

The Ephemeroptera of Central America. Part 2: Nicaragua

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ABSTRACT

The Ephemeroptera fauna of Nicaragua is inventoried based on the study of recent collections and includes eight families, 28 genera, and 56 species. Forty-seven species are reported from Nicaragua for the first time. Genera found in Nicaragua for the first time include *Allenhyphes* Hofmann and Sartori, *Baetodes* Needham and Murphy, *Camelobaetidius* Demoulin, *Choroterpes* Eaton, *Epiphrales* Wiersema and McCafferty, *Fallceon* Waltz and McCafferty, *Farrodes* Peters, *Guajrolus* Flowers, *Hagenulopsis* Ulmer, *Haplohyphes* Allen, *Lachlania* Hagen, *Leptoxyphes* Eaton, *Maccaffertium* Bednarik, *Paracloeodes* Day, *Terpides* Demoulin, *Thraulodes* Ulmer, *Traverella* Edmunds, *Tricoryphes* Allen and Murvosh, *Ulmeritoides* Traver, and *Vacupernius* Wiersema and McCafferty. *Americabaetis alphus* Lugo-Ortiz and McCafferty, *Baetodes bibranchius* McCafferty and Provonsha, *Campsurus notatus* Needham and Murphy, *Fallceon planifrons* (Kluge), *Farrodes pakitza* Domínguez, Molineri and Peters, *F. savagei* Domínguez, *Traverella albertana* (McDunnough), *Tricoryphes condylus* (Allen), and the genus *Tricoryphes* are reported from Central America for the first time.

INTRODUCTION

The mayfly fauna of Nicaragua has been among the poorest known for countries in the Western Hemisphere. Because of this dearth of information, Nicaragua was chosen to be Part 2 in the series documenting the Ephemeroptera fauna of Central America, with the first having covered Guatemala (McCafferty et al. 2004). Previous to the present study, only eight species had been reported from Nicaragua, with the first report of a Nicaraguan species being that of Maes (1988) for the large burrowing mayfly *Tortopus unguiculatus* (Ulmer). Other previous reports of Nicaraguan species were by McCafferty and Lugo-Ortiz (1992) (three species), Lugo-Ortiz and McCafferty (1994a) (one species), Baumgardner and ζ vila (2006) (two species), and Baumgardner et al. (2006) (one species). The subspecies *Caenis diminuta latina* McCafferty and Lugo-Ortiz, 1992, was originally described from Nicaragua, as was the species *Asioplax isabelia* Baumgardner, Meyer and McCafferty, 2006; and *Cabecar serratus* Baumgardner and ζ vila, 2006, was described from Nicaragua and Costa Rica.

Based on extensive collections made by J-M. Maes and J. Hernandez in 1996 (donated to DEB), by MDM in 2002, by MDM and C. Cencini in 2002, by W. D. Shepard in 2002 (donated to WPM), and by DEB in 2004, we have been able to add considerable new data for Nicaragua, so that a total of eight families, 29 genera, and 56 species are now represented. Larval collections made in 2002 and 2004 were of particular importance for the identification of most species.

Among the 47 new species records for Nicaragua, there are eight species that are reported from Central America for the first time. New Central American records of species that were previously known only from north of Central America include *Baetodes bibranchius* McCafferty and Provonsha, *Traverella albertana* (McDunnough), and *Tricoryhypes condylus* (Allen). New Central American records of species that were previously known only from south of Central America include *Americabaetis alphus* Lugo-Ortiz and McCafferty, *Campsurus notatus* Needham and Murphy, *Farrodes pakitza* Domínguez, Molineri and Peters, and *F. savagei* Domínguez. New Central American records of species that were previously known only from the Caribbean Islands include *Fallceon planifrons* (Kluge). Outside of Central America, most Nicaraguan species have ranges that extend southward to include Costa Rica and northward to include at least Mexico, with considerably fewer having South American or broad Panamerican ranges, although our study has increased the number of species known from both Central and South America. In addition to *F. planifrons*, *Terpides jessiae* Peters and Harrison is the only other Nicaraguan species known also to occur in the West Indies.

