

Chenevelia stridulans gen.n. et sp.n. from North Thailand

(Insecta: Heteroptera: Veliidae)

H. Zettel*

Abstract

Chenevelia stridulans gen.n. et sp.n. is described from two localities in North Thailand (Mae Hong Son Province, Phrae Province). The female paratype specimen was collected in the entrance area of a cave. The new genus is closely related to *Tetraripis* LUNDBLAD, 1936, and differs mainly in the presence of stridulatory devices similar to that of *Stridulivelia* BREDDIN, 1898, and *Angilovelina* ANDERSEN, 1981.

Key words: Veliidae, *Chenevelia*, new genus, new species, stridulation, cave, Thailand.

Zusammenfassung

Chenevelia stridulans gen.n. et sp.n. wird von zwei Fundorten in Nord-Thailand (Provinzen Mae Hong Son und Phrae) beschrieben. Der weibliche Paratypus ist im Eingangsbereich einer Höhle gesammelt worden. Die neue Gattung ist nahe mit *Tetraripis* LUNDBLAD, 1936, verwandt und unterscheidet sich vor allem durch Stridulationsorgane, die ähnlich wie die der Gattungen *Stridulivelia* BREDDIN, 1898, und *Angilovelina* ANDERSEN, 1981, ausgebildet sind.

Introduction

Traditionally the subfamily Rhagoveliinae is characterized by deeply cleft mesotarsi with leaflike claws and a hairy swimming plume arising from the base of this cleft. Because of this very specialized character within Gerromorpha, there seemed to be no doubt about the monophyletic status of the Rhagoveliinae (CHINA & USINGER 1949, ANDERSEN 1982, ZETTEL 1995). Only three genera are described which possess this swimming plume: *Rhagovelina* MAYR, 1865, a circumtropical genus with more than 200 described, and still many undescribed species, *Trochopus* CARPENTER, 1898, containing three marine species from the Caribbean region and closely related with *Rhagovelina* (and ranked as a subgenus of *Rhagovelina* by POLHEMUS, in press), and *Tetraripis* LUNDBLAD, 1936, with five described species from the Oriental realm (ZETTEL 1995). But recently, *Tetraripis* has been transferred to the Veliinae because of the morphology of the scent gland channels and because of the fore tibial grasping comb in females; it is subsequently regarded as the sister group of the neotropical genus *Stridulivelia* HUNGERFORD, 1929 (POLHEMUS, in press).

* Dr. Herbert Zettel, Naturhistorisches Museum in Wien, 2. Zoologische Abteilung, Burgring 7, A-1014 Vienna, Austria.

Following POLHEMUS (in press), this means that the similar structures of mesotarsi in *Tetraripis* and *Rhagovelia* have to be regarded as having developed convergently, which is supported by the fact that the microstructure of the "hairs" (here called "rami") of the swimming plume are different in both genera. In *Tetraripis* the metatarsi have a cleft similar to that of the mesotarsi. *Chenevelia* gen.n. shares this character with *Tetraripis*.

Stridulatory devices are known from three genera within the Veliidae, all belonging to the subfamily Veliinae: *Stridulivelia* with ten species from South America (POLHEMUS & POLHEMUS 1995), *Paravelia* BREDDIN, 1898, containing only one stridulating species from Surinam (POLHEMUS & POLHEMUS 1984), and *Angilovelina* ANDERSEN, 1981, with a single known species, *A. y-alba* (PAIVA, 1918), from India (Assam), Myanmar [Burma], and Malaysia (ANDERSEN 1981, 1982). In *Stridulivelia* and *Angilovelina* the plectrum is located on the base of the metafemur and the strigil on the connexival margin of segments 2 and 3. As the two genera do not seem to be closely related, and the stridulatory mechanism is only developed in the subgenus *Stridulivelia* s.str., but not in *Stridulivelia* (*Aenictovelina*), it is obvious, that the stridulatory structures were developed independently twice. *Paravelia stenoptera* POLHEMUS & POLHEMUS, 1984, has the plectrum on the metatrochanter and the strigil laterally on sternites 3 and 4 (POLHEMUS & POLHEMUS 1984). In *Chenevelia* gen.n. plectrum and strigil are located as in *Stridulivelia* and *Angilovelina* (see Figs. 2, 4, 5), showing another case of convergence.

