

SHORT COMMUNICATIONS

**OCCURRENCE OF *TIGRIAGRION AURANTINIGRUM*
(CALVERT) IN PARAGUAY AND NEW SITES IN BRAZIL
(ZYGOPTERA: COENAGRIONIDAE)**

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The sp., formally known from only Chapada, Brazil, has now been reported at other sites and 2 other countries from South America (Bolivia, Paraguay). Some additional characters including penis structure in the ♂ and the prothoracic hind lobe, mesostigmal plates and caudal appendages of the ♀ are described and illustrated.

INTRODUCTION

Many Coenagrionidae from South America are inadequately or, worse, incorrectly described and illustrated. This and the concurrent lack of knowledge of the distribution of many of these species hampers an analysis on affinities with other genera and species. *Tigriagrion* is a small monotypic coenagrionid genus described from Brazil. The original description (CALVERT, 1909) was based on material from "Brazil, Chapada, by H.H. Smith, 4 ♂ and parts of 5 ♂, 1 ♀ numbered 43 by the collector, one male dated May. Carnegie Museum, Pittsburgh". Several sites in Brazil are named "Chapada". We are sure that the type locality for this species refers to Chapada dos Guimarães in Mato Grosso State, central-west Brazil: H.H. Smith collected many Odonata at the same site, and our museum has specimens of *Tigriagrion* collected at Chapada dos Guimarães by Newton Dias dos Santos and L.F.R. Netto.

Our specimens from Paraguay differed enough from CALVERT's (1909) original description for us to consider describing them as a new subspecies. However, new material kindly sent to us from Frederico Lencioni showed this species to be variable.

Here we add new records for the species from central-West (Goiás), central East (Rondônia) regions, from southern Brazil (São Paulo and Minas Gerais), Paraguay,

and Bolivia. We also supplement the description of CALVERT (1909), illustrate general body coloration, structure of the penis, and female caudal appendages.

