

**The genus *Oligoclada* in Argentina,
with description of *O. rubribasalis* sp. nov.
(Odonata: Libellulidae)**

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ABSTRACT

A new species (holotype ♂ in MLP: Argentina, Formosa province, Parque Nacional Río Pilcomayo, Laguna Blanca, marshes next to pond, 25°10'29"S, 58°07'44"W, 74 m a.s.l., 16/17 ii 2008, leg. NvE, RWG) is described, diagnosed and illustrated, and a key, diagnostic illustrations, and distribution maps are provided for the three species of the genus occurring in Argentina. The combination of well defined orange–red dorsal spots on S2-3 in mature specimens, well developed supplementary tooth in pretarsal claws, shape of occipital triangle of female, and of vesica spermalis, genital lobe, posterior hamule, and cercus of male diagnose the new species.

RESUMEN

Una nueva especie (holotipo ♂ en MLP: Argentina, Formosa province, Parque Nacional Pilcomayo, Laguna Blanca, esteros junto a la laguna, 25°10'29"S, 58°07'44"O, 74 m a.s.l., 16/17 ii 2008, col. NvE, RWG) es descrita, diagnosticada e ilustrada, y se proveen una clave, ilustraciones diagnósticas y mapas de distribución para las tres especies del género que ocurren en Argentina. La combinación de manchas dorsales rojo–anaranjadas en S2-3 en ejemplares maduros, diente suplementario de uñas pretarsales bien desarrollado, forma del triángulo occipital de hembra y de vesica spermalis, lóbulo genital, hámulo posterior y cerco del macho permite diagnosticar a la nueva especie.

INTRODUCTION

Borror (1931) provided the first and only revision of the genus *Oligoclada* Karsch, 1890 including 14 species, after which eight species were added and some redescribed (Geijskes 1931, 1984; Santos 1945a, b, 1951; Fraser 1947; Costa 1970; De Marmels 1989, 1992; Rehn 2003). Heckman (2006) differentiated all 22 species, but his keys are essentially transcriptions of descriptions and do not allow for confidently diagnosing species. Garrison et al. (2006) diagnosed the genus and showed its distribution ranging from Guatemala south to Northern Argentina. Recently De Marmels (2008) described a new species from Venezuela, thus increasing the number of species currently known for this genus to 23.

Only two species have been recorded from Argentina so far: *O. haywardi* Fraser, 1947 from Misiones province and *O. laetitia* Ris, 1911 from Misiones, Entre Rios and Formosa provinces (von Ellenrieder & Muzón 2008). *O. haywardi* is known only from its original description (Fraser 1947) based on one incomplete male (missing S5-10) and one female from Puerto Iguazú, Misiones.

In a recent trip to Formosa province, Argentina, we collected and photographed specimens of *O. laetitia* and of an *Oligoclada* species characterized by peculiar orange-red dorsal spots on S2-3, which keys out with *O. xanthopleura* Borror, 1931 in Borror's key (1931) but represents a new species. Thanks to the courtesy of the curators of the Fundación Miguel Lillo (Tucumán, Argentina), we were also able to re-examine and illustrate the types of *O. haywardi*. Here we describe the new species, and illustrate, key, and map the three species known from Argentina.

MATERIAL AND METHODS

Nomenclature for wing venation follows Riek & Kukalová-Peck (1984). Measurements are given in millimeters; total length and abdomen length exclude cerci. Drawings were made with the aid of a camera lucida coupled to a Wild M8 stereomicroscope and are not to scale. The vesica spermalis was removed and soaked overnight in a 15% potassium hydroxide (KOH) solution and illustrated using ventral stage illumination under a Nikon SMZ1500 binocular stereoscopic microscope. Wings were scanned from specimens. Synonymies exclude references to species with no new information. Maps represent distribution records from collections and reliable literature records, and were created electronically from the Digital Chart of the World (1:1,000,000) using ArcView 9.1; longitude/latitude coordinates were culled from the Global Gazetteer website (<<http://www.fallingrain.com/world/>>).

Acronyms for collectors and collections are as follows:

- IFML — Instituto y Fundación Miguel Lillo, Tucumán, Argentina
- JJD — Jerrel J. Daigle collection, Tallahassee, Florida, USA
- MCNS — Museo de Ciencias Naturales de Salta, Argentina
- MLP — Departamento Científico Entomología, Museo de La Plata, Argentina
- NvE — Natalia von Ellenrieder
- RWG — Rosser W. Garrison collection, Sacramento, California, USA

Oligoclada rubribasalis sp. nov.

(Figs 1a, b, 2a, c, d, 3a, 4a, 5a, 6a-d, 7a, b, 8, Plate IVb)

Oligoclada laetitia von Ellenrieder & Muzón (2008: 63; in part, record from Entre Ríos, Argentina).

Etymology

From Latin *ruber* (-bra, -brum), meaning ‘red’ – and *basalis*, meaning ‘basal’ – referring to the diagnostic orange–red dorsal spots on base of abdomen (S2-3) of mature specimens.

