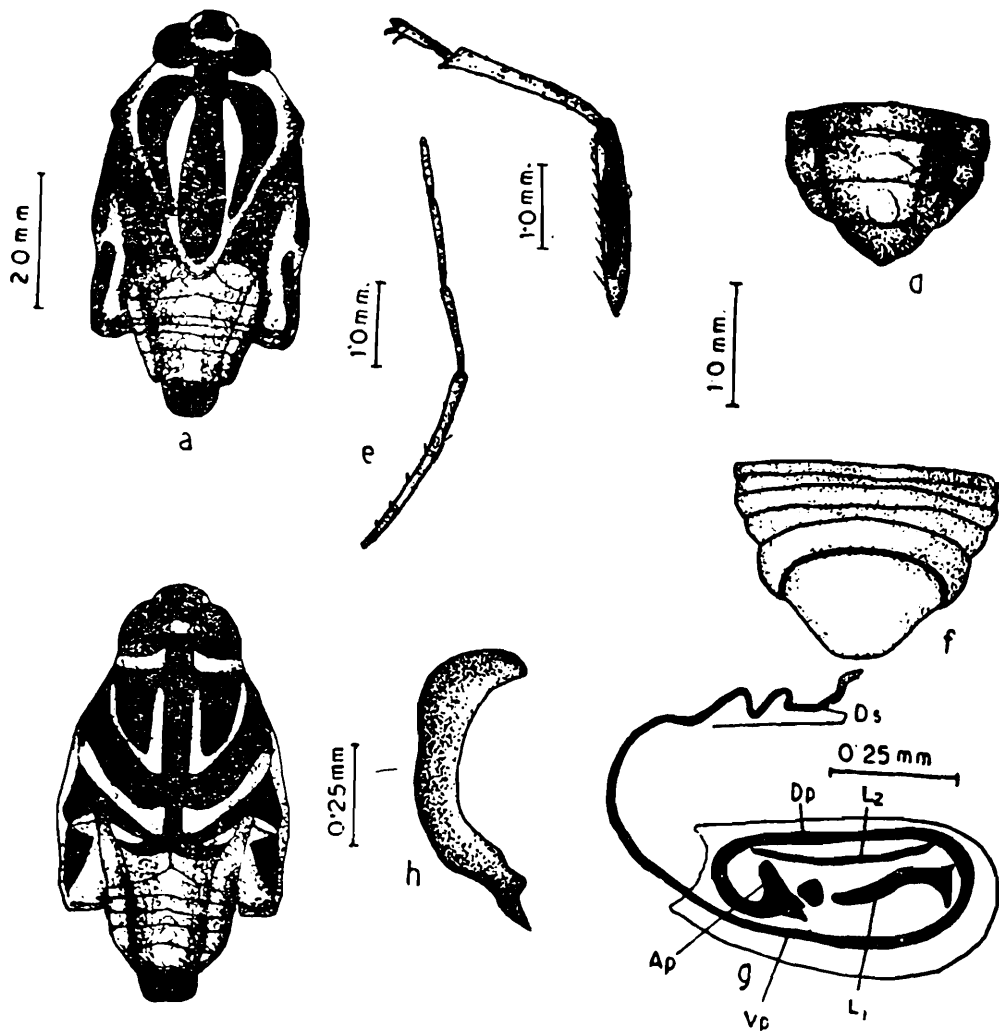
*Size* : Apterous male ; 6.13 long ; maximum width across the body 2.88 ; apterous female 4.94-5.44 long ; maximum width across the body 2.75-3.31 ; macropterous male 5.38 long ; maximum width across the body 2.81 ; macropterous female 4.56-5.5 ; maximum width across the body 2.88-3.19.

*Colour* : Dull yellow with black markings. Antennae and legs dark blakish brown. Venter pale.

*Apterous male* : Head with a central black marking, posteriorly connected with black fascia along the posterior part of the inner margin of eyes ; frontal part of face pale, a narrow longitudinal black fascia continued with central black marking to head ; head protruding well beyond the eyes. Antenna shorter than body, black, base of segment I pale, segment I longest, IVth shortest, II and IIIrd equal, segments I—IV measure, 2.31, 1.0, 1.0, 0.69. Head including eyes two and half times wider than long. Eyes overlapping one third of lateral part of pronotum. Rostrum pale yellow with apical part of

third and fourth segments black, short, surpassing posternum, third segment two and half times as long as the last segment.

