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Review of the *Rhagovelia agilis* species complex (Hemiptera: Heteroptera: Veliidae), with descriptions of seven new species

Herbert Zettel & Alice Laciny

Abstract

The *Rhagovelia agilis* species complex of the *R. papuensis* group is endemic to the Philippines. Three species were previously described: *Rhagovelia agilis* Polhemus, 1976 from Luzon, *Rhagovelia ingleae* Zettel, 2012 from Sibuyan, and *Rhagovelia rufescens* Zettel, 2012 from Tablas. The following seven species are described as new: *Rhagovelia agiloides* sp.n. from Catanduanes and South Luzon, *R. antiqua* sp.n. from Panay, *R. isarogensis* sp.n. from South Luzon, *R. mambucalensis* sp.n. from Negros, *R. samarensis* sp.n. from Samar, *R. satoi* sp.n. from Negros, and *R. victorgapudi* sp.n. from Leyte. Specimens from the north-eastern part of Luzon and from Mindoro are noted but presently insufficiently represented for species descriptions. The species complex is absent from the Palawan region and possibly also from Mindanao. A table lists all hitherto described *Rhagovelia* species from the Philippines.

Keywords. Rhagoveliinae, taxonomy, new species description, *Rhagovelia agilis*, island endemism.

Zusammenfassung

Der Artenkomplex um *Rhagovelia agilis* Polhemus, 1976 (in der *R. papuensis*-Gruppe) ist endemisch auf den Philippinen verbreitet. Drei Arten wurden bisher beschrieben: *Rhagovelia agilis* Polhemus, 1976 von Luzon, *Rhagovelia ingleae* Zettel, 2012 von Sibuyan und *Rhagovelia rufescens* Zettel, 2012 von Tablas. Die folgenden sieben Arten werden neu beschrieben: *Rhagovelia agiloides* sp.n. von Catanduanes und Südluzon, *R. antiqua* sp.n. von Panay, *R. isarogensis* sp.n. von Südluzon, *R. mambucalensis* sp.n. von Negros, *R. samarensis* sp.n. von Samar, *R. satoi* sp.n. von Negros und *R. victorgapudi* sp.n. von Leyte. Exemplare vom nordöstlichen Teil Luzons und von Mindoro werden angeführt, sind aber derzeit für Artbeschreibungen unzureichend repräsentiert. Der Artenkomplex fehlt in der Palawan Region und möglicherweise auch auf Mindanao. Eine Tabelle listet alle bisher beschriebenen *Rhagovelia*-Arten von den Philippinen auf.

Introduction

Traditionally, *Rhagovelia* Mayr, 1865, *Tetraripis* Lundblad, 1933 and the monotypic genus *Chenevelia* Zettel, 1996 form the subfamily Rhagoveliinae of the family Veliidae. While the latter two are restricted to South and Southeast Asia, *Rhagovelia* has a circumtropical distribution and is – with approximately 400 described species – the most speciose genus of Gerromorpha, the semi-aquatic bugs (Polhemus & Polhemus 2008). However, molecular data suggest a polyphyly of the Veliidae (Armisén et al. 2022), which means that Rhagoveliinae should be raised to family level in the future, possibly including some

Neotropical genera that are presently placed in the subfamily Veliinae. *Rhagovelia* shows its highest diversity in South America and in Southeast Asia. With 67 described species (including the seven new species in this paper; see Table 1 in Appendix), the Philippines are a hotspot of diversity.

Polhemus & Polhemus (1988) defined the *Rhagovelia papuensis* species group and included 21 species distributed from Sri Lanka to New Guinea and Australia (five from the Philippines). Distinguishing invariable characters like the extended pronotal lobe of the wingless morph, the strongly developed forewing venation, and strongly enlarged hind femora of the males are similarly found in various *Rhagovelia* species from Madagascar and the Americas, too. As probably all three characters are plesiomorphic character states within the genus, the relationships of species from different continents are dubious. Another, probably also plesiomorphic character is that winged species never break off their wings, as frequently observed in other clades (e.g., *R. orientalis* group, *R. sarawakensis* group).

The Philippine species of the *Rhagovelia papuensis* species group were studied by Zettel (1996) who recognized four species subgroups ("Untergruppen") and revised two of them (*R. luzonica* and *R. kawakamii* subgroups). Contributions to the *R. cotabatoensis* subgroup were published more recently (e.g., Zettel et al. 2020, Pangantihon & Zettel 2023, Zettel & Laciny 2023), but a few species still remain to be described.

Hitherto, the *Rhagovelia agilis* species complex has remained unrevised, although descriptions of two species were added by Zettel (2012). It is restricted to the Philippines excluding the southwestern islands (Palawan region) and possibly also Mindanao. So far, the following species have been described: *Rhagovelia agilis* Polhemus, 1976 from Central Luzon, *Rhagovelia ingleae* Zettel, 2012, and *Rhagovelia rufescens* Zettel, 2012 from Tablas (Polhemus & Reisen 1976, Zettel 2012). In this study we add seven new species from the islands of Catanduanes, Leyte, Luzon, Negros, Panay, and Samar.

Material and methods

Repositories of specimens.

ADMU	Ateneo de Manila University, Biodiversity Laboratory, School of Science & Engineering, Quezon City, Philippines
BMNH	The Natural History Museum, London, United Kingdom
NHMW	Natural History Museum Vienna, Austria
NMPC	National Museum in Prague, Czech Republic
PNMNH	Philippine National Museum of Natural History, Manila, Philippines
UPLB	Museum of Natural History, University of the Philippines, Los Baños, Laguna, Philippines
USNM	Smithsonian National Museum of Natural History, Washington D.C., U.S.A. (including Carl J. Drake Collection and John T. Polhemus Collection)
ZCVA	Herbert Zettel Collection, Vienna, Austria
ZRC	Zoological Reference Collection, Lee Kong Chian Natural History Museum, National University of Singapore
ZSM	Zoological State Collection, Munich, Germany

Methods. Insects were examined with a Leica Wild M10 binocular microscope (max. 128× magnification). Parameres were studied under an Olympus BX40 compound microscope. Drawings were made with the help of a camera lucida attached to these microscopes.

Stacked digital images exemplarily show some species, primarily to help recognize the species group. They were taken with a Leica DFC490 camera attached to a Leica Z16APO optics carrier, using Leica Application Suite V3.8. Images were stacked with ZereneStacker 64-bit and processed with Adobe Photoshop 7.0.

Measurements of holotypes were performed with a Nikon SMZ1500 binocular microscope at magnifications from 51.2× to 256× and are given in millimetres. Measurements of paratypes were performed with a Leica Wild M10 binocular microscope at magnifications of 20× (body length) and 80× (head width, pronotal width). They refer to the maximum length or width of the respective structure (except teeth not included in metafemur width). Measurements of the body were taken in dorsal view of specimens, except body lengths of winged specimens, which were measured in lateral view excluding wings.

The descriptions are restricted to characters which are of some use to recognize the species.

Terminology largely follows Polhemus & Polhemus (1988) and subsequent publications on taxonomy of Oriental *Rhagovelia* (e.g., Zettel 1996, 2012, Nieser et al. 1997, Zettel et al. 2020, Zettel & Laciny 2023).

Taxonomy

The *Rhagovelia agilis* species complex

Diagnosis. Body length 2.9–4.3 mm. Body shape stout in both sexes. Examples of habitus (apterous morph) see Figs 1–4. Colour orange-reddish to brown; blackish usually at metanotum, mediotergites, and medial parts of laterotergites, in some species with variable pair of patches on pronotal lobe; tarsi black. Legs predominantly of light colour, in most species only with black patches on metafemora, rarely more strongly infuscated (in *R. isarogensis* sp.n. and *R. mambucalensis* sp.n.). Proepisternum and jugum without black spicules (a few spicules might be observed in some individuals of *R. agilis*). – Male. Hind legs polymorphous (e.g., Figs 15–18) or rather dimorphous (e.g., in *R. agilis* and *R. satoi* sp.n.), with strongly and moderately incrassate metafemora. Metafemora with several usually irregular rows of teeth; their base without strictly straight row of granules. Metatibia slightly S-curved and with strong tooth in distal half in large specimens, almost straight in small specimens (never evenly curved). Mediotergite 7 with shiny area. Genitalia small. Parameres of uniform structure, i.e. short and curved or angled dorsad; their distal part species-specific; apex acute, rounded or truncated. – Female. Abdomen broad, also in apterous morph simple. Sterna never folded dorsally or strongly converging. Connexival margins always distant from each other over entire length. Mediotergite 7 short, about as long as broad. Mediotergite 8 shorter than mediotergite 8, not or hardly curved ventrad. Laterotergites with simple, uniform pilosity. Large gonocoxae and the small, elongated proctiger well visible, not retracted.

