

**ERPETOGOMPHUS ERICI SPEC. NOV. FROM MEXICO,
AND A DESCRIPTION OF THE MALE OF
E. AGKISTRODON GARRISON
(ANISOPTERA: GOMPHIDAE)**

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Received November 25, 1998 / Reviewed and Accepted December 12, 1998

E. erici is described and figured from: El Muro, km 16 Rte 131, Altotonga-Tlapacoyan, Veracruz State, Mexico, and from Pemuxtitla, Rio Zacuala, and Molango, Laguna de Atezca (stream), both in Hidalgo State, Mexico. The allotype ♂ of *E. agkistrodon* is described and illustrated from: Coatepec, Rio La Marina, Veracruz State, Mexico. Both are most closely related to *E. schausi* Calvert, but differ in details of the appendages and occiput.

INTRODUCTION

The new world genus *Erpetogomphus* was revised by GARRISON in 1994. He described six new species, one of them based upon one female only (*E. agkistrodon*), bringing the total known species to 21. We describe *Erpetogomphus erici* and the previously unknown male of *E. agkistrodon*. The description of *E. erici* is based on three fully mature males and four teneral: two males and two females; the description of male *E. agkistrodon* on six teneral specimens. All tenerals were reared from larvae and adults kept alive until they died five days later. Two individuals of *E. agkistrodon* were then injected and preserved with acetone, while the others were preserved in 80% ethanol. The types are deposited in the entomological collection of the Instituto de Ecología, A.C. Xalapa, Mexico (IEXA). Descriptions, abbreviations and illustrations follow that of GARRISON (1994).

ERPETOGOMPHUS ERICI NOVELO SP. NOV.

Figures 1, 3, 5, 8, 10, 13, 15, 17, 18, 20, 21

Material. — **Holotype** ♂, MEXICO: Veracruz State, El Muro, km 16 Rte 131, Altotonga-Tlapacoyan, cloud forest, 17-VIII-1996, 1100 m (R. Novelo). — **Allotype** ♀, (teneral, alcoholic), MEXICO: Hidalgo State, Pemuxtitla, Río Zacuala, cloud forest, 8-IV-1994, 1000 m (R. Novelo, as last instar larva; emerged 18-IV-1994). — **Paratypes**: (4 ♂, 1 ♀), MEXICO: Hidalgo, Molango, Laguna de Atezca (stream), 12-II-1994, 1450 m (R. Novelo, 1 ♂, as last instar larva; emerged 4-IV-1994); Pemuxtitla, Río Zacuala, 8-IV-1994, 1000 m (R. Novelo, 2 ♂, 1 ♀, as last instar larvae; emerged (♂) 27 and 29-IV-1994, (♀) 10-V-1994); Veracruz, El Muro, km 16 Rte 131, Altotonga-Tlapacoyan, 17-VIII-1996, 1100 m (R. Novelo), 2 ♂.

