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Lamproneura lucerna gen. nov., sp. nov. from Venezuela, and *Cyanallagma ferenigrum* sp. nov., a remarkable new species from Brazil (Odonata: Protoneuridae, Coenagrionidae)

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Abstract

Lamproneura lucerna gen. nov., sp. nov. (Protoneuridae) is described from a male from the Turimiquire mountains, in northeastern Venezuela. Penis morphology places the new genus close to *Forcepsioneura*, *Psaironeura* and *Roppaneura*. The first Venezuelan record of the genus *Phasmoneura* is presented. *Cyanallagma ferenigrum* sp. nov. (Coenagrionidae) is described from a male and a female from Mato Grosso, Brazil. Morphologically, this species seems to bridge the gap between the Adustum-group of *Acanthagrion* and southeastern *Cyanallagma*.

Introduction

Knowledge of the neotropical Zygoptera is still poor, and the definitions of many genera are unsettled. Recently, colleagues at my institution brought back a curious protoneurid which cannot be assigned to any known genus because the combination of characters of its wing venation and secondary genitalia match no other protoneurid genus. I am creating a new genus for this undescribed species collected from a part of Venezuela known for its high number of endemic species.

The second species that I treat here is a coenagrionid from Brazil sent to me by Angelo Machado, Belo Horizonte, a few years ago. Its characters place it between *Acanthagrion* Selys, 1876 and *Cyanallagma* Kennedy, 1920. Provisionally, I have assigned this new species to the latter.

Methods

Wing vein nomenclature follows Riek & Kukalovà-Peck (1984). Dimensions given for length of abdomen do not include caudal appendages. All measurements are given in millimeters (mm).

Lamproneura gen. nov. [Protoneuridae]

(Figs 1-7)

Etymology

'Lamprós' (greek) means bright, shining, sparkling, splendid; 'neura' is a common suffix for protoneurid genera.

Description of the genus

Medium-sized protoneurid with metallic black coloration on top of head, thorax and basal parts of abdomen; no pruinosity on any part of body. Legs short, hind femur not reaching to base of abdomen; hind tibia with six spines in external row; tarsal claws with well-developed subapical tooth. Wings hyaline; Pt about as long as underlying cell, its proximal edge slanting distally towards Costa, more so in Fw than in Hw. Second antenodal space little shorter than third antenodal space; relative position of CuP distal to middle of second antenodal space. Arculus distal to second Ax; IR2 originating immediately after subnodus, origin of RP3-4 immediately before subnodus; both veins almost or factually fused at origin of first Px descending from subnodus (Fig. 7); CuA ('anal vein') present in all wings, starting well after CuP and ending at cross-vein descending from distal end of discal cell (Figs 6-7); MP ending after cross-vein descending from subnodus. Penis with remarkably elongate internal fold; third segment ending in two long, apically slender filaments; no setae or spines either on shaft or on second segment (Figs 4-5). Cerci directed dorsoposteriorly; with basal ventral branch, and subapically with mesal-ventral bifid apophysis; basal internal apophysis absent; paraprocts vestigial (Figs 1-3).

