

***Phoenicagrion* gen. nov. for *Leptagrion flammeum*,  
with description of a new species, *P. paulsoni*, from Peru  
(Odonata: Coenagrionidae)**

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**ABSTRACT**

The placement of *Leptagrion flammeum* in *Aeolagrion* is confirmed to be incorrect; comparison with all other described genera of New World Coenagrionidae shows that this species does not belong in any of them. A new genus, *Phoenicagrion* (type species *L. flammeum*), is here described to include *L. flammeum* and a new species, *P. paulsoni* (holotype ♂: Peru, Loreto department, Río Napo 50 km above Río Amazonas, 3°12'S, 72°57'W, 22 iii 2004, in UMMZ). A generic characterization, diagnoses, illustrations and distribution maps are provided.

**RESUMEN**

Se confirma que la inclusión de *Leptagrion flammeum* Selys, 1876 en *Aeolagrion* es incorrecta; comparación con todos los restantes géneros descritos de Coenagrionidae americanos demuestra que esta especie no pertenece a ninguno de ellos. Un nuevo género, *Phoenicagrion* (especie tipo *L. flammeum*), se describe aquí para incluir a *L. flammeum* y a una nueva especie, *P. paulsoni* (holotipo ♂: Perú, departamento Loreto, Río Napo 50 km sobre Río Amazonas, 3°12'S, 72°57'W, 22 iii 2004, en UMMZ). Se proveen una caracterización genérica, diagnosis, ilustraciones y mapas de distribución.

**INTRODUCTION**

The family Coenagrionidae is the most diverse within Zygoptera with representatives spanning the entire world. In South America 34 genera and 289 species have been described but many of its generic concepts are artificial and several are composed of polythetic suites of characters while for others no unique combinations of characters are known (De Marmels & Garrison 2005; De Marmels 2007; von Ellenrieder &

Garrison 2007; von Ellenrieder & Lozano 2008). An example is found in the genus *Aeolagrion* Williamson, 1917. As was already argued by both Dunkle (1991) and De Marmels (2007), *Leptagrion flammeum* Selys, 1876, placed in *Aeolagrion* by Williamson (1917) is not a true *Aeolagrion* because it differs radically in appendage and genital ligula morphology from the type species, *Agrion dorsale* Burmeister, 1839. Examination of specimens and comparison with all described New World coenagrionid genera revealed several additional differences which confirm that '*Aeolagrion flammeum*' does not fit the character sets diagnosing *Aeolagrion*, *Leptagrion*, or any other genus currently described. An undescribed species from Peru was found to be congeneric with it, and consequently a new genus is here described for these two taxa, and a generic characterization, diagnoses, illustrations and distribution maps are provided.

## HISTORY

Williamson (1917) designated *Agrion dorsale* as type species of his new genus *Aeolagrion* and also included *A. demararum* sp. nov. and *Leptagrion flammeum*, although he expressed doubts that the latter belonged in this genus. He (Williamson 1917) redescribed *L. flammeum* and observed some venational differences with remaining species of *Aeolagrion*: RP2 originating closer or proximal to Px 7 in Fw and closer or proximal to Px 6 in Hw (5 and 4 respectively in *Aeolagrion*), CuPAA arising proximal to CuP (at CuP or distal in *Aeolagrion*), and CuP in Fw distal to first Ax for a distance nearly or slightly more than 0.5 the length of the second Ax space, in Hw from more than 0.5 to 0.66 (in *Aeolagrion* 0.25 to 0.33 in Fw and less than 0.5 in Hw). He was inclined to place *L. flammeum* in a separate genus, but followed Calvert's and Kennedy's advice against it instead (Williamson 1917).

De Marmels (1989) regarded *Aeolagrion* as a heterogeneous group within a complex of genera related to *Telebasis* Selys, 1865, and considered its generic status as doubtful. Dunkle (1991) described *Aeolagrion axine* from Ecuador and restricted the concept of *Aeolagrion* to include only three species characterized by male cerci greatly expanded vertically at apex, pale colors blue and female mesanapleural suture dorsally convex: *A. dorsale*, *A. inca* Selys, 1876 (= *A. foliaceum* Sjöstedt, 1918) and *A. axine*. He (Dunkle 1991) considered that these three species constitute a monophyletic group, but suggested that it might not deserve generic rank, being a subgeneric rank within *Telebasis* perhaps more appropriate for it. He also regarded *A. demararum* Williamson, 1917 and *A. inalata* Calvert, 1961 as probable *Telebasis*, which was later confirmed by Bick & Bick (1995). *Leptagrion flammeum* and three other species originally described in *Aeolagrion* – *A. fulvum* Needham, 1933, *A. chimantai* De Marmels, 1988 and *A. neblinae* De Marmels, 1989 – were thus excluded from *Aeolagrion* s. str. and left in an unresolved position as '*Aeolagrion*'. Recently De Marmels (2007) placed the three '*Aeolagrion*' species with cylindrical male cerci with an articulated ventro-basal branch in his new genus *Tepuibasis*. '*Aeolagrion flammeum*' is therefore the only one among these species of still uncertain generic affiliation.

