



# Baetidae (Insecta: Ephemeroptera) from the state of Rondônia, Northern Brazil

Rafael Boldrini<sup>1, 3, 4</sup> & Paulo Vilela Cruz<sup>1, 2</sup>

1. INPA - Instituto Nacional de Pesquisas da Amazônia, Programa de Pós-Graduação em Entomologia (PPGENT), CEP 69067-370, Manaus, Amazonas, Brazil.

2. IFAM - Instituto Federal de Educação, Ciência e Tecnologia do Amazonas, Campus Lábrea, 22 de outubro, CEP 69830-000, Lábrea, Amazonas, Brazil.

3. UFRR - Universidade Federal de Roraima, Campus Paricarana, Centro de Estudos da Biodiversidade (CBio), CEP 69310-000, Boa Vista, Roraima, Brazil.

4. Corresponding author. E-mail: rafaelboldrini.2@gmail.com

Recebido em: 27/05/2014 Aceito em: 16/07/2014.

## RESUMO

**Baetidae (Insecta: Ephemeroptera) do Estado de Rondônia, Norte do Brasil.** Uma lista preliminar das espécies de Baetidae para o estado de Rondônia é apresentada tendo como base estudos da literatura, adultos e ninfas recém coletados em 20 localidades. Previamente, apenas dez espécies de Baetidae pertencentes a cinco gêneros eram registradas para o estado. Incluindo os novos registros, o estado passa a conter 27 espécies de Baetidae pertencentes a 16 gêneros: *Americabaetis*, *Apobaetis*, *Aturbina*, *Baetodes*, *Callibaetis*, *Camelobaetidius*, *Chane*, *Cloeodes*, *Corinnella*, *Cryptonympha*, *Guajirolus*, *Harpagobaetis*, *Paracloeodes*, *Rivudiva*, *Spiritiops* e *Waltzoyphius*. Dois morfótipos não puderam ser identificados e duas espécies foram consideradas novas.

**PALAVRAS-CHAVE:** Neotropical; Inseto aquático; América do Sul.

## ABSTRACT

**Baetidae (Insecta: Ephemeroptera) from the state of Rondônia, Northern Brazil.** We present a preliminary list of small minnow mayflies (Ephemeroptera: Baetidae) from Rondônia State based on literature and adults & nymphs collected from 20 different sites in the state. Previously, only ten species from five genera were reported from the state. Including our new records, we now report 23 species from 16 genera, including *Americabaetis*, *Apobaetis*, *Aturbina*, *Baetodes*, *Callibaetis*, *Camelobaetidius*, *Chane*, *Cloeodes*, *Corinnella*, *Cryptonympha*, *Guajirolus*, *Harpagobaetis*, *Paracloeodes*, *Rivudiva*, *Spiritiops* and *Waltzoyphius*. Two morphotypes could not be assigned to named species, and two species are new to science.

**KEYWORDS:** Neotropics; Aquatic Insect; South America.

## INTRODUCTION

Baetidae is considered to be the largest family of Ephemeroptera, in terms of number of species, and it includes about 100 genera worldwide. This family is represented by approximately 830 species, with the largest number of species being reported in the Neotropical region (Baber-James *et al.* 2008).

Brazil has about 100 species of Baetidae, most of which are recorded from the Southeast region (Salles *et al.* 2013). The North region of Brazil, represented by the states of Acre, Amapá, Amazonas, Pará, Rondônia, Roraima and Tocantins, is one of the lesser studied areas of the country regarding mayflies. The state of Roraima is more studied than the others, in

which Falcão *et al.* 2012 reported 26 species of Baetidae from 66 collection sites. The states of Amapá and Rondônia are much less studied in relation to the Ephemeroptera fauna in general, and these states are represented by only one and ten species of Baetidae, respectively.

This study aims to present new records and distributional notes for the family in the state of Rondônia, as well as a list of all known Baetidae species from Rondônia state.

## MATERIALS AND METHODS

Collects were done between August and September 2012 in the state of Rondônia (Fig. 1). Data pertaining to each sample site are provided in Table 1.

