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Erythiagrion, a new genus of damselfly from Peru, with description of its type species *Erythiagrion alidae* (Odonata: Coenagrionidae)

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Abstract. *Erythiagrion* gen. n. is erected and *Erythiagrion alidae* sp. n. is described and illustrated. The genus *Erythiagrion* can be recognized morphologically by the following character combination: rounded frons, long abdomen (abdomen/HW length: 1.6–1.9), absence of pretarsal supplementary tooth and CuA ending at or within one cell distance of vein descending from subnodus. Additionally, males have a medial bifid process on posterior edge of both prothorax and S10 and an entirely yellow HW pterostigma bordered by a black spot. The general coloration of adults is black and bright yellow with a red abdominal tip.

Keywords. Dragonfly, Zygoptera, Amazon, South America, tahuampa, taxonomy

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Data Availability Statement:
All relevant data are within the paper.

Introduction

Coenagrionidae comprises one of the most diverse clades of Zygoptera (Dijkstra et al., 2014). Although the phylogenetic relationships and taxonomic status of certain coenagrionid clades are the subject of debate, several studies support the presence of the monophyletic clade 'core Coenagrionidae' (Bybee et al., 2021; Dijkstra et al., 2014; Pessacq et al., 2025). This clade is characterized by the presence of well-developed postocular spots (usually centrally positioned in the postocular lobes and enclosed by a dark coloration) and the absence of a ridged frons (Dijkstra et al., 2014). In this study, we describe a new genus, *Erythiagrion* gen. n., and a new species, *Erythiagrion alidae* sp. n., belonging to the core Coenagrionidae, specifically to the subfamily Ischnurinae.

Ischnurinae is the largest clade of the core Coenagrionidae (Dijkstra et al., 2014). This subfamily includes genera whose females usually possess a vulvar spine at S8 (Dijkstra et al., 2014; Muzón & Lozano, 2020). In the New World, this subfamily comprises 27 genera (Muzón & Lozano, 2020). Most genera were described before 2000, except *Denticulobasis* Machado, 2009; *Dolonagrion* Garrison & von Ellenrieder, 2008; *Fluminagrion* Anjos-Santos, Lozano & Costa, 2013; *Negragrion* Muzón &

Lozano, 2020; *Oreiallagma* von Ellenrieder & Garrison, 2008; and *Tuberculobasis* Machado, 2009. The new genus described in this study was found in the Amazonian region of Peru. In Peru, 15 genera of Ischnurinae are found: *Acanthagrion* Selys, 1876; *Acanthallagma* Williamson & Williamson, 1924; *Calvertagrion* St. Quentin, 1960; *Denticulobasis* Machado, 2009; *Dolonagrion* Garrison & von Ellenrieder, 2008; *Enallagma* Charpentier, 1840; *Homeoura* Kennedy, 1920; *Ischnura* Charpentier, 1840; *Leptobasis* Selys, 1877; *Mesoleptobasis* Sjöstedt, 1918; *Oreiallagma* von Ellenrieder & Garrison, 2008; *Oxyagrion* Selys, 1876; *Oxyallagma* Kennedy, 1920 and *Protallagma* Kennedy, 1920 (Garrison et al., 2010; Hoffmann, 2009). *Erythiagrion* gen. n. displays similarities to several Ischnurinae genera, but matches conclusively with none of them; hence, we present its description in this paper.

Materials and methods

In 2010 and 2015 teneral specimens of the new species were collected in the Loreto Region of Northeastern Peru by the third author. Three specimens stored in alcohol were deposited in Naturalis, Leiden, the Netherlands (RMNH). In 2024 fifteen adult specimens were collected by the first author during a field trip to the same area. These specimens were netted, photographed in order to show living coloration, preserved using acetone, then dried and stored in glassine envelopes and deposited in the Museo de Historia Natural, Universidad Nacional Mayor de San Marcos, Lima, Peru.

Photographs of preserved specimens were taken by the third author using focus stacking technology (Canon EOS 90D digital camera mounted on a Tamron 90/2.8 macro for overviews and Canon MPE 65/2.8 macro and Nikon CFN 10× microscope objective for smaller details).

To help clarify the position of *Erythiagrion* gen. n. within the Coenagrionidae a COI-5P-sequence of *Erythiagrion alidae* sp. n. was compared with that of species from 48 other New World genera: *Acanthagrion* Selys, 1876; *Aeolagrion* Williamson, 1917; *Amazoneura* Machado, 2004; *Anisagrion* Selys, 1876; *Anomisma* McLachlan, 1877; *Argia* Rambur, 1842; *Bromeliagrion* De Marmels, 2005; *Calvertagrion* St. Quentin, 1960; *Cyanallagma* Kennedy, 1920; *Denticulobasis* Machado, 2009; *Dolonagrion* Garrison & von Ellenrieder, 2008; *Drepanoneura* von Ellenrieder & Garrison, 2008; *Enallagma* Charpentier, 1840; *Epipleoneura* Williamson, 1915; *Forcepsioneura* Lencioni, 1999; *Franciscagrion* Machado & Bedê, 2016; *Homeoura* Kennedy, 1920; *Idioneura* Selys, 1860; *Inpabasis* Santos, 1961; *Ischnura* Charpentier, 1840; *Leptagrion* Selys, 1876; *Leptobasis* Selys, 1877; *Mecistogaster* Rambur, 1842; *Megalopreppus* Rambur, 1842; *Mesamphiagrion* Kennedy, 1920; *Mesoleptobasis* Sjöstedt, 1918; *Metaleptobasis* Calvert, 1907; *Microstigma* Rambur, 1842; *Minagrion* Santos, 1965; *Nehalennia* Selys, 1850; *Neoerythromma* Kennedy, 1920; *Neoneura* Selys, 1860; *Oxyagrion* Selys, 1876; *Oxyallagma* Kennedy, 1920; *Peristicta* Hagen in Selys, 1860; *Phoenicagrion* von Ellenrieder, 2008; *Platystigma* Kennedy, 1920; *Protoneura* Selys in Sagra, 1857; *Psaironeura* Williamson, 1915; *Pseudostigma* Selys, 1860; *Roppaneura* Santos, 1966; *Schistolobos* von Ellenrieder & Garrison, 2008; *Telagrion* Selys, 1876; *Telebasis* Selys, 1865; *Tepuibasis* De Marmels, 2007; *Tigriagrion* Calvert, 1909; *Tuberculobasis* Machado, 2009 and *Tukanobasis* Machado, 2009.

