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Two New Species of *Miroculis* from Cerro de la Neblina, Venezuela with New Distribution Records for *Miroculis fittkaui* and *Microphlebia surinamensis* (Ephemeroptera: Leptophlebiidae)

by

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SAVAGE, H. M.: Two new species of *Miroculis* from Cerro de la Neblina, Venezuela with new distribution records for *Miroculis fittkaui* and *Microphlebia surinamensis* (Ephemeroptera: Leptophlebiidae).
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Two new species of *Miroculis* are described and new country records reported for *Miroculis fittkaui* Savage & Peters and *Microphlebia surinamensis* Savage & Peters based upon male imagines from Cerro de la Neblina, Venezuela. Subgeneric placement of these two new species, one in *Miroculis* (*Miroculis*) and the other in *Miroculis* (*Atroari*), increases the known range of variation for various length, ratio and eye characters. Data on these characters are summarized for both subgenera, and a modified subgeneric key for male imagines is presented.

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INTRODUCTION

Two new species of *Miroculis* Edmunds are described and new country records are reported for *Miroculis fittkaui* Savage & Peters and *Microphlebia surinamensis* Savage & Peters based upon male imagines from Cerro de la Neblina, Venezuela. Cerro de la Neblina is a sandstone-capped plateau mountain located on the western portion of the crystalline Guayana Shield near the Venezuelan-Brazilian border. Cerro de la Neblina, discovered in 1955, rises from the surrounding lowlands to a maximum elevation of 3014 m, and based upon botanical studies approximately 50% of the species occurring there are endemic (Maguire, 1955). Three of the four taxa reported on herein, *Miroculis (M.) fittkaui, M. (Atroari) nebulosus* sp.n., and *Microphlebia surinamensis*, were collected at lowland sites near the base of Cerro de la Neblina at elevations of 140-145 m. *Miroculis fittkaui* and *Microphlebia surinamensis* were previously recorded from the eastern Guayana Shield and/or lowland areas north of this eastern formation. The species, *Miroculis (Atroari) nebulosus* sp.n., has morphologically unique male imaginal eyes, but is closely related to its subgeneric congeners which occur in the Rio Negro Basin of Brazil and the Orinoco Basin in Colombia. The species, *M. (Miroculis) bicoloratus* sp.n., was collected from a highland site with elevations of 2085-2100 m. The subgenus *Miroculis* is currently known to be widespread throughout the Amazon Basin; however, *bicolo-*

ratus sp.n. does not appear to be closely related to any previously described species within the subgenus. Including these new records and species, the genus *Miroculis* is known from Brazil, Colombia, Peru, Surinam and Venezuela, and appears to be an important element in terms of both species diversity and abundance in streams of tropical South America.

Discovery of these two new species of *Miroculis*, one of which is exceptionally large for the genus, and their subgeneric placement increase the known range of variation for various length, ratio and eye characters summarized in the subgeneric and generic descriptions of Savage & Peters (1982). These modifications are presented along with a modified subgeneric key for male imagines that supercedes the first three couplets of the key in Savage & Peters (1982: 511). In addition, the species couplets from Savage & Peters (1982) are expanded to allow identification of all described species.

In the descriptions that follow, the length of each fore leg segment from the femur apically is expressed as a ratio of tibia length with tibiae lengths provided in parentheses. Body length was measured from the anterior margin of the head to the posterior margin of tergum 10. Other character terminology and methods follow Savage & Peters (1982) and Savage (1983).

Miroculis Edmunds, 1963

Male Imago: as in Savage & Peters (1982) except as noted. Length: body, 3.8-8.6 mm; fore wings, 4.1-7.5 mm; fore legs, 4.0-7.2 mm. Legs: ratio of segments in fore legs, 0.42-0.64: 1.00 (1.61-2.86 mm): 0.01-0.04: 0.30-0.41: 0.22-0.32: 0.17-0.22: 0.06-0.11. Wings: bullae present or absent in fore wings.

Distribution: northern South America including Brazil, Colombia, Peru, Surinam and Venezuela.

Discussion: Collection of these two new species and specimens of *M. (Miroculis) fittkaui* from Venezuela constitutes a new country record for *Miroculis*.

KEY

to Subgenera of *Miroculis* for Male Imagines

The following key supercedes the first three couplets of the key in Savage & Peters (1982: 511) and should be used in conjunction with that key.

