

**LARVAE OF THE *OPHIBOLUS*-SPECIES GROUP
OF *ERPETOATOMPHUS* HAGEN IN SELYS
FROM MEXICO AND CENTRAL AMERICA
(ANISOPTERA: GOMPHIDAE)**

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Detailed descriptions and illustrations of *Erpetogomphus agkistrodon* Garrison, *E. erici* Novelo and *E. ophibolus* Calvert are provided and a comparison with other larvae of the subgenus *Erpetocyclops* Carle is also included. Larvae of *E. agkistrodon* and *E. erici* show the closest resemblance, while *E. ophibolus* is more similar to *E. constrictor*.

INTRODUCTION

Erpetogomphus includes 22 species, 17 of which occur in Mexico (GARRISON, 1994; NOVELO-GUTIERREZ & GARRISON, 1999). Larvae of seven species (32%) have been described: *Erpetogomphus compositus* Hagen in Selys, 1858 (HAGEN, 1885), *E. constrictor* Ris, 1917 (RAMIREZ, 1996), *E. crotalinus* (Hagen in Selys, 1854) (NOVELO-GUTIERREZ & GONZALEZ-SORIANO, 1991), *E. designatus* Hagen in Selys, 1858 (HAGEN, 1885), *E. lampropeltis natrix* Williamson & Williamson, 1930 (NEEDHAM & WESTFALL 1955 [keyed]; NOVELO-GUTIERREZ & GONZALEZ-SORIANO, 1991), *E. sabaleticus* Williamson, 1918 (BELLE, 1992) and *E. tristani* Calvert, 1912 (RAMIREZ, 1996). Of these, the first five occur in Mexico.

CARLE (1992) erected the subgenus *Erpetocyclops* with type species *E. ophibolus*. His diagnosis ("Metepimera each with posterior brown band; postocellar ridge and prepuce well developed; 4th penile segment slightly longer than wide; penile flagella lobate; male cerci each typically with laterally compressed dorsal process; female with anterior margin of median ocellus typically posterior to lateral

ocelli”), limited to a few key characters separating it from other subgenera, did not mention what other species, if any, were to be included, nor did he provide any synapomorphies for this taxon. GARRISON (1994) provided 7 synapomorphies to support a monophyletic grouping consisting of *E. ophibolus*, *E. constrictor*, *E. sabaleticis*, *E. tristani*, *E. agkistrodon*, and *E. schausi*. NOVELO & GARRISON (1999) added details of the poorly known *E. agkistrodon* as well as adding a new species, *E. erici* Novelo. GARRISON (1994) did not believe it was necessary to use *Erpetocyclops* for this clade but I am using it to include all seven species based on the synapomorphies described by GARRISON (1994) and analysis of the newly described larvae of *E. agkistrodon*, *E. erici* and *E. ophibolus*. Here, I describe three unknown larvae of the subgenus *Erpetocyclops* Carle: *E. agkistrodon* Garrison, *E. erici* Novelo, and *E. ophibolus* Calvert.

LARVAL DESCRIPTION OF THE GENUS

Larvae of *Erpetogomphus* are characterized as follows: Body thickset, moderately depressed, integument finely granulose, hairy at sides; coloration yellowish-brown to dark brown. Head longer than wide, third antennomere usually densely scaly and hairy, 2-5 times longer than its widest part; mandibles biramous, internal branches of right and left mandibles with 3-6 and 5-7 cuspids respectively; galeolaciniae with 7 robust moderately incurved hooks; articulation prementum-postmentum almost reaching the posterior margin of prosternum; prementum subquadrate, slightly longer than wide, ligula slightly prominent and with pilliform setae; labial palp short and thick, its distal margin rounded and the ventral one serrate, movable hook shorter than palp. Prothorax narrow, synthorax robust, pale or with dark bands, wing cases reaching basal half of abdominal segment 4; legs short (e.g. hind leg not surpassing abdominal segment 7), densely hairy. Abdomen flattened ventrally, convex dorsally, reaching its maximum width at level of segments 5-6, then narrowing caudad; lateral spines on segments 3-9, commonly 6-9, dorsal protuberances usually well developed on basal segments (e.g. 2-5) and blunt-tipped, those on caudal segments (6-9) well developed, rudimentary, vestigial or wanting, blunt-tipped or sharp-pointed. Sternite 8 divided into 3 or 5 plates; sutures on sternite 9 ending at or more laterad to the posterolateral angle. Caudal appendages usually of the same length, sharply-pointed. Male gonapophyses absent, female gonapophyses rudimentary.

