

First records of small minnow mayflies (Ephemeroptera: Baetidae) from the state of Espírito Santo, southeastern Brazil

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Introduction

Brazilian small minnow mayflies (Ephemeroptera: Baetidae) are typical of most other groups of insects in tropical countries in that they remain virtually undocumented and lack specialists to work on them (Brown & Lomolino, 1998). As of this writing, only 35 baetid species in 16 genera have been officially reported from Brazil, mostly from sparse localities in the North and South. Significantly, 18 of those reports, or 51.4%, correspond to studies dealing primarily with alpha-level taxonomy published during the second half of the 1990's (McCafferty & Lugo-Ortiz, 1995; Lugo-Ortiz & McCafferty, 1995ab, 1996ab, 1997, 1998). Also noteworthy is the fact that the Northeast, which comprises nine states (Alagoas, Bahia, Ceará, Maranhão, Paraíba, Pernambuco, Piauí, Rio Grande do Norte, and Sergipe) with an estimated combined area of 1,558,200.4 km², or 18.22% of the Brazilian territory, has no baetid records. Compounding to the problem, the taxonomic integrity and precise locale data of several species described from Brazil between the first half of the 19th century and the first third of the 20th century are doubtful and cannot be corroborated with any degree of certainty because the materials upon which they are based are lost or in extremely poor conditions (Lugo-Ortiz & McCafferty, 1999a). Thus, the overall state of knowledge of small minnow mayflies in Brazil not only contributes in hindering practical endeavors to establish conservation priorities for freshwater habitats in the country, but also impedes theoretical efforts for understanding the evolutionary and biogeographic history of the family in the Southern Hemisphere (Lugo-Ortiz & McCafferty, 1999b).

Given current rates of degradation and destruction of freshwater habitats throughout Brazil, it becomes critical to document as soon as possible any instances of the occurrence of baetids and other mayfly families throughout the country. This is particularly true for the Northeast, as mentioned above. However, other regions are, for practical purposes, virtually as unknown as the Northeast. Among the least known regions, the Southeast, comprised of four states (Espírito Santo, Minas Gerais, Rio de Janeiro, and São Paulo) with an estimated combined area of 927,286.2 km², or 10.85% of the country's territory, should be given high priority with respect to the documentation of its small minnow mayfly fauna. Only seven baetid species—*A. alphas* Lugo-Ortiz & McCafferty, *A. longetron* Lugo-Ortiz & McCafferty, *Baetodes itaiyanus* Demoulin, *B. serratus* Needham & Murphy, *Callibaetis guttatus* Navás, *C. jocosus* Navás, and *Moribaetis comes* (Navás)—are currently registered from sparse localities in the region (Navás, 1912, 1915;

Needham & Murphy, 1924; Demoulin, 1955; Da Silva, 1991; Lugo-Ortiz & McCafferty, 1996b, 1999a). Importantly, none of the published records are from Espírito Santo.

Herein, we report the family Baetidae from Espírito Santo for the first time. The report is based on five species, four of which represent new records for the entire southeastern region. One of the reported species also represents a new record for Brazil. The specimens upon which the reports are based consist of larvae collected between the 9th and 11th of July 2001 from several localities along the Timbuí River in the Santa Lúcia Biological Station (SLBS) (19°57'S, 40°32'W; 650 masl), in the city of Santa Teresa, and are housed in the Museu de Biologia "Professor Mello Leitão", also in Santa Teresa. The river is considerably impacted by the city and its immediate surroundings, mainly by receiving litter and untreated sewage (Mendes & Padovan, 2000). There is also intensive logging in the area near the SLBS, thus causing soil erosion that result in the accumulation of sediments in interstitial microhabitats for small fish and macroinvertebrates in the river. One researcher (P. De Marco, personal communication), however, has observed that the SLBS appears to have a slight positive effect on the river's biota, at least with respect to damselflies and dragonflies (Odonata), since their diversity slightly increases within the station's area.