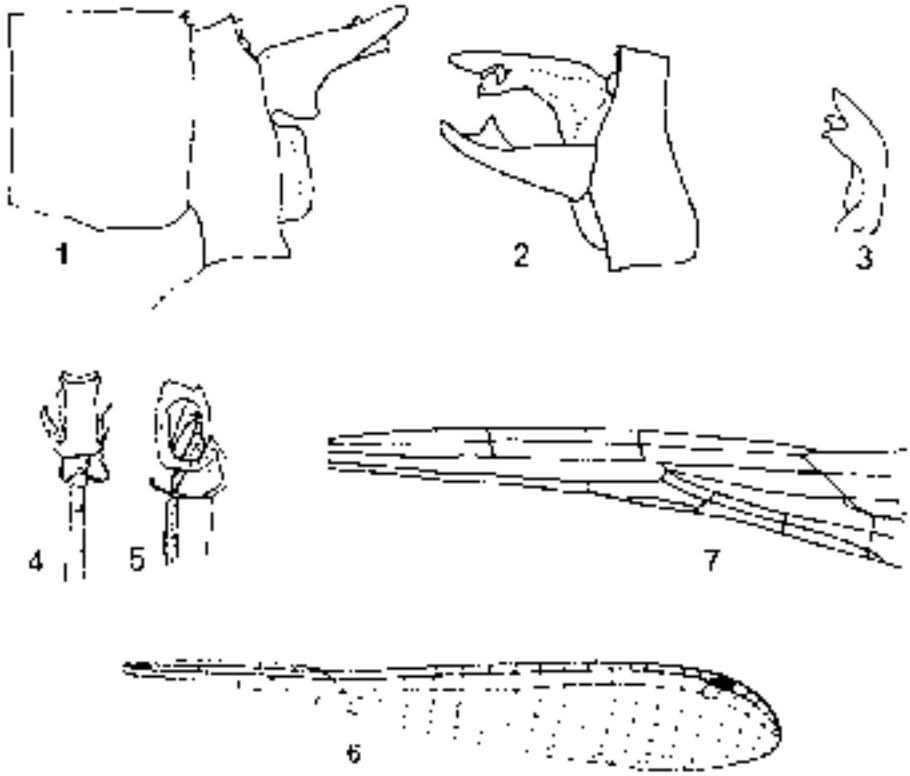
Type species: *Lamproneura lucerna* sp. nov., by present designation.

Remarks

The presence of a free CuA ('anal vein') in the subquadrangular cell is shared with *Idioneura* Selys, 1860, *Junix* Rácenis, 1968, *Neoneura* Selys, 1860, *Peristicta* Hagen in Selys, 1860, and *Proneura* Selys, 1889, while the peculiar penis morphology closely resembles that found in *Forcepsioneura* Lencioni, 1999, *Psaironeura* Williamson, 1915, and *Roppaneura* Santos, 1966 (some *Neoneura*, such as *N. denticulata* Williamson, 1917, also have fairly long penis filaments, but have short internal fold). Since *Lamproneura* is the only American genus which combines these two character states, assignment to a new genus seems justified. An additional feature may yet be added: the combination of a comparatively long second antenodal space with the distal position of CuP is shared only with *Junix*, a genus with different secondary genitalia and caudal appendages.

A long second antenodal space is otherwise shared with *Psaironeura*, the distal position of CuP and the rudimentary condition of the paraprocts with *Forcepsioneura*. The position of the arculus distad of Ax 2 exists in both *Forcepsioneura* and *Psaironeura*. The curious cercal morphology in *Lamproneura* has some similarity with the type of cercus found in the Bifurcata-group of *Psaironeura*. Penile morphology allies *Lamproneura* to *Forcepsioneura*, *Psaironeura* and *Roppaneura*.

***Lamproneura lucerna* sp. nov.**
(Figs 1-7, 21)



Figures 1-7. *Lamproneura lucerna* gen. nov., sp. nov. (holotype ♂) — (1) caudal appendages, left lateral view; (2) same, right dorsolateral view; (3) right cercus, ventroposterior view; (4) penis, ventral view; (5) same, right lateral view; (6) right forewing; (7) base of right forewing. Figures 1-3 and 4-5 are to scale, respectively.

Specimen examined

Holotype ♂: Venezuela, Anzoátegui State, Freites District, Municipio Freites, Serranía de Turimiquire, Las Haciendas, between Las Piedras and Cerro de La Laguna, 1,540 m, 5 July 1999, J. Manzanilla and D. Sánchez leg. (MIZA No. 16752).

Etymology

'Lucerna' (Latin) means lamp, referring to the bright red tip of the abdomen in this species. The term is used here as a substantive in apposition.

