CONCERNING SOME AMERICAN MICROVELIA (HEMIPTERA: VELIIDAE)

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This paper is based entirely upon specimens of the genus *Microvelia* Westwood in the private collections of the authors. It includes the descriptions of two new species, new synonymical and distributional records, and discriminative notes on polymorphic forms of several little-known species. The types of both new species are in the Drake collection, paratypes of *M. pexa* in the collections of both authors. In the descriptions given here, 1 millimeter equals 80 micrometer units.

Polymorphism and especially sexual dimorphism of the apterous forms are very pronounced in many species of veliids. The occurrence of marked sexual dimorphism in apterous individuals appears to be independent of polymorphism. Thus it is necessary to characterize several types of individuals in a single species. The striking differences in forms of the same species, as well as widely separated and interrupted distributional records, account for part of the synonymy.

Original descriptions of a number of the species are wholly inadequate for their identification. In addition, both the sexes as well as both alate and wingless forms are not always represented in long series. Even in the largest collections many species are not represented by both sexes of apterous and macropterous forms. As a result several species of *Microvelia* described by the earliest workers in the genus are still imperfectly known.

Numerous species of Microvelia, such as *M. summersi* Drake and Harris, *M. munda* Drake and *M. hinei* Drake, rank among the tiniest "pygmies" of the waterstriders, measuring less than two millimeters in length. And, curiously enough, these little dwarfs are often very widely, though sometimes spottily distributed. When fully fledged they are capable of sustained flight. One of the most diminutive pygmies is *M. hinei,* which is represented in our collections by specimens from Canada, many states of the United States, Mexico, Insular and Central America, and south into Brasil and Peru. In Florida this species sometimes comes through window screens to lights. Another widely distributed form is *M. albonotata* Champion, described

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from Guatemala but ranging from New York southward through the eastern United States to the West Indies, Mexico and Central America. It has been found in numbers in Panama (Drake) and is plentiful in woodland habitats in Florida (Hussey).

Many species of *Microvelia* are shy and timid, dwelling on the quiet waters close to shore (often among partly submerged vegetation) in the secluded recesses and quiet coves of pools, ponds and lakes. And, too, similar types of favorable habitats in slow-moving waters of large and small streams are not infrequently inhabited by several species, notably *M. americana* and some of the forms related to it.

Microvelia summersi Drake and Harris

Microvelia summersi Drake and Harris, 1928, Fla. Ent. 12: 8.

This very short robust species is represented by the types from *GRENADA*, B. W. I., and a series of alate individuals from *PANAMA*, Canal Zone, taken Feb. 10, 1939, by C. J. Drake. Antennal formula, I:II:III:IV = 10:7:8:13. The wingless form is unknown. *M. summersi* is the shortest of the group of small robust species with short stout appendages. The other members of this group are *M. venustatis* Drake and Harris, *M. lujanana* Drake, and *M. marginata* Uhler.

Microvelia venustatis Drake and Harris

Microvelia venustatis Drake and Harris, 1933, Proc. Biol. Soc. Wash. 46: 53.

This species, described from "Brazil", is now known to range widely over tropical South America. The notes which follow are based on specimens from: *BRASIL*, Rio de Janeiro, Nov. 6, 1938 (C. J. Drake); *PARAGUAY*, Colonia Independencia, near Villarrica, Nov. 13, 1931 (R. F. Hussey); and east-central *PERU*, Tingo María, Sept. 9, 1944 (E. J. Hambleton). At Colonia Independencia both alate and apterous individuals were found in large numbers on a quiet pool in a grass-bordered brook. The apterous form has not been characterized before, nor have the male genital characters been described.

APTEROUS FORM: Male, length 1.31 mm., humeral width 0.65 mm. Female, length 1.38 mm., humeral width 0.80 mm., width at 4th abdominal segment 0.82 mm. Very dark plumbeous, almost black, the dorsum with fine prostrate pilosity which is more evident on the first two connexival segments and toward the sides of the first two abdominal tergites; pronotum

with a transverse flavo-testaceous band anteriorly, this band somewhat emarginate behind at the middle; sides of the thorax and entire venter with sparse prostrate silvery pubescence; first antennal segment, second rostral segment, trochanters, femora (except the tips), and tibiae beneath, flavous; last three antennal segments, base and apex of the rostrum, tips of the femora, tibiae above, and tarsi, fusco-testaceous; last two connexival segments above and below commonly (though not always in the males) with the outer half flavous, the extreme edge very narrowly brown.

