

Amemboa

News and Results on Heteroptera of Thailand

Number 1

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From the Editor's view ...

We are studying details, but we must see things in context.

Thailand is situated in the center of the Southeast Asian landmass. This area is - together with the Amazonian and African rain forests and the Malayan-Papuan Archipelago - one of the hot spots of biodiversity on earth. But because Thailand always has been independent from colonialism, Western scientists did not pay enough attention to the richness of the fauna and flora of Thailand during the last two centuries. This changed during the last twenty years when biologists started to "discover" the high biodiversity - attracted by an enforced tourism, an exemplary enforcement of Thai nature protection, and the willingness of Thai scientists to undertake co-operative projects.

Only two examples - taken from semiaquatic and aquatic Heteroptera - will demonstrate the diversity of the Thai fauna: The Oriental waterstrider genus *Amemboa* (Gerridae) contains 25 described species, of which 10 are recorded from Thailand. Two more species from Thailand are known, but undescribed, and probably further new species will be discovered in the future. This means that more than 40 % of the known species live in Thailand. The richness of Thai *Amemboa* is the reason for the name of this newsletter! - In the genus *Helotrephes* (Helotrephidae) only four species are described from China and Taiwan, but recently collected material from Thailand contains eight undescribed species.

Because of its geographical position, the Thai fauna is very interesting for a zoogeographical analysis of the Southeast Asian region. As far as we know there are some centres of endemism within this area, e.g. the southern part of Thailand forms together with Peninsular Malaysia a zoogeographical area which is very different from other parts of the country; the Northeast of Thailand has some similarities with the fauna of Viet Nam; the fauna of North Thailand shows close connections with those of Myanmar and Yunnan Province in China.

Today, "Biodiversity Projects" are the main arguments for a global nature protection. But so far nature protection is mainly based on diversity of plants, birds, mammals, reptiles and amphibians. Insects (although containing four-fifths of described species of the world) play an unimportant part, except for some colourful butterflies and beetles. Reasons are restricted knowledge and the less popular reputation of insects. Therefore it is a bold but exciting idea of Pingping Chen to start a project called "Heteroptera of Thailand". Perhaps there will not be strong public support for the study of Thai bugs. But on the other hand Heteroptera show a high diversity in species and life forms; so they are ideal objects for a biodiversity project with the goal of secondary applied use.

Imprint: "*Amemboa*" is a newsletter for taxonomical, systematical, and faunistical co-operative works on Thai Heteroptera. Editor: Dr. Herbert Zettel, Naturhistorisches Museum Wien, 2. Zoologische Abteilung, Burgring 7, A-1014 Vienna, Austria. Proof reading: Prof. Dr. C. W. Schaefer, Storrs, USA. Published by Naturhistorisches Museum Wien. © Naturhistorisches Museum Wien, 1996. Authors are fully responsible for the content of their papers.

Due to a rapid increase of knowledge during the last twenty years (especially by Nils Møller Andersen, John T. & Dan A. Polhemus, Nico Nieser, Antti Jansson, Pingping Chen, and many others) aquatic and semiaquatic Heteroptera are among the best-known insect groups. Although there are still numerous undescribed species, there is an excellent base for research. Scientists are working on the Oriental fauna in a fruitful competition. That is why it is easy to find contributors to these groups. And that is why this issue deals only with aquatic Heteroptera. We hope that soon studies on terrestrial bugs will follow!

Issue 1 will demonstrate the intended purpose of *Amemboa*: To keep contact between co-operators of the project; to offer information to interested scientists; to provide co-operators and applied scientists with simple keys; and last but not least to ask questions!

Herbert Zettel

Exploring Thailand ...

During a collecting trip (November 1994 – February 1995) in Thailand, and after discussion with Thai biologists at several universities and in the Department of Agriculture, I have been working out a plan to study the aquatic and semi-aquatic Heteroptera in Thailand. Urbanization has become a major problem in the country, and Thai biologists have been using aquatic insects as bioindicators of water quality. A series of handbooks has been and is being published: two on Thai odonates in 1995, from co-operative work between Thai and Japanese scientists; and Thais in the north and northeast are working with American and Austrian collaborators on the caddis flies of Thailand.

About 30 years ago a small brochure on aquatic bugs of Thailand was published, in the Thai language; unfortunately, it is incomplete, and contains misidentifications and some wrong names. Recently, revisionary works on semi-aquatic bugs by such people as N.M. Andersen and J.T. and D.A. Polhemus have used Thai material; and in general the Thai semi-aquatic bug fauna may be better known than many others of the country's faunas.

The plan is to work out the aquatic and semi-aquatic bug fauna of Thailand. The plan has been enthusiastically endorsed by several research departments in the country (Phitsanulok Univ., Khon Kaen Univ., Chulalongkhon Univ., Chiang Mai Univ., Department of Agriculture [national], and Biological Science Society of Thailand). Later, it is planned to expand the project to include various groups of terrestrial Heteroptera. The aim is to increase knowledge of the fauna, both by world scientists and by local people. Thus taxonomists interested in the Oriental bug fauna will have access to collections, and will have a manual(s) useful when collecting in the country. Perhaps more important, local people will be able to know, to use, and to learn from their own fauna.

The main points of the plan are these:

- * To produce a book (in English) with illustrated keys to the known species of Thai aquatic and semi-aquatic bugs. In addition, preliminary checklists of some terrestrial groups will be published.
- * To continue the collecting trips into the year 2000: at least one trip per year.
- * To encourage collecting trips, which may be co-ordinated through me. Unfortunately, money for such trips is not available.
- * To make available to experts the material collected.
- * To issue this newsletter for keeping contact and informing interested scientists. Progress, and tentative research results, will appear here. "*Amemboa*" will be edited by Herbert Zettel, Natural History Museum in Vienna.

The final result will be handbooks as described above. The production of these will be supported financially by several commercial companies in Thailand.

Several experts have already expressed interest in this work. Anyone interested should get in touch with me as soon as possible.

Ping-ping Chen

List of collaborators

Bu, W.J.: Anthocoridae

Chen, P.P.: Mesoveliidae, Hydrometridae, Gerridae, Veliidae

Hecher, Ch.: Veliidae (Microveliinae)

Heiss, E.: Aradidae

Kerzhner, I.M.: Nabidae

Nieser, N.: Belostomatidae, Nepidae, Ochteridae, Gelastocoridae, Aphelocheiridae, Notonectidae, Pleidae, Corixidae, Micronectidae

Polhemus, J.T.: Leptopodomorpha, Nepidae

Ren, S.Z.: Coreidae, Reduviidae

Schaefer, C.W.: Pyrrhocoridae, Largidae, Alydidae

Sites, R.: Naucoridae

Yang, C.M.: Gerridae, Veliidae

Zettel, H.: Helotrephidae, Hebridae, Hydrometridae, Gerridae, Veliidae

Zheng, L.Y.: Acanthosomatidae, Lygaeidae, Malcidae, Miridae, Pentatomidae, Plataspidae, Urostylidae