Sequences available at RMNH and boldsystems.org were used for the analysis. A phylogenetic tree was constructed using phyML (Guindon et al., 2010) and Chi2-based parametric branch supports (Guindon & Gascuel, 2003) on NGPhylogeny.fr (Lemoine et al., 2019). Sequences were aligned manually. Genera that ended up at greater distance from *Erythiagrion* in the initial tree were subsequently removed, thus zooming in on genera closest to *Erythiagrion*. In the initial tree *Hetaerina* Selys, 1853 was selected as an outgroup; in the final tree *Telebasis* Selys, 1865.

Body morphology nomenclature follows Garrison et al. (2010). Measurements are in millimeters, abdominal length excludes appendages. Abbreviations used are as follows: FW = fore wing; HW = hind wing; CuP = cubitus posterior; CuA = cubitus anterior; RP_2 = radius posterior, second branch; CuP&AA = cubitus posterior and anal anterior; S1–10 = abdominal segments 1 to 10; MUSM = Museo de Historia Natural, Universidad Nacional Mayor de San Marcos, Lima, Peru.

Erythiagrion *gen. n.*

Type species

Erythiagrion alidae sp. n. by present designation.

Etymology

Erythia + *agrion*. *Erythia* in Greek mythology is one of the Hesperides sisters, nymphs of the golden light of sunset. This forms a reference to the coloration of this damselfly. Furthermore, these sisters were guardians of a tree with golden apples, resembling the way these damselflies tend to spend time gathering around specific trees.

Agrion is the neuter form of *agrios* meaning "living in the wild", which is commonly used as an indicator that a genus belongs to the Coenagrionidae (Fliedner, 2006).

Filiation

A basic phylogenetic analysis of the COI-5P barcode of *Erythiagrion* indicates a relationship to *Mesoleptobasis*, *Leptobasis*, *Denticulobasis*, *Tuberculobasis*, *Tukanobasis*, *Telagrion*, *Calvertagrion*, *Anisagrion* and *Dolonagrion* (Fig. 3C), thus placing the genus *Erythiagrion* within the Ischnurinae as interpreted by Dijkstra et al. (2014).

Within this group of genera several branch supports are low, thus still insufficient for a definitive phylogenetic classification of all genera. The presented tree is meant merely to illustrate that these genera are genetically all close to *Erythiagrion*.

Generic characterization

Medium sized Coenagrionidae (total length: 32–36 mm). Male and female predominantly black and yellow, with red abdominal tip when mature (Figs 1A–D).

Frons rounded. Postocular spots present in males (Fig. 2D); in females postocular light area occupies almost entire rear of head (Fig. 2H). Antehumeral stripes present (Figs 1E–F). Posterior lobe of prothorax with process in both sexes, anvil-shaped in male (Fig. 3B), rounded in female (Fig. 2I). Pretarsal supplementary tooth absent. CuA not extending distally past vein descending from subnodus or at most by one cell length. CuP not reaching posterior wing margin but linking CuA to CuP&AA. HW pterostigma yellow in male, bordered caudally by a black spot (Fig. 2F). Ratio abdomen/HW length 1.87 in males and 1.58 in females; ratio body length/(head+thorax) 6.0–6.1 in males and 5.3–5.7 in females. Genital ligula bifid apically with chitinized areas on the lateral lobes (Figs 1G–H). Posterodorsal edge of S10 projected into a bifid process (Figs 2A–C). Cercus of male lacking ventrobasal branch and shorter than paraproct; paraprocts forcipate (Figs 2A–C). Ovipositor of female surpassing cerci. Vulvar spine absent (Fig. 2G).

Diagnosis

Erythiagrion has a rounded frons and relatively long abdomen (mean abdomen/HW length 1.87 in males and 1.58 in females), like all known related genera (as defined under Filiation). Morphologically it can be distinguished from these other genera by the character combination discussed below [other genera in parentheses].

The type species is of average size for Coenagrionidae: 32–36 mm [*Calvertagrion* species are much smaller: 21–24 mm]. It has postocular spots and antehumeral stripes [species without these occur within *Dolonagrion*, *Leptobasis*, *Tukanobasis*, *Tuberculobasis* and *Mesoleptobasis*]. A bifid process on the posterior margin of the prothorax is present in *Erythiagrion* males [only shared with males of *Dolonagrion*, *Calvertagrion* and most *Mesoleptobasis* spp.]. *Erythiagrion* lacks a pretarsal supplementary tooth [in all related genera there is at least a trace of a tooth in the form of an obtuse (*Mesoleptobasis*) or right angled (*Dolonagrion, Leptobasis, Tukanobasis* and *Telagrion*) prominence]. In *Erythiagrion* CuA usually (85% of cases) reaches to vein descending from subnodus; in 15% of cases CuA ends one cell length proximally to at most one cell length distally [only shared with *Calvertagrion* and some species of *Mesoleptobasis*; in other genera it extends at least two cells distally]. CuP in *Erythiagrion* does not reach posterior wing margin but links CuA to CuP&AA [shared only with *Anisagrion*, *Dolonagrion* and *Calvertagrion*]. As far as is known, damselfies within *Erythiagrion* do not develop pruinescence [pruinescence is known from *Dolonagrion* and *Calvertagrion*].

