

LISTS OF SPECIES

Mayflies (Insecta: Ephemeroptera) from Venezuela

María M. Chacón¹
Manuel L. Pescador²
Michael D. Hubbard²
Samuel Segnini¹

¹ *Universidad de los Andes, Departamento de Biología Facultad de Ciencias, Laboratorio de Ecología de Insectos. Núcleo “Pedro Rincón Gutiérrez”, Edificio “A”, La Hechicera, Mérida 5101. Venezuela. E-mail: machacon@ula.ve*

² *Florida Agricultural and Mechanical University, Laboratory of Aquatic Entomology. 117 Perry-Paige, Tallahassee, Florida 32307. USA.*

Abstract

A list of the known mayfly (Ephemeroptera) fauna of Venezuela is given, along with the states and bioregions from which each species is known. Depositions of the type specimens of each species are also listed.

Introduction

Knowledge of the systematics of the mayfly fauna of Venezuela is limited. Pescador et al. (2001) pointed out that roughly 5% of the 375 nominal mayfly species known at that time in South America occur in Venezuela, compared to 38% and 30% from Brazil and Argentina, respectively. Smaller countries in the region like Peru and Ecuador have twice as many mayfly species known as does Venezuela. Domínguez et al. (2006) found a similar trend of mayfly diversity among countries in the region. Of the approximately 442 mayfly species known in South America, only 33 species (7.5%) representing 20 genera and six families have been reported from Venezuela. The enormous gap in faunal composition reflects the history of collecting in certain countries rather than the actual taxon richness. Based on the number of published studies on mayflies in the region, it is obvious there has been more concerted collecting in Argentina, Brazil and Chile than in other countries of South America (Pescador et al. 2001)

The checklist herein provides comprehensive records on the mayfly species of Venezuela, and the data include the following: 1) references of the original description of species; 2) life forms in which original descriptions were based; 3) synonymies; 4) specimens from the country; 5) type locality, and depositions of type material; and 6) state and bioregional distributions of the species in Venezuela (provided in Additional

locality data). Related references mention the occurrence of species in the country but without specific locality. Coordinates given in Additional locality data were approximated from Google Earth, 2009, when the data are not given in published records. Abbreviations of deposition of type specimens, states, and bioregions of Venezuela are indicated below. Bioregions follow the classification by MARN (2001). For convenience the families and species within families are listed in alphabetical order.

Depositions of Type Specimens: AMNH (American Museum of Natural History, New York, NY, USA), CU (Cornell University, Ithaca, NY, USA), HAMPG (Hydrobiologische Anstalt der Max-Planck-Gesellschaft, Plön, Germany), EIHG (*Estacion de Investigaciones Hidrológicas de Guayana*, Venezuela, SA), LPSH (*Laboratoire de Petit Saut-HYDRECO*, Fr. Guiana, SA), LHUPS (*Laboratoire d’Hydrobiologie, Université Paul Sabatier*, France), MB (Museum Berlin, Germany), NMC (National Museum Caracas, Venezuela, SA), UU (University Utah, Salt Lake City, USA), FAMU (Florida A&M University, Tallahassee, Florida, USA), IFML (*Instituto-Fundación Miguel Lillo*, Tucumán, Argentina, SA), PCT (Private Collection of J. R. Traver), MIZA (*Museo del Instituto de Zoología Agrícola “Francisco Fernández Yépez”, Facultad de Agronomía, Universidad Central de Venezuela*, Maracay, Edo. Aragua, Venezuela. (IZAM), SA), NMNH (National Museum of Natural History,

LISTS OF SPECIES

Smithsonian Institution, Washington, DC, USA), ORSTOM (*Institut Français de Recherche Scientifique pour le Développement en Coopération*, France), ULA (*Universidad de Los Andes*, Mérida, Venezuela, SA), VM (Vienna Museum, Austria), ZS (*Zoologische Staatssammlung*, Munich, Germany), ZSBS (*Zoologische Sammlung des Bayerischen Staates*, München, Germany).

States of Venezuela (Figure 1A)
Amazonas (AM), Anzoátegui (AN), Apure (AP), Aragua (AR), Barinas (BA) Bolívar (BO), Carabobo (CA), Cojedes (CO), Distrito Capital Vargas (CV), Distrito Capital (DC), Delta Amacuro (DA), Falcón (FA), Guárico (GU), Lara (LA), Mérida (ME), Miranda (MI), Monagas (MO), Portuguesa (PO), Sucre (SU), Táchira (TA), Trujillo (TR), Yaracuy (YA), Zulia (ZU).

Bioregions of Venezuela (Figure 1B)
Marina [MARI], Insular [INSU], Depresión del Lago de Maracaibo [DLMA], Los Andes [LAND], Sistemas de colinas Lara-Falcón [SCLF], Costera Continental [COSC], Cordillera de la Costa [CORC], Deltaica del Río Orinoco [DROR], Los Llanos [LLLA], Guayana [GUAY].

