

A taxonomic study of the Malayan Corixidæ
(Hemiptera-Heteroptera) with the description of *Micronecta
malayana* sp. nov.¹

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INTRODUCTION

The Corixidæ are widespread in Malaya. They are often very abundant in standing water e.g., ponds, pools and the edges of lakes. No taxonomic work has been done so far on Malayan material but a number of species have been recorded by Dover (1928) and Fernando (1961a, 1963a & 1963b). Material from the surrounding countries has been studied to a greater extent however by Lundblad (1933) for Indonesia, and Hutchinson (1940) and Chen (1960) for India and the adjacent areas. Wroblewski (1960) described a number of Asiatic species and Fernando (1964) has dealt with the Ceylonese species. These taxonomic works have dealt with Malayan species and in the present work the Malayan species are described from Malayan material. Nine species namely *Micronecta issa* (Dist.), *M. thyesta* Dist., *M. punctata* Fieb., *M. scutellaris* (Stal.), *M. quadristrigata* Breddin, *M. albifrons* (Motsch.), *Micronecta malayana* sp. nov., *Agraptocorixa hyalinipennis* (F.) and *Tropocorixa connexa* (Lundb.) are described. Keys are given for the separation of Malayan genera and species.

MALAYAN GENERA AND SPECIES

The Malayan Corixidæ are represented by the three genera, *Micronecta*, *Agraptocorixa* and *Tropocorixa*. *Micronecta* is the commonest and seven species have been recorded, one of which is new. The other two genera are represented by one species each. The following key is given for the separation of the genera:

1. Scutellum exposed, covered by pronotum only at anterior margin; antennæ three-jointed; rarely exceed 4.5 mm. in length *Micronecta*
- Scutellum covered by pronotum (apex may be visible); antennæ four-jointed; rarely less than 4.5 mm. in length 2
2. Pronotum and elytra unicolorous hyaline; fore leg of male without a well defined stridulatory area *Agraptocorixa*
- Pronotum and elytra with dark brown vermiculate markings; fore leg of male with well defined stridulatory area *Tropocorixa*

¹ Part of a thesis accepted by the University of Singapore for a M.Sc. Degree.

TAXONOMY

The characters used in the taxonomy of the Corixidæ have been revised in detail by Hungerford (1948). As Wroblewski (1958) has pointed out, the male parameres, in spite of their variation, are the only reliable characters for species identification. These have been used by most recent workers on South East Asian species.

Micronecta

Micronecta is found throughout the Eastern and Western Hemispheres. It is differentiated from the closely related genus restricted to the Western Hemisphere namely *Tenagobia* by the crescent-shaped pronotum and the absence of a strigil in the males of the latter. Important contributions to the study of the genus in this part of the world include those of Lundblad (1933), Hutchinson (1940) Chen (1960) and Wroblewski (1960).

Micronecta issa (Dist.)

Material examined.—Malaya: Johore, Kahang, 26-27-11-1961, 1 male, 28 females; 13-12-1961, 3 females; 14-12-1961, 17 females; 15-12-1961, 2 males, 8 females; 23-12-1961, 7 females; 24-12-1961, 17 females; 25-12-1961, 6 females; 28-12-1961, 4 females; 10 mi, Mawai Road, 5-5-1960, 1 male, 1 female.

The male measures $2.92-2.96 \times 1.33$; the female $2.23-2.52 \times 1.10-1.35$. The head is pale coloured with a dark brown posterior margin. Pronotum and hemelytra irregularly dotted; but in the case of the hemelytra the dots tend to merge into large blotches of brown. Abdomen and legs yellow.

Lundblad (1933) described as *Synaptonecta breddini* what is now known to be the brachypterous form of *Micronecta issa*, the latter being based on the macropterous form (Hutchinson, 1940). *Micronecta issa* differs from all other species in that the male possesses a tibiotarsus formed from the fusion of the tibia and the tarsus of the anterior leg. Another distinctive feature is that the free lobe of the eighth abdominal tergite lacks a tuft of hairs at its distal end.