Larvae of *Erpetogomphus* inhabit lotic environments, although they are usually found in sites with slow water flow; species such as *E. crotalinus* and *E. lampropeltis natrix* are frequently found among rough gravel in wide, shallow, open streams; *E. agkistrodon*, *E. erici* and *E. ophibolus* do prefer microhabitats such as sandy banks, mud or leave detritus. Emergence takes place usually at dusk.

METHODS

Correlation larva-imago was made in two ways: (1) rearing penultimate and/or ultimate instar larvae, and (2) searching for individuals at the time of emergence; only the larva of *E. ophibolus* is described by supposition, but it is assigned here with a high degree of confidence, because it is the only species of this subgenus recorded in the vicinity of the Biological Station of «Los Tuxtlas», Veracruz, during the last 20 years. Descriptions were made mainly upon last instar larval exuviae; illustrations were rendered using a stereomicroscope and camera lucida. Measurements, in mm, were made using an ocular micrometer (0.1-10 mm). Total length was measured from the anterior margin of labrum to the apices of caudal appendages; measurements of the abdomen and metafemora were made ventrally and along the dorsal margin, respectively. Abdominal lateral spines were measured dorsally, as shown in Figure 12. Terminology of setae follows CORBET (1953).

All material in Colección Entomológica del Instituto de Ecología, A.C. at Xalapa (IEXA) and duplicates, when available, in the Ken Tennessen collection (KT) in Alabama (USA).

ERPETO GOMPHUS AGKISTRODON GARRISON, 1994

Figures 1-11a

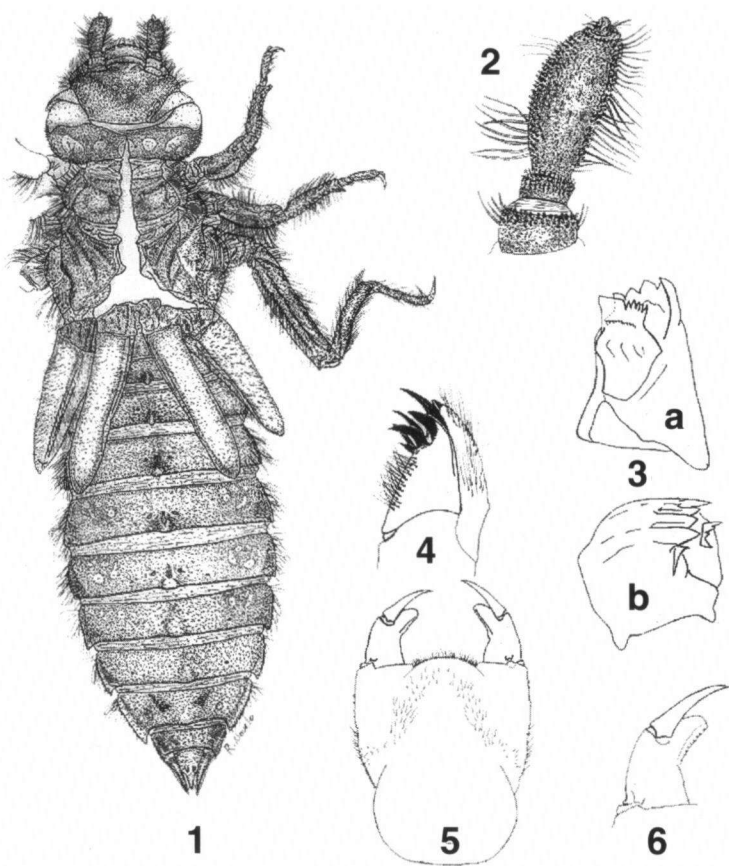
Material. — 12 exuviae last instar (7 ♂, 5 ♀ reared). MEXICO: Veracruz; Coatepec, Río Huehucyapan (1150 m asl), 4-VI-1994, 8-IV-1995, R. Novelo leg., deposited in IEXA and KT.