## MATERIAL AND METHODS

Nomenclature for wing venation follows Riek & Kukalová-Peck (1984) and for genital ligula Kennedy (1916). Measurements are given in millimeters; total length and abdomen length exclude cerci. All drawings were made with the aid of a camera lucida coupled to a Wild M8 stereomicroscope. Wings were scanned from specimens. Specimens examined are deposited in the following collections:

- BMNH — British Natural History Museum, London, UK  
DRP — Dennis R. Paulson collection, Seattle, Washington, USA  
FSCA — Florida State Collection of Arthropods, Gainesville, USA  
IRSN — Institut Royal des Sciences Naturelles de Belgique, Brussels, Belgium  
MIZA — Museo del Instituto de Zoología Agrícola, Maracay, Venezuela  
NVE — Natalia von Ellenrieder collection, Salta, Argentina  
RWG — Rosser W. Garrison collection, Sacramento, California, USA  
SWD — Sidny W. Dunkle collection, Tucson, Arizona, USA  
UMMZ — University of Michigan, Museum of Zoology, Ann Harbor, Michigan, USA

### *Phoenicagrion* gen. nov.

Type species

*Leptagrion flammeum* Selys, 1876 by present designation.

Etymology

From the Greek *phoinicos* meaning 'red' – and *agrion*, a neuter noun transliterated from the Greek *agrios* – used for many coenagrionid names meaning 'that which is living in the fields, wild'. Allegory to the mythological Phoenix bird of golden red color, always unique and being reborn from its own ashes, referring to the uniqueness of the red and rusty orange colors of *P. flammeum* and *P. paulsoni* and to *P. flammeum* being periodically 'reborn' in different genera.

Generic characterization

Frons in profile rounded or angulate; labrum blue in females and blue or bright red in males, anterior half of head dorsum red to reddish brown or black, posterior half black, with a short oblique red stripe to the side of each lateral ocellus, lacking pale postocular spots but with a red occipital bar (Figs 1a, b). Pterothorax reddish orange brown with a complete pale blue antehumeral stripe and a pair of pale blue oblique stripes on the sides: an elongate stripe extending from posterior margin of humeral suture on mesepimeron antero-ventrally to metacoxae and another shorter stripe obliquely traversing metepimeron (Figs 1a, b, Plate IVb). Wings (Fig. 2) petiolated to CuP or proximal for a distance as long as CuP length or shorter; CuP reaching CuPAA and not A; vein descending from subnodus forming a straight line to wing margin; costal side of Fw quadrangle less than 0.5 as long as distal side; RP2 in Fw beginning closer to Px 5-8 (most frequently at 7) and in Hw closer to Px 5-7 (most frequently at 6); Pt about as long as underlying cell, with costal and posterior sides

of subequal length. Femora with a marked longitudinal carina on outer extensor margin (Figs 5a, b); metafemoral spurs on distal half longer than width of femur; basal metatibial spurs as long as or longer than twice intervening spaces (Fig. 5c); pretarsal claw with well developed supplementary tooth (Fig. 5d). Dorsum of S1-6 and basal half of S7 orange or dark reddish brown to black, distal half of S7 and S8-10 orange to bright red (Figs 1b-d, Plate IVb). Male genital ligula with well developed inner and terminal folds, apex entire, and two pairs of lateral lobes with sclerotized apices (Figs 6a-d). Male cercus (Fig. 7) in lateral view as long as or slightly longer than S10, not markedly expanded distally, about as wide at apex as at base, with a ventro-apical process ending on a simple or bifid tooth; male paraproct entire, in lateral view subequal to cercus. Female S8 lacking vulvar spine; cercus shorter than S10; tergum of S10 with apical longitudinal cleft shorter than half of S10 (Fig. 8a); outer valves of ovipositor with a single row of teeth; tip of ovipositor (excluding stylus) extending beyond posterodorsal margin of S10 but not reaching tip of cerci (Fig. 8b). Larva unknown.

Diagnosis

Pterothoracic color orange lacking black stripes, with a complete pale blue ante-humeral stripe and a pair of pale blue oblique stripes on the sides (Figs 1a, b, Plate IVb), and male genital ligula with two pairs of lateral lobes with sclerotized apices (Figs 6a-d) are unique character states for this genus.