TIGRIAGRION AURANTINIGRUM CALVERT, 1909

Figures 1-36

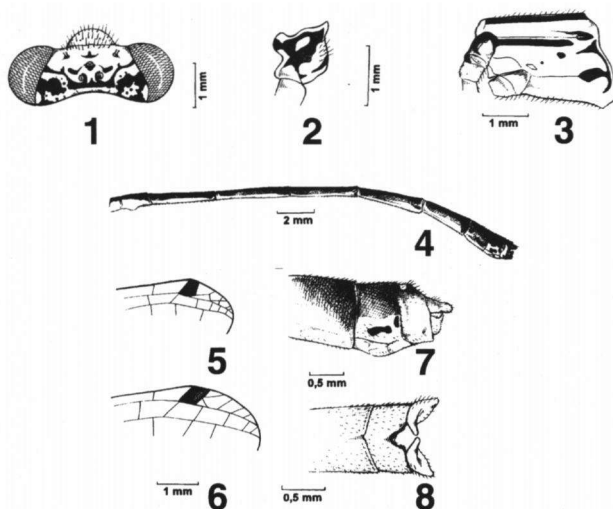
Material.—BRAZIL, 6 ♂, Rondônia, Fazenda Rancho Grande, 62 km SW Ariquemes, 10°50'S, 63°7'W, 187 m, 2-11-XI-1989, R.W. Garrison leg.;—1 ♂, Rio de Janeiro, Valença, Represa do Mocambo, 27-IX-1998, B. Mascarehas leg.;—4 ♂, 1 ♀, São Paulo, Lins, Estrada Marechal Rondon, ca 6 km from Lins, 6-X-1985, N.D. Santos, L.F.R. Netto & J.R. Pujol-Luz leg.;—1 ♂, Promissão, rio entre Lins e Promissão, 6-X-1985, N.D. Santos, L.F.R. Netto & J.R. Pujol-Luz leg.;—1 ♂, Pirassununga, 13-III-1985, N.D. Santos leg.;—5 ♂, Teodoro Sampaio, Morro do Diabo, 13-X-1985, N.D. Santos, L.F.R. Netto & J.R. Pujol-Luz leg.;—1 ♂, Jacaré, Fazenda Santana do Rio Abaixo, 18-I-1996, F.A.A. Lencioni leg.;—1 ♂, Jacaré, Fazenda Santana do Rio Abaixo, 10-XI-1996, F.A.A. Lencioni leg.;—1 ♂, 2 ♀, Jacaré, Fazenda Santana do Rio Abaixo, 9-XI-1996, F.A.A. Lencioni leg.;—1 ♂, Campo Grande, 13-VII-1996, F.A.A. Lencioni leg.;—2 ♂, 24-II-1996, F.A.A. Lencioni leg.;—2 ♂, Brotas, 19-II-1998, F.A.A. Lencioni leg.;—1 ♂, 1 ♀, Brotas, 30-XII-1997, F.A.A. Lencioni leg.;—5 ♂, Ilha Seca, 18/26-II-1940, Com. IOC leg.;—15 ♂, Ribeirão de São Vicente, 15-XII-1948, N.D. Santos & J.P. Machado leg.;—1 ♂, Rio Claro, without data;—3 ♂, Goiás, Planaltina, Rio Mestre D'Armas, 16-II-1981, N.D. Santos, L.F.R. Netto & H. Mesquita leg.;—4 ♂, 1 ♀, Planaltina, Rio Bartolomeu, 26-IX-1971, N.D. Santos & J.P. Machado;—1 ♂, Buriú Alegre, 15-XII-1975, J. Silva leg.;—1 ♂, Mato Grosso, Chapada dos Guimarães, Rio Catipozinho, 26-X-1983, N.D. Santos leg.;—4 ♂, 13-IV-1963, N.D. Santos & J.P. Machado leg.;—1 ♂, Acorizal, Rio Bauas, 21-VII-1983, L.F.R. Netto leg.;—3 ♂, Sierra da Bodoquena, XII-1941, COM. IOC leg.;—1 ♂, Minas Gerais, Jaíba, Mocambinho, Dreno Jaíba, 11-X-1997, T.C. Santos, A.M. Telles & C.A. Raposo leg.;—2 ♂, Jaíba, Mocambinho, Dreno Jaíba, 31-III-1998, T.C. Santos, A.M. Telles & C.A. Raposo leg.;—3 ♂, Corinto, Córrego no campo, X-1979, N.D. Santos leg.;—5 ♂, Lagoa Santa, estrada para Lavrinhas, 10-IV-1979, N.D. Santos, J.M. Costa & J.P. Machado leg. — PARAGUAY, —2 ♂, ca 60-70 km from Assuncíon, rio em campo aberto, 9-II-1983, N.D. Santos, J.M. Costa & L.F.R. Netto leg.;—2 ♂, river, near Parque Guaiáqui, 9-II-1983, N.D. Santos, J.M. Costa & L.F.R. Netto leg. — BOLIVIA, —1 ♂, Santa Cruz Dept., Prov. Ichilo, Rio San Miguelito, 14 km E Buena Vista, 21-III-1960, R.B. Cumming leg.

MALE. — Coloration variable within specimens from same and different sites; dark transverse line on the fronto-nasal area, broad in specimens from Goiás or sometimes vestigial; narrow dark ring encircling each ocellus complete (Fig. 11) or incomplete (Fig. 1); two small spots on labrum pronounced; orange spot on side of prothoracic lobe small in some specimens (Figs 2, 12).

Femora striped with black; tibiae and tarsi black; 6-8 spines on outer row of third tibia.

Wings hyaline, pterostigma brownish yellow, surmounting less than one cell, distal edge distinctly convex and forming a much less acute costal angle than proximal side; pterostigma of hindwing larger, its costal edge shorter than proximal side; pterostigmata on both wings with costal edges varying from longer to shorter than proximal or distal edge (Figs 5, 6, 15, 16, 25-34). Anal vein originating from hind margin of wings, proximal to cubitoanal crossvein in specimens from Mato Grosso, Paraguay and some from São Paulo. Forewings with 8-9 postnodals and 6-8 in the hindwings; M_4 on hindwing arising at fourth postnodal, nearest fourth or nearest fifth postnodal.

