

Rhagovelia heissi nov.sp., a remarkable new species of the *R. orientalis* species group (Heteroptera, Veliidae) from Cebu Island, Philippines¹

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Abstract: *Rhagovelia heissi* nov.sp., an endemic species from Cebu Island, Philippines, is newly described. The new species belongs to the *Rhagovelia orientalis* species group, but is morphologically distant from all other species.

Key words: Cebu, Heteroptera, new species, Philippines, *Rhagovelia*, *Rhagovelia orientalis* group, Veliidae.

Introduction

The *Rhagovelia orientalis* species group is a monophyletic clade of the large circum-(sub-)tropical genus *Rhagovelia* MAYR 1865. It was originally defined by POLHEMUS & POLHEMUS (1988), and slightly re-defined by NIESER et al. (1997). Species of the *R. orientalis* group are known from Sulawesi and Sangihe Island in Indonesia, and from most major islands of the Philippines (except the Palawan region), the majority of species (14 out of 20) occurring in the latter country (NIESER et al. 1997). The Philippine species of the *R. orientalis* group have been revised by ZETTEL (1995), but a few undescribed species have been discovered since then (unpublished data). One of them, a remarkable endemic species from Cebu Island, is described in this study.

Material and Methods

Material is referred to by citing the original labels of the dry mounted and in alcohol preserved specimens. Each single label is separated by square brackets; the backslash sign \ indicates the break of a line.

Insects were examined with a Leica Wild M10 binocular microscope (max. 128x magnification); parameres were studied with an Olympus BX40 compound microscope (max. 400x magnification). Drawings were made with the help of a camera lucida fixed to these microscopes.

Measurements: Variation is given for body length and ratio of length : width of the metafemur and includes most of the type specimens. Other measurements refer to the holotype or the allotype. Body length is measured from the apex of the head to the tip of the proctiger (♂) or connexival spines (♀), respectively, and given in millimetres. Measurements for lengths of antennomeres and leg segments are presented relative to antennomere 2 (= 1) and mesofemur (= 100), respectively.

Terminology follows mainly ZETTEL (1995).

Rhagovelia heissi nov.sp. (Figs 1-11)

Type material: Holotypus (apterous ♂, in Museum of Natural History, University of the Philippines, Los Baños) and allotype (apterous ♀, in Museum

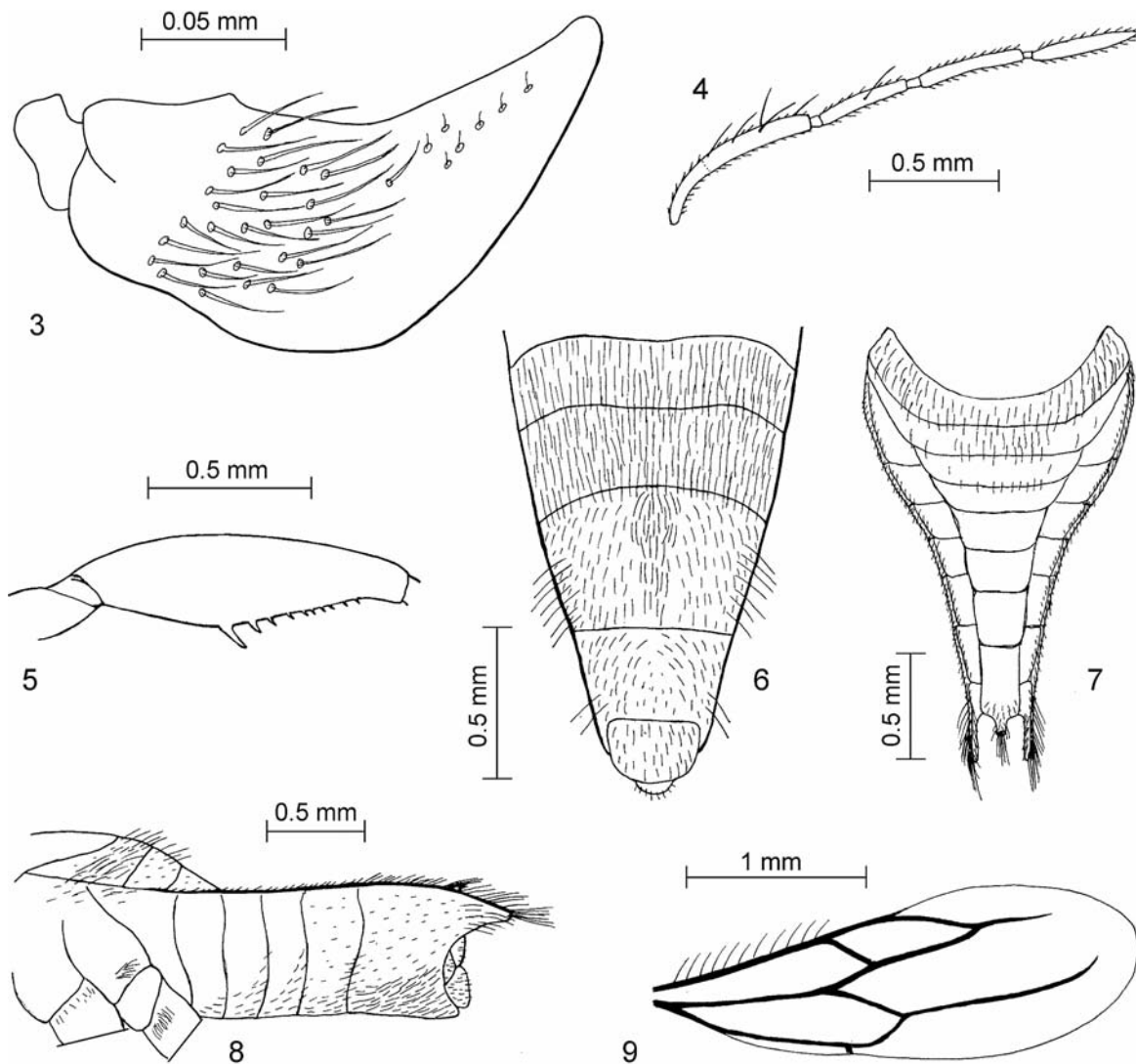
¹ This article is dedicated to Ernst Heiss on the occasion of his 70th birthday.



