

Mexican mayflies : inventory and additions (Ephemeroptera)

R.P. Randolph¹
W.P. McCafferty¹

Keywords : Ephemeroptera, Mexico, distribution, new country records, new state records.

The 138 species and subspecies of Ephemeroptera now known to occur in Mexico, of which 35, approximately 25 %, are endemic, are listed along with distributional annotations. New Mexican records are included for *Americabaetis lugoi* Waltz & McCafferty, *Baetodes velmae* Cohen & Allen, *Drunella coloradensis* (Dodds), *Farrodes otiesa* Lugo-Ortiz & McCafferty, *Plauditus virilis* (McDunnough), *Tricorythodes fictus* Traver, *T. texanus* Traver, and *Varipes lasiobrachiis* Lugo-Ortiz & McCafferty, the latter of which also constitutes a new continental record for the genus *Varipes* Lugo-Ortiz & McCafferty in North America. *Traverella sallei* (Navás), n. comb., is transferred from the genus *Thraulius*.

Ephéméroptères mexicains : inventaire et compléments (Ephemeroptera)

Mots-clés : Ephemeroptera, Mexique, répartition, citations nouvelles pour le pays, citations nouvelles par états.

Les 138 espèces et sous-espèces d'éphéméroptères actuellement connues du Mexique, dont 35 - soit approximativement 25% - endémiques, sont listées avec des annotations sur leur répartition. Les citations suivantes sont nouvelles pour le Mexique : *Americabaetis lugoi* Waltz & McCafferty, *Baetodes velmae* Cohen & Allen, *Drunella coloradensis* (Dodds), *Farrodes otiesa* Lugo-Ortiz & McCafferty, *Plauditus virilis* (McDunnough), *Tricorythodes fictus* Traver, *T. texanus* Traver, et *Varipes lasiobrachiis* Lugo-Ortiz & McCafferty. Cette dernière constitue aussi une nouvelle citation continentale pour le genre *Varipes* Lugo-Ortiz & McCafferty en Amérique du Nord. *Traverella sallei* (Navás), n. comb., est transférée du genre *Thraulius*.

1. Introduction

Mexico is significant with respect to the biodiversity and biogeography of its flora and fauna. It has been recognized as having a high number of endemic species and distinct regional assemblages due, in part, to its widely varied topography, which results in highly localized regional climates (Anderson & O'Brien 1996). Also, the region represents a transition zone between the Nearctic and Neotropical zones (Ramamoorthy et al. 1993, Anderson & O'Brien 1996, McCafferty 1998). As a result, Mexico was ranked third worldwide with respect to its biodiversity by Mittermeier (1988). In light of this, we would expect the Mexican mayfly (Ephemeroptera) fauna also to be rich, but moderated to a certain extent by the dearth of perennial

stream habitats in the larger arid regions, mainly in northern Mexico.

The most recent comprehensive listing of the Mexican mayfly fauna was provided by McCafferty & Lugo-Ortiz (1996), wherein 116 species were documented from the literature up to that time. By comparison, 143 species are known from the state of Indiana, USA (Randolph & McCafferty 1998), a region with an area of 99,993 km², and less than 5 % the area of Mexico (1,972,544 km²). Nevertheless, of the 138 Mexican species and subspecies reviewed herein, 35 or approximately 25 %, are endemic.

Prior to the study by McCafferty & Lugo-Ortiz (1996), Edmunds et al. (1976) had listed 63 nominal species from Mexico. Since then, works by Allen (1977, 1978, 1985), Allen & Brusca (1978), Allen & Cohen (1977), Allen & Murvosh (1983, 1987abc), Cohen & Allen (1978), Lugo-Ortiz & McCafferty (1994ab, 1995ab, 1996abc), Waltz & McCafferty (1987), Lugo-Ortiz et al. (1994), and McCafferty & Lugo-Ortiz (1998) have provided the majority of re-

¹ Department of Entomology, Purdue University, West Lafayette, IN 47907, USA.

cent Mexican mayfly records. Since McCafferty & Lugo-Ortiz (1996), studies by Domínguez et al. (1996), Wiersema (1998), Domínguez (1999), Wiersema & Baumgardner (2000), Baumgardner & McCafferty (2000), McCafferty & Randolph (2000), and Randolph & McCafferty (2000) have also contributed some additional Mexican data, including new synonyms. The biogeography of Mexican mayfly genera was addressed by McCafferty et al. (1992) and McCafferty (1998). McCafferty et al. (1997) provided an illustrated stage correlated identification key in Spanish to all known Mexican mayfly families. For a review of works dealing with Mexican mayflies prior to Edmunds et al. (1976), see Lugo-Ortiz & McCafferty (1994a) and McCafferty & Lugo-Ortiz (1996).

Herein we provide an up to date inventory of the Mexican mayfly species and subspecies, and provide new country and state records based on previously unstudied material. We list 138 species and subspecies among 11 families and 38 genera, and include eight new country records and 48 new state records.

Of the new country records, *Varipes lasiobranchius* Lugo-Ortiz & McCafferty also represents a new continental record for the genus *Varipes* Lugo-Ortiz & McCafferty. This distinctive species was recently described from Colombia and Ecuador by Lugo-Ortiz & McCafferty (1998). Its presence in Mexico, and North America, is remarkable because only four other mayfly species [*Euthyplocia hecuba* (Hagen), *Hexagenia albivitta* (Walker), *H. mexicana* Eaton, and *Leptohyphes nigripunctus* Traver] are known to occur in both North and South America (McCafferty 1985, 1998).

