

# Records of aquatic bugs (Heteroptera, Gerromorpha, Nepomorpha) mainly from Northeast Thailand, with descriptions of four new species<sup>1</sup>

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**Abstract:** Records of Nepomorpha and Gerromorpha from Thailand, mainly Sakon Nakhon Province, are presented and four species are described as new: *Fischerotrephes heissi* nov.sp. and *F. maculatus* nov.sp. (Helotrephidae) from West Thailand, *Strongylovelia paitooni* nov.sp. and *S. sujini* nov.sp. (Veliidae) from Northeast Thailand. Three new records for Thailand: *Micronecta ornitheia* CHEN et al. 2005 (Micronectidae), *Paraplea frontalis* (FIEBER 1844) (Pleidae) from Sakon Nakhon Prov. (Northeast), *Heleocoris strabus* MONTANDON 1879 (Naucoridae) from Kanchanaburi (West) and Loei (Northeast) Provinces. The macropterous flightless form of *Micronecta ornitheia* is diagnosed.

**Key words:** Gerromorpha, Nepomorpha, new records, new species, Thailand.

## Introduction

In the last decade the study of aquatic bugs of Thailand has been intensive. Many papers were published in the project "Heteroptera of Thailand" which covers a broad scale of the aquatic and semiaquatic groups and a number of terrestrial bugs. The results can be found in the Newsletter of the project "Amemboa" no.1-3, and papers scattered in several European and American journals. However, the faunistic element of aquatic bugs in northern Thailand is better known than in the other areas. So far only a few actual records from the northeast of Thailand have been published. The junior author has worked on aquatic ecology in the northeast, especially in Sakon Nakhon Province, for many years and collected aquatic and semiaquatic bugs during the process. The purpose of this paper is to summarize these collections, and present results of the project "Diversity of water bugs at Thong Pah Phum forest area" (see Acknowledgements). In addition, the paper will add to our comparatively poor knowl-

edge of the faunistics of water bugs in Northeast and West Thailand and contribute to the project "Heteroptera of Thailand". A total of 47 species of aquatic and semiaquatic bugs is treated in this paper, among them, three species are recorded as new to Thailand, and four species are new to science.

LUNDBLAD (1933) indicated that the genital segments of the veliid males are very variable in structure and offer the most useful characters for the separation of species, which is agreed upon by ANDERSEN (1982). So far the identification to the species of *Strongylovelia* is based mainly on the external characters of female, e.g. size and form of body, pilosity, and cuticular modifications, etc. Except for parameres, there is so far no literature available about male genital characters of *Strongylovelia*, mostly due to their very small size. ANDERSEN (1981, 1982) indicated that the genital structures in Veliidae, especially the vesica are strongly modified. LUNDBLAD (1936) is the first one to examine the structures of the vesical scler-

<sup>1</sup>With great pleasure we dedicate this publication to our friend and fellow heteropterist Dr. Ernst Heiss, on occasion of his 70<sup>th</sup> birthday.

rites in Vellidae in his revision of the Old World species of *Rhagovelina*. Later TAMANINI (1947) made extensive use of the structure of the vesical sclerites in his revision of the genus *Velia*. We have studied the male genital structures of several species of *Strongylovelia*. It shows the differences according to species, which also leads to the recognition to species groups by the structural similarity. However, it is still premature to draw a conclusion on this point, further study is required for a better understanding, e.g. the development of genital structure in the various veliids groups and the role they could play in the biosystematics. The vesical sclerites of *Strongylovelia sujini* nov.sp. are discussed in this paper as an example of these structures in the genus *Strongylovelia*.

## Materials and methods

Measurements are in mm, based on five specimens of each sex, if available, and presented as the mean ( $\bar{x}$ ) sometimes followed by the standard deviation of the sample (s), and/or the value of the holotype between [ ]. When only two specimens are available size is presented as the range of these two. The width of interoculus in *Strongylovelia* is measured between the anterior angles of eyes, where it is narrowest. Apart from material collected by the third author and B. Boonsoong some specimens collected by the first two authors in Northeast Thailand are included. Depositories are only cited for type material. Other specimens are deposited in KKUT unless otherwise stated.

### The following abbreviations are used:

apt. . . . . apterous form  
 a.s.l. . . . . above sea level  
 brachy. . . . . brachypterous form  
 Distr. . . . . District  
 Lv. . . . . larva(e)  
 macr. . . . . macropterous  
 Nat. . . . . Natural  
 Prov. . . . . Province

SE Asia stands for continental Southeast Asia: Thailand, Indochina, West Malaysia and Singapore.

### Depositories

CCBC . . . P.-p. Chen Collection, Beijing, China.

KKUT . . . Department of Biology, Faculty of Science, Khon Kaen University, Thailand.

NCTN . . . Nieser Collection, Tiel, The Netherlands.

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

ZMAN . . . Zoological Museum, University of Amsterdam, Amsterdam, The Netherlands.

## Results

### NEPOMORPHA Popov 1971

#### Family Nepidae LATREILLE 1802

##### 1. *Cercotmetus asiaticus* AMYOT & SERVILLE

*Cercotmetus asiaticus* AMYOT & SERVILLE 1843: 441.

*Cercotmetus asiaticus*; LANSBURY 1973: 89-92 (re-description).

Material examined: Thailand: Sakon Nakhon Prov., Phuphan Nat. Park, Ma-Ngaew stream, 12.X.1997, leg. N. Sangpradub, 1 ♂

Distribution: China (Yunnan), Thailand, Malaysia and the Sundaland part of Indonesia (LANSBURY 1973; NIESER et al. 2005). In Thailand not uncommon in virtually stagnant edges of streams under overhanging plants or plant roots or floating between plant debris.

##### 2. *Cercotmetus brevipes brevipes* MONTANDON

*Cercotmetus brevipes* MONTANDON 1909: 65.

*Cercotmetus brevipes*; LANSBURY 1973: 92-95 (re-description).

*Cercotmetus brevipes brevipes*; LANSBURY 1975: 17-19.

Material examined: Thailand: Sakon Nakhon Prov., Phu Phan Nat. Park, Kang Mod Daeng stream, 20.XII.1997, leg. N. Sangpradub, 1 ♂. Chiang Rai Prov., Muang Distr., Muang Baan Tambon lake just outside of Mae Fah Luang University campus, 24.X.2004, leg. P. Chen & N.

Nieser, small natural lake in agricultural area, 1000 x 800 m, edges grass, 1♂ (NCTN). Indonesia: Central Sumatra, Sohilan Mountain, 1907, leg. Kleinoy & Zwaan, identified by Montandon in 1911, 1♂ (ZMAN); Sumatra: Sumatera Utara Prov., Bohorok, Glugun stream, VIII.1916, leg. J.E.A. den Doop, Small stream with sand/loam bottom on terrace of Bohorok, also cited by LANSBURY (1973), 1♀ (ZMAN).

Distribution: From eastern India (Bengal) through SE Asia to Southwest China, the Philippines and Borneo. LANSBURY (1975) described *C. brevipes australis* from North Australia. Throughout Thailand, it has been found regularly in ponds and small lakes. This is somewhat contrary to *C. asiaticus*, which is regularly found in quiet parts of streams.

Remark: The hair fringes on the hind tibia and lateroventrally on tergites VII are variable. They are very strongly developed in the specimen from Sakhon Nakhon, this is accentuated by adhering dirt and gives the impression of a different species. The specimen was compared with the males from Chiang Rai and Sumatra (the type locality) cited above, and no differences were found in measurement ratios and structural characteristics, including the paramere.

### 3. *Ranatra lansburyi* CHEN, NIESER & HO

*Ranatra lansburyi* CHEN, NIESER & HO 2004: 89. Material examined: Thailand: Sakon Nakhon Prov., Phu Phan Nat. Park, ICS-stream, 7.X.1998, leg. N. Sangpradub, 1♀; Kanchanaburi Prov., Thongphaphon Distr., Ban Rypa, Kayen stream, 10.V.2002, leg. N. Sangpradub, 1♀.

Distribution: Northern Thailand and Southwest China (Yunnan).

Remark: The length of the hind femur of these specimens agrees with specimens of *R. lansburyi* but males are necessary for a definitive identification.

### Family Belostomatidae LEACH 1815

#### 4. *Diplonychus rusticus* (FABRICIUS)

*Nepa rustica* FABRICIUS 1781: 333. *Sphaerodema rusticum*; LUNDBLAD 1933: 55-61 (redescription). *Diplonychus rusticus*; POLHEMUS 1995: 651 (synonymy). Material examined: Thailand: Sakon Nakhon Prov., constructed wetland for water treatment

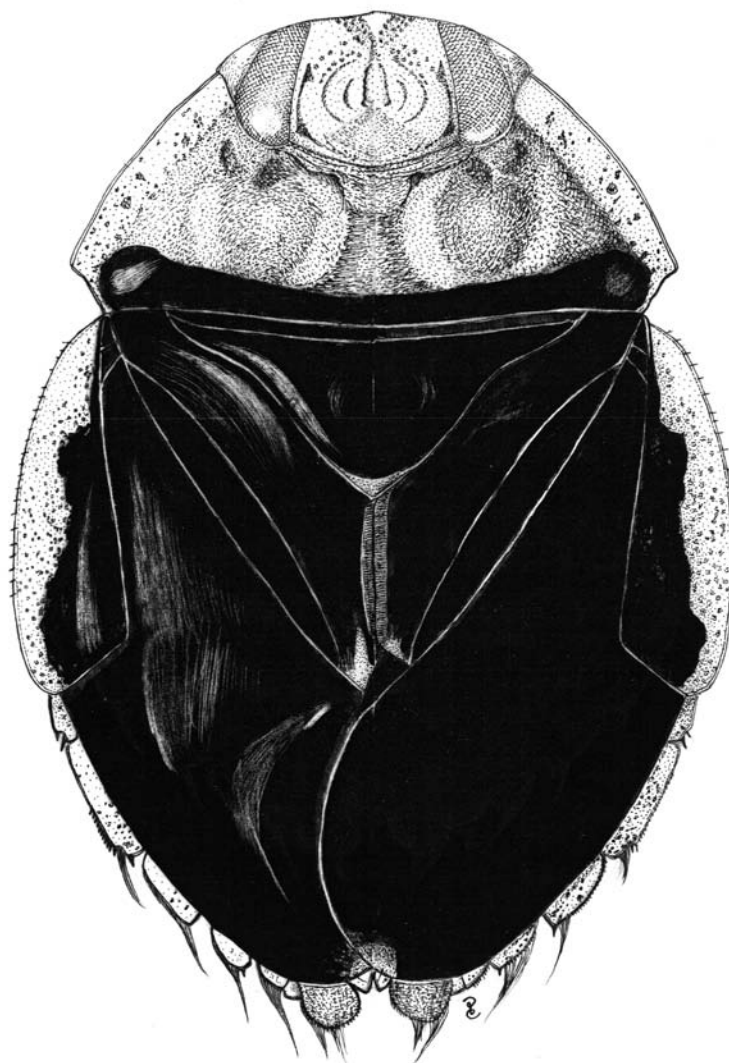


Fig. 1: *Heleocoris strabus* MONTANDON, male, body length 11.5 mm.

near Nong Haan, overgrown marshy pond, 23.XI.1995, leg. N. Nieser, 1♂ 4♀ (NCTN); Sakhon Nakhon Prov., Huay Wangtam, small reservoir, 20.III.1999, leg. N. Sangpradub, 1♀.

Distribution: From India and Sri Lanka through Southeast Asia to China, South Japan, The Philippines and Indonesia eastward to Sulawesi. In Thailand this species is commonly found in ponds with rich to dense aquatic vegetation.

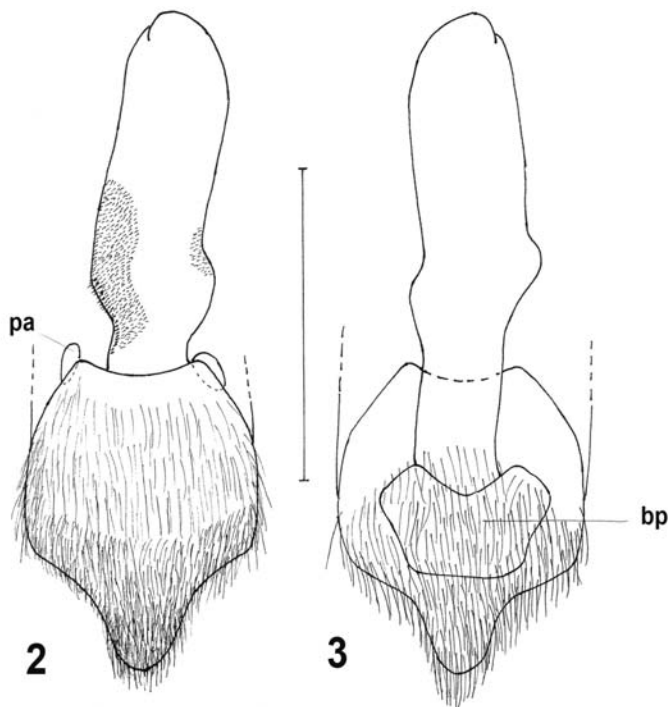
### Family Aphelocheiridae FIEBER 1851

#### 5. *Aphelocheirus grik* POLHEMUS & POLHEMUS

*Aphelocheirus grik* POLHEMUS & POLHEMUS 1989: 218-220.

Material examined: Thailand: Kanchanaburi Prov., Thongphaphom District, Ban Toatan, Kayen stream, 11.V.2002, leg. N. Sangpradub, 2♂♂ 2♀♀ brachy.

Distribution: Thailand and West Malaysia.



**Figs 2-3:** *Heleocoris strabus* MONTANDON, male. Base of pygophore and aedeagus. (2) dorsal view (3) ventral view. scale 1 mm, bp = basal plate; pa = paramere.

#### Family Naucoridae LEACH 1815

##### 6. *Ctenipocoris asiaticus* MONTANDON

*Ctenipocoris asiaticus* MONTANDON 1897: 373-376.

Material examined: Thailand: Loei Prov., Phukradueng Distr., Phu Kradung Nat. Park, Wang Kwang stream, 27.II.1996, leg. N. Sangpradub, 3♂♂ 6♀♀.

Distribution: Southeast Asia. In Thailand it is common at quiet edges of streams, also at edges of ponds, usually at muddy places.

##### 7. *Heleocoris strabus* MONTANDON, first record (Figs 1-3)

*Heleocoris strabus* MONTANDON 1897: 372-373.

Material examined: Thailand: Kanchanaburi Prov., Thongphaphom District, Ban Pakpilock, Kayen stream, 14°37'54.3"N, 98°34'17.4"E, 25.II.2002, leg. N. Sangpradub, 1♀ macr.; Loei Prov., Phu Luang District, Nam Jun stream (tributary of Loei River), 14.XI.2004, leg. B. Boonsoong, 1♂ 1♀ macr., First record for Thailand.

Distribution: Myanmar (Tenasserim), Thailand.

Remark: We have seen samples of this species from various localities in Thailand, this species is apparently widespread in streams in hilly and mountainous areas. Although we were not able to study the holotype from the Natural History Museum in Genua (Italy), however, we have little doubt of its identity due to a) The locality in

Kanchanaburi is quite close to the type locality in Tenasserim; b) in view of the fact that this species is apparently quite common and widespread; and c) it agrees well with the description by MONTANDON (1897).

##### 8. *Gestroiella limnocoroides*

MONTANDON

*Gestroiella limnocoroides* MONTANDON 1897: 371-372.

Material examined: Thailand: Kanchanaburi Prov., Thong Pha Phom District, Ban Taotan, Kayen stream, 14°38'54.6"N, 98°34'42.0"E, 150m a.s.l., 11.V.2001, leg. N. Sangpradub, 1♀ brachy., 3 Lv.; Loei Prov., Phu Luang District, Nam Jun stream (tributary of Loei River), 14.XI.2004, leg. B. Boonsoong, 1♂ brachy., 1Lv.

Distribution: Myanmar, northern Thailand.

Remark: These two specimens are much smaller than eight specimens from northern Thailand (Chiang Mai, Chiang Rai and Mae Hong Son): body length and greatest width of the male from Loei, and the female from Kanchanaburi are respectively: 15.7/9.0 mm, and 14.0/7.4 mm; whereas the smallest specimen from northern Thailand has a length of 18.0 and a width of 10.5 mm. However, structurally, including the male genitalia, no differences between all these specimens were found.

##### 9. *Naucoris scutellaris* (STÅL)

*Naucoris scutellaris* STÅL 1858: 266.

*Naucoris scutellaris*; LUNDBLAD 1933: 63-67 (re-description).

*Thurselinus scutellaris*; ZETTEL 2001: 1090.

*Naucoris scutellaris*; CHEN et al. 2005: 127.

Material examined: Thailand: Kanchanaburi Prov., Thongphaphom District, Ban Taotan, Kayen stream, 7.XII.2001, leg. N. Sangpradub, 1♀.

Distribution: From India and Sri Lanka through Southeast Asia to Philippines and Sulawesi (NIESER & CHEN 1999; ZETTEL 2003a). In Thailand common at the edges of various stagnant waters including virtually stagnant margins of streams.

##### 10. *Naucoris sigaloeis* LA RIVERS

*Naucoris sigaloeis*; LA RIVERS 1974: 4-5.

Material examined: Thailand: Khon Kaen province, Muang District, Namphon River, 12 km E of Khon Kaen city, downstream from Wat Tha Song Koorn, fishery "pond", polluted, 28.XII.1994, leg. P. Chen & Tasanee, 1♂ 3♀ brachy. (NCTN).

Distribution: Previously only known from the type locality, Bung Boraphet lake in Nakhon Sawan Province, Thailand.

#### Family Micronectidae JACZEWSKI 1924

##### 11. *Micronecta haliploides* HORVÁTH

*Micronecta haliploides* HORVÁTH 1904: 57.

*Micronecta haliploides*; NIESER 2000: 285 (key to Thai species).

Material examined: Thailand: Sakon Nakhon Prov., constructed wetland for water treatment near Nong Haan, overgrown marshy pond, 23.XI.1995, leg. N. Nieser, 1♂ 2♀ brachy. (NCTN); Sakon Nakhon Prov., Phu Phan District, Preechasuksan Reservoir, 17.X.1998, leg. N. Sangpradub, 5♀ macr.

Distribution: India, Sri Lanka, through Southeast Asia to Sumatra and Java (CHEN et al. 2005). In Thailand not uncommon throughout the country, frequently at light.

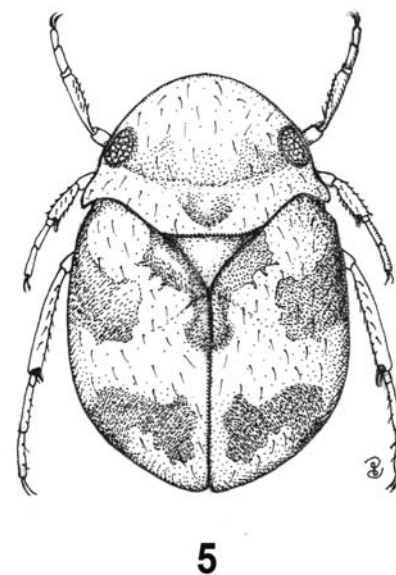
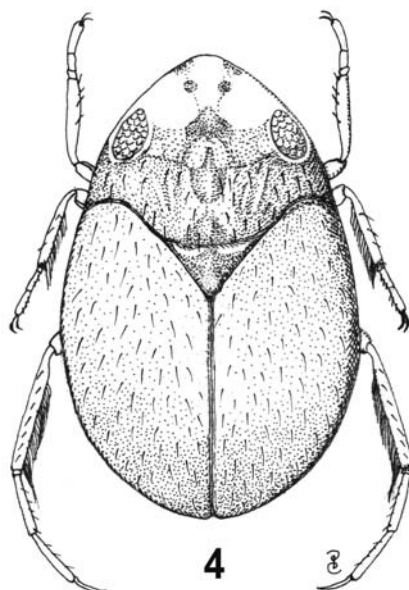
##### 12. *Micronecta ornitheia* NIESER, CHEN & YANG, first record

*Micronecta ornitheia* NIESER, CHEN & YANG 2005.

Material examined: Thailand: Petchabun Prov., Nam Nao Nat. Park, Phromlaeng stream, 26.VII.1997, leg. N. Sangpradub, 2♂♂ 7♀♀ macr., flightless form. First record from Thailand.

Distribution: China (Yunnan) and Thailand.

Remarks: In many European species of Corixidae there are two forms of morphologically macropterous specimens. One form with fully developed indirect flight muscles with distinct muscle fibres: the flying form or normal macropterous form. A second form in which the indirect flying muscles are not developed, with thin, indistinct muscle fibres and the mesothorax is largely filled with a pulpy (fat and connective) tissue: the flightless macropterous form (YOUNG 1965). In Micronectidae the only species for which normal and flightless macropterous forms have been reported is in southern England populations of *Micronecta minutissima* (LINNAEUS 1758) by YOUNG (1965). JANSSON (1968), states on p. 3: "In Micronectinae, flightlessness is caused by both poor development of the flight muscles and shortness of the hind wings, and flightless (= brachypterous) specimens are much smaller than those capable of flying (= macropterous)", so Young's record seems to be the unique one of a flightless macropter-

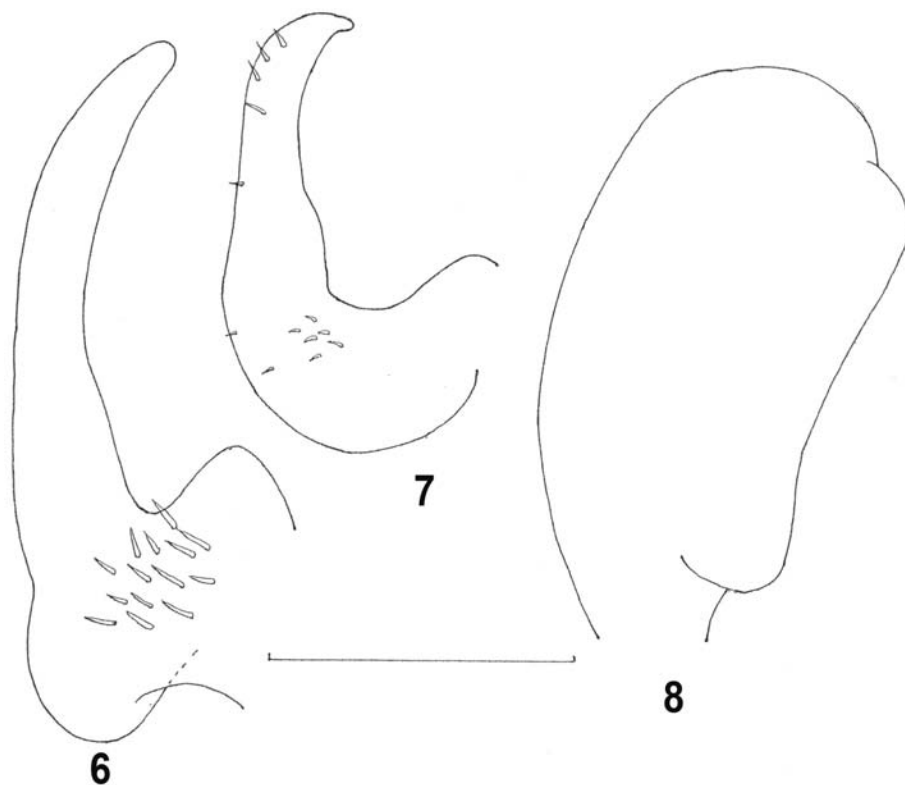


ous form in *Micronecta*. Fortunately we had still alcohol specimens of the type series of *M. ornitheia* at hand, so the condition of the indirect flight muscles could be inspected easily. The type series from Yunnan consists of normal macropterous specimens, the present sample from Thailand consists of flightless macropterous specimens, this is the second species of *Micronecta* for which a normal and a flightless macropterous morph is recorded. The flightless morph is structurally, including male primary and secondary sexual characteristics, identical with the normal macropterous form. However, the flightless form is smaller and some ratios and the colour are different between the morphs. Therefore we give a short diagnosis stating the differences of the flightless morph compared to the normal macropterous morph.

**Figs 4-5:** *Fischerotrephes heissi* nov.sp. (4) holotype, male, body length 1.38 mm (5) *F. maculatus* nov.sp., holotype female, body length 1.32 mm.

Flightless macropterous form: Colour dorsally uniformly yellowish brown without orange spot on head or reddish markings on hemelytra, eyes castaneous, posterior margin of pronotum indistinctly and narrowly yellow.

Measurements: Length ♀ 1.62-1.65, ♂  $\bar{x}$  1.62, s 0.025; width ♀ 0.73-0.80, ♂  $\bar{x}$  0.78, s 0.031; width of head ♀ 0.57-0.60, ♂  $\bar{x}$  0.60, s 0.011; ocular index ♀ 1.53-1.75, ♂  $\bar{x}$  1.56, s 0.047; width of pronotum ♀ 0.60-0.60, ♂  $\bar{x}$  0.61, s 0.017. Ratio length/width of body in both sexes 2.1, width of head nearly equal to width of pronotum. Pronotum hardly convex, with well developed lat-



**Figs 6-8:** *Fischerotrephes heissi* nov.sp. (6) left paramere (7) right paramere (8) aedeagus, scale 0.1 mm.

eral margins, nearly three times as wide as long (0.61/0.22).

### 13. *Micronecta quadristrigata* BREDDIN

*Micronecta quadristrigata* BREDDIN 1905a: 57.

*Micronecta quadristrigata*; LUNDBLAD 1933: 87-91 (redescription).

*Micronecta quadristrigata*; NIESER 2000: 286 (key to Thai species).

Material examined: Thailand: Sakon Nakhon Prov., Phu Phan District, Preechasuksan Reservoir, 17.X.1998, leg. N. Sangpradub, 5♂♂ 11 ♀♀ macr.

Distribution: From Iran through the Oriental Region to South China and Australia (CHEN et al. 2005). Throughout Thailand the commonest species of *Micronecta*, notably common and abundant in rice fields but also in other shallow stagnant waters, often, sometimes in massive numbers, attracted to light.

## Family Notonectidae LATREILLE 1802

### 14. *Anisops breddini* KIRKALDY

*Anisops breddini* KIRKALDY 1901a: 5-6.

*Anisops breddeni* BROOKS 1951: 439-441 (misspelling, redescription).

*Anisops breddini*; NIESER 2004: 84-86 (key to W Malaysian species).

Material examined: Thailand: Sakon Nakhon Prov., constructed wetland for water treatment

near Nong Haan, 23.XI.1995, leg. N. Nieser, 20♂♂ 25 ♀♀ brach. (NCTN); Phuphan Nat. park, Ouun stream, 18.V.1997, leg. N. Sangpradub, 1 ♀ brach.

Distribution: From India and Sri Lanka through Southeast Asia to Java and Sulawesi. In Thailand the commonest species of the genus, occurring in ponds in natural and agricultural areas. Although this is the commonest species of *Anisops* in Thailand and NIESER (1998) recorded this species from Thailand in his table there seems to be no previous record with locality data from Thailand.

### 15. *Anisops nigrolineatus* LUNDBLAD

*Anisops nigrolineata* LUNDBLAD 1933: 160-163.

*Anisops nigrolineata*; BROOKS 1951: 409-411 (redescription).

*Anisops nigrolineatus*; NIESER 2004: 84, 88 (key to W Malaysian species).

Material examined: Thailand: Sakon Nakhon Prov., Phuphan Nat. Park, Kaeng Moddaeng stream, 18.V.1997, leg. N. Sangpradub, 1♂ 1 ♀.

Distribution: India, Myanmar, through Thailand and West Malaysia to Indonesia (Java) and the Philippines (Sibuyan Island). Distributed throughout Thailand but rare.

### 16. *Enithares mandalayensis* DISTANT

*Enithares mandalayensis* DISTANT 1911: 331-332.

*Enithares mandalayensis*; LANSBURY 1968: 380-381 (redescription).

*Enithares mandalayensis*; NIESER 2004: 93-94 (key to *Enithares* of Malay Peninsula).

Material examined: Thailand: Kanchanaburi prov., Thongphaphom District, Ban Passaduuklang, Kayen stream, 23.II.2002, leg. N. Sangpradub, 1 ♀ 1Lv.

Distribution: Myanmar, Thailand, Malay Peninsula, Indochina. Occurring throughout Thailand but infrequently collected.

### 17. *Nychia sappho* KIRKALDY

*Nychia marshalli* var. *sappho* KIRKALDY 1901b: 809-810.

*Nychia sappho*; LANSBURY 1985: 4-8 (redescription).

Material examined: Thailand: Sakon Nakhon Prov., constructed wetland for water treatment near Nong Haan, overgrown marshy pond, 23.XI.1995, leg. N. NIESER, 4♂♂ 7 ♀♀ brachy. (NCTN). Kanchanaburi Prov., Thongphaphom Distr., Ban Taotan, Kayen stream, 25.II.2002, leg. N. Sangpradub, 1 ♀ brachy.

Distribution: From Burma through Southeast Asia and Indonesia to the Philippines, New Guinea and North Australia.

Remark: The specific identity of *Nychia* recorded from Sri Lanka (KIRKALDY 1904) is uncertain. *Nychia limpida* STÅL 1859 from China (Guangdong) may be the same species, in that case the correct name is *N. limpida* STÅL. Unfortunately no specimens of *Nychia* have been collected in China since Stål's specimen. Common throughout Thailand in stagnant waters, including virtually stagnant parts of streams.

### Family Pleidae FIEBER 1851

#### 18. *Paraplea frontalis* FIEBER, first record

*Ploa frontalis* FIEBER 1844: 18.

*Plea frontalis*; BENZIE 1989: 157-170 (redescription, variability).

*Paraplea frontalis*: NIESER 2004: 82 (key to *Paraplea* of Malay Peninsula).

Material examined: Thailand: Sakon Nakhon Prov., Ban Tonmy, small reservoir 2, 23.I.1999, leg. N. Sangpradub, 2 ♀. First record for Thailand.

Distribution: From India and Sri Lanka through Southeast Asia and Indonesia to Southeast China and the Moluccas (NIESER & CHEN 1999). Although this is apparently the first published record of this species for Thailand it is not uncommon in various stagnant waters with vegetation throughout the country.

#### 19. *Paraplea liturata* FIEBER

*Ploa liturata* FIEBER 1844: 19.

*Plea (Paraplea) liturata*; LUNDBLAD 1933: 129-135 (redescription).

Material examined: Thailand: Sakon Nakhon Prov., Ban Tonmy, small reservoir 2, 23.I.1999, leg. N. Sangpradub, 7♂ 3♀.

Distribution: From India through Southeast Asia and Indonesia to New Caledonia. Common throughout Thailand in vegetation rich stagnant waters including rice-fields.

### Family Helotrepidae

ESAKI & CHINA 1927

#### 20. *Fischerotrepes heissi* nov.sp. (Fig. 4, 6, 7, 8)

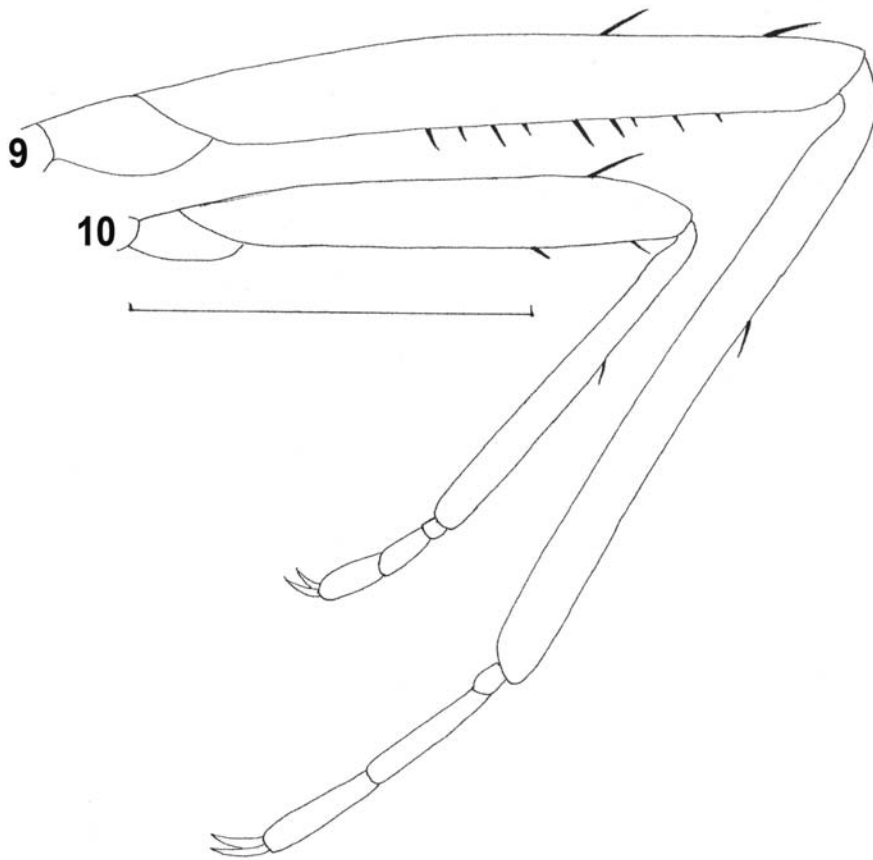
Type material: Holotype, brachypterous male (RMNH): Thailand: Kanchanaburi Prov., Thong

Pha Phoom Distr., Ban Pakpilock, stream Huay Kayen, 14°39'00.6"N, 98°35'14.6"E, 150m a.s.l., 25.II.2002, leg. N. Sangpradub. Paratype, brachypterous female (KKUT), Thailand: Kanchanaburi Prov., Thong Pha Phoom District, Ban Taotan, Huay Kayeng, 14°37'54.3"N, 98°34'17.4"E, 180m a.s.l., 25.II.2002, leg. N. Sangpradub.

Description: Dimensions. Male (Fig. 4) length 1.35, maximal width 0.87; female length 1.44, maximal width 0.90. General shape ovoid, strongly depressed. Colour: dorsally light to medium brown, head in front of eyes, rostrum and legs yellow, venter light brown. Cephalonotum with maximum width 1.2 times its median length in the male (0.72/0.61), 1.5 times in the female (0.85/0.56); lateral margin very slightly concave posteriorly of eyes; mediocaudal part smooth and shining, lateral and anterior part rugulose, dull. Rostrum reaching between the middle coxae. Cephalonotum and hemelytra beset with scattered yellow bristles. Basal width of mesoscutellum 1.6 its median length in the male (0.28/0.18), 1.4 times in the female (0.27/0.20); surface rugulose, dull. Hemelytra rugulose and with small pits, dull. Male: Left paramere as in Fig. 6, right paramere (Fig. 7) slightly hooked apically; aedeagus large, club-shaped (Fig. 8).

Etymology: Dedicated to Dr. Ernst Heiss, a prominent heteropterologist and our long time colleague and friend.

Comparative Notes: The left paramere is similar to that of *F. depressus* ZETTEL (1994) from Sarawak, this species is unicolourous yellowish and has a more distinctly hooked right paramere. The only other species known from Thailand (Songhkla Prov., SITES & POLHEMUS 2001), *F. jaechi* ZETTEL (1994), has the cephalonotum nearly entirely yellow, the left paramere more slender and the right paramere apically widened. *Fischerotrepes maryatae* ZETTEL (1997b) from Sabah, has similar parameres but a blackish cephalonotum and reddish hemelytra. Finally, *F. indicus* ZETTEL (1997a) from South India, has a similar colour pattern but is relatively wider, has different shapes of parameres, namely the left paramere straight and the right paramere with a widened tip (see PAPÁČEK & ZETTEL 2001).



**Figs 9-10:** *Mesovelia* spp. females, middle leg in dorsal view (9) *M. vittigera* HORVÁTH (10) *M. horvathi* LUNDBLAD, scale 0.5 mm.

**21. *Fischerotrepes maculatus* nov.sp. (Fig. 5)**

Type Material: Holotype, brachypterous female (RMNH), Thailand: Loei Prov., Phu Luang District, Nam (=river) Loei, 14.XI.2004, leg. B. Boonsoong. In addition two larvae were collected with the holotype.

Description (based on unique female holotype): Dimensions. Length 1.32, maximal width 0.86. General shape ovoid, strongly depressed. Colour (Fig. 5) dorsally yellow with distinct dark brown marks on the hemelytra, eyes dark brown to blackish with outer rim reddish, cephalonotum between eyes with an indistinct light brown transverse band. Rostrum and legs yellow, venter yellowish to light brown. Cephalonotum with maximum width 1.5 times its median length (0.76/0.50); lateral margin very slightly concave posteriorly of eyes (best visible in obliquely lateral view); rugulose, dull. Rostrum reaching between middle coxae. Cephalonotum, mesoscutellum and hemelytra beset with scattered yellow bristles. Basal width of mesoscutellum nearly twice its median length in the male (0.24/0.13), 1.4 times in the female (0.27/0.20); surface rugulose, dull. Hemelytra rugulose and with dis-

tinct pits, dull. Legs with short bristles along inner sides of tibiae and tarsi.

Etymology: *Maculatus* (Latin, meaning blotched or spotted) refers to the hemelytral pattern.

Comparative Notes: (see also under *F. heissi*). The distinctive colour pattern differs from all other known species of *Fischerotrepes*.

Remark: SITES & POLHEMUS (2001) discussed the general distribution of *Fischerotrepes*, stating that it had not been recorded north of the Isthmus of Kra in Thailand, and that it has a more southern distribution than other taxa within Helotrephidae. The presently described species are both collected north of the Isthmus of Kra. Moreover, Loei River is a tributary of the Mekong River, indicating the possibility that the genus could be found in neighbouring countries adjacent to the Mekong drainage system.

**Family Mesoveliidae  
DOUGLAS & SCOTT 1867**

**22. *Mesovelia vittigera* HORVÁTH**

*Mesovelia vittigera* HORVÁTH 1895: 160.

*Mesovelia vittigera*; POLHEMUS & POLHEMUS 2000: 226-229 (redescription, distribution).

Material examined: Thailand: Sakon Nakhon Prov., Phu Phan Nat. Park, Huay Sai, small reservoir, 22.VIII.1998, leg. N. Sangpradub, 10♂♂ 6♀♀ apt.

Distribution: Very widespread, throughout Africa, Mediterranean Europe through the Middle East to Southeast Asia, southern China, far Southeast Russia, Indonesia, The Philippines, Guam, Samoa, Vanuatu, New Caledonia, North Australia and New Guinea (POLHEMUS & POLHEMUS 2000; NIESER & CHEN 2005). Common throughout Thailand, also on brackish water.

Remark: In Thailand there are two species of *Mesovelia* common throughout the country, *M. horvathi* LUNDBLAD 1933 and *M. vittigera*. Males are easily separated, *M. vittigera* has a single tuft of short black bristles placed on a protuberance medioventrally on segment VIII near its base, whereas *M. horvathi* males have two lateral tufts of black bristles basally on sternite VIII. Females of these species look, at first sight, very similar (Fig. 9), although *M. vittigera* is



slightly larger on average. In both sexes there is a difference in the black spines ventrocaudally on the middle femur, in *M. vittigera* these (usually about 10) are well developed (Fig. 10), whereas in *M. horvathi* they are poorly developed, absent or only one or two present (Fig. 11).

### Family Hebridae

AMYOT & SERVILLE 1843

#### 23. *Merragata pallescens* DISTANT

*Merragata pallescens* DISTANT 1909: 498.

*Merragata pallescens*; ZETTEL 1999: 6-8.

Material examined: Thailand: Sakon Nakhon Prov., Preechasukan, small reservoir, 20.III.1999, leg. N. Sangpradub, 4♂♂ 5♀♀; overgrown marshy pond in constructed wetland for water treatment, near Nong Haan, 23.XI.1995, leg. N. Nieser, 3♂♂ 1♀♀ (NCTN, cited by ZETTEL 1999).

Distribution: India, Thailand, Java. Probably occurring throughout Thailand, especially on thick floating vegetation but due to its small size rarely observed. We have also seen a sample from Dutch customs found on imported plants from Thailand for use in aquaria.

Remark: The specimens studied belong to the variety *whitei* LUNDBLAD (1933), see ZETTEL (1999) for comments.

#### 24. *Timasius miyamotoi* ANDERSEN

*Timasius miyamotoi* ANDERSEN 1981: 396-397.

*Timasius miyamotoi*; ZETTEL 2004: 251-253.

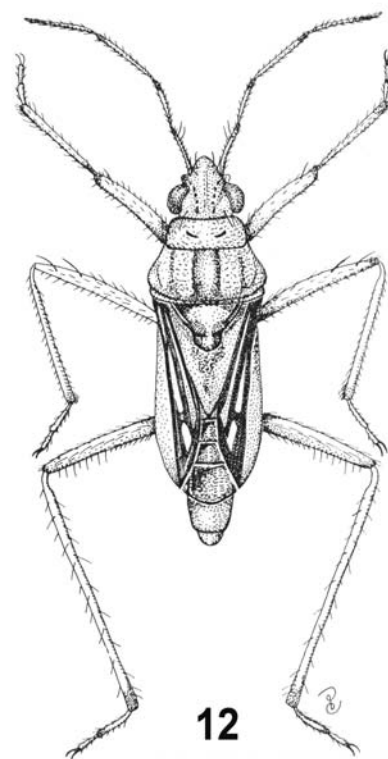
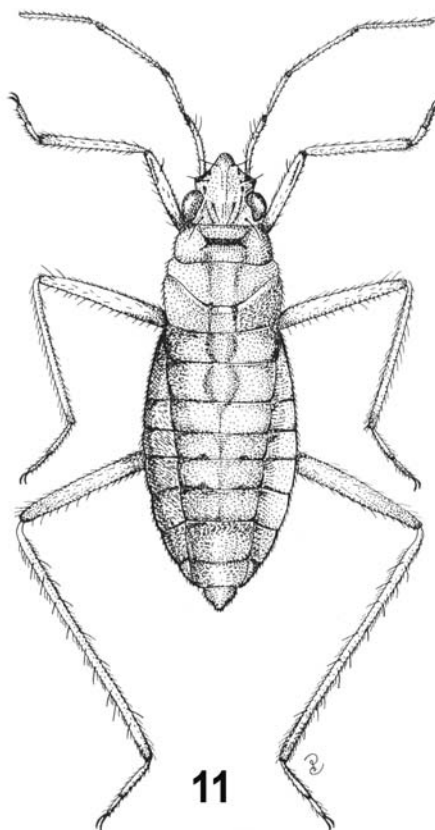
Material examined: Thailand: Loei Prov. Phu Luang Distr. Nam Jun stream (tributary of Loei River), 14.XI.2004, leg. B. Boonsoong, 1♂ 1♀ (1♂ NCTN).

Distribution: North and Northeast Thailand, Laos, Southwest China (Yunnan, Guangdong) (ZETTEL 2004b).

#### 25. *Timasius* sp. *livens*-group

Material examined: Thailand: Loei Prov. Phu Luang Distr. Nam Jun stream (tributary of Loei River), 14.XI.2004, leg. B. Boonsoong, 1♀ (NCTN).

Remark: This single female agrees well with the description of *Timasius livens* ANDERSEN (1981) except for the buccula which has a different shape, notably with its ventral posterior process distinctly more rounded, somewhat club-shaped.



**Figs 11-12:** *Mesovelgia vittigera* HORVÁTH (11) apterous female, body length 3.30 mm (12) macropterous male, dealate, body length 2.70 mm. After CHEN et al. (2005).

#### 26. *Hyrcanus varicolor* ANDERSEN

*Hyrcanus varicolor* ANDERSEN 1981: 410-411.

*Hyrcanus varicolor*; ZETTEL 1998: 599-601.

Material examined: Thailand: Kanchanaburi Prov., Thongphaphoon Distr., Ban Thamadue, Huay Team stream, 14°37'47.4"N, 98°35'47.2"E, 180m a.s.l., leg. N. Sangpradub, 3♂♂ 2♀♀.

Distribution: Thailand, Vietnam, Indonesia (Sumatra, Java).

### Family Hydrometridae BILLBERG 1820

#### 27. *Hydrometra greeni* KIRKALDY

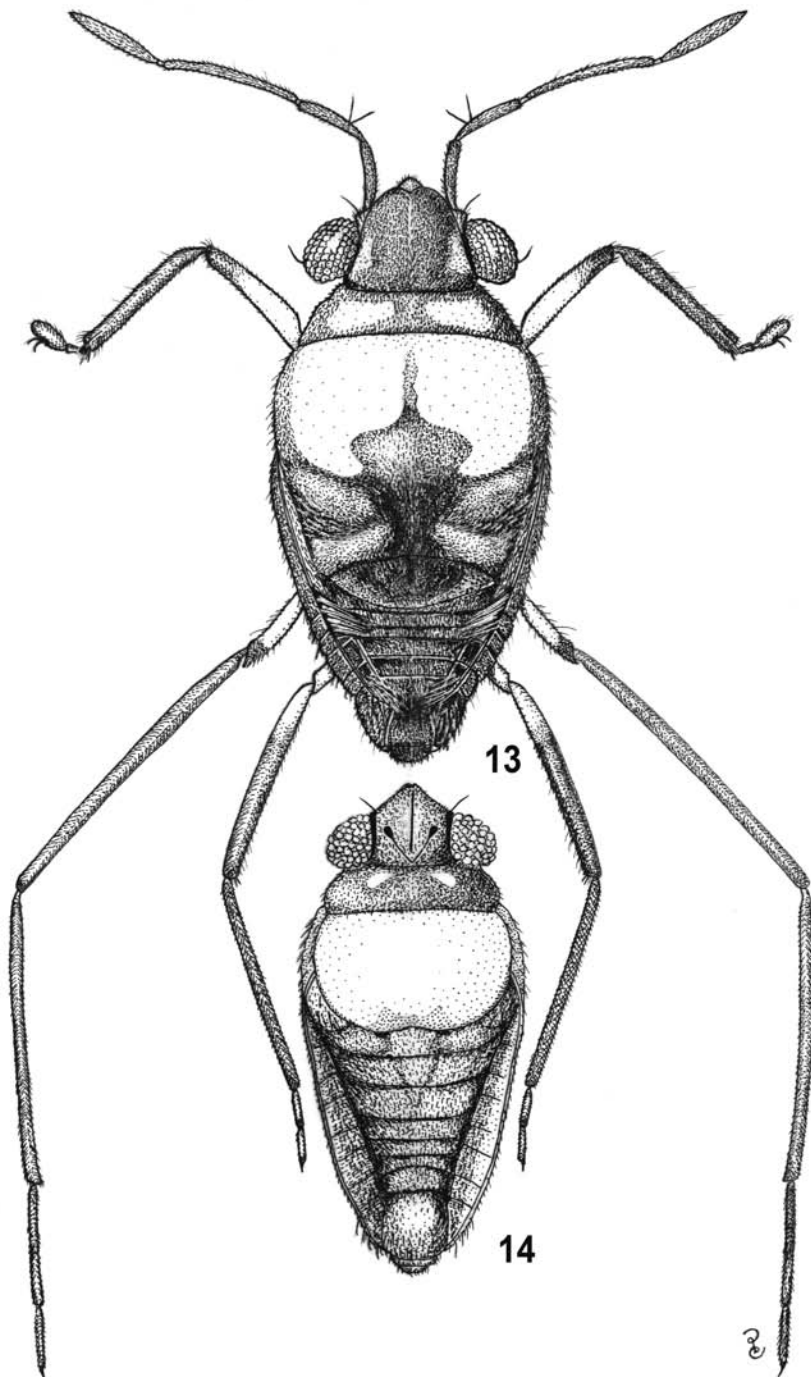
*Hydrometra greeni* KIRKALDY 1898: 2

*Hydrometra greeni*; POLHEMUS & POLHEMUS 1995: 22-23 (redescription).

*Hydrometra greeni*; ZETTEL & CHEN 1996: 14-17 (key to Thai species).

Material examined: Thailand: Sakon Nakhon Prov., Phu Phan Distr., Phu Phan Nat. Park, Kang Mod Daeng stream, leg. N. Sangpradub, 1♀ macr.

Distribution: From Nepal, India, Sri Lanka through Southeast Asia to West Malaysia and Sumatra. Common and often abundant throughout Thailand where it was found from sea level up to 1567m a.s.l. and in habitats varying from the edges of organically polluted ponds to clean mountain streams. Nearly always macropterous.



**Figs 13-14:** *Strongylovelia paitooni* nov.sp. (13) holotype, apterous female, body length 1.78 mm (14) apterous male, body length 1.54 mm, appendages removed.

**28. *Hydrometra maidli***  
HUNGERFORD & EVANS

*Hydrometra maidli* HUNGERFORD & EVANS 1934: 73-74.

*Hydrometra maidli*; POLHEMUS & POLHEMUS 1995: 34-36 (redescription).

*Hydrometra maidli*; ZETTEL & CHEN 1996: 14-17 (key to Thai species).

*Hydrometra maidli*; ZETTEL & YANG 2005: 393.

Material examined: Thailand: Phitsanulok Prov., Nakorn Thai Distr., Phu Hin Rong Kla Nat. Park, Water wheel waterfall, 8.IX.2004, leg. N. Sang-

pradub, 1♂ 1♀ macr.; Sakon Nakhon Prov., Phu Phan District, Ban Tonmay, small reservoir 2, 22.VIII.1998, leg. N. Sangpradub, 1♂ 1♀ macr.

Distribution: Thailand, Laos, Hong Kong, West Malaysia, Indonesia (Sumatra, Java, Nusa Tenggara and Sulawesi). Distributed throughout Thailand but not common.

Remark: POLHEMUS & POLHEMUS (1995) identified specimens from Kalimantan as *H. maidli*. Subsequently ZETTEL & YANG (2005) described *H. borneensis* from both North Borneo and Kalimantan and argue that the material from Kalimantan identified by POLHEMUS & POLHEMUS (1995) as *H. maidli* actually belongs to *H. borneensis*.

**Family Veliidae AMYOT & SERVILLE 1843**

**29. *Microvelia douglasi* SCOTT**

*Microvelia douglasi* SCOTT 1874: 448-449.

*Microvelia douglasi*; LUNDBLAD 1933: 347-357.

Material examined: Thailand: Sakon Nakhon Prov., Phu Phan Distr., Phu Phan Nat. Park, Huay Wungruua, small reservoir, 23.I.1999, leg. N. SANGPRADUB, 4♂♂ 1♀ macr., 1Lv.

Distribution: India and Sri Lanka through SE Asia to southern China and Japan, through Indonesia and the Philippines to North Australia, Guam, Samoa. In Thailand very common throughout the country, on various stagnant waters including flower pots and other small artificial basins, frequently at light.

**30. *Pseudovelvia sexualis* (PAIVA)**

*Microvelia* (*Kirkaldyia*) *sexualis* PAIVA 1917: 77-79.

*Pseudovelvia sexualis*; ANDERSEN 1983: 256-259.

Material examined: Thailand: Sakon Nakhon prov., Phuphan Distr., Nampung reservoir, 22.V.1999, leg. N. Sangpradub, 4♂♂ 3♀♀ apt., 3Lv.

Distribution: Pakistan, India, Bangladesh, Thailand and Indonesia (Sumatra). In Thailand this species has been recorded from Phattalung and Kanchanaburi provinces (ANDERSEN 1983) the present record is a considerable extension of its distributional area to the northeast. Most *Pseudovelvia* species are associated with streams but this species apparently prefers the edges of lakes and reservoirs.

**31. *Rhagovelvia* sp.**

Material examined: Thailand: Petchabun Prov., Nam Nao Nat. Park, Phromlaeng stream, 16°38'24.2"N 101°34'52.9", 720m a.s.l.,

26.VII.1997, leg. N. Sangpradub, 2 ♀ apt.

Remark: These specimens are similar to females of *R. sumatrensis* LUNDBLAD 1933. They differ from females of *R. inexpectata* ZETTEL 2000 by having more (6-8) spines distally of the largest spine on the hind femur. Males are needed to fix the identity of this species.

### 32. *Strongylovelia paitooni* nov.sp. (Figs 13-17, 23)

Material examined: Holotype (RMNH): apterous female, Thailand: Sakon Nakhon Prov., Phu Phan District, Phu Phan N.P., ICS stream, 23.I.1999, leg. N. Sangpradub, S9903. Paratypes, same data as holotype 10♂♂ 7♀ apt. (KKUT, NCTN).

Description: Dimensions. Length male  $\bar{x}$  = 1.54 s = 0.029, female  $\bar{x}$  = 1.80 s = 0.033 [1.80]; greatest width male  $\bar{x}$  = 0.71 s = 0.012, female  $\bar{x}$  = 0.87 s = 0.026 [0.83]; width of head across eyes male  $\bar{x}$  = 0.57 s = 0.010, female  $\bar{x}$  = 0.64 s = 0.048 [0.63].

Colour. Dorsally generally blackish beset with short sordid yellow hairs. Pronotum anteriorly with a yellowish transverse band which is more or less distinctly interrupted medially. Mesonotum with a large yellowish central spot (Fig. 14), posterior margin with a large indentation in females, more or less straight in males. Venter blackish, mesosternum laterally yellowish, extending onto the largely yellowish mesopleura. Legs brown, middle and hind coxae, all trochanters, anterior femur except for distal apex, and basal third of hind femur, yellowish.

Structural characteristics. Width of head twice its median length. Median length of pronotum two thirds the length of an eye (0.12/0.18). Meso- and metanotum separate. Thoracic dorsum clearly raised above abdominal tergites. Yellowish parts of prothorax and mesothorax with black denticles, on mesothorax restricted to mesosternum and upper part of mesopleura. Mesonotum and metanotum separate. Middle and hind femur posteriorly with a row of erect, 0.06 long, bristles, denser on hind femur than on middle femur. Length of leg segments, see Table 1.

Female (Fig. 13). Body shape ovoid, caudally distinctly tapering. Length 2.0-2.2 times greatest width across mesothorax.

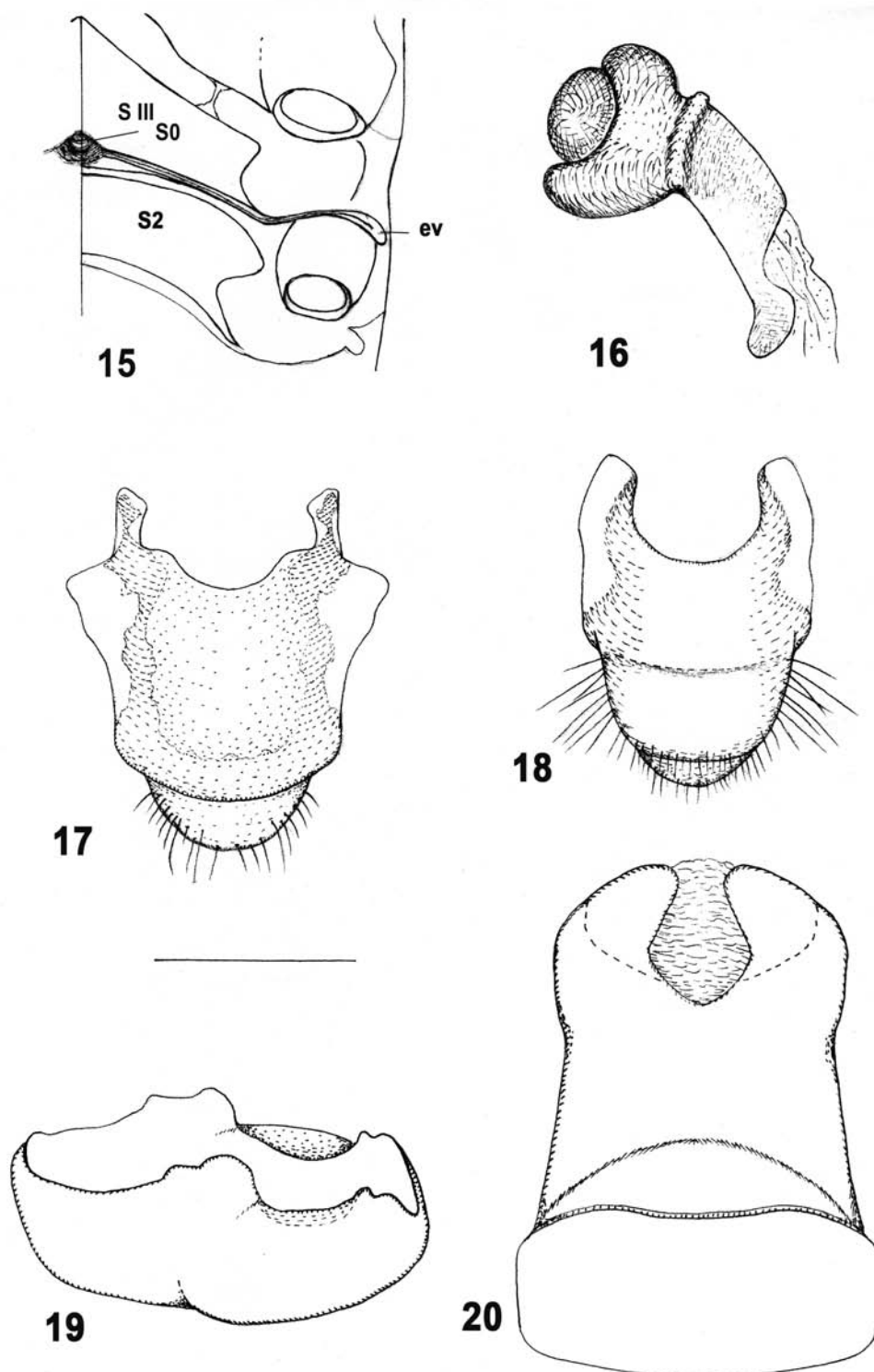
**Table 1:** Leg segments of *Strongylovelia* in mm. Tarsal segment 2 of fore leg is the length of segments 1+2 together.

<i>Strongylovelia paitooni</i> nov.sp.	Femur	Tibia	Tars1	Tars2
male fore leg	0.44	0.44	0.04	0.14
female fore leg	0.47	0.51	0.05	0.15
male middle leg	0.99	0.82	0.32	0.19
female middle leg	1.10	0.90	0.38	0.21
male hind leg	0.63	0.63	0.09	0.13
female hind leg	0.72	0.68	0.12	0.16
<i>Strongylovelia sujini</i> nov.sp.	Femur	Tibia	Tars1	Tars2
male fore leg	0.33	0.31	0.03	0.11
female fore leg	0.55	0.39	0.05	0.12
male middle leg	0.83	0.63	0.30	0.18
female middle leg	0.96	0.76	0.36	0.18
male hind leg	0.55	0.42	0.08	0.08
female hind leg	0.63	0.50	0.11	0.10

Width of an eye about 0.45 times the width of head between eyes. Length of antennal segments 1-4 0.26:0.24:0.47:0.37; length of antenna 0.74 times body length. Connexiva anteriorly vertical, with a prominent, medially directed tuft of brownish bristles at the level of tergites 2-4; caudally, on segments 6-7, folded medially and with a less prominent tuft of brownish bristles; the caudal apex rounded. Abdominal tergites without median impression, tergites 2-3 strongly declivent; Proctiger well developed, slanting nearly vertically, covering the apex of abdomen. Abdominal sternite 7 large, 2-3 times as long as preceding sternites, covering the gonocoxae in ventral view. Fore femur slightly swollen, greatest width 0.10; middle and hind femur not noticeably swollen basally, virtually parallel-sided, greatest width of middle femur 0.06, of hind femur 0.08.

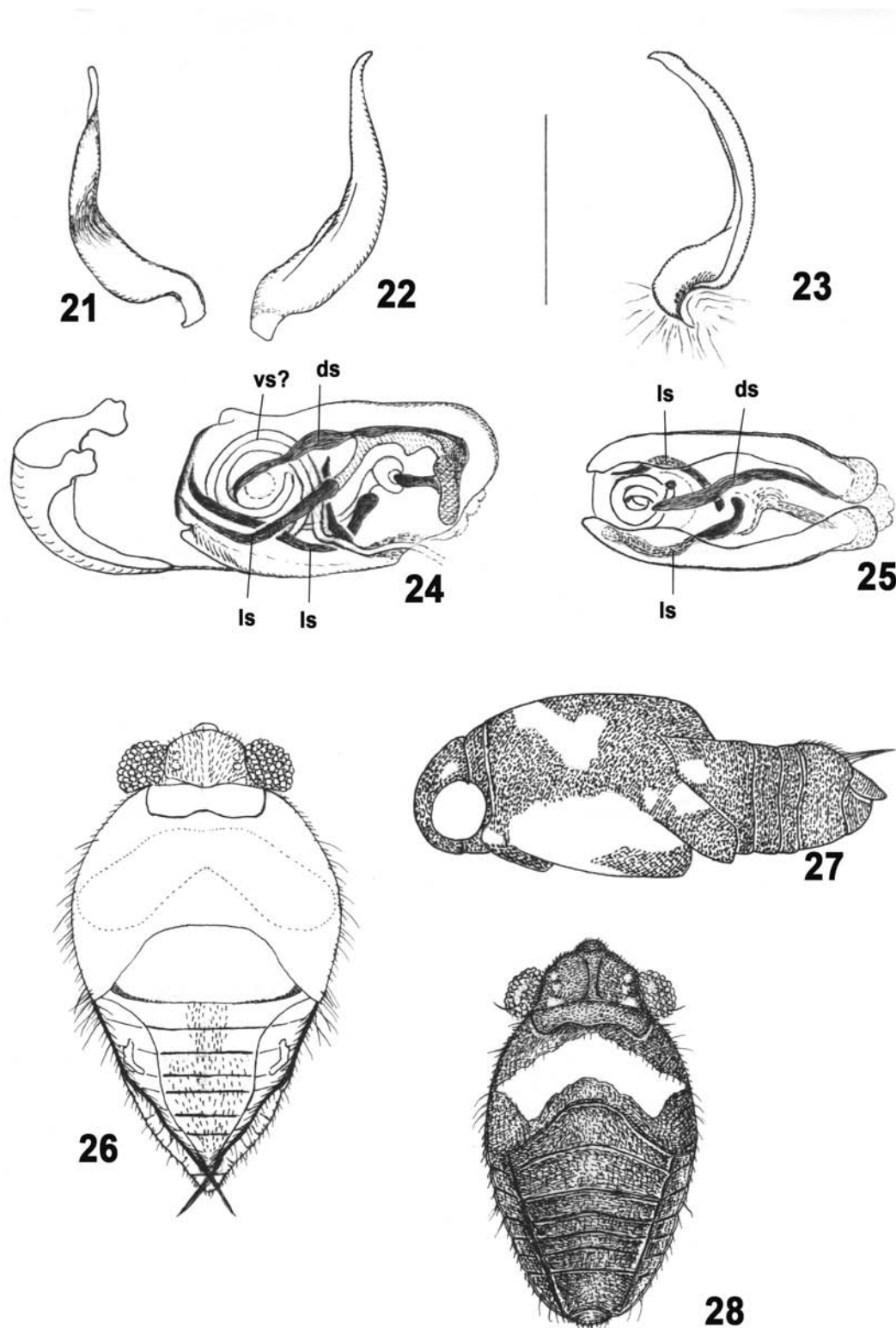
Male (Fig. 14). Body shape suboval. Length 2.1-2.2 times greatest width. Width of an eye about 0.40 the width of head between eyes. Length of antennal segments 1-4 0.21:0.20:0.44:0.34; length of antenna 0.77 times body length. Connexiva from slanting outward about 45° to nearly horizontal; caudally tapering to the posterior margin of tergite 7. Abdominal tergite 7 large, its median length about four times the length of preceding segments, covering most of the genital segments in dorsal view. Fore femur slightly swollen, its greatest width 0.10; middle and hind femur swollen proximally, distinctly tapering towards distal apex, greatest width of middle femur 0.08, of hind femur 0.10.

**Figs 15-20:** *Strongylovelia* spp.  
**(15-17)** *S. paitooni* nov.sp., male  
**(15)** metasternum (S III) with  
 metasternal scent orifice (SO),  
 lateral scent evaporatorium (ev) and  
 abdominal sternum 2 (S2).  
**(16-17)** Proctiger and anal plate  
**(16)** lateral view **(17)** dorsal view  
**(18-20)** *S. sujini* nov.sp., male  
**(18)** ventral view of 8<sup>th</sup> abdominal  
 segment **(19)** pygophore,  
 dorsolateral view **(20)** proctiger,  
 dorsal view. Scale 0.1 mm.



Male genitalia. Abdominal segment 8, cylindrical with its caudal opening rectangular. Pygophore (Fig. 19) boat-shaped, with almost flat bottom, about 1.5 times as long as wide, with smooth dorsolateral margins which are slightly folded inwards posteriorly. Proctiger (Figs 16, 17) ovate, lateral margin

straight, over half of its length with a carina, caudal margin with sparse longer setae, denser at each corner, median length 0.15, maximum with 0.12. Paramere (Fig. 23) slender and curved upwards, shaft short and thickened, the rest part moderately thin and curved forward. Basal apiculatary appara-



**Figs 21-28:** *Strongylovelia* spp. (21, 22, 24-28). *S. sujini* nov.sp., male (23) *S. paitooni* nov.sp. (21) left paramere internal view (22-23) left paramere external (lateral) view (24) phallus lateral view, ds = dorsal sclerite, ls = lateral sclerite, vs = ventral sclerite (25) phallus dorsal view. Scale 0.1 mm (26) holotype, apterous female, body length 1.50 mm (27) same as above, lateral view (28) paratype, apterous male, body length 1.21 mm, appendages removed.

tus comparatively large. Phallosome cylindrical with dorsal or upper part membranous.

**Comparative Notes.** *Strongylovelia paitooni* nov.sp. has the separate meso- and metanotum in common with *S. albicollis* ESAKI 1926 and *S. priori* LANSBURY 1993, both from New Guinea. In all other de-

scribed species of *Strongylovelia* the meso- and metanotum are fused (LANSBURY & ZETTEL 1997; ZETTEL 2003b, 2003c). Females of *S. albicollis* and *S. priori* are lacking the distinct tuft of hairs on segments 2-4 of connexivum, and have the connexivum whitish on segments 3-6, whereas in *S. paitooni*

nov.sp. females the connexivum is entirely black; *S. albicollis* females have two separate, comparatively small white spots on mesonotum. The male of *S. albicollis* is unknown, the male of *S. priori* has the second antennal segment 1.4 times as long as the first whereas in *S. paitooni* nov.sp. the first and second antennal segments are of subequal length.

### 33. *Strongylovelia sujini* nov.sp. (Figs 18-22, 24-28)

Material examined: Holotype (RMNH): apterous female Thailand: Sakon Nakhon Prov., Phuphan Distr., Ouun stream, 21.XI.1998, leg. N. Sangpradub, S9813. Paratype, same data as holotype, 1 apterous male (KKUT).

Description: Dimensions. Length male 1.22, female 1.50; greatest width male 0.70, female 0.90; width of head across eyes male 0.55, female 0.62.

Colour. Dorsally generally blackish beset with scattered sordid yellow hairs. Head with a pair of small light brown patches at inner anterior angle of eye. Mesonotum with a large, broadly V-shaped sordid white central spot (Figs 26, 28). Abdominal tergites and connexiva beset with short somewhat scale-like whitish hairs, more densely in female than in male. Thoracic venter sordid white, extending onto mesopleura; in female with two additional pairs of smaller whitish spots laterally, one just dorsally of metacetabula and one on the first abdominal laterotergite (Fig. 27). Abdominal venter blackish. Legs and antennae brown to blackish, first antennal segment, middle and hind trochanters, proximal third to half of anterior and hind femur, sordid white.

Structural characteristics. Width of head one and a half times its median length. Width of an eye 0.7 times the width of interoculus. Median length of pronotum less than half the length of an eye (0.13/0.30). Meso- and metanotum fused. Thoracic dorsum clearly raised above abdominal tergites. Black denticles on episternum and epimeron of prothorax only. Middle and hind femur posteriorly with a row of erect, about 0.06 long, bristles. Length of segments, see Table 1.

Female (Fig. 26). Body shape ovoid, caudally distinctly tapering. Length 1.7 times greatest width across mesothorax.

Length of antennal segments 1-4 0.14:0.20:0.36:0.26; length of antenna 0.64 times body length. Connexiva about vertical, with a thin but prominent, posteriorly directed tuft of long bristles caudally, best visible in lateral view (Fig. 27); caudal apex of connexiva rounded. Abdominal tergites without median impression, tergites 1 and 2 separate, tergite 1 clearly raised above remaining tergites, tergites 2-3 strongly declivent Proctiger well developed, declivent with an angle of about 45°, covering the genital segments in dorsal view. Abdominal sternite 7 large, about 2 times as long as preceding sternites, not covering the gonocoxae in ventral view. Maximal width of all femura about 0.08; fore and hind femur virtually parallel-sided, middle femur distinctly tapering distally.

Male (Fig. 28). Body shape suboval. Length 1.7 times greatest width. Width of an eye about 0.40 the width of head between eyes. Length of antennal segments 1-2 (3 and 4 lacking): 0.14:0.14. Connexiva nearly horizontal; caudally tapering to the posterior margin of tergite 7. Abdominal tergites 1 and 2 apparently fused although still recognizable by a shallow transverse impression, median length of abdominal tergite 7 twice the length of preceding segments. Greatest width of fore femur 0.06, its ventral margin straight, dorsal margin slightly convex; middle and hind femur swollen proximally, distinctly tapering towards distal apex, greatest width of both 0.09.

Male Genitalia. Abdominal segment 8 (Fig. 18) cylindrical with its caudal opening rectangular. Pygophore (Fig. 19) boat-shaped, with almost flat bottom and posterolateral margins folded inwards, caudal margin slightly convex, about 1.5 times as long (0.33) as wide (0.22). Paramere (Figs 21, 22) slightly curved upwards with the tip curved backwards. Proctiger (Fig. 20) triangular, with lateral margin transparent and expanding laterally, near caudal margin with a carina, median length 0.12, maximum with 0.14. Basal apiculatory apparatus comparatively large. Phallosome cylindrical with the upper part membranous. Vesical sclerites (Figs 24, 25) asymmetrical: dorsal sclerite arched and lying at left side in dor-

sal view (Fig. 25), its apical part well developed; a pair of lateral sclerites asymmetrical and long; ventral sclerites weakly sclerotized, seemed modified strongly, coiled at basal part at least twice before stretching out of the phallotheca; an additional vertical sclerite between lateral sclerites (Fig. 24). Basal lobes assymetrical armed with dense pegs.

Comparative Notes. *Strongylovelia sujini* nov.sp. has the fused meso- and metanotum in common with the type species, *S. formosa* ESAKI (ESAKI 1924) from Taiwan and a number of species recently described from the Philippines, Borneo and Sulawesi (LANSBURY & ZETTEL 1997; ZETTEL 2003b, 2003c). Except for *S. seyferti* ZETTEL (ZETTEL 2003c) from Sulawesi, females of these species lack the thin tuft of long bristles posteriorly on connexiva although they may have broader tufts of shorter bristles there. Females of *S. seyferti* differ from *S. sujini* by having an additional narrow tuft of long bristles anteriorly on the connexiva which are folded inward over the abdomen. *Strongylovelia formosa*, which at first sight looks similar because of a similar shape of the whitish mark on mesonotum, has the sordid white marks on mesonotum and mesopleura confluent, whereas in *S. sujini* nov.sp. these are separate (Fig. 27). Females of the species and subspecies described by LANSBURY & ZETTEL (1997) and ZETTEL (2004b) except *S. hirsutula* LANSBURY & ZETTEL from Borneo, have a larger whitish mark covering the entire mesonotum except for its anterior angles and posterior angles or narrow posterior band which are black. *Strongylovelia hirsutula* females have a different shape, which a broader thorax and the connexiva folded inward, covering lateral parts of tergites especially posteriorly. Males of *S. aberrans* LANSBURY & ZETTEL from Borneo and *S. hirsutula* are not known. In other species the whitish mark covers nearly the entire mesonotum as in females. ZETTEL & TRAN (2006) described four species of *Strongylovelia* from Vietnam. Of these, *S. albopicta*, *S. bipunctata*, and *S. varshelyii* have different yellowish white dorsal markings; the fourth species, *S. setosa*, looks at first sight very similar, but it has black middle- and hindtrochanters whereas these are whitish in *S. sujini* nov.sp.

## Family Gerridae LEACH 1815

### 34. *Rhagodotarsus kraepelini* BREDDIN

*Rhagodotarsus kraepelini* BREDDIN 1905b: 137-139.  
*Rhagodotarsus kraepelini*; POLHEMUS & KARUNARATNE 1993: 100-102.

Material examined: Thailand: Sakon Nakhon Prov., Huay Hawy, small reservoir, 19.VI.1999, leg. N. Sangpradub, 2♂♂ 4♀♀ apt.

Distribution: From India and Sri Lanka through SE Asia to Southwest China, the Philippines, Indonesia, Papua New Guinea and Palau (POLHEMUS & KARUNARATNE 1993). In Thailand common and widespread on rather open, small to medium sized, stagnant waters including potholes in streams.

### 35. *Aquarius adelaidis* (DOHRN)

*Gerris adelaidis* DOHRN 1860: 408.

*Aquarius adelaidis*; ANDERSEN 1990: 61-63 (re-description).

Material examined: Thailand: Sakon Nakhon Prov., constructed wetland for water treatment near Nong Haan, 23.XI.1995, leg. N. Nieser 9♂♂ 6♀♀ brachy., 1♂ 1♀ macr. (NCTN); Sakon Nakhon Prov., Phu Phan District, Ban Tonmay, small reservoir 1, 18.VII.1998, leg. N. Sangpradub, 3♀♀ brachy., 1♀ macr.

Distribution: From Nepal, India, Sri Lanka through SE Asia to Southwest China, Philippines (Luzon) and Indonesia (Kalimantan, Sumatra). Common on various stagnant waters throughout Thailand, in mountainous areas in North Thailand (Chiang Mai, Chiang Rai) it is often replaced by *A. p. paludum* (FABRICIUS 1794). The difference between the two is that the hind margin of pronotum and the hemelytra in *A. adelaidis* are pale to medium brown whereas in *A. p. paludum* the hind margin of pronotum and the hemelytra are dark brown to black. For structural differences see ANDERSEN (1990).

### 36. *Limnogonus fossarum fossarum* (FABRICIUS)

*Cimex fossarum* FABRICIUS 1775: 727.

*Limnogonus fossarum fossarum*; ANDERSEN 1975: 30-36 (re-description).

Material examined: Thailand: Sakon Nakhon Prov., Huay Hintaeak, mall reservoir, 19.IX.1998, leg. N. Sangpradub, 1♀ macr.

Distribution: From India and Sri Lanka through SE Asia to South China, South Japan, the Philippines, North Borneo (Sabah) and Sumatra (ANDERSEN 1995).

Common throughout Thailand, mostly on small to middle sized stagnant waters, also on brackish water.

### 37. *Limnogonus nitidus* (MAYR)

*Hydrometra nitida* MAYR 1865: 443.

*Limnogonus nitidus*; ANDERSEN 1975: 62-65 (re-description).

Material examined: Thailand: Sakon Nakhon Prov., Huay Sai, small reservoir, 19.IX.1998, leg. N. Sangpradub, 1 ♂ macr.

Distribution: Nepal, India, Sri Lanka, through SE Asia to Sumatra, Java, Borneo, Sulawesi and the Philippines (ANDERSEN 1995). On various types of stagnant waters, including virtually stagnant bays of streams. In Thailand somewhat more common on small to middle sized stagnant waters than *L. f. fossarum* but not on moderately to strongly brackish waters, regularly collected at light.

### 38. *Neogerris parvulus* (STÅL)

*Gerris parvula* STÅL 1859: 265.

*Neogerris parvula*; ANDERSEN 1975: 86-89.

*Neogerris parvulus*; ANDERSEN 1995: 120.

Material examined: Thailand: Sakon Nakhon Prov., constructed wetland for water treatment near Nong Haan, overgrown marshy pond, 23.XI.1995, leg. N. Nieser, 1♂ 1♀ macr. (NCTN); Sakon Nakhon Prov., Phu Phan District, Hintak, small reservoir, 17.X.1998, leg. N. Sangpradub, 1♂ 1♀ macr.; Sakon Nakhon Prov., Phu Phan Nat. Park, Wainprai stream, 17.X.1998, leg. N. Sangpradub, 1♂ 1♀ macr.

Distribution: Arabian Peninsula, Iran, through the Oriental Region to southern China, South Japan, New Guinea and the Solomon Islands (ANDERSEN 1975). In the Philippines, except for Busuanga Island near Palawan, occurs a different species, *N. philippinensis* ZETTEL 2004. According to ZETTEL (2004a) the identity of material from the eastern part of the distributional area (Sulawesi, New Guinea) should be revised. In Thailand common on small to medium sized stagnant waters.

### 39. *Limnometra matsudai* (MIYAMOTO)

*Tenagogonus (Limnometra) matsudai* MIYAMOTO 1967: 223-226.

*Limnometra matsudai*; ANDERSEN 1995: 118.

Material examined: Thailand: Sakon Nakhon Prov., Phuphan National Park, Ouun stream, 18.VII.1998, leg. N. Sangpradub, 2♂♂ 1♀ apt.; same locality, 17.X.1998, leg. N. Sangpradub, 1♂ 1♀ apt.

Distribution: Thailand, West Malaysia, Vietnam.

### 40. *Amemboa (Amemboa) aquafrigida* ZETTEL & CHEN

*Amemboa (Amemboa) aquafrigida* ZETTEL & CHEN 1997: 94-96.

Material examined: Thailand: Petchabun Prov., Nam Nao Nat. Park, Phromlaeng stream, 28.IV.1997, leg. N. Sangpradub, 2 ♀ apt.; same locality, 28.VI.1997, leg. N. Sangpradub, 1 larva; same locality, 26.VII.1997, leg. N. Sangpradub, 4♂♂ apt. (KKUT, NCTN), this is the type locality of this species.

Distribution: Northeast Thailand.

### 41. *Amemboa (Amemboides) velaris* POLHEMUS & ANDERSEN

*Amemboa (Amemboa) velaris* POLHEMUS & ANDERSEN 1984: 104-105.

Material examined: Thailand: Petchabun Prov., Nam Nao Nat. Park, Yakrua stream, 26.XII.1997, leg. N. Sangpradub, 1 ♀ apt. (KKUT).

Distribution: Northern Thailand, Vietnam.

### 42. *Onychotrechus esakii* ANDERSEN

*Onychotrechus esakii* ANDERSEN 1980: 127-128.

Material examined: Thailand: Petchabun Prov., Nam Nao Nat. Park, Phromlaeng, 30.XI.1997, leg. N. Sangpradub, 1♂ 3♀ ♀ macr.; Sakon Nakhon Prov., Phu Phan Nat. Park, Wainprai stream, 17.X.1998, leg. N. Sangpradub, 1♂ 1♀ apt.

Distribution: Myanmar, Thailand and Vietnam.

### 43. *Cylindrostethus costalis* SCHMIDT

*Cylindrostethus costalis* SCHMIDT 1915: 364.

*Cylindrostethus costalis*; POLHEMUS 1994: 9-10 (re-description).

Material examined: Thailand: Sakon Nakhon Prov., Phu Phan Nat. Park, Wainprai stream, 17.X.1998, leg. N. Sangpradub, 1♂ apt., 3 Lv. POLHEMUS (1994) reports 9♂♂ 9♀ ♀ macr. from Phu Phan.

Distribution: Myanmar, Thailand and Indochina. In Thailand, except for one record from Phuket (POLHEMUS 1994), in the northern half of the country, not uncommon.

### 44. *Ptilomera tigrina* UHLER

*Ptilomera tigrina* UHLER 1860: 230.

*Ptilomera harpyia* SCHMIDT 1926: 65-66.



*Ptilomera tigrina*; HUNGERFORD & MATSUDA 1965: 462-465 (redescription).

*Ptilomera harpyia*; HUNGERFORD & MATSUDA 1965: 466-470 (redescription).

*Ptilomera tigrina*; POLHEMUS 1992: 439 (synonymy).

*Ptilomera tigrina*; POLHEMUS 2001: 230-234 (distribution).

Material examined: Thailand: Chaiyaphun Prov., Phu Kaew Wildlife Sanctuary, leg. N. Sangpradub, 1♂ apt., 1♀ macr.

Distribution: Myanmar, Thailand, Indochina, Malay Peninsula, China (Yunnan, Hong Kong). By far the most common and widespread species in continental SE Asia (POLHEMUS 2001).

#### 45. *Metrocoris acutus* CHEN & NIESER

*Metrocoris acutus*; CHEN & NIESER 1993: 32-33 (description).

Material examined: Thailand: Petchabun Prov., Nam Nao National Park, Phromlaeng stream, 28.IV.1997, leg. N. Sangpradub, 3♂♂ 2♀♀ apt.

Distribution: Thailand, Laos, Vietnam, S China, SW China.

#### 46. *Metrocoris inthanon* CHEN & NIESER

*Metrocoris inthanon*; CHEN & NIESER 1993: 57-59 (description).

Material examined: Thailand: Petchabun Prov., Nam Nao National Park, Phromlaeng stream, 28.IV.1997, leg. N. Sangpradub, 2♀♀ apt; Petchabun Prov., Nam Nao National Park, 24.V.1997, leg. N. Sangpradub, 1♂ macr. dealate.

Distribution: Thailand, Laos, Vietnam. Published records of this species are all north of the Isthmus of Kra. Recently this species was also collected south of the Isthmus by Chen et al. (in prep.).

#### 47. *Ventidius (Ventidioides) karen* LANSBURY

*Ventidius (Ventidioides) karen* LANSBURY 1990: 61-65

*Ventidius (Ventidioides) karen*; CHEN & ZETTEL 1999: 181-185 (redescription).

Material examined: Thailand: Petchabun Prov., Nam Nao National Park, Phromlaeng stream, 28.IV.1997, leg. N. Sangpradub, 4♂♂ apt.; same locality, 28.VII.1997, leg. N. Sangpradub, 7♀♀ apt. (KKUT, NCTN).

Distribution: Thailand, Vietnam.

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## Zusammenfassung

Funde von Nepomorpha und Gerromorpha aus Thailand, vorwiegend aus der Sakon Nakhon Provinz, werden mitgeteilt und vier Arten als neu beschrieben: *Fischerotrepthes heissi* nov.sp. und *F. maculatus* nov.sp. (Helotrephidae) aus West-Thailand, *Strongylovelia paitooni* nov.sp. und *S. sujini* nov.sp. (Veliidae) aus Nordost-Thailand. Drei Erstnachweise für Thailand werden mitgeteilt: *Micronecta ornitheia* CHEN et al. 2005 (Micronectidae), *Paraplea frontalis* (FIEBER 1844) (Pleidae) aus dem Nordosten der Sakon Nakhon Provinz, *Heleocoris strabus* MONTANDON 1879 (Naucoridae) aus den Provinzen Kanchanaburi und Loei. Die makroptere, flugunfähige Form von *Micronecta ornitheia* wird beschrieben.

## References

- ANDERSEN N.M. (1975): The *Limnogonus* and *Neogerris* of the Old World. — Entomol. Scand. Suppl. **7**: 1-96.
- ANDERSEN N.M. (1980): Hygropetric water striders of the genus *Onychotrechus* KIRKALDY with description of a related genus (Insecta, Hemiptera, Gerridae). — Steenstrupia **6**: 113-146.
- ANDERSEN N.M. (1981): Semiaquatic bugs: phylogeny and classification of the Hebridae (Heteroptera: Gerromorpha) with revisions of *Timasius*, *Neotimasius* and *Hyrchanus*. — Syst. Entomol. **6**: 377-412.
- ANDERSEN N.M. (1983): The Old World Microveliinae (Hemiptera: Veliidae) I. The status of *Pseudovelia* HOBERLANDT and *Perivelia* POISSON, with a review of Oriental species. — Entomol. Scand. **14**: 253-268.
- ANDERSEN N.M. (1990): Phylogeny and taxonomy of water striders, genus *Aquarius* SCHELLENBERG (Insecta, Hemiptera, Gerridae), with a new species from Australia. — Steenstrupia **16**: 37-81.
- ANDERSEN N.M. (1995): Cladistics, historical biogeography, and a check list of gerrine water striders (Hemiptera, Gerridae) of the World. — Steenstrupia **21**: 93-123.
- BENZIE J.A. (1989): The immature stages of *Plea frontalis* (FIEBER, 1844) (hemiptera, Pleidae), with a redescription of the adult. — Hydrobiologia **179**: 157-171.
- BREDDIN G. (1905a): Übersicht der javanischen *Micronecta*-Arten (Rhynchota). — Societas Entomologica **20**: 57.
- BREDDIN G. (1905b): Rhynchota Heteroptera aus Java, gesammelt von Prof. K. Kraepelin 1904. — Mitt. Naturhist. Mus. Hamburg **22**: 109-159.
- BROOKS G.T. (1951): A revision of the genus *Anisops* (Notonectidae, Hemiptera). — Univ. Kansas Sci. Bull. **34**: 301-519.
- CHEN P.-P. & N. NIESER (1993): A taxonomic revision of the Oriental water strider genus *Metrocoris* MAYR (Hemiptera, Gerridae). — Steenstrupia **19** (1-2): 1-82.
- CHEN P.-P., NIESER N. & J.-Z. HO (2004): Review of Chinese Ranatrinae (Hemiptera: Nepidae), with descriptions of four new species of *Ranatra* FABRICIUS. — Tijdschr. Entomol. **147**: 81-102.
- CHEN P.-P., NIESER N. & H. ZETTEL (2005): The aquatic and semi-aquatic bugs (Heteroptera: Nepomorpha & Gerromorpha) of Malesia and adjacent areas. — Fauna Malesiana Handbook **5**, Brill, Leiden, Boston: 1-546.
- CHEN P.-P. & H. ZETTEL (1998): Key to genera and subgenera of Gerridae (Gerromorpha) of Thailand and adjacent countries, with a check-list of species known from Thailand. — Amemboa **2**: 24-41.
- CHEN P.-P. & H. ZETTEL (1999): A taxonomic revision of the water strider genus *Ventidius* DISTANT (Hemiptera, Gerromorpha, Gerridae). — Tijdschr. Entomol. **141**: 137-208.
- DISTANT W.L. (1909): Oriental Rhynchota Heteroptera. — Ann. Mag. Nat. Hist. **(8)** 3: 491-507.
- DOHRN A. (1860): Zur Heteropteren-Fauna Ceylon's. — Stettiner Entomol. Z. **21**: 399-409.
- ESAKI T. (1926): The water-striders of the subfamily Halobatinae in the Hungarian National Museum. — Ann. Mus. Nat. Hung. **23**: 117-164.
- FABRICIUS J.C. (1775): Systema Entomologiae. — Flensburgi et Lipsiae: 1-832.
- FIEBER F.X. (1844): Monographie der Gattung *Ploa*. — Entomologische Monographien, Barth Leipzig & Clave Prague: 16-19, pl. 1 (preprint of Abhandlungen der Böhmisches Gesellschaft der Wissenschaften (5) 3: (1845): 294-297, pl. 1).
- HORVÁTH G. (1895): Hémiptères nouveaux d'Europe et des pays limitrophes. — Revue d'Entomol. **14**: 152-165.
- HORVÁTH G. (1904): Hydrocorisae tres novae. — Ann. Hist.-Nat. Mus. Nat. Hung. **2**: 594-495.
- HUNGERFORD H.B. & N.E. EVANS (1934): The Hydrometridae of the Hungarian national Museum and other studies in the family (Hemiptera). — Ann. Hist.-Nat. Mus. Nat. Hung. **28**: 31-112.
- HUNGERFORD H.B. & R. MATSUDA (1965): The genus *Ptilomera* AMYOT & SERVILLE (Gerridae: Hemiptera). — Univ. Kansas Sci. Bull. **45**: 397-515.
- JANSSON A. (1986): The Corixidae (Heteroptera) of Europe and some adjacent regions. — Acta Entomol. Fenn. **47**: 1-94.
- KIRKALDY G.W. (1898): Notes on aquatic Rhynchota. — The Entomologist **31**: 2-4.
- KIRKALDY G.W. (1901a): Miscellanea Rhynchotalia. — The Entomologist **34**: 5-6.
- KIRKALDY G.W. (1901b): On some Rhynchota, principally from New Guinea, (Amphibicorisae and Notonectidae). — Ann. Mus. Civ. Stor. Nat. Giacomo Doria **20**: 804-810.
- KIRKALDY G.W. (1904): Über Notonectiden (Hemiptera). I, II. — Wiener Entomol. Ztg. **23**: 93-135.
- LANSBURY I. (1973): A review of the genus *Cercotmetus* AMYOT & SERVILLE, 1843 (Hemiptera-Heteroptera: Nepidae). — Tijdschr. Entomol. **116**: 83-106.
- LANSBURY I. (1975): Notes on additions, changes and the distribution of the Australian water-bug fauna (Hemiptera-Heteroptera). — Mem. Nat. Mus. Victoria **36**: 17-24.
- LANSBURY I. (1985): Notes on the identity of *Nychia* STÅL (Hemiptera-Heteroptera: Notonectidae) in Australia. — The Beagle, Occasional Papers of the Northern Territory Museum of Arts and Sciences **2**: 1-9.

- LANSBURY I. (1990): New species of *Ventidius* DISTANT (Hem., Gerridae) from Thailand and Malaya. — Entomologist's Monthly Magazine **126**: 61-66.
- LANSBURY I. (1993): *Strongylovelia* (Veliidae) and *Metrobatopsis* (Gerridae) and associated pleuston Hemiptera of West New Britain. — Tijdschr. Entomol. **136**: 15-22.
- LANSBURY I. & H. ZETTEL (1997): New species and subspecies of the genus *Strongylovelia* ESAKI (Insecta: Heteroptera: Veliidae) from Borneo and the Philippines. — Ann. Naturhist. Mus. Wien **99 B**: 51-77.
- LINNAEUS C. (1758): Systema Naturae. Ed. X — Holmiae: 1-823.
- LA RIVERS I. (1974): Catalogue of taxa described in the family Naucoridae (Hemiptera) Supplement No. 1. — Biological Society of Nevada Occasional Papers **38**: 1-17.
- LUNDBLAD O. (1933): Zur Kenntnis der aquatilen und semiaquatilen Hemipteren von Sumatra, Java und Bali. — Archiv f. Hydrobiol. Suppl. **12** (Tropische Binnengewässer 4): 1-104, 263-489.
- LUNDBLAD O. (1936): Die altweltlichen Arten der Veliidengattungen *Rhagovelia* und *Tetraripis*. — Arkiv f. Zoologi **28 A** No. 21: 1-63, pls 1-12.
- MAYR G.L. (1865): Diagnosen neuer Hemipteren 2. — Verh. Zool.-Bot. Ges. Wien **15**: 429-446.
- MIYAMOTO S. (1967): Gerridae of Thailand and North Borneo taken by the joint Thai-Japanese Biological Expedition 1961-1962. — Nature and Life in Southeast Asia **5**: 217-257.
- MONTANDON A.L. (1897): Viaggio di Leonardo Fea in Birmania e regione vicine. — Ann. Mus. Civ. Stor. Nat. Genova (ser. 2) **17**: 365-377.
- MONTANDON A.L. (1909): Nepidae et Belostomidae. Notes diverses et descriptions d'espèces nouvelles. — Ann. Mus. Nat. Hung. **7**: 59-70.
- NIESER N. (2000): Three new species of *Micronecta* from Thailand with a key to SE Asian species (Heteroptera: Corixidae). — J. N.Y. Entomol. Soc. **107** [1999]: 277-288.
- NIESER N. (2004): Guide to aquatic Heteroptera of Singapore and Peninsular Malaysia. III. Pleidae and Notonectidae. — Raffles Bull. Zool. **52**: 79-96.
- NIESER N. & P.-p. CHEN (1999): Sixteen new species of Nepomorpha (Heteroptera) mainly from Sulawesi (Indonesia). — Tijdschr. Entomol. **142**: 77-123.
- NIESER N. & P.-p. CHEN (2005). The water bugs (Hemiptera: Nepomorpha and Gerromorpha) of Vanuatu. — Tijdschr. Entomol. **148** (2): 307-328.
- NIESER N., CHEN P.-p. & C.M. YANG (2005): A new subgenus and six new species of Nepomorpha (Insecta: Heteroptera) from Yunnan, China. — Raffles Bull. Zool. **53** (2): 189-209.
- PAPÁČEK M. & H. ZETTEL (2001): Notes on the Helotrephidae (Insecta: Heteroptera) of South India, with description on *Nanotrepes* gen.n. and five new species. — Ann. Naturhist. Mus. Wien **103 B**: 283-300.
- POLHEMUS D.A. (1994): Taxonomy, phylogeny, and zoogeography of the genus *Cylindrostethus* FIEBER in the Palearctic region. — Bishop Mus. Occ. Pap. **38**: 1-34.
- POLHEMUS D.A. (2001): A review of the genus *Ptilomera* (Heteroptera: Gerridae) in Indochina, with descriptions of two new species. — J. N.Y. Entomol. Soc. **109**: 214-234.
- POLHEMUS D.A. & J.T. POLHEMUS (1989): The Apheleirinae of tropical Asia (Heteroptera: Naucoridae). — Raffles Bull. Zool. **36** [1988]: 167-300.
- POLHEMUS J.T. & N.M. ANDERSEN (1984): A revision of *Amemboa* ESAKI with notes on the phylogeny and ecological evolution of eotrechine water striders (Insecta, Hemiptera, Gerridae). — Steenstrupia **10** (3): 65-111.
- POLHEMUS J.T. & P.B. KARUNARATNE (1993): A review of the genus *Rhagadotarsus*, with descriptions of three new species (Heteroptera: Gerridae). — Raffles Bull. Zool. **41**: 95-112.
- POLHEMUS J.T. & D.A. POLHEMUS (1995): Revision of the genus *Hydrometra* LATREILLE in Indochina and the western Malay Archipelago (Heteroptera: Hydrometridae). — Bishop Mus. Occ. Pap. **43**: 9-72.
- POLHEMUS J.T. & D.A. POLHEMUS (2000): The genus *Mesovelia* MULSANT & REY in New Guinea (Heteroptera: Mesoveliidae). — J. N.Y. Entomol. Soc. **108**: 205-230.
- SCHMIDT E.T. (1915): Das Genus *Cylindrostethus* FIEBER. — Stettiner Entomol. Z. **76**: 361-364.
- SCHMIDT E.T. (1926): Neue *Ptilomera*-Arten aus dem Stettiner Museum (Hemipt.-Heteropt.). — Entomologische Mitteilungen **15**: 63-66.
- SCOTT J. (1874): On a collection of Hemiptera Heteroptera from Japan. Descriptions of various new genera and species. — Ann. Mag. Nat. Hist. (4) **14**: 289-304, 360-365, 426-452.
- SITES R.W. & J.T. POLHEMUS (2001): Distribution of Helotrephidae (Heteroptera) in Thailand. — J. N.Y. Entomol. Soc. **109**: 372-391.
- STÅL C. (1858): Hemiptera. — Kongliga Svenska Fregatten Eugeniess resa omkring Jorden. Zoologi 1. Insecta: 219-298.
- TAMANINI L. (1947): Contributo ad una revisione del genere *Velia* LATR. E de di alcune specie nuove (Hemiptera, Heteroptera, Veliidae). — Mem. Soc. Entomol. Ital. **26**: 17-74.
- UHLER P.R. (1860): Hemiptera of the North Pacific Exploring Expedition. — Proc. Acad. Nat. Sci. Phil. **12** (1861): 221-231.
- YOUNG E.C. (1965): The incidence of flight polymorphism in British Corixidae and description of the morphs. — J. Zool. **146**: 567-576.
- ZETTEL H. (1994): *Fischerotrepes* gen.n., eine orientalische Gattung der Familie Helotrephidae, welche eine neue Unterfamilie repräsentiert.

- tiert (Heteroptera: Helotrephidae). — Linzer biol. Beitr. **26**: 1069-1079.
- ZETTEL H. (1997a): One new genus and two new species of Helotrephidae (Insecta: Heteroptera) from India, with notes on the phylogeny of the family. — Ann. Naturhist. Mus. Wien **99 B**: 83-95.
- ZETTEL H. (1997b): Notes on Helotrephidae (Insecta: Heteroptera) from Borneo with descriptions of two new species of the genera *Fischerotrepes* and *Trephotomas*. — Entomol. Probl. **28**: 117-126.
- ZETTEL H. (1998): Eine taxonomische revision der gattung *Hyrcanus* DISTANT, 1910 (Heteroptera: Hebridae) mit Neubeschreibungen von vier Arten aus Indien, Thailand, Laos und China. — Stapfia **55**: 585-606.
- ZETTEL H. (1999): The genus *Merragata* BUCHANAN-WHITE, 1877 (Gerromorpha: Hebridae) in Thailand, with notes on the Oriental taxa. — Amemboa **3**: 6-8.
- ZETTEL H. (2001): Die Indische Zwergschwimmwanze *Nanonaucoris* gen. n., eine neue Gattung der Naucorini (Heteroptera: Naucoridae) aus Südindien. — Linzer biol. Beitr. **33**: 1085-1095.
- ZETTEL H. (2003a): Additional notes on the Aphelecheiridae, Naucoridae, and Notonectidae (Insecta: Heteroptera: Nepomorpha) of the Philippine Islands. — Ann. Naturhist. Mus. Wien **104 B**: 109-130.
- ZETTEL H. (2003b): New species, subspecies, and records of *Strongylovelia* ESAKI, 1924 (Insecta: Heteroptera: Veliidae) from the Philippines. — Ann. Naturhist. Mus. Wien **104 B**: 183-193.
- ZETTEL H. (2003c): *Strongylovelia seyferti* sp.n. (Heteroptera: Veliidae: Haloveliinae) from Waleakodi, Kepulauan Togian, first record of the genus for the Sulawesi area. — Linzer Biol. Beitr. **35**: 1135-1140.
- ZETTEL H. (2004a): Neue Wasserläufer (Insecta: Heteroptera: Gerridae) von den Philippinen. — Ann. Naturhist. Mus. Wien **105 B**: 361-387.
- ZETTEL H. (2004b): Revision of the *Timasius chinai* species group (Insecta: Heteroptera: Hebridae), with descriptions of ten new species. — Insect Syst. Evol. **35**: 241-260.
- ZETTEL H. & P.-P. CHEN (1996): An illustrated key to the Hydrometridae of Thailand. — Amemboa **1**: 14-17.
- ZETTEL H. & P.-P. CHEN (1997): Three new taxa of *Amemboa* ESAKI, 1925, from Thailand and Viet Nam (Heteroptera: Gerridae). — Ann. Hist.-Nat. Mus. Nat. Hung. **89**: 93-101.
- ZETTEL H. & YANG C.M. (2004): New oriental species and subspecies of *Hydrometra* LATREILLE (Heteroptera: Hydrometridae). — Raffles Bull. Zool. **52**: 389-398.
- ZETTEL, H. & A.D. TRAN (2006): New species and new records of Haloveliinae (Insecta: Heteroptera: Veliidae) from Vietnam. — Ann. Naturhist. Mus. Wien **107 B**: 71-90.

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