The female paratype and the larvae of *Chenevelia stridulans* sp.n. were collected in the entrance area of a cave in Mae Hong Son Province. Cave inhabiting Gerromorpha are mostly known from the family Mesoveliidae. Only one species of Veliidae, *Perittopus vicarians* BREDDIN, 1905, is - beside other localities - also recorded from a cave (LUNDBLAD 1933: "in einem Tümpel der Fledermausgrotte Guwa Lalai"). The mesoveliid *Cavaticovelina aaa* (GAGNÉ & HOWARTH, 1975) is described from the dark zone of larva tubes in Hawaii, and *Speovelina maritima* (YUASA, 1929) from moist walls of a coastal cave in Japan. But this species as well as the Mexican *Speovelina mexicana* POLHEMUS, 1975, is also known from tidal habitats outside of caves. These are probably also the habitats of *Darwinivelia fosteri* ANDERSEN & POLHEMUS, 1980. Far-reaching adaptations of cave insects like reduction of eyes, pale colour, and long bristles are not observed in all species: eyes are reduced in *Speovelina* ESAKI, 1929, and *Darwinivelia* ANDERSEN & POLHEMUS, 1980, and vestigial in *Cavaticovelina* ANDERSEN & POLHEMUS, 1980, as well as in *Cryptovelina* ANDERSEN & POLHEMUS, 1980, although this is no cave inhabitant. Extremely long hairs can be observed only on the head of *Cavaticovelina aaa* (ANDERSEN & POLHEMUS 1980, ANDERSEN 1982), but are also found in other mesoveliids which are not inhabiting caves. No plain reduction of eyes is observed in *Chenevelia stridulans* sp.n. In this species long bristles are confined to the larval stages, a fact which is also observed in other veliid genera, e.g. in *Rhagovelia*.

Acknowledgements

The author thanks the Austrian Ministry of Education and Arts for the financial support of the scientific trip to Thailand, Nico Nieser (Tiel) and Dan A. Polhemus (Bishop Museum, Honolulu) for critical comments on the manuscript, Mrs. Janet Margerison-Knight (The Natural History Museum, London) for a linguistic review, and Mag. Martin Donabauer (Vienna) for the excellent drawing of Fig. 1.

***Chenevelia* gen.n.**

Etymology: The new genus is named for Dr. Ping-Ping Chen (Beijing/ Vienna) in honour of her eager activities, enforcing the studies on Thai Heteroptera and her powers of persuasion on me to co-operate in this project.

Type species: *Chenevelia stridulans* sp.n.

Diagnosis: Veliinae with cleft meso- and metatarsi and a swimming plume consisting of simple rami arising from the base of this cleft. Stridulatory devices on metafemur and connexival margin of sternites 2 and 3. Colour mainly yellow and brown. Anterior margin of pronotum laterally with a narrow and deep incision. Body shape of male and female broad boat-shaped, broadest at segments 4 and 5. Larvae with long bristles on antennae, legs and abdomen, and cleft mesotarsi only.

***Chenevelia stridulans* sp.n.**

(Figs. 1 - 9)

Etymology: The species is named after the presence of stridulatory devices.

Type locality: Thailand, Phrae Province, 15 km E Phrae, Mae Khaem, 16.11.1995, 350 m, small rivulet after heavy rainfalls, about 30 cm broad and probably not permanent, in wet area.

Type material: holotype, apterous male: "Thailand, Phrae Prov.\ 15 km E Phrae, Mae Khaem\ 16.11.1995, 350m\ leg. H. Zettel (16b)"; paratype, apterous female: "Thailand: Mae Hong Son Prov.\ 17 rd.km N Mae Hong Son\ Mok Cham Pae, nr. Fish Cave\ 11.11.1995, leg. H.Zettel (12c)".

Larvae: 3 larvae from the same locality as the paratype, bearing the same label.

Depository of types and larvae: Natural History Museum, Vienna.

