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Description of three females of the genus *Acanthagrion* (Odonata: Coenagrionidae) with a key to the females of Argentina

FEDERICO LOZANO

Centro Regional de Estudios Genómicos (UNLP) Av. Calchaquí km 23.4, 1888, Florencio Varela, Buenos Aires, Argentina.
E-mail: federicolozano82@gmail.com

Abstract

The neotropical genus *Acanthagrion* Selys (Odonata: Coenagrionidae) is composed of 44 species, of which the females of 31 species are currently known. In this contribution the females of *A. aepiolum* Tennessen and *A. minutum* Leonard are described and that of *A. ascendens* Calvert is redescribed. Distribution maps and new records are provided for all three species. Finally, a key to females of the genus *Acanthagrion* from Argentina is provided.

Key words: *Acanthagrion*, damselfly, Neotropical region

Resumen

El género neotropical *Acanthagrion* Selys (Odonata: Coenagrionidae) contiene 44 especies de las cuales se conocen las hembras de 31 especies. En esta contribución se describen las hembras de *A. aepiolum* Tennessen y *A. minutum* Leonard, y se redescribe la hembra de *A. ascendens* Calvert. Se proveen además mapas de distribución y nuevos registros para todas ellas. Por último, se brinda una clave para las hembras del género *Acanthagrion* presentes en Argentina.

Introduction

The neotropical genus *Acanthagrion* was erected in 1876 by Baron Edmond Selys Longchamps to include nine species of Coenagrionidae. Currently it includes 44 small to medium species which are distributed from Texas (USA) to Buenos Aires (Argentina) (Garrison *et al.* 2010; Machado 2012). This genus can be diagnosed by wings hyaline with CuP of Hw reaching hind margin of wing (except in *A. minutum*); flexure of genital ligula short; lateral lobes of genital ligula, when present, distal to flexure; cerci slanting from base (forming an angle of 45° with posterior margin of S10) and with a basal tubercle (absent only in *A. taxaense* whose generic placement is formerly being reconsidered, Anjos-Santos & Lozano in press). Females lack a well-defined mesepisternal carina between mesostigmal plates and middorsal carina, and generally have mesepisternal fossae on the dorsum of the pterothorax and a vulvar spine on S8 (von Ellenrieder & Lozano 2008; Garrison *et al.* 2010). The knowledge of the females is incomplete, with 31 females described to date (70.5%).

In Argentina the genus *Acanthagrion* is represented by eight species: *A. aepiolum* Tennessen, *A. cuyabae* Calvert, *A. floridense* Fraser, *A. gracile* (Rambur), *A. hildegarda* Gloger, *A. lancea* Selys, *A. minutum* Leonard and *A. temporale* Selys (von Ellenrieder & Muzón 2008). Of these, only the females of *A. aepiolum* and *A. minutum* have not been described yet.

The specific status of *A. ascendens* Calvert has been misinterpreted for approximately 50 years. Calvert (1909) described *A. ascendens* based on Brazilian specimens. Rácenis (1958) described the male and female of *A. luteum* based on specimens collected in Venezuela and Surinam; as both species (*A. ascendens* and *A. luteum*) were very

similar, Rácenis compared his specimens from northern South America with specimens identified by him as *A. ascendens* from Brazil but omitted examining Calvert's types. Therefore, he confused *A. ascendens sensu* Calvert with *A. luteum*. Tennessen (2004), based on careful examination of type material, solved this problem by proposing *A. luteum* as a junior synonym of *A. ascendens* and described a new species, *A. aepiolum*, for the species misidentified as *A. ascendens* by Rácenis.

The female of *A. ascendens* was described by Williamson (1916) based on a teneral specimen. Rácenis (1958), in his description of *A. luteum*, drew a female from Brazil; Tennessen (2004) speculated that this specimen could belong to *A. aepiolum* due to the position of the mesepisternal fossae which would reflect the differences quantified by him in the length of male cerci of both species. Later on, several authors (von Ellenrieder & Lozano 2008; Garrison *et al.* 2010) illustrated and commented on different structures of the female of *A. ascendens*, but none of them described it formally.

Acanthagrion minutum was described by Leonard (1977) as part of his Adustum group from specimens collected in Venezuela. Mentions of this species in the literature are scarce, and its records are isolated. Up to now the female has not been described.

In this contribution the females of *A. aepiolum* and *A. minutum* are described and that of *A. ascendens* is redescribed. Complete synonymic lists and updated distribution maps with new records are also provided. Finally, a key to the species of the genus *Acanthagrion* from Argentina is given.

Material and methods

Specimens were studied with the aid of a Leica MS5 stereomicroscope in the Instituto de Limnología Dr. R. A. Ringuelet (ILPLA). Illustrations were made with the aid of a camera lucida and an open-source design program (Inkscape version 0.47. at <www.inkscape.org>) and are not to scale. Specimens for SEM were cleaned in acetone, air dried and mounted on SEM stubs with carbon-conductive adhesive tabs, and then sputter coated with gold/palladium alloy and examined with a Jeol JSM 6360 LV scanning electron microscope in the Museo de La Plata, Buenos Aires, Argentina.

Wing venation follows Riek & Kukalová-Peck (1984), modified by Bechly (1996). Abbreviations for structures used throughout the text are as follows: FW: forewing; HW: hindwing; pt: pterostigma; Ax: antenodals; Px: postnodals; LPx: last postnodal crossvein; PtP: proximal transversal vein of pterostigma. S1–10: abdominal segments 1 to 10.

Color pattern terminology of thorax follows Westfall & May (1996) (Figs. 2–3). Color pattern of head and abdomen are named as follows (abdominal terga are described considering them extended horizontally):

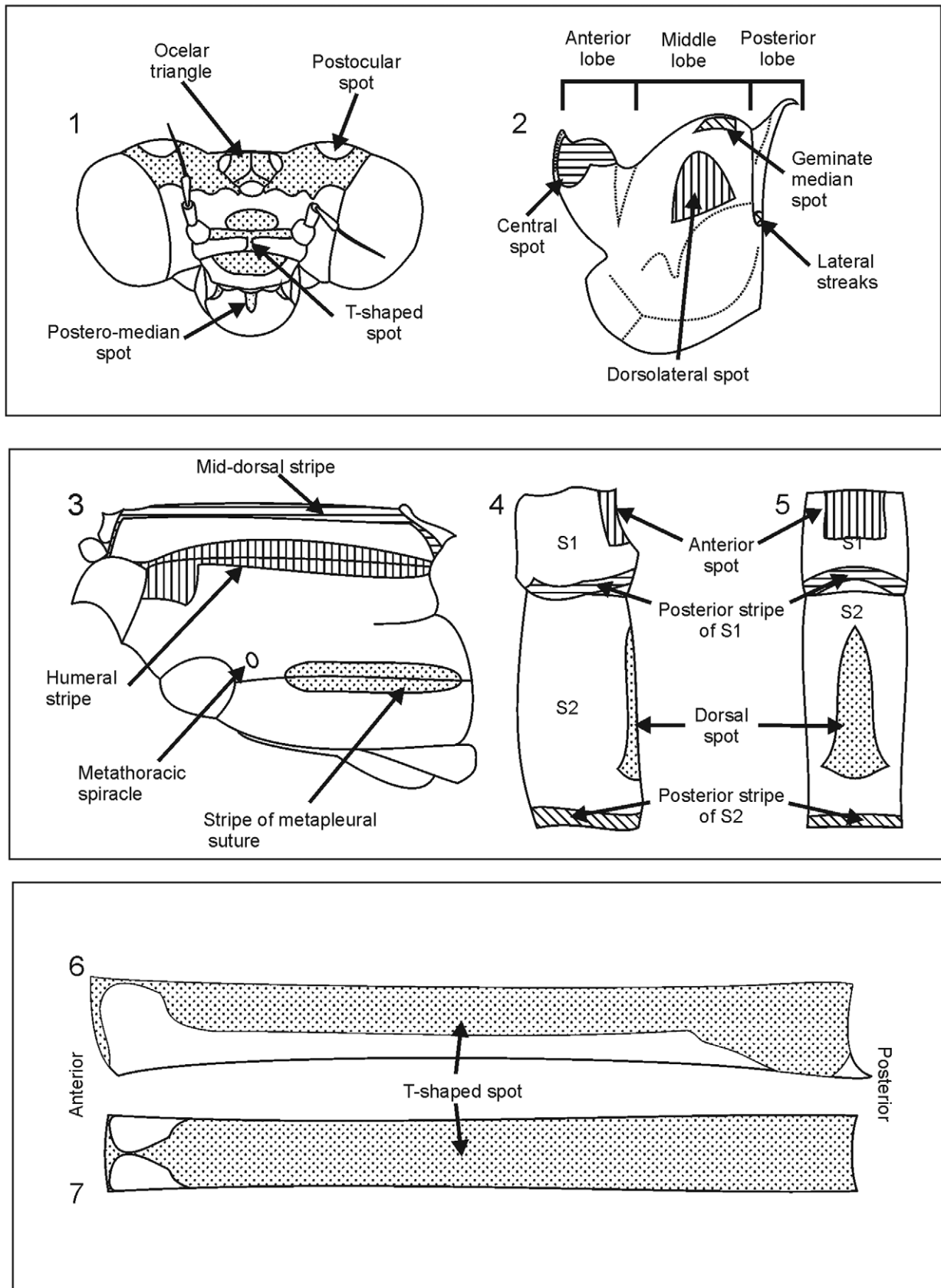
Head (Fig. 1): *Postero-median spot of labrum*: located on the posterior margin of the labrum, generally dome-shaped, either dark brown or black. *T-shaped spot of antefrons*: when present longitudinal axis of the T coincident with antero-posterior axis of antefrons, its lateral arms reaching or not the bases of the antennae. *Postocular spots*: located on the postocular lobes; shape and size variable. *Occipital bar*: situated on posterior margin of head between the postocular lobes; it can be absent.

S1 (Figs. 4–5): *Anterior spot*: generally rectangular, located anteriorly and medially on the segment; posterior margin of it either free or reaching posterior stripe of S1. *Posterior stripe*: located posteriorly on the segment; it can be either complete or incomplete (discontinued mediodorsally); its lateral margins are generally in contact with the ventrolateral margins of the tergum.

