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*Anacroneuria* from Mexico and upper Mesoamerica (Plecoptera: Perlidae)

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The earliest description of Mexican or upper Mesoamerican Anacroneuria evidently was that of Guerin-Meneville (1838), who proposed *Perla mexicana*, a species that cannot be recognized (Illies 1966). Pictet (1841) provided descriptions of 11 Neotropical *Perla* species, including 5 based on Mexican material. Zwick (1972) illustrated and described holotype or lectotype specimens for *A. annulicauda* (Pictet), *A. litura* (Pictet), and *A. nigrocincta* (Pictet), but the type of *A. cincta* (Pictet) and *A. costalis* (Pictet) are unfortunately lost, and these species are considered *nomen dubium.* Walker (1852) and Enderlein (1909) each contributed a single species, *A. aethiops* (Walker) and *A. guatemalensis* (Enderlein), but Zwick (1972) indicates that the Needham and Broughton (1927) usage of *A. nigrocincta* is not consistent with the lectotype selected from Pictet’s (1841) type series, and we have determined that figures of Mesoamerican males that Needham and Broughton (1927) attributed to *A. dilaticollis* (Burmeister), a Brazilian species, actually represent *A. perplexa* Stark, a recently described species (Stark 1998). The other 3 Mesoamerican species of Needham and Broughton were described as new. Of these, *A. coronata* Needham and Broughton and *A. naomi* Needham and Broughton are considered valid, but *A. sulana* Needham and Broughton, which Zwick (1972) placed as a synonym of *A. annulicauda*, we placed as a synonym of *A. lineata* (Navas).

Jewett (1958) published the first comprehensive review of *Anacroneuria* from this region, including data for 15 species from Mexico, Guatemala, and Belize. Ten of these species Jewett described as new; the other species in the sample were assigned as *A. aethiops*, *A. dilaticollis*, *A. naomi*, *A. nigrocincta*, or *A. sulana*. It has not been possible to locate and examine all the material Jewett studied, but the determinations of specimens we have checked were quite erratic. Consequently, from this material, we consider here only those records we were able to verify.

**ANACRONEURIA FROM MEXICO AND UPPER MESOAMERICA (PLECOPTERA: PERLIDAE)**

Bill P. Stark1 and Boris C. Kondratieff2

**ABSTRACT.—**This paper reviews the status of 39 *Anacroneuria* species reported for Mexico, the adjacent areas of Mesoamerica (Belize, Guatemala, Honduras, Nicaragua), and the United States. Sixteen species are described as new (*A. baumanni*, *A. brailovskyi*, *A. buenoi*, *A. contrerasi*, *A. izapa*, *A. mixteca*, *A. olmec*, *A. pareja*, *A. quetzalcoatl*, *A. ratcliffei*, *A. senahu*, *A. shepardii*, *A. sonora*, *A. wellsi*, *A. zaculeu*, and *A. zaga*). *Anacroneuria sulana* Needham and Broughton is removed from synonymy with *A. annulicauda* (Pictet) and classified as a synonym of *A. lineata* (Navas). *Anacroneuria proxima* Klapálek, *A. crenulata* Jewett, and *A. conaniche* Stark and Baumann are classified as synonyms of *A. litura* (Pictet). Identification keys are presented for males in the region, and the nymphs of 2 species, *A. baumanni* and *A. quadriloba*, are described.

**Key words:** *Anacroneuria*, Mexico, Mesoamerica, stonefly.

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Thus, the combined efforts of Pictet (1841), Walker (1852), Enderlein (1909), Klápálek (1923), Needham and Broughton (1927), and Jewett (1958) led to the proposal of 23 Mexican or upper Mesoamerican species. More recently, Baumann and Olson (1984) and Stark and Baumann (1987) reported the discovery of Anacroneuria in Arizona and Texas, while Harper (1992), Stark (1998), and Fenoglio and Morisi (2000) considered species of lower Mesoamerica (Costa Rica, Nicaragua, and Panama). We have attempted to reevaluate each of these from type material and from other collections available to us. The results indicate that 13 of the species originally proposed to be Mexican or upper Mesoamerican specimens are valid, and 3 others are synonyms of A. acutipennis Klapálek, A. annulipalpis, and A. lineata (Navas), previously known to be from Costa Rica (Stark 1998). In addition, we report finding A. benedettoi Stark, A. costana (Navas), A. holzenthali Stark, A. perplexa Stark, A. starki Fenoglio and Morisi, and A. uatsi Stark in the area from Mexico to Honduras. We also provide 16 new species descriptions. This results in a preliminary list of 39 regional Anacroneuria species (Table 1), including those reported from Arizona and Texas. Significantly, a “relatively strong pattern of endemism” (Stark 1998) is also suggested by
this study, with only 4 species [A. costana (Navas), A. lineata (Navas), A. perplexa Stark, and A. planicollis] known to be from both Mexico and Costa Rica. However, several additional species reported from Costa Rica have now been found as far north as Honduras (Table 1).

Baumann and Kondratieff (1996) were first to attempt a review of the stoneflies of Mexico. They included 22 species of Anacroneuria but indicated the list was clearly preliminary because of the poor taxonomic status of this group. They also stated that “very little can be said about the distribution of this genus in Mexico.” The distribution of the 30 Anacroneuria species recognized in this study is given in Table 2. The best represented Mexican states are Chiapas, Oaxaca, and Veracruz; however, specimens were not available or only 1 or 2 records were available from several large states, including Coahuila, Durango, Hidalgo, Nayarit, Zacatecas, and from the Yucatan peninsula. Efforts were also made to find this genus in Baja California, but no specimens were collected, even in the suitable habitats of Sierra San Pedro Mártir and Sierra de Lázaro (Sargent et al. 1991).

Abbreviations (Arnett et al. 1993) are used for the following museums and private collections to indicate sources and repositories of the material: American Museum of Natural History, New York (AMNH); Bill P. Stark, Clinton, Mississippi (BPSC); Brigham Young University, Monte L. Bean Museum, Provo (BYUC); British Museum of Natural History, London (BMNH); California Academy of Sciences, San Francisco (CASC); Canadian National Collection, Ottawa (CNCI); Colorado State University, C.P. Gillette Museum of Arthropod Diversity, Fort Collins (CSUC); Cornell University, Ithaca (CUIC); Field Museum of Natural History, Chicago (FMNH); Florida State
 Provisional Key to Known Mexican and Upper Mesoamerican *Anacroneuria* Males

(A. flavolineata, A. nigrocineta, A. pallida males unknown)

1. Hammer absent or reduced to an obscure spot (Figs. 2, 111, 159) .......... 2
   Hammer a distinct thimble-shaped structure (Figs. 25, 35, 55) .......... 6

2. Pronotum with distinct median yellow band covering about 25–30% of disc width (Figs. 1, 110, 115) .......... 3
   Pronotum with narrow, diffuse brown pigment bands along median suture (Figs. 153, 158) .......... 5

3. Forewing length less than 12 mm; aedeagus as Figs. 117–119; *perplexa* Forewing length at least 15 mm; aedeagus as Figs. 3–5, 112–114 .......... 4

4. Aedeagal apex a simple, spatula-shaped structure (Figs. 113–114) .......... *pareja*, nov. spec. Aedeagal apex trilobed; median lobe deeply notched (Figs. 4–5) .......... *scutipennis*

5. Aedeagal apex with a terminal notch (Figs. 161–162); dorsal aedeagal keel a prominent V-shape (Fig. 161) .......... *starki*
Aedeagal apex almost trilobed, with bulging shoulders and median fingerlike lobe (Figs. 156–157); dorsal keel absent (Fig. 156) .......... *litoral*, nov. spec.

6. Dorsal aedeagal keel Y-shaped (Figs. 76, 151) .......... 7
   Dorsal keel absent (Fig. 32) or, if present, not Y-shaped (Figs. 47, 123) .......... 8

7. Aedeagal apex beyond tips of keel X-shaped longer than wide; apex truncate or slightly notched (Fig. 151) .......... *shepardii*, nov. spec. Aedeagal apex beyond tips of keel Y-shaped about as long as wide; apex rounded (Fig. 76) .......... *taipai*, nov. spec.

8. Aedeagus without distinctive, balloon-like ventral membranous lobe (Figs. 28, 167, 187) .......... 9
   Aedeagus with a pair of balloon-shaped ventral membranous lobes (Figs. 20, 102, 142) .......... 14

9. Dorsal aedeagal keel a long, narrow U- or V-shaped structure (Fig. 186) .......... *A. zaga*, nov. spec.
   Dorsal aedeagal keel absent or, if present, not U-shaped (Figs. 27, 86, 171) .......... 10

10. Aedeagal apex without large, lateral, earlike lobes (Figs. 86, 166, 171); pronotum with distinct median yellow band usually covering about 25–30% of disc width (Figs. 83, 163, 168) .......... 12
   Aedeagal apex with a pair of large, lateral, earlike lobes (Figs. 28, 69); median pronotal band usually much narrower than 25% of disc width (Figs. 24, 65) .......... 11

11. Lateral aedeagal wings projecting around bases of shoulders in ventral aspect (Fig. 69) .......... *holzenthali*
   Lateral aedeagal wings not projecting around bases of shoulders in ventral aspect (Fig. 28) .......... *benedetti*

12. Aedeagal apex with shoulders bulging around base of projecting, fingerlike median lobe (Fig. 166); ocellar area dark brown (Fig. 163) .......... *uabi*, nov. spec.
   Aedeagal apex without fingerlike median lobe (Figs. 86, 171); ocellar area pale or diffuse (Figs. 83, 168) .......... 13

13. Forewing length greater than 16 mm; aedeagal apex beyond hooks about as long as wide (Fig. 172) .......... *teofisi*, nov. spec.
   Forewing length less than 12 mm; aedeagal apex beyond hooks about twice as long as wide (Fig. 87) .......... *litera*

14. Dorsal aedeagal keel absent (Figs. 73, 101, 141) .......... 15
   Dorsal aedeagal keel present (Figs. 37, 81, 123) .......... 26

15. Pronotum with dark brown median and lateral to midlateral pigment bands (Figs. 98, 133, 139) .......... 16
   Pronotum without dark brown median and lateral to midlateral pigment bands (Figs. 70, 103, 125) .......... 18

16. Forewing length 10–12 mm; aedeagal apex with bulging shoulders giving a trilobed appearance (Figs. 101, 141) .......... 17
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Forewing length 17–20 mm; aedeagal apex a simple spatulate structure (Fig. 136).

17. Aedeagal hooks expanded preapically (Fig. 102); aedeagal apex much wider at shoulders than at tip (Fig. 101); head without extensive dark pigment lateral to cells (Fig. 98). .......... nigronevata
Aedeagal hooks slender (Fig. 142); aedeagal apex not much wider at shoulders than at tip (Fig. 140); head with extensive area of dark pigment lateral to ocelli (Fig. 138). .......... ratcliffei, nov. spec.

18. Pronotum with pale pigment bordering median suture and forming a yellow band (Figs. 89, 103). .......... 19
Pronotum with at least diffuse brown pigment adjacent to median suture or with pigment not forming bands (Figs. 16, 93). .......... 22

19. Interocellar area filled with dark brown pigment (Figs. 70, 103). .......... 20
Interocellar area filled with yellow or diffuse brown pigment (Figs. 88, 125). .......... 21

20. Dark pigment on central frons reaches or almost reaches anterior margin (Fig. 70); sclerites supporting ventral membranous lobes of aedeagus inconspicuous (Fig. 74).

Dorsal aedeagal keel lines touching or almost touching near midlength (Fig. 81). .......... lineata
Dorsal aedeagal keel lines widely separated throughout their length (Fig. 14). .......... annulicauda

21. Aedeagal apex beyond shoulders narrow, parallel sided, with notched tip (Figs. 128–129); in lateral aspect, sclerotized portion of tip deeply divided from membranous lobes (Fig. 127).

 .................. quadriloba (in part)
Aedeagal apex beyond shoulders about as wide as long, barrel shaped with truncate tip (Figs. 91–92); in lateral aspect, sclerotized portion of tip and membranous portion form a continuous process (Fig. 90).

 .................. olmec, nov. spec.

22. Ocellar area and occiput pale or with limited diffuse brown pigment (Fig. 60); aedeagal apex slightly constricted beyond shoulders but margins parallel to tip beyond constriction (Fig. 64).

 .................. flauminta
Ocellar area and occiput with extensive dark pigment (Figs. 16, 29); aedeagal apex variable but not as above. .......... 23

23. Aedeagal apex distinctively expanded beyond shoulders (Figs. 33, 97); hammer thimble shaped (Figs. 25, 35). .......... 24
Aedeagal apex beyond shoulders with parallel or convergent margins (Figs. 20, 57); hammer dome shaped (Fig. 55). .......... 25

24. Pronotum dark over most of disc (Fig. 29); femora brown. .......... brailovskii, nov. spec.
Pronotum yellow over most of disc (Fig. 93); femora banded. .......... nauini

25. Aedeagal apex beyond shoulders with lateral margins almost parallel (Fig. 20); wings usually slightly brachypterous; known only from Chi-

huahua, Mexico. .......... barraoani, nov. spec.
Aedeagal apex beyond shoulders with lateral margins convergent (Fig. 57); wings macropterus; known from southern Mexico and Honduras. .......... flavifacies

26. Pronotum with dark brown median and lateral to midlateral pigment bands (Figs. 11, 34, 39, 138). .......... 27
Pronotum without dark brown median and lateral to midlateral pigment bands (Figs. 6, 44, 49, 173). .......... 32

27. Aedeagal apex with shoulders bulging, giving a trilobed appearance (Figs. 42, 123). .......... 28
Aedeagal apex simple without trilobed appearance (Figs. 14, 37, 81, 146). .......... 29

28. Dorsal aedeagal keel a long, prominent, close-set ridge (Fig. 123). .......... planicollis
Dorsal aedeagal keel a pair of short, widely separated, obscure lines (Fig. 42). .......... contrerasi, nov. spec.