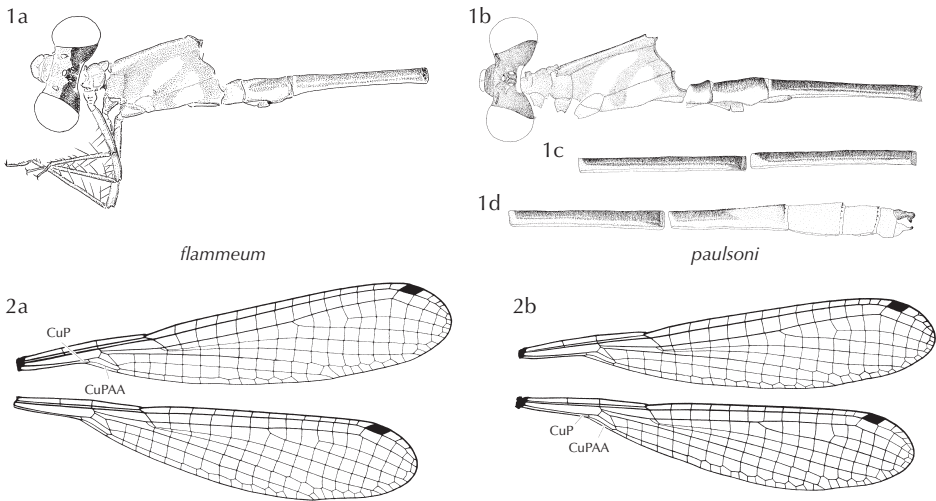


Figure 1: Color pattern of *Phoenicagrion flammeum* (a) and *P. paulsoni* sp. nov. (b-d) — (a) head, thorax and S1-3 of male from Peru, Aguahalito; (b) head, thorax and S1-3 of holotype male; (c) S4-5; (d) S6-10. Figure 1a by R.W. Garrison.

Figure 2: Wings of *Phoenicagrion* — (a) *P. flammeum*, male from Peru, Aguahalito; — (b) *P. paulsoni* sp. nov., paratype male.

Although color pattern combining orange and pale blue is found in some *Leptobasis* and *Calvertagrion* St. Quentin, 1960 species, the oblique orientation of the pale blue thoracic lateral stripes of *Phoenicagrion* is shared only with *Hylaeonympha* Rácenis, 1968 and will distinguish them from all other New World Coenagrionidae. They also share the long tibial spurs, presence of outer femoral carina, of well developed inner and terminal folds in male genital ligula, and male cerci and paraprocts subequal in length, none of which is however a unique character state for this pair of genera. *Phoenicagrion* and *Hylaeonympha* differ in several characters; posterior margin of mesostigmal plates is not projected in *Phoenicagrion* (Fig. 4), whereas there is a prominent flange along posterior margin in *Hylaeonympha*, which in males is projected into a long apical process. Distal segment of genital ligula has two lateral lobes with sclerotized tips in *Phoenicagrion* (Figs 6a, b) and an entire apex (Figs 6a-d); in *Hylaeonympha* there are no lateral lobes and its apex is deeply cleft (Figs 6e, f). Postero-dorsal margin of male S10 is recessed and cleft (Fig. 7) and female tergum of S10 is longitudinally cleft for a distance shorter than half of S10 length (Fig. 8) in *Phoenicagrion*; in *Hylaeonympha* these character states are not recessed and cleft for more than half of S10 length respectively. *Phoenicagrion* differs from *Hylaeonympha* also by the presence of a pale occipital bar and absence of black stripes on thorax, which are absent and present respectively in *Hylaeonympha*, relatively longer wing petiolation, with origin of CuPAA slightly proximal to CuP to proximal for a distance as long as CuP (Fig. 2), which in *Hylaeonympha* is shorter, with origin of CuPAA proximal to CuP for a distance as long as CuP to as long as twice CuP, and by its larger size (abdomen length 29-35, Hw 18.7-24), smaller in *Hylaeonympha* (abdomen length 26-28, Hw 15-16.5).

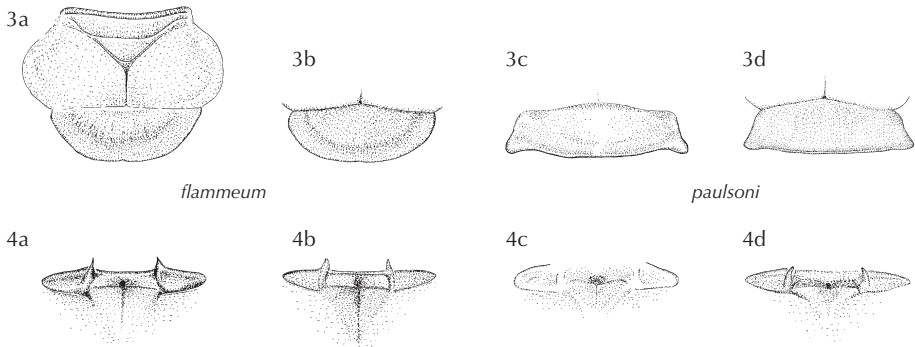


Figure 3: Pronotum of *Phoenicagrion flammeum* (a, b) and *P. paulsoni* sp. nov. (c, d), dorsal view — (a) male from Brazil, Rio Xingu; (b) female from Peru, Aguahalito; (c) male paratype; (d) female paratype. Figure 3d by R.W. Garrison.

