

**Notes on aquatic and semiaquatic bugs
(Hemiptera: Heteroptera: Nepomorpha, Gerromorpha)
from Malesia with description of three new species**

Ping-ping CHEN¹⁾, Nico NIESER²⁾ & Ivor LANSBURY³⁾

¹⁾ Section of Entomology, Plant Protection Service, P.O.Box 9102, NL-6700 HC, Wageningen & c/o Dept. of Entomology, National Museum of Natural History – Naturalis, P.O.Box 9517, NL-2300 RA, Leiden, The Netherlands; e mail: p.chen@minlnv.nl

²⁾ c/o Dept. of Collections, National Museum of Natural History – Naturalis, P.O.Box 9517, NL-2300 RA, Leiden, The Netherlands; e-mail: nico.nieser@hotmail.com

³⁾ 10 Chilswell Road, Oxford OX1 4PJ, England, U.K.

Abstract. *Micronecta lumutensis* sp. nov. (Micronectidae) from Kalimantan (Borneo, Indonesia), *Enithares rinjani* sp. nov. (Notonectidae) from Lombok (Indonesia) and *Neusterensifer stysi* sp. nov. (Veliidae) from New Guinea are newly described. In addition, distributional records are given for three species of the genus *Enithares* Spinola, 1937, *Neusterensifer sepik* (Polhemus & Polhemus, 1994), and *Tenagobius kampaspe* (Kirkaldy, 1900). Morphological variability in *T. kampaspe* is discussed.

Key words. Heteroptera, Gerridae, *Tenagobius*, Micronectidae, *Micronecta*, Notonectidae, *Enithares*, Veliidae, *Neusterensifer*, new species, new records, Indonesia, Papua New Guinea

Introduction

While sorting out material in the Leiden and Oxford Museums we came across some specimens belonging to new or rarely reported species of aquatic and semiaquatic bugs which are described or reported in this paper.

In the Old World, the family Micronectidae is, apart from *Synaptonecta* Lundblad, 1933 (two species) and *Papuanecta* Tinerella, 2008 (four species, see TINERELLA (2008)), dominantly represented by the genus *Micronecta* Kirkaldy, 1897, which has numerous species in the Old World tropics, especially on the Asian continent, and the richness of species is gradually declining eastward except for a secondary centre of diversification in Australia (WRÓBLEWSKI 1968, 1972; ANDERSEN & WEIR 2004). CHEN et al. (2005) report 32 species of *Micronecta* from Malesia. However, the micronectine fauna of Borneo is poorly known, with only three reported species. As a comparison, eight species have been found in Sulawesi. In this paper, the fourth species of *Micronecta* is added to Kalimantan.

The back-swimmers of the genus *Enithares* Spinola, 1837, replace *Notonecta* Linnaeus, 1758, in the Old World tropics. There are numerous species of *Enithares* especially in tropical Asia, e.g. 45 in Malaysia (CHEN et al. 2005). LANSBURY (1968) described *Enithares lombokensis* Lansbury, 1968, from Lombok. A second, hitherto undescribed species of *Enithares* from Lombok is treated in this paper.

The microveliine genus *Neusterensifer* was erected by J. POLHEMUS & D. POLHEMUS (1994) to contain five species from New Guinea. Up till now this genus has been found in New Guinea and the adjacent small islands. Originally the name, which refers to the large projection on the proctiger of the male (Fig. 16), was incorrectly spelled *Neusterinsifer*. In a subsequent paper (D. POLHEMUS & J. POLHEMUS 2000a) six new species were added and the generic name emended to *Neusterensifer*. In two further papers (D. POLHEMUS & J. POLHEMUS 2000b, 2004) 18 more species were added, several of them occurring on the small islands surrounding New Guinea. We found the 30th species, collected in an area already sampled by the 'Polhemi'.

Material and methods

All measurements are given in millimetres. Length and width refer to the maximum value of the specified body part oriented horizontally, if not specified they refer to body length and width. Length of body is measured in dorsal view from anterior margin of vertex to apex of hemelytra in Nepomorpha and macropterous Gerromorpha, and from anterior margin of vertex to apex of abdomen in apterous and micropterous Gerromorpha.

