



LECTOTYPE DESIGNATION AND REDESCRIPTION FOR *ANACRONEURIA FUMIGATA* KLAPÁLEK (PLECOPTERA: PERLIDAE), WITH NEW RECORDS AND DESCRIPTION OF A NEW SPECIES OF *ANACRONEURIA* FROM ARGENTINA

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ABSTRACT

Anacroneuria tucuman sp. nov. is described from two males collected in Tucuman Province, Argentina, and a lectotype is designated for *Anacroneuria fumigata* Klapálek, a Brazilian species. The first Argentine records are given for *A. atrifrons* Klapálek and *A. handlirschi* Klapálek, and a few additional specimens of *A. impensa* Jewett, *A. trimacula* Jewett and *A. uyara* Froehlich are recorded. A checklist for 24 Argentine *Anacroneuria* species is given.

Keywords: *Anacroneuria*, Plecoptera, Perlidae, Brazil, Argentina, Lectotype, new species, new records

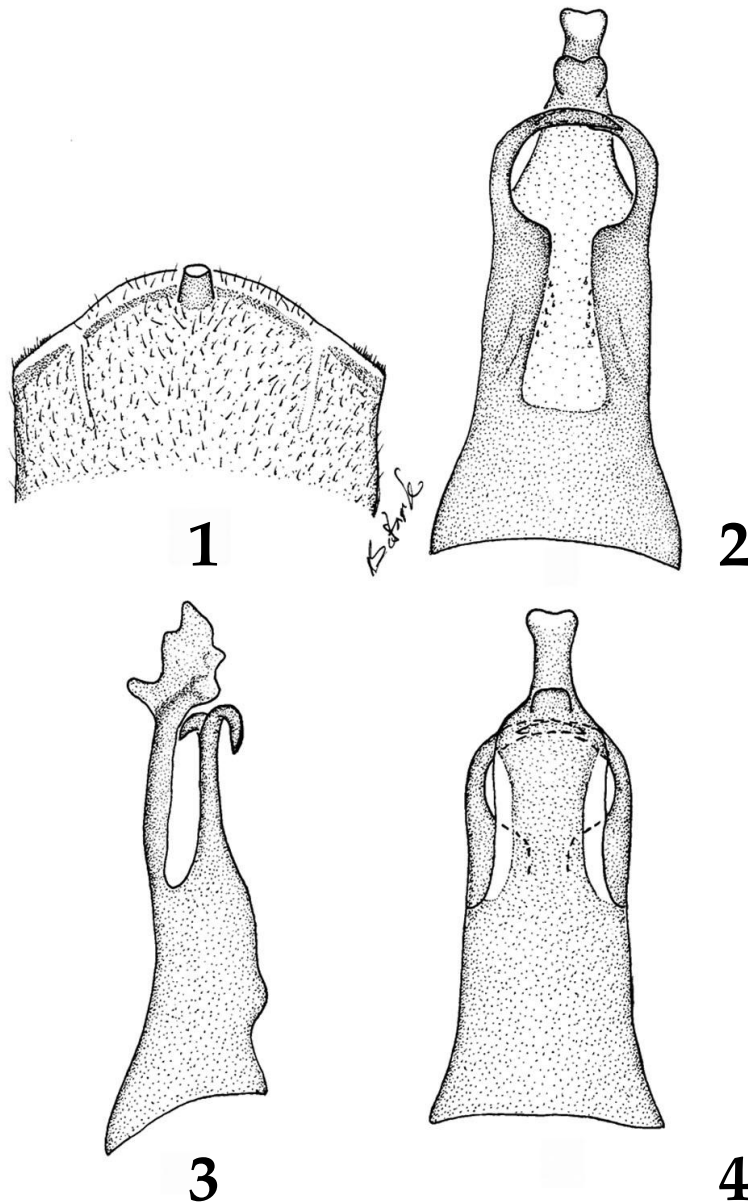
INTRODUCTION

Anacroneuria fumigata Klapálek is the last of 17 *Anacroneuria* species proposed posthumously by Klapálek (1922). Specific information on the composition of the type series is not given, but specimens deposited in the Berlin Museum and the Klapálek collection are indicated, and a range is given for body length and for wingspan, suggesting multiple specimens were included. While visiting Schlitz in 1988, I had the opportunity to examine the male terminalia of one of the syntypes from the National Museum, Prague, while the specimen was on loan to P. Zwick. Sketches made at that time were shared with C. Froehlich to assist in possible recognition of the species should it be rediscovered. Despite significant study of Brazilian *Anacroneuria* in the 25 year interval, apparently no specimens of *A. fumigata* have been discovered (Baldin et al. 2013; Bispo & Froehlich 2004a, b; Bispo et al., 2005; De Ribeiro & Froehlich 2007; Froehlich 2002, 2003, 2004, 2007, 2008, 2010b; Ribeiro-Ferreira & Froehlich 2001). Consequently, I provide the following redescription

of male genitalic characters and designate a lectotype for this distinctive species. In addition, I have studied a few *Anacroneuria* specimens from Argentina over the past 25 years. Because there are relatively few published Argentine records in the literature, I take this opportunity to describe a previously unrecognized species and to provide records for additional species. These additions bring the list of *Anacroneuria* species reported for Argentina to 24, however two of these are *nomen dubia*, and two others were considered by Illies (1966) as "*Species inquirenda*". Hopefully this small contribution will encourage continued collection and study of *Anacroneuria* at the southern extremity of its range.