List of Venezuelan mayflies

BAETIDAE

Baetodes arawak (Traver, 1943)

First record and original description: Traver (1943): 90, *Pseudocloeon arawak*. Holotype: male imago; Antímáno, 900 meters; 13/i/1940; R. Lichy. Deposition: FAMU.

Additional locality data: 10°27' N, 66°59' W; Antímáno, DC [CORC]

Related references: Nieto (2004): 65, Domínguez et al. (2006): 93.

Baetodes peniculus Mayo, 1973

First record and original description: Mayo (1973): 310. Holotype: male nymph; Mérida State, 13 Km. E. Apartaderos; 24/ii/1969; P. and P. Spangler. Paratypes: 4 nymphs (2 males and 2 females), same data as holotype. Deposition: holotype and paratypes in FAMU.

Additional locality data: 8°48' N, 70°50' W; Apartaderos, ME [LAND]

Related references: Nieto (2004): 72, Domínguez et al. (2006): 98.

Baetodes spinifer Traver, 1943

First record and original description: Traver (1943): 94, *Baetodes spiniferum*. Holotype: male imago; Antímáno, 900 meters; 13/i/1940; R. Lichy; in PCT. Allotype: female subimago, same data as holotype. Deposition: Holotype in PCT, allotype in NMC.

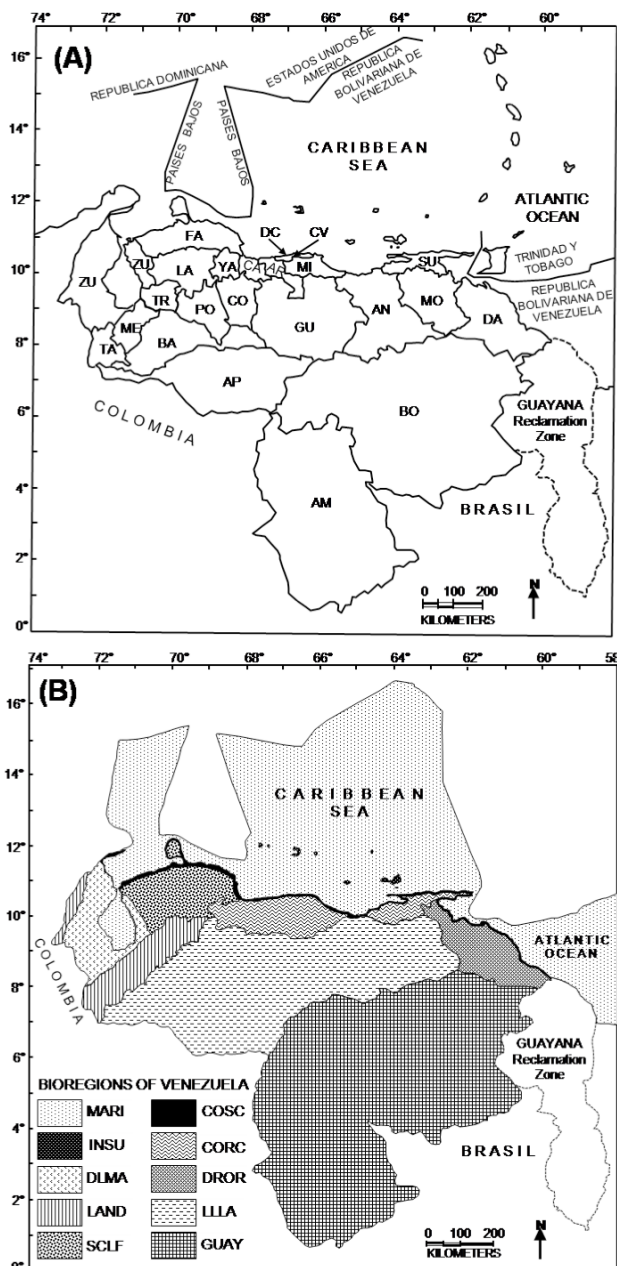


Figure 1. (A) States and (B) Bioregions of Venezuela (modified from MARN 2001). Abbreviations are indicated in the text.

LISTS OF SPECIES

Additional locality data: 10°27' N, 66°59' W; Antímáno, DC [CORC]

Related references: Nieto (2004): 75, *Baetodes spiniferum*; Domínguez et al. (2006): 102.

Camelobaetidius alcyoneus (Traver, 1943)

First record and original description: Traver (1943): 85, *Baetis alcyoneus*. Holotype: male imago; Antímáno 900 meters; 13/i/1940; R. Lichy. Allotype: female imago; same data as holotype. Paratype: female imago, same data as holotype. Deposition: holotype in FAMU, allotype and paratype in NMC.

Additional locality data: 10°27' N, 66°59' W; Antímáno, DC [CORC]

Related references: Lugo-Ortiz and McCafferty (1999): 258; Domínguez et al. (2006): 127.

Cloeodes anduzei (Traver, 1943)

First record and original description: Traver (1943): 88, *Pseudocloeon anduzei*. Holotype: male imago; Antímáno, 900 meters; 13/i/1940; R. Lichy. Paratypes: 2 male imagos, same data as holotype. Deposition: holotype and 1 male imago paratype in FAMU, 1 male imago paratype in NMC.

