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The larva of *Limnephilus wittmeri* Malicky, 1972

(Insecta, Trichoptera, Limnephilidae)

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A description of the hitherto unknown larva of *Limnephilus wittmeri* Malicky, 1972, an endemic of the Iberian Peninsula, is given. The most important diagnostic features are illustrated, and an attempt is made to include the larva in an existing key for larvae of Limnephilidae published by Wallace et al. (1990). Some zoogeographical and ecological notes are included.

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Introduction

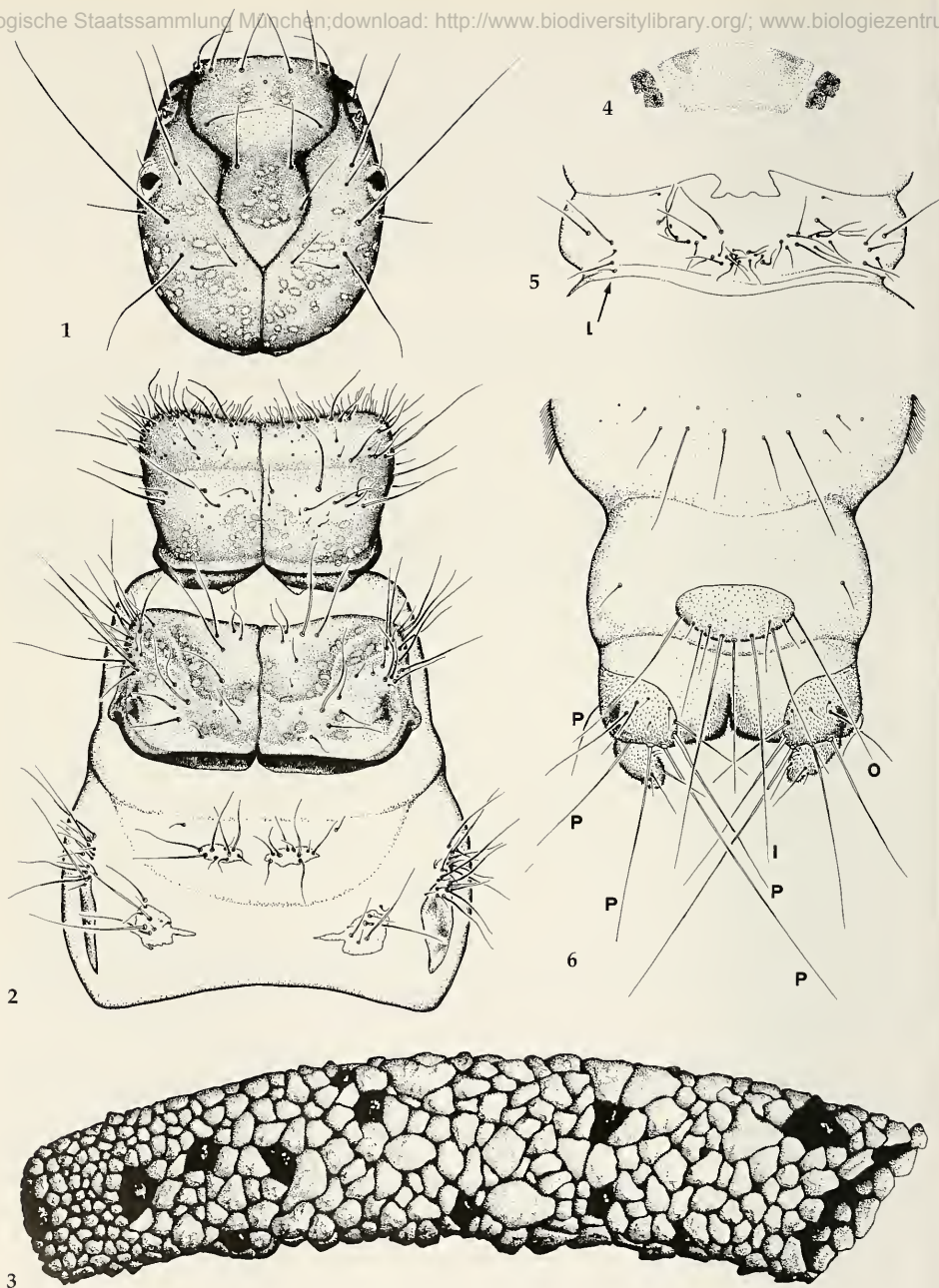
Twenty-three species of the genus *Limnephilus* have been reported by González et al. (1992) from the Iberian Peninsula. However, the presence of *L. coenosus* Curtis, 1834, *L. decipiens* (Kolenati, 1848), *L. extricatus* McLachlan, 1865, *L. griseus* (Linnaeus, 1758), *L. politus* McLachlan, 1865 and *L. stigma* Curtis, 1834 is considered doubtful within this region. Moreover, *L. subcentralis* (Brauer, 1857) was only reported from Portugal by Cortés (1989) and has been recently excluded from the catalogue of the Portuguese Trichoptera (Terra 1994).

