

Annulipalpia (Insecta: Trichoptera) from the state of Espírito Santo, Brazil

Patrik Barcelos e Silva^{1*}, Ana Maria Oliveira Pes¹ and Frederico Falcão Salles²

¹ Instituto Nacional de Pesquisas da Amazônia (Entomologia), Caixa Postal: 2223. CEP 69.080-971. Manaus AM, Brazil.

² Universidade Federal do Espírito Santo, Depto. de Ciências Agrárias e Biológicas. CEP 29.933-415. São Mateus, ES, Brazil.

* Corresponding author. E-mail: patrikbarcelos@gmail.com

ABSTRACT: In order to access and integrate the knowledge regarding the diversity of the suborder Annulipalpia (Insecta: Trichoptera) from the state of Espírito Santo, southeastern Brazil, we present a preliminary list of this group based on literature and on adults collected from 26 different sites in the state. Prior to this study only 11 species of Annulipalpia, belonging to six genera and two families were reported from the state. Based on the adults collected during this study the number of taxa increased considerably to 48 species, 15 genera and five families. Ten species could not be identified and probably are new to science. With the performance of new collections and with the increase in number of sampling points, the number of species of Annulipalpia as well of Trichoptera can still grow considerably.

INTRODUCTION

The order Trichoptera includes about 14.500 species of aquatic insects (Morse 2012). It represents the most diverse order among those insects strictly aquatic and often accounts for the largest proportion of the benthic macroinvertebrates community (Holzenthal *et al.* 2007b). Santos *et al.* (2012) reported about 600 species from Brazil, although these records were quite uneven and fragmented between the states.

The members of the suborder Annulipalpia are those caddisflies which larvae build shelters or networks fixed to the substrate (Holzenthal *et al.* 2007). This group comprises ten extant families (Holzenthal *et al.* 2011), five of which are recorded from Brazil: Ecnomidae, Hydropsychidae, Philopotamidae, Polycentropodidae and Xiphocentronidae. They answer for about 50% of the Brazilian Trichoptera diversity. In the state of Espírito Santo, the knowledge concerning the order is scant and fragmented, only 17 species have been officially registered until now, 11 of which belong to Annulipalpia (Santos *et al.* 2012).

The present study is the first attempt in order to improve and integrate the knowledge of this important group of aquatic insects in the state of Espírito Santo. Therefore, our aim is to present the first survey of Annulipalpia from the state, gathering data from recently collected specimens with those from the literature, in order to present a list of Annulipalpia from Espírito Santo with notes on the previous distribution of these species.

MATERIALS AND METHODS

This study was conducted in the state of Espírito Santo, Brazil. Samples were collected between 2007 and 2011 at various sites distributed throughout the state (Figure 1) utilizing of three types of traps: Malaise (Townes style), Pennsylvania with white light bulbs, and a white sheet with mixed light bulbs attached. In order to explore the widest range of environments, the collections points

were set at different sites in relation to topography, mean temperature, and type and size of water bodies. In the Table 1 a list of sampling sites is presented with their respective city, location, geographic coordinates, elevation, and collectors.

The collected material was fixed and preserved in 80% ethyl alcohol and is deposited at Coleção Zoológica Norte Capixaba (CZNC), Universidade Federal do Espírito Santo, São Mateus, Espírito Santo. The symbol "P" refers to the sampling site listed in Table 1; to each collector (in Table 1) was designated an acronym as follows: **EAR** to Erikksen Augusto Raimundi; **EDGS** to Elaine Della Giustina Soares; **FCM** to Fabiana Criste Massariol; **FFS** to Frederico Falcão Salles; **JAR** to Jessika Ana Rudio; **JMNC** to Jeane Marcelle Cavalcante do Nascimento; **KBA** to Kamila Batista Angeli; **KDCB** to Karina del Caro Bertazo; **LCO** to Laís Caneva Oliveira; **MLL** to Marcela Miranda Lima; **PBS** to Patrik Barcelos e Silva; **PVAB** to Pedro Vale Azevedo Brito; **RB** to Rafael Boldrini; **YS** to Yulie Shimano Feitosa. In Table 2 "Tr" means catalogue number of the CZNC for Trichoptera and "A" is the abbreviation for adults.

To identify the material to the genus level were used identification keys to proposals for Angrisano (1995). The species were identified with specialized bibliographic for each genus in which the main structure used was the male genitalia. To the visualization of this structure was applied clarification process according to the protocol proposed by Blahník and Holzenthal (2004) using heated KOH and lactic acid.

Some species included in the list were not collected during the course of the work however they were already reported from the state based on literature. These data were primarily based on Paprocki *et al.* (2004) and then on Chamorro and Holzenthal (2010) and Santos *et al.* (2012).

RESULTS AND DISCUSSION

Altogether 48 species are listed of which 43 were found during the surveys, all listed in Table 2, 11 species of them

were previously recorded and five were not collected during the study. Twenty-four species, eight genera and the families Ecnomidae and Xiphocentronidae are recorded for the first time from the state of Espírito Santo. Furthermore, the species *Macrostemum erichsoni* (Banks, 1920) and *Smicridea roraimense* Albino, Pes, and Hamada, 2011, previously found only in the Amazon region, are recorded for the first time from the Atlantic Forest. The species *Smicridea palmar* Sganga, 2005 previously recorded from Argentina and the state of Mato Grosso, is recorded for the first time from Southeastern Brazil. Some of the representatives of Annulipalpia were documented in photos and are presented in Figures 2 and 3.