With respect to other species reported here for Mexico for the first time, *Americabaetis lugo* Waltz & McCafferty and *Farrodes otiosa* Lugo-Ortiz & McCafferty were previously known only from Costa Rica, respectively (Waltz & McCafferty 1999, Lugo-Ortiz & McCafferty 1996b), and *Baetodes velmae* Cohen & Allen was known only from Panama (Cohen & Allen 1978). Our discovery of *Plauditus virilis* (McDunnough) in Mexico also represents the first report of the genus *Plauditus* Lugo-Ortiz & McCafferty south of the USA. *Tricorythodes fictus* Traver was previously known only from the southwestern USA (Traver 1935). Allen (1967) reported paratype material of *T. edmundsi* Allen from Tamaulipas. The recent examination by N. A. Wiersema (pers. comm.) of that paratype material has shown that those specimens are actually misidentified *T. texanus* Traver. *Drunella coloradensis* (Dodds) was previously known throughout the western USA and Canada (Allen & Edmunds 1962, McCafferty et al. 1997, McCafferty & Randolph 1998).

We include the species *Traverella sallei* (Navás), n. comb., in our inventory, although it had been inadvertently omitted previously by McCafferty & Lugo-Ortiz (1996). This species was originally described in the genus *Thraululus* Eaton; however, *Thraululus* is now known to be limited to the Eastern Hemisphere (Peters and Edmunds 1970). Based on the genitalia figured by Navás (1935), this species is consistent with the genus *Traverella* Edmunds. Peter Grant (pers. comm.), who is currently revising *Thraululus*, has confirmed our assessment of the species. No specific location other than Mexico was provided by Navás, nor has the species been reported since its description.

The date ascribed to *Homoeoneuria salviniae* Eaton has sometimes been 1883 (e.g., Pescador and Peters 1980, McCafferty 1996), but the species name appeared, and it was briefly described in 1881 (Eaton 1881). It should also be pointed out that the date ascribed to the species *Camelobaetidius variabilis* Wiersema is 1997. The date appearing on the issue of the journal in which the species was described (Wiersema 1998) was mailed and available in 1997, and thus the species name was available in 1997.

In the inventory below, known Mexican state distributions are provided for all species and full collection data are given for the new state and country records. Species are listed alphabetically by family, genus, and species. Mexican states are abbreviated as follows and are depicted in Figure 1: AG (Aguascalientes), BJ (Baja California), BS (Baja California Sur), CH (Chihuahua), CL (Coahuila), CM (Colima), CP (Campeche), CS (Chiapas), DF (Distrito Federal), DU (Durango), GJ (Guanajuato), GO (Guerrero), HD (Hidalgo), JA (Jalisco), MH (Michoacan), ML (Morelos), MX (state of Mexico), NL (Nuevo Leon), NT (Nayarit), OA (Oaxaca), PU (Puebla), QR (Quintana Roo), QT (Queretaro), SI (Sinaloa), SL (San Luis Potosi), SO (Sonora), TA (Tamaulipas), TB (Tabasco), TC (Tlaxcala), VC (Vera Cruz), YT (Yucatan), ZA (Zacatecas). Asterisks indicate species currently thought to be endemic to Mexico. For all species originally described from Mexico, states representing type localities for those species are also annotated. Except where otherwise indicated, all materials examined are deposited in the Purdue Entomological Research Collection, West Lafayette, Indiana.

2. Baetidae

2.1. *Acentrella insignificans* (McDunnough), 1926

CH; SO.



Fig. 1. State map of Mexico. State abbreviations are explained in Introduction.

Fig. 1. Carte politique du Mexique. L'abréviation des noms d'états est détaillée dans l'introduction.

2.2. *Americabaetis intermedius* (Lugo-Ortiz & McCafferty), 1994

MX ; OA [Río Atoyac at Ayoquezco, elev. 4,600', temp. 72°F, X-22-1968, R. K. Allen (larva)] ; VC [3 km W Zaculpan, elev. 6,000', IV-14-1960, M. Raymond Lee (larva)].

2.3. *Americabaetis lugoi* Waltz & McCafferty, 1999

CS [stream at Santa Isabel 12 mi above Arriaga on Hwy 190, elev. 2000', temp. 73°F, X-23-1968, R. K. Allen (larvae)].

2.4. *Americabaetis pleturus* (Lugo-Ortiz & McCafferty), 1994

NL ; SL [Río Axtla at Comoco, 20 mi N Tamazunchale, VII-9-1966, R. K. Allen (larvae)]; TA ; VC [Río Paso de Ovejas at Paso de Ovejas, elev. 200', temp. 76°F, XI-10-1968, R. K. Allen (larva) ; Río Piedras Negras at Piedras Ne-

gras, near Poza Rica, elev. 600', temp. 67°F, XI-12-1968, R. K. Allen (larva)].

2.5. *Apobaetis indeprensus* Day, 1955

TA.

2.6. *Baetis adonis* Traver, 1935

BN ; BS ; CH.

2.7. *Baetis flavistriga* McDunnough, 1921

CH.