Description of apterous male: Length 4.5 mm, maximum width (at abdominal segment 4) 1.55 mm. Body shape slender boat-shaped. Colour yellowish and brownish, head, medio-anterior part of the pronotum, acetabula, lateral parts of the sternites, and anterior parts of the paratergites lighter yellow. Antennal segments 1 and 2 (except tip) lighter than segments 3 and 4. Legs yellow, but meso- and metafemora each with two faint brownish stripes. Body almost completely covered with very thin, short, yellow hairs, which are longer on tergites 2 - 4. Dorsal surface also with scattered, erect, long, dark hairs. Inner face of femora and external face of tibiae with very long hairs. Pronotum dorso-laterally in anterior part, tergite 1 laterally, and meso- and metapleura with whitish frosted spots.

Head short, posteriorly not produced. Eyes globular, not removed from the anterior margin of prothorax, with two curved eye bristles (one situated centro-caudally, one dorso-caudally). Smallest distance between eyes 0.45 times as long as head at eyes. Middle furrow of head deep and shiny, two oblique, deep furrows behind end of middle furrow. Juga slender. Rostrum reaching mesoacetabula. Antennal segment 1 stouter and longer than the following. Relative length of antennal segments as 1.5 : 1 : 1.1 : 1.0.

Pronotum very long, covering mesonotum completely and metanotum and tergite 1 in middle (Fig. 1). Anterior margin of pronotum dorsally slightly elevated, with a row of

