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NOTES ON SOME AMERICAN RHAGOVELIA,  
WITH DESCRIPTIONS OF TWO NEW SPECIES  
(HEMIPTERA: VELIIDAE)BY CARL J. DRAKE<sup>1</sup> AND ROLAND F. HUSSEY<sup>2</sup>

THIS contribution is based very largely upon water-striders of the genus *Rhagovelia* Mayr, 1865, in the collection of the University of Michigan Museum of Zoology. Some records have also been taken from specimens in other collections, notably those of the University of Florida and of the authors. Comparative measurements in the descriptions are given in hundredths of a millimeter.

*Rhagovelia spinosa* Gould

*Rhagovelia spinosa* Gould, 1931, Univ. Kans. Sci. Bull., 20(1): 13 and 43, Pl. IV, Fig. 10 (♂ paramere).

The original description was based on two males (type and paratype) from Tena, Oriente Province, Ecuador. We have studied two specimens from Aguaytia, Peru, collected September 7, 1944 (E. J. Hambleton), as well as two males and one female collected on the Río Leán, under overhanging shrubbery, at Dakota Farm, Tela, Honduras, May 26, 1923 (T. H. Hubbell). The male is readily distinguished from its congeners by the fairly prominent, backward bent, sharp spine on the midventral line at the base of the last (seventh) abdominal segment.

APTEROUS FEMALE.—Length 3.0 mm., width 1.3 mm. Slightly larger than the male, but very similar in color and markings. Lengths of antennal segments I–IV = 69:40:40:40. Pronotum very short, sutured from mesonotum; mesonotum very large, concealing most of metanotum, obliquely narrowed behind the humeral angles, its truncate apex

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one-third as wide as transhumeral width (40:131). Connexiva largely brownish, narrowly black within, moderately narrowed behind, fairly wide at apex, vertical for a short distance behind base, slightly turned inward on last three segments. Lengths of podomeres of middle legs, femur: tibia: tarsal II: tarsal III = 138:100:56:65. Hind femora scarcely swollen, armed at apical two-fifths with a moderately large, outward-curved, pale spine which is followed by a short spine, then by three or four minute spines. Hind tibiae straight, unarmed beneath, longer than hind femur (131:106), with a short spur at apex.

*Plesiallotype*, ♀, Tela, Honduras; data as above; in University of Michigan Museum of Zoology.

*Rhagovelia torreyana*, new species

APTEROUS FORM.—Length, ♂, 3.65 mm. ♀, 3.75 mm.; width, ♂, 1.32 mm., ♀, 1.31 mm. Brownish black, with minute golden pubescence and with short, thick, subappressed brown pilosity which is somewhat more evident on abdomen; abdominal dorsum of females glabrous on either side of a fairly broad, median, longitudinal pubescent band. Prothorax, both above and below, whitish or pale testaceous anteriorly, the pale color broadly interrupted with black at middorsal line. First antennal segment (except apex), acetabula, trochanters, and femora toward base and below, whitish testaceous; femora, especially the middle ones, infuscated above and at tips; tibiae and tarsi blackish, fore tibiae of females often with a quadrate yellow spot on anterior side near base. Connexivum black on inner third, yellow on outer two-thirds, extreme edge and incisures lightly embrowned. Last ventral segment (except median part in males) and first genital segment yellowish in both sexes.

Transocular width of head nearly four times the minimum interocular width as seen from above (82:22). Lengths of antennal segments I–IV = 88:46:56:57, the strongly curved first segment measured on the chord of the arc subtended by it. Pronotum about one-tenth shorter than wide (♂, 91:100; ♀, 99:113), not sutured from mesonotum, though females (but not males) display a lightly curved, nearly transverse black line simulating a suture; pronotum eight or nine times as long as exposed part of metanotum at middorsal line. Front tibiae of both sexes about one-tenth longer than front femora and about three times as long as front tarsi, the tibiae widened dorsoventrally from base to apex, the anterior face flattened and very lightly concave or channeled on the apical third or fourth of its length.

Middle femora somewhat longer than middle tibiae (168:148), the latter subequal to the tarsal segments conjoined. All femora, also the front tibiae, with numerous long setiform hairs, those on hind femora occurring only on dorsal surface.

MALE.—Hind femora strongly incrassate, about two-fifths as thick as their length measured on ventral side (58:149), armed beneath (Fig. 1) with two rows of teeth, the upper or posterior row beginning at middle of femur and comprising about nine evenly spaced teeth, the first one conspicuously longest, the others progressively decreasing in length; lower or anterior row composed of minute denticles and interrupted at middle, denticles beyond the lacuna slightly larger than proximal ones; hind trochanter with a few minute denticles beneath. Hind tibiae very lightly curved, subequal in length to hind femora (145:149), armed beneath on their whole length with a single row of about 18 minute, dentiform tubercles, apex of tibiae with a short, subacute spur; third tarsal segment less than three times as long as the first two together (39:15). First genital segment only moderately constricted beneath at base. Male claspers (Figs. 2, 3) symmetrical, these and internal genitalia (Figs. 4, 5) distinctive of the species.