Drawings were made with the aid of a camera lucida mounted on a Leitz binocular microscope or an Olympus monocular microscope.

The separate rows on locality label are indicated by a slash (/) and different labels are indicated by double slash (//). Explanations on labels are given between square brackets []. Specimens are deposited in the following collections:

NCTN Nico Nieser Collection, Tiel, The Netherlands;

OXUM Oxford University Museum of Natural History, Hope Entomological Collections, Oxford, U.K.;

RMNH National Museum of Natural History 'Naturalis', Leiden, The Netherlands.

The larvae in the material are indicated as 'Lxx', where 'xx' stands for the instar number.

Results

Micronectidae Jaczewski, 1924

Micronecta Kirkaldy, 1897

Micronecta lumutensis sp. nov.

(Figs. 1-5, 7-9)

Type locality. Indonesia, Kalimantan Timur Province, Pasir on Mount Lumut.

Type material. HOLOTYPE: ♂ 'INDONESIA: Kal/Tim [= Kalimantan Timur], Pasir / G. Lumut, 2 km E Rantaulayong / 1°36'36,8"S 115°58'38,7"E / E. Gassó Miracle 24-xi-2005 // GLBA 24-XI-2005 EGM25 / evergreen rain forest along / river; at light ML 19-21 hrs // NNM Leiden' (RMNH). Paratypes: 1 ♂ 2 ♀♀, same data as holotype (RMNH).

Description. Macropterous specimens; a small greyish *Micronecta*.

Dimensions (all in mm). Length ♂ 1.48-1.52, ♀ 1.45-1.50; width ♂ 0.69-0.72, ♀ 0.52-0.54; width of head ♂ 0.49-0.51, ♀ 0.52-0.54; synthlipsis ♂ 0.23-0.24, ♀ 0.23-0.24; width of eye ♂ ♀ 0.16; width of pronotum ♂ 0.54-0.57, ♀ 0.56-0.58.

Colour. Dorsally light brown, eyes grey, head yellowish with large brown spot on frons (in one female paratype reduced to two smaller points) and dark brown transverse grooves on rostrum, legs and posterior and lateral margins of pronotum yellowish; ventral side greyish, becoming sordid yellowish caudally. Pronotum shining, unmarked except for lighter posterior and lateral margins. Hemelytra shining with usual hyaline spot basally on clavus, hyaline stripe distally of apex of clavus indistinct; apex of clavus darker brown, darker marks on corium arranged in three interrupted longitudinal stripes, inner angle of corium with a single, variably developed, elongate spot; left membrane hyaline with outer half smoky.

Structural characteristics. Ratio length/width of body: male 2.2-2.5, female 2.1. Head narrower than pronotum, synthlipsis distinctly wider than posterior width of an eye, ocular index: male 1.77-1.78, female 1.59-1.60. Pronotum dorsally convex, about two and a half times as wide as its median length (male 2.7, female 2.4-2.5). Hemelytra appearing smooth at lower magnifications, with very small spines most distinctly on corium where they are arranged in longitudinal rows, and along membranul suture. Spines on lateral sides of abdominal segments as follows: V, 2 short, 1 long; VI, 2-3 short, 1 intermediate, 1-2 long; VII,



Figs. 1-6. 1-5 – *Micronecta lumutensis* sp. nov., ♂ (paratype). 1 – fore leg; 2 – apex of abdomen in dorsal view; 3 – strigil; 4 – free lobe of left part of tergite VIII; 5 – right paramere. 6 – *Micronecta skutalis* Nieser & Chen, 1999, right paramere. Scales = 0.1 mm except Fig. 2 = 0.25 mm.

