Aquatic Insects
2002, Vol. 24, No. 1, pp. 41–52

0165-0424/02/2401-43$16.00

Immature Stages of Neotropical *Enochrus* (Coleoptera: Hydrophilidae): *E. (Methydrus) lampros* Knisch, 1924 and *E. (Hugoscottia) tremolerasi* Knisch, 1922

Miguel Archangelsky

CRILAR, Anillaco, La Rioja, Argentina

Abstract

The preimaginal stages of the Neotropical species *E. (M.) lampros* Knisch, and *Enochrus (H.) tremolerasi* Knisch, are described and illustrated for the first time. They are compared to the immatures of the Neotropical species *E. (M.) vulgaris* (Steinheil) and *E. (Hugoscottia) scutellaris* (Bruch), the Nearctic *E. (M.) fimbriatus* (Melsheimer) and *E. (M.) pygmaeus nebulosus* Say, and the Australian *E. (M.) maculiceps* (MacLeay). Bionomical notes on the two species are included.

Keywords: Aquatic Coleoptera, Hydrophilidae, *Enochrus*, larvae, immatures, bionomics, Neotropical Region, Argentina.

Introduction

The genus *Enochrus* Thomson, 1859 belongs into the family Hydrophilidae (tribe Hydrophilini). It is a large genus, with about 175 species (Hansen, 1999), that has a worldwide distribution. Immature stages of several New World species have been described. From the Nearctic Region Richmond (1920) described all the immature stages of *E. (Methydrus) fimbriatus* (Melsheimer, 1844) (as *E. (M.) perplexus* (LeConte, 1855)); Wilson (1923) did the same with all the stages of *E. (M.) pygmaeus nebulosus* (Say, 1824), and the egg case and larva of *E. (Lumetus) diffusus* (LeConte, 1855); more recently Archangelsky (1997) described all the stages of *E. (M.) ochraceus* (Melsheimer, 1844). Richmond (1920) also provided a few notes on the egg cases and larvae of *E. (M.) ochraceus*, *E. (M.) cinctus* (Say, 1824), and *E. (L.) hamiltoni* (Horn, 1890). Even though the genus *Enochrus* is more diverse in the Neotropical Region, thus far the preimaginal stages of only two South American species have been described (Fernández, 1992; Archangelsky, 1999), those of *E. (M.) vulgaris* (Steinheil, 1869) and *E. (Hugoscottia) scutellaris* (Bruch, 1915).

Address correspondence to: Miguel Archangelsky, Centro Regional de Investigaciones Científicas y Transferencia Tecnológica La Rioja, CRILAR (CONICET — UNLaR), Entre Ríos y Mendoza s/n, 5301, Anillaco, La Rioja, ARGENTINA. Fax: +54 3827 494231; E-mail: marchangelsky@crilar.com.ar

In this paper the larval stages of two Neotropical species of the genus *Enochrus*, *E. (H.) tremolerasi* Knisch, 1922 and *E. (M.) lampros* Knisch, 1924 are described for the first time. They are also compared to those of *E. (M.) vulgaris*, *E. (H.) scutellaris*, *E. (M.) fimbriatus*, *E. (M.) pygmaeus nebulosus* and the Australian *E. (M.) maculiceps* (MacLeay, 1871). It is also worth mentioning here that this is the first record of *E. (H.) tremolerasi* and *E. (M.) lampros* for the province of La Rioja, Argentina.

Materials and Methods

Adult specimens of *E. (M.) lampros* and *E. (H) tremolerasi* were collected from different localities of La Rioja province. They were carried alive to the laboratory in plastic containers, algae and some water were used to keep them moist and protected. In the laboratory they were placed in larger clear plastic containers (20 cm long by 8 cm wide by 9 cm high), with a perforated lid; soil, sand and algae from the collection site were used as a substrate for the beetles. The containers were slightly inclined in order to provide an artificial littoral habitat, on one half water and algae were placed, and on the other soil, sand and small rocks. The egg cases were transferred to smaller containers (tissue culture plates with six cells). As first instar larvae hatched, they were placed in small, clean cells with filter paper, some algae, and water (1–2 mm deep); to prevent cannibalism only one larva was placed in each cell. Larvae were fed twice a day and were changed to clean cells every other day. The prey provided were live dipteran larvae, mostly chironomids. Prepupae were placed in larger cells with moist sand, and kept there until pupation. Once prepupae were in the pupal chamber the top part of the sand was removed and replaced with a piece of filter paper covered with sand, that allowed to check them daily in order to know the exact time of pupation and moult to adult stage.

Larvae and pupae were fixed with boiling water, and stored in 75% alcohol. Pupae were punctured, after fixation, with a minuten under the wing pads in order to prevent swelling. Descriptions and illustrations were made using a Leitz MZ12 dissecting scope and a Leica DML compound scope, both with a camera lucida. Illustrations were then scanned, and plates were put together using a computer. The identification of the adults was done using the keys from Fernández (1994, 1997).