Figure 4: Mesepisternal plates of *Phoenicagrion flammeum* (a, b) and *P. paulsoni* sp. nov. (c, d), dorsal view — (a) male from Brazil, Rio Xingu; (b) female from Peru, Aguahalito; (c) male paratype; (d) female paratype. Figure 4d by R.W. Garrison.

In addition to the unique characters of male genital ligula and color pattern, wing petiolation ending proximal to CuP so that CuP reaches CuPAA and not A (Fig. 2) will separate *Phoenicagrion* from both *Aeolagrion* and *Leptagrion*, which have wing petiolation ending distal to CuP. It further differs from *Aeolagrion* by its unmodified female mesanapleural suture vs suture dorsally convex, and male cercus about as wide at apex as at base vs markedly expanded apically, and from *Leptagrion* by male paraprocts subequal to cerci vs vestigial, and female valves of ovipositor with a single row of teeth vs with several rows.

Distribution

Amazon forest, from S Venezuela and Colombia to Guyana, N Peru and Brazil (Fig. 9).

Species included

*Phoenicagrion flammeum* comb. nov. and *P. paulsoni* sp. nov. There is a third species from Peru, but I refrain from describing it since it is thus far known only from a single female (in RWG).

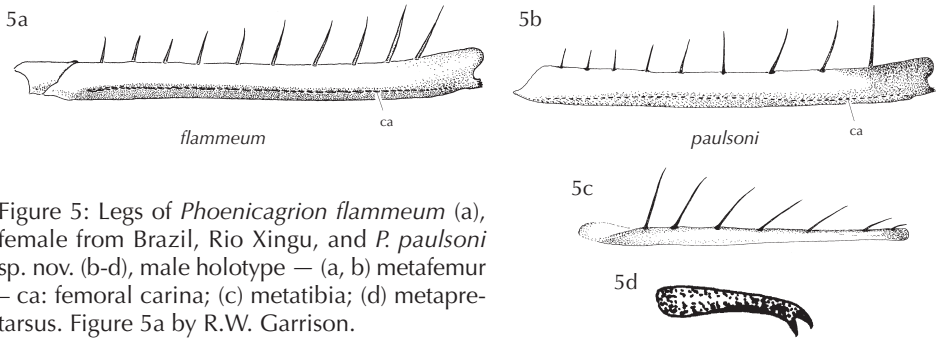


Figure 5: Legs of *Phoenicagrion flammeum* (a), female from Brazil, Rio Xingu, and *P. paulsoni* sp. nov. (b-d), male holotype — (a, b) metafemur — ca: femoral carina; (c) metatibia; (d) metapretarsus. Figure 5a by R.W. Garrison.

*Phoenicagrion flammeum* (Selys, 1876) comb. nov.  
(Figs 1a, 2a, 3a, b, 4a, b, 5a, 6a, b, 7a-c, 8a, 9, Plate IVb)

*Leptagrion flammeum* Selys, 1876: 986-987 [276-277 reprint] (description of male and female).

*Aeolagrion flammeum* (Selys) — Williamson (1917: 243, 250, figs 13, 14, 20; placement of *L. flammeum* in *Aeolagrion* gen. nov., key, illustrations of male S10 and picture of wings); — Fraser (1946: 458; mention from Peru); — Rácenis (1959: 474; mention of Fraser’s 1946 record); — Davies & Tobin (1984: 78; synonymic list); — Bridges (1994: VII-86; synonymic list); — Steinmann (1997: 291; synonymic list); — Tsuda (2000: 20; synonymic list).

*Leptagrion autazensis* Sjöstedt, 1918: 11 (description of male); — Costa & Garrison (2001: 386; discussion of original description and comments on placement in *Leptagrion*).

'*Aeolagrion flammeum* (Selys) — Dunkle (1991: 243; discussion of *A. flammeum*); — De Marmels (1992: 62; record from Venezuela); — De Marmels & Garrison (2005: 258-259, figs 1a-d; synonymy with *L. autazensis* Sjöstedt, 1918, illustrations of caudal appendages and genital ligula); — De Marmels (2007: 118, 141, fig. 134; discussion of generic placement, illustration of genital ligula); — von Ellenrieder & Garrison (2007: 9, figs 5a-d; designation of male #136 in IRSNB as lectotype, illustrations of male S10 and genital ligula).

