

LARVAL DESCRIPTION OF *MICRASEMA SERVATUM* (NAVÁS, 1918) (TRICHOPTERA, BRACHYCENTRIDAE)

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ABSTRACT

The larva of *Micrasema servatum* (Navás, 1918), an endemic species of the Iberian Peninsula, is described for the first time and compared with those known of other Iberian species. The most important diagnostic features are illustrated and some taxonomic, zoogeographical and ecological notes are presented. Larva of *M. servatum* is, for the moment, the only known European species of the genus with four mesonotal sclerites and a case made of vegetal fragments in combination.

Keywords: Trichoptera, Brachycentridae, *Micrasema servatum*, larval description, endemic, Iberian Peninsula.

RESUMEN

Descripción de la larva de *Micrasema servatum* (Navás, 1918) (Trichoptera, Brachycentridae)

La larva de *Micrasema servatum* (Navás, 1918), una especie endémica de la Península Ibérica, se describe por vez primera comparándola con el resto de las especies ibéricas del género. Se ilustran sus caracteres diagnósticos más importantes y se realizan algunas observaciones taxonómicas, zoogeográficas y ecológicas. Por el momento, *M. servatum* es la única especie europea de este género cuya larva combina la presencia de cuatro escleritos mesonotales con la construcción de un estuche de naturaleza vegetal.

Palabras clave: Trichoptera, Brachycentridae, *Micrasema servatum*, descripción larvaria, endemismo, Península Ibérica.

Introduction

Brachycentrid larvae are small, eruciform case-makers easily recognized by the following characteristics: the pronotum bears a transverse groove at midlength, the mesonotum bears a pair of plates (that are often divided longitudinally by narrow sutures) and the first abdominal segment lacks the dorsal and lateral spacing humps (Flint, 1984).

Micrasema McLachlan, 1876 and *Brachycentrus* Curtis, 1834 —*Oligoplectrum* McLachlan, 1878 is according to Flint (1984) a subgenus of

Brachycentrus— are the only two European genera of this family and their larvae can be easily distinguished by the morphology of the meso- and meta-thoracic legs (Wiggins, 1977; Flint, 1984).

According to the inventory given by González *et al.* (1992) 12 species of *Micrasema* McLachlan, 1876, have been reported from the Iberian Peninsula. However, five of them are considered of doubtful validity (*M. cenerentola* Schmid, 1952; *M. difficile* Mosely, 1934; *M. gabusi* Schmid, 1952; *M. salardum* Schmid, 1952, and *M. vestitum* Navás,

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1918), and the presence of *M. setiferum* (Pictet, 1834) and *M. togatum* (Hagen, 1863) is considered doubtful within this region. Thus, the genus *Micrasema* is at present represented by five species in the Iberian Peninsula: *M. longulum* McLachlan, 1876; *M. minimum* McLachlan, 1876; *M. moestum* (Hagen, 1868); *M. morosum* (McLachlan, 1868) and *M. servatum* (Navás, 1918).

M. servatum is the only species of this group which is hitherto unknown in the larval stage whereas detailed descriptions and illustrations of the remaining species have been given by several authors for different European regions. Thus, larval morphology and cases of *M. longulum* and *M. minimum* were compared by Lestage (1921) and larvae of *M. morosum* and *M. minimum* were described by Moretti (1983), but not in detail. The case construction of the first larval instars has been described and compared by Bohle (1972, 1974) in two species of *Micrasema*: *M. minimum* and *M. longulum*. In France, larvae of the *Brachycentridae* have been studied by Décamps (1970); in this really interesting paper we can find detailed descriptions and illustrations on larval taxonomy of *M. moestum*, *M. minimum*, *M. longulum* and some other species of the genus as *M. morosum* and *M. tristellum* McLachlan, 1876. Nevertheless, according to Botosaneanu (1974), *M. tristellum* is a synonymy of *M. morosum*; therefore, in Décamps (1970) there are two different larval descriptions of *M. morosum*: *M. morosum* (based on material from the Pyrenees) and *M. tristellum* (based on material from Engadin, Central Europe). Larval pictures of *M. morosum* included in Waringer & Graf (1997) are based on larvae collected in Austria and the association between larval and adult specimens was ensured by emergence studies (Waringer, pers. comm., 1997). Surprisingly the photographs and the characters used in the key to *M. morosum* in Waringer & Graf (1997) depicts not Décamps' *M. morosum*, but his *M. tristellum*. So, we consider that the larval description of *M. tristellum* given by Décamps is, in fact, the correct larval description for *M. morosum*. Therefore, the description of *M. morosum* given by Décamps seems to refer to another species of the Pyrenees or the Iberian Peninsula.