Figs 1-2: Habitus of apterous male (1) and female (2) of *Rhagovelia heissi* nov.sp.

of Natural History, University of the Philippines, Los Baños), labeled [PHILIPPINEN: Cebu, S Badian/ Matutinao, Kawasan Falls/ 2-50m, 29.-30.11.1996/ leg. H. Zettel (112)]; Paratypes (in Natural History Museum Vienna; Museum of Natural History, University of the Philippines, Los Baños; University of San Carlos, Cebu City; Zoological Museum, Amsterdam; Zoological Reference Collection, National University of Singapore; Muséum National d'Histoire Naturelle, Paris, France; Hungarian Natural History Museum, Budapest, Hungary; Oberösterreichisches Landesmuseum, Linz, Austria, Coll. Ernst Heiss, Innsbruck): 23♂♂, 22 ♀♀ (apterous), 1♂, 2 ♀♀ (macropterous, 1 ♀ dealate), same label data as holotype; 6♂♂, 14 ♀♀ (apterous) [Philippinen: Cebu, S Badian \ Matutinao, Kawasan Falls \ 2-50 m, 23.-24.2.1997 \ leg. H. Zettel (116)]; 2♂♂, 1 ♀ [Philippinen: Cebu, S Badian \ Matutinao, Kawasan Falls \ 1-30m, 11.11.2003 \ leg. H. Zettel (352a)]; 8♂♂, 7 ♀♀ (apterous) [Philippinen: Cebu, S Badian \ Matutinao, Kawasan Falls \ 20-50m, 12.11.2003 \ leg. H. Zettel (352d)]; 12♂♂, 12 ♀♀ (apterous) [Philippinen: Cebu, Kawasan \ river, coll. Tran A.D., 11-12 \ Nov 2003.