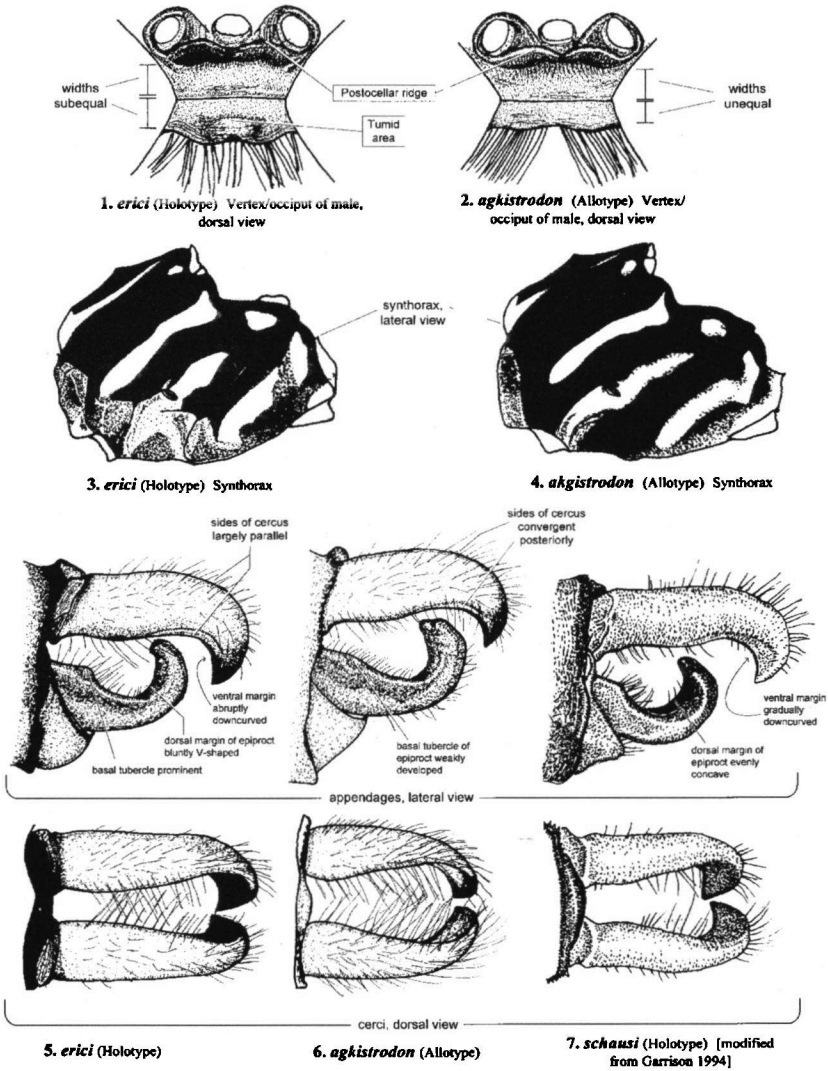
Ety m o l o g y. — This species is dedicated to the senior author's son, E r i c.

Coloration when alive: dark areas dark brown, pale areas emerald green and turquoise blue; pale areas becoming light yellow when acetoned.

MALE (Holotype), acetoned. — **H e a d.** — Labium gray medially, apex dark brown, creamy at sides; labrum mostly pale, anterior border and basal 0.40 dark; base of mandible pale, anteclypeus mostly gray, paler at sides; postclypeus brown with three pale spots, one on each side and a smaller one at center; genae dark brown; antefrons brown, connecting with brown of postclypeus, postfrons pale with a large transverse furrow at base of postfrons, this area with a pair of shallow pits, each anterolateral to median ocellus, base of antefrons with a slight longitudinal raised area with a slight concavity on each side; antennae, vertex and occiput dark brown; transverse postocellar ridge complete (Fig. 1), slightly concave medially, with some scattered, long brown hairs; occiput tumid medially, its posterior margin black, slightly raised and slightly undulate, with long black hairs; length of occiput equal to the post-transverse ridge surface of vertex; rear of head dark brown.

T h o r a x. — Prothorax mostly light brown with pale as follows: anterior half of anterior lobe and two large areas, at each side of median lobe; posterior lobe dark brown; synthorax (Fig. 3) with dark brown thoracic stripes well developed on pale background; rectangular middorsal stripe interrupting inverted pale "7" at base, upper end of middorsal stripe connecting with antehumeral and humeral stripes, thus leaving only pale spot below antealar sinus and small pale streak below; second lateral stripe connecting with humeral and third lateral stripe only above, just below the antealar sinus, this stripe also connecting with third lateral at upper 0.50, thus isolating a pale spot; metaspiracle black; a dark brown stripe on posterior margin of metepisternum; metasternum gray. Coxae, trochanters grayish white with slight wash of brown, femora light brown, becoming darker apically and on internal surface; tibiae, tarsi and armature black, claws dark red brown.

Wings hyaline, with a light, uniform, amber tint; venation and pterostigma black. Venational details. Fifth antenodal thickened in all wings; number of marginal cells behind fore wing paranal cells: 1/1; antenodals (anx): fore wing 14/15, hind wing 10/11; postnodals (pnx): fore wing 12/12, hind wing 11/12; crossveins (cs) under



pterostigma (pt): fore wing 4/4, hind wing 4/4; anal triangular cells 3/3. Hind wing 28 mm.