3-4 short, 1 intermediate, and 1 or 2 long; VIII, 5 short, 2 very long, bristle-like. Length of fore leg segments (femur : tibia : tarsus, all in mm): 0.19 : 0.07 : 0.11 in male and 0.20 : 0.20 in female; length of middle and hind leg segments (femur : tibia : tarsus : claw): middle leg 0.49 : 0.17 : 0.24 : 0.17, hind leg 0.31 : 0.25 : 0.26 : 0.12 : 0.07.

Male. Fore leg (Fig. 1); femur in basal part with two spines and apically with 2-3 small spines; tibia with three spines near distal margin; pala with three long dorsal hairs, palm with about 15 bristles in dorsal and about 16 in ventral row, claw simple, clavate. Abdomen with prestrigilar lobe as in Fig. 7, strigil (Figs. 2 and 3) small, at a magnification of 400 × without distinct teeth, median lobe of sternite VII short and acute with four bristles (three in paratype on Fig. 8). Free lobe of left part of segment VIII (Fig. 4) with rounded apex with 9-10 bristles; plectrum on right part of segment VIII very finely wrinkled, about 40 thick hairs in a double row along inner margin between plectrum and apex of right part of segment VIII (Fig. 2). Shaft of right paramere (Fig. 5) gradually widened towards apex, left paramere (Fig. 9) apparently with apical impression.

Female. With the same size and general structure as the male except for the usual differences in sexual characteristics.

Brachypterous form unknown.

Differential diagnosis. With the key to West Indonesian males of *Micronecta* (NIESER & CHEN 1999), this species runs to *M. skutalis* Nieser & Chen, 1999, from Sabah (Malaysia) and Palawan (the Philippines) (NIESER & CHEN 2003). The latter species is of about the same size and, due to a similar hemelytral pattern, looks very similar. Male fore leg and prestrigilar lobe of *M. skutalis* and *M. lumutensis* sp. nov. are also very similar. However, the right paramere of the male of *M. skutalis* is straight with more or less parallel margins, whereas in *M. lumutensis* sp. nov. it is slightly curved and somewhat widened at the apex (Figs. 5 and 6); the left paramere of *M. skutalis* is parallel sided, whereas in *M. lumutensis* sp. nov. it has a widened apex. Most other South East Asian and Malesian species of *Micronecta* are distinctly larger than *M. lumutensis* sp. nov. Other species of similar size to *M. lumutensis* sp. nov. are *M. acuta* Lundblad, 1933, from Java, which is slightly smaller (1.1-1.3 mm body length) and lacks a strigil; *M. lemnae* Nieser, 2000, from Thailand, West Malaysia and Yunnan (NIESER et al. 2005) is known only from the brachypterous form, which is slightly smaller (1.2-1.3 mm) and has a characteristic, apically lobed right paramere.

Etymology. Named after its type locality, Mount Lumut.

Bionomics. Collected at light in an evergreen rain forest along a river.

Distribution. Indonesia, Eastern Kalimantan.

Notonectidae Latreille, 1802

Enithares Spinola, 1837

Enithares elongata Lansbury, 1973

Enithares elongata Lansbury, 1973: 226.

Material examined. INDONESIA: IRIAN JAYA: 'Neth.Ind.- American / New Guinea Exped. / 1938-39. / Hollandia 30.vii 38 / L.J. Toxopeus // [handwritten on backside of label:] bergbeek donkere hoek met veel rottend blad [= mountainous stream, dark edge with a lot of rotting leaves]', 1 ♂ 2 ♀♀ (1 ♀ teneral) 2 L5 (RMNH).

Note. This species was only known from its type locality Mt. Nomo south of Bougainville, West New Guinea (LANSBURY 1973). Hollandia was the name of Jayapura during Dutch rule.

Enithares lombokensis Lansbury, 1968

Enithares lombokensis Lansbury, 1968: 416-418.

Enithares lombokensis: NIESER & CHEN (1992): 34-35.