Description of holotype

Head: Labium pale; labrum, clypeus and top of head brassy black. Antennae dark brown, second segment with pale cross-band. Rear of head pale.
Thorax: Pronotum black, dorsodistal external angle of median lobe projecting. Mesepisternum black with metallic green reflections; lateral parts of thorax also black except for scattered, irregular pale areas possibly due to post-mortem changes; ventral margin of metepimeron probably paler. Legs pale with dark area at distal end of femora; tibial spines of hind leg as long as spaces separating them; apical segment of tarsi dark; claws orange with black tip. Wings hyaline; venation black; Pt brown black (Fig. 6). MP ending at wing margin in proximal half of first postnodal marginal cell. Fw with 14-15 Px, IR1 originating at Px 9, RP2 at Px 6; Hw with 11-12 Px, IR1 originating at Px 7 or slightly distally, RP2 at Px 4-5.
Abdomen: S1-7 black dorsally, pale lateroventrally; basal ring of S3-7 also pale; S7 black in basal third, becoming red-brown apically, S8-9 dark red dorsally, S10 black dorsally; S7-10 bright vermilion ventrally. Cercus black externally, red internally, obtusely pointed and slightly curved mesally; cercus armed with a pair of claw-like mesoventrally directed apophyses ("ventral apophyses" of Lencioni 1999), at apical fourth of appendage. A broadly triangular and mesally curved ventral branch at base of cercus (Figs 1-3). Paraproct vestigial. Penis as illustrated (Figs 4-5).
Dimensions: Total length – 44.1; abdomen – 37.2; cercus – 0.8; Fw – 24.7; Hw – 22.6.

Remarks

The type locality (Fig. 21) is part of the northeastern Venezuelan coastal mountain system, an area of known high endemicity (for Odonata see Rácenis 1959; De Marmels 1989, 1994). With the noteworthy exception of *Lamproneura*, all Venezuelan protoneurids are restricted to the lowlands. The holotype of *L. lucerna* was caught at a small mountain stream in a narrow gallery forest.

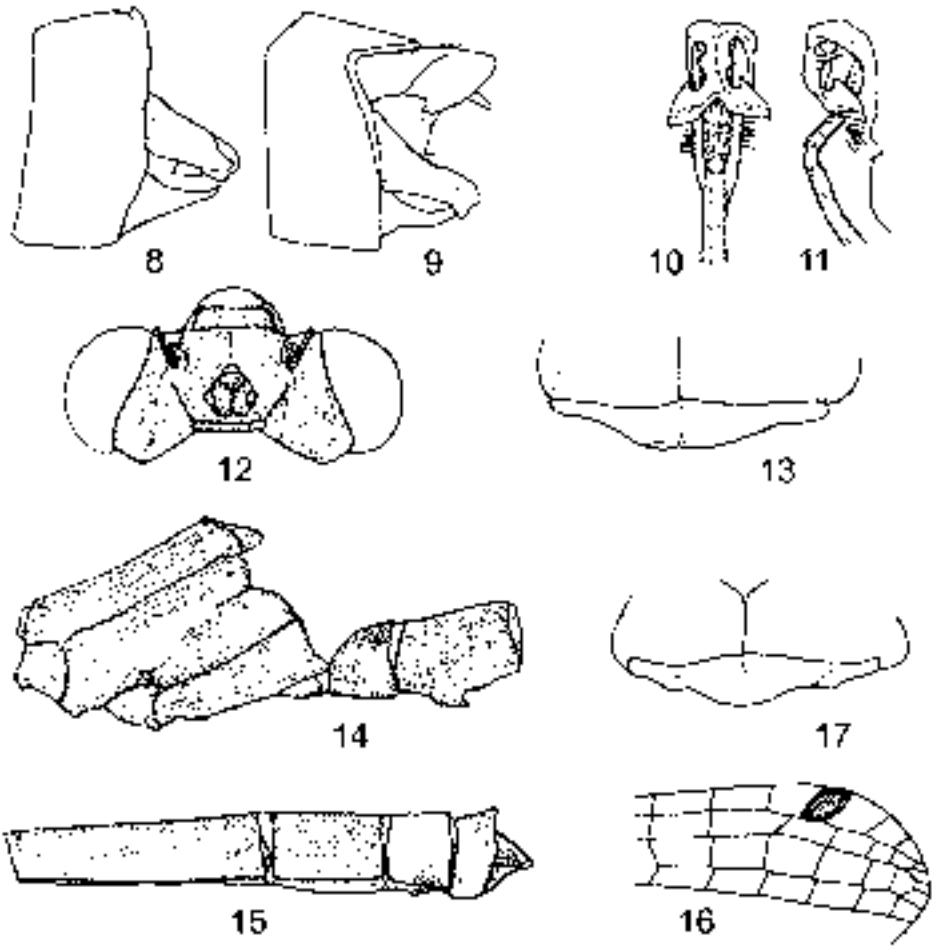
Phasmoneura exigua (Selys, 1886) **[Protoneuridae]**
(Fig. 21)

