UNIVERSIDADE FEDERAL DO PARÁ – UFPA
MUSEU PARAENSE EMÍLIO GOELDI
INSTITUTO DE CIÊNCIAS BIOLÓGICAS
PROGRAMA DE PÓS-GRADUAÇÃO EM ZOOLOGIA - PPGZOOL

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SINOPSE DO GRUPO *SALINA* DO GÊNERO *RHAGOVELIA* (INSECTA: HEMIPTERA: VELIIDAE), COM DESCRIÇÃO DE NOVA ESPÉCIE E CHAVE DE IDENTIFICAÇÃO

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Dissertação apresentada ao Programa de Pós-Graduação em Zoologia do Instituto de Ciências Biológicas da Universidade Federal do Pará em convênio com Museu Paraense Emílio Goeldi, para a obtenção do grau de Mestre em Zoologia.
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Synopsis of the *salina* group of the genus *Rhagovelia* (Heteroptera: Gerromorpha: Veliidae), with description of a new species and identification key

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Introdução Geral

Rhagoveliinae é uma subfamília composta por apenas dois gêneros, dos quais somente *Rhagovelia* Mayr, 1865 ocorre no Brasil. A mesma é caracterizada pela presença de um leque de cerdas plumosas que se origina de uma fenda profunda no pré-tarso da perna mediana. Considera-se que esse gênero possui a morfologia mais especializada da família Veliidae, além de ser o segundo maior em número de espécies e o mais estudado taxonomicamente (ex:Bacon 1956; Matsuda 1956; Polhemus 1997).

Considerando a fauna das Américas, Rhagovelia é dividido atualmente em vinte grupos de espécies (armata, abrupta, ainsliei, bisignata, cali, collaris,elegans, hambletoni, hirtipes, itatiaiana, lucida, obesa, robusta, salina, secluda, spinigera, taylloriella, torquata, varipes e whitei), sendo estes agrupados em quatro complexos (monofiléticos) e um grado (parafilético). O Brasil é o pais mais diverso em número de espécies, mas nem todos os grupos ocorrem no país (Polhemus 1997; Moreira *et al.* 2012; Padilla-Gil &Moreira 2013.

O complexo angustipes é caracterizado por espécies com pronoto das formas ápteras curto, pertencendo a ele os grupos bisignata, hambletoni e salina. Este último foi proposto por Polhemus (1997) para agrupar espécies que possuem apenas dois artículos tarsais e representantes primariamente marinhos. Originalmente, essas mesmas espécies encontravam-se no gênero *Trochopus* Carpenter, 1898, descrito para abrigar a espécie *T. marinus* Carpenter 1898. Após esta descrição, *T. salinus* Champion, 1898 foi descrita do Panamá.

Kirkaldy (1900) julgou *Trochopus* como sinônimo de *Rhagovelia* e corretamente considerou *T. marinus* como sinônimo de *R. plumbea* Uhler, 1894, transferindo as duas para o gênero *Rhagovelia*. China & Usinger (1949) não consideraram válida a proposta de Kirkaldy e separaram novamente *Rhagovelia* de *Trochopus*. Bacon (1956) e Matsuda (1956), revisaram o gênero *Rhagovelia* no hemisfério ocidental e concordaram a sinonímia indicada por Kirkaldy e incluíram novamente as espécies de *Trochopus* em *Rhagovelia.*Drake & Doesburg (1966), por sua vez, não consideraram *Trochopus* como sinônimo de *Rhagovelia*, revalidando-o novamente e descrevendo a espécie *T.ephidros*

Drake & Van Doesburg, 1966. Tal revalidação foi questionada por Polhemus (1997), que retomou a sinonímia entre os dois gêneros.

Atualmente, o grupo salina possui oito espécies, *R. plumbea* Uhler, 1894, *R. salina* (Champion, 1898), *R. ephydros* (Drake & van Doesburg, 1966), R. *arcuata* Polhemus & Manzano, 1992, R. *columbiana* Polhemus & Manzano, 1992, R. *aguaclara* Padilla-Gil 2010, R. *rosarensis* Padilla-Gil, 2010 e R. *mangle* Moreira, Nessimian & Rúdio, 2010, sendo a última a única conhecida do Brasil até o momento (Moreira *et al.* 2010, 2011).