Additional locality data: 10°27' N, 66°59' W; Antímáno, DC [CORC]

Related references: Waltz and McCafferty (1987): 197, Domínguez et al. (2006): 148.

Cloeodes venezuelensis (Traver, 1943)

First record and original description: Traver (1943): 92, *Pseudocloeon venezuelensis*. Holotype: male imago, Antímáno, 900 meters; 13/i/1940; R. Lichy. Allotype: female imago, same data as holotype. Paratypes: one male and two female imagos; same data as holotype. Deposition: holotype, allotype and paratypes in FAMU.

Additional locality data: 10°27' N, 66°59' W; Antímáno, DC [CORC]

Related references: Lugo-Ortiz and McCafferty (1999): 261, Domínguez et al. (2006): 153.

EUTHYPLOCIIDAE

Campylocia anceps (Eaton, 1883)

Original description: Eaton [(1883 (1883-1888))]: 38 (male), *Euthyplocia anceps*.

First record: Spieth (1943): 1 (*C. anceps*). Male imago, Mt. Duida 16/x/1928, 4/xi/1928, 7-8/iii/1929; Tate. Deposition: AMNH.

Additional locality data: 3°35' N, 65°30' W; Mt. Duida, AM [GUAY]

Related references: Hubbard (1982): 262, Pereira and Da-Silva (1990): 2, Domínguez et al. (2006): 238.

Euthyplocia hecuba (Hagen, 1861)

Original description: Hagen (1861): 40 (female imago), *Palingenia hecuba*.

First record: Ulmer (1920): 10 (*E. hecuba*). 4 nymphs, Caracas (without collection date), Gollm. Deposition: MB.

Additional locality data: 10°29' N, 66°53' W; Caracas, DC [CORC]

Related references: Gros and Lestage (1927): 121, Ulmer (1942), Demoulin (1952): 11, Hubbard (1982): 263, Domínguez et al. (2006): 241.

LEPTOHYPHIIDAE

Allenhyphes flinti (Allen, 1973)

Original description: Allen (1973): 365 (nymph), *Leptohyphes flinti*.

First record: Molineri and Flowers (2001): 61 (*A. flinti*). 1 male subimago, Zulia, Perijá El Tucuco, Mission El Tucuco, Río El Tucuco, ½ Km from church, 1-5/x/1979, H. M. Savage; 6 males and > 100 female subimagos, Dist. Baralt, Río Paují, ruta 3 between San Juan y San Antonio, 9-11/x/1979, H. M. Savage. Deposition: FAMU.

Additional locality data: 9°50' N, 72°48' W; Perijá, El Tucuco, ZU [LAND]. 9°46' N, 70°45' W; Dist. Baralt, Río Paují, ZU [DLMA]

Related references: Domínguez et al. (2006): 253.

Leptohyphes nigripunctum Traver, 1943

First record and original description: Traver (1943): 82. Holotype: male subimago; Antímáno, 900 meters; 13/i/1940; R. Lichy. Deposition: NMC.

Additional locality data: 10°27' N, 66°59' W; Antímáno, DC [CORC]

Related references: Domínguez et al. (2006): 273.

Tricorythodes lichyi Traver, 1943

First record and original description: Traver (1943): 83. Holotype: male imago; Antímáno, 900

LISTS OF SPECIES

meters; 13/i/1940; R. Lichy. Allotype: female imago, same data as holotype. Paratypes: 33 male imagos, same data as holotype. Deposition: holotype, allotype and 21 male imagos paratypes in NMC; 12 male imagos paratypes in FAMU. Additional locality data: 10°27' N, 66°59' W; Antímáno, DC [CORC]
Related references: Domínguez et al. (2006): 310.

Tricorythopsis volsellus Molineri, 1999

First record and original description: Molineri (1999): 294. Holotype: male imago; TFA, Río Negro, San Carlos de Río Negro; 5-12/iii/1984; O. Flint and J. Louton. Allotype: female imago, same data as holotype. Paratypes: 5 male imagos and 5 female imagos, same data as holotype. Deposition: holotype, allotype, 3 male imagos and 3 female imagos paratypes, in NMNH; 2 male and 2 female paratypes in IFML. Additional locality data: 1°55' N, 67°03' W; Río Negro, San Carlos de Río Negro, AM [GUAY]
Related references: Domínguez et al. (2006): 323.

LEPTOPHLEBIIDAE

Farrodes caribbeanus (Traver, 1943)

First record and original description: Traver (1943): 79 (*Thraulius caribbeanus*). Holotype: male imago; Antímáno, 900 meters; 13/i/1940; R. Lichy. Allotype: female imago, same data as holotype. Paratype: female subimago, same data as holotype. Deposition: holotype in FAMU; allotype and paratype in NMC.
New record: Domínguez (1999): 159 (*Farrodes caribbeanus*). 21 male imagos, 3 female imagos, 7 male subimagos, 8 nymphs; Aragua State, P.N. Henry Pittier, Río La Trilla, 22.5 Km N of Rancho Grande on Road; 17-19/ix/1979; H.M. Savage. Deposition: FAMU. Additional locality data: 10°27' N, 66°59' W; Antímáno, DC [CORC]. 10°25' N, 67°42' W; Henry Pittier National Park, AR [CORC]
Related references: Hubbard (1982): 267, Domínguez et al. (2006): 372.

