



## ANACRONEURIA PAKARAIMA AND *A. WOKOMUNG*, TWO NEW STONEFLY SPECIES FROM GUYANA (PLECOPTERA: PERLIDAE)

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### ABSTRACT

Two new stonefly species, *Anacroneuria pakaraima* sp. n. and *A. wokomung* sp. n., are described from adult male and female specimens collected on Mount Wokomung, Guyana. The new species are compared to similar ones known from northeastern South America, and a provisional key to male *Anacroneuria* from Guyana is presented.

**Keywords:** *Anacroneuria*, Plecoptera, Perlidae, New species, Guyana

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### INTRODUCTION

Guyana remains one of the areas of South America whose stonefly fauna is most poorly documented (Stark 2000). The formally recognized plecopteran fauna currently includes three *Macrogynoplax* species (*M. flinti* Stark 1996; *M. guayanensis* Enderlein 1909; *M. kanuku* Stark 1996) and eight *Anacroneuria* species (*A. arawak* Stark 1999; *A. cruza* Stark 1995; *A. llana* Stark 1995; *A. makushi* Stark 1999; *A. phantoma* (Banks 1914); *A. pictipes* Klapálek 1923; *A. takutu* Stark 2000; *A. wapishana* Stark 1999) (Froehlich 2010). Females of four unassociated *Anacroneuria* were given informal designations by Stark (1999; 2000).

The present study is based on a small collection of adult specimens which represent two undescribed species. These specimens were collected in a Malaise trap or in Mercury vapor light traps on Mount Wokomung by Brad Hubley of the Royal Ontario Museum. Because stonefly samples from this region are uncommon, I take this occasion to add to the known diversity of Neotropical *Anacroneuria*. All specimens are deposited in the Royal Ontario Museum, Toronto, Ontario, Canada (ROM).

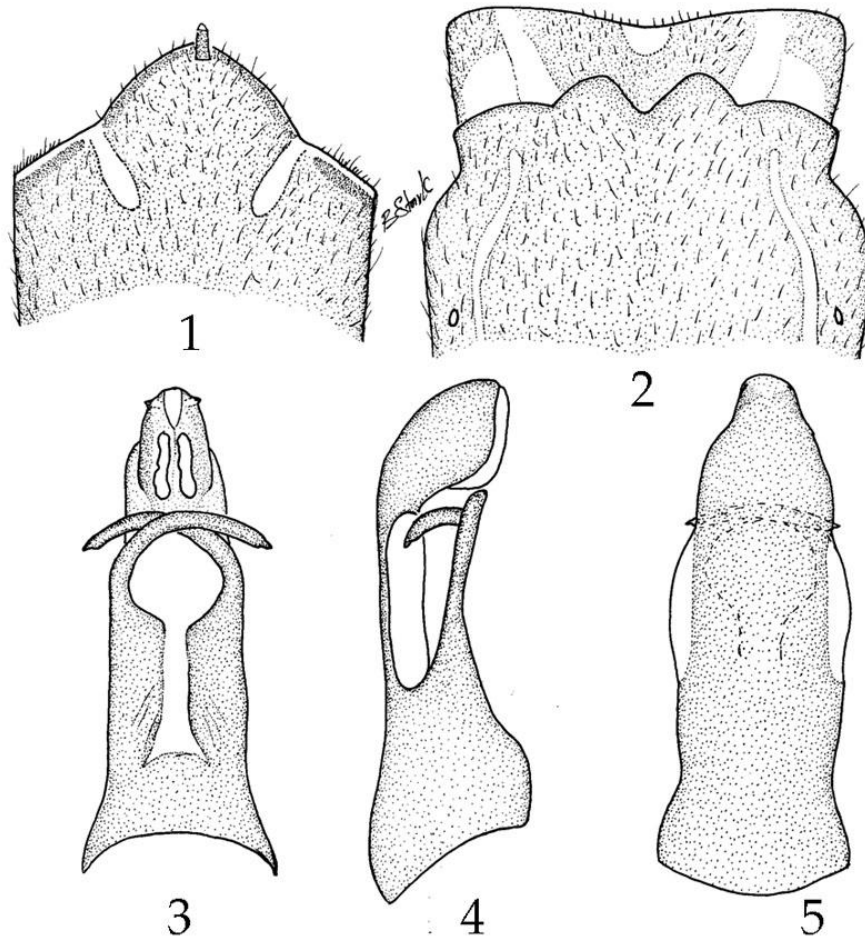
### RESULTS AND DISCUSSION

#### *Anacroneuria pakaraima* sp. n. (Figs. 1-5)

**Material examined.** Holotype ♂, 6♂, 6♀ paratypes (all pinned) from Guyana, District 8, Mount Wokomung, 1234 m, 05° 06' 34.8" N, 59° 49' 15.3" W, Mercury vapor light, 27 October-1 November 2004, ROM 2004515, B. Hubley (ROM).

