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The Larva, ecology and distribution of *Tinodes braueri* McLachlan, 1878 (Trichoptera: Psychomyiidae)

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Abstract

The hitherto unknown larva of *Tinodes braueri* McLachlan, 1878, is described and discussed in the context of contemporary Psychomyiidae keys. In addition, zoogeographical and ecological notes are included.

Keywords

Trichoptera; *Tinodes braueri*; description; habitat; ecology

Introduction

In the “Atlas of European Trichoptera” (Malicky 2004, 2005a), genus *Tinodes* Curtis 1834 is represented by well over 80 species; when omitting the Caucasus region, Iran, Asia minor, Turkestan, the Maghreb and the Levant, over 50 species remain in Europe proper, with the highest diversity within the genus unfolded at the Balkans. Eighteen species (*T. alepochori* Malicky 1975, *T. aligi* Malicky 1972, *T. anemossa* Malicky 1984, *T. archilochos* Malicky 1975, *T. braueri* McL. 1878, *T. erato* Malicky 1976, *T. jansseni* Jacquemart 1957, *T. makedonicus* Malicky 1980, *T. megalopompos* Malicky 1977, *T. peterressli* Malicky 1975, *T. polyhymnia* Malicky 1976, *T. portolafia* Malicky 1976, *T. raina* Botosanenu 1960, *T. reisseri* Malicky 1970, *T. rethimnon* Malicky 1972, *T. sarisa* Malicky 1975, *T. serifos* Malicky 1984 and *T. unidentatus* Klapálek 1894) are exclusively known from the Balkan peninsula and adjacent islands (Malicky 2005b); from the latter group, the larval stages are completely unknown. Recently, however, larvae of an unknown *Tinodes* species were

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collected by W.G., A.P, M.K. at river Cetina, Croatia, which could be clearly associated with *T. braueri* by adults originating from the same location.

Morphological separation of *Tinodes braueri* from other Trichoptera

By following Edington & Hildrew (1995) and Waringer & Graf (1997, 2004), last instar larvae of *Tinodes* are separated from other Central European Trichoptera by the following set of morphological characters typical for Psychomyiids:

- Dorsal sclerites on thorax present on pronotum only (Fig.1);
- Larvae without transportable cases but in galleries made of detritus;
- Labrum sclerotized (Fig. 3 l);
- Ninth abdominal segment lacking a dorsal sclerite;
- Anal prolegs without basal membraneous section (Fig. 2);
- Lobus labialis of maxillolabium greatly elongated (Fig. 3, arrow);
- Pronotum without black thickening in posterior-lateral position (Fig. 1);
- Coxopleurite of fore leg blunt; anterior section with two black, vertical bars (Fig. 6 b).

Within *Tinodes*, *T. braueri* can be easily separated from the other central European species described so far by its size and head coloration: whereas fifth instar head width is in the 0.55 – 0.80 mm range in other *Tinodes* species, it ranges from 1.01-1.18 mm in *T. braueri*. In addition, the head coloration pattern is very typical: from the large yellowish patches around the eyes two sharply-defined yellow bars extend in medio-posterior direction along the frontoclypeus border until the median constriction of this sclerite (Figs. 3, 4). The dorsal occipital area is also yellowish with large muscle attachment spots clearly visible (Fig. 4). Separation from other *Tinodes* species is as follows: *T. waeneri* is easily identified by four large longitudinal spots at the pronotum (e.g. Fig. 8, p. 119 in Waringer & Graf, 1997), and *T. zelleri* by its bluish body pigmentation which covers the whole body surface (e.g. Fig. 14, p. 123 in Waringer & Graf, 1997). In *T. braueri*, the labrum is uniformly dark except the light anterior border (Fig. 3 l), whereas in *T. unicolor*, the whole labrum surface is uniformly pale and in *T. pallidulus*, *T. maculicornis*, *T. assimilis* and *T. maclachlani* the labrum pigmentation is of uneven intensity and most darkest in the posterolateral corners. Only in *T. rostocki* and *T. dives* the labrum pigmentation resembles *T. braueri* and may be separated by the latter species' large head width and distinctive head coloration.

Description of the fifth instar larvae of *Tinodes braueri*

Material examined: five fifth instar larvae, one male and one female from river Cetina, at ikitina La a, collected on 6.6.2007 by W.G., A.P., M. K.

Body length of final instar larvae: 9.5 -- 11.8 mm; head width: 1.01 -- 1.18 mm. Dorsal area of the head capsule distinctly flattened and granulated, with large round yellowish areas around the eyes. From each of these areas, one sharply defined parietal band extends in

postero-median direction, thereby following the frontoclypeal suture until the median constriction of the frontoclypeus. The end points of the parietal bands are connected across the frontoclypeus by a light brown transverse band (Fig. 3, 4). Frontoclypeal area brown to dark brown; in its posterior third, a transverse row of muscle attachment spots is clearly visible. The parietal area bordering the yellow areas around the eyes in posterior direction is light brown in colour with large muscle attachment spots. Dorsal occipital region yellowish, with large muscle attachment spots. Ventral head surface light to medium brown. As typical for Psychomyiids, the lobus labialis of the maxillolabium is greatly elongated (Fig. 3).