A proposição recente dos grupos feita dentro da revisão de Polhemus (1997), as boas descrições, ilustrações e chaves apresentadas por esse autor deram um novo impulso ao estudo de *Rhagovelia*, permitindo que material depositado em coleções e material recentemente coletado seja identificado corretamente e novas contribuições sejam feitas ao estudo do gênero. Após a criação do grupo salina, não houve trabalhos de revisão das espécies do mesmo, apenas descrições isoladas.

No presente estudo, uma nova espécie do grupo salina é descrita, duas outras são redescritas e uma chave de identificação para todas as espécies do grupo é apresentada. São apresentadas, também, uma diagnose, listas sinonímicas e bibliográficas, e mapas com a distribuição para as espécies do grupo, sendo que para algumas delas a distribuição é ampliada para o Brasil.

Abstract

Rhagovelia bentoi **sp. nov.**, from the state of Pará, northern Brazil, is described, illustrated, and compared with other species of the genus. *Rhagovelia ephydros* (Drake & Van Doesburg) and *R. plumbea* Uhler are redescribed and recorded for the first time from Brazil. Diagnosis, maps, and an identification key to all species of the *salina* group are also presented.

Key words. Hemiptera, Neotropical Region, taxonomy, riffle bugs.

Introduction

Rhagoveliinae currently includes the cosmopolitan genus *Rhagovelia* Mayr, 1865 and the Oriental genus *Tetraripis* Lundblad, 1936. *Rhagovelia* is considered the genus with the most specialized morphology among the veliids, being the second in terms of diversity and the most studied taxonomically (e.g. Bacon 1956; Matsuda 1956; Polhemus 1997). The most distinguishing feature of the genus is the swimming fan that arises from a deep cleft on the pre-tarsus of the middle leg.

Considering the fauna from the New World, the genus is currently divided in twenty groups of species (*armata*, *abrupta*, *ainsliei*, *bisignata*, *cali*, *collaris*, *elegans*, *hambletoni*, *hirtipes*, *itatiaiana*, *lucida*, *obesa*, *robusta*, *salina*, *secluda*, *spinigera*, *tayloriella*, *torquata*, *varipes*, and *whitei*), which are further gathered in four complexes (monophyletic) and a grade (paraphyletic) (*sensu* Polhemus 1997). Currently there are 48 species recorded from Brazil, but not all groups occur in the country (Polhemus 1997; Moreira *et al.* 2012; Padilla-Gil & Moreira 2013; Moreira & Barbosa 2014).

Species of the *angustipes* complex have pronotum of apterous form shorter on midline than eye, being included in the groups *bisignata*, *hambletoni*, and *salina*. The last group was proposed by Polhemus (1997) to include apterous, primarily marine species, with two-segmented tarsi. Such species were previously assigned to the genus *Trochopus* Carpenter, 1898. Kirkaldy (1900) was the first to consider *Trochopus* as a synonym of *Rhagovelia*, which was not followed by China & Usinger (1949). Subsequently, Bacon (1956) and Matsuda (1956) agreed with the synonymy proposed by Kirkaldy, but not Drake & Van Doesburg (1966). Finally, Polhemus (1997) questioned the revalidation of *Trochopus*, reinstating the synonymy.

The *salina* group currently includes eight species: *Rhagovelia plumbea* Uhler, 1894, *R. salina* (Champion, 1898), *R. ephydros* (Drake & Van Doesburg, 1966), *R. arcuata* (Polhemus & Manzano, 1992), *R. columbiana* (Polhemus & Manzano, 1992), *R. aguaclara* Padilla-Gil 2010, *R. rosarensis* Padilla-Gil, 2010, and *R. mangle* Moreira, Nessimian & Rúdio, 2010, the last being the only so far recorded from Brazil (Moreira *et al.* 2010, 2011). A new species of the group from northern Brazil is herein described and illustrated. New records, descriptions or diagnosis, maps, and an identification key to all species of the *salina* group are also presented.

Material and Methods

Specimens are deposited in the following Brazilian collections: Museu Paraense Emílio Goeldi, Pará (MPEG); Museu de Zoologia, Universidade de São Paulo, São Paulo (MZUSP); and Coleção Entomológica Prof. José Alfredo Pinheiro Dutra, Universidade Federal do Rio de Janeiro, Rio de Janeiro (DZRJ). Measurements are given in millimeters and abbreviated as follows: body length (BL), head length (HL), head width through the eyes (HW), length of antennomeres I–IV (ANT I, ANT II, ANT III, ANT IV), pronotum length on midline (PL), pronotum width (PW), length of leg: femora (FEM), tibia (TIB), tarsomeres I–II (TAR I, TAR II). New records are marked by an exclamation mark.