Pronotum not divided into two lobes by a transverse suture, the posterior half with fine punctures in two irregular transverse rows (not visible in some males); hind margin of pronotum varying from nearly straight to distinctly emarginate at the middle; disk with a most obsolete longitudinal median ridge anteriorly; antero-lateral portion with (♀) or without (♂) some erect hairs. Mesonotum visible only as a narrow transverse strip behind the pronotum, entirely concealed beneath it at the sides, its hind margin widely transversely excavated, its median length 5/16 (♀) to 4/18 (♂) that of the pronotum; a deep arcuate phragmal impression each side just behind the "humeral angle" of the pronotum. Metanotal triangles extended forward along the postero-lateral margin of the pronotum about to the middle of the latter, their median angles truncated, depressed, apparently fused with the mesonotum. First abdominal tergite of males as long as (18:18) the second and third tergites together, of females slightly longer (20:18); first tergite with a deep fovea each side on the basal half, punctiform in males, distinctly transverse in females. Sixth and seventh tergites commonly with a narrow glabrous median line, narrower on the sixth segment and abbreviated at both ends; seventh tergite of female as long as (15:15) the fifth and sixth tergites together, seventh tergite of male slightly longer (15:13). Fourth antennal segment longest, about equal in length to the anterior interocular distance, distinctly shorter (16:20) than the posterior interocular width as seen from above.

MALE: Genital segments withdrawn into the venter, the first one appearing as a narrow flavous ring, broadly interrupted beneath by a U-shaped excavation which is largely concealed by the last ventral segment, the exposed part of the margins of this excavation diverging anteriorly and bearing a row of 8 to 10 long flavous hairs, this segment also thickly set externally with yellow hairs, directed upward, on its dorso-lateral portion. Second genital segment not protruding beyond the first, broadly subconical as seen from behind, not visible from above.

Microvelia marginata Uhler

Microvelia marginata Uhler, 1893, Proc. Zool. Soc. London, p. 719.

Microvelia pudoris Drake and Harris, 1936, Proc. Biol. Soc. Wash. 49: 105. (NEW SYNONYMY.)

Specimens of *M. marginata* Uhler from *GRENADA*, B. W. I. (determined by Dr. W. E. China of the British Museum) are identical with the type series of *M. pudoris* D. & H. from the

same island; the latter name is here synonymized with *M. marginata,* whose types were from *ST. VINCENT.*

In addition to the material from Grenada, numerous specimens of *M. marginata* have been examined from: *PERU,* Tingo María, Sept. 9, 1944 (E. J. Hambleton); *PANAMA,* Canal Zone, Feb. 6-8, 1939 (C. J. Drake); Barro Colorado, C. Z., Feb. 10, 1939 (C. J. Drake); *VENEZUELA,* Barinitas, Dec. 1942 (P. Anduzee); and *TRINIDAD,* B. W. I., Oct. 27-29, 1938 (C. J. Drake). The apterous form is not represented in our collections.

Winged males and females of *M. marginata* agree closely in size with *M. venustatis* D. & H., but are readily separable by the pale and distinctly pitted hind margin of the pronotum; and the under side of the first genital segment of the male is without the oblique rows of long hairs found in *M. venustatis. M. summersi* D. & H. is a shorter species. The antennal formula of *M. marginata* is: I:II:III:IV = 10:9:11:18.

Microvelia fasciculifera McKinstry

Microvelia fasciculifera McKinstry, 1937, J. Kans. Ent. Soc. 10(1): 31.

Specimens of this very distinct species are at hand from: *ARIZONA,* Huachuca Mts., Aug. 1934 (C. J. Drake); Santa Rita Mts., Aug. 9, 1934 (E. D. Ball). *MEXICO,* Durango (H. F. Wickham); Real de Arriba, Temescaltepec, May 13, 1923 (Hilton and Usinger); Colonia Garcia, Chihuahua, May 13, 1923 (D. E. Beck); Mexico City, D. F., July 30, 1950 (C. J. Drake).

