SPIXIANA	25	3	209–224	München, 01. November 2002	ISSN 0341-8391

New species and records of Colombian *Anacroneuria*

(Insecta, Plecoptera, Perlidae)

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Zúñiga, M. C. & B. P. Stark (2002): New species and records of Colombian *Anacroneuria* (Insecta: Plecoptera: Perlidae). – Spixiana **25/3**: 209-224

Descriptions are given for five species new to science including *Anacroneuria inza*, *A. marta*, *A. munchique*, *A. ricki*, and *A. toni*. Females of *A. azul* Rojas & Baena, *A. farallonensis* Rojas & Baena, and *A. puna* Stark are described, the first Colombian records are given for *A. blanda* Needham & Broughton, *A. caraca* Stark, *A. chipaya* Stark & Sivec, *A. jewetti* Stark and *A. puna*, and *A. farallonensis* is redescribed from the male holotype. An updated checklist of the 47 species of *Anacroneuria* recorded for Colombia is given.

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Introduction

Stark et al. (1999) recognized 35 species of *Anacroneuria* based on museum specimens and collections made in the 1991-1996 field seasons in Colombia. Subsequently Stark & Zúñiga (2002) described an additional Colombian species, Stark et al. (2001) added a record of *A. montera* Stark & Sivec, and intensive field work continues to yield undescribed species and records, or unknown life stages for previously described species. In this study we report the results of collections made mainly from July 1996 through May 2001. Included are five previously undescribed species, new distributional data for nine species previously reported in Colombia and the first Colombian records for five species previously known from other countries. Descriptions are given for females of *Anacroneuria azul* Rojas & Baena, *A. farallonensis* Rojas & Baena, and *A. puna* Stark; *A. farallonensis* is also redescribed from the male holotype. These records increase the list of formally recognized Colombian *Anacroneuria* to 47 species. Two species known only from female specimens are described under informal designations bringing the list of described but unassociated Colombian females to six species. Holotypes and paratypes are deposited in the Museo de Entomología de la Universidad del Valle, Cali (MEUV), the Museo de Historia Natural-Colección de Entomología, Instituto de Ciencias Naturales, Universidad Nacional de Colombia, Santafé de Bogotá (UN-ICN), the Carnegie Museum of Natural History, Pittsburg (CMNH), the National Museum of Natural History, Washington (USNM), or the Stark collection at Mississippi College, Clinton (BPS). The following abbreviations are used for collectors:

ACZ	A.J. Cardoso-Zúñiga
AR	A. Ramos
CC	C. Camargo
CMA	C. Mathuriau
CMO	C. Molineri
ED	E. Domínguez
FMQ	F. Muñoz-Quesada

FP	F. Pérez
GG	G. Guevara
GMA	G. Martínez
GME	G. Melo
GMI	G. Millán
JL	J.H. López
JR	J.F. Ruiz
LG	L.C. Gutiérrez
LP	L. Pérez
LV	L.C. Vera
MCZ	M. del Carmen Zúñiga
MG	M. Grisales
MR	M.P. Rozo
NM	N. Martínez
NO	N. OsoRío
RCZ	R.J. Cardoso-Zúñiga
RP	R. Perdomo
SM	S. Mosquera
TD	T. Díaz
YG	Y. Guzman

Anacroneuria inza, spec. nov.
Figs 1-5

Types. Holotype: ♂, Colombia, Cauca, Municipio de Inzá, Quebrada San Andrés, Cuenca Río Paez, 1 km S San Andrés de Pisimbalá, 1730 m, Trampa de luz, 20 December 1997, MCZ, FMQ, JL (MEUV). – Paratypes (all from Colombia): 2♂♂, same data (MEUV); 1♂, Cauca, Municipio de Inzá, Quebrada San Andrés, 500 m W Rest. La Portada, San Andrés de Pisimbalá, 1750 m, 21 December 1997, MCZ, FMQ, JL (BPS); 1♂, Cauca, Municipio de Paez, Quebrada Tálaga, Cuenca Río Paez, 14 km N Paez, 1680 m, Trampa de luz, MCZ, FMQ, JL (USNM).

Description

Adult habitus. Head pattern pale except lappets and diffuse brown area along apical margin of frons. Pronotum with broad diffuse to dark brown lateral bands (Fig. 1). Wing membrane pale, veins brown.

Male. Forewing length 12 mm. Hammer thimble shaped, height subequal to basal diameter (Fig. 2). Aedeagal apex simple, scoop shaped, moderately long and slightly narrowed from shoulders to tip (Figs 3-4). Dorsal keel of two close set curved ridges (Fig. 5), hooks slender.

Female. Unknown.

Nymph. Unknown.

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

Diagnosis. The aedeagal structure of this species is similar to that of *A. meta* Stark & Zúñiga (Stark et al. 1999) and *A. bari* Stark (Stark 1995) but *A. inza* is a slightly larger and darker species than either of these. The aedeagal apex is more broadly rounded than the almost acute form of *A. bari* or the truncate form of *A. meta*. In Stark et al. (1999), *A. inza* will key to couplet 29; beyond this point only three species, *A. cipriano* Zúñiga & Rojas, *A. meta* and *A. planada* Baena & Rojas remain in the key and the closest fit is *A. cipriano*. The narrowed ventral and dorsal aedeagal apex of *A. inza* and the greater forewing length (12 mm *vs* 8 mm) will permit separation of these species.

Anacroneuria marta, spec. nov.
Figs 6-9

Types. Holotype: ♂ (pinned), Colombia, Magdalena, Don Diego, 100 ft., July, collector unknown (CMNH).

Description

Adult habitus. Head pale but lappets and ocellar area dark brown; pronotal pattern obscured by specimen condition. Wing membrane pale brown, veins brown, costal area pale.

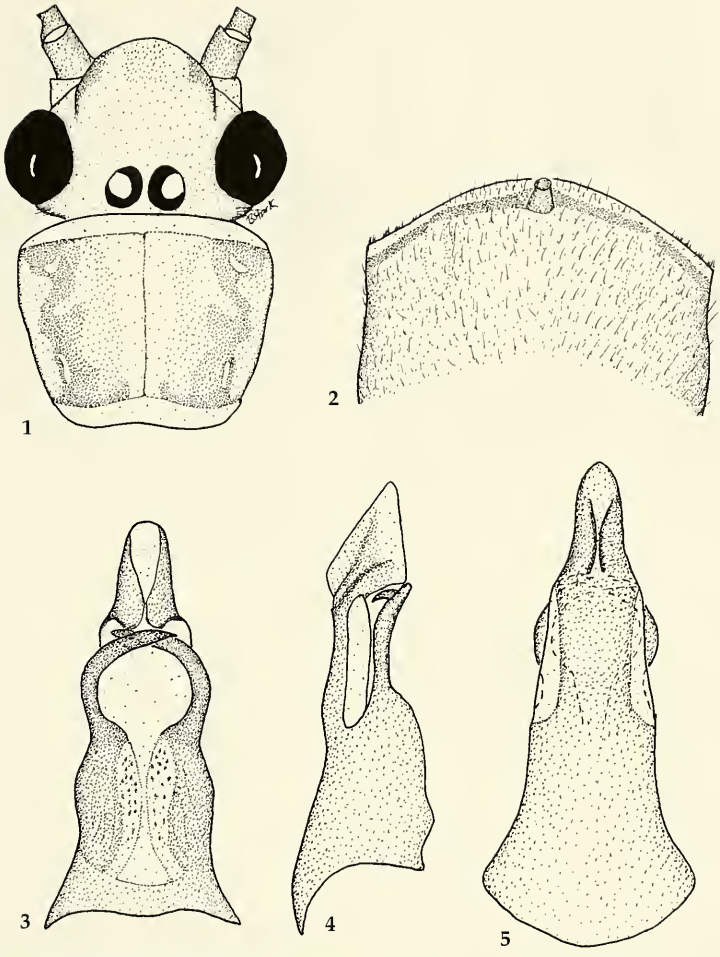
Male. Forewing length 10 mm. Hammer thimble shaped, height subequal to basal diameter (Fig. 9). Ventral aedeagal apex broad, outline almost circular (Fig. 6); lateral aspect with blunt, ventrally directed tip and almost square outline (Fig. 8); dorsal aspect wide with almost truncate tip; keel absent (Fig. 7); hooks slender.