DESCRIPTION. — Larvae dark brown, exuviae yellow-brown to dark brown, body finely granulose, hairy at sides (Fig. 1).

Head. — Wider than long, densely covered with scale-like setae except the following areas: a central oval on labrum, the anteclypeus, two small subrectangular in front of anterior ocellus, and five areas on occiput, the three central circular-shaped, the two lateral suboval or nearly so; an obscure, transverse line running along anterior margins of lateral and median ocelli, except at middle part of median ocellus; posterior margin of occiput slightly concave, cephalic lobes bulging. Antennae densely scaly, third antennomere flattened dorsoventrally (Fig. 2), two times longer than its widest part, sides convex and covered with long stiff setae; fourth antennomere globose. Mandibles biramous (Fig. 3), external branch of right mandible with four stout, sharp cuspids, the ventral one with a small triangular cuspid at its base, internal branch with 3-4 (usually 3) cuspids, the dorsal one largest; external branch of left mandible with four stout cuspids, internal branch with 6-7 (usually 7) cuspids, the dorsal one notably largest. Maxillae covered with abundant, long, delicate setae; galeolaciniae (Fig. 4) with seven, robust, moderately incurved hooks, those of the dorsal row with the same length and robustness, the four of the ventral row of variable length and robustness, being the apical hook the strongest; palp short, hairy, ending in a small stout spine. Labium short, prementum-postmentum articulation almost reaching the posterior margin of prosternum; prementum subquadrate (Fig. 5), very slightly longer than wide, dorsal surface with abundant, delicate, whitish setae, arranged in a row on each side of the midline and converging at the ligula, lateral margins serrulate all the way, serrulations very

short and truncate; on ventral side, a transverse row of long delicate setae at base of ligula. Ligula slightly prominent and convex, its apical margin serrate with abundant pilliform setae. Palp short and thick (Fig. 6), its distal margin rounded, the internal one serrate; movable hook shorter than palp.

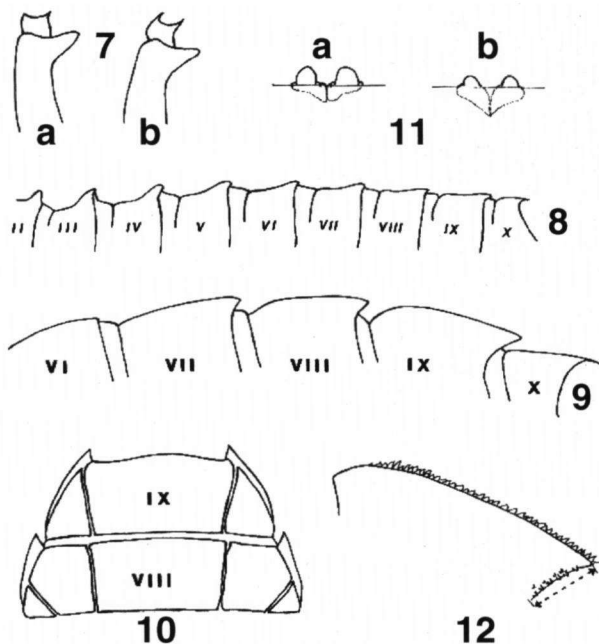
T h o r a x . — Prothorax narrow; sides of pronotum rounded, posterior margin widely rounded. Synthorax robust, with an obscure band on each pleural suture. Legs (Fig. 1) hairy and short (e.g.: hind leg, when fully extended, not surpassing abdominal segment 7), femora dark with an apical yellow ring on metafemora, tibiae and tarsi yellow; burrowing hooks moderately developed on first two pairs of tibiae (Fig. 7); setae on anterior (ventral) surface of metatibiae longer than the



Figs 1-6. Details of the morphology of *Erpetogomphus agkistrodon*: (1) male exuvia, dorsal view; — (2) left antenna, dorsal view; — (3) mandibles, a, internal view of left mandible; b, fronto-ventral view of right mandible; — (4) galeolacinia and palp, ventral view; — (5) dorsal view of prementum; — (6) left palp, dorsal view.

width of their external surface. Wing cases widely divergent, reaching basal half of abdominal segment four; with long, abundant, delicate setae on dorsal borders.