1. Upper portions of eyes on long, narrow stalks, dorsally upper portions circular with 5-10 large facets in longest row, height of a stalk slightly less than to greater than diameter of a lower portion of eyes (Figs. 5-6) ..... *M. (Miroculis)* 4
— Upper portions of eyes variable: upper portions unstalked, or on short wide stalks, with 27-40 medium-sized facets in longest row; or if upper portions on narrow stalks, then dorsally upper portions subcircular with 11-14 large facets in longest row, stalks moderately long with height of a stalk less than diameter of a lower portion (Figs. 14-15) 2
2. Upper portions of eyes on short, wide stalks; dorsally upper portions separated by a distance

0.1-0.2 maximum width of an upper portion ..... *M. (Yaruma)* 6
— Upper portions of eyes unstalked, or on moderately long, narrow stalks; dorsally upper portions separated by a distance 0.5-1.0 width of an upper portion 3
3. Posteromedian margin of styliger plate rounded, with or without shallow, median indentation; fore wings with brown markings forming irregular, broken transverse bands and numerous blotches (Fig. 10); maximum width of fore wings 0.46-0.51 maximum length; penes 1.1-1.9 length of forceps segment 1 ..... *M. (Atroari)* 7
— Posteromedian margin of styliger plate with a large U-shaped indentation; fore wings with darker clouds around crossveins but not forming irregular, broken transverse bands; maximum width of fore wings 0.41-0.43 maximum length; penes 0.8-1.0 length of forceps segment 1 ..... *M. (Ommaethus)* 8

Miroculis (Miroculis) Edmunds, 1963

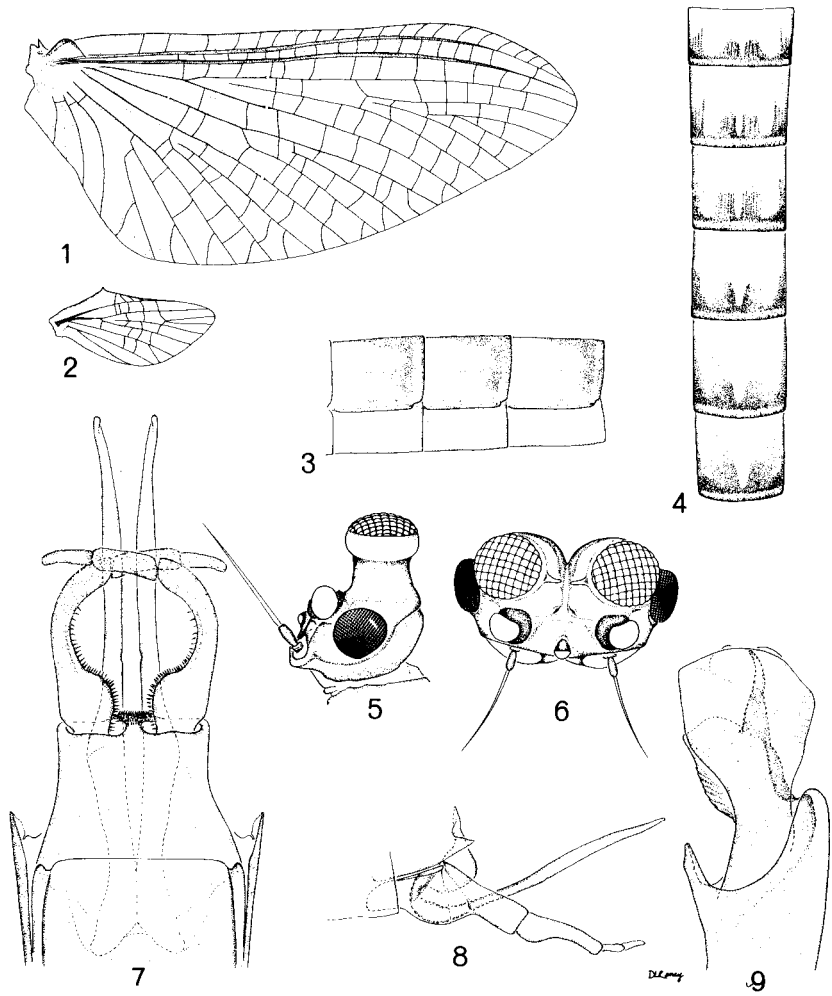
Male Imago: as in Savage & Peters (1982) except as noted. Length: body, 4.6-8.6 mm; fore wings, 4.1-7.5 mm; fore legs, 4.0-7.2 mm. Eyes: upper portions with 5-10 facets in longest row. Wings: maximum width of fore wings 0.41-0.51 maximum length; membrane of fore wings hyaline, or hyaline to light brown with darker brown clouds around crossveins, or with distinct contrast in coloration between dark basal portion and light apical portion; hind wings variable in coloration. Legs: ratios of segments in fore legs, 0.56-0.64: 1.00 (1.61-2.86 mm): 0.02-0.04: 0.36-0.41: 0.24-0.31: 0.17-0.19: 0.06-0.11. Penes: length 0.8-3.2 length of forceps segment 1.