2.8. *Baetis magnus* McCafferty & Waltz, 1986

CH ; CS ; DF ; DU ; GO [Río Acapulco 7 mi S Taxco, elev. 4,500', temp. 62°F, XI-16-1968, R. K. Allen (larvae)] ; JA [Río La Pasion at Tizapan El Alto, elev. 5,100', temp. 72°F, X-16-1968, R. K. Allen] ; MH [stream 9 mi E Morelia on

Hwy 15, VIII-5-1966, R. K. Allen (larvae)]; MO ; MX ; NL ; OA ; PU ; SL ; VC.

2.9. *Baetis notos* Allen & Murvosh, 1987

MX ; VC.

2.10. *Baetis tricaudatus* Dodds, 1923

BN ; DF ; JA [stream Hacienda Guadalupe, elev. 4,500', temp. 70°F, X-17-1968, R. K. Allen (larvae)]; ML [Río Amcuzac at Huajintlan on Hwy 95, elev. 3,200', temp. 64°F, XI-14-1968, R. K. Allen (larvae)]; Río Cuautla at Cuautla, elev. 4,600', temp. 70°F, XI-13 1968, R. K. Allen (larva)]; MX; OA [Río Atoyac at Ayoquezco, elev. 4000', temp. 72°F. X-22-1968 (larvae)]; VC.

2.11. *Baetodes adustus* Cohen & Allen, 1972

VC (type locality).

2.12. *Baetodes bibranchius* McCafferty & Provonsha, 1993

TA.

2.13. *Baetodes caritus* Cohen & Allen, 1972

CH ; GO ; ML ; VC.

2.14. *Baetodes deficiens* Cohen & Allen, 1972

GO ; JA ; ML ; SO ; VC.

2.15. *Baetodes edmundsi* Koss, 1972

SI ; SO.

2.16. **Baetodes fortinensis* Mayo, 1972

VC (type locality).

2.17. *Baetodes fuscipes* Cohen & Allen, 1972

ML ; SI ; SO ; VC (type locality).

2.18. *Baetodes inermis* Cohen & Allen, 1972

GO ; JA ; ML ; OA ; PU [creek at Hwy 106, Pahuatlan, VIII-17-1994, B. Kondratieff (larva)]; TA (type locality); VC.

2.19. **Baetodes longus* Mayo, 1973

BS ; NL ; TA (type locality).

2.20. **Baetodes obesus* Mayo, 1972

VC (type locality).

2.21. *Baetodes pallidus* Cohen & Allen, 1972

CS ; JA.

2.22. **Baetodes pictus* Cohen & Allen, 1972

CH ; VC (type locality).

2.23. *Baetodes tritus* Cohen & Allen, 1972

CS ; GO [km 15 Carretera Bejucos cerca de Altamirano, XI-22-1984 (larvae)]; km 145 carretera Iguala, near Altamirano, XI-23-1984, H. Brailovsky et al. (larvae)]; JA ; ML ; TA ; NL ; VC (type locality).

2.24. *Baetodes velmae* Cohen & Allen, 1978

NL [Galeana, Municipiote Galeana, elev. 7,250', VII-8-1938, H. Hoogstraal (larva)].

2.25. *Callibaetis californicus* Banks, 1900

BN [Río Santo Toma, 2 mi S Santo Tomas, VI-8-1978, RKA & CMM (larva)]; BS [Arroyo Agua Caliente, 3 mi E Ejido Agua Caliente off Hwy #1, VI-4-1978, RKA & CMM (larvae)]; GO ; MX ; ML ; NL.

2.26. *Callibaetis distinctus* Lugo-Ortiz & McCafferty, 1996

SO (type locality).

2.27. *Callibaetis floridanus* Banks, 1900

AG ; CS ; CH ; DU ; GO ; HD ; JA ; ML ; NL ; OA ; TA ; TC ; VC.

2.28. *Callibaetis montanus* Eaton, 1885

BS [9 mi NW Cabo San Lucas, unnamed stream, VI-7-1997, W. D. Shepard (larvae)]; Arroyo Agua Caliente, 3 mi E Ejido Agua Caliente off Hwy #1, VI-4-1978, RKA & CMM (larvae)]; DF.

2.29. *Callibaetis pictus* (Eaton), 1884

BN [Río Santo Toma, 2 mi S Santo Tomas, VI-8-1978, RKA & CMM (larva)]; 11 mi E Mike's Sky Rancho, unnamed stream, VI-3-1997, W. D. Shepard (larvae)]; BS ; CH ; CS ; DF ; DU ; GO ; HD ; MH ; MO ; MX ; NL ; OA ; PU ; SI ; SO ; TA ; VC ; ZA [10 km antes de Tresnillo, VIII-17-1977, J. Bueno (larvae)].

2.30. *Callibaetis punctilulus* McCafferty & Provonsha, 1993

CH ; NL ; SO [7.4 mi E Alamoso, rock hole off Cuchajqui R, VI-5-1971, L. T. Nielsen & T. J. Zavortiak (adult)].

2.31. *Callibaetis undatus* (Pictet), 1843

DF.

2.32. **Camelobaetidius arriaga* (Traver & Edmunds), 1968

BS ; CH ; CS (type locality) ; DU ; GO.

2.33. *Camelobaetidius mexicanus* (Traver & Edmunds), 1968

BS [3 mi W Agua Caliente, VI-22-1997, W. D. Shepard (larva)]; CS ; GO ; JA ; ML ; NL ; OA ; SI ; SO ; TA (type locality) ; VC ; ZA.