S2 (Fig. 4–5): *Dorsal spot*: Located medially and posteriorly on the tergum; it can be variable in shape and can contact the anterior margin of the tergum through a thin line or through a stripe of variable width; posteriorly it can be in contact with the posterior stripe. *Posterior stripe*: Similar to that described for S1.

S3–6 (Fig. 6–7): *Dorsal T-shaped spot*: longitudinal axis of the T coincident with middorsal line, lateral arms either parallel to posterior margin of the segment or directed anteriorly, forming an acute angle with posterior margin. Distal margin of lateral arms either in contact with ventrolateral margins of tergum or free. *Posterior stripe*: Only visible when the lateral arms of the dorsal T-shaped spot are directed anteriorly, in which case it is similar to that described for S1.

S7 and terminalia: Because the color pattern of these structures varies greatly among species, it will be described in detail for each of the species herein studied.



FIGURES 1-7. Color pattern of genus *Acanthagrion*. 1, head, anterodorsal view; 2, prothorax, lateral view; 3, pterothorax, lateral view; 4, S1-S2, lateral view; 5, S1-S2, dorsal view; 6, S4, lateral view; 7, S4, dorsal view.

Measurements are given in mm.

For each species a synonymic list is provided; between brackets and where necessary, there are comments on the identity of the specimens. A list of examined material is provided in alphabetical order; country, department, state, province or any other political/administrative equivalent subdivision, locality, geographic coordinates and altitude, collector/s, date of collection, number of male and female specimens (when necessary number of pairs in copula/tandem are indicated in brackets), and deposition of material are indicated. Any additional information is given between square brackets ([]). When geographic coordinates were not included in the original label, they were culled from the Global Gazetteer website (<<http://www.fallingrain.com/world/>>) with the aid of Google Earth Plus version 4.2.0205.5730, and this is indicated in braces ({ }). Maps represent distribution records from collections and reliable literature records, and were created electronically using DIVA-GIS version 7.5.0.0 (available at: <http://www.diva-gis.org/>).

Acronyms for collections are as follows: (FML) Fundación Miguel Lillo, Tucumán, Argentina; (MLP) Museo de La Plata, Buenos Aires, Argentina; (RWG) Dr. R. W. Garrison personal collection, Sacramento, California, USA; (UMMZ) University of Michigan Museum of Zoology, Ann Arbor, Michigan, USA; (USNM) National Museum of Natural History, Smithsonian Institution, Washington D. C., USA.

Results

Acanthagrion aepiolum Tennessen, 2004

(Figs. 8, 11–12, 16–17)

Acanthagrion ascendens: Fraser, 1948: 51 (with doubts); Rácenis, 1958: 187–190; figs. 3a, 3d; Gloger, 1967: 49, 53–54 (records from Ecuador possibly belong to *A. ascendens*); Paulson, 1977: 174; table 1 (In part: records from “Colombia o más al norte” possibly belong to *A. ascendens*); Jurzitza, 1981: 117; Muzón, 1995: 51–56; figs. 1–2, 5; Muzón & von Ellenrieder, 1998: 23; appendix; Lencioni, 2006: 56; fig. 6 (In part: except figure 6 C, the illustrations belong to *A. ascendens*).

Acanthagrion aepiolum Tennessen, 2004: 79, 81–86; figs. 2–5, 7; Lencioni, 2006: 53, 321; figs. 3 A–E, F29; Lozano *et al.* 2007: 1–4; figs.: 1–7; Muzón & Weigel Muñoz, 2007: 238; von Ellenrieder & Garrison, 2007: 10, 33–34; table 1; figs. 126–127; Muzón *et al.* 2008: 65 (In part: record for locality 6 Corrientes Argentina, belong to *A. ascendens*); von Ellenrieder & Lozano, 2008: 99, 101, 103, 105, 110–111; table 1; figs. 3a, 5h, 11; von Ellenrieder & Muzón, 2008: 59; Novelo Gutiérrez, 2009: 321, 326–327; von Ellenrieder, 2009a: 45; von Ellenrieder, 2009b: 63–64; table 1–2; Garrison *et al.* 2010: 163, 181–185; figs. 859, 1035, 1041, 1048–1049, 1064–1065.

Head: Labrum pale brown with posteromedian spot and posterolateral margins black. Anteclypeus greenish light blue; postclypeus mostly greenish light blue with three anterior irregular spots and posterior margin black. Antefrons without T-shaped spot, with ventral half light blue and dorsal half pale brown. Dorsum of head mostly black with two light brown spots behind scape, two N-shaped spots (either separated or not) in front of median ocellus, a T-shaped spot within ocellar triangle, and a sub-rectangular spot on each side of lateral ocelli. Occipital bar brown. Antennifers anteriorly greenish light blue and posteriorly black. Antennae black. Postocular spots light blue, subrectangular, approximately equal in size to ocellar triangle. Most posterior point of head located behind compound eyes. Occipital area pale brown, except for two dark brown rounded spots on each side of occipital foramen.

Prothorax. Anterior lobe: Central spot light blue and T-shaped spot occupying almost all of dorsum, rest of dorsum black; laterals light blue. Middle lobe: geminate median spots brown, subrectangular or subtriangular; dorsolateral spots light blue; propleuron light blue. Posterior lobe (Fig. 8): anterior half black, posterior half brown; lateral streaks light blue; lateral margins rounded; without median projection.

Pterothorax. Predominant color light blue. Middorsal black stripe interrupted at middorsal carina by a dark brown stripe. Antealar sinus black. Antehumeral stripe light blue and entire, not reaching antealar crest; anterior to posterior limit of mesinfraepisternum antehumeral stripe widens, doubling its minimum width. Humeral stripe black, in some cases with dark brown line along mesopleural suture. Interpleural suture black. Stripe of metapleural suture incomplete. Mesinfraepisternum black with posteroventral angle light blue. Metinfraepisternum pale brown. Venter of thorax pale brown without black spots. Mesostigmal plates (Fig. 8) without diagonal carina, with inner half black and outer half light blue, with conical protuberance on posterior angle. Interlaminar sinus (Fig. 8)

triangular (width of interlaminar sinus/length of interlaminar sinus less than 0.4) and black with distal third dark brown; anterior margin of sinus slightly convex; lateral tips acute and projected anteriorly. Mesepisternal fossae (Fig. 8) separated from interlaminar sinus, elevated, separated from each other by middorsal carina, slightly elongated longitudinally.

Legs. Coxae and trochanters pale brown. Femora with extensor margin mostly pale brown, with black stripe on posterior half of external surface which widens distally; toward femur 3 this band becomes smaller, in some cases represented by row of small black spots; flexor margin pale brown. Length of femur 1/width of head equal to 1 (75%) or slightly more than 1 (25%). Tibiae pale brown; longitudinal row of elongated black spots on extensor margin, just behind row of external spurs. Tarsi pale brown with tips black. Leg spurs shorter than intervening spaces.

Wings. CuP reaching posterior margin of wing or CuP&AA'; arculus opposite Ax2 or slightly distal to it. FW: Px 11 (75%) or 12 (25%); RP₂ beginning at Px5 (100%); IR₁ beginning at Px6 (12.5%), Px7 (12.5%) or Px8 (75%); four (37.5%), five (12.5%) or six (50%) cells posterior to pt. HW: Px nine (25%) or 10 (75%); RP₂ beginning at Px4 (100%); IR₁ beginning at Px6 (12.5%), Px7 (50%) or Px8 (62.5%); five (75%) or six (25%) cells posterior to pt. pt pale brown.

S1. Tergum: posterior margin of anterior spot in contact with posterior stripe of S1. Posterior stripe complete, its central region separated from posterior margin of tergum; lateral margins in contact with ventrolateral margins of tergum in lateral view. Sternum: pale brown, with a triangular black spot on posterior margin that extends anteriorly to the middle of the sternum.

S2. Tergum: dorsal spot bell-shaped, maximum width located at posterior fourth of tergum; anterior margin in contact with anterior margin of tergum through stripe as wide as its minimum width; posterior margin in contact with posterior stripe of S2. Posterior stripe in contact with posterior margin of tergum; lateral margins in contact with ventrolateral margins of tergum in lateral view. Sternum: brown with midventral line black.

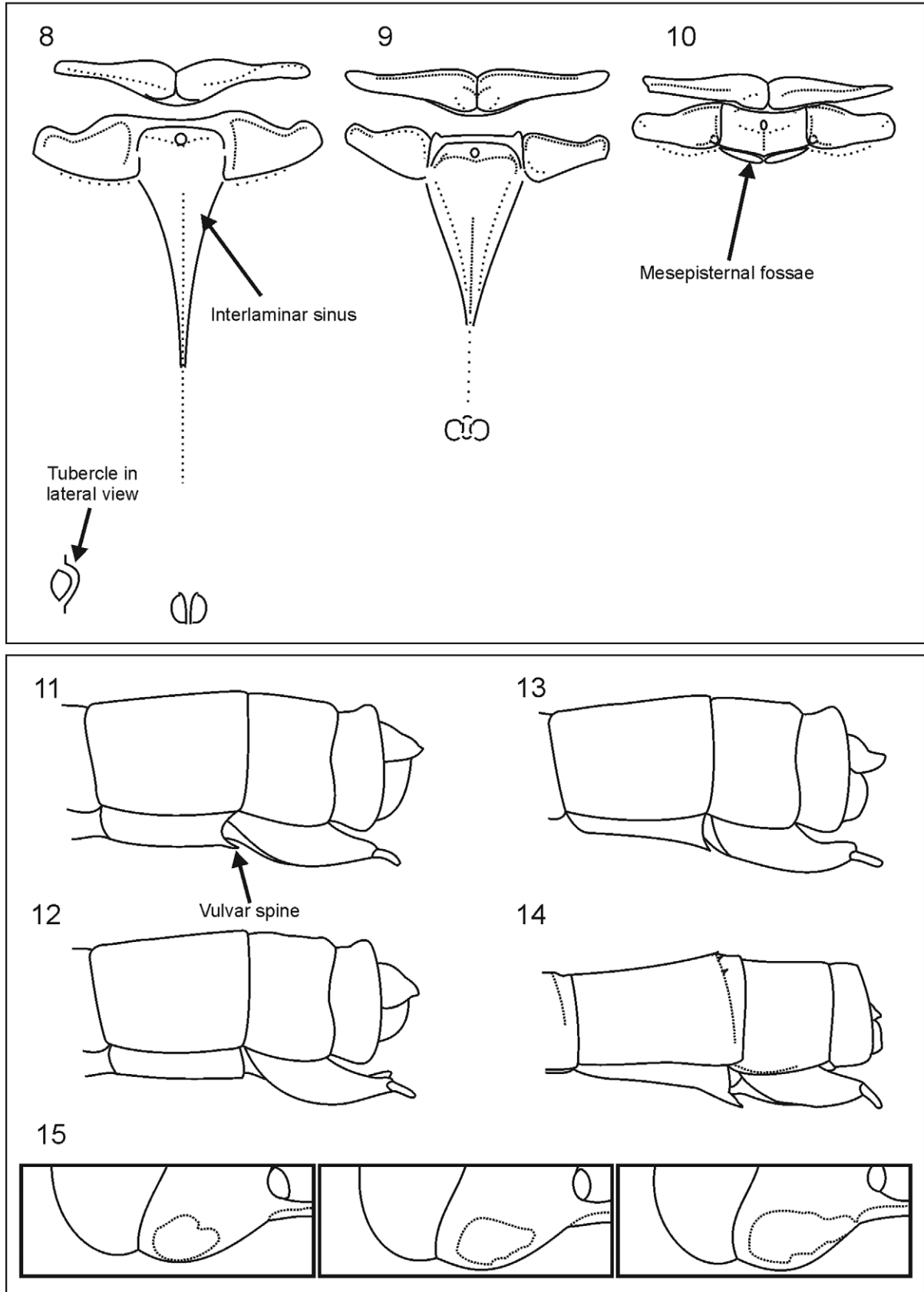
S3 to S6. Terga: dorsal T-shaped spots reaching anterior margin; anterior margins blunt; lateral arms directed anteriorly, reaching halfway down terga in lateral view. Posterior stripes visible. Sterna: pale brown with pale brown to black midventral line.