Text Fig 5 *Metrocoris variegans* Sp nov



Text-fig. 5. *Metrocoris variegans* sp. nov.

a. Macropterous male dorsal view (wings removed). b. Apterous male dorsal view. c. Male fore femur. d. Apterous female apical abdominal segments dorsal view. e. Male antenna. f. Apterous female apical abdominal segments ventral view. g. Endosoma lateral view. h. Male paramere.

**Thorax :** Pronotum equal or a little wider than head including eyes, lateral margins concave, thrice wider than long, medianally finely pubescent, with black fascia as shown in Fig. 5b. Mesonotum with black fasciae, adpressed with minute brownish silvery long hairs, six times as long as metanotum, meta-acetabular area with black markings, setose ; omphalium indistinct. Fore leg with femur thrice as stouter as tibia, dark brown with a black longitudinal stripe, basal one third pale yellow, without any prominent teeth or spines, a very shallow

notch without a tooth at the extreme apex towards inner side, tibia brownish black, a small tooth like prolongation at distal end; tarsi two segmented, dark brown, first very short, about six times as short as the second. Second leg black or brownish black, femur stouter than tibia, tarsi two segmented, first longest, five times as long as the second. Hind leg brownish black, femur 1.6 times as long as tibia; tarsi short, two segmented, second a little longer than first. Measurements of leg segments; fore leg : 2.5, 1.94, 0.13, 0.81; second leg : 5.44, 4.25, 1.75, 0.31; hind leg : 6.31, 4.06, 0.25, 0.31.

*Abdomen* : Short, black with golden pilosity, connexival spines absent, seventh abdominal segment well developed. Endosoma with dorsal portion of apical plate curved inwardly, basically indistinguishably fused with the ventral plate. The apex of apical plate has a pair of extension laterally, sclerotized. The lateral plates are paired, feebly sclerotized to moderately sclerotized. first pair distinct, second pair thin, thread like, less sclerotized, but still visible in permanent (KOH) cleared materials. Parameres short, broad, more wider in the apical half (Fig. 5h).

*Apterous female* : Similar to apterous male in colouration and markings. Abdominal segments as in Fig. 5d & f. Antenna shorter than body, segment IV shortest, 1st segment longest, IIIrd a little longer than IIrd, segments I—IV measure, 1.88, 0.69, 0.79, 0.59. Measurements of leg segments; fore leg 2.13, 1.97, 0.13, 0.72; middle leg : 6.09, 4.38, 1.72, 0.34; hind leg 5.97, 3.72, 0.28, 0.34.

*Macropterous male* : Colour markings differ from apterous forms; head with a central black marking, expanded posteriorly. Pronotum 0.8 times as broad as its median length, markings as shown in Fig. 5a; with a central broad black fascia to the tip, expanded posteriorly, a pair of curved fasciae joined with central one anteriorly. Wings dark brown, extended well beyond the tip of abdomen. Antenna shorter than body, segment IV shortest, IIIrd and IIrd equal, segments I-IV measure, 2.25, 0.94, 0.94, 0.69. Measurements of leg segments; fore leg 2.63, 2.25, 0.19, 0.88; middle leg 6.44, 5.25, 1.75, 0.39; hind leg : 6.44, 3.69, 0.28, 0.38. Other structural details similar to apterous male.

*Macropterous female* Similar to macropterous male in colouration and markings; antenna shorter than body, segment I-IV measure,

1.88, 0.75, 0.81, 0.63. Measurements of leg segments ; fore leg : 2.06, 1.88, 0.94, 0.63 ; middle leg : 6.0, 4.44, 1.69, 0.31 ; hind leg : 5.69, 3.81, 0.25, 0.31.

*Material examined* *Holotype* : Macropterous ♂ on pins, from Kariamalaithodu, alt. 871 metres, coll. R. S. Pillai ; 3. v. 1980. *Paratypes* : apterous one ♂, two ♀♀ and one macropterous ♀ on pins, from Valiyaparathodu, alt. 910 metres, coll. R. S. Pillai ; 26. iv. 1980 ; one apterous ♀ from Kumattamthodu, alt. 871 metres, coll. R. S. Pillai ; 30. iv. 1980 ; four macropterous ♀♀ from Kumattamthodu, alt. 871 metres, coll. R. S. Pillai ; 3. v. 1980. (Endosoma and parameres on slides).