For comparative notes, egg cases, larvae and pupae of *Enochrus (M.) vulgaris* (Steinheil, 1869) were obtained from adults collected (and reared in laboratory) from temporary pools at the sides of a dirt road connecting the locality of Totoralejos with Rd. 60 (Argentina, Córdoba province, 29°37′26″S –64°50′23″W, 185 m, 29°C, pH 9.5–9.9, 13–17.III.1999).

Enochrus (Methydrus) lampros Knisch, 1924 (Figs. 1–8)

Material examined

Argentina, La Rioja province: Departamento Sanagasta, Arroyo Tambito, 1340 m, 29°09′47″S, 67°04′47″W, 29.XI.1999, M. Archangelsky (90 larvae, 4 pupae).

Egg case

Height, without mast: 1.5 to 2.3 mm; width: 1.9 to 2.5 mm; length of mast variable, one to three times width of case. The cases are attached to different substrates, usually rocks or submerged plants. Suboval in shape (Fig. 1), constructed of two layers of silk, first one cup-shaped, laid on substrate, second layer covering the eggs, and extending sideways into a narrow mast as long as case; mast usually attached to substrate. Number of eggs variable, between 20 and 25.

Third instar larva

Length: 5.5 to 7.9 mm. Colour whitish, with sclerotized parts light brown; non-sclerotized integument covered by microspines, denser and rougher on dorsal side.

Head capsule subquadrate (Fig. 4); occipital foramen wide, dorsal part of cervix with two small subtriangular cervical sclerites. Frontoantennal sutures as an inverted

bell, coming together close to base of head capsule; coronal suture short. Six stemmata on each side of head, close to base of antennae.

Labroclypeus asymmetrical (Figs. 3, 4). Nasale projecting obliquely, with seven or eight irregular teeth, right teeth projecting farther than left ones; six short setae present along outer margin. Right epistomal lobe projecting further than left lobe, left lobe rounded, both lobes with a pair of short setae projecting mediad.

Antennae three-segmented (Fig. 2); basal segment shorter than second, bearing three campaniform sensilla. Second segment slightly slender, with four setae, two on inner margin, other two subapical, on outer margin; distal sensory appendage present on outer apical margin, one third the length of last antennal segment. Third segment the smallest, with six apical setae, two long and four short ones, one of those articulated.

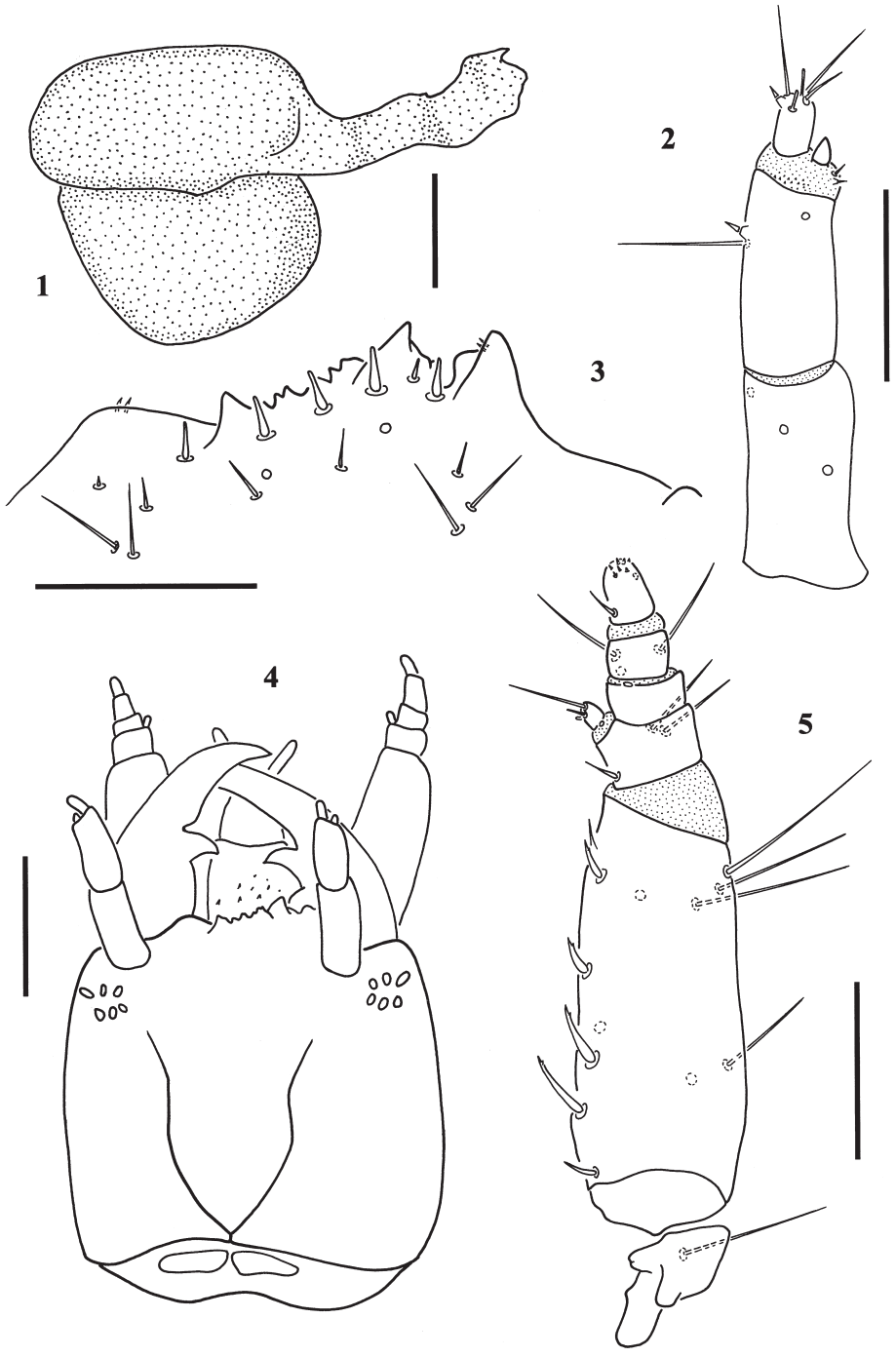
Maxillae five-segmented (Fig. 5), longer than antennae; cardo small, irregularly shaped, with a long outer seta. Stipes the longest segment, bearing a row of five inner setae, distal four with short toothlet at apex; outer margin with four long setae, one on basal third, a group of three on distal third. Palp four-segmented, second and third segments the shortest; basal segment the widest, bearing three slender setae and a short inner process with three distal setae; second segment short, lacking setae; third segment with two subapical setae; last segment bearing one long basal seta, projecting mediad, and six or seven short distal setae.