S7. Tergum: with a black subrectangular spot that occupies almost all of tergum; anterior margin in contact with anterior margin of tergum through thin black line; lateral margins parallel, reaching ventral fifth of tergum in lateral view; posterior margin interrupted by irregular light blue spot. Subapical row of spines present. Sternum: pale brown with black midventral stripe.

Terminalia (Figs. 11–12). S8 tergum with dorsal black subrectangular spot that extends posteriorly up to subapical row of spines and lateroventrally up to ventral fifth of tergum in lateral view; sternum pale brown with midventral line black; with well-developed vulvar spine that reaches anterior margin of S9 (one specimen without vulvar spine). S9 tergum with pair of L-shaped black spots that in lateral view occupy almost all of tergum; rest of tergum light blue. Anterior gonapophyses of ovipositor pale brown; posterior gonapophyses brown; valves surpassing S10 and extending to half length of cerci; ventral margin slightly concave and serrated. S10 mostly light blue with posterior margin pale brown. Cerci slightly shorter than (75%) or equal to (25%) length of S10; in lateral view dorsal margin concave, ventral margin convex, tip slightly curved dorsally; in dorsal view external margin slightly concave, inner margin straight, tips slightly divergent. Paraprocts without modifications.

Measurements: (mean is given; range in brackets; N=4 unless stated otherwise).

Head: max. length 0.97 [0.9–1.0]; width between compound eyes along anterior margin 1.4 [1.3–1.5]. **Legs:** femur 1 length 1.42 [1.3–1.5]; femur 2 length 1.95 [1.8–2.0]; femur 3 length (N=3) 2.5 [2.4–2.6]. **Thorax:** interlaminar sinus max. length 0.87 [0.8–0.9]; interlaminar sinus width between anterior angle of mesostigmal plates 0.3; distance between mesepisternal fossae and posterior margin of mesostigmal plates 1.4 [1.3–1.5]. **Wings:** FW length left 19.4 [18.3–20.2], right 19.62 [18.6–20.5]; HW length left 18.15 [17.4–18.7], right 18.6 [17.6–19.5]. **Abdomen:** max. length 26.5 [24.8–27.9]; S1 max. length 0.7; S2 max. length 1.65 [1.6–1.7]; S3 max. length 4.45 [4.2–4.7]; S4 max. length 4.67 [4.3–4.9]; S5 max. length 4.65 [4.3–4.9]; S6 max. length 4.42 [4.1–4.7]; S7 max. length 3.45 [3.2–3.7]; S8 max. length 1.32 [1.2–1.5]; S9 max. length 0.65 [0.5–0.7]; S10 max. length 0.3; S3 min. width (N=3) 0.4 [0.3–0.5]; S9 height (N=3) 1.0; S10 height (N=3) 0.97 [0.9–1.0]. **Cerci:** distance surpassing posterior margin of S10 in lateral view 0.22 [0.2–0.3]. **Paraprocts:** length in lateral view 0.15 [0.1–0.2]. **Total length** 32.4 [30.5–33.9].



FIGURES 8–15. Diagnostic characters of females. 8, 11–12, *Acanthagrion aepiolum*. 9, 13, *Acanthagrion ascendens*. 10, 14–15 *Acanthagrion minutum*. 8–10, thorax, dorsal view; 11–14, terminalia, lateral view; 15, variations in shape of postocular spots.

Females examined (N=6): **ARGENTINA: Corrientes province:** Mercedes, Pay Ubre Grande stream and provincial road 29, 29°01'41''S - 58°10'28''W, 65 m.a.s.l., leg. J. Muzón & P. Pessacq, 21/23-II-2003, 3♀, MLP. **Salta province:** Río Anta Muerta, side shady creek, 23°07'00''S - 64°29'53''W, 496 m.a.s.l., leg. F. Lozano & N. von Ellenrieder, 02-XII-2006, 1♀ (in tandem), RWG. **BRAZIL: Goiás state:** Expedição Formosa-Brasília, {15°32'15''S - 47°20'08''W, 919 m.a.s.l.} [geographic coordinates and altitude for Formosa city because the data are inadequate for exact georeferencing], leg. unknown, 15-VII-1960, 1♀, MLP. **PARAGUAY: Concepción department:** swamp in the forest E of Cerro Momby [the correct name is Cerro Memby, "Momby" probably a misspelling], {22°54'12''S - 56°27'14''W, 325 m.a.s.l.}, leg. O. Flint, 20-XI-1973, 1♀, MLP

Other material examined (N=66): **ARGENTINA: Corrientes province:** Mercedes, Pay Ubre Grande stream and provincial road 29, 29°01'41''S - 58°10'28''W, 65 m.a.s.l., leg. J. Muzón & P. Pessacq, 21/23-II-2003, 13♂♂, MLP; same as before except for: 27-II-2003, 3♂♂, MLP; same as before except for: leg. P. Pessacq, 09/11-X-2004, 10♂♂, MLP. Santo Tomé, unnamed stream and provincial road 94, 2 km N of Santo Tomé, 28°31'52''S - 56°03'10''W, 56 m.a.s.l., leg. J. Muzón, J. Lambruschini, F. Lozano, P. Pessacq, L. Ramos, M. S. Weigel Muñoz & N. von Ellenrieder, 21-IX-2005, 1♂, MLP. **Entre Ríos province:** Parque Nacional El Palmar, La Glorietta, {31°53'06''S - 58°16'16''W, 26 m.a.s.l.}, leg. J. Muzón, IX-1987, 1♂, MLP. **Misiones province:** stream in the swampy area at the park ranger's quarter {25°40'51''S - 54°27'05''W, 183 m.a.s.l.}, leg. J. Muzón, 01-XII-1988, 1♂, MLP. León stream and provincial road 2, 27°55'59,82''S - 55°36'58,14''W, 120 m.a.s.l., leg. J. Muzón & F. Lozano, 10-XII-2009, 4♂♂, MLP. Itacuararé, Itacuararé stream and provincial road 2, 27°52'14,7''S - 55°16'38,16''W, 100 m.a.s.l., leg. J. Muzón & F. Lozano, 09-XII-2009, 5♂♂, MLP. Parque Provincial Urugua-í, Arroyo Uruzú, provincial road 19, 25°51'27,9''S - 5°10'52,99''W, 319 m.a.s.l., leg. C. Molineri, 7/11-XII-1999, 1♂, FML. Puerto Iguazú, {25°34'00''S - 54°34'00''W, 161 m.a.s.l.}, leg. Hermida, 24-XI-1989, 1♂, MLP. Puerto Iguazú, Tacuara stream, 25°36'31,28''S - 54°34'23,05''W, 177 m.a.s.l., leg. J. Muzón, 18-V-2006, 1♂, MLP. **Salta province:** Río Anta Muerta, side shady creek, 23°07'00''S - 64°29'53''W, 496 m.a.s.l., leg. F. Lozano & N. von Ellenrieder, 02-XII-2006, 1♂ (in tandem), RWG. Unnamed river 15 km SE of Isla de Cañas, 22°55'32''S - 64°34'33''W, 706 m.a.s.l., leg. F. Lozano & N. von Ellenrieder, 02-XII-2006, 7♂, MLP. **BRAZIL: Goiás state:** Expedição Formosa-Brasília, {15°32'15''S - 47°20'08''W, 919 m.a.s.l.} [geographic coordinates and altitude for Formosa city because the data are inadequate for exact georeferencing], leg. unknown, 15-VII-1960, 1♂, MLP. **São Paulo state:** Jacareí, Fazenda Santana do Poço, {23°12'37,3''S - 45°57'55,78''W, 576 m.a.s.l.}, leg. F. A. A. Lencioni, 15-IX-1996, 1♂, MLP. Univap, Campus Urbanova, São José dos Campos, {23°12'26,36''S - 45°57'10,07''W, 616 m.a.s.l.}, leg. F. A. A. Lencioni, 23-XI-2000, 1♂, MLP. **PARAGUAY: Caaguazú department:** near Caaguazú, {25°27'00''S - 56°01'00''W, 315 m.a.s.l.} [geographic coordinates and altitude from Caaguazú city], leg. L. A. Bulla, III-1970, 1♂, MLP. **Central department:** Asunción, {25°16'55,91''S - 57°38'06,36''W, 62 m.a.s.l.}, leg. R. Golbach, II-1994, 2♂♂, FML. **Concepción department:** swamp in the forest E of Cerro Momby [the correct name is Cerro Memby, "Momby" probably a misspelling], {22°54'12''S - 56°27'14''W, 325 m.a.s.l.}, leg. O. Flint, 20-XI-1973, 1♂, MLP; same as before except for: leg. L.A. Bulla, 30-XI-1973, 4♂♂. **Cordillera department:** Caacupé, Instituto Agronómico Nacional, {25°23'10''S - 57°08'27''W, 183 m.a.s.l.}, leg. R. D. Cave, 17-XII-1980, 1♂, USNM. **Guairá department:** 8 km S of Villarica, {25°51'23,88''S - 56°26'59''W, 134 m.a.s.l.}, leg. L. A. Bulla, 02-XII-1973, 3♂♂, MLP. Mbocayati [the correct name is Mbocayaty, "Mbocayati" probably a misspelling], {25°42'50''S - 56°24'26''W, 157 m.a.s.l.}, leg. L. A. Bulla, 11-II-1973, 2♂♂, MLP.