The 20 genera of mayflies that we found in Nicaragua for the first time include *Allenhyphes* Hofmann and Sartori, *Baetodes* Needham and Murphy, *Camelobaetidius* Demoulin, *Choroterpes* Eaton, *Epiphraides* Wiersema and McCafferty, *Fallceon* Waltz and McCafferty, *Farrodes* Peters, *Guajiroilus* Flowers, *Hagenulopsis* Ulmer, *Haplohyphes* Allen, *Lachlania* Hagen, *Leptohyphes* Eaton, *Maccaffertium* Bednarik, *Paracloeodes* Day, *Terpides* Demoulin, *Thraulodes* Ulmer, *Traverella* Edmunds, *Tricoryhypes* Allen and Murvosh, *Ulmeritoides* Traver, and *Vacupernius* Wiersema and McCafferty. Previously, *Tricoryhypes* was not known in Central America. *Choroterpes* was based on larvae unidentifiable to species and therefore does not appear in the faunistic account below. Eventually from Nicaragua, we fully expect also to find at least *Ableptemetes* Wiersema and McCafferty, *Euthyplocia* Eaton, *Hexagenia* Walsh, *Mayobaetis* Waltz and McCafferty, and *Moribaetis* Waltz and McCafferty.

In the inventory presented below, taxa are arranged alphabetically, and all new data are based on larval samples unless specifically noted parenthetically preceding the date of collection in the data set as (A) for male adults collected or (A,L) for adults and larvae collected. Departments or autonomous regions within Nicaragua are given in upper case in the data sets, and are also depicted in Figure 1. Materials are deposited in collections indicated by acronyms bracketed at the end of the data sets as follows: MEN (Museo Entomológico, LEÓN, Nicaragua); PERC (Purdue Entomological Research Collection, West Lafayette, Indiana); and TAMU (Texas A & M University Insect Collection, College Station).

FAUNISTIC ACCOUNT

Baetidae

Americabaetis alphas Lugo-Ortiz and McCafferty

New data.—RÍO SAN JUAN: Río Bartola trib nr Río San Juan confl, 5-VI-2002, M Meyer [PERC]; unnamed stream, Refugio Bartola, 8-VIII-2002, W Shepard [PERC]; Río Bartola, Refugio Bartola, 10-VIII-2002, W Shepard [PERC].

Remarks.—This is the first report of this species north of South America, where it is widespread in Argentina, Bolivia, Brazil, Chile, and Paraguay (Lugo-Ortiz and McCafferty 1996b).

Americabaetis intermedius (Lugo-Ortiz and McCafferty)

New data.—RÍO SAN JUAN: unnamed stream, Refugio Bartola, 6-VIII-2002, W Shepard [PERC].

Remarks.—This species is also known from southern Mexico, Costa Rica, and Guatemala (McCafferty et al. 2004).

Americabaetis lugoi Waltz and McCafferty

New data.—RÍO SAN JUAN: unnamed stream, Refugio Bartola, 6-VIII-2002, W Shepard [PERC].

Remarks.—This species is also known from Costa Rica (Waltz and McCafferty 1999) and southern Mexico (Randolph and McCafferty 2000).

Americabaetis pleturus (Lugo-Ortiz and McCafferty)

Previous data.—Lugo-Ortiz and McCafferty (1994a): LEÓN (Presa El Clavo).

New data.—GRANADA: unnamed stream at Domitila Field Station, ca. 30 km S Granada, 13-18-VI-2004, D Baumgardner [TAMU]. RÍO SAN JUAN: unnamed stream, Refugio Bartola, 8-VIII-2002, W Shepard [PERC].

Remarks.—This species is also known from Belize, Costa Rica, Mexico, and Texas (McCafferty et al. 2004).

Baetodes bibranchius McCafferty and Provonsha

New data.—RÍO SAN JUAN: Río Bartola, Refugio Bartola, 10-VIII-2002, W Shepard [PERC]; unnamed stream, Refugio Bartola, 8-VIII-2002, W Shepard [PERC]; Río Bartola trib nr Río San Juan confl, 5-VI-2002, M Meyer [PERC].

Remarks.—This species is also known from southern Mexico (Lugo-Ortiz and McCafferty 1996a), Texas (McCafferty and Provonsha 1993), and Idaho and Oregon (Lester et al. 2002).

Baetodes caritus Cohen and Allen

New data.—GRANADA: unnamed stream at Domitila Field Station, ca. 30 km S Granada, 13-18-VI-2004, D Baumgardner [TAMU]. RÍO SAN JUAN: Río Bartola, Refugio Bartola, 10-VIII-2002, W Shepard [PERC].