Americabaetis longetron Lugo-Ortiz & McCafferty

Americabaetis longetron is the only species reported herein previously known to occur in southeastern Brazil in the states of Minas Gerais, Paraná, and Santa Catarina (Lugo-Ortiz & McCafferty, 1996b). Elsewhere, Francischetti et al. (in preparation) are also reporting *A. longetron* from the state of Rio de Janeiro. The species is also known to occur in Paraguay and Uruguay (Lugo-Ortiz & McCafferty, 1996b). Thus, *A. longetron* appears to be widespread along the southern Atlantic coast, and probably extends far into the South American continent. Collection dates: 10 and 11 July 2001. Individuals collected: 12.

Cloeodes irvingi Waltz & McCafferty

Cloeodes irvingi was known to occur in Paraguay only (Waltz & McCafferty, 1987). The new record from Espírito Santo thus represents a new country record and a significant northward extension of the species' range. Elsewhere, Francischetti et al. (in preparation) are also reporting *C. irvingi* from the state of Rio de Janeiro. At the SLBS, *C. irvingi* was collected among leaf litter from Córrego Bonito (Mendes & Padovan, 2000: Fig. 3), a clean, first-order tributary of the Timbuí River. Collection date: 9 July 2001. Individuals collected: 3.

Paracloeodes eurybranchus Lugo-Ortiz & McCafferty

Paracloeodes eurybranchus was known to occur in Brazil

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in the state of Rio Grande do Sul, and it has also been reported from northern Argentina (Lugo-Ortiz & McCafferty, 1996a). The new record from Espírito Santo therefore represents a significant northward extension of the species' range. Elsewhere, Francischetti et al. (in preparation) are also reporting *P. eurybranchus* from the state of Rio de Janeiro. At the SLBS, the species was collected among leaf litter from Córrego Bonito (see above) and from marginal vegetation in the Timbuí River. Collection dates: 10 and 11 July 2001. Individuals collected: 2 among leaf litter and 22 among marginal vegetation.

***Waltzophius fasciatus* McCafferty & Lugo-Ortiz**

Waltzophius fasciatus was previously known from the states of Amazonas and Pará in Brazil, and from Paraguay (Lugo-Ortiz & McCafferty, 1995a). The new record from Espírito Santo confirms that *W. fasciatus* is widespread in South America, and extends its range eastward. At the SLBS, the species was collected from marginal vegetation in the Timbuí River. Collection date: 11 July 2001. Individuals collected: 1.

***Zelus principalis* Lugo-Ortiz & McCafferty**

Zelus principalis was originally reported from the states of Amazonas and Pará in Brazil, the Brazil-Suriname border, and Colombia (Lugo-Ortiz & McCafferty, 1998). The new record from Espírito Santo thus represents a considerable southward extension of the species' range, and suggests that it is widespread in Brazil. At the SLBS, the species was collected among leaf litter from Córrego Bonito (see above). Collection date: 10 July 2001. Individuals collected: 6.

Concluding remarks

Americabaetis longetron and *W. fasciatus* were collected only from marginal vegetation in the Timbuí River, whereas *C. irvingi* and *Z. principalis* were collected only from leaf litter in the Córrego Bonito. *Paracloeodes eurybranchus* was the only species collected from both biotopes, but it was considerably more abundant among marginal vegetation in the river. Although no quantitative sampling protocol was followed, the relatively high number of individuals of *A. longetron* and *P. eurybranchus* collected from the river suggests that both species are tolerant of high organic pollution. The presence of *W. fasciatus* in the river might be fortuitous, since it consists of only one individual, but the possibility that the species is also tolerant of relatively high levels of organic pollution should not be discarded at this time.

Cloeodes irvingi and *Z. principalis* were collected in relatively low numbers from the Córrego Bonito. Generally, first-order streams like the Córrego Bonito offer limited biotopes for species to exploit, and this might explain in part the low numbers for both species. Another possible explanation is that *C. irvingi* and *Z. principalis* tend to be rare where they occur. What is important in this case, however, is that the two species appear to be intolerant of organic pollution at the level found in the Timbuí River.

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