29. Aedeagal apex turned sharply ventrad beyond shoulders (Figs. 36). .......... bueno, nov. spec.
Aedeagal apex not turned ventrad (Figs. 13, 80, 145). .......... 30

30. Aedeagal tip about half as wide as aedeagal apex beyond notches at shoulders (Figs. 145–146).

 .................. senahu, nov. spec.
Aedeagal tip almost as wide as aedeagal apex beyond notches at shoulders (Figs. 14, 81). .......... 31

31. Dorsal aedeagal keel lines touching or almost touching near midlength (Fig. 81). .......... lineata
Dorsal aedeagal keel lines widely separated throughout their length (Fig. 14). .......... annulicauda

32. Ocellar area filled with dark pigment (Figs. 6, 44).

 .................. 33
Ocellar area filled with yellow to diffuse brown pigment (Figs. 125, 173).

 .................. 35

33. Pronotum almost entirely dark; dark ocellar pigment extends to M-line (Fig. 6); forewing length at least 13 mm; aedeagus as Figs. 8–10. .......... athliops
Pronotum disc with extensive pale pigment (Figs. 44, 178). .......... 34

34. Pronotum with wide median yellow band and dark ocellar pigment spot small (Fig. 44); forewing length at most 10 mm; aedeagus as Figs. 46–48. .......... coronata
Pronotum entirely yellow or orange; head almost entirely dark brown (Fig. 178); forewing length 15 mm; aedeagus as Figs. 180–182. .......... zacutus, nov. spec.

35. Dorsal aedeagal keel of 2 close-set, low ridges (Fig. 32); ventral membranous lobes obscure (Fig. 53). .......... costula
Dorsal aedeagal keel V-shaped (Figs. 128, 176); ventral membranous lobes distinct (Figs. 129, 177).

 .................. 36
Aedeagal apex at shoulders constricted (Figs. 128–129); dorsal keel lines irregular (Fig. 128); known from southern Mexico and Guatemala.

Aedeagal apex at shoulders not constricted (Figs. 176–177); dorsal keel lines straight (Fig. 176); known only from Arizona, USA.

**TREATMENT OF SPECIES**

**Anacroneuria acutipennis** Klapálek

(Figs. 1–5)


**MATERIAL.**—Lectotype ♀ (NMPC), Guatemala.

**DISTRIBUTION.**—Costa Rica, Guatemala, and Panama.

**COMMENTS.**—Stark (1998) redescribed the adults of this species, but no additional specimens beyond the *A. expansa* lectotype are known for the area of upper Mesoamerica. The aedeagus (Figs. 3–5) and the head and pronotum (Fig. 1) are shown for comparison with regional species.

**Anacroneuria aethiops** (Walker)

(Figs. 6–10)


*Anacroneuria aethiops* Needham and Broughton, 1927: 116.

**MATERIAL.**—Mexico: Chiapas, Palenque, 19 May 1984, A. Ibarra, 1 ♀ (UNAM); Chiapas, 9 km SW Palenque ruins, 200 m, 24 April 1993, G. Eickwort, 1 ♂ (INHS); Oaxaca, 8 km S Valle Nacional, 25 May 1981, C.M. & O.S. Flint, 1 ♀ (USNM); Puebla, 5ª Laguna de Zampoala, 30 June 1979, Padilla, 1 ♂ (UNAM); Veracruz, Santiago Tuxtla, Cerro del Vigía, 2 April 1965, L. Vásquez, 1 ♂, 2 ♀ (UNAM).

**ADULT HABITUS.**—Head with dark pigment over ocelli, extending forward to M-line and beyond as a small triangular area. Pale callosities lateral to ocelli prominent; lappets brown (Fig. 6). Pronotum brown but with pale spots along median line and at anterolateral corners. Wing membrane and veins brown except apical half of costa pale. Femora banded; apical third of hind femora and apical half of fore femora dark; tibiae and cerci entirely dark brown.

**MALE.**—Forewing length 11–13.5 mm. Hammer thimble shaped. Aedeagal apex a simple, truncate structure, constricted subapically and gradually narrowed beyond constriction to tip (Figs. 9–10); ventral membranous lobes large, oval, and with a dark parenthesis-shaped supporting sclerite (Fig. 10); dorsal keel short but prominent, consisting of a pair of divergent, short ridge lines (Fig. 9); aedeagal apex somewhat boot shaped in lateral aspect (Fig. 8). Aedeagal hooks slender (Fig. 10).

**FEMALE.**—Forewing length 15–19 mm. Subgenital plate weakly 4-lobed; mesal notch relatively deep and wide, inner lobes separated from lateral lobes by a shallow emargination (Fig. 7). Sternum 9 transverse sclerite un sclerotized but posterior margin with a relatively thick setal row; mesal sclerite with fine, short, median setal patch and slightly longer setae laterally.

**NYMPH.**—Unknown.

**DISTRIBUTION.**—Mexico.

**COMMENTS.**—Although Needham and Broughton (1927) do not indicate they studied the holotype, their assigning of the name to this “big black species with banded legs” seems eminently reasonable. One of us (BCK) examined the female holotype in the British Museum, and although it is pinned and in generally poor condition, we concur with Needham and Broughton (1927) and with Jewett (1958) in their association of *Perla aethiops* Walker with this species.

**Anacroneuria annulicauda** (Pictet)

(Figs. 11–15)


**MATERIAL.**—Guatemala: El Progresso, 24.5 miles NE Guatemala City, Puente Punta Gorda, 5 August 1966, University of Kansas Mexican Expedition, 1 ♂ (SEMC); Suchitepéquez, Finca Moca, 12 June 1966, O.S. Flint & Ortiz, 1 ♂, 1 ♀ (USNM). **Honduras:** Río Hamuya, NW Comayagua, 3 August 1967, O.S. Flint, 1 ♂ (USNM). **Mexico:** Arroyo del Refil- ian, Tecpán, 23 September 1963, 1 ♂ (BPSC); Chiapas, 6 June 1969, 2 ♂ (CNCI); Chiapas, jct. Hwy 1908-195, 7 May 1969, J.E.H. Martin, 2 ♂ (CNCI); Chiapas, El Chorreadero, E Tuxtla Gtz, 13 June 1959, P.K. Lago & S. Testa, 1 ♂, 1 ♀ (PKLC); Guerrero, Zihuaquia, km 95,

**Adult Habitus.**—Head with dark pigment extending from ocelli to M-line and beyond as a mesal tongue-shaped area; lappets brown (Fig. 11). Pronotum with median and lateral dark bands; lateral bands with scattered rugosities and a larger marginal pale area (Fig. 11). Wing membrane pale amber; veins brown but costa pale. Femora pale except for narrow, dark apical band; tibiae pale brown.

**Male.**—Forewing length 11–12 mm. Hammer thimble shaped with apical diameter subequal to height. Aedeagal apex a wide, apically rounded, and gradually narrowed scoop (Figs. 14–15); ventral membranous lobes well developed (Fig. 15); hooks slender (Fig. 15); dorsal keel of 2 widely separated and apically divergent ridges (Fig. 14).

**Female.**—Forewing length 15–17 mm. Subgenital plate 4-lobe but with small inner lobes and much shorter than wide lateral lobes; mesal notch wide, U-shaped; lateral lobes with outer shoulders projecting well beyond inner shoulders (Fig. 12). Transverse sclerite of sternum 9 absent; posterior margin of mesal sclerite with deep V-shaped notch; median patch of setae on mesal sclerite short and sparse; lateral setae longer.

**Nymph.**—Unknown.

**Distribution.**—Guatemala, Honduras, and Mexico.

**Comments.**—This species is closely related to *A. lineata* (Navas) and because the 2 species share a similar color pattern and are sympatric, confusion has occurred. We address this in the comments section for *A. lineata*. We accept the synonymy of *N. guatemalensis* as proposed by Zwick (1972).

**Anacroneuria baumanni, spec. nov.** (Figs. 16–23)


**Adult Habitus.**—Head pattern with pale brown pigment over ocelli, extending forward to pale spot at M-line and beyond pale spot as a tongue-shaped patch; lappets brown (Fig. 16). Pronotum with obscure, linear brown areas near midline and with irregular, dark midlateral bands on disc (Fig. 16).

**Male.**—Brachypterous or macropterous. Forewing length 7–12 mm. Hammer reduced to a low, mound-shaped structure. Aedeagal apex a narrow scoop extending forward from broad sinuate shoulders (Figs. 19–20); ventral membranous lobes large (Fig. 20); tip truncate or slightly emarginate (Figs. 19–20); apex somewhat boat shaped in lateral aspect (Fig. 18); aedeagal hooks slender (Fig. 20); dorsal keel absent (Fig. 19).

**Female.**—Slightly brachypterous or macropterous. Forewing length 10–14 mm. Subgenital plate emarginate and distinctly pigmented (Fig. 17). Transverse sclerite of sternum 9 divided mesally; membrane beyond sclerite with
Figs. 1–5. Anacroneuria acutipennis Klapálek: 1, adult head and pronotum; 2, male sternum 9; 3, aedeagus, lateral; 4, aedeagus, dorsal; 5, aedeagus, ventral.
Figs. 6–10. Anacroneuria aethiops (Walker): 6, adult head and pronotum; 7, female subgenital plate; 8, aedeagus, lateral; 9, aedeagus, dorsal; 10, aedeagus, ventral.
Figs. 11–15. *Anacroneuria annulicauda* (Pictet): 11, adult head and pronotum; 12, female subgenital plate; 13, aedeagus, lateral; 14, aedeagus, dorsal; 15, aedeagus, ventral.
Figs. 16–20. Anacroneuria baumanni, nov. spec.: 16, adult head and pronotum; 17, female subgenital plate; 18, aedeagus, lateral; 19, aedeagus, dorsal; 20, aedeagus, ventral.
dense microtrichia patch; mesal sclerite very sparsely setose with fine, short setae.

**Nymph.**—Preemergent body length 12–14 mm. Dorsum of head brown but with paired pale spots lateral to ocelli and near transverse pale band at base of labrum; pale M-line complete or almost complete, usually consisting of 2 anterolateral bars and a mesal bar near center of frons; most of occiput pale (Fig. 21). Pronotum dark brown but with scattered pale areas on disc; margins of pronotum completely fringed with thick bristles, somewhat variable in length. Femora with well-developed dorsal setal fringe; transverse bristle row absent, but anterior surface covered with short and moderate-length bristles and dark clothing hairs except for hairless median bar; ventral surface fringed with fine, short setae and interspersed bristles (Fig. 22). Cercal segments armed with irregular whorls of thick bristles; longest bristles...
on apical segments about two-thirds as long as segment (Fig. 23); inner dorsal margins with a sparse fringe of silky setae.

**DISTRIBUTION.**—Mexico.

**DIAGNOSIS.**—Many specimens of this species are brachypterous, a condition not previously reported for any *Anacroneuria*. The aedeagus (Figs. 18–20) is similar to that of *A. maritza* Stark from Costa Rica (Stark 1998) but lacks the well-developed dorsal keel typical of that species. An emarginate, distinctively pigmented subgenital plate (Fig. 17) is uncommon among *Anacroneuria* species and is otherwise unknown among the Mexican species.

**COMMENTS.**—Specimens were collected from small to larger streams flowing through pine forests. Adults could be found under rocks and in streamside debris, like species of Neartic Perlodinae.

**ETYMOLOGY.**—The species name honors our colleague and friend, Richard W. Baumann, Brigham Young University, ardent student of Plecoptera and one of the collectors of the type series for this species. His remarkable leadership on several collecting expeditions into Mexico resulted in the collection of much valuable material for this study.

*Anacroneuria benedettoi* Stark
(Figs. 24–28)


**MATERIAL.**—Honduras: Galveston, 9 November 1936, A.B. Gurney, 1 ♀ (USNM).

**COMMENTS.**—This species was previously known to be from Costa Rica and Panama (Stark 1998). The aedeagus (Figs. 26–28) and the head and pronotum (Fig. 24) are shown for comparison with other regional species.

*Anacroneuria brailovskyi*, spec. nov.
(Figs. 29–33)


**ADULT HABITUS.**—Head with dark pigment over occiput and ocelli, extending laterally to eyes and forward to M-line; darker area encloses pale oval calllosities anterolateral to ocelli (Fig. 29); lappets diffuse brown, frons anteriorly yellow. Pronotum mostly dark brown to black but with scattered darker rugosities and paler anterolateral marginal area (Fig. 29). Wings and veins dark brown except paler costa. Fore femora dark brown but with small sub-apical pale median spot; tibiae dark brown.

**MALE.**—Forewing length 16–17 mm. Hammer a low thimble with apical diameter subequal to height. Aedeagal apex simple, scoop shaped with tip flared from shoulders and relatively straight in lateral aspect (Fig. 31); margins of tip form a trough-shaped structure with shallow V-shaped apical notch; membranous ventral lobes well developed (Fig. 33). Dorsal aedeagal keel absent (Fig. 32); aedeagal hooks slender (Fig. 33).

**FEMALE.**—Forewing length 22 mm. Subgenital plate distinctly 4-lobed, but lateral and median notches shallow; sternum 9 transverse sclerite absent; mesal sclerite deeply notched with V-shaped membranous area. Mesal sclerite with fine, short median setal patch and slightly longer and thicker setae scattered in lateral patches (Fig. 30). Membrane caudal to mesal sclerite densely covered with fine microtrichia.

**NYMPH.**—Unknown.

**DISTRIBUTION.**—Mexico.

**DIAGNOSIS.**—The aedeagus of *A. brailovskyi* is very similar to that of *A. naomi* Needham and Broughton, but that species has an obscure dorsal aedeagal keel (Fig. 96), and the aedeagal tip is more flattened (less trough shaped) and truncate rather than notched (Figs. 96–97). The female subgenital plate of *A. brailovskyi* is virtually identical to that of *A. naomi*. The 2 species are most easily distinguished by the pronotal color pattern, essentially bright yellow in *A. naomi* and black in *A. brailovskyi*. Additionally, the femora of *A. naomi* are conspicuously banded, whereas in *A. brailovskyi* the femora are almost unicolorous brown.