Acanthagrion ascendens Calvert, 1909

(Figs. 9, 13, 16)

Acanthagrion gracile ascendens Calvert, 1909: 161, 165–166, 272; pl. V, figs. 81, 81a; Longfield, 1929: 136 (with doubts); St. Quentin, 1960: 58.

Acanthagrion ascendens: Kennedy, 1916: 327–330; figs. 12–13; Williamson, 1916: 314, 317–318, 320, 325, 351–355, 357–358; pl. XVII, fig. 13; Geijskes, 1932a: 255–257; Geijskes, 1932b: 127; Geijskes, 1941: 724–726, 728; figs. 3a–3f; Fraser, 1946: 38–39 (with doubts); Rácenis, 1953: 22; Rácenis, 1959: 473 (with doubts); Santos, 1961: 3; Roback, 1966: 83–84; table 3; Gloger, 1967: 46–47, 49, 53–54 (in part: specimens from Argentina and Brazil possibly belong to *A. aepiolum*); Bulla, 1971: 50; Leonard, 1977: 1, 13, 16, 21, 24, 37, 53, 56, 60, 77–78, 80, 84, 88, 89, 90–94, 158, 164, 169, 172; pl. IV: figs. 37–38, X: figs. 107, 113–114, XV: fig. 154, XVIII (some records, especially those for Brazil and Paraguay, doubtful);

Paulson, 1977: 174, 180; tables 1, 3 (in part: records for Argentina, Brazil and Paraguay possibly belong to *A. aepiolum*); Santos, 1981: 71; table 4; Paulson, 1984: 12; table 1 (doubtful); Costa *et al.* 2000: 7, 12; table 1 (doubtful); Ferreira-Perruquetti & Fonesca-Gessner, 2003: 221; table 1; Tennessen, 2004: 79–81, 83–86; figs. 1, 6, 8–10; Lencioni, 2006: 56, 267; figs. 6 A–B, D, figs. D22 A–G (In part: figure 6C belongs to *A. aepiolum*); Lozano *et al.* 2007: 1; von Ellenrieder & Lozano, 2008: 99–101, 111; table 1; fig. 11; von Ellenrieder & Muzón, 2008: 56; Novelo Gutiérrez, 2009: 321, 325–327; fig. 13; De Souza *et al.* 2010: 82–83; figs. 11, 22; Garrison *et al.* 2010: 181.

Acanthagrion ascendens form a Ris 1918: 124–127.

Acanthagrion luteum Rácenis, 1958: 184–190; figs. 3b–3c, 3e; Santos, 1961: 3; Gloger, 1967: 46; Gloyd, 1977: 147–149 (records for Brazil and Paraguay doubtful); Muzón, 1995: 51–56, figs. 3–4, 5; De Marmels, 1990: 336; De Marmels, 1992: 62; Louton *et al.* 1996: 438 (doubtful); Muzón *et al.* 2001: 95, 97; Pessacq *et al.* 2005: 73, 75.

Acanthagrion aepiolum: Muzón *et al.* 2008: 65 (in part: only the record for locality 6, Corrientes, Argentina belongs to *A. ascendens*, the rest belong to *A. aepiolum*).

Head: Labrum light blue with posteromedian spot and posterolateral margins black. Anteclypeus greenish light blue; postclypeus mostly greenish light blue with T-shaped spot and posterior margin black. Antefrons with T-shaped spot black; lateral arms not reaching bases of antennae; longitudinal axis less than half width of median ocelli, with its lateral margins straight. Dorsum of head mostly black, with two brown spots behind pedicel, rhomboidal pale brown spot on each side of scape, two subrectangular pale brown spots in front of median ocellus, two comma-shaped light blue spots anterior to lateral ocelli, and two elongated pale brown spots lateral to lateral ocelli. Occipital bar brown. Antennifers anteriorly pale brown and posteriorly black. Antennae: scape with anterior half brown and posterior half black, pedicel and flagellum dark brown. Postocular spots light blue, subcircular, larger than ocellar triangle. Most posterior point of head located behind compound eyes. Occipital area pale brown, except for two dark brown rounded spots on each side of occipital foramen.

Prothorax. Anterior lobe: Central spot light blue and T-shaped, occupying almost all of dorsum, rest of dorsum black; laterals light blue. Middle lobe: without geminate median spots or, if present, these very small and dark brown; dorsolateral spots light blue; propleuron light blue. Posterior lobe (Fig. 9) black with posterior half brown; lateral streaks light blue; lateral margins rounded; without median projection.

Pterothorax. Predominant color light blue. Middorsal black stripe not interrupted at middorsal carina. Antealar sinus black with posterior angles light blue in some specimens. Antehumeral stripe light blue and entire, not reaching antealar crest; antehumeral stripe widens to 1.5 times its minimum width anterior to posterior limit of mesinfraepisternum. Humeral stripe black. Interpleural suture black. Stripe of metapleural suture complete. Mesinfraepisternum with dorsal third dark brown or black, fading progressively toward posteroventral angle. Metinfraepisternum pale brown. Venter of thorax pale brown without black spots. Mesostigmal plates (Fig. 9) without diagonal carina, with inner half black and outer half light blue, without modifications on posterior angle. Interlaminar sinus (Fig. 9) triangular (width of interlaminar sinus/length of interlaminar sinus less than 0.4) and black; anterior margin of sinus slightly convex; lateral tips acute and projected anteriorly. Mesepisternal fossae (Fig. 9) separated from interlaminar sinus, elevated, separated from each other by middorsal carina, slightly elongated longitudinally.

Legs. Coxae and trochanters pale brown. Femora with extensor margin mostly pale brown with black stripe on posterior half of external surface which widens distally; toward femur 3 this band becomes smaller and shorter, occupying just distal third; flexor margin pale brown. Length of femur 1/width of head less than 1. Tibiae pale brown; on extensor margin, just behind row of external spurs, black stripe on tibia 1 and longitudinal row of elongated brown spots on tibiae 2 and 3. Tarsi pale brown with tips dark brown. Leg spurs shorter than intervening spaces.

Wings. CuP reaching posterior margin of wing or CuP&AA'; *arculus* opposite Ax2 or slightly distal to it. FW: Px 11 (50%) or 12 (50%); RP₂ beginning at Px4 (25%), between Px4 and Px5 (50%) or at Px5 (25%); IR₁ beginning between Px7 and Px8 (25%), at Px8 (25%) or at Px9 (50%); five (75%) or six (25%) cells posterior to pt. HW: Px 10 (75%) or 11 (75%); RP₂ beginning at Px4 (100%); IR₁ beginning at Px8 (100%); four (25%) or six (75%) cells posterior to pt. pt pale brown.

S1. Tergum: posterior margin of anterior spot in contact with posterior stripe of S1. Posterior stripe complete, its central region separated from posterior margin of tergum; lateral margins reaching halfway down or to ventral third of tergum in lateral view. Sternum: pale brown, with triangular black spot on posterior margin that extends anteriorly until middle or posterior third of sternum.

S2. Tergum: dorsal spot bell-shaped, maximum width located at posterior fourth of tergum; anterior margin in

contact with anterior margin of tergum through stripe slightly less wide than its minimum width; posterior margin in contact with posterior stripe of S2. Posterior stripe in contact with posterior margin of tergum; lateral margins reaching halfway down tergum in lateral view. Sternum: brown with midventral line black.

S3–6. Terga: dorsal T-shaped spots reaching anterior margin; anterior margins blunt; lateral arms directed anteriorly on S1–4, reaching from ventral third to ventrolateral margins of terga in lateral view. Posterior stripes visible on S1–4 reaching halfway down terga in lateral view. Sterna: pale brown with midventral line pale brown to black.

S7. Tergum: with black subrectangular spot that occupies almost all of tergum; anterior margin straight, in contact with anterior margin of tergum through black thin middorsal line; lateral margins parallel, reaching halfway down tergum in lateral view, widens slightly in posterior sixth, reaching ventral fourth of tergum; posterior margin reaching subapical row of spines except in ventral third of tergum in lateral view, where black marking surpasses this line without reaching posterior margin. Subapical row of spines present. Sternum: pale brown with midventral line black.

Terminalia (Fig. 13). S8 tergum with a dorsal black subrectangular spot that extends posteriorly up to subapical row of spines and lateroventrally up to ventral fourth of tergum in lateral view; sternum pale brown with midventral line black; well-developed vulvar spine reaches anterior margin of S9. S9 tergum with pair of L-shaped black spots that, in lateral view, occupy almost all of tergum; rest of tergum light blue except for ventral fourth, which is pale brown. Gonapophyses of ovipositor pale brown; valves reaching posterior margin of S10; ventral margin slightly concave and serrated. S10 light blue, in some cases with two small semicircular black spots located on anterior margin. Cerci slightly shorter than length of S10; in lateral view dorsal margin concave, ventral margin convex, tip directed posteriorly; in dorsal view external margin slightly convex, inner margin straight, tips slightly divergent. Paraprocts without modifications.

Measurements: (N=2; in brackets values from both specimens).

