Key to the genera of Veliidae (Gerromorpha) of Thailand and adjacent countries, with a check-list of genera and species known from Thailand

by Christine Hecher

Abstract: An illustrated key for the sixteen genera of Veliidae occurring in Thailand and adjacent countries is provided. A check-list of the thirteen genera and eighteen described and several undescribed species known from Thailand is added.

The Veliidae is a large and diverse family of the Gerromorpha. Species of the Veliidae are characterized by the claws inserting before the apex of the last tarsal segment (also in Gerridae), by the impressed line on the vertex, by the grasping comb on the fore tibia of males, and by the row of setae on the middle tibia (ANDERSEN 1982). CHEN & ZETTEL (1996, Amemboa 1) provide a key to the families of Gerromorpha occuring in Thailand, which is useful to separate Veliidae from other water striders.

In Thailand five of the six subfamilies of Veliidae are represented: Perittopinae and Rhagoveliinae each with only one genus, Haloveliinae and Veliinae each with three genera, and Microveliinae with five genera (see check-list). The occurrence of further three genera (known from West Malaysia or Myanmar) is probable.

As the Veliidae is rather diverse, species of this family are found in very different habitats: Most species inhabit the surface of running and stagnant freshwater, brackish or sea water. A few are terrestrial (hygropetric). Detailed descriptions of the habitat preferences of the subfamilies are given by ANDERSEN (1982).

Up to now eighteen described species of Veliidae are known from Thailand (see check-list). Several undescribed species of *Pseudovelia*, *Xiphovelia*, *Microvelia*, *Strongylovelia*, *Perittopus*, *Rhagovelia*, and *Tetraripis* are deposited in the collection of the Natural History Museum Vienna and the Nieser Collection (Tiel, The Netherlands).

Microvelia is one of the world's largest genera within the Veliidae (about 170 described species; ANDERSEN 1983). LUNDBLAD (1933) already reported on seventeen species of this genus (including species now belonging to *Pseudovelia*) occurring in the Oriental and Australian Realms. *Microvelia* is thought to be a polyphyletic taxon (ANDERSEN 1982, POLHEMUS & POLHEMUS 1994). Some African and North and Central American species groups are already established (LINNAVOURI 1977, POLHEMUS 1974). The specimens of "*Microvelia*" from Thailand and adjacent countries are so diverse, that they are thought to belong to even several undescribed genera, which will have to be erected, as was done previously for *Pseudovelia* by HOBERLANDT (1950). A revision of this difficult genus is badly needed.

Key to the genera of Veliidae

1 Middle tarsi with three segments (basal segment sometimes very short)..... 2

Middle tarsi with two segments..... 7

2 Fore tarsi with two segments, basal segment very short; first segment of middle tarsi subequal to the two apical segments; fore wings divided into proximal coriaceous part with two closed cells, and distal membranous part without veins (Fig. 1); bright orange or reddish coloured species. (Perittopinae) ..... ***Perittopus***

All tarsi three-segmented, basal segments of fore and hind tarsi sometimes very short; fore wings not divided as above, with three or four closed cells (Fig. 2); blackish or yellowish brown coloured species 3

3 Middle tarsi deeply cleft, with leaflike claws and plumose or hairy swimming fans arising from base of the cleft, which are fold up at rest (Fig. 10). 4

Middle tarsi not deeply cleft and without plumose or hairy swimming fans. (Veliinae, partim) 6

4 Hind tarsi not cleft and without swimming fan; in Thai species pronotum short. (Rhagoveliinae) ..... ***Rhagovelia***

Hind tarsi cleft, with swimming fan; pronotum long (Veliinae, partim) 5

5 Stridulatory devices present on connexival margin of sternites 2 and 3 (Fig. 5) and on hind femur (Fig. 6); anterior margin of pronotum laterally with a narrow and deep incision (Fig. 7) ..... ***Chenevelia***

Stridulatory devices absent; anterior margin of pronotum with indistinct or without an incision. ..... ***Tetraripis***

6 Stridulatory devices absent; macropterous morph with apex of pronotum drawn out into a finger-like projection (Fig. 8); apical part of fore wing with one large, irregular white spot surrounded by 2 4 smaller spots (Fig. 4); head strongly deflected in front of eyes (Fig. 9); grasping comb on fore tibia long in both sexes. ..... ***Angilia***

