



Systematics, Morphology and Biogeography

Four new species of *Triorla* Parks (Diptera, Asilidae, Asilinae) from Brazil

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ABSTRACT

Triorla Parks has been reported from the Nearctic and Neotropical regions with 10 described species: *T. ambigua* (Macquart), *T. argyrogaster* (Macquart), *T. demifasciata* (Macquart), *T. interrupta* (Macquart), *T. nervosa* (Macquart), *T. parastricola* Pamplona & Aires, *T. rubidiventris* (Macquart), *T. spinosa* Tomasovic, *T. striola* (Fabricius), and *T. trichina* Tomasovic. Two species, *T. striola* and *T. parastricola*, have been recorded from Brazil. This paper describes four new species of *Triorla* from Brazil: *T. beckeri* sp. nov., *T. milineae* sp. nov., *T. paraensis* sp. nov., and *T. spatulata* sp. nov., and includes comments on the morphology of *T. parastricola*. An identification key to the species of *Triorla* is provided.

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Introduction

Asilinae Latreille, 1802 is the most diverse subfamily of Asilidae, including 179 extant genera, distributed in all biogeographic regions, except Antarctica (Geller-Grimm, 2004; Londt, 2005; Vieira, 2012; Artigas and Vieira, 2014; Vieira and Rafael, 2014). Sixty-eight genera are recognized in the Neotropical region, of which 20 occur in Brazil (Papavero, 2009; Vieira, 2012; Artigas and Vieira, 2014; Vieira and Rafael, 2014). *Triorla* Parks, 1968 is characterized by vein R₅ ending before wing apex, male terminalia parallel with longitudinal axis of the body and tergites 9 and 10 of ovipositor fused together (Parks, 1968). The Neotropical and Nearctic *Triorla* was proposed based on two species – the type species *T. interrupta* (Macquart, 1834), with the type locality U.S.A. (distribution: U.S.A., Mexico, Guatemala, Honduras, Nicaragua, Costa Rica, Panama, and Colombia) and *T. striola* (Fabricius, 1805), with the type locality “South-America” (distribution: Panama, Colombia, Venezuela, Guyana and Surinam, and south of Paraguay) (Papavero, 2009).

A third species of the genus, *T. parastricola* Pamplona and Aires, 1999 was described from Roraima State in the Brazilian Amazon (Pamplona and Aires, 1999). Recently, seven species of *Triorla* were proposed by Tomasovic (2002) based on the type-material of *Erax Scopoli*, 1763, described by Macquart (1838, 1846, 1850) and deposited in the French museums of Lille and Paris,

including: (1) two new species, *T. spinosa* and *T. trichina*; (2) five species that were transferred to *Triorla*: *T. argyrogaster* (Macquart, 1846), *T. demifasciata* (Macquart, 1850), *T. nervosa* (Macquart, 1838), *T. tibialis* (Macquart, 1838), and *T. vicina* (Macquart, 1846); and (3) three species previously synonymized with *T. interrupta* that were re-established to specific status: *T. ambigua* (Macquart, 1846) and *T. maculatus* (Macquart, 1838) synonymized by Martin and Papavero (1970), and *T. rubidiventris* (Macquart, 1850) synonymized by Artigas and Papavero (1997).

Papavero (2009), in the Catalogue of Neotropical Asilidae, allocated *T. ambigua* and *T. rubidiventris* in *Triorla*, but did not include *T. vicina* and *T. tibialis* as valid species for the genus. He also proposed *T. maculatus* as a synonym for *T. striola*. Hence, at the present time, 10 species of *Triorla* are recognized in Nearctic and Neotropical regions (Table 1).

Here we describe four new species of *Triorla* from Brazil, and include morphological comments concerning *T. parastricola*. An identification key, as well as geographical records and biology data (when available) are provided.

Material and Methods

Specimens from four Brazilian insect collections were examined. The abbreviations of the collections referred to in this paper are: INPA – *Coleção de Invertebrados do Instituto Nacional de Pesquisa da Amazônia*, Manaus, Amazonas, Brazil; MPEG – *Coleção de Invertebrados do Museu Paraense Emilio Goeldi*, Belém, Pará, Brazil; MZFS – *Coleção Entomológica Prof. Johann Becker do Museu de Zoologia da Universidade Estadual de Feira de Santana*, Feira de Santana, Bahia,

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Brazil; MZUSP – *Museu de Zoologia da Universidade de São Paulo*, São Paulo, São Paulo, Brazil. Dissected terminalia were placed in a 10% KOH solution at 40°C for 8 h, washed in water, treated with 10% acetic acid, and subsequently examined in concavity slides in glycerin. After examination and illustration, the detached parts were placed in microvials with glycerin and pinned with their respective specimens. The female terminalia were mounted on permanent slides using Canada balsam. The terminology used in the morphological descriptions follows [Cumming and Wood \(2009\)](#).

Taxonomy

Triorla Parks

Triorla Parks, 1968 – Parks (1968: 175, 176).