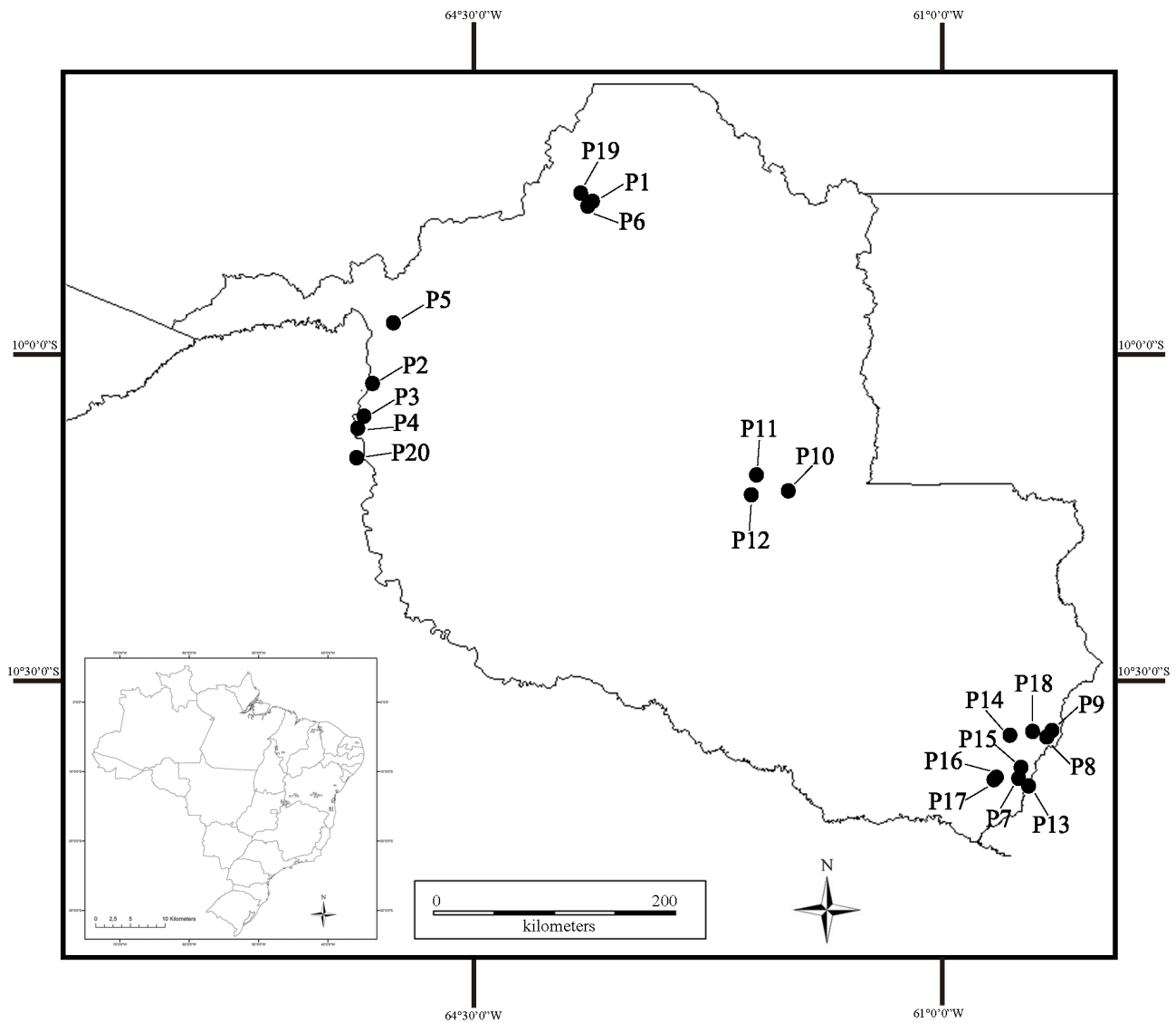


Figure 1. Sampling sites in Rondônia state where Baetidae (Insecta: Ephemeroptera) species were collected.

Table 1. Sample sites at state of Rondônia, followed by site, location, date, geographic coordinates, and collectors.

site	Location	date	coordinates	collectors
P1	Rondônia, below the bridge, Rio Preto	19.viii.2012	S 08°52'40.0" / W 63°38'02.2"	Boldrini, R. and Fernandes, A. S.
P2	Rondônia, Ribeirão, Rio Mamoré, RO 425	21-22.viii.2012	S 10°13'54.9" / W 65°17'08.8"	Boldrini, R. and Fernandes, A. S.
P3	Rondônia, Pedra da Memória balneary, near Guajará Mirim, RO 425	21.viii.2012	S 10°28'20.4" / W 65°20'05.0"	Boldrini, R. and Fernandes, A. S.
P4	Rondônia, Iata, Rio Mamoré, near Guajará Mirim, RO 425	22.viii.2012	S 10°34'12.2" / W 65°23'47.7"	Boldrini, R. and Fernandes, A. S.
P5	Rondônia, Rio Cotia, near power station, BR 364.	23.viii.2012	S 09°46'01.3" / W 65°06'53.7"	Boldrini, R. and Fernandes, A. S.
P6	Igarapé in the road, first brigde after Rio Preto	26.viii.2012	S 08°53'49.6" / W 63°38'29.5"	Boldrini, R. and Fernandes, A. S.