Notes. Zettel (1996) provided a key to the four species complexes (subgroups) of the *R. papuensis* group. Important characters of the *R. agilis* species complex are the lack of spiculae on proepisternum and, in males, a strongly incrassate metafemur, a more or less S-curved (never evenly curved) metatibia, and – most characteristic – a small, upcurved paramere (Figs 5–14). There is often a strong variation of the size of males which is

Fig. 1. Habitus of *Rhagovelia agiloides* sp.n., apterous male. © NHMW Hemiptera Image Collection / Alice Laciny.

unknown in most species of other clades and results in a polymorphism of hind legs: Large males possess extremely enlarged femora and S-curved tibiae bearing a distinct tooth at distal third to two-fifths of length (e.g., Zettel 2012: figs 28, 30; Figs 15, 18); small males have relatively slender femora and almost straight, toothless tibiae (e.g., Figs 17, 18). In large series of conspecific specimens, it can be shown that there are intermediate forms. Females have less variation in size and armature of hind legs. Their metafemur possesses two moderately long teeth, each followed by a few short teeth (e.g., Zettel 2012: figs 29, 31; Figs 19, 20); their abdomen is always simple. The species are of brownish to reddish base colour, with dark mediotergites and pronotal lobes, rarely with more extended black marks (examples see Figs 1–4, or Zettel 2012: figs 5–8) as compared to most species of clades represented in the Philippines.

Species identification. Whereas recognition of the *R. agilis* species complex is relatively simple, species discrimination is difficult, and hardly possible for females. Therefore, collecting samples without males should be avoided. This is usually no problem, because *Rhagovelia* species live in groups or swarms.

The only very reliable differences between species are found in the parameres of males (Figs 5–14). For their examination, the genital capsule should be pulled out or dissected

Fig. 2. Habitus of *Rhagovelia antiqua* sp.n., apterous male. © NHMW Hemiptera Image Collection / Alice Laciny.

from segment 8 and the left paramere should be turned laterally for comparison with figures (parameres are symmetrical but figures show the left paramere). Examination of parameres in situ is often misleading, if the apex is not properly visible.

Although there are obviously differences in size range and dorsal colour patterns, such external characters are variable to some extent. For species which are only known in a few specimens or from a single locality, these characters should be confirmed, if larger series become available.

As far as known today, the distributional ranges of species do not overlap (Fig. 21).

E c o l o g y. Except for some rather anecdotical notes, little is known on the ecology of *Rhagovelia* species. According to the observations of the first author, species of the *R. agilis* complex inhabit rather fast running, permanent streams, usually in forested uphill areas. Winged specimens are rare in most populations, in some species even unknown. This is

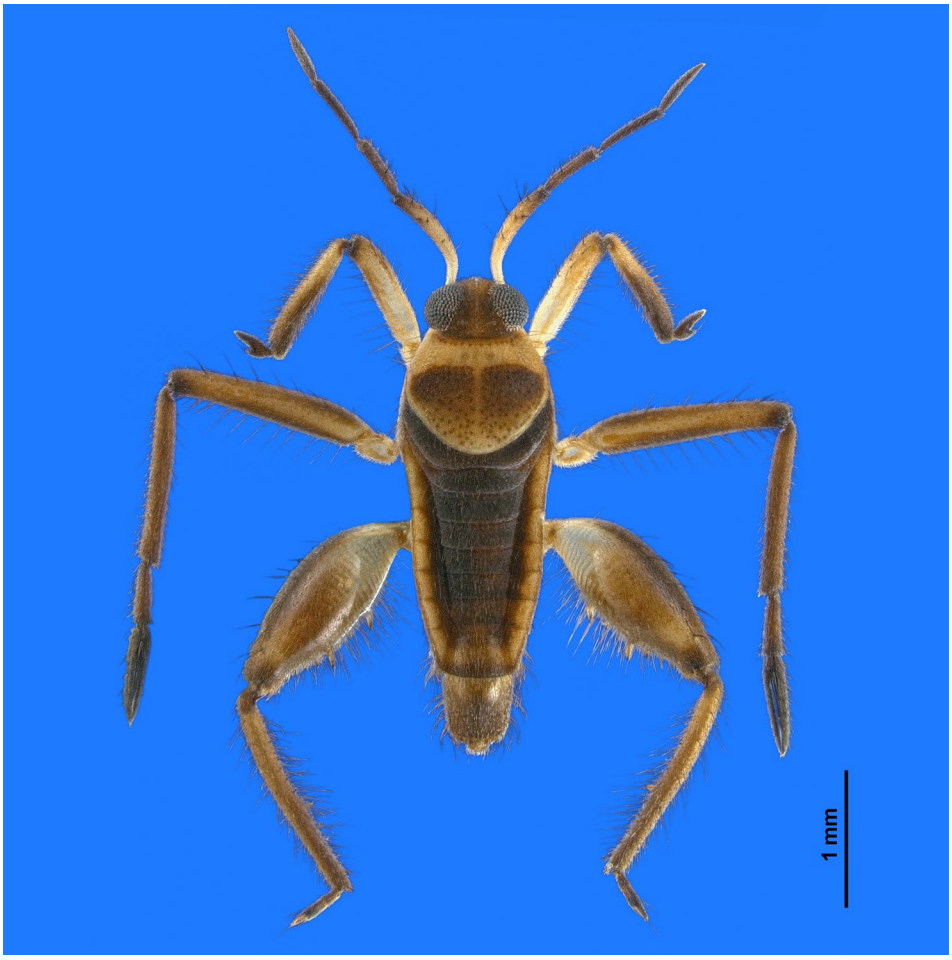


Fig. 3. Habitus of *Rhagovelia victorgapudi* sp.n., apterous male. © NHMW Hemiptera Image Collection / Harald Bruckner.

in some contrast to the species of the more common *R. luzonica* subgroup, which seem to prefer slowly flowing to almost stagnant zones of streams and are more frequently winged.

Treatment of new species

Rhagovelia agiloides **sp.n.** (Figs 1, 5, 21)

Etymology. This species is named for its high similarity with *R. agilis*.

Type locality. Catanduanes Island, San Miguel, S of Summit, N of site "Narsari", ca N 13°45′, E 124°16′, ca. 80 m a.s.l.

Type material. Holotypus (apterous male, PNMNH), labelled "Philippinen: Catanduanes\ S of Summit, N Narsari\ 9.3.1999, small creek\ leg. H. Zettel (198)". Paratypes (all apterous if