Type specimens

Total 7 ♂, 3 ♀. — 1 ♂ holotype: Argentina, Formosa province, Parque Nacional Río Pilcomayo, Laguna Blanca, marshes by pond (25°10'29"S, 58°07'44"W, 74 m a.s.l.), 16/17 ii 2008, leg. NvE, RWG (MLP); 6 ♂, 3 ♀ paratypes: same data as holotype but 1 ♂, 1 ♀ (MLP); 4 ♂, 2 ♀ (MCNS); 1 ♂ (FML).

Other specimens

2 ♂, 1 ♀: Argentina, Entre Ríos province, Parque Nacional Pre Delta (32°7'0"S, 60°40'32"W) 24 ii 2006, leg. A. Garré, F. Lozano, L. Ramos, M.S. Weigel Muñoz (MLP).

Male holotype

Head: Eyes in life orange-red above, pale grey-blue below (as in Plate IVb). Labium black except outer half of labial palps ivory; labrum ivory with outer margin narrowly black; base of mandibles, clypeus, and lower 0.7 of antefrons ivory (Fig. 1a); occipital triangle black with a pair of rounded white spots almost touching medially; rear of head black; remainder of head metallic blue. Antefrons with wide-shallow medial furrow; vertex rounded; posterior margin of occipital triangle linear (Fig. 1b).

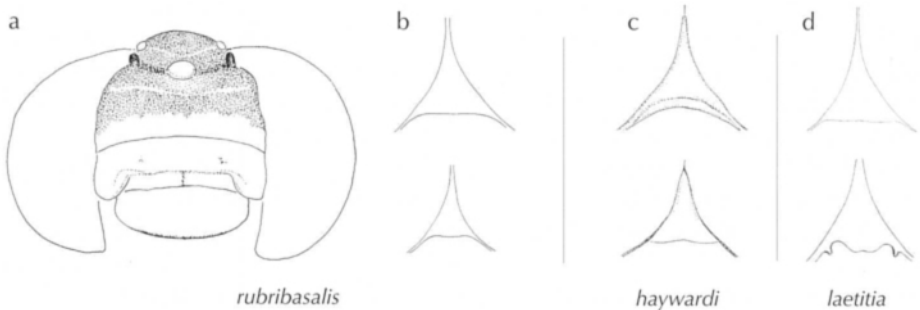


Figure 1: Head — (a) *Oligoclada rubribasalis* n. sp., male holotype, frontal view; (b-d) occipital triangle, dorsal view — (b) *O. rubribasalis* sp. nov., male holotype (above) and female paratype (below); (c) *O. haywardi*, male holotype (above) and female allotype (below); (d) *O. laetitia*, R.N. Formosa, Argentina, male (above) and female (below).

Thorax: Anterior lobe of prothorax ivory, remainder of prothorax and pterothorax black, covered with long pale hairs and dusted with pale blue pruinosity in life. Legs black dusted with pale blue pruinosity in life; metafemora armed with 23 (right) or 24 (left) short spurs followed distally by one longer spur (Fig. 2a); 13 long metatibial spurs longer than intervening spaces; pretarsal claws with long, acute supplementary inferior tooth at about $\frac{3}{4}$ (inner claw; Fig. 2c) and $\frac{2}{3}$ (outer claw; Fig. 2d) of their length. Wings (as in Fig. 3a) hyaline, relatively broad with Hw extending to base of S5; sectors of arculus stalked; last antenodal complete (incomplete in left Fw); triangles and subtriangles free; costal side of Fw triangle straight; anal loop with well developed toe; Rspl defined; Aspl bent at heel level of anal loop at an obtuse angle; with two rows of cells between margin of wing and ventral margin of anal loop at mid-level. Pt light grey, 1.8 long in Fw, 2.0 in Hw. Ax: 8 (left) and 7 (right) in Fw; 6 in Hw; Px: 6 (left) and 7 (right) in Fw; 7 (left) and 6 (right) in Hw.

Abdomen: Black, in life dusted with pale blue pruinosity on S1-4 and base of remaining segments; with orange-red dorsal spots on S2-3 (Fig. 7a, Plate IVb). Anterior lamina with posterior margin approximately smoothly concave in ventral view, in lateral view shorter than posterior hamule; posterior hamule bifid with inner branch hooked and longer than tuberculate outer branch; genital lobe smoothly rounded with anterior margin longer than posterior margin (Fig. 4a). Vesica spermalis with filiform cornu extending to apex of triangular lateral lobes, longer than medial and internal lobes (as in Fig. 5a). S4 lacking a transverse carina. Cerci in lateral view with dorsal margin linear and ventral margin constricted at 0.4, with 5-6 larger tubercles and 4-5 smaller ones in a row at distal 0.6 (Fig. 6b); in dorsal view approximately linear and converging along basal 0.6, to then run parallel to each other at distal 0.4 (Fig. 6a). Epiproct slightly bifid at tip, extending to 0.75 of cerci length (Figs 6b, c).

Dimensions: Total length 24.5; abdomen length 15.5; Fw length 21; Hw length 22; Hw maximum width 8.