The genus *Phasmoneura* Williamson, 1916 has not been previously reported from Venezuela.

Specimen examined

1 ♂: Venezuela, Bolívar State, km 88, road El Dorado – Santa Elena de Uairén, 10 November - 4 December 1998, A. Chacón leg. (MIZA).

***Cyanallagma ferenigrum* sp. nov. [Coenagrionidae]**
(Figs 8-17, 21)



Figures 8-17. *Cyanallagma ferenigrum* sp. nov. (8-16 holotype ♂, 17 female) — (8) caudal appendages, left lateral view; (9) same, left dorsolateral view; (10) penis, ventral view; (11) same, right lateral view; (12) head, dorsal view; (13) pronotal hindlobe, dorsal view; (14) pterothorax and base of abdomen, left lateral view; (15) apical abdominal segments, left lateral view; (16) tip of left hindwing; (17) pronotal hindlobe of female, dorsal view. Figures 8-9, 10-11, 12-13, 17, and 14-15 are to scale, respectively.

Specimens examined

Holotype ♂: Brazil, Mato Grosso State, Utiariti, August 1961, K. Lenko leg.
Paratype: 1 ♀: same data as holotype (both in A.B.M. Machado coll., Belo Horizonte).

Etymology

'Fere' (Latin) means 'almost'; 'nigrum' is 'black', referring to the overall dark coloration of the holotype.

Description

Holotype ♂
Head: Labium pale; labrum black in proximal half, pale distally; clypeus black dorsally; genae pale; antennae black; top and rear of head black, except for two somewhat asymmetrical blue postocular spots (Fig. 12).
Thorax: Prothorax black, except for circular blue spot at middle behind anterior lobe; posterior lobe with smoothly rounded median projection (Fig. 13); pterothorax black with blue marks as in Figure 14. Hind border of mesostigmal lamina raised as a long, transverse rectangle; a deep furrow behind mesostigmal lamina on mesepisternum. Legs dark brown; tibial spines shorter than intervening spaces; subapical tooth of claws small. Wings hyaline, venation dark brown, Pt higher than broad, orange (Fig. 16). Fw with first costal space more than half the length of third space; 10 Px, IR1 originating at Px 7, RP2 at Px 5. Hw with 8 Px, IR1 originating at Px 6, RP2 at Px 4. Petiolation ceasing at about a distance before CuP as this latter is long.
Abdomen: S1-2 and S7-10 as illustrated (Figs 14-15); remaining segments colored as S7, i.e. black above, pale (apparently yellow) lateroventrally, basal ring also pale. Caudal appendages black, about as long as S10 (Figs 8-9). Penis with scale-like setae laterally on second segment; internal process of third segment bifid (Figs 10-11).
Dimensions: Total length – 26.3; abdomen – 20.9; cercus – 0.4; Fw – 15.0; Hw – 13.8.