TAD0363]; 1 ♀ (apterous) [Kawasan R. \ Badian 2-23-03 \ Bongo J.]; 2♂♂, 2 ♀♀ (apterous) [4-28-02 \ Kawasan, Cebu \ Coll. Bendanillo]; 2♂♂, 2 ♀♀ (apterous) [Kawasan R. B. \ Cebu 11-13-03 \ Bendanillo]; 4♂♂, 2 ♀♀ [Kawasan, Matutinao River, K.L. Yeo, 30. Jul. 2003]; 10♂♂, 33 ♀♀ (apterous), 1 ♀ (macropterous) [Philippines, Cebu, Lusan \ river, coll. Tran A.D., 09 Nov \ 2003. TAD0361]; 4♂♂, 3 ♀♀ (apterous), 2 ♀♀ (macropterous) [Philippines, Cebu, Lusan \ river, downstream, coll. Tran \ A.D. 09 Nov 2003. TAD0362]; 30♂♂, 85 ♀♀ (apterous), 1♂, 4 ♀♀ (macropterous) [Philippinen: Cebu, NNW \ Cebu City, Lusan, Lu- \ saran River, 9.11.2003 \ leg. H. Zettel (350)]; 4♂♂, 2 ♀♀ (apterous) [Lusan River \ Cebu 11-9-03 \ F. Bendanillo]; 1 ♀ (apterous) [11-9-03 Lusan \ River, Cebu \ Bendanillo]; 30♂♂, 13 ♀♀ (apterous) [PHILIPPINEN: Cebu \ Barili, Paradise Valley \ 50m, 1.12.1996 \ leg. H. Zettel (113)] (NHMW, UPLB, USC); 1♂, 2 ♀♀ (apterous), 1♂, 1 ♀ (macropterous) [PHILIPPINEN: Cebu \ SE Moalbag, Balabagon \ 2.12.1996 \ leg. H. Zettel (115)]; 8♂♂, 10 ♀♀ (apterous) [Philippinen: Cebu \ Malabuyog, Monteneza \ 0-10 m, 13.11.2003 \ leg. H.



Zettel (353)]; 4♂♂, 10♀♀ (apterous), 2♀♀ (macropterous) [Philippines, Cebu, \ Montaneza, km 168+400 from \ Cebu City, coll. Tran A.D., 13 \ Nov 2003. TAD0366]; 1♂, 5♀♀ (apterous), 1♂ (macropterous) [Philippines: Cebu \ Malabuyog, Monteneza \ 0-10 m, 13.11.2003 \ leg. Pangantihon (P353)]; 3♂♂, 7♀♀ (apterous) [11-13-03 - Mainit \ River Malabuyoc \ Cebu Benda-nillo]; 3♂♂, 1♀ (apterous), 1♂ (macropterous) [Philippines: Cebu, Argao \ Simala, first large river \ N of town, 6.12.2005 \ leg. H. Zettel (439)]; 5♂♂, 13♀♀ [Philippines: Cebu, Boljoon \ Poblacion, river, \ 13.11.2005, leg. \ C. Pangantihon (P196)]; 67♂♂, 122♀♀ (apterous), 3♂♂ (macropterous) [Philippines: Cebu, Boljoon \ (Pobl.), river at Lusapon \ Bridge, freshwater, 5.12. \ 2005, leg. H. Zettel (437)].

Description of apterous male: body length 2.8-2.9 mm (holotype: 2.9 mm); length of second antennomere 0.41 mm; length of mesofemur 1.51 mm; body relatively slender (Fig. 1).

Colour: body mainly black; juga and rostrum yellowish brown; pronotum anteromedially with narrow pruinose stripe; basal two-fifths of antennomere 1, all acetabula, pro- and metacoxa, pro- and metatrochanter, and basal ca. two-fifths of profemur yellow; distal parts of legs with blue-green shimmer.

Pilosity: body with short grey appressed hair layer and with posteriad directed, long, greyish to slightly yellowish pilosity, this relatively except a narrow stripe medially; relative lengths of leg segments (relative to mesofemur dense compared with most other species of the group; ventral surface without black spiculae; antennomeres 1 and 2, femora, and tibiae with several long black setae.

Structural characteristics: juga not flattened, shining, without spiculae; proepisterna without spiculae; relative lengths of an-

Figs 3-9: *Rhagovelia heissi* nov.sp.: (3) left paramere, lateral aspect; (4) antenna; (5) metafemur of apterous male; (6) terminal abdomen of male, ventral aspect; (7) abdomen of apterous female, dorsal aspect; (8) abdomen of apterous female, lateral aspect; (9) forewing.