Dorsum of abdominal segments 1-10 orange with black dorsally (Figs 4, 14); black widening on side at apices on segments 3-8; a narrow transverse basal ring on 3-7 or 3-8; a distinct yellow middorsal spot on segments 9 and 10; lateral side and ventral surface of abdominal segments orange in life. Posterior margin of segment 10 dorsally with a small semi-circular non-elevated middorsal excision.



Figs 1-8. *Tigriagrion aurantinigrum*, ♂ from Paraguay: (1) head, dorsal view; — (2) prothorax, lateral view; — (3) thorax, lateral view; — (4) abdomen, lateral view; — (5) pterostigma in forewing, anomalous; — (6) same, in hindwing, anomalous; — (7) terminal segments and appendages, lateral view; — (8) same, dorsal view.

Cerci shorter than segment 10 (Figs 7, 19), blackish, in dorsal view divergent, narrower at obtuse apex than at base (Fig. 21); paraproct in lateral view twice as thick at base as distal half; apical half attenuate, directed dorsally, slightly recurved and hooked at extreme apex, extending to 3/5 length of cercus (Figs 7, 19).

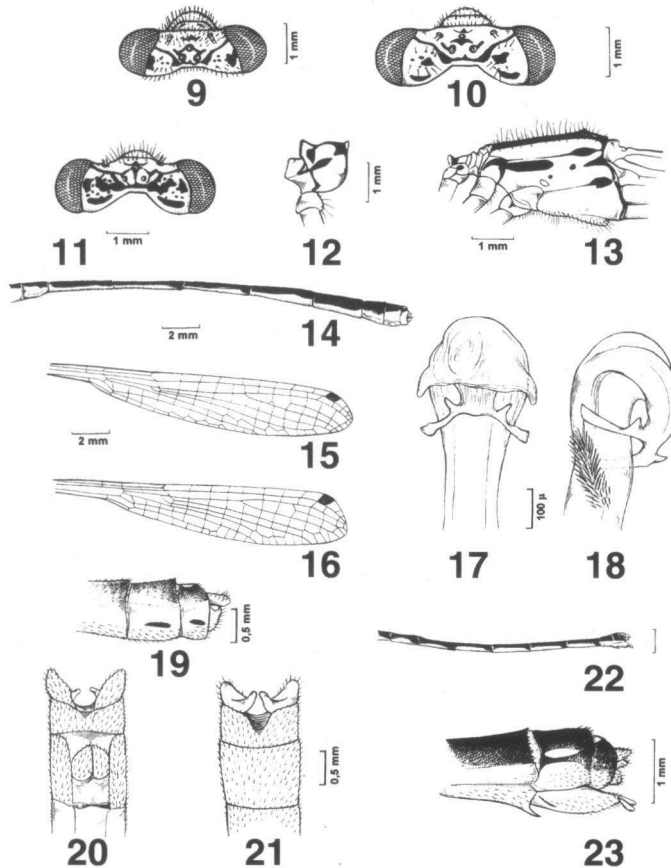
Penis with third segment distally expanded and prolonged on each side, with two lobes; inner margin of second segment with protuberance; lateral side of second segment with numerous small spines (Fig. 17).

Measurements (in mm). — Total length 25.0-28.0; thoracic thickness 2.0-2.5.

FEMALE. — Similar to male; prothorax with middle lobe lacking anteriorly directed protuberances (as in most *Telebasis*), hind lobe simple, slightly erect, sinuous with medial part slightly produced posteriorly; medially with a small convex ridge just below posterior margin of prothorax; mesostigmal plate mostly planar, roundly rectangular; synthorax with no mesepisternal fosse (Figs 35, 36); cerci slightly divergent; vulvar spine present.