In the brachypterous form, the hemelytra is peculiarly shaped, though the colour pattern is very much the same as the macropterous form. The hind wing is poorly developed. Unlike the macropterous form, the pronotum is very much shorter than the head, being only about half the head length. The pronotal width is slightly over six times its length; and the lateral margins are short and indistinctive.

Micronecta issa has so far been found in only two habitats in Malaya. Judging from the yield and frequency of occurrence in light-trap catches, it is probably a common species in Malaya. The species is also recorded from Burma, India and Java.

Micronecta thyesta Dist.

Material examined.—Malaya: Malacca, Jasin Stream, 1 female; Johore, Mawai-Sedili Road, 10-11-1960, 2 females; 6 mi, Mawai-Sedili Road, 20-10-1960, 1 female; 21-8-1960, 1 female; Kahang, 14-12-1961, 1 male.

The male measures 3.09×1.40 ; the female 2.95×1.40 . The head is pale coloured with brown posterior margin. Pronotum and scutellum brown. Hemelytral pattern in the form of dark, uneven, broken stripes. Venter and legs stramineous.

Micronecta thyesta is the second largest of the Malayan species, and can be distinguished from all the others in that it lacks a strigil.

Micronecta thyesta has been found to occur at a temporary habitat in Johore. Fernando (1963c) has recorded it at light. The species is also recorded from India, Taiwan and Ceylon.

² All measurements in millimetres.

Micronecta punctata Fieb.

Material examined.—Malaya: Negri Sembilan, Rembau, 31-10-1961, 9 males, 22 females, nymphs; Johore, Kahang, 26-27-11-1961, 2 males, 47 females; 14-12-1961, 2 males, 75 females; 15-12-1961, 3 males, 102 females; 13-12-1961, 18 females; 16-17-11-1960, 5 males, 33 females; 28-12-1961, 11 females; 25-12-1961, 1 male, 6 females; 24-12-1961, 16 females; 23-12-1961, 12 females; Sedili Kechil, 2-3-1960, 7 males, 12 females, nymphs; Malacca, Jasin, 4-4-1960, 2 males, 2 females, nymphs; Masjid Tanah Road, 5-3-1960, 3 males, 3 females, nymphs; Penang, Sungai Burong, 28-10-1961, 5 males, 11 females, nymphs; Penang Hill, 24-10-1960, 1 female; Selangor, 23 mi, Sabak Bernam, 16-3-1960, 2 females; Singapore: 17 mi. Jurong Road, 29-6-1961, 1 male, 2 females; Buona Vista Road, 2-10-1961, 1 male; Plantation Road, 13-3-1962, 2 males, 2 females, nymphs.

The male measures 2.57-2.72 x 1.15-1.30; the female 2.47-2.87 x 1.29-1.40. The head is pale coloured. Pronotum greyish-brown with brown margins; and a broken brown stripe centrally across the disc. Scutellum brown. Hemelytra has a pale background with irregularly arranged black spots. Venter and legs yellow.

Micronecta punctata is easily recognised by its hemelytral patterning. Both the brachypterous and macropterous forms exist locally. They can be distinguished by the fact that in the brachypterous form the length of the head is much greater than the pronotal length; whilst in the macropterous form the head and pronotal length are about equal.

Micronecta punctata has been found to occur in sawahs (temporary habitats). Fernando (1959) has recorded it from rock pools in Ceylon. In Malaya, it is the most common species next to *Micronecta quadristrigata*. Fernando (1963c) has recorded it at light in Malaya. Also recorded from Ceylon, Java, India, Sumatra and Siam.

Micronecta scutellaris (Stal.)

Material examined.—Malaya: Johore, Kahang, 28-29-11-1960, 1 male, 3 females; Malacca, Batu Berendam, 3-10-1960, 1 female; Singapore: Lorong Chuan, 29-8-1961, 3 males, 7 females; 4-9-1961, 13 males, 28 females; 10 mi, Tampenis Road, 9-4-1962, 1 male, 1 female.

The male measures 3.68-4.10 x 1.52-1.64; the female 3.71-4.35 x 1.55-1.76. Head pale coloured. Pronotum dull grey with a broken brown stripe across the disc a third of the way from the posterior margin. Scutellum dark brown. Hemelytra grey with broken brown longitudinal stripes. Venter and legs yellow.