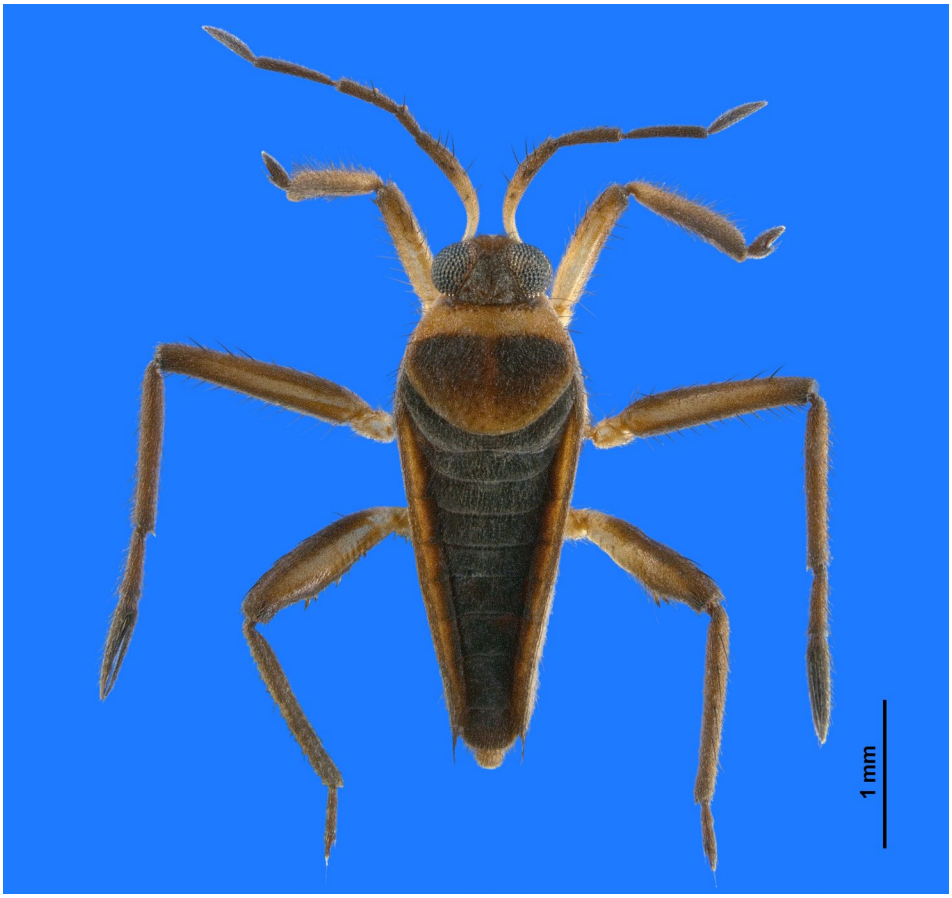
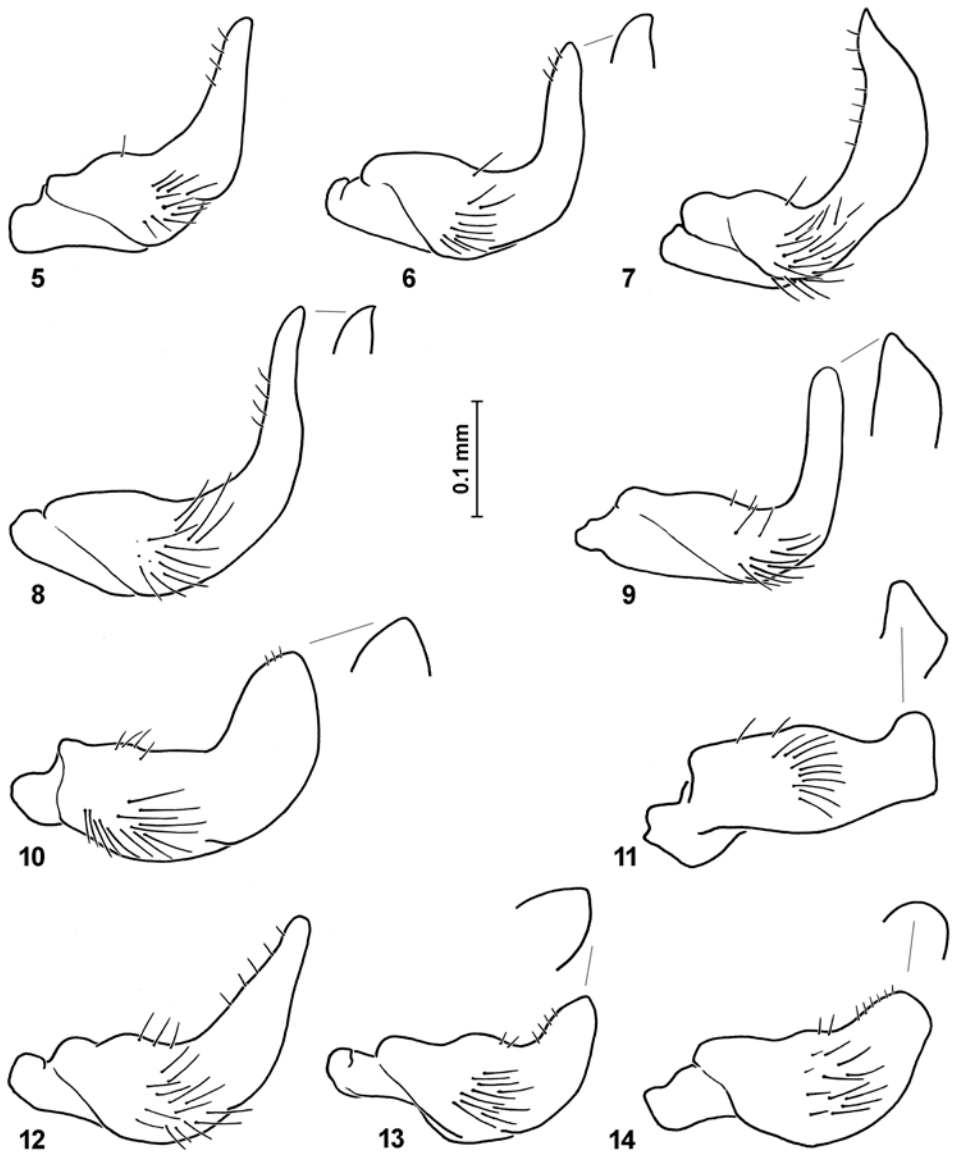


Fig. 4. Habitus of *Rhagovelia victorgapudi* sp.n., apterous female. © NHMW Hemiptera Image Collection / Harald Bruckner.

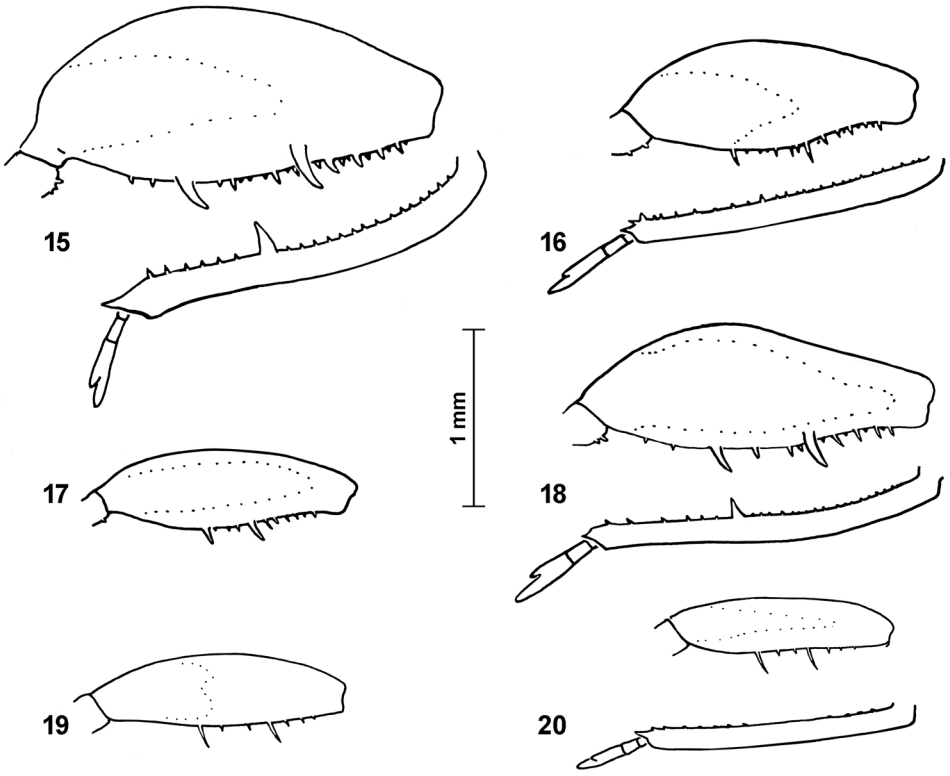
not mentioned otherwise; ADMU, NHMW, NMPC, UPLB, ZCVA). 18 ♂♂, 40 ♀♀, and 2 ♀♀ (macropterous), same label data (#198); 2 ♂♂, 5 ♀♀ from Catanduanes, W of Bato, Maribini Falls, 6.III.1999, leg. H. Zettel (#194); 1 ♂, 3 ♀♀ from Catanduanes, N of Bato, S of San Miguel, Balongbong Falls, 7.III.1999, leg. H. Zettel (#195); 1 ♂, 1 ♀ from Catanduanes, E of San Andres, 11–12.III.1999, leg. H. Zettel (#200); 4 ♂♂, 6 ♀♀ from Catanduanes, E of San Andres, below Lu Yong Cave, 12.IV.2000, leg. H. Zettel (#254); 3 ♂♂, 2 ♀♀ from Luzon, Camarines Sur Province, Lagonoy, Buenavista, Parogcan, 10.II.2001, leg. H. Zettel (#267b).

Diagnosis and comparative notes. The paramere shape (Fig. 5) is characteristic, although similar to other species from Luzon, *R. isarogensis* sp.n. and *R. agilis*; when studying the parameres, an identical orientation is necessary for comparing the apices (view as in Figs 5, 7, 12). According to present data, the three species occur parapatrically (Fig. 15). *Rhagovelia agiloides* sp.n. is almost always smaller than *R. isarogensis* sp.n., and its colour is paler, similar to most specimens of *R. agilis*.