Farrodes longispinus Domínguez, Molineri and Peters, 1996

First record and original description: Domínguez et al (1996): 95. Holotype: male imago; T.F. Amazonas, Cerro La Neblina, Basecamp, 0°50' N, 66°94' W (longitude data obviously erroneous, corrected coordinates are given below), 140 m, 4-

12/ii/1984; D. Davis, T. McCabe. Deposition: NMNH (according to J. Peters, personal communication).

Additional locality data: 00°49'50" N, 66°09'40" W (data were supplied by O. S. Flint from NMNH); Cerro La Neblina, AM [GUAY].

Related references: Domínguez et al. (2006): 373

Farrodes savagei Domínguez, 1999

First record and original description: Domínguez (1999): 164. Holotype: male imago; Zulia State, Perija, El Tucuco, Mission El Tucuco, Río del Pelaya, 2 1/2 km from church, 28-30/xi/1979. H. M. Savage; in FAMU. Allotype: female imago, same data as holotype. Paratypes: 6 male imagos, 2 female imagos, 6 nymphs, same data as holotype; 1 male subimago, 6 nymphs, same data as holotype, except date: 1-5/x/1979; 2 female imagos, 1 nymph, same data as holotype, except dates: 9-11/x/1979. Deposition: holotype, allotype and paratypes (4 male imagos, 2 female imagos and 4 nymphs) in FAMU; 2 male imagos and 2 nymphs paratypes in IFML.

Additional locality data: 9°50' N, 72°48' W; Perija, El Tucuco, ZU [LAND]

Related references: Domínguez et al. (2006): 376.

Farrodes tepui Domínguez, Molineri and Peters, 1996

First record and original description: Domínguez et al. (1996): 98. Holotype: male imago; T.F. Amazonas, Basecamp. 0°51' N, 66°10' W, Cerro La Neblina, 140 m, 13-15/iii/1984; O. Flint and J. Louton. Allotype: female imago; T.F. Amazonas, Basecamp. 0°50' N, 66°9'44" W, Cerro La Neblina, 140 m; 1-10/iii/1984; D. Davis and T. McCabe. Paratypes: 9 male imagos, same data as holotype; 1 male imago and 1 female imago, same data as allotype; 21 male imagos, same data as holotype, except date, 20-24/iii/1984. Deposition: holotype, allotype and 17 male imagos paratypes in NMNH; 11 male imagos and 1 female imago paratypes in IFML; 3 male imagos paratypes in FAMU.

Additional locality data: Cerro La Neblina, AM [GUAY]

Related references: Domínguez et al. (2006): 376.

Hagenulopsis minuta Spieth, 1943

Original description: Spieth (1943): 10 (female imago), *Hagenulopsis minutus*

LISTS OF SPECIES

First record: Peters and Domínguez (2001): 354.
Nymphs: T.F. Amazonas, Cerro La Neblina, BaseCamp, 0°50' N, 66°10' W, rapids of Río Baria; 12/ii/1985; P.J. and P.M. Spangler, R. Faitoute. Male imagos: same locality, 4-12/ii/1984, D. Davis and T. McCabe. Male imago: T.F. Amazonas, Cerro La Neblina, Camp VII, 1,800 m, 0°50' N, 66°68' W (longitude questionable), small stream; 30/i/-10/ii/1985; P.J. and P.M. Spangler, R. Faitoute. Male and Female subimagos: T.F. Amazonas, Cerro La Neblina Agua Blanca, 0°49' N and 66°08' W, 160m; 21-21/iii/1984; O. Flint and J. Louton. Deposition: NMNH

Additional locality data: Cerro La Neblina, AM [GUAY]

Related references: Domínguez et al. (2006): 386.

Massartella devani Derka, 2002

First record and original description: Derka (2002): 310. Holotype: mature nymph; Bolivar State, a torrential stream below the waterfall on the southwestern face of the Mt. Roraima crossing a tourist pathway to the Mt. Roraima plateau, ca 2000 m; 3/ii/1999; T. Derka. Paratypes: 1 mature nymph and 6 immature nymphs, same data as holotype. Deposition: holotype and paratypes in MIZA.

Additional locality data: 5°08' N, 60°46' W; Mt. Roraima, BO [GUAY]

Related references: Domínguez et al. (2006): 417.

Massartella venezuelensis Pescador and Peters, 1990

First record and original description: Pescador and Peters (1990): 155. Holotype: mature nymph; Bolivar, La Escalera, 108 km. S Río Cuyuní; 11-12/ii/1976; CM & OSF. Paratypes: 1 female subimago and 5 nymphs, same data as holotype. Deposition: holotype and paratypes in NMNH.