Remarks.—This species is also known from Costa Rica, Guatemala, Honduras, El Salvador, and southern Mexico (McCafferty et al. 2004).

Baetodes longus Mayo

New data.—RÍO SAN JUAN: Río Bartola, Refugio Bartola, 10-VIII-2002, W Shepard [PERC].

Remarks.—This species is also known from throughout Mexico and Guatemala (McCafferty et al. 2004).

Baetodes tritus Cohen and Allen

New data.—RÍO SAN JUAN: Río Bartola, Refugio Bartola, 10-VIII-2002, W Shepard [PERC].

Remarks.—This species is known from much of Mexico and Central America (Belize, Costa Rica, Guatemala, Honduras, Panama) (McCafferty et al. 2004).

Callibaetis montanus Eaton

Previous data.—McCafferty and Lugo-Ortiz (1992): REGIÓN AUTÓNOMA DEL ATLÁNTICO SUR (El Recreo).

New data.—GRANADA: unnamed stream at Domitila Field Station, ca. 30 km S Granada, (A) 13-18-VI-2004, D Baumgardner [TAMU].

Remarks.—This species is also known from Guatemala, Mexico, and southwestern U.S.A. (McCafferty et al. 2004).

Camelobaetidius mexicanus (Traver and Edmunds)

New data.—GRANADA: unnamed stream at Domitila Field Station, ca. 30 km S Granada, 13-18-VI-2004, D Baumgardner [TAMU].

Remarks.—This species is also known from Guatemala, throughout Mexico, Texas, Idaho, and Oregon (McCafferty et al. 2004), as well as Arizona (Baumgardner 2005), Kansas (McCafferty and Jacobus 2007), and Oklahoma (Reisen 1975).

Camelobaetidius musseri (Traver and Edmunds)

New data.—RÍO SAN JUAN: Río Bartola, Refugio Bartola, 10-VIII-2002, W Shepard [PERC]; unnamed stream, Refugio Bartola, 8-VIII-2002, W Shepard [PERC].

Remarks.—This species is known from Costa Rica, Guatemala, Honduras, El Salvador, and the U.S.A. states of Arizona, Nevada, and New Mexico (Allen and Chao 1978, McCafferty and Randolph 2000, McCafferty et al. 2004).

Camelobaetidius shepardi Randolph and McCafferty

New data.—RÍO SAN JUAN: Río Bartola, Refugio Bartola, 10-VIII-2002, W Shepard [PERC].

Remarks.—This species is also known from Guatemala and south-central Mexico (McCafferty et al. 2004).

Camelobaetidius warreni (Traver and Edmunds)

New data.—RÍO SAN JUAN: Río Bartola, upstream Río San Juan confl, 4-VI-2002, M Meyer [PERC]; Río Bartola trib nr Río San Juan confl, 5-VI-2002, M Meyer, C Cencini [PERC].

Remarks.—This species is known from Costa Rica, Guatemala, Honduras, throughout Mexico, western and intermountain U.S.A. states, Nebraska, North Dakota, and Saskatchewan (McCafferty et al. 2004, Guenther and McCafferty 2005).

Fallceon fortipalpus Lugo-Ortiz and McCafferty

New data.—RÍO SAN JUAN: Río Bartola trib nr Río San Juan confl, 5-VI-2002, M Meyer [PERC].

Remarks.—This species is also known from Costa Rica, Guatemala, and northern Mexico (McCafferty et al. 2004).

Fallceon planifrons (Kluge)

New data.—MANAGUA: Managua, unnamed stream, 54.8 km Panam Hwy, 4-VIII-2002, W Shepard [PERC].

Remarks.—This species was previously known only from Cuba (Kluge 1992).

Fallceon quilleri (Dodds)

New data.—MANAGUA: Managua, unnamed stream, 54.8 km Panam Hwy, 4-VIII-2002, W Shepard [PERC]. RÍO SAN JUAN: unnamed stream, Refugio Bartola, 7-VIII-2002, W Shepard [PERC].

Remarks.—This is relatively common species also known from Costa Rica, Guatemala, Honduras, throughout Mexico, many western and central U.S.A. states, and western and central Canada (McCafferty et al. 2004).

Fallceon sageae McCafferty

New data.—MANAGUA: Managua, unnamed stream, 54.8 km Panam Hwy, 4-VIII-2002, W Shepard [PERC].