The ten following species among the 48 listed were not possible to identify at species level or may represent undescribed species (the species of *Austrotinodes* requires confirmation about that): two species of *Austrotinodes* Schmid, 1955, four of *Smicridea* McLachlan, 1871, three of *Cernotina* Ross, 1938 and one of *Xiphocentron* (Brauer, 1870).

Hydropsychidae was the most representative family with 25 species (more than half the number of recorded species), whereas the genus *Smicridea* was not only the most diverse but also the most abundant with nearly 50% of the examined specimens. Philopotamidae was the second family in number of species and Polycentropodidae was the second in number of genera.

Even though the Southeastern Region is the most studied area in Brazil in regarding Trichoptera and other aquatic insects, studies concerning this group in the state of Espírito Santo have been historically neglected, so that the state represents a significant gap in the knowledge of aquatic insects. Nevertheless, this scenario is changing with the realization of several taxonomic studies on different groups of aquatic insects of this state (e.g. Boldrini and Salles 2009; Moreira et al. 2010; Salles et al. 2010).

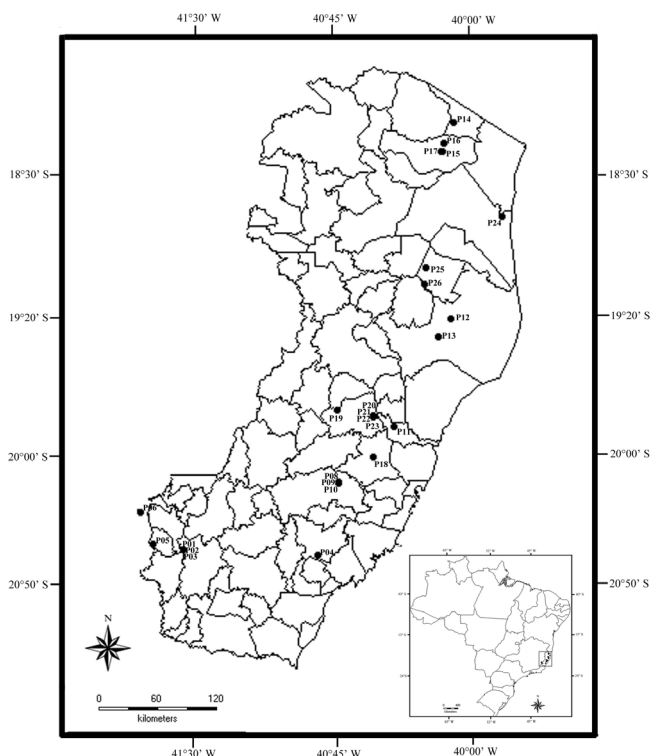


FIGURE 1. Sampling sites in the state of Espírito Santo.

It is noteworthy that this work is result of a preliminary survey carried out in various places in the State. With the achievement of more and new sampling points (sampling effort), the number of species of Annulipalpia and others Trichoptera taxa will increase considerably.