Mandibles asymmetrical (Figs. 6, 7). Right mandible serrated on distal half, with two large, irregular inner teeth; distal tooth irregularly serrated on inner margin. Left mandible serrated on distal half, with one inner tooth.

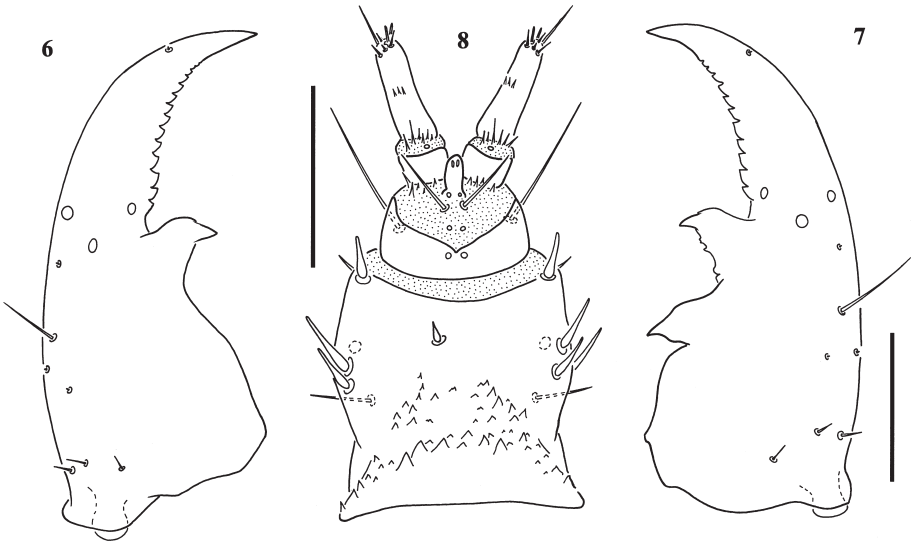
Labium stout and well developed (Fig. 8). Submentum large, subpentagonal, wider than mentum. Mentum subquadrate, with triangular area of strong cuticular spines at base on dorsal side; three or four strong setae on each margin, one distal and two or three at midlength; disc on dorsal side with two short setae (only one in specimen pictured); ventral side with one pair of long, slender setae. Prementum subtrapezoidal, wider at base, with four long setae, two ventral ones lateral, two dorsal ones close to base of ligula; membranous area at base of labial palpi with several short cuticular spines. Ligula short, easily seen in dorsal view; labial palpi long, two-segmented; basal segment short, with a few dorsal spines on membranous distal area; second segment long, bearing seven apical setae and few short cuticular spines at midlength.

Prothorax slightly wider than head capsule; pronotal shield formed by two large plates separated by a fine sagittal line; prosternum subtrapezoidal, with an incomplete sagittal line on posterior two thirds. Mesonotum with two pairs of dorsal sclerites, anterior pair transverse and narrow, posterior pair large, irregular in shape; metanotum with two pairs of dorsal sclerites as those of mesonotum but smaller. Pleural areas with small sclerotized area subdivided into episternum and epimeron. Legs, five-segmented, visible in dorsal view; coxa subtriangular, widely separated and elongate, trochanter short, femur as long as coxa but slender, tibiotarsus shorter and slightly more slender than femur, pretarsal claw half the length of tibiae bearing a pair of strong basal setae.