**ETYMOLOGY.**—The patronym honors Dr. Harry Brailovsky, the eminent heteropterist from Universidad Nacional Autónoma de México, in recognition of his extensive studies of Mexican insects. Additionally, he facilitated several enjoyable stonefly-collecting trips in Mexico.
Anacroneuria buenoi, spec. nov.  
(Figs. 34–38)

**Types.**—Holotype ♀ and 2♂, 1♀ para-
types, Mexico: Veracruz, Río Jamapa, 6 km N Coscomatepec, 26 May 1981, J. Bueno (UNAM). Additional paratypes, same locality but C.M. and O.S. Flint, 2♂ (USNM); same locality but 2 May 1981, C.M. & O.S. Flint, 1♀ (USNM).

**Adult habitus.**—Head with dark ocellar spot extending to M-line and beyond as a diffuse, tongue-shaped area; darker rings surround ocelli; lappets brown (Fig. 34). Pronotum with narrow median brown band and wider brown marginal bands (Fig. 34). Hind femora pale but with dorsoapical area diffuse brown; tibiae brown. Wing membranes transparent; veins brown.

**Male.**—Forewing length 12.5 mm. Hammer cylindrical (Fig. 35). Aedeagal apex turned sharply ventrad beyond shoulders and foot shaped in lateral aspect (Fig. 36); apex truncate at tip in ventral aspect (Fig. 38) but more rounded from dorsum (Fig. 37) and longer than shown in Figures 37–38 due to the sharply angled apex. Dorsal keel broadly V-shaped with apical section beyond keel set distinctively higher than aedeagal body at shoulders (Fig. 37). Hooks slender but with a prominent ventral keel (Fig. 38).

**Female.**—Unknown.

**Nymph.**—Unknown.

**Distribution.**—Mexico.

**Diagnosis.**—The head and pronotal patterns of *A. buenoi* (Fig. 34) are similar to those of *A. nigrolineata* (Fig. 98), *A. lineata* (Fig. 78), and several others, but the relatively long, sharply downturned aedeagal apex with V-shaped dorsal keel will easily distinguish *A. buenoi*. It is interesting to note that both *A. buenoi* and *A. brailovskyi* were collected at the same location and time.

**Etymology.**—The patronym honors Dr. Joaquin Bueno-Soria, a trichopterist from Universidad Nacional Autónoma de México. He collected the type and other specimens used in this study. Additionally, Dr. Bueno-Soria assisted in several collecting trips in Mexico.

Anacroneuria contrerasi, spec. nov.  
(Figs. 39–43)

**Types.**—Holotype ♀; Mexico: Nuevo León, Santiago, Potrero Redondo, 25 March 1984, A. Contreras-Ramos (USNM). Paratypes: same locality, 9 June 1985, A. Contreras-Ramos, 1♂, 1♀ (BYUC); Nuevo León, Arroyo San Juan, on road to Laguna de Sanchez, 3.5 km W La Ciénega, 1400 m, 13 May 1987, S. Harris & A. Contreras-Ramos, 1♀ (BYUC).

**Adult habitus.**—Head with dark ocellar spot extending to M-line and beyond as a tongue-shaped area of diffuse brown; lappets brown (Fig. 39). Pronotum with median and midlateral dark bands; lateral margins pale (Fig. 39). Wing membrane pale brown; veins brown except costa. Fore femora dark on dorsal surface and at knee, pale on venter; hind femora pale except at knee; fore tibiae brown; hind tibiae banded with pale mesal area between dark apical and basal bands.

**Male.**—Forewing length 12–13 mm. Hammer a low, moundlike structure. Aedeagal apex with shoulders projecting to give a trilobed appearance (Figs. 42–43); truncate or emarginate mesal lobe projecting well beyond earlike lateral lobes (Figs. 42–43); large membranous lobes cover lateral lobes (Fig. 43). Dorsal keel an obscure, low, and wide structure without distinct ridges (Fig. 42). Hooks moderately wide and somewhat scythe shaped (Fig. 43). Lateral aspect of aedeagal apex foot shaped with distinctive heel and flat sole (Fig. 41).

**Female.**—Forewing length 17 mm. Subgenital plate bilobed; truncate lobes with outer shoulder angulate and projecting slightly beyond inner shoulder; mesal notch V-shaped (Fig. 40). Transverse sclerite of sternum 9 absent, but posterior margin of mesal sclerite with dense, irregular row of thick setae; mesal sclerite with median patch of short, thin setae and lateral patches of longer and thicker setae. Intersegmental membrane of sternum 9 covered with fine microtrichia.

**Nymph.**—Unknown.

**Distribution.**—Mexico.

**Diagnosis.**—This species is closely related to *A. planicollis*, and females of the 2 species appear very similar and difficult to separate. Usually with *A. planicollis* the notch is more U-shaped (Fig. 121). The species are most readily distinguished by the aedeagus. The dorsal keel is a thin, elevated median ridge in *A. planicollis* (Fig. 123) and an obscure, low structure in *A. contrerasi* (Fig. 42).

**Etymology.**—The species name honors the megalopteran specialist Dr. Atilano Contreras-Ramos, collector of the type series.
Figs. 24–28. *Anacroneuria benedettoi* Stark: 24, adult head and pronotum; 25, male sternum 9; 26, aedeagus, lateral; 27, aedeagus, dorsal; 28, aedeagus, ventral.
Figs. 29–33. Anacroneuria brailowskyi, nov. spec.: 29, adult head and pronotum; 30, female subgenital plate; 31, aedeagus, lateral; 32, aedeagus, dorsal; 33, aedeagus, ventral.
Figs. 34–38, *Anacroneuria buenoi*, nov. spec.: 34, adult head and pronotum; 35, male sternum 9; 36, aedeagus, lateral; 37, aedeagus, dorsal; 38, aedeagus, ventral.
Figs. 39–43. *Anacroneuria contrerasi*, nov. spec.: 39, adult head and pronotum; 40, female subgenital plate; 41, aedeagus, lateral; 42, aedeagus, dorsal; 43, aedeagus, ventral.
Anacroneuria coronata Needham and Broughton
(Figs. 44–48)

Anacroneuria coronata Needham and Broughton, 1927: 117. Holotype ♂ (CUIC), Mexico.

Material.—Honduras: Dept. Comayagua, Rancho Chiquita, km 62, 2800 feet, 7 June 1964, Blanton, Broce, & Woodruff, 3 ♂, 2 ♀ (FSCA); same locality, 29 May 1964, Blanton, Broce, & Woodruff, 1 ♂, 1 ♀ (FSCA); Olancho, Sierra de Agalta National Park, 9 June 1995, S. Wells, 1 ♂ (BYUC); Olancho, Los Botaderos, N of Los Escuentros, 5 August 2002, S. Wells, 1 ♂ (CSUC). Mexico: Chiapas, jct. Hwy 1908-195, 7 May 1969, J.E.H. Martin, 2 ♂ (CNCI); Chiapas, Río Lacanja, 22 km N Ocosingo, 19
May 1981, C.M. & O.S. Flint, 4♂ (USNM); Sallé, no other data, holotype ♀ (CUIC).

**ADULT HABITUS.**—Head mostly yellow but with a small brown spot between ocelli and with dusky bars extending along suture toward compound eyes; lappets brown (Fig. 44). Mesal yellow pronotal band covers about one-third of disc; disc darker laterally but with scattered pale rugosities (Fig. 44). Wing membrane pale brown; veins brown. Fore femora yellow in basal half and brown apically; mid- and hind femora with basal two-thirds yellow; tibiae brown.

**MALE.**—Forewing length 8–9 mm. Hammer thimble shaped; height greater than apical diameter. Aedeagal apex simple but with stair-step attenuations at the shoulders; ventral membranous lobes large (Figs. 47–48). Dorsal keel short and divergent towards apex (Fig. 47).

**FEMALE.**—Forewing length 11–12 mm. Subgenital plate bilobed with a small, mesal U-shaped notch; lobes of plate truncate but with outer shoulder extending beyond inner shoulder (Fig. 45). Transverse sclerite of sternum 9 narrow and rather densely hirsute; median sclerite with fine, short setae in mesal patch and longer setae laterally.

**NYMPH.**—Unknown.

**DISTRIBUTION.**—Honduras and Mexico.

**COMMENTS.**—The holotype male is in poor condition, and the abdomen is missing. Needham and Broughton (1927) described *A. coronata* as a species with a large expanse of yellow on the head and only limited brown pigment “not enveloping the ocelli.” Indeed, the holotype seems to lack any dark pigment on the head, although the condition of the specimen leaves this ambiguous at best. The sample of fresh material includes a pale, probably teneral specimen in which the ocellar spot is indistinct and could be easily overlooked. Furthermore, the aedeagal figure in Needham and Broughton (1927) drawn *in situ* is shown to have the area beyond the hooks relatively short; among small Mexican *Anacroneuria* species, this characteristic is exhibited only by *A. coronata.*

*Anacroneuria costana* (Navas)  
(Figs. 49–53)

*Neoperla costana* Navas, 1924: 72. Holotype ♂ (MNHN), Costa Rica.  

**MATERIAL.**—Mexico: Chiapas, 3 miles S Motozintla, 3 June 1969, H.J. Teskey, 3♂ (CNCI); Chiapas, 5 miles N Ixhuatan, 9 September 1985, B. Batchliff & C. Messenger, 1♂ (UNSM); Oaxaca, Puente Jalatenca, Rt. 175, 5 km Portilla del Rayo, 1 November 1987, R. Barba & F. Arias, 1♂, 2♀ (UNAM); Sonora, Maycoba River W of Maycoba, 21 August 1986, R.W. Baumann, B.C. Kondratieff, & B. Sargent, 1♂, 3♀ (BYUC); Sonora, creek 3 miles W of Maycoba River, 21 August 1986, R.W. Baumann, B.C. Kondratieff, & B. Sargent, 5♂, 2♀ (BYUC); Veracruz, Fortín de las Flores, Cerv cerería Moctezuma, 10 June 1964, D. Rabago, 1♂ (FSCA); same locality, 30 June 1964, D. Rabago, 1♂ (FSCA); same locality, 23 July 1964, D. Rabago, 2♂ (FSCA); Veracruz, Cordoba, 20–29 July 1966, A.B. Lau, 1♂ (USNM).

The aedeagus (Figs. 51–53) and the head and pronotum (Fig. 49) are shown for comparison with regional species.

**PUTATIVE FEMALE.**—Forewing length 14–15 mm. Subgenital plate bilobed; notch V-shaped, lobes truncate with outer shoulders projecting slightly beyond inner shoulders (Fig. 50). Transverse sclerite of sternum 9 narrow and lightly sclerotized; mesal sclerite with median patch of fine, short setae and larger setae in lateral patches.

**NYMPH.**—Unknown.

**DISTRIBUTION.**—Costa Rica and Mexico.

**COMMENTS.**—Mexican specimens are larger and slightly darker than those reported from Costa Rica by Stark (1998). In addition, some specimens have a slight constriction of the aedeagal apex at the shoulders and the ventral membranous lobes are more conspicuous than those of the Costa Rican specimens. These Mexican specimens may represent 1 or more sibling species, but the matter is best left unresolved until more samples are available. The aedeagus (Figs. 51–53) and the head and pronotum (Fig. 49) are shown for comparison with other regional species. The female was previously not described.

*Anacroneuria flavifacies* Jewett  
(Figs. 54–57)


**MATERIAL.**—Mexico: Temascaltepec, Real de Arriba, 4 June 1933, holotype ♂ (CASC).

**ADULT HABITUS.**—Head and pronotal pattern...
obscured by specimen condition, but head apparently with dark pigment over ocelli, extending laterally to near inner margins of compound eyes, posteriorly over occiput and over lappets; pronotum brown with scattered pale rugosities on disc (Fig. 54). Legs dark brown; wing membrane and veins dark brown.

**MALE.**—Forewing length 17.5 mm. Hammer a small, dome-shaped structure (Fig. 55). Aedeagal apex damaged, but tip apparently a simple, broad scoop with a pair of ventral membranous lobes; aedeagal keel absent; hooks slender (Figs. 56–57).

**FEMALE.**—Unknown.

**NYMPH.**—Unknown.

**DISTRIBUTION.**—Mexico.

**COMMENTS.**—This is one of the larger species of Mexican *Anacroneuria*, but it is still known only from the damaged male holotype in the California Academy of Sciences collection. The type was previously pinned and transferred to alcohol. The body is in 4 major pieces: head and pronotum, remainder of thorax and wings, basal abdominal segments through segment 9, and abdominal segment 10. The aedeagus, with damaged tip, is in a microvial. Recognition of this species from fresh material should be possible despite the poor condition of the holotype.

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**Anacroneuria flavolineata** Jewett (Figs. 58–59)


**MATERIAL.**—**Guatemala:** Alta Verapaz, Lanquin, 1000 feet, 8 June 1948, R.D. Mitchell, 6 ♀ paratypes (FMNH); same locality, 5 June 1948, R.D. Mitchell, 3 ♀ paratypes (FMNH). **Mexico:** Veracruz, Tézonapa, 8 August 1941, H. Dybas, 1 ♀ paratype (FMNH).

**ADULT HABITUS.**—Head with pale brown pigment over ocelli; lappets and a median tongue-shaped patch forward of M-line (Fig. 58). Pronotum with broad median pale band; lateral dark bands with scattered pale rugosities. Wing membrane pale amber; veins amber brown except pale apical half of costa. Femora yellow-brown except narrow, dark apical band; tibiae brown.