After the publication of the Iberian species list, our own records and personal communications with several colleagues have corroborated the presence of three of this doubtful species in the Iberian Peninsula: *L. extricatus* was recorded in Lérida (Malicky, pers. comm.), *L. griseus* in Santander (Botosaneanu, pers. comm.) and Lérida (González, unpublished), and *L. stigma* was recorded in Lérida (González, unpublished).

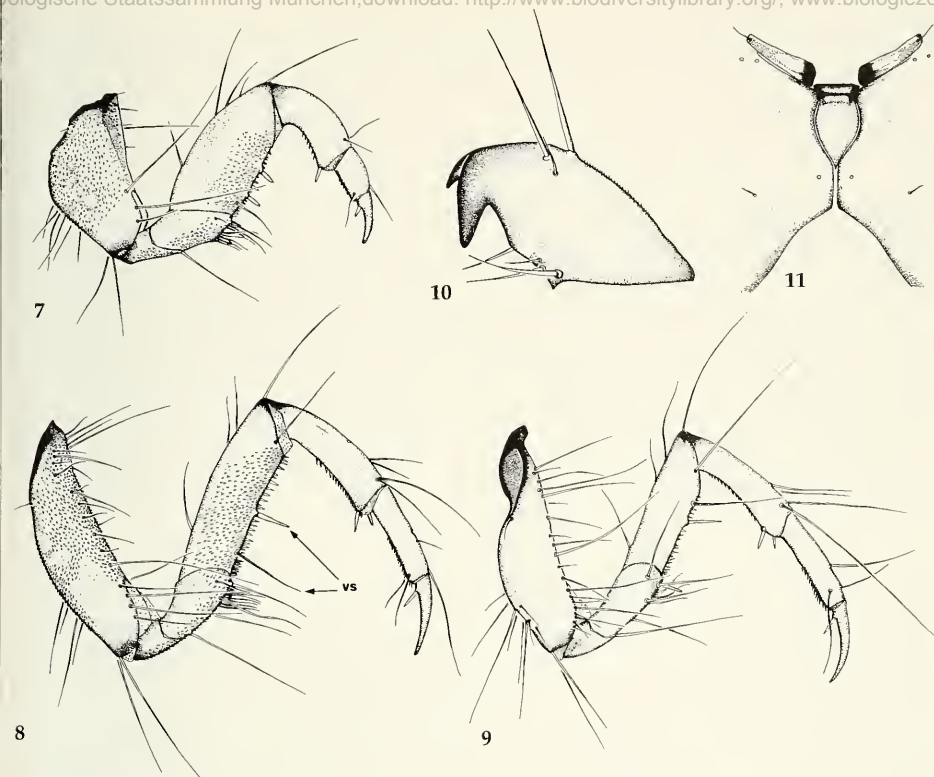
Thus, at present, the genus *Limnephilus* is represented by 19 species in the Iberian Peninsula, four of them endemics: *L. aistleitneri* Malicky, 1986, *L. guadarramicus* Schmid, 1955, *L. obsoletus* Rambur, 1842 and *L. wittmeri* Malicky, 1972. Larvae of *L. guadarramicus* have been described by Vera (1979), but larval descriptions for the other endemic species are still lacking.