2.34. *Camelobaetidius musseri* (Traver & Edmunds), 1968

BS [3 mi W Agua Caliente, Río Agua Caliente, VI-22-1997, W. D. Shepard (larvae)]; CS ; GO ; JA ; ML ; NL ; OA ; SL ; VC (type locality).

2.35. **Camelobaetidius similis* Lugo-Ortiz & McCafferty, 1995

GO (type locality) ; OA [Río Atoyac at Ayoquezco, elev. 4,600', temp. 72°F, X-22-1968, R. K. Allen (larva)]; SI [Río

Evora Mocerito near Mocerito on Hwy 21, I-17-1983, Allen, Murvosh, and Van Vector (larvae) ; SO [Río Sonora 2 mi SE Rte 21 between Uras and Mazocahui, I-14-1983, Allen, Murvosh, and Van Vector (larva) ; TA.

2.36. *Camelobaetidius sinaloa (Allen & Murvosh), 1987

SI (type locality).

2.37. *Camelobaetidius variabilis* Wiersema, 1997

NL ; TA.

2.38. *Camelobaetidius warreni* (Traver & Edmunds), 1968

BS ; CS ; CH ; GO ; OA ; SI [Río Baluarte at Rosarito, I-18-1983, Allen, Murvosh, and Van Vector (larvae) ; SO.

2.39. *Camelobaetidius* sp. 1 McCafferty & Davis, 1992

CH ; CL.

2.40. *Cloeodes excogitatus* Waltz & McCafferty, 1987

BS [3 mi W. Agua Caliente, Río Agua Caliente, VI-22-1997, W. D. Shepard (larvae) ; CS [stream at Santa Isabel, 12 mi above Arriaga on Hwy 190, elev. 2,000', temp. 73°F, X-23-1968, R. K. Allen (larvae) ; NL ; SI [Río Evora Mocerito near Mocerito on Hwy 21, I-17-1983, Allen, Murvosh, and Van Vector (larvae) ; Río Baluarte at Rosarito, I-18-1983, Allen, Murvosh, Van Vector (larvae) ; TA ; VC [Río Paso de Ovejas at Paso de Ovejas, elev. 200', temp. 76°F, XI-10-1968, R. K. Allen].

2.41. *Cloeodes macrolamellus* Waltz & McCafferty, 1987

CH ; DU.

2.42. **Cloeodes peninsulus* Waltz & McCafferty, 1987

BS (type locality).

2.43. **Cloeodes waltzi* Wiersema & Baumgardner, 1999

TA (type locality).

2.44. **Fallceon eatoni* (Kimmins), 1934

SO (type locality).

2.45. *Fallceon fortipalpus* Lugo-Ortiz & McCafferty, 1999

TA.

2.46. *Fallceon longifolius* (Kluge), 1992

HD.

2.47. *Fallceon quilleri* (Dodds), 1923

BN ; BS ; CH ; CS ; GO [Río Balsas between Iguala and Chilpancingo on Hwy 95, elev. 1,800', temp. 76°F, XI-16-1968, R. K. Allen (larvae) ; MH [Río Turundeo at Turundeo on Hwy 15 near Tuxpan, elev. 6,633', VII-4-1966, R. K. Allen (larvae) ; ML [stream 7 mi S Cuemauaca, elev. 4,300' temp. 62°F, XI-14-1968, R. K. Allen (larvae) ; NL [Río Sabinas at Villaldama, elev. 1,500' temp. 80°F, VIII-4-1970, R. K. Allen (larvae) ; Río Salinas at Cienega de Flores, elev. 1,450', VII-4-1966, R. K. Allen (larvae) ; Sabinas at Sabinas Hidalgo, elev. 1,180' temp. 70°F, XI-25-1968, R. K. Allen (larvae) ; Río Camacho at Linares, elev. 1,350', temp. 84°F,

VIII-5-1970, R. K. Allen (larva) ; OA [Oaxaca, elev. 5,500', VII-28-1966, R. K. Allen (larvae) ; stream 6 mi N Oaxaco, elev. 5,100', temp. 70°F, X-22-1968, R. K. Allen (larvae) ; Río Atoyac at Ayoquezco, elev. 4,600', temp. 72°F, X-22-68, R. K. Allen (larvae) ; stream 10 mi N Huajuapán de León, elev. 5,400', temp. 70°F, XI-7-1968, R. K. Allen (larvae) ; PU ; SL ; SI ; SO ; TA ; VC ; ZA [Río Juchipila at Juchipila, elev. 4,500', temp. 80°F, X-18-1968, R. K. Allen (larvae)].

2.48. *Moribaetis macaferti* Waltz, 1985

CS ; GO [trib. Río Papagayo near Tierra Colorado, elev. 500', temp. 86°F, XI-16-1968, R. K. Allen (larva) ; MX [Río Los Barbechos, Nanchitla N. P. VIII-23-1994, B. Kondratieff (adult) ; OA ; PU ; VC.

2.49. *Moribaetis salvini* (Eaton), 1885

VC.

2.50. **Paracloeodes lugoi* Randolph & McCafferty, 2000

ML (type locality).

2.51. *Paracloeodes minutus* (Daggy), 1945

BS.

2.52. *Plauditus virilis* (McDunnough), 1923

TA [Río Purificacion near Hidalgo, elev. 1400', temp. 74°F, XI-25-1968, R. K. Allen (larvae)].