MATERIALS AND METHODS

The abdomen for specimens was clipped near midlength and the terminalia brought to a boil in 10% KOH for a few seconds. Boiled terminalia were removed to dishes of distilled water and the internal viscera carefully removed; the aedeagus of male



Figs. 1-4. *Anacroneuria fumigata* male genitalic features. 1. Sternum 9. 2. Aedeagus, ventral. 3. Aedeagus, lateral. 4. Aedeagus, dorsal.

specimens could then be grasped and pulled forward inside the abdominal cavity with fine tip forceps while the posterior end of the abdomen was held in place with a bent dissecting needle made from a minuten. Specimens from the following collections were examined during the study.

BPSC	Stark Collection, Clinton, Mississippi, U.S.A.
CMNH	Carnegie Museum of Natural History, Pittsburgh, Pennsylvania, U.S.A.
FSCA	Florida Collection of Arthropods, Gainesville, Florida, U.S.A.

NMP National Museum, Prague, Czech Republic
USNM United States National Museum of Natural History, Washington, D.C., U.S.A.

RESULTS AND DISCUSSION

Anacroneuria atrifrons Klapálek

Anacroneuria atrifrons Klapálek 1922:89. Holotype ♂ (British Museum of Natural History), Amazon, St. Paul [Brazil, Amazonas, São Paulo de Olivença]
Anacroneuria montera Stark & Sivec 1998:41. Holotype ♂ (United States National Museum), Iquitos, Loreto, Peru, syn. Froehlich (2008)

Material examined. ARGENTINA: Córdoba, Alta Gracia, La Paisanita, 17-23 February, 1984, L. Olivia, 1♂, 3♀ (BPS). **BRAZIL:** Bahia, Barra, 9 December 1907, 1♂ (CMNH).

Comments. This species was formerly known from Brazil, Colombia and Peru (Froehlich 2008; Stark 2004; Stark & Sivec 1998; Stark et al. 2001). This is the first Argentine record and both new localities represent significant range extensions beyond the known Amazonas and Loreto area distribution.

Anacroneuria fumigata Klapálek (Figs. 1-4)

Anacroneuria fumigata Klapálek 1922:95. Lectotype ♂, here designated (National Museum, Prague), Espírito Santo, Brazil
Anacroneuria fumigata: Froehlich, 2010a:156.

Material examined. BRAZIL: Espírito Santo, lectotype ♂ (NMP).

Male genitalia. Hammer thimble shaped, height greater than basal diameter (Fig. 1). Aedeagal apex bearing upright lobes on ventral and dorsal surfaces beyond hooks (Figs. 2-4); apex slender in dorsal and ventral aspect, and slightly excavated, but somewhat thicker and irregular in lateral aspect; ventral lobe concave, dorsal lobe convex. Hooks slender (Figs. 2, 4).

Femle. Unknown.