Material examined. **INDONESIA:** NUSA TENGGARA: LOMBOK: 'N Lombok / Mt Rinjani: Senaru / waterfall alt. m 0470 / 21.x.1991 / Krikken, Huijbregts, de Vries // multistr evergr forest / (remnant) / rivulets from waterfall', 1 ♀ (RMNH). 'Flores, Desa Detubawa / 10 km NE of Ende along Maumere road / alt.ca. 100m, 12.04.1986 / A.L. van Berge Henegouwen / S. Pariwono // hilly area with monsoon forest / pools in dry river bed', 1 ♂ (NCTN); FLORES: 'Flores, Wolotolo 20 km / NE of Ende along Maumere / road, 450m 12.04.1986 A.L. van / Berge Henegouwen, S. Pariwono // cultivated area, irrigation / system in sawah, surrounded by / pieces of monsoon forest, from / small brook' 1 ♀ (NCTN).

Note. This species is known from Lombok and Flores but has as yet not been found on the islands in between.

Enithares rinjani sp. nov.

(Figs. 10-13)

Type locality. Indonesia, Nusa Tenggara Province, Lombok Island, Mt. Rinjani, Senaru.

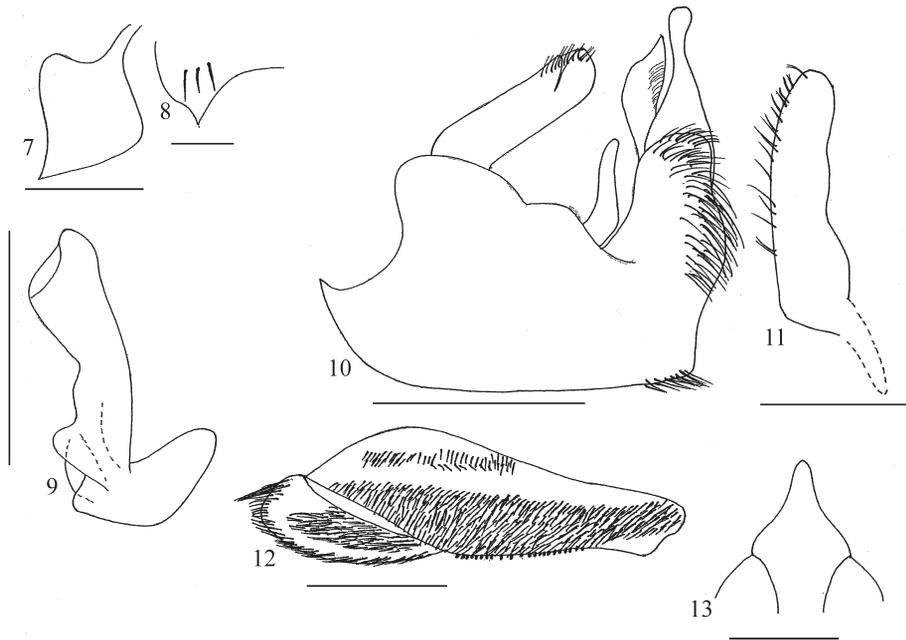
Type material. HOLOTYPE: ♂, 'INDONESIA: N Lombok / Mt. Rinjani: Senaru / waterfall alt. M 0470 / 21.x.1991 / Krikken, Huijbregts, de Vries // multistr evergr forest / (remnant) / rivulets from waterfall' (RMNH). Unique specimen, lacking left fore tibia and tarsus.

Description. Medium sized with greatest width at humeral angles of pronotum.

Dimensions (all in mm). Length 10.55, humeral width of pronotum 4.10, width of head 3.22, anterior width of vertex 0.89, synthlipsis 0.55.

Colour. Vertex pale yellowish, eyes castaneous. Pronotum pale yellowish with anterior third medium brown; pronotal fovea brown. Scutellum dark brown, posterior two fifths pale yellowish. Hemelytra anteriorly pale yellowish and posteriorly dark brown to blackish. Pro- and metasternum yellowish, mesosternum mostly brown. Abdominal ventrites II-V and anterior half of ventrite VI blackish, posterior half of ventrite VI and ventrites VII and VIII yellowish; median keel and connexiva yellowish, hair fringes black.