Results and Discussion

***Rhagovelia bentoi* Maia, Moreira & Rodrigues, sp. nov.**

(Figs 1–2, 14, 25, 41)

Apterous female. Measurements (n=1). BL—2.36; HL—0.28; HW—0.58; ANT I—0.53; ANT II—0.26; ANT III—lost; ANT IV—lost; PL—0.11; PW—0.62; foreleg: FEM—0.57, TIB—0.58, TAR I—0.10, TAR II—0.12; midleg: FEM—1.03, TIB—lost, TAR I—lost, TAR II—lost; hindleg: FEM—0.89, TIB—1.00, TAR I—0.04, TAR II—0.24.

Head dorsally dark brown, with longitudinal midline and two oblique marks on base impressed and shining. Venter of head brown. Bucculae light brown. Antenniferous tubercles dark brown. Eyes black. Antennomere I yellow, with brown apex; II brown. Rostrum dark brown, with black apex. Pronotum orange brown behind base of head, laterally black. Meso-, metanotum and sides of thorax black, covered by grayish pubescence. Prosternum yellow. Meso- and metasternum black, covered by grayish pubescence. Proacetabulum yellow. Mesoacetabulum orange brown. Metacetabulum black. Coxae and trochanters yellow. Fore femur yellow up to middle, then brown; middle femur black; hind femur black, with small proximal area yellow. Tibiae and tarsi dark brown. Abdominal tergites black, covered by grayish pubescence. Connexives orange. Abdominal sternites black, covered by grayish pubescence, except last segment shining black.

Head short, velvety, covered by short golden setae, with longer setae on frons and along inner margin of eyes. Antenna covered by short brown setae; antennomeres I-II also with long robust brown setae. Antennomeres I–II with subequal width. Venter of head without black denticles. Rostrum short, not passing fore coxae. Pronotum short, not covering mesonotum, covered by short golden setae, with longer setae laterally and hind margin slightly concave (Fig. 25), without row of circular punctations adjacent to anterior margin. Hind margin of mesonotum centrally convex. Metanotum short, with posterior margin straight. Pro- and mesopleura impunctate; metapleura with some circular punctations. Venter of thorax impunctate, without black denticles. Legs covered by short black setae, with rows of long setae on femora and tibiae. Trochanters unarmed. Fore femur unmodified, cylindrical. Fore tibia widened and laterally flattened near apex. Middle femur unmodified, cylindrical. Hind femur wider than middle femur, with a decreasing row starting in a long curved spine, followed by seven shorter spines, the distalmost two being extremely small (Fig. 14). Hind tibia straight, without spines throughout the length, with straight apical spur. Abdominal tergites I–VI transversely rectangular; VII subquadrate, with hind margin slightly concave. Abdominal connexives vertical on sides of tergites I–IV, reflected over abdomen and covering part of tergites V–VII. Abdominal sternites without black denticles or carina, with patches of punctations laterally near connexives.

Type-material. BRAZIL: **Pará** – Altamira, Baixo Rio Xingu, Igarapé Imbaubal, 25.XI.1983, (B. Mascarenhas): 1 apterous female [**HOLOTYPE**] (MPEG).

Distribution. So far known only from the type-locality on the lower reaches of the Xingu River (Fig. 41).

Etymology. Named in honor of Dr. Bento Melo Mascarenhas (MPEG), for encouraging the senior author in the study of aquatic Heteroptera.

Comments. *Rhagovelia bentoi* **sp. nov.** is included on the *salina* group based on the pronotum shorter than the eye and two-segmented tarsi. The only representative of the new species was collected in freshwater, more than 400 km away from the sea influence. Drake & Van Doesburg (1966) mentioned that some specimens of the type series of *R. ephydros* were also collected relatively far from brackish water, although according to them this appears to be a secondary habitat.