Specimens examined

Total 26 ♂, 28 ♀. — 1 ♂ lectotype [#136], 1 ♂ [#56], 1 ♀ [#136] paralectotypes, Brazil, Rives Amazonas, leg. M. Bates (IRSNB); 1 ♂, 3 ♀, Brazil, Pará state, Rio Xingu Camp, ca 60 km S of Altamira (3°39'S, 52°22'W), Igarapé N of camp, trail 04 ix/ 14 x 1986, leg. P. Spangler & O. Flint, Jr. (RWG); 1 ♂, Brazil, Rondônia State, Rio Pardo and tributaries (10°25'48"S, 62°51'36"W; 165 m), ca 13 km NW of Fazenda Rancho Grande and 62 km SW of Ariquemes, 05/10 xi 1989, leg. R.W. Garrison (RWG); 4 ♂, 4 ♀, Peru, Loreto department, Aguas Negras, Aguahalito (0°31'22"S, 75°15'24"W; 145 m), 05/19 iii 1994, leg. J. Louton (RWG); 1 ♂, 1 ♀, Peru, Loreto department, Explorama Lodge, 50 km NE Iquitos on Amazon River at junction with Yanamono River (3°21'56"S, 72°21'59"W), 14 viii 1989, leg. S.W. Dunkle (RWG); 1 ♂, 1 ♀, same but 28 viii 1989 (NVE); 1 ♂, 1 ♀, Peru, Loreto department, Yarinacocha (145 m), forest trail 11/14 xiii 1972, leg. D.L. Pearson (RWG); 1 ♂, Peru, Loreto department, Iquitos, Río Amazonas (3°46'S, 73°15'W; 106 m), vii 1940, leg. G. Klug (RWG); 13 ♂, 16 ♀, Peru, Loreto department, Mishuyacu (BMNH); 1 ♂, 1 ♀, Colombia, Caquetá department, Río Ortegaza, near Tres Esquinas (1°50'51"N, 74°47'43"W), 18 i 1969, leg. R.E. Dietz (RWG).

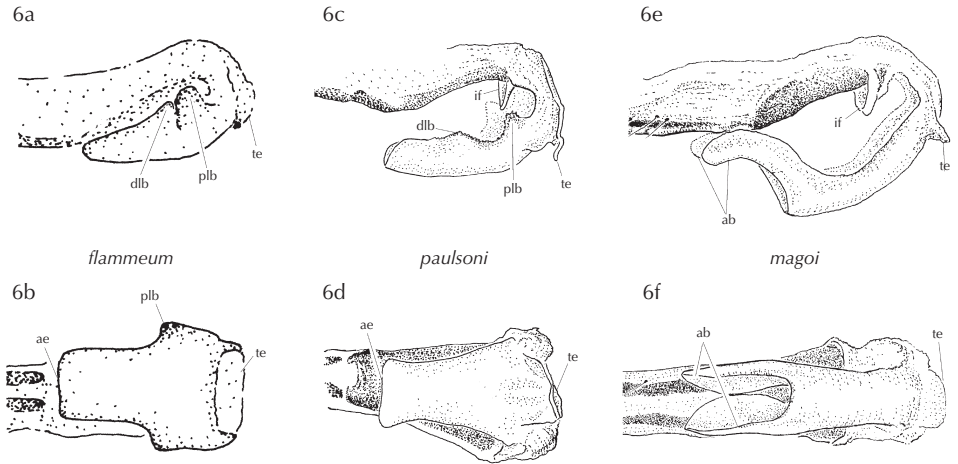


Figure 6: Male genital ligula of *Phoenicagrion* and *Hylaeonympha* — (a, b) *P. flammeum*, lectotype; (c, d) *P. paulsoni* sp. nov., holotype; (e, f) *H. magoi*, paratype, Venezuela, San Fernando de Atabapo. ab: apex bifid; ae: apex entire; if: inner fold; dlb: distal lateral lobe; plb: proximal lateral lobe; te: terminal fold. Figures 6c-f by R.W. Garrison.

Diagnosis

See under *P. paulsoni*.

Biology

Adults found along forest trails, perching on leaves (DRP coll. data; Williamson 1917), on sunlit bushes, flying along shady rain pools (De Marmels 1992) and swarming around bromeliads (J. Louton pers. comm.). D. Paulson (pers. comm.) found only this damselfly common along with *Mecistogaster linearis* (Fabricius) in the understory of well-developed rain forest during a dry-season visit. Larva and breeding habitat unknown.

Distribution

As for genus (Fig. 9).