2.53. *Varipes lasiobranchius* Lugo-Ortiz & McCafferty, 1998

CS [stream at Santa Isabel 12 mi above Arriaga on Hwy 190, elev. 2,000' temp., 73°F, 23-X-1968, R. K. Allen (larva)].

3. Caenidae

3.1. *Caenis anceps* Traver, 1935

VC.

3.2. *Caenis bajaensis* Allen & Murvosh, 1983

BN [Mike's Sky Rancho, unnamed stream, VI-3-1997, W. D. Shepard (larva) ; BS (type locality) ; CS ; DU ; NT ; SO.

3.3. *Caenis latipennis* Banks, 1907

CH ; CS ; NL ; SL [Ruinas de Tamuin, V-19-1979, J. Bueno (adults) ; TA.

3.4. *Caenis punctata* McDunnough, 1931

NL.

4. Ephemeridae

4.1. *Hexagenia albivitta* (Walker), 1853

VC.

4.2. *Hexagenia bilineata* (Say), 1824

SL.

4.3. *Hexagenia limbata* (Serville), 1829

JA ; NL ; SL ; TA.

4.4. *Hexagenia mexicana* Eaton, 1885

OA ; VC ; (type locality : country only)

5. Ephemerellidae**5.1. *Drunella coloradensis* (Dodds), 1923**

BN [Mike's Sky Rancho, Río San Rafael, VI-3-1997, W. D. Shepard (larvae)].

5.2. *Drunella flavilinea* (McDunnough), 1926

BN.

5.3. *Ephemerella altana* Allen, 1968

BN.

5.4. *Serratella micheneri* (Traver), 1934

BN ; BS.

6. Heptageniidae**6.1. *Epeorus margarita* Edmunds & Allen, 1964**

BN ; BS ; CH.

6.2. *Epeorus metlacensis* Traver, 1964

DU ; HD ; MH ; MO ; OA ; VC.

6.3. *Ironodes nitidus* (Eaton), 1885

BN.

6.4. **Nixe bella* (Allen & Cohen), 1977

VC (type locality).

6.5. **Nixe salvini* (Kimmins), 1934

SO (type locality).

6.6. *Rhithrogena morrisoni* (Banks), 1924

BN.

6.7. *Rhithrogena notialis* Allen & Cohen, 1977

DF (type locality) ; MH ; OA ; VC.

6.8. *Stenonema mexicanum integrum* (McDunnough), 1924

TA.

6.9. *Stenonema mexicanum mexicanum* (Ulmer), 1920

TB (type locality).

7. Isonychiidae**7.1. *Isonychia intermedia* (Eaton), 1885**

CH.

7.2. *Isonychia sicca* Walsh, 1862

CH ; NL ; SL ; SO ; TA ; VC.

8. Leptohyphidae**8.1. **Leptohyphes alleni* Brusca, 1971**

OA (type locality).

8.2. **Leptohyphes bernerii* Traver, 1958

VC (type locality).

8.3. *Leptohyphes brunneus* Allen & Brusca, 1973

CS ; GO ; JA ; ML ; OA (type locality) ; SO.

8.4. *Leptohyphes castaneus* Allen, 1967

OA.

8.5. **Leptohyphes dicinctus* Allen & Brusca, 1973

GO (type locality).

8.6. *Leptohyphes lestes* Allen & Brusca, 1973

GO (type locality).

8.7. *Leptohyphes michaeli* Allen, 1978

NL.

8.8. *Leptohyphes mirus* Allen, 1967

CH ; SI ; SO.

8.9. *Leptohyphes nigripunctus* Traver, 1943

GO.

8.10. *Leptohyphes packeri* Allen, 1967

CH ; ML ; NL ; NT ; OA ; SI ; SL ; SO ; TA ; VC.

8.11. **Leptohyphes pilosus* Allen & Brusca, 1973

VC (type locality).

8.12. *Leptohyphes sabinas* Traver, 1958

NL (type locality) ; TA ; VC.

8.13. **Leptohyphes spiculatus* Allen & Brusca, 1973

ML (type locality).

8.14. **Leptohyphes tarsos* Allen & Murvosh, 1987

SO (type locality).

8.15. *Leptohyphes vesus* Allen, 1978

TA.

8.16. *Leptohyphes zalope* Traver, 1958

CH ; CS ; GO (type locality) ; NL ; OA ; SL ; SO ; TA ; TB ; VC.

8.17. **Tricorythodes angulatus* Traver, 1959

State Uncertain [Río Santa Lucia ; type locality] ; State Uncertain [San Pedro, 12-1840-1, L. Berner (adult)] ; SO [Río Chico, above El Chico, I-18-1988, B. C. Kondratieff and R. W. Baumann (adult)].

8.18. **Tricorythodes comus* Traver, 1959

GO (type locality).

8.19. *Tricorythodes condylus* Allen, 1967

CH ; SO.

8.20. *Tricorythodes dimorphus* Allen, 1967

CH.

8.21. *Tricorythodes explicatus* (Eaton), 1892

BN ; BS ; CH ; SI ; SO.

8.22. *Tricorythodes fictus* Traver, 1935

CH [Río Gavilan, Gavilan Ranch, VIII-25-1986, B. C. Kondratieff (adult) ; Chuchugate Arroyo, trib. to Rio Chuhulpa, VI-23-1997, B. C. Kondratieff and R. W. Baumann (adults)].

8.23. **Tricorythodes mulaiki* Traver, 1959

GO (type locality).