Additional locality data: 6°01' N, 61°28' W; La Escalera, BO [GUAY].

Related references: Domínguez et al. (2006): 418.

Microphlebia surinamensis Savage and Peters, 1983

Original description: Savage and Peters (1983): 572 (male subimago, nymph).

First record: Savage (1987): 107. 1 male subimago Territorio Federal Amazonas, Departamento Río Negro, Cerro 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. Deposition: NMNH.

Additional locality data: Cerro La Neblina, AM [GUAY].

Related references: Domínguez et al. (2006): 435.

Miroculis (Miroculis) bicoloratus Savage, 1987

First record and original description: Savage (1987): 99. Holotype: male imago; Territorio Federal Amazonas, Departamento Río Negro, Cerro La Neblina, Camp II, 2.5-3.5 km NE Pico Phelps (= Neblina); 00°50'0-12" N, 65°58'48" W, 2,085-2,100 m; 18/iii/1984; J. A. Louton. Paratypes: 13 male imagos, same data as holotype. Deposition: holotype and paratypes in NMNH.

Additional locality data: Cerro La Neblina, AM [GUAY].

Related references: Domínguez et al. (2006): 445.

Miroculis (Miroculis) fittkai Savage and Peters, 1983

Original description: Savage and Peters (1983): 529 (male imago, female imago, nymph).

First record: Savage (1987): 103. 3 male imagos: Territorio Federal Amazonas, Departamento Río Negro, Cerro La Neblina, Basecamp on Río Baria (= Río 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: Territorio Federal Amazonas, Departamento Río Negro, Cerro 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. Deposition: NMNH.

Additional locality data: Cerro La Neblina, AM [GUAY]

Related references: Domínguez et al. (2006): 445.

Miroculis (Miroculis) nebulosus Savage, 1987

First record and original description: Savage (1987): 104. Holotype male imago: Territorio Federal Amazonas, Departamento Río Negro, Cerro La Neblina, Basecamp on Río Paria (= Río Mawarinuna), 00°49'50" N, 66°09'40" W, 140 m; 20-24/iii/1984; O.S. Flint, Jr. & J.A. Louton. Paratypes: 3 male imagos, same data as holotype. Deposition: holotype and paratypes in NMNH.

Additional locality data: Cerro La Neblina, AM [GUAY]

Related references: Domínguez et al. (2006): 447.

LISTS OF SPECIES

Paramaka convexa (Spieth, 1943)

Original description: Spieth (1943): 10 (male imago), *Thraulodes convexus*

First record: Blanco-Belmonte et al. (2003): 119, *Paramaka convexa*. Nymphs and imagos: Bolivar State, Colibrí Creek, La Llovizna National Park, Caroni River Basin; 25/iii/2000; V. Ruaise and L. Blanco. Deposition: EIHG, LPSH, FAMU and LHUPS.

Additional locality data: 8°18' N, 62°40' W; La Llovizna National Park, BO [GUAY]

Related references: Domínguez et al. (2006): 463.

Simothraulopsis demerara (Traver, 1947)

Original description: Traver (1947): 150, *Thraulodes demerara*

First record: Domínguez et al. (1997): 146, *Simothraulopsis demerara* new combination. Subimagos (sex and number of specimens are not specified in this reference); Bo. Morichal Tauca, 22 mi. E. Río Caura; 8-9/ii/1976; C.M. & O.S. Flint, Jr. Deposition: CU, FAMU, NMNH, ORSTOM, IFML, ZS (deposition of specimens from Venezuela in these institutions is doubtful because this information is not specified in the reference).

Additional locality data: 7°29' N, 65°00' W, San Pedro de Tauca, BO [GUAY].

Related references: Domínguez et al. (2006): 486.

Thraulodes guanare Chacón, Segnini and Domínguez, 1999

First record and original description: Chacón et al. (1999): 252. Holotype: male imago; Portuguesa State, Río Guanare, 200 m; 9/xii/1995; M.M. Chacón, S. Segnini, E. Domínguez. Allotype: female imago, same data as holotype. Paratypes: 7 male imagos and 5 female imagos, same data as holotype. Deposition: holotype, allotype, 4 male and 3 female paratypes in ULA; 3 males and 2 female paratypes in IFML.

Additional locality data: 9°02' N, 69°49' W; Río Guanare, PO [LLLA].

Related references: Domínguez et al. (2006): 502.

Thraulodes marreroi Chacón, Segnini and Domínguez, 1999

First record and original description: Chacón et al. (1999): 255. Holotype: male imago; Portuguesa State, Río Guanare, 200 m; 9/xii/1995; M.M. Chacón, S. Segnini, E. Domínguez. Paratypes: 3

male imagos, same data as holotype. Deposition: holotype and 1 male paratype in ULA; 2 male paratypes in IFML.

Additional locality data: 9°02' N, 69°49' W; Río Guanare, PO [LLLA].