Female. Unknown.

Nymph. Unknown.

Etymology. The species name, based on the Sierra Nevada de Santa Marta, is used as a noun in apposition.

Diagnosis. The aedeagus of this species is similar to that of *A. tejon* Baena & Stark (Stark et al. 1999) particularly in lateral aspect, but the aedeagal apex of that species is constricted in ventral and dorsal aspect. *Anacroneuria marta* will key to *A. tejon* (couplet 16) in Stark et al. (1999) but the two species may be separated by comparing the ventral aspect of the aedeagal

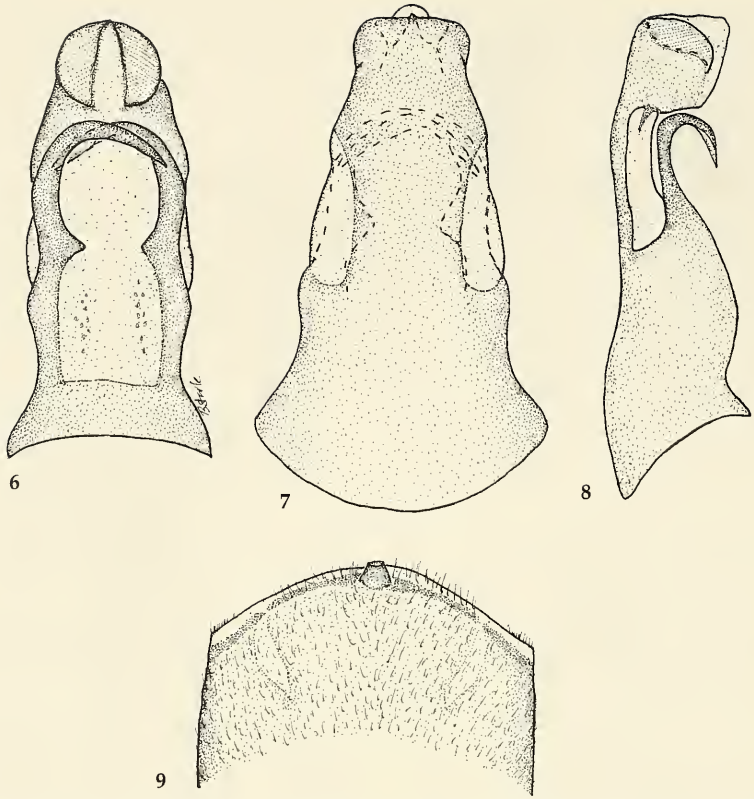


Figs 1-5. *Anacroneuria inza*, spec. nov. **1.** Head and pronotum. **2.** ♂ sternum 9. **3.** Aedeagus, ventral. **4.** Aedeagus, lateral. **5.** Aedeagus, dorsal.

apex. In *A. marta* the elevated apex is almost circular in outline whereas in *A. tejon* this area is elongate oval in outline.

Anacroneuria munchique, spec. nov.
Figs 10-14

Types. Holotype ♂, Colombia, Cauca, Parque Natural Nacional Munchique, La Romelia, 63 km al Occidente de Popayán, Quebrada San Julián, Cuenca alta del Río San Joaquín, 1930 m, Trampa de luz, 5-7 April 1998, MCZ, RCZ, GMI, YG (MEUV). – Paratypes (all from Colombia): 2♂♂, same data (BPS, USNM); 6♂♂, Cauca: Municipio de Silvia, Quebrada El Molino, Cuenca media Río Piendamò, 2400 m, Trampa de luz, 5 January 2000, MCZ, ACZ, JFR (MEUV). 1♂, same location, 14 January 2000, MCZ, RCZ, GMI (UN-ICN); 4♂♂, same location, 19-21 January 2000, MCZ, ACZ, RP (MEUV); 1♂, same location, 29-30 January 2000, MCZ, ACZ, RP (UN-ICN); 3♂♂, same location, 3-6 February 2000 (MEUV); 4♂♂, same location, 10-13 February 2000, MCZ, ACZ, RP (BPS); 3♂♂, same location, 18-22 February 2000, MCZ, ACZ, RP (BPS); 1♂, Risaralda, Parque Natural Regional Ucumarí, Estación La Suiza, 18 km E Pereira, Cuenca alta del Río Otún, 1850 m, Trampa de luz, 30 January 1997, GG, AR (MEUV); 1♂, Valle del Cauca, Municipio de Cali, Peñas Blancas, Río Pichindé, Cuenca alta del Río Cali, 2000 m, Trampa de luz, 17 February 1999, MCZ, ED, CMO (MEUV); 1♂, same site, 5 March 1998, MCZ, RCZ, GG (MEUV).



Figs 6-9. *Anacroneuria marta*, spec. nov. **6.** Aedeagus, ventral. **7.** Aedeagus, dorsal. **8.** Aedeagus, lateral. **9.** ♂ sternum 9.

Description

Adult habitus. Head mostly pale except dark area forward of ocelli which encloses a pale median spot; lappets dark brown and occiput dusky brown; pronotum with diffuse midlateral brown stripes and pale median and marginal stripes (Fig.10). Wing membrane brown, veins dark brown.