8.24. **Tricorythodes notatus* Allen & Brusca, 1973

ML (type locality) ; OA.

8.25. *Tricorythodes texanus* Traver, 1935

TA [paratypes misidentified as *T. edmundsi* Allen, 1967 (Wiersema pers. comm.)]

8.26. **Tricorythodes ulmeri* Allen & Brusca, 1973

ML (type locality).

9. Leptophlebiidae**9.1. *Choroterpes inornata* Eaton, 1892**

BN ; BS ; CH ; OA ; SI ; SO (type locality).

9.2. **Choroterpes unguis* Lugo-Ortiz & McCafferty, 1996

CS (type locality).

9.3. **Farrodes maya* Dominguez, 1999

CS (type locality).

9.4. **Farrodes mexicanus* Dominguez, 1999

VC (type locality).

9.5. *Farrodes otiesa* Lugo-Ortiz & McCafferty, 1996

TA [Río Guayalejo, X-25-1985, J. Bueno (larvae)].

9.6. *Farrodes texanus* Davis, 1987

TA.

9.7. **Farrodes tulija* Dominguez, Molineri & Peters, 1996

CS (type locality).

9.8. *Hydrosmilodon primanus* (Eaton), 1892

TB ; VC (type locality).

9.9. *Neochoroterpes oklahoma* (Traver), 1934

CH ; CS ; DU ; NL ; SL ; TA ; VC ; ZA.

9.10. **Neochoroterpes orientalis* Henry, 1993

PU ; QT (type locality).

9.11. *Paraleptophlebia memorialis* (Eaton), 1884

BN.

9.12. *Thraulodes brunneus* Koss, 1966

BN ; BS ; CH ; DU ; GO ; JA ; MH ; MX ; ML ; OA ; SI ; SO ; VC.

9.13. **Thraulodes eccentricus* Lugo-Ortiz & McCafferty, 1996

CS ; DF ; GO ; HD (type locality) ; ML ; NL ; OA ; VC ; ZA.

9.14. **Thraulodes ehippiatus* Traver & Edmunds, 1967

CS (type locality).

9.15. *Thraulodes gonzalesi* Traver & Edmunds, 1967

CH ; NL ; SI ; SO ; TA.

9.16. *Thraulodes hilaris* (Eaton), 1892

TB ; (type locality : country only).

9.17. *Thraulodes humeralis* Navás, 1935

(type locality : country only).

9.18. **Thraulodes lunatus* Traver & Edmunds, 1967

HD ; NL ; TA (type locality) ; ZA.

9.19. *Thraulodes mexicanus* (Eaton), 1884

(type locality : country only).

9.20. *Thraulodes packeri* Traver & Edmunds, 1967

CS.

9.21. *Thraulodes spangleri* Traver & Edmunds, 1967

CS ; VC [Tiapacoyan, Río Tomata, V-25-1985, J. Nagro (adults)].

9.22. *Thraulodes speciosus* Traver, 1934

CH ; GO ; SO.

9.23. **Thraulodes tenuilineus* Lugo-Ortiz & McCafferty, 1996

CH ; CS ; ML (type locality) ; NT ; OA ; SI ; SL ; SO ; TA ; VC.

9.24. *Thraulodes zonalis* Traver & Edmunds, 1967

CS.

9.25. *Traverella albertana* (McDunnough), 1931

CH ; CS ; GO ; HD ; JA ; ML ; SI ; SO ; TB ; VC ; ZA.

9.26. *Traverella presidiana* (Traver), 1934

CS ; NL ; TA.

9.27. *Traverella promifrons* Lugo-Ortiz & McCafferty, 1996

CS ; NL.

- 9.28. **Traverella sallei* (Navas), 1935
(type locality : country only).

10. Oligoneuriidae

- 10.1. *Homoeoneuria alleni* Pescador & Peters, 1980

CH.

- 10.2. *Homoeoneuria salviniae* Eaton, 1881

CS.

- 10.3. **Lachlania iops* Allen & Cohen, 1977

CS (type locality) ; SL.

- 10.4. *Lachlania saskatchewanensis* Ide, 1941

GO.

11. Polymitarciidae

- 11.1. *Campsurus cuspidatus* Eaton, 1871

SL ; VC.

- 11.2. *Campsurus decoloratus* (Hagen), 1861

TA.

- 11.3. *Euthyplocia hecuba* Hagen, 1861

CH ; VC.

12. Siphonuridae

- 12.1. *Siphonurus occidentalis* (Eaton), 1885

CH ; HD ; SO.

Acknowledgments

We thank R. Bauman (Provo, Utah), G. Edmunds (Salt Lake City, Utah), B. Kondratieff (Fort Collins, Colorado), W. Reeves (Clemson, South Carolina), and W. Shepard (Sacramento, California) for the donations that were used in this study. Also, we thank D. Baumgardner (College Station, Texas) for providing previously unpublished data. For aid in identification of certain specimens we thank C. Lugo-Ortiz (Grahamstown, South Africa) and N. Wiersema (Houston, Texas). This research was funded in part by the NSF Grant DEB-9901577. The paper has been assigned Purdue Agricultural Research Journal Number 16216.