Distribution: Amazonas, Pará, and Goiás States of Brazil; Loreto Province, Peru; and Territorio Federal Amazonas, Venezuela.

Discussion. Inclusion of the new species, *bicoloratus* sp.n., in the subgenus *M. (Miroculis)* requires only minor alteration of the previous subgeneric description, and this species would have been readily identified as a member of *M. (Miroculis)* using the previous key and subgeneric diagnosis of Savage & Peters (1982). Many of the changes summarized above, including body, fore wing, fore leg and tibiae lengths, stem from the unusually large size of *bicoloratus* sp.n., and the only significant change in the subgeneric description of *M. (Miroculis)* occurs in the ratio of fore wing width to length (FWW/FWL).

Miroculis (Miroculis) bicoloratus sp.n.
(Figs. 1-9)

Male Imago (in alcohol). Length: body, 7.1-8.6 mm; fore wings, 6.7-7.5 mm; fore legs, 6.1-7.2 mm. Eyes (Figs. 5-6): upper portions separated mesially by a length 0.7-0.9 width of an upper portion; dorsally upper portions circular, each with small median projection as in Fig. 6; stalked turbinate portion long, basally brownish yellow, apically light yellow; facets of upper portions square, large, with 8-10 facets in longest row, facets yellow, separated by dark brown grooves; from lateral view, diameter of a lower portion less than height of stalk (Fig. 5); facets of lower portions hexagonal, small, black. Head and antennae light



Figs. 1-9. Male imago of *Miroculis (Miroculis) bicoloratus* sp.n.: 1, fore wing; 2, hind wing; 3, abdominal segments 4-6, lateral; 4, abdominal terga 2-7, dorsal; 5-6, head, lateral (5), dorsal (6); 7-8, genitalia, ventral (7), lateral (8); 9, fore claw.

brown, with moderately heavy brownish black wash, wash on pedicelli darker than on scapes and flagella. Lateral ocelli enlarged (Fig. 6).

Thorax: pronotum light brown to brown, median carina, submedian sutures and areas, lateral and anterior margins brownish black, mesonotum and metanotum dark brown, carinae and posteromedian portion of mesonotum darker; sternal sclerites light brown to brown, washed with brownish black, membrane of sterna white, prosternal membranous areas washed with brownish black; pleural sclerites light brown to brown, carinae darker, pleural membrane white with to without light brownish black wash, except median longitudinal area just posterior to lateral margins of pronotum and ventral to base of fore wings washed heavily with brownish black.

Wings (Figs. 1-2): fore wings with bullae; crossveins connecting veins MP and CuA basal to the fusion of MP_1 and MP_2 in fore wings present or absent; maximum width of fore wings 0.41-0.45 maximum length; stigmatic crossveins unanastomosed to anastomosed; longitudinal veins and crossveins of fore wings brown, longitudinal veins and crossveins of hind wings light brown basally to hyaline apically; membrane of fore wings with distinct contrast in coloration between apical and basal portions (Fig. 1), basal portion light brown to brown with light brownish black wash on anterior cells, apical portion hyaline to hyaline with light brown tinge, apical 1/3 of cells of C and Sc translucent, brownish white; membrane of hind wings light brown to brown, anterior portion of cell C and apical margin of wings slightly lighter.

Legs (Fig. 9): ratio of segments in fore legs, 0.56-0.62: 1.00 (2.44-2.86 mm): 0.02-0.04: 0.36-0.39: 0.24-0.26: 0.18-0.19: 0.07-0.08; claws of fore legs dissimilar as in Fig. 9, one claw with irregular pad, other with straight to weakly hooked projection; legs light brown to semihyaline and yellowish brown, fore femora, fore tibiae and basal portion of all tibiae darker than remainder of legs; fore femora with variable brownish black wash, entire fore femur with heavy wash that increases in intensity apically to with wash moderately light to absent basally and with heavy wash producing a black band on apical 1/5, mid and hind femora with heavy wash forming dark apical bands; fore tibiae with wash absent basally, brownish black wash gradually increasing in intensity distally with heavy wash forming a preapical dark mark on each tibia, apices of fore tibiae pale, mid and hind tibiae with heavy wash forming narrow, longitudinal preapical marks, marks present or absent on hind tibiae; fore tarsi 5 washed uniformly with brownish black.