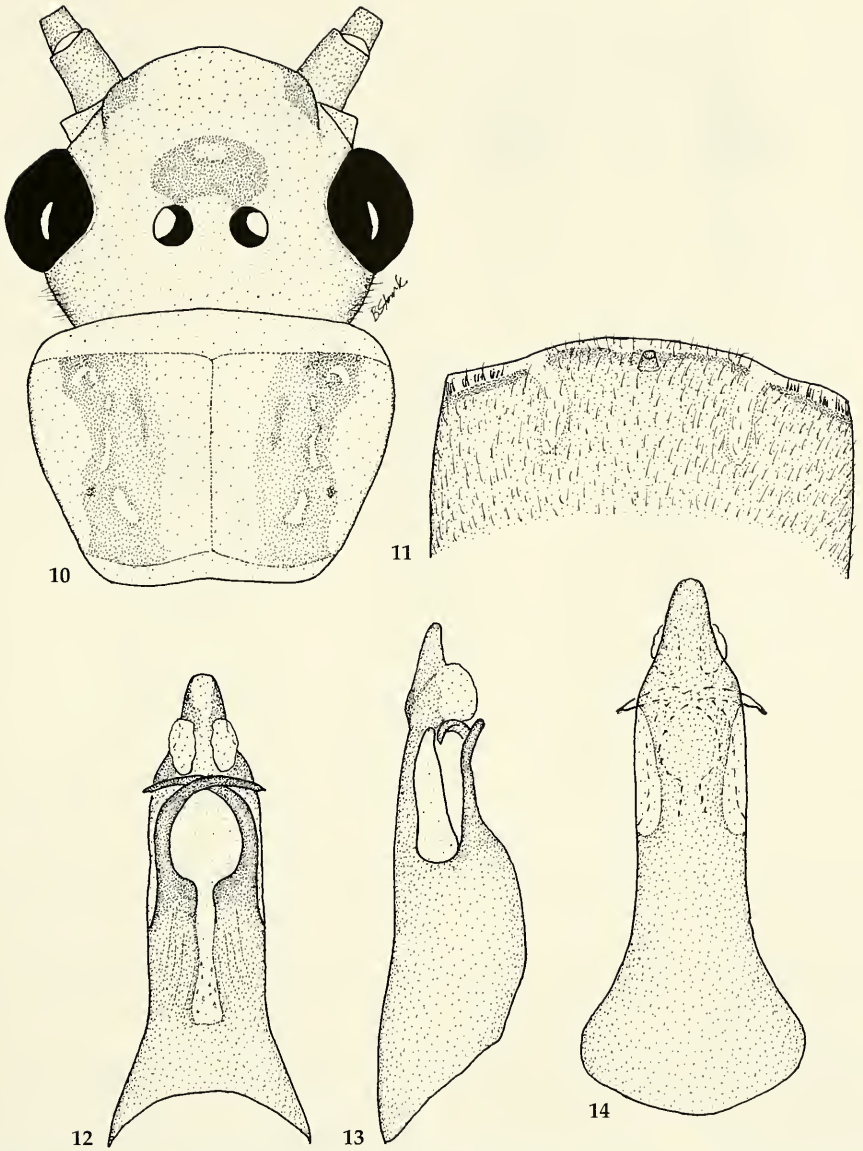
Male. Forewing length 14-15 mm. Hammer thimble shaped, height subequal to basal diameter (Fig. 11). Aedeagal apex simple, tapered from shoulders to a narrow rounded tip; ventral membranous lobes present (Fig. 12); dorsal keel lines obscure or absent (Fig. 14); hooks slender.

Female. Unknown.

Nymph. Unknown.

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

Diagnosis. This species will key to couplet 17 in Stark et al. (1999) but an impasse occurs at this point because the dorsal keel is obscure or absent. The aedeagal structure is similar to that of *A. chaima* Stark (Stark 1999) from Venezuela and *A. cotacachi* Stark (Stark 2001) from Ecuador but the dorsal aedeagal keel is prominent in these species. In addition, the forewing length for *A. chaima* is only 8 mm and the pronotum is more darkly pigmented than in *A. munchique*. The size and pronotal pigment pattern is more similar for *A. cotacachi* but in that species the aedeagal tip is truncate and the head pattern lacks a dark pre-ocellar spot.



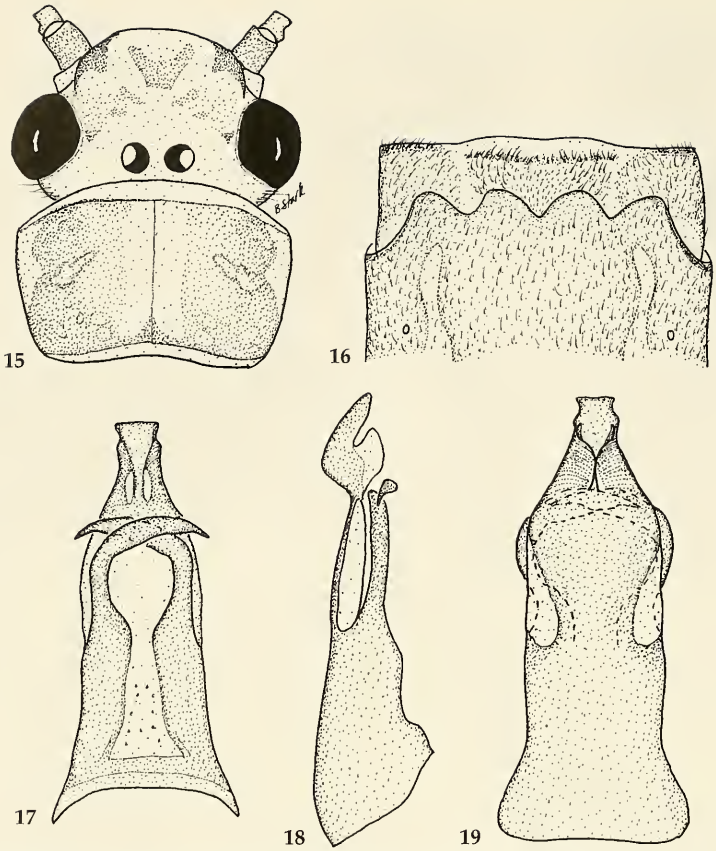
Figs 10-14. *Anacroneuria munchique*, spec. nov. **10.** Head and pronotum. **11.** ♂ sternum 9. **12.** Aedeagus, ventral. **13.** Aedeagus, lateral. **14.** Aedeagus, dorsal.

Anacroneuria toni, spec. nov.
Figs 15-19

Types. Holotype: ♂, Colombia, Cauca, Municipio de Inzá, Quebrada San Andrés, Cuenca Río Paez, 1 km S San Andrés de Pisimbalá, 1730 m, 20 December 1997, MCZ, FMQ, JL (MEUV). – Paratypes: 17♂♂, 29♀♀, same data (USNM, UN-ICN, MEUV, BPS).

Description

Adult habitus. Head yellow brown with dark lappets, a dark Y or V-shaped marking and dusky midlateral areas forward of the eyes; ocellar region pale; pronotum broadly covered with brown to pale brown bands and interspersed pale rugosities; median, narrow pronotal band pale (Fig. 15). Wing membrane pale, veins brown.



Figs 15-19. *Anacroneuria toni*, spec. nov. **15.** Head and pronotum. **16.** ♀ sterna 8-9. **17.** Aedeagus, ventral. **18.** Aedeagus, lateral. **19.** Aedeagus, dorsal.

Male. Forewing length 9 mm. Hammer thimble shaped, height subequal to basal diameter. Aedeagal apex truncate and offset by a slight subapical constriction; ventral lobes small and membranous, hooks subchelate (Fig. 17). Dorsal aedeagal keel of two sinuate ridges, divergent apically but merging to form an X-pattern (Fig.19). Sclerotized portion of apex foot shaped in lateral aspect (Fig. 18).

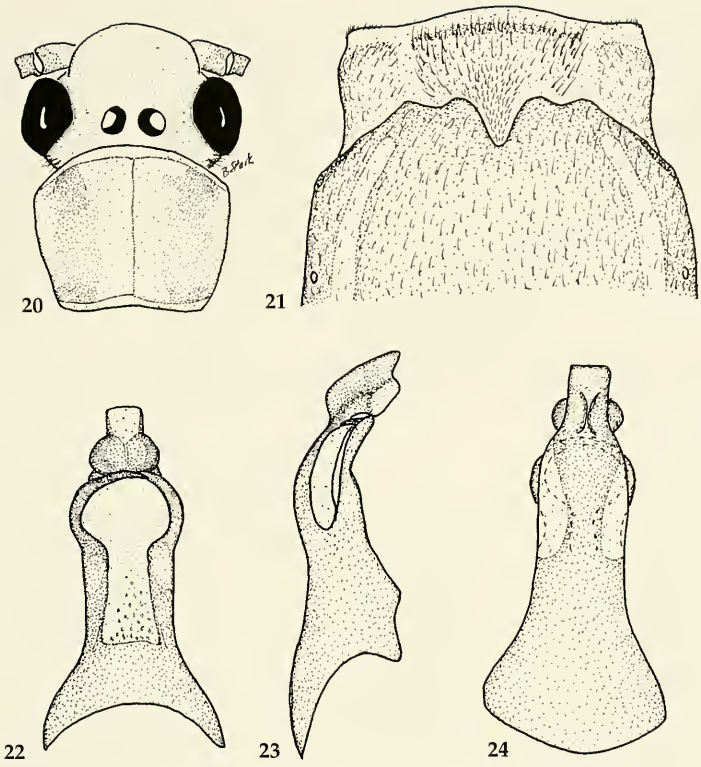
Female. Forewing length 12 mm. Subgenital plate 4-lobed; mesal lobes slightly longer than lateral lobes and with a broad apical hairless zone; transverse sclerite of sternum 9 sparsely clothed with short bristles; median sclerite with larger posterolateral bristles (Fig. 16).