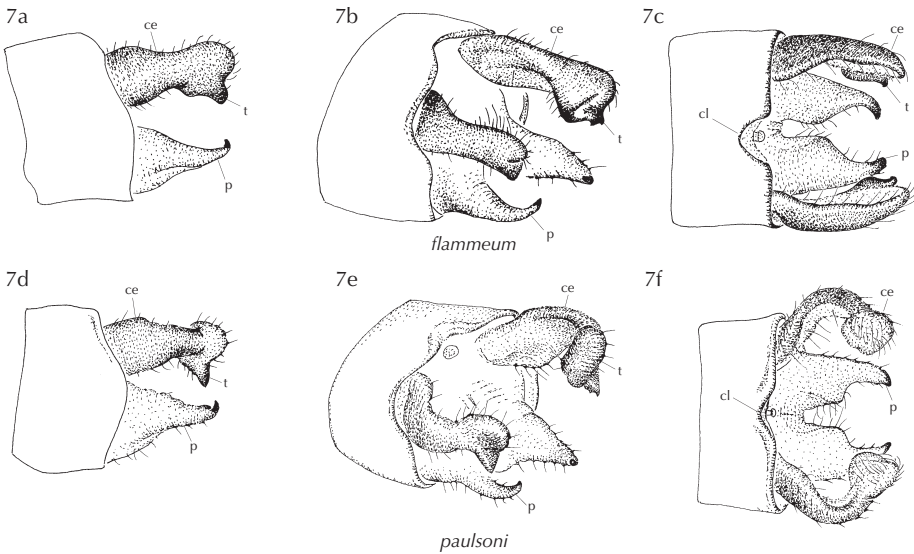
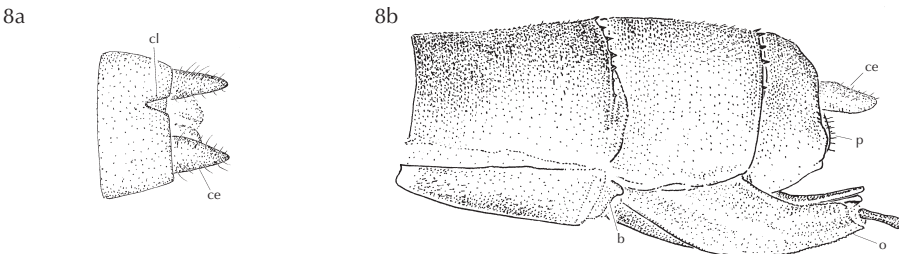


Figure 7: Male S10 of *Phoenicagrion flammeum* (a-c) and *P. paulsoni* sp. nov. (d-f) in lateral, medio-dorsal, and dorsal view — (a, b) lectotype; (c) male from Peru, Explorama; (d-f) holotype. ce: cercus; cl: cleft on posterodorsal margin of S10; p: paraproct; t: tooth.

Figure 8: Female of *Phoenicagrion* — (a) *P. flammeum*, dorsal view of S10, Brazil, Rio Xingu; (b) *P. paulsoni* sp. nov., female allotype, lateral view of S8-10. b: sub-basal plate of ovipositor; ce: cercus; cl: cleft; o: ovipositor; p: paraproct. Figure 8b by R.W. Garrison.





*Phoenicagrion paulsoni* sp. nov.  
(Figs 1b-d, 2b, 3c, d, 4c, d, 5b-d, 6c, d, 7d-f, 8b, 9)

Etymology

I name this species after my good friend and colleague Dennis Paulson, in recognition of his invaluable contributions to the knowledge of New World Odonata and his always kind encouragement to odonate enthusiasts.

Specimens examined

Total 3 ♂, 1 ♀. — Holotype ♂, Peru, Loreto department, Río Napo 50 km above Río Amazonas (3°12'S, 72°57'W), 22 iii 2004, leg. W. Reeves (UMMZ). — Paratype ♀, Peru, Loreto department, ExplorNapo camp at junction of Sucusari River and Napo River, ca 160 km NE of Iquitos (3°16'33"S, 72°56'18"W), 30 vi 1991, leg. S.W. Dunkle (UMMZ). — Paratype males – 1 ♂, Peru, Loreto Department, Quebrada Sucusari at ExplorNapo Camp, on Río Sucusari (3°16'33"S, 72°56'18"W), ca 160 km NE of Iquitos, 02 iv 1992, leg. P. Donahue (DRP); 1 ♂, same data as paratype ♀ (SWD).

Male holotype

**Head:** Labium pale yellow; labrum, base of mandibles and anterior surface of genae light blue; clypeus, dorsal surface of genae, frons and top of head matt black, with a pair of oblique comma shaped red stripes antero-lateral to outer sides of lateral ocelli and a red occipital bar (Fig. 1b); back of head black dorsally and light brown ventrally. First antennal segment black, second reddish brown, remaining missing. Frons in profile angulate.

**Thorax:** Prothorax reddish orange brown; posterior lobe of pronotum projected posteriorly, slightly trilobate with broadly angulate postero-distal corners (as in Fig. 3c). Mesepisternal plates flat and triangular (as in Fig. 4c). Pterothoracic dorsum dark reddish brown with mesepisternal longitudinal pale blue antehumeral stripe; sides reddish orange brown with two pale blue oblique stripes as described for genus (Fig. 1b). Venter of thorax and legs pale brown, except for black spurs, extensor surface and apex of femur, flexor surface, base and apex of tibiae, and dark brown apex of tarsi and pretarsi. Femora with marked longitudinal carina on outer extensor margin; metafemoral spurs on distal half longer than width of femur (Fig. 5b); metatibial spurs long, at base about as long as twice the intervening spaces (Fig. 5c); pretarsal claw with well developed supplementary tooth (Fig. 5d). Wings (as in Fig. 2b) hyaline; pterostigma in Hw with posterior angle slightly more acute than in Fw, covering one cell, dark reddish brown with thin marginal yellow hairline; CuP reaching CuPAA at point of confluence of CuPAA with A, petiolation ending slightly distal to mid-point between Ax 1 and Ax 2; Px 12 in right Fw, 13 in left Fw, 11 in Hw; RP2 branching slightly proximal to Px 6 in Fw, at 5 in Hw.