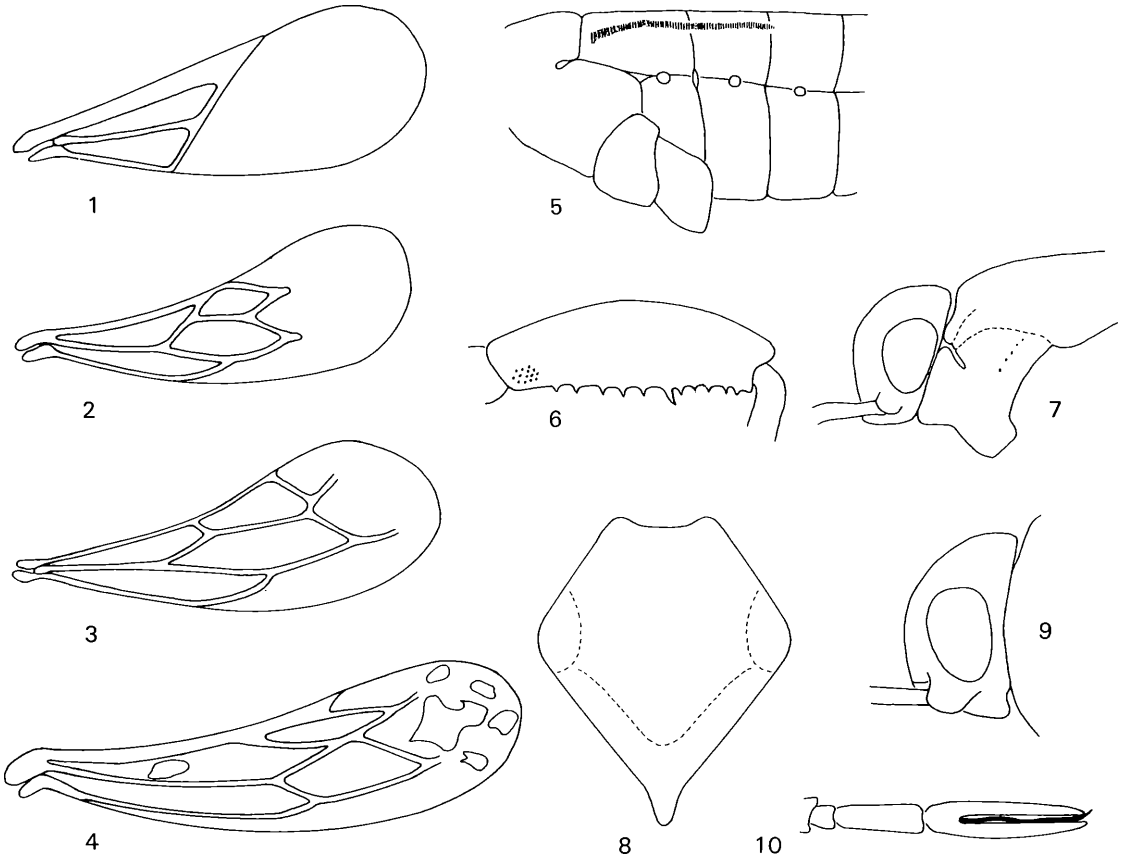
Stridulatory devices present on connexival margin of sternites 2 and 3 and on hind femur (as in Figs. 5 6); macropterous morph with apex of pronotum without finger-like projection; colour of fore wing not as above; head moderately deflected in front of eyes; grasping comb on fore tibia short in males and absent in females. ..... ***Angilovelia***

7 All tarsi two-segmented (basal segment of fore tarsi very short); middle leg obviously longer than hind leg; middle tarsi three or more times as long as hind tarsi. (Haloveliinae) 8

Fore tarsi one-segmented, middle and hind tarsi two-segmented; middle leg subequal to hind leg; middle tarsi rarely more than twice as long as hind tarsi. (Microveliinae) 11

8 Eyes small, not broader than half width of interocular space (Figs. 14, 15); head moderately deflected in front of eyes; living in brackish or sea water 9

Eyes very large, broader than half width of interocular space (Fig. 16); head strongly deflected in front of eyes; living in freshwater 10