Micronecta scutellaris is easily recognised as the largest Malayan species with a length exceeding 3.5 mm.

Micronecta scutellaris has often been found to occur together with *Micronecta quadristrigata*, but is by no means as common or abundant as the latter. Both species are among the most widely distributed aquatic Hemiptera in South-east Asia, (Fernando, 1963a). *Micronecta scutellaris* has been recorded at light and in temporary habitats (Fernando, 1961a & 1963b). Also recorded from Africa, Arabia, Burma, Ceylon, India and Palestine.

Micronecta quadristrigata Bredd.

Material examined.—Malaya: Johore, Kahang, 15-12-1961, 43 males, 57 females; 28-29-11-1960, 36 males, 47 females; 13-12-1961, 33 males, 67 females; 16-17-11-1960, 18 males, 82 females; 18-9-1960, 14 males, 18 females, nymphs; 30-10-1960, 2 males, 15 females; 29-4-1961, 3 males, 3 females; 25-12-1961, 61 males, 39 females; 14-12-1961, 53 males, 47 females; 24-12-1961, 55 males, 45 females; 23-12-1961, 33 males, 67 females; 28-12-1961, 50 males, 50 females; 4 mi. Mawai-Sedili Road, 10-11-1960, 2 females; Mt. Ophir, 4-4-1960, 1 male, 2 females, nymphs; Malacca, Batu Berendam, 3-10-1960, 40 males, 60 females; Bukit Sabukor Road, 6-4-1960, 8 males, 11 females; ½ m. Alor Gajah, 8-4-1960, 2 males; Perak, Taiping, 15 m. Kuala Kangsar Road, 24-10-1961, 21 males, 31 females; Penang, Gtugor, 24-10-1961, 2 females; Pulau Butong, 28-10-1961, 13 males, 27 females, nymphs; Penang Hill, 24-10-1960, 32 males, 68 females; 23-10-1960, 43 males, 57 females; Selangor, Sabak Bernam, 16-3-1960, 38 males, 62 females; Singapore: 17 mi. Jurong Road, 30-6-1961, 1 male; Changi, Pond, 19-12-1960, 1 female; Lorong Chuan,

4-9-1961, 34 males, 66 females, nymphs; 2-10-1961, 13 males, 32 females, nymphs; 8-8-1961, 2 females; 29-8-1961, 50 males, 50 females; Buona Vista Road, 2-10-1961, 2 females; 12½ mi. Tampenis Road, 15-8-1961, 1 male, 1 female; 10 mi. Tampenis Road, 9-4-1962, 2 males; Boon Lay Road, 27-3-1962, 2 males, 17 females, nymphs.

The male measures 2.47-3.14 x 1.10-1.12; the female 3.24-3.38 x 1.31-1.37. Head pale coloured with brown posterior margin. Pronotum grey with a broken brown stripe across the posterior third of the disc. Scutellum dark brown. Hemelytra grey with longitudinal, broken brown stripes. Venter and legs yellow.

This is the commonest Malayan species of *Micronecta*. Superficially it resembles *Micronecta thyesta*; however, the very distinct shape of the free lobe of the eighth tergite in *Micronecta quadririgata* easily distinguishes the two.

Micronecta quadririgata occurs commonly in sawahs in Ceylon (Fernando, 1959), Indonesia (Ardwinata, 1958) and Malaya. Lundblad (1933) collected this species from a large variety of habitats including lakes, sphagnum pools, fountains and hot springs. It usually forms the bulk of the light-trap catches in Malaya (Fernando, 1961a, 1963c). It has also been recorded at light in Indonesia (Lundblad, 1933), Ceylon (Fernando, 1961b), and India (Fernando, in press). Also recorded from Ceylon, India, Java, Philippine Islands and Sumatra.

Micronecta albifrons (Motsch.).