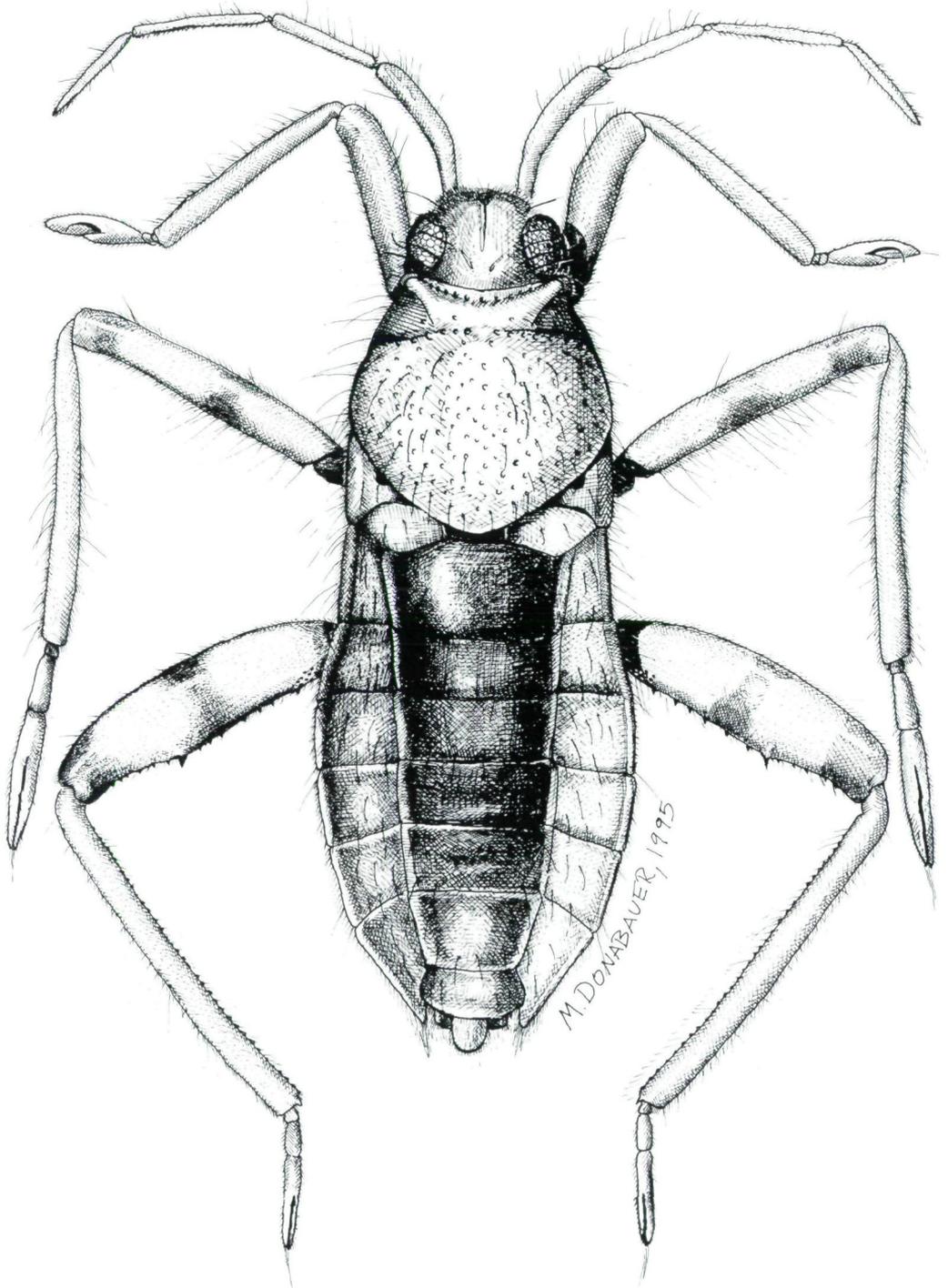


Fig. 1: *Chenevelia stridulans* sp.n., apterous female. Graph: M. Donabauer.

punctures in middle and a sharp incision on each side, laterally serrate in ventral part (Fig. 3). Pronotal lobe with many deep punctures. Meso- and metapleurae nearly bare, only mesopleura with a few punctures anteriorly.

Legs rather stout. Relative length of segments (mesofemur = 100): profemur = 72, protibia = 73, protarsus = 3 + 2.5 + 20, mesotibia = 100, mesotarsus = 3.5 + 17 + 41, metafemur = 116, metatibia = 127, metatarsus = 3 + 10 + 31. Fore tibia with a crasping comb which is 1.5 times as long as segment 3 of protarsus (Fig. 6). Segment 3 of meso- and metatarsi with a deep cleft in apical two thirds, in which claws and swimming plume are situated. This plume consisting of simple, not secondary ramified rami. Metatrochanter with three black denticles. Metafemur strongly incrassate, 3.1 times as long as broad, basally with a plectrum consisting of 16 - 17 small conical denticles. Inner face of metafemur with rows of teeth, two larger teeth are followed by 10(9) and 8(7) small teeth respectively, and the anterior accessory distal row consisting of 8 small teeth. Metatibia strongly bent in apical third, inner face with numerous small denticles, apically with a prominent spine (Fig. 5).

Abdomen broad, connexiva elevated. Tergite 1 very short, medially covered by the pronotal lobe. Tergite 2 large and fairly domed, the following tergites (3 - 6) of decreasing length. Tergite 7 is 0.65 times as long as width at base, 1.2 times as long as tergite 6, and caudally not clearly separated from the laterotergites. Connexival margin of segments 2 and 3 externally with a strigil consisting of numerous fine vertical ridges (Fig. 2). Segment 8 with a deep impression ventrally which is bordered by a sharp semicircular ridge anteriorly. Paramere evenly bowed, with acute tip and setiferation as in Fig. 9. Proctiger as in Fig. 8. Vesicula very faintly sclerotized (Fig. 7).

Description of apterous female: Characters similar than in male except the following: Length 4.6 mm, maximum width (at abdominal segment 4) 1.7 mm. Body shape broader than in male. Stripes on meso- and metafemora more distinct. Tibiae and especially tarsi darker brownish (Fig. 1).

Relative length of antennal segments as 1.4 : 1 : 1.0 : 0.95. Relative length of leg segments (mesofemur = 100): profemur = 70, protibia = 78, protarsus = 3 + 3 + 21, mesotibia = 101, mesotarsus = 4 + 18 + 46, metafemur = 110, metatibia = 125, metatarsus = 3 + 11 + 31. Fore tibia with a grasping comb which is half as long as segment 3 of protarsus. Metatrochanter with one black denticle. Metafemur slightly incrassate, 4.2 times as long as broad, basally with a plectrum consisting of 17 - 18 small conical denticles. Inner face of metafemur with rows of teeth, proximal row with 9 small teeth, distal row with 7 - 8 teeth of decreasing length, and accessory distal row with 5 - 7 small teeth of increasing length. Metatibia straight (Fig. 4).