site	Location	date	coordinates	collectors
P7	Rondônia, Colorado do Oeste, Eixo Zero, Rio Hermes	30.viii.2012	S 13°12'07.6"/ W 60°23'25.1"	Boldrini, R., Fernandes, A. S. and Hamada, N.
P8	Rondônia, Vilhena, Bicho do Mato balneary, Rio Vermelho	31.viii.2012	S 12°52'54.8"/ W 60°11'37.9"	Boldrini, R., Fernandes, A. S. and Hamada, N.
P9	Rondônia, Colorado do Oeste, old road to Colorado do Oeste, Igarapé Ponte de Pedra	31.viii.2012	S 12°52'/ W 60°11'	Boldrini, R., Fernandes, A. S., and Hamada, N.
P10	Rondônia, Nova Londrina, Rio Urupá	02.ix.2012	S 11°02'05.8"/ S 62°08'34.1"	Boldrini, R., Fernandes, A. S., and Hamada, N.
P11	Rondônia, Texeirópolis, Balneário com Cachoeira	03.ix.2012	S 10°55'20.4"/ W 62°22'34.7"	Boldrini, R., Fernandes, A. S., and Hamada, N.
P12	Rondônia, Urupá, Rio Ezídio	03.ix.2012	S 11°05'00.8"/ W 62°25'28.4"	Boldrini, R., Fernandes, A. S., and Hamada, N.
P13	Rondônia, Colorado do Oeste, Rio Cabixi	06.ix.2012	S 13°15'31.8"/ W 60°20'04.8"	Boldrini, R., Fernandes, A. S., and Hamada, N.
P14	Rondônia, road in the right, before Nova Conquista do Oeste.	11.ix.2012	S 12°53'53.0"/ W 60°27'58.7"	Boldrini, R., Fernandes, A. S., and Hamada, N.
P15	Rondônia, Colorado do Oeste, Eixo Zero, igarapé bellow the bridge, before to Rio Hermes	11.ix.2012	S 13°07'34.2"/ W 60°23'39.3"	Boldrini, R., Fernandes, A. S., and Hamada, N.
P16	Rondônia, Colorado do Oeste, river on the road, RO 370	12.ix.2012	S 13°11'17,1"/ W 60°35'09.4"	Boldrini, R., Fernandes, A. S., and Hamada, N.
P17	Rondônia, Colorado do Oeste, river on the road, RO 370	12.ix.2012	S 13°11'30.2"/ W 60°34'27.9"	Boldrini, R., Fernandes, A. S., and Hamada, N.
P18	Rondônia, Vilhena, Cachoeira do Melque	13.ix.2012	S 12°52'20.8"/ W 60°17'48.6"	Boldrini, R., Fernandes, A. S., and Hamada, N.
P19	Rondônia, Candeias do Jamari, Bahia, Rio Candeias	26.viii.2012	S 08°47'30.2"/ W 63°42'20.3"	Boldrini, R. and Fernandes, A. S.
P20	Rondônia, Guajará Mirim, in front of the municipality, Rio Mamoré	20.viii.2012	S 10°47'20.3"/ W 65°3'47.11"	Boldrini, R. and Fernandes, A. S.

Nymphs were collected with an aquatic entomological net. The imagos and subimagos were captured with light traps and, in the case of subimagos, reared to the imago stage. Collected specimens were fixed in 80% ethanol. Permanent slides, when needed, were made using Euparal® as the mounting medium. The

identifications were based on Salles & Serrão (2005), Domínguez *et al.* (2006), Emmerich & Nieto (2009) and other relevant papers for each taxon (*e.g.* Salles 2007; Salles & Francischetti 2004).

Examined specimens are deposited in the Zoological Collection of the Universidade

Federal de Roraima (UFRR), Boa Vista, Roraima and in the Invertebrate Collection of the Instituto Nacional de Pesquisas da Amazônia (INPA), Manaus, Amazonas, Brazil.

The symbol “P” refers to the collection site, listed in Table 2; “I” and “N” mean “imago” and “nymph”, respectively.

Table 2. List of species of Baetidae from the Rondônia state.