Females of other species of the group are always larger than the males, with body length between 2.93–4.53 mm. The female of *R. bentoi* **sp. nov.**, however, is only 2.36 mm long. The smallest described females currently held in the *salina* group are those of *R. ephydros* (2.93–3.00 mm), from which *R. bentoi* **sp. nov.** differs by the absence of longitudinal dark stripes on antennomere I and femora (Fig. 1), hind femur with a long curved spine followed by seven shorter spines (Fig. 14), and shape of abdominal connexives, which are distinctly reflected on tergites V–VII (Fig. 1); whereas in *R. ephydros* the longitudinal dark stripes on antennomere I and femora are present (Figs 3–4), female hind femur bears 4–9 shorter spines (Fig. 19) and the abdominal connexives range from horizontal to slightly elevated (Fig. 3).

***Rhagovelia aguaclara* Padilla-Gil, 2010**

(Figs 9, 15, 30, 41)

Type locality. Colombia, Nariño, Tumaco, Aguaclara.

Diagnosis. Antennomere I with proximal 1/3 yellow, black distally. Proximal 2/3 of fore femur and 1/3 of hind femur yellow, remaining of fore and hind femora and entire middle femur black. Male fore trochanter unarmed. Male fore tibia straight. Male hind femur with approximately 15–16 spines throughout length, the median spines longer than the basal and apical spines. Male hind tibia with three spines close to apex (Fig. 15). Female connexives elevated at 45°, with margins of segments I–IV thickened. Paramere strongly sculptured, with shape as in figure 30.

Distribution. Colombia (Fig. 41).

***Rhagovelia arcuata* (Polhemus & Manzano, 1992)**

(Figs 10, 16, 31, 42)

Type locality. Colombia, Valle del Cauca, Bahía de Buenaventura, Cangrejo Island, Estero Veneno, Punteno.

Diagnosis. Antennomere I basally yellowish, then dark brown. Fore and hind femora dark brown, yellowish dorsally and ventrally. Middle femur dark brown. Male fore tibia strongly bowed (Fig. 10). Male hind femur with six shorter spines basally, followed by a stout spine before the middle and approximately 10 shorter spines

arranged in irregular rows distally (Fig. 16). Female impressed on metanotum and each side of the midline of abdominal tergite I. Paramere shape as in figure 31.

Distribution. Colombia (Fig. 42).

***Rhagovelia columbiana* (Polhemus & Manzano, 1992)**

(Figs 11, 17, 32, 41)

Type locality. Colombia, Valle del Cauca, Bahía de Buenaventura, Soldado Estero, Veneno-Punteno.

Diagnosis. Antennomere I basally yellowish, then dark brown. Fore and hind femora broadly yellowish basally, then dark brown. Middle femur dark brown. Male fore trochanter unarmed. Male fore tibia very slightly curved (Fig. 11). Male hind femur with six shorter spines basally, two larger spines in the middle, followed by 5–6 shorter spines towards the apex (Fig. 17). Male hind tibia unarmed. Paramere large and strongly sculptured (Fig. 32).

Distribution. Colombia (Fig. 41).

***Rhagovelia ephydros* (Drake & Van Doesburg, 1966)**

(Figs 3–4, 18–19, 26, 33–34, 42)

Type locality. Suriname, Para, Carolina Creek.

Apterous female. Measurements (n=5). BL—2.93–3.00; HL—0.31–0.38; HW—0.70–0.72; ANT I—0.82–0.83; ANT II—0.40–0.43; ANT III—0.46–0.52; ANT IV—0.41–0.44; PL—0.15–0.16; PW—0.80–0.85; foreleg: FEM—0.95–1.00, TIB—0.95–0.98, TAR I—0.10, TAR II—0.30–0.34; midleg: FEM—1.88–1.91, TIB—1.43–1.52, TAR I—0.73–0.77, TAR II—0.67–0.72; hindleg: FEM—1.29–1.34, TIB—1.60–1.80, TAR I—0.01, TAR II—0.38–0.44.

Head dorsally dark brown, with longitudinal midline and two oblique marks on base impressed and shining. Venter of head brown. Bucculae yellow. Antenniferous tubercles dark brown. Eyes reddish brown. Antennomere I yellow, with longitudinal brown stripe on outer surface; II–IV dark brown. Rostrum dark brown, with black apex. Pronotum yellow, with a rounded brown mark on each side. Meso- and metanotum black, covered by golden pubescence. Sides of thorax yellow. Prosternum yellow.

