

## ***Rhagovelia sehnali* sp.n. (Insecta: Heteroptera: Veliidae) from Costa Rica**

F.M. Buzzetti\* & H. Zettel\*\*

### **Abstract**

*Rhagovelia sehnali* sp.n. from Costa Rica is described and illustrated in morphological detail. The new species is tentatively placed in the *R. robusta* group, but differs in several important characteristics from other species of this group. The male of the new species can be recognized by the shape of its paramere; the female has a unique set of characteristics on the abdomen.

**Key words:** *Rhagovelia*, *Rhagovelia robusta* group, new species, Costa Rica.

### **Zusammenfassung**

*Rhagovelia sehnali* sp.n. aus Costa Rica wird beschrieben und in morphologischen Details abgebildet. Die neue Spezies wird provisorisch in die *R. robusta*-Artengruppe gestellt, unterscheidet sich aber in mehreren wichtigen Merkmalen von anderen Arten der Gruppe. Das Männchen der neuen Art kann an der charakteristischen Form der Paramere erkannt werden, das Weibchen hat eine einzigartige Kombination von Merkmalen am Abdomen.

### **Introduction**

In tropical regions the genus *Rhagovelia* MAYR, 1865 is the most diverse genus of the Gerromorpha (= water striders in a wide sense). For example, in the Esquinas Forest, type locality of the species described here, ten species of *Rhagovelia* have been found in an area of only 6 km<sup>2</sup> (HECHER & ZETTEL 1996).

New World species of this genus, exclusive of the *R. angustipes* complex, were monographed by POLHEMUS (1997). Since then, only few other species have been described (NIESER & POLHEMUS 1999, POLHEMUS & CHORDAS 2004). During a two-week visit at the Natural History Museum Vienna (NHMW) within the framework of the Synthesys Project, the first author found seven specimens of the new species described below from Costa Rica in the unidentified Neotropical material of *Rhagovelia*.

### ***Rhagovelia sehnali* sp.n. (Figs. 1 - 7)**

**Type material:** Holotype (apterous male), allotype (apterous female), and five paratypes (four apterous males, one apterous female), labelled "COSTA RICA: Puntarenas\ Esquinas Forest, (3)\ Quebrada Negra,

\* Dr. Filippo Maria Buzzetti, Università degli Studi di Padova, Dip. Agronomia Ambientale e Produzioni Vegetali - Entomologia Agripolis, Viale dell'Università 16, I-35020 Legnaro (PD), Italy.  
– filippomaria.buzzetti@unipd.it

\*\* Dr. Herbert Zettel, Natural History Museum Vienna, International Research Institute for Entomology, Burgring 7, A-1010 Vienna, Austria. – herbert.zettel@nhm-wien.ac.at

80 m\ 12.2.1995, leg. P. Sehnal", holotype in the Instituto Nacional de Biodiversidad, Heredia, Costa Rica, allotype and four paratypes in the Natural History Museum Vienna, one male paratype in the first author's private collection.

**Diagnosis:** Species of the *R. robusta* group, as defined by a combination of characteristics (see Discussion). Within the *R. robusta* group, *R. sehnali* sp.n. is relatively dark coloured, small, and slender species. Male: Hind trochanter with 0 - 1 small teeth. Hind femur (Fig. 1) relatively slender, basally with 0 - 2 small teeth, on distal two thirds with one distinct row arranged in two spine sets, second row strongly reduced and consisting of 2 - 5 minute teeth. Hind tibia (Fig. 1) with small, peg-like teeth. Male parameres (Fig. 5) distinctive, differing markedly from other species of the group by their long, slender, curved distal part. Proctiger of characteristic shape (Fig. 6). Female: Connexiva (Fig. 3) strongly convergent, tergite VII smooth and shiny except on margins, tergite VIII shiny in basal half; distal half of tergite VIII, dorsal areas of gonocoxae, and proctiger with long, brown pilosity (Figs. 3, 4).