Larval exuviae of *L. wittmeri* were obtained from larvae reared in the laboratory to the adult stage and from mature pupae with distinct genitalia collected in several field samples, thereby ensuring the association between larval and adult specimens. The objective of this paper is to describe fifth instar larvae of this species.

The morphological terminology and setal nomenclature follows Wallace et al. (1990).



Figs 1-6. *Limnephilus witthneri* (fifth instar larva). 1. Head, dorsal view. 2. Thorax, dorsal view. 3. Larval case, lateral view. 4. Prosternites. 5. 1st abdominal venter. 6. 8th and 9th abdominal segments and anal prolegs, dorsal view. L: lateral setal group. I: innermost primary seta. O: outermost primary seta. P: primary setae.



Figs 7-11. *Limnephilus wittmeri* (fifth instar larva). 7. Prothoracic leg. 8. Mesothoracic leg. 9. Metathoracic leg. 10. Right anal claw. 11. Ventral apotome. vs: ventral edge setae.

Description of the final instar larva

Material examined: fifth instar larval exuviae of 54 pupae reared in the laboratory, 15 field collected pupae and 6 last instar larvae, all from Sierra de Ancares (Lugo, NW of Spain).

Mean body length: 13 mm (range 12-15 mm).

Head capsule (Fig. 1). Mean head width 1.17 mm (range 1.12-1.26 mm). Uniformly dark brown in colour; the most conspicuous character is the absence of pigment from the triangular-shaped area at the aboral end of the fronto-clypeal apotome; sometimes a pale area on the posterior region of each parietal may also be present as in *L. griseus* (cf. Wallace et al. 1990, fig. 75B). The muscle attachment spots are clearly visible. Mandibles black, with distal margins reddish and five teeth along edges as well as with ridges in central concavity. The ventral apotome (Fig. 11) is slightly longer than the posterior ventral ecdysial line; inner area of cardo black in colour.

Thorax (Fig. 2). Pronotum uniformly brown with distinct muscle attachment spots and a transverse furrow separating the anterior third from the posterior two thirds; posterior margin with two small, black transverse stripes with overlapping ends and a brown space between them. Proventer (Fig. 4) with two small, black lateral prosternites normally fused, lying a little apart from the central prosternite. The central prosternite is almost indistinct except for two pigmented areas, sometimes inconspicuous, on its anterior margin. Mesonotum slightly more yellowish than pronotum; posterior margin and part of lateral margin narrow and blackish brown. Metadorsum with three pairs of little sclerites: posterior metadorsal sclerites with an inner process and without setae on soft cuticle between

them; the anterior third of lateral metadorsal sclerites is ill-defined and more pale than the other two thirds.

Legs (Figs 7-9). Yellowish brown in colour with muscle attachment spots ill-defined. Mesothoracic leg slightly longer than metathoracic leg. Each trochanter without ventrodistal setal brush and without additional setae on proximal section. All femora with only one seta on inner dorsal half. Femur of first leg with two strong ventral edge setae *vs* pale in colour. Meso- and metafemora with two long ventral edge setae *vs* contrasting in colour. Neither femur has any additional setae on either the anterior or posterior face. Tarsal claw with a short basal seta.

Abdomen. 1st abdominal venter (Fig. 5) with 4 setae (range 3-5) in each lateral setal group *I*. Lateral fringe extends from the beginning of the 3rd segment to the extreme end of the 8th; gills present on segments 2-7 with number of filaments as in tab. 1. Segment 8 dorsally (Fig. 6) with a continuous transverse row of 2 long and 6 shorter setae. 9th abdominal dorsal sclerite (Fig. 6) light brown or yellowish, with indistinct punctation at anterior margin and 4 primary setae; each side with one seta between innermost primary seta *I* and outermost primary seta *O* which is more than half as long as seta *O*. Lateral sclerite of anal proleg with no squat setae on the face; surface with 5-6 setae (apart of five primary setae *P*). Anal proleg claw (Fig. 10) chestnut brown, darker apically and with one accessory hook. Lobe of anal proleg with no setae *Is* on soft cuticle by anal slit.