Mesosternum yellow, with triangular brown mark; metasternum brown, both segments covered by grayish pubescence. Pro-, meso-, metacetabulum yellow. Coxae and trochanters yellow; middle trochanter with brown stripe. Femora yellow to yellowish brown, with longitudinal black stripe on posterior surfaces. Tibiae and tarsi dark brown. Abdominal tergites black, with yellowish to brownish center, covered by golden pubescence. Connexives and abdominal sternites yellow.

Head short, velvety, covered by short golden setae, with longer setae on frons and along inner margin of eyes. Antenna covered by short brown setae; antennomeres I–II also with long robust brown setae. Antennomeres with subequal width; I–III cylindrical; IV fusiform. Venter of head without black denticles. Rostrum short, not passing fore coxae. Pronotum short, not covering mesonotum, with hind margin sinuous and strongly notched centrally (Fig. 26), and circular punctations adjacent to lateral margins and on brown spots. Hind margin of mesonotum centrally sinuous. Metanotum short, with posterior margin straight (Fig. 3). Pro-, meso-, and metapleura with few punctations. Venter of thorax impunctate, without black denticles. Legs covered by short black setae, with rows of long setae on femora and tibiae. Trochanters unarmed. Fore femur unmodified, cylindrical. Fore tibia widened centrally and slightly curved. Middle femur and tibia unmodified, cylindrical. Hind femur with a row of 4–9 indistinct spines, usually obscured by setae (Fig. 19). Hind tibia straight, without spines throughout the length, with short straight apical spur. Abdominal tergites I–VI transversely rectangular; VII subquadrate. Abdominal connexives ranging from horizontal to slightly elevated (Fig. 3). Abdominal sternites without black denticles or carina.

Apterous male. Measurements (n=5). BL—1.96–1.98; HL—0.23–0.27; HW—0.53–0.56; ANT I—0.41–0.46; ANT II—0.21–0.25; ANT III—0.29–0.31; ANT IV—0.27–0.32; PL—0.09–0.10; PW—0.59–0.61; foreleg: FEM—0.66–0.69, TIB—0.63–0.66, TAR I—0.10, TAR II—0.13–0.15; midleg: FEM—1.21–1.27, TIB—0.98–1.03, TAR I—0.43–0.51, TAR II—0.43–0.48; hindleg: FEM—0.78–0.83, TIB—1.12–1.17, TAR I—0.01, TAR II—0.19–0.24.

Body much smaller than on female and more flattened. Pronotum yellow, with an oval brown mark on each side; remaining of body predominantly black. Abdominal connexives with brown apex. Abdominal segment VIII, when exposed, dorsally yellow, with a brown triangular mark on center. Abdominal sternites brown; VII yellow on

center. Fore tibia strongly bowed (Fig. 4). Hind femur with a decreasing row of 7–10 spines (Fig. 18). Hind tibia without spines. Proctiger with a distinct notch in lateral view. Genital capsule and paramere shape as in figures 33–34.

Material examined. BRAZIL: **Pará** – Maracanã, Ilha de Algodoal, 14.IX.2013, (A.M. Maia): 42 apterous females, 46 apterous males (MPEG).

Distribution. Suriname, Brazil! (Fig. 42).

Comments. *Rhagovelia ephydros* was collected at Pará on brackish water, which is the typical habitat for species of the group. The original description mentioned 4–5 spines on the hind femur of the female, but the range seen in Brazilian specimens is wider (4–9) and the spines are sometimes obscured by setae. This species is more similar to *R. mangle*, from which it differs mainly by the absence of longitudinal dark stripes on the anterior surfaces of fore and hind femora and shape of male proctiger and paramere. For comparisons with *R. bentoi* **sp. nov.**, see comments under that species.

***Rhagovelia mangle* Moreira, Nessimian & Rúdio, 2010**

(Figs 5, 20, 27, 35–36, 42)

Type locality. Brazil, Espírito Santo, Conceição da Barra, foz do rio.

Diagnosis. Antennomere I yellowish, with longitudinal dark stripe on outer surface. Fore and hind femora yellowish, with longitudinal dark stripes on anterior and posterior surfaces. Hind margin of pronotum sinuous, with a small convex projection medially (Fig. 27). Male fore tibia strongly bowed (Fig. 5). Male hind femur with a row of 7–10 decreasing spines towards the apex (Fig. 20). Male hind tibia with approximately four short spines at proximal third. Female hind femur with a row of 8–11 decreasing spines, occupying approximately the posterior half. Genital capsule and paramere with shape as in figures 35–36.