Ping-ping Chen

An illustrated key to the families of Nepomorpha in Thailand

by Nico Nieser

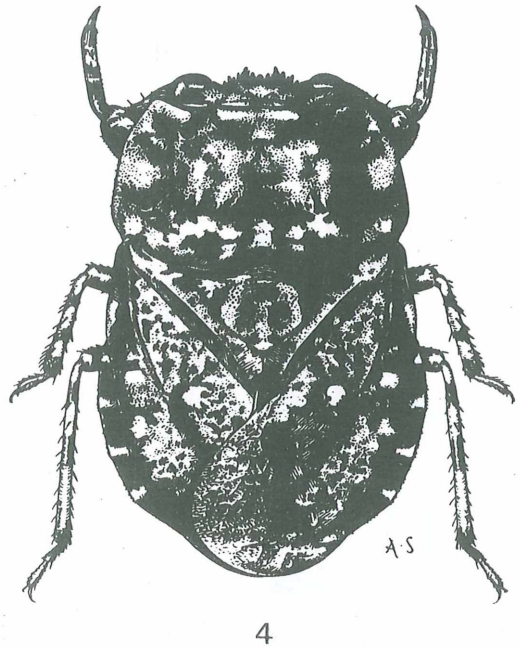
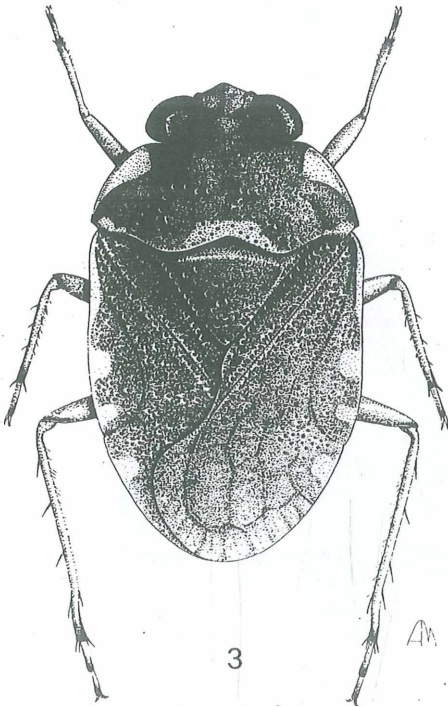
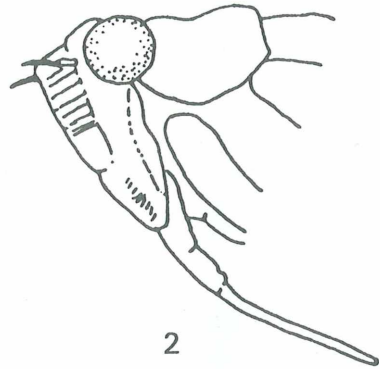
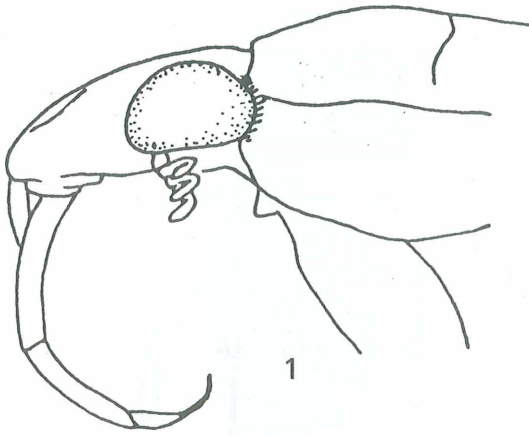
Abstract: An illustrated key is provided for the eleven families of Nepomorpha which occur in the Oriental realm. Notes on biology and habitat preference are included.

To distinguish Hemiptera from other insects the reader is referred to a general text on entomology. A useful difference between Homoptera and Heteroptera is the development of the gula, which in Homoptera is reduced so that the rostrum originates backward on the ventral side of the head (Fig. 1). In Heteroptera the gula is well developed and the rostrum originates at the anterior end of the head (Fig. 2). In addition the wings of Heteroptera, when fully developed, overlap with their caudal parts (membranes), which is not the case in Homoptera. Various Homoptera live on more or less aquatic plants. Also representatives of various terrestrial heteropteran families may live near the water's edge or on marsh plants and thus may be collected by accident in aquatic sampling and may occasionally pollute a sample.

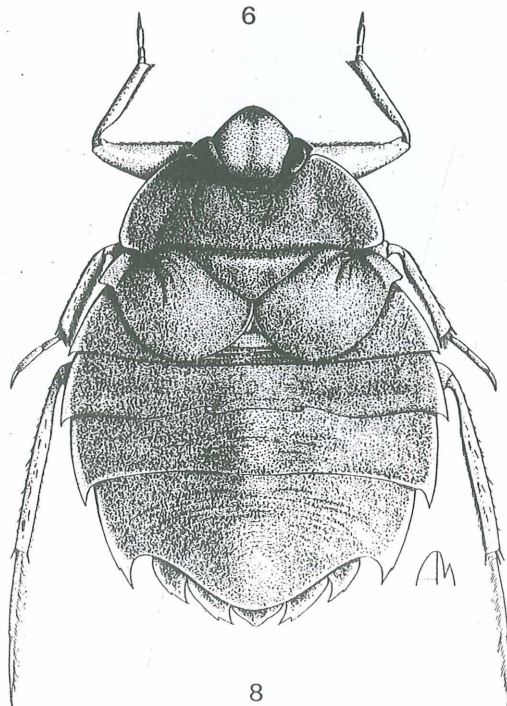
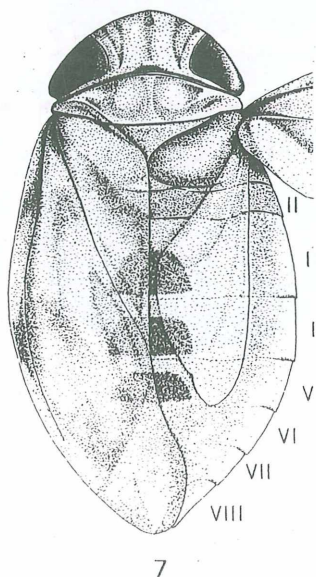
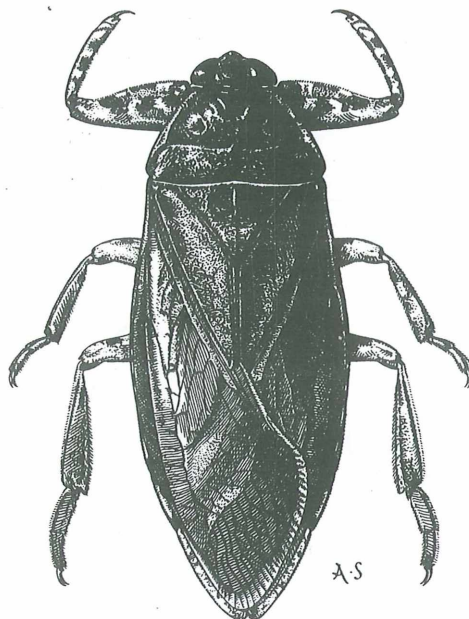
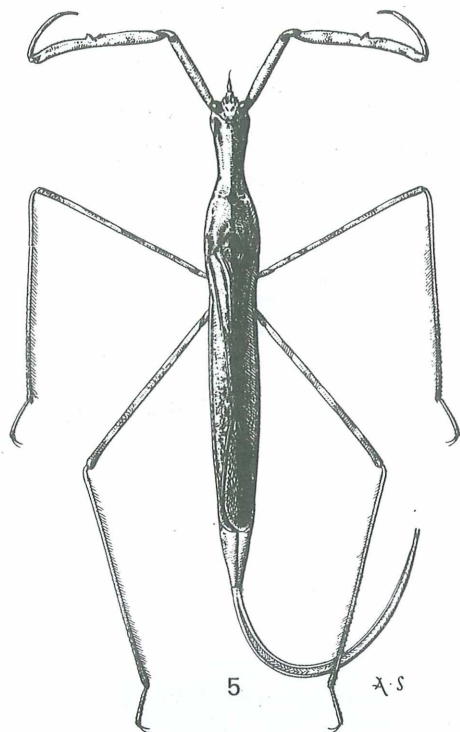
Ten families of Nepomorpha are recorded from Thailand, the presence of an eleventh family (Gelastocoridae) is likely. Nepomorpha are usually easy to distinguish from semiaquatic Gerromorpha (see following article by Chen & Zettel) and from terrestrial Heteroptera by the characters of antenna mentioned under point 0. Representatives of other families with very short antennae are very specialized forms with reduced eyes found on bats or in termites nests. The key is based on adults but most characteristics (except size and wings) are valid for larvae too.