Related references: Domínguez et al. (2006): 504.

Thraulodes mucuy Chacón, Segnini and Domínguez, 1999

First record and original description: Chacón et al. (1999): 250. Holotype: male imago; Mérida State, Río La Mucuy, 2,000 m; 4/xii/1995. M.M. Chacón, S. Segnini, E. Domínguez. Paratypes: 1 male imago, same data as holotype. Deposition: holotype in ULA, paratype in IFML.

Additional locality data: 8°37'57" N, 71°03'31" W; Río La Mucuy, ME [LAND].

Related references: Domínguez et al. (2006): 506.

Thraulodes venezuelana Ulmer, 1943

First record and original description: Ulmer (1943): 23. Holotype: male imago; 1864; Lindig (locality data and exact date are not specified in this reference). Deposition: VM

Related references: Traver and Edmunds (1967): 382; Hubbard (1982): 267; Domínguez et al. (2006): 509.

Tikuna bilineata (Needham and Murphy, 1924)

Original description: Needham and Murphy (1924): 48 (male subimago, female), *Choroerpes bilineata*.

First record: Peters et al. (2005): 52. *Tikuna bilineata*. 1 male subimago: Zulia State, Dist. Mara, Río Socuy, Campamento Corpozulia, 50 km W of Carrasquero; 6-7/x/1979; H.M. Savage & R.A. Romero. 1 female imago: Zulia State, Perija El Tucuco, Mission El Tucuco, Río El Tucuco, 1/2 km from church; 1-5/x/1979; H.M. Savage. Deposition: NMNH, FAMU, ZSBS.

Additional locality data: 10°45' N, 72°28' W; Río Socuy. 9°50' N, 72°48' W, Perija, El Tucuco. ZU [LAND].

Related references: Domínguez et al. (2006): 511.

OLIGONEURIIDAE

Fittkauneria adusta Pescador and Edmunds, 1994

First record and original description: Pescador and Edmunds (1994): 268. Holotype: mature nymph; La Escalera, 108 km S. Río Cuyuní; 11-

LISTS OF SPECIES

12/ii/1976; C.M. and O.S. Flint, Jr. Paratypes: 7 mature nymphs, same data as holotype. Deposition: Holotype and 5 nymphs in NMNH, 2 nymphs in MIZA.

Additional locality data: 6°01' N, 61°28' W; La Escalera, BO [GUAY].

Related references: Domínguez et al. (2006): 542.

Fittkaunearia carina Pescador and Edmunds, 1994

First record and original description: Pescador and Edmunds (1994): 268. Holotype: male imago; T.F.A. Camp IV, 0°58' N, 65°57' W, Cerro La Neblina, 750 m; 15-18/iii/1984; O.S. Flint, Jr. Paratypes: 1 mature nymph, T.F.A. Camp V, 0°49' N, 66° 0' W, Cerro La Neblina, 1,250 m, 23-24/iii/1984, O.S. Flint, Jr.; 6 fairly mature nymphs, T.F.A. Camp XI, 0°52' N, 65°50' W, Cerro La Neblina, 26-28/ii/1985, P.J. & P.M. Spangler & R.A. Faitoute; 7 fairly mature nymphs, Amazonas, Dept. Río Negro, small forest stream nr. of Unturan Range, 1,000 m, 1°33' N, 65°12' W, 11/ii/1989. Deposition: Holotype and 6

nymphs paratypes in NMNH, 2 nymphs paratypes in FAMU, 2 nymphs paratypes in MIZA, 2 nymphs paratypes in UU, 2 nymphs paratypes in HAMPG.

Additional locality data: AM [GUAY]

Related references: Domínguez et al. (2006): 542.

POLYMITARCYIDAE

Asthenopus curtus (Hagen, 1861)

Original description: Walker (1853): 554 (*Palingenia albifilum*, var.); Hagen (1861): 304 (*Palingenia curta*); Eaton (1868): 84 (*Campsurus curtus*); Eaton (1871): 59 (male imago, *Asthenopus curtus*).

First record: Spieth (1943): 1 (*A. curtus*). 2 males, Río Casiquiare, 18/iii/1929 (collector unknown).

Deposition: AMNH.

Additional locality data: 2°00'-3°08' N, 65°52'-67°06' W; Río Casiquiare, AM [GUAY].

Related references: Traver (1950): 606, Traver (1956): 7, Demoulin (1966): 4, Sattler (1967): 104, Hubbard (1982): 270, Domínguez (1989): 173, Domínguez et al. (2006): 561.

Acknowledgements

We thank Janice Peters, Florida A&M University, for providing some literature used in this study and providing information on depositions of type material. We are also grateful to Ingrid Correa, Universidad de Los Andes, Mérida, Venezuela, provided some literature used in this study. Oliver S Flint, Dept. of Entomology, National Museum of Natural History (Smithsonian Institution), provided some of the locality coordinate data which is deeply appreciated. This research was supported in part by the *Oficina de Intercambio Científico de la Universidad de Los Andes*; and the *Fondo Nacional de Ciencia y Tecnología* (FONACIT) of Venezuela.