In recent years, larvae and pupae of several species of *Micrasema* were collected from several streams in Galicia. Larval exuviae of *M. servatum* collected from mature pupae with distinct genitalia were examined, thereby ensuring the association between larval and adult specimens. In this paper we

describe the final instar larvae of this species. Setal nomenclature and terminology follows Wallace *et al.* (1990) and Williams & Wiggins (1981).

Description of the final instar larva

Material examined: final instar larval exuviae of 1 male and 1 female of field collected pupae and 354 larvae of final and previous instars. All from Galicia, NW of Spain.

Body length up to 8.6 mm, mean body width up to 1.5 mm.

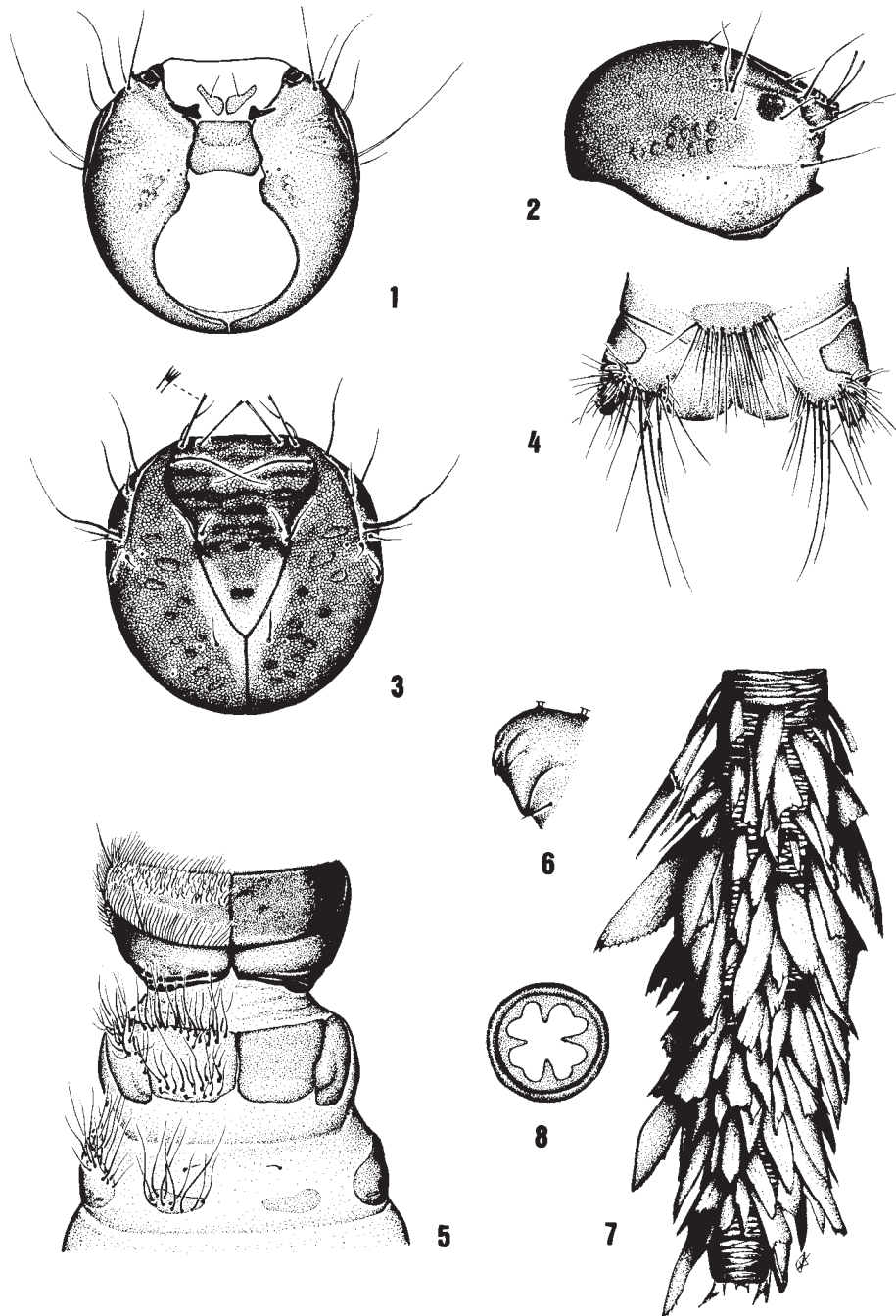
Head capsule: Mean head width 1.06 mm (n = 34), mean head length 1.02 mm. Head round (Figs. 1, 3); black in colour with Y-shaped yellowish colour pattern along dorsal eclypsial line which ends at the level of the frontoclypeal seta 6. Posterior area of the frontoclypeal apotome with two distinct muscle attachment spots.