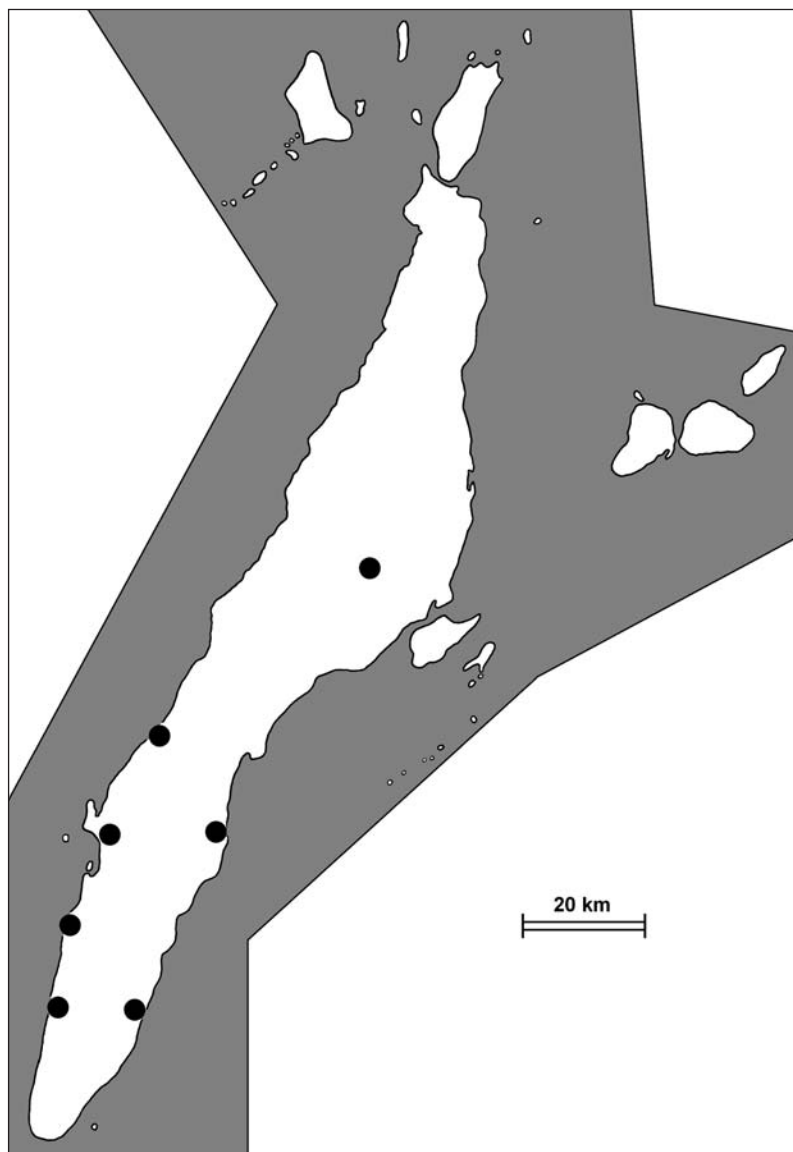


Fig. 10: Map of Cebu Province with distribution of *Rhagovelia heissi* nov.sp.

tennomeres 1 : 4 as 1.9 : 1.0 : 1.1 : 1.1 (Fig. 4); pronotum long, medially 2.9 times as long as eye, covering mesonotum = 100); profemur 60, protibia 64, protarsus 1+1+15, mesofemur 100, mesotibia 80, mesotarsus 4+34+43, metafemur 81, metatibia 90, metatarsus 2+5+20; metafemur relatively slender, 3.9-4.6 times (in holotype 4.3 times) as long as wide (measured without teeth), on ventral side with distal row consisting of 5-10 teeth (in holotype 7 and 8 on left and right metafemur, respectively), first tooth very strong, following teeth smaller, decreasing in size (Fig. 5); metatibia straight, on inner side with distinct granules in basal half, with few tooth-like structures distally, with long apical spine.

Pregenital segments of abdomen weakly modified, relatively slender; all tergites matt;

fifth tergite 2.9 times as wide as long; seventh tergite 2.0 times as long as sixth and 1.25 times as long as wide at posterior margin; sternites without median carina; medial areas of sternites 5-7 (Fig. 6) medially flat, with somewhat longer yellowish pilosity at median line; sternite 7 with tuft of longer, brownish, erect setae anteromedially.

Genital segments: small and weakly modified; segment 8 small, subcylindrical, with short and weak ventrobasal median carina; pygophore subovate; proctiger with well developed lateral lobes, sclerotized part slightly longer than wide; paramere (Fig. 3) small, relatively stout, strongly curved dorsad, lateral surface with brush of long setae in basal half, apex narrowly rounded.