Remarks.—This long-gilled species is also known from South-Central Mexico and Belize, where it originally had been misidentified as *F. longifolium* by Lugo-Ortiz et al. (1994) and Wiersema and Baumgardner (2000), respectively. The true *F. longifolium* is evidently restricted to Cuba (González-Lazo and Salles 2007, McCafferty 2008).

Guajirolus nanus Lugo-Ortiz and McCafferty

New data.—RÍO SAN JUAN: Río Bartola, upstream Río San Juan trib, 4-VI-2002, M Meyer [PERC].

Remarks.—This species is also known from Costa Rica and Guatemala (McCafferty et al. 2004).

Paracloeodes minutus (Daggy)

New data.—RÍO SAN JUAN: Refugio Bartola, (A) 5-VI-2002, M Meyer [PERC].

Remarks.—This species is also known from Belize (Wiersema and Baumgardner 2000) and Costa Rica and Honduras (McCafferty and Lugo-Ortiz 1996), and throughout much of North America (e.g., McCafferty and Randolph 1998, McCafferty and Meyer 2007).

Caenidae

Caenis bajaensis Allen and Murvosh

New data.—GRANADA: unnamed stream at Domitila Field Station, ca. 30 km S Granada, 13-18-VI-2004, D Baumgardner [TAMU]; shore of Lk Nicaragua, ca. 30 km S Granada, 17-VI-2004, D Baumgardner [TAMU].

Remarks.—This species is also known from Costa Rica (McCafferty and

Lugo-Ortiz 1996), much of Mexico (Allen and Murvosh 1983, Provonsha 1990, Randolph and McCafferty 2000), and the U.S.A. states of Arizona, California, Colorado, Nebraska, and New Mexico (Provonsha 1990).

Caenis diminuta latina McCafferty and Lugo-Ortiz

Previous data.—McCafferty and Lugo-Ortiz (1992): REGIÓN AUTÓNOMA DEL ATLÁNTICO SUR (El Recreo).

New data.—GRANADA: unnamed stream at Domitila Field Station, ca. 30 km S Granada, 13-18-VI-2004, D Baumgardner [TAMU]. RÍO SAN JUAN: unnamed stream, Refugio Bartola, 6-VIII-2002, W Shepard [PERC].

Remarks.—Although the species is relatively widespread in North America (Provonsha 1990), this subspecies remains to be known only from Nicaragua (McCafferty and Lugo-Ortiz 1992).

Heptageniidae

Maccaffertium mexicanum mexicanum (Ulmer)

New data.—REGIÓN AUTÓNOMA DEL ATLÁNTICO NORTE: Reserva de la Biosfera Bosawas, Río Waspuk, Rapido Waula Kumbas, (A) IX-1996, J Maes, J Hernandez [TAMU]. GRANADA: unnamed stream at Domitila Field Station, ca. 30 km S Granada, 13-18-VI-2004, D Baumgardner [TAMU]. RÍO SAN JUAN: Río Bartola trib nr Río San Juan confl, (A,L) 5-V-2002, M Meyer, C Cencini [PERC].

Remarks.—Although the species is relatively widespread in central and eastern North America (Bednarik and McCafferty 1979), this particular subspecies is now known from Belize, Costa Rica, Guatemala, Nicaragua, Panama, and Tabasco, Mexico (McCafferty 1984, McCafferty et al. 2004).

Isonychiidae

Isonychia sicca (Walsh)

New data.—RÍO SAN JUAN: Refugio Bartola, (A,L) 5-V-2002, M Meyer [PERC].

Remarks.—This species is also known from Belize, Costa Rica, Guatemala, Honduras, and throughout much of North America (McCafferty et al. 2004).

Leptohyphidae

Allenhyphes nanus (Allen)

New data.—RÍO SAN JUAN: Río Bartola nr Río San Juan confl, 4-V-2002, M Meyer [PERC]; unnamed stream, Refugio Bartola, 8-VIII-2002, W Shepard [PERC]. MANAGUA: Managua, unnamed stream, 54.8 km Panam Hwy, 4-VIII-2002, W Shepard [PERC].

Remarks.—This species is also known from Guatemala, Honduras, and Panama (McCafferty et al. 2004).

Asioplax isabelia Baumgardner, Meyer, and McCafferty

Previous data.—Baumgardner et al. (2006): RÍO SAN JUAN (trib Río Bartola).

Remarks.—This species is also known from Costa Rica (Baumgardner et al. 2006).