Pronotum only sclerotized, as it is common in Psychomyiidae. The pronotum is light to medium brown, with darker muscle attachment spots. Along the anterior border a continuous row of long setae is present. At each pronotal area, 4-5 yellowish round spots at the base of individual setae are clearly visible. As in all other known *Tinodes* species, the pronotum lacks a black thickening in posterior-lateral position which is common in genus *Psychomyia* (Fig. 1). First coxopleurite light to medium brown; two black vertical bars at the anterior section are present (Fig. 5 b; one such bar is present only in *Lype* larvae). At the anterior edge of the first coxopleurite, a small unsclerotized spot is present forming the base for two tiny setae (Fig. 6). Legs light brown in colour. Coxopleurites of second and third leg weakly sclerotized and only lightly pigmented as it is the case in *T. rostocki*. Abdomen without gills and creamy white in colour, with traces of a very light reddish pigmentation dorsally and ventrally. Anal prolegs are short and consist of a sclerotized section only. Anal claws are sharply bent and lack any accessory teeth (Fig. 2).

Phenology, habitat and distribution

The geographical range of *Tinodes braueri* comprises the Western and Southern Balkan Peninsula (Malicky, 2004). The species is known from Croatia, Bosnia and Herzegovina, Albania, and Greece (Barnard, 2007).

On River Cetina *T. braueri* was found at the locations Obrovac Sinjski, Ikitina Lađa and Radmanove Mlinice.

At these locations the following Trichoptera-species were observed: *Rhyacophila fasciata* Hagen 1859, *Agraylea sexamaculata* Curtis 1834, *Psychomyia klapaleki* Malicky 1995, *Halesus digitatus* (Schrank 1781), *Limnephilus lunatus* Curtis 1834, *Limnephilus rhombicus* (Linnaeus 1758), *Lepidostoma hirtum* (Fabricius 1775), *Sericostoma flavicorne* Schneider 1845, *Silo piceus* (Brauer 1857) (Obrovac Sinjski); *Rhyacophila fasciata* Hagen 1859, *Rhyacophila tristis* Pictet 1834, *Polycentropus flavomaculatus* (Pictet 1834), *Cyrnus trimaculatus* (Curtis 1834), *Wormaldia subnigra* McLachlan 1865, *Psychomyia klapaleki* Malicky 1995, *Hydropsyche* cf. *incognita* Pitsch 1993, *Adicella syriaca* Ulmer 1907, *Athripsodes dalmatinus* Malicky 1980, *Mystacides azurea* Linnaeus 1761 (Ikitina Lađa); *Rhyacophila fasciata* Hagen 1859, *Lype reducta* (Hagen 1868), *Wormaldia subnigra* McLachlan 1865, *Hydropsyche* cf. *incognita* Pitsch 1993, *Halesus digitatus* (Schrank 1781), *Lepidostoma hirtum* (Fabricius 1775), *Athripsodes dalmatinus* Malicky 1980, *Ceracela dissimilis* (Stephens 1836), *Mystacides azurea* Linnaeus 1761, *Oecetis testacea* (Curtis 1834), *Sericostoma flavicorne* Schneider 1845 (Radmanove Mlinice).

Monthly measurements of physical-chemical parameters during 2004 and 2005 showed the following values: Alkalinity: 140 to 187.5 mgCaCO₃/l; Electric conductivity: 343 to 724 µS/cm, pH: 7.8 to 8.5, maximum water temperature: 13.9 °C (Obrovac Sinjski) to 20.5°C (Ikotina Laća).

Additionally *T. braueri* was found in the River Krka at Miljacka (near the city of Knin). This location is the westernmost record known so far.

At Ikotina Laća the dense population of the rare stonefly *Besdolus imhoffi* is most remarkable at this location.

In Croatia, adults were collected from April to May and September to October respectively which indicates that *T. braueri* has two generations in Croatia like in Greece (Malicky 2005a). 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* (Pictet 1834) and hygropetric habitats (*T. zelleri* McLachlan 1878) to streams (*T. rostocki* McLachlan 1878, *T. dives* (Pictet 1834) and rivers (e. g. *T. pallidulus* McLachlan 1878) with one species occurring in lakes and other lentic habitats also (*T. waeneri* (Linnaeus 1758)). Most of the species seem to prefer cold and swift running waters.

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References

- BARNARD, P., editor. Trichoptera. Fauna Europaea version 1.3. 2007. <http://www.faunaeur.org>
- EDINGTON, J.M.; HILDREW, A.G. Caseless caddis larvae of the British Isles. Cumbria, UK: 1995. p. 134 Freshwater Biological Association Scientific Publication No. 53
- MALICKY, H. Atlas of European Trichoptera. Springer; 2004. p. 359 Second Edition
- MALICKY H. Ein kommentiertes Verzeichnis der Köcherfliegen (Trichoptera) Europas und des Mittelmeergebietes. Linzer biol. Beitr. 2005a; 37:533–596.
- MALICKY H. Die Köcherfliegen Griechenlands. Denisia. 2005b; 17:240.
- WARINGER, J.; GRAF, W. Atlas der österreichischen Köcherfliegenlarven unter Einschluß der angrenzenden Gebiete. Facultas Universitätsverlag; Wien: 1997. p. 286
- WARINGER, J.; GRAF, W. Ergänzungen und Berichtigungen zum “Atlas der österreichischen Köcherfliegenlarven unter Einschluß der angrenzenden Gebiete”. Facultas Universitätsverlag; Wien: 2004. p. 19 Beilage zum 2. unveränderten Nachdruck

Figs.1 – 6.

Tinodes braueri, fifth instar larva; 1: Pronotum, left lateral view; 2: Left anal proleg, lateral view; 3: Head, anterolateral view; 4: Head, dorsal view; Fig. 5: First coxopleurite, left lateral view; Fig. 6: Tip of first coxopleurite, right anterolateral view, showing a tiny unsclerotized spot. l = Labium; arrow in Fig. 3: Lobus labialis. Scale bars: 0.5 mm.