A b d o m e n (Fig. 8). – Predominantly dark brown with a narrow blue-green stripe along dorsum of segments 2-3, on segments 4-6 this stripe only on basal 0.50, then forming a mere line on segments 4-5; basal 0.50 of segment 7 pale; broad brown midlateral stripe on segment 2 extending ventrally encircling pale auricle, and a subquadrate pale spot at distal 0.80, this brown midlateral stripe

becoming darker on segment 3 and more extensive posteriorly thus encircling small pale anterolateral spots; segment 8 mostly dark except for a pale anterolateral spot on each side; segments 9-10 entirely dark. Ventral carina on segment 2 with one black denticle on either side. Abdomen (including appendages) 33 mm.

Cercus (Fig. 5) mostly pale, tip black, in lateral view basal 0.75 parallel-sided, then strongly curved ventrally at distal 0.25, ventral margin with a well developed carina only at distal 0.50; epiproct red brown, curved dorsally at distal 0.40, a rounded low tubercle at basal 0.20 of dorsal margin, in posterior view, tip (Fig. 10) strongly truncate with medial margin slightly concave before acute tip, distal margin straight.

Accessory genitalia: Hamules dark brown, becoming black apically; anterior hamule (Fig. 13) divided at apical 0.25, lower branch a well developed shoulder; posterior hamule roughly triangular, its tip with a spine; penis (Fig. 15) with well developed prepuce and cornuae, lateral lobe spinulate.

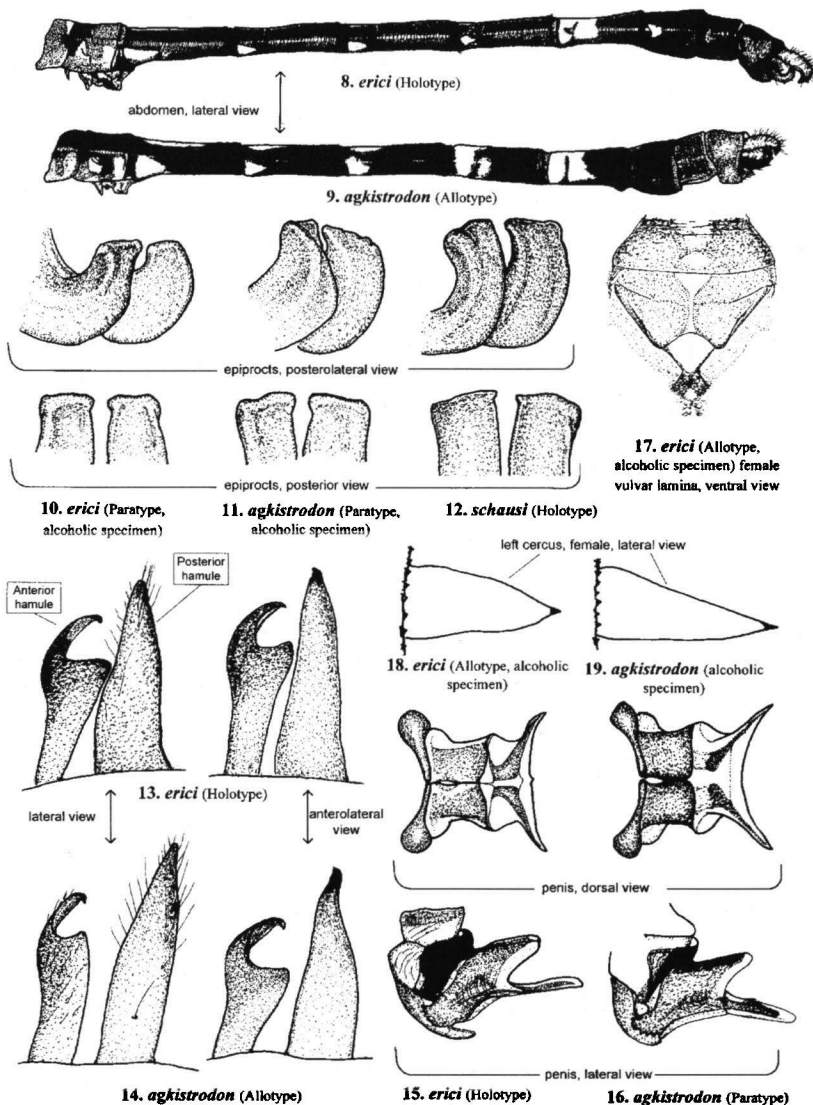
FEMALE (Allotype) teneral, alcoholic. — Similar to male with the following differences: Labium pale; occiput pale, reduced, 5 times wider than long, not tumid, its posterior margin convex medially. Femora gray at basal half; apical half of femora, tibiae and tarsi light brown; armature black. Wings hyaline, venation and preostigma light brown.