Abdomen (Figs. 3-4): terga 1-8 semihyaline, light brown, terga 9-10 light brown; terga 1-9 with brownish black wash producing variable patterns; tergum 1 with nearly uniform, moderately heavy wash except posterior margin darker, and narrow median line pale; terga 2-9 with wash absent or very light anteriorly, increasing in intensity posteriorly with heavy wash on posterior margins; terga 2-6 with heavy wash forming posterosubmedian and posterosublateral dark marks, posterosubmedian marks separated by a median pale area that increases in size on posterior terga, heavy wash may reduce distinction between submedian and sublateral marks; tergum 7 with broad posterosubmedian dark marks and median pale area to posterosubmedian dark marks extending to near anterior margin of tergum producing a large median V-shaped pale area with open end of V directed anteriorly; wash on terga 8-9 variable, as in tergum 7 or with wash heavier and V-shaped pale area reduced to a light median area; tergum 10 with posterior margin dark brown with to without darker median area; spiracles black, tracheae semihyaline, light brown with to without brownish black wash; sterna semihyaline, light blackish brown, except sternum 9 with posterolateral and anterior areas light brown, median area membranous, white.

Forceps (Figs. 7-8): segment 3 from 0.66-0.88 length of segment 2; segment 2 from 0.35-0.50 length of segment 1; forceps segment 1 with basal 1/3 strongly expanded and apical portion curved medially as in Fig. 7; light brown to light yellowish brown, paler apically, segment 2 and apical 2/3 of segment 1 washed with brownish black, segment 3 without to with light brownish black wash. Styliger plate (Figs. 7-8): maximum length along lateral margin 0.80-1.10 maximum width; posteromedian margin gently rounded with shallow median indentation (Fig. 7); light brown except anteromedian area membranous and white. Penes (Figs. 7-8): length 2.80-3.20 length of forceps segment 1; shaped as in Figs. 7-8, with small notch on ventral surface approximately 1/2 length base to apex, and a shallow, subapical indentation immediately before rounded apex; dark brown basally to yellowish brown apically. Caudal filaments: light brown, articulations darker, apical 1/4 with black wash.

Female Imago and Nymph: Unknown.

Specimens Examined: Holotype male imago, Venezuela: Territorio Federal Amazonas, Departamento Rio Negro, Cerro de la Neblina, Camp II, 2.5-3.5 km NE Pico Phelps (= Neblina), 00°50′00-12″N: 65°58′48″W, 2085-2100 m, 18-III-1984, J. A. Louton. Paratypes: 13 male imagines, same

data as holotype. Holotype and 13 male imaginal paratypes are deposited in collections of the National Museum of Natural History (USNM), Smithsonian Institution.

Etymology: adj.; bi, L., meaning two; coloratus, L., meaning colored; in reference to the distinctly bicolored fore wings of this species.

Discussion. Male imagines of *M. bicoloratus* can be readily distinguished from all other species of *Miroculis* by the following combination of characters: 1) upper portions of eyes are on long, narrow stalks; dorsally upper portions are circular with 8-10 large facets in longest row (Figs. 5-6); 2) membrane of fore wings displays distinct contrast in coloration between basal dark portion and apical light portion (Fig. 1); 3) penes are extremely long, 2.8-3.2 length of forceps segment 1, and shaped as in Figs. 7-8 with a small notch on ventral surface approximately 1/2 length from base to apex; 4) forceps segment 1 with apical portion curved medially as in Fig. 7 and basal 1/3 strongly expanded; 5) posteromedian margin of styliger plate is gently rounded with shallow median indentation (Fig. 7); 6) basal portions of fore tibiae are pale, brownish black wash increases gradually in intensity distally with heavy wash forming preapical dark marks, apices pale; 7) brownish black wash on abdominal terga produces patterns as in Figs. 3-4; and 8) caudal filaments are light brown, except articulations darker and apical 1/4 washed with black.

A new couplet, labelled 4[a] and presented below, which easily distinguishes *M. (Miroculis) bicoloratus* from all remaining species of *M. (Miroculis)*, should be used prior to entering couplet 4 in Savage & Peters (1982: 512).

