

# First record of *Hydropsyche spiritoi* Moretti, 1991 in France [Trichoptera, Hydropsychidae]

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Several adults and larvae of *H. spiritoi* were collected in the Provence-Alpes-Côte d'Azur Region (S-E France). This material completes our knowledge on the geographical distribution of this species throughout the W-Mediterranean. *H. spiritoi* is a new record for France. Some ecological data and morphological characters are provided.

## Première citation d'*Hydropsyche spiritoi* en France [Trichoptera, Hydropsychidae]

Mots clés : *Hydropsyche spiritoi*, Trichoptera, nouvelle citation, Région PACA, S-E France.

Des collectes de Trichoptères dans la Région Provence-Alpes-Côte d'Azur, ont permis de noter pour la première fois la présence d'*H. spiritoi* en France. Ces découvertes complètent nos connaissances sur la distribution géographique de cette espèce dans l'Ouest méditerranéen. Des éléments concernant sa détermination et son écologie sont donnés.

## Introduction

*Hydropsyche* s. l. (Trichoptera, Hydropsychidae) is one of the most diverse Trichopteran genera, with over 600 described species distributed all over biogeographic Regions (MORSE

2016). Larvae of *Hydropsyche* occur in lotic habitats with a wide variety of environmental conditions, frequently reaching high densities (e.g., TANIDA 1980, YAN & LI 2007). In Europe, the genus comprises 120 species (PESI 2016), with 26 recorded in Greece (MALICKY 2005), 25 in France (OPIE-BENTHOS 2016), 23 in Spain (GONZÁLEZ & MARTÍNEZ-MENÉNDEZ 2011, MARTÍNEZ-MENÉNDEZ 2014), 20 in Italy (CIANFICCONI 2002), and 9 in Portugal (GONZÁLEZ & MARTÍNEZ-MENÉNDEZ 2011, MARTÍNEZ-MENÉNDEZ 2014). The Mediterranean countries do not only hold a high number of species but also many endemics. Out of the 74 *Hydropsyche* species recorded in Mediterranean rivers of these countries, 41 are endemic (TIERNO DE FIGUEROA et al. 2013). Moreover, the number of *Hydropsyche* species in these countries is most likely underestimated and new species have been recently described (e.g., GONZÁLEZ & MALICKY 1999, MALICKY 2001, ZAMORA-MUÑOZ et al. 2002, SIPAHILER 2016).

*Hydropsyche spiritoi* Moretti, 1991 belongs to the *instabilis*-group, originally considered as an endemic element of the Italian Peninsula that was recently cited in Spain (GONZÁLEZ & MARTÍNEZ-MENÉNDEZ 2008). In Italy, it has a wide distribution all over the country (from central Alps to Sicily) but it is more frequently found in the central and southern regions (CIANFICCONI et al. 2006). According to GONZÁLEZ & MARTÍNEZ-MENÉNDEZ (2008), despite the existing adult records in the Aragon region (Spain), *H. spiritoi* is likely more widespread in the north eastern areas. Up to know, *H. spiritoi* has not been recorded in France.

## Studied material

Adults and larvae of *H. spiritoi* were collected in the Provence-Alpes-Côte d'Azur Region (S-E France) at the following sites:

Grana River, waterfalls at Saorge, Maritime Alps dept., alt. 430 m: 2 ♂, 17.07.2009 (leg S. Jolivet & G. Coppa).

Cagne River, the confluence of Cagne River and Foussa spring, at Coursegoules, Var dept, alt. 940 m: 1 ♂, 2 ♀, 12.06.2009 (leg M. Derrien & G. Coppa)

Grand Torrent stream, downstream Realtor Lake at La Tour d'Arbois, Aix-en-Provence, Bouches-du-Rhône dept, alt. 129 m: 2 ♂, 24.07.2014.

Bresque River at Sillans-la-Cascade, Var dept., alt. 376 m: 17 ♂, 09.06.2011 and 12.09.2011.

Argens stream at Montaud, near from Chateaufort, Var dept., alt. 223 m: 1 ♂, 08.09.2011.

Vallon-de-Véounes spring at Barjols, Var dept., alt. 240 m: 1 ♂, 26.06.2012.

Vallon de la Combe Amère spring at Salernes, Var dept., alt. 332 m: 1 ♂, 13.10.2011 (leg G. Coppa & G. Le Guellec).

Calavon River, near from Valsaintes, at Simiane-la-Rotonde, Alpes-de-Haute-Provence dept., alt. 500 m: 1 larva, 19.11.2013.

Calavon River, downstream Saut-du-Moine waterfalls, at Simiane-la-Rotonde, Alpes-de-Haute-Provence dept., alt. 467 m: 2 larvae, 19.11.2013, 24.04.2014.

Toulourenc River at Montbrun-les-Bains, Drôme dept., alt. 582 m: 1 larva, 07.01.2015 (leg B. Launay & T. Datry).

## Taxonomic remarks

Male adults of *H. spiritoi* are characterized by a combination of the main following morphological characters:

- inferior appendages bearing a very short and thin coxopodite;
- aspect of apical part of the phallic apparatus, which is long and slightly rounded at the tips in lateral view;
- lateroapical projections of the phallic apparatus large and triangular.

Larval gills are lacking on the 7<sup>th</sup> abdominal segment. Larvae have a submentum with short and wide lateral lobes. The apotome is slightly elongated with parallel-sided lateral margins and with an aboral light spot often joining the light lateral spot forming a V-shape (DE PIETRO 1999). An oral spot can be also present and often joined to the lateral light spot.

## Geographical distribution and ecology

Material composed of adults and larvae were collected in the upper basin of karstic temporary streams and rivers. Localities where larvae were collected are characterized by the following environmental data of water: mean temperature,  $7.92 \pm 6.51$  °C; pH,  $8.32 \pm 0.28$ ; conductivity,  $575.53 \pm 65.54$   $\mu\text{S}/\text{cm}$ ; dissolved oxygen, concentration ( $10.78 \pm 1.25$  mg/l), saturation ( $98.02 \pm 1.25\%$ ). Nevertheless, similar environmental characteristics were reported by GRAF et al. (2008) for *H. spiritoi*.

Based on the present records of *H. spiritoi* from southern France (Provence), the current geographical distribution of this species may cover a larger area throughout the North Western part of the Mediterranean Basin than previously thought. Although biological and ecological traits of *Hydropsyche* larvae are regularly monitored by researchers and water managements (STATZNER & MONDY 2009), more detailed information about its geographical distribution and its morphological variation is still needed to make identifications more reliable. However, additional relevant information on molecular variability of *H. spiritoi* remains necessary and extremely valuable to learn more about its evolutionary origin and its taxonomic position, which could help to assess the status of the existing populations.

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