Distribution. Brazil (Bahia, Espírito Santo) (Fig. 42).

Material examined. BRAZIL: **Espírito Santo** – Conceição da Barra, foz do rio, raízes de *Rizophora mangle*, 21.V.2009, (F.F.F. Moreira & J.A. Rúdio): 2 apterous females, 6 apterous males [**PARATYPES**] (DZRJ).

***Rhagovelia plumbea* Uhler, 1894**

(Figs 7–8, 21–22, 28, 37–38, 41)

= *Trochopus marinus* Carpenter, 1898

Type locality. West Indies, Grenada and St. Vincent.

Apterous female. Measurements (n=5). BL—3.36–3.41; HL—0.40–0.44; HW—0.68–0.70; ANT I—0.53–0.57; ANT II—0.40–0.42; ANT III—0.44–0.48; ANT IV—0.48–0.55; PL—0.16–0.22; PW—0.74–0.78; foreleg: FEM—0.82–0.88, TIB—0.78–0.80, TAR I—0.01, TAR II—0.15–0.18; midleg: FEM—1.62–1.67, TIB—1.40–1.46, TAR I—0.88–0.90, TAR II—0.55–0.62; hindleg: FEM—0.91–1.02, TIB—1.40–1.44, TAR I—0.01, TAR II—0.28–0.31.

Head dorsally black, with longitudinal midline and two oblique marks on base impressed and shining. Venter of head brown. Bucculae yellow. Antenniferous tubercles dark brown. Eyes reddish to dark brown. Antennomere I with proximal half yellow and distal half brown; II–IV dark brown. Rostrum dark brown, with black apex. Pronotum orange centrally, brown on sides. Meso- and metanotum dark brown, covered by grayish pubescence. Sides of thorax brown. Prosternum yellowish. Meso- and metasternum yellowish brown. Pro-, meso-, metacetabulum yellow. Fore and hind coxae yellow; middle coxa brown. Trochanters yellow. Fore femur yellow up to middle, then brown; middle and hind femora brown. Tibiae and tarsi brown. Abdominal tergites black, covered by grayish pubescence. Connexives and abdominal sternites brown.

Head relatively elongated, velvety, with longer setae on frons and along inner margin of eyes. Eyes covered by setae (Fig. 6). Antenna covered by short golden setae; antennomere I also with long robust brown setae. Antennomeres with subequal width; I–III cylindrical; IV fusiform. Venter of head without black denticles. Rostrum short, not passing fore coxae. Pronotum short, not covering mesonotum, hind margin sinuous with a small convex projection medially (Fig. 28), and circular punctations adjacent to lateral margins. Mesonotum covered by punctations, with hind margin centrally convex. Metanotum short, with punctations restricted to sides, and posterior margin slightly notched medially. Pro-, meso-, and metapleura with few punctations. Venter of thorax impunctate, without black denticles. Legs covered by short silvery setae, with rows of long setae on femora and tibiae. Trochanters unarmed. Fore femur unmodified, cylindrical. Fore tibia weakly curved, slightly wider on apex. Middle femur and tibia

unmodified, cylindrical. Hind femur unarmed (Fig. 21). Hind tibia straight, without spines or apical spur. Abdominal tergites I–VI transversely rectangular; VII subquadrate. Connexives reflected from sides of tergite IV towards apex (Fig. 8). Abdominal sternites without black denticles or carina.

Apterous male. Measurements (n=5). BL—2.25–2.37; HL—0.35–0.40; HW—0.65–0.67; ANT I—0.60–0.62; ANT II—0.30–0.32; ANT III—0.40–0.41; ANT IV—0.35–0.36; PL—0.17–0.20; PW—0.70–0.75; foreleg: FEM—0.82–0.87, TIB—0.75, TAR I—0.03–0.04, TAR II—0.17–0.20; midleg: FEM—1.55–1.56, TIB—1.25–1.30, TAR I—0.70–0.75, TAR II—0.55–0.63; hindleg: FEM—0.96–1.00, TIB—1.32–1.37, TAR I—0.04–0.05, TAR II—0.25–0.27.