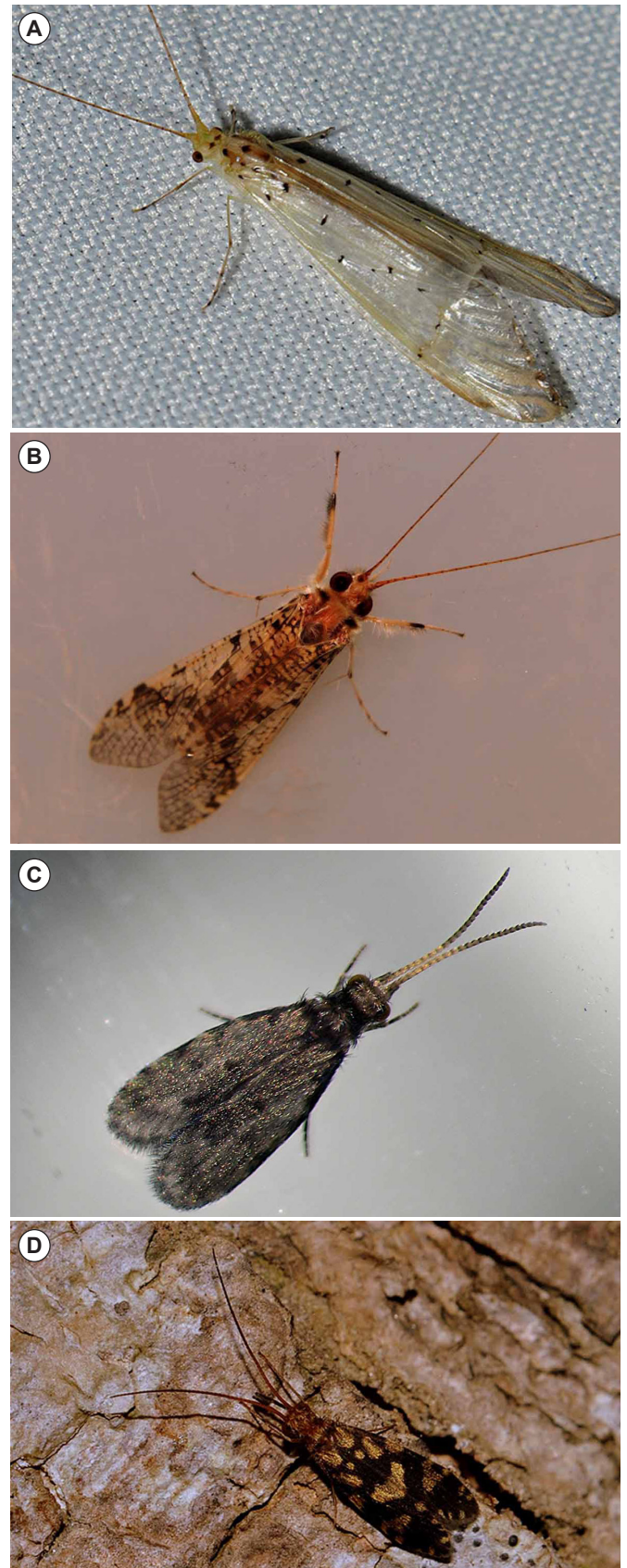


FIGURE 2. Representatives Annulipalpia from Espírito Santo state. A) *Synoestropsis pedicillata* Ulmer, 1905; B) *Blepharopus diaphanus* Kolenati, 1859; C) *Nyciophylax* sp.; D) *Chimarra hyooides* Flint, 1983. Photos: F.F. Salles (A, B, D) and A.M.O. Pes (C).



FIGURE 3. Representatives Annulipalpia from Espírito Santo state. A) and B) *Smicridea* spp.; C) *Macronema* aff. *bicolor*; D) *Macrostemum maculatum* (Perty, 1833). Photos: F.F. Salles (A, C, D) and A.M.O. Pes (B).

TABLE 1. Sample sites at Espírito Santo state followed by site, city, location, geographic coordinates, elevation and acronyms of collectors.

SITE	CITY	LOCATION	GEOGRAPHIC COORDINATES	ELEVATION	ACRONYMS OF COLLECTORS
P01	Alegre	Cachoeira da Fumaça, Trilha do Remanso	20°37'52.1" S, 41°36'12.8" W	455 m	KBA, KDCB, PBS.
P02	Alegre	Cachoeira da Fumaça, Sede	20°37'52.2" S, 41°36'12.9" W	447 m	KBA, KDCB, PBS.
P03	Alegre	Cachoeira da Fumaça, Trilha do Remanso	20°37'52.2" S, 41°36'12.9" W	447 m	KBA, KDCB, PBS.
P04	Alfredo Chaves	Nova Mantova	20°39'41.7" S, 40°50'24.3" W	371 m	FCM, FFS, KBA, RB.
P05	Caparaó	Dores do Rio Preto, Novo Mundo	20°36'03.8" S, 41°46'37.4" W	894 m	EAR, FCM, KBA, PVAB.
P06	Caparaó	Alto Caparaó, Vale Verde	20°25'11.6" S, 41°50'45.7" W	1309 m	FCM, FFS, JMCN, KBA, KDCB, PBS.
P07	Caparaó	-	-	-	FFS, JMCN, JAR, MML, PVAB.
P08	Domingos Martins	Cachoeira I	20°14'48.3" S, 40°43'31.2" W	650 m	FCM, FFS, JMCN, KBA, MML, PBS.
P09	Domingos Martins	Cachoeira II	20°14'53.1" S, 40°43'30.0" W	636 m	FCM, FFS, JMCN, KBA, MML, PBS.
P10	Domingos Martins	Cachoeira III	20°15'02.6" S, 40°43'27.4" W	622 m	FCM, FFS, JMCN, KBA, MML, PBS.
P11	Fundão	Hotel Fazenda Lua Nova	19°56'02.0" S, 40°24'45.0" W	57 m	EAR, FCM, FFS, PBS, YS.
P12	Linhares	Lagoa Juparanã, Praia do Minotauro	19°19'05.8" S, 40°05'11.9" W	17 m	EAR, FFS, PBS, PVAB.
P13	Linhares	Lagoa Nova	19°25'07.2" S, 40°09'26.4" W	17 m	FCM, FFS, RB.
P14	Pedro Canário	Cachoeira da Mata	18°12'10.8" S, 40°04'37.9" W	35 m	EAR, FCM, KDCB, PVAB.
P15	Pinheiros	Água Limpa	18°22'04.1" S, 40°08'23.8" W	41 m	EAR, FCM, FFS, JMCN, KBA, KDCB, PBS.
P16	Pinheiros	Córrego São Roque	18°18'53.5" S, 40°09'10.4" W	94 m	EAR, FCM, FFS, JMCN, KBA, KDCB, PBS.
P17	Pinheiros	Rio Sede	18°22'16.8" S, 40°08'30.2" W	55 m	EAR, FCM, FFS, JMCN, KBA, KDCB, PBS.
P18	Santa Leopoldina	Hospedaria Pau-a-Pique	20°6'9.05" S, 40°31'45.42" W	-	FCM.
P19	Santa Teresa	Cachoeira do Strutz	19°50'06.1" S, 40°43'46.0" W	169 m	FCM, KBA.
P20	Santa Teresa	Cachoeira Grande	19°52'30.8" S, 40°31'56.6" W	712 m	EDGS, FFS, JMCN, MML, PBS, RB.
P21	Santa Teresa	Córrego Grande (Área Aberta)	19°52'31.0" S, 40°31'56.6" W	768 m	EDGS, FFS, JMCN, MML, PBS, RB.
P22	Santa Teresa	Córrego Grande (Área Fechada)	19°52'31.0" S, 40°31'56.6" W	768 m	EDGS, FFS, JMCN, MML, PBS, RB.
P23	Santa Teresa	Córrego Grande (Pingueta)	19°52'16.0" S, 40°31'43.1" W	718 m	EDGS, FFS, JMCN, MML, PBS, RB.
P24	São Mateus	Rio Preto	18°44'08.0" S, 39°47'47.0" W	-	FCM, FFS, KBA JMCN, JAR, LCO.
P25	Sooretama	Córrego Rodrigues	19°01'36.6" S, 40°13'39.0" W	44 m	FFS, JMCN, PBS.
P26	Sooretama	Rio São José	19°07'33.1" S, 40°14'26.1" W	24 m	EAR, FCM, FFS, JMCN, KBA, KDCB, PBS.