**MALE.**—Unknown.

**FEMALE.**—Forewing length 20–22 mm. Subgenital plate weakly 4-lobed; inner lobes narrower but about as long as outer lobes (Fig. 59). Transverse sclerite of sternum 9 distinct but often less sclerotized near midline and appearing as a pair of linear sclerites; margin of sternum 9 behind sclerite with a linear patch of setae and a smaller number of setae scattered on sclerite; intersegmental membrane covered with fine microtrichia; median sclerite of sternum 9 with fine, mesal setal patch and slightly longer setae in lateral patches.

**NYMPH.**—Unknown.

**DISTRIBUTION.**—Guatemala and Mexico.

**COMMENTS.**—Jewett (1958) described *A. flavolineata* from 22 female specimens, including the holotype and 10 paratype specimens listed above from the Field Museum of Natural History, Chicago. All but 1 of these are from the type locality, and all clearly represent the same species. The Veracruz specimen, although in poor condition, has the same subgenital plate and sternum 9 features as the Guatemala specimens. The species has some similarities with *A. shepardi*, but the subgenital plate and sternum 9 of that species are distinctive.

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**Anacroneuria flavominuta** Jewett (Figs. 60–64)


**MATERIAL.**—**Honduras:** Olancho, Los Bata-deros, 7 August 2002, S. Wells, 2 ♀ (CSUC). **Mexico:** Chiapas, Santa Ana, 25 February 1931, J. Parra, 1 ♂, 3 ♀ (det. as *A. nigrocincta* by Jewett) (CNCI); Chiapas, Santa Ana, 25 February 1931, A. Dampf, holotype ♀, allotype ♂ (INHS); San Luis Potosí, 1450 feet, 23 July 1953, 1 ♀ (BPSC); Veracruz, Fortín de las Flores, Cervecería Moctezuma, 18 May 1964, Blanton, Broce, & Woodruff, 1 ♀ (FSCA); same locality, 27–28 June 1963, R. Woodruff, 2 ♀ (FSCA); Veracruz, nr. Huatusco, 25–26 July 1965, O.S. Flint & Ortiz, 2 ♀ (USNM).

**ADULT HABITUS.**—Head without distinctive dark pigment pattern. Pronotum mostly pale but with an incomplete midlateral brown band and a more diffuse band along the midline (Fig. 60); the latter is hardly discernable in some specimens. Wing membrane transparent, veins yellow brown, and costa white. Femora pale yellow brown except for dark marginal band at knee; tibiae pale brown.

**MALE.**—Forewing length 11–13 mm. Hammer thimble shaped; height subequal to apical diameter. Aedeagal apex scoop shaped with
truncate margin and sharply constricted base beyond shoulders (Figs. 63–64). Aedeagal hooks slender (Fig. 64); dorsal keel absent or very weak (Fig. 63).

**FEMALE.**—Forewing length 15–17 mm. Subgenital plate broadly bilobed with deep U-shaped notch separating slightly rounded or truncate lobes (Fig. 61). Transverse sclerite of sternum 9 pale and heavily setose; mesal sclerite clothed throughout with short setae; those in median patch shorter and more sparse.

**NYMPH.**—Unknown.

**DISTRIBUTION.**—Confirmed from Honduras and Mexico.

**COMMENTS.**—Paratype specimens from Panama, redescribed by Harper (1992), were placed as *A. curiosa* Stark by Stark (1998). Guatemalan paratypes and much of the Mexi-
Figs. 54–57. Anacroneuria flavifacies Jewett: 54, adult head and pronotum; 55, male sternum 9; 56, aedeagus, lateral; 57, aedeagus, ventral.
can paratype series have not been examined, but based on our experience, several different species are probably represented in this material. Jewett’s (1958) description indicates the pronotum is “yellow . . . over most of median area.” As our figure (Fig. 60) shows, in well-pigmented individuals there is a diffuse brown band along the median suture in addition to the more prominent midlateral bands.

Anacroneuria holzenthali Stark
(Figs. 65–69)


Material.—Honduras: Minas de Oro, Comay, 4000 feet, May 1929, J.R. Edwards, 1♂ (USNM).

Distribution.—Costa Rica, Honduras, and Nicaragua.

Comments.—This species was previously known from Costa Rica and Nicaragua (Stark 1998). The aedeagus (Figs. 67–69) and the head and pronotum (Fig. 65) are shown for comparison with other regional species.

Anacroneuria hoogstraali Jewett
(Figs. 70–74)


Material.—Mexico: Nuevo León, Municipio de Galeana, Galeana, 7250 feet, 8 July 1938, H. Hoogstraal, paratype ♀ (CASC); same locality, 22 July 1938, H. Hoogstraal, holotype ♂, allotype ♂ (FMNH); Nuevo León, Municipio de Santiago, Arroyo San Juan, 3.5 km W La Ciénega, 13 May 1989, S.C. Harris, 4♂ (CSUC); San Luis Potosí, El Salto, 9 June 1961, University of Kansas Mexican Expedition, 3♂, 1♀ (SEMC); San Luis Potosí, El Salto, 19 July 1962, University of Kansas Mexican Expedition, 1♂, 13♀ (SEMC); San Luis Potosí, El Salto, 20 July 1962, University of Kansas Mexican Expedition, 2♂, 11♀ (SEMC); San Luis Potosí, El Salto, 21 July 1962, Naumann, Ordway, & Roberts, 4♂, 14♀ (SEMC); San Luis Potosí, El Salto Falls, 12–14 June 1963, R. Woodruff, 5♂ (FSCA); same locality but 23–24 June 1965, O.S. Flint, 1♂, 2♀ (USNM); San Luis Potosí, Río Salta, 46 km W Antiguo Morelos, 15 May 1989, S.C. Harris, J. Ramos-Contreras, 2♂, 16♀ (CSUC); San Luis Potosí,
ADULT HABITUS.—Head with dark pigment over ocelli, extending over center of occiput, forward to M-line, and beyond as a narrow, tongue-shaped extension; lappets dark brown; elongate linear callosities slanted inward, located anterolateral to ocelli (Fig. 70). Pronotum dark over most of disc but with narrow yellow median band and scattered pale and dark rugosities in

Figs. 60–64. Anacroneuria flavominuta Jewett: 60, adult head and pronotum; 61, female subgenital plate; 62, aedeagus, lateral; 63, aedeagus, dorsal; 64, aedeagus, ventral.
dark pigment band (Fig. 70). Wing membrane brown; veins brown except pale costa; femora and tibiae brown.

**MALE.**—Forewing length 10–12 mm. Hammer thimble shaped; height less than apical diameter. Aedeagal apex long and slender, tip rounded to slightly emarginate; ventral membranous lobes small, circular in outline (Figs. 73–74); aedeagal hooks long and slender; dorsal keel absent (Fig. 73); apex foot shaped in lateral aspect with sole distinctively arched (Fig. 72).

**FEMALE.**—Forewing length 14–15 mm. Subgenital plate bilobed; notch shallow and V-shaped; lobes truncate (Fig. 71). Transverse sclerite of sternum 9 absent; median sclerite clothed with a mesal band of short, fine setae; lateral setae sparse except along margins of sclerite.

**NYMPH.**—Unknown.

**DISTRIBUTION.**—Mexico.

**COMMENTS.**—Anacroneuria hoogstraali is a distinctive, moderate-sized species with brown pigment over much of the head and pronotum (Fig. 70) and the legs. In the holotype the head and pronotal patterns are not as fully developed as in most specimens, but the subgenital plate and sternum 9 features are in full agreement with other specimens we have examined. This species seems especially common in streams in the vicinity of El Salto in the Mexican state of San Luis Potosí.

**Anacroneuria izapa**, spec. nov.

**(Figs. 75–77)**

**TYPES.**—Holotype ♀ and 2♂ paratypes, **Mexico:** Chiapas, San Quintín, Jatate River, 750 feet, 15 March 1935, D.W. Anram, deposited in the Illinois Natural History Survey (INHS).

**ADULT HABITUS.**—Head and pronotal pattern obscure due to specimen condition. Wing membrane pale; veins pale brown.

**MALE.**—Forewing 13–14 mm. Hammer a low thimble with apical diameter subequal to height. Aedeagal apex a short structure with rounded tip and sides constricted subapically (Figs. 76–77); membranous lobes small and elongate oval; outer margins of lobes sclerotized (Fig. 77). Dorsal keel well developed, Y-shaped, with arms reaching margins at point of constriction (Figs. 75–76); hooks slender (Fig. 77).

**FEMALE.**—Unknown.

**ETYMOLOGY.**—The species name, used as a noun in apposition, honors the creators of the distinctive Izapan artistic style known from the Chiapas, Mexico-Guatemala, border region.

**DIAGNOSIS.**—The dorsal aedeagal keel of this species (Fig. 75) is somewhat suggestive of *A. shepardi* nov. spec. (described below), but the 2 species do not appear to be closely related. The aedeagal apex of *A. shepardi* is longer and thinner (Figs. 150–151) than that of *A. izapa*, and the truncate or slightly notched tip is also quite different.

**Anacroneuria lineata** (Navas)

**(Figs. 78–82)**

*Neoperla lineata* Navas, 1924: 73. Holotype ♀ (MNHN), Costa Rica.


**MATERIAL.**—**Belize:** Cayo District, 16.6 km SE Belmopan, 10 August 1993, W.D. Shepard, 1♂ (WDSC); Cayo District, Augustine, 7 August 1993, W.D. Shepard, 2♂ (WDSC); Cayo District, Belmopan Airport, 8 August 1993, W.D. Shepard, 3♂ (WDSC); Stann Creek, Cockscomb Basin, 12 June 1991, T. Myers, 1♂, 1♀ (WDSC); Toledo District, Blue Creek Village, 22 June 1981, D.H. Messersmith & W.E. Steiner, 1♂, 1♀ (USNM); Middlesex, Stann Creek, 2 August 1964, E.C. Welling, 2♂ (AMNH); no locality data, 1♂ (CUIC).

**Guate-**


**Honduras:** Atlantida, Río Congrejal, 500 feet, 14 August 1980, D. Pendleton, 1♂ (CSUC); Estancia de la Virgen, 11–12 August 1965, O.S. Flint & Ortiz, 1♂ (USNM); Zaca, La Unión, 27 October 1972, T.W. Taylor, 2♂ (LACM).

**Nnympha.**—Unknown.

**DISTRIBUTION.**—Mexico.

**ETYMOLOGY.**—The species name, used as a noun in apposition, honors the creators of the distinctive Izapan artistic style known from the Chiapas, Mexico-Guatemala, border region.

**DIAGNOSIS.**—The dorsal aedeagal keel of this species (Fig. 75) is somewhat suggestive of *A. shepardi* nov. spec. (described below), but the 2 species do not appear to be closely related. The aedeagal apex of *A. shepardi* is longer and thinner (Figs. 50–51) than that of *A. izapa*, and the truncate or slightly notched tip is also quite different.
Comayagua, Rancho Chiquita, 29 May 1964, Blanton, Broce, & Woodruff, 1♂, 7♀ (FSCA); same locality, 7 June 1964, Blanton, Broce, & Woodruff, 18♂, 1♀ (FSCA). **Mexico:** Chiapas, Finca Vergel, 23 May 1935, A. Dampf, 1♂ (INHS); Chiapas, Bonampak, 2 May 1978, H. Brailovsky, 1♂, 3♀ (UNAM); Bora Lacantou, 25 May 1984, E. Barrera, 1♂ (UNAM); Chiapas, Camino a Sinojebel, 25 May 1967, G.H. Halfter & P. Royas, 2♂ (UNAM); Chiapas, Chorreradero, 20 June 1987, Thomas, Burne, 3♂, 2♀ (UAZC); Chiapas, El Aguacero, Rt 190, 550 m, 26 October 1983, J. Bueno, 1♂ (UNAM); Chiapas, Lagartera, 10 July 1979, J. Bueno, 1♂ (UNAM); same locality, 20–22 May 1984, A. Ibarrá & M. García, 2♂, 5♀ (UNAM); Chiapas, E. Arriaga, Rt 185, km 135, 9 June 1966, O.S. Flint & Ortiz, 1♂ (USNM); Chiapas, Palenque, 22 May 1965, G.V. Halfter, 1♂ (UNAM); Chiapas, 10 miles N Palenque, 14 June 1971, J.R. Zimmerman, 1♂, 1♀ (BYUC); Chiapas, near Ciudad Cuauhtemoc, El Tapón Pass, 3 September 1959, R.J. Dysart, 1♂ (CNCI); Chiapas, El Aguacero, 26 June 1989, PK. Lago & E.B. Lago, 7♂, 7♀ (PKLC); Chiapas, Santa Elena, 8 April 1979, E. Marino, 1♂ (UNAM); Chiapas, no locality, 6 June 1969, 5♂ (CNCI); El Saltito, Nanchititla National Park, 23 August 1994, R.W. Baumann & B. Kondratieff, 1♂ (CSUC); Michoacán, San Lorenzo, Rt 15, km 206, 14–15 July 1966, O.S. Flint & Ortiz, 6♂ (USNM); Nayarit, 7.3 miles E Huajicori, Mina el Tigre, 12–13 March 1987, N. Bloomfield, 3♂ (LACM); Nuevo León, San‐tiago, Potrero Redondo, 25 March 1984, A. Contreras‐Ramos, 4♂, 2♀ (BYUC); same locality, 9 June 1985, A. Contreras‐Ramos, 1♂ (BYUC); same locality, 20 March 1985, A. Contreras‐Ramos, 1♂ (BYUC); Oaxaca, 1 mile SW Valle Nacional, 15 February–5 April 1961, L. Wolf, 2♂, 3♀ (UMMZ); Puebla, Río Patla near Patla, 19 August 1994, R.W. Baumann & B.C. Kondratieff, 1♂ (BYUC); Puebla, 13 miles E Villa Juarez, 25 June 1953, University of Kansas Mexican Expedition, 1♂ (SEM); San Luis Potosí, El Salto Falls, 11–14 June 1963, R.E. Woodruff, 5♂ (FSCA); San Luis Potosí, El Salto, 17 June 1955, University of Kansas Mexican Expedition, 1♂ (SEM); San Luis Potosí, Río Salta, 46 km W Antigua Morelos, 15 May 1989, S.C. Harris & A. Contreras‐Ramos, 2♂, 6♀ (CSUC); Tabasco, Río Chacamax, Palenque, 6 December 1975, C.M. Flint & O.S. Flint, 1♂, 1♀ (USNM); Tamaulipas, Río Corona, Hwy 85 N of Victoria, 4 July 1985, A. Contreras‐Ramos, 2♂ (BYUC); Tamaulipas, Municipio de Victoria, Cañon del Navillo, 3 August 1988, A. Contreras‐Ramos, 1♂, 1♀ (BYUC); Tamaulipas, Salamanca, 7 miles E Juamare, 29 July 1981, B.C. Ratcliffe & C.L. Messenger, 22♂, 6♀ (UNSM); Veracruz, Cuitláhuac, 24–27 July 1965, O.S. Flint & Ortiz, 2♂ (USNM); Veracruz, Fortín de las Flores, Cervecería Moctezuma, 28 May–3 June 1964, D. Rabago, 5♂, 60♀ (FSCA); same locality, 7–23 July 1964, D. Rabago, 5♂ (FSCA); Veracruz, Los Tuxtlas, Río Maquinas, 4–14 May 1981, C.M. & O.S. Flint, 1♂ (USNM); Veracruz, Río La Palma, La Palma, Los Tuxtlas Biological Station, 18 November 1993, R.W. Baumann, 1♂ (BYUC); Veracruz, Los Tuxtlas, 3 May 1981, D. Orregas, 1♂ (UNAM).