Larva. Unknown.

Comments. The Berlin syntype is said to be missing (Froehlich 2010a) and the original description does

not identify the total number of syntypes, consequently I designate the National Museum, Prague, *Anacroneuria fumigata* Klapálek male specimen labeled Zw# 100 as lectotype in order to provide stability for this species. The aedeagus is quite distinctive and no closely related species is known.

Anacroneuria handlirschi Klapálek

Anacroneuria handlirschi Klapálek 1922:94. Lectotype ♂ (Vienna Museum), Coroica, Bolivia, designation by Zwick (1973)
Anacroneuria handlirschi: Stark & Sivec, 1998:28.

Material examined. ARGENTINA: Salta, Aguas Blancas, Oran, 1 March 1958, 1♂ (BPSC).

Comments. This species was previously reported from Bolivia and Peru (Stark & Sivec 1998).

Anacroneuria impensa Jewett

Anacroneuria impensa Jewett 1959:157. Holotype ♀ (California Academy of Sciences), Nova Teutonia, Santa Catarina, Brazil
Anacroneuria impensa: Froehlich, 2002:80.

Material examined. ARGENTINA: Misiones, Arroyo Piray-Mini, W Dos Hermanas, 23 November 1973, O.S. Flint, Jr. 3♂ (USNM).

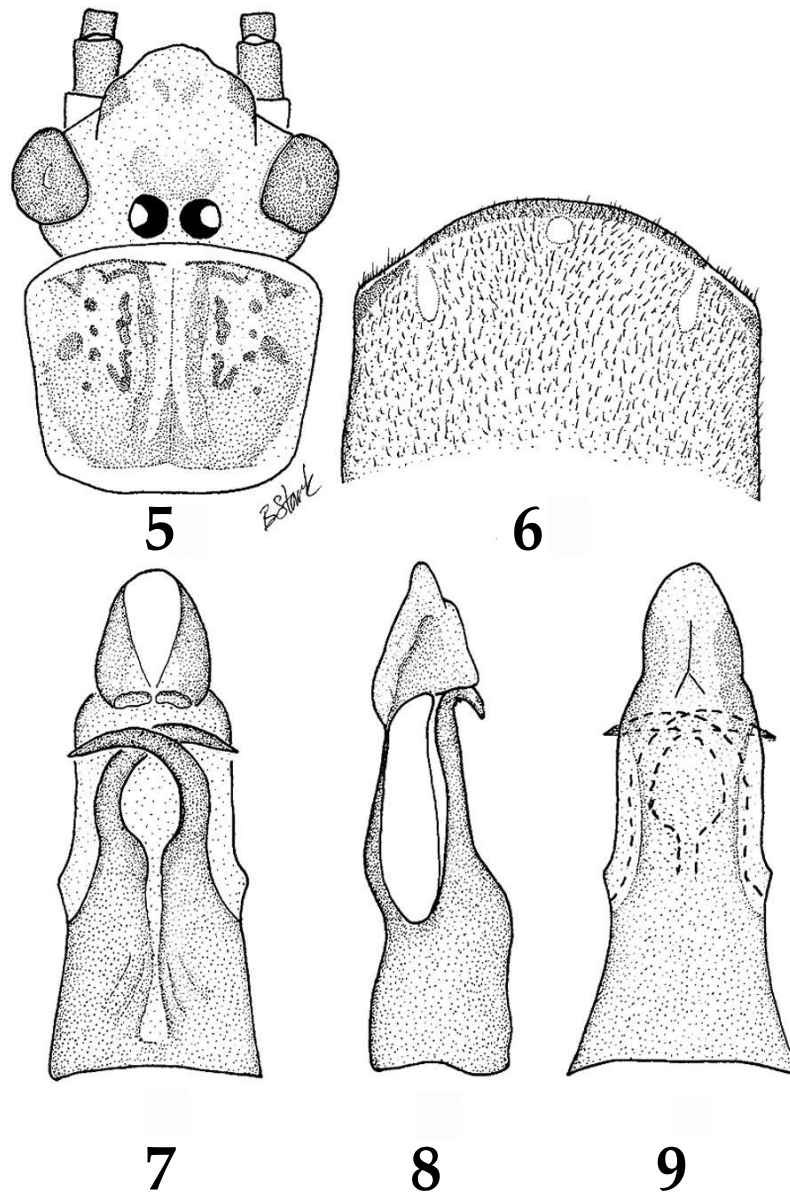
Comments. Froehlich (2002) previously reported *A. impensa* from this site. The species is presently known only from the Brazilian type locality and from this Argentine site.