TABLE 2. List of species of Annulipalpia (Trichoptera) from the State of Espírito Santo, followed by their geographical distribution and material examined, including collection date. The localities in bold are to contrast the sites where the species were collected in the State.* means first record for the Espírito Santo State.

TAXON	KNOWN GEOGRAPHICAL DISTRIBUTION	MATERIAL EXAMINED
Ecnomidae		
<i>Austrotinodes</i> sp. 1	BRAZIL: Espírito Santo [Fundão].	P11: 02.xii.2010 (Tr-269 – 1A)
<i>Austrotinodes</i> sp. 2	BRAZIL: Espírito Santo [Fundão].	P11: 02.xii.2010 (Tr-543 – 1A)
Hydropsychidae		
<i>Blepharopus diaphanus</i> Kolenati, 1859*	ARGENTINA, VENEZUELA, BRAZIL: Minas Gerais, Paraná, Rio de Janeiro, Santa Catarina (Paprocki <i>et al.</i> 2004); Mato Grosso (Nogueira and Cabette 2011); Acre, Amazonas, Pará, Roraima (Santos <i>et al.</i> 2012). Espírito Santo [Alegre, Linhares and Sooretama].	P03: 27-28.v.2011 (Tr-550 – 1A); P26: 09.ix.2010 (Tr-272 – 3A), 19.x.2010 (Tr-270 – 1A), 09.v.2011 (Tr-297 – 6A), 18.vii.2011 (Tr-551 – 5A)
<i>Leptonema bifurcatum</i> Flint, McAlpine and Ross, 1987	BRAZIL: Minas Gerais (Blahnik <i>et al.</i> 2004); Espírito Santo (Flint <i>et al.</i> 1987).	-
<i>Leptonema crassum</i> Ulmer, 1905	ARGENTINA, COLOMBIA, COSTA RICA, GUATEMALA, HONDURAS, MEXICO, NICARAGUA, VENEZUELA, BRAZIL: Goiás, Mato Grosso, Minas Gerais, São Paulo, Roraima, Espírito Santo (Paprocki <i>et al.</i> 2004).	-
<i>Leptonema pallidum</i> Guerin-Meneville, 1843	ARGENTINA, BRAZIL: Distrito Federal, Goiás, Minas Gerais, Rio de Janeiro, São Paulo (Paprocki <i>et al.</i> 2004). Espírito Santo (Paprocki <i>et al.</i> 2004) [Alegre, Domingos Martins and Santa Teresa].	P01: 27-29.v.2011 (Tr-548 – 1A); P10: 27-29.viii.2010 (Tr-409 1A)
<i>Leptonema viridianum</i> (Navás, 1916)*	ARGENTINA, BOLIVIA, COLOMBIA, ECUADOR, GUYANA, PARAGUAY, PERU, VENEZUELA, BRAZIL: Bahia (Navás 1916); São Paulo (Blahnik <i>et al.</i> 2004); Rio de Janeiro (Santos and Nessimian 2009); Distrito Federal, Goiás, Minas Gerais, Pará (Dumas <i>et al.</i> 2010). Espírito Santo [Alegre and Domingos Martins].	P03: 27-28.v.2011 (Tr-547 – 1A); P08: 28-29.viii.2010 (Tr-374 – 6A); P09: 25.viii.2010 (Tr-408 – 1A); P10: 27-29.viii.2010 (Tr-407 – 3A)
<i>Macronema</i> aff. <i>bicolor</i>	BRAZIL: Espírito Santo [Sooretama].	P26: 09.x.2010 (Tr-416 – 1A)
<i>Macrostemum digramma</i> (McLachlan, 1871)*	BRAZIL: Minas Gerais (Paprocki <i>et al.</i> 2004) and Rio de Janeiro (Dumas <i>et al.</i> 2010). Espírito Santo [Santa Teresa].	P20: 22-28.x.2008 (Tr-419 – 2A).
<i>Macrostemum erichsoni</i> (Banks, 1920)*	GUYANA, FRENCH GUYANA, SURYNAME, BRAZIL: Amazonas (Flint 1978). Espírito Santo [Pinheiros].	P15: - (Tr-403 – 2A)
<i>Macrostemum hyalinum</i> (Pictet, 1836)*	BRAZIL: Pará, Paraná (Blahnik <i>et al.</i> 2004); Rio de Janeiro (Santos and Nessimian 2009); Amazonas (Santos <i>et al.</i> 2012). Espírito Santo [Domingos Martins].	P08: 28-29.viii.2010 (Tr-418 – 2A)

TABLE 2. CONTINUED.