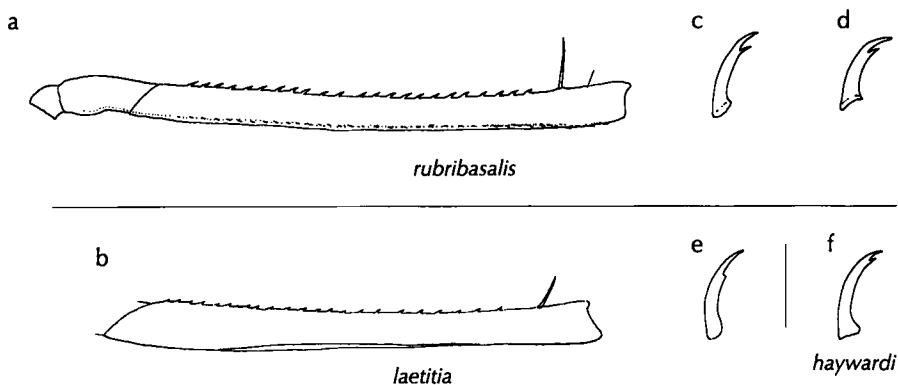


Figure 2: Hind leg — (a, b) metafemur, latero-external view — (a) *O. rubribasalis* sp. nov., male holotype; (b) *O. laetitia* male, R.N. Formosa, Argentina — (c-f) metapretarsus, lateral view — (c, d) *O. rubribasalis* sp. nov., male holotype, (c) inner claw, (d) outer claw; (e) *O. laetitia*, male R.N. Formosa, Argentina (outer claw); (f) *O. haywardi*, male holotype (outer claw).

Variation in paratypes

Head: As for holotype but labrum black with basal fourth ivory in one male and one female.

Thorax: As for holotype but 19-24 metafemoral and 12-15 metatibial spurs in males, 15-20 and 12-15 in females respectively; last antenodal always complete; pterostigma 1.6-1.7 long in male Fw, 1.7-1.9 in female Fw, 1.8-2 in male Hw, 2-2.2 in female Hw; Ax 7-8 in Fw, 5-6 in Hw; Px 5-7 in Fw, 6-7 in Hw.

Abdomen: As for holotype but 4-6 larger ventro-apical tubercles on male cerci; transverse carina on S4 slightly insinuated in some males, present in females; female vulvar lamina deeply V-shaped (Fig. 7b); S9 with medio-longitudinal ventral keel; female cerci conical and acutely pointed at tips, as long as 1.5-2 times S10 length and 1.5 times as long as epiproct; female epiproct rounded and with long hairs (Fig. 6d).

Dimensions: Males ($n = 6$): total length 22.5-26 [24.17 ± 1.51]; abdomen length 14.5-16 [15 ± 0.55]; Fw length 19-21 [20.08 ± 0.74]; Hw length 19-20 [19.42 ± 0.49]; maximum Hw width 7-8 [7.25 ± 0.42]. Females ($n = 3$): total length 23-24 [23.67 ± 0.58]; abdomen length 14-16 [15.33 ± 1.15]; Fw length 20-21 [20.67 ± 0.58]; Hw length 19-20 [19.67 ± 0.58]; maximum Hw width 7.5.

Diagnosis

Both sexes of *O. rubribasalis* can be distinguished from mature specimens of all known congeners by their unique color pattern of entirely dark thorax and abdomen marked with well defined orange-red dorsal spots on S2-3 (Fig. 7a; Plate IVb). Juvenile individuals of some other species, i.e. *O. abbreviata* (Rambur, 1942), *O. pachystigma* Karsch, 1890, and *O. risi* Geijskes, 1984, show however the same orange spots and dorsally red eyes, which become obscured by pruinosity when they mature (D.R. Paulson pers. comm.). The extensive pruinescence covering thorax and abdomen on the specimens of *O. rubribasalis* and their presence at water indicate they had reached maturity retaining the juvenile colors characteristic of other species of this genus.

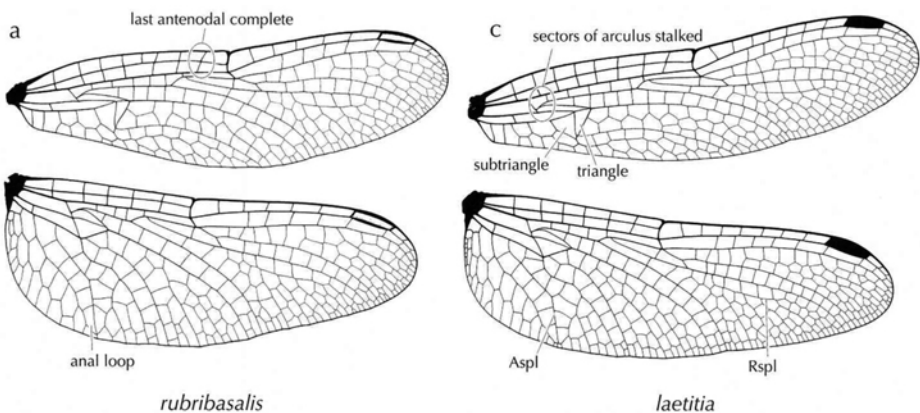


Figure 3: Wings — (a) *O. rubribasalis* sp. nov., male paratype; (b) *O. laetitia*, male R.N. Formosa, Argentina.