A unique characteristic of *Erythiagrion* males is the bright yellow HW-pterostigma, bordered caudally by a black spot [*Tukanobasis huamantincoae* has yellow in the HW-pterostigma, but in this species the pterostigma itself is half yellow, half black, and black markings bordering the pterostigma are lacking]. The genital ligula of *Erythiagrion* is bifid apically [not bifid in *Calvertagrion*, *Tuberculobasis* and some members of *Leptobasis*] with chitinized areas on the lateral lobes [shared with *Anisagrion*, *Leptobasis*, *Calvertagrion*, *Tukanobasis* and *Mesoleptobasis*; *Telagrion* only has some lateral setae]. The posterodorsal edge of S10 is projected into a bifid process in *Erythiagrion* [shared with *Anisagrion* and some species within *Mesoleptobasis* and *Leptobasis; Calvertagrion* has a u-shaped incision; other related genera have an entire posterodorsal edge without projections]. The cerci of *Erythiagrion* males lack a distinct ventrobasal branch and are shorter than the paraprocts [shared only with *Tukanobasis*, *Denticulobasis* and *Mesoleptobasis*].

Females of *Erythiagrion* have no vulvar spine [vulvar spine is present in *Tuberculobasis* and some members of *Leptobasis;* in *Denticulobasis* it evolved into a plate; females of *Tukanobasis* are unknown]. The ovipositor of *Erythiagrion* females surpasses the cerci [in *Anisagrion*, *Tuberculobasis* and some *Mesoleptobasis* spp. it does not].

The general coloration of adult *Erythiagrion*, black and bright yellow with a red abdominal tip, is also known from *Tukanobasis huamantincoae,* which occurs sympatrically with *Erythiagrion*. Males of this species have a hairy tubercle on venter of metathorax, lack the black spot bordering the pterostigma caudally, have an entire posterodorsal margin on S10, more intricately shaped black cerci and longer, entirely black, paraprocts.

Addition to generic key in Garrison et al. (2010)

When trying to identify *Erythiagrion alidae* to genus-level using Garrison et al. (2010), one ends up at the last couplet in both the key for males and for females. In the case of a male that implies couplet 61, in the case of a female, couplet 80. Here it is impossible to choose correctly as both options are partly correct and partly incorrect for *Erythiagrion alidae*.

At these couplets the keys can be modified as follows:

Key to males

61(4). Supplementary tooth of pretarsal claw well developed, forming an acute angle with claw (Fig. 813); two cells between quadrangle and vein descending from subnodus in HW .... *Calvertagrion* (Page 225)

61'. Supplementary tooth of pretarsal claw vestigial, forming an obtuse low prominence, or absent (Fig. 814); three cells between quadrangle and vein descending from subnodus in HW 62

62(61). RP_2 in FW starting near postnodal 5; FW CuP linking CuA to posterior wing margin (Fig. 818); pterostigma in FW and HW equally dark; pterothorax not black middorsally, but orange or (non-metallic) greenish (often bordered by blue mesepisternal stripe); paraprocts twice as long as cerci or longer ... *Mesoleptobasis* (Page 280)

62'. RP_2 in FW starting near postnodal 4; FW CuP linking CuA to CuP&AA, not reaching posterior wing margin; pterostigma in FW dark, in HW yellow with a dark patch posterior to it covering about one cell; pterothorax dorsally half black, except for yellow antehumeral stripe; paraprocts less than twice as long as cerci ..... *Erythiagrion*

Key to females

80(79). Frons angulate (as in Fig. 1018); pterothorax with (very narrow or wider) dark middorsal stripe present, but black humeral stripe absent ..... *Metaleptobasis* (Page 284)

80'. Frons rounded (as in Fig. 1017); pterothorax with black middorsal and black humeral stripe either both present or both absent 81

81(80). FW CuP linking CuA to posterior wing margin (Fig. 1024); RP_2 in FW starting near or distal to postnodal 5; pterothorax not black middorsally, but orange or (non-metallic) greenish (often bordered by blue mesepisternal stripe); total length ≥ 36 mm ... *Mesoleptobasis* (Page 280)

81'. FW CuP linking CuA to CuP&AA, not reaching posterior wing margin; RP_2 starting near postnodal 4 in (one or both) FW; pterothorax black middorsally, bordered by yellow antehumeral stripe and black humeral stripe; total length < 36 mm ..... *Erythiagrion*

Erythiagrion alidae *sp. n.*
Figs 1–4

Etymology

'Alida' is the name of the mother of the first author, without whose unwavering belief and support, both logistical and emotional, this project could never have reached fruition. Noun in genitive case.

Specimens studied
Holotype ♂

Peru, Loreto Región, Tamshiyacu-Tahuayo Reserve, east of Río Tahuayo in tahuampa forest, elevation 96 m a.s.l., 4.355° S, 73.248° W; 01.iv.2024, leg. M. Christie [MUSM].

Paratypes

1 ♂, same data as holotype, 4 ♂♂ and 4 ♀♀, same data as holotype but 03.iv.2024, 1 ♂ and 1 ♀, same data as holotype but 4.356° S, 73.248° W; 04.iv.2024; 2 ♂♂ and 1 ♀, same data as holotype but 09.iv.2024.

Additional teneral specimens studied, not included in type series: 1 ♂: same data as holotype but west of Río Tahuayo 4.33° S, 73.26° W; 4-iii-2010, leg. T. Faasen [RMNH] and 2 ♂♂, same data as holotype but in igapó forest 4.33° S, 73.23° W; 1-ii-2015, leg. T. Faasen [RMNH].