FEMALE.—Hind femora only slightly thicker than middle femora, about four times as long as thick (125:30), distinctly shorter than hind tibiae (125:149), armed beneath at about apical third with two rather slender teeth of which the proximal one is the longer, and with two or three small tubercles between these teeth and apex of femur; hind tibiae straight, unarmed. Connexivum commonly almost vertical, rarely folded inward over the abdomen, but the two connexiva never meet above the dorsum; connexival margins distinctly divergent behind over last abdominal segment. Last ventrite very long.

Alate form unknown.

*Holotype*, ♂, and *allotype*, ♀; Liberty County, Florida, near Torreya State Park; May 22, 1954 (R. F. Hussey); in University of Florida collections (Florida State Museum). *Paratypes*: numerous specimens, topotypic; March 27, 1954, May 22, 1954, and June 5, 1955 (R. F. Hussey), also June 2, 1924 (T. H. Hubbell); in University of Florida collections, U. S. National Museum, Snow Entomological Museum of the University of Kansas, Purdue University collection, University of Michigan Museum of Zoology, and the authors' collections.

Differs from the common Floridian *Rhagovelia choreutes* Hussey by its smaller pronotum, by the much more strongly swollen hind femora of the males, and by the male genital characters. Females do not have the middle femora constricted at the middle as they are in *R. choreutes*,

and the connexiva are more nearly vertical, not horizontally depressed so as to meet over the last segments of the abdomen.

This species is known definitely from only a single locality. It occurs in considerable numbers on a tiny brook at the bottom of a deep, narrow, steep-sided, shady ravine, about one-half mile south of the present Torreya State Park. This ravine, at the site of "Old Camp Torreya," has been a favorite collecting ground for naturalists at the University of Florida for more than thirty years, and descriptions of it have been published by Rogers<sup>3</sup> and by Hubbell, Laessle, and Dickinson.<sup>4</sup> It is the type locality of a number of insect species, some of which (like the present one) have not been found elsewhere, even in similar habitats in the immediate vicinity.

Besides the type series, we have seen a few other specimens of this new species in the University of Florida collections. These lack all collecting data, but they, too, may well be topotypic. Because of the uncertainty regarding their origin, they have not been made paratypes.

In comparing *R. torreyana* with *R. choreutes* above, reference was made to an unusual type of sexual dimorphism. Three American species of *Rhagovelia* are now known whose females (but not the males) have middle femora that are very sharply but narrowly constricted near mid-length. This gives them quite an abnormal appearance, as if the middle legs had been severely injured at some time in their development; however, this sharply pinched condition is a normal one peculiar to the females of these few species. It occurs consistently on both middle legs of every female specimen, even in long series from the same or from different localities. The three species which show this character are the following: *Rhagovelia spinigera* Champion, 1898, known from Guatemala, Costa Rica, Mexico, and Texas; *R. choreutes* Hussey, 1925, from Florida, Mississippi, Texas, Oklahoma, New Mexico, Arizona, and California; and *R. ignota* Drake and Harris, 1933, from Mexico and Texas. Both Champion<sup>5</sup> and Gould,<sup>6</sup> in their keys to *Rhagovelia*, treated the femoral constriction as if it occurs in both sexes, and consequently the males of the species in question do not run properly through these keys.

<sup>3</sup> J. Speed Rogers. "The Ecological Distribution of the Crane-flies of Northern Florida," *Ecol. Monogr.*, 3, No. 1 (1933): 1-74.

<sup>4</sup> T. H. Hubbell, A. M. Laessle, and J. C. Dickinson. "The Flint-Chattahoochee-Apalachicola Region and Its Environments," *Bull. Fla. State Mus. Biol. Sci.*, 1, No. 1 (1956): 1-72 (pp. 20-23).

<sup>5</sup> *Biol. C.-Amer., Hem.-Het.*, 2 (1898): 131-32.

<sup>6</sup> *Univ. Kans. Sci. Bull.*, 20, No. 1 (1931): 12-14.

*Rhagovelia gaigei*, new species

APTEROUS FORM.—Length, ♂, 4.20 mm., ♀, 4.78 mm.; greatest width of body, ♂, 1.45 mm., ♀, 1.59 mm. Reddish brown, without distinct color markings; pronotum slightly frosted on anterior part; abdominal tergites slightly bluish. Head sparsely clothed with blackish hairs. Antennae dark fuscous, basal segment largely brownish testaceous, clothed with pale pubescence, first two segments with some long, dark, bristly hairs. Tarsi dark fuscous; tibiae generally darker than femora and more heavily infuscated toward the tips; middle femora with a fuscous stripe on posterior face.