4[a] Fore wings with distinct contrast in coloration between basal dark portion and apical light portion (Fig. 1); penes and forceps shaped as in Figs. 7-8, penes extremely long, 2.8-3.2 length of forceps segment 1 ..... *M. (Miroculis) bicoloratus*

— Fore wings variable, but never with distinct contrast in coloration between basal and apical portions; penes and forceps not as above, length of penes less than 2.3 length of forceps segment 1 ..... 4 (in Savage & Peters)

Miroculis bicoloratus is the only species of *Miroculis* that has been observed to have a crossvein connecting veins MP and CuA basal to the fusion of MP_1 and MP_2. Seventy-three percent, or 19, of the wings within the type-series (n=26) have one such basal crossvein, 2 have two basal crossveins, while the remaining 5 lack this crossvein. Stigmatic crossveins in *M. bicoloratus* are typically unanastomosed, as observed in 68%, or 17, of the available wings (n=25). However, 7 wings have weakly anastomosed stigmatic crossveins, defined as 4 or less crossveins attached to other crossveins, and 1 wing has strongly anastomosed crossveins. FWW/FWL ratios in *M. (Miroculis) bicoloratus* vary from 0.41-0.45 with the majority of specimens having ratios of 0.43-0.44.

Biology: The type-series represents a portion of a swarm netted by Dr. J. A. Louton. The swarm was located from approximately 3.5-10 m above the ground, and over a tent which was a light brown nylon fly about 3 x 3 m in size. The swarm was not dense and consisted of males spaced many feet apart with total numbers varying between 30-50. The swarm was first noticed at 15.00 hrs on an overcast day and held its position over the tent until dusk; although, their

numbers started to diminish after an hour due to collecting and reduced recruitment (J. A. Louton – pers. comm.). The tent was located on a *Heliamphora* bog about 50 m from a small stream with an *Euterpe* gallery forest.

Miroculis (Miroculis) fittkaui Savage & Peters, 1982

Specimens Examined: 3 male imagines, Venezuela: Territorio Federal Amazonas, Departamento Rio Negro, Cerro de la Neblina, Basecamp on Rio Baria (= Rio Mawarinuna), 00°49′50″N: 66°09′40″W, 140 m, 20-24-III-1984, O. S. Flint, Jr. & J. A. Louton; 1 male imago, Venezuela: Territorio Federal Amazonas, Departamento Rio Negro, Cerro de la Neblina, Agua Blanca, 00°48′50″N: 66°08′20″W, 145 m, 20-21-III-1984, O. S. Flint, Jr. & J. A. Louton. Specimens are deposited in USNM collections.

Distribution: Pará State, Brazil; Brokopondo, Para and Saramacca Districts of Surinam; Territorio Federal Amazonas, Venezuela.

Discussion. The four male imaginal specimens examined from Venezuela constitute a new country record for this species. The Venezuelan specimens were readily identifiable using the key of Savage & Peters (1982). However, the Venezuelan specimens differ from the original description, which was based upon specimens from northeastern Brazil and Surinam in the following details: 1) upper portions of eyes have 6-8 facets in longest row; 2) color patterns on abdominal terga 6-8 are variable, as described and illustrated by Savage & Peters (1982) to with wash on terga 7-8 heavy and submedian marks coalescing to form V-shaped median marks; 3) mid and hind tibiae have a brownish black streak on inner basal margin (fore legs broken from specimens and missing); 4) posteromedian margin of styliger plate is flat with or without a very shallow median indentation; 5) forceps segment 1 is variable, as described and illustrated by Savage & Peters (1982) to with basal 1/3 gradually expanded; and 6) basal 2/3-3/4 of caudal filaments are brownish yellow to light brown with articulations of basal segments dark brown to brownish black, apical 1/3-1/4 of caudal filaments are semihyaline, whitish; caudal filaments are 2.3-3.0 length of body, subequal.