Material examined.—Malaya: Johore, Kahang, 26-27-11-1961, 1 male, 10 females; 15-12-1961, 3 males, 2 females; 14-12-1961, 3 males, 3 females; 3-12-1961, 2 males, 5 females; 24-12-1961, 4 males, 3 females; 25-12-1961, 1 male, 1 female; 23-12-1961, 3 males, 1 female; Malacca, Jasin, 4-4-1960, 4 males, 1 female; Singapore: Buona Vista Road, 5-7-1961, 19 males, 22 females, nymphs; 13½ mi. Sembawang Road, 21-1-1960, 8 males, 21 females; nymphs; Changi, Pond, 19-2-1960, 5 females; 12½ mi. Tampenis Road, 15-8-1961, 2 females; Ang Mo Kio, 13-3-1962, 2 males, 1 female; Lorong Chuan, 29-8-1961, 1 male, 9 females.

The male measures 2.08-2.28 x 0.89-0.93; the female 2.13-2.29 x 0.87-0.93. Head pale coloured. Pronotum light brown with two short transverse stripes not reaching the lateral edges of the pronotum. Both the anterior stripe (central in position) and the posterior stripe (close to posterior margin of pronotum) are discontinuous and dark brown in colour. Scutellum light brown. Hemelytra light brown with well defined brown stripes on the clavus and corium. Venter and legs yellow.

Chen (1960) has clarified the position of Hutchinson's sub-species *Micronecta albifrons albifrons* (Motsch.) and his intermediate race *M. albifrons albifrons* trans. ad. *striatella* Lundb. as being the brachypterous and macropterous forms respectively. Both forms are present in Malaya. The macropterous form has a longer pronotum, the median length being one third the pronotal width.

Micronecta albifrons has been recorded in temporary habitats in Ceylon (Fernando, 1959) but not in Malaya. Locally, it is present in light catches quite frequently but not in abundance. Fernando (1963c) has recorded it at light in Kahang, Johore, and in Ceylon (Fernando, 1961b). Also recorded from Burma, Ceylon, India and Java.

Micronecta malayana sp. nov.

Holotype.—A dissected male, 6th mile, Johore Bahru—Pontian Road, Johore, Malaya, collected by Dr. C. H. Fernando on 27th February, 1960, deposited in the British Museum (Natural History), London.

Paratypes.—(All with the same date as the holotype.) 2 males and 2 females, British Museum (Natural History); 2 males and 2 females, Institute of Zoology, Polish Academy of Science, Poznan, Poland; 1 male and 3 females, Zoology Department, University of Singapore.

Other material examined.—Malaya: Johore, 6 mi., Pontian Road, 27-2-1960, 14 males, 18 females, nymphs; Kahang, 13-12-1961, 1 female; 26-27-11-1961, 1 male, 1 female; 14-12-1961, 4 males, 5 females; 10 mi., Mawai Road, 5-5-1960, 3 males, 2 females; Selangor 7 mi., Banting-Klang Road, 17-3-1960, 6 males, 10 females, nymphs.

The males measure 2.04-2.30 x 0.88-0.96; the females 2.08-2.20 x 0.08-0.88. Head pale coloured. Pronotum yellow with brown markings in the form of two small rectangles centrally. In some specimens, each continues laterally as a short streak. Scutellum brown. Hemelytral pattern as reticulations of brown on a pale yellow background. Abdominal venter and legs yellow.

Structure.—The length of head to pronotum as 3:2. Width of head almost three and one third its length. The least interocular distance about one and a half times the posterior margin of eye. Pronotal width nearly five times the length. Pronotum triangular in shape with short lateral margins. Proportions of median lengths of pronotum, scutellum, and distance from apex of scutellum to apex of clavus as 7:8:33. Hemelytra smooth and shiny with fine hairs. Margins of fifth to seventh abdominal segments as in figs. 1a-1c. Free lobe of the eighth tergite has an emarginate distal margin with a short tuft of hairs at one end. Strigil dextral. Parameres as in figs. 1e and 1f.