Based on morphology of vesica spermalis, with cornu extending to apex of lateral lobes and medial lobes two thirds as long as cornu or longer (Fig. 5a), this species belongs in Borror's (1931) group II, together with *O. laetitia* Ris, 1911 (Fig. 5b), *O. pachystigma*, *O. teretidentis* Rehn, 2003, and *O. xanthopleura*. Male cercus with a distinct distal constriction in lateral view (Fig. 6b) and pretarsal supplementary tooth well developed (Figs 2c, d) will distinguish *O. rubribasalis* from *O. laetitia* and *O. pachystigma* in which cercus narrows gradually to tip (Fig. 6f) and pretarsal supplementary tooth is represented by a notch (Fig. 2e). In *O. teretidentis* there is a yellow mesepisternal spot, and male cercus is strongly up-curved in basal half with one ventral prominent rounded tooth at mid-length (Rehn 2003), whereas in *O. rubribasalis* thorax is entirely dark, male cercus is only slightly up-curved in basal half with several ventral prominent rounded teeth of equal size distal to mid-length (Fig. 6b). In *O. xanthopleura* S4-8 have lateral yellow spots, and inner branch of male hamule is shorter than outer branch (Borror 1931), while in *O. rubribasalis* S4-8 are uniformly dark (Pl. IVb) and inner branch of male hamule is as long as outer branch (Fig. 4a).

Female differs from most described females – those of *O. amphinome* Ris, 1911, *O. leucotaenia* De Marmels, 1989, *O. nemesis* (Ris, 1911), *O. rhea* Ris, 1911, *O. stenoptera* Borror, 1931, and *O. waikinimae* De Marmels, 1992 still unknown – by the smooth posterior margin of occipital triangle devoid of lobes or projections (Fig. 1b below). In females of *O. calverti* Santos, 1945, *O. haywardi*, and *O. umbricola* Borror, 1931 posterior margin of occipital triangle also lacks projections and is only slightly bilobed (Fig. 1c below; Kormondy 1958); they can be distinguished from *O. rubribasalis* by three celled triangle in *O. calverti* and *O. haywardi*, which

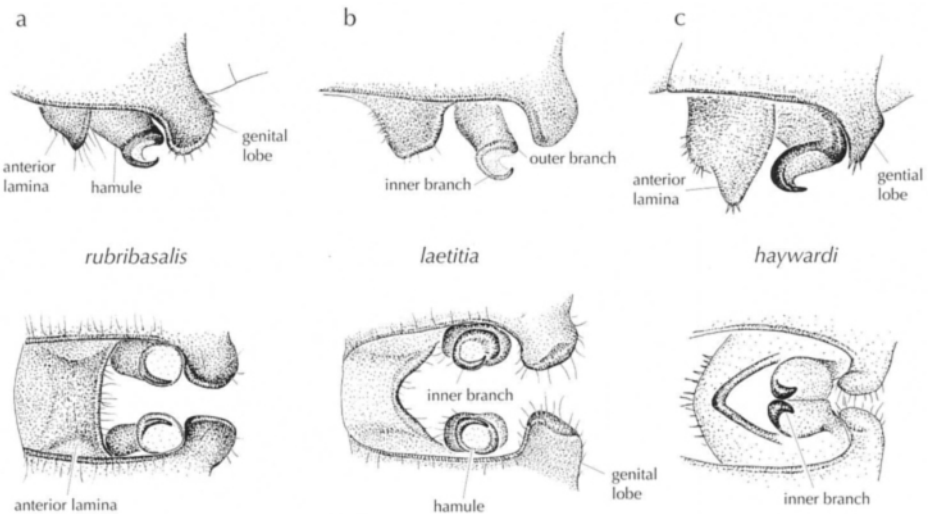


Figure 4: Male S2, lateral view (above) and ventral view (below) — (a) *O. rubribasalis* sp. nov., holotype; (b) *O. laetitia*, R.N. Formosa, Argentina; (c) *O. haywardi*, holotype.

is one celled in *O. rubribasalis* (Fig. 3a) and supplementary pretarsal tooth represented by a small notch in *O. umbricola* (as in Fig. 2e), which is well developed in *O. rubribasalis* (as in Figs 2c, d). Female of *O. garrisoni* De Marmels, 2008 also lacks projections on posterior margin of occipital triangle, but differs from *O. rubribasalis* by its yellow thoracic markings and U-shaped vulvar lamina (De Marmels 2008), which are respectively black and V-shaped (Fig. 7b) in *O. rubribasalis*.