TAXON	KNOWN GEOGRAPHICAL DISTRIBUTION	MATERIAL EXAMINED
<i>Macrostemum maculatum</i> (Perty, 1833)*	BRAZIL: Bahia and São Paulo (Paprocki <i>et al.</i> 2004). Espírito Santo [Santa Teresa] .	P20: 22-28.x.2008 (Tr-420 – 3A)
<i>Smicridea</i> (<i>Ryachophylax</i>) <i>coronata</i> Flint, 1980*	ARGENTINA, PARAGUAY, URUGUAY, BRAZIL: Minas Gerais, São Paulo (Paprocki <i>et al.</i> 2004). Espírito Santo [Alegre, Caparaó, Pedro Canário and Sooretama] .	P03: 27-28.v.2011 (Tr-562, Tr-568 and Tr-580 – 6A); P14: 29.vi.2011 (Tr-589 – 1A); P25: 29.iv.2009 (Tr-499 – 1A).
<i>Smicridea</i> (<i>Ryachophylax</i>) <i>iguazu</i> Flint, 1983*	ARGENTINA, BRAZIL: Minas Gerais, Paraná, Rio de Janeiro, Santa Catarina (Paprocki <i>et al.</i> 2004). Espírito Santo [Alegre, Domingos Martins, Pedro Canário and Sooretama] .	P01: 27-29.v.2011 (Tr-574 and Tr-582 – 3A); P02: 26.v.2011 (Tr-583 – 1A); P03: 27-28.v.2011 (Tr-563, Tr-567 and Tr-576 – 24A); P10: 27-29.viii.2010 (Tr-539 and Tr-541 – 22A); P14: 29.vi.2011 (Tr-591 – 20A); P25: 29.iv.2009 (Tr-498 – 13A); P26: 19.xi.2010 (Tr-537 – 17A), 19.v.2011 (Tr-553 – 2A).
<i>Smicridea</i> (<i>Ryachophylax</i>) <i>jundiai</i> Almeida and Flint, 2002	BRAZIL: Paraná, Rio de Janeiro (Paprocki <i>et al.</i> 2004); Minas Gerais, São Paulo (Dumas <i>et al.</i> 2010). Espírito Santo (Paprocki <i>et al.</i> 2004) [Alegre, Domingos Martins, Pedro Canário, Sooretama and Santa Teresa] .	P02: 26.v.2011 (Tr-571 and Tr-572 – 2A); P03: 27-28.v.2011 (Tr-561, Tr-570 and Tr-578 – 148A); P10: 27-29.viii.2010 (Tr-540 – 14A); P14: 29.vi.2011 (Tr-590 – 5A); P26: 09.x.2010 (Tr-529 and Tr-530 – 200A).
<i>Smicridea</i> (<i>Ryachophylax</i>) <i>palmar</i> Sganga, 2005*	ARGENTINA, BRAZIL: Mato Grosso (Albino <i>et al.</i> 2011). Espírito Santo [Pinheiros and Sooretama] .	P15: 08.x.2009 (Tr-506 – 1A); 24.ii.2010 (Tr-505 – 2A); 25.x.2010 (Tr-504 – 1A); P17: 18.i.2010 (Tr-507 – 1A); P26: 19.v.2011 (Tr-555 – 1A).
<i>Smicridea</i> (<i>Ryachophylax</i>) <i>piraya</i> Flint, 1983*	ARGENTINA, BRAZIL: Minas Gerais, Paraná, Santa Catarina, São Paulo (Paprocki <i>et al.</i> 2004). Espírito Santo [Caparaó and Domingos Martins] .	P07: 24-28.iii.2009 (Tr-621 – 1A); P10: 27-29.viii.2010 (Tr-622 and Tr-623 – 15A).
<i>Smicridea</i> (<i>Ryachophylax</i>) <i>radula</i> Flint, 1974*	COSTA RICA, EL SALVADOR, GUATEMALA, HONDURAS, MEXICO, PANAMA, BRAZIL: Minas Gerais, Paraná, São Paulo, Rio de Janeiro (Paprocki <i>et al.</i> 2004). Espírito Santo [Alegre and Santa Teresa] .	P03: 27-28.v.2011 (Tr-560, Tr-569 and Tr-577 – 70A); P21: 22-28.x.2008 (Tr-503 – 1A); P22: 22-28.x.2008 (Tr-501 and Tr-502 – 12A); P23: 22-28.x.2008 (Tr-500 – 1A).
<i>Smicridea</i> (<i>Ryachophylax</i>) <i>ralphi</i> Almeida and Flint, 2002	BRAZIL: Paraná, Rio de Janeiro, São Paulo (Paprocki <i>et al.</i> 2004). Espírito Santo (Paprocki <i>et al.</i> 2004) [Santa Teresa and Sooretama] .	P22: 22-28.x.2008 (Tr-515, Tr-516 and Tr-517 – 45A); P25: 29.iv.2009 (Tr-518 – 11A).
<i>Smicridea</i> (<i>Ryachophylax</i>) <i>roraime</i> Albino, Pes and Hamada, 2011*	BRAZIL: Roraima (Albino <i>et al.</i> 2011). Espírito Santo [Alegre, Pinheiros and Sooretama] .	P03: 27-28.v.2011 (Tr-654 and Tr-566 – 3A); P26: 09.x.2010 (Tr-527 and Tr-528 – 233A), 19.xi.2010 (Tr-538 – 31A), 19.v.2011 (Tr-554, Tr-556 and Tr-557 – 410A), 18.vii.2011 (Tr-586 – 1A).
<i>Smicridea</i> (<i>Ryachophylax</i>) sp. 1	BRAZIL: Espírito Santo [Caparaó] .	P05: 28.iii.2011 (Tr-587 – 1A).