Description. Measurements of holotype. Body length 3.50; maximum body width (at metapleura) 1.23. Head length 0.48, width 0.78; minimum eye distance 0.18. Pronotum



Figs 5–14. Parameres of the described species of the *R. agilis* species complex. (5) *Rhagovelia agiloides* sp.n.; (6) *R. antiqua* sp.n.; (7) *R. isarogensis* sp.n.; (8) *R. mambucalensis* sp.n.; (9) *R. samarensis* sp.n.; (10) *R. satoi* sp.n.; (11) *R. victorgapudi* sp.n.; (12) *R. agilis*; (13) *R. ingleae*; (14) *R. rufescens.*



Figs 15–20. Intraspecific variability of hind legs (or metafemora) using the example of *Rhagovelia isarogensis* sp.n., paratypes, pilosity omitted. (15) Large apterous male; (16) small apterous male; (17) small macropterous male; (18) large macropterous male; (19) apterous female; (20) macropterous female.

length 0.94, width 1.09. Lengths of antennomeres, I 0.90, II 0.50, III 0.54, IV 0.49. Lengths of leg segments: profemur 0.94, protibia 1.09, protarsus 0.05 + 0.03 + 0.28, mesofemur 1.59, mesotibia 1.31, mesotarsus 0.10 + 0.41 + 0.72, metafemur 1.91, metatibia 1.88, metatarsus 0.06 + 0.11 + 0.36.

Measurements of apterous paratypes (10 ♂♂, 10 ♀♀). Body length, male 3.2–3.7, female 3.2–3.6. Head width, male 0.73–0.81, female 0.75–0.81. Pronotum width, male 0.99–1.14, female 1.04–1.16. Measurements of macropterous paratypes (2 ♀♀). Body length 3.6. Head width 0.76–0.78. Pronotum width 1.48–1.50.

Colour of apterous specimens comparatively pale (example in Fig. 1), usually without deeply black parts except antennomeres 2–4 and tarsi. Other body parts yellowish to medium or dark brown, darkest are usually disk of pronotal lobe and mediotergites. A few specimens (mostly females) with blackish mediotergites also known.

Macropterous morph with pronotal lobe brown, anteriorly with yellow midline. Forewing black, with whitish streak.

Structures of male. Metafemur of apterous morph strongly variable, ca. 2.3–3.4 times as long as maximum width (excluding teeth), but in most cases stout. Dentition on flexor side rich and very variable; basal one of the two longest teeth at flexor side, distal one usually moved backwards. Metatibia in most specimens with (sometimes long) tooth at three fifths of length and then distinctly S-curved; in some small specimens toothless and straight.

Segment 8 and genitalia of normal size. Paramere (Fig. 5) curved from broad base to distal part, on other side of curve with a slight angle; both of similar length; distal part narrower than base, basally more suddenly constricted (compared with *R. agilis*) and very slender; apex almost pointed.

Structures of female. Metafemur moderately stout, ca. 3.1–3.4 times as long as maximum width (excluding teeth), with two long teeth, each followed by a few (usually 3–4) short teeth. Abdomen of apterous morph stout, side margins posteriorly straight to weakly convex. Mediotergite 7 at least slightly wider at anterior margin than long. Connexival corner slightly triangularly protruded and with small tuft of long black setae.

Distribution (Fig. 21). Only known from the island of Catanduanes and one near locality on Luzon.

Rhagovelia antiqua sp.n. (Figs 2, 6, 21)

Etymology. The name refers to the province of origin, Antique. Used as a noun in apposition.

Type locality. Panay Island, Antique Province, Libertad, ca. N 11°47′, E 121°55′.

Type material. Holotypus (apterous male, PNMNH), labelled "PHILIPPINEN: N Panay/ Antique, Libertad/ 21.-22.I.1994/ leg. Seyfert & Graindl". Paratypes (all apterous, NHMW). 6 ♂♂, 4 ♀♀, same label data.

Diagnosis. A small species (largest male only 3.4 mm long, but with extremely thickened metafemora). Colour strongly variable, but in most specimens with extended black pattern. Paramere of characteristic shape (Fig. 6).

Description. Measurements of holotype. Body length 3.25; maximum body width (at metapleura) 1.13. Head length 0.45, width 0.75; minimum eye distance 0.17. Pronotum length 0.88, width 1.03. Lengths of antennomeres, I 0.83, II 0.49, III 0.59, IV 0.50. Lengths of leg segments: profemur 0.94, protibia 1.00, protarsus 0.03 + 0.04 + 0.23, mesofemur 1.56, mesotibia 1.34, mesotarsus 0.07 + 0.41 + 0.69, metafemur 1.69, metatibia 1.66, metatarsus 0.07 + 0.13 + 0.33.

Measurements of apterous paratypes (5 ♂♂, 3 ♀♀). Body length, male 2.9–3.4, female 3.0–3.2. Head width, male 0.72–0.80, female 0.70–0.74. Pronotum width, male 0.97–1.15, female 1.00–1.07.

Colour. A variably coloured species (a light specimen is shown in Fig. 2), but most specimens (all females) rather dark, with blackish mediotergites and medial halves of laterotergites, and disk of pronotal lobe usually infuscated. In two paler males base colour rather reddish than yellowish.

Structures of male. Metafemur strongly variable, ca. 2.2–3.0 times as long as maximum width (excluding teeth). Dentition on flexor side variable; always two teeth distinctly longer than others, distal one moved backwards in large specimens (Fig. 2). Metatibia in large specimens with tooth at three fifths of length and then distinctly S-curved, in small specimens toothless and straight.

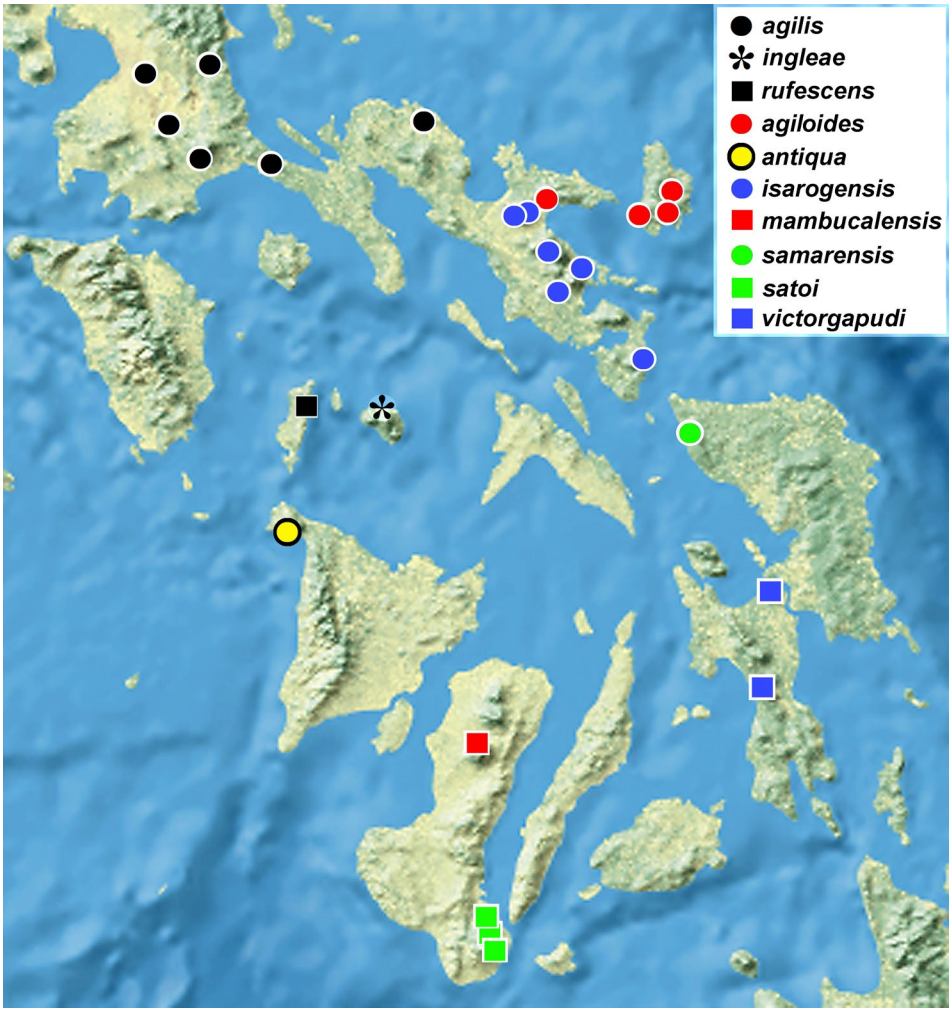


Fig. 21. Map of the central Philippines with all records of described species of the *R. agilis* species complex. Made with Natural Earth, free vector and raster map data. © naturalearthdata.com

Segment 8 and genitalia of normal size. Paramere (Fig. 6) strongly curved and distal part twisted. Distal part appearing very narrow, almost needle-shaped in lateral view of paramere, but strap-shaped, with narrowly rounded apex in perpendicular view.