Structural characteristics. In dorsal view, anterior margin of vertex very slightly protruding in front of eyes. Median length of head half its width (1.58 / 3.22); somewhat less than twice the anterior width of vertex (1.58 / 0.89) and slightly longer than median length of pronotum (1.58 / 1.27). Pronotum: humeral width 3.2 times its median length (4.10 / 1.27), lateral margins divergent posteriorly, hind margin gently sinuate; prothoracal fovea well visible in dorsal view, its dorsal margins diverging behind eyes, its ventral margin in lateral view anteriorly rounded. Hemelytra: embolium in ventral view only slightly expanded anteriorly; nodal furrow nearly straight, its distance to membranous suture less than its length (0.30 / 0.56). Fore trochanter posteriorly rounded without ventral nodule; fore tibia and tarsus with dense pilosity and somewhat thickened, otherwise not modified. Middle trochanter and femur ventrally with extensive pilosity (Fig. 12). Connexival segments I-III ventrally smooth. Metasternal xiphus (Fig. 13) with apically convergent margins ending in narrow tip. Genital capsule (Fig. 10): lateral arms of basal plate elongate with apical knob, parameres (Fig. 11) elongate.



Figs. 7-13. 7-9 – *Micronecta lumutensis* sp. nov., ♂ (paratype). 7 – prestigilar lobe; 8 – median lobe of abdominal sternite VII; 9 – left paramere, lateral view. 10-13 – *Enithares rinjani* sp. nov., ♂ (holotype). 10 – genital capsule; 11 – right paramere, mesal view; 12 – trochanter and femur of middle leg, ventral view; 13 – metasternal xiphus.

Female unknown.

Differential diagnosis. This species does not run well in the key by LANSBURY (1968); the options are *E. bergrothi* Montandon, 1892, *E. hebridensis* Lansbury, 1968, or *E. rogersi* Distant, 1911. However, males of all the three species have much shorter and more or less plump parameres. *Enithares lombokensis* Lansbury, 1968, with which this new species was collected together, has very small parameres, a genital capsule with bulky lateral arms of the basal plate, and in addition, its metaxiphus has lateroapical earlike extensions, appearing three pronged apically.

Etymology. Rinjani is a noun in apposition and refers to the type locality, Mount Rinjani, in northern Lombok.

Bionomics. The specimen has been found in a rivulet at the base of a waterfall.

Distribution. Indonesia, north of Lombok Island.

Enithares stylata Lansbury, 1968

Enithares stylata Lansbury, 1968: 425-426.

Material examined. INDONESIA: IRIAN JAYA: 'Neth.Ind. - American / New Guinea Exped. / Rattan Camp 1150 m / 14.ii.1939 L.J. Toxopeus', 1 ♂ 4 ♀♀ 5 LS; 'Neth.Ind. - American New Guinea Exped. / Sigi Camp 1300m / 15.ii.1939 L.J. Toxopeus / in moerassig kreekje [= in marshy streamlet]', 1 ♂; same locality, '20.ii.1939 L.J. Toxopeus', 1 ♂ (all RMNH).

Note. This species was only known from an area around the type locality in north-eastern New Guinea (LANSBURY 1968), and has now been found in West New Guinea. All localities known so far are situated over 1000 m a.s.l.; apparently this species is distributed throughout the mountains of New Guinea.

Veliidae Amyot & Serville, 1843

Neusterensifer J. Polhemus & D. Polhemus, 1994

Neusterensifer J. Polhemus & D. Polhemus, 1994: 67-68 (original incorrect spelling).

Neusterensifer: D. POLHEMUS & J. POLHEMUS (2000a: 113) (justified emendation).

Neusterensifer sepik J. Polhemus & D. Polhemus, 1994

Neusterensifer sepik J. Polhemus & D. Polhemus, 1994: 72-74.

Neusterensifer sepik: D. POLHEMUS & J. POLHEMUS (2000a): 115.