<i>Smicridea</i> (<i>Ryachophylax</i>) sp. 2	BRAZIL: Espírito Santo [São Mateus] .	P24: 27.x.2007 (Tr-619 – 1A).
<i>Smicridea</i> (<i>Smicridea</i>) <i>gemina</i> Blahnik, 1995*	COLOMBIA, COSTA RICA, ECUADOR, NICARAGUA, PANAMA, BRAZIL: Rio de Janeiro (Santos and Nessimian 2009). Espírito Santo [Pinheiros and Sooretama] .	P15: 24.ii.2010 (Tr-508 – 1A); P16: 22.vi.2010 (Tr-510 – 14A); P17: 26.x.2009 (Tr-511 – 2A); P25: 29.iv.2009 (Tr-512 – 5A).
<i>Smicridea</i> (<i>Smicridea</i>) <i>palifera</i> Flint, 1981*	VENEZUELA, BRAZIL: Rio de Janeiro (Blahnik <i>et al.</i> 2004). Espírito Santo [Alegre, Pinheiros and Sooretama] .	P03: 27-28.v.2011 (Tr-559 – 3A); 24-25.ii.2010 (Tr-520, Tr-521 and Tr-523 – 9A), 22.vi.2010 (Tr-525 and Tr-532 – 17A); P25: 29.iv.2009 (Tr-519 – 22A); P26: 19.xi.2010 (Tr-535 – 1A).
<i>Smicridea</i> (<i>Smicridea</i>) sp. 1	BRAZIL: Espírito Santo [Santa Teresa] .	P21: 22-28.x.2008 (Tr-513 – 1A).
<i>Smicridea</i> (<i>Smicridea</i>) sp. 2	BRAZIL: Espírito Santo [Alegre] .	P02: 26.v.2011 (Tr-585 – 1A); P03: 27-28.v.2011 (Tr-575 – 3A).
<i>Synoestropsis pedicilatta</i> Ulmer, 1905	ARGENTINA, BRAZIL: Santa Catarina and Minas Gerais (Paprocki <i>et al.</i> 2004). Espírito Santo (Ulmer 1905) [Sooretama]	P26: 26.viii.2011 (Tr-625 – 1A).
Philopotamidae		
<i>Alterosa truncata</i> Blahnik, 2005*	BRAZIL: Minas Gerais, São Paulo (Santos and Nessimian 2009). Espírito Santo [Caparaó] .	P07: 24-28.iii.2009 (Tr-626 – 2A).
<i>Chimarra</i> (<i>Chimarrita</i>) <i>kontilos</i> Blahnik, 1997	BRAZIL: Minas Gerais, Rio de Janeiro, São Paulo (Paprocki <i>et al.</i> 2004). Espírito Santo (Paprocki <i>et al.</i> 2004) [Fundão and Santa Teresa] .	P11: 02.xii.2010 (Tr-462 and Tr-463 – 58A).
<i>Chimarra</i> (<i>Curgia</i>) <i>beckeri</i> Flint, 1998*	BRAZIL: (Rio de Janeiro (Paprocki <i>et al.</i> 2004); Minas Gerais, São Paulo (Dumas <i>et al.</i> 2010). Espírito Santo [Fundão] .	P11: 02.xii.2010 (Tr-456 – 2A).
<i>Chimarra</i> (<i>Curgia</i>) <i>conica</i> Flint, 1983*	ARGENTINA, BRAZIL: Ceará, Goiás, Mato Grosso, Minas Gerais, Rio de Janeiro, Rondônia, Santa Catarina (Paprocki <i>et al.</i> 2004). Espírito Santo [Alfredo Chaves, Caparaó, Pinheiros, Santa Leopoldina, Santa Teresa and Sooretama] .	P04: 23.viii.2008 (Tr-468 – 4A); P07: 24-28.iii.2009 (Tr-470 – 6A); P15: - (Tr-465 and Tr-466 – 119A), 22.vi.2010 (Tr-467 – 4A); P18: 25.vii.2008 (Tr-469 – 10A); P19: 08.ii.2011 (Tr-593 – 46A); P26: 19.xi.2010 (Tr-464 – 2A).
<i>Chimarra</i> (<i>Curgia</i>) <i>froehlich</i> Flint, 1998	BRAZIL: Minas Gerais, Rio de Janeiro, São Paulo and Espírito Santo (Paprocki <i>et al.</i> 2004)	-
<i>Chimarra</i> (<i>Curgia</i>) <i>hyooides</i> Flint, 1983*	ARGENTINA, PARAGUAY, BRAZIL: Pará, Santa Catarina, São Paulo (Paprocki <i>et al.</i> 2004). Espírito Santo [Sooretama] .	P26: 18.vii.2011 (Tr-600 – 2A).
<i>Chimarra</i> (<i>Curgia</i>) <i>parana</i> Flint, 1972*	ARGENTINA, PARAGUAY, BRAZIL: Distrito Federal, Goiás, Minas Gerais, Rio de Janeiro, Santa Catarina, São Paulo (Paprocki <i>et al.</i> 2004). Espírito Santo [Alegre, Caparaó, Domingos Martins, Pinheiros and Santa Teresa] .	P01: 27-29.v.2011 (Tr-594 – 1A); P03: 27-28.v.2011 (Tr-602 – 1A); P07: 24-28.iii.2009 (Tr-458 – 1A); P08: 28-29.viii.2010 (Tr-459 – 2A); P10: 27-29.viii.2010 (Tr-460 – 5A); P15: 08.x.2009 (Tr-453 and Tr-457 – 127A); P23: 22-28.x.2008 (Tr-471 – 1A).
<i>Chimarra</i> (<i>Curgia</i>) <i>plaumanni</i> Flint, 1983*	BRAZIL: Santa Catarina (Paprocki <i>et al.</i> 2004). Espírito Santo [Caparaó] .	P07: 24-28.iii.2009 (Tr-454 – 7A).