The aedeagus of *A. lineata* is illustrated in Figures 80–82 for comparison with other species of the region.

**Putative female.—** Forewing length 15–16 mm. Subgenital plate 4-lobed; inner lobes narrow; mesal notch U-shaped and deeper than lateral notches; lateral lobes rounded but with outer shoulders projecting well beyond inner shoulders (Fig. 79). Transverse sclerite absent; posterior margin of mesal sclerite with deep U-shaped notch; median patch of setae on mesal sclerite very short; lateral patches with prominent setae.

**Nymph.—** Unknown.

**Distribution.—** Belize, Costa Rica, Guatemala, Honduras, and Mexico.

**Comments.—** Many Mexican specimens of this species have the anterior arms of the dorsal aedeagal keel more distinct (Fig. 81) than in typical Costa Rican specimens but are otherwise indistinguishable. The amount of brown on the head can range from reduced to more extensive (Fig. 78). The female terminalia (Fig. 79) is similar to that of *A. divisa* (Navas) but differs in relative widths of the subgenital plate lobes (Stark 1998). The great similarity in color pattern of *A. annulicauda* and *A. lineata* has led to some confusion in the synonymy of the former species. The female holotype of *A. sulana* shares subgenital plate shape and sternum 9 features more closely with *A. lineata* than with *A. annulicauda*, where Zwick (1972) placed it as a synonym. As Zwick’s figure of the holotype shows and our description emphasizes, *A. annulicauda* has smaller inner subgenital plate lobes that are much shorter than...
Figs. 65–69. *Anacroneuria holzenthali* Stark: 65, adult head and pronotum; 66, female subgenital plate; 67, aedeagus, lateral; 68, aedeagus, dorsal; 69, aedeagus, ventral.
Figs. 70–74, *Anacroneuria hoogstraali* Jewett: 70, adult head and pronotum; 71, female subgenital plate; 72, aedeagus, lateral; 73, aedeagus, dorsal; 74, aedeagus, ventral.
the outer lobes, whereas in Anacroneuria lineata (and the A. sulana holotype) the inner lobes are wider and longer. Consequently, we regard A. sulana as a junior synonym of A. lineata. In addition, the paralectotype of A. guatemalensis (Endlerlein), figured by Zwick (1973), should be assigned to A. lineata rather than to A. annulicauda. Unfortunately, no figure of the lectotype female is presented, and we are accepting Zwick’s (1973) placement of A. guatemalensis as a synonym of A. annulicauda. The aedeagus (Figs. 80–82) and the head and pronotum (Fig. 78) are shown for comparison with other regional species. Anacroneuria lineata appears to be a widespread and common species, especially in Mexico.

Anacroneuria litura (Pictet)  
(Figs. 83–87)  

Anacroneuria izapa, nov. spec.: 75, aedeagus, lateral; 76, aedeagus, dorsal; 77, aedeagus, ventral.
Figs. 78–82. *Anacroneuria lineata* (Navas): 78, adult head and pronotum; 79, female subgenital plate; 80, aedeagus, lateral; 81, aedeagus, dorsal; 82, aedeagus, ventral.
FEMALE.—Forewing length 11–13 mm. Suberect; dorsal keel of 2 moderately long and slender hooks about twice as long as wide; ventral lateral aspect (Fig. 85); apical section beyond than height. Aedeagal apex simple but thick in mer thimble shaped with apical diameter less than height. Aedeagal apex simple but thick in mer thimble shaped with apical diameter less than height. Aedeagal apex simple but thick in mer thimble shaped with apical diameter less than height. Aedeagal apex simple but thick in mer thimble shaped with apical diameter less than height.

Distribution.—Belize, Honduras, Mexico, Nicaragua, and Texas (USA).

COMMENTS.—The Texas, USA, to Nicaragua range of this species is substantially greater than for other regional Anacroneuria species. Available specimens show some variation in expression of the dorsal aedeagal keel, the presence of a keel on the aedeagal hooks, the relative width of the aedeagal apex, and the presence of an ocellar pigment spot. However, available material, especially larger series from single localities, is not available to resolve whether sibling species are involved. Currently, we regard A. proxima, A. crenulata, and A. comanche as synonyms of a single, widespread species. Panamanian specimens listed by Harper (1992) as "A. gr crenulata" should be referred to A. uatsi (Stark 1998).

Anacroneuria mixtca, spec. nov.
(Figs. 88–92)

Types.—Holotype ♂; Mexico: Oaxaca, 90 miles N Oaxaca, 22 May 1969, J.E.H. Martin (CNCI).

Adult habitus.—Head mostly yellow with diffuse brown posterolaterally on occuput, on center of frons, and on lappets (Fig. 88). Pronotum with broad, pale mesal band and brown midlateral bands with scattered darker rugosities (Fig. 88). Wing membrane pale brown; veins amber, but costa pale. Fore femora mostly pale on anterior surface but dark on apicodorsal surface and at knee; fore tibiae brown but with a narrow longitudinal pale band on ventral margin; hind femora pale except at knee; hind tibiae yellow brown.

MALE.—Forewing length 9–10 mm. Hammer thimble shaped with apical diameter less than height. Aedeagal apex simple but thick in lateral aspect (Fig. 85); apical section beyond hooks about twice as long as wide; ventral membranous lobes absent (Figs. 86–87). Hooks slender; dorsal keel of 2 moderately long and narrowly separated weak ridges (Fig. 86).

FEMALE.—Forewing length 11–13 mm. Subgenital plate 4-lobed; inner lobes narrow and separated by wide mesal notch; outer lobes about twice as wide and separated from inner lobes by wide notch (Fig. 84). Transverse sclerite of sternum 9 relatively straight, of uniform width, and bearing a dense setal patch along entire length; mesal sclerite with fine, short setae in median patch and larger setae in lateral patches.

Nymph.—Unknown.

Distribution.—Belize, Honduras, Mexico, Nicaragua, and Texas (USA).

COMMENTS.—The Texas, USA, to Nicaragua range of this species is substantially greater than for other regional Anacroneuria species. Available specimens show some variation in expression of the dorsal aedeagal keel, the presence of a keel on the aedeagal hooks, the relative width of the aedeagal apex, and the presence of an ocellar pigment spot. However, available material, especially larger series from single localities, is not available to resolve whether sibling species are involved. Currently, we regard A. proxima, A. crenulata, and A. comanche as synonyms of a single, widespread species. Panamanian specimens listed by Harper (1992) as "A. gr crenulata" should be referred to A. uatsi (Stark 1998).

Anacroneuria mixtca, spec. nov.
(Figs. 88–92)

Types.—Holotype ♂; Mexico: Oaxaca, 90 miles N Oaxaca, 22 May 1969, J.E.H. Martin (CNCI).

Adult habitus.—Head mostly yellow with diffuse brown posterolaterally on occuput, on center of frons, and on lappets (Fig. 88). Pronotum with broad, pale mesal band and brown midlateral bands with scattered darker rugosities (Fig. 88). Wing membrane pale brown; veins amber, but costa pale. Fore femora mostly pale on anterior surface but dark on apicodorsal surface and at knee; fore tibiae brown but with a narrow longitudinal pale band on ventral margin; hind femora pale except at knee; hind tibiae yellow brown.

MALE.—Forewing length 12.5 mm. Hammer thimble shaped, with height subequal to apical diameter (Fig. 89). Aedeagal apex with shoulders projecting laterally, giving a trilobed appearance (Figs. 91–92); median lobe truncate; lateral lobes notched, giving stairstep appearance; membranous lobes large and oval; aedeagal hooks slender (Fig. 92); dorsal keel absent (Fig. 91). Lateral aspect of tip essentially straight (Fig. 90).

FEMALE.—Unknown.

Nymph.—Unknown.

Distribution.—Mexico.

Diagnosis.—This species is similar in aedeagal structure to A. naomi Needham and Broughton, but that species has a much wider
tip and lacks the stairstep shape of the lateral lobes (Fig. 96). In addition, the 2 species have very different color patterns.

**ETYMOLOGY.**—The species name, used as a noun in apposition, honors the Mixteca, or Cloud People culture.

*Anacroneuria naomi*  
Needham and Broughton  
(Figs. 93–97)

*Anacroneuria naomi* Needham and Broughton, 1927: 115.  
Holotype ♀ (CUIC), Alta Verapaz, Senahú, Guatemala.

**MATERIAL.**—**Guatemala:** Alta Verapaz, Finca Trece Aguas, Senahú, 900 m, 27 February 1981, M. Dix, 1 ♀ (USNM); Alta Verapaz, Senahú, holotype ♀ (CUIC). **Mexico:** Oaxaca, Juquita Mixes, September 1971, 1 ♂, 1 ♀ (CNCI); Oaxaca, Juquila, March 1969, W. Miller, 2 ♂ (CNCI).

**ADULT HABITUS.**—Head with dark pigment over ocelli, extending laterally to eyes, posteriorly over occiput; dark area encloses pale oval callosities anterolateral to ocelli (Fig. 93). Pronotum mostly bright yellow in life, pale in preserved specimens (Fig. 93), but sometimes with an irregular, diffuse brown area over central disc (Fig. 93). Wings and veins dark brown except for pale costa. Fore femora pale basally and dark over apical half; mid- and hind femora more sharply banded, with yellow basally and dark brown pigment on apical third; tibiae and tarsi dark brown.

**MALE.**—Forewing length 15–17 mm. Hammer a low thimble with apical diameter subequal to height. Aedeagal apex simple, scoop shaped, with tip flared from shoulders (Figs. 96–97) and relatively straight in lateral aspect (Fig. 95); ventral membranous lobes well developed and attached to earlike, sclerotized lobes at shoulders (Fig. 97). Dorsal keel absent (Fig. 96); hooks slender (Fig. 97).

**FEMALE.**—Forewing length 20–22 mm. Subgenital plate lobes truncate or slightly emarginate; median notch shallow and U-shaped (Fig. 94). Sternum 9 transverse sclerite absent; mesal sclerite deeply notched from posterior margin; sclerite with fine, short median setal patch but slightly longer setae clustered laterally.

**NYMPH.**—Unknown.

**DISTRIBUTION.**—Mexico and Guatemala.

**COMMENTS.**—The female holotype agrees very well with the recent specimens in subgenital plate structure, form, and setation of sternum 9 and in size and general coloration, but Needham and Broughton (1927) and Jewett (1958) describe the head of the holotype as being darker, particularly on the area anterior to the M-line, than the recent material. This may be due to the poor condition of the original material, which was pinned and later removed to alcohol; it seems possible that some of the dark pattern attributed to the holotype might be the result of discoloration. This species is similar to *A. brailovskyi* and *A. zaculeu*, and characters for separation are given under these species.

Jewett's (1958) putative male specimen from "Alta Vera Paz, Guatemala," supposedly in the USNM, was not available for our study.

*Anacroneuria nigrolineata*  
Jewett  
(Fig. 98–102)


**MATERIAL.**—**Mexico:** No specific locality data, A. Dampf, holotype ♀ (INHS); Guerrero, Tierra Colorada, 18 December 1929, A. Dampf, 1 ♂ (INHS); Sonora, Maycoba River, W of Maycoba, 21 August 1986, R.W. Baumann, B.C. Kondratieff, & B. Sargent, 3 ♂, 1 ♀ (BYUC).

**ADULT HABITUS.**—Head with dark ocellar spot extending forward to M-line; a dusky transverse bar forward of M-line connects to
Figs. 83–87. *Anacroneuria litura* (Pictet): 83, adult head and pronotum; 84, female subgenital plate; 85, aedeagus, lateral; 86, aedeagus, dorsal; 87, aedeagus, ventral.
Figs. 88–92. *Anacroneuria mixteca*, nov. spec.: 88, adult head and pronotum; 89, male sternum 9; 90, aedeagus, lateral; 91, aedeagus, dorsal; 92, aedeagus, ventral.
Figs. 93–97. *Anacroneuria naomi* Needham and Broughton: 93, adult head and pronotum; 94, female subgenital plate; 95, aedeagus, lateral; 96, aedeagus, dorsal; 97, aedeagus, ventral.
lappets (Fig. 98). Pronotum with dark mesal and lateral pigment bands and an irregularly shaped midlateral pale area on disc completely surrounded with dark pigment (Fig. 98). Wing membrane and veins brown except for pale apical two-thirds of costa. Fore femora brown, darker at knee; hind femora pale in basal half and brown apically; tibiae rather uniformly brown.