**Description** (measurements in mm):

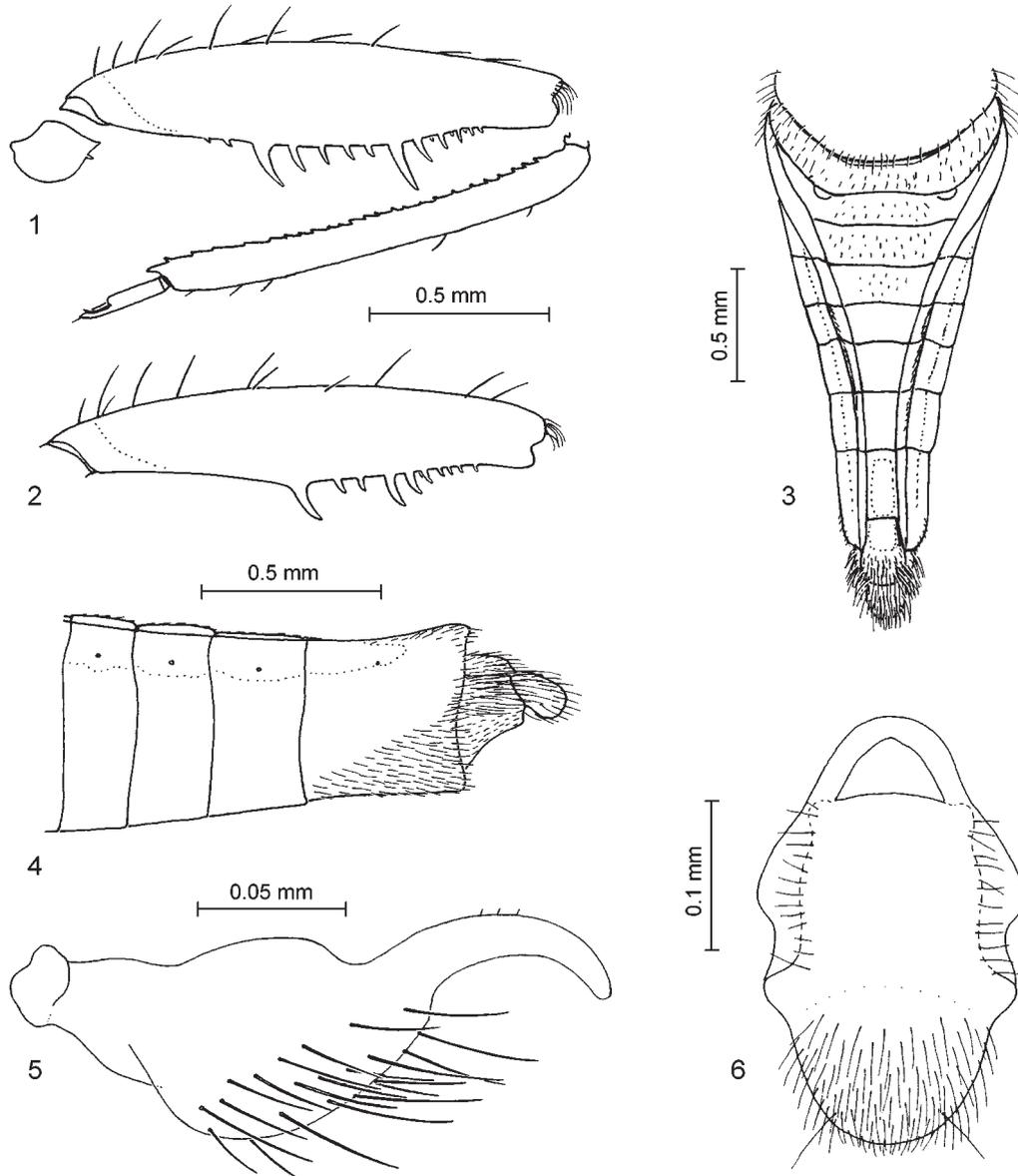
Holotype (apterous male): Measurements: body length 2.9, maximum width across metanotum 1.12, length of head 0.35, width of head between eyes 0.12, eye length 0.40, eye width 0.21, pronotum length 0.77, pronotum width 1.10, abdomen length 1.37 (from anterior margin of tergite I to posterior margin of tergite VII), maximum width of first tergite 0.87, lengths of antennomeres: I 0.70, II 0.41, III 0.45, IV 0.42, fore leg length: femur 0.82, tibia 0.92, tarsus 0.25, mid leg length: femur 1.62, tibia 1.25, tarsus 1.26 (tarsomeres I 0.01, II 0.60, III 0.65), hind leg length: femur 1.50, tibia 1.25, tarsus 0.27, hind femur width 0.35.

Colour: Head black. Antennae black except yellow basal third of antennomere I. Thorax black except acetabula yellow and pronotum in anterior fifth with dark yellow stripe (interrupted behind eyes). Abdomen dorsally black, sternites and laterotergites with broad dark yellow margins. Ventral surface of abdomen dark grey. Legs black with coxae, fore and hind trochanters, basal half of fore femur, and base of hind femur yellow.