Cabecar serratus Baumgardner and ávila

Previous data.—Baumgardner and ávila (2006): GRANADA (Domitila Field Station); RÍO SAN JUAN (Río San Juan).

Remarks.—This species is also known from Costa Rica and Panama (Baumgardner and ávila 2006).

Epiphrades undatus (Lugo-Ortiz and McCafferty)

New data.—RÍO SAN JUAN: Río Bartola, Refugio Bartola, 10-VIII-2002, W Shepard [PERC]; unnamed stream, Refugio Bartola, 6-VIII-2002, W Shepard [PERC].

Remarks.—This species is also known from Costa Rica and Guatemala (McCafferty et al. 2004).

Haplohyphes mithras (Traver)

New data.—REGIÓN AUTÓNOMA DEL ATLÁNTICO NORTE: Cerro Saslaya, IV-1996, J Maes, J Hernandez [TAMU].

Remarks.—This species is also known from Costa Rica (Traver 1958).

Leptohyphes zalope Traver

New data.—RÍO SAN JUAN: unnamed stream, Refugio Bartola, 8-VIII-2002, W Shepard [PERC]; Río Bartola nr Río San Juan confl, 4-5-V-2002, M Meyer [PERC].

Remarks.—This species is also known from Belize, Costa Rica, Guatemala, Honduras, El Salvador, and at least southern Mexico (McCafferty et al. 2004). An on going study of this species to determine which of its previous junior synonyms (Baumgardner and McCafferty 2000) may be valid in light of a comprehensive revision of the genus *Leptohyphes* Eaton (Baumgardner and McCafferty in prep.) should clarify a more exact range of the species.

Tricorythodes condylus (Allen)

New data.—RÍO SAN JUAN: Río Bartola, Refugio Bartola, 10-VIII-2002, W Shepard [PERC].

Remarks.—This is the first Central American record of this species, which is also known from the Mexican states of Chihuahua and Sonora and the U.S.A. states of Arizona and New Mexico (Allen 1967, Kilgore and Allen 1973, Lugo-Ortiz and McCafferty 1994b).

Tricorythodes sordidus Allen

Previous data.—Baumgardner and ávila (2006): GRANADA (Domitila Field Station).

New data.—RÍO SAN JUAN: unnamed stream, Refugio Bartola, 6-VIII-2002, W Shepard [PERC]. MANAGUA, unnamed stream, 54.8 km Panam Hwy, 4-VIII-2002, W Shepard [PERC].

Remarks.—This species is also known from Costa Rica and Guatemala (McCafferty et al. 2004). It currently has not been documented from north of Central America.

Vacupernius packeri (Allen)

New data.—RÍO SAN JUAN: Río Bartola, Refugio Bartola, 10-VIII-2002, W Shepard [PERC]. MANAGUA: Managua, unnamed stream, 54.8 km Panam Hwy, 4-VIII-2002, W Shepard [PERC].

Remarks.—This species is also known from Belize, Costa Rica, Guatemala, Honduras, Mexico, Arizona and Texas (McCafferty et al. 2004).

Leptophlebiidae

Farrodes caribbeanus (Traver)

New data.—RÍO SAN JUAN: Refugio Bartola, (A) 5-VI-2002, M Meyer [PERC].

Remarks.—This species is also known from Costa Rica, Panama, Ecuador, and Venezuela (Domínguez 1999).

Farrodes flavipennis Domínguez, Molineri and Peters

New data.—RÍO SAN JUAN: Refugio Bartola, (A) 5-VI-2002, M Meyer [PERC].

Remarks.—This species is also known from Honduras (Domínguez et al. 1996).

Farrodes pakitza Domínguez, Molineri and Peters

New data.—RÍO SAN JUAN: Refugio Bartola, (A) 5-VI-2002, M Meyer [PERC].

Remarks.—This species was previously known only from Peru (Domínguez et al. 1996).

Farrodes savagei Domínguez

New data.—REGIÓN AUTÓNOMA DEL ATLÁNTICO NORTE: Reserva de la Biosfera Bosawas, Río Waspuk, Rapido Waula Kumbas, (A) IX-1996, J Maes, J Hernandez [TAMU]. GRANADA: unnamed stream, Refugio Domitila, (A,L) 13-18-VI-2004, D Baumgardner [TAMU]; shore of Lake Nicaragua, ca. 30 km S Granada, 17-VI-2004, D Baumgardner [TAMU]. RÍO SAN JUAN: Río San Juan, 4 km SE El Castillo, (A) 19-24-VI-2004, D Baumgardner [TAMU].