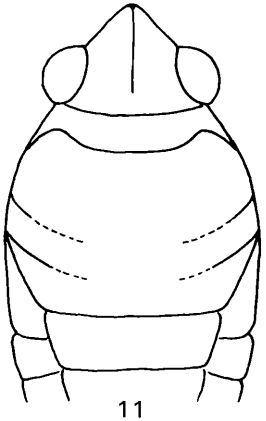


Figs. 1 10: (1 - 4): Fore wing of (1) *Perittopus* sp., (2) *Pseudovelia* sp., (3) *Microvelia* sp., and (4) *Angilia orientalis*; (5 - 7) *Chenevelia stridulans*: (5) sternites 2 - 4, lateral view, (6) hind femur, and (7) head and pronotum, lateral view; (8 9) *Angilia orientalis*: (8) pronotum, dorsal view and (9) head, lateral view; (10) middle tarsus of *Tetraripis* sp.

9 Eyes more than 0.4 times as wide as interocular distance (Fig. 14); male fore tibia without grasping comb; male genital segments distinctly protruding from pregenital abdomen; pronotum usually with pale stripe or spots..... ***Haloveloides***

Eyes less than 0.3 times as wide as interocular distance (Fig. 15); fore tibia of male with grasping comb; male genital segments withdrawn into pregenital abdomen and only slightly protruding; pronotum usually totally dark..... ***Halovelia***

10 Second segment of antenna longer than or subequal to first (Fig. 17); first hind tarsal segment subequal to second segment (Fig. 24); body with yellow markings, but without dense pilosity ***Strongylovelia***



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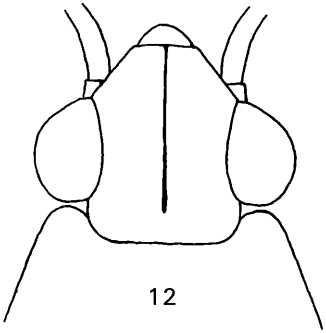

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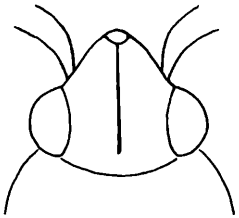

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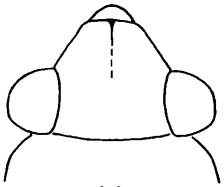

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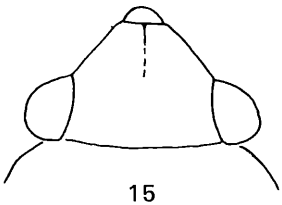

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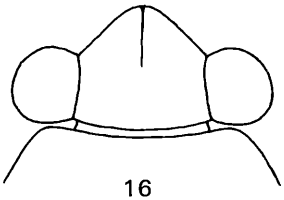

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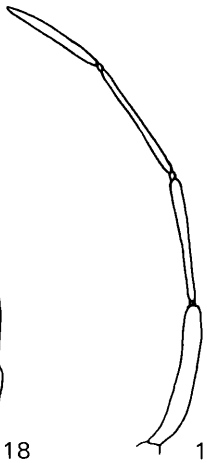

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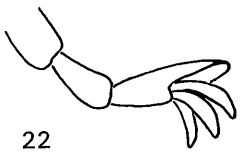

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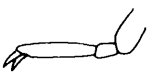

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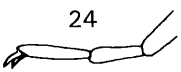

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Second segment of antenna shorter than first (Fig. 18); first hind tarsal segment about half as long as second segment (Fig. 23); body with dense pilosity, but without yellow markings ***Entomovelia***

11 Head posteriorly produced, extending well behind margin of eyes, anterior margin of pronotum deeply emarginated (Fig. 12); body usually elongate and relatively slender 12

Head not produced as above, anterior margin of prontum straight or only slightly convex (Fig. 13); body usually shorter and stouter 14

12 Eyes distinctly removed from anterior margin of prothorax; pronotal collar distinct ..... ***Lathriovelia***

Eyes not removed from anterior margin of prothorax; pronotal collar absent 13

13 Antennal segments 3 and 4 very slender, much longer than basal two segments; femora modified (with hair tufts, tubercles, etc.) on posterior surface (at least in males) ***Baptista***

Antennal segments 3 and 4 slender, but shorter than segment 1 and subequal to segment 2 (Fig. 19); femora not modified on posterior surface ..... ***Neoalardus***