Pilosity: Entire body surface covered with short, light brown to greyish hairs. Long, black setae numerous on head, sides of thorax, femora, extensor face of tibiae and antennomere I; one isolated seta near middle of antennomere II.

Structural characteristics: Jugum without, proepisternum with, a few very small, black denticles close to rostrum channel. Pronotum almost completely covering mesonotum (Fig. 3; medially, a ca. 0.02 mm wide stripe of mesonotum uncovered, best seen in dorsocaudal view). Metanotum exposed. Fore tibia slightly expanded apically. Hind femora (Fig. 1) moderately incrassate, basally with 1 or 2 small teeth, in distal two thirds with one distinct row arranged in two spine sets (5, 6 or 9, respectively, spines of each set decreasing in size toward femoral apex), second row strongly reduced and consisting of 4 minute teeth. Sternite II sharply carinate, sternite VII with large, half-ovate, depressed area. Segment VIII relatively small and narrow, subcylindrical.

Genital segments: Pygophore boat-shaped, distal portion heavily sclerotized. Proctiger (Fig. 6) with heavily sclerotized distal portion furnished with lateral lobes, hind margin rounded, basal portion slightly sclerotized and with lateral lobes larger than those on dis-



Figs. 1 - 6: *Rhagovelia sehnali* sp.n. (1: male holotype; 2-4: female allotype; 5, 6: male paratype): (1) hind leg: trochanter, femur, and tibia, in slightly different views; (2) hind femur; (3) abdomen, dorsal; (4) caudal part of abdomen, lateral; (5) paramere; (6) proctiger.

tal part. Paramere (Fig. 5) "bird-head-shaped", with strongly enlarged basal portion set with numerous setae, ending in distal slender ventrocaudad-curved hook.

Paratypes (apterous males): Similar to holotype. Body length 2.7 - 2.9 mm. Armature of hind femur varying as follows: basally with 0 - 1 small tooth, first set of distal row with 5 - 6, second set with 6 - 9 spines; second distal row consisting of 2 - 5 minute teeth.

Allotype (apterous female): Size: body length 3.1, maximum width across metanotum 0.55, length of head 0.31, width of head between eyes 0.27, eye length 0.40, eye width 0.33, pronotum length 0.75, pronotum width 0.95, abdomen length 1.87, width of first tergite 0.92, lengths of antennomeres: I 0.62, II 0.35, III 0.40, IV 0.40, fore leg length: femur 0.75, tibia 0.85, tarsus 0.25, mid leg length: femur 1.57, tibia 1.15, tarsus 1.25 (tarsomeres I 0.01, II 0.60, III 0.65), hind leg length: femur 1.35, tibia 1.32, tarsus 0.25.

Colour and pilosity: Similar to apterous male, yellow areas of pronotum and connexiva lighter and more strongly contrasting with blackish abdomen than in male.

Structural characteristics: Similar to apterous male. Hind leg less thickened and with weaker armature. Hind trochanter without tooth. Hind femur (Fig. 2) weakly incrassate, basally without teeth, in distal two thirds with one distinct row arranged in two spine sets (3, 7, respectively), these shorter than in male, second row extremely reduced and consisting of 1 minute tooth. Peg-like teeth on hind tibia reduced. Abdomen (Figs. 3, 4) very slender. Connexiva distinctly convergent caudally, slightly thickened on margin of segments IV and V. Tergites I-III with short, sparse pilosity, IV-VI hairless, VII with dark hairs along hind margin, VIII densely pilose in caudal half. Tergites matt, except VII largely shiny, and VIII shiny in anterior half. Tergite VII twice as long as wide, tergite VIII slightly longer than wide. Dorsal areas of gonocoxa and proctiger with long, brown pilosity. In lateral view (Fig. 4) connexival corners pronounced, slightly elevated.

Paratype (apterous female): This specimen was illustrated by Iris Rubin in HECHER & ZETTEL (1996: fig. 227: specimen in the centre of the plate). Body length 3.2. Extremely similar to allotype, but armature of hind femur slightly different: basally without teeth, in distal two thirds with one distinct row organized in two spine sets (3, 5 or 6, respectively), second row consisting of 2 or 3 minute teeth.

Macropterous male and female unknown.

**Ecological notes:** The Quebrada Negra (Fig. 7) is a small tributary of the Rio Bonito in the Rio Esquinas water shed. The collection site was shaded by secondary forest. During the dry season when sampled, the stream was ca. 4 metres wide and 0.5 metres deep at the site (P. Sehnal, pers. comm.).