Distribution and biology

Examination of the specimens on which the record of *O. laetitia* from Entre Rios in von Ellenrieder & Muzón (2008) was based, revealed they belong to *O. rubribasalis*. Thus *O. rubribasalis* is known so far from two localities of the Paraná river watershed in E Argentina (Fig. 8): Parque Nacional Río Pilcomayo, situated in the NE of Formosa province, and Parque Nacional Pre Delta, located in the W of Entre Rios province. The Río Pilcomayo Park where the type series was collected is located within the 'wet Chaco' biome, a plain with slow slopes, vegetation dominated by grasslands, caranday palms, marshes, and ponds in the lower areas and patches of trees in the higher areas. It is bordered on the North by the Pilcomayo River, which experiences periodic flooding over vast areas in summer alternating with periods of drought in winter. Adults of *O. rubribasalis* were found at marshes surrounding the 'Laguna Blanca' pond, perching horizontally with wings and abdomen in same plane as body (Plate IVb) on leaves exposed to the sun from water surface to 1 m above it. Reproductive behavior was not observed, and the larva is still unknown. Other species found at the same locality were (new records for the province indicated with an asterisk): *Acanthagrion cuyabae* Calvert, 1909, *Argentagrion ambiguum* (Ris, 1904), *Ischnura fluviatilis* Selys, 1876, *Telebasis willinki* Fraser, 1948, *Aphylla dentata* Selys, 1859*, *Rhionaeschna bonariensis* (Rambur, 1842), *Brachymesia herbida* Gundlach, 1889*, *Diastatops Rambur*, 1842 sp.* [seen only], *Erythemis vesiculosa* (Fabricius, 1775), *Erythrodiplax ochracea* (Burmeister, 1839), *E. umbrata* (Linnaeus, 1758), *Miathyria marcella* Selys in Sagra, 1857, *Micrathyria longifasciata* Calvert, 1909, *Perithemis mooma* Kirby, 1889* and *Tauriphila risi* Martin, 1896*.

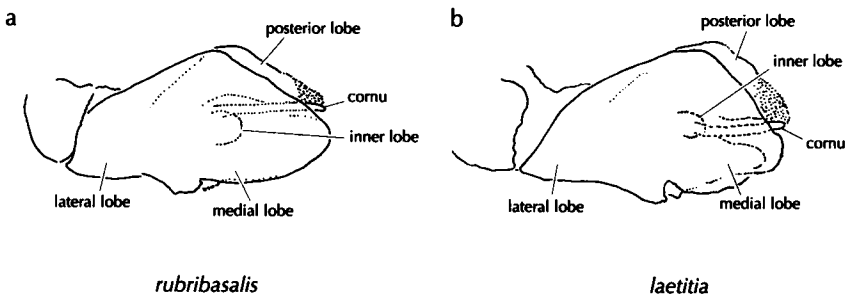


Figure 5: Vesica spermalis, lateral view — (a) *O. rubribasalis* sp. nov., paratype; (b) *O. laetitia*, R.N. Formosa, Argentina.

Oligoclada haywardi Fraser, 1947

(Figs 1c, 2f, 4c, 7c, 8)

Oligoclada haywardi Fraser, 1947: 453-454, fig. 3f (description of male and female, illustration of male S2); — Santos (1951: 136; comparison with male of *O. calverti*); — Machado (1954: 140, 142; comparison with female of *O. calverti*).

Specimens examined

Total 1 ♂, 1 ♀. — Argentina, Misiones: 1 ♂ holotype, 1 ♀ allotype, Puerto Iguazú (25°34'S, 54°34'W, 160 m a.s.l.), 1945, leg. K.J. Hayward, A. Willink, R. Golbach (IFML).

Diagnosis

Subtriangle with 3 cells, male S4 with a distinct carina and anterior lamina as high as or higher than hamule (Fig. 4c above) are shared only with *O. abbreviata*, *O. calverti*, *O. heliophila* Borror, 1931, *O. risi*, *O. umbricola*, and *O. walkeri* Geijskes, 1931. *O. haywardi* can be distinguished from all of them except for *O. calverti* by the well developed supplementary tooth of pretarsus (Fig. 2f), which is vestigial in the others. It differs from *O. calverti* by male hamule with narrow ventral tip and posterior margin straight (Fig. 4c above), which is broad and rounded in *O. calverti* (Santos 1951), and by female abdomen with a pale medio-dorsal stripe extending along its entire length, which in *O. calverti* extends only over S2-6 (Machado 1954).

Distribution and biology

O. haywardi is known so far only from its type locality in Misiones province, Argentina (Fig. 8), within the Paranense forest biome, and nothing is known about its biology.