Similar to the apterous female in color and structure, but much smaller (Fig. 7). Fore tibia strongly bowed. Hind femur more robust, at distal portion with a decreasing row of 3–7 spines (Fig. 22). Hind tibia straight, without spines or apical spur. Abdominal connexives vertical, but not reflected over abdomen. Proctiger with a distinct notch in lateral view. Genital capsule and paramere with shape as in figures 37–38.

Material examined. BRAZIL: **Pará** – Bragança, Praia de Ajuruteua, 5.III.1986, (R.B. Neto & M. Zanuto): 41 apterous females, 2 apterous males (MPEG). **Pernambuco** – Porto de Galinhas, Pontal de Maracaípe, 08°32'26"S/ 35°00'25"W, 02.I.2013, (H.D.D. Rodrigues): 21 apterous females, 24 apterous males (MZUSP), 4 apterous females, 4 apterous males (MPEG).

Distribution. United States (Florida), Mexico, Bahamas, Cuba, Cayman Islands, Puerto Rico, U.S. Virgin Islands, Jamaica, Belize, Honduras, St. Lucia, St. Vincent & Grenadines, Aruba, Curaçao, Bonaire, Venezuela, Grenada, Trinidad & Tobago, Brazil! (Pará, Pernambuco) (Fig. 41).

Comments. The presence of numerous setae on the eyes (Fig. 6) is a distinctive and easily observed feature of *R. plumbea.* It can also be separated from other species of the group by the absence of longitudinal dark stripes on antennomere I and femora (Fig. 7–8), and armature of the hind femur of males (Fig. 22) and females (Fig. 21).

***Rhagovelia rosarensis* Padilla-Gil, 2010**

(Figs 12, 23, 39, 42)

Type locality. Colombia, Nariño, Tumaco, Río Rosario, Vereda Corriente Grande.

Diagnosis. Antennomere I yellow on proximal 1/3, brown distally. Fore and hind femora yellow on proximal half, distally dark brown. Middle femur dark brown. Male fore tibia strongly bowed (Fig. 12). Middle and hind tibiae of males and females with apical spur. Male hind femur with a row of five spines on distal half, starting with a more robust spine, followed by another small, and three very shorter (Fig. 23). Female hind femur with four shorter spines. Paramere shape as in figure 39.

Distribution. Colombia (Fig. 42).

***Rhagovelia salina* (Champion, 1898)**

(Figs 13, 24, 29, 40, 42)

Type locality. Panama, San Miguel, Pearl Islands.

Diagnosis. Antennomere I basally light brown, then dark brown. Fore femur basally light brown. Remaining of legs dark brown. Male fore trochanter armed with a distinct spine posteriorly. Male fore tibia weakly curved (Fig. 13). Male hind femur with 10–12 spines throughout length, two in the middle being larger and curved (Fig. 24); female hind femur with 0–4 short spines posteriorly. Hind tibia unarmed in males and females. Paramere shape as in figure 40.

Distribution. Panama (Fig. 42).

Identification key to the species of the *salina* group of the genus *Rhagovelia*

1. Antennomere I yellow to orange, with longitudinal dark brown to black stripe on outer surface (Figs 3–4, 5)... 2

- Antennomere I basally yellow to light brown, distally dark brown to black (Figs. 1, 7–8)... 3

2. Fore and hind femora with longitudinal dark stripes on anterior and posterior surfaces, sometimes partially fused; male genital capsule and paramere as in Figs 35–36... *Rhagovelia mangle*

- Fore and hind femora with longitudinal dark stripes on posterior surfaces only; male genital capsule and paramere as in Figs 33–34... *Rhagovelia ephydros*

3. Female at most 3.50 mm long; male at most 2.40 mm long [estimated for *R. bentoi*]... 4

- Female at least 3.60 mm long; male at least 2.65 mm long... 5

4. Female shorter than 2.50 mm; eyes not covered by setae; female hind femur with 1 long spine followed by 7 progressively smaller spines (Fig. 14) [male unknown]... *Rhagovelia bentoi*

- Female body length 3.30–3.50; male body length 2.20–2.40 mm; eyes covered by setae (Fig. 6); female hind femur unarmed (Fig. 21); male hind femur with a decreasing row of 3–7 spines at distal portion (Fig. 22)... *Rhagovelia plumbea*