Abdomen ten-segmented, tapering towards posterior end, segments nine and ten reduced. Segments one to seven similar in size and shape, each one subdivided into three or four transverse folds. Segment one with two pairs of small suboval tergal plates on anterior fold, anterior plate smaller than posterior; remaining folds with



Figures 1–5. Enochrus (Methydrus) lampros. (1) Egg case; (2) Right antenna, dorsal view; (3) Labroclypeus, dorsal view; (4) Head capsule, dorsal view; (5) Right maxilla, dorsal view. Scale bars: Fig. 1 = 1 mm, Figs. 2–3 and 5 = 0.1 mm, Fig. 4 = 0.2 mm.



Figures 6–8. Enochrus (Methydrus) lampros. (6) Left mandible, dorsal view; (7) Right mandible, dorsal view; (8) Labium, dorsal view. Scale bars = 0.1 mm.

transverse row of small tubercles, each bearing a short seta. Segments two to seven with two pairs of small, oval dorsal spots close to midline on anterior folds, anterior one bare, second bearing a seta; remaining folds with transverse row of small seta-bearing tubercles. Segment eight with a large dorsal suboval plate and a pair of short, one-segmented lateral appendages. Segment nine trilobed, partially covered by eighth, with a pair of short, one-segmented urogomphi; each segment with small subtriangular dorsal plate. Sternites three to seven with a pair of prolegs, each proleg bearing a pad of rough spines.

Nine pairs of spiracles, one on mesothorax and eight abdominal. Thoracic and first seven abdominal pairs of spiracles non-functional. Last abdominal pair enclosed within a spiracular atrium.

Pupa (not illustrated)

Size: 4.1 to 4.5 mm long (not counting cerci). Color white, eyes of pharate adult red to brown. Head and eyes partially covered by pronotum; antennae completely covered by head and pronotum; mouthparts visible in ventral view, maxillary palps long, projecting close to end of mesotarsi. Pro- and mesothoracic legs visible in ventral view, free, metathoracic legs covered by wingpads, only distal segments of tarsi visible, reaching sixth abdominal segment.

Styli on head, thorax and abdomen as follows. Head with one pair of short supraorbital styli on inner margin of each eye. Pronotum with 24 styli, five pairs on anterior margin, five pairs on posterior one, two pairs on disc; two middle pairs of anterior margin and inner pair of disc longer than remaining styli. Mesonotum with one pair, one stylus on each side of scutellum; metanotum also with one pair. Abdominal segment one with three pairs of styli; segments two to seven with a transverse row of

eight styli, three pairs on each side of midline of terga, outer pair on pleural areas; segment eight with one distal pair; segment nine bearing a pair of long cerci, wider on basal third.

Comparative Notes with First Instar Larvae

First instar larvae range between 2.0 and 3.0 mm (second instars between 3.4 and 4.8 mm). Head capsule as wide or slightly wider than prothorax. Nasale of first instar larvae with less prominent teeth. The antennae are proportionally shorter and wider; segment one is shorter than second; sensory appendage of the second segment longer than in third instars, about half the length of the third segment. The mandibles are similar to those of third instars except for the presence of a sparse irregular serration on the inner tooth of left mandible. Proportionally, the prementum of first instar larvae is slightly wider than that of third instars; the mentum lacks lateral setae, and has less but larger cuticular spines which almost reach the distal end; the ligula is slightly longer than the first palpal segment. The maxillae are proportionally shorter and wider, the distribution of setae is similar to those of third instars, but the inner appendage of the first palpal segment is longer than the second palpal segment.