Type-species: *Asilus interruptus* [Macquart, 1834](#) – [Macquart \(1834: 310\)](#).

Diagnosis based on [Parks \(1968\)](#) and [Pamplona and Aires \(1999\)](#). Ocellar tubercle with few macrosetae or setae; stylus without microsegment; R₅ ending before wing apex; short stump vein at base of R₄ not reaching base of R₂₊₃; male terminalia parallel with

longitudinal axis of the body; gonostylus situated on proximal portion of gonocoxite; hypandrium well-developed, approximately 0.5× the length of epandrium; apex of aedeagus with 3 thin prongs, approximately as long as the flagellum ([postpedicel sensu Stuckenberg, 1999](#)), with dilations near apex; prongs tapered after dilations; female terminalia with tergite VII pruinescence, except on shiny posterior margin; segment VIII shiny; sternite VIII basally platelike and hypogynial valves forming keel distally; ovipositor conical, not laterally compressed, not longer than abdominal segments VI and VII together; ovipositor without apical spur.

Remarks. The grammatical genus of *Triorla* is feminine. This affirmation is based on the specific epithet of the type-species, *T. interrupta*. [Parks \(1968\)](#) did not address this point in the original description of the genus.

Two species, previously transferred to *Triorla* by [Tomasovic \(2002\)](#), *Erax tibialis* [Macquart](#) and *Erax vicinus* [Macquart](#), are not included in the list of recognized species in the Catalogue of Neotropical Asilidae prepared by [Papavero \(2009\)](#). We agree with this view as [Tomasovic's](#) illustrations of their male terminalia make it unlikely that they are *Triorla* species.

Key to the males of *Triorla* Parks from Nearctic and Neotropical regions

1.	Gonostyle with long spur-like macrosetae (see Tomasovic, 2002: 80, Fig. 17b)	<i>T. spinosa</i> Tomasovic
1'	Gonostyle with diminute setae (Figs. 19, 27, 43, 51, 57)	2
2(1)	Epandrium, in lateral view, divided in two projections, format of V shaped (see Tomasovic, 2002: 65, Fig. 2a)	<i>T. ambigua</i> (Macquart)
2'	Epandrium, in lateral view, not V-shaped (Figs. 21, 29, 36, 40, 53, 59)	3
3(2)	Distal region of epandrium with 3 projections	4
3'	Distal region of epandrium with at most 2 projections (Figs. 21, 29, 36, 40, 53, 59)	6
4(3)	Median projection of epandrium larger than lateral ones (see Tomasovic, 2002: 75, Fig. 12a)	<i>T. rubidiventris</i> (Macquart)
4'	Median projection of epandrium smaller than lateral ones	5
5(4)	Posteroventral projection of epandrium with abruptly acute apex; median projection situated on internal margin of epandrium (see Tomasovic, 2002: 66, Fig. 3a)	<i>T. argyrogaster</i> (Macquart)
5'	Posteroventral projection of epandrium elongated with truncated apex; median projection situated on external margin of epandrium (see Tomasovic, 2002: 73, Fig. 10a)	<i>T. nervosa</i> (Macquart)
6(3)	Median-apical region of dorsal margin of epandrium strongly angled downwards (Figs. 21, 53, 59)	7
6'	Median-apical region of dorsal margin of epandrium straight (Fig. 40)	10
7(6)	Proximal region of hypandrium rounded (Figs. 24, 50)	8
7'	Proximal region of hypandrium more or less straight (Figs. 18, 56)	9
8(7)	Distal region of hypandrium with median projection (Fig. 50)	<i>T. paraensis</i> sp. nov.
8'	Distal region of hypandrium without median projection (Fig. 24)	<i>T. beckeri</i> sp. nov.
9(7)	Hypandrium subtriangular with median-apical spatulate projection (Fig. 56)	<i>T. spatulata</i> sp. nov.
9'	Hypandrium pentagonal with apex of median-apical rounded projection (Fig. 18)	<i>T. parastricola</i> Pamplona and Aires
10(6)	Posteroventral margin of epandrium with distinctly elongated projection	<i>T. interrupta</i> (Macquart)
10'	Posteroventral margin of epandrium without projection (Figs. 36, 40)	11
11(10)	Distal margin of epandrium truncated in lateral view (see Tomasovic, 2002: 81, Fig. 18a)	<i>T. trichina</i> Tomasovic
11'	Distal margin of epandrium rounded in lateral view (Figs. 36, 40)	12
12(11)	Ejaculatory apodeme with concentric rows of diminute spines	<i>T. striola</i> (Fabricius)
12'	Ejaculatory apodeme without concentric rows of spinules	13
13(12)	Distal margin of gonocoxite pointed, ventral margin curved (Fig. 43)	<i>T. milineae</i> sp. nov.
13'	Distal margin of gonocoxite truncated, ventral margin straight (see Tomasovic, 2002: 69, Fig. 6b)	<i>T. demifasciata</i> (Macquart)

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