Egg. Spindle shaped, typical of genus.

Nymph. Unknown.

Etymology. The patronym honors Antonio José Cardoso-Zúñiga in recognition of his important contribution to this study, mainly as a collector.

Diagnosis. This is a member of the *Anacroneuria aymara* Stark & Sivec (Stark & Sivec 1998) species group which also includes *A. portilla* Stark & Rojas (Stark et al. 1999), *A. farallonensis* Rojas & Baena (Rojas & Baena 1993), and *A. ricki* Stark & Zúñiga (described below). Most members of the complex have dark ocellar pigment spots but these are absent in *A. toni* and *A. ricki*. The aedeagal apex of *A. toni* is similar to that of *A. farallonensis* in having a slight subapical constriction, but the dorsal keel is more prominent and the shoulders are more gradually narrowed in *A. toni*. Despite the apparent close relationship between these species, specimens of *A. toni* key to couplet 29 in Stark et al. (1999) rather than to *A. farallonensis*. This is due, in part, to



Figs 20-24. *Anacroneuria ricki*, spec. nov. **20.** Head and pronotum. **21.** ♀ sterna 8-9. **22.** Aedeagus, ventral. **23.** Aedeagus, lateral. **24.** Aedeagus, dorsal.

the difference in the ocellar pigment spot and in part to the inaccurate description of the *A. farallonensis* aedeagus as a structure appearing to exhibit a deeply notched apex.

Anacroneuria ricki, spec. nov.

Figs 20-24

Types. Holotype: ♂, Colombia, Municipio de Buenaventura, Río Escaletete, Cuenca Río San Cipriano, 150 m, 16 km SE Córdoba, Trampa de luz, 1 December 1997, MCZ, FMQ, GG, CMA (MEUV). – Paratypes (all from Colombia): 17♂♂, 10♀♀, same data (USNM, UN-ICN, MEUV, BPS); 5♂♂, type locality, 20-21 May 1997, MCZ, GG, SM (MEUV); 3♂♂, 3♀♀, type locality, 10 August 1998, MCZ, RCZ, GMI (MEUV); 1♀, type locality, 5 July 1996, MCZ, GG, SM (MEUV); 1♀, type locality, 2 December 1998, MCZ, RCZ, GMI (MEUV).

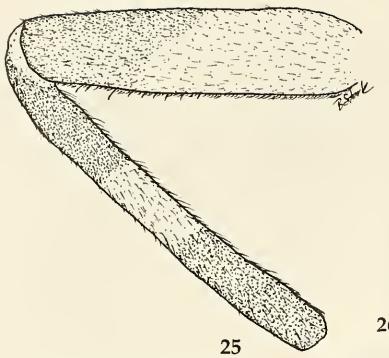
Description

Adult habitus. Head completely pale, pronotum obscurely marked with dusky midlateral to lateral pigment darkest along posterior and anterior margins (Fig. 20). Wings transparent, veins pale yellow brown.

Male. Forewing length 9 mm. Hammer thimble shaped, height subequal to basal diameter. Aedeagal apex truncate, scoop shaped; ventroapical processes rounded laterally with sclerotized margins extending beyond apicolateral margins; hooks very slender (Fig. 22). Dorsal aedeagal keel consists of two curved ridges extending to anterior margins of ventroapical processes (Fig. 24).

Female. Forewing length 11 mm. Subgenital plate weakly 4-lobed; lateral lobes separated from median lobes by shallow notch; transverse sclerite of sternum 9 sparsely clothed with bristles, mesal sclerite wih long bristles located in posterolateral patch (Fig. 21).

Egg. Spindle shaped, typical of genus.



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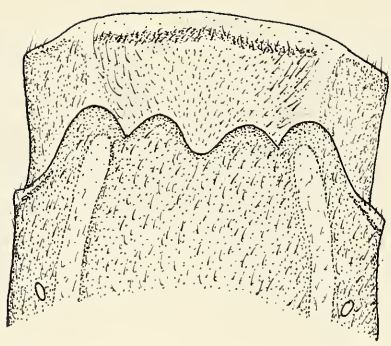

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Figs **25-26.** *Anacroneuria azul* Rojas & Baena. **25.** Hind femora and tibia. **26.** ♀ sterna 8-9.

Nymph. Unknown.

Etymology. The patronym honors Ricardo Javier Cardoso-Zúñiga in recognition of his important contribution to this study, mainly as a collector.

Diagnosis. As discussed above, *A. ricki* is a member of the *Anacroneuria aymara* species group but in Stark et al. (1999) it will key to *A. cipriano*. It is distinguished from that species by details of the aedeagal apex and by the absence of dark lappets on the head of *A. ricki*. Within the *A. aymara* group, *A. ricki* is the only known species with male forewing length less than 10 mm and is also the only species in the group without dark pigment on either the frons or lappets.

Anacroneuria azul Rojas & Baena
Figs 25-26

Anacroneuria azul Rojas & Baena in Stark et al., 1999. Holotype ♂, Colombia, Valle del Cauca, Río Azul, Cuenca media Río Calima.

Examined material. Colombia: 1♂, Antioquia, 1983, H. Moreno (MEUV); 5♂♂, 5♀♀, Valle del Cauca, Municipio de Buenaventura, Río Escalerete, Cuenca Río San Cipriano, Bocatoma Planta de Potabilización, Acua-Valle, 16 km SE Córdoba, Trampa de luz, 150 m, 10 August 1998, MCZ, RCZ, GMI (MEUV, BPS); 1♀, same location, 26 April 1997, MCZ, RCZ, GMIf (USNM).

Description

Adult habitus. Described and illustrated by Stark et al. (1999). The distinctive pattern of the mid and hindleg is illustrated in Fig. 25 to assist in recognition of this species.

Female. Forewing length 12 mm. Subgenital plate 4-lobed; outer lobes slightly longer than inner lobes; transverse sclerite of sternum 9 rather densely clothed with short bristles; mesal sclerite sparsely setose; longer bristles located posterolaterally (Fig. 26).

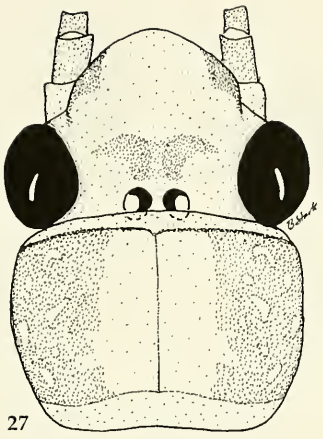
Egg. Spindle shaped, typical of genus.