Head with a dorsolateral supraocular ridge along each side and one more lateral infraocular ridge shorter and less conspicuous. The frontoclypeal apotome (Fig. 3) is clearly wider at eye level and bears 6 pairs of setae; setae 2 and 3 poly-furcated (see detail in Fig. 3), seta 4 the longer of the sclerite and seta 5 the shorter. Antennae short, inconspicuous in dorsal view, placed in a concavity near the end of anterior margin.

Head capsule (Fig. 2) with a very curved dorsal edge when viewed in profile. Periocular area whitish. Ventral side of the head capsule (Fig. 1) paler than dorsum; ventral apotome more or less trapezoidal which separates the genae completely. Sclerites of cardo black in colour; median margin with sharp anterior process. Submental sclerites elongate, concolorous with the ventral side of the head and bearing one moderately long seta each. Ventral seta 8 long, brownish; seta 18 absent.

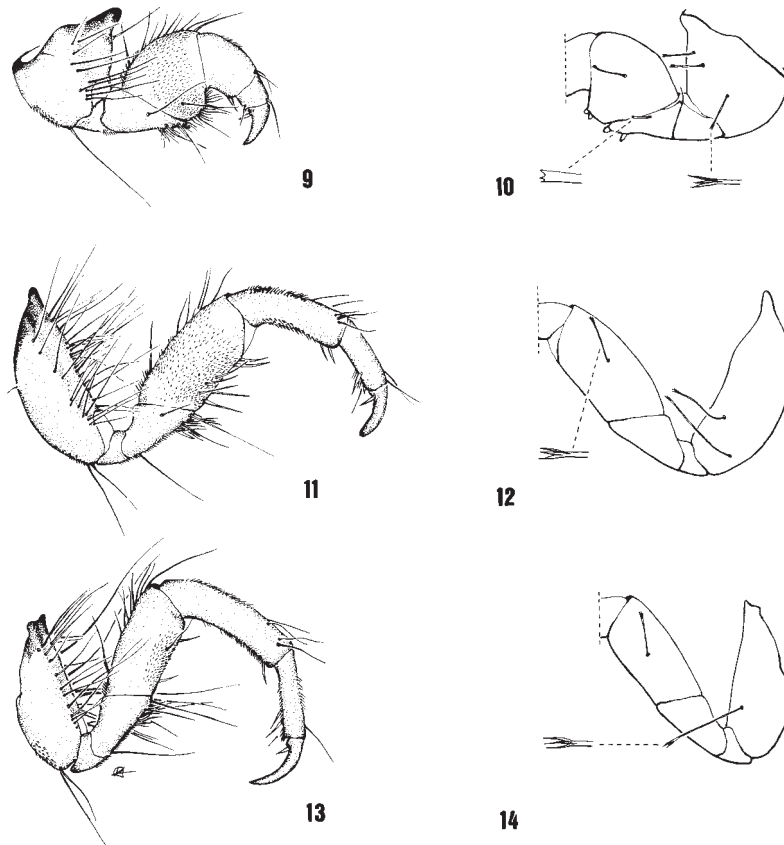
Thorax (Fig. 5): Posterior third of pronotum uniformly black to deep brown, anterior two thirds paler. Pronotum with a distinct, curved transverse ridge; anterior third and ridge with sparse, small, thin, light setae; anterior margin with smaller, thinner setae; surface along ridge with six large, strong, brown setae. Meso- and metanotum chestnut brown, paler than pronotum.