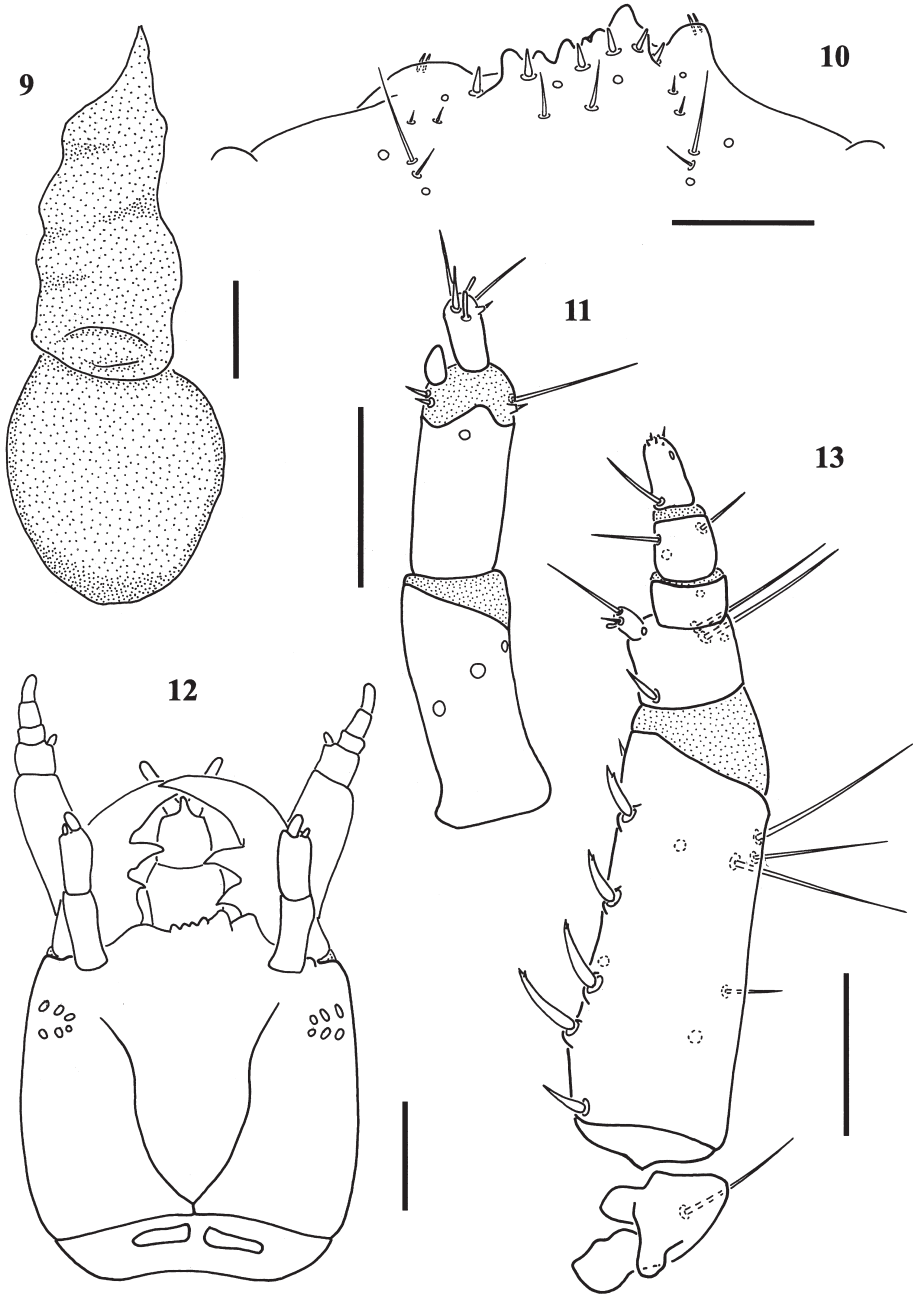
Bionomical Notes

Most egg cases were constructed on rocks at the edge of the water, only a few cases were laid on leaves; in the field egg cases were easily seen on rocks and plant debris lying at the water's edge. Development was fast, first instar larvae emerged three to four days after the construction of the cases; the duration of the first larval instar ranged between three and four days, that of second instar between three and five days and that of third instar between five and six days. Prepupal period was of only one day, and adults (two individuals) emerged four days after pupation. As most hydrophiloids, larvae were predatory, feeding on a variety of prey (chironomid and culicid larvae, small ephemeropteran larvae, etc.). Larvae stayed at the water's edge looking for prey, they were also capable of walking into and out of the water or along sticks or aquatic plants, always staying close to the water's surface.

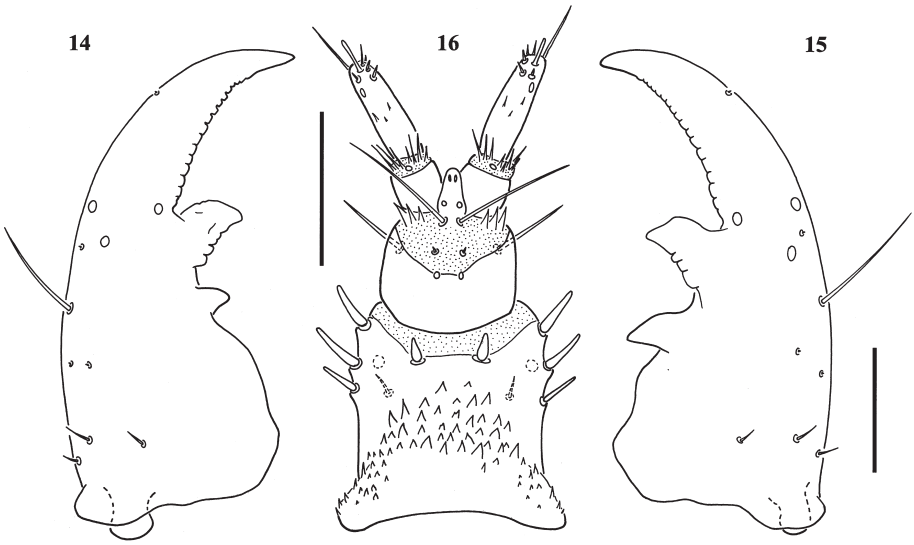
Enochrus (Hugoscottia) tremolerasi Knisch, 1922 (Figs. 9–18)

Material examined
Argentina, La Rioja province: Departamento Castro Barros, Arroyo Santa Vera Cruz, 1900 m, 28°40′34″S, 66°59′23″W, 5.IX.1999, M. Archangelsky (55 larvae, 4 pupae).