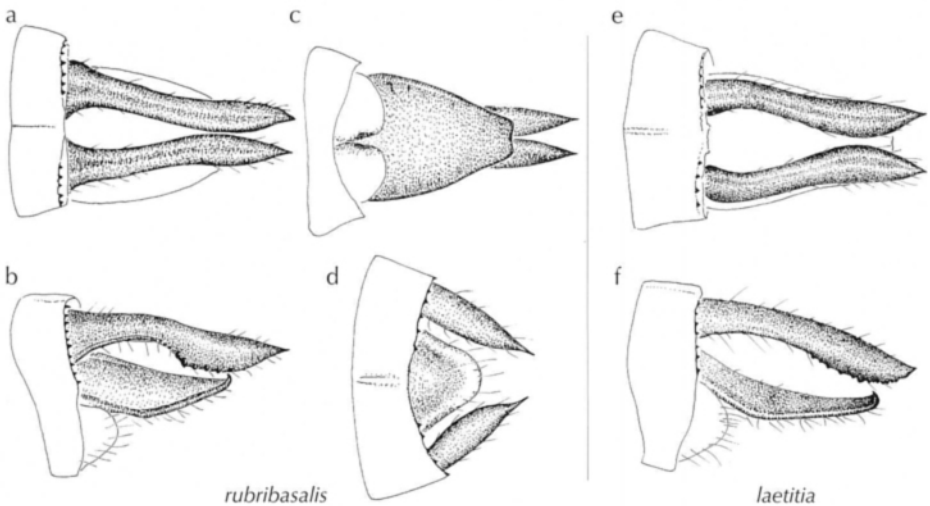


Figure 6: S10 — (a-d) *O. rubribasalis* sp. nov., (a-c) holotype, (d) female paratype; (e, f) *O. laetitia*, male R.N. Formosa, Argentina; (a, d, e) dorsal view, (b, f) lateral view, (c) ventral view.

Oligoclada laetitia Ris, 1911

(Figs 1d, 2b, e, 3b, 4b, 5b, 6e, f, 7d, 8, Plate IVa, c)

Oligoclada laetitia Ris, 1911: 404, fig. 252 (description of male, illustration of S2); — Ris (1919: 1132-1132; inclusion in key); — Borror (1931: 10, 17, 26; inclusion in key, discussion of original description); — Costa (1970: 207-209, figs 1-9; redescription of male and description of female, illustrations of male S2, S10, hamule, vesica spermalis and female S8-9); — Souza et al. (2002: 403-407, figs 1-8; description and illustrations of larva); — von Ellenrieder & Muzón (2008: 63; in part, records for Formosa and Misiones, Argentina).

Specimens examined

Total 8 ♂, 1 ♀. — Brazil, São Paulo: 1 ♂, Sitio Primavera, Rio Claro (22°24'33"S, 47°36'44"W, 569 m a.s.l.), 21 i 2001, leg. F.A.A. Lencioni (RWG). Bolivia, Santa Cruz: 1 ♂, deep lake 23 km N of Guayaros, highway 9 (17°09'11"S, 61°42'20"W, 260 m), 26 viii 2003, leg. J.J. Daigle (JJD); Argentina, Misiones: 1 ♂, Puerto Iguazú (25°34'S, 54°34'W, 160 m), 05 ii 1979, leg. G. Jurzitza (RWG). Formosa: 1 ♂, Puesto Porteño (24°43'S, 59°35'W, 110 m), xi 1945, leg. I. Morel (IFML); 3 ♂, 1 ♀, Reserva Natural Formosa, side pond of Bermejo river, (24°19'S, 61°48'W, 60 m), 15 ii 2008, leg. NvE, RWG (MCNS). Salta: 1 ♂, Dique El Tunal (25°13'10" S, 64°29'12" W, 566 m), 26 iv 2008, leg. NvE (MCNS) [new record for the province].

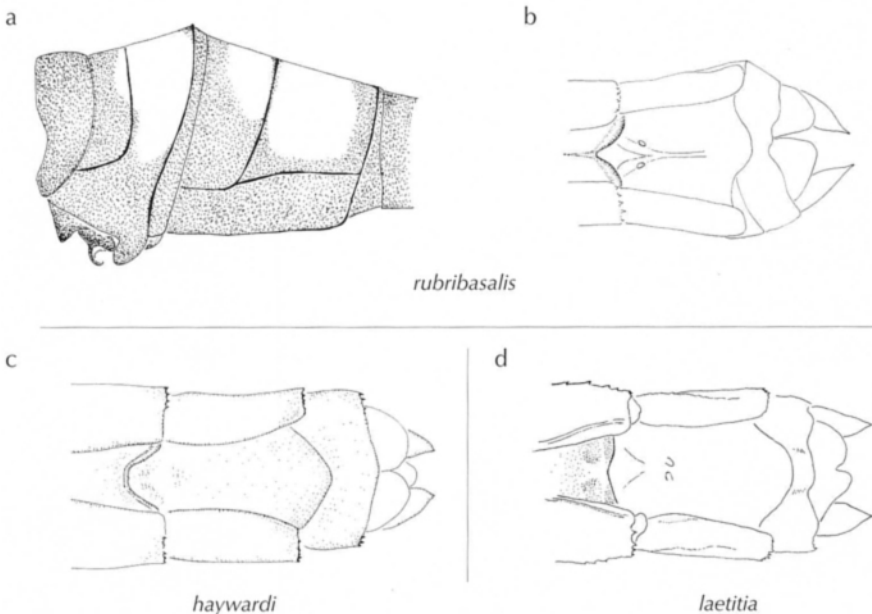


Figure 7: Abdomen — (a) male S1-3, lateral view, *O. rubribasalis* sp. nov., holotype; (b-d) female S8-10, ventral view — (b) *O. rubribasalis* sp. nov., paratype; (c) *O. haywardi*, allotype; (d) *O. laetitia*, R.N. Formosa, Argentina.