Species	Distribution	Material examined
<i>Americabaetis alphas</i> Lugo-Ortiz & McCafferty (Fig. 2A)	Argentina, Bolivia, Chile, Paraguay, Brazil: Minas Gerais, Paraná, Santa Catarina, Rio Grande do Sul (Lugo-Ortiz & McCafferty 1996); Rio de Janeiro (Francischetti <i>et al.</i> 2003); São Paulo (Salles <i>et al.</i> 2003); Mato Grosso (Salles <i>et al.</i> 2004b); Bahia (Lima <i>et al.</i> 2010); Espírito Santo (Salles <i>et al.</i> 2010a); Alagoas, Amazonas, Pernambuco, Sergipe, Goiás (Salles <i>et al.</i> 2010b); Roraima (Falcão <i>et al.</i> 2011); Piauí, Ceará (Boldrini <i>et al.</i> 2012). <b>New Record:</b> Rondônia	P13 (2N); P15 (3N); P7 (2N)
<i>Apobaetis fiuzai</i> Salles & Lugo-Ortiz (Fig. 2B)	Argentina (Nieto 2006); Brazil: Mato Grosso, Minas Gerais (Salles & Lugo-Ortiz 2002a); São Paulo (Salles <i>et al.</i> 2003); Rio de Janeiro (Salles <i>et al.</i> 2004a); Espírito Santo (Salles <i>et al.</i> 2010a); Amazonas (Cruz <i>et al.</i> 2011). Roraima (Falcão <i>et al.</i> 2011); Bahia, Maranhão (Boldrini <i>et al.</i> 2012); Pernambuco (Lima <i>et al.</i> 2012b). <b>New Record:</b> Rondônia	P11 (5N); P13 (3N)
<i>Apobaetis kallawaya</i> Nieto	Bolívia (Nieto 2006). <b>New Record:</b> Brazil, Rondônia	P11 (1N)
<i>Apobaetis</i> sp. nov. A (Fig. 2C)		P13 (4N)
<i>Aturbina nigra</i> Salles, Boldrini & Shimano	Brazil: Roraima, Amazonas, Mato Grosso (Salles <i>et al.</i> 2011). <b>New Record:</b> Rondônia	P12 (1I male)
<i>Baetodes</i> sp. A		P 15 (4)
<i>Callibaetis</i> sp. A (Fig. 2D)		P6 (4N)
<i>Callibaetis calloventer</i> Cruz, Salles & Hamada	Brazil: Amazonas, Rondônia, Roraima (Cruz <i>et al.</i> 2014).	
<i>Callibaetis gellidus</i> Cruz, Salles & Hamada	Brazil: Amazonas, Rondônia (Cruz <i>et al.</i> 2014).	
<i>Callibaetis gonzalezi</i> (Navás)	Paraguay (Navás 1934); Argentina (Gillies, 1990), Brazil: Amazonas, Rondônia (Cruz <i>et al.</i> 2014). Bahia (Boldrini <i>et al.</i> 2012, Cruz <i>et al.</i> 2014, Lima <i>et al.</i> 2010). Pernambuco (Lima <i>et al.</i> 2012b).	
<i>Callibaetis itannae</i> Cruz, Salles & Hamada	Brazil: Rondônia (Cruz <i>et al.</i> 2014).	
<i>Callibaetis pollens</i> Needham & Murphy	Argentina (Nieto 2008); Brazil: Mato Grosso do Sul (Needham and Murphy 1924). Ceará, Bahia, Goiás, Piauí, Maranhão (Boldrini <i>et al.</i> 2012); Pernambuco (Lima <i>et al.</i> 2012b). <b>New Record:</b> Rondônia	P10 (1N)
<i>Camelobaetidius cayumba</i> (Traver & Edmunds)	Colombia (Domínguez <i>et al.</i> 2002); Peru (Traver & Edmunds 1968); French Guiana (Thomas <i>et al.</i> 2003); Brazil: Rondônia, Goiás (Salles & Serrão 2005); Roraima (Falcão <i>et al.</i> 2011); Piauí, Maranhão, Ceará (Boldrini <i>et al.</i> 2012); Pernambuco (Lima <i>et al.</i> 2012a)	
<i>Camelobaetidius caroliniae</i> Boldrini	Rondônia (Boldrini & Pes 2014)	P13 (2N)