Egg case
Height, without mast: 2.8 to 3.1 mm: width: 1.6 to 2.2 mm; length of mast variable, two to three times the height of case. The cases were attached to rocks or gravel, above water level. Suboval in shape (Fig. 9), constructed of two layers of silk, first one cup-shaped, with narrow neck, laid on substrate, second layer covering the eggs, and extending upwards into a wide, irregular mast as long as case. Number of eggs variable, between 5 and 15.



Figures 9–13. Enochrus (Hugoscottia) tremolerasi. (9) Egg case; (10) Labroclypeus, dorsal view; (11) Left antenna, dorsal view; (12) Head capsule, dorsal view; (13) Right maxilla, dorsal view. Scale bars: Fig. 9 = 1 mm, Figs 10–11 and 13 = 0.1 mm, Fig. 12 = 0.2 mm.



Figures 14–16. Enochrus (Hugoscottia) tremolerasi. (14) Left mandible, dorsal view; (15) Right mandible, dorsal view; (16) Labium, dorsal view. Scale bars = 0.1 mm.

Third instar larva

Length: 5.8 to 8.2 mm. Colour whitish, with sclerotized parts light brown; non-sclerotized integument covered by microspines, denser and rougher on dorsal side.

Head capsule subquadrate (Fig. 12); occipital foramen wide, dorsal part of cervix with two small subtriangular cervical sclerites. Frontoantennal and coronal sutures as in *E. (M.) lampros*. Six stemmata on each side of head, close to base of antennae.

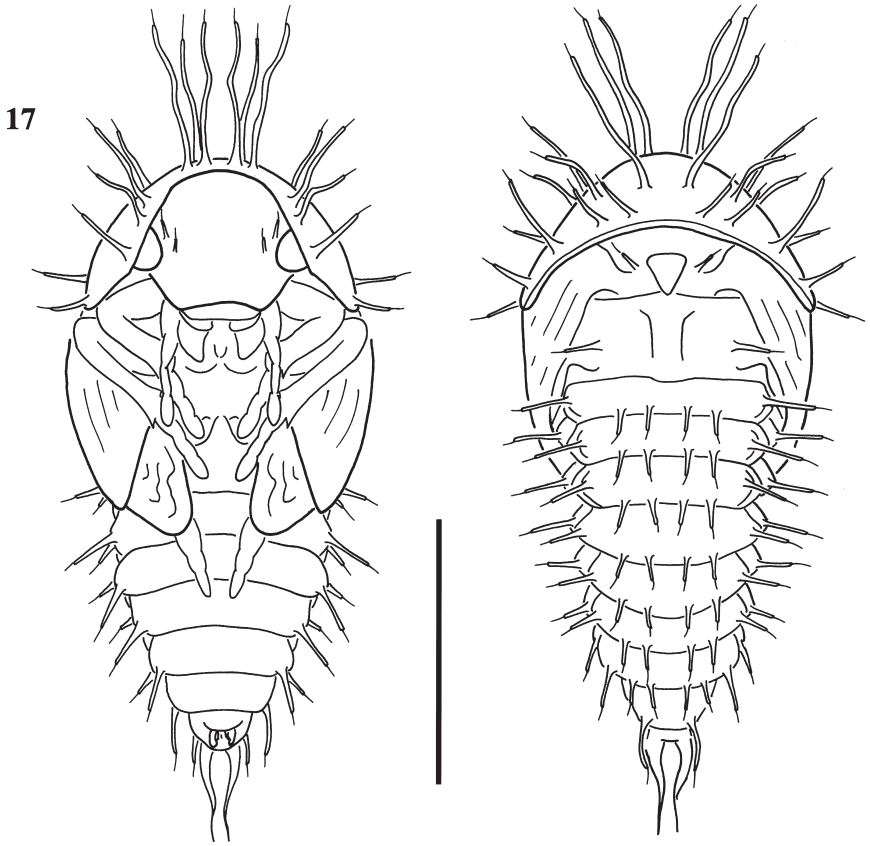
Labroclypeus asymmetrical as in *E. (M.) lampros* (Figs. 10, 12). Nasale projecting obliquely, with six blunt teeth, right teeth projecting farther than left ones; six short setae present along outer margin. Right epistomal lobe projecting farther than left lobe, left lobe rounded, both with a pair of short setae.

Antennae similar to those of *E. (M.) lampros* (Fig. 11). Two inner setae of second segment placed more distally; third segment with six apical setae, two long and four short ones, one of those articulated.

Maxillae as those of *E. (M.) lampros* (Fig. 13); stipes proportionally shorter, with stouter inner setae; second palpal segment the shortest.

Mandibles asymmetrical (Figs. 14, 15). Right mandible serrated on distal half, with two large, irregular inner teeth, distal one serrated on inner margin, basal tooth slightly smaller. Left mandible serrated on distal half, with two inner teeth; distal tooth serrated on inner margin, basal tooth much smaller.