WINGED FORM: Length 3.75 mm., width 1.60 mm., gradually narrowed from the humeral angles backward. Blackish, with short brownish pubescence; pronotum with a rectangular spot on each side (or a band interrupted at the middle) near the anterior margin, also the posterior margin of the hind process (except at the middle), testaceous or brownish-testaceous. Hemelytra dark fuscous, the veins a little darker and clothed with short brownish pubescence, the outer vein also with some brownish hairs at the base. Pronotum moderately convex, wider across the humeral angles (124:100) than long on the middle line; median raised line present but not prominent. Pronotum in front and sides of head with short silvery hairs; width of head across the eyes 0.88 mm.; head with the usual impressed median line. Antennae long, dark fuscous, shortly darkly pilose, formula I:II:III:IV = 42:40:45:42. Legs slender, fuscous with the bases paler, clothed with brownish hairs on dark areas and with much longer pale hairs beneath on testaceous areas. Abdomen bluish black beneath.

MALE: Last ventral segment with a prominent cone-shaped tuft of stiff dark hairs on the middle line slightly behind the middle. First genital

segment very long, its upper side slightly narrowed posteriorly, with the hind margin deeply excavated; under side basally with the margins sharply raised to form a deep cup-like cavity with truncate base, the rim on each side just before the apex distinctly raised and there beset with long, erect, dark bristly hairs; immediately behind the cup-like cavity the concave hind margin is deeply broadly excavated apically as in other members of the *M. americana* group.

The dense cone-like tuft of long hairs on the last ventral segment and the singularly formed under side of the male first genital segment are very distinctive characters for the recognition of this species.

Microvelia pexa, new species

APTEROUS FORM: Moderately large, subfusiform (male) or broadly ovate (female); blackish, with several small patches of silvery pubescence or silvery hairs; pronotum with the transverse rufous-brown band interrupted at the middle. Connexiva of the male concolorous with the tergites, those of female with a large quadrate brownish spot in each segment. Legs dark fuscous with the bases pale; femora and tibiae testaceous beneath; front femora largely brownish above. Abdomen bluish black beneath.

SIZE: Male, length 3.00 mm., width 1.15 mm., female, length 2.75 mm., width 1.30 mm. Antennal formula, male, I:II:III:IV = 36:35:40:41; female, 32:30:34:35.

THORAX: Pronotum short, not produced posteriorly, slightly longer than the posterior lobe of mesonotum, but distinctly (⅓ to ½) shorter than the anterior mesonotal lobe, which is narrowed posteriorly and broadly truncate behind; metanotal triangles narrow, transverse, their median angles acute.

ABDOMEN: Length, male, 2.20 mm.; female, 1.62 mm. Abdomen gradually narrowed behind in males, broadly ovate in females and with wider connexiva.

MALE: Thorax and abdomen above rather densely clothed with fine erect dark hairs which may be difficult to see unless viewed from the side; abdomen with slightly coarser and slightly longer hairs. Legs rather densely clothed with moderately long pale hairs which are paler on testaceous surfaces; hairs longer on middle and hind femora, many of them nearly or quite twice as long as the diameter of the femur; tibial hairs usually about twice as long as the diameter of the tibia at their point of origin, sometimes not longer than its diameter. Hind femora armed beneath on distal half with numerous short black teeth or short blunt spines. Genital segments large, blackish, with long hairs; first segment, seen from above, slightly narrowed posteriorly, broadly and deeply emarginate on the hind margin. Under side of first genital segment very broad, deeply and roundly impressed basally with the apex rather sharply rounded and reflexed, there beset with a thick, transverse crescent-shaped comb of long pale bristly hairs just in front of the roundly produced margin; basal discal impression black at the bottom, the raised brown lateral sides and

base beset with a thin ring of long, laterally projecting pale hairs pointed toward the center of the saucer-like depression; deeply broadly excavated beyond the discal impression as in other species of the *americana* group. Second genital segment small, unarmed.

Type (male), *allotype* (female) and 20 *paratypes, MEXICO,* Mexico City, D. F., July 30, 1950 (C. J. Drake and F. C. Hottes). Other *paratypes, MEXICO:* 8 specimens, Valles, July 30, 1950; 3 specimens, Puebla, July 29, 1950; 2 specimens, Aguascalientes, Aug. 5, 1950; 2 specimens, Guadalajara, Aug. 4, 1950; Durango, Aug. 6, 1950; Cuernavaca, July 30, 1950 (all collected by C. J. Drake).