Material examined. PAPUA NEW GUINEA: SEPIK: 'PNG: Sepik P. / river nr. Dagua / Misson R. Prior // Edge of river / 29.XI.1995', 11 ♂♂ 15 ♀♀ (OXUM, 2 ♂♂ 2 ♀♀ NCTN).

Note. This species is only known from a restricted area near Wewak in East Sepik Province (POLHEMUS & POLHEMUS 1994, 2000a).

Neusterensifer stysi sp. nov.

(Figs. 14-18)

Type locality. Papua New Guinea, East Sepik Province, Passam near Wewak.

Type material. HOLOTYPE: ♂ (micropterous), PAPUA NEW GUINEA: SEPIK: 'P.N.G. E. Sepik / P.R. Prior // Passam 400m / village S. Wewak on / Sepik hghwy. 30.xi. / 1995' (OXUM). PARATYPES: 1 ♂ 1 ♀ (micropterous), same data as holotype (OXUM).

Description. Micropterous specimens.

Dimensions (all in mm). Length ♂ 1.90-2.01, ♀ 2.18; width ♂ 0.83-0.88, ♀ 0.89.

Colour (Fig. 14). Ground colour dull dark greyish brown to blackish. Head: rostrum yellowish to light brown with darker median stripe, apical segment shining black; bucculae yellowish; clypeus shining black and mostly covered with silvery pubescence; a band of silvery pubescence from clypeus to inner angle of eye; antennal sockets and eyes castaneous; vertex dull grey brown to dark grey, median groove black. Pronotum: anterior quarter medially half dark greyish brown, second quarter medially yellowish brown, lateral parts of anterior half covered by thick silvery pubescence; posterior half dull dark grey, concolorous with metanotum; anterolateral angles of metanotum with silvery pubescence. Tergites II-VI dull grey, VII and VIII medium brown to grey; tergites II-VIII laterally with patches of variable size of silvery pubescence, which are nearly absent on tergite IV. Connexiva medium to dark brown. Venter dark grey, medially variably medium brown. Antennae and legs yellowish with infuscated stripes and apices of segments.

Structural characteristics. Body dorsally covered with appressed golden brown pilosity and sparse longer semi-erect brownish setae. Width of head 1.3 times its length (0.90 / 0.62); width of eye about half the width of interocular space (0.15 / 0.27). Lengths of antennal segments I : II : III : IV equal to 0.31 : 0.22 : 0.37 : 0.47, with short and not striking pilosity except for

