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The Larva and distribution of *Psychomyia klapaleki* Malicky, 1995 (Trichoptera: Psychomyiidae)

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With 2 Figures and 1 Table

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The larva of *Psychomyia klapaleki* Malicky, 1995 is described and compared with the morphologically similar larva of *Psychomyia fragilis* Pictet, 1834. Information for the identification of the species is given and some taxonomical, zoogeographical and ecological notes are presented. In addition, the geographical distribution is discussed.

1 Introduction

According to Malicky (1995), genus *Metalype* Klapálek, 1898 is a synonym to *Psychomyia* Latreille, 1829 and, based on priority, the latter genus designation has to be used for *Metalype fragilis* Pictet, 1834, too. Therefore, together with the newly described *Psychomyia klapaleki* (Malicky, 1995) and the well-known *Psychomyia pusilla* Fabricius, 1781, there are now three Central-European *Psychomyia* species. *P. pusilla* and *P. fragilis* are included in the larval keys of Edington & Hildrew (1995) and Waringer and Graf (1997, 2000), whereas *P. klapaleki* has been unknown so far. Recently, larvae and pupae of a *Psychomyia* species morphologically close to *P. fragilis* were collected from Žerovniščica, Žerovnica, Slovenia, which could be clearly associated with *P. klapaleki* by adults originating from the same location.

2 Separation of *Psychomyia klapaleki* from other Trichoptera

Material examined: 8 fifth instar larvae. Head width: 0.74-0.82 mm. Body length: 4.2-4.8 mm.

By following Edington & Hildrew (1995) and Waringer & Graf (1997, 2000), last instar larvae of *Psychomyia klapaleki* are separated from other Central European Trichoptera by the following set of morphological characters typical for Psychomyids:

Dorsal sclerites present on pronotum only
 Larvae without transportable case
 Labrum sclerotized
 Dorsal sclerite lacking at ninth abdominal segment
 Anal prolegs without basal membranous section
 Lobus labialis of maxillolabium greatly elongated

In the three Central European *Psychomyia* species the pronotum has a very obvious blackish thickening in posterior-lateral position (Fig. 1, p. 117 in Waringer & Graf, 1997) which is lacking in *Lype* and *Tinodes*. In *P. pusilla*, the black mental plates are distinctly longer than wide and heavily ornamented like shagreen (Fig. 3, p. 117 in Waringer & Graf, 1997). This feature clearly separates *P. pusilla* from *P. klapaleki* and *P. fragilis* which both have brownish-black, smooth mental plates distinctly wider than long (e.g. Fig. 4, p. 117 in Waringer & Graf, 1997); by sharing this morphological character, *P. klapaleki* keys out together with *P. fragilis* when using Edington & Hildrew (1995) and Waringer & Graf (1997, 2000). Unfortunately, we were not able to find any reliable diagnostic characters for the separation of the latter two species. Therefore we do not make any attempt to separate the two species by now. However, geographical distribution patterns may be helpful in the separation of these two morphologically close species.

3 Habitat and distribution

Whereas *P. pusilla* is widespread and common throughout Europe, being virtually reported from each zoogeographical region included in the "Limnofauna Europaea" (second edition; Botosaneanu & Malicky 1978), the two other central European *Psychomyia* species are much more restricted. *P. fragilis* is known from the Western Mediterranean (Italy: Liguria; Cianficconi, 2002), the Alps, the Balkans (but not Slovenia; Krušnik & Urbanič, 2002), the Central European Highlands and the British Isles. In Austria, *P. fragilis* is reported from Lower and Upper Austria (Malicky 1999) (Fig. 1) and in Germany from Baden-Württemberg and Bavaria only (Robert 2001). On the other hand, *P. klapaleki* is lacking in Austria and Germany, but present in Italy (Friuli V. Giulia; Cianficconi, 2002) and Southeastern Europe (Croatia, Bosnia and Herzegovina, Montenegro and Slovenia; Malicky, 1995). In Slovenia, recent records demonstrate that *P. klapaleki* is widely distributed (Fig. 2)

