

Larvae of Neotropical *Helochares* Mulsant (Coleoptera, Hydrophilidae): Description of *H. femoratus* (Brullé)

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ABSTRACT

Egg case and larvae of *Helochares femoratus* (Brullé) are described from Ensenada, Buenos Aires Province, Argentina. Diagnostic characters of external morphology are discussed, and comparisons with other known species of *Helochares* Mulsant are made. A key to different larval instars is provided.

KEY WORD: Aquatic Coleoptera, Hydrophilidae, *Helochares femoratus*, egg case, larva.

INTRODUCTION

The genus *Helochares* Mulsant has a worldwide distribution and is represented by 156 species included in five subgenera (Hansen, 1999). While the adult forms are rather well known, the immature stages have not yet been adequately studied. There are only six larval descriptions (d'Orchymont, 1913; Richmond, 1920; Böving & Henriksen, 1938; Panzera, 1932; Anderson, 1976; Fernández, 1983). *Helochares (Sindolus) femoratus* has been reported from the Antilles to Argentina, and has its southernmost limit in Buenos Aires. Data on the biology and spatial distribution and its variability in accordance with the timing of different developmental stages were published by Fernández and Kehr (1994, 1995). The aims of this study are to describe its egg case and the larval instars, making these characters available to future phylogenetic studies of the genus.

MATERIALS AND METHODS

The larvae described herein were reared in aquarium from females with their egg cases attached the abdomen. They were taken from a permanent pond at Punta Lara (34° 47' S; 58° 01' W; Ensenada district in Buenos Aires Province, Argentina). Punta Lara is located at the austral end of the "gallery forest", has a subtropical and tropical floristic composition, and in this area the water level is influenced by the tidal cycle of the Río de La Plata estuary. The aquatic vegetation in the pond studied included *Salvinia rotundifolia* Willd., *Hydrocotyle ranunculoides* L., *Spirodela intermedia* W. Koch, and *Lemma* sp.

The females with their egg-cases were kept in aquaria with water and plants from the original environments (*Salvinia rotundifolia* and *Spirodela intermedia*). Hatched larvae were reared individually. Dipterous larvae were offered as prey in proportion to the size of the *H. femoratus* instars.

The terminology used in the description follows Archangelsky (1997). The larvae were macerated in 10% KOH solution, the alkali was neutralized with phenol and they were dehydrated and mounted in Canada balsam.

RESULTS

EGG CASE (Fig. 2): almost semicircular in shape, length through midline: 1.67 - 1.85 mm; maximum width 2.44 mm.

Constructed of silk fibers, dorsal surface clean and transparent where it lies against the abdominal sterna; fibers of ventral surface are more tightly woven than that on the dorsal side. The excision line of the egg case, for emergence of the first instar, larvae is located around the posterior end of the bag. The number of eggs per bag fluctuates between 47 and 60. Eggs are ellipsoidal, length 0.58 - 0.77 mm ($n = 14$, mean = 0.69, SD = 0.05); maximum width 0.18 - 0.22 mm ($n = 14$, mean = 0.27, SD = 0.18), white to yellow, deposited horizontally, oriented in a radial fashion. Females of *Helochares* carry their egg-cases beneath the abdomen, attached to the hind femora by a few silk strands as in other *Helochares* and *Helobata* (Böving and Henriksen, 1938; Spangler and Cross, 1972; Anderson, 1976; Fernández, 1983).

THIRD INSTAR LARVA (Fig. 1): ($n = 5$), length from labroclypeus edge to abdomen end, excluding antennae and appendages is shown in the Table 1. Color yellowish white with sclerotized brown areas.

Head subquadrangular: length of the head in the midline, from the apex of the labroclypeus to occipital foramen border is shown in Table 1. Frontal sulci inversely bell-shaped; coronal sulcus quite short. Cervical sclerites present, narrow, subrectangular. *Labroclypeus* (Fig. 3): asymmetrical, lateral lobes of the epistome exceeding the nasale, with four short and strong setae in each one; nasale with five small teeth, each interspace between the teeth with a short and strong seta. Six stemmata in each ocular area. *Antennae* (Fig. 4): three segmented, basal segment longer than the other two combined; second segment with one stout apical appendage, distal segment small and subcylindrical; the last two segments with setae distributed as shown in Fig. 4. *Mandibles* (Figs. 5 and 6): slightly asymmetrical, each one with two teeth on the inner margin. Distal tooth of the left mandible with serrated borders and larger than the proximal tooth, which has a smooth border. Right mandible with distal tooth smaller than the proximal, with a serrated border, the proximal one showing only one serrated border. *Maxillae* (Fig. 7): five-segmented, stout, longer than antennae. Stipes longer than the other four segments combined; with six stout spines on the inner margin; and with five slender setae on the outer margin. Palpus four-segmented. First segment with a short ventral seta and a long seta on the outer apical margin; this segment has a small appendage on the inner margin, which bears three setae. The shortest (second) segment of the palpus lacks a seta. The longest is the third segment, with a pair of setae, one on the outer margin, the other on the inner margin. Last segment with a group of small apical setae. *Labium* (Fig. 8): Palpus two segmented, the basal one short and glabrous, the distal one bearing apical setae, approximately four times as long as basal segment. Ligula slightly longer than the first segment of palpus, with two long basal setae and two short distal setae. Prementum subrectangular bearing two long ventral setae arising near base of ligula. Mentum with most part of dorsal surface covered with cuticular spines and with three stout spines in each externo-frontal angle.