A b d o m e n . — Finely granulose, with a complex mottled pattern due to combined pigmented and bare areas (Fig. 1). Dorsal protuberances on abdominal segments 2-9, well developed on 2-4 or 2-5 but decreasing in height caudad, reduced on 5-6 and vestigial on 7-9 (Fig. 8). Lateral margins of 2-10 covered with abundant, small, close-set spinules which increase in number and size caudad, and with long, delicate, white setae on the whole margins of 2-7, and on basal 0.70 and 0.50 of 8 and 9 respectively. Lateral spines on 7-9 short and bluntly tipped, those on 9 the largest (Fig. 9). Posterior margins of tergites 2-9 with abundant, blunt, minute spinules which increase in size posteriorly; posterior margin on 10 smooth. Sternites 1-7 and 9 divided into 3 plates: two lateral and one central; sternite 8 divided into 5 plates as follows: a large, central, trapezoid plate, two lateral pentagonal plates, and two anterolateral subtriangular plates; these last the smallest, the central one the largest (Fig. 10); longitudinal suture of sternite 9 not ending at the posterolateral



Figs 7-12. Details of the morphology of *Erpetogomphus*. Figs 7-11a *E. agkistrodon*, 11b and 12 *E. erici*: (7) apical ends of right protibia (a) and mesotibia (b), dorsal view; — (8) left lateral view of abdominal segments 2-10; — (9) dorsal view of the right side of abdominal segments 6-10 showing the short and blunt lateral spines on 7-9; — (10) ventral view of sterna 8 and 9 showing the five sclerites on 8; — (11) female gonapophyses; — (12) lateral keel on abdominal segment 9, showing how the spines were measured.

angle of such sternite but more laterad (Fig. 10); posterior margin of sternite 10 smooth. Male gonapophyses absent, vestigial in the female (Fig. 11a). Caudal appendages: Epiproct yellow-brown, finely granulose, granules more abundant at apical 0.40, in the male there is a pair of black tubercles at basal 0.60, one to each side of the midline, tip of epiproct gently decurved ending in an acute spine. Cercus brown, sharply pointed, its external surface covered with minute spinules; internal margin slightly sinuated, tips gently downcurved. Paraproct pyramidal, brown at basal 0.60, remainder yellowish, external surface with a row of minute spinules which run from the base to the apex throughout the midline, its apex acute and straight. Tips of caudal appendages reddish. Size proportions: Epiproct 0.98, cercus 1.0, paraproct 1.0.

Measurements (mm). — Total length (TL) 23.4-23.7 (♂), 22.0-23.5 (♀); abdomen (ABD) 14.7-14.8 (♂), 14.4-14.9 (♀); hind femur (HF) 3.7-3.8 (♂), 3.6-3.8 (♀); maximum width of head (MWH) 4.8 (♂), 4.7-5.0 (♀); caudal appendages (CA) 1.4-1.5 (♂, ♀); lateral spines (LS) on abdominal segment 7, 0.2; on 8, 0.3; on 9, 0.4.

ECOLOGY. — Larvae were found in shaded parts of a rocky stream, inhabiting small sandy banks protected by big rocks and where the water flow was moderate. Mature larvae can be found only during March, April and May which indicates a marked seasonality in the imagoes' emergence. One specimen (♀) was captured at the time of emergence; this occurred at 1300 h. The female choose for her last molting, a long leaf of a plant growing at the edge of the stream, very close to the water surface, and in a sheltered site. Other specimens captured as last instar larvae emerged at laboratory from 1715 to 1840 h.

ERPETOGOMPHUS ERICI NOVELO, 1999

Figures 11b, 12

Material. — 9 exuviae last instar (6 ♂, 3 ♀ reared), 3 last instar larvae (♀), 1 penultimate instar larva (♀). MEXICO: Hidalgo State; Pemuxtitla, Río Zacuala (1000 m asl), 22-IV-1984, R. Novelo leg. (1 ♂, 2 ♀ last instar); 8-IV-1994, R. Novelo leg. (4 ♂ [emerged 27/29-IV-1994 and 5-V-1994], 3 ♀ [emerged 18-IV-1994 and 10-V-1994]); Molango, Laguna de Atezca (stream, 1400 m asl), 12-II-1994, R. Novelo leg. (1 ♂ [emerged 4-IV-1994]); Tlanchinol (1500 m asl), 11-II-1994, R. Novelo leg. (1 ♀). Veracruz State; Tlapacoyan, 27/28-III-1984, H. Velasco leg. (1 ♀).