Species	Distribution	Material examined
<i>Camelobaetidius janae</i> Dominique & Thomas (Fig. 2E)	Venezuela (Nieto <i>et al.</i> 2011); French Guiana (Dominique <i>et al.</i> 2001); Brazil: Rondônia, Mato Grosso (Salles & Serrão 2005); Roraima (Falcão <i>et al.</i> 2011); Piauí (Boldrini <i>et al.</i> 2012)	P12 (4N); P2 (8N)
<i>Chane baure</i> Nieto	Bolivia (Nieto 2003); Brazil: Roraima (Salles 2007). <b>New Record:</b> Rondônia	P10 (2N)
<i>Cloeodes auwe</i> Salles & Batista (Fig. 2F)	Brazil: Mato Grosso (Salles <i>et al.</i> 2004b); Roraima (Falcão <i>et al.</i> 2012); Rondônia (Massariol <i>et al.</i> 2013).	P13 (1N); P12 (1N)
<i>Cloeodes</i> sp. nov. A (Fig. 3A)		P11 (4N)
<i>Corinnella thomasi</i> Boldrini & Salles	Rondônia (Boldrini <i>et al.</i> 2013)	
<i>Cryptonympha copiosa</i> Lugo-Ortiz & McCafferty	Colombia (Domínguez <i>et al.</i> 2002); Venezuela (Nieto <i>et al.</i> 2011); Brazil: Acre, Amazonas, Pará, Rio Grande do Sul, Santa Catarina, Paraná, Amazonas (Lugo-Ortiz & McCafferty 1998); Bahia, Maranhão (Boldrini <i>et al.</i> 2012). <b>New Record:</b> Rondônia	P13 (4N)
<i>Guajirolus rondoni</i> Salles (Figura 3B)	Brazil: Rondônia (Salles 2007); Roraima (Falcão <i>et al.</i> 2011); Maranhão (Boldrini <i>et al.</i> 2012)	P15 (4N)
<i>Harpagobaetis gulosus</i> Mol (Fig. 3C)	Venezuela (Nieto <i>et al.</i> 2011); Suriname (Mol 1986); Brazil: Goiás (Salles & Lugo-Ortiz 2002b); Mato Grosso (Salles <i>et al.</i> 2004b), Roraima (Falcão <i>et al.</i> 2010), Maranhão (Boldrini <i>et al.</i> 2012). Pernambuco (Lima <i>et al.</i> 2012b). <b>New Record:</b> Rondônia	P1 (1N)
<i>Paracloeodes pacawara</i> Nieto & Salles	Bolivia (Nieto & Salles 2006); Brazil: Piauí, Bahia (Boldrini <i>et al.</i> 2012). <b>New Record:</b> Rondônia	P11 (5N); P15 (1N)
<i>Paracloeodes waimiri</i> Nieto & Salles	Brazil: Amazonas (Nieto & Salles 2006); Maranhão, Piauí, Ceará, Bahia, Goiás (Boldrini <i>et al.</i> 2012). <b>New Record:</b> Rondônia	P6 (3N); P14 (6N)
<i>Rivudiva trichobasis</i> Lugo-Ortiz & McCafferty (Fig. 3D)	Paraguay; Brazil: Rio Grande do Sul (Lugo-Ortiz & McCafferty 1998); Amazonas (Cruz <i>et al.</i> 2011). <b>New Record:</b> Rondônia	P11 (4N); P14 (5N); P13 (5N)
<i>Spiritiops silvudus</i> Lugo-Ortiz & McCafferty (Fig. 3E)	Venezuela (Nieto <i>et al.</i> 2011); French Guiana, Brazil: Amazonas, Pará (Lugo-Ortiz & McCafferty 1998); Mato Grosso (Salles <i>et al.</i> 2004b); Bahia (Lima <i>et al.</i> 2010); Roraima (Falcão <i>et al.</i> 2011); Maranhão, Goiás (Boldrini <i>et al.</i> 2012). <b>New Record:</b> Rondônia	P1 (5N); P18 (3N)
<i>Waltzoyphius roberti</i> Thomas & Peru (Fig. 3F)	French Guiana (Thomas & Peru 2002); Brazil: Mato Grosso (Shimano <i>et al.</i> 2010); Roraima (Falcão <i>et al.</i> 2011); Bahia (Boldrini <i>et al.</i> 2012). <b>New Record:</b> Rondônia	P14 (2N); P18 (1N)

## RESULTS AND DISCUSSION

Our study records 13 species and 11 genera for the first time from Rondônia, bringing the total for this state to 23 species and 16 genera, all listed in Table 2. One species of *Apobaetis* and one of *Cloeodes* are new to science, and the nymph of *Baetodes* was not possible to identify to the species level. The nymph of *Callibaetis* not identified could be either the undescribed nymph of a species known only in the adult stage or, alternatively, a new species.