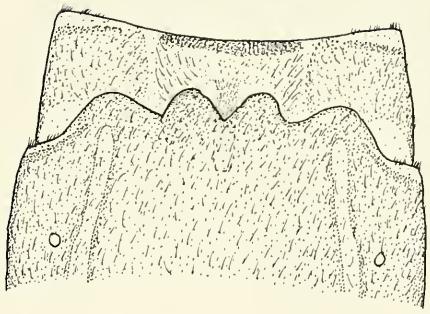
Diagnosis. The female shares the dark ocellar spot, narrow median pronotal stripe and banded femora and tibiae found in male specimens (Stark et al. 1999). The subgenital plate and 9th sternal structure are similar to those of many species which makes identification of unassociated females difficult. The species has been reported previously from Cauca and Valle del Cauca in Colombia (Stark et al. 1999) and from Pastaza and Pichincha in Ecuador (Stark 2001). The Antioquia record is the northernmost for the species.

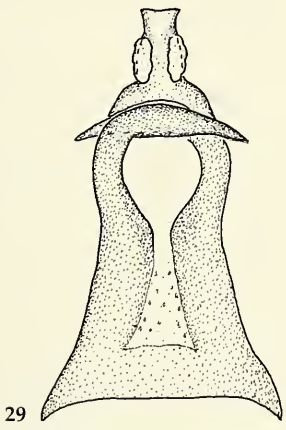
Anacroneuria farallonensis Rojas & Baena
Figs 27-31

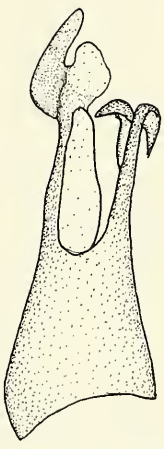
Anacroneuria farallonensis Rojas & Baena, 1993. Holotype ♂, Colombia, Valle del Cauca, Río Cali, Peñas Blancas.

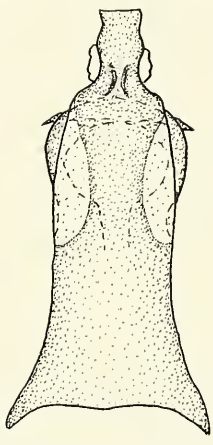
Examined material. Colombia: ♂, holotype, Valle del Cauca, Río Cali, Peñas Blancas, 2000 m (MEUV); 2♂♂, 2♀♀, Valle del Cauca, Municipio de Cali, Parque Natural Nacional Farallones de Cali, Peñas Blancas, Río Pichindé, Cuenca alta del Río Cali, 2000 m, Trampa de luz, 29-30 September 1997, MCZ, ACZ, RCZ, GG, GMA (MEUV, BPS); 2♂♂, 2♀♀, same location, 10 March 1998, MCZ, RCZ, GMI, GMA (MEUV, USNM).











Figs 27-31. *Anacroneuria farallonensis* Rojas & Baena. **27.** Head and pronotum. **28.** ♀ sterna 8-9. **29.** Aedeagus, ventral. **30.** Aedeagus, lateral. **31.** Aedeagus, dorsal.

Redescription

Adult habitus. Head with a pair of narrowly separated brown pigment lobes forward of ocelli; lappets brown; pronotum with dark lateral pigment bands enclosing pale rugose areas; median pale stripe narrow (Fig. 27). Wing membrane pale, veins brown, R vein dark brown. Tibiae banded.

Male. Forewing length 12-13 mm. Hammer thimble shaped. Aedeagal apex truncate and bearing a pair of ventral membranous lobes; hooks subchelate (Fig. 29). Dorsal aedeagal keel comprised of two short divergent ridges (Fig. 31).

Female. Forewing length 13-14 mm. Subgenital plate 4-lobed; lobes subequal in length; transverse sclerite of sternum 9 covered with short bristles; mesal sclerite T-shaped with slender, parallel-sided stalk clothed with fine bristles; larger bristles located in lateral patches (Fig. 28).

Nymph. Unknown.

Diagnosis. This is the first report of this species since the original description by Rojas & Baena (1993). The color patterns of adults in this sample are quite close to the original description but the aedeagus has been redrawn to show the truncate aspect of the apex. Figures in the original description show the aedeagal apex as deeply notched and this is reflected in the Stark et al. (1999) key. Because of this error the holotype of *A. farallonensis* keys to *A. portilla* but as indicated above, it is more closely relat-

ed to the newly described *A. toni*. The species can be distinguished from *A. portilla* by comparing subtle details of the aedeagal apex and by the dark head patterns of the two species. The aedeagal apex of *A. portilla* in lateral aspect is shorter and wider than in *A. farallonensis* (Fig. 30); in dorsal aspect the apex narrows slightly from the shoulders to a rounded apex in the former species, but widens slightly, subapically in *A. farallonensis* and constricts again near the tip (Fig. 31). The dark head pattern of *A. portilla* extends far forward but in *A. farallonensis* it is limited to the area just forward of the ocelli (Fig. 27). Diagnostic information is given above to separate this species from *A. toni*.

Anacroneuria puna Stark
Figs 32-36

Anacroneuria puna Stark, 2001. Holotype ♂, Ecuador, Cotopaxi, San Francisco de Las Pampas, Otonga.

Examined material. Colombia: 1♂, 1♀, Valle del Cauca, Municipio de Buenaventura, Río Escalerete, Cuenca Río San Cipriano, 150 m, 16 km SE Córdoba, Trampa de luz, 10 August 1998, MCZ, RCZ, GMI (MEUV).

Redescription

Female. Forewing length 13 mm. Subgenital plate 4-lobed; mesal lobes divergent, lateral lobes short and broadly rounded; transverse sclerite of sternum 9 covered with long bristles; mesal sclerite with long posterolateral bristle patch enclosing median field of short fine setae (Fig. 33).

Diagnosis. *Anacroneuria puna*, described by Stark (2001) from Ecuadoran material, has not previously been reported from Colombia. Males of this species key to couplet 28 in Stark et al. (1999) but cannot be resolved beyond that point. Among the species included in the key beyond couplet 27, *A. calima* is most similar, but can be distinguished on the basis of the notched aedeagal apex in that species. The aedeagus (Figs 34-36) of the Colombian specimen shows slight variation from the holotype in shape of the dorsal keel, size and in the degree of overlap of the shoulders over the hooks. When a larger sample is available the possibility that these two specimens represent sibling species should be considered.

Anacroneuria anchicaya Baena & Zúñiga

Anacroneuria anchicaya Baena & Zúñiga in Stark et al., 1999. Holotype ♂, Colombia, Valle del Cauca, Alto Anchicaya.

Examined material. Colombia: 1♂, Valle del Cauca, Municipio de El Cerrito Las Brisas, 65 km NE Cali, Cuenca media del Río Cerrito, 1460 m, Trampa de luz, 13 June 1998, MCZ, SM, RCZ, GMI (MEUV); 1♂, same locality, 19 February 1999, MCZ, ED, CMO, RCZ (MEUV); 2♂♂, Valle del Cauca, Municipio de El Cerrito El Pomo, 70 km NE Cali, Cuenca alta del Río Cerrito, 1950 m, Trampa de luz, 16 March 1998, MCZ, RCZ, GMI (MEUV).

Discussion. This species was previously known from two Colombian localities (Stark et al. 1999) in Valle del Cauca and from four Ecuadoran sites (Stark 2001).

Anacroneuria blanda Needham & Broughton

Anacroneuria blanda Needham & Broughton, 1927. Holotype ♀, Panama, Barro Colorado Island.
Anacroneuria blanda, Stark 1998: Redescription.