Head: max. length [without data; 1.0]; width between compound eyes along anterior margin [without data; 1.4]. **Legs:** femur 1 length [1.4; 1.2]; femur 2 length [1.8; 2.1]; femur 3 length [2.3; 2.6]. **Thorax:** interlaminar sinus max. length [0.8; 0.9]; interlaminar sinus width between anterior angle of mesostigmal plates [0.3; 0.3]; distance between mesepisternal fossae and posterior margin of mesostigmal plates [0.8; 1.0]. **Wings:** FW length left [19.7; 19.2], right [19.8; 19.1]; HW length left [18.8; 18.0], right [18.7; 17.6]. **Abdomen:** max. length [26.8; 26.8]; S1 max. length [0.6; 0.6]; S2 max. length [1.7; 1.6]; S3 max. length [4.4; 4.5]; S4 max. length [4.8; 4.7]; S5 max. length [4.9; 4.8]; S6 max. length [4.6; 4.5]; S7 max. length [3.6; 3.6]; S8 max. length [1.5; 1.5]; S9 max. length [0.8; 0.7]; S10 max. length: [0.3; 0.3]; S3 min. width [0.5; 0.6]; S9 height [0.7; 0.8]; S10 height [0.6; 0.8]. **Cerci:** distance surpassing posterior margin of S10 in lateral view [0.2; 0.2]. **Paraprocts:** length in lateral view [0.1; 0.1]. **Total length** [without data; 32.0].

Females examined (N=2): **PERU: Loreto department:** Explorama Inn, 25 mi NE Iquitos on Amazon River, {03°30'28"S - 73°04'23"W, 105 m.a.s.l.}, leg. S. W. Dunkle, 19-VIII-1989, 1♀, MLP. **TRINIDAD AND TOBAGO: Municipality of Arima:** St. George Co., Arima river at Churchill-Roosevelt Hwy, about 2.25 mi SSE of Arima, {10°36'45"N - 61°15'48"W, 33 m.a.s.l.}, leg. R. W. Garrison, 12-I-1981, 1♀ (in tandem), RWG.

Other material examined (N=12): **ARGENTINA: Corrientes province:** Santo Tomé, Ita Cuá stream and provincial road 94, 28°26'53"S - 56°00'34"W, 61 m.a.s.l., leg. J. Muzón, J. Lambruschini, F. Lozano, P. Pessacq, L. Ramos, M. S. Weigel Muñoz & N. von Ellenrieder, 19/21-IX-2005, 2♂♂, MLP. **PARAGUAY: Concepción department:** swamp in the forest E del Cerro Momby [correct name is Cerro Memby, "Momby" probably a misspelling], {22°54'12"S - 56°27'14"W, 325 m.a.s.l.}, leg. O. Flint, 20-XI-1973, 1♂, MLP. **Cordillera department:** Caacupé, Instituto Agronómico Nacional, {25°23'10"S - 57°08'27"W, 183 m.a.s.l.}, leg. R. D. Cave, 12-II-1981, 1♂, USNM. **PERU: Loreto department:** Explorama Inn, 25 mi NE Iquitos on Amazon River, {03°30'28"S - 73°04'23"W, 105 m.a.s.l.}, leg. S. W. Dunkle, 19-VIII-1989, 1♂, MLP. **TRINIDAD AND TOBAGO: Nariva county:** 8 mi S of Río Claro, {10°11'12"N - 61°10'13"W, 84 m.a.s.l.}, leg. T. W. Donnelly, 14-IV-1965, 2♂♂, MLP. **Saint Andrew county:** Cunapo River, {10°35'00"N - 61°08'00"W, 33 m.a.s.l.} [According to the Global Gazetteer v. 2.2 website there are two different localities named "Cunapo", one in Saint Andrew County and the other in Saint George county. The Cunapo river is located within Saint Andrew county, therefore the georeferencing is for Cunapo in Saint Andrew], leg. unknown, 27-II-1912, 2♂♂, USNM. **Municipality of Arima:** St. George Co., Arima river at Churchill-Roosevelt Hwy, about 2.25 mi SSE of Arima, {10°36'45"N - 61°15'48"W, 33 m.a.s.l.}, leg. R. W. Garrison, 12-I-1981, 1♂ 1♀ (in tandem), RWG.

VENEZUELA: Guárico state: Espino, {08°33'41"N - 66°01'35"W, 144 m.a.s.l.}, leg. J. Rácenis, 29-XII-1954, 2♂♂, MLP (paratypes of *Acanthagrion luteum*).

***Acanthagrion minutum* Leonard, 1977**

(Figs. 10, 14–16)

Acanthagrion minutum Leonard, 1977: 7, 22, 24, 98, 119–122, 135, 159, 166, 173; pl. V: figs. 51–52, pl. XII: figs. 130, 135–136, pl. XIX; Gloyd, 1977: 122, 148–149; De Marmels, 1983: 156; De Marmels, 1984: 25; Paulson, 1984: 12, table 1; De Marmels, 1989: 29; De Marmels, 1990: 336; Costa *et al.* 2000: 12; table 1; Ferreira-Perruquetti & Fonesca-Gessner, 2003: 221; table 1; Garrison *et al.* 2003: 35; Lencioni, 2005: 10; fig. A3A; Lencioni, 2006: 8–9, 65; fig. A3A, figs. 15 A–E; Muzón *et al.* 2008: 66; von Ellenrieder & Lozano, 2008: 97, 99, 101–102, 111; table 1; fig. 11; von Ellenrieder & Muzón, 2008: 59; Rojas-R. & Sánchez, 2009: 17–18; Garrison *et al.* 2010: 181–182.

Head: Labrum light blue with posteromedian spot and posterolateral margins black. Anteclypeus light blue; postclypeus mostly black with margins light blue. Antefrons light blue, in some cases with black median line. Genae light blue. Dorsum of head mostly black, with the following pale brown to light blue spots: two circular spots behind scapes, in some cases light blue color of genae extends posteriorly and contacts these spots either through thin line or band; circular or triangular spot anterior to median ocellus; two circular spots on each side of lateral ocelli; irregular spot between these latter spots and those behind scape that can be either small and subcircular or large and subtriangular reaching in some cases the antefrons. In many specimens dorsum of head shows different color patterns due to fusion of two or more spots described above. Occipital bar pale brown to light blue. Antennifers anteriorly pale brown and posteriorly black. Antennae: scape either black or with anterior half light blue and posterior half black; pedicel and flagellum dark brown to black. Postocular spots light blue or pale brown, generally with projections towards sagittal plane that reaches occipital bar (Fig. 15). Most posterior point of head located behind compound eyes. Occipital area light blue or pale brown, except for two dark brown to black rounded spots on each side of occipital foramen.

Prothorax. Anterior lobe: Central spot light blue and subrectangular, occupying anterior half of lobe, rest of dorsum black; laterals from pale brown to light blue. Middle lobe generally with large trapezoidal or subrectangular geminate median spots, in a few cases very small or absent; dorsolateral spots light blue; propleuron light blue or pale brown. Posterior lobe (Fig. 10): light blue with anterior margin black; lateral margins rounded; without median projection.

Pterothorax. Predominant color light blue. Middorsal black stripe usually interrupted at middorsal carina by thin pale brown to dark brown line. Antealar sinus black with margins pale brown to brown. Antehumeral stripe light blue and entire, not reaching antealar crest; antehumeral stripe widens to 1.5 its minimum width anterior to posterior limit of mesinfraepisternum. Humeral stripe black; posterior margin generally in contact with antealar crest, in some specimens separated from it. Interpleural suture black. Stripe of metapleural suture incomplete. Mesinfraepisternum with dorsal third black and remainder light blue; in some cases black coloration reaches ventral third. Metinfraepisternum pale brown, in some cases with anterior angle slightly darker. Venter of thorax pale brown, generally with two circular black spots. Mesostigmal plates (Fig. 10) without diagonal carina, inner half black and outer half light blue, posterior angle with blunt tubercle. Interlaminar sinus (Fig. 10) subrectangular, (width of interlaminar sinus/length of interlaminar sinus more than 1.0) and brown to black; anterior margin of sinus straight or slightly concave; lateral tips acute and projected anteriorly. Mesepisternal fossae (Fig. 10) contiguous to interlaminar sinus, not elevated, separated from each other by middorsal carina, slightly elongated transversally.

Legs. Coxae and trochanters pale brown to light blue. Femora with external surface of extensor margin dark brown to black, internal surface slightly paler; flexor margin pale brown to light blue, slightly darker distally. Length of femur 1/width of head equal to 1 (5%) or slightly more than 1 (95%). Tibiae pale brown to brown; on extensor margin, just behind row of external spurs, a dark brown to black stripe. Tarsi dark brown with tips black. Leg spurs shorter than intervening spaces.

Wings. CuP reaching posterior margin of CuP&AA' or slightly distal to it; arculus opposite to antenodal 2. FW: Px 7 (17.5%), 8 (67.5%) or 9 (15%); RP₂ beginning between Px3 and Px4 (52.5%), at Px4 (42.5%) or between Px4 and Px5 (5%); IR₁ beginning at Px7 (52.5%), between Px7 and Px8 (30%), at Px8 (12.5%), between Px8 and

Px9 (2.5%) or at PtP (2.5%); 2 (35%), 3 (57.5%) or 4 (5%) cells posterior to Pt (without data 2.5%). HW: Px 6 (42.5%) or 7 (57.5%); RP₂ beginning at Px3 (35%) or between Px3 and Px4 (65%); IR₁ beginning between Px5 and Px6 (5%), at Px6 (40%), between Px6 and Px7 (27.5%), at px7 (2.5%), between LPx and PtP (12.5%) or at PtP (12.5%); 3 (72.5%) or 4 (25%) cells posterior to pt (without data 2.5%). pt pale brown.

S1. Tergum: posterior margin of anterior spot in contact with posterior stripe of S1. Posterior stripe complete, its central region separated from posterior margin of tergum; lateral margins visible as thin line widened distally, reaching ventral third or fourth of tergum in lateral view. Sternum pale brown, with triangular black spot on posterior margin that extends anteriorly, reaching anterior third of the sternum.

S2. Tergum: dorsal spot subrectangular, slightly widened on posterior half or third; anterior margin in contact with anterior margin of tergum through stripe as wide as its minimum width; posterior margin in contact with posterior stripe of S2. Posterior stripe in contact with posterior margin of tergum; lateral margins reaching ventrolateral margins of tergum in lateral view. Sternum pale brown with black midventral stripe, in some cases occupying almost all of sternum.