Two species previously recorded from Bolivia, near Rondônia state, were recorded from the state of Rondônia: *Apobaetis kallawayana* Nieto, 2006 and *Chane baure* Nieto, 2003. *Apobaetis kallawayana* is recorded here for the first time from Brazil, but *C. baure* was previously recorded from state the state of Roraima (Salles 2007).



Figure 2. Baetidae nymphs, dorsal view. A. *Americabaetis alphas*; B. *Apobaetis fiuzai*; C. *Apobaetis* sp. nov. A; D. *Callibaetis* sp. A; E. *Camelobaetidius janae*; F. *Cloeodes auwe*.





Figure 3. Baetidae nymphs, dorsal view. A. *Cloeodes* sp. nov. A; B. *Guajirolus rondoni*; C. *Harpagobaetis gulosus*; D. *Rivudiva trichobasis*; E. *Spiritiops silvudus*; F. *Waltzoyphius roberti*.

## ACKNOWLEDGEMENTS

We would like to express our gratitude to FAPEAM (Fundação de Amparo à Pesquisa do Estado do Amazonas) for financial support, and CAPES (Coordenação de Aperfeiçoamento de Pessoal de Nível Superior) for financial support of the Pro-Equipamentos CAPES. The authors would like to thank Dr. Neusa Hamada (Instituto Nacional de Pesquisas da Amazônia) for logistic support. PVC is thankful for financial support provided by Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq) – Protax processes number 562188/2010-0.

## REFERENCES

- Barber-James, H.M.; Gattolliat, J.-L.; M. Sartori & Hubbard, M.D. 2008. Global diversity of mayflies (Ephemeroptera, Insecta) in freshwater. *Hydrobiologia* 595(1): 339-350.
- Boldrini, R.; Cruz, P.V.; Salles, F.F.; Belmont, L.E. & Hamada, N. 2012. Baetidae (Insecta: Ephemeroptera) from northeastern Brazil. *Check List* 8(1): 88-94.
- Boldrini, R.; Salles, F.F. & Pes, A.M.O. 2013. A new species of *Corinnella* Thomas & Dominique, 2006 (Ephemeroptera: Baetidae). *Zootaxa* 3608(1): 75-80.
- Boldrini, R. & Pes, A.M.O. 2014. Five new species of *Camelobaetidium* Demoulin, 1966 (Ephemeroptera: Baetidae), and redescription of *Camelobaetidium mexicanus* (Traver & Edmunds, 1968). *Zootaxa*, 3796(3): 545-567.
- Cruz, P.V.; Boldrini, R.; Salles, F.F. & Hamada, N. 2011. The male imago of *Rivudiva trichobasis* Lugo-Ortiz & McCafferty from Amazonas state, Brazil. *Zootaxa* 2907: 60-61.
- Cruz, P.V., Boldrini, R. & Salles, F.F. 2011. *Apobaetis* Day (Ephemeroptera: Baetidae) from northern Brazil: description of a new species and of the male imago of *A. fuzai* Salles and Lugo-Ortiz. *Aquatic Insects* 33 (1): 81-90.
- Cruz, P.V., Salles, F.F. & Hamada, N. 2014. *Callibaetis* Eaton (Ephemeroptera: Baetidae) from Brazil. *Journal of Natural History* 48(11-12): 591-660.
- Domínguez, E.; Zúñiga, M.C. & Molineri, C. 2002. Estado actual del conocimiento y distribución del orden Ephemeroptera (Insecta) en la región amazónica. *Caldasia* 24: 459-469.