**Adult habitus.** General appearance pale yellow brown with obscure darker markings. Head entirely pale except for pale brown antennae; pronotum pale over most of disk but with narrow, dark brown pigment bands near lateral margins. Legs pale except for narrow, dark bands at distal end of femora. Wings pale but with slightly darker yellow-brown longitudinal band over bases of anal veins, extending to apical margin but with an obscure pale circular area beyond cord; first cubital vein and cord crossveins slightly darker.

**Male.** Forewing length 10-11 mm. Hammer long and slender, posteromesal margin of sternum 9 prolonged (Fig. 1). Aedeagal apex conspicuously



Figs. 1-5. *Anacroneuria pakaraima* structures. 1. Male sternum 9. 2. Female abdominal sterna 8-9. 3. Male aedeagus, ventral. 4. Male aedeagus, lateral. 5. Male aedeagus, dorsal.

narrower than shoulders, and bearing a poorly defined pair of ventral membranous lobes (Fig. 3); dorsal keel poorly defined, consisting of a short stem and a pair of divergent arms which circumscribe upturned tip (Fig. 5); keel lines interrupted along length, consisting of a linear series of small raised areas. Apex turned ventrad giving a smoothly curved lateral profile (Fig. 4). Aedeagal hooks slender.

**Female.** Forewing length 12-13 mm. Subgenital plate 4-lobed (Fig. 2); mesal lobes larger than lateral ones and separated by a relatively deep, V-shaped notch; lateral lobes separated by shallow V-shape notches from mesal lobes. Mesal sclerite of sternum 9 with a

pair of prominent lateral patches of setae, separated by a median, triangular patch of fine short setae. Posterior transverse sclerite obscure.

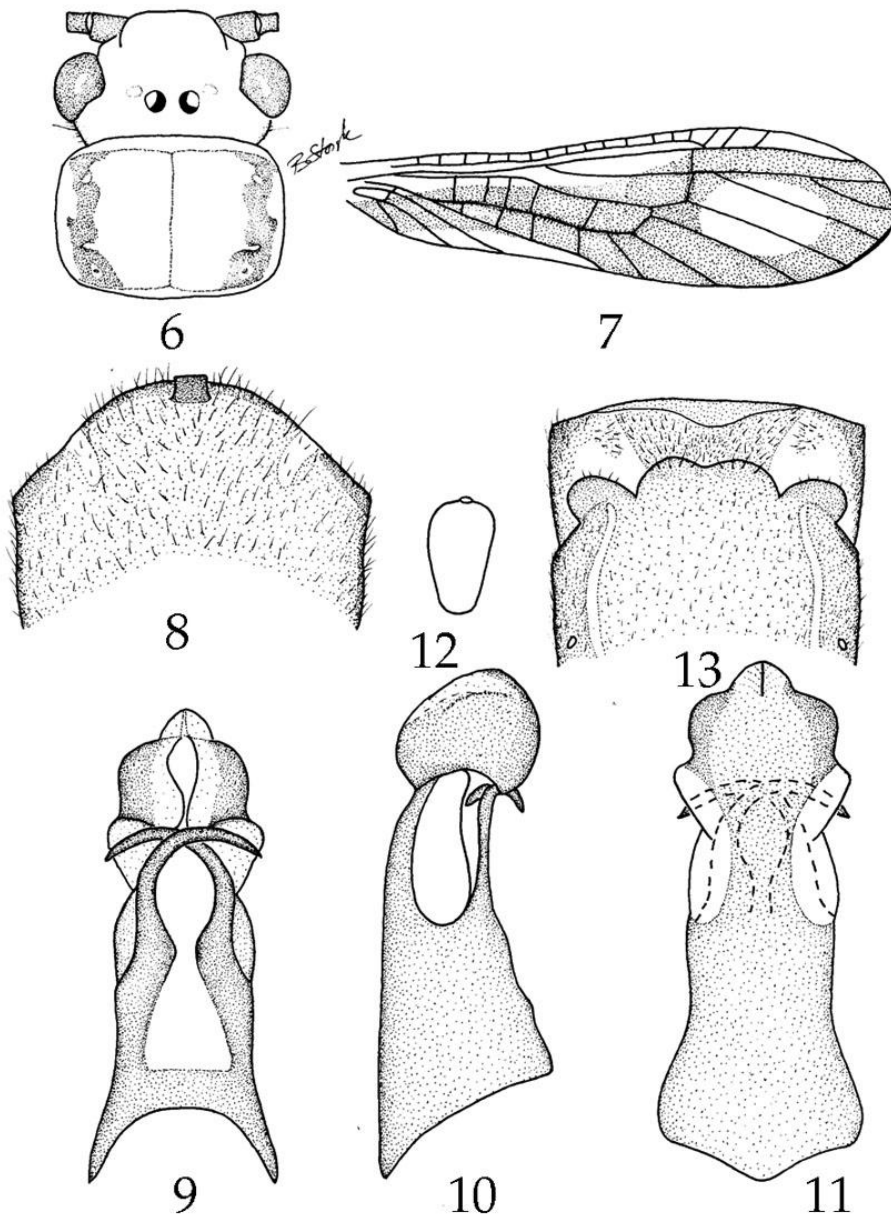
**Larva.** Unknown.