Miroculis (Atroari) Savage & Peters, 1982

Male Imago: as in Savage & Peters (1982) except as noted. Length: body, 4.8-6.0 mm; fore wings, 4.4-4.7 mm; fore legs, 5.0-5.7 mm. Eyes: upper portions separated on meson of head by a length 0.5-1.0 width of an upper portion; upper portions unstalked or stalked; in unstalked-eyed species, upper portions large and rounded with 30-40 medium-sized facets in longest row; in stalked-eyed species, upper portions distinctly subcircular with 11-14 large facets in longest row; from lateral view, lower portions touching upper portions to lower and upper portions separated by a distance less than height of stalk (Fig. 14). Lateral ocelli close together or separated. Antennae coloration variable. Wings: maxi-

mum length of hind wings 0.24-0.30 maximum length of fore wings; apex of costal projection located 0.27-0.31 distance from base to apex of hind wings. Legs: ratio of segments in fore legs, 0.42-0.53: 1.00 (1.92-2.45 mm): 0.01-0.04: 0.37-0.40: 0.25-0.32: 0.19-0.22: 0.06-0.09. Genitalia: posteromedian margin of styliger plate rounded, with or without shallow median indentation.

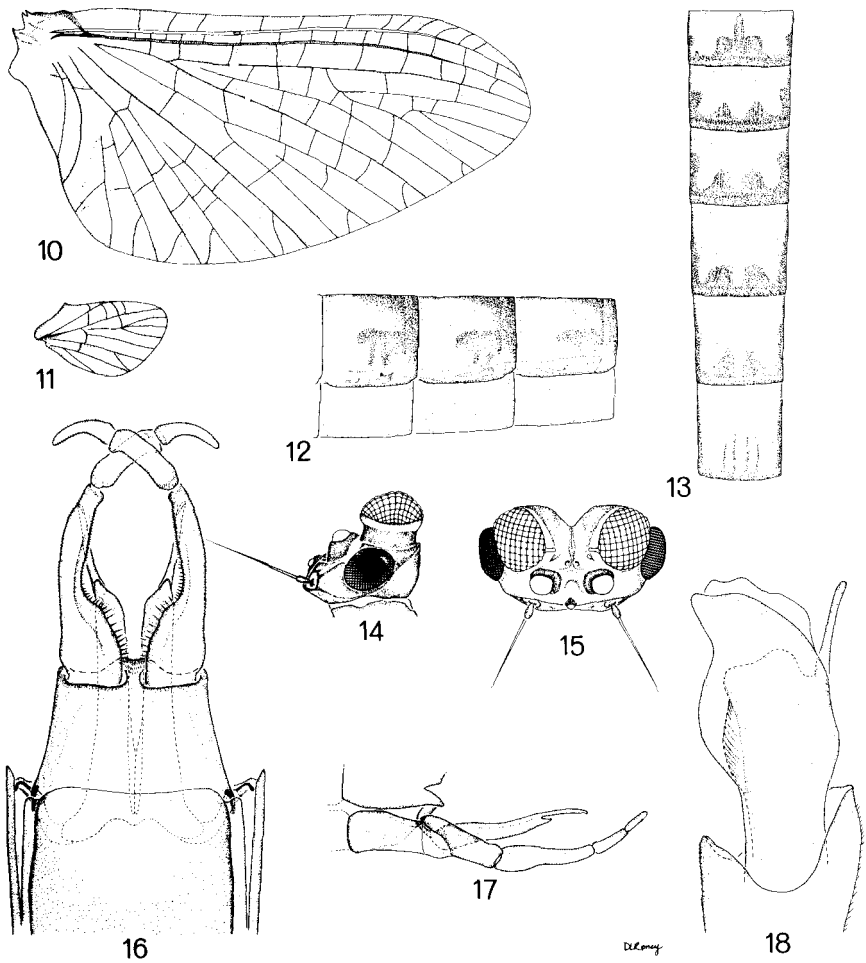
Distribution: Amazonas State, Brazil; Department Meta, Colombia; and Territorio Federal Amazonas, Venezuela.

Discussion. Discovery of the new species, *M. (Atroari) nebulosus* sp.n., requires alteration of male eye, ocelli, and styliger plate descriptions for the subgenus *Atroari*, and minor modifications for a few additional characters.

In all previously described species of *M. (Atroari)*, the upper portions of male eyes are unstalked, large and rounded with 30-40 facets in the longest row. The large eyes in these species distorts head shape and causes the lateral ocelli to be more closely situated than in other species of *Miroculis*. In sharp contrast to previously described species of *M. (Atroari)*, the upper portions of the male eyes in *nebulosus* sp.n. are on moderately long, narrow stalks, and correspondingly they have a reduced number of large facets, 11-14. Due to the stalked eyes, *nebulosus* sp.n. has a head shape similar to that of most other species of *Miroculis* including widely spaced lateral ocelli (Fig. 15). While the eyes of *nebulosus* sp.n. superficially resemble those typical of *M. (Miroculis)*, closer examination reveals that the upper portions in *nebulosus* sp.n. are distinctly subcircular (Fig. 15), and not circular as in *M. (Miroculis)* (Figs. 5-6). In addition, the height of a stalk is distinctly shorter than the width of a lower portion of an eye in *nebulosus* sp.n. (Fig. 14), whereas in the known species of *M. (Miroculis)* the height of a stalk is greater than to only slightly less than the width of a lower portion (Fig. 5).