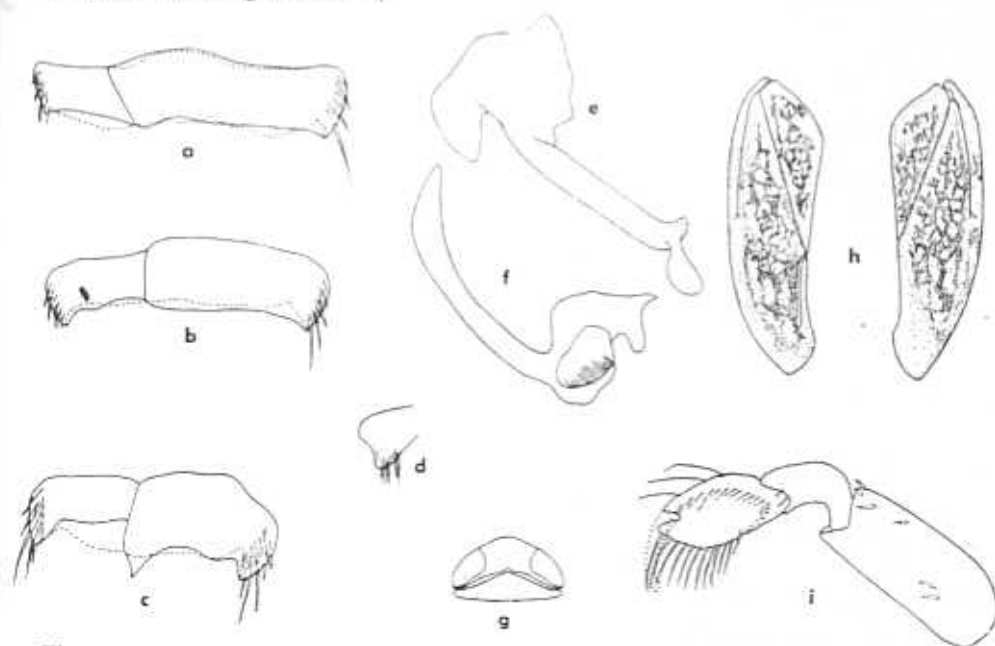


Figure 1. *Micronecta malayana* sp. nov. a-c fifth to seventh abdominal segments in ventral view, d free lobe of eighth tergite, e left paramere, f right paramere, g head and pronotum, h hemelytra, i foreleg of male.

Chaetotaxy of anterior leg and shape of claw as in fig. 1i. Middle leg: femur: tibia: tarsus: claw as 100: 34: 45: 31. Hind leg: femur: tibia: tarsus₁: tarsus₂ as 100: 68: 86: 34.

Discussion.—*Micronecta malayana* sp. n. is very similar to *Micronecta ludibunda* Bredd. from Java (Lundlad, 1933). However, they may be distinguished by a number of characteristics. In *Micronecta malayana*, the pronotum is triangular-shaped due to very short lateral margins; the hemelytral pattern consists of reticulations both on the clavus and corium; and the free lobe of the eighth tergite has an emarginate distal margin. *Micronecta ludibunda* differs in having longer lateral pronotal margins; the hemelytral pattern consists of distinct stripes; and the free lobe of the eighth tergite has an almost straight distal margin. The most important difference lies in the shape of the left paramere in the two species. In both

cases the left paramere is made up of a small distal lobe attached to the main proximal portion. In *Micronecta malayana* this distal lobe narrows markedly at the region of attachment, whilst in *Micronecta ludibunda* the sides of the distal lobe are sub-parallel. In addition, the apex of the proximal portion in *Micronecta malayana* is pointed and directed upwards. *Micronecta ludibunda* however, has a truncate apex to its proximal portion.

Both the brachypterous and macropterous forms are present. The macropterous form has a longer pronotum and also longer lateral margins, so that it does not appear triangular-shaped.

Micronecta malayana has been recorded in light-trap catches from Kahang, Johore and from shallow pools with peaty bottom. It appears to be a common species.