Male holotype

Head. Predominantly black, including postfrons, clypeus, postocular lobes and dorsum. Antefrons yellow. Genae yellow with small, irregular black markings. Yellow postocular spots present. Occipital bar absent. Mandibles yellow, orange apically. Labium yellow ventrally, dark brown dorsally. Frons rounded. Postocular lobes not protruding posteriorly beyond level of hind margin of compound eyes (Figs 2D–E).

Thorax. Prothorax mostly black dorsally, except for a large posteriorly pointing yellow right triangle extending longitudinally halfway down middle lobe. Base of triangle slightly posterior to anterior margin of anterior lobe, with rounded corners (Fig. 3A). Propleuron yellow. Middle prothoracic lobe smoothly convex. Posterior lobe with medial, truncate, bifid, anvil-shaped posterior process, projected slightly dorsoposteriorly at base and anterodorsally apically. Laterally the process is constricted angularly. Posterior lobe black, except for pale dorsal margin and tips of process (Fig. 3B).

Pterothorax yellow ventrally, including coxa, metinfraepisternum and metepimeron. Ventral ⅖ of mesinfraepisternum yellow, dorsal ⅗ black. Metepisternum yellow, except darkened posterior margin, caudally darkened interpleural suture and small dark brown strip near posteroventral apex. Mesepimeron black. Mesepisternum black with a medial yellow stripe. Middorsal carina black. Mesostigmal plate black with yellow tips. Anterior portion of mesepisterna without horns or tubercles (Fig. 1E).

Legs: Trochanter yellow, femora mostly yellow, but darkened at knee (Fig. 1A). Tibiae yellow. Spines black. Tarsi yellow. Pretarsus darkened distally; claws yellow with darkened tips. Spines on tibia longer than on femur. Metatibial spurs longer than twice intervening spaces; pretarsal supplementary tooth absent.

Wings hyaline, save for a black spot in HW, posterior to pterostigma and equal in size. Wingspot almost completely covers cell posteriorly bordering pterostigma and proximal end of cells bordering pterostigma apically. Pterostigma covering one cell, brown with yellow

outer margin in FW, yellow in HW. CuP at end of petiolation at about 65% of the length between antenodals one and two. CuP linking CuA to CuP&AA and not reaching posterior wing margin. Postnodals: 9 in FW, 8 in HW. RP_2 branching slightly proximally to postnodal 4 in FW, and slightly proximally to postnodal 3 in HW. Vein descending from quadrangle in HW forming straight line to wing margin. CuA ending at vein descending from subnodus in three wings, 0.8 cell lengths proximally in right FW (Fig. 2F).

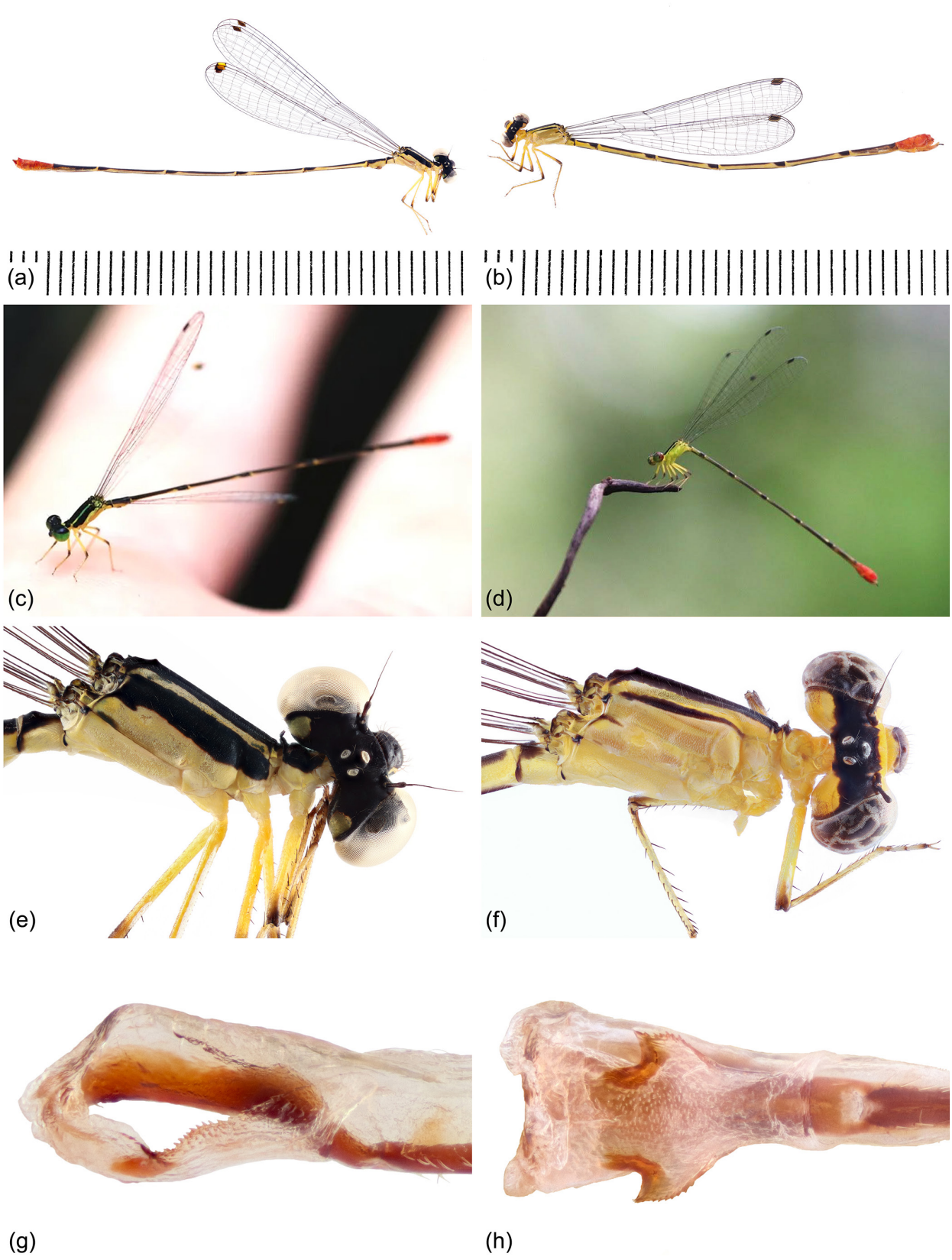


Figure 1. *Erythiagrion alidae*: A – habitus male paratype, lateral view; B – habitus female paratype, lateral view; C – habitus male *in situ*; D – habitus female *in situ*; E – head & thorax lateral view, male paratype; F – head & thorax lateral view, female paratype; G – genital ligula lateral view, male paratype; H – genital ligula ectal view, male paratype.