Remarks.—This species is also known from Venezuela (Domínguez 1999).

Farrodes texanus Davis

New data.—RÍO SAN JUAN: Río Bartola trib nr Río San Juan confl, 5-VI-2002, M Meyer, C Cencini [PERC]; Río Bartola, Refugio Bartola, 10-VIII-2002, W Shepard [PERC]; unnamed stream, Refugio Bartola, 8-VIII-2002, W Shepard [PERC].

Remarks.—This species is also known from Belize, Guatemala, Mexico, and Texas (McCafferty et al. 2004).

Hagenulopsis ingens Lugo-Ortiz & McCafferty

New data.—RÍO SAN JUAN: unnamed stream, Refugio Bartola, 7-VIII-2002, W Shepard [PERC].

Remarks.—This species is also known from Costa Rica (Lugo-Ortiz and McCafferty 1996c).

Terpides jessiae Peters and Harrison

New data.—REGIÓN AUTÓNOMA DEL ATLÁNTICO NORTE: Reserva de la Biosfera Bosawas, Río Waspuk, Rapido Waula Kumbas, (A) IX-1996, J Maes, J Hernandez [TAMU].

Remarks.—This species is also known from Costa Rica (McCafferty 1985) and St. Vincent (Peters and Harrison 1974), where it had been described. Although there may have been some doubt as to the identification of larvae from Costa Rica, McCafferty (1985) indicated that they were a perfect match to the original description. And now, the adults found in Nicaragua clearly confirm the presence of the species in Central America.

Thraulodes eccentricus Lugo-Ortiz and McCafferty

New data.—RÍO SAN JUAN: Río Bartola trib nr Río San Juan confl, 5-VI-2002, M Meyer, C Cencini [PERC]; Río Bartola, upstream Río San Juan confl, 4-VI-2002, M Meyer [PERC].

Remarks.—This species is also known from Guatemala and throughout Mexico (McCafferty et al. 2004).

Thraulodes gonzalesi Traver and Edmunds

New data.—RÍO SAN JUAN: unnamed stream, Refugio Bartola, 7-VIII-2002, W Shepard [PERC].

Remarks.—This species is also known from Guatemala, Mexico, Arizona, New Mexico, and Texas (McCafferty et al. 2004).

Thraulodes grandis Lugo-Ortiz and McCafferty

New data.—RÍO SAN JUAN: Río Bartola, upstream Río San Juan confl, 4-VI-2002, M Meyer [PERC]; Río Bartola trib nr Río San Juan confl, 5-VI-2002, M Meyer [PERC]; unnamed stream, Refugio Bartola, 8-VIII-2002, W Shepard [PERC].

Remarks.—This species is also known from Guatemala (Lugo-Ortiz and McCafferty 1996c).

Thraulodes pacaya McCafferty, Baumgardner and Guenther

New data.—RÍO SAN JUAN: Río Bartola trib nr Río San Juan confl, 5-VI-2002, M Meyer, C Cencini [PERC]; Río Bartola, upstream Río San Juan confl, 4-VI-2002, M Meyer [PERC]; unnamed stream, Refugio Bartola, 8-VIII-2002, W Shepard [PERC].

Remarks.—This species is also known from Guatemala, Honduras, Panama, and southern Mexico (McCafferty et al. 2004).

Thraulodes packeri Traver and Edmunds

New data.—RÍO SAN JUAN: Río Bartola, upstream Río San Juan confl, 4-VI-2002, M Meyer [PERC].

Remarks.—This species is also known from Belize, Costa Rica, Guatemala, Honduras, and southern Mexico (McCafferty et al. 2004).

Thraulodes prolongatus Traver

New data.—REGIÓN AUTÓNOMA DEL ATLÁNTICO NORTE: Reserva de la Biosfera Bosawas, Río Waspuk, Rapido Waula Kumbas, (A) IX-1996, J

Maes, J Hernandez [TAMU]. RÍO SAN JUAN: Refugio Bartola, (A) 5-VI-2002, M Meyer [PERC].

Remarks.—This species is also known from Costa Rica (Traver 1946).

Thraulodes zonalis Traver and Edmunds

New data.—RÍO SAN JUAN: Río Bartola, upstream Río San Juan confl, 4-VI-2002, M Meyer [PERC].