**Abdomen:** Dorsum of S1-2 dark reddish brown, of S3-S6 and basal half of S7 matt black, distal half of S7 and S8-S10 bright red; lateral portion of terga S1-2 and base of S3 light blue, of S3-S6 reddish brown, of S7-S10 bright red; ventral portion of terga S1-S7 reddish brown, of S8-S10 bright red (Figs 1c, d). Genital ligula (Figs 6c, d) with well developed inner and terminal folds, apex entire, and two pairs of lateral

lobes sclerotized along their apices. Cercus (Figs 7d-f) reddish brown and hairy along inner surface, black on external surface, slightly longer than S10, about as wide at apex as at base, with a constriction before rounded tip which ends on a blade-shaped tooth directed ventrally (Figs 7d, e), strongly arched at mid-length (Fig. 7f); paraproct entire, bright red with black pointed tip directed medially.

**Dimensions:** Total length 35.6; abdomen length 29.3; Fw 19.8; Hw 18.7.

Female paratype (juvenile)

**Head:** As in holotype but labium dull orange; labrum dull brown; base of mandibles, anterior surface of genae and anteclypeus dull yellow-green; postclypeus orange; dorsal surface of genae ventral to antennae with a transverse black bar; anterior half of head dorsum reddish brown, posterior half black with metallic luster; comma shaped spots pale yellow; antennae brown, segment 1 dull orange ventrally, segment 2 dull orange with tip dark brown, remaining segments dark brown.

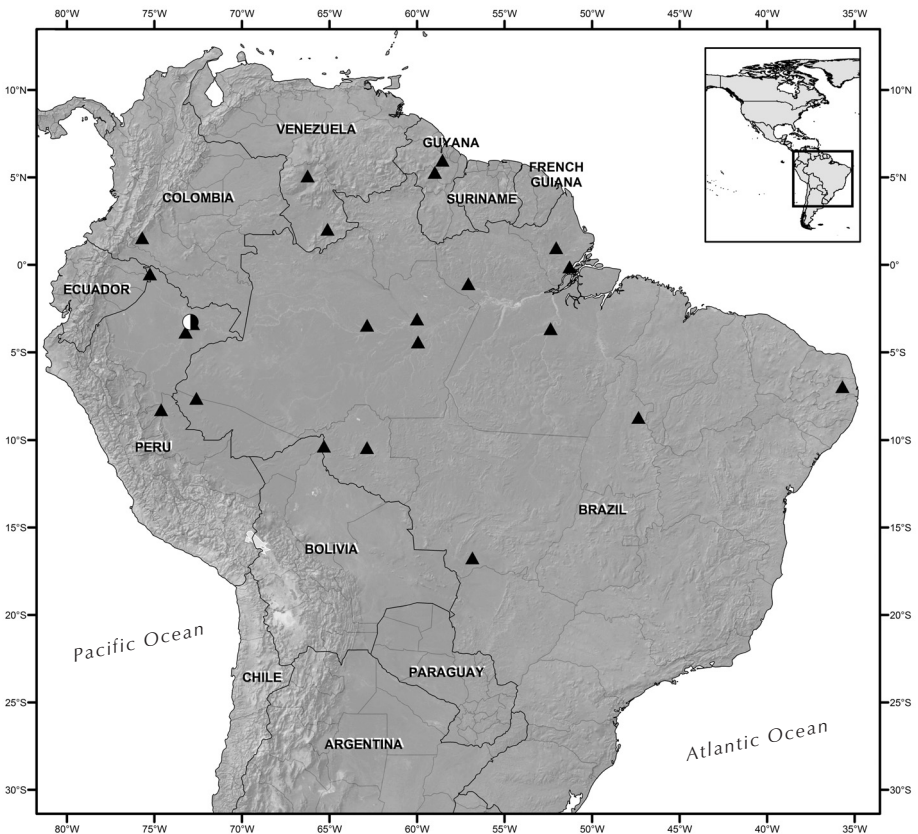


Figure 9: Distribution map of *Phoenicagrion* in South America — ▲: *P. flammeum*; ●: *P. paulsoni* sp. nov.