Abdomen: S1–7 black dorsally, yellow laterally, with darkened posterior margins; S3–7 black dorsal area narrowed near anterior margin and at ⅝ of length of each segment, widest posteriorly; S7 with reddish posterior margin; S8–10 red dorsally, reddish yellow laterally (Fig. 1A). Sterna with a dark longitudinal line on S1 and S3–8.

Genital ligula: without terminal fold, but with small inner fold; one proximal pair of lateral processes, chi-

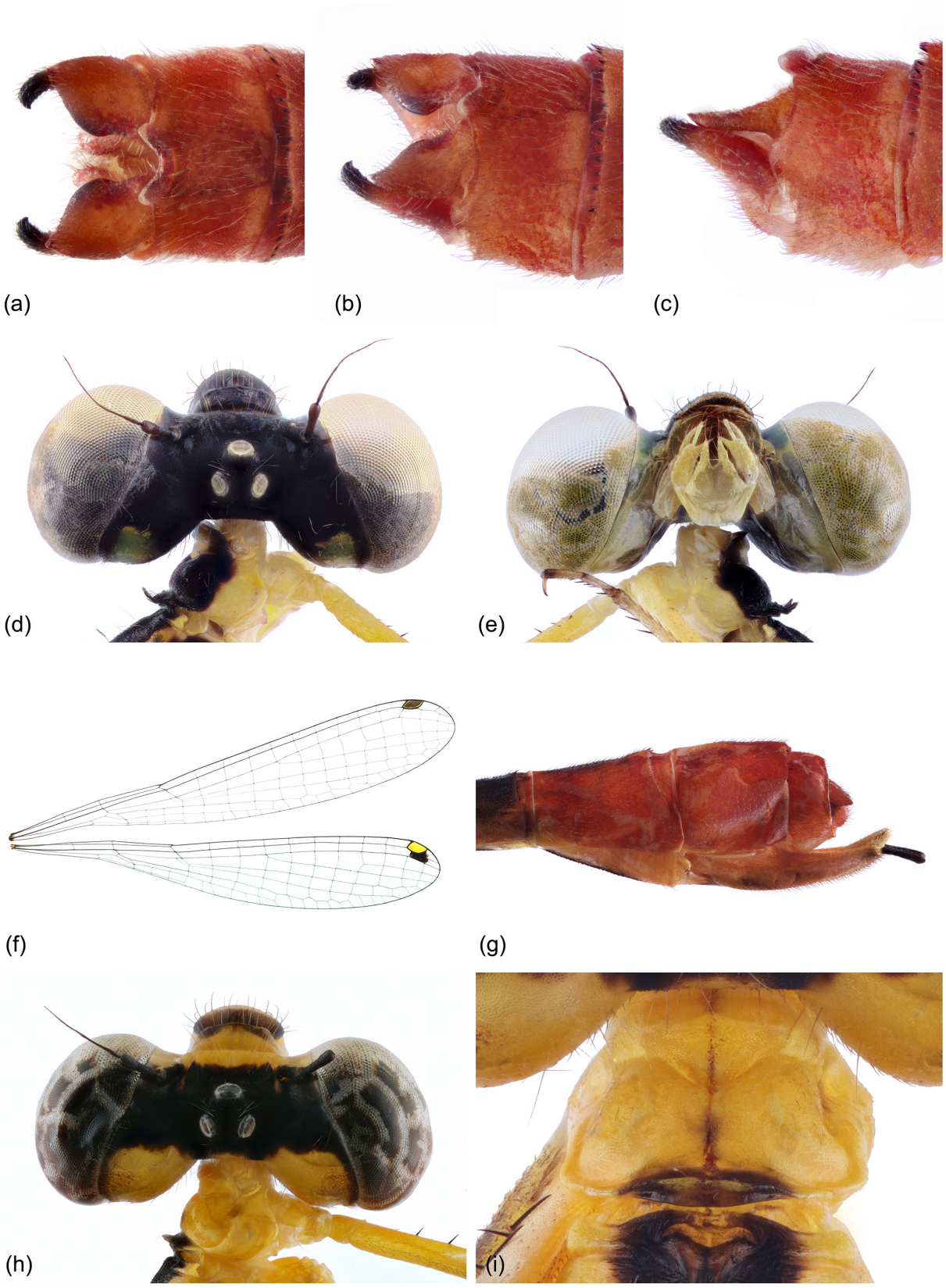


Figure 2. *Erythiagrion alidae*: A – caudal appendages dorsal view, male paratype; B – caudal appendages mediodorsal view, male paratype; C – caudal appendages lateral view, male paratype; D – head dorsal view, male paratype; E – head ventral view, male paratype; F – wings, male paratype; G – ovipositor, female paratype; H – head dorsal view, female paratype; I – prothorax dorsal view, female paratype.

tinized at lateral margins, with chitinized denticules along margin and posteriorly curved spine at tip; one large distal pair of lateral processes, falcate in lateral view, tip blunt and curved in anterior direction, with small transparent denticules; distal margin bifid in ectal view (Figs 1G–H).