DESCRIPTION. — Larva reddish-brown, exuviae yellow-brown. Extremely similar to *E. agkistrodon* except: internal branch of the right mandible with 4-5 cuspids (usually 5), internal branch of the left mandible with 5-6 cuspids (usually 5). Size proportions of caudal appendages: Epiproct 1.0, cercus 0.96, paraproct 0.92. Other features as described for *E. agkistrodon*.

Measurements (mm). — TL 21.5-23.5 (♂), 22.9-23.3 (♀); ABD 14.2-15 (♂), 14.6-14.9 (♀); HF 3.3-4.1 (♂), 3.5-4.0 (♀); MWH 4.7-4.9 (♂), 5.1-5.2 (♀); CA 1.3-1.6 (♂), 1.3-1.4 (♀); LS on 7, 0.15-0.20 (♂), 0.2-0.3 (♀); on 8, 0.25-0.30 (♂), 0.30-0.35 (♀); on 9, 0.4-0.5 (♂, ♀).

ERPETO GOMPHUS OPHIBOLUS CALVERT, 1905 (supposition)

Figures 13-19a

Material. — 3 larvae penultimate instar (2 ♂, 1 ♀), 10 young larvae (sex indetermined). MEXICO: Veracruz; Estación de Biología Tropical "Los Tuxtlas", arroyo de la Laguna Escondida, 24-V-1984, 19-VII-1992, R. Novelo leg., deposited in IEXA and KT.

DESCRIPTION. — Larvae yellow-brown to reddish-brown, dorsum of body finely scaly (Fig. 13a), hairy at sides, venter smooth.

Head. — As described for *E. agkistrodon* except: third antennomere claviform (Fig. 14), narrow at base and gradually widening at apex, reaching its widest part at basal 0.80, five times longer than its widest part; scaly, with some sparse setae; fourth antennomere a conical rudiment. Internal branch of right mandible with five cuspids (Fig. 15c). Prementum-postmentum articulation reaching posterior margin of procoxae.

Thorax. — As in *E. agkistrodon* except: synthorax with a small brown spot on upper end of each pleural suture. Legs more scaly than hairy; setae on anterior (ventral) surface of metatibiae as long as or shorter than the width of their external surface; femora reddish-yellow, tibiae and tarsi yellow; burrowing hooks on pro- and mesotibiae poorly developed (Fig. 16). Wing cases reaching the anterior margin of abdominal segment four, with two or three rows of scale-like setae on dorsal borders.