*Distribution* : INDIA ; Kerala : Silent Valley.

*Remarks* : The species is close to *M. ciliata* Den Boer, but easily distinguished by the structure of endosoma, presence of a small tooth at the apical end of forefemur in males and other structural characters mentioned in the text.

### 9. *Ventidius (Ventidius) aquarius* Distant (Text-fig. 6a & b)

1910a. *Ventidius aquarius* Distant, *Ann. Mag. nat. Hist.*, 5 (8) : 150.

1910b. *V. aquarius* Distant, *The fauna of British India including Ceylon and Burma*, 5 : 157.

1928. *V. aquarius* Distant : Esaki. *Ann. Mag. nat. Hist.*, 2 (10) : 572.

1930. *V. aquarius* Distant : Esaki, *J. Fed. Malay St. Mus.*, 16 : 18 (determined as error ; described as a new species, *V. malayensis* by Hungerford and Matsuda, 1960.

1960. *V. aquarius* Distant : Hungerford and Matsuda, *Kans. Univ. Sci. Bull.*, 40 (7) : 324.

1911. *Metrocoris aquarius* Distant : Bergroth, *Annl. Soc. ent. Belg.*, 60 : 186,

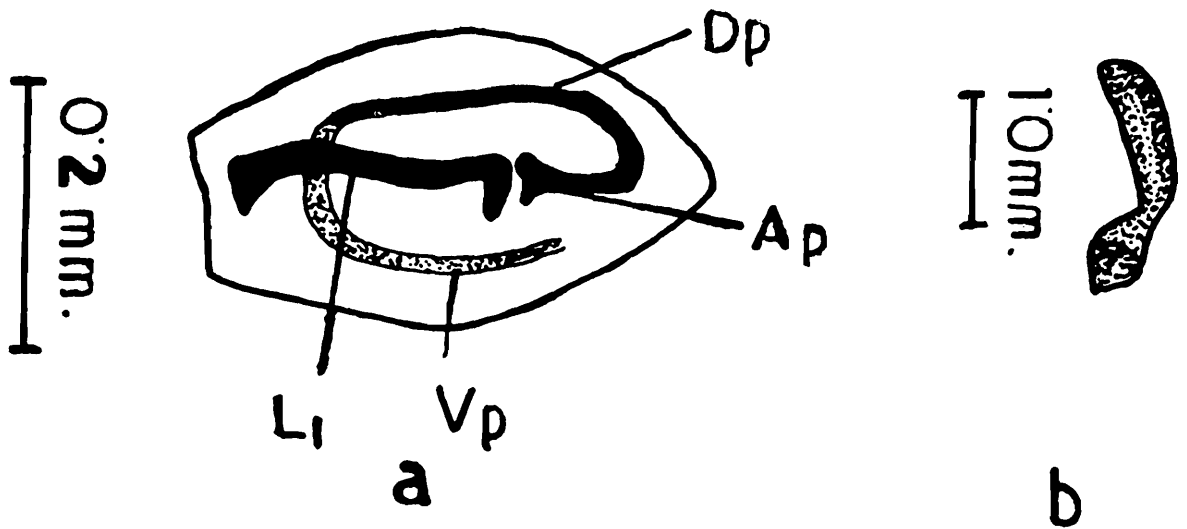
While revising the genus *Ventidius* Distant, Hungerford and Matsuda (1960) considered that a satisfactory description of *V. aquarius* awaits the capture of more specimens from South India. In the present expedition (April-May, 1980) two males, four females and three nymphs were collected from a road side jungle pool from Valiyaparathodu at an altitude of 1000 metres. The following additional descriptions may be further useful in the identification of the species.

**Size** Macropterous male 4.13 long ; width across the body 3.0. Macropterous female 4.5 long ; width across the body 3.2.