Most closely related to *M. irrasa* Drake and Harris,, but smaller, with shorter hairy clothing and different antennal formula. *M. gerhardi* Hussey has the under side of the first genital segment (male) somewhat similar in construction, but lacks the clothing of long hairs on legs and body. The females of both *M. pexa* and *M. irrasa* are very broad, and distinctly broadly ovate. The winged form of *M. pexa* is unknown.

Microvelia costaiana, new species

APTEROUS FORM: Moderately large, elongate, testaceous, the sutures between tergites and connexival segments brownish black; sides of pronotum and head in front blackish. Legs dark fuscous-brown, the tibiae and femora beneath, almost all of fore femora above, bases of middle and hind femora above, coxae, trochanters, meso- and metasternum, and prosternum pale testaceous. Abdomen beneath blackish with bluish lustre; connexiva beneath and last two segments of venter testaceous. Length 2.00 mm., width 0.55 mm.

HEAD: Width across the eyes 0.55 mm. Head with two broad yellowish brown stripes between the eyes, coalescing posteriorly; median line indistinct behind. Antennae brown-fuscous, the base paler; segment I moderately stout, almost entirely pale beneath, slightly curved; II much more slender, a little thicker apically; III and IV very slender, practically equal in thickness. Antennal formula, I:II:III:IV = 16:11:24:34. Rostrum testaceous, the terminal segment blackish.

THORAX: Pronotum twice as wide (40:20) as long, covering posteriorly about half the mesonotum, feebly convex behind; mesonotum nearly one-half as long as the pronotum, clothed with short hairs which are pale in testaceous areas, brownish in darkened areas; hind femora unarmed, scarcely thicker than the other pairs, subequal to the tibiae in length. Tarsal segments of both middle and hind legs subequal in length.

ABDOMEN: Length 1.25 mm., width 0.58 mm. Last tergite nearly twice as long as the preceding tergite. Venter without tubercles, slightly flattened; last segment much longer than the preceding, truncate behind. Male genital segments dark fuscous, moderately hairy; first genital segment moderately wide as seen from above, truncate behind, slightly nar-

rowed apically with the sides distinctly convex; beneath with a short smooth base, thence deeply and broadly excavated; second segment beneath testaceous, very strongly flattened, with some short hairs but without tufts.

Type (male), *BRASIL,* Rio de Janeiro, Nov. 6, 1938 (C. J. Drake).

The completely flattened under side of the second ventral segment at once distinguishes this species from its allies. The venter, genital segments and hind femora are without tubercules or spines. The female and the alate forms are unknown. *M. sarpta* Drake and Harris, from Brasil, has quite differently formed genital segments, and its middle femora are greatly enlarged and strongly compressed and are much stouter than the other femora. In *M. costaiana* the middle femora are not at all stouter than the others. This species is named in honor of the noted Brasilian entomologist Dr. A. M. da Costa Lima.

Microvelia braziliensis McKinstry

Microvelia braziliensis McKinstry, 1937, J. Kansas Ent. Soc. 10(1): 36.

The winged form of this species is characterized here from a female taken on a spring-fed pool at Colonia Troche, *PARAGUAY,* Nov. 17, 1931 (R. F. Hussey). Colonia Troche is about 35 km. northeast of Villarrica on the road to Caaguazú. Apterous individuals were found Nov. 18, swarming on temporary rain-water pools in the road through the forest between Colonia Troche and Caaguazú. Apterous specimens collected by E. J. Hambleton are before us from *PERU* (Aguaytia, Sept. 7, 1944) and *ECUADOR* (El Topo, Oct. 5, 1944), and thus *M. braziliensis* has a very wide range in tropical South America.