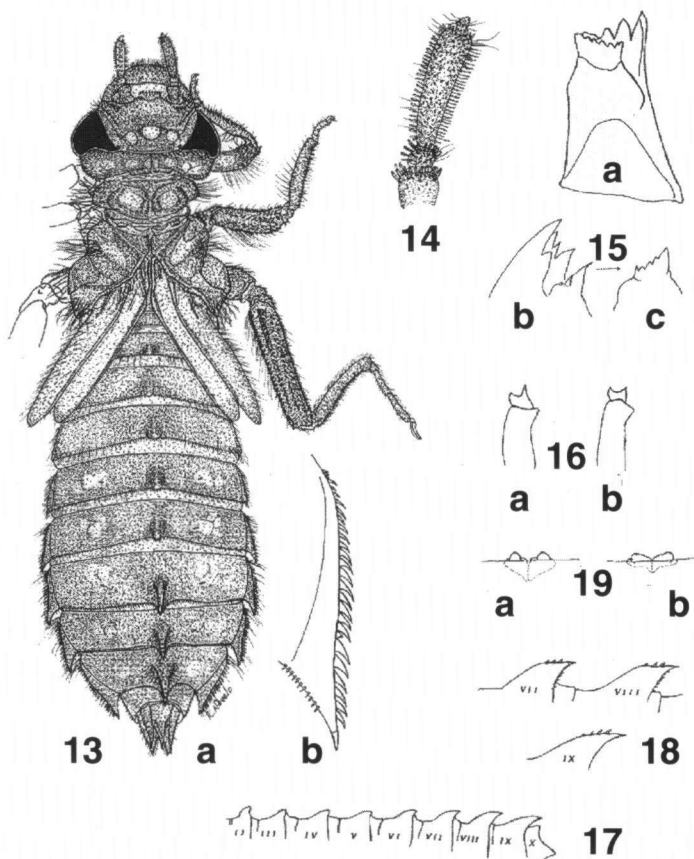
Abdomen. — Finely granulose. Dorsal protuberances well developed on abdominal segments 2-9 (Fig. 17), those on 2-6 blunt, decreasing in height caudad, those on 7-9 sharp, increasing in length and becoming more spiny rearwardly, and with a row of 3, 3 and 4 small spinules on their dorsal margin, respectively (see Fig. 18); lateral margins of 2-4 covered with abundant, short, close-set robust setae and spinules; lateral margins of 5-9 keeled, keels ending in a small spine on 5 and large ones on 6-9 (Fig. 13a), borders of keels beset with short, robust spinules which increase in length, robustness and sharpness rearwardly, 23-25 spinules on lateral keel of segment 9 (Fig. 13b); lateral margins of 10 with short, sharp, stout spinules but no keels. Posterior margins of tergites 2-9 with abundant, sharp, minute spinules which increase in size caudad; posterior margin of 10 smooth; posterior margins of sternites 2-8 smooth, those of 9-10 with minute sharp spinules. Sternites 1-9 as described for *E. agkistrodon*. Female gonapophyses as in Figure 19a. Caudal appendages as in *E. agkistrodon* but lateral spinules on cerci and paraprocts are more robust and sharp. Proportions: Epiproct 1.0, Cercus 0.98, Paraproct 1.0.

Measurements (mm). — TL (penultimate instar larvae) 17.7-19.1 (♂), 18.2 (♀); ABD 11.8-12.2 (♂), 11.9 (♀); HF 3.3-3.5 (♂), 3.5 (♀); MWH 4.0 (♂), 4.1 (♀); CA 1.3 (♂, ♀); LS on abdominal segment 5 0.1, on 6 0.4, on 7 0.5, on 8 0.6, on 9 0.9.

ECOLOGY. — Larvae of this species were found on muddy-sandy banks with decaying leaves at shaded parts of a rocky stream into the tropical rain forest; some young larvae were also found at the interface between sandy bank-rough gravel.

They were not reared to eclosion of adult, so diel activity in nature is unknown.

Larvae of the following species have already been described by other authors. Here I provide some details not mentioned previously, in order to make them comparable to those described in this paper.



Figs 13-19a. Details of the morphology of *Erpetogomphus ophibolus*. Fig. 19b *E. sabaleticus*: (13) a, dorsal view of the penultimate instar larva (♀); b, detail of the lateral keel on abdominal segment 9; — (14) left antenna, dorsal view; — (15) mandibles, a, left mandible, internal view; b, apex of right mandible, ventral view; c, detail of the apex of internal branch of right mandible, internal view. — (16) apical ends of right protibia (a) and mesotibia (b), dorsal view; — (17) left lateral view of abdominal segments 2-10; — (18) left lateral view of protuberances on abdominal segments 7-9, showing the spinules on their dorsal margin; — (19) female gonapophyses.