**Etymology:** This species is dedicated to Peter Sehnal, dipterist in the Natural History Museum Vienna, who discovered it in the Esquinas Forest during the preparation of an exhibition and a book (SEHNAL & ZETTEL 1996). This book is titled "Esquinas National Park. The Austrians' Rain Forest in Costa Rica". The title reflects the campaign in Austria to collect donations enabling the buying of lots from private owners for the purpose of forest conservation.

## Discussion

*Rhagovelia sehnali* sp.n. is tentatively placed in the *R. robusta* group as defined by POLHEMUS (1997) on the basis of the following set of characteristics: pronotal lobe of apterous morph medially "completely" covering mesonotum (see Description). Posterolateral margin of abdominal segment VII of male without black denticles. Tergites of apterous female without median carina. Connexival margin of female not (or hardly)



Fig. 7: Type locality of *R. sehnali* sp.n.: Quebrada Negra, Esquinas National Park (photo: Peter Sehnal).

thickened. Base of middle femur of female not flattened. Hind tibia apically without crescent-shaped spur. Proctiger of male basally with well developed lateral lobes. Paramere of male distally not curved dorsad. – However, by its general appearance, the structures of hind legs and male genitalia, and the strong modifications of the abdomen of the female, the new species is only distantly related to the other species of the group. Most importantly, though they are present, the new species does not show well the two proposed synapomorphies of the group (POLHEMUS 1997), i.e. the shape of the proctiger and the dentation on the hind tibia. The lateral lobes of the distal cone of the proctiger are relatively poorly developed, and there is no "conical spike" (POLHEMUS 1997) on the hind tibia of the male. The latter character is also absent in some other species of the group and might be an effect of the small size of *R. sehnali* sp.n.

Species of the *R. robusta* group are mostly distributed in tropical South America (19 species). However, five species are known from Mesoamerica and southern North America: *R. johnpolhemi* POLHEMUS, 1997 from Costa Rica and Panama, *R. nitida* BACON, 1948 from Jamaica, *R. torreyana* BACON, 1956 from Florida (POLHEMUS 1997), *R. nigranota* POLHEMUS & CHORDAS, 2004 from Chiapas, Mexico (POLHEMUS & CHORDAS 2004), and *R. sehnali* sp.n. from Costa Rica (this study). POLHEMUS (1997) suggested that the species of the *R. robusta* group were isolated in the South American continent before the appearance of the Panamian Isthmus and that, after the connection of South America with Mesoamerica, few species have colonized the northern regions.

### Acknowledgements

The authors wish to thank Peter Sehnal (Natural History Museum Vienna), who discovered this new species and provided information on the habitat; Glenn Morris (University of Toronto) for a linguistic review; and Christine Hecher (Natural History Museum Vienna) for some corrections to the manuscript.

Research of the first author in the Natural History Museum Vienna received support from the SYNTHESYS Project <http://www.synthesys.info/> which is financed by European Community Research Infrastructure Action under the FP6 "Structuring the European Research Area" Programme (AT-TAF-1670).

### References

- HECHER C. & ZETTEL H., 1996: Sammeln - Erforschen - Bewahren. Die Forschung an den Naturhistorischen Museen als Grundlage für einen fundierten Naturschutz. – In: SEHNAL P. & ZETTEL H. (eds.): Esquinas-Nationalpark. Der Regenwald der Österreicher in Costa Rica. – Naturhistorisches Museum in Wien, Vienna, pp. 130-132.
- NIESER N. & POLHEMUS D.A., 1999: Four new species of *Rhagovelia* (Heteroptera: Veliidae) from Minas Gerais (Brazil), with a key to the regional species of the *angustipes* complex. – Aquatic Insects 21(1): 53-76.
- POLHEMUS D.A., 1997: Systematics of the genus *Rhagovelia* MAYR (Heteroptera: Veliidae) in the Western Hemisphere (exclusive of the *angustipes* complex). – Thomas Say Publications in Entomology, Monographs, Entomological Society of America, Lanham, MD, 386 pp.
- POLHEMUS D.A. & CHORDAS S.W., 2004 [2003]: A new species of *Rhagovelia* and first member of the *robusta* group known from Mexico (Heteroptera: Veliidae). – Journal of the New York Entomological Society 111(4): 202-206.
- SEHNAL P. & ZETTEL H. (eds.), 1996: Esquinas-Nationalpark. Der Regenwald der Österreicher in Costa Rica. – Naturhistorisches Museum in Wien, Vienna, 138 pp.