Miroculis (Atroari) nebulosus sp.n.
(Figs. 10-18)

Male Imago (in alcohol). Length: body, 5.4-5.8 mm; fore wings, 4.1-4.7 mm; fore legs, 5.0-5.2 mm. Eyes (Figs. 14-15): upper portions on moderately long, narrow stalks, upper portions separated mesially by a length 0.5-1.0 width of an upper portion; dorsally upper portions distinctly subcircular, each with small median projection as in Fig. 15; basally stalked turbinate portions light brown washed with brownish black, apically pale; facets of upper portions square, large, with 11-14 facets in longest row, facets brownish yellow, separated by brown grooves; from lateral view, diameter of a lower portion greater than height of stalk (Fig. 14); facets of lower portions hexagonal, small, black. Head light brown, dorsum with light brownish black wash, carinae darker, ventrum with wash heavy; posterior margin of head with large, broad V-shaped indentation (Fig. 15). Antennae light brownish yellow, except pedicelli with light to heavy brownish black wash. Lateral ocelli enlarged and separated as in Fig. 15. Cervix white with brownish black wash.



Figs. 10-18. Male imago of *Miroculis (Atroari) nebulosus* sp.n.: 10, fore wing; 11, hind wing; 12, abdominal segments 4-6, lateral; 13, abdominal terga 2-7, dorsal; 14-15, head, lateral (14), dorsal (15); 16-17, genitalia, ventral (16), lateral (17); 18, fore claw.

Thorax: pronotum light brown, carinae and submedian sutures brownish black, posterior and posterolateral margins washed with brownish black, mesonotum and metanotum brown, carinae dark brown to black; sternal and pleural sclerites brown, carinae dark brown to black, metasternum with brownish black wash, membrane of sterna and pleura white, with brownish black wash, wash heavy on prosternum and on pleura near mesocoxae.

Wings (Figs. 10-11): fore wings with bullae; maximum length of hind wings 0.26-0.30 maximum length of fore wings; apex of costal projection located 0.28-0.31 distance from base to apex of hind wings; longitudinal veins and crossveins brown, membrane hyaline with light brown markings as in Figs. 10-11; fore wings with brown markings forming irregular, broken transverse bands and numerous blotches, apical 1/3 of cells of C and Sc translucent, brownish; apical margin of hind wings brown.

Legs (Fig. 18): ratio of segments in fore legs, 0.51-0.53: 1.00 (1.92-2.04 mm): 0.02-0.04: 0.38-0.40: 0.29-0.32: 0.19-0.22: 0.08-0.09; claws of fore legs dissimilar as in Fig. 18, one claw with irregular pad,

other with straight spike-like projection; fore legs light brown, middle and hind legs light brownish yellow, femora slightly darker at apex, preapical black bands on femora and tibiae, except preapical band on fore tibiae pale and represented only by brownish black wash, femora with median brownish black marks.

Abdomen (Figs. 12-13): terga 1-8 brownish yellow, semihyaline, washed with brownish black, heavy wash forming marks; terga 9-10 light brown, carinae darker, tergum 9 with dark brown sublateral marks, tergum 10 with dark brown median mark; tergum 1 heavily washed with brownish black, wash darker medially, sublaterally and along posterior margin; terga 2-8 with posterior dark bands, bands on terga 2-5 distinct, bands on terga 6-7 distinct to light, band on tergum 8 absent to light; tergum 2 with posterosublateral marks and a large median mark; terga 3-5 with posterosubmedian and posterosublateral marks, terga 4-5 with to without brownish black wash between submedian and sublateral marks; tergum 6 with posterosubmedian and posterosublateral marks and brownish black wash laterally between marks, heavy wash may obscure distinctiveness of markings; wash on terga 7-8 highly variable, heavy wash forming large irregular median mark with pale posteromedian area, heavy submedian wash may extend anteriorly and fuse forming a light V-shaped mark, with open end of V directed posteriorly; tergum 9 with light submedian marks; spiracles brownish black, tracheae semihyaline, lightly washed with brownish black; sterna 1-8 semihyaline, light brownish yellow, sternum 9 light brown except posteromedian area membranous and white.