Posterior margin of S10 projected mediodorsally, with a small bifid process. Male cercus: red, widened, leaf-shaped, longer than wide, lacking ventrobasal branch, with concave dorsal surface in lateral view and strongly convex lateral margin in dorsal view. Medial margin with shallow excavation proximal to mid-length. Tip pointed, posteriorly directed.

Paraproct: forcipate, directed dorsoposteriorly, pressed firmly against the cercus, basally red, apically black, slightly longer than cercus, wider basally, narrowing apically, smoothly mediodorsally curved with tip directed medially (Figs 2A–C).

Dimensions (in mm): Total length 34.8. Abdomen length 30.2. FW length 17.8. HW length 16.5.

Male *in vivo*: dorsal third of eyes black, remaining two thirds bright green to greenish-yellow ventrally. Postocular spots and medial stripe on mesepisternum greenish (Fig. 1C).

Female paratype

Head: Yellow, except for following black areas: posterior section of postfrons, anterior margin of postclypeus, dorsal portion of labrum and dorsum of head, excluding postocular lobes but including postocular margin with eye. Neither postocular spots nor occipital bar present. Postocular lobes not protruding posteriorly beyond level of hind margin of compound eyes. Frons rounded (Fig. 2H).

Thorax: Anterior prothoracic lobe and middle lobe yellow dorsally, except for a narrowly darkened mediodorsal longitudinal seam. Prothorax yellow laterally. Posterior prothoracic lobe with rounded, posterodorsally projected process, darkened with lateral apices yellow. Apical margin of process smoothly convex medially and gently concave near lateral apices (Fig. 2I). Pterothorax mostly yellow, including coxa, metinfraepisternum, mesinfraepisternum, metepimeron, mesepimeron and metepisternum, except for the interpleural suture. Mesepisternum dark, except for a medial longitudinal yellow stripe. Middorsal carina black. Mesostigmal plate black, except for yellow tips. Anterior portion of mesepisterna without tubercles or horns (Fig. 1F).

Legs: trochanter yellow, femora mostly yellow, but darkened dorsally and at knee (Fig. 1B). Tibiae yellow, with brown stripe on inner surface fading distally. Spines black. Tarsi yellow. Pretarsi and claws yellow with dark brown tips. Spines on tibia longer than on femur. Pretarsal supplementary tooth absent.

Wings hyaline. Pterostigma covering one cell, brown with yellow outer margin. CuP at end of petiolation at about 65% of the length between antenodals 1 and 2.

Postnodals: 10 in left FW, 9 in right FW, 8 in HW. RP_2 branching at postnodal four in FW, at postnodal three in HW. Vein descending from quadrangle in HW forming straight line to wing margin. CuP linking CuA to CuP&AA and not reaching posterior wing margin; CuA ending at vein descending from subnodus in all wings.

Abdomen: S1–7 dark dorsally, yellow laterally with dark dorsal area narrowed near anterior margin and narrowed at ⅝ of length of each segment; S8–10 reddish (S8 with diffuse dark medio-dorsal marking) (Fig. 1B). Sterna: with a dark longitudinal line on S1–8.

Cerci reddish, conical, directed ventrocaudally, shorter than S10. Ovipositor reddish-yellow and extending 0.4 mm past posterior margin of cerci. Stylus black and 0.4 mm long. S8 without vulvar spine (Fig. 2G).

Dimensions (in mm): Total length 34.0. Abdomen length 28.5. FW length 18.7. HW length 17.5.

Female *in vivo*: posterior half of eye, red; anterior half, green. Pterothorax: yellowish-green rather than yellow (Fig. 1D).

Variation in male paratypes

Head: as in holotype.

Thorax: as in holotype, except for: 8 postnodals in left FW of two paratypes, 8 in right FW of two paratypes, 10 in left FW of one paratype, 10 in right FW of two paratypes, 7 in HW of two paratypes, 9 in left HW of one paratype. RP_2 in FW branches at (as opposed to slightly proximal to) postnodal four in six paratypes, and RP_2 in HW branches at (not proximal to) postnodal three in seven paratypes, and at postnodal three in only the left HW of one paratype. CuA ending at vein descending from subnodus in all wings in five specimens; CuA ending one cell length proximally to vein descending from subnodus in right wings in one paratype and in right FW in another. CuA ending 0.5 cell distally to vein descending from subnodus (without reaching wing margin) in left HW in one paratype.

Abdomen: as in holotype.

Dimensions (in mm): total length 33.8–35.9. Abdomen length 28.8–30.7. FW length 16.5–17.9. HW length: 15.4–16.5.

Variation in female paratypes

Head: as in female described above.

Thorax: 8 postnodal crossveins in right FW of one paratype, 9 in left FW of three paratypes, 10 in right FW of

two paratypes, 7 in HW of one paratype, 9 in left HW of one paratype. RP_2 in FW branches proximally to postnodal four in one paratype, and proximally to postnodal five in right FW in one paratype; RP_2 in HW branches distally to postnodal three in right HW and proximally to postnodal four in left HW of one paratype. CuA ending one cell length proximally to vein descending from subnodus in both FW and left HW in one paratype; CuA ending one cell length distally to vein descending from subnodus in left HW in one paratype.

Abdomen: as in female described above.

Dimensions (in mm): total length 32.2–34.8. Abdomen length 26.4–28.5. FW length 18.0–19.7. HW length 17.1–18.1.

Habitat and ecology

All known specimens of *E. alidae* were observed and/or collected from a canoe in flooded lowland rainforests bordering the black water Río Tahuayo. A teneral male was collected in tahuampa forest west of the river on 4th March 2010. Two teneral males were collected roughly 3 km away in igapó forest east of the river on 1st February 2015. On 2nd April 2023 an adult was observed but not collected at the same location as the first teneral. Between 1st and 9th April 2024 fifteen mature specimens (9 males, 6 females) were collected 2 km further south in tahuampa forest east of the river (Fig. 3D). These were all collected within 220 m of each other, under a fairly dense canopy.