Venational details. — Fifth antenodal thickened in three wings, sixth antenodal thickened on left fore wing; number of marginal cells behind fore wing paranal cells: 3/3; anx: FW 15/15, HW 11/10; pnx: FW 12/13, HW 12/11; cs under preostigma: FW 5/5, HW 6/6. Hind wing 31.5 mm.

Abdomen as in holotype male except: pale coloration creamy; basal 0.40 of segment 7 pale; segment 8 mostly brown except for a pale basidorsal spot. Cercus (Figs. 18, 21) white with a dark tip, thicker, ending in a spine which is 0.18 the length of the cercus. Vulvar lamina as shown in Fig. 17. Abdomen 34 mm.

DIAGNOSIS. — *Erpetogomphus erici* is closely related to *E. schausi* and *E. agkistrodon*. These species possess a unique combination of characters of the penis and a gently decumbent cercus, as stated by GARRISON (1994). The closest relative of *E. erici* is *E. schausi* Calvert from which it can be distinguished only by slight but consistent details (characters of *E. schausi* in parentheses, as in CALVERT, 1919 and GARRISON, 1994): male occiput tumid medially [Fig. 1] (occiput not tumid); basal 0.75 of inferior margin of cercus slightly undulate then abruptly down curved almost at a right angle, apical 0.25 of this margin straight [Fig. 5] (basal 0.75 of inferior margin of cercus slightly undulate, then the apical 0.25 gradually decumbent [Fig. 7]); in lateral view, dorsal margin of epiproct bluntly V-shaped, its basal 0.20 straight and parallel to cercus, ending in a prominent tubercle (dorsal margin of epiproct evenly concave, its basal 0.20 not parallel to cercus but slightly slanting, ending in a less prominent tubercle); epiproct 0.80 length of cercus (0.75).

REMARKS. — The two male paratypes from El Muro, Veracruz State, have the posterior lobe of prothorax light brown. One paratype has irregular, dark brown



spots on pale areas of meso- and metapleura, which are probably due to postmortem changes. One paratype lacks the black denticle on the left side of ventral carina on segment 2. The female paratype (teneral alcoholic) is similar in maculation to allotype.

VENATIONAL VARIATIONS FOR PARATYPE MALES (n = 4). — One individual (Pemuxtla, Hidalgo State) with the sixth antenodal thickened in three wings, the

right fore wing with the fifth thickened; number of marginal cells behind fore wing paranal cells: 0-2/0-2; anx: FW 13-17/14-16, HW 10-12/10-13; pnx: FW 11-14/11-14, HW 11-15/12-14; cs under pt: FW 4-6/4-6, HW 4-6/4-6; anal triangular cells 3-4/3-4. Hind wing 28-29.5 mm. Abdomen 30.6-33.5 mm.

VENATIONAL VARIATIONS FOR PARATYPE FEMALE (n = 1). — Number of marginal cells behind fore wing paranal cells: 2/3; anx: FW 16/16, HW 12/12; pnx: FW 15/15, HW 14/14; cs under pterostigma: FW 6/6, HW 6/7. Hind wing 32 mm. Abdomen 34.4 mm.

BIOLOGY. — The fully mature males were collected between 1330-1500 h. at a small creek in the cloud forest. Each was seen and collected at the same place but only during short periods when the sun appeared for a few (e.g. 35-40) seconds followed by cloudy periods of several minutes.

DISTRIBUTION. — Known only from Hidalgo and Veracruz states in cloud forests from the Sierra Madre Oriental.