**Etymology.** The species name, used as a noun in apposition, is based on the Pakaraima Mountain range of Guyana.

**Diagnosis.** This species is similar in pigment pattern to *A. wokomung*, described below, however, the pattern is not as distinct in the specimens available, and might be overlooked. Adults of these two Mount Wokomung species are separated on the basis of genital structures; externally *A. pakaraima* has the

hammer long and slender (Fig. 1), whereas that of *A. wokomung* is wide with parallel margins (Fig. 8). The aedeagal apex of the two species are also quite distinctive with *A. wokomung* having a short, but conspicuous dorsal keel line (Fig. 11) and *A.*

*pakaraima* having inconspicuous keel lines that diverge and circle around a portion of the curved aedeagal tip (Fig. 5). The female subgenital plates of the two species are also distinct with *A. pakaraima* having a much deeper mesal notch (Figs. 2, 13).



Figs. 6-13. *Anacroneuria wokomung* structures. 6. Head and pronotum. 7. Forewing. 8. Male sternum. 9. Male aedeagus, ventral. 10. Male aedeagus, lateral. 11. Male aedeagus, dorsal. 12. Egg outline. 13. Female abdominal sterna 8-9.

*Anacroneuria wokomung* sp. n.  
(Figs. 6-13)

**Material examined.** Holotype ♂ and 2♀ paratypes from Guyana, District 8, Mount Wokomung, 736 m, 05° 07' 43.2" N, 59° 48' 40.0" W, Malaise trap, 21-26 October 2004, ROM 2004531, B. Hubley (ROM). Additional paratypes (pinned). Guyana: District 8, Mount Wokomung, 1411 m, 05° 05' 33.4" N, 59° 50' 34.5" W, Mercury vapor light, 2-8 November 2004, ROM 2004521, B. Hubley 4♂, 1♀ (ROM).

**Adult habitus.** General appearance in alcohol pale white with limited brown pigment pattern. Head entirely pale except for pale brown antennae (Fig. 6); pronotum pale over most of disk, but with narrow, dark brown pigment bands near lateral margins. Legs pale except for narrow dark bands at distal ends of tibiae and femora. Wings pale along costal margins including subcosta and radius, but with pale amber pigment forming a longitudinal band over bases of anal veins, extending across cubito-median veins to apical margin (Fig. 7). A circular unpigmented area is located distal to cord crossveins; the first cubital vein and cord crossveins are dark brown.

**Male.** Forewing length 10.5-11 mm. Hammer strongly sclerotized with parallel lateral margins; height about equal to width (Fig. 8). Aedeagal apex broadly rounded in lateral aspect (Fig. 10), bearing a short recurved, ventroapical tip (Fig. 9), and a short, thick dorsal keel line (Fig. 11). Ventral membranous lobes absent, but basolateral area of aedeagal apex bulging slightly. Aedeagal hooks slender.