Structures of female. Metafemur rather slender, with two long teeth on flexor side, each followed by usually 3 much shorter teeth. Abdomen of simple, rather stout shape in dorsal view, without concavity of sides posteriorly. Mediotergite 7 anteriorly slightly wider than long. Tuft of setae at connexival corners inconspicuous.

Distribution (Fig. 21). Only known from the north-western part of Panay Island.

Rhagovelia isarogensis **sp.n.** (Figs 7, 15–21)

Etymology. This species is named for the type locality, Mount Isarog.

Type locality. Camarines Sur Province, 20 km E of Naga, 5 km E of Carolina, Mount Isarog, near Malabsay Falls, N 13°39.7′, E 123°20.1′, ca. 500 m a.s.l.

Type material. Holotypus (apterous male, PNMNH), labelled "Philippinen: Camarines Sur\ 20 km E Naga, 5 km E Carolina\ Mt. Isarog, nr. Malabsay Falls\ 4.3.1999, leg. Zettel (192)". Paratypes (apterous, if not mentioned otherwise; ADMU, NHMW, UPLB, ZCVA). 18 ♂♂, 14 ♀♀, and 1 ♂, 2 ♀♀ macropterous, same label data (#192); 2 ♂♂, 1 ♀ from Luzon, Camarines Sur Province, Pili, Buncao, Himaao Creek, 1.II.2002, leg. H. Zettel (#302); 6 ♂♂, 4 ♀♀, and 1 ♂, 1 ♀ macropterous, from Luzon, Camarines Sur Province, Lake Buhi area, Twin Falls near Itbog, 22.III.1998, leg. H. Zettel (#164); 3 ♂♂, 3 ♀♀ from Luzon, Albay Province, Guinobatan, Masarawag, 4.VII., leg. C. V. Pangantihon (#PX38); 1 ♂, 4 ♀♀ from Luzon, Albay Province, 40 km N Legaspi, 1 km W Malilipot, Busai Falls, 23.II.1998, leg. H. Zettel (#143); 26 ♂♂, 40 ♀♀, and 2 ♂♂ macropterous, from Luzon, Sorsogon, Bulusan, San Roque, Palog Toc [labelled "Palok Tok"] Falls, 26.II.1998, leg. H. Zettel (#147).

Diagnosis and comparative notes. The paramere of the male has a characteristic shape (Fig. 7), although it is similar to parameres of the other two species from Luzon, *R. agilis* and *R. agiloides* sp.n. The distal part of the paramere is distinctly broader and more regularly curved than in these two species. *Rhagovelia isarogensis* sp.n. is relatively large and dark. In apterous specimens the pronotal lobe is anteriorly black and strongly contrasting with the yellow anterior part of the pronotum. Only the most posterior part of the pronotal lobe is usually pale brown. The mediotergites and the medial half of the laterotergites are also black or dark brown.

Description. Measurements of holotype. Body length 3.88; maximum body width (at metapleura) 1.34. Head length 0.50, width 0.84; minimum eye distance 0.18. Pronotum length 1.00, width 1.25. Lengths of antennomeres, I 0.99, II 0.56, III 0.67, IV 0.53. Lengths of leg segments: profemur 1.09, protibia 1.19, protarsus 0.03 + 0.04 + 0.30, mesofemur 1.88, mesotibia 1.66, mesotarsus 0.11 + 0.53 + 0.78, metafemur 2.13, metatibia 2.13, metatarsus 0.07 + 0.13 + 0.43.

Measurements of apterous paratypes (10 ♂♂, 10 ♀♀). Body length, male 3.6–4.3, female 3.5–3.9. Head width, male 0.81–0.88, female 0.77–0.86. Pronotum width, male 1.12–1.24, female 1.12–1.23. Measurements of macropterous paratypes (3 ♂♂, 2 ♀♀). Body length, male 3.8–4.2, female 3.7–4.0. Head width, male 0.81–0.84, female 0.80–0.81. Pronotum width, male 1.57–1.70, female 1.51–1.56.

Colour. A rather dark coloured species. In apterous morph, disk of pronotal lobe dark brown to blackish, anteriorly strongly contrasting with yellow pronotum; posterior margin of pronotal disk narrowly yellowish to pale brown, mediotergites and median parts of laterotergites blackish. Femora and tibiae distinctly infuscated. In macropterous morph pronotal lobe medium brown. Forewing black with whitish stripe at base.

Structures of male. Metafemur very variable (Figs 15–18), ca. 2.5–3.1 times as long as maximum width (excluding teeth). Metatibia in large specimens slightly S-curved, with large tooth at three fifths of length, straight and toothless in small specimens.

Genitalia of normal size. Paramere (Fig. 7) strongly curved; base relatively long; distal part very broad, from base to acute apex evenly narrowed.

Structures of female. Metafemur (Figs 19, 20) with two long teeth, each followed by a few (1–4) short teeth, in apterous morph ca. 3.8–4.1 times long as maximum width (excluding

teeth). Mediotergite 7 as long as wide at anterior margin or minimally wider. Connexival corner hardly protruded and apically with a few thin, black setae.

Distribution (Fig. 21). Known from the provinces Camarines Sur, Albay, and Sorsogon in southern Luzon (Bicol Region).

Rhagovelia mambucalensis sp.n. (Figs 8, 21)

Etymology. This species is named for the type locality, Mambucal.

Type locality. Negros Island, Negros Occidental Province, township of Mambukal (alternatively spelled as "Mambucal"), Mount Canlaon area, Seven Falls, ca. N 10°30.5′, E 123°06.5′, ca. 400 m a.s.l.

Type material. Holotype (apterous male, PNMNH), labelled "PHILIPPINEN: Negros/ Mambucal, Mt. Canlaon/ Seven Falls, 13.2.1994/ leg. Seyfert & Graindl". Paratypes (all apterous, NHMW). 1 ♂, 3 ♀♀, same label data.

Diagnosis and comparative notes. Dark species; pronotum anteriorly with lateral stripes, disk widely black; legs strongly infuscated. The two species inhabiting Negros, *R. mambucalensis* sp.n. and *R. satoi* sp.n. can be easily distinguished by the shape of the paramere (compare Figs 8 and 10); the paramere resembles that of *R. antiqua* sp.n. from Panay, but the apex is narrower. The two males of the type series of *R. mambucalensis* sp.n. differ strongly in size and armature of the hind leg.

Description. Size (apterous morph). Measurements of holotype. Body length 3.50; maximum body width (at metapleura) 1.19. Head length 0.50, width 0.81; minimum eye distance 0.17. Pronotum length 0.88, width 1.09. Lengths of antennomeres, I 0.87, II 0.49, III n.a., IV n.a. Lengths of leg segments: profemur 1.06, protibia 1.13, protarsus 0.03 + 0.03 + 0.30, mesofemur 1.66, mesotibia 1.34, mesotarsus 0.08 + 0.47 + 0.72, metafemur 1.56, metatibia 1.66, metatarsus 0.09 + 0.14 + 0.38.

Measurements of apterous paratypes (1 ♂, 3 ♀♀). Body length, male 4.3, female 3.3–3.7. Head width, male 0.89, female 0.77–0.81. Pronotum width, male 1.33, female 1.01–1.19.

Colour. The darkest coloured species of the group. Pronotal lobe almost completely black (except narrow margins), and with blackish stripes reaching forward almost to anterior margin of pronotum (indistinct in one female); mediotergites and medial parts of laterotergites black; femora and tibiae strongly infuscated.

Structures of male. In paratype, metafemur 2.4 times as long as maximum width (excluding teeth) and metatibia slightly S-curved, with tooth at three fifths of length. Distal long tooth of metafemur slightly shifted backwards. In holotype, metafemur 3.1 times as long as maximum width (excluding teeth) and metatibia straight and without long tooth.

Genitalia of normal size. Paramere (Fig. 8) strongly curved, distal part strongly narrowed towards apex; apex very slender, slightly S-curved, and sharply pointed.

Structures of female. Metafemur with two long teeth, each followed by a few (1–3) short teeth. Mediotergite 7 as long as wide at anterior margin or minimally wider. Connexival corner slightly protruded and apically with a few black setae.