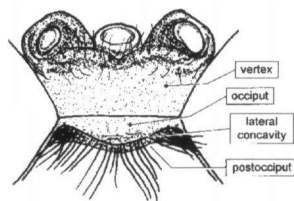
ERPETOGOMPHUS AGKISTRODON GARRISON

Figures 2, 4, 6, 9, 11, 14, 16, 22

Material. — **Allotype** ♂, MEXICO: Veracruz State, Coatepec, Rio La Marina, cloud forest, 8-IV-1995 (as ultimate larva); emerged 13-V-1995, alt. 1340 m (R. Novelo). — **Paratypes:** 5 ♂, same data as allotype; one of them preserved dry and acetoned, remainder in 80% ethanol.

Dark areas dark brown, pale areas from gray to light yellow.

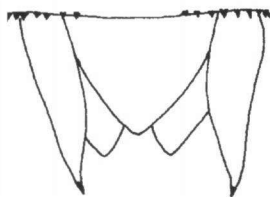
MALE (Allotype) acetoned. — **H e a d.** — Labium gray medially, apically light brown, creamy at sides; labrum mostly pale, anterior border and basal 0.50 light brown; base of mandible pale, anteclypeus gray, postclypeus brown with three pale spots, one to each side and smaller medial one; genae brown; antefrons brown, connecting with brown of postclypeus; postfrons pale, a large transverse furrow at



20. *erici* (Allotype female, alcoholic specimen)



21. *erici* (Allotype female, alcoholic specimen)



22. *agkistrodon* (female, alcoholic specimen)

base of postfrons, this area with a pair of shallow pits each anterolateral to median ocellus; the distal margin of postfrons with a slight longitudinal raised area with a slight concavity on each side; antennae and vertex dark brown; transverse postocellar ridge complete, emarginate medially (Fig. 2), with a dense brush of long hairs on each side of medial emargination; occiput light brown, its posterior margin black at sides, light brown medially, slightly raised and linear, fringed with long black hairs, occiput length shorter than the post-transverse ridge surface of vertex; rear of head dark brown.

T h o r a x. — As for *E. erici* but differing as follows: prothorax brown, sides of posterior lobe pale; synthorax (Fig. 4) with triangular middorsal stripe interrupting inverted pale “7” at base; metaspiracle brown. Coxae and trochanters gray; femora brown becoming darker apically, internal surface gray; tibiae and tarsi red-brown, armature black.

Wings hyaline, with a light amber tint; venation black, pterostigma brown.

Venational details: Sixth antenodal thickened on left wings, fifth antenodal thickened on right wings; number of marginal cells behind fore wing paranal cells: 1/2; anx: FW 15/14, HW 11/10; pnx: FW 14/14, HW 13/14; cs under pt: FW 4/5, HW 4/4; anal triangular cells 3/3. Hind wing 28 mm.

A b d o m e n (Fig. 9). — As for *E. erici* but differing as follows: segments 9-10 entirely light brown. Ventral carinae on segment 2 with 3-4 black denticles. Abdomen (including appendages) 32 mm.

Cercus (Fig. 6) as for *E. erici* but differing as follows: in lateral view basal 0.50 parallel-sided, then gradually converging on remaining decurved portion, ventral margin with a well developed carina at distal 0.65; epiproct (Fig. 6) brown, distal 0.40 gently curved dorsally, tip of epiproct viewed posteriorly with internal and external margins ending in small rounded tubercles, same structure in lateroposterior view with apical margin slightly notched medially (Fig. 11).

Accessory genitalia. Accessory genitalia as for *E. erici* but with anterior hamule thicker and more robust (Fig. 14); penis as in Fig. 16.

DIAGNOSIS. — Male of *E. agkistrodon* is distinguishable from *E. erici* (features of this species in parentheses) by: occiput with no tumid central area, 3-4 times wider than long, its length shorter than the post-transversal ridge of vertex [Fig. 2] (with a tumid central area, 2 times wider than long, its length equal to post-transversal ridge surface of vertex [Fig. 1]); usually sixth antenodal crossvein thickened (fifth); in lateral view, basal 0.50 of cercus parallel-sided, then gradually converging, inferior margin gently decurved (basal 0.75 of cercus parallel-sided, inferior margin strongly decurved); in lateroposterior view [Fig. 11], tips of epiproct with apical margins slightly notched medially (straight [Fig. 10]).