TABLE 2. CONTINUED.

TAXON	KNOWN GEOGRAPHICAL DISTRIBUTION	MATERIAL EXAMINED
<i>Chimarra (Curgia) teresae</i> Flint, 1998	BRAZIL: Minas Gerais, Rio de Janeiro, Santa Catarina, São Paulo (Paprocki et al. 2004). Espírito Santo (Flint 1998) [Caparaó and Santa Teresa].	P05: 28.iii.2011 (Tr-596 – 1A); P23: 22-28.x.2008 (Tr-461 – 1A).
<i>Chimarra (Otarra) odonta</i> Blahnik, 2002*	BRAZIL: Minas Gerais, Rio de Janeiro (Paprocki et al. 2004); São Paulo (Dumas et al. 2010). Espírito Santo [Fundão].	P11: 02.xii.2010 (Tr-455 – 6A).
Polycentropodidae		
<i>Cernotina antonina</i> Holzenthal and Almeida, 2003*	BRAZIL (Minas Gerais, Paraná (Paprocki et al. 2004); Rio de Janeiro (Santos et al. 2012). Espírito Santo [Santa Teresa].	P23: 22-28.x.2008 (Tr-437 – 1A);
<i>Cernotina</i> sp. 1	BRAZIL: Espírito Santo [Pinheiros].	P15: 22.vi.2010 (Tr-435 – 1A).
<i>Cernotina</i> sp. 2	BRAZIL: Espírito Santo [Fundão].	P11: - (Tr-436 – 1A).
<i>Cernotina</i> sp. 3	BRAZIL: Espírito Santo [Linhares and Pedro Canário].	P12: 02.xii.2010 (Tr-468 – 1A); P14: 29.vi.2011 (Tr-620 – 1A).
<i>Cynrellus fraternus</i> (Banks, 1915)	BRAZIL: Amazonas, Minas Gerais, Pará, Paraná, Santa Catarina (Paprocki et al. 2004), Espírito Santo (Santos et al. 2012).	-
<i>Cynrellus risi</i> (Ulmer, 1907)*	ARGENTINA, BRAZIL: Amazonas, Minas Gerais, Pará (Paprocki et al. 2004). Espírito Santo [Sooretama].	P26: 19.x.2010 (Tr-434 – 1A), 19.vi.2011 (Tr-612 – 1A).
<i>Nyctiophylax neotropicalis</i> Flint, 1971*	COLOMBIA, BRAZIL: Amazonas, Minas Gerais, Pará, Rio de Janeiro (Paprocki et al. 2004). Espírito Santo [Fundão].	P11: 02.xii.2010 (Tr-430 – 2A).
<i>Polycentropus fluminensis</i> Hamilton and Holzenthal, 2011*	BRAZIL: Minas Gerais, Rio de Janeiro (Hamilton and Holzenthal 2011). Espírito Santo [Caparaó].	P06: 29.v.2011 (Tr-610 – 1A).
<i>Polycentropus santateresae</i> Hamilton and Holzenthal, 2011	BRAZIL: Minas Gerais, Espírito Santo [Santa Teresa] (Chamorro and Holzenthal 2010).	-
<i>Polypsectropus tragularius</i> Chamorro and Holzenthal, 2010	BRAZIL: Minas Gerais, São Paulo, Espírito Santo (Chamorro and Holzenthal 2010) [Pinheiros and Santa Teresa].	P15: 08.x.2009 (Tr-433 – 1A); 22.vi.2010 (Tr-432 – 2A); 25.xii.2010 (Tr-431 – 1A).
Xiphocentronidae		
<i>Xiphocentron</i> sp. 1	BRAZIL: Espírito Santo [Pinheiros].	P15: 22.vi.2010 (Tr-613 – 3A).

ACKNOWLEDGMENTS: We thank the collaboration of Allan Santos and Leandro Dumas for their help during the course of this work. The Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq), the Fundação de Amparo à Pesquisa do Espírito Santo (FAPES) (Process 511187434/2010), and the Universidade Federal do Espírito Santo (UFES) for grants awarded during the work. The Instituto Chico Mendes de Conservação da Biodiversidade (ICMBio) and Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis (IBAMA) (Process number 11239-1, 16719-1, 12777-1) for the permissions of collections to the realization of this work. Managers of protected areas, especially José Maria Poubel (Reserva Biológica Córrego do Veado), Marcel Teixeira and Éliton Lima (Reserva Biológica de Sooretama), Valdomiro Lopes (Parque Nacional do Caparaó) and Ângela Bruner (Santa Teresa).