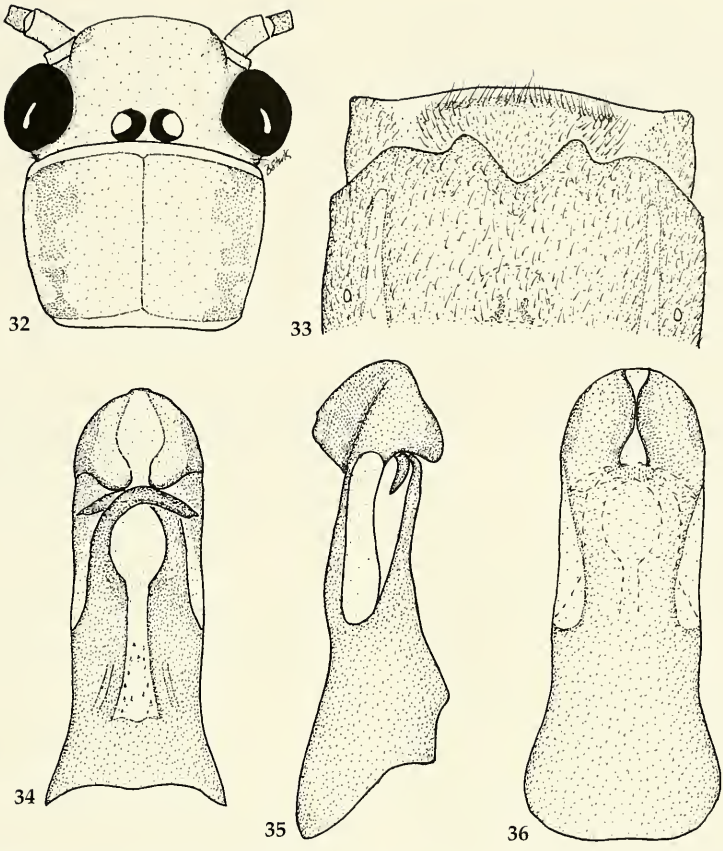
Examined material. Colombia: 1♂, Choco, Municipio de Acandí, Cerro de Tripogandí, Quebrada Coquital, 115 m, December 1999, MR, CC (MEUV).

Discussion. This species was previously known from Costa Rica and Panama (Stark 1998) and although this is the first authenticated record of a Mesoamerican species in South America, the locality is in the lowlands east of the Serrania del Darién near the Panamanian border.

Anacroneuria bolivari (Banks)

Neoperla bolivari Banks, 1914. Holotype ♀, Monte Socorro, Colombia.
Anacroneuria bolivari, Stark et al. 1999: Redescription.

Examined material. Colombia: 1♂, Cauca, Parque Natural Nacional Munchique, La Romelia, 63 km W Popayán, Quebrada San Julián, sobre la via a La Gallera, Cuenca alta Río San Joaquín, 1930 m, Trampa de luz, 7 April 1998, MCZ, RCZ, GMI, YG (MEUV); 1♂, Cauca, Municipio de Silvia, Quebrada Manchay-Juanambù, Cuenca media Río Piendamó, 2710 m, Trampa de luz, 15 January 2000, MCZ, RCZ, GMI (MEUV); 1♂, Valle del Cauca, Municipio de Cali, Parque Nacional Natural Farallones de Cali, Peñas Blancas, Río Pichindé, Cuenca alta del Río Cali, 2000 m, Trampa de luz, 20 November 1997, MCZ,



Figs 32-36. *Anacroneuria puna* Stark. **32.** Head and pronotum. **33.** ♀ sterna 8-9. **34.** Aedeagus, ventral. **35.** Aedeagus, lateral. **36.** Aedeagus, dorsal.

RCZ, GG (BPS); 1♂, same location, 29 September 1997, MCZ, ACZ, GMA (MEUV).

Anacroneuria caraca Stark

Anacroneuria caraca Stark, 1995. Holotype ♂, Venezuela, Aragua, Parque Nacional Henri Pittier, Río Limón.

Examined material. Colombia: 2♂♂, 3♀♀, Magdalena, Municipio de Ciénaga, Río Córdoba, 25 km NW Estación Exp. San Lorenzo, Sierra Nevada de Santa Marta, 930 m, 12 December 1997, FMQ, LG, RCZ (MEUV); 1♂, Magdalena, Municipio de Santa Marta Vereda Minca, Pozo Azul, Cuenca media Río Gaira, 750 m, Trampa de luz, 29 September 2000, MCZ, LG, LP, NM (MEUV); 1♂, Valle del Cauca, Río La Cristalina, Cuenca alta Río Riofrio, 2 km al Occidente de Salónica, 1240 m, Trampa de luz, 20 August 2000, MCZ, MG, RCZ (MEUV).

Discussion. This species has previously been reported from the Venezuelan states of Aragua, Barinas and Guárica (Stark 1995, 1999) and tentatively from the Ecuadoran state of Napo (Stark 2001). These are the first records of the species from Colombia and only the second stonefly to be identified from Sierra Nevada de Santa Marta.

Anacroneuria chipaya Stark & Sivec

Anacroneuria chipaya Stark & Sivec, 1998. Holotype ♂, Bolivia, Cochabamba, Incachaca.

Examined material. Colombia: 1♂, Risaralda, Parque Natural Regional Ucumarí, Estación La Pastora, 30 km E Pereira, Cuenca alta del Río Otún, 2400 m, Trampa de luz, 4 September 1996, MCZ, GG, SM (USNM); 2♂♂, same location 29 January 1997, GG, AR (BPS); 2♂♂, same location, 30 October 1996, GG,

AR (MEUV); 1♂, Cauca, Municipio de Silvia, Río Piendamó, 5 km NE Silvia, 2610 m, 30 December 1997, FMQ et al. (BPS); 2♂♂, same location, 28 February 1998, MCZ, RCZ, GMI (MEUV, UN-ICN); 1♀, Cauca, Municipio de Inzá, Quebrada San Andrés, Cuenca Río Paez, 1 km S San Andrés de Pisimbalá, 1730 m, 20 December 1997, MCZ, FMQ, JL (MEUV).

Description

Adult habitus. Head mostly yellow but with dark lappets and an obscure brown area between and extending forward of ocelli to a pale mesal spot. Pronotum with dark midlateral stripes enclosing pale rugosities; mesal band and lateral margins pale. Wing membrane pale, veins dark brown except along costal area. Tibiae dark brown.

Diagnosis. This species was described from Bolivian specimens (Stark & Sivec 1998) and has not previously been reported from Colombia. Males key to *A. guayaquil* Zúñiga & Rojas in Stark et al. (1999) but the dorsal aedeagal keel of *A. chipaya* is much longer, the aedeagal hooks are smaller and the aedeagal apex is gradually tapered to the tip. The aedeagus is similar to that of *A. planada* Baena & Rojas but the dorsal keel of that species is shorter and the ridges are approximately parallel throughout their length. The Colombian specimens have a slightly shorter and wider aedeagal apex than the Bolivian specimens otherwise we are unable to distinguish them. The adult habitus data are given because the color pattern was not obvious on the type material.

Anacroneuria cordillera Rojas & Baena

Anacroneuria cordillera Rojas & Baena *in* Stark et al., 1999. Holotype ♂, Colombia, Valle del Cauca, Villa Carmelo, Cuenca alta Río Meléndez.