MALE.—Forewing length 10–11 mm. Hammer a short thimble with apical diameter greater than height. Aedeagal apex simple truncate at tip and with moderately sized ventral membranous lobes (Figs. 101–2); shoulders bulging, giving apex a trilobed appearance. Aedeagal hooks scythe shaped, somewhat broad preapically (Fig. 102); dorsal keel absent (Fig. 101); dorsolateral margin almost straight in lateral aspect (Fig. 100).

FEMALE.—Forewing length 15 mm. Subgenital plate bilobed with narrow V-shaped notch separating large truncate lobes; outer shoulders of lobes slightly longer than inner shoulders (Fig. 99). Transverse sclerite of sternum 9 absent; median sclerite uniformly covered with short to moderate-length setae. INTERSEGMENTAL membrane with prominent microtrichia patches.

NYMPH.—Unknown.

DISTRIBUTION.—Mexico.

COMMENTS.—The holotype is in poor condition, but the head and pronotal and leg patterns are distinctive and agree very well in these features and in size and subgenital plate structure with the fresh material. The holotype label bears the name “Anacroneuria nigrolineata,” but S.G. Jewett (1958) published it as A. nigrolineata. The head and pronotum pattern of this species (Fig. 98) is similar to that of A. annulicauda (Fig. 11) and A. lineata (Fig. 78). Jewett also determined many male specimens of these species to be A. nigrolineata.

**Anacroneuria olmec**, spec. nov.

(Figs. 103–107)

TYPES.—Holotype ♂ and 2 ♀, 3 ♀ paratypes, **Mexico**: Veracruz, Fortín de las Flores, Cervecería Moctezuma, 26 June 1964, D. Rabago (FSCA). Additional paratypes, **Mexico**: Puebla, Metlca, 17 February 1977, J. Bueno, 2♂ (UNAM); Veracruz, Fortín de las Flores, Cervecería Moctezuma, 15–18 May 1964, Blanton, Broce, & Woodruff, 6♂, 53♀ (FSCA); same locality, 22 May 1964, D. Rabago, 10♂, 39♀ (FSCA); same locality, 7–14 July 1964, D. Rabago, 3♂, 30♀ (FSCA); same locality, 16 August 1964, D. Rabago, 1♂ (FSCA); Veracruz, Sumidero, Planta de la Cervecería Moctezuma, 18 May 1965, H.V. Weems, 1♂, 22♀ (FSCA); same locality, 26–28 April 1965, H.V. Weems, 1♂, 3♀ (FSCA).

ADULT HABITUS.—Head pattern with brown pigment spot over ocelli extending forward to M-line; lappets brown (Fig. 103). Pronotum with broad pale median band and dark lateral bands; lateral bands with irregular pale rugosities (Fig. 103). Wing membrane pale; veins amber except R and cord crossveins darker and costa pale. Femora mostly pale yellow brown but darker at knee; dark pigment on dorsal surface of fore femora more extensive than on anterior face. Fore tibiae brown; hind tibiae banded with mesal two-thirds yellow.

MALE.—Forewing length 13–14 mm. Hammer thimble shaped, height slightly greater than apical diameter. Aedeagal apex a simple scoop, truncate at the tip, narrowed from the shoulders, and slightly constricted at attachment point of membranous lobes (Figs. 106–107); aedeagal hooks slender (Fig. 107); dorsal keel absent (Fig. 106); lateral aspect foot shaped with arched sole (Fig. 105).

FEMALE.—Forewing length 16–17 mm. Subgenital plate weakly 4-lobed; inner lobes scarcely offset from lateral lobes by shallow notch; mesal notch U-shaped (Fig. 104). Transverse sclerite of sternum 9 absent; mesal sclerite deeply notched and bearing a median patch of fine, short setae and more prominent setae in lateral patches. INTERSEGMENTAL membrane with prominent microtrichia patches.

NYMPH.—Unknown.

DISTRIBUTION.—Mexico.

DIAGNOSIS.—The aedeagus of this species is generally similar to that of A. hoogstraali (Figs. 72–74), but the apical section projecting beyond the hooks is much shorter in A. olmec (Figs. 106–107), and the sclerotized bases of the membranous lobes are more prominent than in A. hoogstraali. In addition, the latter species is darker, the subgenital plate is bilobed (Fig. 71), and the female sternum 9 lacks the large notch in the mesal sclerite.

ETYMOLOGY.—The species name, used as a noun in apposition, honors the people of the Olmec culture.
Anacroneuria pallida Jewett
(Figs. 108–109)


**Material.**—Guatemala: Chimaltenango, Yepocapa, Yepocapa Mun., 4800 feet, 12 May 1948, R.L. Wenzel, holotype ♀ (FMNH); Sierra de las Minas, N of Cabañas, Zacapa, 5500 feet, 8 August 1948, R.D. Mitchell, 1 ♀ female (FMNH).

**Adult Habitus.**—Head entirely yellow; pronotum yellow but with an apparent paler median band (Fig. 108). Wings and veins pale. Femora and tibiae pale except narrow, dark apical femoral band.

**Male.**—Unknown.

**Female.**—Forewing length 22–23 mm. Subgenital plate weakly 4-lobed with small inner lobes separated by deep notch and broad outer lobes separated from inner lobes by shallow emarginations (Fig. 109). Sternum 9 without transverse sclerite, but mesal sclerite with V-shaped mesal membranous notch; mesal sclerite with apical patches of setae separated from basolateral patches by narrow hairless zones; mesal setae shorter and finer than lateral and apical setae.

**Nymph.**—Unknown.

**Distribution.**—Reported from Guatemala and Mexico (Jewett 1958).

**Comments.**—Jewett (1958) described *A. pallida* from 5 large female specimens (forewing length 22–25 mm) and suggested that this species may be greenish in life, but it seems more likely that these specimens are teneral. The holotype terminalia segments were previously cleared, and the subgenital plate is ripped. L. Benedetto studied both specimens listed above and placed a label in the vials identifying them as *A. naomi*. Jewett (1958) also noted similarities in the subgenital plates of these species, and although these appear virtually identical to us in this structure, the major differences in pigment pattern support continued recognition of this species until specimens clearly identifiable as *A. naomi* are found at the type locality of this species. Harper (1992) described a “putative male” for this species from Panama, but the small size (forewing length 12 mm) of this male specimen makes this an unlikely association.

Anacroneuria pareja, spec. nov.
(Figs. 110–114)

*Anacroneuria pareja,* spec. nov.


**Adult Habitus.**—Color pattern obscured by specimen condition but apparently with dark pigment over head forward of ocelli to M-line and extending beyond as a tongue-shaped area; lappets brown; area between ocelli diffuse brown, but suture line behind ocelli brown (Fig. 110). Pronotum with a broad median pale area and dark lateral bands (Fig. 110). Wing membrane transparent, veins brown. Femora and tibiae pale brown.

**Male.**—Forewing length 16 mm. Hammer a low, sclerotized bump (Fig. 111). Aedeagal apex a simple, apically truncate spatula with constriction beyond shoulders (Figs. 113–114); large, oval, membranous lobes attached to shoulders across a wide, sclerotized surface (Figs. 112, 114). Dorsal keel composed of 2 low, short ridges separated by a distinct gap (Fig. 113); hooks slender (Fig. 114).

**Female.**—Unknown.

**Nymph.**—Unknown.

**Distribution.**—Mexico.

**Diagnosis.**—The aedeagus of *A. pareja* is similar to that of *A. quetzalcoatl*, but the latter species lacks a dorsal keel (Fig. 136), and the aedeagal apex in lateral aspect (Fig. 135) is smoothly curved along the dorsal margin from hooks to tip.

**Etymology.**—The species name refers to the pair of dorsal aedeagal keel lines.

Anacroneuria perplexa Stark
(Figs. 115–119)


**Material.**—Belize: Middlesex, Stann Creek, 2 August 1964, E.C. Welling, 1 ♂ (AMNH).

**Guatemala.**—Izabal, nr. Matias de Galvez, 26–27 June 1966, O.S. Flint & Ortiz, 14 ♂, 2 ♀ (USNM); same locality, 14–16 August 1965, O.S. Flint & Ortiz, 1 ♂, 1 ♀ (USNM). Honduras: Dept. Comayagua, Rancho Chiquita, 29 May
Figs. 98–102. Anacroneuria nigrolineata Jewett: 98, adult head and pronotum; 99, female subgenital plate; 100, aedeagus, lateral; 101, aedeagus, dorsal; 102, aedeagus, ventral.
Figs. 103–107. *Anacroneuria olmec*, nov. spec.: 103, adult head and pronotum; 104, female subgenital plate; 105, aedeagus, lateral; 106, aedeagus, dorsal; 107, aedeagus, ventral.
1964, Blanton, Broce, & Woodruff, 1 ♂ (FSCA); same locality, 7 June 1964, Blanton, Broce, & Woodruff, 2 ♂ (FSCA); Dept. Cortes, Rancho Chiquita, 29 May 1964, Blanton, Broce, & Woodruff, 1 ♂ (FSCA); Río Humuya, NW Comayagua, 3 August 1967, O.S. Flint, 1 ♂ (USNM); Lancetilla, no date, M. Bates, 1 ♂ (MCZC). Mexico: Chiapas, jct. Hwy 1908-195, 7 May 1969, J.E.H. Martin, 2 ♂ (CNCI); Chiapas, nr. Ciudad Cuauhtemoc, El Tapón Pass, 3 September 1959, R.J. Dysart, 1 ♂ (CNCI); Chiapas, 6 June 1969, 1 ♂ (CNCI); Chiapas, Ixhuatan, km 3, Carr. Poza Resarita, 11 December 1985, F.Arias, R. Barba, L. Cerrantes, 1 ♂, 2 ♀ (UNAM); Chiapas, Río Lacanja, 22 km, N Ocosingo, 19 May 1981, C.M. & O.S. Flint, 1 ♂, 1 ♀ (USNM); Chiapas, Río Contento, 7 km N Ocosingo, 20 May 1981, C.M. & O.S. Flint, 1 ♂ (USNM); Tabasco, Teapa Río Puyacatengo, 9 December 1985, R. Borba, 2 ♀ (UMMZ).

Putative Female.—Forewing length 12–13 mm. Subgenital plate bilobed with V-shaped mesal notch; lobes truncate to slightly emarginate (Fig. 116). Transverse sclerite of sternum 9 absent; mesal sclerite clothed with short setae, those in median patch shorter.

Nymph.—Unknown.

DISTRIBUTION.—Belize, Costa Rica, Guatemala, Honduras, and Mexico.

COMMENTS.—Mexican specimens are not as dark as Costa Rican specimens, and some subtle aedeagal differences exist. We believe these slight differences represent individual variation. Needham and Broughton (1927) clearly described and illustrated the aedeagus for males of this species as *A. dilaticollis* (Burmeister), a Brazilian species. Because the combination of small size and the absence of a hammer are apparently unique to this species in upper Mesoamerica, we accept the Needham and Broughton determinations from Guatemala, Belize, and Mexico as valid records. The aedeagus (Figs. 117–119) and the head and pronotum (Fig. 115) are shown for comparison with other regional species.

*Anacroneuria planicollis* Klapálek
(Figs. 120–124)


Figs. 110–114. *Anacroneuria pareja*, nov. spec.: 110, adult head and pronotum; 111, male sternum 9; 112, aedeagus, lateral; 113, aedeagus, dorsal; 114, aedeagus, ventral.


Material.—Belize: Cayo District, Mountain Pine Ridge, D’Silva Forestry Station, 24 April 1998, S. Simonson, 1♂ (CSUC). Guatemala: Alta Verapaz, Cacao, Trece Aguas, Schwarz & Barber, 1♂ (USNM); Baja Verapaz, Las Tapias, 25 June 1966, O.S. Flint & Ortiz, 2♂, 5♀ (USNM); El Progreso, Finca la Cajeta, 12–20 August 1965, O.S. Flint & Ortiz, 1♂ (USNM); Baja Verapaz, unnamed stream near Hacienda Pastores, 4900 feet, 12 July 2001, D.E. Baumgardner, 1♂ (CSUC); 1 mile S Quetzaltepeque, 8 May 1947, R.R. Miller, 1♂ (USNM); Volcán, Stallaria, no date, Schaus & D.E. Baumgardner, 1♂ (USNM); Baja Verapaz, unnamed stream near Las Tapias, 25 June 1966, O.S. Flint & Ortiz, 1♂ (USNM); Baja Verapaz, unnamed stream near Hacienda Pastores, 4900 feet, 12 July 2001, D.E. Baumgardner, 1♂ (CSUC); 1 mile S Quetzaltepeque, 8 May 1947, R.R. Miller, 1♂ (USNM); Volcán, Stallaria, no date, Schaus & D.E. Baumgardner, 1♂ (USNM).