Labium similar to that of *E. (M.) lampros* (Fig. 16). Submentum large, subpentagonal, wider than mentum. Mentum narrower, with triangular area of strong cuticular spines reaching farther; three strong setae on distal half of each margin; disc with



Figures 17–18. Enochrus (Hugoscottia) tremolerasi. (17) Pupa, ventral view. Scale bar = 2 mm; (18) Same, dorsal.

two stout setae; ventral side with one pair of short setae. Prementum proportionally larger than in *E. (M.) lampros*, subquadrate, membranous area at base of labial palpi with fewer and stronger cuticular spines. Spines on membranous distal area of first palpal segment stouter; second segment long and bearing seven setae.

Thorax and abdomen as in *E. (M.) lampros*, with few differences. Prosternum subdivided by shorter sagittal line, only on basal third. Abdominal segments subdivided into two or three transverse folds; transverse rows of small seta-bearing tubercles on abdominal folds absent; tergal plate of segment eight smaller.

Spiracles: number and distribution as in *E. (M.) lampros*

Pupa

Size: 3.8 to 5.0 mm long, very similar to that of *E. (M.) lampros* (Figs. 17–18). The main differences are the shorter maxillary palps which only reach the base of the mesotarsi, and the shorter mesotarsi which only reach the fifth abdominal segment. Distribution and size of styli similar to *E. (M.) lampros*.

Comparative Notes with First Instar Larvae

First instar larvae range between 1.9 and 2.7 mm (second instars between 3.4 and 4.6 mm). The antennae are proportionally shorter and wider; segment one is slightly shorter than second; the sensory appendage of the second segment is longer than in third instars, about two thirds the length of the third segment. The prementum of first instar larvae is wider than that of third instars, almost as large as mentum; the mentum lacks lateral setae, and has less but stronger cuticular spines, which reach the distal margin. The maxillae are proportionally shorter and wider, the distribution of setae is similar to that of third instars, but the inner appendage of the first palpal segment is longer than the second palpal segment.

Bionomical Notes

Egg cases were constructed on gravel and plants at the edge of the water, or on the walls of the plastic container, always above the water level. Those constructed on gravel had shorter masts than those constructed on the container's wall. Development was slightly longer than that of *E. (M.) lampros*, first instar larvae emerged six days after the construction of the cases; the duration of the first larval instar ranged between four and five days, that of the second instar between three and five days and that of the third instar between five and six days. Prepupal period was of one or two days, and adults (two individuals) emerged five days after pupation. Larvae were predatory, feeding on chironomid and culicid larvae, small ephemeropteran larvae, etc. Larval behavior was similar to that of *E. (M.) lampros*, with larvae staying at the water's edge looking for prey and walking into and out of the water, and also along sticks or aquatic plants, always staying close to the water's surface.

Comparative Notes with Other Known *Enochrus*

Until now only two South American species of *Enochrus* had described immatures: *E. (M.) vulgaris* and *E. (H.) scutellaris*; larvae and egg cases of both species were described by Fernández (1992) and pupae of *E. (M.) vulgaris* by Archangelsky (1999). With the immatures described in this paper the number of species with known larvae for the Neotropical Region, within this genus *Enochrus*, is now four, two belonging to the subgenus *Methydrus* and two to the subgenus *Hugoscottia*. Larvae of both subgenera can be easily differentiated by the number of inner teeth in their mandibles; in the subgenus *Methydrus* the right mandible has two teeth while the left one has only one; in the subgenus *Hugoscottia* both mandibles have two inner teeth. With the current knowledge, egg cases and pupae do not seem to show characters that allow to tell the subgenera apart. What follows is a comparison between the known immature stages within each subgenus.

The egg cases of *E. (M.) lampros* can be told apart from those of *E. (M.) vulgaris* by the following differences: they are shorter, have a mast of variable length (absent in *E. (M.) vulgaris*), and they house more eggs (20–25) than those of *E. (M.) vulgaris*

(14–18 according to Fernández, 1992 and Archangelsky, 1999). Even though Fernández (1992) based her description of *E. (M.) vulgaris* on first instar larvae, I have third instars of this species from Córdoba province (Argentina), only a few differences could be found between the third instars of both species. In the first place the epistomal lobes in *E. (M.) lampros* have a pair of short setae projecting mediad, absent in *E. (M.) vulgaris*; the length of the sensory appendage is also different, about one third of the last antennal segment in *E. (M.) lampros* and over half the length of the last antennal segment in *E. (M.) vulgaris*; the length of the last two palpal segments of the maxilla of *E. (M.) vulgaris* is similar, while the last palpal segment in *E. (M.) lampros* is slightly longer than the penultimate; finally, the second palpal segment of the labium in *E. (M.) vulgaris* seems to have more cuticular spines at midlength (5, 6) than in *E. (M.) lampros* (3, 4). Pupae of both species are very similar, the only differences are the size of the pupae and the length of the cerci: pupae of *E. (M.) lampros* are 4.1–4.5 mm long and their cerci are shorter, about twice the length of the last abdominal segment; pupae of *E. (M.) vulgaris* are smaller, 3.2–3.6 mm long (Archangelsky, 1999) but their cerci are longer, about three times the length of the last abdominal segment.