Paratype ♀
The specimen is subteneral and incomplete.
Head: As in male, but postocular spots symmetrical and shaped as right side spot of male.
Thorax: Prothorax colored as in male; pronotal hindlobe as illustrated (Fig. 17); color pattern of pterothorax as in male; mesostigmal lamina gradually rising towards external angle, the latter inclined proximad; a deep furrow behind each lamina. Legs, except for left fore leg, lost. Wings partly damaged, yellowish; Pt as in male; 10 Px in Fw, IR1 originating at Px 8, RP2 before Px 5. Hw with 9 Px, IR1 originating at or slightly after Px 7, RP2 before Px 4.
Abdomen: S1 as in male; S2 laterally blue with dorsal brown mark shaped as a bowling cone with its head at the distal end of the segment; S3 as in male; remaining segments lost, except for one (probably S4, S5 or S6), which resembles S3.

Dimensions: Due to missing abdominal segments and damaged Fw tips, only the Hw measurements can be given: 14.5.

Remarks

Recently, Lencioni (2001) added a fifth species to the four non-Andean species of *Cyanallagma* known from southeastern South America. Unfortunately, he did not describe or illustrate the penis of his *C. angelae* Lencioni. Bulla (1973) offered figures of this organ for *C. bonariense* (Ris, 1918) and *C. interruptum* (Selys, 1876), and Santos (1965) illustrated the penis of *C. trimaculatum* (Selys, 1876). Illustrations of the penes of *C. nigrinuchale* (Selys, 1876) and *C. angelae* are given here (Figs 18-20; the internal process is not visible in this view, but is present in both species as a small point at middle of membranous transverse fold). All these illustrations show that the southeastern species of *Cyanallagma* share a common penile morphology. The one exception is *C. ferenigrum*. This species (then undescribed) was already referred to by De Marmels (1997) as the only one within *Cyanallagma* with spines or setae on the second segment of the penis. But also the third segment differs considerably in its morphology from the common pattern observed in the remaining species instead resembling the penis within the Adustum-group of *Acanthagrion* (cf. Leonard 1977: 159, figs 51-56). Also significant is the bifid internal process which is unlike the internal process in other *Cyanallagma*. The long, pointed and slightly inwards curved paraprocts found in *C. ferenigrum* are otherwise typical for *Acanthagrion*, but unknown in *Cyanallagma*. There is no bifid, dorsomedian distal process on S10 in *C. ferenigrum*, a feature found in most *Cyanallagma*, and the cerci are slanting, as in *Acanthagrion*. On the other hand, the cercus of *C. ferenigrum* is typical for *Cyanallagma* in lacking also the dorsobasal mesiad directed process known in *Acanthagrion*. The female correspondingly has no mesepisternal fossae. The short petiolation of the wings is shared with two species of the Adustum-group of *Acanthagrion*, and with several species of *Cyanallagma*, while the short Pt is indicative of *Cyanallagma*. Finally, color pattern of *C. ferenigrum* is closely similar to that present in the other southeastern species of *Cyanallagma*, and hence, distinct from that found in most species of *Acanthagrion*. Due to its unique character set, *C. ferenigrum* cannot be placed in the key offered by Lencioni (2001). So far, this species appears to be a curious intermediate between the Adustum-group of *Acanthagrion* and southeastern *Cyanallagma*.

Figures 18-20. Penes of two species of southern *Cyanallagma* — (18) *C. nigrinuchale*, ventral view, Brazil, Minas Gerais, Florestal, October 1979, A. Machado leg.; (19) same, right lateral view; (20) *C. angelae*, ventral view, Brazil, São Paulo, Salesopolis, 3 November 2000, F.F.A. Lencioni leg.; both in MIZA collection.

Figure 21. Map of South America showing localities for the two new species and the new Venezuelan record — solid circle: type locality of *Lamproneura lucerna*; empty circle: first Venezuelan locality for *Phasmoneura exigua*; triangle: type locality of *Cyanallagma ferenigrum*. Map courtesy of Oliver S. Flint, Smithsonian Institution, Washington, D.C.

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