DISCUSSION

The original description of *T. aurantinigrum* is extensive, but CALVERT's illustration of the appendages in lateral view (1909, pl. 5, fig. 105) shows the paraproct as long as the cercus. CALVERT (1909: 196) describes the paraproct as



Figs 9-23. *Tigriagrion aurantinigrum* from Chapada dos Guimarães, Mato Grosso, Brazil [Figs 9, 10-21: ♂, – Figs 10, 22-23: ♀]: (9-11) head, dorsal view; – (12) prothorax, lateral view; – (13) thorax, lateral view; – (14) abdomen, lateral view; – (15) forewing; – (16) hindwing; – (17) penis, ventral view; – (18) same, lateral view; – (19) terminal segments and appendages, lateral view; – (20) same, ventral view; – (21) same, dorsal view; – (22) abdomen, lateral view; – (23) terminal segments and appendages, dorsal view.

reaching “... to the level of three-fifths of the length of the superiors ...”, which is confirmed in this paper. The superior appendages are divergent. The mesostigmal plates and abdominal segments 7-10 of the female were not described by CALVERT (1909). The ninth segment has a vulvar spine. The coloration in males is variable. We observed no variation in penis structure.

The principal differences among the specimens from Brazil and Paraguay are given in Table I.

The differences observed among the examples from Brazil and Paraguay are not enough to consider those from Paraguay a new subspecies. Character variability is

Table I
Principal differences among *Tigriagrion aurantinigrum* specimens from Brazil and Paraguay

Characters	Brazil	Paraguay
Total length (mm)	25.0-27.0	28.0
Thickness of thorax (mm)	2.0	2.4
Dorsum of abdominal segment 9	with or without spot	without spot
Black ring on abdominal intersegmental articulation	segments 3-7 (CALVERT, 1909 cites 3-5)	segments 3-8
Black spot on median lobe of prothorax	small to large	large
Origin of arculus on hindwing	at base, proximal or slightly distal of 2 nd antenodal	at base of 2 nd antenodal
Peciolation	at or slightly beyond Cu ₁	beyond Cu ₁
Margin of forewing at stigma	slightly expanded	greatly expanded
M ₂ , hindwing	at base or proximal to 4 th postnodal	proximal to 4 th postnodal
Postnodals, forewing	8-9	8
Postnodal, hindwing	6-8	7
Posterior tibiae	7-8 spines	6 spines

common to specimens from Brazil and Paraguay. It is necessary to analyze a longer series to evaluate interpopulational differences.

The genus *Tigriagrion* may be characterized by the following:

- (1) Head orange with black spots, which vary in shape according to maturity; frons angular
- (2) Spot of ocellar area not reaching antennae
- (3) Thorax orange with black stripes
- (4) Without true postocular spot
- (5) Arculus arising at base, proximal to base or slightly distal of second antenodal
- (6) Wings petiolate as far as or beyond Cu₁
- (7) Pterostigma with costal angle smaller than proximal angle in both wings
- (8) Cu₁ more proximal to first than second antenodal
- (9) Cu₁ and Cu₂ not reaching level of M_{1a} or M₂ respectively
- (10) M₂ in hind wing arising nearest 4th postnodal, in fore wing distal from 4th, proximal of 5th or at base of these
- (11) Margin of wings near pterostigma expanded or slightly expanded
- (12) Spine on posterior tibia slightly smaller, the same length or slightly longer than space between spines
- (13) Tarsal claw with small supplementary tooth
- (14) Abdomen without ventral process, dorsum of segments 1-10 orange and with black dorsally
- (15) Penis with third segment distally expanded and prolonged on each side, with two lobes; inner margin of second segment with a protuberance; lateral side of second segment with numerous small spines
- (16) Cerci males not unbranched, without tubercles
- (17) Posterior margin of segment 10 not elevated dorsally
- (18) Female with vulvar spine on segment 8
- (19) Genital valve almost reaching apex of segment 10
- (20) Species small and slender
- (21) Coloration of young different from adults