LITERATURE CITED

- Albino, J.L.D., A.M.O. Pes and N. Hamada. 2011. *Smicridea* (Trichoptera, Hydropsychidae) from three Brazilian Amazonian States: New species, larval taxonomy and bionomics. *Zootaxa* 3113: 1-35.
- Angrisan, E.B. 1995. Trichoptera, p. 1199-1237. In E.C. Lopretto, G. Tell (ed.). *Ecosistemas de águas continentais, metodologia para seu estudo*. Tomo III. La Plata: Ediciones Sur.
- Blahnik, R.J. and R.W. Holzenthal. 2004. Collection and curation of Trichoptera, with an emphasis on pinned material, p. 8-20. In M.L. Chamorro (ed.). *Nectophyche Neotropical Trichoptera Newsletter*. St. Paul: University of Minnesota.
- Blahnik, R.J., H. Paprocki and R.W. Holzenthal. 2004. New distribution and species records of Trichoptera from southern and southeastern Brazil. *Biota Neotropica* 4(1): 1-6.
- Boldrini, R. and F.F. Salles. 2009. A new species of two-tailed *Camelobaetis* Demoulin (Insecta: Ephemeroptera: Baetidae) from State of Espírito Santo, southeastern Brazil. *Boletim do Museu de Biologia Mello Leitão* 25: 5-12.
- Calor, A.R., D.S. Amorim and R.W. Holzenthal. 2006. Phylogenetic analysis of *Notalina* (*Neonotalina*) Holzenthal (Trichoptera: Leptoceridae), with descriptions of two new species from southeastern Brazil. *Zootaxa* 1131: 33-48.
- Chamorro, M.L. and R.W. Holzenthal. 2010. Taxonomy and phylogeny of New World *Polypsectropus* Ulmer, 1905 (Trichoptera: Psychomyiidae: Polycentropodidae) with the description of 39 new species. *Zootaxa* 2582: 1-252.
- Dumas, L.L., A.P.M. Santos, G.A. Jardim, N.F. Júnior and J.L. Nessimian. 2010. Insecta, Trichoptera: New records from Brazil and other distributional notes. *Check List* 6(1): 7-9.
- Flint, O.S. Jr. 1978. Studies of Neotropical Caddisflies, XXII: Hydropsychidae of the Amazon Basin (Trichoptera). *Amazoniana* 3(6): 373-421.
- Flint, O.S. Jr. 1998. Studies of Neotropical Caddisflies, LIII: A Taxonomic Revision of the Subgenus *Curgia* of the Genus *Chimarra* (Trichoptera: Philopotamidae). *Smithsonian Contribution to Zoology* 594: 1-131.

- Flint, O.S. Jr., F. McAlpine and H.H. Ross. 1987. A Revision of the Genus *Leptonema* Guerin (Trichoptera: Hydropsychidae: Macronematinae). *Smithsonian Contribution to Zoology* 450: 1-193.
- Hamilton, S.W. and R.W. Holzenthal. 2011. Twenty-four new species of *Polycentropus* (Trichoptera, Polycentropodidae) from Brazil. *ZooKeys* 76: 1-53.
- Holzenthal, R.W., R.J. Blahnik, A.L. Prather, and K.M. Kjer. 2007. Order Trichoptera Kirby, 1813 (Insecta), Caddisflies. *Zootaxa* 1668: 639-698.
- Holzenthal, R.W., J.C. Morse and K. Kjer. 2011. Order Trichoptera Kirby, 1813. In Z.Q. Zhang (ed.) Animal biodiversity: An outline of higher-level classification and survey of taxonomic richness. *Zootaxa* 3148: 209-211.
- Moreira, F.F.F., J.L. Nessimian, J.A. Rudio and F.F. Salles. 2010. New species and new records of *Veliidae* from Espírito Santo State and adjacent Minas Gerais State, Brazil, with notes on nomenclature (Insecta: Heteroptera: Gerromorpha). *Journal of Natural History* 44: 2761-2801.
- Morse, J.C. 2012. *Trichoptera World Checklist*. Electronic database accessible at <http://www.clemson.edu/cafls/departments/esps/database/trichopt/>. Captured on 13 October 2012.
- Navás, R.P.L. 1916. Neurópteros Sudamericanos. Tercera Serie. *Brotéria, Série Zoológica* 14:14-35.
- Neboiss, A. 1991. Trichoptera; p. 787-816. In I.D. Nauman, P.B. Carne, J.F. Laurence, E.S. Nielsen and J.P. Spradbury (ed.). *The Insects of Australia: A Textbook for Students and Research Workers*. 2nd ed. Volume 2. Ithaca: Cornell University Press.
- Nogueira, D.S. and H.S.R. Cabette. 2011. Novos registros e notas sobre distribuição geográfica de Trichoptera Kirby, 1813 (Insecta) do Estado de Mato Grosso, Brasil. *Biota Neotropica* 11(2): 347-355.
- Paprocki, H., R.W. Holzenthal and R.J. Blahnik. 2004. Checklist of the Trichoptera (Insecta) of Brazil I. *Biota Neotropica* 4(1): 1-22.
- Salles, F.F., J.M.C. Nascimento, F.C. Massariol, K.B. Angeli, P. Barcelos-Silva, J.A. Rudio and R. Boldrini. 2010. Primeiro levantamento da fauna de Ephemeroptera (Insecta) do Espírito Santo, Sudeste do Brasil. *Biota Neotropica* 10(1): 293-307.
- Santos, A.P.M., L.L. Dumas, G.A. Jardim and J.L. Nessimian. 2012. *Brazilian Caddisflies: Checklist and Bibliography*. Electronic database accessible at <https://sites.google.com/site/braziliancaddisflies>. Captured on 18 April 2012.
- Ulmer, G. 1905. Zur kenntniss aussereuropäische Trichopteren. *Stettiner Entomologische Zeitung*. 66: 43-47.

RECEIVED: July 2012

ACCEPTED: November 2012

PUBLISHED ONLINE: December 2012

EDITORIAL RESPONSIBILITY: Adolfo Calor