Literature cited

Allen, R. K. 1973. New species of *Leptohyphes* Eaton (Ephemeroptera: Tricorythidae). *Pan-Pacific Entomologist* 49(4): 363-372.

Blanco-Belmonte, L, V. Ruaise, and J. G. Peters. 2003. The nymph of *Paramaka* Savage & Domínguez (Ephemeroptera: Leptophlebiidae: Atalophlebiinae); p. 117-121 *In* E. Gaino (ed.). *Research update on Ephemeroptera & Plecoptera*. Perugia: Università di Perugia..

Chacón, M. M, S. Segnini, and E. Domínguez. 1999. Three new species of *Thraulodes* (Ephemeroptera: Leptophlebiidae: Atalophlebiinae) from Venezuela. *Aquatic Insects* 21: 249-257.

Demoulin, G. 1952. Contribution à l'étude des Ephoronidae Euthyplociinae (Insectes Éphéméroptères). *Bulletin de l'Institut Royale des Sciences Naturelles de Belgique* 28(45): 1-22.

Demoulin, G. 1966. Contribution à l'étude des Éphéméroptères du Surinam. *Bulletin de l'Institut Royale des Sciences Naturelles de Belgique* 42(37): 1-22

Derka, T. 2002. *Massartella devani*, a new mayfly species from Venezuela's Highlands (Ephemeroptera: Leptophlebiidae: Atalophlebiinae). *Aquatic Insects* 24: 309-316.

Domínguez, E. 1989. Primera cita de *Asthenopus curtus* (Hagen) (Ephemeroptera: Polymitarciidae) para la República de Ecuador. *Revista de la Sociedad Entomológica Argentina* 45(1-4): 173-174.

Domínguez, E. 1999. Systematics, cladistics and biogeography of the American genus *Farrodes* (Ephemeroptera: Leptophlebiidae: Atalophlebiinae). *Zoological Journal of the Linnean Society* 126: 155-189.