ALATE FEMALE: Length 3.55 mm., humeral width 1.31 mm., width of head across the eyes 0.78 mm. Dark fuscous; head dull flavo-testaceous, a narrow median line and a fovea each side near the hind angle of the eye, black. Pronotum slightly wider than long (105:95), narrowly black-margined in front, behind this with a percurrent, uninterrupted, dull testaceous transverse band; disk rather tumidly convex, lightly depressed within the somewhat elevated humeral angles and along the posterior margins, coarsely, shallowly and remotely punctate and covered with fine, prostrate, rather scanty silvery pubescence; median carina faintly suggested on the highest part of the disk, not visible elsewhere; a transverse row of punctures at the hind margin of the transverse fascia; the elevated and thickened humeral angles very faintly emarginate, they and the narrow margins of the posterior process obscure honey-yellow. Hemelytra obscurely testaceous along the basal part of the costal margin, elsewhere dark fuscous,

the three apical cells and the median pre-apical cell faintly paler, the last-named with a vague median ocellate dark spot; costa (especially toward the base) and the corial veins set with silvery hairs somewhat longer than those on the pronotum, and also with a few longer black hairs. All femora with rather sparse long pale hairs beneath on the basal two-thirds of their length, many or most of these hairs twice as long as the thickness of the femur. Fourth antennal segment subequal in length (60:62) to the width of the head including the eyes, the third segment very little shorter (58 units).

Microvelia mimula B. White

Microvelia mimula Buchanan White, 1879, J. Linn. Soc. Lond., Zool. 14: 487.

Microvelia myersi McKinstry, 1937, J. Kans. Ent. Soc. 10(1): 32. (NEW SYNONYMY.)

Microvelia mimula China, 1943, Proc. Roy. Ent. Soc. Lond. Ser. B, 12: 121.

This quite striking species can be separated from its congeners by the small tubercle on the penultimate ventral segment of the male. In addition, the second genital segment has on each side, near the hind margin, a long, straight, sharp, horizontal spine projecting laterally; each of these spines is about as long as the width of the segment itself. The first genital segment is very broad and is widened apically to permit the spine-bearing segment to be exserted or retracted, and its broad posterior margin is very deeply emarginate. Since the antennal formula is the same in both sexes, the females too are readily separable from closely allied species.

M. mimula is quite similar to *M. albonotata* Champion in form and size, and both have the conspicuously silvery white spots on the hemelytra. Their antennal formulas are different. *M. mimula* has a small tubercle on the penultimate ventral segment of the male, while *M. albonotata* has an extremely large testaceous tubercle at the base of the male venter. The spines of the male second genital segment of *M. albonotata* are directed downward for about half their length and then are turned obliquely outward, and are noticeably flattened on their outer sides.

APTEROUS FORM: Male, length 1.60 mm., width 0.51 mm.; female, length 1.95 mm., width 0.56 mm. Color testaceous with some brown or blackish markings on the pronotum; legs and antennae as in the winged form.

HEAD: Width across the eyes 0.45 mm. Broad; brownish, the median line more or less obsolete posteriorly. Antennal formula, I:II:III:IV = 19:11:21:36.

THORAX: Pronotum covering a large part of the mesonotum, longer than wide (male, 46:22; female, 52:21); mesonotum with lateral angles visible; mesonotum slightly more exposed in female than in male, from ⅓ to ⅔ as long as the pronotum. Hind femora of male with a long row of sharp spines, beneath, plus a few adventitious spines or a partial second row.

ABDOMEN: Broader in female than in male; connexival margins almost straight in male, but wider in female with outer margin distinctly convex. Male venter with a small tubercle on the penultimate segment, as in winged form.

The authors are greatly indebted to Dr. R. J. Izzard for his kindness in sending four determined specimens of *M. mimula* (China, loc. cit.) collected by Dr. Noel Hynes in *TRINIDAD*, B. W. I. Many other specimens are at hand from: *BRASIL*, Rio de Janeiro, Nov. 18, 1938 (C. J. Drake); Teutonia, Sta. Catharina, June 10, 1950 (Fritz Plaumann); *ECUADOR*, Guayaquil (F. Campos); *PARAGUAY*, Colonia Troche, Villarrica Distr., Nov. 17, 1931 (R. F. Hussey); Estancia Primera, Caaguazú Distr., Dec. 8, 1931 (R. F. Hussey); *ARGENTINA*, Buenos Aires, Dec. 18, 1938; Luján, Dec. 18, 1938; Tigre, Nov. 20, 1938; Sancti Spiritu, Jan. 9, 1939 (all C. J. Drake).