Forceps (Figs. 16-17): segment 3 from 0.77-0.87 length of segment 2; segment 2 from 0.38-0.43 length of segment 1; forceps segment 1 with basal 2/5 expanded, subapical portion slightly expanded; segments 2 and 3 as in Fig. 16; yellowish brown. Styliger plate (Figs. 16-17): maximum length along lateral margin 0.72-0.83 maximum width; posteromedian margin rounded with shallow median indentation (Fig. 16); light brown, except anteromedian area membranous and white. Penes (Figs. 16-17): length 1.47-1.64 length of forceps segment 1; each penis divided at approximately 3/4 distance from base to apex into a short flap-like portion and a long, narrow dorsal portion (Fig. 17); ventral surface of dorsal portion with a shallow, subapical indentation immediately before rounded apex; brown. Caudal filaments: cerci 2.5-2.7 length of body; median filament slightly shorter, 0.8-0.9 length of cerci; caudal filaments brownish yellow basally to pale apically, with brownish bands on basal 0.50-0.66 of segments; bands progressively lighter on apical segments, a band present on the basal portion of each segment basally to every-other segment apically.

Female Imago and Nymph: Unknown.

Specimens Examined: Holotype male imago, Venezuela: Territorio Federal Amazonas, Departamento Rio Negro, Cerro de la Neblina, Basecamp on Rio Baria (= Rio Mawarinuna), 00°49′50″N: 66°09′40″W, 140 m, coll. at light, at small stream on east side of basecamp, 20-24-III-1984, O. S. Flint, Jr. & J. A. Louton. Paratypes: 3 male imagines, same data as holotype. Holotype and 3 imaginal paratypes are deposited in USNM collections.

Etymology: adj.; nebulosus, L., meaning misty; in reference to the type-locality Cerro de la Neblina, or misty hill.

Discussion. Male imagines of *M. nebulosus* can be readily distinguished from all other species of *Miroculis* by the following combination of characters: 1) upper portions of eyes are on moderately long, narrow stalks; dorsally upper portions are distinctly subcircular with 11-14 large facets in longest row (Figs. 14-15); 2) posterior margin of head has a large, broad V-shaped indentation (Fig. 15); 3) pedicelli are washed lightly to heavily with brownish black; 4) fore

wings have brown markings forming irregular, broken transverse bands and numerous blotches as in Fig. 10; 5) fore femora are 0.51-0.53 length of fore tibiae; 6) genitalia are as in Figs. 16-17; penes are 1.47-1.64 length of forceps segment 1; posteromedian margin of styliger plate has a shallow median indentation; 7) brownish black wash on abdominal terga produces patterns as in Figs. 12-13; and 8) caudal filaments are brownish yellow basally to pale apically with brownish bands on basal 0.50-0.66 of segments.

A new couplet, labelled 7[a] and presented below, that easily distinguishes *M. (Atroari) nebulosus* from all remaining species of *M. (Atroari)* should be used prior to entering couplet 7 in Savage & Peters (1982: 512).

7[a] Upper portions of eyes on moderately long, narrow stalks, dorsally upper portions subcircular with 11-14 large facets in longest row (Figs. 14-15); genitalia as in Figs. 16-17, penes 1.47-1.64 length of forceps segment 1 and posteromedian margin of styliger plate with shallow median notch ..... *M. (Atroari) nebulosus*

— Upper portions of eyes unstalked, large and rounded with 30-40 facets in longest row; genitalia not exactly as above, penes variable in length, posteromedian margin of styliger plate rounded and lacking median notch ..... 7 (in Savage & Peters)

Microphlebia surinamensis Savage & Peters, 1982

Specimens Examined: 1 male subimago, Venezuela: Territorio Federal Amazonas, Departamento Rio Negro, Cerro de la Neblina, Agua Blanca, 00°48′50″N: 66°08′20″W, 145 m, 20-21-III-1984, O. S. Flint, Jr. & J. A. Louton. Specimen deposited in USNM collections.

Distribution: Brokopondo and Suriname Districts of Surinam; Territorio Federal Amazonas, Venezuela.

Discussion. The subimaginal specimen from Venezuela constitutes a new country record for this species and genus. The specimen agrees with the original description which was based upon material from Surinam except forceps segment 1 with apical 1/4 heavily washed with brownish black.

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