- Domínguez, E.; Molineri, C.; Pescador, M.L., Hubbard, M.D. & Nieto, C. 2006. Ephemeroptera of South America. In J. Adis, J.R. Arias, G. Rueda-Delgado and K.M. Wantzen (ed). *Aquatic Biodiversity of Latin America*. Volume 2. Moscow-Sofia: Pensoft. 646 p.
- Dominique, Y.; Thomas, A.; Orth, K. & C. Dauta. 2001. Les Ephémères de La Guyane Française. 2. *Camelobaetidium billi* et *C. janae* n. spp (Ephemeroptera, Baetidae). *Ephemerera* 2000, 2(1): 39-48.
- Emmerich, D. & Nieto, C. 2009. First Record of the genus *Paracloeodes* Day (Ephemeroptera: Baetidae) in Uruguay and description of two new species. *Zootaxa* 2225: 57-62.
- Falcão, J.N.; Salles, F.F. & Hamada, N. 2010. The adults of *Harpagobaetis* Mol and *Tomedontus* Lugo-Ortiz and McCafferty (Ephemeroptera: Baetidae) with notes on the nymphal stage. *Zootaxa* 2530: 39-46.
- Falcão, J.N.; Salles, F.F. & Hamada, N. 2011. Baetidae (Insecta, Ephemeroptera) ocorrentes em Roraima, Brasil: novos registros e chaves para gêneros e espécies no estágio ninfal. *Revista Brasileira de Entomologia* 55(4): 516-548.
- Francischetti, C.N.; Salles, F.F.; Lugo-Ortiz, C.R. & Da-Silva, E.R. 2003. First report of *Americabaetis* Kluge (Ephemeroptera: Baetidae) from Rio de Janeiro, Brazil. *Entomotrópica* 18: 69-71.
- Gillies, M.T. 1990. A revision of the Argentine species of *Callibaetis* Eaton (Baetidae: Ephemeroptera). *Revista de la Sociedad Entomológica Argentina* 48:15-39.
- Lima, L.R.C.; Salles, F.F.; Pinheiro, U.S. & Quinto, E. 2010. Espécies de Baetidae (Ephemeroptera) do Sul da Bahia, com Descrição de uma Nova Espécie de *Paracloeodes* Day. *Neotropical Entomology* 39(5): 725-731.
- Lima, L.R.C.; Boldrini, R. & Pinheiro, U. 2012a. Imagos of *Camelobaetidium cayumba* (Traver & Edmunds, 1968) (Ephemeroptera: Baetidae). *Zootaxa*, 3401: 63-5.
- Lima, L.R.C.; Salles, F.F. & Pinheiro, U. 2012b. Ephemeroptera (Insecta) from Pernambuco State, northeastern Brazil. *Revista Brasileira de Entomologia* 56(3): 304-314.
- Lugo-Ortiz, C.R. & McCafferty, W.P. 1996. Taxonomy of the Neotropical genus *Americabaetis*, new status (Insecta: Ephemeroptera: Baetidae). *Studies on Neotropical Fauna Environment* 31: 156-169.
- Lugo-Ortiz, C.R. & McCafferty, W.P. 1998. Five new genera of Baetidae (Insecta: Ephemeroptera) from South America. *Annales de Limnologie* 34(1): 57-73.
- Lugo-Ortiz, C.R.; Salles, F.F. & Furieri, K.S. 2002. First records of small minnow mayflies (Ephemeroptera; Baetidae) from the State of Espírito Santo, southeastern Brazil. *Lundiana* 3: 79-80.
- Massariol, F.C.; Lima, L.R.C.; Pinheiro, U.D.S.; Quieroz, L.L.; Oliveira, L.G. & Salles, F.F. 2013. Two-winged *Cloeodes* in Brazil: New species, stage