KEY TO THE MALAYAN SPECIES OF MICRONECTA

- | | | |
|--|------------------------|---|
| 1. Fore tibia and tarsus fused to form a tibiotarsus; elliptical carina on the head | <i>M. issa</i> | 2 |
| - Fore tibia and tarsus not fused together; head without an elliptical carina | | 2 |
| 2. Strigil absent | <i>M. thyesta</i> | 3 |
| - Strigil present | | 3 |
| 3. Elytra marked with punctate spots | <i>M. punctata</i> | 4 |
| - Elytra not marked with punctate spots | | 4 |
| 4. Large, length exceeds 3.5 mm. | <i>M. scutellaris</i> | 5 |
| - Length not exceeding 3.5 mm. | | 5 |
| 5. Free lobe of eighth tergite deeply angulate, sigmoid shaped | <i>M. quadririgata</i> | 6 |
| - Free lobe of eighth tergite not angulate | | 6 |
| 6. Elytra with entire longitudinal stripes; free lobe of eighth tergite with a slightly convex distal margin | <i>M. albifrons</i> | |
| - Elytra with a reticulate pattern; free lobe of eighth tergite with an emarginate distal margin | <i>M. malayana</i> | |

Agraptocorixa

The characters of this genus and its distribution have been given by Hutchinson (1940). He has also provided a key for the separation of species. There is only one species of this genus in Malaya, namely, *Agraptocorixa hyalinipennis* (F.). Though this species has a rather wide distribution (Lundblad, 1933), it is recorded for the first time in a single locality in Singapore.

Agraptocorixa hyalinipennis (F.).

Material examined.—Singapore: Lorong Chuan, 4-9-1961, 3 males, 9 females, nymphs; 8-11-1961, 3 females; 20-2-1962, 1 female.

The male measures 6.60-7.08 x 2.73-2.75; the female 7.50-8.45 x 2.88-3.10. General facies light or dark brown. Head, pronotum, and hemelytra light brown and hyaline. Markings absent except for two light patches near the posterior margin of the pronotum, and a darker patch near the inner basal angle of each clavus. The dark brown colour of the insect is due to the tergites which are visible through the transparent hemelytra. Abdominal venter and limbs light brown or yellow.

Agraptocorixa hyalinipennis (F.) is very similar to two other species, *Agraptocorixa sacra* Hutch. and *Agraptocorixa dakarica* Jacz. from Africa. Hutchinson (1940) has given in detail the differences between the three species based on the shape of the pronotum, the number of palpal pegs, the size of the strigil, the margin of the seventh abdominal tergite and the shape of the left paramere.

This is the first record of the species in Malaya. Lundblad (1933) has included it among the second most widespread group of aquatic Hemiptera. In addition to his distribution data, it has been recorded in Ceylon by Mendis and Fernando (1962). Also recorded from Burma, Ceylon, Formosa, India, Indo-China, Java, New Guinea and Sumatra.

Tropocorixa

Hutchinson (1940) created this as a sub-genus. It has representatives in both Eastern and Western Hemispheres. There is only a single species of the sub-genus in Malaya, namely, *Tropocorixa connexa* (Lundb.). It is described here from the material available.

Tropocorixa connexa (Lundb.).

Material examined.—Malaya: Johore, Kahang, 13-12-1961, 1 female; Malacca, Alor Gajah, 8-4-1960, 11 males, 13 females, nymphs; Bukit Sabukor Road, 6-4-1960, 18 males, 16 females; 6½ mi. Kuala Pilah, 7-4-1960, 2 males, 2 females; Negri Sembilan, Rembau, 31-10-1961, 3 males, 1 female; Perak, 15 m., Kuala Kangsar Road, 24-10-1961, 1 female.

The male measures 5.00-5.48 x 1.70-1.82; the female 5.12-5.75 x 1.66-2.21. General facies is dark brown. Pronotum crossed by seven dark brown unbroken bands, most of which extend to the edge of the disc. The clavus and corium are covered by dark brown vermiculate markings. Embolium, head and venter very light brown. Limbs yellow.

This species has been described in detail by Lundblad (1933). The Malayan species compares well with it except that the Malayan species is larger in size and has more paler pegs (22-23 pegs in the Sumatran species).

Agriptocorixa hyalinipennis and *Tropocorixa connexa* are the only two members of the Corixinae so far recorded in Malaya. There is no difficulty distinguishing the two species even superficially on the basis of the hemelytral pattern.

Tropocorixa connexa has been found in a sawah (temporary habitat). Fernando (1961a) has recorded it at light in Malacca and the author has found a single female at light in Kahang. This species has a wide distribution in Malaya. Also recorded from Burma and Sumatra.

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COMPLIMENTARY

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