Mesonotum covered with four sclerites, muscle attachment spots indistinct. Lateral margin of median sclerites sinuous and obliquely limited; about 23-25, 15-21 and 37-48 setae on *setal area* (*sa*) 1, *sa* 2 and *sa* 3, respectively: *sa* 1 clearly separated from *sa* 2.



Figs. 1-8.— *Micrasema servatum*; last instar larva: 1) Head, ventral view. 2) Head, lateral view. 3) Head, dorsal view and detail of the apex of setae 2 and 3. 4) Ninth abdominal segment and anal prolegs, dorsal view. 5) Thorax, dorsal view (the setae have only figured in the left half). 6) Left anal claw, detail of the accessory hooks, inner side. 7) Case, lateral view. 8) Case membrane.

Figs. 1-8.— *Micrasema servatum*; larva de último estado: 1) Cápsula cefálica, vista ventral. 2) Cápsula cefálica, vista lateral. 3) Cápsula cefálica, vista dorsal y detalle del extremo de las sedas 2 y 3. 4) Noveno segmento abdominal y apéndices anales, vista dorsal. 5) Tórax, vista dorsal (sólo se han representado las sedas de la mitad izquierda). 6) Uña anal izquierda, detalle de las uñas accesorias, cara interna. 7) Estuche, vista lateral. 8) Membrana oclusiva posterior del estuche.



Figs. 9-14.— *Micrasema servatum*; last instar larva: 9) Prothoracic leg, posterior face. 10, 12 and 14) Pro-, meso- and metathoracic legs, detail of poly-furcated setae on anterior faces. 11) Mesothoracic leg, posterior face. 13) Metathoracic leg, posterior face.

Figs. 9-14.— *Micrasema servatum*; larva de último estado: 9) Pata protorácica, cara posterior. 10, 12 y 14) Cara anterior de las patas pro-, meso- y metatorácicas, detalle de la inserción de las sedas escobilladas. 11) Pata mesotorácica, cara posterior. 13) Pata metatorácica, cara posterior.

Metanotum membranous with 2 pairs of small sclerites; median sclerites with 12-18 setae on *sa* 2; lateral sclerites with 22-26 setae on *sa* 3; one seta on *sa* 1.

Legs (Figs. 9-14) concolorous with meso- and metanotum. Posterior face of coxae and femora densely covered with comb-like spines. Prothoracic legs shorter and stouter; anterior face of coxa, trochanter and femur with 3, 1 and 1 poly-furcated setae, respectively. Meso- and metathoracic legs approximately the same size; anterior face of coxae with 1-2 and femora with 1 poly-furcated setae. Tarsi with two small, ventro-distal spurs but without conical tubercles. Tarsal claws of all 3 legs similar in structure.

Abdomen nearly cylindrical and posterior half gradually tapered, ninth segment clearly thinner. Dorsal hump absent and lateral humps indistinct in segment I. Abdominal gills and lateral line absent. Lateral tubercles present on segments III-VIII, 12-14 on each. A rounded protuberance present on each side of segment VIII.

Mid dorsal sclerite of segment IX (Fig. 4) weakly sclerotized, elliptical, with *ca.* 22 setae different in size along posterior margin.