Examined material. Colombia: 1♂, Valle del Cauca, Municipio de Cali, Villa Carmelo, Dos Quebradas, Cuenca alta del Río Meléndez, 14 km W Cali, 1900 m, Trampa de luz, 28 September 1997, MCZ, ACZ, GG (BPS); 1♂, Valle del Cauca, Río La Cristalina, Cuenca alta Río Riofrio, 2 km al Occidente de Salónica, 1240 m, Trampa de luz, 20 August 2000, MCZ, MG, RCZ (MEUV); 2♂♂, same location, 26 August 2000, MCZ, MG, RCZ (USNM); 4♂♂, same location, 17 September 2000, MCZ, MG, RCZ (MEUV); 3♂♂, same location, 19 September 2000, MCZ, MG, RCZ (UN-ICN); 4♂♂, same location, 6 March 2001, MCZ, MG, RCZ (MEUV); 4♂♂, same location, 1-2 May 2001, MCZ, MG, RCZ (MEUV).

Discussion. This species was previously known from the holotype male collected in the Río Meléndez.

Anacroneuria forcipata Rojas & Baena

Anacroneuria forcipata Rojas & Baena *in* Stark et al., 1999. Holotype ♂, Colombia, Valle del Cauca, Río Azul, Cuenca medio Río Calima.

Examined material. Colombia: 1♂, Valle del Cauca, Municipio de Buenaventura, Río Escalerete, Cuenca Río San Cipriano, Bocatoma Planta Potabilización Acua-Valle, 16 km SE Córdoba, 150 m, Trampa de luz, 10 August 1998, MCZ, RCZ, GM (MEUV).

Discussion. This species was previously known from the holotype male collected in the adjacent Río Calima basin approximately 25 km east of the new site.

Anacroneuria jewetti Stark

Anacroneuria jewetti Stark, 2001. Holotype ♂, Ecuador, Napo, San Francisco de Borja.

Examined material. Colombia: 1♂, Valle del Cauca, Municipio de Cali, Parque Nacional Natural Farallones de Cali, Peñas Blancas, Río Pichinde, Cuenca alta del Río Cali, 2000 m, Trampa de luz, 8 October 1997, MCZ, ACZ, GMA (MEUV); 1♂, same location, 22 October 1997, MCZ, ACZ, GMA (BPS); 1♂, same location 17 February 1999, MCZ, ED, CMO (MEUV); 1♂, same location, 5 March 1998, MCZ, RCZ, GMA (MEUV).

Discussion. This species was described from several sites in Ecuador (Stark 2001) and has not previously been reported in Colombia. In Stark et al. (1999) it keys to couplet 20 and might be placed as *A. anchicaya* but the forewing length is greater (13-14 mm in *A. jewetti*, 9 mm in *A. anchicaya*). Differences in aedeagal structure are subtle but consistent. In lateral aspect, the aedeagal apex of *A. jewetti* has a falcate margin and is rounded in ventral or dorsal aspect; *A. anchicaya* has an acute aedeagal apex that is fairly straight along the dorsal margin in lateral aspect.

Anacroneuria planada Baena & Rojas

Anacroneuria planada Baena & Rojas in Stark et al., 1999. Holotype ♂, Colombia, Nariño, Reserva Natural La Planada.

Examined material. Colombia: 3♂♂, Nariño, Municipio de Ricaurte, Reserva Natural La Planada, Quebrada El Tejón, Puente Sendero Natural, 1830 m, 16-17 August 1999, MCZ, ED, GME (MEUV, BPS); 1♂, Nariño, Municipio de Ricaurte, Reserva Natural La Planada, Centro de Visitantes, 1850 m, 17 August 1999, MCZ, ED, GME (MEUV).

Discussion. The pale habitus of this species was noted in the original description but was based on teneral specimens. This sample indicates the diffuse pronotal pigmentation is restricted to narrow bands near the lateral margins and the Cu vein and apical veins beyond the cord are brown whereas other veins are pale.

Anacroneuria portilla Stark & Rojas

Anacroneuria portilla Stark & Rojas in Stark et al., 1999. Holotype ♂, Colombia, Cauca, 18 km N Popayán.

Examined material. Colombia: 2♂♂, Cauca, Municipio de Inzá, Quebrada San Andrés, Cuenca Río Paez, 1 km S San Andrés de Pisimbalá, 1730 m, 20 December 1997, MCZ, FMQ, JL (MEUV).

Discussion. This species was previously known from the type series (Stark et al. 1999) and from four sites in Ecuador (Stark 2001). Diagnostic information is given above under *A. farallonensis*.

Anacroneuria quilla Stark & Zúñiga

Anacroneuria quilla Stark & Zúñiga in Stark et al., 1999. Holotype ♂, Colombia, Risaralda, Termales de Santa Rosa de Cabal.

Examined material. Colombia: 1♂, Cauca, Municipio de Puracé, Chisbal, 23 km E Popayán, Río Anambiu, Puente via Popayán-Puracé, 2320 m, 21 February 1999, Trampa de luz, MCZ, ED, CMO, ACZ (MEUV); 15♂♂, Valle del Cauca, Municipio de El Cerrito, El Pomo, 70 km NE Cali, Cuenca alta del Río Cerrito, 1950 m, 16 March 1998, Trampa de luz, MCZ, RCZ, GMI (MEUV, UN-ICN, BPS); 4♂♂, same location, 28 March 1998, MCZ, RCZ, GMI (BPS); 1♂, same location, 27 September 1996, MCZ, RCZ, GG (USNM); 1♂, same location, 20 June 1997, MCZ, RCZ, GG (USNM); 3♂♂, same location, 18 April 1998, MCZ, RCZ, GMI (USNM); 3♂♂, Valle del Cauca, Municipio El Cerrito, Río Cerrito, 7 km E Hacienda El Paraiso, 1950 m, 3 December 1997, FMQ et al. (BPS); 1♂, Valle del Cauca, Municipio de Cali, Villa Carmelo, Dos Quebradas, Cuenca alta del Río Meléndez, 14 km W Cali, 1900 m, 28 September 1997, Trampa de luz, MCZ, RCZ, GG (MEUV); 1♂, same location, 1 April 1998, MCZ, RCZ, FP (BPS); 1♂, Valle del Cauca, Parque Natural Nacional Farallones de Cali, Peñas Blancas, Río Pichindé, Cuenca alta Río Cali, 2000 m, Trampa de luz, 3 March 1998, MCZ, RCZ, GMA (MEUV); 1♂, same location, 9 October 1997, MCZ, RCZ, GG (BPS); 1♂, Valle del Cauca, Municipio de Cali, Felidia, El Pato, 23 km W Cali, Cuenca alta Río Cali, Hospedero, 1800 m, 3 March 1997, NO (MEUV); 1♂, Risaralda, Parque Natural Regional Ucumarí, Estación La Pastora, 30 km E Pereira, Cuenca alta del Río Otún, 2400 m, Trampa de luz, 30 October 1996, GG, AR (MEUV).

Discussion. This species was previously known from Risaralda and Valle del Cauca in Colombia (Stark et al. 1999) and from several Ecuadoran sites (Stark 2001). The records given above are the first for Departamento del Cauca.

Unassociated Females

Stark et al. (1999) previously described five *Anacroneuria* species under informal designations (CO-1, CO-2, etc.). Subsequently one of these (*Anacroneuria* CO-1) was identified by Stark et al. (2002) as the female of *Anacroneuria montera* Stark & Sivec. We now have numerous additional female specimens that have not been associated with males but making these associations remains a difficult task based on similarities in size and color patterns. We are hopeful that DNA "fingerprinting" might solve this dilema in the near future. For now we are limiting descriptions of unassociated females to those from remote, seldom collected sites, or to those with exceptional coloration, morphology or egg structure. Accordingly, we include here descriptions of two additional distinctive but unassociated females.