Description of apterous female: body length 2.9-3.1 mm (allotype: 3.0 mm); body relatively slender (Fig. 2); colour similar as in male, but yellow colour on antennomere 1 and on profemur usually more extended, approximately until middle of length, rarely as short as in male; pilosity on head and thorax similar as in males, strongly reduced on tergites and laterotergites; most structural characteristics as in male; hind leg less incrassate and with reduced armature: metafemur 4.7-5.6 times as long as wide (5.1 in allotype), distal row consisting of 4-8 teeth (in allotype 6 and 7 on left and right metafemur, respectively), first tooth much longer than following teeth; metatibia straight, on inner side only distally with few teeth-like projections.

Abdomen strongly modified (Figs 7, 8); connexival margins distinctly converging, slightly S-curved, nearly parallel at segment 7 (Fig. 7); tergite 1 with rich pilosity, especially at tumescent sides, tergite 2 with some pilosity medially; tergite 3 without or with very few hairs; tergites 4-6 bare; tergite 7 mainly bare, but with fine pilosity in approximately posterior fifth, at middle of hind margin with short, straight, posteriad directed process bearing posteriad directed setae; fifth tergite 2.1 times as wide as long, seventh tergite 1.9 times as long as sixth and 1.9 times as long as wide at anterior margin (length measured without setae); tergite 8 small, directed ventrad; proctiger also directed ventrad; gonocoxae mostly concealed by sternite 7 (the last three characteristics

only in normal “resting position“ of genitalia); laterotergites mainly bare, only with pilosity on narrow stripe along connexival margin; in lateral view (Fig. 8) connexival margin of sternite 7 protruded posteriad into a long spine bearing many long black setae.

Description of macropterous male: body length (exclusive wings) 2.8-3.0 mm; forewing dark brown with blackish veins, with three closed cells, distal cell reaching apical third of wing; metafemur 4.5-4.7 times as long as wide, with 5-9 teeth in distal row.

Description of macropterous female: body length (exclusive of wings) 3.1-3.4 mm; forewing (Fig. 9) as in male; metafemur 5.0-5.4 times as long as wide, with 4-7 teeth in distal row, first tooth much longer than following teeth; abdomen similar to that of apterous female, but connexiva less convergent and posterior tergites wider.

Comparative notes and discussion: *Rhagovelia heissi* nov.sp. is a typical species of the *R. orientalis* species group by the combination of following characteristics: predominantly black colour, long pronotum of apterous morph, reduced armature of metafemur (Fig. 5), wing venation as in Fig. 9, dorsad-curved paramere (Fig. 3), and subequal size of sexes. ZETTEL (1995: 74-75) classes the Philippine species into four subgroups; *R. heissi* nov.sp. cannot be assigned to any of them, but has a very isolated position in a species cladogram (Zettel, unpublished data). In the identification key of the same publication (ZETTEL 1995: 48-54), the male of *R. heissi* nov.sp. would key out with males of the *R. orientalis* subgroup because of its plesiomorphic character states of a simple paramere, relatively wide metafemur, and weakly developed structures on sternites 5-7. It can be distinguished from those species by a more slender body and medianly denser pilosity on sternites 5 and 6 (Fig. 6). The female of *R. heissi* nov.sp. has unique abdominal structures (Figs 7, 8) and differs clearly from the females of the *R. orientalis* subgroup, which are characterized, e.g., by wide abdomen, completely pilose tergites 4-6, and the lack of modifications on tergite 7. In the identification key by ZETTEL (1995) the female keyes out with *R. seyferti* ZETTEL 1995, an endemic species from Negros, but



Fig. 11: Stream at Boljoon, Poblacion, a typical habitat of *Rhagovelia heissi* nov.sp.

differs from this species in much smaller size, shorter process on tergite 7 (Fig. 7), and short setae on lateral hind margins of sternite 7 (Fig. 8).

Distribution: Cebu Island (Fig. 10).

Etymology: Named in honour of Prof. Dr. Ernst Heiss (Innsbruck) on the occasion of his 70th birthday.

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Zusammenfassung

Rhagovelia heissi nov.sp. von der Insel Cebu, Philippinen, wird neu beschrieben. Die neue Art gehört in die *Rhagovelia orientalis*-Artengruppe (sensu POLHEMUS & POLHEMUS 1988, ZETTEL 1995), steht aber hier morphologisch sehr isoliert.

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