Tahuampa forest is a forest type that is seasonally flooded with black water, with water levels up to several meters during peak flooding. It has a low diversity of trees, which have a tortuous growth form with an abundance of aerial roots. Igapó forest is the forest found along black water rivers. Like tahuampa, it is also seasonally flooded with black water (Myster, 2009). Tahuampa and igapó are ecologically related and also grow in mosaic and intermediate forms.

These records show that tenerals are already on the wing as early as February, maturing into adults between February and April. As the specimens found in April were still undamaged, brightly coloured, clear-winged and not mating or ovipositing, it seems likely that they were still fairly young adults, indicating that the flight season for this species probably extends at least to the end of April. The flight period might actually be longer but no sampling data from May–June is available. As its habitat dries up for several months per year (Myster, 2009), it seems likely that the species has a single approximately synchronized generation each year.

All mature specimens were collected between the roots of strangler fig trees (genus: *Ficus*). Eleven *Ficus* trees were surveyed at the type locality, and *E. alidae* was present in five of them. Possible correlations between light intensity, foliage density, tree size, or floral diversity and the presence of *E. alidae* were considered, but no concrete pattern could be deduced, except perhaps that larger *Ficus* trees with better developed roots were preferred. It seems likely that these *Ficus* trees play an important role in the reproductive habits and/or survival of *E. alidae*.

These forests begin to drain in late May or early June, and don't flood again until October or November. This poses a significant challenge to larval development. Water retained between the roots of these *Ficus* trees during the dry season could be important in maintaining an aquatic environment for *E. alidae* larvae. An alternative hypothesis is that *E. alidae* survives the dry season as an egg or even as an aestivating adult and undergoes highly accelerated larval development between the end of the dry season (October–November) and late January (given that teneral adults have been observed on the wing as early as February).

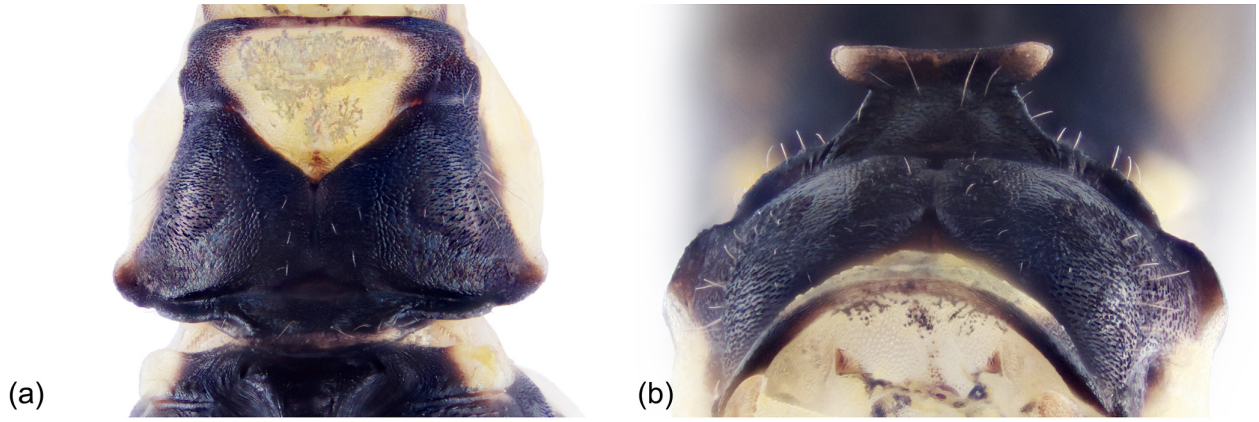
Based on available data presented above, the habitat of *E. alidae* could be characterized as severely flooded primary river-edge forest with strangler figs. These strangler figs may be found in high density, as in some tahuampa forests, or more sparsely, as in igapó forests near rivers.

Behaviour

Erythiagrion alidae appeared to spend most of its active hours flitting from perch to perch, often darting towards vegetation and swiftly retracting in a display of what must have been hunting, as it emerged clutching a mosquito on several occasions. Sustained perching became more common in the later hours of the day (from 13:30 onwards), when females would usually perch with wings spread roughly halfway and abdomen pointed roughly 70 degrees downward (Fig. 1D) and males with wings almost if not completely closed, and abdomen held more or less parallel to the thorax.

In the population observed in 2024 no successful copulation was witnessed. On several occasions a male flew close behind a female, then collided with her in flight, presumably in an attempt to initiate copulation. This often resulted in the male clasping the female in tandem, and on one occasion the female curled her abdomen upwards towards the male's secondary genitalia momentarily, but on all observed occasions the female eventually rejected the mating attempt.

Males seemed to display territorial behaviour. On the one occasion that a damselfly of another species (an unidentified blue female) entered the roots of the *Ficus* tree, it was aggressively mobbed by a male of *E. alidae*. On the whole, these trees seemed fairly devoid of the presence of other Zygoptera. Males of *E. alidae* were also observed colliding aggressively in flight with each other. This could be an example of intraspecific territoriality, but the nature of the encounters seemed remarkably similar to the attempts to initiate copula, so this could equally have been a case of mistaken sex recognition.