5. Male fore tibia strongly bowed (Fig. 10, 12)... 6

- Male fore tibia straight or slightly curved (Fig. 9, 11, 13)... 7

6. Male shorter than 2.80 mm; female shorter than 4.00 mm; female maximum width 1.60 mm; male hind femur with 5 spines on distal half (Fig. 23); male paramere as in Fig. 39... *Rhagovelia rosarensis*

- Male at least 3.00 mm long; female at least 4.20 mm long; female maximum width 2.16 mm; male hind femur with several spines throughout its length (Fig. 16); male paramere as in Fig. 31... *Rhagovelia arcuata*

7. Male at least 3.60 mm long; female at least 4.30 mm long; male hind tibia with 3 spines near apex (Fig. 15); male paramere as in Fig. 30... *Rhagovelia aguaclara*

- Male at most 3.50 mm long; female at most 3.80 mm long; male hind tibia unarmed; male paramere with different shape... 8

8. Abdominal tergites VII–VIII shining black, on the female also medially on tergite VI; middle trochanter yellowish, with a brown streak; male fore trochanter unarmed (Fig. 11); paramere as in Fig. 32... *Rhagovelia columbiana*

- Abdominal tergite VIII or VII–VIII with light brown spots; middle trochanter light brown; male fore trochanter with a long distal spine (Fig. 13); paramere as in Fig. 40... *Rhagovelia salina*

Acknowledgements

We thank Mr. Benedito Nunes for the drawings, the Brazilian Council for Scientific and Technological Development (CNPq) for the scholarship provided to AMM, and the São Paulo Research Foundation (FAPESP 2013/ 16654–0) for the scholarship provided to HDDR. The study was also supported by a CNPq grant (311403/ 2012–3) to JAMF.

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Figure captions

Figures 1–8. (1–2) *Rhagovelia bentoi* **sp. nov.**, (1) dorsal view of holotype female, (2) female hind femur. (3–4) *Rhagovelia ephydros*, dorsal view of (3) female and (4) male. (5) *Rhagovelia mangle*, male paratype, dorsal view. (6–8) *Rhagovelia plumbea*, (6) dorsal view of the eye showing the ocular setae; dorsal view of (7) male and (8) female.

Figures 9–24. (9, 15) *Rhagovelia aguaclara*, (9) male fore tibia, (15) male hind leg (arrow indicates the shorter spines on tibia). (10, 16) *Rhagovelia arcuata*, (10) male fore leg, (16) male hind leg. (14) *Rhagovelia bentoi* **sp. nov.**, female hind femur. (11, 17) *Rhagovelia columbiana*, (11) male fore leg, (17) male hind leg. (18–19) *Rhagovelia ephydros*, (18) male hind femur, (19) female hind femur. (20) *Rhagovelia mangle*, male hind femur. (21–22) *Rhagovelia plumbea*, (21) female hind femur, (22) male hind femur. (23) *Rhagovelia rosarensis*, male hind femur. (13–24) *Rhagovelia salina*, (13) male fore leg, (24) male hind femur. Figures 9, 12, 15, and 23 modified from Padilla-Gil (2010). Figures 10, 11, 16, and 17 modified from Polhemus & Manzano (1992). Figures 13 and 24 modified from Drake & Van Doesburg (1966).

Figures 25–40. Pronotum: (25) *Rhagovelia bentoi* **sp. nov.**, (26) *R. ephydros*, (27) *R. mangle*, (28) *R. plumbea*, (29) *R. salina*. Genital segments of male: (30) *Rhagovelia aguaclara*, paramere. (31) *Rhagovelia arcuata*, paramere. (32) *Rhagovelia columbiana*, paramere. (33–34) *Rhagovelia ephydros*, (33) genital capsule in lateral view, (34) paramere. (35–36) *Rhagovelia mangle*, (35) genital capsule in lateral view, (36) paramere. (37–38) *Rhagovelia plumbea*, (37) genital capsule in lateral view, (38) paramere. (39) *Rhagovelia rosarensis*, paramere. (40) *Rhagovelia salina*, paramere. Figures 29 and 40 modified from Drake & Van Doesburg (1966). Figures 30 and 39 modified from Padilla-Gil (2010). Figures 31 and 32 modified from Polhemus & Manzano (1992).

Figures 41–42. Maps of the geographical records of all species of the *salina* group of the genus *Rhagovelia*.