Abdominal tergite 7 is 1.15 times as long as tergite 6. Tergite 8 directed postward, 0.6 times as long as tergite 7. Connexivum 7 produced in a short, but sharp tip. Sternite 7 simple. Proctiger very small. Gonocoxae simple.

Description of larvae: All the three larvae belong to the same stage. Body length about 2.4 mm, length of metatibia 1.25 mm. Colour yellowish brown, antennae and legs yellow, tarsi brownish. Body covered with a layer of thin, short hairs, which appear yellow on the trunk and darker on legs and antennae. Long and very stout bristles located on antennal segments 1 (9 - 10 bristles) and 2 (1 bristle), on apical part of upper face of pro-

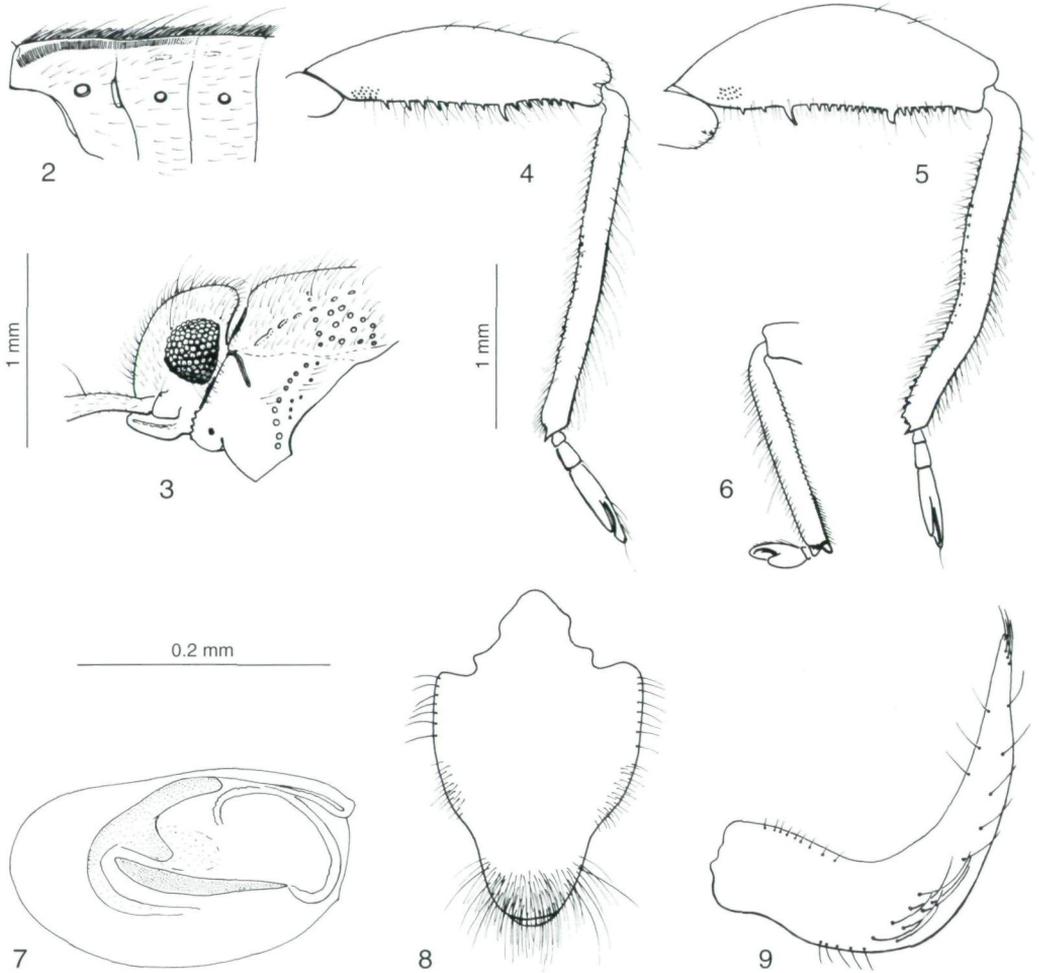


Fig. 2 - 9: *Chenevelia stridulans* sp.n., (2 - 4) apterous female, (5 - 9) apterous male: (2) connexiva of sternites 2 - 4, lateral view, showing the strigil on sternites 2 - 3, (3) head and pronotum, lateral view, showing the plectrum at base of femur, mouthparts omitted, (4, 5) hind legs, (6) fore tibia and tarsus, (7) vesicula, (8) proctiger, (9) paramere.