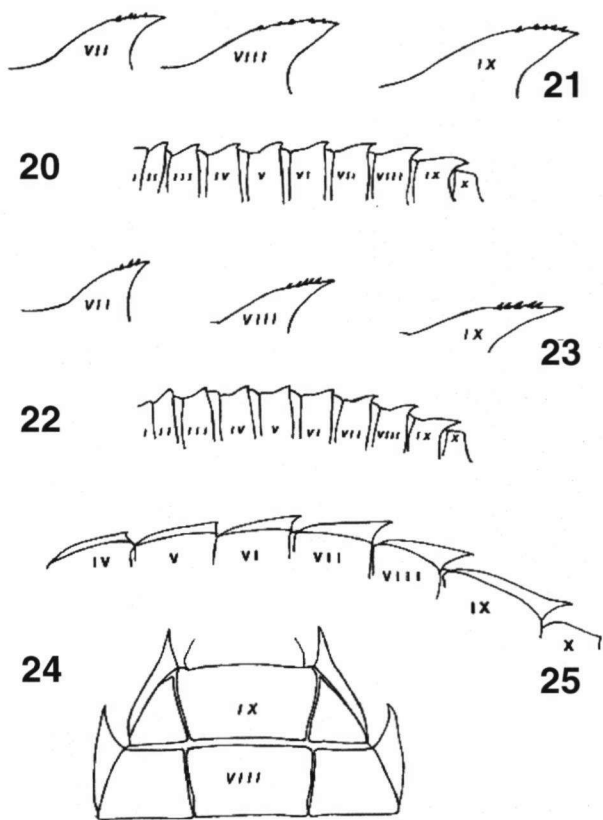
ERPETO GOMPHUS CONSTRICTOR RIS, 1917

Figures 20-21

RAMIREZ, A., 1996, *Odonatologica* 25(2): 150.

Material. — 3 exuviae (♂, reared). COSTA RICA: Guanacaste; Miravalles, 26-IV-1991, C. Esquivel leg., (2 ♂) in Museo de Insectos, Universidad de Costa Rica. MEXICO: San Luis Potosí State; Xilitla, 22-VII-1998, R. Novelo leg., (1 ♂) at IEXA.

Head and thorax as in *E. ophibolus* except: Mexican specimen with third antennomere four times longer than widest part. **Abdomen:** dorsal protuberances



Figs 20-25. Details of the morphology of *Erpetogomphus*. Figs 20-21 *E. constrictor*: (20) left lateral view of abdominal segments 1-10; — (21) dorsal protuberances on abdominal segments 7-9; — Figs 22-24 *E. sabaleticus*: — (22) left lateral view of abdominal segments 1-10; — (23) dorsal protuberances of abdominal segments 7-9; — (24) ventral view of sterna 8-9 showing the three sclerites on 8; — (25) ventral view of the left side of abdominal segments 4-10 of *E. tristani*, showing the small spine on 4.

on 2-5 blunt-tipped, sharp on 6-9 (Fig. 20), forming a well developed carina on apical half of tergites 8-9; protuberance on 7 with 1-2 small spinules, on 8 and 9 with 2 and 2-4 spinules on their dorsal carina, respectively (in the Mexican specimen the number of spinules on dorsal protuberances 7-9 are 3, 5 and 5 respectively [Fig. 21]). In the Costa Rican specimens there is a row of 16-17 spinules on lateral keel of segment 9, and 34-36 in the Mexican one. Posterior margins of abdominal tergites 2-9 with a row of small spinules. Sternites 1-9 as in *E. agkistrodon*.

Measurements (mm). — Length of spines on abdominal segment 5, 0.15-0.2; on 6, 0.3-0.4; on 7, 0.4-0.6; on 8, 0.6-0.8; on 9, 0.75-0.9; in the Mexican specimen the spine on 5 is wanting, on 6, 0.3; on 7, 0.5; on 8, 0.7; on 9, 0.9. Length of dorsal protuberance on 7, 0.4; on 8, 0.5; on 9, 0.7.

ERPETOGOMPHUS SABALETICUS WILLIAMSON, 1918

Figures 19b, 22-24

BELLE, J., 1992, *Odonatologica* 21(1): 21.

RAMIREZ, A., 1996, *Odonatologica* 25(2): 152.

Material. — 2 exuviae (1 ♀, reared, 1 ♀ young instar), 1 last instar larva (♀), 1 probably antepenultimate instar larva (♀), 1 young instar larva (♂). PANAMA: Canal Zone, Pipe Line Road, Quebrada Juan Grande, 4-VII-1974, M.L. May leg. (3 ♀, 1 ♂), 28-I-1975, M.L. May leg. (1 ♀).

Head and thorax as in *E. ophibolus*. **Abdomen** (Fig. 22) as in *E. constrictor* except: protuberance on 7 with 3 spinules, on 8, 4-5, on 9, 5 (Fig. 23). Lateral keel on segment 9 with a row of 13-18 spines. Sternites 1-9 divided in 3 plates (Fig. 24). Female gonapophyses as in Figure 19b.