Comparisons within the subgenus *Hugoscottia* are restricted to the egg cases and first instar larvae since I have not been able to see third instars of *E. (H.) scutellaris*, pupae of this species are unknown. Egg cases of *E. (H.) tremolerasi* are shorter but wider, have a long mast, absent in *E. (H.) scutellaris*, and have a variable number of eggs (5–15), the number in *E. (H.) scutellaris* could be lower (8 in the only egg case collected by Fernández, 1992). First instars show only a few differences. In *E. (H.) tremolerasi* the inner process of the maxilla is slightly longer than the second palpomere, in *E. (H.) scutellaris* the palpomere is as long as the second palpomere; the labium of *E. (H.) tremolerasi* has a shorter ligula, as long or slightly shorter than the first palpomere, the cuticular spines on the dorsal side of the mentum are more widespread, reaching the anterior margin at the midline, in *E. (H.) scutellaris* the ligula is slightly longer than the first palpomere, and the spines on the mentum do not reach the anterior margin at midline.

Three other species within the subgenus *Enochrus (Methydrus)* have been described from the Nearctic and Australian regions, the Nearctic *E. (M.) fimbriatus* and *E. (M.) pygmaeus nebulosus*, and the Australian *E. (M.) maculiceps* (Richmond, 1920; Wilson, 1923; Anderson, 1976). The descriptions and illustrations of these species are rather old and not as detailed as one would wish, but several differences with the egg cases and larvae of *E. (M.) lampros* could be found. The egg cases of *E. (M.) fimbriatus* and *E. (M.) maculiceps* are smaller (1.5 and 1.8 mm high respectively) and have a longer mast, two to four times longer than the egg case proper. The egg case of *E. (M.) pygmaeus nebulosus* is similar in size, but it also has a longer mast, about four times longer than the egg case. The number of eggs in the cases of *E. (M.) fimbriatus* is not mentioned by Richmond (1920), but the other two species have a lower number of eggs/case: 10–12 in *E. (M.) maculiceps* and 12–20 in *E. (M.) pygmaeus nebulosus*; egg cases of *E. (M.) lampros* have 20–25 eggs/case. Third instar larvae of *E. (M.) maculiceps* have six teeth on the labroclypeus, while those of *E. (M.) lampros* have 7–8 irregular teeth, this being

the only difference found between both species since Anderson's description (1976) is very brief. According to Richmond (1920), first instar larvae of *E. (M.) fimbriatus* have a poorly developed labroclypeus, the teeth on it are almost lost, only the right tooth is well developed, a second difference is that the mentum has no cuticular spines on the dorsal surface, these are present in *E. (M.) lampros*. With first instar larvae of *E. (M.) pygmaeus nebulosus* only two differences were found, the first is also the apparent absence of cuticular spines on the mentum (these are not mentioned by Wilson), and the second is the size of the sensory appendage which is as long as the third antennal segment in *E. (M.) pygmaeus nebulosus*, in *E. (M.) lampros* the sensory appendage is about half the length of the third antennal segment.

Acknowledgements

I thank Liliana A. Fernández for confirming the identification of the adult specimens.

References

Anderson JME (1976): Aquatic Hydrophilidae (Coleoptera). The Biology of some Australian species with descriptions of immature stages reared in the laboratory. *J Aust Ent Soc 15*: 219–228.

Archangelsky M (1997): Studies on the Biology, Ecology, & Systematics of the immature stages of New World Hydrophiloidea (Coleoptera: Staphyliniformia). *Bull of the Ohio Biological Survey (New Series) 12(1)*: ix + 207, pp.

Archangelsky M (1999): Immature stages of *Paracymus rufocinctus* Bruch, 1915 and *Enochrus (Methydrus) vulgaris* (Steinheil, 1869) (Coleoptera: Hydrophilidae: Hydrophilinae). *Elytron 13*: 87–99.

Fernández LA (1992): Descripción de la ooteca y estadios larvales *de Enochrus (Hugoscottia) scutellaris* (Bruch) y *Enochrus (Methydrus) vulgaris* (Steinheil) (Coleoptera, Hydrophilidae. *Rev Soc Ent Arg 50(1–4)*: 343–352.

Fernández LA (1994): Contribución al conocimiento del género *Enochrus* Thomson. (Coleoptera: Hydrophilidae) II. El subgénero *Hugoscottia* en la Argentina. *Physis (Buenos Aires), Secc B, 49(116–117)*: 37–45.

Fernández LA (1997): Nuevos aportes para el conocimiento del género *Enochrus* Thomson (Coleoptera: Hydrophilidae). *Physis (Buenos Aires) Secc B, 1995, 53 (124–125)*: 21–29.

Hansen M (1999): *World Catalogue of Insects. 2. Hydrophiloidea (Coleoptera)*. Apollo Books, Steenstrup, Denmark, 416 pp.

Richmond EA (1920): Studies on the biology of aquatic Hydrophilidae. *Bull Am Mus Nat Hist 42*: 1–94.

Wilson CB (1923): Water beetles in relation to pondfish culture with life-histories of those found in fishponds at Fairport, Iowa. *Bull US Bur Fisheries 39*: 231–345.