femur (2), mesofemur (2), and metafemur (4), on external face of metatibia (10), on metatarsi (4), and on abdomen (26). Bristles on the abdomen situated medially on tergites 3 - 7 in 5 pairs, and in two rows of 8 bristles on the lateral margins of the abdomen. Rows of thinner bristles on the inner faces of femora, on external faces of pro- and mesotibia, and on internal face of metatibia. Metatarsi with a deep cleft as in adult specimen, but metatarsi without cleft.

Biology: Female and larvae were collected from a small stream in the entrance area of a cave. The site, illuminated by an upper entrance, was a high dome situated at a distance of approximately 10 - 20 m from the exit of the stream from the cave. The stream was about 0.4 - 1 m broad, very shallow, slow-running, and interrupted by shallow pools,

about 20 cm deep and slightly broader than the stream. In these pools the specimens were collected. Although - due to the darkness - it was impossible to observe the specimens directly, it is supposed that they were sitting at the edge of the water, because they could only be caught after violent disturbance of the water in the pools. Within the net, all specimens showed an unexpected agility, running much faster than known from *Rhagovelia* species.

Unfortunately it was not possible to collect in the stream outside, because the cave is too low at the exit of the stream, and the vegetation is too dense to reach the external part of the stream from outside.

The male was collected in a small rivulet (probably not permanent) after heavy rainfalls. The site was a wet area with high weeds in a degraded forest. The fast running water was about 30 cm wide and a few centimeter high, partly running along a narrow path used by local people. There were many small roots of the trees in the water and between them the single specimen was collected together with a semiterrestrial *Mesovelia* sp. (Mesoveliidae), a single naucorid larva and some hydrophilid and laccophilid beetles. Although the locality was intensively investigated no further specimens could be found. It is very likely that the single male was swept down by the water after the rainfall. In this case also a subterranean (cave) origin is possible. Regarding the lack of more data the typical habitats of *Chenevelia stridulans* sp.n. are still in question.

References

- ANDERSEN, N.M. 1981: A new genus of Veliinae and descriptions of new Oriental species of the subfamily (Hemiptera: Veliidae). – *Entomologica Scandinavica* 12: 339-356.
- ANDERSEN, N.M. 1982: The Semiaquatic Bugs (Hemiptera, Gerromorpha). – *Entomonograph* 3: 1-455.
- ANDERSEN, N.M. & POLHEMUS, J.T. 1980: Four new genera of Mesoveliidae (Hemiptera, Gerromorpha) and the phylogeny and classification of the family. – *Entomologica Scandinavica* 11: 369-392.
- CHINA, W.E. & USINGER, R.L. 1949: Classification of the Veliidae (Hemiptera) with a new genus from South Africa. – *Annals and Magazin of Natural History*, ser. 12, 2: 343-354.
- POLHEMUS, D.A., in press: Systematics, phylogeny and zoogeography of the genus *Rhagovelia* (Heteroptera: Veliidae) in the western hemisphere (exclusive of the *angustipes* complex). – *Thomas Say Monographs*, Entomological Society of America.
- POLHEMUS, J.T. & POLHEMUS, D.A. 1984: Studies on Neotropical Veliidae (Hemiptera) VII. Descriptions of four new species of *Paravelia*. – *Amazoniana*, Kiel, VIII(3): 339-349.
- POLHEMUS, J.T. & POLHEMUS, D.A. 1995: A review of the genus *Stridulivelia* HUNGERFORD and two new species (Heteroptera: Veliidae) from South America. – *Proceedings of the Entomological Society Washington* 97(1): 128-152.
- ZETTEL, H. 1995: Zwei neue Arten der Gattung *Tetraripis* LUNDBLAD aus Borneo (Heteroptera: Veliidae). – *Zeitschrift der Arbeitsgemeinschaft Österreichischer Entomologen* 47 (1/2): 25-30.