Thorax: pronotum strongly sclerotized, wider than the head, almost com-

pletely covered by a dorsal shield, with sagittal line which continues throughout the thorax. Mesonotum with large plates, covering approximately the anterior half of the dorsum esclerite. Metanotum with a pair of irregular plates. Prosternum with a subrectangular plate, divided by a sagittal line. Mesosternal plates present, metasternal plates absents. Meso and metathorax slightly wider than prothorax, but about one-half as long. Legs five segmented (Fig. 9), all pairs with similar morphology, visible in dorsal view. Setae distribution as in Fig. 9. Coxae large, intercoxal distance increasing from first to third pair; trochanter small; femur approximately one and a half the length of the tibiotarsus; pretarsal claw with one basal spine.

Abdomen: ten segmented (ninth and tenth reduced), the first seven tergites similar in size and shape, with four small tubercles, subdivided by three transverse folds, pleural areas slightly lobed. Mesothoracic and first abdominal spiracles non functional. Eighth tergite suboval with a functional pair of spiracles opening into the atrium. Ninth segment trilobed, with a pair of small un-segmented urogomphi.

KEY TO LARVAL INSTARS

- 1a Mentum without lateral spines. Width of head less than 0.33 mm ... Instar I
 1b Mentum with lateral spines. Width of head greater than 0.40 mm 2
- 2a Mentum with one stout spine on each externo-frontal angle. Width of head
 0.41-0.45mm Instar II
 2b Mentum with three stout spines on each externo-frontal angle. Width of head
 0.56 - 0.62 mm Instar III

DISCUSSION

The number of eggs per ootheca of *Helochares* species ranges from 25 to 103. In a previous study of *H. femoratus*, 40 to 72 eggs were observed per case (Fernández & Kehr, 1994), similar to *H. lividus* (Forster) (60 eggs) and *H. griseus* (Fabricius) *sensu* Panzera (50 eggs) (Panzera, 1932). However the egg-case of *H. pallipes* (Brullé) contained 80 to 103 eggs (Fernández, 1983), that of *H. talarum* Fernández, 25 to 40 eggs (Fernández, 1983) and that of *H. tristis* (Macleay), 25 to 50 eggs per ootheca (Anderson, 1976).

In the larvae, the number of teeth on the nasale of *Helochares* species is 5 to 6. *H. femoratus* shares 5 teeth on the nasale with *H. talarum* Fernández. In both species, belonging to subgenus *Sindolus*, the lateral lobes of the epistome exceed the nasale, thus producing the main difference with those described in the subgenera *Helochares* and *Hydrobaticus*. Furthermore, the right mandible of *H. talarum* and *H. femoratus* has the distal tooth smaller than the proximal one, differing from *H. maculicollis* Mulsant, *H. lividus* (Forster), *H. tristis* (Macleay), *H. griseus* (Fabricius) *sensu* Panzera, 1932 and *H. pallipes* (Brullé) in that the distal tooth is larger than the proximal tooth.

The mentum of *H. lividus*, *H. griseus* and *H. maculicollis* has one short seta in each externo-frontal angle as well as the medio-lateral one (Panzera, 1932; Richmond, 1920). However the mentum of *H. pallipes* has one short seta in each

externo-frontal angle and four short setae in each medio-lateral one (Fernández, 1983). *H. tristis* has only one short seta in each externo-frontal angle (Anderson, 1976). *H. talarum* has three short setae on it (Fernández, 1983) like as *H. femoratus*.

Helochares femoratus differs from *H. talarum* by features of the labium, antennae and maxillae. *H. talarum* has four setae in the ventral part of the prementum (*H. femoratus* has two), has two thick and prominent spines on the mid part of the mentum (*H. femoratus* lacks them) and the ligula is approximately two times as long as the basal segment of the palp, while in *H. femoratus* the ligula is scarcely larger than the basal segment. The antennae of *H. femoratus* exhibit one seta in the internal border of the last segment while it is absent in *H. talarum*. The maxillae of *H. femoratus* exhibit two setae in the basal half of the external border, which are absent in *H. talarum*.

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Table 1. Descriptive statistics of measured variables (in millimeters) of *Helochares femoratus* larvae.