Case (Fig. 3). Total length 12-14 mm, maximum width 3 mm. Slightly curved, smooth, almost uniform width but sometimes tapering posteriorly; made of fine sand grains; posterior opening closed by either a membrane with a large round hole, or by sand grains with several little holes. Pupal case entirely composed of sand grains.

Discussion

Hickin (1967), Hiley (1976), and Lepneva (1971) gave a key to larvae of Limnephilidae, but the most inclusive European identification key for Limnephilidae larvae was given by Wallace et al. (1990) for the British and Irish species where all Iberian species of *Limnephilus* are included, except *L. guadarramicus*. Thus it is possible to use this key as a starting point for this work.

When using Wallace's key, larvae of *L. wittmeri* will key out as *L. centralis* (couplet 59) because of the central prosternite about twice as wide as it is high. *L. wittmeri* larvae are very close to *L. centralis* and it's quite difficult to find a plain character to distinguish both species. The only reliable feature (see also Hickin 1967, Hiley 1976, Lepneva 1971 for *L. centralis*) is the length of the ventral apotome, slightly longer than the posterior ecdysial suture in *L. wittmeri*, whereas the ventral apotome of *L. centralis* almost reaches the occipital foramen. However, we can also use (with carefullness) the following characters of *L. wittmeri* to ensure identification: sclerites of metadorsum well defined (pale and indistinct in *L. centralis*); 4 setae only in each setal group *L* on 1st abdominal venter (1-11 in *L. centralis*); chaetotaxy of the 9th abdominal dorsal sclerite is seemingly different (cf. Lepneva 1971, Fig. 382); and the lateral sclerite of anal proleg bears 11-12 setae including the 5 primary setae *P* along posterior edge (11-18 in *L. centralis*). Moreover, it is important to note that *L. centralis* has never been reported from the study area.

Tab. 1. Number of filaments in tracheal gills on abdominal segments 2-7 of fifth instar larvae of *Limnephilus wittmeri* Malicky. Positions abbreviated as: A: anterior. D: dorsal. L: lateral. P: posterior. V: ventral.

Gill	Segment					
	2	3	4	5	6	7
AD	3	3	2-3	1-2	1	1
PD	3	3	2	1-2	1	0
ALD	1-2	2	0	0	0	0
PLV	2	1	0	0	0	0
AV	2	2	2	1	1	1-0
PV	3	3	2	2	2	1-0

Larval morphology of *L. wittmeri* and *L. guadarramicus* (cf. Vera 1979) is completely different and they can be immediately separated by many conspicuous characters: e.g. body size; colour patterning of head, pronotum, mesonotum and legs; case shape; number of filaments and tracheal gill arrangement, etc.

Habitat and distribution

Larvae of *L. wittmeri* were collected on May 5th, 1985 and on March 16th, 1994; prepupae and pupae on May 30th, 1991 and in May 28th, 1995. Prepupae and pupae were found attached to riparian submerged vegetation roots in shallow, flowing water pools in the river of Piornedo and a temporary pool, whereas fifth instar larvae were found in the bed of the stream. River Piornedo is a clean mountain brook with low temperatures; the temporary pool was produced by a spring; both sampling sites are in Sierra de Ancares (Lugo, ca. 1500 m above sea level).

L. wittmeri is an endemic species of the Iberian Peninsula where it is confined to the north-western quarter. In this area, adults have been recorded in several localities of Galicia and some adjacent provinces (Asturias, Cantabria and Zamora) at about 160 to 1650 m a.s.l. (González & Otero 1980, González et al. 1992). We have recorded adults in Galicia on May and from July to October (González 1988).

Acknowledgements

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