Diagnosis

The combination of a free subtriangle, two or more rows of cells between ventral margin of anal loop and hind margin of wing (Fig. 3b), and pretarsal claw with vestigial supplementary tooth (Fig. 2e) is shared only with *O. pachystigma*. In *O. laetitia* male cercus widens slightly along distal half and its tip is ventrally smoothly convex in lateral view (Fig. 6f) and base of hamule is as wide as genital lobe (Fig. 4b above), whereas in *O. pachystigma* male cercus is as wide at distal half as at basal half and its tip is ventrally angled in lateral view (Borror 1931: fig. 4), and base of hamule is narrower than genital lobe (Borror 1931: fig. 4; Costa 1970). Females differ by the vulvar lamina shape, which is shallowly U-shaped in *O. laetitia* (Fig. 7d) and formed by two short rounded and thickened lobes in *O. pachystigma* (Borror 1931: 26).

Distribution and biology

Ranging from W Bolivia to SW Brazil and N Argentina (Fig. 8), present both in the Chaco and the Paranense forest biomes. This species inhabits side pools and flood ponds associated to rivers. We observed adults flying along the shore of an oxbow pond of the Bermejo River, alighting on its banks and on branches and leaves overhanging the water (Plate IVa), some assuming the obelisk position (Plate IVc). Other species present were (new records for Formosa province indicated with an asterisk): *Telebasis willinki* Fraser, 1948, *Aphylla dentata* Selys, 1859*, *Diastatops* Rambur, 1842 sp.* [seen only], *Erythemis plebeja* (Burmeister, 1839), *Macrothemis inacuta* Calvert, 1898, *Miathyria marcella* Selys in Sagra, 1857, *Micrathyria hesperis* Ris, 1911*, *Orthemis nodiplaga* Karsch, 1891, *Perithemis mooma* Kirby, 1889* and *Tramea cophysa* Hagen, 1867.

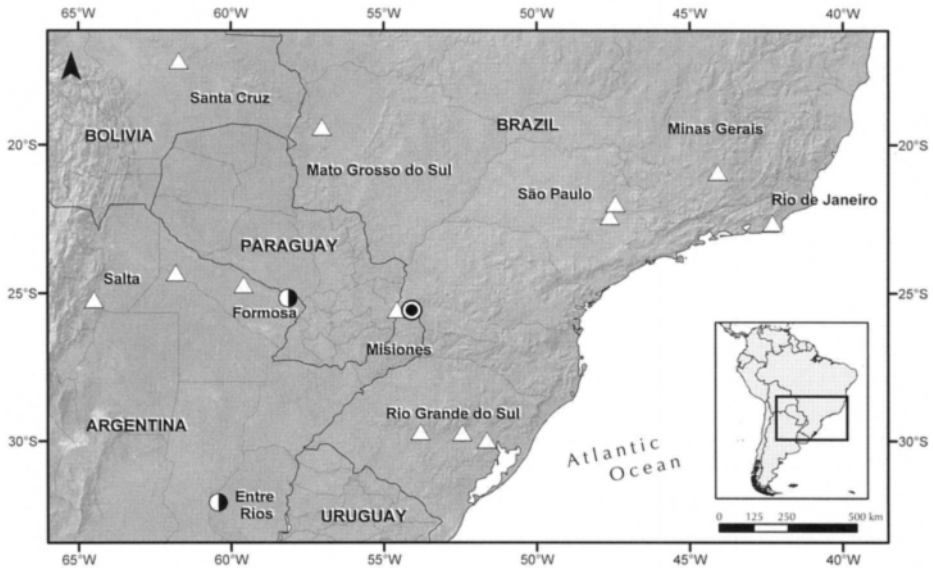


Figure 8: Distribution map of species of *Oligoclada* recorded from Argentina. Only political divisions with known records are named for each country. — (●) *O. rubribasalis*, (◉) *O. haywardi*, (Δ) *O. laetitia*.

KEY TO *Oligoclada* SPECIES FROM ARGENTINA

1. Frons entirely metallic blue; Fw with three celled subtriangle and last antenodal incomplete; well defined transverse carina on male S4; male anterior lamina higher than hamule and genital lobe in lateral view; inner branch of hamule shorter than outer branch; contour of inner and outer branches in ventral view forming an elliptical arc; genital lobe narrowed antero-ventrally (Fig. 4c) *O. haywardi*
- 1'. Frons metallic blue except pale creamy white or ivory ventral half of antefrons (Fig. 1a); Fw usually with one celled subtriangle and last antenodal complete (Fig. 3); transverse carina on male S4 absent or vestigial; male anterior lamina shorter than hamule and genital lobe in lateral view; inner branch of hamule as long as outer branch; contour of inner and outer branches in ventral view forming a semicircular arc; genital lobe not narrowed antero-ventrally (Figs 4a, b) 2
2. Mature specimens with eyes green in life and body entirely dark (Pl. IVa); female occipital triangle with a small postero-lateral digitiform projection on each side of posterior margin (Fig. 1d below); supplementary pretarsal tooth represented by a small notch (Fig. 2e); posterior margin of male genital lobe approximately linear (Fig. 4b); male cercus approximately cylindrical and gradually narrowing distally in lateral view (Fig. 6f); tips of cerci divergent in dorsal view (Fig. 6e); epiproct reaching distal 0.85 of cercus (Figs 6e, f); female vulvar lamina shallowly U-shaped (Fig. 7d) *O. laetitia*
- 2'. Mature specimens with eyes dorsally orange-red in life and body dark with large orange-red dorsal spots on S2-3 (Fig. 7a; Pl. IVb); female occipital triangle with smooth posterior margin devoid of lobes or projections (Fig. 1b below); supplementary pretarsal tooth well developed (Figs 2c, d); posterior margin of genital lobe smoothly convex (Fig. 4a); male cercus with a well defined subapical constriction in lateral view (Fig. 6b); tips of cerci approximately parallel to each other in dorsal view (Fig. 6a); epiproct reaching distal 0.75 of cercus (Figs 6b, c); female vulvar lamina deeply V-shaped (Fig. 7b) *O. rubribasalis*