Variable Instars	Instar I (n = 5)		Instar II (n = 5)		Instar III (n = 5)	
	Mean (SD)	Min-Max	Mean (SD)	Min-Max	Mean (SD)	Min-Max
Length of body	2.06 (0.12)	1.86-2.20	3.42 (0.27)	3.04-3.8	5.12 (0.23)	4.56-5.42
Length of head	0.28 (0.009)	0.28-0.30	0.39 (0.01)	0.39-0.43	0.55 (0.01)	0.54-0.58
Width of head	0.30 (0.004)	0.29-0.31	0.43 (0.01)	0.41-0.47	0.58 (0.01)	0.56-0.62
Width of pronotum	0.32 (0.004)	0.31-0.33	0.49 (0.01)	0.47-0.54	0.76 (0.04)	0.66-0.81

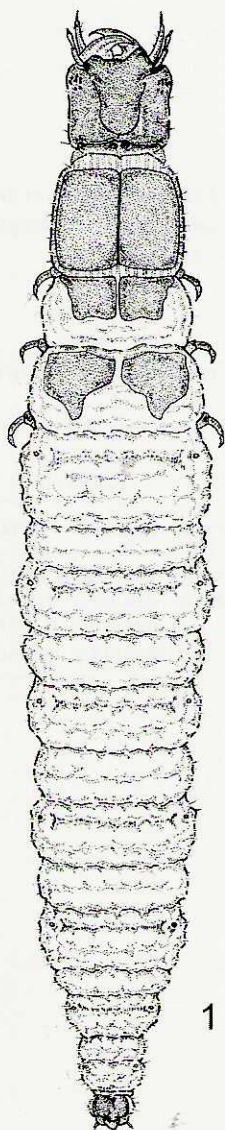
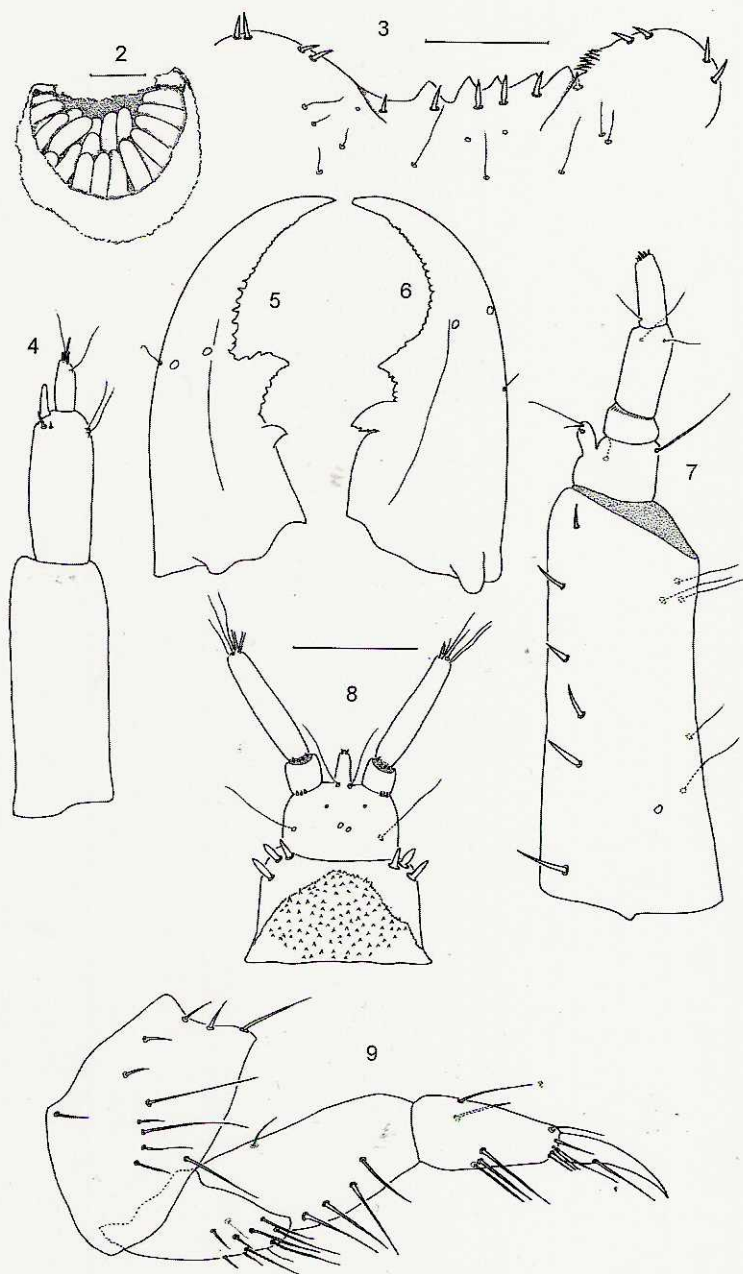


Fig. 1. Habitus of third instar larva of *H. femoratus* (Scale bar = 0.75 mm).



Figs 2-9. Third instar larva of *H. femoratus* (dorsal view): 2, egg case (Scale bar = 1 mm); 3, labroclypeus; 4, antenna; 5, left mandible; 6, right mandible; 7, maxilla; 8, labium; 9, third right leg (latero-posterior view) (Scale bar = 0,1 mm).