Remarks.—This species is also known from Belize (McCafferty 1985), Costa Rica, Honduras, and southern Mexico (Allen and Brusca 1978), and Panama (Traver and Edmunds 1967)

Traverella albertana (McDunnough)

New data.—RÍO SAN JUAN: Río Bartola, upstream Río San Juan confl, 4-VI-2002, M Meyer [PERC]; Río Bartola trib nr Río San Juan confl, 5-VI-2002, M Meyer, C Cencini [PERC].

Remarks.—This species is also known from throughout Mexico (Allen 1973, Allen and Murvosh 1987, Lugo-Ortiz and McCafferty 1996a), and much of western Canada and U.S.A. (e.g., McCafferty and Randolph 1998, McCafferty et al. 1997, Meyer and McCafferty 2007).

Traverella longifrons Lugo-Ortiz and McCafferty

New data.—RÍO SAN JUAN: Río Bartola, upstream Río San Juan confl, 4-VI-2002, M Meyer [PERC]; unnamed stream, Refugio Bartola, 8-VIII-2002, W Shepard [PERC].

Remarks.—This species is also known from Costa Rica and southern Mexico (Lugo-Ortiz and McCafferty 1996c).

Traverella promifrons Lugo-Ortiz and McCafferty

New data.—GRANADA: unnamed stream at Domitila Field Station, ca. 30 km S Granada, 13-18-VI-2004, D Baumgardner [TAMU].

Remarks.—This species is also known from Belize, Costa Rica, Guatemala, Honduras, southern and northern Mexico (McCafferty et al. 2004), and New Mexico (Baumgardner 2005).

Ulmeritoides tifferae Domínguez

New data.—GRANADA: unnamed stream at Domitila Field Station, ca. 30 km S Granada, 13-18-VI-2004, D Baumgardner [TAMU]. RÍO SAN JUAN: Río San Juan, 4 km SE El Castillo, 19-24-VI-2004, D Baumgardner [TAMU].

Remarks.—This species is also known from Costa Rica (Domínguez 1995).

Oligoneuriidae

Lachlania talea Allen and Cohen

New data.—RÍO SAN JUAN: Refugio Bartola, (A) 5-VIII-2002, W Shepard [PERC]; Río Bartola, Refugio Bartola, 10-VIII-2002, W Shepard [PERC].

Remarks.—This species is also known from Honduras (Allen and Cohen 1977).

Polymitarcyidae

Campsurus cuspidatus Eaton

Previous data.—McCafferty and Lugo-Ortiz (1992): REGIÓN AUTÓNOMA DEL ATLÁNTICO SUR (El Recreo).

Remarks.—This species, which was the first mayfly known from Central America (Guatemala), is also known from Belize, Guatemala, and Mexico (McCafferty et al. 2004).

Campsurus notatus Needham and Murphy

New data.—GRANADA: Refugio Domitila, (A) 13-18-VI-2004, D Baumgardner [TAMU]. RÍO SAN JUAN: Refugio Bartola, (A) 4-VI-2002, M Meyer [PERC]; Las Flores Finca Tellez, (A) 20-XI-1987, J Maes [MEN]. MANAGUA: Managua, Hotel Las Mercedes, (A) 8-VI-2002, M Meyer [PERC].

Remarks.—This species is also known from Argentina, Brazil, and Paraguay (e.g., Domínguez et al. 1994).

Tortopus bellus Lugo-Ortiz and McCafferty

New data.—REGIÓN AUTÓNOMA DEL ATLÁNTICO NORTE: Reserva de la Biosfera Bosawas, Río Waspuk, Rapido Waula Kumbas, (A) IX-1996, J Maes, J Hernandez [TAMU].

Remarks.—This species is also known from Costa Rica (Lugo-Ortiz and McCafferty 1996d).

Tortopus unguiculatus (Ulmer)

Previous data.—Maes (1988): “Zelayaó.

New data.—REGIÓN AUTÓNOMA DEL ATLÁNTICO NORTE: Reserva de la Biosfera Bosawas, Río Waspuk, Rapido Waula Kumbas, (A) IX-1996, J Maes, J Hernandez [TAMU].

Remarks.—This species is also known from Costa Rica, Guatemala, Honduras, and Colombia (McCafferty et al. 2004).

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Fig. 1. Nicaragua and its departments and regions.