Distribution (Fig. 21). Only known from the Mount Canlaon area in the north of Negros Island.

Rhagovelia samarensis **sp.n.** (Figs 9, 21)

Etymology. This species is named after the island of origin, Samar.

Type locality. Samar Island, Northern Samar Province, municipality of San Isidro, Veriato, El Amigo, Veriato Falls, ca N 12°17′, E 124°25′, ca. 400 m a.s.l.

Type material. Holotypus (apterous male, PNMNH), labelled "Philippinen: N. Samar/ Veriato, El Amigo/ Veriato Falls, 25.1.2000/ leg. H. Zettel (217)". Paratypes (all apterous) (NHMW, UPLB). 11 ♂♂, 10 ♀♀, same label data (#217).

Diagnosis and comparative notes. Segment 8 and genitalia of males are proportionally large. The paramere is of characteristic shape (Fig. 9), distal part comparatively short, apex triangular and pointed. In females the edge of connexiva posteriorly show a light sinuosity and the setae at connexival corner are relatively long. The body colour is generally light, without black; laterotergites and dark parts of pronotal lobe and mediotergites vary from light to dark brown.

Based on a single sample, the full variability of *R. samarensis* sp.n. probably cannot be depicted yet. Judging from the development of hind leg armature, the largest males of this species do not seem to be available. Only the four largest male paratypes possess a distinct tooth on their metatibia, which is only slightly S-curved.

Description. Measurements of holotype. Body length 3.38; maximum body width (at metapleura) 1.19. Head length 0.44, width 0.75; minimum eye distance 0.19. Pronotum length 0.88, width 1.06. Lengths of antennomeres, I 0.85, II 0.46, III 0.54, IV 0.47. Lengths of leg segments: profemur 0.97, protibia 1.06, protarsus 0.03 + 0.05 + 0.30, mesofemur 1.63, mesotibia 1.34, mesotarsus 0.09 + 0.44 + 0.72, metafemur 1.72, metatibia 1.66, metatarsus 0.08 + 0.11 + 0.36.

Measurements of apterous paratypes (10 ♂♂, 10 ♀♀). Body length, male 3.3–3.8, female 3.2–3.6. Head width, male 0.76–0.81, female 0.76–0.81. Pronotum width, male 1.09–1.18, female 1.07–1.19.

Colour comparatively pale, without deeply black parts except antennomeres 2–4 and tarsi. Other body parts yellowish to medium or dark brown, darkest are usually disk of pronotal lobe and mediotergites.

Structures of male. Metafemur very variable, ca. 2.4–2.8 times as long as maximum width (excluding teeth). Metatibia straight or slightly S-curved, with tooth at three fifths of length in large specimens, but toothless in most specimens.

Segment 8 and genitalia comparatively large. Paramere (Fig. 9) broad and almost evenly curved, the hardly separated, upcurved distal part much shorter than the basal part and of triangular shape; apex acute.

Structures of female. Metafemur with two long teeth, each followed by a few (usually 1–4) short teeth. Mediotergite 7 as long as wide at anterior margin or minimally longer. Connexival corner slightly protruded and with conspicuous tuft of long black setae.

Distribution (Fig. 21). So far only recorded from the type locality in the north of Samar Island.

Rhagovelia satoi **sp.n.** (Figs 10, 21)

Etymology. This species is named in honour of the Japanese zoologist Masataka Satô (1937–2006) (obituary, see JÄCH 2007).

Type locality. Negros Island, Negros Oriental Province, Amlan, ca. N 9°30′, E 123°09′.

Type material. Holotypus (apterous male, PNMNH), labelled "Philippines/ Negros, Amlan/ 17-18, VII. 1970/ M. Satô leg.". Paratypes (all apterous) (ADMU, NHMW, NMPC, UPLB, ZCVA, ZSM). 51 ♂♂, 57 ♀♀ from Negros Oriental Province, Sibulan, Balinsasayao – Lake Danao area, spring, 28–30.X.2004, leg. H. Zettel (#403a, #403b), 17 ♂♂, 12 ♀♀ leg. C. V. Pangantihon (#P403, #P403a); 8 ♂♂, 9 ♀♀ from Negros Oriental Province, Cuernos de Negros, Valencia, Apolong, Casaroro Falls, 9–13.III.2005, leg. H. Zettel (#420), 4 ♂♂, 7 ♀♀, 25–26.X.2004, leg. C. V. Pangantihon (#P400).

Diagnosis and comparative notes. A medium-sized to large (body length 3.5–4.3), rather dark, uniformly coloured species. Paramere (Fig. 10) of characteristic shape; within the *R. agilis* complex, a similar apically rounded and broad distal part of the paramere is only known in two species from Romblon Province, *R. ingleae* ZETTEL, 2012 and *R. rufescens* ZETTEL, 2012 (Figs 13, 14). Females of rather stout habitus.

Description. Measurements of holotype. Body length 3.50; maximum body width (at metapleura) 1.16. Head length 0.47, width 0.81; minimum eye distance 0.19. Pronotum length 0.91, width 1.06. Lengths of antennomeres, I 0.91, II 0.53, III 0.64, IV 0.51. Lengths of leg segments: profemur 1.00, protibia 1.06, protarsus 0.05 + 0.04 + 0.31, mesofemur 1.63, mesotibia 1.31, mesotarsus 0.11 + 0.41 + 0.72, metafemur 1.59, metatibia 1.72, metatarsus 0.05 + 0.12 + 0.37.

Measurements of paratypes (10 ♂♂, 10 ♀♀). Body length, male 3.5–4.3, female 3.6–4.0. Head width, male 0.81–0.89, female 0.80–0.87. Pronotum width, male 1.10–1.31, female 1.11–1.21.

Colour. A rather dark coloured species with little variation. Mediotergites and medial parts of laterotergites always blackish, strongly contrasting with lateral parts. Pronotal lobe with yellowish margins and midline; disk anteriorly blackish to dark brown, posteriorly often much paler brown to yellowish.

Structures of male. Metafemur very variable, ca. 2.2–3.1 times as long as maximum width (excluding teeth). Large specimens with one long tooth at flexor side in proximal third and another one in distal third slightly shifted posteriorly from flexor sides. Irregular teeth of variable length, mostly irregularly arranged at flexor side. Metatibia straight or S-curved, with long tooth at three fifths of length in large specimens, but toothless in small specimens.

Segment 8 and genitalia of normal size. Paramere (Fig. 10) evenly rounded, relatively broad except short apex; apex suddenly narrowed, forming a broad, slightly obtusely rounded angle.

Structures of female. Metafemur with two long teeth, each followed by a few (usually 1–4) short teeth. Mediotergite 7 slightly shorter than or equal to its anterior width. Connexival corner slightly protruded and with some inconspicuous black setae.

Distribution (Fig. 21). Only known from the south-eastern part of Negros Island.

Rhagovelia victorgapudi **sp.n.** (Figs 3, 4, 11, 21)

Etymology. This species is named in honour of the late Philippine heteropterist Victor P. Gapud, former Professor at the University of the Philippine, Los Baños, who discovered this species as early as in 1980.

Type locality. Leyte Island, Leyte Province, Baybay, Mount Pangasugan area, Calbiga-a River, ca. N 10°45′, E 124°48′.

Type material. Holotypus (apterous male, PNMNH), labelled "LEYTE: MT. PA-/ NGA-SUGAN:/ CALBIGA-A RI-/ VER: 10-30-1980/ V.P.GAPUD". Paratypes (all apterous if not mentioned otherwise) (NHMW, UPLB, ZCVA). 2 ♂♂, 3 ♀♀, same label data; 2 ♂♂, 6 ♀♀ from Leyte, Baybay, Mount Pangasugan, Calbiga-a River, 50–200 m a. s. l., 12.II.2000, leg. H. Zettel (#236); 1 ♂, 1 ♀, and 1 ♀ macropterous from Leyte, Baybay, Leyte State University (now Visayas State University), Calbiga-a River, 50–100 m a. s. l., 20–21.III.2005, leg. H. Zettel & C. V. Pangantihon (#422); 11 ♂♂, 9 ♀♀ from Leyte, Baybay, Visayan State Collage of Agriculture (now Visayas State University), Forestry, stream, 50 m a. s. l., 11.II.2000, leg. H. Zettel (#235); 1 ♂, 1 ♀ from Leyte, Baybay, Visayan State Collage of Agriculture (now Visayas State University), creeks, 250 m a.s.l., 1.II.2000, leg. H. Zettel (#222c); 1 ♂, 1 ♀ from Leyte, N of Tacloban, Babatngon, Busay Falls, 28.I.2000, leg. H. Zettel (#220).