Anacroneuria trimacula Jewett

Anacroneuria trimacula Jewett 1959:155. Holotype ♀ (California Academy of Sciences), Nova Teutonia, Santa Catarina, Brazil
Anacroneuria trimacula: Froehlich, 2002:88

Material examined. ARGENTINA: Misiones, Arroyo Coati, 15 km E San Jose, 18-19 November 1973, O.S. Flint, Jr. 2♂, 1♀ (USNM).

Comments. Froehlich (2002) previously reported this species from the same site and several additional ones in Brazil, Argentina and Paraguay. More



Figs. 5-9. *Anacroneuria tucuman* male genitalic features. 5. Head and pronotum. 6. Sternum. 7. Aedeagus, ventral. 8. Aedeagus, lateral. 9. Aedeagus, dorsal.

recently, De Ribeiro & Froehlich (2007) reported the species from Rio Grande do Sul State in Brazil.

***Anacroneuria tucuman* sp. nov.**

(Figs. 5-9)

Material examined. Holotype ♂ and 1♂ paratype

from Argentina, Tucuman Province, Horco Molle, 700 m, 15 January 1980, L. Stange (FSCA).

Adult habitus. General color pale yellow brown. Head with brown lappets and a diffuse spot forward of ocelli and a pair of small diffuse spots between lappets. Pronotum mostly brown but with pale lateral margins, a pale median band on the anterior

half of the disk and a pale area incorporated within dark region in center of disk (Fig. 5). Legs pale brown except for narrow dark brown band on distal end of femora. Wings pale, transparent; veins pale amber except for C and R veins which are very pale.

Male. Forewing length 12-14 mm. Hammer a low, almost transparent bubble-like structure (Fig. 6). Aedeagal apex simple, but slightly offset from shoulders by a subtle notch (Figs. 7-9); a pair of small membranous lobes occur on the posterior margins of the apical area and an inverted Y-shaped keel with long stalk occurs on the dorsum. In lateral aspect the sclerotized area bulges slightly and is offset from the pale keel. Hooks slender (Figs. 7, 9).

Female. Unknown.

Larva. Unknown.

Etymology. The species name, used as a noun in apposition, is based on the Argentine province in which the type specimens were collected.

Diagnosis. Only three *Anacroneuria* species are currently known from the neighboring province of Salta [*A. arrazayalensis* Orce (Orce 2003); *A. marshalli* Stark (Stark 2007); *A. saltensis* Froehlich (Froehlich 2002)] and only *A. reedi* (Navás) (Navás 1919), a species whose identity is in question (Illies 1966), has

been reported from Tucuman Province. The aedeagus of the new species is generally similar to that of *A. saltensis* but the keel in that species consists of a pair of parallel lines, the apex is not offset from the shoulders and the hammer is thimble shaped.

Several other Andean species, such as *A. pachacuti* Stark & Sivec, 1998 have similar aedeagal shape and features but none have the combination of a slightly offset apex, a Y-shaped keel and the low bubble-like hammer found in *A. tucuman*.

Anacroneuria uyara Froehlich

Anacroneuria uyara Froehlich 2002:100. Holotype ♂ (United States National Museum), Nova Teutonia, Santa Catarina, Brazil

Material examined. ARGENTINA: Misiones, Arroyo Coati, 15 km E San Jose, 18-19 November 1973, O.S. Flint, Jr. 1 ♂ (USNM).