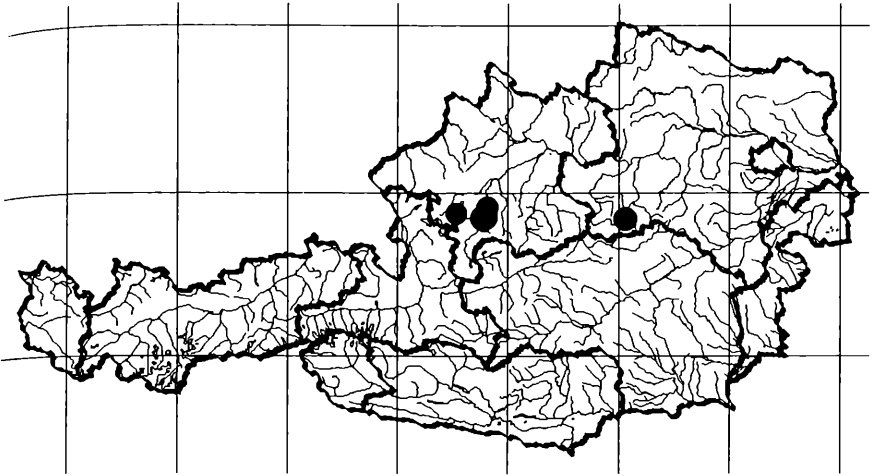


Fig. 1: Distribution of *P. fragilis* in Austria. Map courtesy ZOBODAT, Linz



Fig. 2: Distribution of *P. klapaleki* in Slovenia. Map data after Urbanič (unpublished)

According to our present knowledge, *Psychomyia fragilis* and *P. klapaleki* seem to be more or less separated from each other in Central Europe. As only *P. klapaleki* and *P. pusilla* are present in Slovenia and *P. fragilis* and *P. pusilla* are present in Austria, Switzerland and Germany until now, it should be possible

to separate the species, also in the larval stage, in these countries. This is also the case elsewhere in Europe where *P. fragilis* has been recorded (e.g. Iberian peninsula, France, British Isles). In Italy, however, all three species are present, making the situation much more difficult.

4 Ecological notes

Larval specimens of *P. klapaleki*, belonging to instars 2-5 (Tab. 1), were collected on many occasions between 1998 and 2002. Specimens were found in highly different types of running waters:

Small streams, 3-5 meters wide and with surface water velocity under 0.5 m/s, e.g. streams Žerovniščica and Cerknjščica;

Large rivers, up to 60 m wide and with surface water velocity over 1 m/s, e.g. Savinja River, Kolpa River and Sava River.

A typical karstic spring Velika Ljubljana and
The outlet of the Lake Bohinj

Tab. 1. Head width and body length of instars II-V of *Psychomyia klapaleki*. n = number of specimens

Instar	II (n = 3)	III (n = 5)	IV (n = 5)	V (n = 8)
Head width (mm)	0.29-0.32	0.44-0.49	0.64-0.69	0.74-0.82
Body length (mm)	1.8-1.9	2.2-2.6	3.0-3.5	4.2-4.8

According to this heterogeneousness of water bodies, associated physico-chemical parameters showed great variability. The larvae were found in waters with temperatures between 0 and 23 °C, alkaline pH (7.3-8.3) and high saturations or even supersaturations of oxygen ranging from 93 to 138 %. Values of conductivity showed also great variability and ranged from 175 to 487 $\mu\text{S}/\text{cm}$. In terms of saprobity, waters were classified as slightly polluted (oligo- to beta-mesosaprobic and beta-mesosaprobic, respectively). At these locations many other Trichoptera species were observed, with *Rhyacophila dorsalis* (Curtis, 1834), *Rhyacophila fasciata* Hagen, 1859, *Hydroptila* spp., *Hydropsyche incognita* Pitsch, 1993, *Polycentropus flavomaculatus* (Pictet, 1834), *Psychomyia pusilla* (Fabricius, 1781), *Brachycentrus subnubilus* Curtis, 1834, *Micrasema setiferum* (Pictet, 1834), *Silo piceus* (Brauer 1857) and *Lepidostoma hirtum* (Fabricius, 1775) being the most abundant. In Slovenia, adults were collected between end of June and the beginning of September, but most specimens were caught in the first half of July.

P. fragilis is recorded from "highly calcareous rivers and large streams" (Wallace 1990), from spring sections and headwaters (Botosaneanu & Malicky 1978), but also from lakes like Lake Geneva, Lake Constance and the littoral of the

mesotrophic Tegernsee (Eidel 1968; Orendt 1992; Schäffer 1992). In addition, Malicky (1974) light-trapped *P. fragilis* at a lake outlet (Lunzer Untersee).

As scrapers, Psychomyiidae are mostly associated with stony substrates where their typical galleries are built. An exception is genus *Lype*, whose representatives exclusively live on woody debris. Genus *Tinodes* settles from springs (*T. unicolor*) to streams (*T. rostocki*, *Tinodes dives*) and rivers (e. g. *Tinodes pallidulus*) with one species occurring in lakes also (*T. waeneri*). Most of the species seem to prefer cold and swift running waters. Within the genus *Psychomyia*, *P. pusilla* is more or less restricted to downstream sections of streams and rivers and is also commonly found at stony lake shores. It seems that *P. fragilis* shows a similar ecology as the widespread *P. pusilla* although it is considered a quite rare species.

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