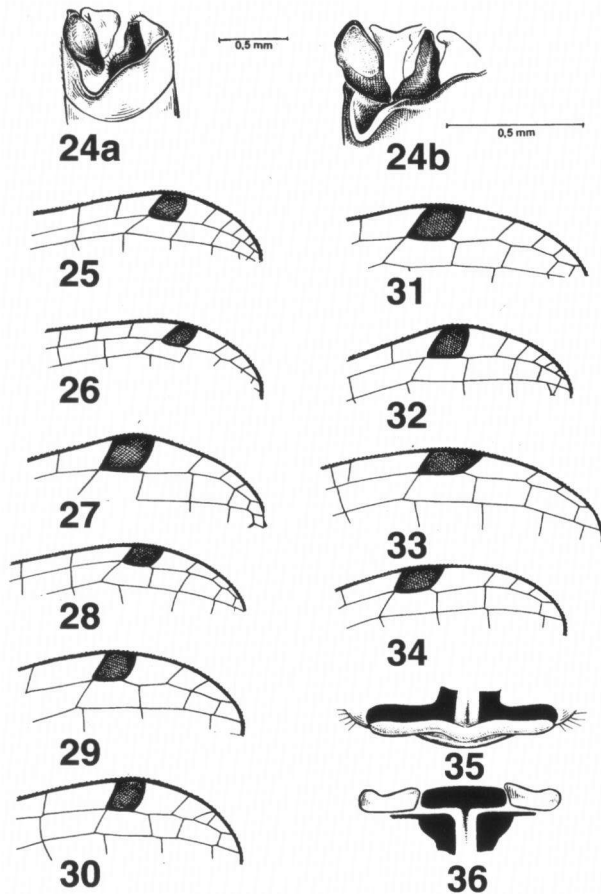
We agree with CALVERT (1909) that *Telebasis* is the nearest ally of *Tigriagrion*.

However, *Tigriagrion* is distinguished from *Telebasis* by the following characters: (1) Cu_1 and Cu_2 not reaching level of M_{1a} or M_2 respectively; - (2) abdominal segments 1-10 orange with black dorsally; and - (3) female with a vulvar spine on segment 8.

Among the characters cited above, numbers 4, 14, 15, 17 and 18 are common to *Telebasis*; numbers 6, 7, and 13 are shared by some, but not all, species of *Telebasis*.

BICK & BICK (1995), in their revision of the genus *Telebasis*, characterize the genus and questioned the validity of *Helvaciagrion* Machado. According to BICK & BICK, the three species currently included in *Helvaciagrion* (*H. chiririhuanum* (Calvert, 1909), *H. simularcnum* (Calvert, 1909), and the type of the genus, *H. vulcanoae* Machado, 1980) could easily be placed in *Telebasis*;

a position corroborated by Dr R.W. Garrison (pers. comm.). At present we prefer to consider *Helvaciagrion* and *Telebasis* distinct and offer the following couplet to allow for their discrimination:



Figs 24-36. *Tigriagrion aurantinigrum* Calvert (São Paulo, Brazil and Paraguay): (24a) paraprocts and cerci, posteromedial view, ♂ from Brotas, SP; - (24b) same, ♂ from Jacareí, SP, redrawn from illustration by R.W. Garrison; - (25) pterostigma in forewing, ♂ from Brotas, SP; - (26) same, in hindwing, ♂ from Brotas, SP; - (27) same, in forewing, ♂ from Jacareí, SP; - (28) same, in hindwing, ♂ from Jacareí, SP; - (29) same, in forewing, ♂ from Paraguay; - (30) same, in hindwing, ♂ from Paraguay; - (31) same, in forewing, ♀ from Brotas, SP; - (32) same, in hindwing, ♀ from Brotas, SP; - (33) same, in forewing, ♀ from Jacareí, SP; - (34) same, in hindwing, ♀ from Jacareí, SP; - (35-36) prothorax and synthorax, ♀ from Jacareí, SP. - [Figs 25-36 not to scale]

- 1 Overall body coloration primarily red, Cu_1 reaching or surpassing level of M_{1a} in hindwing and sometimes in forewing; cerci in male usually not approximate; widespread from southern United States through northern Argentina *Telebasis*
- Overall body coloration primarily blue, Cu_1 not reaching level of M_{1a} in both wings; cerci in male approximate; Venezuela south through Brazil and Bolivia *Helvaciagrion*

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