14 First antennal segment incrassate (Fig. 20), extending more than two thirds of its length beyond apex of head; in macropterous morph apical cells of fore wings reduced (Fig. 2); in apterous morph pronotal lobe long ..... ***Pseudovelia***

First antennal segment more slender and usually much shorter (Fig. 21); if not, then in macropterous morph with normal fore wing venation (Fig. 3) or in apterous morph with shortened pronotal lobe 15

15 Middle tarsi with claws and ventral arolium developed as three leaf-like structures (Fig. 22); pronotum always thin, tergite 1, meso- and metanotum always fused (Fig. 11) ..... ***Xiphovelia***

Middle tarsi not modified as above; tergite 1, pro-, meso-, and metanotum of variable shape ..... ***Microvelia***

Figs. 11 24: (11) Head and thoracic nota of *Xiphovelia* sp.; (12 - 16) head, dorsal view, of (12) *Neoalardus typicus*, (13) *Pseudovelia* sp., (14) *Haloveloides* sp., (15) *Halovelia* sp., and (16) *Strongylovelia* sp.; (17 21) antenna of (17) *Strongylovelia* sp., (18) *Entomovelia* sp., (19) *Neoalardus typicus*, (20) *Pseudovelia* sp., and (21) *Xiphovelia* sp.; (22) middle tarsus of *Xiphovelia* sp.; (23 24) hind tarsus of (23) *Entomovelia* sp. and (24) *Strongylovelia* sp.

Check-list of genera and species known from Thailand

References concern the first record from Thailand or collections where specimens from Thailand are deposited.

NHMW - Natural History Museum Vienna

NCTN - Nieser Collection, Tiel, The Netherlands

Microveliinae:

***Baptista* DISTANT, 1903**

Baptista digitata ANDERSEN, 1989 (ANDERSEN 1989a)

Baptista femoralis ANDERSEN, 1989 (ANDERSEN 1989a)

Baptista gestroi DISTANT, 1903 (ANDERSEN 1989a)

***Neoalardus* DISTANT, 1912**

Neoalardus typicus (DISTANT, 1903) (NHMW)

***Pseudovelia* HOBERLANDT, 1950**

Pseudovelia buccula ANDERSEN, 1983 (ANDERSEN 1983)

Pseudovelia feuerborni (LUNDBLAD, 1933) (ANDERSEN 1983)

Pseudovelia sexualis (PAIVA, 1917) (ANDERSEN 1983)

Pseudovelia sp. (undescribed species, NHMW)

***Xiphovelia* LUNDBLAD, 1933**

Xiphovelia spp. (undescribed species, NHMW, NCTN)

***Microvelia* WESTWOOD, 1834**

Microvelia albolineolata TORRE-BUENO, 1927 (Andersen, unpublished list)

Microvelia diluta DISTANT, 1909 (Andersen, unpublished list)

Microvelia douglasi SCOTT, 1874 (NHMW)

Microvelia insignis (DISTANT, 1903) (DISTANT 1903)

"*Microvelia*" spp. (undescribed species, NHMW)

Haloveliinae:

***Halovelia* BERGROTH, 1893**

Halovelia malaya ESAKI, 1930 (ANDERSEN 1989b)

***Haloveloides* ANDERSEN, 1992**

Haloveloides sundaensis ANDERSEN, 1992 (ANDERSEN 1992)

***Strongylovelia* ESAKI, 1924**

Strongylovelia spp. (undescribed species, NHMW)

Perittopinae:

***Perittopus* FIEBER, 1861**

Perittopus sp. (ANDERSEN 1982; undescribed species, NHMW, NCTN)

Rhagoveliinae:

***Rhagovelia* MAYR, 1865**

Rhagovelia hutchinsoni LUNDBLAD, 1933 (POLHEMUS 1990)

Rhagovelia sumatrensis LUNDBLAD, 1933 (POLHEMUS 1990)

Rhagovelia spp. (undescribed species, NHMW)

Veliinae:

***Angilia* STÅL, 1865**

Angilia (*Adriennella*) *bispinosa* ANDERSEN, 1981 (ANDERSEN 1981)

Angilia (*Adriennella*) *orientalis* ANDERSEN, 1981 (ANDERSEN 1981)

***Tetraripis* LUNDBLAD, 1936**

Tetraripis sp. (undescribed species?, NCTN)

***Chenevelia* ZETTEL, 1996**

Chenevelia stridulans ZETTEL, 1996 (ZETTEL 1996)

References

ANDERSEN, N.M. 1981: A new genus of Veliinae and description of new Oriental species of the subfamily (Hemiptera: Veliidae). - Entomologica scandinavica 12: 339-356.