References

- Allen R.K. 1967. — New species of New World Leptohiphinae (Ephemeroptera : Tricorythidae). *Can. Entomol.*, 99 : 350-375.
Allen R.K. 1977. — A new species of *Tricorythodes* with notes (Ephemeroptera : Tricorythidae). *J. Kans. entomol. Soc.*, 50 : 431-445.
Allen R.K. 1978. — The nymphs of North and Central American *Leptohiphes* (Ephemeroptera : Tricorythidae). *Ann. entomol. Soc. Am.*, 71 : 537-558.
Allen R.K. 1985. — Mexican mayflies : new species, descriptions and records (Ephemeroptera). *Pan-Pac. Entomol.*, 61 : 332-333.
Allen R.K. & Brusca S.D. 1978. — Generic revisions of mayfly nymphs. II. *Thraulodes* in North and Central America (Leptophlebiidae). *Can. Entomol.*, 110 : 413-433.

- Allen R.K. & Edmunds G.F. 1962. — A revision of the genus *Ephemerella* (Ephemeroptera, Ephemerellidae). V. The subgenus *Drunella* in North America. *Misc. Publ. entomol. Soc. Am.*, 3 : 147-179.
Allen R.K. & Cohen S.D. 1977. — Mayflies (Ephemeroptera) of Mexico and Central America : new species, descriptions, and records. *Can. Entomol.*, 109 : 399-414.
Allen R.K. & Murvosh C.M. 1983. — Taxonomy and zoogeography of the mayflies (Ephemeroptera : Insecta) of Baja California. *Ann. entomol. Soc. Am.*, 76 : 425-433.
Allen R.K. & Murvosh C.M. 1987a. — Leptophlebiidae of the southwestern United States and northwestern Mexico (Insecta : Ephemeroptera). *Great Basin Nat.*, 47 : 283-286.
Allen R.K. & Murvosh C.M. 1987b. — New Baetidae from the southwestern United States and northern Mexico (Ephemeroptera : Insecta), with notes. *Can. Entomol.*, 119 : 1095-1099.
Allen R.K. & Murvosh C.M. 1987c. — Mayflies (Ephemeroptera : Tricorythidae) of the southwestern United States and northern Mexico. *Ann. entomol. Soc. Amer.*, 80 : 35-40.
Anderson R.S. & O'Brien C.W. 1996. — Curculionidae (Coleoptera). Pp. 329-349. In : J. Llorente Bousquets, A. N. García Aldrete E. & González Soriano (eds.), *Biodiversidad, taxonomía y biogeografía de artópodos de México : hacia una síntesis de su conocimiento*. Universidad Nacional Autónoma de México, México, D. F.
Baumgardner D.E. & McCafferty W.P. 2000. — *Leptohiphes zalope* (Ephemeroptera : Leptohiphidae) : a polytypic North and Central American species. *Entomol. News*, 111 : 49-59.
Cohen S.D. & Allen R.K. 1978. — Generic revisions of mayfly nymphs. III. *Baetodes* in North and Central America (Baetidae). *J. Kans. entomol. Soc.*, 51 : 253-269.
Domínguez E. 1999. — Systematics, cladistics and biogeography of the American genus *Farrodes* (Ephemeroptera : Leptophlebiidae : Atalophlebiinae). *Zool. J. Linn. Soc.*, 126 : 155-189.
Domínguez E., Molineri C. & Peters W.L. 1996. — Ephemeroptera from Central and South America : new species of the *Farrodes bimaculatus* group with a key for the males. *Stud. Neotrop. Fauna Environ.*, 31 : 87-101.
Eaton A.E. 1881. — An announcement of new genera of the Ephemeridae. *Entomol. monthly Mag.*, 17 : 191-197.
Eaton A.E. 1883-1888. — A revisional monograph of recent Ephemeridae or mayflies. *Trans. Linn. Soc. Lond., 2nd Ser. Zool.*, 3 : 1-352.
Edmunds G.F., Jr., Jensen S.L. & Berner L. — 1976. *The mayflies of North and Central America*. Univ. Minn. Press, Minneapolis.
Lugo-Ortiz C.R. & McCafferty W.P. 1994a. — New records of Ephemeroptera from Mexico. *Entomol. News*, 105 : 17-26.
Lugo-Ortiz C.R. & McCafferty W.P. 1994b. — The mayfly genus *Acerpenna* (Insecta, Ephemeroptera, Baetidae) in Latin America. *Stud. Neotrop. Fauna Environ.*, 29 : 65-74.
Lugo-Ortiz C.R. & McCafferty W.P. 1995a. — New species, stage description, and records of *Baetodes* (Ephemeroptera : Baetidae) from Mexico and Central America. *Entomol. News*, 106 : 81-86.
Lugo-Ortiz C.R. & McCafferty W.P. 1995b. — Taxonomy of the North and Central American species of *Camelobaetidius* (Ephemeroptera : Baetidae). *Entomol. News*, 106 : 178-192.
Lugo-Ortiz C.R. & McCafferty W.P. 1996a. — New Central American and Mexican records of Ephemeroptera species. *Entomol. News*, 107 : 303-310.
Lugo-Ortiz C.R. & McCafferty W.P. 1996b. — New species of Leptophlebiidae (Ephemeroptera) from Mexico and Central America. *Annls. Limnol.*, 32 : 3-18.
Lugo-Ortiz C.R. & McCafferty W.P. 1996c. — Contribution to the taxonomy of *Callibaetis* (Ephemeroptera : Baetidae) in southwestern North America and Middle America. *Aquat. Insects*, 18 : 1-9.