Comments. This species was previously reported from Paraná, Rio Grande do Sul, Santa Catarina and São Paulo states, Brazil, and from Entre Rios Province, Argentina (Froehlich 2002, 2004; De Ribeiro & Froehlich 2007)

Checklist of *Anacroneuria* Species Reported from Argentina, *Nomen Dubia* in Bold Font

Species List	Provincial Records	Source of Record
<i>A. arrazayalensis</i> Orce 2003	Salta	Orce, 2003
<i>A. atrifrons</i> Klapálek 1922	Córdoba	New record
<i>A. badilinea</i> Jewett 1959	Misiones	Froehlich, 2002
<i>A. coscaroni</i> Froehlich 2002	Entre Rios	Froehlich, 2002
<i>A. debilis</i> (Pictet 1841)	Entre Rios, Misiones	Froehlich, 2002
<i>A. fuscicosta</i> (Enderlein 1909)	Misiones	Froehlich, 2002
<i>A. handlirschi</i> Klapálek 1922	Salta	New record
<i>A. ignatiana</i> (Navás 1923)	Misiones	Navás, 1923
<i>A. impensa</i> Jewett 1959	Misiones	Froehlich, 2002
<i>A. marshalli</i> Stark 2007	Salta	Stark, 2007
<i>A. novateutonia</i> Jewett 1959	Entre Rios, Misiones	Froehlich, 2002
<i>A. oculatila</i> Jewett 1959	Misiones	Froehlich, 2002
<i>A. orphana</i> (Navás 1918)	Misiones	Navás, 1918
<i>A. plaumanni</i> Jewett 1959	Misiones	Froehlich, 2002
<i>A. polita</i> (Burmeister 1839)	Misiones	Froehlich, 2002
<i>A. profunda</i> (Navás 1921)	Mendoza	Navás, 1921

<i>A. reedi</i> (Navás 1919)	Tucuman, Catamarca	Navás, 1919; Cabo & Wais, 1988
<i>A. saltensis</i> Froehlich 2002	Salta	Froehlich, 2002
<i>A. stanjewetti</i> Froehlich 2002	Entre Rios, Misiones	Froehlich, 2002
<i>A. tinctilamella</i> Jewett 1959	Misiones	Froehlich, 2002
<i>A. trimacula</i> Jewett 1959	Misiones	Froehlich, 2002
<i>A. tucuman</i> sp. nov.	Tucuman	New record
<i>A. uyara</i> Froehlich 2002	Entre Rios	Froehlich, 2002
<i>A. ytuguazu</i> Froehlich 2002	Entre Rios	Froehlich, 2002

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REFERENCES

- Baldin, C.; P.C. Bispo, & M.C. Novaes. 2013. New species and records of *Anacroneuria* (Plecoptera: Perlidae) from Rio de Janeiro State, Brazil. *Zootaxa*, 3694:391-397.
- Bispo, P.C. & C.G. Froehlich. 2004a. Perlidae (Plecoptera) from Intervalles State Park, São Paulo State, southeastern Brazil, with descriptions of new species. *Aquatic Insects*, 26:97-113.
- Bispo, P.C. & C.G. Froehlich. 2004b. *Anacroneuria* (Plecoptera: Perlidae) from Serra da Mesa, northern Goiás State, Brazil, with descriptions of new species. *Aquatic Insects*, 26:191-197.
- Bispo, P.C., C.O. Neves, & C.G. Froehlich. 2005. Two new species of Perlidae (Plecoptera) from Mato Grosso State, western Brazil. *Zootaxa*, 795:1-6.
- Burmeister, H. 1839. *Handbuch der Entomologie*, Zweiter Band, Zweite Abtheilung, Theod. Chr. Friedr. Endlin, Berlin. xii+755-1050 pp.
- Cabo, L.I. & I.R. Wais. 1988. *Anacroneuria reedi* (Navas, 1919) en la Provincia de Catamarca, Argentina (Plecoptera: Perlidae). *Spheniscus*, 6:10.
- De Ribeiro, V.R. & C.G. Froehlich. 2007. Two new species of *Anacroneuria* (Plecoptera: Perlidae) from southern Brazil. *Zootaxa*, 1624:53-57.
- Enderlein, G. 1909. Klassifikation der Plecopteren sowie Diagnosen neuer Gattungen und Arten. *Zoologischer Anzeiger*, 34:385-419.
- Froehlich, C.G. 2002. *Anacroneuria* mainly from southern Brazil and northeastern Argentina (Plecoptera: Perlidae). *Proceedings of the Biological Society of Washington*, 115:75-107.
- Froehlich, C.G. 2003. Stoneflies (Plecoptera: Perlidae) from the Brazilian Amazonia with the description of three new species and a key to *Macrogyonoplax*. *Studies on Neotropical Fauna and Environment*, 38:129-134.
- Froehlich, C.G. 2004. *Anacroneuria* (Plecoptera: Perlidae) from the Boracéia Biological Station, São Paulo State, Brazil. *Aquatic Insects*, 26:53-63.
- Froehlich, C.G. 2007. Three new species of *Anacroneuria* (Plecoptera: Perlidae) from the State of Mato Grosso do Sul, Brazil. *Zootaxa*, 1461:15-24.
- Froehlich, C.G. 2008. Old species of Neotropical Plecoptera. Pp. 125-132 in Hauer, F.R., J.A. Stanford & R.L. Newell (editors). *International advances in the ecology, zoogeography and systematics of mayflies and stoneflies*. University of California Publications in Entomology, Volume 128. University of California Press, Berkeley and Los Angeles. 412 pp.
- Froehlich, C.G. 2010a. Catalogue of Neotropical Plecoptera. *Illiesia*, 6:118-205.
- Froehlich, C.G. 2010b. *Anacroneuria* (Plecoptera, Perlidae) from the Mantiqueira Mountains, São Paulo State, Brazil. *Zootaxa*, 2365:55-68.
- Illies, J. 1966. *Katalog der rezenten Plecoptera*. Das Tierreich 82. Walter de Gruyter & Co., Berlin, XXX+632 pp.
- Jewett, S.G., Jr. 1959. Some stoneflies from Santa Catarina, Brazil (Plecoptera). *The American*