ANDERSEN, N.M. 1982: The Semiaquatic Bugs (Hemiptera, Gerromorpha). Phylogeny, Adaptations, Biogeography and Classification. - Entomograph 3: 1-455.

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. Entomologica scandinavica 14: 253-268.

ANDERSEN, N.M. 1989a: The Old World Microveliinae (Hemiptera: Veliidae). II. Three new species of *Baptista* DISTANT and a new genus from the Oriental region. - Entomologica scandinavica 19: 363-380.

ANDERSEN, N.M. 1989b: The coral bugs, genus *Halovelia* BERGROTH (Hemiptera, Veliidae). II. Taxonomy of the *H. malaya*-group, cladistics, ecoloy, and biogeography. Entomologica scandinavica 20: 179-227.

ANDERSEN, N.M. 1992: A new genus of marine water striders (Hemiptera, Veliidae) with five new species from Malesia. - Entomologica scandinavica 22: 389-404.

CHEN, P.P. & ZETTEL, H. 1996: An illustrated key to the families of Gerromorpha in Thailand. Amemboa 1: 10 - 13.

DISTANT, W.L. 1903: Report on the Rhynchota. Part I. Heteroptera. - Fascicula malayenses, Zoology 2: 221-271.

HOBERLANDT, L. 1950: Semiaquatic Heteroptera collected in Lunda, North East Angola (Potruguese West Africa) by Dr. a. de Barros Machade in 1946-1949. - Publcoes cult. Co. Diam. Angola, 10: 7 - 50.

LINNAVOURI, R. 1977: On the taxonomy of the subfamily Microveliinae (Heteroptera, Veliidae) of West and Central Africa. - Annales Entomologici Fennici 43: 41-61.

LUNDBLAD, O. 1933: Zur Kenntnis der aquatilen und semiaquatilen Hemipteren von Sumatra, Java und Bali. - Archiv für Hydrobiologie, Supplement 12: 1-195, 263-489, 21 Tafeln.

POLHEMUS, J.T. 1974: The *austrina* group of the genus *Microvelia* (Hemiptera; Veliidae). Great Basin Naturalist 34(3): 207-217.

POLHEMUS, J.T. 1990: Miscellaneous studies on the genus *Rhagovelia* MAYR (Heteroptera: Veliidae) in Southeast Asia and the Seychelles Islands, with keys and descriptions of new species. Raffles Bulletin of Zoology 38(1): 65 - 75.

POLHEMUS, J.T. & D.A.POLHEMUS 1994: Four new genera of Microveliinae (Heteroptera) from New Guinea. - Tijdschrift voor Entomologie 137: 57-74, figs 1-30.

ZETTEL, H. 1996: *Chenevelia stridulans* gen.n. et sp.n. from North Thailand (Insecta: Heteroptera: Veliidae). - Annalen des Naturhistorischen Museums in Wien 98B: 353 - 359.

Author's address: Mag. Christine Hecher, Naturhistorisches Museum Wien, 2. Zoologische Abteilung, Burgring 7, A-1014 Vienna, Austria.

Small communications:

Literature with Heteroptera records:

The following mainly ecologically orientated books include data of aquatic and semiaquatic Heteroptera from Thailand which should be prooved and included in the distribution data:

The material studied by C.W. Heckman is deposited in the Zoologische Staatssammlung, Munich, Germany (as stated in the book).

HECKMAN, C.W. 1979: Rice Field Ecology in Northeast Thailand. The effect of wet and dry seasons on a cultivated aquatic ecosystem. Monographiae Biologicae 34, Dr. W. Junk, The Hague - Boston - London, 228 pp.

YASUMATSU, K., WONGSIRI, T., TIRAWAT, C., WONGSIRI, N. & LEWVANICH, A. 1980: Contributions to the development of integrated rice pest control in Thailand. Department of Agriculture, Ministry of Agriculture & Cooperation, Government of Thailand and Japan International Coop. Agency, IV + 163 pp..

Herbert Zettel