Measurements (mm). — Length of lateral spines on abdominal segment 4, 0.10; on 5, 0.20-0.25; on 6, 0.4; on 7, 0.6; on 8, 0.8-0.9; on 9, 0.9-1.0. Length of dorsal protuberance on 7, 0.3; on 8, 0.5; on 9, 0.7.

ERPETOGOMPHUS TRISTANI CALVERT, 1912

Figure 25

RAMIREZ, A., 1996, *Odonatologica* 25(2): 152.

Material. — 1 exuviae (♂ reared). COSTA RICA: San José; Ciudad Colón, El Rodeo, 20-IV-1993, R. Rowe leg., in Museo de Insectos, Universidad de Costa Rica.

Head and thorax as described for *E. ophibolus*. **Abdomen:** lateral spines on abdominal segments 4-9, those on 4 minute (Fig. 25); 22-26 spines on lateral keel of segment 9. Dorsal protuberances on 2-9, blunt-tipped on 2-5, sharp on 6-9; 1, 2 and 3 spinules on dorsal protuberances on 7-9, respectively. Posterior margins of abdominal tergites 2-9 with a row of close-set small scales, posterior margin of 10 with small spinules on midline. Sternites 1-9 as in *E. agkistrodon*.

Measurements (mm). — Length of lateral spines on abdominal segment 4, 0.15; on 5, 0.2; on 6, 0.3; on 7, 0.4; on 8, 0.6; on 9, 0.8; length of dorsal protuberance on 7, 0.3; on 8, 0.5; on 9, 0.7.

DISCUSSION

Morphology of larvae of *Erpetogomphus* (*Erpetocyclops*) corroborate the *ophibolus* clade proposed by GARRISON (1994) in his study of adults. Larvae of the *ophibolus* group are generally similar in overall body form but are easily separable when examined in detail. Larvae of *E. agkistrodon* and *E. erici* show the closest resemblance within the subgenus, in such a manner that only slight variations in size proportions of caudal appendages and number of cuspids on the internal branches of both mandibles will diagnose them. The larva of *E. schausi* is unknown but, based on similarity among adults, I believe it will be difficult to separate this species from *E. agkistrodon* and *E. erici* when discovered.

Larvae of *E. agkistrodon* and *E. erici* are easily distinguishable from those of the remaining species of the *ophibolus* group by the following features: 3rd antennomere flattened dorsoventrally (Figs 1-2), two times longer than its widest part; burrowing hooks on pro- and mesotibiae moderately developed (Fig. 7); dorsal protuberances on abdominal segments 5-6 reduced, and vestigial on 7-9 (Fig. 8); lateral spines only on segments 7-9 (Figs 1, 9), short and blunt-tipped. Larvae of both species inhabit torrential streams in mountainous areas.

Larvae of the remaining known species of *E.* (*Erpetocyclops*) (except for *E. schausi* which is unknown) share the following features: 3rd antennomere cylindric, claviform, 4-5 times longer than its widest part (Fig. 14); burrowing hooks on pro- and mesotibiae poorly developed (Fig. 16); dorsal protuberances well developed on segments 2-9 (Figs 17, 20, 22), blunt-tipped on 2-5 or 2-6, sharp-pointed on 6-9 or 7-9, with 1-5 small spinules along dorsal protuberances of 7-9; lateral spines on 4-9 or 5-9, those on 6-9 large and sharp (Figs 13, 24-25).

Erpetogomphus sabaleticus is the only species of the subgenus in which the larva has the sternite 8 integrated by 3 plates only (Fig. 24), whereas the remaining species have 5 plates (Fig. 10). This is particularly intriguing because *E. sabaleticus* is the most austral species of the genus, and it shares this character with members of the other two subgenera, *E. (Calogomphus)* Carle and *E. (Erpetogomphus)* (sensu CARLE, 1992) (Novelo-Gutierrez, unpublished data). Members of both of these subgenera range north of Panama. Perhaps this character of the larvae could help to resolve the clades 1.1111, 1.1112 and 1.1113 of GARRISON's (1994) cladogram.

Great variation exists between the Mexican specimen of *E. constrictor* and those from Costa Rica in form of the length and shape of lateral spines on abdomen (see details above) and, less conspicuous, the relation length-maximum width of the 3rd antennomere, the number of spines on lateral keels, and the number of spinules on dorsal protuberances.

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