- description, and key to South American species. *Journal of Insect Science* 13(39): 01-20.
- Mol, A.W.M. 1986. *Harpagobaetis gulosus* gen. nov., spec. nov., a new mayfly from Suriname (Ephemeroptera: Baetidae). *Zoologische Mededelingen* 60: 63-70.
- Navás, L. 1934. Insectos suramericanos. Octava [VIII] serie. *Revista de la Real Academia de Ciencias Exactas Fisicas y Naturales de Madrid* 31:9-28.
- Needham J.G. & Murphy, H.E. 1924. Neotropical mayflies. *Bulletin of the Lloyd Library Number 24, Entomological Series* 4:1-79.
- Nieto, C. 2003. A new species of *Guajirolus* (Ephemeroptera: Baetidae) from Argentina and description of a new genus from Bolivia. In: Gaino E. (ed). *Research Update on Ephemeroptera & Plecoptera*. Università di Perugia. Perugia, Italy p.153-158.
- Nieto, C. 2006. New species of the genus *Apobaetis* Day (Ephemeroptera: Baetidae) from Bolivia and Argentina. *Annales de Limnologie* 42(3): 189-196.
- Nieto, C. 2008. The larvae of some species of *Callibaetis* Eaton (Ephemeroptera: Baetidae). *Aquatic Insects* 30 (3): 229-243.
- Nieto, C. & Salles, F.F. 2006. Revision of the genus *Paracloeodes* (Ephemeroptera: Baetidae) in South America. *Zootaxa* 1301: 1-33.
- Nieto, C.; Grillet, M.E.; Domínguez, E.; Molineri, C. & Guerrero, E. 2011. The Family Baetidae (Insecta: Ephemeroptera) from Venezuelan Guayana's Uplands. *Zootaxa* 2808:1-17.
- Salles, F.F. 2007. The presence of *Chane* Nieto and *Guajirolus* Flowers (Ephemeroptera, Baetidae) in Brazil with the description of a new species. *Revista Brasileira de Entomologia* 51(4): 404-409.
- Salles, F.F. & Lugo-Ortiz, C.R. 2002a. A distinctive new species of *Apobaetis* (Ephemeroptera: Baetidae) from Mato Grosso and Minas Gerais, Brazil. *Zootaxa* 35: 1-6.
- Salles, F.F. & Lugo-Ortiz, C.R. 2002b. Primeiro registro do gênero *Harpagobaetis* Mol (Ephemeroptera: Baetidae) para o Brasil. *Lundiana* 3: 155.
- Salles, F.F.; Francischetti, C.N.; Roque, F.O.; Pepineli, M. and Strixino, S.T. 2003. Levantamento preliminar dos gêneros e espécies de Baetidae (Insecta: Ephemeroptera) do Estado de São Paulo, com ênfase em coletas realizadas em córregos florestados de baixa ordem. *Biota Neotropica* 3(2): 1-7.
- Salles, F.F. & Francischetti, C.N. 2004. *Cryptonympha dasilvai* sp. nov. (Ephemeroptera: Baetidae) do Brasil. *Neotropical Entomology* 33(2): 213-216.
- Salles, F.F.; Da-Silva, E.R.; Serrão, J.E. & Francischetti, C. 2004a. Baetidae (Ephemeroptera) na Região do Sudeste de Brasil: Novos Registros e Chave para os Gêneros no Estágio Ninfal. *Neotropical Entomology* 33(5): 725-735.
- Salles, F.F.; Batista, J.D. & Cabette, H.R.S. 2004b. Baetidae (Insecta: Ephemeroptera) de Nova Xavantina, Mato Grosso, Brasil: novos registros e descrição de uma nova espécie de *Cloeodes* Traver. *Biota Neotropica* 4(2): 1-8.
- Salles, F.F. & Serrão, J.E. 2005. The nymphs of the genus *Camelobaetidius* Demoulin (Ephemeroptera: Baetidae) in Brazil: new species, new records, and key for the identification of the species. *Annales de Limnologie* 41: 267-279.
- Salles, F.F.; Nascimento, J.M.C.; Massariol, F.C.; Angeli, K.B.; Barcelos e Silva, P.; Rúdio, J.A. & Boldrini, R. 2010a. Primeiro levantamento da fauna de Ephemeroptera (Insecta) do Espírito Santo, Sudeste do Brasil. *Biota Neotropica* (10): 294-307.
- Salles F.F.; Raimundi, E.A.; Boldrini, R. & Souza-Franco, G.G. 2010b. The genus *Americabaetis* Kluge (Ephemeroptera: Baetidae) in Brazil: new species, stage description, and key to nymphs. *Zootaxa* 2560: 16-28.
- Salles, F.F., Boldrini, R., Shimano, Y. & Cabette, H.R.S. 2011. Review of the genus *Aturbina* Lugo-Ortiz and McCafferty (Ephemeroptera: Baetidae). *Annales de Limnologie* 47(1): 21-44.
- Salles, F.F.; Boldrini, R., Nascimento, J.M.C.; Angeli, K.B.; Massariol, F.C. & Raimundi, E. 2013. *Ephemeroptera do Brasil*. Electronic database accessible at [http:// http://ephemeroptera.com.br/](http://http://ephemeroptera.com.br/). Captured on 11 December 2013.
- Shimano, Y.; Cabette, H.S.R.; Salles, F.F. & Juen, L. 2010. Composição e Distribuição da fauna de Ephemeroptera (Insecta) em áreas de transição Cerrado-Amazônia, Brasil. *Iheringia, Série Zoologia* 100(4): 301-308.
- Thomas, A. & Peru, N. 2002. Les Ephémères de la Guyane Française. 6. Description de *Waltzoyphius roberti* n. sp. [Ephemeroptera, Baetidae]. *Bulletin de la Société d'Histoire naturelle de Toulouse* 138: 15-20.
- Thomas, A., Dominique, Y. & Horeau, V. 2003. Les Ephémères de la Guyane Française. 7. Redescription de *Camelobaetidius cayumba* (Traver & Edmunds, 1968) (Ephemeroptera: Baetidae). *Ephemera* Vol 3 (2): 117-122.
- Traver, J.R. & Edmunds Jr, G.F. 1968. A revision of the Baetidae with spatulate-clawed nymphs (Ephemeroptera). *Pacific Insects* 10: 629-677.