Anal prolegs (Fig. 4) almost completely membranous dorsally; posterior dorsal margin with 5 long, stout, brown setae and about 27-31 smaller and thinner ones. Lateral sclerite weakly sclerotized dorsally

and with 1-2 small setae. Anal claw stout with 7 setae and with 3 accessory hooks (Fig. 6), one of them ill developed and often inconspicuous.

Case (Fig. 7): Length up to 11.4 mm. The case of the fully grown larva is tubular, straight and tapered posteriorly; membrane (Fig. 8) with a quadruple trefoil-leaf shaped pore present at posterior opening. Case (even in the younger instars) made of small, thin pieces of vegetal fragments arranged transversally in a spiral with ribbon-like pieces of plant materials (usually leaf fragments but also stems, leaf ribs, etc.) fastened around its circumference.

Discussion

The larvae of *M. servatum* can be easily separated from those of other Iberian *Micrasema* species by several larval morphology and case configuration characters.

According to the number of mesonotal sclerites we can divide the Iberian species of the genus into two groups: the first consisting of *M. longulum* and *M. morosum* which are the only Iberian species with two single mesonotal sclerites; the second group is characterized by the presence of four mesonotal sclerites; this group includes *M. servatum* together with the remaining Iberian species of the genus: *M. moestum* and *M. minimum*. The larvae of *M. servatum* can be easily distinguished from the remaining species of the group by the morphology and colour pattern of their head capsules. Thus, whereas the head capsules of *M. moestum* and *M. minimum* are uniformly chestnut brown in colour, in *M. servatum* the head is dark brown in colour with a Y shaped light colour pattern along the dorsal ecdysial lines, very similar to that observed by Ito (1995) for *M. gelidum* McLachlan, 1876 and by Verneaux (1972) and Waringer & Graf (1997) for *M. setiferum* (Pictet, 1834); moreover, the posterior part of the head capsule of *M. servatum* is curved when viewed in profile. This character allows us to distinguish the larvae of *M. servatum* clearly from those of the remaining Iberian species of the group which have a head capsule strongly flattened dorsally in lateral view (cf. Décamps, 1970: Figs. 25 and 30 for *M. minimum* and *M. moestum*, respectively).

M. servatum and *M. morosum* are the only Iberian species of the genus with a larval case made of vegetal fragments; the case of the remainder Iberian species are made either of mineral particles

(*M. moestum* and *M. minimum*) or entirely secreted (*M. longulum*). For the whole European species of the genus *Micrasema* with known larval stages it is important to notice that at least another two species, *Micrasema togatum* (Hagen, 1864) and *Micrasema gelidum* McLachlan, 1876, make their larval cases of vegetal fragments, although none of them bear ribbon-like pieces of plant material. Furthermore, these two species have, as *M. longulum* and *M. morosum*, two mesonotal sclerites so that larvae of *M. servatum* are, for the moment, the only known European species of the genus with 4 mesonotal sclerites and a case made of vegetal fragments in combination.

Habitat and distribution

According to Botosaneanu & Malicky (1978) *M. servatum* is only known from the Iberian Peninsula and Pyrenees. In the Iberian Peninsula this species has been always reported from north-western quarter localities (see González *et al.* 1992). Within this region, *M. servatum* is usually found together with *M. longulum*, *M. moestum* and *M. minimum*; those three species are also distributed throughout several regions of central and southern Europe.

In the Iberian Peninsula, *M. servatum* shows a wide altitudinal distribution, and larvae have been reported from lowlands to high mountains (40-1700 m); this species is very common in small streams and especially abundant in mountain brooks (Terra, 1981; González, 1988). Larvae of *M. servatum* are closely associated with mosses, where it has been often found together with other species of the genus. In Galicia *M. servatum* often lives together with *M. moestum* and *M. longulum* and, as an exception, also with *M. minimum*, a seemingly uncommon species within this region (González, 1988). In the northern part of Portugal *M. servatum* is often found together with *M. moestum* (see Terra 1981, 1994).

In Galicia, adults of this species were collected from February to October (Terra, 1981; González, 1988).

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