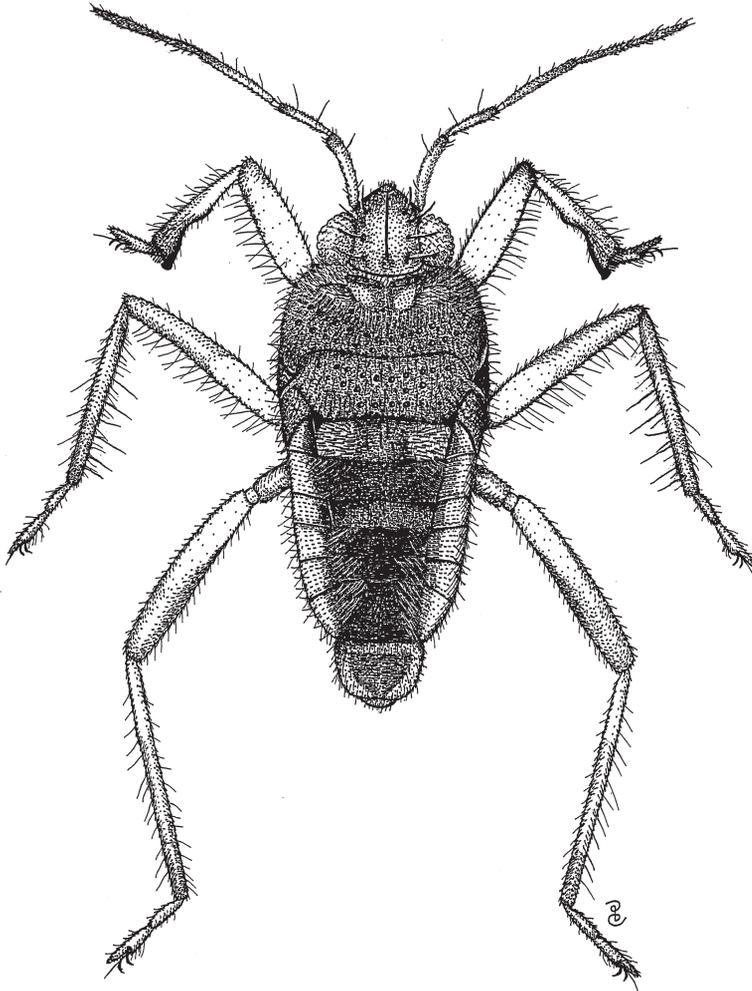
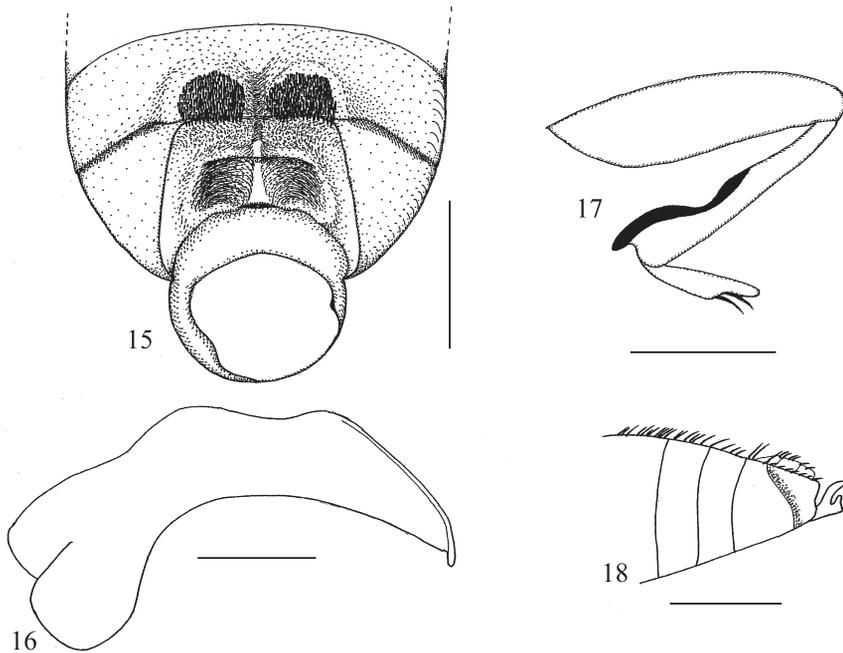


Fig. 14. *Neusterensifer stysi* sp. nov., ♂ (paratype), habitus, body length 1.90 mm.

1-3 longer setae on segment I and 1-2 on segment II. Pronotum covering mesonotum (Fig. 14), its width 2.3 times its median length (0.81 / 0.35), with transverse groove about halfway its length, anterior half covered by very thick pilosity obscuring the underlying pits, posterior half of pronotum and metanotum with well visible pits; lateral margins of prothorax rounded, humeri not developed. Median length of metanotum 0.27. Median length of tergites II-VII equal to 0.15 : 0.13 : 0.11 : 0.12 : 0.13 : 0.25. Lengths of leg segments (femur : tibia : tarsus I : tarsus II), foreleg 0.53 : 0.48 : 0.24, middle leg 0.73 : 0.68 : 0.15 : 0.24, hind leg 0.80 : 0.99 : 0.19 : 0.25.



Figs. 15-18. *Neusterensifer stysi* sp. nov. 15-17 – ♂ (paratype). 15 – apex of abdomen, ventral view, segment IX and proctiger removed; 16 – process of proctiger; 17 – fore leg. 18 – ♀ (paratype), apex of abdomen, lateral view. Scales: Figs. 15 and 17 = 0.25 mm, Fig. 16 = 0.1 mm, Fig. 18 = 0.5 mm.