Diagnosis and comparative notes. The male of *R. victorgapudi* sp.n. is easily recognizable by the shape of the paramere with an obliquely truncated apex (Fig. 11). A light sinuosity is indicated at the edge of connexiva of apterous females (similar as in *R. samarensis* sp.n.). Colour is variable, but usually dark, with almost black pronotal lobe, mediotergites and medial parts of laterotergites. Size is extremely variable.

Description of apterous morph. Measurements of holotype. Body length 3.38; maximum body width (at metapleura) 1.09. Head length 0.50, width 0.73; minimum eye distance 0.18. Pronotum length 0.84, width 0.97. Lengths of antennomeres, I 0.83, II 0.46, III 0.56, IV 0.47. Lengths of leg segments: profemur 0.97, protibia 1.06, protarsus 0.04 + 0.03 + 0.28, mesofemur 1.56, mesotibia 1.25, mesotarsus 0.07 + 0.41 + 0.69, metafemur 1.63, metatibia 1.63, metatarsus 0.07 + 0.12 + 0.33.

Measurements of apterous paratypes (10 ♂♂, 10 ♀♀). Body length, male 3.2–4.0, female 3.2–3.6. Head width, male 0.74–0.88, female 0.74–0.80. Pronotum width male 1.02–1.23, female 1.07–1.20. Measurements of macropterous paratype (1 ♀). Body length (excl. wings). 3.53. Head width 0.75. Pronotum width 1.43.

Colour. Dorsal colour of apterous morph variable, but in most cases dark (examples in Figs 3 and 4). In apterous morph disk of pronotal lobe brown to blackish, anteriorly usually contrasting with yellow pronotum; posterior margin of pronotal disk narrowly yellowish to pale brown.; mediotergites and median parts of laterotergites usually blackish. Femora and tibiae moderately infuscated. Pronotum of macropterous female anteriorly pale yellow; pronotal lobe anteriorly blackish brown, behind shoulders medium brown, with narrow yellow margin. Forewing black with whitish stripe at base.

Structures of male. Metafemur variable, ca. 2.3–2.8 times as long as maximum width. Metatibia with tooth at three fifths of length in most specimens, except smallest.

Segment 8 and genitalia slightly enlarged. Paramere (Fig. 11) unique, distal part strongly curved to middle, relatively long, subparallel, with obliquely truncated apex.

Structures of female. Metafemur of apterous female ca 3.7–4.2 times as long as width (excluding teeth), with two long teeth, each followed by a few (1–4) short teeth. Metafemur

of macropterous female slightly more slender, with two long teeth each followed by 2–3 small teeth. Margin of connexiva anteriorly convex, at segment 7 and at apex straight or with slight sinuosity in dorsal view. Mediotergite 7 as long as wide or minimally wider at anterior margin. Connexival corner slightly protruded and with tuft of black setae.

Distribution (Fig. 21). So far recorded from the northern and central parts of Leyte Island.

Notes on previously described species of the *Rhagovelia agilis* subgroup

Rhagovelia agilis J. Polhemus, 1976 (Figs 12, 21)

Rhagovelia agilis Polhemus, 1976, in Polhemus & Reisen 1976: 278.

Rhagovelia agilis: Polhemus & Polhemus 1988: 165; Zettel 1996: 138, figs 61, 62; Zettel 2014: 109.

Type locality. Luzon Island, Laguna Province, Los Baños, Mount Makiling, Molawin Creek, ca. N 14°09′, E 121°14′.

Material previously examined. 197 specimens, all from Central Luzon (ADMU, BMNH, NHMW, NMPC, PNMNH, UPLB, USNM, ZCVA, ZRC, ZSM) listed by Zettel (2014). Laguna Province (Los Baños, Mount Makiling, Molawin Creek, Mud Spring, Flat Rocks, stream from Tampalit Falls), Cavite Province (Tagaytay), Quezon Province (Polillo Island, Atimonan, Nalubog Creek, Real, National Botanic Garden).

New records (from South Luzon; NHMW, UPLB, ZCVA). 2♂♂, 1♀ from Luzon, Camarines Norte Province, Daet, Bicol National Park, 14.XII.1976, leg. C. S. Sanchez; 2♂♂, 1♀, and 1♂ macropterous, from Luzon, Camarines Norte Province, Mercedes, Matoogtoog River and Falls, 29.X.2012, leg. C. V. Pangantihon (#P454); 1♂, 5♀♀ from Luzon, Camarines Norte Province, S of Daet, Bicol National Park, Nalisan, 7.II.2001, leg. H. Zettel (#265a).

Notes. Types were not available, but numerous other specimens from the type locality were compared with the original description (in Polhemus & Reisen 1976), so that there is no doubt on the species identity.

Diagnosis. Very variable in size. Size (apterous morph, 10♂♂, 10♀♀): Body length, male 3.2–4.0, female 3.3–3.7. Head width, male 0.78–0.86, female 0.79–0.83. Pronotum width, male 1.05–1.20, female 1.14–1.20. Colour in most specimens dark. Metafemur of apterous males often strongly enlarged, up only 2.3 times as long as wide; such specimens with S-shaped metatibia bearing a long tooth. Paramere (Fig. 12) almost evenly curved from broad base to apex, more regularly narrowed towards apex than in *R. agiloides*, thus distal part appearing more triangular; apex acutely triangular. Mediotergite 7 of female slightly wider than long.

Notes on macropterous morph: Size (1♂, 6♀♀): Body length, male 4.0, female 3.7–4.1. Head width, male 0.85, female 0.77–0.88. Pronotum width, male 1.61, female 1.49–1.72. Pronotal lobe variable in colour, from black with narrow brownish posterior margin to middle brown with relatively yellow margin and narrow yellowish midline. White streak on forewing always distinct. Structural characters within variability of apterous morph. Setae at connexival corner of female often more distinct than in apterous specimens.

Distribution (Fig. 21). In his treatment of the Gerromorpha of Luzon, Zettel (2014) listed *R. agilis* from Central Luzon (Cavite, Laguna, and Quezon Provinces) and stated: "Populations from southern Luzon (and Catanduanes) differ in some minor details (including

paramere shape) from typical *R. agilis* …, they are excluded from this study". Our study confirms the presence of *R. agilis* in Camarines Norte Province by three samples whereas more southern regions are populated by other species (*R. agiloides* sp.n. and *R. isarogensis* sp.n.).

Rhagovelia ingleae Zettel, 2012 (Figs 13, 21)

Rhagovelia ingleae Zettel, 2012: 92, figs 7, 8, 30, 31, 42.

Type locality. Romblon Province, Sibuyan Island, E of Magdiwang, W of Silum, Lambigan Falls, N 12°29′30″, E 122°34′42″, ca. 30 m a.s.l.

Material examined. Paratypes (see Zettel 2012).

Diagnosis. Small species. Measurements of apterous paratypes (5 ♂♂, 3 ♀♀): body length, male 3.2–3.3, female 3.2–3.5 (from Zettel 2012). Paramere (Fig. 13) very stout and short, curved medially; apex broad, with an obtuse angle.

Distribution (Fig. 21). Sibuyan Island (part of Romblon Province).

Rhagovelia rufescens Zettel, 2012 (Figs 14, 21)

Rhagovelia rufescens Zettel, 2012: 90, figs 5, 6, 28, 29, 40, 41.

Type locality. Romblon Province, Tablas Island, S of Agustin, Dubduban, Malauay River and Busai Falls, N 12°34′, E 122°07′, ca. 30 m a.s.l.

Material examined. Paratypes (see Zettel 2012).

Diagnosis. Small species. Measurements of apterous paratypes (10 ♂♂, 10 ♀♀). Body length, male 3.1–3.6, female 3.2–3.4. Pronotum width, male 0.99–1.23, female 1.04–1.16 (from Zettel 2012). Paramere (Fig. 14) very stout and short, curved medially; apex very broadly rounded.

Distribution (Fig. 21). Tablas Island (part of Romblon Province).

Notes on further probably undescribed species of the *R. agilis* complex

Rhagovelia sp. "Catalangan"

Material examined. 1 ♂ (NHMW): Luzon, Isabela Province, San Mariano, Catalangan River, "Diginan", 1–4.VII.2000, leg. V. P. Gapud.

Notes. The single, slightly damaged male was collected together with *R. isabela* Zettel & Laciny, 2023. Its paramere suggests that it represents an undescribed species.