S3 to S6. Terga: dorsal T-shaped spots reaching anterior margin through thin black line; anterior margins rounded or acute; lateral arms directed anteriorly, reaching halfway down terga in lateral view. Posterior stripes visible, reaching ventral fourth or ventrolateral margin of terga in lateral view. Sterna: S3 black, rest generally brown with black midventral stripe.

S7. Tergum: with large T-shaped spot similar to those described for other terga; anterior margin blunt, in contact or not with anterior margin of tergum; lateral margins subparallel, reaching from halfway down to ventral third of tergum in lateral view; lateral arms reaching from ventral fourth to ventrolateral margin of tergum in lateral view; posterior margin reaching subapical row of spines, in some cases black coloration surpasses this line without reaching posterior margin. Subapical row of spines present. Sternum: pale brown with a black midventral stripe.

Terminalia (Fig. 14). S8 tergum with black subrectangular spot that extends posteriorly up to subapical row of spines and lateroventrally halfway up sides of tergum in lateral view; sternum pale brown with midventral line black; with well-developed vulvar spine that reaches anterior fourth of S9. S9 tergum with black subrectangular spot that occupies almost all of dorsum, lateral margins generally concave, in some cases spot reduced and restricted to posterior third; rest of tergum light blue. Anterior gonapophyses of ovipositor pale brown; posterior gonapophyses brown; valves reaching posterior margin of S10; ventral margin slightly concave and serrated. S10 light blue with anterior margin black, in some cases black triangular spot on anterior margin visible dorsally. Cerci slightly shorter than (75%), equal to (5%) or longer than (20%) half length of S10; in lateral view dorsal margin slightly concave or straight, ventral margin convex, tip directed posteriorly; in dorsal view external margin convex, inner margin slightly concave or straight, tips parallel. Paraprocts without modifications.

Measurements: (mean and standard deviation given; range in brackets; N=20 unless stated otherwise).

Head: max. length 0.9 ± 0.05 [0.8–1.0]; width between compound eyes along anterior margin 1.33 ± 0.05 [1.3–1.4]. **Legs:** femur 1 length 1.48 ± 0.06 [1.4–1.6]; femur 2 length 2.06 ± 0.09 [1.9–2.2]; femur 3 length 2.64 ± 0.09 [2.4–2.8]. **Thorax:** interlaminar sinus max. length 0.19 ± 0.04 [0.1–0.2]; interlaminar sinus width between anterior angle of mesostigmal plates 0.3 ± 0.02 [0.2–0.3]; distance between mesepisternal fossae and posterior margin of mesostigmal plates 0. **Wings:** FW length left (N=19) 13.61 ± 0.34 [12.9–14.3], right 13.65 ± 0.40 [12.6–14.4]; HW length left 12.74 ± 0.34 [12.1–13.4], right (N=19) 12.8 ± 0.37 [11.8–13.3]. **Abdomen:** max. length 18.4 ± 0.46 [17.3–19.0]; S1 max. length 0.54 ± 0.05 [0.5–0.6]; S2 max. length 1.27 ± 0.05 [1.2–1.3]; S3 max. length 2.91 ± 0.08 [2.7–3.0]; S4 max. length 3.05 ± 0.08 [2.9–3.2]; S5 max. length 3.04 ± 0.09 [2.8–3.2]; S6 max. length 2.9 ± 0.09 [2.7–3.0]; S7 max. length 2.4 ± 0.09 [2.2–2.5]; S8 max. length 1.18 ± 0.05 [1.1–1.3]; S9 max. length 0.65 ± 0.05 [0.6–0.7]; S10 max. length 0.31 ± 0.03 [0.3–0.4]; S3 min. width 0.46 ± 0.07 [0.3–0.6]; S9 height 0.76 ± 0.06 [0.7–0.9]; S10 height 0.76 ± 0.06 [0.7–0.9]. **Cerci:** distance surpassing posterior margin of S10 in lateral view 0.13 ± 0.04 [0.1–0.2]. **Paraprocts:** length in lateral view 0.08 ± 0.03 [0.05–0.1]. **Total length** 23.72 ± 0.57 [22.6–24.5].

Females examined (N=39): **BRAZIL: Roraima state:** Surumu NW of Depósito, 04°14'00''S - 60°55'00''W, {141 m.a.s.l.}, leg. M. Alvarenga, IX-1966, 39 ♀♀, UMMZ.

Identification of females: Even though neither tandems nor copulas were examined, identification was possible because males and females were collected together in the same locality, and in many cases a male and a female were together in the same envelope. Besides, there were similarities between the color pattern of males and females (i.e. projection of postocular spots towards the occipital bar), and this species is the smallest in the genus.

Other material examined (N=29): ARGENTINA: Corrientes province: Reserva Natural Rincón de Santa María, artificial ponds, 27°28'23"S - 56°34'38"W, {83 m.a.s.l.}, leg P. Pessacq & J. Muzón, 30-IX-2003, 1♂, MLP. BRAZIL: Roraima state: Surumu NW of Depósito, 04°14'00"S - 60°55'00"W, {141 m.a.s.l.}, leg. M. Alvarenaga, IX-1966, 28♂♂, UMMZ.

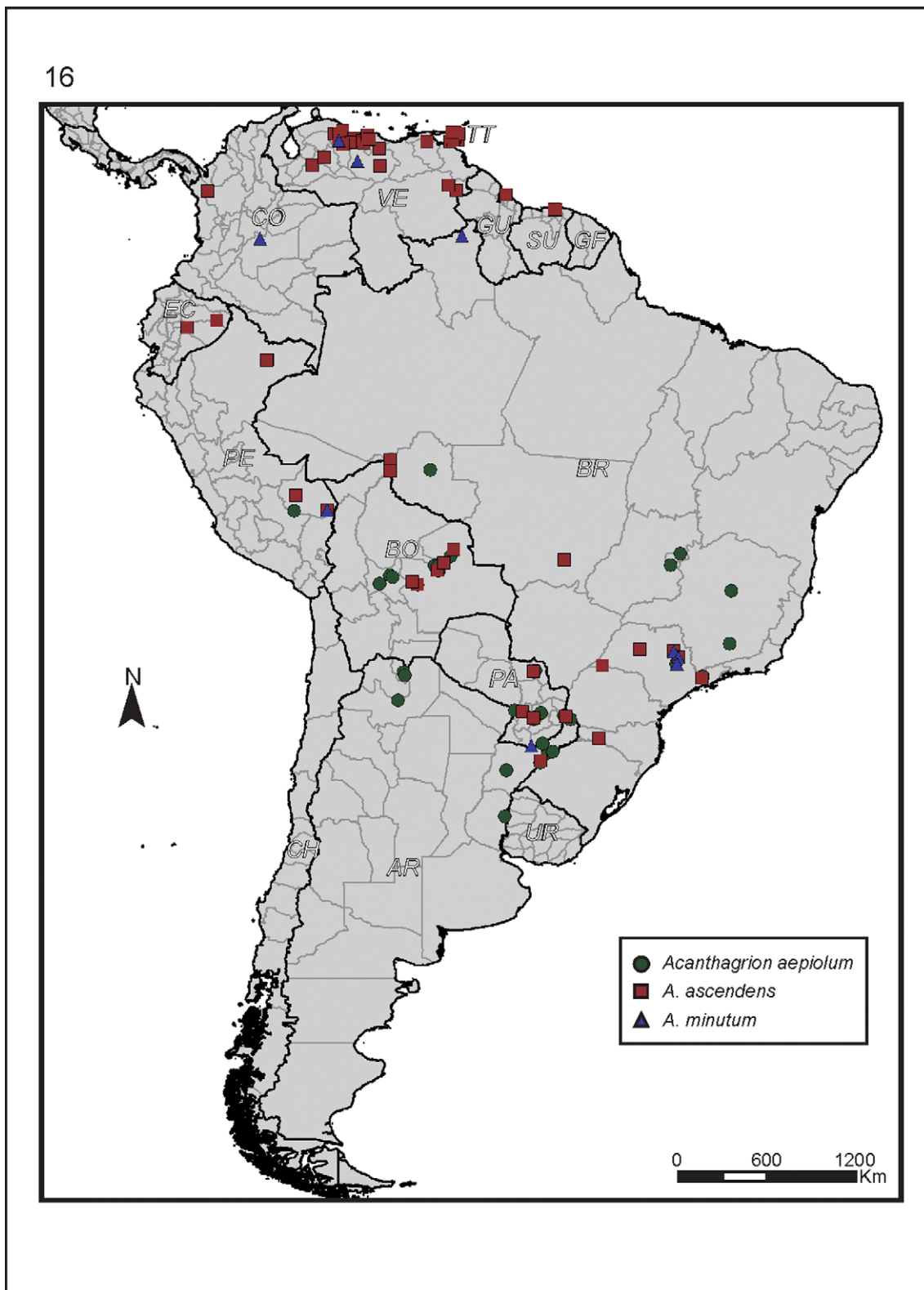


FIGURE 16. Distribution map.