Transocular width of head more than three times the minimum interocular distance (92:28, ♂; 98:31, ♀). Lengths of antennal segments I–IV = 97:59:64:58, ♂; 100:61:67:59, ♀. Pronotum large, concealing most of metanotum, not sutured from mesonotum, about one-fourth wider than long (124:102, ♂; 140:109, ♀), broadly and gradually rounded behind, clothed with dark pubescence, punctures not visible without wetting surface. Front trochanters unarmed in both sexes; front tibiae slightly dilated apically, flattened beneath and then slightly furrowed apically, clothed on posterior side with rather long, golden, semiappressed hairs and with one or two rows of long, dark hairs, more or less erect, on dorsal surface; front tibiae only slightly longer than front femora (117:110, ♂; 128:118, ♀). Middle legs long, slender, with a single row of long, widely separated, seta-like black hairs on lower side and another row of somewhat shorter hairs on anteroventral side; middle tibiae somewhat shorter than femora (172:191, ♂; 182:187, ♀), and very slightly longer than tarsi; third tarsal segment slightly longer than the two basal segments combined.

APTEROUS MALE.—Hind trochanters set with several small denticles. Hind femora moderately swollen, three and one-half times as long as thick (169:48) and slightly longer than hind tibiae (169:159), armed on basal two-fifths with a row of minute teeth, and on apical three-fifths with two rows of spines, the anterior row comprising eight or nine small spines, without large spine at base, the posterior row with a moderately large spine at apical three-fifths, thence with eight or nine spines decreasing in length toward apex of femur; hind tibiae nearly straight, armed beneath with a double row of short teeth and with a short apical spur. Abdomen tapering posteriorly, clothed with longer brownish pubescence. Connexiva gradually narrowed caudad, acutely angulate at apex but not produced; abdomen without carina beneath, unarmed, densely clothed with pale pubescence, last ventrite

one and one-half times as long as preceding segment. First genital segment hairy above, slightly constricted at base beneath; parameres large.

**APTEROUS FEMALE.**—Connexiva wider than in male and less narrowed posteriorly, subtruncate at apex, more strongly reflexed on last four segments where their outer edges lie slightly above the tergites but do not meet on middorsal line, apex with a dense tuft of long fuscous hairs which are spinelike in appearance. Hind femora very slightly swollen, five times as long as thick (149:30), armed at apical two-fifths with a fairly large spine followed by four to six much smaller spinules (anterior row absent or represented by three or four small spines only). Hind tibiae longer than hind femora (184:149), armed with an incomplete row of stout teeth on basal half or two-thirds of lower surface.

**MACROPTEROUS FORM.**—Size, color, and markings quite similar in both sexes. Pronotum large, triangular behind, slightly rounded at apex, apex not produced in female, humeral width very little more than median length (185:175). Hemelytra longer than abdomen, blackish fuscous, the veins distinctly darker, basal cell becoming paler basally.

*Holotype*, apterous ♂, and *allotype*, apterous ♀; Mt. San Lorenzo, Santa Marta Mountains, Colombia; altitude 5,000 feet; June 9, 1920 (F. M. Gaige); in University of Michigan Museum of Zoology. *Paratypes*, 1 apterous ♂, 10 apterous ♀, 2 alate ♂, 2 alate ♀, same data as types; in University of Michigan Museum of Zoology and Drake collection. Named in honor of the collector, Professor F. M. Gaige, who for many years was director of the museum where the types are deposited.

Allied to *R. citata* Drake from Venezuela and Panama, but easily distinguished from it by the larger size, darker legs, armature of male hind femora, and the form of the parameres. In winged females of *R. citata* the pronotum is strongly produced at its apex, and in apterous females the reflexed connexiva meet at the middorsal line over the posterior part of the abdomen.

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**PLATE**

PLATE I

FIGS. 1-5, *Rhagovelia torreyana*, new species.

- FIG. 1. Hind leg of male, anterior aspect.
- FIG. 2. Right paramere, lateral aspect.
- FIG. 3. Right paramere, dorsal aspect.
- FIG. 4. Internal genitalia of male, partly everted, lateral aspect.
- FIG. 5. Phallosoma, unexpanded, dorsal aspect.

FIGS. 6-7, *Rhagovelia choreutes* Hussey.

- FIG. 6. Phallosoma, unexpanded, dorsal aspect (slightly oblique).
- FIG. 7. Right paramere, lateral aspect.



PLATE I