- Midland Naturalist, 61:148-161.
- Klapálek, F. 1922. Plécoptères nouveaux. Quatrième partie. Annales de la Société Entomologique de Belgique, 62:89-95.
- Navás, L. 1918. Algunos insectos Neurópteros de la Argentina (Serie 2a). Physis, 4:80-89.
- Navás, L. 1919. Insecta nova. Memorie della Pontificia Accademia Romana dei Nuovi Lincei, Serie 2, 5:1-29.
- Navás, L. 1921. Insectos sudamericanos. Revista de la Real Academia de Ciencias de Madrid, 19:255-267.
- Navás, L. 1923. Algunos insectos del Museo de Paris. Revista de la Academia de Ciencias Exactas Fisico-Quimicas y Naturales de Zaragoza, 7:15-51.
- Orce, M. 2003. A new species of *Anacroneuria* from northwestern Argentina (Plecoptera: Perlidae). Pp. 225-228 in Gaiño, E. (editor). Research update on Ephemeroptera and Plecoptera. University of Perugia, Perugia. vi+488 pp.
- Pictet, F.J. 1841. Histoire naturelle générale et particulière des insectes Névroptères. Famille des Perlides. 1. Partie: 1-423.
- Ribeiro-Ferreira, A.C. & C.G. Froehlich. 2001. *Anacroneuria* Klapálek, 1909 from Amazonas State, north Brazil (Plecoptera, Perlidae, Acroneuriinae). Aquatic Insects, 23:187-192.
- Stark, B.P. 2004. New species and records of Andean *Anacroneuria* (Insecta, Plecoptera, Perlidae). Spixiana, 27:67-81.
- Stark, B.P. 2007. *Anacroneuria marshalli* (Plecoptera: Perlidae), a new stonefly from Argentina, and two new records from Ecuador. *Illiesia*, 3:171-173.
- Stark, B.P. & I. Sivec. 1998. *Anacroneuria* of Peru and Bolivia (Plecoptera: Perlidae). Scopolia, 40:1-64.
- Stark, B.P., M.C. Zúñiga & I. Sivec. 2001. Descriptions of *Anacroneuria* spp. (Plecoptera: Perlidae) from the upper Rio Amazonas drainage, Colombia and Peru. Acta Entomologica Slovenica, 9:119-122.
- Zwick, P. 1973. Die Plecopteren-Arten Enderleins (Insecta); Revision der Typen. Annales Zoologici, 30:471-507.