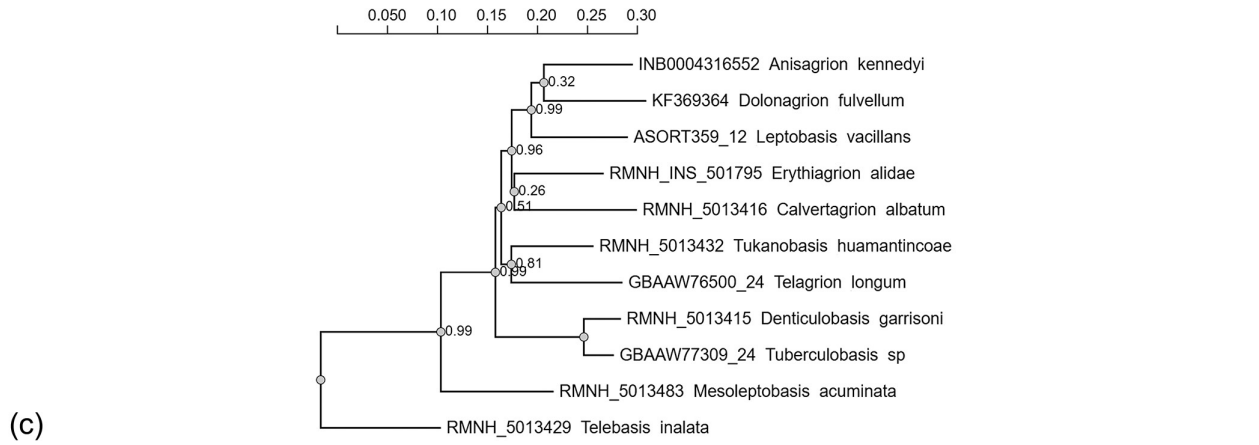


Figure 3. *Erythiagrion alidae*: A – prothorax dorsal view, male paratype; B – prothorax frontal view, male paratype; C – section of rooted maximum likelihood phylogram with neotropical representatives of Ischnurinae including branch support values; D – habitat at type locality (tahuampa forest).

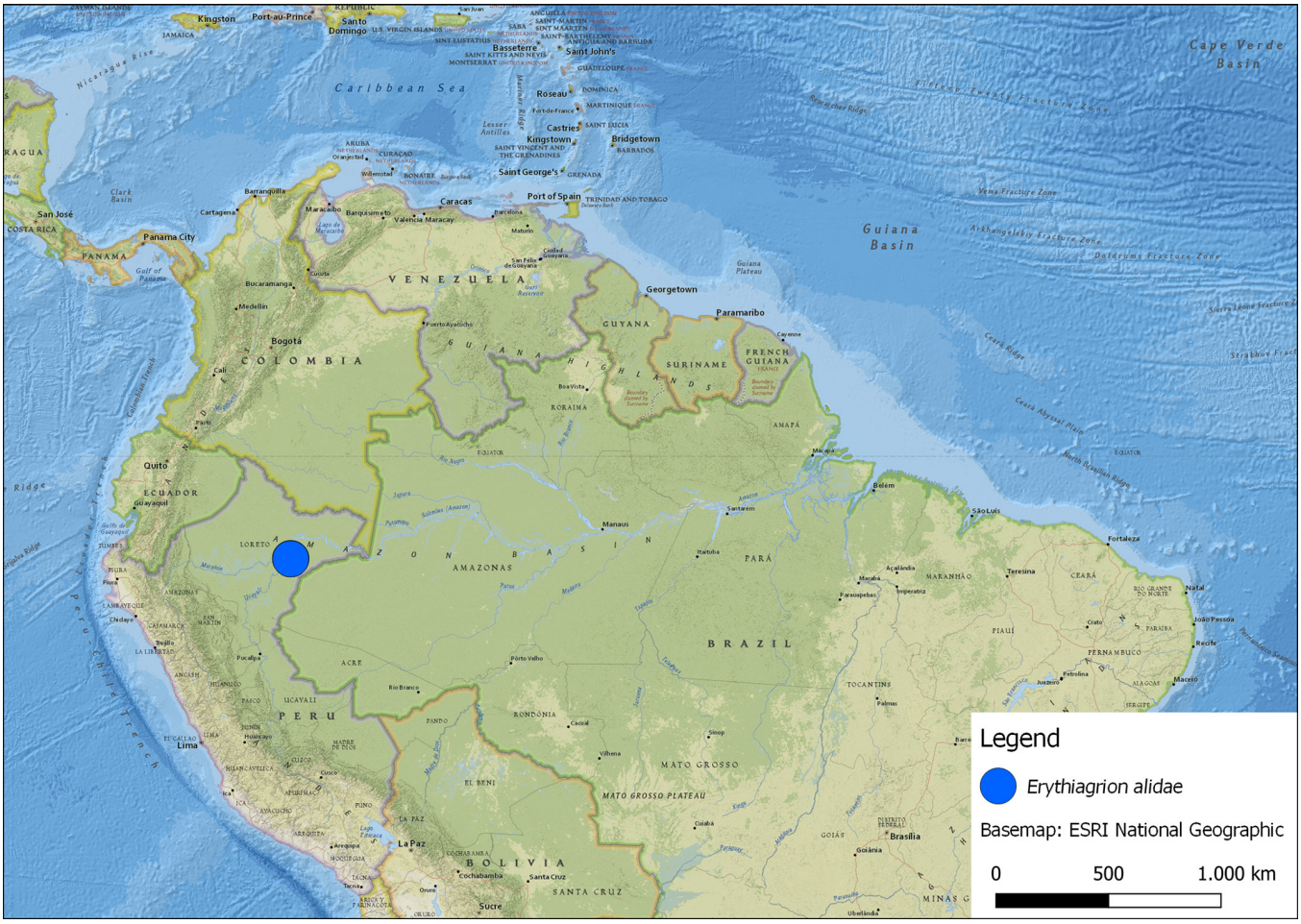


Figure 4. *Erythiagrion alidae*, distribution map.

Distribution

This species has only been recorded in Tamshiyacu Tahuayo Regional Conservation Area in northeastern Peru (Loreto) (Fig. 4). However, given the incomplete sampling of odonates in the rainforests of South America, it is likely that its true range extends further along forests bordering black water rivers within the floodplain of the Amazon basin.

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