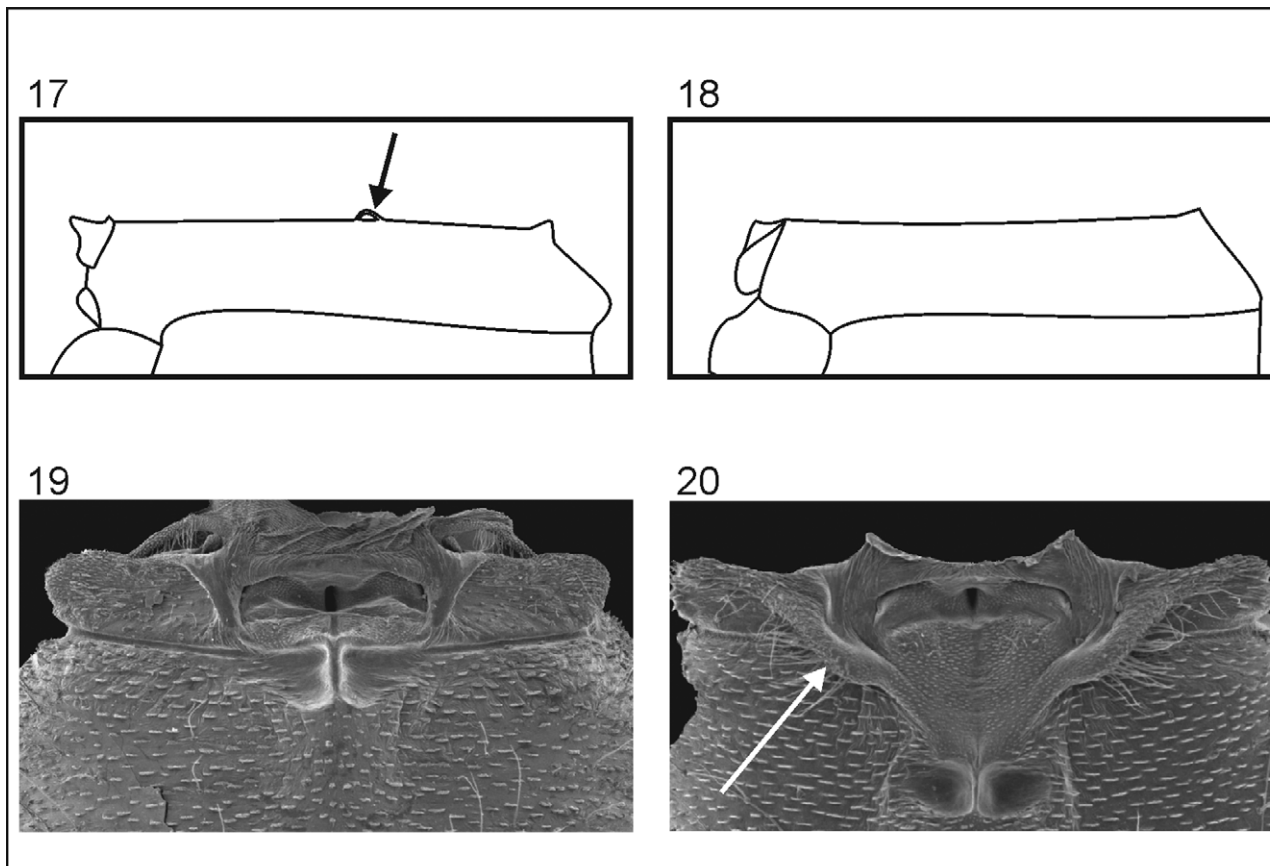


FIGURE 17–24. 17–18, pterothorax, lateral view. 19–24, thorax, dorsal view. 17, *Acanthagrion aepiolum*; 18, *Acanthagrion temporale*; 19, *Acanthagrion hildegarda*; 20 *Acanthagrion lancea*; 21 *Acanthagrion cuyabae*; 22 *Acanthagrion floridense*; 23 *Acanthagrion gracile*; 24 *Acanthagrion temporale* (drawing modified from Leonard 1977).

Key to females of the genus *Acanthagrion* from Argentina

- 1 Mesepisternal fossae elevated, visible in lateral view (Fig. 17) 2
- Mesepisternal fossae not elevated (Fig. 18) 4
- 2 Mesepisternal fossae separated from interlaminar sinus (Figs. 8–9). Interlaminar sinus subtriangular (Figs. 8–9)..... 3
- Mesepisternal fossae contiguous to interlaminar sinus (Fig. 19). Interlaminar sinus subrectangular (Fig. 19)
 *A. hildegarda* Gloger
- 3 Distance between mesepisternal fossae and posterior margin of mesostigmal plates ≥ 1.30 *A. aepiolum* Tennessen
- Distance between mesepisternal fossae and posterior margin of mesostigmal plates ≤ 1.00 *A. ascendens* Calvert
- 4 Mesostigmal plates without tuft of hairs (Fig. 10) 5
- Mesostigmal plates with tuft of hairs on posterior internal angle (Fig. 20) *A. lancea* Selys
- 5 Interlaminar sinus subrectangular (Fig. 21) 6
- Interlaminar sinus subtriangular (Fig. 22) 7
- 6 Mesepisternal fossae transversely elongated (Fig. 10) *A. minutum* Leonard
- Mesepisternal fossae subquadrangular (Fig. 21) ... *A. cuyabae* Calvert
- 7 Interlaminar sinus long (approximately two times as long as wide) (Fig. 22–23); mesostigmal plates without diagonal carina (Fig. 22–23)..... *A. floridense* Fraser / *A. gracile* (Rambur)
- Interlaminar sinus short (approximately as long as wide) (Fig. 24); mesostigmal plates with diagonal carina (Fig. 24)
 *A. temporale* Selys

Discussion

Leonard (1977) included *Acanthagrion minutum*, together with *A. adustum* and *A. indefensum*, within the *Adustum* group based on the morphology of segment 3 of the genital ligula. However, he considered that this group was less stable than the others he described in his thesis due to the low number of specimens examined and because only the

female of *A. adustum* was known. The morphology of the female of *A. minutum* seems to accentuate the differences among the species included in the Adustum group (the character states of *A. adustum* are indicated in brackets): interlaminar sinus subrectangular (subtriangular); mesepisternal fossae not elevated (elevated), transversely elongated (subcircular) and contiguous to interlaminar sinus (anterior third encroached within the interlaminar sinus); posterior angle of mesostigmal plates with a tubercle (without modifications).

Females of *Acanthagrion aepiolum* and *A. ascendens* reflect the differences found by Tennesen (2004) for the males; the distance between the mesepisternal fossae and the posterior margin of mesostigmal plates is greater for *A. aepiolum* (1.3–1.5 vs. 0.8–1.0) which reflects the differences between the length of the cerci of the males.

Remarkably, one specimen of *A. aepiolum* lacked a vulvar spine on S8. This feature is characteristic of the members of the Rubrifrons group (*A. rubrifrons* and *A. longispinosum*) and has also been observed in some specimens of *A. gracile* (Garrison *et al.* 2010).

In this contribution *Acanthagrion aepiolum* is recorded for the first time from Caaguazú, Central, and Cordillera departments in Paraguay, *A. ascendens* from Concepción and Cordillera departments in Paraguay, and *A. minutum* from Roraima state in Brazil.

It is important to note that *A. ascendens* and *A. aepiolum* have been considered by many authors as having an allopatric distribution (Muzón 1995; Tennesen 2004; Lozano *et al.* 2007). Based on that supposition, von Ellenrieder & Muzón (2008) removed *A. ascendens* from the list of Odonata of Argentina. However, the analysis of the genital ligula of males identified as *A. aepiolum* from Corrientes province deposited in MLP revealed that one specimen is in fact *A. ascendens*; therefore, this species should be included again within the checklist of Odonata of Argentina. As more distributional data are available, the superposition of the ranges of *A. ascendens* and *A. aepiolum* is larger than first considered (mainly south to southern Peru) (Fig. 16). Up to the moment, *A. aepiolum* has not been recorded north of 9°S.

Finally, 11 females remain undescribed within the genus: *A. chararum* Calvert, *A. descendens* Fraser, *A. flaviae* Machado, *A. eglerti* Santos, *A. hartei* Muzón & Lozano, *A. indefensum* Williamson, *A. inexpectum* Leonard, *A. kaori* Machado, *A. latapistylum* Calvert, *A. triangulare* Machado, and *A. williamsoni* Leonard.

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References

- Anjos-Santos, D., Lozano, F. & Costa, J.M. *Fluminagrion* gen. nov. for *Acanthagrion taxaense* Santos, 1965, from Brazil (Odonata: Coenagrionidae). *International Journal of Odonatology*, in press.
- Bechly, G. (1996) Morphologische Untersuchungen am Flügelgeäder der rezenten Libellen und deren Stammgruppenvertreter (Insecta; Pterygota; Odonata), unter besonderer Berücksichtigung der Phylogenetischen Systematik und des Grundplanes der Odonata. *Petalura*, 2, 1–402.
- Bulla, L.A. (1971) Consideraciones sobre el género *Argentagrion* Fraser, 1947 con la descripción de una nueva especie (Odonata, Coenagrionidae). *Revista de la Sociedad Entomológica Argentina*, 33(1–4), 49–55.
- Calvert, P.P. (1909) Contributions to a knowledge of the Odonata of the Neotropical region, exclusive of Mexico and Central America. *Annals of the Carnegie Museum*, 6, 73–280.
- Costa, J.M., Machado, A.B.M., Lencioni, F.F.A. & Santos, C.T. (2000) Diversidade e distribuição dos Odonata (Insecta) no Estado de São Paulo, Brasil: Parte I - Lista das espécies e registros bibliográficos. *Publicações Avulsas do Museu Nacional*, 80, 1–27.
- De Marmels, J. (1983) Hallazgo de Odonata nuevos para Venezuela o poco conocidos. 3. *Boletín de Entomología Venezolana* (N. S.), 2(19), 155–156.
- De Marmels, J. (1984) *Oxyagrion fluviatile* sp. n. from Venezuela, with notes on *Oxyagrion cardinale* Fraser (Odonata: Coenagrionidae). *Boletín de Entomología Venezolana* (N. S.), 3(3), 21–28.
- De Marmels, J. (1989) Odonata or dragonflies from Cerro de la Neblina. *Academia de las Ciencias Físicas, Matemáticas y Naturales, Caracas, Venezuela*, 25, 1–78.
- De Marmels, J. (1990) An updated checklist of the Odonata of Venezuela. *Odonatologica*, 19(4), 333–345.