**Female.** Forewing length 13-14 mm. Subgenital plate 4-lobed (Fig. 13). Inner lobes separated by a shallow, median notch, but notch separating outer lobes acute. Mesal sclerite of sternum 9 bearing a basomedian patch of fine short setae and patches of more prominent setae extending to posterior margin of segment. Posterior sclerite poorly developed. Intersegmental membrane armed with fine microtrichia.

**Egg.** Outline spindle shaped, typical of genus (Fig. 12).

**Larva.** Unknown.

**Etymology.** The species name, used as a noun in apposition, is based on the type locality.

**Diagnosis.** Because the wing pigment pattern is

similar, this species is identified as *A. paria* Stark, 1999 in the key proposed by Stark (1999) for *Anacroneuria* known for northeastern South America. However, the ventroapical region of the aedeagus in that species appears trilobed (see Fig. 34 in Stark 1999), the hammer is a short, thimble-shaped structure (see Fig. 33 in Stark 1999) and the female subgenital plate bears a moderately deep median notch (see Fig. 54 in Stark 1999). The male and female reproductive structures for *A. wokomung* are not similar to other regional species (Stark 1999; 2000). The following key to males of Guyana *Anacroneuria* is presented to aid in recognition of the two new species. Figure numbers referenced in the key refer to Stark (1995, 1999; 2000), or to those presented in this study.

**Provisional key for male *Anacroneuria* known for Guyana**

(Male *A. wapishana* Stark 1999 unknown)

- 1 Forewing patterned with a longitudinal amber band, narrow at the base and expanded around an unpigmented circular area beyond cord (Fig. 7), pattern obscure in some specimens ..... 2
- 1' Forewing pattern not as above ..... 3
- 2 Hammer width greater than height (Fig. 8); aedeagal apex somewhat circular in lateral aspect (Fig. 10); dorsal keel line short and reaching apex (Fig. 11) ..... *A. wokomung*
- 2' Hammer laterally compressed, height greater than width (Fig. 1); aedeagal apex curved ventrad but flattened across ventroapical margin (Fig. 4); dorsal keel line obscure, but weak arms diverge near tip (Fig. 5) ..... *A. pakaraima*
- 3 Apical aedeagal section with a prominent pair of membranous lobes (Fig. 9 in Stark, 1999) ..... 4
- 3' Apical aedeagal section without membranous lobes (Fig. 3 in Stark, 2000) ..... 6
- 4 Aedeagal hooks stout (Fig. 29 in Stark, 1999); body of aedeagus with a dorsomesal, transverse, arcuate process (Fig. 31 in Stark, 1999) ..... *A. makushi*
- 4' Aedeagal hooks relatively slender (Figs. 9, 45 in Stark, 1999); body of aedeagus without dorsomesal, transverse, arcuate process ..... 5
- 5 Apex of aedeagus gradually narrowed from hooks to tip (Fig. 9 in Stark, 1999); inner margins



- of hooks smooth ..... *A. arawak*
- 5' Apex of aedeagus flared subapically (Fig. 45 in Stark, 1999); inner margins of hooks irregularly scalloped ..... *A. phantoma*
- 6 Dorsal aedeagal keel a basally directed triangular process (Fig. 52 in Stark, 1999); R-vein of forewing conspicuously darker than others (Fig. 53 in Stark, 1999) ..... *A. pictipes*
- 6' Dorsal aedeagal keel consists of a pair of narrowly separated ridges (Fig. 5 in Stark, 2000); R-vein similarly pigmented to other forewing veins ..... 7
- 7 Hooks almost straight and crossing near aedeagal midlength (Fig. 91 in Stark, 1995) ..... *A. cruza*
- 7' Hooks evenly curved and crossing at base of aedeagal apex (Fig. 3 in Stark, 2000) ..... 8
- 8 Aedeagal apex truncate, width of aedeagal base ca. 2.6 times width of aedeagal apex (Fig. 2 in Stark, 2000) ..... *A. takutu*
- 8' Aedeagal apex rounded, width of aedeagal base ca. 6.5 times width of aedeagal apex (Fig. 109 in Stark, 1995) ..... *A. llana*

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