Mexico: Chiapas, El Zapote, 13 November 1930, A. Dampf, A. chiapasæ holotype ♀, allotype ♂ (INHS); Chiapas, Finca Vergel, 15 May 1935, A. Dampf, A. daniæi holotype ♀, allotype ♂ (INHS); Chiapas, 6 June 1969, 1♂ (CNCI); Chiapas, San Cristobal, 24 July 1969, D. Kritsch, 2♂ (CNCI); Chiapas, Sta. Isabel, 17 November 1930, A. Dampf, 1♂ (CNCI); Chiapas, 4 miles NE San Cristobal, 26 May 1969, J.M. Campbell, 6♂, 2♀ (CNCI); Chiapas, Parque Laguna Belgica, 12 miles N Ocozocuautla, 8–12 September 1985, B. Ratcliffe & C. Messenger, 1♂ (USNM); Durango, 24 miles W La Ciudad, 7000 feet, 18 July 1964, J.F. McAlpine, 1♂ (CNCI); Guerrero, Acuahuiotla, 28 January 1982, I. Barreya, 1♂ (UNAM); Jalisco, 18 miles NW Guadalajara, 30 April 1961, H.F. Howden & J.E.H. Martin, 2♂ (CNCI); Jalisco, 20 miles SW Autlan, 13 July 1982, 1♂ (LACM); Jalisco, 21.7 miles S Puerto Vallarta, 9 July 1982, 1♂ (LACM); Arroyo Jacual, Nanchititla National Park, 23 August 1994, R.W. Baumann & B.C. Kondratieff, 1♂ (BYUC); Michoacan, 25 km E Morelia, 14 June 1955, R.B. Selander & J.M. Selander, 12♂ (BYUC); Nayarit, Compostela, 30 December 1958, Menke & Stange, 1♂ (LACM); Nayarit, 0.6 miles E Ríitos, 9–11 March 1957, N. Bloomfield, 2♂ (LACM); Oaxaca, Tamazulapan, 7–8 June 1967, O.S. Flint & Ortiz, 1♂, 1♀ (USNM); Oaxaca, Juquila, March 1969, W. Miller, 1♂ (CNCI); same locality, July 1969, W. Miller, 1♂ (CNCI); Puebla, Rio Patla near Patla, 19 August 1994, R.W. Baumann & B. Kondratieff, 2♂ (CSUC); San Luis Potosi, El Salto Falls, 12 June 1963, R.E. Woodruff, 1♂ (FSCA); San Luis Potosi, Palitla, 5 August 1966, O.S. Flint, 1♂, 3♀ (USNM); Sinaloa, 15 miles W El Palmito, 30 July 1964, H.F. Howden & W.R.M. Mason, 2♂ (CNCI); same locality, 16 July 1964, J.F. McAlpine, 2♂ (CNCI); Veracruz, Taza de Agua, Ojo Zarco, 26 August 1994, R.W. Baumann & B.C. Kondratieff, 3♂ (BYUC); same locality, 2♂, 1♀ (CNCI); Veracruz, nr. Huatusco, 25–26 July 1965, O.S. Flint & Ortiz, 1♂ (USNM); same locality, 22–24 July 1965, O.S. Flint & Ortiz, 1♂ (USNM); Veracruz, Cordoba, 6–9 November 1966, A.B. Lau, 1♂ (USNM); Veracruz, Las Cabañas, nr. Sontecomaca, 4–5 December 1975, C.M. & O.S. Flint, 1♂ (USNM); Veracruz, Rio Jamapa, 6 km N Cosomatpepec, 26 May 1981, C.M. & O.S. Flint, 1♂ (USNM).

Distribution.—Belize, Costa Rica, Guatemala, Mexico, Nicaragua, and Panama.

Comments.—The general color pattern of a dark median pronotal band and dark ocellar area (Fig. 120) is shared by at least 6 species in Mexico and Mesoamerica. The others known from Mexico (A. annulicauda, A. lineata, A. nigrolineata, A. contrerasi) are each distinguished from A. planicollis by aedeagal structure (Figs. 122–124), and in some cases the female subgenital plates are also known to be distinctive. Anacroneuria annulicauda (Figs. 14–15) and A. lineata (Figs. 81–82) have little development of the lateral lobes at the aedeagal sheild; consequently, the aedeagal apex in these species does not appear trilobed. In A. nigrolineata (Figs. 100–102) and A. contrerasi (Figs. 41–43), the aedeagal apex is more similar to that of A. planicollis in this respect; however, neither of these species has significant development of the dorsal keel. Separation of A. nigrolineata females (Fig. 99) from those of A. planicollis (Fig. 121) is more difficult because both species have bilobed subgenital plates and poor development of the transverse sclerite of sternum 9, but it should be possible to separate fully pigmented individuals on the basis of the more intense pigmentation on the pronotum and wings of A. nigrolineata (Fig. 98). The aedeagus (Figs. 122–124), the head and pronotum (Fig. 120), and the subgenital plate (Fig. 121) are shown for comparison with other regional species. Along with A. lineata and A. littura, A. planicollis has the widest geographical distribution in Mexico and upper Mesoamerica. In Mexico material was examined from at least 12 states (Table 2).
Anacroneuria quadriloba Jewett
(Figs. 125–132)


Material.—Guatemala: No locality data, 1978–1979, J. Cummings, 1 ♀ (UAZC); Dept. Chiquimula, Padre Miguel, 19 August 1965, O.S. Flint & Ortiz, 2 ♀ (USNM); Dept. Suchitepéquez, Finca Moca, 12 June 1966, O.S. Flint & Ortiz 1 ♂ (USNM); Dept. Alta Verapaz, Rio Lanquique, Samastan, 3 January 1989, B.C. Kondratieff, 15 ♀, 1 ♀ (reared), 1 nymph (CSUC); Dept. Suchitepéquez, Finca Moca, 11 June 1967, O.S. Flint & Ortiz, 1 ♂ (USNM). Mexico: Chiapas, 5 miles N Ixhuatan, 16 September 1985, B. Ratcliffe & C. Messenger, 1 ♂ (UNSM); Oaxaca, Juquila, March 1969, W. Miller, 1 ♂ (CNCI); same locality, May 1970, 1 ♂, 3 ♀ (CNCI); Veracruz, Fortín de las Flores, Cervecería Moctezuma, 15 May 1964, R.E. Woodruff, 2 ♀ (FSCA); Veracruz, nr. Huatusco, 25–26 July 1965, O.S. Flint & Ortiz, 2 ♀, 2 ♀ (USNM); Veracruz, Metlac (between Orizaba and Cordoba), 26 December 1940, H.H. Hobbs & E.N. Young, holotype ♀ (FMNH).

Adult habitus.—Head with diffuse brown pigment patch over ocelli, extending to M-line and forward of line as a tongue-shaped patch; lappets brown (Fig. 125). Pronotum with pale mesal band and irregular midlateral brown bands (Fig. 125). Wing membrane pale, veins pale amber, costa white. Legs pale except narrow dark femoral band at knee.

Male.—Forewing length 17 mm. Hammer a low, moundlike structure with oval apex (Fig. 125). Aedeagal apex a slender, parallel-sided structure with notched tip (Figs. 128–129); membranous lobes massive, covering shoulders and most of apex; bases of lobes attached to small, earlike sclerites scarcely projecting beyond shoulders; shoulders rounded and about twice as wide as apex (Fig. 129); dorsal keel absent or present as a pair of irregular lines on sides of raised aedeagal apex (Fig. 128); in lateral view, tip as in Figure 127; hooks stout at base but slender in apical half (Fig. 129).

Female.—Forewing length 19–21 mm. Subgenital plate weakly 4-lobed with shallow notches and a broad, U-shaped median notch. Sternum 9 without transverse sclerite; mesal sclerite with deep, U-shaped notch; median patch of setae short and fine, lateral patches slightly longer and thicker.

Nymph.—Preemergent body length 16–20 mm. Dorsum of head mostly brown forward of ocelli; pale M-line and transverse pale frontoclypeal band present. Occiput and area between ocelli and compound eyes pale. Pronotum brown except for scattered pale areas on disc (Fig. 130). Pronotal setal fringe complete from midlength of anterior margin to midlength of posterior margin, fringe includes mixed setal lengths, particularly on lateral margins. Fore femur with a transverse anterodorsal bristle row near midlength (Fig. 131); ventral margin with few bristles scattered among the fringe of short, fine setae. Basal and mid-cercal segments with only moderate-length bristles in segmental whorls; apical 9–10 segments clothed with a fine dorsal fringe of silky setae; apical 2–3 segments with fringe extending along dorsal and ventral margins (Fig. 132).

Distribution.—Guatemala and Mexico.

Comments.—The aedeagus of this species is similar to that of A. flavominuta (Figs. 62–64) and to A. shepardi (Figs. 150–152, described below) in general structure. It differs from the former in having a longer and more slender apex and in the earlike lobes supporting the membranous lobes at the shoulder (Figs. 128–129). The male of A. shepardi is distinguished by having a well-developed, Y-shaped dorsal keel (Fig. 151), absent in both A. flavominuta (Fig. 63) and A. quadriloba (Fig. 128). The overall yellow-brown coloration of A. quadriloba is very characteristic, especially in pinned specimens. The allotype male in the Field Museum of Natural History, Chicago, is A. planicollis. We have not examined other para-type males designated by Jewett (1958), but it is likely that some of them represent other species.

Anacroneuria quetzalcoatl, spec. nov.
(Figs. 133–137)

Types.—Holotype ♂, Mexico: Chiapas, 10 miles NE San Cristobal de las Casas, 22 May 1969, H.J. Teskey (CNCI).

Adult habitus.—Head with diffuse brown pigment over ocellar area extending to M-line and beyond as a tongue-shaped area; occipital suture behind ocelli dark brown; lappets brown (Fig. 133). Pronotum with narrow median dark band and diffuse midlateral brown bands (Fig. 133).
Figs. 115–119. *Anacroneuria perplexa* Stark: 115, adult head and pronotum; 116, female subgenital plate; 117, aedeagus, lateral; 118, aedeagus, dorsal; 119, aedeagus, ventral.
Figs. 120–124. *Anacroneuria planicollis* Klapálek: 120, adult head and pronotum; 121, female subgenital plate; 122, aedeagus, lateral; 123, aedeagus, dorsal; 124, aedeagus, ventral.
Figs. 125–129. *Anacroneuria quadriloba* Jewett: 125, adult head and pronotum; 126, male sternum 9; 127, aedeagus, lateral; 128, aedeagus, dorsal; 129, aedeagus, ventral.
MALE.—Forewing length 19.5 mm. Hammer thimble shaped, height subequal to apical diameter (Fig. 134). Aedeagal apex a simple, apically truncate spatula with deep constriction beyond shoulders (Figs. 136–137); large, oval, membranous lobes attached to small, earlike sclerites at shoulders (Fig. 137); dorsal aedeagal keel absent (Fig. 136); hooks long and slender; apex in lateral aspect with dorsal margin smoothly rounded from hooks to tip (Fig. 137).

FEMALE.—Unknown.

NYMPH.—Unknown.

 DISTRIBUTION.—Mexico.

DIAGNOSIS.—The aedeagus of this species is similar to that of *A. shepardi* (Figs. 150–152), *A. pareja* (Figs. 112–114), and *A. flavominuta* (Figs. 62–64) but is distinguished from the former 2 species by the absence of a Y-shaped or double-ridged dorsal aedeagal keel (Fig. 136) and from the latter species by the shape of the aedeagal apex in lateral aspect (Figs. 136–137). In addition, *A. quetzalcoatl* is much larger than these species and has a distinctive, dark brown, Y-shaped suture behind the ocelli (Fig. 133), which is also present in *A. pareja* (Fig. 110).
Figs. 133–137. *Anacroneuria quetzalcourti*, nov. spec.: 133, adult head and pronotum; 134, male sternum 9; 135, aedeagus, lateral; 136, aedeagus, dorsal; 137, aedeagus, ventral.
ETYMOLOGY.—The species name, used as a noun in apposition, is based on the feathered serpent figure of Mesoamerican mythology.

Anacroneuria ratcliffei, spec. nov.
(Figs. 138–142)


ADULT HABITUS.—Head dark brown over ocellar region and extending to anterior margin of head; pale spot in center of frons and pale oval callosities located adjacent to ocelli; lappets not as dark as frons (Fig. 138). Pronotum with narrow median dark brown band and broad lateral brown bands with scattered darker rugosities (Fig. 138). Wing membrane dark; veins brown except costa pale. Femora banded with yellow basal and dark brown apical regions; tibiae brown.

MALE.—Forewing length 13 mm. Hammer thimble shaped. Aedeagal apex a slender, simple, spatulate structure (Figs. 141–142), but shoulders projecting slightly dorsad to ventral membranous lobes (Fig. 141) and with pronounced swollen appearance in lateral aspect (Fig. 140). Aedeagal tip distinctly separated from membranous lobes in lateral aspect (Fig. 140); dorsal keel absent (Fig. 141); hooks slender (Fig. 142).

FEMALE.—Forewing length 16.5–18 mm. Subgenital plate weakly 4-lobed; inner lobes small and only slightly separated from large outer lobes by shallow lateral notches (Fig. 139); outer lobes with caudal margin slanted toward base of mesal notch. Sternum 9 with transverse sclerite absent; mesal sclerite deeply notched and covered with a prominent lateral setal patches and fine, short median setal patch.

Nymph.—Unknown.

DISTRIBUTION.—Mexico.

DIAGNOSIS.—The color pattern of this species is similar to that of A. flavominuta (Figs. 62–64) and A. quetzalcoatl (Figs. 135–37) but differs in slight projections of the shoulders under the membranous lobes, best seen in dorsal aspect (Fig. 141). In addition, this is a much darker species than either of the above, with a dark brown head, banded femora, and pronotum with a dark median band and lateral bands (Fig. 138).

ETYMOLOGY.—The patronym honors the esteemed scarab beetle specialist Dr. Bret C. Ratcliffe, University of Nebraska, the collector of the type series and many other specimens made available to us.

Anacroneuria senahu, spec. nov.
(Figs. 143–147)

TYPES.—Holotype ♂ and paratype ♀ (pinned). Guatemala: Alta Verapaz, Finca Trecce Aguas, Senahú, 800 m, 28 December 1980, M. Dix (USNM).

ADULT HABITUS.—Head with dark brown pigment over ocelli, extending to M-line and beyond as a more diffuse, tongue-shaped area; lappets not as dark as frons (Fig. 138). Pronotum with narrow median dark brown band and broad lateral brown bands with scattered darker rugosities (Fig. 138). Wing membrane dark; veins brown except costa pale. Femora pale brown; tibiae brown but with a pale area at joint.