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REFERENCES

- Borror, D.J., 1931. The genus *Oligoclada* (Odonata). Miscellaneous Publications, Museum of Zoology, University of Michigan 22: 1-42.
- Costa, J.M., 1970. Redescricao de *Oligoclada laetitia* Ris, 1911 (Libellulidae: Odonata). Atas da Sociedade de Biologia do Rio de Janeiro 13: 207-209.
- 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., 1992. Odonata del Cerro Guaiquinima (Edo. Bolivar) y zonas aledañas. Boletín de Entomología Venezolana 7: 37-47.
- De Marmels, J., 2008. Three new libelluline dragonflies from southern Venezuela, with new records of other species (Odonata: Libellulidae). International Journal of Odonatology 11: 1-13.
- Fraser, F.C., 1947. The Odonata of the Argentine Republic I. Acta Zoológica Lilloana 4: 427-462.
- Garrison, R.W., N. von Ellenrieder & J.A. Louton, 2006. The dragonfly genera (Odonata: Anisoptera) of the New World. An illustrated and annotated key. The Johns Hopkins University Press, Baltimore.
- Geijskes, D.C., 1931. A new species of *Oligoclada* (Odonata) from Trinidad B.W.Z. Entomologische Berichten 8: 209-214.
- Geijskes, D.C., 1984. What is *Oligoclada abbreviata* (Rambur, 1942)? (Odonata: Libellulidae). Zoologische Mededelingen 58: 175-185.
- Heckmann, C.W., 2006. Encyclopedia of South American aquatic insects: Odonata – Anisoptera. Illustrated keys to known families, genera, and species in South America. Springer, Dordrecht.
- Kormondy, E.J., 1958. The plesiallotype female of *Oligoclada umbricola* Borror, 1931. Entomological News 69: 57-59.
- Machado, A.B.M., 1954. Descrição do "allotypus" (femea) e notas sobre o "homeotypus" de *Oligoclada calverti* Santos, 1951 (Odonata, Libellulidae). Revista Brasileira de Entomologia 2: 139-144.
- Rehn, A.C., 2003. *Oligoclada teretidentis* spec. nov. from eastern Ecuador (Anisoptera: Libellulidae). Odonatologica 32: 171-175.
- Riek, E.R. & J. Kukalová-Peck, 1984. A new interpretation of dragonfly wing venation based upon Early Upper Carboniferous fossils from Argentina (Insecta: Odonatoidea) and basic character states in pterygote wings. Canadian Journal of Zoology 62: 1150-1166.
- Ris, F., 1911. Libellulinen monographisch bearbeitet, Vol. II. Libellulinen 4. Collections Zoologiques du Baron Edm. de Selys Longchamps. Catalogue Systématique et Descriptif 12: 385-528, pl. IV.
- Ris, F., 1919. Libellulinen monographisch bearbeitet, Vol. III. Libellulinen 9. Collections Zoologiques du Baron Edm. de Selys Longchamps. Catalogue Systématique et Descriptif 16 (Deuxième Partie): 1043-1278.
- Santos, N.D., 1945a. *Oligoclada nemesis* (Ris, 1911), nova combinação e notas sobre outras especies (Odonata: Libellulidae). Boletim do Museu Nacional 46: 1-4.
- Santos, N.D., 1945b. Contribuição ao conhecimento da fauna de Pirassununga, estado de São Paulo. 2 – Descrição de *Oligoclada borrori*, n. sp. (Odonata: Libellulidae). Boletim do Museu Nacional 47: 1-5.
- Santos, N.D., 1951. *Oligoclada calverti*, n. sp. (Odonata: Libellulidae). Entomological News 62: 135-137.
- Souza, L.O.I., J.M. Costa & L.A. Espindola, 2002. Description of the last instar larva of *Oligoclada laetitia* Ris, 1911 and comparison with other Libellulidae (Anisoptera). Odonatologica 31: 403-407.
- von Ellenrieder, N. & J. Muzón, 2008. An updated checklist of the Odonata from Argentina. Odonatologica 37: 55-68.