Key to the families of Nepomorpha in Thailand

- 0 Antennae inserted beneath eyes, usually shorter than the head and at least their basal part concealed under the head (**Nepomorpha**) 1
 - Antennae longer than the head, inserted forward of eyes and well visible from above **Gerromorpha and terrestrial Heteroptera**
- 1 Ocelli present (Ochteroidea) 2
 - Ocelli absent 3
- 2 Fore femur not thickened, rostrum very long and slender, reaching the hind coxae, habitus see Fig. 3 **Ochteridae**
 - Ochteridae are active insects, which fly easily and live terrestrially at the edge of the water. In Thailand represented by the genus *Ochterus* LATREILLE.
 - Fore femur strongly thickened, rostrum short and stout, not or hardly reaching beyond the posterior margin of the prosternum, habitus see Fig. 4..... **Gelastocoridae**
 - Species of this family are sluggish semiaquatic insects, which in day time burrow in wet soil usually at the edge of water bodies and creeping on the surface at night. So far this family is not recorded from Thailand, but occurrence of the genus *Nerthra* SAY is probable.
- 3 Rostrum short and broadly triangular, not segmented but in some species with transverse grooves, posterior margin of head covering the anterior part of pronotum (Corixoidea)



Figs. 1 - 2: Head in lateral view, (1) Heteroptera, (2) Homoptera (from NIESER & ALKINS-KOO 1991).
 Figs. 3 - 4: Habitus of (3) *Ochterus* sp. (Ochteridae) and (4) *Nerthra* sp. (Gelastocoridae) (3 from NIESER 1982; 4 from USINGER 1956 in MENKE 1979) (different scales).



Figs. 5 - 8: Habitus of (5) *Ranatra* sp. (Nepidae), (6) *Lethocerus* sp. (Belostomatidae), (7) *Micronecta* sp. (Micronectidae), and (8) *Aphelocheirus* sp. (Aphelocheiridae) (5, 6 from USINGER 1956 in MENKE 1979; 7, 8 from NIESER 1982) (different scales).

Rostrum distinctly segmented and more or less parallel-sided, posterior margin of head not covering anterior part of pronotum..... 5

- 4 Scutellum exposed, rostrum without transverse grooves, small species, length less than 3 mm, habitus see Fig. 7 **Micronectidae**

Species live in more or less stagnant waters including quiet bays of streams. Various species are regularly collected at light. Two genera occur in Thailand: *Synaptonecta* LUNDBLAD, with one species, and *Micronecta* KIRKALDY represented by numerous species.

Scutellum entirely or nearly entirely covered by pronotum, length 3 mm or more..... **Corixidae**

Habitat and biology are similar to preceding family. In Thailand Corixidae are represented by the genus *Sigara* FABRICIUS, mainly subgenus *Tropocorixa* HUTCHINSON.

- 5 A long, non retractable respiratory siphon present (Fig. 5) (the halves of the siphon are not fully fused, especially in dry specimens they may split sometimes) (Nepoidea) **Nepidae**

Nepidae are mostly slowly moving insects which usually hide in the mud or between plants. In Thailand three genera are recorded: *Laccotrephes* STÅL, *Ranatra* FABRICIUS, and *Cercotmetus* AMYOT & SERVILE.

Respiratory appendages absent or paired and retractable 6

- 6 A pair of retractable caudal respiratory strips present, membrane with distinct veins (Fig. 6) (Nepoidea)..... **Belostomatidae**

Belostomatidae are excellent swimmers, which, nevertheless, usually hide within vegetation. In Thailand this family is represented by two genera, *Lethocerus* MAYR ("Giant Water Bug") and *Diplonychus* LAPORTE.

Respiratory appendages absent, membrane without veins (e.g. Fig. 9) 7

- 7 Flat oval to nearly circular insects, swimming with their belly downward, anterior legs inserted on the anterior margin of the prosternum (Naucoroidea) 8

Boatshaped or globular insects, swimming with their belly upward, anterior legs inserted on the posterior margin of the prosternum (Notonectoidea) 9

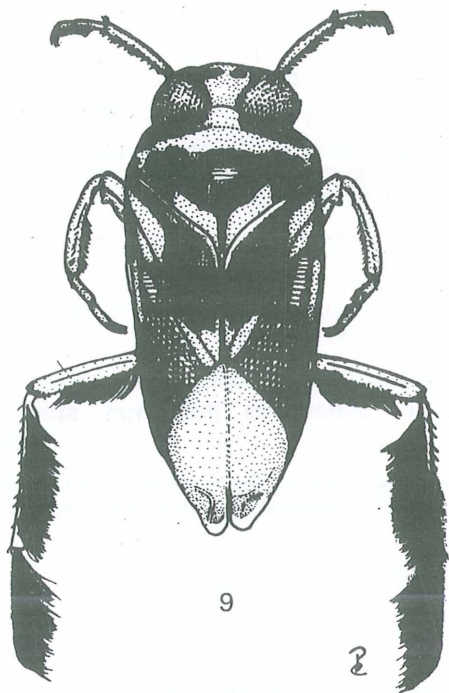
- 8 Rostrum long and narrow, reaching hind coxae, head elongate, as long as or slightly longer than broad, apical part of antennae often visible from above, fore femur hardly thickened, habitus see Fig. 8 **Aphelocheiridae**

Species of the single genus *Aphelocheirus* WESTWOOD live in streams with sandy bottoms, during the day burrowing in the sand of the stream bed, at least some species at night active on the surface.

Rostrum short and stout, not reaching beyond fore coxae, head distinctly transverse, antennae fully concealed under the head, fore femur distinctly thickened **Naucoridae**

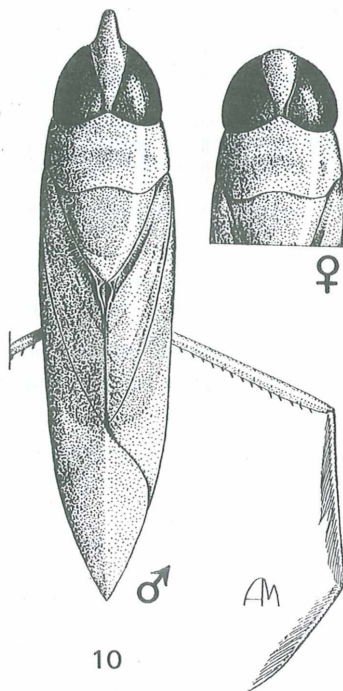
This family is represented by several genera in Thailand. Depending on species, occurring in both stagnant and running waters.

- 9 Head and pronotum fused (in most species head and pronotum recognizable by a shallow more or less W-shaped groove), antennae with 2 segments or less, small insects, length 3.5 mm or (usually distinctly) less **Helotrephidae**



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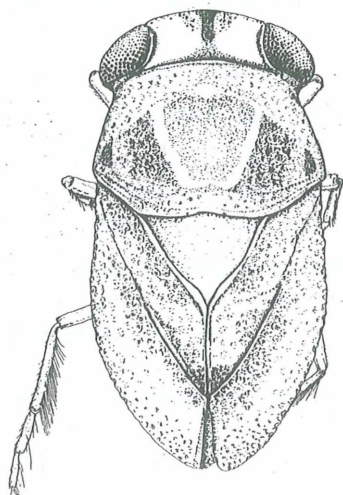


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Figs. 9 - 11: Habitus of (9) *Enithares* sp., (10) *Anisops* sp. (both Notonectidae), and (11) *Plea* sp. (Pleidae), (9 from NIESER & CHEN, in print; 10, 11 from NIESER 1982) (different scales).

Most species are found at the edges of streams, usually at places with little current, only a few species are typical for stagnant waters. So far six genera are known to the author from Thailand.

Head and pronotum separate (Figs. 9 - 11), antennae with 3 or 4 segments, size variable 10

- 10 Small insects, length about 2.5 mm or less, antennae with 3 segments, membrane of hemielytra apparently absent, habitus see Fig. 11 **Pleidae**

Species of the single Oriental genus *Paraplea* ESAKI & CHINA live in stagnant waters within vegetation.

Size variable but nearly always over 3 mm, antennae with 4 segments, membrane of hemielytra present (large in macropterous forms, rather small in some brachypterous forms), habitus see Figs. 9 - 10 **Notonectidae**

Notonectidae prefer stagnant waters, including bays of streams with virtually no current, usually free floating either at the surface or suspended in the water. In Thailand the following genera are recorded: *Anisops* SPINOLA, *Aphelonecta* LANSBURY, *Enithares* SPINOLA, and *Nychia* STÅL.

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- Author's address:** Dr. Nico Nieser, Htg. Eduardstraat 16, NL-4001 Tiel, Netherlands.

An illustrated key to the families of Gerromorpha in Thailand

by Ping-ping Chen & Herbert Zettel

Abstract: An illustrated key is provided for the five families of Gerromorpha which occur in Thailand.

Gerromorpha are a group of an unusual life form of semiaquatic bugs living either on the water surface or the damp water edge. Morphologically there are apterous (wingless), macropterous (full winged), or brachypterous (short winged) forms. Gerromorpha bugs are ideal objects for ecological studies. Besides, certain species are of importance as bioindicators for water pollution.

Taxonomically under Hemiptera Heteroptera, Gerromorpha include eight families and 115 genera (ANDERSEN 1982; several more genera described during the last 15 years). In Thailand so far only five families have been reported.

The key to the families of Thai Gerromorpha follows mainly the keys of ANDERSEN (1982) for the families of the world, and ZHENG & al. (1994) for the families of China.

Key to the families of Thai Gerromorpha

- 1 Head distinctly prolonged (Fig. 9) **Hydrometridae**

In Thailand this family is represented only by the genus *Hydrometra* LATREILLE. *Hydrometra* species live at the edge of stagnant waters, including bays of streams and brooks, partly on the surface of the water, partly terrestrial.

Head much shorter (Figs. 1 - 3, 7, 8, 10 - 12) 2

- 2 Macropterous specimens..... 3

Apterous or brachypterous specimens..... 6

- 3 Metanotal elevation distinctly exposed, forming a large plate (Fig. 1) 4

Metanotal elevation not present, metanotum covered by the pronotal lobe 5

- 4 Tarsi two-segmented (Fig. 4), head ventrally with bucculae covering the base of rostrum (Fig. 2)..... **Hebridae**

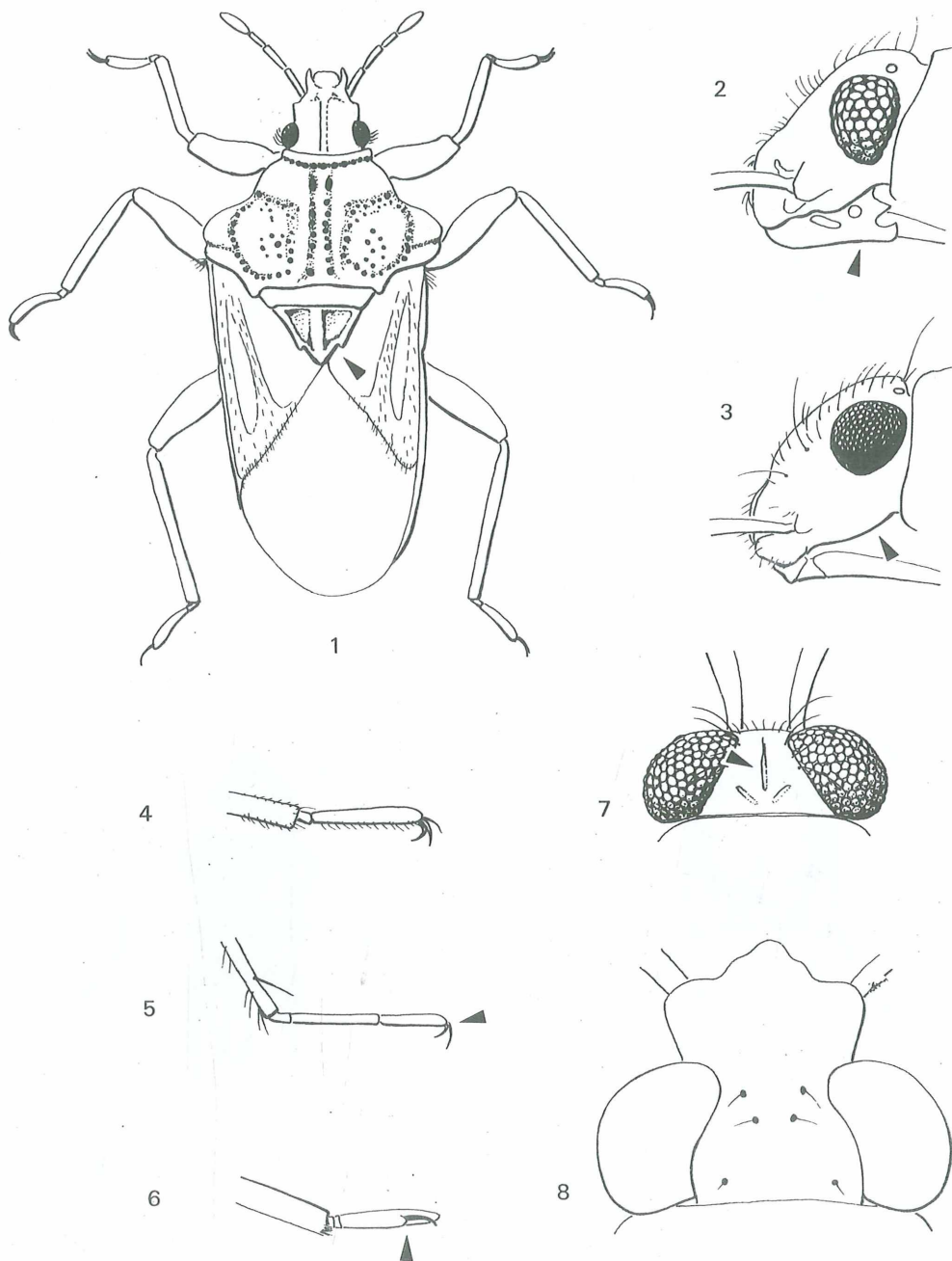
Hebridae are small insects mainly living on land at the edge of the water. A few species live at the surface of the water, and a few are even subaquatic. In Thailand the family is represented by the genera *Hebrus* CURTIS, *Merragata* WHITE, *Timasius* DISTANT, *Hyrcanus* DISTANT, and one undescribed genus.