- Lugo-Ortiz C.R. & McCafferty W.P. 1998. — Five new genera of Baetidae (Insecta : Ephemeroptera) from South America. *Anns Limnol.*, 34 : 57-73.
- Lugo-Ortiz C.R., McCafferty W.P. & Waltz R.D. 1994. — Contribution to the taxonomy of the Panamerican genus *Fallceon* (Ephemeroptera : Baetidae). *J. N. Y. entomol. Soc.*, 102 : 460-475.
- McCafferty W.P. 1985. — New records of Ephemeroptera from Middle America. *Internat. Quat. Entomol.*, 1 : 9-11.
- McCafferty W.P. 1996. — The Ephemeroptera species of North America and index to their complete nomenclature. *Trans. Am. entomol. Soc.*, 122 : 1-54.
- McCafferty W.P. 1998. — Ephemeroptera and the great American interchange. *J. N. Am. benthol. Soc.*, 17 : 1-20.
- McCafferty W.P. & Lugo-Ortiz C.R. 1996. — Ephemeroptera. Pp. 133-145. In : J. Llorente Bousquets, A.N. García Aldrete & E. González Soriano (eds.), *Biodiversidad, taxonomía y biogeografía de artrópodos de México : hacia una síntesis de su conocimiento*. Universidad Nacional Autónoma de México, México D.F.
- McCafferty W.P. & Lugo-Ortiz C.R. 1998. — The adult of *Moribaetis macaferti* (Ephemeroptera : Baetidae). *Entomol. News*, 109 : 117-121.
- McCafferty W.P. & Randolph R.P. 1998. — Canada mayflies : a faunistic compendium. *Proc. entomol. Soc. Ontario*, 129 : 1-51.
- McCafferty W.P. & Randolph R.P. 2000. — Further contributions to the spatulate clawed Baetidae (Ephemeroptera). *Entomol. News*, in press.
- McCafferty W.P., Flowers R.W. & Waltz R.D. 1992. — The biogeography of Mesoamerican mayflies. Pp. 173-193. In : S.P. Darwin & A.L. Weldon (eds.), *Biogeography of Mesoamerica : proceedings of a symposium*. Tulane Univ. Stud. Zool. Bot., Suppl. Publ. 1.
- McCafferty W.P., Lugo-Ortiz C.R., Provonsha A.V. & Wang T-Q. 1997. — Los Efemerópteros de México : I. Clasificación superior, diagnóstico de familias y composición. *Dugesiana*, 4 : 1-29.
- McCafferty W.P., Lugo-Ortiz C.R. & Jacobi G.Z. 1997. — Mayfly fauna of New Mexico. *Great Basin Natural.*, 57 : 283-314.
- Mittermeier R.A. 1988. — Primate diversity and the tropical forest : case studies from Brazil and Madagascar and the importance of the megadiversity countries. Pp. 145-154. In : E. O. Wilson (ed.), *Biodiversity*. National Academic Press, Washington, DC.
- Navás L. 1935. — Efemerópteros. *Decadas de Insectos Nuevos. Broteria Ciencias Naturais*, 99-103.
- Pescador M.L. & Peters W.L. 1980. — A revision of the genus *Homoeoneuria* (Ephemeroptera : Oligoneuriidae). *Trans. Am. entomol. Soc.*, 106 : 357-393.
- Peters W.L. & Edmunds G.F., Jr. 1970. — Revision of the generic classification of the Eastern Hemisphere Leptophlebiidae (Ephemeroptera). *Pac. Insects*, 12 : 157-240.
- Ramamoorthy T.P., Bye R., Lot A. & Fa J. 1993. — Introduction. Pp. xix-xxxix. In : T. P. Ramamoorthy, R. Bye, A. Lot & F. Fa (eds.), *Biological diversity of Mexico, origins and distributions*. Oxford Univ. Press, New York.
- Randolph R.P. & McCafferty W.P. 1998. — Diversity and distribution of the mayflies (Ephemeroptera) of Illinois, Indiana, Kentucky, Michigan, Ohio, and Wisconsin. *Ohio Biol. Surv. Bull. New Ser.*, 13 : 1-188.
- Randolph R.P. & McCafferty W.P. 2000. — A New Species of *Paracloeodes* (Ephemeroptera : Baetidae) from Mexico. *Entomol. News*, 111 : 133-136.
- Traver J.R. 1935. — Part II, Systematics. Pp. 237-739. In : J.G. Needham, J.R. Traver & Y.-C. Hsu (eds.), *The biology of mayflies*. Comstock Publ. Co., Ithaca, New York.
- Waltz R.D. & McCafferty W.P. 1987. — Revision of the genus *Cloeodes* Traver (Ephemeroptera : Baetidae). *Ann. entomol. Soc. Am.*, 80 : 191-207.
- Waltz R.D. & McCafferty W.P. 1999. — Additions to the taxonomy of *Americabaetis* (Ephemeroptera : Baetidae) : *A. lugoi*, n. sp., adult of *A. robacki*, and key to larvae. *Entomol. News*, 110 : 39-44.
- Wiersema N. 1998. — *Camelobaetidium variabilis* (Ephemeroptera : Baetidae) : a new species from Texas, Oklahoma, and Mexico. *Entomol. News*, 109 : 21-26.
- Wiersema N.A. & Baumgardner D.E. 2000. — Distributional and taxonomical contributions to the Ephemeroptera fauna of Mexico and Central America. *Entomol. News*, 111 : 60-66.