- De Marmels, J. (1992) Caballitos del diablo (Odonata) de las Sierras de Tapirapeco y Unturan, en el extremo sur de Venezuela. *Acta Biologica Venezuelica*, 14(1), 57–78.
- De Souza, L.O. I., Costa, J.M. & Santos, T.C. (2010) Revalidation of *Acanthagrion cuyabae* (Odonata, Coenagrionidae) and description of the female, with a key to the Brazilian species of the *viridescens* group. *Iheringia, Série Zoologia*, 100(1), 79–83.
<http://dx.doi.org/10.1590/S0073-47212010000100011>
- Ferreira-Peruquetti, P.S. & Fonseca-Gessner, A.A. (2003) Comunidade de Odonata (Insecta) em áreas naturais de Cerrado e monocultura no nordeste do Estado de São Paulo, Brasil: relação entre o uso do solo e a riqueza faunística. *Revista Brasileira de Zoologia*, 20(2), 219–224.
<http://dx.doi.org/10.1590/S0101-81752003000200008>
- Fraser, F.C. (1946) Notes on Amazonian Odonata in the Leeds Museum. *Transactions of the Royal Entomological Society of London*, 96(2), 11–46.
- Fraser, F.C. (1948) The Odonata of the Argentine Republic II. *Acta Zoologica Lilloana*, 5, 47–67.
- Garrison, R.W., von Ellenrieder, N. & Louton, J.A. (2010) *Damselfly Genera of the New World. An illustrated and annotated key to the Zygoptera*. The Johns Hopkins University Press, Baltimore.
- Garrison, R. W., von Ellenrieder, N. & O'Brien, M.F. (2003) An annotated list of the name-bearing types of species-group names in Odonata preserved in the University of Michigan Museum of Zoology. *Occasional papers of the Museum of Zoology University of Michigan*, 736, 1–73.
- Geijskes, D.C. (1932a) XVIII.- The dragonfly-fauna of Trinidad in the British West Indies (Odonata). *Zoologische Mededeelingen*, 14, 232–262.
- Geijskes, D.C. (1932b) V.- The dragonfly fauna of Trinidad in the British East Indies (Odonata). *Zoologische Mededeelingen*, 15, 96–128.
- Geijskes, D.C. (1941) Notes on Odonata of Surinam. II. Six mostly new zygopterous nymphs from the coastland waters. *Annals of the Entomological Society of America*, 34, 719–734.
- Gloger, H. (1967) Sobre *Acanthagrion* (Odonata, Coenagrionidae) y géneros próximos. *Acta Zoologica Lilloana*, 21, 45–58.
- Gloyd, L.K. (1977) Appendix. In: Leonard, J.W. (1977) A revisionary study of the genus *Acanthagrion* (Odonata: Zygoptera). *Miscellaneous Publications Museum of Zoology*, 153, 146–151.
- Jurzitza, G. (1981) Lista provisional de los Odonata del Parque Nacional Iguazú, provincia de Misiones, República Argentina. *Notulae Odonatologicae*, 1(7), 117–118.
- Kennedy, C.H. (1916) Notes on the penes of Zygoptera (Odonata). No. 1. Species limits in the genus *Acanthagrion*. *Entomological News*, 27, 325–330.
- Lencioni, F.A.A. (2005) *Damselflies of Brazil. An illustrated identification guide. 1- Non-Coenagrionidae families*. All Print Editora. São Paulo. Brasil.
- Lencioni, F.A.A. (2006) *Damselflies of Brazil. An illustrated identification guide. 2- Coenagrionidae*. All Print Editora. São Paulo. Brasil.
- Leonard, J.W. (1977) A revisionary study of the genus *Acanthagrion* (Odonata: Zygoptera). *Miscellaneous Publications Museum of Zoology*, 153, 1–146, 153–173.
- Longfield, C. (1929) A list of Odonata of the State of Matto Grosso, Brazil. *Transactions of the Entomological Society of London*, 1, 125–139.
<http://dx.doi.org/10.1111/j.1365-2311.1929.tb00682.x>
- Louton, J.A., Garrison, R.W. & Flint, O.S. (1996). The Odonata of Parque Nacional Manu, Madre de Dios, Peru; natural history, species richness and comparisons with other Peruvian sites. In: Wilson, D.E. & Sandoval, A. (eds.), *The Biodiversity of Southeastern Peru*, Smithsonian, Washington D.C., USA, pp. 431–449.
- Lozano, F., Garré, A. & Pessacq, P. (2007) Descripción del último estadio larval de *Acanthagrion aepiolum* (Odonata: Coenagrionidae). *Revista de la Sociedad Entomológica Argentina*, 66(1–2), 1–4.
- Machado, A.B.M. (2012) The Apicale species group of *Acanthagrion*, with description of four new species and a hook-moving apparatus (Zygoptera: Coenagrionidae). *Odonatologica*, 41(3), 201–223.
- Muzón, J. (1995) Acerca de la identidad de *Acanthagrion ascendens* Calvert, y *A. luteum* Rácenis (Odonata: Coenagrionidae). *Revista de la Sociedad Entomológica Argentina*, 54(1–4), 51–57.
- Muzón, J. & von Ellenrieder, N. (1998) Odonata. In: Morrone, J.J. & Coscarón, S. (eds.), *Biodiversidad de Artrópodos Argentinos. Una perspectiva biotaxonomica*. Ediciones Sur, La Plata, Argentina, pp. 14–25.
- Muzón, J., von Ellenrieder, N. & Pessacq, P. (2001) Description of the last larval instar of *Acanthagrion hildegarda* (Odonata: Coenagrionidae). *Revista de la Sociedad Entomológica Argentina*, 60(1–4), 95–98.
- Muzón, J., von Ellenrieder, N., Pessacq, P., Lozano, F., Garré, A., Lambruschini, J., Ramos, L. & Weigel Muñoz, M.S. (2008) Odonata from Iberá Wetlands (Corrientes: Argentina): preliminary inventory and biodiversity. *Revista de la Sociedad Entomológica Argentina*, 67(1–2), 59–67.
- Muzón, J. & Weigel Muñoz, S. (2007) Description of the final instar larva of *Lestes dichrostigma* Calvert (Zygoptera: Lestidae). *Studies on Neotropical Fauna and Environment*, 42(3), 235–239.
<http://dx.doi.org/10.1080/01650520601106196>
- Novelo Gutiérrez, R. (2009) Description of the larva of *Acanthagrion quadratum* Selys, with a key to the known larvae of the genus (Zygoptera: Coenagrionidae). *Odonatologica*, 38(4), 321–328.

- Paulson, D.R. (1977) Odonata. In: Hurlbert, S.H. & Villalobos-Figueroa, A. (eds.), *Aquatic Biota of Mexico, Central America and the West Indies*, San Diego State University, pp. 249–277.
- Paulson, D.R. (1984) Odonata of the Tambopata Reserved Zone, Madre de Dios, Perú. *Revista Peruana de Entomología*, 27, 9–14.
- Pessacq, P., Muzón, J. & von Ellenrieder, N. (2005) Description of the last larval instar of *Acanthagrion ablutum* Calvert (Zygoptera: Coenagrionidae). *Odonatologica*, 34(1), 73–76.
- Rácenis, J. (1953) Contribución al estudio de los Odonata de Venezuela. *Anales de la Universidad Central de Venezuela*, 35, 31–96.
- Rácenis, J. (1958) Los Odonatos neotropicales de la colección de la Facultad de Agronomía de la Universidad Central de Venezuela. *Acta Biológica Venezuelica*, 2(19), 179–226.
- Rácenis, J. (1959) Lista de los Odonata del Perú. *Acta Biológica Venezuelica*, 2(34), 467–522.
- Riek, E.F. & Kukulová-Peck, J. (1984) A new interpretation of dragonfly wing venation based upon early Carboniferous fossils from Argentina (Insecta: Odonatoidea) and basic character states in pterygote wings. *Canadian Journal of Zoology*, 62, 1150–1166.
<http://dx.doi.org/10.1139/z84-166>
- Ris, F. (1918) Libellen (Odonata) aus der Region der amerikanischen Kordilleren von Costarica bis Catamarca. *Archiv für Naturgeschichte*, A/9, 1–197.
- Roback, S.S. (1966) The Catherwood Foundation Peruvian-Amazon expedition. V- Odonata nymphs. *Monographs of the Academy of Natural Sciences of Philadelphia*, 14, 75–127.
- Rojas-R, N.C. & Sánchez, M. (2009) New records of *Acanthagrion* (Odonata: Coenagrionidae) from Colombia. *Bulletin of American Odonatology*, 11(1), 17–19.
- Santos, N.D. (1961) *Acanthagrion eglerti* sp. n. (Coenagriidae: Odonata). *Boletim do Museu Paraense Emilio Goeldi*, 38, 1–5.
- Santos, N.D. (1981) Odonata. In: Hurlbert, S.H., Rodríguez, G.N. & Santos, N.D. (eds.), *Aquatic Biota of Tropical South America Part 1 Arthropoda*, San Diego State University, pp. 64–85.
- Selys Longchamps, E. de. (1876) Synopsis des Agrionines, 5me légion: Agrion (suite). *Bulletin de l'Académie royale de Belgique*, 41(2–3), 3–7, 60–77.
- St. Quentin, D. (1960) Zur Kenntnis der Agrioninae (Coenagrioninae) Südamerikas (Odonata). *Beiträge zur Neotropischen Fauna*, 2(1), 45–64.
<http://dx.doi.org/10.1080/01650526009380622>
- Tennessen, K.J. (2004) *Acanthagrion aepiolum* sp. nov. from South America (Odonata: Coenagrionidae). *International Journal of Odonatology*, 7(1), 79–89.
<http://dx.doi.org/10.1080/13887890.2004.9748197>
- von Ellenrieder, N. (2009a) Odonata of the Argentine Yungas cloud forest: distribution patterns and conservation status. *Odonatologica*, 38(1), 39–53.
- von Ellenrieder, N. (2009b) Databasing dragonflies: State of knowledge in the Neotropical region. *Agrion*, 13(2), 58–72.
- von Ellenrieder, N. & Garrison, R.W. (2007) Dragonflies and damselflies (Insecta: Odonata) of the Argentine Yungas: Species composition and larval identification. *Scientific Reports*, 7, 1–103.
- von Ellenrieder, N. & Lozano, F. (2008) Blues for the red *Oxyagrion*: a redefinition of the genera *Acanthagrion* and *Oxyagrion* (Odonata: Coenagrionidae). *International Journal of Odonatology*, 11(1), 95–113.
<http://dx.doi.org/10.1080/13887890.2008.9748315>
- von Ellenrieder, N. & Muzón, J. (2008) An updated checklist of the Odonata from Argentina. *Odonatologica*, 37(1), 55–68.
- Westfall, M.J. & May, M.L. (2006) *Damselflies of North America*. Revised Edition. Scientific Publishers. Gainesville.
- Williamson, E.B. (1916) On certain *Acanthagrions*, including three new species (Odonata). *Entomological News*, 27, 313–325, 349–358.



Erratum

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<http://zoobank.org/urn:lsid:zoobank.org:pub:00000000-0000-0000-0000-000000000000>

FEDERICO LOZANO (2013) Description of three females of the genus *Acanthagrion* (Odonata: Coenagrionidae) with a key to the females of Argentina. *Zootaxa*, 3646(1): 023–038.

FIGURE 17–24 should be display as follows:

