

Annotated catalogue of the semi-aquatic bugs (Hemiptera: Heteroptera: Gerromorpha) of Luzon Island, the Philippines, with descriptions of new species

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Abstract

A catalogue of the semi-aquatic bugs (Gerromorpha) of Luzon, the largest Philippine island, is provided. Five families, 26 genera, and 85 species including two unidentified species and seven new species are currently recognized. The latter are: *Hebrus ilocanus* sp.n. of the Hebridae, *Microvelia (Philippinovelina) dalawa* sp.n., *Microvelia (Philippinovelina) seyferti* sp.n., *Xiphovelina dentata* sp.n., *Rhagovelina bicolorana* sp.n., and *Rhagovelina sorsogonensis* sp.n. of the Veliidae, and *Tenagogonus curvatus* sp.n. of the Gerridae. The catalogue provides detailed information on literature and species distribution. 61 species (71%) are endemic to the Philippines, and 36 species (42%) are hitherto only recorded from Luzon. Island endemism rates are especially high for Veliidae (25 of 38 species; 66%), and for species living in stream and river habitats (35 of 52 species; 67%). Descriptions of undescribed taxa will raise these numbers in the future.

Key words: list, water striders, water crickets, Gerridae, Mesoveliidae, Hebridae, Hydro-metridae, Veliidae, distribution, taxonomy, new species, limnic, marine, Greater Luzon.

Zusammenfassung

Ein Katalog der semiaquatischen Wanzen (Gerromorpha) von Luzon, der größten Insel der Philippinen, wird vorgestellt. Er umfasst fünf Familien, 26 Gattungen und 85 Arten einschließlich zweier unbestimmter Arten und sieben neu beschriebener Arten: *Hebrus ilocanus* sp.n. (Hebridae), *Microvelia (Philippinovelina) dalawa* sp.n., *Microvelia (Philippinovelina) seyferti* sp.n., *Xiphovelina dentata* sp.n., *Rhagovelina bicolorana* sp.n., *Rhagovelina sorsogonensis* sp.n. (Veliidae) und *Tenagogonus curvatus* sp.n. (Gerridae). Der Katalog liefert umfassende Information zur Literatur und zur Verbreitung der Arten. 61 Arten (71%) sind endemisch auf den Philippinen und davon 36 Arten (42%) bisher nur von Luzon nachgewiesen. Der Anteil inselendemischer Spezies ist besonders hoch bei den Veliidae (25 der 38 Arten; 66%) und bei Arten, die ihren Lebensraum in oder entlang von Bächen und Flüssen finden (35 von 52 Arten; 67%). Neubeschreibungen von Arten werden diese Anteile in der Zukunft noch deutlich erhöhen.

Introduction

The Republic of the Philippines (Republika ng Pilipinas) is the earth's second largest archipelago composed of 7,107 islands situated between the South Chinese Sea in the west and the Philippine Sea in the east. It has a land area of circa 300,000 square kilome-

tres and a coastline of more than 36,000 kilometres. The two largest islands, Luzon and Mindanao, take about two thirds of the land area. The terrain is dominated by mountain ranges and coastal lowlands, the highest peak is Mount Apo in Mindanao with 2,954 m a.s.l. The country is densely populated with approximately 100 million people (92.3 mio in May 2010, estimated growth rate 1.7% p.a.). Over-population and poverty are main reasons for unsolved environmental problems like deforestation, soil erosion, and increasing pollution of coastal mangrove swamps. The unique Philippine flora and fauna, with one of the highest endemism rates on earth (about half of the countries animal and plant species) is generally highly endangered. Almost every major island in the country possesses unique species. Sixteen distinct terrestrial biogeographic regions are recognized (ONG et al. 2002, CATIBOG-SINHA & HEANEY 2006).

The biogeographic region Greater Luzon is composed of Luzon, some medium-sized and numerous small adjacent islands (Ong et al. 2002) and has a high degree of endemism. Luzon Island covers an area of 104,700 km² and is the largest in the archipelago. The northern portion of the island is predominantly mountainous. Mount Pulag (2,922 m a.s.l.) in the northwestern Central Cordillera is the highest mountain; high mountains are also found in the Sierra Madre along the east coast, as well as in the Sierra de Caraballo, and the Zambales Mountains in the far west. The highest elevations in the central and southern parts are of volcanic origin (Mt. Banahaw in Laguna, 2,170 m a.s.l., Mt. Mayon 2,462 m a.s.l.). Major forest types are montane, mossy forest and pine forest at high elevation, dipterocarp forest in the lowlands, and mangrove along the coasts (CATIBOG-SINHA & HEANEY 2006). However, natural vegetation is largely replaced by agricultural land, abandoned land, and human settlements.

Luzon is the entomofaunistically best-explored island of the Philippines. Here lies the megacity Manila with its renowned universities and the famous Bureau of Sciences was a centre of biodiversity studies until World War II. The University of the Philippines Los Baños in Laguna has a long and great tradition in entomological research. Subsequently, most of the oldest descriptions of Philippine insects and many faunistic data are based on specimens from Luzon.

The following catalogue includes, first of all, the author's own research data (for project details see GAPUD & ZETTEL 1999, ZETTEL & GAPUD 2003). His field work in the Philippines – greatly supported by numerous local colleagues and institutions – has already started in 1992. In addition, during the course of the taxonomic work many specimens were studied that are housed in Philippine, European, and American museums or universities, and many colleagues kindly allowed examination of the collections under their care (see Acknowledgements).

The Gerromorpha (semi-aquatic bugs) are a monophyletic infraorder of the Heteroptera (true bugs). Eight families are recognized world-wide, six occur in the Philippines and five are recorded from Luzon. The main habitat of Gerromorpha is the water surface (stagnant and running freshwater, and also the sea), but some species live hygropetric or even terrestrial. They are usually predators.

Material and methods

Material: Only specimens from Luzon are listed in the “Material examined” sections. The following acronyms are used:

Collections: BMNH – The Natural History Museum, London, U.K.; CARC – A.J. Cook Arthropod Research Collection, Michigan State University, Michigan, U.S.A.; BPBM – Bernice P. Bishop

Museum, Honolulu, Hawaii, U.S.A.; CNT – Coll. Nico Nieser, Tiel, the Netherlands; CPC – Coll. Ping-ping Chen, Tiel, the Netherlands; CSSAC – Camarines Sur State Agricultural College, Pili, Camarines Sur, the Philippines; CSW – Coll. F. Seyfert, Vienna, Austria; CVPG – Coll. Victor P. Gapud at University of the Philippines, Los Baños, Laguna, the Philippines; CZW – Coll. Herbert Zettel, Vienna, Austria; EMEC – Essig Museum of Entomology, University of California, Berkeley, California, U.S.A.; IRR1 – International Rice Research Institute, Entomological Collection, Los Baños, Laguna, the Philippines; JTPC – Coll. John T. Polhemus, now at Smithsonian Institution, Washington D.C., U.S.A.; MMBR – Moravian Museum, Brno, Czech Republic; MMSU – Mariano Marcos State University, Batac, Ilocos Norte, the Philippines; MNHN Museum national histoire naturelle, Paris, France; – NHMW – Naturhistorisches Museum Wien, Vienna, Austria; NHRS – Naturhistoriska Riksmuseet, Stockholm, Sweden; NMM – National Museum, Manila, the Philippines; NMPC – National Museum Prague, Czech Republic; OÖLM – Upper Austrian State Museum, Linz, Austria; OUM – Oxford University Museum, Oxford, U.K.; SHUK – Entomological Collection, Snow Hall, University of Kansas, U.S.A.; UPLB – Museum of Natural History, University of the Philippines, Los Baños, Laguna, the Philippines; USC – University of San Carlos, Cebu City, the Philippines; ViSCA – Visayas State College of Agriculture, Leyte State University, Baybay, the Philippines; ZMHB – Zoologisches Museum, Humboldt Universität, Berlin, Germany; ZMUC – Zoological Museum, University of Copenhagen, Denmark; ZMUH – Zoological Museum, University of Helsinki, Finland; ZRCS – Zoological Reference Collection, Raffles Museum of Biodiversity Research, National University of Singapore.

Other abbreviations: apt – apterous (wingless); brpt – brachypterous (with shortened wings); leg. – legit / legunt (collected by); mapt – macropterous (fully winged, including dealate specimens); mi – micropterous (with very short wing remnants); m.e. – see paragraph Material examined; # – collection number as given on label.

Descriptions of new species: Terminology of verbal descriptions follows previous publications by the author. A Leica WILD M10 binocular microscope (magnifications up to 128×) and a Nikon SMZ 1500 binocular microscope (magnifications up to 288×) were used for examination of specimens and preparing descriptions; drawings (Figs. 15–35) were made by using a camera lucida. Drawings of the genital structures of *Hebrus* and Veliidae were made with an OLYMPUS BX40 microscope with a camera lucida at a magnification of 400×. Stacked digital images (Figs. 1–14) were taken with a Leica DFC camera attached to a Leica MZ16 binocular microscope with the help of Leica Application Suite V3, stacked with ZereneStacker 64-bit, and processed with Adobe Photoshop 7.0. After having been studied, genitalia of males were imbedded in a transparent, water-soluble medium (dimethylhydantoin formaldehyde resin) on the same cardboard as the specimen. Measurements (in millimetres) refer to the maximum length or width, if not stated otherwise. If no ranges are given, measurements are taken from the holotype.

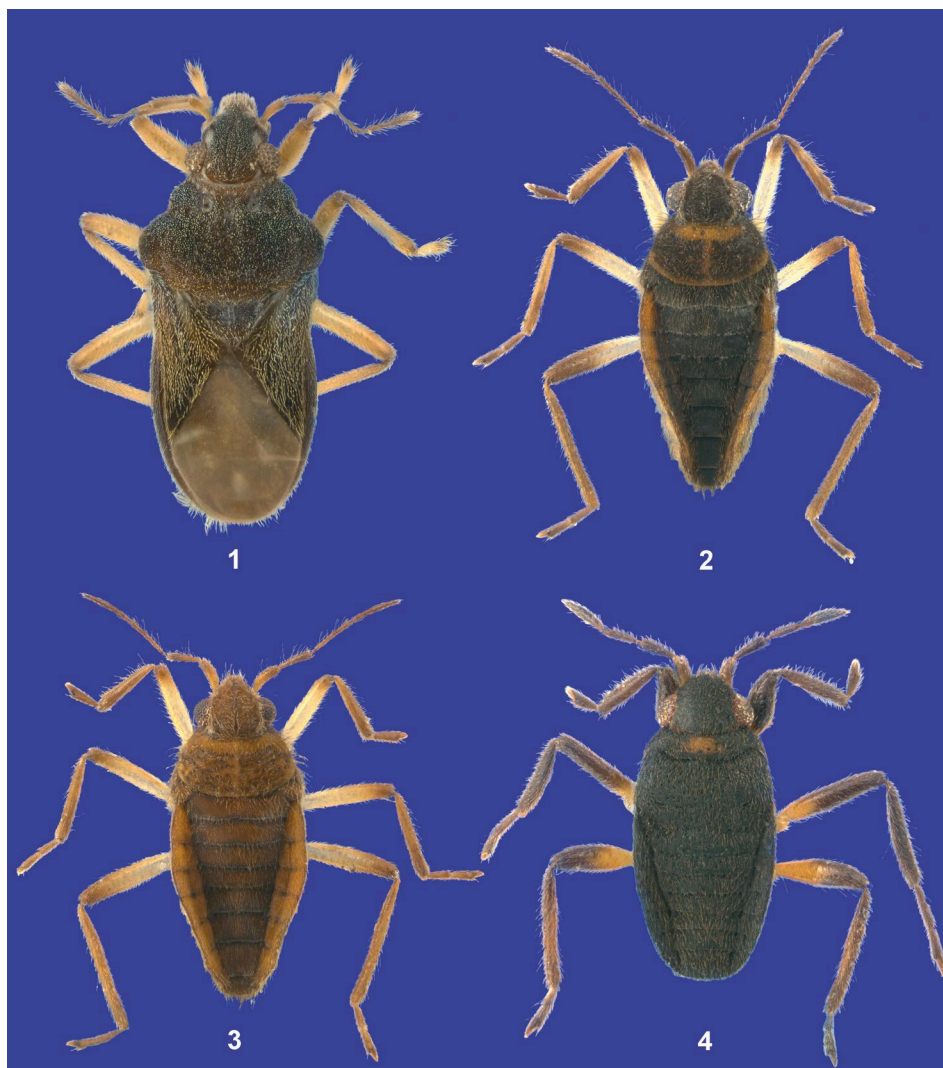
Catalogue

Mesoveliidae DOUGLAS & SCOTT, 1867 (water treaders, pondweed bugs)

Mesovelia horvathi LUNDBLAD, 1933 (sensu lato)

Mesovelia horvathi LUNDBLAD, 1933: 190; FREITAG & ZETTEL 2013: 63.

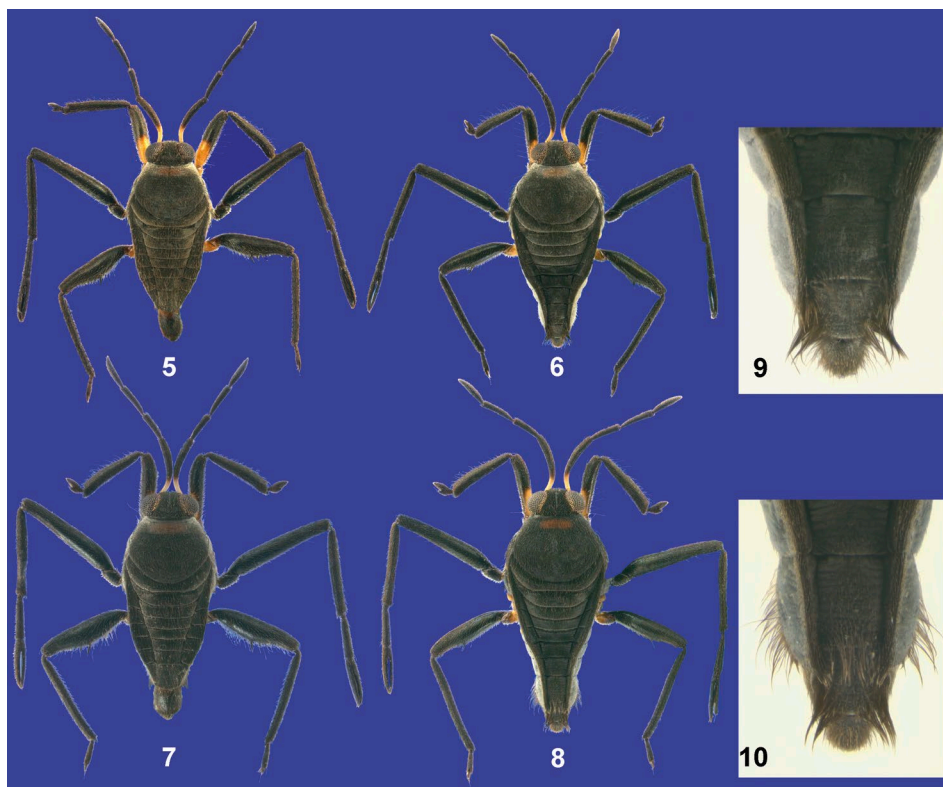
Material examined: 1 ♂, 1 ♀ (mapt), Ilocos Norte, Carasi, Nagoboban Creek, in forest, 28.X.2002, leg. H. Zettel (#319a); 1 ♂, 1 ♀ (apt), 3 ♂♂, 1 ♀ (mapt), La Union, Bacnotan, Don Mariano Marcos Memorial State University, NARTDI Falls, 23.X.2002, leg. H. Zettel (#310) (NHMW); 1 ♂ (apt), 1 ♀ (mapt), Zambales, Olongapo, Subic Bay, near Jungle Survival Station, 4.XII.1993, leg. H. Zettel (#37h) (NHMW); 1 ♂ (apt), 1 ♂, 3 ♀♀ (mapt), same area, near Riding Stable, 30.XI.–5.XII.1993, leg. H. Zettel (#37d) (NHMW); 2 ♂♂ (apt), same locality, 2.XII.1993, leg. H. Zettel (#37e) (NHMW); 1 ♂, 1 ♀ (apt), 1 ♀ (mapt), same area, Triboa Mangrove, 7.XII.2000, leg. H. Zettel (#260) (NHMW); 1 ♂ (apt), Bataan, 10 km E Olongapo, Roosevelt Park,



Figs. 1–4: Habitus of (1) *Hebrus ilocanus* sp.n. (male, holotype), (2) *Microvelia dalawa* sp.n. (female, paratype), (3) *Microvelia seyfertii* sp.n. (female, paratype), and (4) *Xiphovelia dentata* sp.n. (male, paratype). Images not to scale.

1.XII.1993, leg. H. Zettel (#38) (NHMW); 1 ♂ (mapt), same locality, date, and collector (#38a) (NHMW); 1 ♀ (apt), Laguna, Los Baños, Mt. Makiling, Molawin Creek at Flat Rocks, 9.II.1996, leg. H. Zettel (#75) (CZW); 1 ♂ (mapt), 1 ♀ (apt), same area, Molawin Creek at College of Forestry, 8.II.1996, leg. H. Zettel (#72) (CZW); same area, Mud Springs, 23–24.I.1999, leg. H. Zettel (#167) (CZW); 6 ♂♂, 1 ♀ (apt), Camarines Sur, Lupi, Sooc, creek near dam, 13.III.2003, leg. H. Zettel (#347) (CZW); 2 ♂♂ (apt), Albay, 15 km SW of Manito, S of Cawayan River, 24.II.1998, leg. H. Zettel (#144); 6 ♀♀ (apt), Sorsogon, NE of Irosin, N of San Roque, Lake Bulusan, 630 m a.s.l., 26.II.1998, leg. H. Zettel (#146) (NHMW).

Notes: Since there is evidence that *M. horvathi* sensu POLHEMUS & POLHEMUS (2001) is a complex of similar species (see ZETTEL & TRAN 2009, DAMGAARD et al. 2012) the spe-



Figs. 5–10: Habitus of (5) *Rhagovelia bicolorana* sp.n. (male, paratype), (6) *R. bicolorana* sp.n. (female, paratype), (7) *R. sorsogonensis* sp.n. (male, paratype), and (8) *R. sorsogonensis* sp.n. (female, paratype). Terminalia of apterous females, dorsal aspect, of (9) *R. bicolorana* sp.n. and (10) *R. sorsogonensis* sp.n. Images 9 and 10 not to scale.

cies identity of the Philippine populations needs confirmation, and the identification of specimens from Luzon and other Philippine islands is preliminary. The listed material probably belongs to two similar species.

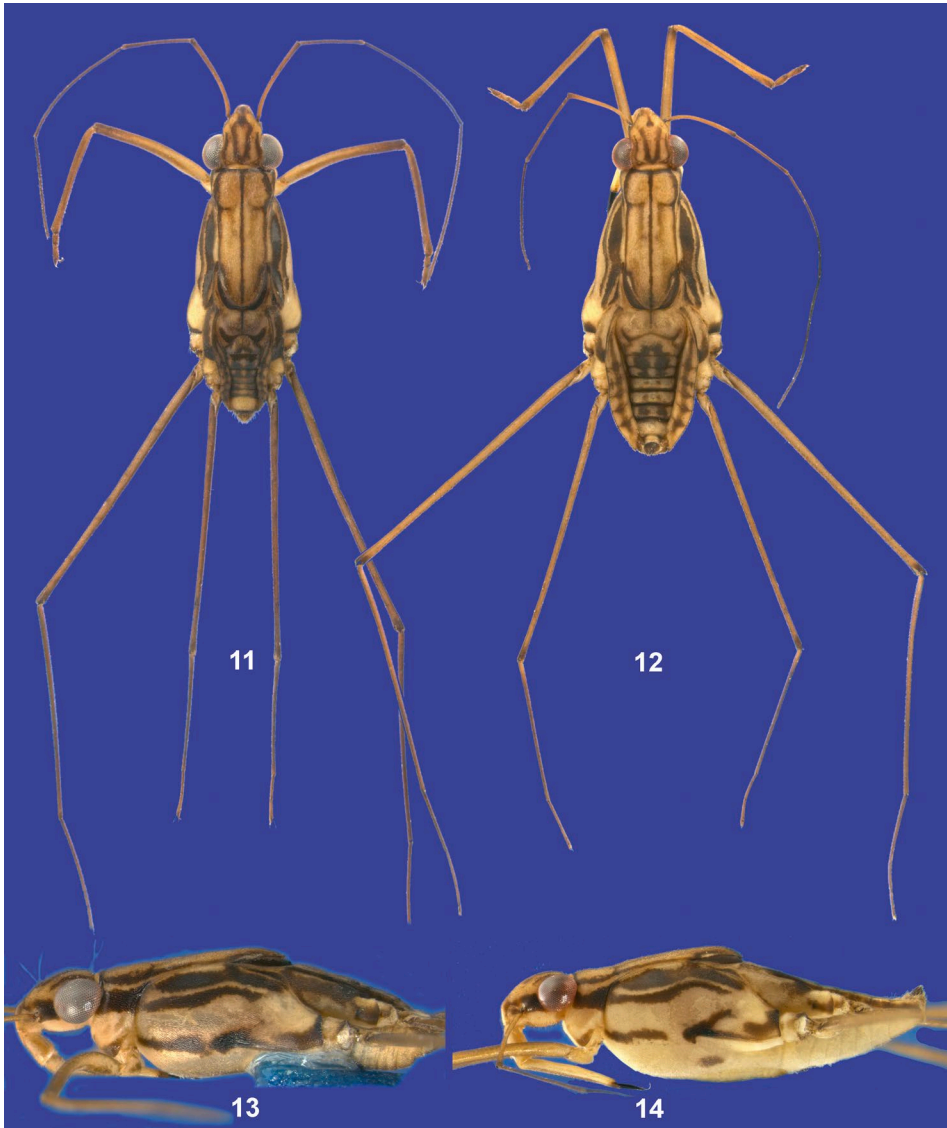
Regional distribution: Widespread and common, especially at streams, with records (see m.e.) from Ilocos Norte, La Union, Zambales, Bataan, Laguna, Camarines Sur, Albay, and Sorsogon.

General distribution: Widespread from India to Japan and Australia (POLHEMUS & POLHEMUS 2001, DAMGAARD et al. 2012); from the Philippines published from Palawan (FREITAG & ZETTEL 2013); unpublished specimens from Mindoro, Negros, Cebu, Bohol, Poro, Pacijan, Camiguin, etc.

***Mesovelia vittigera* HORVÁTH, 1895**

Mesovelia vittigera HORVÁTH, 1895: 160. BERGROTH 1918: 121; POLHEMUS & REISEN 1976: 286; GAPUD 1986: 43.

Material examined: 3 ♂♂ (apt), Zambales, Olongapo, Subic Bay, pond near gate, 3.XII.1993, leg. H. Zettel (#37d) (NHMW); 10 ♂♂, 8 ♀♀ (apt), 6 ♂♂, 13 ♀♀ (mapt), Laguna, Los Baños, vegetated banks of Laguna Bay, 16–18.XI.1992, leg. H. Zettel (#4) (NHMW, UPLB); 2 ♂♂ (mapt), Albay, 15 km SW of Manito, S of Cawayan River, 24.II.1998, leg. H. Zettel (#144).



Figs. 11–14: *Tenagogonus curvatus* sp.n., paratypes. Habitus in dorsal aspect, (11) male and (12) female; trunk in lateral aspect, (13) male and (14) female. Images not to scale.

Regional distribution: Widely distributed and common, usually associated with stagnant waters: Ilocos Norte (GAPUD 1986), Ilocos Sur (GAPUD 1986), La Union (GAPUD 1986), Abra (GAPUD 1986), Pangasinan (GAPUD 1986), Pampanga (POLHEMUS & REISEN 1976, GAPUD 1986), Nueva Ecija (GAPUD 1986), Zambales (m.e.), Rizal (GAPUD 1986), Cavite (GAPUD 1986), Laguna (BERGROTH 1918; m.e.), Quezon (GAPUD 1986), Albay (m.e).

General distribution: Widely distributed in the tropics and subtropics of the Old World (DAMGAARD et al. 2012); no distribution limit within the Philippines, with records

from Palawan, Mindoro, Luzon, and Mindanao (BERGROTH 1918, YANO et al. 1981, GAPUD 1986), and unpublished specimens from Negros, Panay, Cebu, Bantayan, Palawan, etc.

“Mesovelgia” sp.

Mesovelgia ujhelyii LUNDBLAD, 1933: ANDERSEN & POLHEMUS 1980: 390 (partim); CHEN et al. 2005: 427 (partim).

Material examined: 1 ♂, 1 ♀ (apt), Mountain Province, Chico River, Gonogon, 1100 m a.s.l., 21.II.1999, leg. H. Zettel (#184) (CZW); 2 ♂♂, 2 ♀♀ (apt), Mountain Province, NE of Sagada, Banga'an, Bomod-ok Waterfalls, 1500 m a.s.l., 22.II.1999, leg. H. Zettel (#185) (CZW); 1 ♂, 1 ♀ (apt), same locality, 22.II.1999, 1500 m, leg. F. Seyfert (#9) (CZW); 5 ♂♂, 4 ♀♀ (apt), Mountain Province, S of Sagada, Bagnen, slopes of Mt. Polis, 1600 m a.s.l., 26.II.1999, leg. F. Seyfert (#15) (CZW); 6 ♂♂, 10 ♀♀ (apt), Mountain Province, 5 km S of Bontoc, Balitian River, 900 m a.s.l., 27.II.1999, leg. F. Seyfert (#16) (CZW, UPLB); 1 ♀ (apt), Benguet, Baguio, 2 km below Camp John Hay, 18.II.1999, leg. H. Zettel (#181) (CZW); 1 ♂, 1 ♀ (apt), La Union, Bacnotan, Don Mariano Marcos Memorial State University, Casiaman Falls, 24.X.2002, leg. H. Zettel (#312) (NHMW); 1 ♀ (apt), Laguna, Los Baños, Mt. Makiling, Mud Springs, 1.XI.1996, leg. H. Zettel (#88) (NHMW); 1 ♂ (apt), same locality, 13–14.I.1999, leg. H. Zettel (#174) (CZW); 1 ♂, 3 ♀♀ (apt), Quezon, Atimonan, Quezon National Park, near Old Zigzag Road, 12.II.1996, leg. H. Zettel (#79b) (CZW); 2 ♂♂ (apt), same locality, 24–30.III.1998, leg. H. Zettel (#165) (CZW); 1 ♂ (apt), Camarines Sur, 20 km E Naga, 5 km E Carolina, Mt. Isarog, Malabsay Falls, 19.II.1998, leg. H. Zettel (#141) (NHMW).

Notes: Some authors (ANDERSEN & POLHEMUS 1980, CHEN et al. 2005) catalogued *Mesovelgia ujhelyii* LUNDBLAD, 1933 from Luzon, but it seems that the material rather represents a closely related, but distinct species. Moreover, since the clade containing *M. indica* HORVÁTH, 1915, *M. ujhelyii* and some undescribed species from India and southeastern Asia are the sister group of *Phrynovelia* HORVÁTH, 1915 (DAMGAARD et al. 2012), a new genus name becomes necessary to hold these species.

Regional distribution: Widely distributed on Luzon; recorded (see m.e.) from Mountain Province, Benguet, La Union, Laguna, Quezon, and Camarines Sur.

General distribution: Probably endemic to the Philippines, known from the islands of Luzon, Cebu, and Mindanao (unpublished records).

Hebridae AMYOT & SERVILLE, 1843 (velvet water bugs)

***Hebrus balnearis* BERGROTH, 1918**

Hebrus balnearis BERGROTH, 1918: 120.

Material examined: None.

Notes: The type material (three females from Los Baños) of this and the following species could not be located so far. No specimens could be studied that fit the original description of *H. balnearis* by BERGROTH (1918), notably the triangular, apically neither truncated nor notched “scutellum” (that is, in fact, the metanotal plate).

Regional and general distribution: Only known from the original description from Laguna (BERGROTH 1918).

***Hebrus bergrothi* HORVÁTH, 1929**

Hebrus rufescens BERGROTH, 1918: 120 (junior homonym of *Hebrus pusillus* var. *rufescens* REY, 1893).

Hebrus bergrothi HORVÁTH, 1929: 317 (replacement name for *Hebrus rufescens* BERGROTH, 1918); YANO et al. 1981: 20 (doubtful identification).

Hebrus philippinensis POISSON, 1957: 181 (replacement name for *Hebrus rufescens* BERGROTH, 1918).

Material examined: 2 ♂♂ (mapt), Zambales, Olongapo, Subic Bay, near Riding Stable, 2.XII.1993, leg. H. Zettel (#37e) (NHMW).

Notes: Without having seen the types, the identification of the above mentioned specimens is preliminary and chiefly based on the extremely minute body size (length 1.4 –

1.5 mm) and reddish colouration. A record by YANO et al. (1981) from a paddy field in Banaue may refer to another species as well.

Regional and general distribution: A poorly known species, so far only known from Luzon; originally described from Laguna (BERGROTH 1918), and later recorded from Ifugao (YANO et al. 1981); a new sample from Zambales (m.e.).

***Hebrus cruciatus* (DISTANT, 1910)**

Merragata cruciata DISTANT, 1910: 60, tab. I, fig. 7.

Hebrus cruciatus (DISTANT, 1910): BERGROTH 1918: 121 (new combination); LUNDBLAD 1933: 274; CHEN et al. 2005: 428.

Material examined: None from Luzon.

Notes: This species was redescribed by LUNDBLAD (1933).

Regional distribution: The only record from Luzon is that by DISTANT (1910) from the Montalban Gorge in Rizal.

General distribution: Specimens from Panay, Masbate, and Busuanga were studied, and the species is also known from southeastern Asia (CHEN et al. 2005).

***Hebrus drakei* PORTER, 1959**

Hebrus drakei PORTER, 1959: 33; ZETTEL 2006: 1014.

Material examined: 1 ♂ (mapt, holotype), Rizal, Montalban, 24.VII.1936, leg. R.L. Usinger (EMEC).

Notes: *Hebrus drakei* was redescribed and discussed by ZETTEL (2006).

Regional and general distribution: Only known from the holotype and presently considered a regionally endemic species of Luzon: Rizal (PORTER 1959, ZETTEL 2006).

***Hebrus haddeni* PORTER, 1954**

Hebrus haddeni PORTER, 1954: 78; ZETTEL 2006: 1029.

Material examined: 2 ♀♀ (mapt), La Union, Bacnotan, Don Mariano Marcos Memorial State University, NARTDI Falls, 23.X.2002, leg. H. Zettel (#310) (NHMW); 1 ♀ (mapt), same area, Casiaman Falls, 24.X.2002, leg. H. Zettel (#312) (NHMW); 1 ♂ (mapt), Nueva Viscaya, Santa Fe, Imugan, stream at Imugan Falls, 1000 m a.s.l., 6.XI.2002, leg. H. Zettel (#325) (NHMW); 2 ♂♂ (mapt, holotype and paratype), 1 ♀ (mapt, allotype), Laguna, Mt. Makiling, leg. F.C. Hadden (SEML); 1 ♀ (mapt), Laguna, Los Baños, Mt. Makiling, Mud Springs, 8.II.1996, leg. H. Zettel (#73) (CZW); 1 ♂ (mapt), same area, Flat Rocks, 14.II.1999, leg. H. Zettel (#175) (CZW); 1 ♂ (mapt) Camarines Sur, Lupi, Alanao, Bahi River, 3.III.1999, leg. H. Zettel (#191) (NHMW); 1 ♀ (mapt), Camarines Sur, 20 km E Naga, 5 km E Carolina, Mt. Isarog, near Malabsay Falls, 4.III.1999, leg. Zettel (#192) (NHMW); 1 ♀ (mapt), Camarines Sur, Pili, Buncao, Caririga Creek, 1.II.2002, leg. H. Zettel (#301) (CZW); 1 ♂ (mapt), Albay, 40 km N of Legaspi, 1 km W of Malilipot, Busai Falls, 7.III.2003, leg. H. Zettel (#346) (CZW).

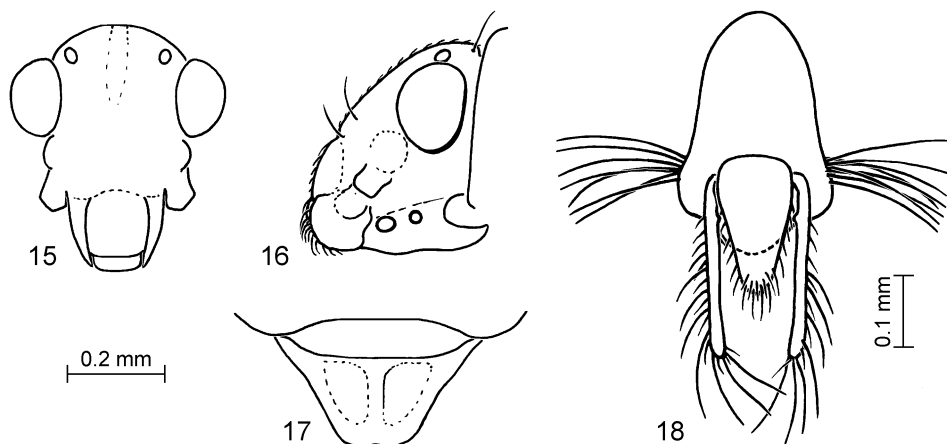
Regional distribution: A widespread, but uncommon species, probably without distributional limit on Luzon; recorded from La Union (ZETTEL 2006; m.e.), Nueva Viscaya (ZETTEL 2006; m.e.), Laguna (PORTER 1959, ZETTEL 2006; m.e.), Camarines Sur (ZETTEL 2006; m.e.), and Albay (ZETTEL 2006; m.e.).

General distribution: Endemic to the Philippines and widespread east of Huxley's Line; recorded from Luzon, Marinduque, Mindoro, Sibuyan, Tablas, Masbate, Negros, Cebu, Siquijor, Leyte, and Bohol (ZETTEL 2006).

***Hebrus harrisi* PORTER, 1959**

Hebrus harrisi PORTER, 1959: 34; ZETTEL 2006: 1015.

Material examined: 1 ♂ (mapt, holotype), Rizal, Montalban, 24.VII.1936, leg. R.L. Usinger (EMEC); 2 ♂♂, 3 ♀♀ (mapt), Ilocos Sur, black light trap, 18.IV.1973, leg. F. J. Santana (CARC, NHMW).



Figs. 15–18: *Hebrus ilocanus* sp.n. (male, holotype): (15) Head, frontal aspect; (16) head, lateral aspect; (17) mesoscutellum and metanotal elevation, dorsal aspect; (18) genitalia of male, dorsal aspect.

Notes: *Hebrus harrisi* was redescribed and discussed by ZETTEL (2006).

Regional and general distribution: Presently considered an endemic species of Luzon; records from Ilocos Sur (m.e.) and Rizal (PORTER 1959, ZETTEL 2006).

***Hebrus hoberlandti* PORTER, 1959**

Hebrus hoberlandti PORTER, 1959: 33.

Material examined: 8 ♂♂, 3 ♀♀ (mapt), 2 ♂♂, 3 ♀♀ (brpt), Batangas, Bauan, San Pedro, 10.IV.2006, leg. C. V. Pangantihon (#P227) (CZW, USC, NHMW); 1 ♂ (brpt, holotype), 2 ♀♀ (brpt, allo- and paratype), Laguna, Mt. Makiling, 19.VII.1936, leg. R.L. Usinger (EMEC); 1 ♂ (brpt), Laguna, Los Baños, Mt. Makiling, Molawin Creek at Flat Rocks, 31.X.1996, leg. H. Zettel (#87) (NHMW); 1 ♂ (brpt), Laguna, Calamba, Mt. Makiling, Puting-Lupa, 18.X.1976, leg. F. A. Mulimbayan (NHMW); 1 ♀ (brpt), Laguna, Mt. Makiling, Dampalit Creek, spring, 21.V.1977, leg. A. A. Barroso (NHMW).

Regional distribution: Batangas (m.e.), Laguna (PORTER 1959; m.e.).

General distribution: Endemic to the Philippines; published records only from Luzon (PORTER 1959), unpublished specimens examined also from Mindoro, Masbate, Cebu, and Leyte.

***Hebrus ilocanus* sp.n. (Figs. 1, 15–18)**

Type locality: Luzon, Ilocos Sur Province, exact locality unknown.

Type material: Holotype (macropterous male, CARC) from Ilocos Sur, labeled: “PHILIPPINE Is.\Luzon Is., Ilocos sur\ Prov., 18-IV-1973\F.J. Santana\ Black light trap”, “Hebrus\ drakei Porter\ det: C.L. Smith”.

Description of macropterous male: Measurements: Body length 2.09. Head length, 0.55, maximum width 0.49; width at antennal tubercles 0.35; minimum distance of eyes 0.27. Lengths of antennomeres, I 0.16, II 0.19, III 0.23, IV 0.33. Pronotum length 0.48, width 0.93. Mesoscutellum length 0.11. Metanotal elevation length (from base to tip of teeth) 0.20. Abdomen length (from apex of metanotal elevation to apex of abdomen) 0.92, maximum width 0.82. Lengths of leg segments: profemur 0.44, protibia 0.46, protarsus 0.18, mesofemur 0.44, mesotibia 0.45, mesotarsus 0.15, metafemur 0.58, metatibia 0.70, metatarsus 0.21.

Colour: Trunk chiefly black. Labrum, anterior and posterior margin of pronotum, ventral parts of humeri, and mesoscutellum chestnut-brown. Ventral parts of head (including buccula) and thorax yellow. Antennae and legs yellow, apices of femora and tarsi weakly infuscated. Forewing blackish, cell of endocorium pale brown and whitish at base, of exocorium medium brown; membrane pale, with four small, very indistinct whitish marks.

Pilosity: Head, pronotum, mesoscutellum, and metanotal elevation with small scale-like setae varying in colour from golden to green and bluish. Entire trunk with extremely short, whitish pilosity. Corium with golden, appressed pubescence, veins with rather short, subcumbent, whitish hairs. Venter of abdomen with relatively long, erect, white setae in addition to short pilosity. Antennae and legs with numerous pale setae, without special modification.

Structures: Body stout (Fig. 1). Head (Figs. 15, 16) short, sides between anterior margin of eyes to small antennal tubercles straight, divergent. Preocular tubercles present, roundish and very low. Anteclypeus without swelling. Buccula (Fig. 16) high, with two impressions, anterior one ovate and large, posterior one circular and small, and posteriorly with large, slightly upcurved apically pointed process. Pronotum with some large, deep grooves between anterior and posterior lobe, the central three grooves largest; midline moderately impressed, groove hardly traceable in posterior third; along anterior margin, and around humeri with some smaller grooves, and some similar grooves scarcely dispersed all over posterior lobe. Metanotal elevation (Fig. 17) short, with sharp median carina, posteriorly broadly rounded and with very small emargination at apex. Forewing reaching apical margin of abdomen. Legs short, without special modifications; metatibia almost straight. Abdomen without modification, except apex ventrally with distinct furrow for holding genitalia. In dorsal aspect, sides of abdomen anteriorly subparallel, posteriorly ovate, apically truncated.

Genitalia of male very large (Fig. 18): Pygophore elongated, diverging from base to insertion of parameres, with paired tufts of very long setae at apical third of length; distal section ventrally strongly protruded. Proctiger small and narrow, sides and apex set with moderately long setae. Paramere extremely long, very slender, almost straight, with small basal tubercle, laterally with long setae that increase in length towards apex.

Female: Unknown.

Comparative notes: *Hebrus ilocanus* sp.n. is similar to *H. drakei* PORTER 1959 and *H. parameralis* ZETTEL 2004, and the holotype was originally misidentified as *H. drakei*. All three species have an almost straightly truncated metanotal elevation, very short antennae (about 0.5 times as long as body), a long and acute buccula process (Fig. 16), extremely elongated parameres process (Fig. 18), and a deeply furrowed abdominal apex of the male. The pilosity of the dorsal surface is identically short in *H. ilocanus* sp.n. and *H. drakei*, but significantly longer and standing in *H. parameralis*. On the other hand, the long standing pilosity of the abdominal sterna is similar in *H. ilocanus* sp.n. and *H. parameralis* and differs very strongly from the clinging short pilosity of *H. drakei* (see ZETTEL 2006). The pale endocorium is of the same colour in *H. ilocanus* sp.n. and *H. drakei*, and overall these two species are extremely similar. However, it is unlikely that PORTER (1959) overlooked the very obvious tuft of long setae on the pygophore (see Fig. 18 for *H. ilocanus* sp.n.), that is not mentioned in the description nor drawn in the figures. Unfortunately, the genitalia of the *H. drakei* type are lost and no other specimen has become available since (ZETTEL 2006).

Regional and general distribution: Only known from the unspecified type locality in Ilocos Sur.

Etymology: Named for the province of origin.

***Hebrus lacustris* ZETTEL, 2006**

Hebrus lacustris ZETTEL, 2006: 1025.

Material examined: 1 ♀ (mpt, paratype), Albay, 40km N of Legaspi, 1 km W of Malilipot, Busai Falls, 23.II.1998, leg. H. Zettel (#143) (NHMW).

Regional distribution: Albay (ZETTEL 2006).

General distribution: Endemic to the Philippines and recorded from both sides of Huxley's Line: Luzon, Negros, Pacijan, and Busuanga (ZETTEL 2006).

***Hebrus pangantihoni* ZETTEL, 2006**

Hebrus pangantihoni ZETTEL, 2006: 1016.

Material examined: 5 ♂♂ (mpt, paratypes), Laguna, Los Baños, Mt. Makiling, Mud Springs, 8.II.1996, leg. H. Zettel (#73) (CZW, UPLB); 1 ♂, 1 ♀ (mpt, paratypes), same locality, 1.XI.1996, leg. H. Zettel (#88) (NHMW); 2 ♂♂, 1 ♀ (mpt, paratypes), same locality, 23–24.I.1999, leg. H. Zettel (#167) (CZW); 2 ♀♀ (mpt, paratypes), same area, Molawin Creek at College of Forestry, 8.II.1996, leg. H. Zettel (#72) (CZW); 2 ♂♂, 1 ♀ (mpt, paratypes), same area, Molawin Creek at Flat Rocks, 9.II.1996, leg. H. Zettel (#75) (CZW); 5 ♂♂, 8 ♀♀ (mpt, paratypes) Quezon, Atimonan, Quezon National Park, near Old Zigzag Road, 24–30.III.1998, leg. H. Zettel (#165) (CZW, UPLB); 1 ♂, 1 ♀ (mpt, paratypes), Camarines Sur, Lagonoy, Buenavista, Parogcan, 10.II.2001, leg. H. Zettel (#267b) (CZW).

Regional distribution: Laguna, Quezon, Camarines Sur (ZETTEL 2006).

General distribution: Endemic to Greater Luzon, recorded from central and southern Luzon and from Polillo Island (ZETTEL 2006).

***Hebrus philippinus* ZETTEL, 2006**

Hebrus philippinus ZETTEL, 2006: 1011.

Material examined: 1 ♂, 3 ♀♀ (mpt, paratypes), La Union, Bacnotan, Don Mariano Marcos Memorial State University, NARTDI Falls, 23.10.2002, leg. H. Zettel (#310) (NHMW); 1 ♂ (mpt, paratype), Laguna, Los Baños, Rest Area, creek from Dampalit Falls, 17.XI.1992, leg. H. Zettel (#1a) (NHMW); 1 ♀ (mpt, paratype), same locality, 15.XI.1993, leg. H. Zettel (#22b) (NHMW); 1 ♂, 2 ♀♀ (mpt, paratypes), Laguna, Los Baños, Mt. Makiling, Molawin Creek at College of Forestry, 8.II.1996, leg. H. Zettel (#72) (CZW); 1 ♀ (mpt, paratypes), same area, Flat Rocks, 14.II.1999, leg. H. Zettel (#175) (CZW); 14 ♂♂, 7 ♀♀ (mpt, paratypes), Quezon, Atimonan, Quezon National Park, near Old Zigzag Road, 24–30.III.1998, leg. H. Zettel (#165) (CZW, UPLB); 12 ♂♂, 10 ♀♀ (mpt, paratypes), Camarines Norte, SW of Daet, S of Vicente, Fabrica, Mananap, 17.III.2003, leg. H. Zettel, C. V. Pangantihon & L. S. Vichozo (#348) (CZW, UPLB); 8 ♂♂, 9 ♀♀ (mpt, paratypes), Camarines Sur, 20 km E of Naga, 5 km E of Carolina, Mt. Isarog, Malabsay Falls, 19.II.1998, leg. H. Zettel (#141) (NHMW, UPLB, CNT, ZMUC); 5 ♂♂, 1 ♀ (mpt, paratypes), same area, 3 km E of Carolina, Mainit Spring (“Hydro”), 20.II.1998, leg. H. Zettel (#142) (NHMW, UPLB); 4 ♀♀ (mpt, paratypes), Camarines Sur, Pili, Buncao, Caririga Creek, 1.II.2002, leg. H. Zettel (#301) (CZW, UPLB); 1 ♂, 1 ♀ (mpt, paratypes), Camarines Sur, Lagonoy, 1 km W of San Sebastian, Kinayangan River, 2.II.2002, leg. H. Zettel (#303) (CZW); 1 ♀ (mpt, paratypes), same area, Buenavista, Parogcan, 10.II.2001, leg. H. Zettel (#267b) (CZW); 10 ♂♂, 2 ♀♀ (mpt, paratypes), Albay, 40 km N of Legaspi, 1 km W of Malilipot, Busai Falls, 23.II.1998, leg. H. Zettel (#143) (NHMW, UPLB); 1 ♂ (mpt, paratypes), Sorsogon, NE of Irosin, N of San Roque, Lake Bulusan, 630m a.s.l., 26.II.1998, leg. H. Zettel (#146) (NHMW).

Regional distribution: Widespread and probably without distributional limit on Luzon; records from La Union, Laguna, Quezon, Camarines Norte, Camarines Sur, Albay, and Sorsogon (ZETTEL 2006).

General distribution: Endemic and widespread in the Philippines, but absent from the Palawan Region. ZETTEL (2006) recorded *H. philippinus* from the islands of Luzon, Polillo, Catanduanes, Masbate, Panay, Negros, Cebu, Poro, Siquijor, Samar, Leyte, Biliran, Bohol, Camiguin, and Mindanao.

***Hebrus timasiformis* ZETTEL, 2004**

Hebrus timasiformis ZETTEL, 2004a: 539.

Material examined: 2 ♂♂ (mapt, holo- and paratype), 1 ♀ (mapt, paratype), Benguet, W of Baguio, Asin Hot Springs, 17.II.1999, leg. H. Zettel (#180) (UPLB, CZW).

Regional and general distribution: Only known from the type series; presently regarded as an endemic species of northern Luzon (ZETTEL 2004a).

Hydrometridae BILLBERG, 1820 (marsh treaders, water measurers)

***Hydrometra lineata* ESCHSCHOLTZ, 1822**

Hydrometra lineata ESCHSCHOLTZ, 1822: 110; HUNGERFORD & EVANS 1934: 72; POLHEMUS & REISEN 1976: 284; YANO et al. 1981: 22; POLHEMUS & POLHEMUS 1995: 29; GAPUD et al. 2003: 145.

Material examined: 1 ♀ (mapt), Mountain Province, 5 km S of Bontoc, Balitjan River, 900 m a.s.l., 27.II.1999, leg. H. Zettel (#190) (NHMW); 1 ♀ (mapt), Mountain Province, NW of Sagada, Lake Danum, 1600 m a.s.l., 24.II.1999, leg. H. Zettel (#187) (NHMW); 1 ♂ (brpt), Mountain Province, Chico River, Gonogon, 1100 m a.s.l., 21.II.1999, leg. H. Zettel (#184) (CZW); 1 ♂, 2 ♀♀ (mapt), Pangasinan, Gayaman Binmalay, 19.XI.1955, leg. P. Catungal (SHUK, NHMW); 5 ♂♂, 2 ♀♀ (mapt), Zambales, Olongapo, Subic Bay, small puddle at Riding Stable, 5.XII.1993, leg. H. Zettel (#37c) (NHMW); 1 ♀ (brpt), 1 # (mapt), same locality, pond at gate, 5.XII.1993, leg. H. Zettel (#37d) (NHMW); 1 ♂, 1 ♀ (mapt), Bataan, 10 km E of Olongapo, Roosevelt Park, 1.XII.1993, leg. H. Zettel (#38) (NHMW); 1 ♂, 1 ♀ (brpt), Laguna, Los Baños, Laguna de Bay, bank with dense vegetation, 13.XI.1992, leg. H. Zettel (#4) (NHMW); 2 ♂♂, 2 ♀♀ (mapt), Camarines Sur, Lagonoy, Buenavista, Parogcan, 10.II.2001, leg. H. Zettel (#267a) (CZW, UPLB); 1 ♂, 1 ♀ (brpt), 1 ♂, 1 ♀ (mapt), Albay, 15 km SW of Manito, S of Cawayan, river, 24.II.1998, leg. H. Zettel (#144) (NHMW, UPLB).

Regional distribution: Widespread and without distribution border on Luzon: Ilocos Norte (GAPUD et al. 2003), Ilocos Norte (GAPUD et al. 2003), Ilocos Sur (GAPUD et al. 2003), La Union (GAPUD et al. 2003), Abra (GAPUD et al. 2003), Mountain Province (GAPUD et al. 2003; m.e.), Ifugao (YANO et al. 1981), Benguet (GAPUD et al. 2003), Pangasinan (POLHEMUS & POLHEMUS 1995, GAPUD et al. 2003; m.e.), Pampanga (POLHEMUS & REISEN 1976), Zambales (POLHEMUS & REISEN 1976, GAPUD et al. 2003; m.e.), Bataan (HUNGERFORD & EVANS 1934, GAPUD et al. 2003; m.e.), Tarlac (GAPUD et al. 2003), Nueva Viscaya (GAPUD et al. 2003), Nueva Ecija (GAPUD et al. 2003), Bulacan (GAPUD et al. 2003), Rizal (HUNGERFORD & EVANS 1934), Laguna (HUNGERFORD & EVANS 1934, POLHEMUS & REISEN 1976, GAPUD et al. 2003; m.e.), Batangas (GAPUD et al. 2003), Cavite (GAPUD et al. 2003), Quezon (GAPUD et al. 2003), Camarines Sur (GAPUD et al. 2003; m.e.), Albay (GAPUD et al. 2003; m.e.).

General distribution: Oriental Realm, Wallacea, and New Guinea (POLHEMUS & POLHEMUS 1995, POLHEMUS & LANSBURY 1997); no distributional limits in the Philippines, records from Luzon, Negros, Bohol, Mindanao, Palawan, and Busuanga (GAPUD et al. 2003).

***Hydrometra mindoroensis* POLHEMUS, 1976**

Hydrometra mindoroensis POLHEMUS, 1976 (in POLHEMUS & REISEN): 283; POLHEMUS & POLHEMUS 1995: 36; POLHEMUS & LANSBURY 1997: 21; GAPUD et al. 2003: 153; FREITAG & ZETTEL 2013: 62.

Material examined: 6 ♂♂, 8 ♀♀ (mipt), Mountain Province, 5 km S of Bontoc, Balitjan River, 900 m a.s.l., 27.II.1999, leg. H. Zettel (#190) (NHMW, UPLB); 1 ♀ (mipt), Mountain Province, Sagada, Bokong Waterfalls, 1400 m a.s.l., 19.II.1999, leg. H. Zettel (#182) (CZW); 1 ♂ (mipt), same area, Echo Valley, Underground River, 23–24.II.1999, 1500 m a.s.l., leg. H. Zettel (#186) (NHMW); 1 ♂ (mipt), Mountain Province, Chico River, Gonogon, 1100 m a.s.l., 21.II.1999, leg. H. Zettel (#184) (CZW); 1 ♀ (mipt), Benguet, Baguio, 2 km below Camp John Hay, 18.II.1999, leg. H. Zettel (#181) (CZW); 2 ♂♂, 1 ♀ (mipt), Laguna, Los Baños, Mt. Makiling, Flat Rocks, 10.II.1998, leg. H. Zettel (#132) (NHMW); 1 ♂ (mipt), same area, Mud Spring area, 11.II.1998, leg. H. Zettel (#134) (NHMW); 1 ♂ (mipt), same locality, 23–24.I.1999, leg. H. Zettel (#167) (CZW); 1 ♂, 1 ♀ (mipt), Laguna, Los Baños, Botanical Garden, 21.4.1983, unknown collector (ZRCS); 1 ♀ (mipt), Quezon, W Atimonan, Quezon National Park, near Old Zigzag Road, 13.II.1996, leg. H. Zettel (#79c)

(CZW); 1 ♂ (mipt), same locality, 24–30.III.1998, leg. H. Zettel (#165) (CZW); 3 ♂♂ (mipt), Camarines Sur, Pili, Buncao, Himao Creek, 1.II.2002, leg. H. Zettel (#302) (CZW, CSSAC); 1 ♂, 2 ♀♀ (mipt), Albay, 15 km SW of Manito, S of Cawayan, river, 24.II.1998, leg. H. Zettel (#144) (NHMW, UPLB).

Regional distribution: Ilocos Sur (GAPUD et al. 2003), Mountain Province (GAPUD et al. 2003; m.e.), Benguet (GAPUD et al. 2003; m.e.), Pampanga (POLHEMUS & REISEN 1976), Zambales (GAPUD et al. 2003), Nueva Vizcaya (GAPUD et al. 2003), Nueva Ecija (GAPUD et al. 2003), Cavite (POLHEMUS & POLHEMUS 1995, GAPUD et al. 2003), Laguna (GAPUD et al. 2003; m.e.), Quezon (POLHEMUS & POLHEMUS 1995, GAPUD et al. 2003; m.e.), Camarines Sur (GAPUD et al. 2003; m.e.), Albay (GAPUD et al. 2003; m.e.);

General distribution: Philippines, Borneo, Sulawesi, New Guinea (POLHEMUS & POLHEMUS 1995, POLHEMUS & LANSBURY 1997).

***Hydrometra orientalis* LUNDBLAD, 1933**

Hydrometra orientalis LUNDBLAD, 1933: 430; POLHEMUS & REISEN 1976: 284; GAPUD et al. 2003: 155.

Material examined: 1 ♀ (mpt), Laguna, Los Baños, Mt. Makiling, Molawin Creek at College of Forestry, 8.II.1996, leg. H. Zettel (#72) (CZW).

Regional distribution: Ilocos Norte (GAPUD et al. 2003), Ilocos Sur (GAPUD et al. 2003), La Union (GAPUD et al. 2003), Abra (GAPUD et al. 2003), Pampanga (POLHEMUS & REISEN 1976), Zambales (POLHEMUS & REISEN 1976, GAPUD et al. 2003), Bataan (GAPUD et al. 2003), Nueva Ecija (GAPUD et al. 2003), Cavite (GAPUD et al. 2003), Laguna (GAPUD et al. 2003; m.e.).

General distribution: Southeast Asian mainland, Philippines, Indonesia (e.g., Sumatra), New Guinea, Australia (POLHEMUS & LANSBURY 1997, YANG & ZETTEL 2005).

Veliidae AMYOT & SERVILLE, 1843 (water crickets, riffle bugs)

Haloveliinae ESAKI, 1930

***Halovelia bergrothi* ESAKI, 1926**

Halovelia bergrothi ESAKI, 1926: 161; ANDERSEN 1989a: 93; ZETTEL 1998: 468; ZETTEL & TRAN 2006: 86.

Material examined: 14 ♂♂, 4 ♀♀ (apt), Ilocos Norte, Currimao, sea coast, tidal flat pools, 30.X.2002, leg. H. Zettel (#321a) (NHMW, UPLB); 1 ♀ (apt), same locality, tidal pools between high rocks, 30.X.2002, leg. H. Zettel (321d) (NHMW); 5 ♂♂, 3 ♀♀ (apt), Batangas, Mabini, Anilao, 14.IV.2005, leg. C. V. Pangantihon (#P151) (CZW).

Regional distribution: Ilocos Norte (m.e.), Bataan (Port Binanga, ANDERSEN 1989a), and Batangas (m.e.).

General distribution: Widely distributed along western Pacific coasts from Vietnam, Cambodia, and the Philippines eastwards to New Guinea, Solomon Islands, New Caledonia, Mariana Islands, Caroline Islands, Marshall Islands, and Samoan Islands (ANDERSEN 1989, ZETTEL 1998, ZETTEL & TRAN 2006).

***Halovelia esakii* ANDERSEN, 1989**

Halovelia esakii ANDERSEN, 1989: 107.

Material examined: 4 ♂♂, 3 ♀♀ (apt), Zambales, Iba Beach, 13.V.1977, leg. A. A. Barroso (UPLB).

Regional distribution: Zambales (ANDERSEN 1989a, same sample as listed above; m.e.).

General distribution: Widely distributed along western Pacific coasts east of the Wallace-Huxley-Line, from the Philippines and Sulawesi eastwards to the Solomon Islands (ANDERSEN 1989).

***Haloveloides (Haloveloides) christyae* ZETTEL, 1998**

Haloveloides christyae ZETTEL, 1998: 465; ZETTEL 2003a: 176.

Haloveloides (Haloveloides) christyae: ZETTEL 2006b: 745.

Material examined: 3 ♂♂ (apt), 7 ♀♀ (apt), Ilocos Norte, Currimao, sea coast, tidal pools between high rocks, 30.X.2002, leg. H. Zettel (#321b) (NHMW, UPLB); 5 ♀♀ (apt), same locality, date, and collector (#321d) (NHMW).

Regional distribution: Camarines Sur (ZETTEL 2003, m.e.).

General distribution: Endemic to the Philippines; originally described from Mindoro (ZETTEL 1998) and later recorded from Coron, Burias, and Luzon (ZETTEL 2003a, 2006b).

***Haloveloides (Anderseniveloides) anderseni* ZETTEL, 2003**

Haloveloides anderseni ZETTEL, 2003a: 167.

Haloveloides (Anderseniveloides) anderseni: ZETTEL 2006b: 746.

Material examined: 13 ♂♂ (apt, holo- and paratypes), 8 ♀♀ (paratypes), Camarines Sur, Lagonoy, San Sebastian, 10.II.2001, leg. H. Zettel (#268a) (UPLB, NHMW, CZW); 4 ♂♂ (apt), 4 ♀♀ (apt), Camarines Norte, Mercedes, Matoogtoog, 28.X.2012, leg. C. V. Pangantihon (#P453) (CZW, NHMW).

Regional and general distribution: Only known from southern Luzon; records from Camarines Norte (m.e.) and Camarines Sur (ZETTEL 2003a, m.e.).

***Haloveloides (Anderseniveloides) cornutus* ANDERSEN, 1992**

Haloveloides cornuta ANDERSEN, 1992: 400.

Haloveloides cornutus: ZETTEL 2003a: 166.

Haloveloides (Anderseniveloides) cornutus: ZETTEL 2006b: 746.

Material examined: 1 ♂, 1 ♀ (apt, paratypes), Zambales, 1 km S of Infanta, 5.VII.1985, leg. J.T. & D.A. Polhemus (#CL1950) (ZMUC).

Regional and general distribution: Endemic to Luzon and only known from the type locality in Zambales (ANDERSEN 1992; m.e.).

***Haloveloides (Anderseniveloides) gapudi* ZETTEL, 2003**

Haloveloides gapudi ZETTEL, 2003a: 172.

Haloveloides (Anderseniveloides) gapudi: ZETTEL 2006b: 746.

Material examined: 2 ♀♀ (apt, paratypes), Zambales, Subic Bay, Triboa Mangrove, 13.IV.1997, leg. V. P. Gapud (UPLB); 6 ♂♂ (apt, holo- and paratypes), 7 ♀♀ (apt, paratypes), same locality, 7.XII.2000, leg. H. Zettel (#260) (UPLB, NHMW).

Regional and general distribution: Endemic to Luzon and only known from the type locality in southern Zambales (ZETTEL 2003a; m.e.).

***Strongylovelia philippinensis philippinensis* LANSBURY & ZETTEL, 1997**

Strongylovelia formosa: POLHEMUS & REISEN 1976: 273 (misidentification).

Strongylovelia philippinensis philippinensis LANSBURY & ZETTEL, 1997: 66; ZETTEL 2003b: 190.

Material examined: 1 ♂, 1 ♀ (apt), 2 ♂♂ (mapt), Ilocos Norte, Piddig, Tangaoan C. Nursery, Paraiso Reforestation Project, 21.X.1976, leg. A. A. Barroso (UPLB); ♀ (apt), Zambales, Subic Bay Forest Reserve, Triboa Mangrove, 13.IV.1997, leg. V. P. Gapud (UPLB); 6 ♀♀ (apt) Zambales, Subic Bay, Triboa Mangrove, 7.XII.2000, leg. H. Zettel (#260) (NHMW, UPLB); 2 ♂♂ (apt, paratypes), Laguna, Los Baños, stream from Dampalit Falls, 17.XI.1992, leg. H. Zettel (#1a) (UPLB, NHMW); 14 ♀♀, 11 ♂♂ (apt, paratypes), Laguna, Los Baños, Mt. Makiling, Mud Springs, 1.XI.1996, leg. H. Zettel (#88) (CNT, CJP, NHMW, UPLB); 6 ♀♀ (apt, holo- and paratypes), 5 ♂♂ (apt, paratypes), 1 ♂ (mapt, paratype), same locality, 15.XI.1993, leg. H. Zettel (#22b) (UPLB, NHMW, OUM); 1 ♀, 1 ♂ (mapt, paratypes), same area, Molawin Creek at College of Forestry, 8.II.1996, leg. H. Zettel (#72) (CZW); 2 ♀♀, 5 ♀♀ (apt, paratypes), 1 ♀ (mapt, paratype), Quezon, W

of Atimonan, Quezon National Park, near Old Zigzag Road, 12–13.II.1996, leg. H. Zettel (#79a); 5 ♀♀, 5 ♂♂ (apt), Camarines Sur, Pili, Buncao, Himaao Creek, 1.II.2002, leg. H. Zettel (#302) (CZW, UPLB, CSSAC).

Regional distribution: Probably distributed all over Luzon, with records from Ilocos Norte (ZETTEL 2003b; m.e.), Zambales (ZETTEL 2003b; m.e.), Laguna (POLHEMUS & REISEN 1976, as *S. formosa*, LANSBURY & ZETTEL 1997; m.e.), Quezon (LANSBURY & ZETTEL 1997; m.e.), and Camarines Sur (ZETTEL 2003b; m.e.).

General distribution: Endemic to the Philippines; the nominotypical subspecies originally described from central Luzon (LANSBURY & ZETTEL 1997) and later recorded from several other islands: Marinduque, Masbate, Ticao, Samar, and Leyte (ZETTEL 2003b). Other subspecies are distributed on Mindanao and Bohol (ZETTEL 2003b).

***Xenobates* sp. aff. *argentatus* ANDERSEN, 2000**

Material examined: 9 ♂♂, 13 ♀♀ (apt), Luzon, Camarines Sur, Lagonoy, San Sebastian, mangrove, 10.II.2001, leg. H. Zettel (#268a) (CZW, NHMW, UPLB); 3 ♂♂, 6 ♀♀ (apt), same locality, 2.II.2002, leg. H. Zettel (#304) (CZW, UPLB).

Notes: This species is closely related to *X. argentatus* ANDERSEN, 2000 originally described from southern Thailand, Borneo, and Cebu in the central Philippines. However, this “species” contains several morphologically distinct populations, including several from the Philippines, which should be considered as separate species.

Regional distribution: At present only known from one locality in Camarines Sur (m.e.).

General distribution: Further records of morphologically identical populations are from the coasts of Polillo Island and northern Samar (m.e.).

Microveliinae CHINA & USINGER, 1949 (1861)

***Microvelia* (*Cloacovelina*) *gapudi* ZETTEL, 2012**

Microvelia (*Cloacovelina*) *gapudi* ZETTEL, 2012: 107.

Material examined: 1 ♂ (mapt, holotype), Laguna, Mt. Makiling, 1.X.1975, leg. V. P. Gapud (UPLB).

Regional and general distribution: So far only known from the holotype and regarded as an endemic species of Luzon.

***Microvelia* (*Dilutovelina*) *leveillei leveillei* (LETHIERRY, 1877)**

Hydroessa leveillei LETHIERRY, 1877: 101.

Microvelia diluta DISTANT 1909; LUNDBLAD 1933: 307; MIYAMOTO 1953: 113; POLHEMUS & REISEN 1976: 271.

Microvelia leveillei: ZETTEL & GAPUD 1999: 136; CHEN et al. 2005: 431.

Microvelia (*Dilutovelina*) *leveillei leveillei* (LETHIERRY, 1877): ZETTEL 2012: 106; FREITAG & ZETTEL 2013: 64.

Material examined: 3 ♂♂, 1 ♀ (mapt), Zambales, Olongapo, Subic Bay, pond near Riding Stable, 5.XII.1993, leg. H. Zettel (#37c).

Remarks: LUNDBLAD (1933) revised this species and MIYAMOTO (1953) gave an interesting account on its biology, both under the junior synonym *M. diluta*. Synonymy with *Hydroessa leveillei* was established by ZETTEL & GAPUD (1999), the subgenus *Dilutovelina* by ZETTEL (2012).

Regional distribution: Although so far only recorded from Pampanga (POLHEMUS & REISEN 1976) and Zambales (m.e.), this species probably has no distributional borders on Luzon.

General distribution: A common species. The subspecies *leveillei* has wide distribution from India to the southern parts of China, to the Philippines and the Lesser Sunda Islands (DISTANT 1909, CHEN et al. 2005); ssp. *nioumbadjoui* POISSON, 1959 was described from the Comoros.

***Microvelia (Philippinovelia) dalawa* sp.n.** (Figs. 2, 19, 22, 24)

Type locality: Luzon, Laguna Province, northern slopes of Mt. Makiling, near University of the Philippines Los Baños, Molawin Creek at Flat Rocks, small rock pool at banks, N 14°08' E 121°13', ca. 300 m a.s.l.

Type material: Holotype (♂, apt; NMM), Laguna, Los Baños, Mt. Makiling, Flat Rocks, 10.II.1998, leg. H. Zettel (#132). Paratypes: 5 ♂♂, 10 ♀♀ (apt), same data (NHMW, UPLB); 1 ♀ (apt), same locality, 31.X.1996, leg. H. Zettel (#87) (NHMW); 1 ♂ (mapt), Laguna, Los Baños, Mt. Makiling, 14.XI.1993, leg. H. Zettel (#21a) (NHMW); 1 ♂, 1 ♀ (apt), same locality, 31.III.1998, leg. H. Zettel (#166) (CZW); 1 ♀ (mapt), same area, Molawin Creek at College of Forestry, 8.II.1996, leg. H. Zettel (#72) (CZW); 4 ♀♀ (apt), 1 ♂, 2 ♀♀ (mapt), Quezon, Atimunan, Quezon National Park, near Old Zigzag Road, 24–30.III.1998, leg. H. Zettel (#165) (CZW, UPLB).

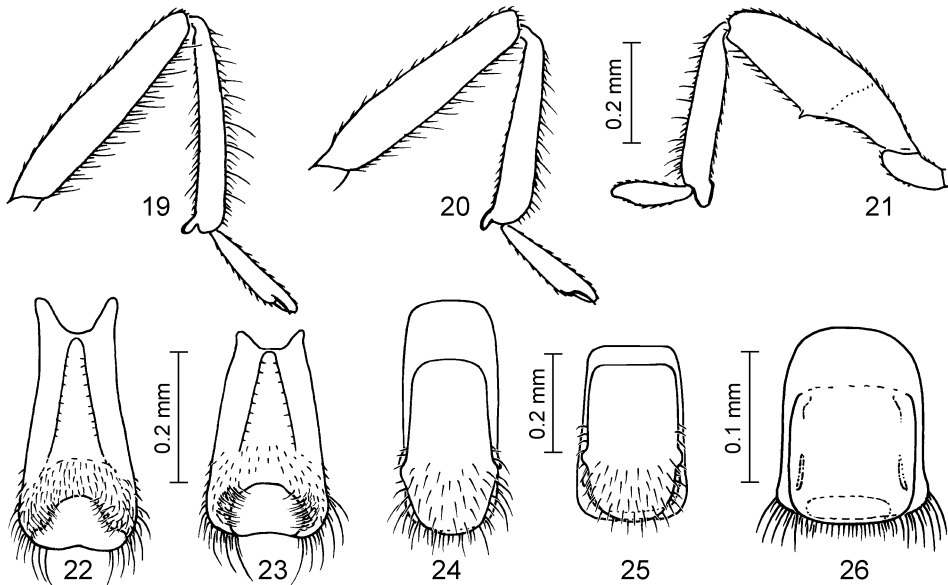
Description of apterous male: Measurements (holotype; n = 7): Body length 1.85 (1.68–1.92), maximum width (at mesothorax) 0.66 (0.60–0.70). Head length 0.29 (0.32–0.35), width 0.48 (0.43–0.50). Lengths of antennomeres, I 0.23, II 0.25, III 0.37, IV 0.39. Pronotum length 0.39 (0.28–0.40), width 0.59 (0.53–0.63). Lengths of leg segments: profemur 0.52, protibia 0.46, protarsus 0.24, mesofemur 0.61, mesotibia 0.56, mesotarsus 0.15 + 0.21, metafemur 0.72, metatibia 0.75, metatarsus 0.15 + 0.20.

Colour: Trunk chiefly dark brown. Pronotum with pruinose transverse stripe anteriorly and with hind margin more or less pale; midline pruinose or brown. Narrow margins of acetabula, sides of laterotergites and a broad stripe along sides of sternites yellowish to orange coloured. Tergites 1–3 laterally, tergites 5–7 medially (or entirely) frosted gray (in most specimens indistinct). Antenna brown, base of antennomere 1 pale. Rostrum yellow. Legs basally yellow, distal parts of femora, tibiae and tarsi brownish.

Pilosity: Trunk with relatively short appressed hairs, but head and thorax with some longer and standing setae. Tergites with comparatively long, subcumbent or slightly raised, posteriorly directed pilosity, especially at sides of tergites 5–7. Posterior margin of tergite 7 with fringe of long dark hairs. Antennae and legs with numerous long setae in addition to short pilosity.

Structures: Head moderately bent ventrad, in dorsal aspect distinctly acuminate; eyes large and globular. Rostrum approximately reaching middle of mesosternum; segment 3 longest, about 1.5 times as long as segment 4. Antennomere 1 thicker than 2, and 2 slightly thicker than 3 and 4. Pronotum completely covering meso- and metanotum; grooves small and inconspicuous. Sides of thorax with a few grooves. Lateral evaporatorium small, knob-like, with a few long setae. Protibial (Fig. 19) comb very short, about 0.10 times as long as flexor sides of tibia, entirely located on an ear-shaped, process that surpasses the insertion of tarsus in an angle with the direction of tibia. Femora not incrassate compared to female. Metatibia on flexor side with row of black granules that almost reaches base and apex. Sides of abdomen hardly convex. Tergites matt; tergites 6 and 7 with weakly impressed midline; posterior margin of tergite 7 straight. Sternites without modifications, hind margin of sternite 7 broadly concave. Segment 8 very slender, distally with long setae; hind margin dorsally slightly and ventrally strongly emarginate; ventral surface (Fig. 22) concave, with a medial area lined by two sharp carinae.

Genitalia (Fig. 24): Pygophore apically broadly rounded; proctiger moderately slender, without modifications; parameres reduced.



Figs. 19–26: Microveliinae: Forelegs of males of (19) *Microvelia (Philippinovelina) dalawa* sp.n., (20) *Microvelia (Philippinovelina) seyferti* sp.n., and (21) *Xiphovelina dentata* sp.n.; segment 8 of male, ventral aspect of (22) *M. dalawa* sp.n. and (23) *M. seyferti* sp.n.; genitalia of male, dorsal aspect, of (24) *M. dalawa* sp.n. (25) *M. seyferti* sp.n., and (26) *Xiphovelina dentata* sp.n.

Description of apterous female: Measurements (n = 10): Body length 1.67–1.96, maximum width (at mesothorax) 0.72–0.81. Head length 0.34–0.37, width 0.47–0.52. Pronotum length 0.29–0.36, width 0.61–0.69.

Colour (Fig. 2) similar to male. Frosted areas on tergites more distinct and more extended, laterally on tergites 1–4, medially on tergites 5–6, almost completely covering tergites 7–8.

Pilosity: Long setae more numerous than in male, but pilosity reduced on tergites and laterotergites; frosted areas more or less bare. Long, erect or semi-erect setae on tergite 1 and along sides of tergites 5–7(8); posterior margin of tergite 8 with posteriorly directed pilosity. Laterotergites 5–7 with some scattered long setae. Sternite 7 at hind margin medially with a pair of distinct tufts of short black setae; their bases in close vicinity but the setae diverging, forming a V.

Structures similar to male, but body shape more stout, especially on abdomen. Protibia unmodified. Laterotergites, especially on segments (4)5–7, directed strongly upward; connexiva strongly curved inwards at segments 4–6, at segment 7 hardly converging. Tergite 8 directed posteriad, hind margin truncated. Terminalia entirely enclosed by segment 7. Gonocoxa 1 small, in caudal view largely covered by the ventrally directed proctiger.

Description of macropterous male: Measurements (n = 2): Body length (without wings) 1.91–1.92, maximum width (at pronotum) 0.80–0.84. Head length 0.29–0.31, width 0.48–0.49. Pronotum length 0.64–0.65.

Colour: Similar to apterous morph; pronotum with pruinose mark in middle of foremargin; midline pruinose or dark. Forewings dark brown, with white base (slightly surpassing apex of pronotum) and with three white patches in distal half. Pilosity reduced (compared to apterous morph). Veins on forewing with relatively long, subcumbent hairs.

Structures: Pronotum like in all macropterous veliids very large, with strongly developed humeri; hind margin almost angularly produced (narrowly rounded at middle); small grooves almost regularly distributed, but lacking on humeri. Forewings posteriorly approximately reaching end of abdomen, laterally not completely covering laterotergites, with four closed cells and one open apical cell. Tergites and laterotergites under the wings bare, tergites 4–7 with narrow shiny midline.

Description of macropterous female: Measurements (n = 3): Body length (without wings) 1.88–2.10, maximum width (at pronotum) 0.83–0.91. Head length 0.31–0.34, width 0.49–0.53. Pronotum length 0.63–0.71.

Colour similar to macropterous male. Pilosity and most structures similar to apterous female or macropterous male, respectively. Sides of abdomen convex, connexiva not bent inwards. Laterotergites weakly sloping. Tergites under the wings bare, tergites 5–8 with narrow shiny midline.

Comparative notes: This is a typical species of *Philippinovelina* ZETTEL, 2012 by the following diagnostic characters of the subgenus: both sexes with long erect hairs on head and pronotum and with long row of granules on flexor side of metatibia; male with a short protibial grasping comb, without mesotibial grasping comb, with reduced parameres; gonocoxae 1 of female not fully covered by proctiger. Hitherto, this subgenus contained only two species from Tablas and Camiguin in the central and southern Philippines. Females of *M. dalawa* sp.n. can be easily distinguished from both by the two tufts of setae on the medial hind margin of sternite 7. The male differs from other species of *Philippinovelina* by very slender genitalia (Figs. 22, 24), from *M. seyferti* sp.n., the only other species of Luzon, also by colour.

Etymology: The species epithet “dalawá” is taken from the Philippine language (meaning “two”) and refers to the two tufts of setae on the hind margin of the female’s sternite 7.

Regional and general distribution: Probably endemic to central Luzon, so far only known from the lower slopes of Mt. Makiling in Laguna (m.e.) and from the hills near Atimonan in Quezon (m.e.).

***Microvelia (Philippinovelina) seyferti* sp.n.** (Figs. 3, 20, 23, 25)

Type locality: Luzon, Benguet Province, Baguio City, 2 km below Camp John Hay, N 16° 23' E 120° 37', ca. 1400 m a.s.l.

Type material: Holotype (♂, apt; NMM), Benguet, Baguio, 2 km below Camp John Hay, 18.II.1999, leg. H. Zettel (#181). Paratypes: 2 ♂♂, 7 ♀♀ (apt), 2 ♂♂, 1 ♀ (mapt), same data (CZW, NHMW, UPLB); 3 ♂♂, 1 ♀ (mapt), Benguet, W of Baguio, at km 7 of Asin Road, 17.II.1999, leg. H. Zettel (#179) (CZW).

Description of apterous male: Measurements (holotype; n = 3): Body length 1.84 (1.66–1.84), maximum width (at mesothorax) 0.69 (0.67–0.70). Head length 0.30 (0.30–0.34), width 0.50 (0.48–0.50). Lengths of antennomeres, I 0.22, II 0.24, III 0.35, IV 0.37. Pronotum length 0.36 (0.33–0.36), width 0.65 (0.62–0.65). Lengths of leg segments: profemur 0.50, protibia 0.45, protarsus 0.26, mesofemur 0.59, mesotibia 0.54, mesotarsus 0.13 + 0.20, metafemur 0.70, metatibia 0.80, metatarsus 0.13 + 0.20.

Colour: Trunk chiefly dark brown. Pronotum pale brown, with two large, dark areas of varying extent on disk (leaving midline pale). Margins of acetabula, entire laterotergites and a broad stripe along sides of sternites yellowish to orange coloured. Laterotergites in some specimens with narrow, dark longitudinal stripe. Tergites 1–2(3) laterally or entirely, tergites 5–7 medially (or entirely) frosted gray. Antenna brown, base of antennomere 1 pale. Rostrum yellow. Legs basally yellow, distal parts of femora, tibiae and tarsi brownish.

Pilosity: Trunk with relatively short appressed hairs, but head and thorax with some longer and standing setae. Tergites and laterotergites with a few long erect setae; short pilosity widely reduced, absent from middle of tergites 6 and 7. Posterior margin of tergite 7 with only few dark hairs. Antennae and legs with numerous long setae in addition to short pilosity.

Structures: Head moderately bent ventrad, in dorsal aspect distinctly acuminate; eyes large and globular. Rostrum approximately reaching middle of mesosternum; segment 3 longest, about 1.5 times as long as segment 4. Antennomere 1 thicker than 2, and 2 slightly thicker than 3 and 4. Pronotum completely covering meso- and metanotum; grooves small. Sides of thorax with a few grooves. Lateral evaporatorium small, knob-like, with a few long setae. Protibial comb (Fig. 20) very short, about 0.10 times as long as flexor sides of tibia, entirely located on a ear-shaped process that surpasses the insertion of tarsus in an almost straight line. Femora not incrassate compared to female. Metatibia on flexor side with row of black granules that reaches base and apex. Sides of abdomen weakly convex. Tergites matt; tergites (5) 6–7 with distinctly impressed midline; posterior margin of tergite 7 straight. Sternites without modifications, hind margin of sternite 7 broadly concave. Segment 8 slender, distally with long setae; hind margin dorsally slightly and ventrally strongly emarginate; ventral surface (Fig. 23) concave, with a medial area lined by two sharp carinae.

Genitalia (Fig. 25): Pygophore slender, with shallow subapical groove, hind margin truncated; proctiger slender; parameres reduced.

Description of apterous female: Measurements ($n = 7$): Body length 1.87–2.04, width at mesothorax 0.79–0.83 (maximum width in some specimens on abdomen). Head length 0.33–0.36, width 0.50–0.52. Pronotum length 0.32–0.36, width 0.68–0.73.

Colour (Fig. 3) similar to male, but more variable; in one specimen entire dorsum medium to orange brown. Frosted areas on tergites on average less extended, especially on tergites 5–8.

Pilosity: Long setae more numerous than in male, but pilosity reduced on tergites and laterotergites; frosted areas mostly bare. A few long, erect or semi-erect setae on tergite 1 and along sides of tergites 5–8; posterior margin of tergite 8 with posteriorly directed pilosity. Laterotergites 5–7 with some scattered long setae. Sternite 7 at hind margin with even row of relatively short, erect setae.

Structures similar to male, but body shape much stouter, especially on abdomen. Protibia unmodified. Laterotergites, especially on segments (4)5–7, directed strongly upward; connexiva almost evenly curved inwards at entire length, or slightly less converging posteriorly. Tergite 8 directed posteriorly, hind margin truncated. Sternites 5–7 with narrowly impressed midline. Terminalia entirely enclosed by segment 7. Gonocoxa 1 small, in caudal view almost entirely covered by the ventrally directed proctiger.

Description of macropterous male: Measurements ($n = 5$): Body length (without wings) 1.79–1.99, maximum width (at pronotum) 0.75–0.84. Head length 0.28–0.33, width 0.47–0.50. Pronotum length 0.61–0.66.

Colour distinctly darker than in apterous morph; pronotum dark brown, with pruinose foremargin and midline (in anterior part); hind margin and humeri lighter brown. Forewings dark brown, with white base (slightly surpassing apex of pronotum) and with three white patches in distal half. Pilosity reduced (compared to apterous morph). Veins on forewing (basally) with relatively long, subcumbent hairs.

Structures: Pronotum large, with strongly developed humeri; hind margin narrowly rounded at middle; small grooves almost regularly distributed, but lacking on humeri. Forewings posteriorly slightly surpassing end of abdomen, laterally not completely covering laterotergites, with four closed cells and one open apical cell. Tergites and laterotergites under the wings bare, tergites 6–7 with broad, shiny midline.

Description of macropterous female: Measurements (n = 2): Body length (without wings) 2.06–2.08, maximum width (at pronotum) 0.90–0.91. Head length 0.30–0.34, width 0.51–0.52. Pronotum length 0.69–0.72.

Colour similar to macropterous male. Pilosity and most structures similar to apterous female or macropterous male, respectively. Sides of abdomen convex, connexiva not bent inwards. Tergites under the wings bare, tergites 6–8 with shiny midline.

Comparative notes: This is a typical species of (for subgeneric characteristics see the previous species). Compared with the other species of this subgenus, the apterous morph of *M. seyfertii* sp.n. has a reduced pilosity of the abdominal tergites and usually uniformly yellow coloured laterotergites, whereas the laterotergites are distinctly infuscated mesally in the other species. The male possesses the stoutest genitalia of all *Philippinovelina* species (Figs. 23, 25) and – in the apterous morph – the dense pilosity is restricted to the margins of tergite 7, whereas it is extended to tergites 5 or 6 in other species. The female of *M. seyfertii* sp.n. is more easily distinguishable from the other three *Philippinovelina* species by the long, posteriorly directed setae at the hind margin of tergite 8 and by a row (no tufts) of moderately long setae at the hind margin of sternite 7. In *P. wala* ZETTEL, 2012 from Tablas Island, a species that also lacks tufts, the setae on sternite 7 are short and, moreover, the metatibial row of granules is shortened basally and apically, whereas it is complete in *M. seyfertii* sp.n.

Etymology: This species is dedicated to my friend Franz Seyfert who joined the expedition to northern Luzon in 1999.

Regional and general distribution: Probably endemic to northern Luzon, so far only known from the type locality in Benguet (m.e.).

Microvelia (Picaultia) douglasi SCOTT, 1874 (sensu lato)

Microvelia atrolineata BERGROTH, 1918: 122; POLHEMUS & REISEN 1976: 270.

Microvelia douglasi atrolineata BERGROTH, 1918: YANO et al. 1981: 20.

Microvelia (Picaultia) douglasi atrolineata: ANDERSEN & WEIR 2003: 339; CHEN et al. 2005: 431.

Microvelia (Picaultia) douglasi: FREITAG & ZETTEL 2013: 63.

Material examined: 1 ♂, 1 ♀ (mapt), Benguet, W of Baguio, at km 7 of Asin Road, 17.II.1999, leg. H. Zettel (#179) (CZW); 3 ♀♀ (mapt), Benguet, Baguio, 2 km below Camp John Hay, 18.II.1999, leg. H. Zettel (#181) (CZW); 1 ♂, 2 ♀♀ (mapt), La Union, Bacnotan, Don Mariano Marcos Memorial State University, NARTDI Falls, 23.X.2002, leg. H. Zettel (#310) (NHMW); 1 ♂, 3 ♀♀ (mapt), Zambales, Olongapo, Subic Bay, pond near Riding Stable, 5.XII.1993, leg. H. Zettel (#37c) (NHMW); 3 ♂♂ (apt), 1 ♂, 6 ♀♀ (mapt), same area, pond near gate, 3.XII.1993, leg. H. Zettel (#37d) (NHMW); 1 ♂, 1 ♀ (mapt), same area, near Riding Stable, 2.XII.1993, leg. H. Zettel (#37e) (NHMW); 6 ♂♂, 3 ♀♀ (mapt), 3 ♂♂ (apt), Bataan, 10 km E Olongapo, Roosevelt Park, 1.XII.1993, leg. H. Zettel (#38) (NHMW); 4 ♀♀ (apt), 6 ♂♂, 5 ♀♀ (mapt), Laguna, Los Baños, vegetated banks of Laguna Bay, 16–18.XI.1992, leg. H. Zettel (#4) (NHMW); 3 ♂♂ (mapt), Laguna, Los Baños, Rest Area, 15.XI.1993, leg. H. Zettel (#22a) (NHMW); 1 ♂, 3 ♀♀ (apt), Albay, 15 km SW of Manito, S of Cawayan River, 24.II.1998, leg. H. Zettel (#144).

Notes: Los Baños and Mt. Makiling, both in Laguna, are the type localities of *M. atrolineata* (BERGROTH 1918), a taxon presently in the rank of a subspecies. YANO et al. (1981) described differences between the two subspecies, but morphological and geographical

limits should be re-evaluated in consideration of the wide general distribution of the species. See also ANDERSEN (1967) for intraspecific variation of parameres and YE et al. (2014) for regional molecular diversity in China.

Regional distribution: No distributional limits on Luzon, records from Benguet (m.e.), La Union (m.e.), Pampanga (POLHEMUS & REISEN 1976), Zambales (m.e.), Bataan (m.e.), Laguna (BERGROTH 1918; m.e.), and Albay (m.e.).

General distribution: Common in all kinds of stagnant freshwater and extremely widely distributed in the Oriental, Australian and Melanesian Regions eastwards up to the remote islands of the West Pacific Region (ANDERSEN & WEIR 2003).

***Microvelia (Somnovelia) atroelegans* ZETTEL & GAPUD, 1999**

Microvelia atroelegans ZETTEL & GAPUD, 1999: 142.

Microvelia (Somnovelia) atroelegans: ZETTEL 2012: 109.

Material examined: 1 ♂ (mapt, holotype), 1 ♀ (mapt, paratype), Quezon, Atimonan, Quezon National Park, near Old Zigzag Road, 16.III.1999, leg. H. Zettel (#202) (UPLB, NHMW); 2 ♀♀ (mapt, paratypes), same locality, 12–13.II.1996, leg. H. Zettel (#79a); 1 ♂ (mapt, paratype), Quezon, Quezon National Park, 30 km E of Lucena City, 23.XI.1992, leg. M.A. Jäch (NHMW).

Regional and general distribution: Probably endemic to central Luzon, so far only known from the type locality in Quezon (ZETTEL & GAPUD 1999; m.e.).

***Microvelia (Somnovelia) legorskyi* ZETTEL, 2012**

Microvelia (Somnovelia) legorskyi ZETTEL, 2012: 109.

Material examined: 2 ♂♂, 3 ♀♀ (brpt, paratypes), 10 ♂♂ (mapt, holo- and paratypes), 9 ♀♀ (mapt, paratypes), Nueva Viscaya, Santa Fe, N of Imugan, puddles in forest, 1200 m a.s.l., 10.XI.2002, leg. H. Zettel (#335) (NHMW, UPLB); 7 ♂♂, 2 ♀♀ (brpt, paratypes), 2 ♂♂, 6 ♀♀ (mapt, paratypes), same locality, temporary pools in intermittent forest stream, 29.V.2002, leg. V. P. Gapud (CZW, CVPG).

Regional and general distribution: Probably endemic to northern Luzon, so far only known from the type locality in the Sierra de Caraballo, Nueva Viscaya (ZETTEL 2012; m.e.).

***Microvelia (Somnovelia) somnokrene* ZETTEL & GAPUD, 1999**

Microvelia somnokrene ZETTEL & GAPUD, 1999: 138.

Microvelia (Somnovelia) somnokrene: ZETTEL 2012: 109.

Material examined: 7 ♂♂ (mapt, holo- and paratypes), 5 ♀♀ (mapt, paratypes), Laguna, Mt. Makiling, 500–1144 m a.s.l., 14.XI.1993, leg. H. Zettel (21a) (UPLB, NHMW, CNT); 9 ♂♂, 8 ♀♀ (mapt), Laguna, Mt. Makiling, 1.X.1975, leg. V. P. Gapud (UPLB); 4 ♂♂ (mapt), Albay, Mayon Volcano National Park, 800 ft a.s.l., 6.XII.1976, leg. H. O. Sanvalentin (UPLB, NHMW).

Regional and general distribution: Probably endemic to Luzon, so far recorded from Laguna and Albay (ZETTEL & GAPUD 1999; m.e.).

***Pseudovelina cristata* HECHER, 2006**

Pseudovelina cristata HECHER, 2006: 440.

Material examined: 1 ♂ (apt, holotype), 1 ♀ (apt, paratype), Mountain Province, Mt. Data, near Mount Data Hotel, 2300 m a.s.l., 25.II.1999, leg. H. Zettel (#188) (UPLB, NHMW).

Regional and general distribution: So far, this species is only known from high altitudes on Mt. Data, Mountain Province (HECHER 2006). It might be a very locally endemic species.

***Pseudovelia curvata* HECHER, 2006**

Pseudovelia curvata HECHER, 2006: 441.

Material examined: 1 ♂ (apt, holotype, 2 ♀♀ (apt, paratypes), 1 ♀ (mapt, paratype), Mountain Province, NE of Sagada, Banga'an, Bomod-ok Waterfalls, 22.II.1999, 1500 m a.s.l., leg. H. Zettel (#185) (UPLB, NHMW).

Regional and general distribution: So far *P. curvata* is only known from the type locality in Mountain Province (HECHER 2006).

***Pseudovelia gapudi* HECHER, 2006**

Pseudovelia reiseni [nec POLHEMUS, 1976]: NIESER 1995: 83.

Pseudovelia gapudi HECHER, 2006: 442.

Material examined: 1 ♀ (apt), Laguna, Mt. Makiling, Los Baños, 13–18.XI.1992, leg. H. Zettel (#1) (NHMW); 3 ♂♂, 2 ♀♀ (apt), same locality, 31.III.1998, leg. H. Zettel (#166) (CZW); 1 ♀ (apt, paratype), same area, stream above Mud Springs, 700 m a.s.l., 22.XI.1995, leg. J. Kodada (NHMW); 4 ♂♂, 5 ♀♀ (apt, paratypes), 1 ♂ (mapt, paratype), same area, Molawin Creek at Flat Rocks, 31.X.1996, leg. H. Zettel (#87) (NHMW); 5 ♂♂, 2 ♀♀ (apt, paratypes), same locality, 9.II.1996, leg. H. Zettel (#75) (CZW); 10 ♂♂, 5 ♀♀ (apt, paratypes), same locality, 10.II.1998, leg. H. Zettel (#132) (NHMW); 6 ♂♂, 7 ♀♀ (apt, paratypes), same locality, 14.II.1999, leg. H. Zettel (#175) (NHMW); 1 ♂ (apt, paratype), same area, Molawin Creek at College of Forestry, 8.II.1996, leg. H. Zettel (#72) (CZW); 1 ♀ (apt, paratype), same area, Mud Spring, 23–24.I.1999, leg. H. Zettel (#167) (NHMW); 1 ♂ (apt, paratype), Laguna, Los Baños, rest area, stream from Dampalit Falls, 15.XI.1993, leg. H. Zettel (#22b) (NHMW, UPLB); 1 ♀ (apt, paratype), Laguna, Mt. Banahaw above Kinabuhayan, 600–700 m a.s.l., trail to Crystallino, 24.XI.1995, leg. J. Kodada & B. Rigová (NHMW); 6 ♂♂, 3 ♀♀ (apt, paratypes), Nueva Viscaya, Santa Fe, Malico, Inacio, Inacio River, 1200 m a.s.l., 8.XI.2002, leg. H. Zettel (#330) (NHMW); 1 ♂, 3 ♀♀ (apt, paratypes), same area, Malico, Dulipay River, 8.XI.2002, leg. H. Zettel (#331) (NHMW); 5 ♂♂, 5 ♀♀ (apt, paratypes), same area, Malico, small creek, 8.XI.2002, leg. H. Zettel (#332) (NHMW); 1 ♂ (apt, paratype), same area, Barakbak, 620 m a.s.l., Barakbak River, 7.XI.2002, leg. H. Zettel (#326) (NHMW).

Regional and general distribution: This species is endemic to Luzon, with records from Mt. Makiling and Mt. Banahaw in Laguna, and from the Caballos Mountains in Nueva Viscaya.

***Pseudovelia heissi* HECHER, 2006**

Pseudovelia heissi HECHER, 2006: 447.

Material examined: 1 ♂, 1 ♀ (apt), Camarines Sur, Lupi, Sooc, Sooc River, above dam, 19–20.III.2003, leg. H. Zettel & C. V. Pangantihon (#349) (CZW); 2 ♀♀ (apt, paratypes), Camarines Sur, 20 km E of Naga, 5 km E of Carolina, Mt. Isarog, Malabsay Falls, 19.II.1998, leg. H. Zettel (#141) (NHMW); 2 ♂♂ (apt, paratypes), same locality, 4.III.1999, leg. H. Zettel (#192); 7 ♂♂, 5 ♀♀ (apt, paratypes), 1 ♂, 1 ♀ (mapt, paratypes), same area, 3 km E of Carolina, Mainit Spring ("Hydro"), 20.II.1998, leg. H. Zettel (#142) (NHMW); 3 ♂♂ (apt, paratypes), same locality, 4.III.1999, leg. H. Zettel (#193) (NHMW); 1 ♂, 3 ♀♀ (apt, paratypes), same area, Caririga Creek, 1.II.2002, leg. H. Zettel (#301) (CZW); 5 ♂♂, 1 ♀ (apt, paratypes), Camarines Sur, Pili, Buncao, Himaao Creek, 1.II.2002, leg. H. Zettel (#302) (CZW); 1 ♂, 5 ♀♀ (apt, paratypes), Camarines Sur, Lake Buhí area, Twin Falls near Itbog, 22.III.1998, leg. H. Zettel (#164) (CZW); 3 ♂♂, 1 ♀ (apt, paratypes), 1 ♀ (mapt, paratype), Camarines Sur, Lagonoy, 1 km W of San Sebastian, Kinayangan River, 2.II.2002, leg. H. Zettel (#303) (CZW); 6 ♂♂, 4 ♀♀ (apt, paratypes), 5 ♂♂, 2 ♀♀ (mapt, paratypes), Albay, 40 km N of Legaspi, 1 km W of Malilipot, Busai Falls, 23.II.1998, leg. H. Zettel (#143) (NHMW); 7 ♂♂, 6 ♀♀ (apt, paratypes), 1 ♀ (mapt, paratype), same locality, 7.III.2003, leg. H. Zettel (#346) (CZW); 7 ♂♂, 2 ♀♀ (apt, paratypes), 1 ♀ (mapt, paratype), Camarines Sur, Lagonoy, Buenavista, Parogcan, 10.II.2001, leg. H. Zettel (#267b) (CZW); 3 ♂♂, 3 ♀♀ (apt, paratypes), Sorsogon, NE of Irosin, N of San Roque, Lake Bulusan, 630 m a.s.l., 26.II.1998, leg. H. Zettel (#146) (NHMW); 3 ♂♂, 3 ♀♀ (apt, paratypes), Sorsogon, San Roque, Palok Tok Falls, 26.II.1998, leg. H. Zettel (#147) (NHMW).

Regional distribution: Common in the southern provinces and recorded from Camarines Sur, Albay, and Sorsogon (HECHER 2006; m.e.).

General distribution: Endemic to the Bicol Region, with records from southern Luzon and Catanduanes (HECHER 2006).

***Pseudovelvia polhemi* HECHER, 2006**

Pseudovelvia polhemi HECHER, 2006: 438.

Material examined: 11 ♂♂, 11 ♀♀ (apt, paratypes), Mountain Province, Sagada, Echo Valley, Underground River, 23–24.2.1999, 1500 m a.s.l., leg. H. Zettel (#186) (NHMW); 6 ♂♂, 3 ♀♀ (apt, paratypes), same area, Bokong Waterfalls, 1400 m a.s.l., 19.II.1999, leg. H. Zettel (#182) (CZW); 2 ♂♂, 2 ♀♀ (apt, paratypes), Mountain Province, NE of Sagada, Banga'an, 1500 m a.s.l., Bomod-ok Waterfalls, 22.II.1999, leg. H. Zettel (#185) (CZW); 1 ♂, 1 ♀ (apt), same locality, 14.III.2012, leg. C. V. Pangantihon (#P409); 4 ♂♂, 1 ♀ (apt, paratypes), Mountain Province, S of Sagada, Bagnen, slopes of Mt. Polis, 1550 m a.s.l., 26.II.1999, leg. H. Zettel (#189b) (NHMW); 1 ♂ (apt, paratype), Benguet, at km 219.5 on Kennon Road, 30 km S of Baguio City, 200 m a.s.l., 8.VII.1985, leg. J.T. & D.A. Polhemus (#CL1962) (NHMW); 1 ♂, 1 ♀ (apt, paratypes), Benguet, Baguio, 2 km below Camp John Hay, 18.II.1999, leg. H. Zettel (#181) (CZW); 3 ♂♂ (apt, paratypes), La Union, Bacnotan, Don Mariano Marcos Memorial State University, NARTDI Falls, 23.X.2002, leg. H. Zettel (#310) (NHMW); 13 ♂♂, 15 ♀♀ (apt, paratypes), same, locality, Casiaman Falls, 24.X.2002, leg. H. Zettel (#312) (NHMW).

Regional and general distribution: Endemic in the northwestern part of Luzon (Central Cordillera), recorded from Mountain Province, Benguet, and La Union (HECHER 2006).

***Pseudovelvia quadrifolia* HECHER, 2006**

Pseudovelvia quadrifolia HECHER, 2006: 452.

Material examined: 10 ♂♂, 8 ♀♀ (apt, paratypes), Camarines Sur, 20 km E of Naga, 5 km E of Carolina, Mt. Isarog, Malabsay Falls, 19.II.1998, leg. H. Zettel (#141) (NHMW); 1 ♂ (apt, paratype), same locality, 20.XI.1999, leg. H. Zettel (#208) (CZW); 3 ♂♂ (apt, paratypes), Camarines Sur, Lagonoy, Buenavista, Parogcan, 10.II.2001, leg. H. Zettel (#267b) (CZW); 1 ♀ (apt, paratypes), Camarines Sur, Pili, Buncao, Caririga Creek, 1.II.2002, leg. H. Zettel (#301) (CZW); 1 ♂ (mapt, paratype), same area, Himaa Creek, 1.II.2002, leg. H. Zettel (#302) (CZW); 1 ♂ (apt, paratypes), 1 ♂, 3 ♀♀ (macr, paratypes), Camarines Sur, 1 km W of San Sebastian, Kinayangan River, 2.II.2002, leg. H. Zettel (#303) (CZW).

Regional distribution: Uncommon species, recorded from Camarines Sur (HECHER 2006; m.e.).

General distribution: Endemic to the Bicol Region, with records from southern Luzon and Catanduanes (HECHER 2006).

***Pseudovelvia quezonica* HECHER, 2006**

Pseudovelvia quezonica HECHER, 2006: 446.

Material examined: 5 ♂♂, 7 ♀♀ (apt), Cavite, Alfonso, Pajo, 7.II.2010, leg. C. V. Pangantihon (#P345) (CZW, NHMW); 1 ♂ (apt, holotype), Quezon Province, Quezon National Park, ponds and waterfalls at picnic area, 10.VII.1985, leg. J.T. & D.A. Polhemus (#CL1970) (JTPC); 1 ♀ (apt, paratype), Quezon, Atimonan, Quezon National Park, near Old Zigzag Road, 24–30.III.1998, leg. H. Zettel (#165) (CZW).

Regional and general distribution: Probably endemic to Central Luzon; known from Quezon (HECHER 2006; m.e.) and Cavite (m.e.).

***Pseudovelvia reiseni* POLHEMUS, 1976**

Pseudovelvia reiseni POLHEMUS, 1976 (in POLHEMUS & REISEN): 272.

Material examined: 1 ♂, 1 ♀ (apt), 1 ♀ (mapt), Zambales, Subic Bay, Riding Stable, 2.XII.1993, leg. H. Zettel (#37e) (NHMW); 14 ♂♂, 12 ♀♀ (apt), 1 ♂, 1 ♀ (mapt), same area, at Aeta Village, 9.XII.2000, leg. H. Zettel (#261) (NHMW).

Regional and general distribution: Recorded from several localities in Zambales Province only (see HECHER 2006); a record from “Bataan” (in HECHER 2006) refers to mislabeled specimens from a locality just at the border between the two provinces. The record from Laguna (in NIESER 1995) refers to a morphologically similar species, *P. gapudi*.

***Pseudovelgia simplex* HECHER, 2006**

Pseudovelgia simplex HECHER, 2006: 444.

Material examined: 1 ♂ (apt, holotype), 1 ♀ (apt, paratype), Quezon, Infanta, Agos River, pool at margin at mouth, 4.IV.1993, leg. N. Nieser (#N9335) (CNT, NHMW).

Regional and general distribution: This species is probably endemic to Central Luzon and so far only recorded from the type locality in Quezon.

***Xiphovelgia dentata* sp.n.** (Figs. 4, 21, 26)

Type locality: Luzon, Mountain Province, N of Sagada, stream below Bomod-ok Falls (N 17° 07' E 120° 54', 1380 m a.s.l.).

Type material: Holotype (apterous male, NMM), Mountain Province, Sagada, Bomod-ok Falls, 14.III.2012, leg. C. V. Pangantihon (#P409). Paratypes: 2 ♂♂, 7 ♀♀ (apt, paratypes), same data (CZW, NHMW).

Description of apterous male: Measurements (holotype; n = 3): Body length 1.56 (1.54–1.56); maximum width (at mesothorax) 0.76 (0.72–0.76). Head length 0.29 (0.29–0.30), width 0.48 (0.48–0.49). Lengths of antennomeres, I 0.18, II 0.19, III 0.20, IV 0.25. Pronotum length 0.13 (0.12–0.13), width 0.58 (0.58–0.61). Lengths of leg segments: profemur 0.45, protibia 0.39, protarsus 0.19, mesofemur 0.55, mesotibia 0.52, mesotarsus 0.22+0.24, metafemur 0.50, metatibia 0.64, metatarsus 0.09+0.19.

Colour (Fig. 4): Almost entirely black; on pronotum with small ovate pruinose mark. Coxae, trochanters, and bases of femora yellow on all legs; base of antennomere 1 yellowish.

Pilosity: Trunk with brown to grayish, thin, short, decumbent pilosity; dorsum without distinct marks of short, silverish setae, although individual silverish setae recognizable in some specimens. Antenna with numerous brown, erect setae, longest on antennomere 2. Legs with more or less erect pilosity; with longer hairs on extensor sides of meso- and metatibia; rows of long slender setae present on flexor sides of meso- and metafemur (distally) and mesotibia.

Structures: Trunk strongly depressed, of slender ovate shape. Head large, hardly bent ventrally, firmly attached to pronotum. Rostrum almost reaching hind margin of mesosternum, its third segment about twice as long as fourth. First antennomere thickest, second slightly thicker than third and fourth. Pronotum very short, posteriorly curved, behind eyes extremely narrow, laterally fused with mesothorax. Mesonotum fused with metanotum, suture reduced to a pair of lateral impressions. Thorax and base of abdomen with numerous deep pits. Pro- and mesosternum with broad and deep furrow for keeping the rostrum. Legs short. Profemur (Fig. 21) strongly incrassate, with tooth at midlength of flexor side; outline of flexor side slightly concave in basal half, convex distally. Protibial grasping comb very short, less than one sixth of tibia length, distally clearly surpassing tarsal insertion. Meso- and metafemur slightly incrassate (compared to female). Praetarsus of middle leg as typical for the genus. Sides of abdomen weakly convex. Tergites without modifications, short and wide, tergite 7 clearly longer than the others. Abdominal segment 8 very small, subcylindrical, posteriorly slightly widened, hind margin dorsally and ventrally slightly emarginated at middle, ventrally with paired pilose areas.

Genitalia very small (Fig. 26): Pygophore subcylindrical, posteriorly weakly diverging and with inconspicuous pilosity; posterior margin hardly emarginated in caudal aspect. Proctiger oblong, slightly longer than wide. Paramere reduced.

Description of apterous female: Measurements (n = 7): Body length 1.94–2.05, maximum width (at base of abdomen) 0.92–1.00. Head length 0.43–0.47, width 0.53–0.56. Pronotum length 0.11–0.13, width 0.64–0.68.

Colour as in male. Pilosity similar as in male, but sides of thorax with some long black setae, middle of tergite 1 with long pilosity; connexiva of abdominal segments 6 and 7 with laterally and mesally with some long black setae.

Structures partly as in male. Trunk much wider. Foreleg simple. Abdomen trough-shaped. Tergites even wider than in male, tergite 8 directed straight caudal. Gonocoxa 1 large, plate-shaped. Proctiger small, knob-like.

Macropterous morph: Unknown.

Comparative notes: The male of *X. dentata* sp.n. strongly differs from all other species of *Xiphovelia* by a tooth on the profemur (Fig. 21). *Xiphovelia philippinensis* ZETTEL, 2012, the only species described from the Philippines so far, differs from *X. dentata* sp.n. also by larger size and chiefly yellow antennae and legs. The male of *X. philippinensis* has a long protibial grasping comb, the female has no raised setae on tergite 1 and concealed gonocoxa 1.

Etymology: Named for the tooth on the profemur of males.

Rhagoveliinae CHINA & USINGER, 1949

Rhagovelia agilis POLHEMUS, 1976

Rhagovelia agilis POLHEMUS (in POLHEMUS & REISEN), 1976: 278; POLHEMUS & POLHEMUS 1988: 165; ZETTEL 1996: 138.

Material examined: 7 ♂♂, 1 ♀ (apt), 2 ♀♀ (mapt), Laguna, Los Baños, 4.III.1914, leg. G. Böttcher (BMNH, NHMW, NMPC); 8 ♂♂ (mapt), 3 ♀♀ (mapt), Laguna, Mt. Makiling, Molawin Creek at Mud Spring, 9.VII.1985, leg. J.T. & D.A. Polhemus (#CL1975) (JTPC, NHMW); 2 ♂♂, 3 ♀♀ (apt), 1 ♀ (mapt), same locality, 1.XI.1996, leg. H. Zettel (#88) (NHMW, UPLB, ZRCS); 11 ♂♂, 14 ♀♀ (apt), same locality, stream above Mud Springs, 700 m a.s.l., 22.XI.1995, leg. J. Kodada (NHMW); 2 ♂♂, 2 ♀♀ (apt), 5 ♂♂, 2 ♀♀ (mapt), same locality, 23–24.I.1999, leg. H. Zettel (#167) (CZW, UPLB); 3 ♂♂, 2 ♀♀ (apt), 2 ♂♂ (mapt), same locality, 13–14.I.1999, leg. H. Zettel (#174) (CZW); 2 ♀♀ (apt), same locality, Mud Spring area, 6.X.1976, leg. A. A. Barroso (CVPG); 6 ♂♂, 3 ♀♀ (apt), 2 ♂♂ (mapt), Laguna, Los Baños, Mt. Makiling, Flat Rocks, 15.VIII.1978, leg. R. C. Garcia (CVPG); 4 ♂♂, 9 ♀♀ (apt), same locality, 10.II.1998, leg. H. Zettel (#132) (NHMW); 1 ♂, 2 ♀♀ (apt), Laguna, Mt. Makiling Los Baños, 13–18.XI.1992, leg. H. Zettel (#1) (NHMW); 9 ♂♂, 6 ♀♀ (apt), Laguna, Los Baños, rest area, stream from Dampalit Falls, 17.XI.1992, leg. H. Zettel (1a) (NHMW); 20 ♂♂, 4 ♀♀ (apt), same locality, 15.XI.1993, leg. H. Zettel (#22b) (NHMW, UPLB); 1 ♂ (apt), Tagaytay City, 24.VII.1985, leg. J.T. & D.A. Polhemus (#CL2002) (JTPC); 1 ♂ (mapt), Quezon, Atimonan, Quezon National Park, 11.IX.1976, leg. V. P. Gapud (CVPG); 1 ♂, 7 ♀♀ (apt), same locality, 17.VI.1978, leg. C. S. Sanchez (CVPG); 7 ♂♂, 21 ♀♀ (apt), 1 ♀ (mapt), Quezon, Quezon National Park, Nalubog Creek, 10.VII.1985, leg. J.T. & D.A. Polhemus (#CL1971) (JTPC, NHMW); 7 ♂♂, 10 ♀♀ (apt), Quezon Province, Quezon National Park, ponds and waterfalls at picnic area, 10.VII.1985, leg. J.T. & D.A. Polhemus (#CL1970) (JTPC, NHMW); 3 ♂♂ (apt), Quezon, Real, National Botanic Garden, forested stream, 26.II.1978, leg. V. P. Gapud (CVPG).

Notes: The types of *R. agilis* originating from Los Baños and deposited in JTPC (now at the Smithsonian Institution Washington) were not examined, but the species identity was based on numerous specimens from the type locality. Populations from southern Luzon (and Catanduanes) differ in some minor details (including paramere shape) from typical *R. agilis* from central Luzon. As the author has not yet decided how to evaluate the status of the southern populations, they are excluded from this study.

Regional and general distribution: Endemic to central Luzon, with records from Tagaytay City (part of Cavite), Laguna, and Quezon.

Rhagovelia akrita POLHEMUS, 1976

Rhagovelia luzonica [nec LUNDBLAD, 1933]: DRAKE 1948: 62 (misidentification, see POLHEMUS & REISEN 1976: 279).
Rhagovelia akrita POLHEMUS (in POLHEMUS & REISEN) 1976: 280.

Material examined: 13 ♂♂, 13 ♀♀ (apt), Mountain Province, Mt. Data, mountain stream, 7,500 ft a.s.l., 29.XII.1980, leg. V. P. Gapud (CVPG, JTPC, CZW, NHMW); 4 ♂♂, 7 ♀♀ (apt), Mountain Province, Mt. Data, near Mount Data Hotel, 2300 m a.s.l., 25.II.1999, leg. H. Zettel (#188) (NHMW, UPLB); 1 ♂, 1 ♀ (apt), Mountain Province, S of Sagada, Bagnen, slopes of Mt. Polis, 1600 m a.s.l., 26.II.1999, leg. S. Schödl (#23) (NHMW); 3 ♂♂, 1 ♀ (apt), Benguet, Baguio, stream near Pacoal, 15.IV.1975, leg. A. A. Barroso (CVPG).

Notes: The types of *R. akrita* originating from Baguio are deposited in the Drake Collection and in JTPC (both now in USNM) and were not examined. However, some specimens from the type area were available and some studied specimens (in JTPC) were compared with the types by Dr. John T. Polhemus. The species can be easily distinguished from closely related species by large size and keeled abdominal sterna.

Regional and general distribution: Only known from high elevations in the Central Cordillera, with records from Mountain Province (m.e.) and Benguet (POLHEMUS 1976; m.e.).

***Rhagovelia bicolorana* sp.n.** (Figs. 5, 6, 9, 27, 29)

Type locality: Luzon, Camarines Sur, 20 km E of Naga, 3 km E of Carolina, Mainit Spring, N 13°39', E 123°16', 140 m a.s.l.

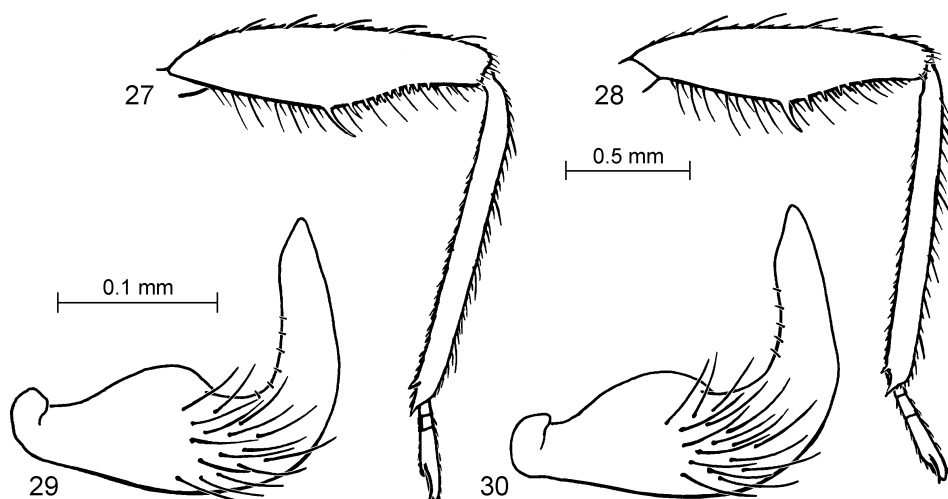
Type material: Holotype (apt male, NMM), Camarines Sur, 20 km E of Naga, 3 km E of Carolina, Mainit Spring ("Hydro"), 20.II.1998, leg. H. Zettel (#142). Paratypes: 43 ♂♂, 40 ♀♀ (apt), 2 ♂♂ (mapt, dealate), 1 ♀ (mapt), same data as holotype (NHMW, UPLB); 11 ♂♂, 3 ♀♀ (apterous), 1 ♂ (mapt, dealate) same locality, 4.III.1999, leg. H. Zettel (#193) (NHMW, UPLB); 9 ♂♂ (apt), 2 ♂♂, 6 ♀♀ (mapt, dealate), Camarines Sur, 20 km E of Naga, 5 km E of Carolina, Mt. Isarog, Malabsay Falls, 19.II.1998, leg. H. Zettel (#141) (NHMW, UPLB); 84 ♂♂, 59 ♀♀ (apt), 5 ♂♂, 8 ♀♀ (mapt), Camarines Sur, Lupi, Alanao, Bahi River (border with Camarines Norte), 3.III.1999, leg. H. Zettel (#191) (NHMW, UPLB); 11 ♂♂, 10 ♀♀ (apt), same locality, 14.XI.1999, leg. H. Zettel (#205) (CZW, UPLB); 5 ♂♂, 4 ♀♀ (apt), 2 ♂♂, 1 ♀ (mapt), Camarines Sur, N of Sipocot, Sooc, Sooc River, 16.II.2001, leg. H. Zettel (#270) (CZW); 1 ♂ (apt), Camarines Sur, Lake Buhi area, Twin Falls, near Itbog, 22.III.1998, leg. H. Zettel (#164) (CZW); 1 ♂ (apt), 2 ♂♂, 2 ♀♀ (mapt), Camarines Sur, Lagonoy, 1 km W of San Sebastian, Kinayangan River, 2.II.2002, leg. H. Zettel (#303) (CZW, UPLB).

Description of apterous male: Measurements (holotype; n = 12): Body length 3.03 (2.74–3.05); maximum width (at metapleura) 1.22 (1.17–1.26). Head length 0.33 (0.32–0.35), width 0.76 (0.72–0.81); minimum eye distance 0.20 (0.19–0.22). Lengths of antennomeres, I 0.77, II 0.42, III 0.48, IV 0.45. Pronotum length 0.81 (0.76–0.84), width 1.10 (1.02–1.11). Lengths of leg segments: profemur 0.91, protibia 0.97, protarsus 0.06 + 0.22, mesofemur 1.44, mesotibia 1.17, mesotarsus 0.07 + 0.48 + 0.65, metafemur 1.24, metatibia 1.38, metatarsus 0.03 + 0.09 + 0.28.

Colour (Fig. 5): Trunk black; pronotum with transverse yellow or orange coloured mark near anterior margin; distal parts of all acetabula yellowish. Antenna black, basal fourth or third of antennomere yellow. Legs chiefly black, often with weak bluish or greenish shimmer; pro- and metacoxa, pro- and metatrochanter yellow; base of profemur yellow, but on dorsal surface, close to flexor side, with black stripe that reaches base in most specimens.

Pilosity: Body dorsally with short, gray, appressed hair layer and (except on pronotum) with posteriad directed, long, black setae. Venter of thorax and abdomen with short gray pilosity and dispersed whitish setae; sternite 7 with three longitudinal stripes of relatively long, yellowish, posteriad directed setae. Ventral surface without black spiculae. Antennomeres 1 and 2, femora and tibiae with several long black setae.

Structures: Juga not flattened, shiny. Pronotum much longer than head, covering mesonotum. Metafemur (Fig. 27) moderately slender, ca. 3.9–4.3 times (in holotype 4.3 times) as long as wide, on flexor side with one distal row consisting of 6–9 teeth (in holotype 7 teeth). Metatibia (Fig. 27) straight, on flexor side with fine tooth-like structures all over length, with long apical spine. Pregenital segments of abdomen relatively wide. All tergites



Figs. 27–30: Hind leg of (27) *Rhagovelia bicolana* sp.n. and (28) *R. sorsogonensis* sp.n.; left paramere, lateral aspect, of (29) *R. bicolana* sp.n. and (30) *R. sorsogonensis* sp.n.

mat. In holotype, fifth tergite 3.2 times as wide as long, seventh tergite 1.8 times as long as sixth and 1.1 times as long as wide at anterior margin. Sternites without long median carina; medial areas of sternites 4–6 flat. Sternite 7 with low median carina, areas lateral of carina flat. Segment 8 small, subcylindrical, with short ventrobasal median carina.

Genital segments small and weakly modified. Pygophore subovate. Proctiger with well developed lateral lobes, sclerotized part approximately as long as wide. Paramere (Fig. 29) small, strongly curved, with large basal tubercle, distal part relatively short and wide, suddenly narrowed apically.

Description of apterous female: Measurements ($n = 12$): Body length 3.01–3.39; maximum width (at metapleura) 1.27–1.46. Head length 0.30–0.38, width 0.75–0.80; minimum eye distance 0.20–0.24. Pronotum length 0.80–0.89, width 1.08–1.22.

Colour (Fig. 6) as in male. Pilosity similar as in male, but strongly reduced on tergites; setae absent from tergites 4–6 (in some specimens with short hairs on hind margin of tergite 6). Tergite 7 (Fig. 9) bare, except a dense row of long, posteriorly directed black setae on hind margin. Tergite 8 with scattered, moderately long hairs and with very conspicuous, posterolaterally directed tufts of long setae. Proctiger and apex of gonocoxa 1 with moderately long, black pilosity. Laterotergites laterally with dense, black, appressed pilosity; this stripe widest at laterotergites 3–6, but very narrow anteriorly and posteriorly. Sternites without long pilosity, except sternite 7 at medial (ventral) part with dense, yellowish, posteriorly directed hair layer.

Structures: Head and thorax as in male. Metafemur more slender than that of male, ca. 4.4–4.9 times as long as wide, on flexor side with distal row consisting of 3–6 teeth. Abdomen (Figs. 6, 9) weakly modified, moderately narrow at segments 6–8. Connexival margins evenly converging at segments 2–5, subparallel at segments 6–7. Sternites 5–7 partly visible in dorsal aspect. Tergites 1–3 convex, 4–8 flat. Fifth tergite 2.6 times as wide as long; seventh tergite 1.4 times as long as sixth and 1.1 times as long as wide at

anterior margin. Hind margin of tergite 7 straight. Medial areas of sternites 4–6 shallowly impressed. Posterior corner of sternite 7 rectangular, not protruded. Ventral outline of gonocoxa 1 (in lateral view) straight.

Description of macropterous male: Measurements (n = 10): Body length (measured without wings) 2.92–3.10; maximum width (at pronotum) 1.34–1.45. Head length 0.30–0.34, width 0.74–0.80; minimum eye distance 0.19–0.22. Pronotum length 1.17–1.31.

Colour and pilosity similar to apterous morph, except pilosity much reduced on tergites. Wings uniformly blackish brown. Structures: Pronotum much enlarged and with strong humeri, as typical for alate morphs. Wings surpassing apex of body; forewing with three closed cells, distal one reaching apical third of wing. Some specimens dealate. Metafemur ca. 4.1–4.5 times as long as wide, with 3–7 teeth in distal row. Abdominal carinae short, reaching base or hind margin of tergite 2. Tergites 6 and 7 with small shiny areas along mid-length.

Description of macropterous female: Measurements (n = 10): Body length (measured without wings) 3.22–3.38; maximum width (at pronotum) 1.39–1.53. Head length 0.30–0.35, width 0.78–0.82; minimum eye distance 0.21–0.23. Pronotum length 1.21–1.33.

Characteristics as in apterous female or macropterous male, respectively. Wings as in winged male, some specimens dealate. Metafemur ca. 4.7–5.2 times as long as wide, with 3–6 teeth in distal row. Connexiva evenly converging, almost in straight lines. Posterior tergites wider than in apterous morph. Pilosity of tergite 7 reduced. Tergites 6–8 medially with narrow shiny area.

Comparative notes: *Rhagovelia bicolorana* sp.n. is a species of the *R. orientalis* group (see ZETTEL 1995) and similar to *R. philippina* and to *R. sorsogonensis* sp.n. described below. Whereas *R. philippina* is widely distributed in the northern and central parts of Luzon, four closely related species have local distributions in the Bicol Region and on Masbate in the Visayas Region (*R. bicolorana* sp.n. *R. seyfertii* sp.n. and two further undescribed taxa from Catanduanes and Masbate). *Rhagovelia bicolorana* sp.n. can be distinguished from *R. philippina* in both sexes and morphs by a dark stripe reaching the base of the profemur (rarely indistinct), a character shared with *R. sorsogonensis* sp.n. Males have the distal part of the paramere (Fig. 29) distinctly stouter and its apex less acuminate compared to *R. philippina*, but are difficult to separate from *R. sorsogonensis* sp.n., because the paramere shape has slight variation in both species. The female of *R. bicolorana* sp.n. differs from *R. philippina* by a shallow impression on sternites 4–6, and from *R. sorsogonensis* sp.n. by lack of long hairs laterally on sternite 7 (Fig. 9).

Etymology: Named after the occurrence in the Bicol Region.

Regional and general distribution: Endemic to a relatively small distribution area in southern Luzon, with several records from Camarines Sur and Camarines Norte.

***Rhagovelia cotobatoensis* HUNGERFORD & MATSUDA, 1961**

Rhagovelia (Rhagovelia) cotobatoensis HUNGERFORD & MATSUDA, 1961: 259.

Rhagovelia cotobatoensis: POLHEMUS & REISEN 1976: 275, 275.

Material examined: 5 ♂♂, 3 ♀♀ (apt), 3 ♂♂, 3 ♀♀ (mapt), Zambales, Subic Bay, Triboa Mangrove, 7.XII.2000, leg. H. Zettel (#260) (NHMW, UPLB); 3 ♀♀ (apt), Quezon, Atimonan, Quezon National Park, 17.I.1976, leg. A. A. Barroso (CVPG); 1 ♂ (mapt), same area, W of Atimonan, near Old Zigzag Road, 12.II.1996, leg. H. Zettel (#79b) (CZW); 1 ♂, 1 ♀ (apt), 1 ♀ (mapt), Camarines Sur, N of Sipocot, Sooc, Sooc River, 16.II.2001, leg. H. Zettel (#270) (CZW); 2 ♀♀ (apt), Albay, Bonga, creek, 6.XII.1976, leg. A. A. Barroso (CVPG).

Regional distribution: Widespread on Luzon, but unknown from the mountainous areas in the north; Pampanga (POLHEMUS & REISEN 1976), Zambales (m.e.), Quezon (m.e.), Camarines Sur (m.e.), Albay (m.e.).

General distribution: Endemic to the Philippine islands east of Huxley's Line, with records from Mindanao (HUNGERFORD & MATSUDA 1961) and Luzon (POLHEMUS & REISEN 1976) and unpublished data from Mindoro, Panay, Negros, Cebu, Bohol, Samar, and Leyte.

***Rhagovelia fischeri* ZETTEL, 1999**

Rhagovelia fischeri ZETTEL, 1999a: 748.

Material examined: 31 ♂♂ (apt, holo- and paratypes), 19 ♀♀ (apt, paratypes), Mountain Province, S of Sagada, Bagnen, slopes of Mt. Polis, 1600 m a.s.l., 26.II.1999, leg. H. Zettel (#189) (UPLB, NHMW, JTPC, CNT, OÖLM); 4 ♂♂, same locality and date, leg. F. Seyfert (#15) (CSW, UPLB); 2 ♂♂, 3 ♀♀ (apt, paratypes), Mountain Province, NE of Sagada, Banga'an, Bomod-ok Waterfalls, 22.II.1999, 1500 m a.s.l., leg. H. Zettel (#185) (CZW, UPLB); 5 ♂♂, 4 ♀♀ (apt), 2 ♂♂ (mapt), Nueva Viscaya, Santa Fe, Malico, small creek, 8.XI.2002, leg. H. Zettel (#332) (NHMW, UPLB).

Regional and general distribution: Only known from high elevations in the Central Cordillera and in the Sierra de Caraballo, with records from Mountain Province (ZETTEL 1999a; m.e.) and Nueva Viscaya (m.e.).

***Rhagovelia kawakamii kawakamii* (MATSUMURA, 1913)**

Kotovelia kawakamii MATSUMURA, 1913: 98.

Rhagovelia kawakamii: LUNDBLAD 1937: 1; POLHEMUS & REISEN 1976: 275; ZETTEL 1996: 127 (partim).

Rhagovelia kawakamii kawakamii: FREITAG & ZETTEL 2013: 65.

Material examined: 1 ♂ (apt), Ilocos Norte, Vintar, Vintar Dam, 22.X.1976, leg. A. A. Barroso (CVPG); 1 ♂ (mapt), Ilocos Norte, Piddig, Tangaoan C. Nursery, Paraiso Reforestation Project, 21.X.1976, leg. A. A. Barroso (CVPG); 1 ♀ (apt), Abra, Bangued, Abra River, 23.X.1976, leg. A. A. Barroso (CVPG); 3 ♀♀ (apt), Ilocos Sur, Santa, beach area, 20.X.1976, leg. H. O. Sanvalentin (CVPG); 3 ♀♀ (apt), La Union, Bacnotan, Don Mariano Marcos Memorial State College, 19.X.1976, leg. A. A. Barroso (CVPG); 2 ♂♂, 3 ♀♀ (mapt), La Union, Tubao, Alipang River Ent., 18.X.1976, leg. A. A. Barroso (CVPG); 1 ♀ (apt), 1 ♂, 1 ♀ (mapt), Benguet, km 7 on Asin Hot Springs road, 7.VII.1985, leg. J.T. & D.A. Polhemus (#CL1960) (JTPC); 1 ♂, 2 ♀♀ (apt), 4 ♀♀ (mapt), Benguet, km 219.5 on Kennon Road, 30km S of Baguio City, 8.VII.1985, 200 m a.s.l., leg. J.T. & D.A. Polhemus (#CL1962) (JTPC, NHMW); 1 ♀ (mapt), Benguet, Trinidad, 30.X.1976, leg. V. P. Gapud (CVPG); 1 ♀ (mapt), Benguet, Baguio, 29.X.1976, leg. V. P. Gapud (CVPG); 2 ♂♂, 2 ♀♀ (apt), 1 ♂, 1 ♀ (mapt), Pangasinan, Bayaling River, 100 m a.s.l., 15 km E of Bauang, 6.VII.1985, leg. J.T. & D.A. Polhemus (#CL1958) (JTPC); 2 ♂♂, 2 ♀♀ (apt), 1 ♂, 1 ♀ (mapt), Zambales, 16 km SE of Santa Cruz, 5.VII.1985, leg. J.T. & D.A. Polhemus (#CL1952) (JTPC); 1 ♀ (mapt), Zambales, Santa Cruz, Acoje Mine site, Balsibis Creek, 16.V.1977, leg. H. O. Sanvalentin (CVPG); 3 ♀♀ (apt), Zambales, Santa Cruz, Upper Lawis River, 16.V.1977, leg. H. O. Sanvalentin (CVPG); 4 ♂♂, 5 ♀♀ (apt), 2 ♂♂, 4 ♀♀ (mapt), Nueva Ecija, Carranglan, Maringalo BFD Station, creek, 5.XI.1976, leg. A. A. Barroso (CVPG); 2 ♂♂, 4 ♀♀ (apt), 2 ♂♂, 2 ♀♀ (mapt), Nueva Ecija, creek above Pantabangan Dam, 7.XI.1976, leg. C. S. Sanchez (CVPG); 1 ♀ (apt), Pampanga, Arayat, Arayat National Park, creek, 10.V.1977, leg. A. A. Barroso (CVPG); 2 ♀♀ (apt), Zambales, Olongapo, Subic Bay, near Riding Stable, 30.XI.–XII.1993, leg. H. Zettel (#37d) (NHMW); 7 ♂♂, 12 ♀♀ (apt), 4 ♂♂, 5 ♀♀ (mapt), same locality 2.XII.1993, leg. H. Zettel (#37e) (NHMW, UPLB); 13 ♂♂, 13 ♀♀ (apt), 8 ♂♂, 5 ♀♀ (mapt), same area, near Jungle Survival Station, 4.XII.1993, leg. H. Zettel (#37h) (NHMW, UPLB); 12 ♂♂, 15 ♀♀ (apt), 2 ♂♂, 3 ♀♀ (mapt), Bataan, 10 km E of Olongapo, Roosevelt Park, 1.XII.1993, leg. H. Zettel (#38) (NHMW, UPLB); 1 ♀ (apt), 15 ♂♂, 15 ♀♀ (mapt), same locality, date, and collector (#38a) (NHMW, UPLB); 2 ♂♂ (apt), 2 ♂♂, 2 ♀♀ (mapt), Rizal, Montalban, 25.III.1914, leg. G. Böttcher (BMNH, NHMW); 1 ♂ (apt), Quezon, Llavac, National Botanic Gardens, 11.VII.1985, leg. J.T. & D.A. Polhemus (#CL1973) (JTPC); 1 ♂ (apt), Quezon, Real, National Botanic Garden, creek, 1.IV.1977, leg. H. O. Sanvalentin (CVPG).

Regional distribution: On Luzon, the species does not occur together with *R. luzonica*, although the two species are not closely related. This can probably be explained by the similarity of their habitat requirements and by competition. The distribution area of *R. kawakamii kawakamii* is chiefly confined to the island's north, with records from

Ilocos Norte, Abra, Ilocos Sur, La Union, Benguet, Pangasinan, Pampanga, Zambales, Bataan, Nueva Ecija, and Rizal. The presence in Quezon should be confirmed as there are only two individuals from this province which might be mislabeled.

General distribution: This species has a relatively wide distribution from Lan Yu (= Botel Tobago, = Kotosho) east of Taiwan to northern Borneo. The southern populations (Borneo, Palawan Region) belong to subspecies *hoberlandti* HUNGERFORD & MATSUDA, 1961, whereas the northern populations (Lan Yu, Luzon) are identified as the nominotypical subspecies. Mindoro, located between these areas, is inhabited by a related, but very distinct species, *R. mindoroensis* ZETTEL, 1996.

***Rhagovelia luzonica* LUNDBLAD, 1937**

Rhagovelia luzonica LUNDBLAD, 1937: 6.

Rhagovelia teretis DRAKE, 1948: 61 (syn. by POLHEMUS & REISEN 1976).

Rhagovelia (Rhagovelia) luzonica: HUNGERFORD & MATSUDA 1961: 269, 270.

Rhagovelia luzonica: POLHEMUS & REISEN 1976: 277; POLHEMUS & POLHEMUS 1988: 165; ZETTEL 1996: 114.

Material examined: 1 ♂, 2 ♀♀ (apt), 1 ♂, 2 ♀♀ (mapt), Cavite, Alfonso, Pajo, Humayan Creek, brook, 17.V.1977, leg. V. P. Gapud (CVPG); 2 ♂♂, 3 ♀♀ (apt), Cavite, 2 km S of Alfonso, Tapat River, 24.VII.1985, leg. J.T. & D.A. Polhemus (#CL2003) (JTPC); 7 ♂♂, 7 ♀♀ (apt), Cavite, Alfonso, Pajo, 7.II.2010, leg. C. V. Pangantihon (#P345) (CZW); 1 ♂, 1 ♀ (apt), 4 ♂♂ (mapt), Laguna, Los Baños, 4.III.1914, leg. G. Böttcher (BMNH, NHMW, NMPC); 11 ♂♂, 8 ♀♀ (apt), 3 ♂♂, 1 ♀ (mapt), Laguna, Los Baños, rest area, creek from Dampalit Falls, 17.XI.1992, leg. H. Zettel (#1a) (NHMW); 2 ♀♀ (apt), same area, Dampalit Falls, 26.IX.1978, leg. C. S. Sanchez (CVPG); 1 ♀ (apt), same locality, 19.IX.1976, leg. A. A. Barroso (CVPG); 11 ♂♂, 4 ♀♀ (apt), 4 ♂♂, 3 ♀♀ (mapt), same locality, 15.XI.1993, leg. H. Zettel (#22b) (NHMW, UPLB); 1 ♀ (apt), 1 ♂ (mapt), Laguna, Mt. Makiling, Los Baños, Molawin Creek at Mud Spring, 9.VII.1985, leg. J.T. & D.A. Polhemus (#CL1975) (JTPC); 1 ♂ (apt), same area, stream above Mud Springs, 700 m a.s.l., 22.XI.1995, leg. J. Kodada (NHMW); 1 ♂ (apt), 2 ♂♂, 1 ♀ (mapt), same area, Molawin Creek at College of Forestry, 8.II.1996, leg. H. Zettel (#72) (CZW, UPLB); 10 ♂♂, 9 ♀♀ (apt), same area, Molawin Creek, 9.VII.1985, leg. J.T. & D.A. Polhemus (#CL1974) (JTPC); 1 ♀ (apt), 1 ♀ (mapt) Laguna, Los Baños, Mt. Makiling, Flat Rocks, 10.II.1998, leg. H. Zettel (#132) (NHMW); 1 ♀ (apt), Laguna, Alaminos, Awique Creek, Hidden Valley side, 7.III.1979, leg. F. A. Mulimbayan (CVPG); 1 ♀ (apt), 1 ♂, 8 ♀♀ (mapt), Quezon, Mt. Banahaw, Conception, Sariaya, spring, 20.II.1977, leg. H. O. Sanvalentin (CVPG); 1 ♂ (apt), Quezon, 30 km E of Lucena City, Quezon National Park, 23.XI.1992, leg. M.A. Jäch (#11) (NHMW); 17 ♂♂, 8 ♀♀ (apt), 3 ♂♂, 3 ♀♀ (mapt), Quezon, Quezon National Park, stream at entrance house, 10.VII.1985, leg. J.T. & D.A. Polhemus (#CL1969) (JTPC); 2 ♂♂, 1 ♀ (apt), 3 ♂♂, 1 ♀ (mapt), Quezon, Quezon National Park, Nalubog Creek, 10.VII.1985, leg. J.T. & D.A. Polhemus (#CL1971) (JTPC); 1 ♀ (mapt), Quezon Quezon National Park, ponds and waterfalls at picnic area, 10.VIII.1985, leg. J.T. & D.A. Polhemus (#CL1970) (JTPC); 3 ♀♀ (apt), Quezon, Quezon National Park, Atimonan, 11.IX.1976, leg. V. P. Gapud (CVPG); 4 ♂♂, 3 ♂♂ (apt), 2 ♂♂, 2 ♀♀ (mapt), same area, near Old Zigzag Road, 13.II.1996, leg. H. Zettel (#79c) (CZW, NHMW, UPLB); Quezon, Real, National Botanic Garden, creek, 1.IV.1977, leg. H. O. Sanvalentin (CVPG).

Notes: Some *luzonica*-like individuals from southern Luzon (Camarines Sur) differ in some characters and were neither taxonomically evaluated nor considered in this study at all.

Regional distribution: Only known from the island's central parts: Cavite, Laguna, and Quezon (ZETTEL 1996; m.e.).

General distribution: This species is endemic to the Greater Luzon biogeographic region, with records from Luzon, Polillo (ZETTEL 1996), and Marinduque (unpublished data).

***Rhagovelia minuta* LUNDBLAD, 1936**

Rhagovelia minuta LUNDBLAD, 1936: 34; LUNDBLAD 1937: 7; POLHEMUS & REISEN 1976: 276; ZETTEL 1995: 60.

Material examined: 1 ♂, 1 ♀ (apt), Ilocos Norte, Solsona, XII.1928, leg. R.C. McGregor, (NHRS); 2 ♂♂, 6 ♀♀ (apt), 1 ♂ (mapt), La Union, Bayaling River, 100 m a.s.l., 15 km E of Bauang, 6.VII.1985, leg. J.T. & D.A. Polhemus (#CL1957) (JTPC); 1 ♂, 1 ♀ (apt), Kalinga, Pasil, Pasil River, Chico River tributary, 350 m a.s.l., N 17°23', E 121°13', 13.VI.2010, leg. H. Freitag (#292M) (NHMW); 1 ♂ (mapt), Benguet, km 31 of Ken-

non Road, S of Baguio, Camp 1, Bridal Falls, 16.II.1999, leg. S. Schödl (#9) (NHMW); 8 ♂♂, 9 ♀♀ (apt), 1 ♂ (mapt), Benguet, W of Baguio, Asin Hot Springs, 17.II.1999, leg. H. Zettel (#180) (CZW, UPLB); 5 ♂♂, 2 ♀♀ (apt), Nueva Viscaya, Aritao, Baan, Baan River, agricultural land, 9.XI.2002, leg. H. Zettel (#334) (NHMW); 1 ♂ (apt), Nueva Ecija, Gabaldon, 21.II.1989, leg. A. M. Almeroda (NHMW); 15 ♂♂, 22 ♀♀ (apt), Pangasinan, Bayaling River, 100 m a.s.l., 15 km E of Bauang, 6.VII.1985, leg. J.T. & D.A. Polhemus (#CL1958) (JTPC); 22 ♂♂, 57 ♀♀ (apt), 1 ♂ (mapt), Zambales, 16 km SE of Santa Cruz, 5.VII.1985, leg. J.T. & D.A. Polhemus (#CL1952) (JTPC); 12 ♂♂, 19 ♀♀ (apt), 6 ♂♂, 8 ♀♀ (mapt), Zambales, Subic Bay, Riding Stable, 30.XI.–5.XII.1993, leg. H. Zettel (#37d) (NHMW, UPLB); 1 ♂, 3 ♀♀ (apt), 1 ♂ (mapt), same locality, 2.XII.1993, leg. H. Zettel (#37e) (NHMW); 8 ♂♂, 1 ♀ (apt), 2 ♂♂, 2 ♀♀ (mapt), Bataan, 10 km E of Olongapo, Roosevelt Park, 1.XII.1993, leg. H. Zettel (#38) (NHMW); 1 ♂ (apt, holotype), Laguna, Los Baños, leg. Baker (ZMUH); 20 ♂♂, 43 ♀♀ (apt), Quezon, rocky stream at Lucena, 10.VII.1985, leg. J.T. & D.A. Polhemus (#CL1972) (JTPC); 12 ♂♂, 8 ♀♀ (apt), Quezon, Infanta, irrigation channel, 4.IV.1993, leg. N. Nieser (#N9336) (CNT, NHMW); 1 ♂ (apt), Quezon, Pagbilao, Iringan, 23.IV.2006, leg. C. V. Pangantihon (#P233) (CZW).

Regional and general distribution: Endemic to northern and central Luzon, with published records from Ilocos Norte, La Union, Pangasinan, Zambales, Bataan, Laguna, and Quezon (LUNDBLAD 1936, POLHEMUS & REISEN 1976, ZETTEL 1995), and new records (m.e.) from Kalinga-Ampayao, Benguet, Nueva Ecija, and Nueva Viscaya.

Rhagovelia philippina LUNDBLAD, 1936

Rhagovelia philippina LUNDBLAD, 1936: 36; ZETTEL 1995: 63.

Material examined: 2 ♂♂, 2 ♀♀ (apt), Mountain Province, Sagada, Bokong Waterfalls, 1400 m a.s.l., 19.II.1999, leg. H. Zettel (#182) (CZW); 1 ♂ (apt), same locality, 13.III.2012, leg. C. V. Pangantihon (#CP408) (CZW); 8 ♂♂, 9 ♀♀ (apt), 1 ♂ (mapt), Mountain Province, Gonogon, Chico River, 1100 m a.s.l., 21.II.1999, leg. H. Zettel (#184) (CZW, UPLB); 15 ♂♂, 10 ♀♀ (apt), Mountain Province, NE of Sagada, Banga'an, Bomodok Waterfall, 22.II.1999, 1500 m a.s.l., leg. H. Zettel (#185) (UPLB, CZW, NHMW); 13 ♂♂, 8 ♀♀ (apt), same locality and date, leg. F. Seyfert (#9) (CZW, UPLB); 30 ♂♂, 28 ♀♀ (apt), Mountain Province, Sagada, Echo Valley, Underground River, 1500 m a.s.l., 23–24.II.1999, leg. H. Zettel (#186) (UPLB, NHMW); 25 ♂♂, 21 ♀♀ (apt), Mountain Province, 5 km S of Bontoc, Balitjan River, 900 m a.s.l., 27.II.1999, leg. H. Zettel (#190) (NHMW, UPLB); 77 ♂♂, 12 ♀♀ (apt), Benguet, stream SW of Baguio City, 1500 m a.s.l., 7.VII.1985, leg. J.T. & D.A. Polhemus (#CL1961) (JTPC); 1 ♂ (apt, holotype), 1 ♀ (apt, allotype), Benguet, Baguio, leg. Baker (ZMUH); 16 ♂♂, 1 ♀ (apt), 6 ♂♂, 2 ♀♀ (mapt), Benguet, Asin Hot Springs, W Baguio, 17.II.1999, leg. H. Zettel (#180) (UPLB, CZW); 3 ♂♂, 5 ♀♀ (apt), Pangasinan, 15 km E of Bauang, Bayaling River, 100 m a.s.l., 6.VII.1985, leg. J.T. & D.A. Polhemus (#CL1958) (JTPC); 6 ♂♂, 6 ♀♀ (apt), 1 ♂, 3 ♀♀ (mapt), Zambales, 16 km SE of Santa Cruz, 5.VII.1985, leg. J.T. & D.A. Polhemus (#CL1952) (JTPC); 38 ♂♂, 27 ♀♀ (apt), 1 ♀ (mapt), Benguet, 30 km S of Baguio City, kilometre 219.5 of Kennon Road, 200 m a.s.l., 8.VII.1985, leg. J.T. & D.A. Polhemus (#CL1962) (JTPC); 1 ♀ (apt), Zambales, Olongapo, Subic Bay, at Riding Stable, 2.XII.1993, leg. H. Zettel (#37e) (NHMW); 1 ♀ (mapt), Cavite, Indang, Tambung Ilaya, Purok 1, 26.II.2010, leg. C. V. Pangantihon (#P349) (CZW); 1 ♂ (mapt), Laguna, Los Baños, leg. Baker (NHRs); 3 ♂♂, 2 ♀♀ (apt), same locality, leg. G. Böttcher (BMNH); 5 ♂♂, 5 ♀♀ (apt), Laguna, Los Baños, rest area, creek from Dampalit Falls, 17.XI.1992, leg. H. Zettel (#1a) (NHMW); 6 ♂♂, 4 ♀♀ (apt), same locality, 15.XI.1993, leg. H. Zettel (#22b) (NHMW, UPLB); 1 ♀ (apt), Laguna, Los Baños, UPLB, Hortorium, 16.XI.1993, leg. H. Zettel (#23) (NHMW); 2 ♂♂, 2 ♀♀ (apt), Laguna, Los Baños, Mt. Makiling, Flat Rocks, 10.II.1998, leg. H. Zettel (#132) (NHMW, UPLB); 1 ♂ (apt), Quezon, rocky stream at Lucena, 10.VII.1985, leg. J.T. & D.A. Polhemus (CL1972) (JTPC); 27 ♂♂, 37 ♀♀ (apt), 1 ♂, 2 ♀♀ (mapt), Quezon, Llavac, National Botanic Gardens, 11.VII.1985, leg. J.T. & D.A. Polhemus (#CL1973) (JTPC).

Regional and general distribution: Endemic to the northern and central parts of Luzon with records from Benguet, Pangasinan, Zambales, Laguna, Quezon (LUNDBLAD 1937, POLHEMUS & REISEN 1976, ZETTEL 1995), Cavite (m.e.), and Mountain Province (m.e.).

Rhagovelia rigovae ZETTEL, 2012

Rhagovelia sp.: ZETTEL 1996: 137 (fig. 59).

Rhagovelia rigovae ZETTEL, 2012: 97.

Material examined: 17 ♂♂ (apt, holo- and paratypes), 14 ♀♀ (apt, paratypes), 1 ♂ (mapt, paratype), Laguna, Mt. Banahaw above Kinabuhayan, 800 m a.s.l., creek in degraded rain forest, 25.XI.1995, leg. J. Kodada & B. Rigová (NHMW, UPLB); 1 ♀ (apt, paratype), same area, 600–700 m a.s.l., trail to Crystallino,

24.XI.1995, leg. J. Kodada & B. Rigová (NHMW); 1 ♂ (apt, paratype), Laguna, San Pablo, Mt. Banahaw, 18.XI.1992, leg. H. Zettel (#6) (NHMW); 5 ♂♂, 3 ♀♀ (apt, paratypes), Quezon, Real, National Botanic Garden, creek, 1.IV.1977, leg. A. A. Barroso (CVPG, CZW); 5 ♂♂, 3 ♀♀ (apt, paratypes), same area, Lalawinan creek, 31.III.1977, leg. C. S. Sanchez (VCPG); 19 ♂♂, 11 ♀♀ (apt, paratypes), same area, forested stream, 26.II.1978, leg. V. P. Gapud (CVPG, CZW); 9 ♂♂, 7 ♀♀ (apt, paratypes), same area, streams 1 and 2, 2.XII.1992, unknown collector (VCPG); 3 ♂♂, 3 ♀♀ (apt, paratypes), 1 ♀ (mapt, paratype), Quezon, Mt. Banahaw, 2,500 ft a.s.l., 22.XII.1980, leg. C. S. Sanchez (CVPG); 17 ♂♂, 15 ♀♀ (apt, paratypes), 1 ♂ (mapt, paratype), Quezon, Llavac, National Botanic Gardens, 11.VII.1985, leg. J.T. & D.A. Polhemus (#CL1973) (JTPC, NHMW).

Regional and general distribution: Endemic to the central parts of Luzon where it occurs only at higher elevations; only recorded from Laguna and Quezon (ZETTEL 2012; m.e.).

***Rhagovelia sorsogonensis* sp.n.** (Figs. 7, 8, 10, 28, 30)

Type locality: Luzon, Sorsogon, W of Sorsogon City, Ticol, N 12°59', E 123°59', ca. 50 m a.s.l.

Type material: Holotype (male, apt, NMM), Sorsogon, W of Sorsogon City, Ticol, 23.I.2000, leg. H. Zettel (#214). Paratypes: 43 ♂♂, 39 ♀♀ (apt), 2 ♂♂, 2 ♀♀ (mapt), same data as holotype (NHMW, UPLB); 22 ♂♂, 13 ♀♀ (apt), 4 ♂♂, 1 ♀ (mapt, 1 ♂ dealate), Sorsogon, Guinlajon W of Sorsogon City, 23.I.2000, leg. H. Zettel (#215) (NHMW, UPLB); 44 ♂♂, 44 ♀♀ (apt), 1 ♂ (mapt, dealate), Albay, Malinao, Palali Falls, 200 m a.s.l., 14.III.1999, leg. H. Zettel (#201) (NHMW, UPLB); 13 ♂♂, 8 ♀♀ (apt), Albay, 40 km N of Legaspi, 1 km W of Malilipot, Busai Falls, 23.II.1998, leg. H. Zettel (#143) (NHMW, UPLB); 40 ♂♂, 28 ♀♀ (apt), 1 ♀ (mapt), same locality, 7.III.2003, leg. H. Zettel (#346) (CZW, UPLB).

Description of apterous male: Measurements (holotype; n = 12): Body length 2.91 (2.69–3.07); maximum width (at metapleura) 1.19 (1.15–1.25). Head length 0.33 (0.30–0.34), width 0.75 (0.73–0.77); minimum eye distance 0.21 (0.20–0.23). Lengths of antennomeres, I 0.74, II 0.43, III 0.47, IV 0.44. Pronotum length 0.80 (0.75–0.84), width 1.01 (1.00–1.09). Lengths of leg segments: profemur 0.91, protibia 0.99, protarsus 0.05 + 0.23, mesofemur 1.50, mesotibia 1.16, mesotarsus 0.05 + 0.45 + 0.65, metafemur 1.29, metatibia 1.34, metatarsus 0.03 + 0.08 + 0.29.

Colour: Trunk black; pronotum with transverse yellow or orange coloured mark near anterior margin; distal parts of all acetabula yellowish. Antenna black, basal third (or little less) of antennomere yellow. Legs chiefly black, often with weak bluish or greenish shimmer; pro- and metacoxa, pro- and metatrochanter yellow; base of profemur yellow, but on dorsal surface, close to flexor side, with black stripe that reaches base in most specimens.

Pilosity: Body dorsally with short, gray, appressed hair layer and (except on pronotum) with posteriad directed, long, black setae. Venter of thorax and abdomen with short, gray pilosity and dispersed whitish setae; sternite 7 with three longitudinal stripes of relatively long, yellowish, posteriad directed setae. Ventral surface without black spiculae. Antennomeres 1 and 2, femora and tibiae with several long black setae.

Structures: Juga not flattened, shiny. Pronotum much longer than head, covering mesonotum. Metafemur (Fig. 28) moderately slender, ca. 4.1–4.5 times (in holotype 4.4 times) as long as wide, on flexor side with one distal row consisting of 4–9 teeth (in holotype, right and left, 4 and 6 teeth). Metatibia (Fig. 28) straight, on flexor side with fine tooth-like structures all over length, with long apical spine. Pregenital segments of abdomen relatively wide. All tergites matt. In holotype, fifth tergite 3.1 times as wide as long, seventh tergite 1.8 times as long as sixth and 1.1 times as long as wide at anterior margin. Sternites without long median carina; medial areas of sternites 4–6 flat. Sternite 7 with low median carina, areas lateral of carina flat. Segment 8 small, subcylindrical, with short ventrobasal median carina.

Genital segments small and weakly modified. Pygophore subovate. Proctiger with well developed lateral lobes, sclerotized part approximately as long as wide. Paramere (Fig. 30) small, strongly curved, with large basal tubercle, distal part relatively short and wide, shortly narrowed towards acute apex.

Description of apterous female: Measurements (n = 12): Body length 3.02–3.36; maximum width (at metapleura) 1.29–1.46. Head length 0.30–0.35, width 0.74–0.79; minimum eye distance 0.21–0.24. Pronotum length 0.78–0.84, width 1.07–1.20.

Colour as in male. Pilosity similar as in male, but setae strongly reduced on tergites, absent from tergites 4–5; posterior half of tergite 6 and entire tergite 7 with dispersed short hairs, in a few specimens (almost) bare; tergite 7 (Fig. 10) consistently with dense row of long, posteriorly directed black setae. Tergite 8 densely pilose, with long, posterolaterally directed, black hairs along lateral margins, longest in posterior half. Proctiger and apex of gonocoxa 1 with moderately long, black pilosity. Laterotergites laterally with dense, black, appressed pilosity; this stripe widest at laterotergites 3–6, but very narrow anteriorly and posteriorly. Sternites without long pilosity, except sternite 7 at medial (ventral) part with yellowish, posteriorly directed hair layer, at lateral parts with very long (postero-)laterally directed hairs (Fig. 10), and at posterior corner of connexivum with small tuft of black hairs.

Structures: Head and thorax as in male. Metafemur more slender than that of male, ca. 4.6–5.0 times as long as wide, on flexor side with distal row consisting of 3–7 teeth. Abdomen moderately modified (Figs. 8, 10), moderately narrow at segments 6–8. Connexival margins strongly converging at segments 2–5, only slightly at segments 6–7. Sternites (4) 5–7 partly visible in dorsal aspect. Tergites 1–3 convex, 4–8 flat. Fifth tergite 2.4 times as wide as long; seventh tergite 1.6 times as long as sixth and 1.3 times as long as wide at anterior margin. Hind margin of tergite 7 straight. Medial areas of sternites 4–6 shallowly impressed. Posterior corner of sternite 7 rectangular or slightly acute, not much protruded. Ventral outline of gonocoxa 1 (in lateral view) concave.

Description of macropterous male: Measurements (n = 6): Body length (measured without wings) 2.94–3.09; maximum width (at pronotum) 1.32–1.40. Head length 0.31–0.34, width 0.76–0.79; minimum eye distance 0.20–0.23. Pronotum length 1.19–1.26.

Colour and pilosity similar to apterous morph, except pilosity much reduced on tergites. Wings uniformly blackish brown. **Structures:** Pronotum much enlarged, as typical for alate morphs. Wings surpassing apex of body; forewing with three closed cells, distal one reaching apical third of wing. Two specimens dealate. Abdominal carinae short, reaching posterior half of tergite 2. Tergites 6 and 7 with small shiny areas in middle. Metafemur 4.4–4.6 times as long as wide, with 5–8 teeth in distal row.

Description of macropterous female: Measurements (n = 3): Body length (measured without wings) 3.16–3.23; maximum width (at pronotum) 1.36–1.41. Head length 0.31–0.33, width 0.75–0.78; minimum eye distance 0.20–0.21. Pronotum length 1.20–1.23.

Characteristics as in apterous female or macropterous male, respectively. Wings as in winged male. Metafemur 5.1–5.2 times as long as wide, with 3–4 teeth in distal row. Connexiva anteriorly slightly more converging than posteriorly. Posterior tergites wider than in apterous morph. Pilosity of tergite 7 reduced. Tergites 7–8 medially with narrow shiny area.

Comparative notes: *Rhagovelia sorsogonensis* sp.n. is similar to *R. philippina*, *R. bicolorana* sp.n. and two species from Catanduanes and Masbate, but females can be immediately distinguished from all of them by the numerous erect hairs on the lateral

surface of sternite 7 (Fig. 10) and by the concave ventral outline of gonocoxa 1. A shallow concavity in the middle of sternites 4–6 is present in *R. sorsogonensis* sp.n. and *R. bicolorana* sp.n., but not in *R. philippina*. Males of *R. sorsogonensis* sp.n. differ from *R. philippina* by the relatively broad and shortly acumined apex of the paramere (Fig. 30), but are hardly distinguishable from *R. bicolorana* sp.n. Both sexes can usually be distinguished from *R. philippina* by a black stripe reaching the base of the profemur (in very few specimens indistinct).

Etymology: Named after the type locality near Sorsogon City.

Regional and general distribution: Endemic to the most southern part of Luzon, with records from Sorsogon and Albay.

Veliinae AMYOT & SERVILLE, 1843

***Angilia (Adrienella) philippiensis* DRAKE & HOBERLANDT, 1953**

Angilia philippiensis DRAKE & HOBERLANDT, 1953: 223.

Angilia (Adrienella) philippiensis: ANDERSEN 1981: 345, POLHEMUS & POLHEMUS 1999: 129; ZETTEL & YANG 2002: 1540; CHEN et al. 2005: 441.

Material examined: 1 ♀ (mapt), Luzon, Mountain Province, 5 km S of Bontoc, Balitian River, 900 m a.s.l., 27.II.1999, leg. F. Seyfert (#16) (CSW); 1 ♀ (mapt), Nueva Ecija, Carranglan, Maringalo, BDF Station, creek, 5.XI.1976, leg. A. A. Barroso (UPLB).

Notes: This is a taxonomically dubious species, because not enough material is accessible. The types, two males, originate from Mindoro (DRAKE & HOBERLANDT 1953). Later interpretations of this taxon in literature (ANDERSEN 1981, POLHEMUS & POLHEMUS 1999, ZETTEL & YANG 2002), however, are based on females from Luzon.

Regional distribution: A rare species, so far recorded from Luzon's northern and central parts: Mountain Province (ZETTEL & YANG 2002; m.e.), La Union (ANDERSEN 1981), Nueva Ecija (POLHEMUS & POLHEMUS 1999; m.e.), and Rizal (ANDERSEN 1981).

General distribution: Endemic in the Philippines, with records from Mindoro (DRAKE & HOBERLANDT 1953) and Luzon.

Gerridae LEACH, 1815 (water striders, pond skaters)

Rhagadotarsinae LUNDBLAD, 1933

***Rhagadotarsus (Rhagadotarsus) kraepelini* BREDDIN, 1905**

Rhagadotarsus kraepelini BREDDIN, 1905: 137; LUNDBLAD 1933: 412; POLHEMUS & REISEN 1976: 267; POLHEMUS & KARUNARATNE 1993: 100.

Material examined: 13 ♂♂, 26 ♀♀ (apt), and 1 ♂ (mapt), Zambales, Olongapo, Subic Bay, pond at gate, 3.XII.1993, leg. H. Zettel (#37d) (NHMW, UPLB); 1 ♂ (apt), Manila, leg. G. Böttcher (NMPR); 1 ♂ (apt), Laguna, Sta. Cruz, Bagumbayan, Laguna de Bay, N 14°16', E 21°23', 6.X.2014, leg. C. V. Pangantihon (#P514); 2 ♂♂, 2 ♀♀ (apt), Sorsogon, NE of Irosin, N of San Roque, Lake Bulusan, 630 m a.s.l., 26.II.1998, leg. H. Zettel (#146) (NHMW, UPLB).

Regional distribution: Records from Zambales (m.e.), Manila (m.e.), Laguna (POLHEMUS & REISEN 1976, POLHEMUS & KARUNARATNE 1993; m.e.), and Sorsogon (m.e.).

General distribution: Widely distributed in the Oriental Region and Malesia, from Sri Lanka and southern India to southern China and New Guinea (POLHEMUS & KARUNARATNE 1993).

Trepobatinae MATSUDA, 1960

Stenobates sp.

Material examined: 10 ♂♂, 10 ♀♀ (apt), Zambales, Subic Bay, Triboa Mangrove, 7.XII.2000, leg. H. Zettel (#260) (NHMW); 8 ♀♀ (apt), Camarines Norte, Mercedes, Matoogtoog, 28.X.2012, leg. C. V. Pangantihon (#P453) (NHMW); 10 ♂♂, 9 ♀♀ (apt), Luzon, Camarines Sur, Lagonoy, San Sebastian, mangrove, 10.II.2001, leg. H. Zettel (#268a) (CZW); 5 ♂♂, 3 ♀♀ (apt), same locality, 2.II.2002, leg. H. Zettel (#304) (CZW, UPLB).

Notes: Species of *Stenobates* are common water striders in mangroves, and the large amount of material collected in the Philippines – chiefly in the Visayas Region – requires a careful revision. The specimens from Luzon probably belong to an undescribed species, because they differ from the two other Philippine species described from Palawan and Mindanao by POLHEMUS & POLHEMUS (1996) in some details.

Regional distribution: Hitherto recorded from Zambales, Camarines Norte, and Camarines Sur (m.e.).

General distribution: Needs clarification (see Notes).

Gerrinae LEACH, 1815

Aquarius philippinensis ZETTEL & RUIZ, 2003

Gerris adelaidis (nec DOHRN, 1860): POLHEMUS & REISEN 1976: 265.

Aquarius adelaidis: ANDERSEN 1995: 111 (partim).

Aquarius philippinensis ZETTEL & RUIZ, 2003: 196; DAMGAARD & ZETTEL 2003: 322.

Material examined: 3 ♂♂, 1 ♀ (mapt), Nueva Ecija, Val de Fuente, Pampanga River, 5.XI.1976, leg. A. A. Barroso (CVPG); 1 ♀ (brpt), Zambales, Maloma, river, 16.V.1977, leg. A. A. Barroso (CVPG); ♀ (brpt), Laguna, Sta. Cruz, Bagumbayan, Laguna de Bay, N 14° 16', E 21° 23', 6.X.2014, leg. C. V. Pangantihon (P514); 23 ♂♂ (brpt, holo- and paratypes), 21 ♀♀ (brpt, allo- and paratypes), Camarines Sur, Buhi, Santa Cruz, Lake Buhi, 21.XII.2001, leg. R. B. Ruiz (UPLB, CSSAC, CZW, NHMW, UPLB); 1 ♂ (brpt, paratype), und 1 ♀ (mapt, paratype), Camarines Sur, Baao, San Francisco, Lake Baao, 21.XII.2002, leg. R. B. Ruiz (CSSAC, CZW).

Notes: When ZETTEL & RUIZ (2003) described *A. philippinensis*, they suspected it to be an endemic species in crater lakes in the Bicol Region, southern Luzon. This assumption was supported by the fact that *A. adelaidis*, a closely related species, had been reported from Pampanga in northern Luzon by POLHEMUS & REISEN (1976). Later-on, material of *A. philippinensis* from Zambales and Nueva Ecija (see m.e.) became available, and the Pampanga specimens were reported to have characteristics of *A. philippinensis* (J.T. Polhemus, pers. comm.) (DAMGAARD & ZETTEL 2003). DAMGAARD & ZETTEL (2003) studied the species diversity of the *A. paludum* species group by molecular data and stated considerable differences between *A. adelaidis*, *A. lili*, and *A. philippinensis*. A new record of *A. philippinensis* from Panay (unpublished data) shows that this species is more widely distributed in the Philippines than previously expected.

Regional distribution: Pampanga (POLHEMUS & REISEN 1976), Zambales (m.e.), Nueva Ecija (m.e.), Laguna (m.e.), Camarines Sur (ZETTEL & RUIZ, 2003; m.e.).

General distribution: Endemic to the Philippines; known from Luzon (m.e.) and Panay (unpublished data).

Limnogonus (Limnogonus) fossarum fossarum (FABRICIUS, 1775)

Cimex fossarum FABRICIUS, 1775: 727.

Gerris discolor STÅL, 1860: 265 (syn. by LUNDBLAD 1933: 377).

Limnogonus (s.str.) *fossarum*: ANDERSEN 1967: 261.

Limnogonus (s.str.) *fossarum fossarum*: ANDERSEN 1975: 30; ANDERSEN 1995: 116; FREITAG & ZETTEL 2013: 58.

Limnogonus fossarum: POLHEMUS & REISEN 1976: 265; YANO et al. 1981: 22.

Material examined: 1 ♀ (apt), Ilocos Norte, Batac, 17.IX.1998, leg. L. B. Flores & J. R. Ulep (#40) (MMSU); 1 ♂, 1 ♀ (mapt), Ilocos Norte, Bodoc, 4.IX.1997, leg. L. B. Flores & J. R. Ulep (#34) (MMSU); 1 ♀ (mapt), Ilocos Norte, E of Batac, Payao, Quiaoit River, 26.X.2002, leg. H. Zettel (#315) (NHMW); 1 ♀ (mapt), Ilocos Norte, between Bangui and Dumalneg, river and stream, 27.X.2002, leg. H. Zettel (#318) (NHMW); 1 ♂ (mapt), Ilocos Norte, Currimao, sea coast, tidal pools between high rocks, 30.X.2002, leg. H. Zettel (#321d) (NHMW); 1 ♂ (mapt), Cagayan, Gonzaga, Pateng, 10.IV.2005, leg. C. V. Pangantihon (#P146) (CZW); 1 ♂, 1 ♀ (mapt), Nueva Viscaya, Santa Fe, Consuelo, large river from Santa Fe, 600 m a.s.l., 7.XI.2002, leg. Zettel (#328) (NHMW); 1 ♀ (mapt), Zambales, XII.1917, leg. G. Böttcher (NMPR); 1 ♂ (mapt, syntype of *Gerris discolor*), Manila, coll. Signoret (NHMW); 1 ♀ (mapt), Manila, leg. W. Schulze (NMPR); 1 ♂ (mapt), Quezon, Pagbilao, Iringan, 23.IV.2006, leg. C. V. Pangantihon (#P233) (CZW); 1 ♂ (apt), 1 ♂ (mapt), Camarines Sur, Lupi, Sooc, at light, 9–15.III.2004, leg. H. Zettel & C. V. Pangantihon (#379) (CZW); 2 ♂♂, 4 ♀♀ (mapt), Camarines Sur, Lagonoy, Buenavista, Parogcan, 10.II.2001, leg. H. Zettel (#267a) (CZW, UPLB).

Regional distribution: Ilocos Norte (m.e.); Ifugao (YANO et al. 1981), Pangasinan (POLHEMUS & REISEN 1976), Pampanga (POLHEMUS & REISEN 1976), Cagayan (m.e.), Nueva Viscaya (m.e.), Zambales (m.e.), Bataan (MIYAMOTO 1967), Manila (STÅL 1860; m.e.), Quezon (m.e.), Camarines Sur (m.e.).

General distribution: *Limnogonus fossarum* inhabits the Oriental and West-Pacific Realms; the nominotypical subspecies is distributed on the Asian mainland, Sri Lanka, southern Japan, Taiwan, Sumatra, northern Borneo, and the Philippines (ANDERSEN 1975, 1995).

***Limnogonus (Limnogonus) hungerfordi* ANDERSEN, 1975**

Limnogonus (s.str.) *luctuosus* (MONTROUZIER, 1864) (misidentification): ANDERSEN 1967: 261.

Limnogonus hungerfordi ANDERSEN, 1975: 46; POLHEMUS & REISEN 1976: 266.

Material examined: 1 ♀ (mapt), Zambales, Olongapo, Subic Bay, pond at Riding Stable, 5.XII.1993, leg. H. Zettel (#37c) (NHMW); 1 ♂ (mapt), Bataan, 10 km E of Olongapo, Roosevelt Park, 1.XII.1993, leg. H. Zettel (#38) (NHMW); 1 ♂ (mapt), 1 ♀ (apt), Batangas, Lemery, Kawit, 20.V.2004, leg. C. V. Pangantihon (#P97) (CZW); 1 ♂, 1 ♀ (mapt), Camarines Sur, Lagonoy, Buenavista, Parogcan, 10.II.2001, leg. H. Zettel (#267a) (CZW, UPLB).

Regional distribution: Zambales (m.e.), Tarlac (POLHEMUS & REISEN 1976), Pampanga (POLHEMUS & REISEN 1976), Bataan (m.e.), Batangas (m.e.), Camarines Sur (m.e.).

General distribution: Malesia; from the Malay Peninsula westwards to New Guinea and northeastern Australia (ANDERSEN 1975, 1995).

***Limnogonus (Limnogonus) nitidus* (MAYR, 1865)**

Hydrometra nitida MAYR, 1865: 443.

Limnogonus (s. str.) *nitidus*: ANDERSEN 1975: 69; YANO et al. 1981: 22; ANDERSEN 1995: 116.

Material examined: 1 ♀ (mapt), Ilocos Norte, between Bangui and Dumalneg, river and stream, 27.X.2002, leg. H. Zettel (318) (NHMW); 1 ♂ (mapt), Ilocos Norte, Batac, 8.X.1998, leg. L. B. Flores & J. R. Ulep (#11) (MMSU); 1 ♀ (mapt), Ilocos Norte, Badoc, 6.X.1998, leg. L. B. Flores & J. R. Ulep (#33) (MMSU); 1 ♀ (mapt), same locality, 4.IX.1997, leg. L. B. Flores & J. R. Ulep (#6) (MMSU); 1 ♂ (mapt), same locality, 6.X.1998, leg. L.B. Flores & J.R. Ulep (#31) (MMSU); 1 ♀ (mapt), Nueva Viscaya, Santa Fe, Imugan, stream at Imugan Falls, 1000 m a.s.l., 6.XI.2002, leg. H. Zettel (#325) (NHMW); 1 ♂ (mapt), Nueva Viscaya, Santa Fe, Consuelo, large river from Santa Fe, 600 m a.s.l., 7.XI.2002, leg. H. Zettel (#328) (NHMW); 1 ♀ (mapt), Nueva Viscaya, Santa Fe, Malico, Dulipay River, 8.XI.2002, leg. H. Zettel (#331) (NHMW); 3 ♀♀ (mapt), Nueva Ecija, NE of Muñoz, light trap, 8.XII.1999, leg. L. B. Flores & J. R. Ulep (MMSU); 3 ♀♀, Nueva Ecija, Muñoz, PhilRice, light trap, 23.VIII.1999, leg. L. B. Flores & J. R. Ulep (MMSU); 1 ♀ (mapt), Nueva Ecija, Maligaya, light trap, 5.VIII.1999, leg. L. B. Flores & J. R. Ulep (MMSU); 4 ♂♂, 2 ♀♀ (mapt), Zambales, Olongapo, Subic Bay, at Riding Stable, 30.XI–5.XII.1993, leg. H. Zettel (#37d) (NHMW); 2 ♀♀ (mapt), same area, Triboa Mangrove, 7.XII.2000, leg. H. Zettel (#260) (NHMW, UPLB); 1 ♂, 1 ♀ (mapt), Batangas, Lem-

ery, Kawit, 20.V.2004, leg. C. V. Pangantihon (#P97) (CZW, UPLB); 1 ♀ (mapt), Camarines Sur, Pili, Buncao, near Himaa Creek, 1.II.2002, leg. H. Zettel (#302b) (CZW); 1 ♂, 2 ♀♀ (mapt), Camarines Sur, Lagonoy, Presentacion, Kinaholugan Falls, 10.II.2001, leg. H. Zettel (#266) (CZW, UPLB); 1 ♀ (mapt), Camarines Sur, Lagonoy, Buenavista, Parogcan, 10.II.2001, leg. H. Zettel (#267a) (CZW).

Regional distribution: Ilocos Norte (m.e.), Zambales (m.e.), Nueva Viscaya (m.e.), Nueva Ecija (m.e.), Batangas (m.e.), Camarines Sur (m.e.).

General distribution: Chiefly Oriental, from India to Indonesia (ANDERSEN 1975, 1995); Philippines (YANO et al. 1981). Three specimens from Papua New Guinea housed in the Natural History Museum Vienna from the same sample as the New-Guinea endemic *Limnognathus darthulus* (KIRKALDY, 1901) represent the first record from eastern Malesia.

***Limnometra ciliata* MAYR, 1865**

Limnometra ciliata MAYR, 1865: 444.

Limnometra inermis MAYR, 1865: 444 (syn. by HUNGERFORD & MATSUDA 1958a: 409).

Gerris anadyomene KIRKALDY, 1901 (misidentification): ? DISTANT 1904: 177 (partim).

Limnometra ciliata: HUNGERFORD & MATSUDA 1958a: 409; NIESER & CHEN 1992: 12, 14; ANDERSEN 1995: 118; ANDERSEN & WEIR 1997: 245; ZETTEL & CHEN 2000: 76; FREITAG & ZETTEL 2013: 59.

Tenagogonus (Limnometra) ciliatus: ANDERSEN 1964: 333; ANDERSEN 1967: 261.

Tenagogonus (Limnometra) ciliata [!]: POLHEMUS & REISEN 1976: 268.

Material examined: 4 ♂♂, 4 ♀♀ (mapt), 2 ♂♂, 4 ♀♀ (mipt), Pangasinan, Gayaman Binmalay, 19.XI.1955, leg. P. Catungal (SHUK, NHMW); 1 ♂ (mipt), Pangasinan, Canaoalan Binmalay, 7.I.1956, leg. P. Catungal (SHUK); 1 ♀ (mapt, holotype), Manila (NHMW); 1 ♀ (mapt), Manila, X.1913, leg. G. Böttcher (NMPR).

Regional distribution: Pangasinan (m.e.), Pampanga (POLHEMUS & REISEN 1976), Manila (MAYR 1865, HUNGERFORD & MATSUDA 1958a, ANDERSEN 1964; m.e.), Laguna (HUNGERFORD & MATSUDA 1958a).

General distribution: Without distribution limits in the Philippines and otherwise recorded from Thailand, Vietnam, Peninsular Malaysia, Sumatra, Borneo, Sumbawa, Sulawesi, Moluccas, New Guinea, New Britain, Solomon Islands, Fidji Islands, and Guam (ANDERSEN 1995, ANDERSEN & WEIR 1997).

***Limnometra femorata* MAYR, 1865**

Limnometra femorata MAYR, 1865: 443.

Limnometra femorata: HUNGERFORD & MATSUDA 1958a: 413; NIESER & CHEN 1992: 12, 15; ANDERSEN 1995: 118; ZETTEL & CHEN 2000: 75; ZETTEL 2002: 138.

Tenagogonus (Limnometra) femoratus: ANDERSEN 1967: 261.

Tenagogonus (Limnometra) femorata [!]: POLHEMUS & REISEN 1976: 269.

Material examined: 1 ♂ (mapt), Cagayan, Camoyanan, Baggao, V.1989, leg. V. Samarita (NMM); 1 ♂ (mapt, holotype), Manila (NHMW); 1 ♂ (mapt), Laguna Los Baños, Mt. Makiling, 18.XI.1993, leg. H. Schillhammer (#7) (NHMW); 2 ♂♂, 3 ♀♀ (mapt), Laguna, Los Baños, Mt. Makiling, Mud Springs, 1.XI.1996, leg. H. Zettel (#88) (NHMW, UPLB); 1 ♀ (mapt), same locality, stream above Mud Springs, 700 m a.s.l., 22.XI.1995, leg. J. Kodada (NHMW); 1 ♂ (mapt), Camarines Sur, Lupi, Sooc, Bicol National Park, creek, 6–9.III.2006, leg. H. Zettel (#440a) (CZW).

Regional distribution: Cagayan (POLHEMUS & REISEN 1976; m.e.), Pampanga (POLHEMUS & REISEN 1976), Manila (MAYR 1865; m.e.), Laguna (ZETTEL & CHEN 2000; m.e.), Camarines Sur (m.e.).

General distribution: Widely distributed in the Philippines, with published records from Luzon, Marinduque, Sibuyan, Samar, Bohol, Mindanao, Palawan, and Basilan (MAYR 1865, HUNGERFORD & MATSUDA 1958a, ANDERSEN 1967, POLHEMUS & REISEN 1976, ZETTEL & CHEN 2000) and unpublished collections from Catanduanes, Polillo, Negros, Cebu, and

Leyte; confirmed were records from Banggi Island (Malaysia) offshore northern Borneo (see HUNGERFORD & MATSUDA 1958a); records from Taiwan and the Ryu-kyu Islands in southern China are probably correct; old records from Indonesia and other parts of Malaysia refer to *Limnometra spinosa* ZETTEL, 2002.

Limnometra nigripennis nigripennis MAYR, 1865

Limnometra nigripennis MAYR, 1865: 443.

Limnometra nigripennis: HUNGERFORD & MATSUDA 1958a: 415 (partim); NIESER & CHEN 1992: 13, 15 (partim); ANDERSEN 1995: 118; ZETTEL & CHEN 2000: 78 (partim).

Tenagobonus (Limnometra) nigripennis: POLHEMUS & REISEN 1976: 269.

Limnometra nigripennis nigripennis ZETTEL, 2004b: 376.

Material examined: 3 ♂♂ (mipt), 1 ♀ (mapt), Cagayan, Camoyanan, Baggao, V.1989, leg. V. Samarita (NMM); 1 ♀ (apt), 1 ♂ (mipt), Ilocos Norte, Patapat Mountains, N of Adams, N 18°30', E 120°55', 3.IV.2000, leg. L. Dembický (MMBR); 2 ♂♂, 3 ♀♀ (mapt), Ilocos Norte, Carasi, Nagoboban Creek, in forest, 28.X.2002, leg. H. Zettel (#319a) (NHMW, UPLB); 2 ♀♀ (mapt), Ilocos Norte, Solsona, Gasgas River, 29.X.2002, leg. H. Zettel (#320a) (NHMW); 3 ♂♂, 1 ♀ (mipt), 1 ♂, 2 ♀♀ (mapt), Ilocos Sur, Bantay, Taleb, reforestation area, Kayan Creek, 25.X.2002, leg. H. Zettel (#313) (NHMW); 1 ♂, 1 ♀ (mipt), La Union, Bacnotan, Don Mariano Marcos Memorial State University, small stream, 24.X.2002, leg. H. Zettel (#311) (NHMW, UPLB); 1 ♀ (mipt), same area, Casiaman Falls, 24.X.2002, leg. H. Zettel (#312) (NHMW); 2 ♀♀ (mipt), 2 ♀♀ (mapt), Mountain Province, Chico River, Gonogon, 1100 m a.s.l., 21.II.1999, leg. H. Zettel (#184) (CZW, UPLB); 2 ♂♂, 1 ♀ (mapt), Mountain Province, S of Sagada, Bagnen, slopes of Mt. Polis, 1600 m a.s.l., 26.II.1999, leg. H. Zettel (#189) (NHMW); 1 ♀ (mapt), Mountain Province, 5 km S Bontoc, Balitian River, 900 m a.s.l., 27.II.1999, leg. H. Zettel (#190) (NHMW); 1 ♂ (mapt), Benguet, at km 7 of Asin Road, W of Baguio, 17.II.1999, leg. H. Zettel (#179) (CZW); 1 ♀ (mipt), 1 ♂ (mapt), Benguet, Baguio, 2 km below Camp John Hay, 18.II.1999, leg. H. Zettel (#181) (CZW); 1 ♂ (mapt), Nueva Viscaya Santa Fe, Imugan, stream at Kalahan Educational Center, 950 m a.s.l., 5–6.XI.2002, leg. H. Zettel (#324) (NHMW); 1 ♂, 4 ♀♀ (mapt), same area, stream at Imugan Falls, 1000 m a.s.l., 6.XI.2002, leg. H. Zettel (#325) (NHMW, UPLB); 1 ♀ (mipt), 3 ♀♀ (mapt), Nueva Viscaya, Santa Fe, Villafior, Consuelo Creek, 600 m a.s.l., 7.XI.2002, leg. H. Zettel (#327) (NHMW, UPLB); 1 ♂ (mipt), Nueva Viscaya, Santa Fe, Malico, Maliit, Maliit River, 1200 m a.s.l., 8.XI.2002, leg. H. Zettel (#329) (NHMW); 1 ♀ (mipt), 1 ♀ (mapt), Nueva Viscaya, Santa Fe, small creek at Malico, 8.XI.2002, leg. H. Zettel (#332) (NHMW); 1 ♀ (mipt), 1 ♂, 1 ♀ (mapt), Nueva Viscaya, Kayapa, Pingkiang, small creek, 9.XI.2002, leg. H. Zettel (#333) (NHMW, UPLB); 3 ♂♂, 5 ♀♀ (mipt), Zambales, Zambales Mountains, High Peak, west side, 850±500 m a.s.l., N 15°26–28', E 120°03–06', 18.III.2000, leg. L. Dembický (MMBR); 1 ♂ 2 ♀♀ (mapt), Zambales, Olongapo, Subic Bay, near Riding Stable, 30.XI.–5.XII.1993, leg. H. Zettel (#37d) (NHMW); 1 ♂ 1 ♀ (mipt), 1 ♂ (mapt), same area, near Jungle Survival Station, 4.XII.1993, leg. H. Zettel (#37h) (NHMW); 2 ♀♀ (mipt), 2 ♂♂, 5 ♀♀ (mapt), Bataan, 10 km E of Olongapo, Roosevelt Park, 1.XII.1993, leg. H. Zettel (#38a) (NHMW); 4 ♂♂, 2 ♀♀ (mipt), 1 ♂ (mapt), same locality, date and collector (#38) (NHMW); 1 ♂ (mipt), 1 ♀ (mipt), 1 ♀ (mapt), Rizal Wawa, leg. W. Schulze (NMPR); 1 ♀ (mapt), Cavite, Alfonso, Pajo, 7.II.2010, leg. C. V. Pangantihon (#P345) (NHMW); 1 ♂ (mapt), Laguna, Paete, leg. W. Schultze (NMPR); 1 ♂ (mipt), 1 ♂ (mapt), Laguna, Los Baños, rest area, stream from Dampalit Falls, 17.XII.1992, leg. H. Zettel (#1a) (NHMW); 2 ♂♂, 4 ♀♀ (mipt), 5 ♀♀ (mapt), same locality, 15.XI.1993, leg. H. Zettel (#22b) (NHMW, UPLB); 4 ♂♂, 2 ♀♀ (mipt), 3 ♂♂, 2 ♀♀ (mapt), Laguna, Los Baños, Mt. Makiling, Molawin Creek at College of Forestry, 8.II.1996, leg. H. Zettel (#72) (CZW, UPLB); 3 ♂♂, 3 ♀♀ (mapt), Laguna, Los Baños, Mt. Makiling, Mud Springs, 8.II.1996, leg. H. Zettel (#73) (CZW, UPLB); 1 ♂, 1 ♀ (mipt), 1 ♂, 2 ♀♀ (mapt), same locality, 1.XI.1996, leg. H. Zettel (#88) (NHMW, UPLB); 1 ♀ (mapt), same locality 11.II.1998, leg. H. Zettel (#134) (NHMW); 1 ♂, 4 ♀♀ (mipt), Laguna, Mt. Makiling, stream above Mud Springs, 700 m a.s.l., 22.XI.1995, leg. J. Kodada (NHMW, CPC); 1 ♂, 2 ♀♀ (mipt), Laguna, Los Baños, Mt. Makiling, Flat Rocks, 10.II.1998, leg. H. Zettel (#132) (NHMW, UPLB); 1 ♂, 1 ♀ (mapt), Laguna, SE of San Pablo, Kinabuhayan, Mt. Banahaw, 16.XI.1993, leg. H. Schillhammer (#5) (NHMW); 1 ♀ (mapt), Laguna, Mt. Banahaw above Kinabuhayan, 800 m a.s.l., creek in degraded rain forest, 25.XI.1995, leg. J. Kodada & B. Rigová (NHMW); 5 ♂♂, 4 ♀♀ (mipt), 1 ♂ (mapt), Quezon, Lucena, Site, Botanical Garden, 11.II.1996, leg. H. Zettel (#78) (CZW, UPLB); 1 ♀ (mipt), Quezon, 30 km E of Lucena City, Quezon National Park, 23.XI.1993, leg. M.A. Jäch (#11) (NHMW); 1 ♀ (mipt), 1 ♀ (mapt), Quezon, Atimonan, Quezon National Park, near Old Zigzag Road, 24–30.III.1998, leg. H. Zettel (#165) (CZW); 2 ♀♀ (mapt), same locality, 16.III.1999, leg. H. Zettel (#202) (NHMW); 1 ♀ (mipt), same locality, 27–28.I.2002, leg. H. Zettel (#300) (CZW); 1 ♂, 4 ♀♀ (mipt), 1 ♂, 2 ♀♀ (mapt), Quezon, Pagbilao, Iringan, 23.IV.2006, leg. C. V. Pangantihon (#P233) (CZW, NHMW).

Notes: *Limnometra nigripennis* is endemic in the Philippines east of Huxley's Line and parapatric with *L. palawanensis* ZETTEL & CHEN, 2000, a species of the Palawan Region. ZETTEL (2004b) divided *L. nigripennis* into four subspecies that are distinguishable chiefly by distinct colour patterns: the widely distributed nominate subspecies, *L. nigripennis cebuana* ZETTEL, 2004 from Cebu, *L. nigripennis amabilis* ZETTEL, 2004 from Dinagat, and *L. nigripennis bicolorana* ZETTEL, 2004 from southern Luzon and some nearby islands.

Regional distribution: Cagayan (m.e.), Ilocos Norte (m.e.), Ilocos Sur (m.e.), La Union (m.e.), Mountain Province (ZETTEL & CHEN 2000; m.e.), Benguet (HUNGERFORD & MATSUDA 1958a; m.e.), Nueva Viscaya (m.e.), Cagayan (HUNGERFORD & MATSUDA 1958a), Zambales (ZETTEL & CHEN 2000; m.e.), Bataan (ZETTEL & CHEN 2000; m.e.), Cavite (m.e.), Laguna (HUNGERFORD & MATSUDA 1958a, ZETTEL & CHEN 2000; m.e.), Quezon (ZETTEL & CHEN 2000; m.e.).

General distribution: Endemic to and widespread in the Philippines, with records from Luzon, Mindoro, Sibuyan, Tablas, Panay, Ticao, Negros, Biliran, Leyte, Bohol, Mindanao, Camiguin (ZETTEL & CHEN 2000), Polillo, Guimaras (HUNGERFORD & MATSUDA 1958a), and Masbate (unpublished).

***Limnometra nigripennis bicolorana* ZETTEL, 2004**

Limnometra nigripennis: HUNGERFORD & MATSUDA 1958a: 415 (partim); NIESER & CHEN 1992: 13, 15 (partim); ZETTEL & CHEN 2000: 78 (partim).

Limnometra nigripennis bicolorana ZETTEL, 2004b: 375.

Material examined: 1 ♀ (mipt, paratype), Camarines Norte, S of Daet, Bicol National Park, Nalisan, 7.II.2001, leg. H. Zettel (#265b) (CZW); 3 ♂♂ (mipt, holo- and paratypes), 5 ♀♀ (mipt, paratypes), 1 ♂ (mapt, paratype), Camarines Sur, Lupi, Alanao, Bahi River (border with Camarines Norte), 14.XI.1999, leg. H. Zettel (#205) (CZW, UPLB); 1 ♂, 2 ♀♀ (mipt, paratypes), same locality 11.II.2003, leg. H. Zettel (#337) (CZW, UPLB); 1 ♂ (mapt, paratype), Camarines Sur, N Sipocot, Sooc, Sooc River, 16.II.2001, leg. H. Zettel (#270) (CZW); 1 ♂, 1 ♀ (mipt, paratypes), 2 ♀♀ (mapt, paratypes), same area, small creek, 20.III.2003, leg. C. V. Pangantihon (CZW, UPLB); 1 ♀ (mipt), Camarines Sur, Mt. Isarog, 4000 ft. a.s.l., 11.IV.1916, leg. G. Böttcher (NMPR); 3 ♂♂, 5 ♀♀ (mipt, paratypes), Camarines Sur, 20 km E of Naga, 5 km E of Carolina, Mt. Isarog, near Malabsay Falls, 4.III.1999, leg. H. Zettel (#192) (NHMW, UPLB, MNHN); 4 ♀♀ (mipt, paratypes), Camarines Sur, Pili, Buncao, Caririga Creek, 1.II.2002, leg. H. Zettel (#301) (CZW, UPLB); 2 ♀♀ (mipt, paratypes), Camarines Sur, Lake Buhi area, Twin Falls, near Itbog, 22.III.1998, leg. H. Zettel (#164) (CZW); 1 ♂, 3 ♀♀ (mipt, paratypes), 1 ♂ (mapt, paratype), Camarines Sur, Lagonoy, Presentacion, Kinaholugan Falls, 10.II.2001, leg. H. Zettel (#266) (CZW, UPLB); 4 ♀♀ (mipt, paratypes), 3 ♂♂, 2 ♀♀ (mapt, paratypes), Albay, 40 km N of Legaspi, 1 km W of Malilipot, Busai Falls, 23.II.1998, leg. H. Zettel (#143) (NHMW, UPLB, ZRCS); 1 ♂ (mipt, paratype), Albay, 15 km SW of Manito, S of Cawayan, river, 24.II.1998, leg. H. Zettel (#144) (NHMW).

Regional distribution: Camarines Norte (m.e.), Camarines Sur (ZETTEL & CHEN 2000; m.e.), Albay (m.e.). In addition, six micropterous females in the Bavarian State Collection labeled “Philippinen\ Manila 9.76\ Lumawig” have the typical very dark colour pattern of ssp. *bicolorana*, but are completely out of the distribution range so that mislabeling is suspected.

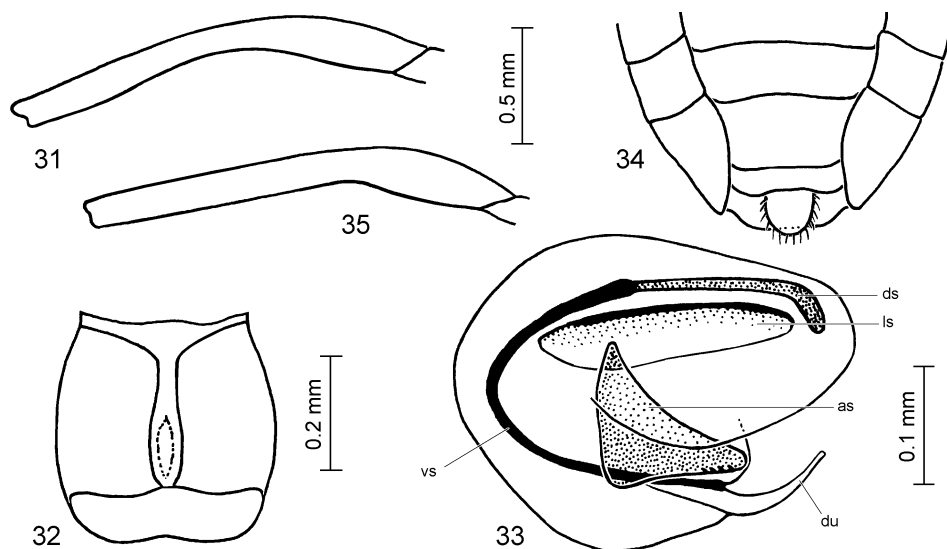
General distribution: This subspecies is restricted to the southern parts of Luzon and to the islands of Catanduanes and Marinduque which also belong to the biogeographical region of Greater Luzon; in the south it transgresses the border of Greater Mindanao with an occurrence in northern Samar.

***Neogerris philippinensis* ZETTEL, 2004**

? *Neogerris parvula* (STÅL, 1860 [“1959”]) (misidentification?): ANDERSEN 1975: 69 (partim).

Limnogonus parvulus: YANO et al. 1981: 22, 27.

Neogerris philippinensis ZETTEL, 2004b: 367.



Figs. 31–35: (31–34) *Tenagogonus curvatus* sp.n.: (31) profemur of male; (32) segment 8 of male, ventral aspect; (33) vesicula, lateral aspect (as – accessory sclerite, ds – dorsal sclerite, du – ductus seminalis, ls – lateral sclerite, vs – ventral sclerite); (34) posterior part of abdomen of female, dorsal aspect. (35) *Tenagogonus bergrothi*, profemur of male.

Material examined: 1 ♂ (mapt, paratype), Mountain Province, 5 km S of Bontoc, Balitjan River, 900 m a.s.l., 27.II.1999, leg. H. Zettel (#190) (NHMW).

Regional distribution: Mountain Province (ZETTEL 2004b; m.e.), Ifugao (YANO et al. 1981; this record can be related to this species after head mark in fig. 15; see ZETTEL 2004b).

General distribution: Endemic to the Philippines, with records from Luzon, Marinduque, and Siquijor (ZETTEL 2004b). A record of *N. parvulus* from Mindanao (Agusan) by ANDERSEN (1975) likely belongs to this species, too.

***Tenagogonus bergrothi* HUNGERFORD & MATSUDA, 1958 (Fig. 35)**

Tenagogonus pravipes bergrothi HUNGERFORD & MATSUDA, 1958a: 393.

Tenagogonus (Tenagogonus) pravipes bergrothi: MATSUDA 1960: figs. 375, 376, 385, 405.

Tenagogonus (Tenagogonus) bergrothi: HUNGERFORD & MATSUDA 1962a: 144; POLHEMUS & REISEN 1976: 268.

Tenagogonus bergrothi: ANDERSEN 1995: 121.

Material examined: 2 ♀♀ (apt), Ilocos Norte, E Batac, Payao, Quiaoit River, 26.X.2002, leg. H. Zettel (#315) (NHMW); 1 ♂ (apt), 2 ♀♀ (mapt), Ilocos Norte, between Bangui and Dumalneg, river and stream, 27.X.2002, leg. H. Zettel (#318) (NHMW); 1 ♂, 1 ♀ (mapt), Ilocos Norte, Solsona, stream below waterfall, 29.X.2002, leg. H. Zettel (#320) (NHMW); 2 ♀♀ (apt), 12 ♂♂, 12 ♀♀ (mapt), Zambales, Olongapo, Subic Bay, stream near Jungle Survival, 4.XII.1993, leg. H. Zettel (#37h) (NHMW, UPLB); 4 ♂♂, 1 ♀ (mapt), Zambales, Subic Bay, Triboa Mangrove, 7.XII.2000, leg. H. Zettel (#260) (NHMW, UPLB); 2 ♂♂ (mapt), Manila, X.1913, leg. G. Böttcher (NMPR); 8 ♂♂, 8 ♀♀ (apt), 1 ♂ (mapt), Laguna, Los Baños, rest area, pond in park, 16.XI.1993, leg. H. Zettel (#22a) (NHMW); 3 ♂♂ (mapt), Laguna, Los Baños, creek from Dampalit Falls, 15.XI.1993, leg. H. Zettel 1993 (#22b) (NHMW); 1 ♀ (mapt), Laguna, Los Baños, Mt. Makiling, Molawin Creek at College of Forestry, 8.II.1996, leg. H. Zettel (#72) (CZW); 2 ♂♂, 4 ♀♀ (apt), Quezon, Atimonan, Quezon National Park, Old Zigzag Road, 27–28.I.2002, leg. H. Zettel (300) (CZW, UPLB); 2 ♂♂, 2 ♀♀ (apt), Quezon, Lucena, Site, Botanical Garden, 11.II.1996, leg. H. Zettel (#78) (CZW, UPLB); 1 ♀ (mapt), Camarines Norte, S Daet, Bicol National Park, Nalisan, 7.II.2001, leg. H. Zettel (#265b) (CZW); 1 ♂, 2 ♀♀ (apt), Camarines Sur, Lupi, Sooc, small creek, 20.III.2003, leg. C. V. Pangantihon (CZW); 2 ♂♂, 1 ♀ (apt), same area, creek near dam, 13.III.2003, leg. H. Zettel (#347) (CZW); 1 ♂ (apt), Camarines Sur, Lagonoy, Presentacion, Kinaholu-

gan Falls, 10.II.2001, leg. H. Zettel (#266) (CZW); 1 ♀ (mapt), Albay, 40 km N of Legaspi, 1 km W of Malipot, Busai Falls, 23.II.1998, leg. H. Zettel (143) (NHMW, UPLB); 2 ♂♂, 1 ♀ (apt), Sorsogon, NE of Irosin, N of San Roque, Lake Bulusan, 630 m a.s.l., 26.II.1998, leg. H. Zettel (#146) (NHMW).

Notes: *Tenagonus* is restricted to Africa and Madagascar. A new genus name will become necessary to include the Asian “*Tenagonus*” species (see DAMGAARD et al. 2014).

Regional distribution: Ilocos Norte (m.e.), Zambales (m.e.); Manila (HUNGERFORD & MATSUDA 1958a; m.e.), Laguna (POLHEMUS & REISEN 1976; m.e.), Quezon (m.e.), Camarines Norte (m.e.), Camarines Sur (m.e.), Albay (m.e.), Sorsogon (m.e.).

General distribution: Endemic and widespread in the Philippines, but not occurring in the Palawan Region; published records from Luzon and Mindanao (HUNGERFORD & MATSUDA 1958a), unpublished material from several other islands.

***Tenagonus curvatus* sp.n.** (Figs. 11–14, 31–34)

Type locality: Luzon, Quezon, W of Atimonan, Quezon National Park, near Old Zigzag Road, intermittent brook in dipterocarp forest, N 13°59', E 121°48', ca. 230 m a.s.l.

Type material: Holotype (♂, apt, NMM), Quezon, W of Atimonan, Quezon National Park, near Old Zigzag Road, 16.III.1999, leg. H. Zettel (#202). Paratypes: 6 ♂♂, 5 ♀♀ (apt), same data as holotype (NHMW, UPLB); 9 ♂♂, 3 ♀♀ (apt), same locality, 12.II.1996, leg. H. Zettel (#79b) (CZW, UPLB); 8 ♂♂, 6 ♀♀ (apt), same locality, 24–30.III.1998, leg. H. Zettel (165) (CZW, UPLB); 1 ♂, 2 ♀♀ (apt), Laguna, Los Baños, Mt. Makiling, Mud Springs, 8.II.1996, leg. H. Zettel (#73) (CZW); 1 ♂, 1 ♀ (apt), same locality, 11.II.1998, leg. H. Zettel (#134) (NHMW); 2 ♂♂, 2 ♀♀ (apt), same locality, 23–24.I.1999, leg. H. Zettel (#167) (CZW); 3 ♂♂, 1 ♀ (apt), Camarines Norte, S of Daet, Bicol National Park, Nalisan, 7.II.2001, leg. H. Zettel (#265a) (CZW).

Description of apterous male: Measurements (holotype; n = 11): Body length 4.39 (4.22–5.29); maximum width (at mesacetabula) 1.59 (1.47–2.12). Head length (without neck) 0.82 (0.70–0.90), width 1.08 (1.00–1.28); minimum eye distance 0.50 (0.48–0.61). Lengths of antennomeres, I 1.17, II 1.15, III 1.74, IV 2.27. Pronotum length 1.95 (1.63–2.40), width 0.91 (0.82–1.13). Lengths of leg segments: profemur 1.88, protibia 1.58, protarsus 0.15 + 0.29, mesofemur 3.95, mesotibia 2.99, mesotarsus 1.34 + 0.37, metafemur 3.54, metatibia 1.63, metatarsus 0.33 + 0.29.

Colour: See Figures 11 and 13, depicting a relatively pale specimen. Colour pattern hardly varying, but pale ground colour tending to brownish in darkest specimens. Venter pale yellow; metasternum with round blackish central mark, more or less extended to basal abdominal sternites, in some specimens also to mesosternum. Antennae and legs yellowish, distally more or less infuscated.

Structures: Head acuminate. Anteclypeus smooth and shiny. Eyes large, laterally distinctly surpassing sides of pronotum. Rostrum long, reaching basal third of mesosternum. Pronotum with distinct transverse impressions separating pronotal lobe; pronotal lobe tongue-shaped, posteriorly narrowly rounded, slightly varying in length reaching hind margin of metanotum or ending in short distance from it. No wing rudiments externally visible. Mesosternum anteriorly with median groove, posteriorly broadly and shallowly impressed. Metasternum medially flat, with small gland orifice. Profemur (Fig. 11, 13, 31) very characteristic: at base slightly widened, distal of this widening widely curved, curve reaching apical third or fourth; middle part slightly flattened; in one very large specimen curvature weaker than in normal-sized specimens, but also wide. Protibia straight. Middle and hind legs without modifications; mesofemur apically with one short spine; claws present. Abdomen (Fig. 11) very short, with slightly converging sides; connexival spines absent. Tergites convex; tergite 1 with median furrow, tergites 1–2 with lateral longitudinal impressions. Sternites 1–7 without modifications. Abdominal segment 8 (Fig. 32) with narrow median groove that deepens strongly in apical third.

Genitalia small: Pygophore elongate ovate, distolaterally with some long pilosity. Proctiger slender, apex narrowly rounded. Paramere absent. Vesica (Fig. 33): dorsal sclerite connected with ventral sclerite, apically split into short arms; paired lateral sclerites large, only dorsal margins distinct; large, paired, subtriangular accessory sclerites connected with lateral sclerites; ductus seminalis short.

Description of apterous female: Measurements (n = 10): Body length 5.55–6.37; maximum width (at mesacetabula) 2.10–2.69. Head length (without neck) 0.79–0.90, width 1.18–1.37; minimum eye distance 0.57–0.68. Pronotum length 2.09–2.44, width 0.99–1.21.

Colour: Colour pattern dorsal and laterally (Figs. 12, 14) similar to that of male. Venter with pair of blackish marks near base of mesacetabula, and with a usually continuous blackish midline from anterior third of mesosternum to end of sternite 7.

Structures: Larger than male, thorax and abdomen much more robust. Mesosternum anteriorly with shallow groove, posteriorly without impression. Profemur simple, almost straight, slightly flattened. Abdomen (Figs., 12, 34) very wide, all tergites transverse, flat; tergite 7 approximately as long and tergites 5 and 6 combined and twice as long as tergite 8. Proctiger slender, knob-like, directed caudad. Laterotergite 7 forming an acute angle, but no spine, with a few black setae. Sternite 7 laterally with very short corners, between them broadly convex, completely covering gonocoxae 1.

Macropterous morphs: Unknown.

Comparative notes: This species is very similar to *T. bergrothi*, a widespread species of the Philippines. The colour pattern of the two species is very similar, but the mesopleural stripes are more sinuate in *T. curvatus* sp.n. (Figs. 13, 14) than in *T. bergrothi*. The male of *T. curvatus* sp.n. can be easily distinguished from *T. bergrothi* and some undescribed Philippine congeners by the profemur which, after a slightly thickened base (Fig. 31), is more widely curved, so that only the apical third or fourth remains straight, whereas in other species the base is very strongly thickened (indistinct in the largest specimens), the basal curve narrow, and the distal half of femur straight (Fig. 35). Moreover, the median furrow of abdominal segment 8 ends in a deep groove in males of *T. curvatus* sp.n. (Fig. 32), while it is almost equally deep over its length in *T. bergrothi*. Females of the two species are not easy to separate: In addition to the mesopleural pattern, females of *T. bergrothi* from Luzon have a short connexival spine (see MATSUDA 1960: fig. 405), which is not present in *T. curvatus* sp.n. (Fig. 34). However, in some populations of *T. bergrothi* from other islands, these spines are also lacking.

Etymology: Named after the characteristically curved profemur of males.

Regional and general distribution: Endemic to the central and southern parts of Luzon, with records from Laguna, Quezon, and Camarines Norte.

Subfamily Cylindrostethinae MATSUDA, 1960

Cylindrostethus vittipes (STÅL, 1871)

Hydrobates vittipes STÅL, 1871: 705.

Cylindrostethus vittipes: HUNGERFORD & MATSUDA 1962b: 96; POLHEMUS & REISEN 1976: 264; POLHEMUS 1994: 14.

Material examined: 11 ♂♂, 11 ♀♀ (apt), 1 ♂, 1 ♀ (mapt), Camarines Sur, Lupi, Alanao, Bahi River (border between Camarines Sur and Camarines Norte, 14.XI.1999, leg. H. Zettel (#205) (CZW, UPLB); 2 ♂♂ (apt), Camarines Sur, N of Sipocot, Sooc, Sooc River, 16.II.2001, leg. H. Zettel (#270) (CZW).

Regional distribution: Pangasinan (POLHEMUS 1994), Camarines Norte (m.e.), Camarines Sur (m.e.).

General distribution: Endemic in the Philippines, with published records from Luzon, Samar, Leyte, and Mindanao (POLHEMUS 1994), and unpublished records from Masbate, Negros, and Panay.

Subfamily Ptilomerinae BIANCHI, 1896

Potamometropsis ikarus ZETTEL, 1994

Potamometropsis ikarus ZETTEL, 1994a: 95 (partim); ZETTEL 1999b: 159.

Material examined: 3 ♂♂ (mapt, holo- and paratypes), 4 ♀♀ (mapt, paratypes), Camarines Sur, Mt. Iriga, 500 m a.s.l., 25.III.1962, leg. H.M. Torre Villas (BPBM, NHMW); 2 ♂♂, 9 ♀♀, and 2 ♀♀ (mapt), Camarines Sur, at border with Camarines Norte, Lupi, Alanao, Bahi River, 3.III.1999, leg. H. Zettel (#191) (NHMW, UPLB, MNHN); 4 ♂♂, 5 ♀♀ (apt), same locality and date, leg. F. Seyfert (#18) (CSW, UPLB); 9 ♂♂, 9 ♀♀ (apt), same locality, 14.XI.1999, leg. H. Zettel (#205) (CZW, UPLB); 2 ♀♀ (apt), Camarines Sur, Pili, Buncao, Caririga Creek, 1.II.2002, leg. H. Zettel (#301) (CZW); 4 ♂♂ (apt), Camarines Sur, Lagonoy, Presentacion, Kinaholugan Falls, 10.II.2001, leg. H. Zettel (#266) (CZW, UPLB); 13 ♂♂, 10 ♀♀ (apt), Albay, Malinao, Palali Falls, 200 m a.s.l., 14.III.1999, leg. H. Zettel (#201) (NHMW, UPLB, JTPC).

Notes: ZETTEL (1994a) described *P. ikarus* from southern and northern Luzon, but later (ZETTEL 1999b) the northern populations were recognized as a distinct species and described as *P. sumaldei*.

Regional distribution: Camarines Norte (m.e.), Camarines Sur (m.e.), Albay (m.e.).

General distribution: Endemic to the southern parts of Luzon and the nearby island of Catanduanes (unpublished records).

Potamometropsis longipes ZETTEL, 2004

Potamometropsis longipes ZETTEL, 2004b: 377.

Material examined: 1 ♀ (apt, holotype), Nueva Ecija, Carranglan, Puncan, BFD, 5.IV.1981, leg. L. G. Alfonso (ViSCA).

Regional and general distribution: Endemic to northern Luzon and only known from the type locality in Nueva Ecija (ZETTEL 2004b; m.e.).

Potamometropsis luzonica ZETTEL, 1994

Potamometropsis luzonica ZETTEL, 1994a: 86; ZETTEL 1999b: 160.

Material examined: 4 ♂♂, 3 ♀♀ (apt), Ilocos Norte, Patapat Mountains, of Adams, N 18°30', E 120°55', 3.IV.2000, leg. L. Dembický (MMBR); 1 ♂ (apt), Ilocos Norte, NE Pagudpud, Batapat, stream below dam, 27.X.2002, leg. H. Zettel (#316) (NHMW); 2 ♂♂ (apt), Ilocos Norte, Solsona, stream below waterfall, 29.X.2002, leg. H. Zettel (#320) (NHMW); 1 ♂ (apt), Ilocos Norte, Solsona, Gasgas River, 29.X.2002, leg. H. Zettel (#320a) (NHMW); 2 ♀♀ (apt), Kalinga-Apayao, Cordillera Central, Saltan, upper valley, N 17°30', E 121°08', 750 m a.s.l., 22.III.2000, leg. L. Dembický (MMBR, NHMW); 7 ♂♂, 8 ♀♀ (apt), Mountain Province, Gonogon, Chico River, 1100 m a.s.l., 21.II.1999, leg. H. Zettel (#184) (UPLB, CZW); 2 ♂♂, 8 ♀♀ (apt), same area, tributary to Chico River, 1100 m a.s.l., 21.II.1999, leg. F. Seyfert (#8b) (CSW, CZW, UPLB); 8 ♂♂, 8 ♀♀ (apt), Mountain Province, NE of Sagada, Banga'an, Bomod-ok Waterfalls, 22.II.1999, 1500 m a.s.l., leg. H. Zettel (#185) (UPLB, CZW); 2 ♂♂, 2 ♀♀, same locality and date, leg. F. Seyfert (#9) (CSW, UPLB); 3 ♂♂, 7 ♀♀ (apt), same locality, 14.III.2012, leg. C. V. Pangantihon (#P409) (CZW); 1 ♀ (mapt), 7 ♀♀ (apt), Mountain Province, Sagada, Bokong Falls, 13.III.2012, leg. C. V. Pangantihon (#CP408) (CZW, NHMW); 4 ♂♂, 6 ♀♀ (apt), Mountain Province, Sagada, Echo Valley, Underground River, 1500 m a.s.l., 23–24.II.1999, leg. H. Zettel (#186) (NHMW, UPLB); 5 ♂♂, 7 ♀♀ (apt), Mountain Province, S of Sagada, Bagnen, slopes of Mt. Polis, 1600 m a.s.l., 26.II.1999, leg. H. Zettel (#189) (NHMW, UPLB); 1 ♀ (apt), same locality and date, leg. S. Schödl (#23) (NHMW); 1 ♂, 4 ♀♀ (apt), same area, 1550 m, 26.II.1999, leg. H. Zettel (#189b) (NHMW, UPLB); 1 ♀ (apt), Mountain Province, 5 km S of Bontoc, Balitnan River, 900 m a.s.l., 27.II.1999, leg. F. Seyfert (#16) (CSW); 12 ♂♂, 36 ♀♀ (apt, paratypes), and 1 ♂ (mapt, paratype), Ifugao, Mayoyao, 1200–1500 m a.s.l., 11–13., 13–15., 17–18.VIII.1966, leg. H.M. Torre Villas (BPBM, NHMW); 26 ♂♂, 32 ♀♀ (apt and mapt, paratypes), Ifugao, Jacmal Bunhian, 24 km E of Mayoyao, 800–1000 m a.s.l., 7–8., 9–12., 16–18., 19–21., 22–24.IV.1967, leg. H.M. Torre Villas (BPBM, NHMW); 1 ♂ (mapt, paratype), Ifugao,

Liwo, 8 km E of Mayoyao, 1000–1300 m a.s.l., 30.V.1967, leg. H.M. Torrevillas; 7 ♂♂, 11 ♀♀ (apt, paratypes), Benguet, at kilometre 219.5 of Kennon Road, 30 km S of Baguio City, 200 m a.s.l., 8.VII.1985, leg. J.T. & D.A. Polhemus (#CL1962) (JTPC); 2 ♀♀ (apt, paratypes), Benguet, Tuba, 18.VII.1975, leg. W.K. Reisen (#H-165-73) (JTPC); 2 ♂♂ (apt), Nueva Viscaya, Santa Fe, Imugan, stream at Kalahan Educational Center, 950 m a.s.l., 5–6.XI.2002, leg. H. Zettel (#324) (NHMW, UPLB); 7 ♂♂, 8 ♀♀ (apt), same area, stream at Imugan Falls, 1000 m a.s.l., 6.XI.2002, leg. H. Zettel (#325) (NHMW, UPLB, MNHN); 3 ♂♂, 2 ♀♀ (apt), Nueva Viscaya, Santa Fe, Malico, Maliit, Maliit River, 1200 m a.s.l., 8.XI.2002, leg. H. Zettel (#329) (NHMW, UPLB); 2 ♀♀ (apt), same area, Inacio, Inacio River, 1200 m a.s.l., 8.XI.2002, leg. H. Zettel (#330) (NHMW); 2 ♂♂, 1 ♀ (apt), same area, Malico, small creek, 8.XI.2002, leg. H. Zettel (#332) (NHMW); 7 ♂♂, 7 ♀♀ (apt, paratypes), Laguna, Los Baños, rest area, creek from Dampalit Falls, 17.XI.1992, leg. H. Zettel (#1a) (NHMW); 6 ♀♀ (apt, paratypes), same locality, 15.XI.1993, leg. H. Zettel (#22b) (NHMW, UPLB); 5 ♂♂, 6 ♀♀ (apt), Laguna, Los Baños, Mt. Makiling, Molawin Creek, Flat Rocks, 9.II.1996, leg. H. Zettel (#75) (CZW, UPLB); 2 ♂♂, 2 ♀♀ (apt), same locality, 10.II.1998, leg. H. Zettel (#132) (NHMW, UPLB); 3 ♂♂ (apt, holo- and paratypes), 4 ♀♀ (apt, paratypes), Laguna, San Pablo, Mt. Banahaw, 15.XI.1992, leg. H. Zettel (#6) (NHMW); 1 ♀ (apt, paratype), same locality and date, leg. H. Schillhammer (#5) (NHMW); 3 ♂♂, 6 ♀♀ (apt, paratypes), Quezon, Llavac, National Botanic Garden, 11.VII.1985, leg. J.T. & D.A. Polhemus (#CL1973) (JTPC);

5 ♂♂, 4 ♀♀ (apt, paratypes), Camarines Sur, Mt. Isarog, 500–600 m a.s.l., 11.IV.1963, leg. H.M. Torrevillas (BPBM, NHMW); 3 ♂♂, 6 ♀♀ (apt), Camarines Sur, 20 km E of Naga, 5 km E of Carolina, Mt. Isarog, near Malabsay Falls, 4.III.1999, leg. H. Zettel (#192) (NHMW, UPLB); 1 ♀ (apt), same area, Malabsay Falls, 20.XI.1999, leg. H. Zettel (#208) (CZW); 1 ♂, 3 ♀♀ (apt, paratypes), Camarines Sur, Mt. Iriga, 500–600 m a.s.l., 13.IV.1962, leg. H.M. Torrevillas (BPBM); 1 ♂ (mapt), Camarines Sur, Pili, Buncao, Caririga Creek, 1.II.2002, leg. H. Zettel (#301) (CZW).

Regional and general distribution: Endemic to Luzon island, with records from Ilocos Norte (m.e.), Kalinga-Apayao (m.e.), Mountain Province (m.e.), Ifugao (m.e.), Benguet (m.e.), Nueva Viscaya (m.e.), Laguna (m.e.), Quezon (m.e.), and Camarines Sur (m.e.).

***Potamometropsis sumaldei* ZETTEL, 1999**

Potamometropsis ikarus ZETTEL, 1994a: 95 (partim).

Potamometropsis sumaldei ZETTEL, 1999b: 156.

Material examined: 9 ♂♂ (apt, holo- and paratypes), 8 ♀♀ (apt, paratypes), Mountain Province, 5 km S of Bontoc, Balitian River, 900 m a.s.l., 27.II.1999, leg. H. Zettel (#190) (UPLB, NHMW); 14 ♂♂, 20 ♀♀ (apt, paratypes), Mountain Province, Gonogon, Chico River, 1100 m a.s.l., 21.II.1999, leg. H. Zettel (#184) (UPLB, CZW); 1 ♂, 8 ♀♀ (apt, paratypes), same locality and date, leg. F. Seyfert (#8a) (CSW, UPLB); 1 ♀ (apt) Ilocos Norte, Solsona, Gasgas River, 29.X.2002, leg. H. Zettel (#320a) (NHMW); 1 ♂, 2 ♀♀ (apt), Kalinga-Apayao, Pasil, Pasil River, tributary to Chico River, 350 m a.s.l., N 17°23', E 121°13', 13.VI.2010, leg. H. Freitag (#292M) (NHMW); 11 ♂♂, 14 ♀♀ (apt), 5 ♂♂, 10 ♀♀ (mapt, paratypes), Benguet, Asin Hot Springs, W of Baguio, 17.II.1999, leg. H. Zettel (#180) (UPLB, CZW, NHMW, CNT); 2 ♀♀ (apt, paratype), 1 ♀♀ (mapt, paratype) same locality and date, leg. F. Seyfert (#4) (CSW); 33 ♂♂, 22 ♀♀ (mapt, paratypes, also paratypes of *P. ikarus*), Ifugao, Jacmal Bunhian, 24 km E of Mayoyao, 800–1000 m a.s.l., 7–8.IV., 9–12.IV., 16–18.IV., 19–21.IV., 25–26.IV., 25–27.IV., 30.IV., 4–6., 1–10.V.1967, leg. H.M. & L.M. Torrevillas (BPBM, NHMW); 1 ♂ (mapt, paratypes, also paratypes of *P. ikarus*), Ifugao, Liwo, 8 km E of Mayoyao, 1000–1300 m a.s.l., 30–31.V.1967, leg. L.M. Torrevillas (BPBM); 1 ♂, 1 ♀ (apt, paratypes), Ilocos Norte, Piddig, Tangadan C. Nursery, Paraiso Reforestation Project, 21.X.1976, leg. A. A. Barroso (CZW); 1 ♂, 1 ♀ (apt), Nueva Viscaya, Santa Fe, Barakbak, Barakbak River, 620 m a.s.l., 7.XI.2002, leg. H. Zettel (#326) (NHMW); 1 ♂, 1 ♀ (apt), Cagayan, Gonzaga, Pateng, 10.IV.2005, leg. C. V. Pangantihon (#P146) (CZW); 1 ♂, 1 ♀ (apt), same locality, 11.IV.2005, leg. C. V. Pangantihon (#P148) (CZW); 1 ♂, 1 ♀ (apt), Isabela, San Mariano, Digsinan, Catalangan River, 1–4.VII.2000, leg. V. P. Gapud (CVPG).

Notes: Specimens from the Sierra Madre (Cagayan, Isabela) and from the Caballos Mountains (Nueva Viscaya) slightly differ from typical specimens of the Cordillera by darker colouration of head and profemora and by a thin, greyish pubescence of thoracic nota, but are identical in the other diagnostic characters mentioned by ZETTEL (1999b).

Regional and general distribution: Endemic to the northern parts of Luzon, with records from Kalinga-Apayao (m.e.), Ilocos Norte (m.e.), Mountain Province (ZETTEL 1999b; m.e.), Ifugao (m.e.), Benguet (ZETTEL 1999b; m.e.), Nueva Viscaya (m.e.), Isabela (m.e.), Cagayan (m.e.).

***Rheumatogonus luzonicus* (KIRKALDY, 1909)**

Ptilomera (*Rheumatogonus*) *luzonica* KIRKALDY, 1909: 389.

Rheumatogonus luzonicus: ANDERSEN 1967: 270; POLHEMUS & REISEN 1976: 267; ZETTEL 1994b: 81; CHEN & NIESER 2002: 383.

Material examined: 8 ♂♂, 8 ♀♀ (apt), Ilocos Norte, between Bangui and Dimalneg, river and stream, 27.X.2002, leg. H. Zettel (#318) (NHMW, UPLB); 11 ♂♂, 8 ♀♀ (apt), Cagayan, Gonzaga, Barangay Pattao, near provincial highway, rocky stream, tributary to large river, N 18°15.319', E 121°59.226', 22.IV.2007, leg. T. Naruse & J.E. C. Mendoza (ZRCS); 1 ♂, 1 ♀ (apt), Cagayan, Gonzaga, Pateng, 10.IV.2005, leg. C. V. Pangantihon (#P146) (CZW); 4 ♂♂, 3 ♀♀ (apt), 2 ♀♀ (mapt), Nueva Viscaya, Santa Fe, Consuelo, large river from Santa Fe, 600 m a.s.l., 7.XI.2002, leg. H. Zettel (#328) (NHMW, UPLB); 7 ♂♂, 18 ♀♀ (apt), Zambales, Zambales Mountains, west side of High Peak, N 15°26–28', E 120°03–06', 850±500 m a.s.l., 18.III.2000, leg. L. Dembický (MMBR); 2 ♂♂, 1 ♀ (apt), Zambales, Olongapo, Subic Bay, near Riding Stable, 2.XII.1993, leg. H. Zettel (#37e) (NHMW); 2 ♂♂, 2 ♀♀ (apt), same area, Jungle Survival Station, 4.XII.1993, leg. H. Zettel (#37h) (NHMW); 1 ♂, 1 ♀ (apt), 1 ♂ (mapt), same area, Triboa Mangrove, 7.XII.2000, leg. H. Zettel (#260) (NHMW, UPLB); 7 ♂♂, 7 ♀♀ (apt), Bataan, 10 km E of Olongapo, Roosevelt Park, 1.XII.1993, leg. H. Zettel (#38) (NHMW); 6 ♂♂, 5 ♀♀ (apt), 1 ♂ (mapt), same locality, date and collector (#38a) (NHMW); 5 ♂♂ (apt), Bulacan, 14 km E of San Miguel, Biak na Bato National Park, upstream of B. Panici Cave, riverside pool, N 15°06', E 121°06', 300 m a.s.l., 10.IV.1995, leg. H. Freitag (#28bM) (NHMW); 5 ♂♂, 4 ♀♀ (apt), 1 ♀ (mapt), Cavite, Alfonso, Pajo, 7.II.2010, leg. C. V. Pangantihon (#P345) (CZW, NHMW); 4 ♂♂, 4 ♀♀ (apt), 1 ♂, 3 ♀♀ (mapt), Laguna, Los Baños, creek from Dampalit Falls, 15.XI.1993, leg. H. Zettel (#22b) (NHMW, UPLB); 1 ♂ (mapt), Quezon, Pagbilao, Iringan, 23.IV.2006, leg. C. V. Pangantihon (#P233) (CZW); 1 ♂, 2 ♀♀ (apt), Camarines Norte, S of Daet, Bicol National Park, Nalisan, 7.II.2001, leg. H. Zettel (#265b) (CZW, UPLB); 3 ♂♂, 4 ♀♀ (apt), Camarines Sur, Lagonoy, Presentacion, Kinaholugan Falls, 10.II.2001, leg. H. Zettel (#266) (CZW, UPLB); 5 ♂♂, 5 ♀♀ (apt), 1 ♀ (mapt), Camarines Sur, N of Sipocot, Sooc, Sooc River, 16.II.2001, leg. H. Zettel (#270) (CZW, UPLB); 15 ♂♂, 13 ♀♀ (apt), 1 ♂, 1 ♀ (mapt), Albay, 40 km N of Legaspi, 1 km W of Malilipot, Busai Falls, 23.II.1998, leg. H. Zettel (#143) (NHMW, UPLB).

Regional distribution: Probably without distribution limits on Luzon, with records from Ilocos Norte (m.e.), Cagayan (m.e.), Nueva Viscaya (m.e.); Zambales (POLHEMUS & REISEN 1976, ZETTEL 1994b; m.e.), Bataan (ZETTEL 1994b), Pampanga (POLHEMUS & REISEN 1976), Bulacan (m.e.), Cavite (m.e.), Laguna (POLHEMUS & REISEN 1976, ZETTEL 1994b; m.e.), Quezon (m.e.), Camarines Norte (m.e.), Camarines Sur (m.e.), and Albay (m.e.).

General distribution: Endemic and widespread in the Philippines, but absent from the Palawan Region. With published records from Luzon, Panay, and Negros (POLHEMUS & REISEN 1976, ZETTEL 1994b) and unpublished records from Catanduanes, Marinduque, Mindoro, Sibuyan, Ticao, Cebu, Samar, Leyte, Mindanao, Siquijor, and Poro.

Subfamily Halobatinae BIANCHI, 1896

***Esakia usingeri* HUNGERFORD & MATSUDA, 1958**

Esakia usingeri HUNGERFORD & MATSUDA, 1958b: 196; ZETTEL 2004b: 384.

Material examined: 6 ♂♂, 1 ♀ (apt), 1 ♂ (mapt), Isabela, San Mariano, Catalungan River, Digsinan, 1–4.VI.2000, leg. V. P. Gapud (CVPG, NHMW); 1 ♀ (apt), Zambales, Santa Cruz, Upper Lawis River, pool, 15.V.1977, leg. H. O. Sanvalentin (CZW); 3 ♂♂, 3 ♀♀ (apt), Manila, leg. van Martens (ZMHB); 1 ♂ (mapt, paratype), 1 ♀ (apt), Rizal, Montalban, 24.VII.1936 (SHUK); 1 ♂, 1 ♀ (apt), Laguna, Los Baños, 19.X.1954, leg. G. B. Viado (BMNH).

Notes: All three Philippine *Esakia* species are endemic. A key was provided by ZETTEL (2004b).

Regional and general distribution: Endemic to the northern and central parts of Luzon: Zambales (m.e.), Isabela (m.e.), Manila (m.e.), Rizal (HUNGERFORD & MATSUDA 1958b; m.e.), Laguna (m.e.).

***Halobates (Halobates) calyptus* HERRING, 1961**

Halobates calyptus HERRING, 1961: 285; ANDERSEN & CHENG 2004: 177.

Material examined: 2 ♂♂ (apt), Sorsogon, Pinaculan Island offshore Sorsogon City, 23.I.2000, leg. H. Zettel (#216) (NHMW).

Notes: A key to Philippine sea skaters (*Halobates*) was provided by ZETTEL (2005).

Regional distribution: Bataan ("Binanga" = Port Binanga, HERRING 1961), Sorsogon (m.e.).

General distribution: Indonesia (from Sulawesi eastwards), Philippines, Papua New Guinea, Solomon Islands (HERRING 1961, ANDERSEN & CHENG 2004).

***Halobates (Halobates) diana*e ZETTEL, 2001**

Halobates peronis HERRING, 1961: 278 (partim).

*Halobates diana*e ZETTEL, 2001: 1097.

Material examined: 1 ♀ (apt, paratype of *Halobates peronis*), Pangasinan, Dagupan, 10.V.1936, leg. R. Abalos (NHMW); 1 ♂, 1 ♀ (apt), Zambales, 1 km S of Infanta, 5.VII.1985, leg. J.T. & D.A. Polhemus (#CL1950) (ZMUC); 1 ♂ (apt, paratype) Zambales, Subic Bay, Triboa Mangrove, 7.XII.2000, leg. H. Zettel (#260); 141 ♂♂ (apt, holo- and paratypes), 45 ♀♀ (apt, paratypes), Camarines Sur, Lagonoy, San Sebastian, 10.II.2001, leg. H. Zettel (#268b) (UPLB, CZW, NHMW, ZMUC, ViSCA, IRRI, BMNH, ZRCS, CPC, CNT, OÖLM); 7 ♂♂, 3 ♀♀ (apt, paratypes), same data except (#268a) (CZW).

Regional distribution: Pangasinan (HERRING 1961; m.e.), Zambales (ZETTEL 2001; m.e.), Camarines Sur (ZETTEL 2001; m.e.).

General distribution: Endemic in the Philippines, with published records from Luzon, Leyte, and Ponson (ZETTEL 2001) and unpublished records from Burias, Masbate, Bantayan, Cebu, Bohol, and Siquijor.

***Halobates (Halobates) esakii* MIYAMOTO, 1967**

Halobates esakii MIYAMOTO, 1967: 241. CHENG et al. 2001: 143; ZETTEL 2005: 412.

Material examined: 3 ♂♂, 1 ♀ (apt), Sorsogon, Pinaculan Island offshore Sorsogon City, 23.I.2000, leg. H. Zettel (#216) (NHMW, UPLB).

Regional distribution: Only known from the single record in Sorsogon (ZETTEL 2005; m.e.).

General distribution: Philippines (ZETTEL 2005), Borneo (MIYAMOTO 1967), Singapore (CHENG et al. 2001), Thailand, Halmahera (Andersen, pers. comm.).

***Halobates (Halobates) germanus* BUCHANAN-WHITE, 1883**

Halobates germanus BUCHANAN-WHITE, 1883: 50; HERRING 1961: 228, 253; CHENG 1989: 360; ANDERSEN & WEIR 1994: 900.

Material examined: None from the Philippines.

Notes: This is an off-shore species, but living more closely to land than *H. micans* (see CHENG 1989).

Regional distribution: HERRING (1961: map 3) locates two records in the South Chinese Sea southwest of Luzon.

General distribution: Indo-West Pacific (HERRING 1961).

***Halobates (Halobates) hayanus* BUCHANAN-WHITE, 1883**

Halobates hayanus BUCHANAN-WHITE, 1883: 52; HERRING 1961: 284; ANDERSEN & WEIR 1994: 893; ANDERSEN & CHENG 2004: 177; ZETTEL 2005: 414.

Material examined: 6♂♂, 7♀♀ (apt), Ilocos Norte, Currimao, sea coast, tidal flat pools, 30.X.2002, leg. H. Zettel (#321c) (NHMW); 2♀♀ (apt), same locality, date, and collector, tidal pools between high rocks, (#321d) (NHMW); 45♂♂, 9♀♀ (apt), Cagayan, Santa Ana, Palau Island, 12.IV.2005, leg. C. V. Pangantihon (#P149) (CZW, USC, UPLB, NHMW).

Notes: ANDERSEN & WEIR (1994) correctly describe the structural differences between *H. hayanus* and *H. calyptus*, ZETTEL (2005) noticed consistent differences in colour. There is considerable variation in *H. hayanus*, even among Philippine populations, which may indicate that the name holds more than one species.

Regional distribution: “Luzon” (ANDERSEN & CHENG 2004); Ilocos Norte (m.e.), Cagayan (m.e.).

General distribution: Indo-West-Pacific Region (HERRING 1961, ANDERSEN & CHENG 2004).

***Halobates (Halobates) maculatus* SCHADOW, 1922**

Halobates maculatus SCHADOW, 1922: 2.

Material examined: 1♂ (apt), Batangas, Mabini, Anilao, 14.IV.2005, leg. C. V. Pangantihon (#P151) (CZW).

Regional distribution: Only one record from Batangas (m.e.).

General distribution: Uncommon in the Philippines, with additional records from Oriental Mindoro and Ticao (ZETTEL 2005); also known from Indonesia (Sulawesi), New Guinea, Bismarck Archipelago, and Solomon Islands (HERRING 1961, ANDERSEN & CHENG 2004).

***Halobates (Halobates) micans* ESCHSCHOLTZ, 1822**

Halobates micans ESCHSCHOLTZ, 1822: 107; HERRING 1961: 227, 246; CHENG 1989: 359; ANDERSEN & WEIR 1994: 895.

Material examined: None from the Philippines.

Notes: This is an open-ocean species that usually lives in considerable distance from land. Individuals near shore or on beaches may be taken occasionally after severe storms (ANDERSEN & WEIR 1994).

Regional distribution: HERRING (1961) locates a record in the South Chinese Sea southwest of Luzon, CHENG (1989) also east of the northeastern coast of Luzon.

General distribution: Circumtropical oceanic (HERRING 1961, CHENG 1989).

***Halobates (Halobates) proavus* BUCHANAN-WHITE, 1883**

Halobates proavus BUCHANAN-WHITE, 1883: 54.

Material examined: 44♂♂, 32♀♀ (apt), Batangas, Mabini, Anilao, 14.IV.2005, leg. C. V. Pangantihon (#P151) (CZW, USC, NHMW, UPLB).

Regional distribution: So far only one record from Batangas (m.e.).

General distribution: Indonesia, Philippines, Nicobar Islands, Solomon Islands (ANDERSEN & CHENG 2004).

***Metrocoris luzonicus* D. POLHEMUS, 1990**

Metrocoris philippinensis DEN BOER, 1965: 29 (partly, misidentification); POLHEMUS & REISEN 1976: 266 (misidentification).

Metrocoris luzonicus D. POLHEMUS, 1990: 15; CHEN & NIESER 1993: 72; POLHEMUS 1998: 261.

Material examined: 1♂ (apt), Ilocos Norte, Carasi, Cura River, 28.X.2002, leg. H. Zettel (#319) (NHMW); 1♂, 1♀ (apt), 1♀ (mapt), same area, Nagoboban Creek, in forest, 28.X.2002, leg. H. Zettel (#319a) (NHMW); 1♂, 3♀♀, Ilocos Sur, Bantay, Taleb, reforestation area, Kayan Creek, 25.X.2002, leg. H. Zettel

Tab. 1: Number of species of the gerromorphan families treated in this study, and numbers of endemics (undescribed species of “*Mesovelia*”, *Xenobates* and *Stenobates* considered as endemic for Philippines, but not for Greater Luzon / Luzon).

Family/Group	n species	n endemic species		
	Total	Philippines	Greater Luzon	Luzon Island
Mesoveliidae	3	1 (33%)	0 (0%)	0 (0%)
Hebridae	12	11 (92%)	7 (58%)	6 (50%)
Hydrometridae	3	0 (0%)	0 (0%)	0 (0%)
Veliidae (all species)	38	33 (87%)	28 (74%)	25 (66%)
Veliidae (without marine species)	31	28 (90%)	25 (81%)	22 (76%)
Gerridae (all species)	29	16 (55%)	7 (24%)	5 (17%)
Gerridae (without marine species)	20	14 (70%)	7 (35%)	5 (25%)
All species confined to stream habitats	52	50 (96%)	40 (77%)	35 (67%)
Gerromorpha (all species)	85	61 (71%)	42 (49%)	36 (42%)

(#313) (NHMW, UPLB); 2 ♂♂, 3 ♀♀ (apt), La Union, Bacnotan, Don Mariano Marcos Memorial State University, Casiaman Falls, 24.X.2002, leg. H. Zettel (#312) (NHMW, UPLB); 1 ♀ (apt), Mountain Province, Chico River, Gonogon, 1100 m a.s.l., 21.X.1999, leg. H. Zettel (#184) (CZW); 1 ♂, 2 ♀♀ (apt), Mountain Province, Sagada, Echo Valley, Underground River, 23–24.II.1999, 1500 m a.s.l., leg. H. Zettel (#186) (NHMW, UPLB); 13 ♂♂, 21 ♀♀ (apt), 1 ♀ (mapt), Mountain Province, S of Sagada, Bagnen, slopes of Mt. Polis, 1600 m a.s.l., 26.II.1999, leg. H. Zettel (#189) (NHMW, UPLB, CPC, MNHN); 4 ♂♂, 7 ♀♀ (apt), 2 ♂♂, 5 ♀♀ (mapt), Benguet, km 7 of Asin Road, W of Baguio, 17.II.1999, leg. H. Zettel (#179) (CZW, UPLB, CPC); 1 ♂, 3 ♀♀ (apt), Nueva Viscaya, Santa Fe, Imugan, stream at Imugan Falls, 1000 m a.s.l., 6.XI.2002, leg. H. Zettel (#325) (NHMW, UPLB); 1 ♂, 3 ♀♀ (apt), Nueva Viscaya, Santa Fe, Malico, small creek, 8.XI.2002, leg. H. Zettel (#332) (NHMW, UPLB); 1 ♀ (apt), Nueva Ecija, Carranglan, Puncan, BDF, VIII.1981, unknown collector (ViSCA); 1 ♀ (apt), Zambales, Zambales Mountains, west side of High Peak, 850 ± 500 m a.s.l., N 15° 26–28', E 120° 03–06', 18.III.2000, leg. L. Dembický (MMBR); 4 ♀♀ (apt), 2 ♂♂ (mapt), Laguna, Los Baños, creek from Dampalit Falls, 7.XI.1992, leg. H. Zettel (#1a) (NHMW); 1 ♂, 1 ♀ (apt), 1 ♀ (mapt), same locality, 15.XI.1993, leg. H. Zettel (#22b) (NHMW, UPLB); 4 ♂♂, 7 ♀♀ (apt), 1 ♂, 1 ♀ (mapt), Laguna, Los Baños, Mt. Makiling, Molawin Creek at College of Forestry, 8.II.1996, leg. H. Zettel (#72) (CZW, UPLB); 3 ♂♂, 1 ♀ (mapt), same area, Mud Springs, 8.II.1996, leg. H. Zettel (#73) (CZW, UPLB); 1 ♀ (apt), same locality, 1.XI.1996, leg. H. Zettel (#88) (NHMW); 1 ♀ (apt), 1 ♂, 1 ♀ (mapt), same locality, 23–24.I.1999, leg. H. Zettel (#167) (CZW); 1 ♀ (apt), same locality, 400–500 m, 19.XI.1995, leg. J. Kodada (NHMW); 1 ♀ (mapt), same area, stream above Mud Springs, 700 m a.s.l., 22.XI.1995, leg. J. Kodada (NHMW); 6 ♀♀ (apt), same area, Flat Rocks, 10.II.1998, leg. H. Zettel (#132) (UPLB, NHMW, CPC); 1 ♀ (apt), same locality, 14.II.1999, leg. H. Zettel (#175) (CZW); 6 ♀♀ (apt), same area, small creek at Mud Springs, 3.XI.2002, leg. H. Zettel (#322) (UPLB, NHMW); 1 ♀ (apt), 1 ♂ (mapt), Quezon, W of Atimonan, Quezon National Park, near Old Zigzag Road, 12.II.1996, leg. H. Zettel (#79b) (CZW); 2 ♂♂, 4 ♀♀ (apt), same area, 13.II.1996, leg. H. Zettel (#79c) (CZW, UPLB); 1 ♀ (mapt), same locality, 16.III.1999, leg. H. Zettel (#202) (NHMW); 2 ♂♂, 3 ♀♀ (apt), 2 ♀♀ (mapt), same locality, 6.IV.2000, leg. H. Zettel (#253) (CZW, UPLB); 1 ♂, 4 ♀♀ (apt), same locality, 27–28.I.2002, leg. H. Zettel (#300) (CZW); 1 ♂ (mapt), Quezon, 30 km E of Lucena City, Quezon National Park, 23.XI.1992, leg. M.A. Jäch (#11) (NHMW); 1 ♀ (apt), Camarines Sur, Mt. Isarog, 500–600 m a.s.l., 11.IV.1963, leg. H.M. Torrevillas (NHMW); 2 ♀♀ (apt), Camarines Sur, 20 km E of Naga, 5 km E of Carolina, Mt. Isarog, Malabsay Falls, 19.II.1998, leg. H. Zettel (#141) (NHMW); 4 ♀♀ (apt), 1 ♀ (mapt), same area, near Malabsay Falls, 4.III.1999, leg. H. Zettel (#192) (NHMW, UPLB).

Regional distribution: Ilocos Norte (m.e.), Ilocos Sur (m.e.); La Union (m.e.), Mountain Province (m.e.), Benguet (m.e.), Nueva Viscaya (m.e.), Nueva Ecija (m.e.), Zambales (m.e.), Manila (DEN BOER 1965), Laguna (POLHEMUS & REISEN 1976, POLHEMUS 1990; m.e.), Quezon (POLHEMUS 1990; m.e.), Camarines Sur (m.e.).

General distribution: Endemic to the biogeographic region Greater Luzon. Besides the Luzon records unpublished specimens from Marinduque became known.

***Ventidius (Ventidius) usingeri* HUNGERFORD & MATSUDA, 1960**

Ventidius (s.str.) *usingeri* HUNGERFORD & MATSUDA, 1960: 326; CHEN & ZETTEL 1999: 150.

Material examined: 1 ♂ (mapt, holotype), Laguna, Los Baños, 17.VII.1936, leg. R.L. Usinger (CNHM); 11 ♂♂, 7 ♀♀ (apt), 2 ♂♂, 2 ♀♀ (mapt), Quezon, W of Atimonan, Quezon National Park, near Old Zigzag Road, 12.II.1996, leg. H. Zettel (#79b) (CZW, CPC, UPLB); 1 ♂, 1 ♀ (apt), same locality, 27–28.I.2002, leg. H. Zettel (#300) (CZW); 1 ♂ 7 ♀♀ (apt), Quezon, Quezon National Park, 10.VII.1985, leg. J.T. & D.A. Polhemus (#CL1969) (JTPC, NHMW); 1 ♂, 1 ♀ (apt), 1 ♂, 1 ♀ (mapt), Quezon, Quezon National Park, Nalubog Creek, 10.VII.1985, leg. J.T. & D.A. Polhemus (#CL1971) (JTPC).

Regional distribution: Laguna (HUNGERFORD & MATSUDA 1960, CHEN & ZETTEL 1999; m.e.), Quezon (CHEN & ZETTEL 1999; m.e.).

General distribution: Endemic to the Philippines and recorded from the islands of Luzon and Mindanao (HUNGERFORD & MATSUDA 1960, CHEN & ZETTEL 1999; m.e.); in addition one unpublished record from Samar.

Discussion

Diversity and taxonomy: The diversity of the Gerromorpha of Luzon is relatively well known. On the family level only the marine Hermatobatidae (coral treaders; genus *Hermatobates* CARPENTER, 1892) can be expected to be discovered along the shores of Luzon in the future. Other genera known from nearby islands are the hygropetric mesoveeliid *Phrynovelia* HORVÁTH, 1915 (recorded from Polillo; see ZETTEL 2004c) and the marine gerrid *Pseudohalobates* POLHEMUS & POLHEMUS, 1996 (recorded from the coast of Ticao; unpublished data). There is still a considerable number of species to be described, especially in the genera *Hebrus* and *Microvelia*, but also in *Rhagovelia*.

Endemism: The rates of endemic species are shown in Table 1. Endemic subspecies were not considered. Endemism rates would be distinctly higher if estimates of undescribed species – which usually have only small areas of distribution – were included. CATIBOG-SINHA & HEANEY (2006) report an estimated rate of endemism of 70% for described Philippine insects. The figure for Luzon's Gerromorpha (71%) seems to fit fairly well. However, it must be considered that the number is much higher for all Philippine Gerromorpha (appr. 90%), because many further endemic species, but only a few additional non-endemic species are recorded from other islands. Moreover, the percentage of marine species is much higher in Gerromorpha than in other insects. Table 1 shows that the percentage of Luzon-endemic species increases considerably in Veliidae (from 66 to 76%) and Gerridae (from 17 to 25%), if marine species are excluded. The rate of endemism is extremely high (96% Philippine endemics, 67% Luzon endemics) for Gerromorpha species living in streams and rivers or in habitats in their close vicinity (e.g., mossy rocks or puddles on their banks), whereas species of open-land freshwaters (lakes, paddy fields etc.) and marine environments are often widespread.

Regional endemism on Luzon: Luzon is composed of several biogeographical subregions (see ONG et al. 2002, CATIBOG-SINHA & HEANEY 2006). This fact is also reflected by the distribution of gerromorphan species, even under consideration that the distribution of some species (chiefly in *Hebrus*, *Microvelia*, and *Haloveloides*) is not well studied. As shown in this catalogue, there is a good number of locally endemic species. There are, firstly, species living at high elevations that are restricted to certain mountain ranges (e.g., in *Pseudovelia* and *Rhagovelia*). Secondly, concerning low-land species there

is a distinct difference between the faunas of the most-southern part (Bicol Region) and the northern plus central parts of Luzon expressed by allopatry of closely related species.

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