VENATIONAL VARIATIONS FOR PARATYPE MALES (n = 5). — Number of marginal cells behind fore wing paranal cells: 1-4/1-3; anx: FW 14-17/14-17, HW 11-13/12-13; pnx: FW 11-14/12-13, HW 12-14/12-14; cs under pt: FW 5-5/3-5, HW 4-5/4-5; anal triangular cells 3-4/3-4.

Hind wing 29-29.5 mm. Abdomen 31 mm.

FEMALE. — One freshly emerged female differs only slightly from the holotype female described by GARRISON (1994), by having the postocellar ridge slightly less emarginate than his fig. 148. Venational details. Sixth antenodal thickened in right fore wing and left hind wing, the fifth thickened in the remaining wings; number of marginal cells behind fore wing paranal cells: 3/3; anx: FW 16/16, HW 13/11; pnx: FW 14/13, HW 13/14; cs under pt: FW 5/5, HW 4/5.

REMARKS. — GARRISON (1994: 200) stated: "I suspect the male of *E. agkistrodon* will have a penis similar to that of *E. ophibolus* or *E. schausi*; it should have a prepuce and the lateral lobes should be small, semicircular and with or without spinules". The penis of *E. agkistrodon* is similar to those of *E. schausi* and *E. erici*, with prepuce and lateral lobes small, semicircular and with spinules. He also suggested that the thickened sixth antenodal probably was an anomaly of the holotype. However all individuals we examined show at least two wings with the sixth antenodal thickened. Distribution counts of second thickened antenodal are as follows: at seventh: one left FW; at sixth: five left FW, four right FW; six left HW, four right HW; at fifth: one left FW, three right FW; one left HW, three right HW.

THE KEYS to males and females for *Erpetogomphus* by GARRISON (1994) can be altered to include *E. erici* as follows:

Males

- 18(15) Thorax blue-green, with full complement of dark stripes, including second lateral stripe on posterior margin of metepimeron (GARRISON, 1994, fig. 6); face (GARRISON, 1994, fig. 142) predominantly dark, with a well defined blue green spot on frons 21
- 21(18) Occiput 3-4 times wider than long (Fig. 2), its length shorter than the post-transverse ridge surface of vertex; usually sixth antenodal crossvein thickened; Coatepec and Jalapa, Mexico *agkistrodon*
- Occiput 2 times wider than long, its length subequal to the post-transverse ridge surface of vertex (Fig. 1); usually fifth antenodal crossvein thickened 22
- 22(21) Cercus, in lateral view, twice thicker medially than its apical 0.25, its inferior margin roundly bent at a right angle on latter 0.25 (Fig. 5). Dorsal margin of epiproct, in lateral view, bluntly V-shaped, distance between its tips and its basal tubercle less than twice the distance between its dorsal and ventral margins, measured at middle; Tlapacoyan and Molango *erici*
- Cercus, in lateral view, less than twice thicker medially than its apical 0.25, its inferior margin roundly bent gradually on latter 0.25 (Fig. 7). Dorsal margin of epiproct, in lateral view, evenly concave, distance between its tips and its basal tubercle twice the distance between its dorsal and ventral margins, measured at middle; Guatemala, Costa Rica *schausi*

Females

- 7a(6) Occiput transversally narrow, forming a shallow semicircle (GARRISON, 1994, fig. 148); posterior margin of occiput straight to each side of the semicircle; Coatepec and Jalapa, Mexico *agkistrodon*
- Occiput wide, forming a moderate or full semicircle (Fig. 20; GARRISON, 1994, fig. 149); posterior margin of occiput concave lateral to semicircle 7b
- 7b(7a) Occiput a moderate semicircle (Fig. 20), 5 times wider than long; Tlapacoyan and Molango, Mexico *erici*

Occiput a full semicircle, 4 times wider than long (GARRISON, 1994, fig. 149); Guatemala, Costa Rica *schausi*

ACKNOWLEDGEMENT

We thank DON AZUMA of the Academy of Natural Sciences, Philadelphia, for the loan of the holotype of *Erpetogomphus schausi* Calvert.

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