**Thorax:** Color pattern, pronotum (Fig. 3d) and mesostigmal plates (Fig. 4d) as in holotype. Wings as in holotype but pt brown lacking marginal yellow hairline; Px 15 in right Fw, 14 in left Fw, 12 in Hw; RP2 branching slightly proximal to Px 7 in Fw, slightly proximal to 6 in Hw.

**Abdomen:** Color pattern as in male holotype, except for dorsum of S1 orange, S2-3 orange brown becoming dark brown at distal end of S3, S4-7 dark brown, laterally pale bluish green, and S8-10 brown dorsally, becoming pale orange laterally. Vulvar spine on S8 absent. Tergum of S10 with apical longitudinal cleft shorter than half of S10 (as in Fig. 8a); cercus shorter than S10, conical and yellow except for dark brown mediodorsal surface. Sub-basal plate of ovipositor small and triangular; outer valve of ovipositor with a single row of teeth; tip of ovipositor (excluding stylus) extending beyond posterodorsal margin of S10 but not reaching tip of cercus (Fig. 8b).

**Dimensions:** Total length 36; abdomen length 29; Fw 22; Hw 21.

#### Variation in male paratypes

As for holotype but male labium dull blue; anterior half of head dorsum reddish brown; pterostigma brown; S8-10 orange; CuP reaching CuPAA distally to point of confluence of CuPAA with A, petiolation ending slightly distal to midpoint between Ax 1 and Ax 2; Px 15 in right Fw, 13-14 in left Fw, 11 in right Hw, 12 in left Hw; RP2 branching slightly proximal to Px 7 in Fw, at 5 in right Hw, slightly distal to midpoint between 5 and 6 in left Hw.

**Dimensions:** total length 36.5-37.9; abdomen length 30-30.9; Fw 21.5; Hw 20-20.4.

#### Diagnosis

*P. paulsoni* can be differentiated from *P. flammeum* by its angulate frons, posterior lobe of pronotum trapezoidal with lateral corners broadly angulate and posterior margin slightly trilobate in both sexes (Fig. 3c, d) and male cerci strongly arched at mid-length (Fig. 7f), vs frons rounded, posterior lobe of pronotum semicircular with posterior margin smoothly rounded (Fig. 3a, b) and male cerci only slightly curved (Fig. 7c) in *P. flammeum*.

#### Remarks

*P. paulsoni* seems to be a relatively smaller species, its size included within the lower end of the range for *P. flammeum* (abdomen 29-30.9 and Hw 18.7-21.5 vs 30-35 and 20-24 respectively). Its color pattern is also encompassed within the range of variability of *P. flammeum*, offering no diagnostic characters, viz. male face is blue in *P. paulsoni* and blue to red in *P. flammeum*, and black on top of head extends from distal half to entire dorsum in males of both species. Its small representation among the examined specimens of *Phoenicagrion* (less than 7%) would indicate that its distribution is more restricted and its habits perhaps more elusive than those of *P. flammeum*. However, due to their almost identical color pattern (Fig. 1, Plate IV) and similar shape of male cerci in lateral view (Figs 7a, d) there might be more specimens in collections masquerading as *P. flammeum*.

#### Biology

Collection label of one male paratype indicates it was found in the varzea forest (flooded ground) near edge of river, about 90 cm above ground. Breeding habitat and larva unknown.

## Distribution

So far known only from two localities within the Amazon basin in Loreto Department, Peru (Fig. 9).

## DISCUSSION

A recent phylogenetic analysis of Coenagrionidae (O'Grady & May 2003) showed traditional subfamilial divisions (as outlined by Davis & Tobin 1984) to be artificial and that taxonomic characters commonly used in this family are continuously distributed. As an example, *Phoenicagrion* shares some characters with the 'Argiinae' and some with the '*Coenagrion-Pseudagrion*' series as defined by Kennedy (1920); its lack of female vulvar spine is shared by all of them, its long tibial spurs with 'Argiinae' and its longer petiolation of wings with the '*Coenagrion-Pseudagrion*' series.

I agree with De Marmels (2007) who hypothesized that '*A.* *flammeum*' is more closely related to *Tepuibasis* than to *Aeolagrion* due to the sclerotized apices of lateral lobes of genital ligula distal segment, which he considers homologous to the spiny auricles at the bases of the apical lobes of *Tepuibasis*, and noted also the similar color pattern of *Hylaeonympha* and '*A.* *flammeum*'. However, I think that phylogenetic analyses within New World Coenagrionidae are presently obscured by the artificial nature of many of its genera, which hampers a meaningful analysis of their relationships, and that it will be possible to reliably solve relationships of *Phoenicagrion* through phylogenetic analyses only after all genera of New World Coenagrionidae have been unambiguously defined.

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Colour plate IVb: Male of *Phoenicagrion flammeum* in the understory of the Amazon forest at Campamento Junglaven (5°06'N, 66°22'W), Amazonas, Venezuela, where it was common during the dry season, 3 January 2001. Photo by Dennis Paulson.