Anacroneuria CO-6
Figs 37-38

Examined material. Colombia: 1♀, Risaralda, Parque Natural Regional Ucumarí, Camino El Cedral-Ceylán, antes de Las Peñas, 25 km E Pereira, Cuenca alta del Río Otún, 2300 m, 28 January 1997, AR, GG (MEUV).

Description

Adult habitus. Head with a dark brown patch covering ocellar area but with a pair of large pale spots in contact with ocelli; lappets dark brown and anterior margin of frons with a narrow diffuse brown band connecting lappets; pronotum with wide but diffuse brown lateral bands; median stripe and lateral margins pale (Fig. 37). Wing membrane brown, veins dark brown. Tibiae and dorsoapical half to third of femora brown.

Female. Forewing length 16 mm. Subgenital plate 4-lobed; lobes subequal in size; transverse and median sclerites of sternum 9 sparsely setose (Fig. 38).

Discussion. The color pattern of this species is similar to that of *A. montera* (Stark & Sivec 1998) but that species is smaller and has a bilobed subgenital plate.

Anacroneuria CO-7
Figs 39-40

Examined material. Colombia: 11♀♀, Choco, Municipio de Acandí, Cerro de Tripogandí, 2 km S Bahia de Napú, Quebrada Coquital, 115 m, 16-18 July 1999, Trampa de luz, MCZ, MR, CC, LV, TD (MEUV, BPS).

Description

Adult habitus. Head yellow with diffuse brown lappets; pronotum with irregular midlateral brown bands; median band and lateral margins pale (Fig. 39). Wing membrane pale except diffuse longitudinal brown band along M and Cu veins and surrounding obscure window at cord.

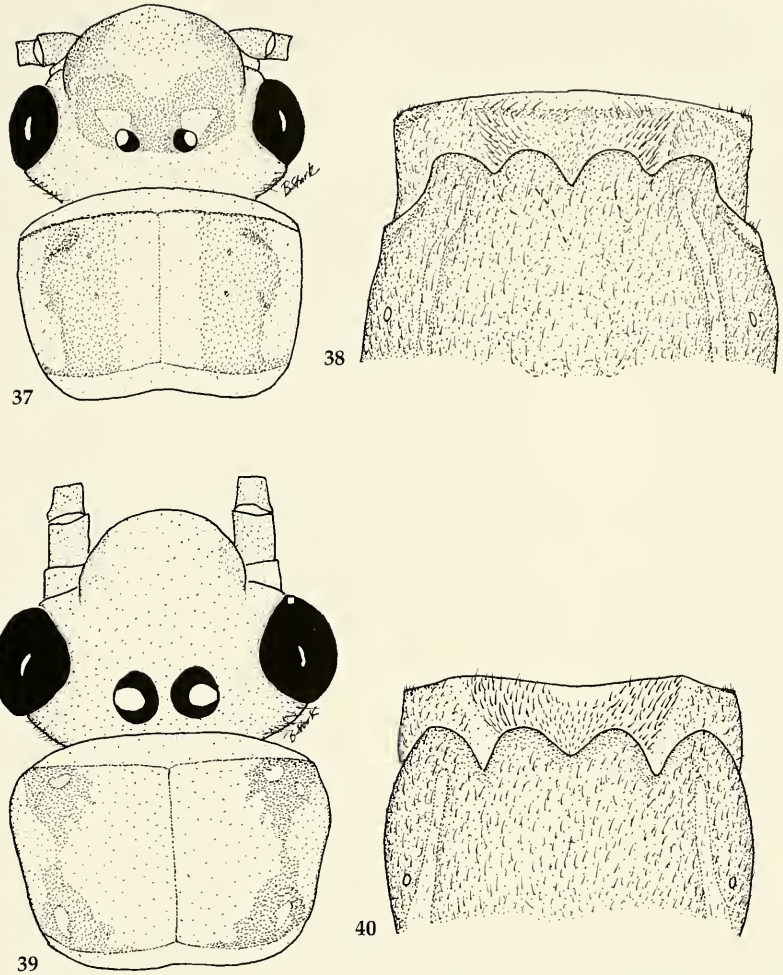
Female. Forewing length 11 mm. Subgenital plate 4-lobed; lobes subequal in size; transverse sclerite obsolete, median sclerite with lateral patches of thick setae and mesal patch of short fine setae (Fig. 40).

Discussion. This species is similar to *A. paria* (Stark 1999) in wing pattern but differs significantly in head and pronotal pattern and subtly in subgenital plate and sternal 9 features. The dark midlateral pronotal bands of this species will distinguish it from *A. paria*. This species was collected in the same area as the *A. blanda* specimens listed above but no Panamanian or Costa Rican species are known which share this distinctive color pattern (Stark 1998)

Colombian *Anacroneuria* species list

47 Colombian *Anacroneuria* species are currently recognized and listed below. Four of these (*A. apicalis*, *A. pehlkei*, *A. schmidti* and *A. vespertilio*) are known only from females and 25 are known only from males.

A. albimacula Klapálek, 1921
A. anchicaya Baena & Zúñiga, 1999
A. angusticollis (Enderlein, 1909)
A. apicalis (Enderlein, 1909)
A. azul Rojas & Baena, 1999
A. bifasciata (Pictet, 1841)
A. blanda Needham & Broughton, 1927
A. bolivari (Banks, 1914)
A. calima Baena & Rojas, 1999
A. caraca Stark, 1995
A. chipaya Stark & Sivec, 1998
A. choachi Stark & Zúñiga, 1999
A. cipriano Zúñiga & Rojas, 1999
A. cordillera Rojas & Zúñiga, 1999
A. farallonensis Rojas & Baena, 1993
A. fenestrata (Pictet, 1841)
A. forcipata Rojas & Baena, 1999
A. guambiana Zúñiga & Stark, 1999
A. guayaquil Zúñiga & Rojas, 1999
A. inza, spec. nov.
A. jewetti Stark, 2001
A. marta, spec. nov.
A. meta Stark & Zúñiga, 1999
A. montera Stark & Sivec, 1998
A. morena Stark & Zúñiga, 1999
A. munchique, spec. nov.
A. oreja Zúñiga & Stark, 1999
A. pacifica Rojas & Baena, 1999
A. paez Zúñiga & Stark, 1999
A. paleta Stark, 1995
A. pallens Klapálek, 1922
A. pehlkei (Enderlein, 1909)
A. planada Baena & Rojas, 1999



Figs 37-40. Unassociated ♀ *Anacroneuria*. **37.** CO-6, head and pronotum. **38.** CO-6, sterna 8-9. **39.** CO-7, head and pronotum. **40.** CO-7, sterna 8-9.

A. portilla Stark & Rojas, 1999
A. puna Stark, 2001
A. quilla Stark & Zúñiga, 1999
A. regleta Stark & Rojas, 1999
A. ricki, spec. nov.
A. rosita Stark & Rojas, 1999
A. schmidti (Enderlein, 1909)
A. socapa Stark & Zúñiga, 1999
A. tejon Baena & Stark, 1999
A. toni, spec. nov.
A. ucumari Stark & Zúñiga, 2002
A. undulosa Stark & Rojas, 1999
A. valle Zúñiga & Baena, 1999
A. vespertilio Klapálek, 1921

Acknowledgments

We are grateful to all our colleagues who participated in the field work for this project and we also thank J. Rawlins of the Carnegie Museum of Natural History for the loan of specimens. M.P. Rozo and C. Camargo generously provided specimens of *A. blanda* and H. Moreno provided the Antioquia specimen of *A. azul* for our study.

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