MALE.—Forewing length 13.5 mm. Hammer thimble shaped. Dorsal sclerite of aedeagal apex thin and appearing shield shaped with truncate tip (Figs. 146–147); hooks slender (Fig. 147); dorsal keel V-shaped and prominently raised on apex of sclerite above aedeagal body (Fig. 146); ventral membranous lobes large (Fig. 147). Lateral aspect of aedeagal apex rather thick (Fig. 145).

FEMALE.—Forewing length 17 mm. Subgenital plate 4-lobed with U-shaped mesal notch and shallow lateral notches; inner lobes smaller than outer lobes (Fig. 144). Sternum 9 transverse sclerite absent; mesal sclerite with a broad, shallow apical notch; sclerite with a distinctive transverse pigment bar, which extends under subgenital plate lobes; lateral areas of sclerite with prominent setal patches; median area with fine, short setae.

Nymph.—Unknown.

DISTRIBUTION.—Guatemala.

DIAGNOSIS.—The color pattern of this species is similar to that of A. lineata (Fig. 78) and several other species; however, the aedeagal apex is distinctive. The short, shield-shaped aedeagal apex and prominent V-shaped keel and truncate tip (Figs. 146–147) are unique to Anacroneuria.
ETYMOLOGY.—The species name, used as a noun in apposition, is based on the type locality, a fruitful collecting locality for new Guatemalan *Anacroneuria*.

*Anacroneuria shepardi*, spec. nov.  
(Figs. 148–152)


**ADULT HABITUS.**—Head with dusky brown pigment over ocelli, extending to M-line; lappets brown (Fig. 148). Broad lateral brown bands of pronotum with several pale rugosities; median band pale (Fig. 148). Wing membrane pale; veins amber except pale costa. Femora dusky brown on dorsum and with a narrow, dark apical band at knee; tibiae pale brown.

**MALE.**—Forewing length 13–14 mm. Hammer thimble shaped with height subequal to apical diameter. Aedeagal apex a simple, narrow, apically truncate or emarginate scoop; apex slightly constricted at shoulders and bearing a pair of large, elongate oval membranous lobes (Figs. 151–152). Dorsal keel Y-shaped with arms reaching lateral margins anterior to constriction of shoulders (Fig. 151). Dorsal margin abruptly elevated at shoulder in lateral aspect and tapered to an acute tip (Fig. 150).

**FEMALE.**—Forewing length 19 mm. Subgenital plate only slightly notched; lateral corners of plate lobes not projecting as much as inner corners (Fig. 149). Transverse sclerite of sternum 9 absent; mesal sclerite with thick row of marginal setae and scattered setae in median and lateral patches.

**NYMPH.**—Unknown.

**DISTRIBUTION.**—Belize, Honduras, and Mexico.

**DIAGNOSIS.**—The aedeagus and color pattern of this species are similar to that of *A. flacominuta* (Figs. 62–64) and *A. quetzalcocatl* (Figs. 135–137). The sharp, Y-shaped dorsal aedeagal keel (Fig. 151) will distinguish *A. shepardi* from both species above, and the female subgenital plate (Fig. 149) is distinctive from all known Mesoamerican *Anacroneuria*, with the possible exception of *A. nigrocincta* (Zwick 1972). The forewing length of 14.5 mm and the more rounded subgenital plate structure illustrated by Zwick (1972) for the lectotype of *A. nigrocincta* would seem to distinguish that species.

ETYMOLOGY.—The patronym honors our friend and colleague Dr. W.D. Shepard for his generous contribution of material used in this and other studies.

*Anacroneuria sonora*, spec. nov.  
(Figs. 153–157)


**ADULT HABITUS.**—Head with pale brown pigment over ocelli, extending to M-line and beyond as a tongue-shaped area; lappets brown (Fig. 153). Pronotum with diffuse brown median band and darker midlateral brown band with scattered rugosities (Fig. 153). Wing membrane and veins brown except pale costa. Fore femora brown on dorsum, pale along ventral margin, dark at knee; tibiae brown; hind femora almost entirely pale but with narrow dark band at knee.

**MALE.**—Forewing length 11–12 mm. Hammer absent or with, at most, a pale oval spot. Aedeagus large but with sides approximately parallel from base of hooks to shoulders; shoulders project slightly, giving a trilobed apex (Figs. 156–157); mid-lobe truncate or rounded at apex (Figs. 156–157); membranous lobes rounded (Fig. 157). Aedeagal hooks scythe shaped (Fig. 157); dorsal keel absent (Fig. 156). Apex gradually curved ventrad in lateral aspect (Fig. 155).

**FEMALE.**—Forewing length 16–17 mm. Subgenital plate bilobed with median notch narrow and inner shoulders of lobes projecting slightly beyond outer shoulders (Fig. 154). Transverse sclerite of sternum 9 absent; mesal sclerite clothed with almost uniformly short setae.
Figs. 138–142. Anacroneuria ratcliffei, nov. spec.: 138, adult head and pronotum; 139, female subgenital plate; 140, aedeagus, lateral; 141, aedeagus, dorsal; 142, aedeagus, ventral.
Figs. 143–147. *Anacroneuria senahu*, nov. spec.: 143, adult head and pronotum; 144, female subgenital plate; 145, aedeagus, lateral; 146, aedeagus, dorsal; 147, aedeagus, ventral.
Figs. 148–152. *Anacroneuria shepardi*, nov. spec.: 148, adult head and pronotum; 149, female subgenital plate; 150, aedeagus, lateral; 151, aedeagus, dorsal; 152, aedeagus, ventral.
NYMPH.—Unknown.

DISTRIBUTION.—Mexico.

DIAGNOSIS.—This species is similar to A. exquisita Stark from Costa Rica (Stark 1998) in hammer structure and general aedeagal shape. However, the aedeagus of A. sonora is almost twice as long as that of A. exquisita, and the latter species has the aedeagal apex offset from the aedeagal body rather than a continuous smooth curve from bases of hooks to apex. Differences also exist in coloration, including the presence of a window beyond the cord in A. exquisita and the presence of a median dark pronotal band in this species. Anacroneuria sonora was collected with A. annulicauda, a species with a similar color pattern (Fig. 11), at both Maycoba River sites.

ETYMOLOGY.—The species name, used as a noun in apposition, is based on the Mexican state of Sonora, the collection locality.

Anacroneuria starki
Fenoglio and Morisi
(Figs. 158–162)


ADULT HABITUS.—Head yellow with diffuse brown pigment patch over ocelli and a smaller triangular patch forward of M-line, lappets brown (Fig. 158). Pronotum with narrow, diffuse brown median band and darker lateral bands (Fig. 158). Wing membrane pale brown; veins dark brown except pale costal area. Fore femora brown on dorsum and in apical third on anterior surface; fore tibiae dark brown in proximal half and apical fourth, pale brown in median area.

MALE.—Forewing length 13 mm. Hammer an obscure membranous mound (Fig. 159). Aedeagal apex simple, scoop shaped, almost as wide as shoulders, and notched at tip (Figs. 161–162); membranous lobes large and elongate oval (Fig. 162); apex wide in lateral aspect (Fig. 160). Dorsal keel V-shaped with apical arms divergent (Fig. 161); hooks slender (Fig. 162).

FEMALE.—Described by Fenoglio and Morisi (2000). The subgenital plate has 4 subequal lobes and the transverse sclerite of sternum 9 is absent.

NYMPH.—Unknown.

DISTRIBUTION.—Honduras and Nicaragua.

COMMENTS.—This species does not appear closely related to others known from Mesoamerica. Perhaps the species with the greatest similarity in aedeagal structures is A. hacha Stark (1998). This species has a similar aedeagal apex but has poorly developed membranous lobes and the dorsal keel is not V-shaped. On the Honduras specimen, the keel ridges meet to form a complete V, but the base of the V is open in the Nicaraguan paratype.

Anacroneuria uatsi Stark
(Figs. 163–167)

MATERIAL.—Honduras: Olancho, La Venta, 3 August 2002, S. Wells, 1  , 4  (CSUC).

DISTRIBUTION.—Costa Rica and Honduras.

COMMENTS.—Stark (1998) described the male, female, and nymph of this species from Costa Rica specimens. The male sternum 9 (Fig. 164), the aedeagus (Figs. 165–167), and the head and pronotum (Fig. 163) are shown for comparison with other regional species.

Anacroneuria wellsi, spec. nov.
(Figs. 168–172)


ADULT HABITUS.—Head yellow or with diffuse brown pigment on central frons and lappets (Fig. 168). Pronotum mostly yellow but with brown pigment spots, grading to pigment bands, near pronotal corners (Fig. 168). Femora and tibiae pale except for dark narrow band on femora at knee. Wing membrane and most veins pale but first Cu vein, apical branches of Cu and M vein amber brown; interradial and radiomedian crossveins and Rs vein amber brown at cord.

MALE.—Forewing length 17–18 mm. Hammer dome shaped. Aedeagal apex a simple, broad scoop with shoulder margins darkly sclerotized but body of shoulders pale; ventral membranous lobes absent (Figs. 171–172).
Aedeagal hooks scythe shaped (Fig. 172); dorsal keel X-shaped (Fig. 172).

**FEMALE.**—Forewing length 21 mm. Subgenital plate 4-lobed, outer lobes slightly longer and wider than inner lobes (Fig. 169). Sternum 9 transverse sclerite absent; median sclerite with dense median patch of short, fine setae, lateral patches with longer setae.

**NYMPH.**—Unknown.

**DISTRIBUTION.**—Guatemala and Honduras.

**DIAGNOSIS.**—The aedeagus of this species is similar to that of *A. divisa* (Navas) (Stark 1998), but the apical section is broader and shorter. In addition, *A. wellsi* is a larger species that lacks dark pigment on the central frons and median pronotum (Fig. 168).

**ETYMOLOGY.**—The patronym honors the elaterid expert Dr. Samuel A. Wells, Colorado State University, a prolific collector of *Anacroneuria*.

*Anacroneuria wipukupa* Baumann and Olson, 1984. Holotype ♂ (USNM), Oak Creek, Yavapai Co., Arizona, USA.

**MATERIAL.**—USA: Arizona, Yavapai County, Oak Creek, Page Springs, 30 May 1978, M.W. Sanderson, 1 ♂ paratype (BYUC).

**DISTRIBUTION.**—Arizona, USA.

**COMMENTS.**—Baumann and Olson (1984) have provided an excellent description of the male, female, and nymph of this species. The aedeagus (Figs. 175–177) and the head and pronotum (Fig. 173) are shown for comparison with other regional species. The aedeagus is similar to that of *A. lineata* (Figs. 80–82) and *A. annulicauda* (Figs. 13–15), but these species are distinguished by the shape of the dorsal keel and by the distinctive notch of the aedeagal apex. Females of this group share a deeply notched median sclerite of sternum 9, but *A. wipukupa* is the only 1 of these 3 species to have a bilobed subgenital plate.

*Anacroneuria zaculeu*, spec. nov. (Fig. 178–182)

**TYPES.**—Holotype ♂ (pinned), Guatemala: Alta Verapaz, Tamahu, 1100 m, 11 November 1963, E.C. Welling (PMNH).

**ADULT HABITUS.**—Head mostly yellow but with diffuse brown pigiment on central frons and behind compound eyes; lappets dark brown (Fig. 183). Pronotum with a narrow pale mesal band; broad lateral bands vary from dark brown to diffuse brown (Fig. 183). Wing membrane
Figs. 158–162. *Anacroneuria starki* Fenoglio and Morisi: 158, adult head and pronotum; 159, male sternum 9; 160, aedeagus, lateral; 161, aedeagus, dorsal; 162, aedeagus, ventral.
transparent; veins amber except costa pale. Femora banded, apical 25%–30% brown and basal section yellow; tibiae pale brown.

MALE.—Forewing length 9.5 mm. Hammer thimble shaped (Fig. 184). Aedeagal apex a simple, broad scoop with margins gradually converging from shoulders to a rounded tip (Figs. 186–187); ventral membranous lobes absent (Fig. 187); outline of aedeagus almost circular in lateral aspect (Fig. 185); dorsal keel a long, narrow U- or V-shaped structure (Fig. 186); hooks slender (Fig. 187).

FEMALE.—Unknown.

NYMPH.—Unknown.

Figs. 163–167. Anacroneuria uatsi Stark: 163, adult head and pronotum; 164, male sternum 9; 165, aedeagus, lateral; 166, aedeagus, dorsal; 167, aedeagus, ventral.
Figs. 168–172. *Anacroneuria wellsii*, nov. spec.: 168, adult head and pronotum; 169, female subgenital plate; 170, aedeagus, lateral; 171, aedeagus, dorsal; 172, aedeagus, ventral.
Figs. 173–177. *Anacroneuria wipukupa* Baumann and Olson: 173, adult head and pronotum; 174, male sternum 9; 175, aedeagus, lateral; 176, aedeagus, dorsal; 177, aedeagus, ventral.
Figs. 178–182. *Anacroneuria zaculeu*, nov. spec.: 178, adult head and pronotum; 179, male sternum 9; 180, aedeagus, lateral; 181, aedeagus, dorsal; 182, aedeagus, ventral.
Figs. 183–186. *Anacroneuria zago*, nov. spec.: 183, adult head and pronotum; 184, male sternum 9; 185, aedeagus, lateral; 186, aedeagus, dorsal; 187, aedeagus, ventral.
DISTRIBUTION.—Mexico.

DIAGNOSIS.—The aedeagus of this species is of the general A. costana type (Figs. 51–53) and is most similar to A. marginata Stark known from Costa Rica (Stark 1998). Anacroneuria zaga is distinguished from both species by the narrow U- or V-shaped dorsal aedeagal keel (Fig. 186).

ETYMOLOGY.—The specific epithet, a noun in apposition, refers to the placement of this species near the end of the manuscript.

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