Male. Fore tibia with a subapical indentation (Figs. 14 and 17); tibial comb 0.57 times as long as tibia (0.27 / 0.47). Abdomen: ventrites IV-VI and anterior half of ventrite VII with median groove becoming deeper posteriorly; ventrite VI in posterior half, adjacent to the median groove with a pair of tumescences each bearing a dense tuft of short black setae (Fig. 15); ventrite VII medially with a large tumescence about half as wide as the ventrite, its caudal half with transverse impression anteriorly and posteriorly demarcated by a rim; ventrite VIII flattened.

Female. Connexiva IV-VII dorsally with double row of long erect bristles. Gonocoxae expanded with broad basal and narrow apical part (Fig. 18).

Macropterous form unknown.

Differential diagnosis. *Neusterensifer* is a very speciose genus in New Guinea and adjacent islands (POLHEMUS & POLHEMUS 1994, 2000a,b, 2004). Males are identified primarily by the process of proctiger and the abdominal venter. The new species is very similar to *N. cyclops* J. Polhemus & D. Polhemus, 1994, with a nearly identical pattern of silvery hairs on the thoracic and abdominal dorsum and the identical structure of ventrite VII and process of proctiger in the male. However, the male of *N. cyclops* is slightly smaller (1.87 mm long), the ratio of antennal segments is different (0.21 : 0.19 : 0.33 : 0.40), the fore femur is without subapical

indentation and, according to one of the peer reviews, the tibial comb on the foreleg is 0.50 tibial length in *N. cyclops* and 0.57 in *N. stysi* sp. nov., and the raised patches on ventrite VI have a more ovate shape in *N. cyclops* than in *N. stysi* sp. nov. *Neusterensifer sepik*, which occurs in the same area as *N. stysi* sp. nov., has a somewhat similar process of proctiger in the male. However, males of *N. sepik* have a distinct row of black bristles on the fore femur which are lacking in *N. stysi* sp. nov. Females of *N. sepik* have the apex of connexiva pointed whereas it is rounded in *N. stysi* sp. nov.

Etymology. With pleasure we dedicate this species to our colleague and friend, Prof. Pavel Štys, for his extensive and great contributions to heteropterology.

Distribution. Northern Papua New Guinea.

Gerridae Leach, 1815

Tenagonus Stål, 1855

Tenagonus kampspe (Kirkaldy, 1901)

Gerris Kampspe Kirkaldy, 1901: 804.

Tenagonus kampspe: HUNGERFORD & MATSUDA (1958): 386-388, pl.1 fig. 5, pl. 7 fig. 4.

Tenagonus (Tenagonus) kampspe: LANSBURY (1993): 22.

Material examined. PAPUA NEW GUINEA: MOROBE: 'New Guinea, Kodoka on rd. / Popondetta 1000' 5 / km past Oivy Ridge / 30.iv.1989 R. Prior', 2 ♂♂ (apterous), 2 ♂♂ 1 ♀ (macropterous). EAST SEPIK: 'PNG East Sepik / R. Salamin 29.xi. / 1995 R. Prior', 3 ♀♀ (apterous) (OXUM).

Remarks. The apterous males are somewhat longer (4.6 mm) than the length (4.2 mm) indicated by HUNGERFORD & MATSUDA (1958). Moreover, in all the males we have examined the spines on ventrite VII are pointed ventrally, whereas in both the text and the figure of HUNGERFORD & MATSUDA (1958) these spines point caudally roughly in the same plane as the longitudinal axis of the body. Unfortunately we did not get a reaction on our request for the loan of some specimens from the type series. However, as the relative length of antennal and leg segments, the ratios of the abdominal tergites, and the colour pattern, notably of the apterous female, agree very well with the redescription by HUNGERFORD & MATSUDA (1958), we can hardly consider our material as an undescribed species but as *T. kampspe*. This species is only known from the south-eastern peninsular part of New Guinea and from West New Britain.

Acknowledgements

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