Tarsi three-segmented (Fig. 5), head without bucculae (Fig. 3) **Mesoveliidae**

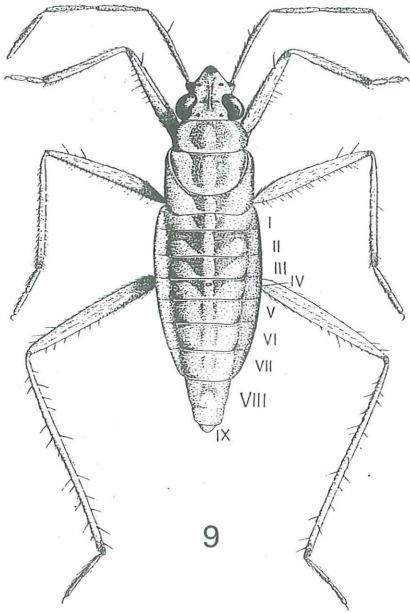
The few species of the genus *Mesovelvia* MULSANT & REY live at the edge of stagnant waters including bays of streams without current, or are hygropetric on mossy rocks.

- 5 Head medio-dorsally with a distinct impressed line (Fig. 7), legs usually not very long and slender (Fig. 12), hind femora usually stouter than middle femora, very small to medium sized species..... **Veliidae**

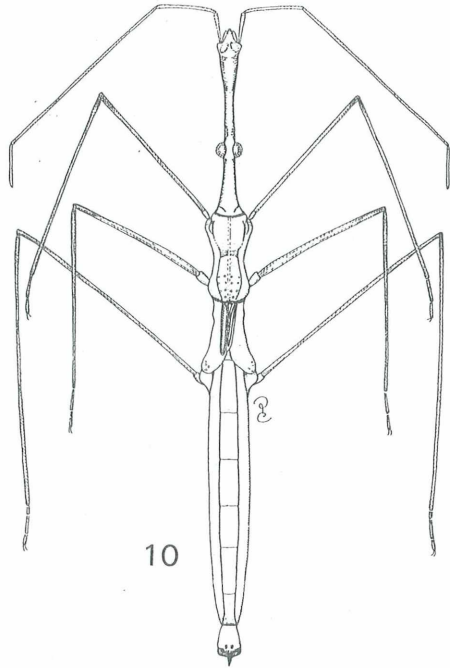
Large family with 13 described genera known from Thailand; a further three genera may occur. About 30 species are known by the authors, mostly undescribed or not recorded from Thailand. Species live in various limnic habitats in running and stagnant waters, two genera (*Halovelia* BERGROTH and *Haloveloides* ANDERSEN) live on the sea shore.



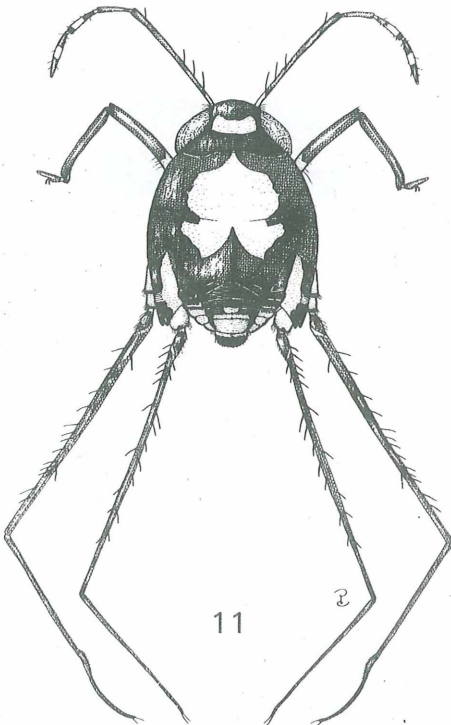
Figs. 1 - 8: (1) Habitus of *Hyrcanus* sp. (Hebridae) (► metanotal elevation); head, lateral view, of (2) *Timasius* sp. (Hebridae) (► buccula) and (3) *Mesovelia vittigera* (Mesoveliidae); hind tarsi of (4) *Timasius* sp. (Hebridae) and (5) *Mesovelia vittigera* (Mesoveliidae), and (6) *Rhagovelia sumatrensis* (Veliidae) (► insertion of claws); head, dorsal view, of (7) *Rhagovelia sumatrensis* (Veliidae) (► impressed midline of head) and (8) *Ptilomera tigrina* (Gerridae) (different scales).



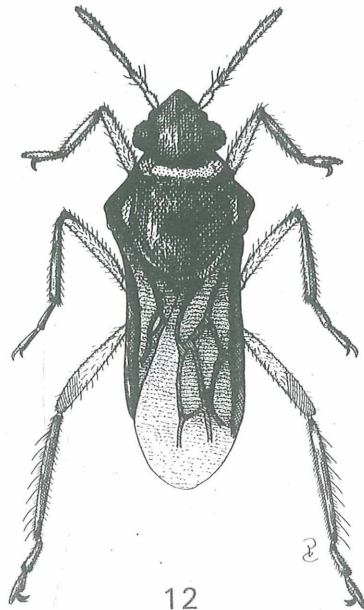
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Figs. 9 - 12: Habitus of (9) *Mesovelia* sp. (Mesoveliidae), (10) *Hydrometra* sp. (Hydrometridae), (11) *Ventidius* (*Ventidioides*) sp. (Gerridae), and (12) *Microvelia* sp. (Veliidae) (different scales).

Head medio-dorsally without impressed line (Fig. 8), legs usually very long and slender (Fig. 11), hind femora usually more slender than middle femora, usually medium-sized to large, but also with a few small representatives.....

Gerridae

Very large family with 20 genera (including one undescribed) and more than 40 species known from Thailand. A further five genera may occur but are so far not recorded. Species live in stagnant as well as in running waters; *Halobates* ESCHSCHOLTZ is marine.

- | | | |
|---|--|---------------------|
| 6 | Metanotal elevation distinctly exposed, forming a large plate (Fig. 1) | Hebridae |
| | Metanotum not elevated | 7 |
| 7 | Abdominal scent orifice on tergite 4 present (Fig. 10), claws inserted apically (Fig. 5) | Mesoveliidae |
| | Abdominal scent orifice absent, claws inserted not apically in most genera (e.g. Fig. 6) | 5 |

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Small notes, announcements & requests:

For my studies on Thai aquatic and semiaquatic bugs within the current project, I would like to borrow all "Indo-Chinese" material of Helotrephidae and Hebridae from any collections.

Herbert Zettel
Naturhistorisches Museum Wien
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Thai material of the following genera of Microveliinae (Veliidae) is needed for revision: *Pseudovelgia* and *Xiphovelgia*. Material from Philippine Islands is also welcome.

Christine Hecher
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An illustrated key to the Hydrometridae of Thailand

by Herbert Zettel & Ping-ping Chen

Abstract: Nine species of the genus *Hydrometra* LATREILLE are known from Thailand. An illustrated key to these species is provided. The presence of further three species seems possible.

In Thailand the family Hydrometridae is represented by the genus *Hydrometra* LATREILLE only. This genus is easily recognizable by the long, slender head, which is unique among the Gerromorpha of Thailand. Recently ANDERSEN (1992) revised the species of the *H. longicapitis*-group, and POLHEMUS & POLHEMUS (1995) the *Hydrometra* of Indochina and the Western Malay Archipelago. According to this paper (POLHEMUS & POLHEMUS 1995), six species occur in Thailand, two further (*H. carinata*, *H. gilloglyi*) were collected by the authors, and a ninth species (related to *H. julieni*) seems to be undescribed. The presence of a further three species seems probable. The revision of POLHEMUS & POLHEMUS (1995) contains also a key to species, which is based mainly on male characters.

For an identification of the Thai species only, we present an easier key to those species which are known from Thailand (and are present in our collections), and try to offer an identification key to females, too. Mainly by the shape of the anteclypeus, we divide the species of the Southeast Asian mainland into five species groups.

List of species groups and species of Thailand

[Species in brackets not recorded but probably present in Thailand]

Hydrometra longicapitis group:

Hydrometra carinata POLHEMUS & POLHEMUS, 1995

Hydrometra longicapitis TORRE-BUENO, 1927

Hydrometra ripicola ANDERSEN, 1992

Hydrometra julieni group:

Hydrometra gilloglyi POLHEMUS & POLHEMUS, 1995

Hydrometra sp.

[*Hydrometra julieni* HUNGERFORD & EVANS, 1934]

[*Hydrometra papuana* group:]

[*Hydrometra papuana* KIRKALDY, 1901]

Hydrometra lineata group:

Hydrometra annamana HUNGERFORD & EVANS, 1934

Hydrometra greeni KIRKALDY, 1898

Hydrometra maidli HUNGERFORD & EVANS, 1934

Hydrometra orientalis LUNDBLAD, 1933

[*Hydrometra cracens* POLHEMUS & POLHEMUS, 1995]

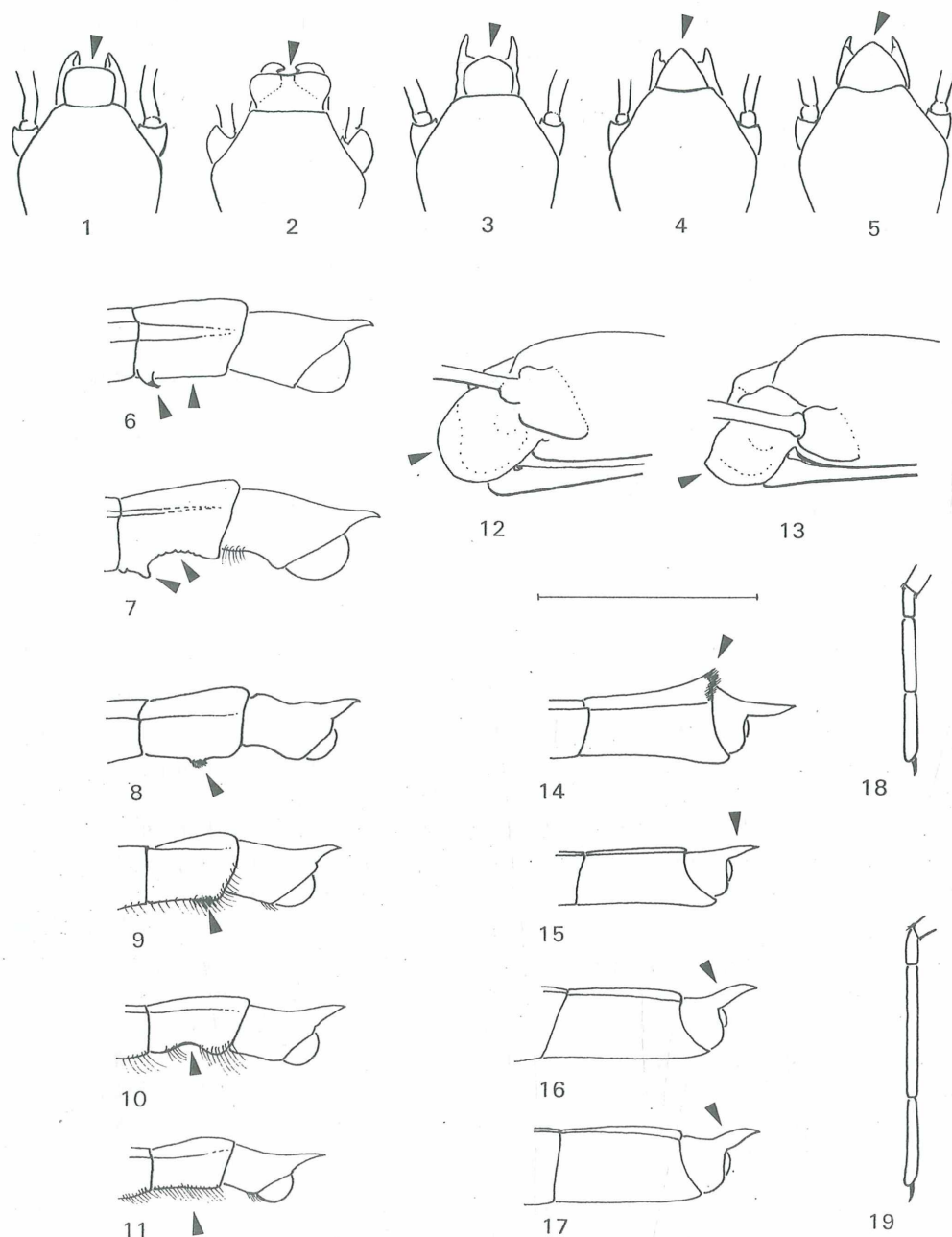
Key to the *Hydrometra* species recorded from Thailand

(partly modified after POLHEMUS & POLHEMUS 1995)

Male: tip of abdomen as in Figs. 6 - 11.

Female: tip of abdomen as in Figs. 14 - 17.

- 1 Anterior margin of anteclypeus truncate or medially concave (Figs. 1, 2), if broadly angulate (Fig. 3), then middle tarsus shorter than one-seventh of length of middle tibia..... 2
Anterior margin of anteclypeus angulate or narrowly rounded (Fig. 4, 5), middle tarsus always longer than one-seventh of length of middle tibia 6
- 2 Anteclypeus shorter than wide, concave in middle of anterior margin, with more or less depressed midline (Fig. 2), middle tarsus longer than one-sixth of length of middle tibia..... 3
Anteclypeus as long as wide, medially truncate or broadly angulate, without depressed midline (Fig. 1, 3), middle tarsus shorter than one-seventh of length of middle tibia 4
- 3 Anteclypeus nearly straight in middle of its anterior margin, with impressed midline only in anterior half, smooth laterally (Fig. 2), process of tergite 8 directed downward *H. gilloglyi*
Anteclypeus deeply concave in middle of its anterior margin, with deeply impressed midline in anterior two-thirds, rugous laterally, process of tergite 8 directed straight backward *H. sp.*
We have a single female which probably represents a new species.
- 4 Body extremely long (males 14.5 mm, females 15.5 mm minimum length), maxillary plates very large (Fig. 12), sternites of female carinate *H. carinata*
Body shorter (males 14.0 mm, females 15.0 mm maximum length), maxillary plates elongate (Fig. 13), sternites of female not carinate 5
- 5 Middle and hind tarsi very short, length of middle tarsus less than one ninth of length of middle tibia, second segment of middle tarsus about 1.2 times as long as third (Fig. 18), sternite 7 of male not impressed and with a pair of small, setiferous tubercles close to its anterior margin (Fig. 6), only micropterous form known (wing rudiments about one-fourth of length of metanotum) *H. ripicola*
Middle and hind tarsi longer, length of middle tarsus more than one-eighth of length of middle tibia, second segment of middle tarsus more than 1.5 times as long as third (Fig. 19), sternite 7 of male impressed and with a pair of large, not setiferous tubercles close to its anterior margin (Fig. 7), brachypterous (wing rudiments about as long as metanotum) and macropterous form known *H. longicapitis*
- 6 Males..... 7
Females..... 10
- 7 Hind femur with a fringe of thin, long, erect hairs, sternite 7 with a cluster of short setae (Figs. 8, 9) 8
Hind femur without long erect hairs, sternite 7 without a cluster of short setae (Figs. 10, 11) 9



Figs. 1 - 5: Anteclypeus of (1) *H. ripicola*, (2) *H. gilloglyi*, (3) *H. longicapitis*, (4) *H. greeni*, (5) *H. maidli*. Figs. 6 - 11: Segments 7 - 9 of males of (6) *H. ripicola*, (7) *H. longicapitis*, (8) *H. annamana*, (9) *H. maidli*, (10) *H. greeni*, (11) *H. orientalis*. Figs. 12 - 13: Tip of head of (12) *H. carinata* and (13) *H. ripicola*. Figs. 14 - 17: Segments 7 - 8 of females of (14) *H. greeni*, (15) *H. orientalis*, (16) *H. annamana*, (17) *H. maidli*. Figs 18 - 19: Middle tarsus of (18) *H. ripicola* and (19) *H. longicapitis*. Scale: 6 - 11, 14 - 17: 1 mm; 1 - 5, 12, 13, 18, 19: 0.625 mm.

- 8 Sternite 7 with a pair of smaller, tightly clustered black setae just behind middle (Fig. 8)..... *H. annamana*
 Sternite 7 with a pair of longer, less tightly clustered brown setae near posterior margin (Fig. 9) *H. maidli*
- 9 Sternite 7 with a broad, transverse sulcus, easily seen in lateral view (Fig. 10) *H. greeni*
 Sternite 7 without this sulcus (Fig. 11) *H. orientalis*
- 10 Hind margin of tergite 7 raised and with longer, black hairs, which are sometimes rubbed off (Fig. 14)..... *H. greeni*
 Hind margin of tergite 7 not raised, without longer hairs (Figs. 15 - 17) 11
- 11 Process of tergite 8 directed upward (Figs. 16, 17), pronotum with three whitish longitudinal lines (middle line and sublateral lines), which are sometimes less distinct 12
 Process of tergite 8 directed straight posteriorly (Fig. 15), pronotum at most with a faint whitish middle line *H. orientalis*
- 12 Process of tergite 8 at least as long as its anterior part (Fig. 16) *H. annamana*
 Process of tergite 8 shorter than its anterior part (Fig. 17)..... *H. maidli*

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A preliminary list of aquatic and semiaquatic Heteroptera (Nepomorpha, Gerromorpha) from the Maekhong-Chi-Mun rivers area, Thailand

by Yupa Hanboonsong, Pinthita Mungkandee & Herbert Zettel

Abstract: A list of Nepomorpha and Gerromorpha from the Maekhong-Chi-Moon rivers area in Ubon Ratchathani Province, Thailand, is presented. All together 26 species in 9 families are recorded. The following species are newly recorded for Thailand: *Anisops barbatus* BREDDIN, *Anisops nigrolineatus* LUNDBLAD (Notonectidae), *Neolardus typicus* (DISTANT) (Veliidae), *Gerris nepalensis* DISTANT, *Ptilomera hylactor* BREDDIN, and *Ventidius modulatus* LUNDBLAD (all Gerridae).

Introduction

Maekhong, Chi and Moon rivers are three main fresh water reservoirs for people in the Northeast of Thailand. Chi River (Nam Chi) passes through the Northeast region from west to east. Mun River (Nam Mun) drains a large part of Ubon Ratchathani Province by several tributaries and joins Chi in the West of Muang Ubon in the South of Ubon Ratchathani; then Chi runs to the Maekhong River (Mae Nam Khong), which constitutes the border between Thailand and Laos.

The present day concerns of these resources is the impact of water quality due to rapid growth of industrialization and population. Beside physical and chemical measurements of water quality, aquatic insects have been widely used as bioindicators for this purpose. To test the water quality of the river system, a study was carried out by the first and second authors involving seasonal monitoring of aquatic insects from several sites in the Maekhong-Chi-Mun river system in Ubon Ratchathani Province (see Tab. 1).

The results from physical and chemical measurements of these three water resources have shown high levels of oxygen (7.10–8.25 mg/l) and low levels of nutrients (nitrogen and phosphorus), heavy metals, and other organic matter. It is implied that the water quality of Maekhong-Chi-Mun rivers that pass through sites in Ubon Ratchathani is still of good quality and has not much contamination. This is also indicated by the results of aquatic insect samplings.

In the course of the study, material of six insect orders (Ephemeroptera, Odonata, Heteroptera, Trichoptera, Coleoptera, and Diptera) was collected. In the following, the results on aquatic and semiaquatic Heteroptera are presented. The following species list is a contribution to the knowledge of the Heteroptera fauna of Northeast Thailand, especially to that of Ubon Ratchathani Province, from which so far no aquatic Heteroptera have been reported in literature.

Material and Methods

The study was a seasonal survey of Maekhong-Chi-Mun rivers by the first and second authors from July 1995 to July 1996. Eleven sampling sites (see Tab. 1) were chosen for collecting aquatic insects. Specimens were collected qualitatively and preserved in ethanol. The physical and chemical parameters of water quality such as pH, chemical oxygen demand (BOD), nitrogen, phosphorus, and heavy metal contents were measured by using procedures given in the Standard Methods for the Examination of Water and Wastewater (AMERICAN PUBLIC HEALTH ASSOCIATION & al. 1981).

Table 1: List of sites, collecting dates, and reference numbers used in the species list.

Sampling Site	Date	Reference number
Chi River:		
Ban Tasala	17.11.1995	10
	16.3.1996	12
	7.7.1996	18
Mun River:		
Ban Kudchom	16.3.1996	11
	7.7.1996	17
Koloi Muang	16.3.1996	2
	7.7.1996	15
Hanphudung Muang	16.3.1996	1
	7.7.1996	14
Tan Soom	16.3.1996	3
Kansapung Piboon	16.3.1996	4
	7.7.1996	16
Sirinton	16.3.1996	13
	7.7.1996	19
Maekhong River:		
Ban Nasanum	16.3.1996	5
Kamarat	16.3.1996	6
Ban Gum	16.3.1996	9
Kong Chaim	16.3.1996	8

Identifications were mainly done by the third author, some material of the families Noto-nectidae and Nepidae was identified by Dr. N. Nieser (Tiel, The Netherlands).

Material is mainly deposited in the entomological collection of the Khon Kaen University, Faculty of Agriculture, a smaller part also in the Natural History Museum Vienna (NMV).

List of species

Nepomorpha

Belostomatidae

Diplonychus rusticus (F.)

Site: 17.

A common and widely distributed species in Southeast Asia.

Nepidae

Ranatra longipes thai LANSBURY

Site: 3.

A common and abundant species in larger stagnant waters in Northeast Thailand.

Ranatra sp.

Sites: 4, 16.

One larva (4), one male and one female (16) probably represent a new species similar to *R. malayana* LUNDBLAD which was described from Sulawesi.

Cercotmetus asiaticus (AMYOT & SERVILLE)

Site: 8.

Micronectidae (Corixidae, part)

Micronecta spp.

Sites: 1, 2, 4, 5, 6, 8, 11, 17.

Numerous specimens of this genus were collected, most of them probably belonging to *M. quadristrigata* BREDDIN.

Notonectidae

Anisops barbatus BROOKS

Site: 1.

In our material this species is represented by a single female. First record for Thailand!

Anisops kuroiwa MATSUMURA

Site: 19.

A widely distributed and abundant species living in stagnant waters, previously reported under the synonym *A. batillifrons* LUNDBLAD.

Anisops nigrolineatus LUNDBLAD

Sites: 8, 13.

Known from India (main distribution), Myanmar, and Sumatera (type locality). Not common. First record for Thailand!

Anisops sp. (larvae)

Site: 9.

Nychia sp.

Site: 15.

All material from Southeast Asia was previously reported under the names *N. limpida* STÅL or *N. sappho* KIRKALDY. The genus is now under revision by N. Nieser.

Pleidae***Paraplea* sp.**

Site: 14.

Represented by a single, unidentified female.

Gerromorpha**Mesoveliidae*****Mesovelia vittigera* HORVATH**

Sites: 11, 17.

A common species, widely distributed in Asia, living at the edge of stagnant waters.

***Mesovelia horvathi* LUNDBLAD**

Site: 2.

Rarer than *M. vittigera* and mainly found in the environment of running waters.

Hydrometridae***Hydrometra orientalis* LUNDBLAD**

Sites: 4, 8.

***Hydrometra greeni* KIRKALDY**

Sites: 8, 9, 19.

Veliidae***Neolardus typicus* DISTANT**

Site: 4.

Described from India. Material from Laos in the NMV. First record for Thailand!

***Baptista* sp.**

Site: 8.

An unidentified species represented by a single female.

***Microvelia douglasii* SCOTT**

Site: 9.

A common species all over Southeast Asia. Typical inhabitant of small stagnant waters.

Genus ?

Site: 5.

An unknown Microveliinae, possibly belonging to an undescribed genus, represented by two larvae only.

Gerridae

***Rhagadotarsus kraepelini* BREDDIN**

Sites: 14, 15.

A widely distributed species. Prefers open surface of stagnant or slowly flowing waters.

***Naboandelus signatus* DISTANT**

Sites: 5, 8, 14, 17, 19.

Similar habitats like *Rhagadotarsus kraepelini*, but usually much rarer. Up to now only a single published record from Thailand (POLHEMUS & POLHEMUS 1994), more material collected by P.P. Chen and the third author.

***Aquarius adalaidis* (DOHRN)**

Site: 16.

Inhabitant of the open surface of larger stagnant water bodies and lentic parts of larger rivers.

***Gerris nepalensis* DISTANT**

Site: 16.

Rarely collected, mainly a palaearctic species. First record for Thailand.

***Limnogonus fossarum fossarum* (F.)**

Site: 1.

Common and widely distributed species, living in small and large stagnant water bodies even in rain puddles and flooded paddy fields.

***Limnogonus nitidus* (MAYR)**

Site: 4.

Common and widely distributed, similar like *L. fossarum*, but rarer and also found in lentic parts of running waters.

***Neogerris parvulus* STÅL**

Sites: 1, 4, 8.

Widely distributed and preferring similar habitats like *L. fossarum*, but normally in smaller water bodies or between some vegetation. Not so common.

***Amemboa brevifasciata* MIYAMOTO**

Site: 8.

Usually found in small stagnant waters.

***Ptilomera hylactor* BREDDIN**

Site: 6.

Ptilomera species are typical inhabitants of running waters. This species was described from Cambodia and recorded from Viet Nam (ZETTEL & CHEN 1996). The third author collected this species also in Chayaphum Province. First records for Thailand!

***Ventidius modulatus* LUNDBLAD**

Sites: 10, 12, 13, 14, 18.

Usually in slowly flowing waters. Widely distributed from Sri Lanka and India to Indonesia (CHEN & ZETTEL, in prep.), but not common. Up to now no published records for Thailand!

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Planned for Amemboa, No. 2:

- * Keys to Thai genera of Hebridae, Veliidae, Gerridae, and Helotrephidae
- * A check-list of Notonectidae in Southeast Asia
- * Regional species lists
- * and more news on the project ...