Rhagovelia sp. "Mindoro"

Material examined. 1 ♂, 1 ♀ (CZVA): Mindoro, Oriental Mindoro, Roxas, San Vicente, Taugad Diit, Baroc River tributary, N 12°37.5′, E 121°21.3′, 180 m, 22.IX. 2012, leg. C. V. Pangantihon.

Notes. These are the first specimens of the *R. agilis* group known from Mindoro. Both specimens are comparatively dark coloured and stout. The shape of the paramere suggests a close relationship with *R. agilis*.

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Authors' addresses: Herbert Zettel & Alice Laciny,
2nd Zoological Department, Natural History Museum Vienna,
Burgring 7, 1010 Vienna, Austria.
E-mail: herbert.zettel @nhm-wien.ac.at;
alice.laciny@nhm-wien.ac.at

Appendix

Table 1. Species groups, subgroups, and species of *Rhagovelia* in the Philippines with their regional distribution. *Rhagovelia kawakamii* is the only species which is recorded from outside of the country (Taiwan, Northern Borneo), but its taxonomy requires further study. Groups and subgroups are arranged alphabetically, species chronologically following the date of description. Position of *R. lansburyi* in the *R. borneensis* group follows unpublished results.

Species group	Species subgroup	Species	Regional distribution
borneensis gr.	–	*lansburyi* Zettel, 1995	Luzon (N)
borneensis gr.	–	*fischeri* Zettel, 1999	Palawan
hoogstraali gr.	–	*hoogstraali* Hungerford & Matsuda, 1961	Mindanao
novacaledonica gr.	–	*werneri* Hungerford & Matsuda, 1961	Mindanao
orientalis gr.	*aberrans* sgr.	*aberrans* Andersen, 1965	Mindanao (NW)
orientalis gr.	*aberrans* sgr.	*ridicula* Polhemus, 1996	Mindanao (S, C)
orientalis gr.	*aberrans* sgr.	*nieseri* Zettel, 1995	Mindanao (NE)
orientalis gr.	*aberrans* sgr.	*cenizae* Zettel, 2007	Leyte
orientalis gr.	*aberrans* sgr.	*guentheri* Zettel, 2007	Mindanao (N)
orientalis gr.	*minuta* sgr.	*minuta* Lundblad, 1936	Luzon
orientalis gr.	*minuta* sgr.	*seyferti* Zettel, 1995	Negros
orientalis gr.	*negrosensis* sgr.	*negrosensis* Zettel, 1995	Negros
orientalis gr.	*negrosensis* sgr.	*panayensis* Zettel, 1995	Panay
orientalis gr.	*negrosensis* sgr.	*heissi* Zettel & Bongo, 2006	Cebu
orientalis gr.	*negrosensis* sgr.	*masbatensis* Zettel & Laciny, 2021	Masbate, Ticao
orientalis gr.	no sgr. association	*raddai* Zettel, 1994a	Mindoro
orientalis gr.	no sgr. association	*tansiongcoi* Zettel, 1995	Sibuyan
orientalis gr.	no sgr. association	*raymondi* Zettel, 1995	Ticao
orientalis gr.	*orientalis* sgr.	*orientalis* Lundblad, 1937	Mindanao (NW)
orientalis gr.	*orientalis* sgr.	*mindanaoensis* Hungerford & Matsuda, 1961	Mindanao, Leyte, Samar
orientalis gr.	*orientalis* sgr.	*orientaloides* Zettel, 1995	Camiguin
orientalis gr.	*orientalis* sgr.	*marinduquensis* Zettel, 2012	Marinduque
orientalis gr.	*orientalis* sgr.	*sumaldei* Zettel, 2012	Bohol
orientalis gr.	*orientalis* sgr.	*orientaliformis* Zettel & Laciny, 2021	Mindanao (NW)
orientalis gr.	*philippina* sgr.	*philippina* Lundblad, 1936	Luzon (C, N)
orientalis gr.	*philippina* sgr.	*bicolana* Zettel, 2014	Luzon (S)
orientalis gr.	*philippina* sgr.	*sorsogonensis* Zettel, 2014	Luzon (S)
orientalis gr.	*philippina* sgr.	*sophiae* Zettel & Laciny, 2021	Catanduanes
papuensis gr.	*agilis* sgr.	*agilis* Polhemus, 1976	Luzon
papuensis gr.	*agilis* sgr.	*ingleae* Zettel, 2012	Sibuyan
papuensis gr.	*agilis* sgr.	*rufescens* Zettel, 2012	Tablas
papuensis gr.	*agilis* sgr.	*agiloides* Zettel & Laciny, 2024	Catanduanes
papuensis gr.	*agilis* sgr.	*antiqua* Zettel & Laciny, 2024	Panay
papuensis gr.	*agilis* sgr.	*isarogensis* Zettel & Laciny, 2024	Luzon (S)
papuensis gr.	*agilis* sgr.	*mambucalensis* Zettel & Laciny, 2024	Negros (N)
papuensis gr.	*agilis* sgr.	*samarensis* Zettel & Laciny, 2024	Samar
papuensis gr.	*agilis* sgr.	*satoi* Zettel & Laciny, 2024	Negros (S)
papuensis gr.	*agilis* sgr.	*victorgapudi* Zettel & Laciny, 2024	Leyte

Species group	Species subgroup	Species	Regional distribution
papuensis gr.	*cotabatoensis* sgr.	*lundbladi* Hungerford & Matsuda, 1961	Mindanao
papuensis gr.	*cotabatoensis* sgr.	*cotabatoensis* Hungerford & Matsuda, 1961	widely distributed, except SW
papuensis gr.	*cotabatoensis* sgr.	*akrita* Polhemus, 1976	Luzon (N)
papuensis gr.	*cotabatoensis* sgr.	*graindli* Zettel, 2012	Mindanao, Camiguin
papuensis gr.	*cotabatoensis* sgr.	*rigovae* Zettel, 2012	Luzon (C)
papuensis gr.	*cotabatoensis* sgr.	*gapudi* Zettel, Laciny & Freitag, 2020	Busuanga, Palawan
papuensis gr.	*cotabatoensis* sgr.	*borbei* Pangantihon & Zettel, 2023	Jolo
papuensis gr.	*cotabatoensis* sgr.	*montana* Zettel & Laciny, 2023	Luzon (N)
papuensis gr.	*cotabatoensis* sgr.	*isabela* Zettel & Laciny, 2023	Luzon (N)
papuensis gr.	*cotabatoensis* sgr.	*torosa* Zettel & Laciny, 2023	Luzon (N)
papuensis gr.	*kawakamii* sgr.	*kawakamii kawakamii* (Matsumura, 1913)	Luzon
papuensis gr.	*kawakamii* sgr.	*kawakamii hoberlandti* Hungerford & Matsuda, 1961	Greater Palawan
papuensis gr.	*kawakamii* sgr.	*mindoroensis* Zettel, 1994a	Mindoro
papuensis gr.	*luzonica* sgr.	*luzonica* Lundblad, 1937	Luzon, Polillo
papuensis gr.	*luzonica* sgr.	*usingeri* Hungerford & Matsuda, 1961	Mindanao
papuensis gr.	*luzonica* sgr.	*camiguinana* Zettel, 1996	Camiguin
papuensis gr.	*luzonica* sgr.	*canlaonensis* Zettel, 1996	Negros
papuensis gr.	*luzonica* sgr.	*leyteensis* Zettel, 1996	Leyte, Samar
papuensis gr.	*luzonica* sgr.	*potamophila* Zettel, 1996	Mindoro
papuensis gr.	*luzonica* sgr.	*schoedli* Zettel, 1996	Panay
papuensis gr.	*luzonica* sgr.	*sibuyana* Zettel, 1996	Sibuyan
papuensis gr.	*luzonica* sgr.	*tablasensis* Zettel, 1996	Tablas
phoretica gr.	–	*phoretica* Polhemus, 1996	Mindanao
phoretica gr.	–	*sallyae* Zettel, 2003	Samar
sarawakensis gr.	*minutissima* sgr. (clade 1)	*minutissima* Hungerford & Matsuda, 1961	Busuanga
sarawakensis gr.	*minutissima* sgr. (clade 1)	*palawanensis* Zettel, 1994b	Palawan
sarawakensis gr.	*minutissima* sgr. (clade 1)	*matillanoi* Zettel, Laciny & Freitag, 2020	Palawan
sarawakensis gr.	*estrella* sgr. (clade 2)	*estrella* Zettel, 1994b	Palawan
sarawakensis gr.	*estrella* sgr. (clade 2)	*abbreviata* Zettel, Laciny & Freitag, 2020	Palawan