**Colour** : Ochraceous, with 'T' shaped black marking on the pronotum, hemelytra black, venter pale brown.

**Description** : Head longer than broad, 1.3 times in male, 1.5 times in female, black markings on base and laterally in front of innerside of eyes ; eyes black. Antenna four segmented, segment I longest, base ochraceous, Ist and IInd segments hirsute, relative length of segments, 1.59, 1.02, 0.63, 0.6 in male ; 1.41, 0.87, 0.84,

## Text Fig.6. *Ventidius aquarius* Distant



Text-fig. 6. *Ventidius aquarius* Distant

a. Endosoma lateral view. b. Male paramere.

0.6 in female. Pronotum long, thrice as long as head. Measurements of leg segments ; fore leg : 1.47, 1.35, 0.37, 0.27 ; second leg : 4.05, 2.73, 0.12, 0.21 ; hind leg : 4.35, 2.4, 0.38, 0.88 in males ; fore leg : 1.47, 1.26, 0.1, 0.303 ; middle leg : 4.14, 2.58, 1.0, 0.15 ; hind leg : 4.29, 2.31, 0.29, 0.2 in female. Endosoma with apical and dorsal plates sclerotised, the former bifid at the tip, ventral plate simple, less sclerotized. Lateral plates paired, apical portion curved perpendicularly downwards (Fig. 6a), parameres short, simple as in Fig. 6b.

*Material examined* : Macropterous two ♂♂, four ♀♀ and three nymphs collected from Valiyaparathodu, alt. 1000 metres, coll. R. S. Pillai ; 26. iv. 1980.

*Distribution* : INDIA ; Kerala : Pallode, 20 miles Northeast of Trivandrum (Type), Silent Valley.

Family NOTONECTIDAE

Subfamily NOTNECTINAE

10. **Enithares fusca** Brooks

1948. *Enithares fusca* Brooks, *J. Kans. ent. Soc.*, 21 (2) : 46.  
 1966. *E. fusca* Brooks : Lansbury, *Bull. zool. Nome*, 23 (4) : 192.  
 1968. *E. fusca* Brooks. Lansbury, *Pacif. Insects*, 10 (2) : 412.

*Material examined* : Three ♂♂ and three ♀♀ collected from Damsite, alt. 871 metres, coll. R. S. Pillai ; 4. xii. 1980 and 9. xii. 1980.

*Distribution* : INDIA ; Kerala : Cochin, Silent Valley.

11. **Enithares hungerfordi** Brooks

1948. *Enithares hungerfordi* Brooks, *J. Kans. ent. Soc.*, 21 (2) : 41.  
 1966. *E. hungerfordi* Brooks : Lansbury, *Bull. zool. Nome.*, 23 (2) : 192.  
 1968. *E. hungerfordi* Brooks : Lansbury, *Pacif. Insects*, 10 (2) : 372.

*Material examined* : Two ♀♀ and three ♂♂ from Half way to Valiyaparathodu, alt. 1000 metres, coll. R. S. Pillai. 26. iv. 1980.

*Distribution* : INDIA ; Kerala : Nelliampathi Hills, Silent Valley ; Tamilnadu : Kodaikanal, Palani Hills, Nilgiri Hills, Cinchona, Top Slip.

The occurrence of the Malayan element in the fauna and flora of Peninsular India is a widely recognised fact, but how this fauna and flora came to be so dispersed and isolated are the important points that require elucidation. It is interesting to note that in this study, out of nine species of gerrids, the genus *Pleciobates*, a typical Malayan genus, was recorded for the first time from Silent Valley and thereby from India. Similarly, *Limnometra anadyomene* which is known so far from Coimbatore, in South India & Srilanka, Philippine Islands, Malaya and Singapore, has been collected in goods numbers from this valley. Thus the presence of Indo-Ceylonese

and Indo-Malayan forms in Silent Valley shows its uniqueness and proves the Valley as an important reservoir harbouring various isolated genera and species which may be truly autochthonous or biogeographical relicts.

All the type-materials are deposited in Zoological Survey of India, Southern Regional Station, Madras. They will be in due course transferred to National Collections of Zoological Survey of India, Calcutta.

#### SUMMARY

Nine species belonging to six genera of the family Gerridae were studied, of which five new species under three genera are described from Silent Valley. The genus *Pleciobates* Esaki originally described from Burma was recorded for the first time from India. Endosoma and parameres of *Ventidius aquarius* Distant are also studied for the first time. The family Notonectidae is represented by a single genus and two species, belonging to the subfamily Notonectinae.

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