LISTS OF SPECIES

- Domínguez, E., C. Molineri, and W. L. Peters. 1996. Ephemeroptera from Central and South America: New species of the *Farrodes bimaculatus* group with a key for the males. *Studies on Neotropical Fauna and Environment* 31:87-101.
- Domínguez, E., C. Molineri, M. L. Pescador, M. D. Hubbard, and C. Nieto. 2006. Ephemeroptera of South America. *Aquatic Biodiversity in Latin America (ABLA)*. Vol. 2. Sofia-Moscow: Pensoft. 646 p.
- Domínguez, E., W. L. Peters, J. G. Peters, and H. M. Savage. 1997. The imago of *Simothraulopsis* Demoulin with a redescription of the nymph (Ephemeroptera: Leptophlebiidae: Atalophlebiinae). *Aquatic Insects* 19: 141-150.
- Eaton, A. E. 1868. An outline of a re-arrangement of the genera of Ephemeridae. *Entomologist's Monthly Magazine* 5: 82-91.
- Eaton, A. E. 1871. A monograph on the Ephemeridae. *Transactions of the Entomological Society of London* 1871: 1-164.
- Eaton, A. E. 1883-1888. A revisional monograph of recent Ephemeridae or mayflies. *Transactions of the Linnean Society of London, Second Series, Zoology* 3: 1-352.
- Gros, A. J. and J. A. Lestage. 1927. Contribution à l'étude des larves des Ephéméroptères. Série IV. Le groupe Euthyplocien. *Annales de Biologie Lacustre* 15: 119-162.
- Hagen, H. A. 1861. Synopsis of the Neuroptera of North America. With a list of the South American species. Washington: Smithsonian Miscellaneous Collections. 347 p.
- Hubbard, M. D. 1982. Catálogo abreviado de Ephemeroptera da América do Sul. *Papéis Avulsos de Zoologia* 34: 257-282.
- Lugo-Ortiz, C. R. and W. P. McCafferty. 1999. Revision of South American species of Baetidae (Ephemeroptera) previously placed in *Baetis* Leach and *Pseudocloeon* Klapalek. *Annales de Limnologie* 35(4): 257-262.
- Mayo, V. K. 1973. Four new species of the genus *Baetodes* (Ephemeroptera: Baetidae). *Pan-Pacific Entomologist* 49(4): 308-314.
- MARN - Ministerio del Ambiente y de los Recursos Naturales. 2001. Estrategia Nacional sobre Diversidad Biológica y su plan de acción. República Bolivariana de Venezuela, Oficina Nacional de Diversidad Biológica. Caracas: Fondo para el Medio Ambiente Mundial (FMAM) y Programa de las Naciones Unidas para el Desarrollo (PNUD). 135 p.
- Molineri, C. 1999. Revision of the genus *Tricorythopsis* (Ephemeroptera: Leptohiphidae) with the description of four new species. *Aquatic Insects* 21: 285-300.
- Molineri, C. and Flowers, R. W. 2001. Primera cita de *Allenhyphes* Hofmann y Sartori, 1999 (Ephemeroptera: Leptohiphidae) para América continental. *Entomotopica* 16: 61-62.
- Nieto, C. 2004. The genus *Baetodes* (Ephemeroptera: Baetidae) in South America with the description of new species from Argentina, Bolivia and Peru. *Studies on Neotropical Fauna and Environment* 39: 63-79.
- Needham, J. G. and H. E. Murphy. 1924. Neotropical mayflies. *Bulletin of the Lloyd Library, Number 24, Entomological Series* 4: 1-79
- Pereira, S. M. and E. R. Da-Silva. 1990. Nova espécie de *Campylocia* Needham & Murphy, 1924 com nota biológicas (Ephemeroptera, Euthyplociidae). *Boletim do Museu Nacional, Nova Série, Zoologia* 336:1-12.
- Pescador, M. L. and G. F. Edmunds Jr. 1994. New genus of Oligoneuriidae (Ephemeroptera) from South America. *Annals of the Entomological Society of America* 87: 263-269.
- Pescador, M. L., M. D. Hubbard, and M. C. Zúñiga. 2001. The status of the taxonomy of the mayfly (Ephemeroptera) fauna of South America; p. 37-42 *In* E. Domínguez (ed.). *Trends in Research in Ephemeroptera and Plecoptera*. New York: Kluwer Academic/Plenum
- Pescador, M. L. and W. L. Peters. 1990. Biosystematics of the genus *Massartella* Lestage (Ephemeroptera: Leptophlebiidae: Atalophlebiinae) from South America. *Aquatic Insects* 12: 145-160.
- Peters, W. L. and E. Domínguez. 2001. The identity of *Hagenulopsis minuta* Spieth (Leptophlebiidae: Atalophlebiinae); p. 353-358 *In* E. Domínguez (ed.). *Trends in Research in Ephemeroptera and Plecoptera*. New York: Kluwer Academic/Plenum.
- Peters, J. G., R. W. Flowers, M. D. Hubbard, E. Domínguez, and H. M. Savage. 2005. New records and combinations for Neotropical Leptophlebiidae (Ephemeroptera). *Zootaxa* 1054: 51-60.
- Sattler, W. 1967. Über die Lebensweise, insbesondere das bauerhalten, neotropischer Eintagsfliegen-Larven (Ephemeroptera, Polymitarcidae). *Beiträge zur Neotropischen Fauna* 5(2): 89-110.
- Savage, H. M. 1987. Two new species of *Miroculis* from Cerro de La Neblina, Venezuela with new distribution records for *Miroculis fittkai* and *Microphlebia surinamensis* (Ephemeroptera: Leptophlebiidae). *Aquatic Insects* 9(2): 97-108.
- Savage, H. M. and W. L. Peters. 1983. Systematics of *Miroculis* and related genera from northern South America (Ephemeroptera: Leptophlebiidae). *Transactions of the American Entomological Society* 108: 491-600.
- Spieth, H. T. 1943. Taxonomic studies on the Ephemeroptera. III. Some interesting Ephemerids

LISTS OF SPECIES

- from Surinam and other Neotropical localities. American Museum Novitates 1244: 1-13.
- Traver, J. R. 1943. New Venezuelan mayflies. Boletín de Entomología Venezolana 2(2): 79-98.
- Traver, J. R. 1947. Notes on Neotropical mayflies. Part II. Family Baetidae, subfamily Leptophlebiinae. Revista de Entomología 18: 149-160.
- Traver, J. R. 1950. Notes on Neotropical mayflies. Part. IV. Family Ephemeridae (continued). Revista de Entomología 21: 593-614.
- Traver, J. R. 1956. The genus *Asthenopodes* (Ephemeroptera). Comunicaciones Zoológicas del Museo de Historia Natural de Montevideo 4: 1-10.
- Traver, J. R. and G. F. Edmunds Jr. 1967. A revision of the genus *Thraulodes* (Ephemeroptera: Leptophlebiidae). Miscellaneous Publications of the Entomological Society of America 5(8): 349-395.
- Ulmer, G. 1920. Über die Nymphen einiger exotischer Ephemeropteren. Festschrift für Zschokke 25: 1-25.
- Ulmer, G. 1942. Alte und neue Eintagsfliegen (Ephemeropteren) aus Süd- und Mittelamerika. Stettiner Entomologische Zeitung 103: 98-128.
- Ulmer, G. 1943. Alte und neue Eintagsfliegen (Ephemeropteren) aus Süd- und Mittelamerika. Stettiner Entomologische Zeitung 104: 14-46.
- Walker, F. 1853. Ephemerinae. List of the specimens of neuropterous insects in the collection of the British Museum, Part III - (Termitidae- Ephemeridae): 533-585.
- Waltz, R. D. and W. P. McCafferty. 1987. Revision of the genus *Cloeodes* Traver (Ephemeroptera: Baetidae). Annals of the Entomological Society of America 80(2): 191-207.

Received June 2009

Accepted September 2009

Published online September 2009