

FIRST RECORD OF *BERAEA DIRA* MCLACHLAN 1875 (INSECTA, TRICHOPTERA, BERAEDIAE) IN CROATIA

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The caddisfly species *Beraea dira* McLachlan 1875 was recorded for the first time in Croatia in the upper course of the Bistrac River in October 2014.

Key words: caddisfly, new record for Croatia, Bistrac River

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Tular *Beraea dira* McLachlan 1875 je po prvi put utvrđen na području Hrvatske u gornjem toku rijeke Bistrac u listopadu 2014. godine.

Ključne riječi: tulari, nova vrsta za Hrvatsku, rijeka Bistrac

INTRODUCTION

The order Trichoptera, or caddisflies, includes 14,548 extant species (MORSE, 2015), more than 1,400 of which occur in Europe (MALICKY, 2004). Trichoptera have evolved into a highly diverse fauna that exploits nearly all aquatic habitats (GRAF *et al.*, 2008a).

In the last two decades systematic research of caddisflies has been conducted in Croatia, resulting in a relatively good knowledge of the caddisfly fauna of certain areas (e.g. Plitvice Lakes National Park, the Cetina River, the Dobra River, the Krka River). In this period several new species and subspecies have been discovered (PREVIŠIĆ *et al.*, 2014; KUČINIĆ *et al.*, 2013; OLÁH, 2010, 2011; MALICKY *et al.*, 2007; KUČINIĆ & MALICKY, 2002). Caddisfly females (KUČINIĆ *et al.*, 2014; VUČKOVIĆ *et al.*, 2011) and larvae (PREVIŠIĆ *et al.*, 2014; WARINGER *et al.*, 2009; GRAF *et al.*, 2008b; KUČINIĆ *et al.*, 2008) have been described from specimens collected in Croatia. Furthermore, due to all this research as well as national monitoring of surface water quality a high number of species has been recorded for the first time (e.g. ČUK & VUČKOVIĆ, 2014; PREVIŠIĆ *et al.*, 2012; KUČINIĆ *et al.*, 2011).

However, some parts of Croatia are still poorly investigated and more detailed research should be conducted.

Considering the available literature data, previous research and individual records, the number of documented caddisfly species in Croatia is around 200 and it is estimated that in total 220–240 species might occur in Croatia.

This paper presents the first record of *Beraea dira* McLachlan 1875 in Croatia.

RESEARCH AREA

The Bistrac (Bistrica) River is situated in the Dinaric ecoregion (ER5) (ILLIES, 1978) and belongs to the catchment area of the Dobra River (Fig. 1a). It is a small continental river with a length of 4.5 km (OPALA & OŽANIĆ, 2010). According to national typology the Bistrac River is classified as „a small montane and upland rives“ (NARODNE NOVINE, 73/13). The study site at the Bistrac River is located approximately 20 km from the city of Ogulin, near the settlement of Trošmarija (Fig. 1b). The dominant substrates were lithal (macro-, meso- and microlithal) and phytal (HRN EN 16150) (Fig. 2).

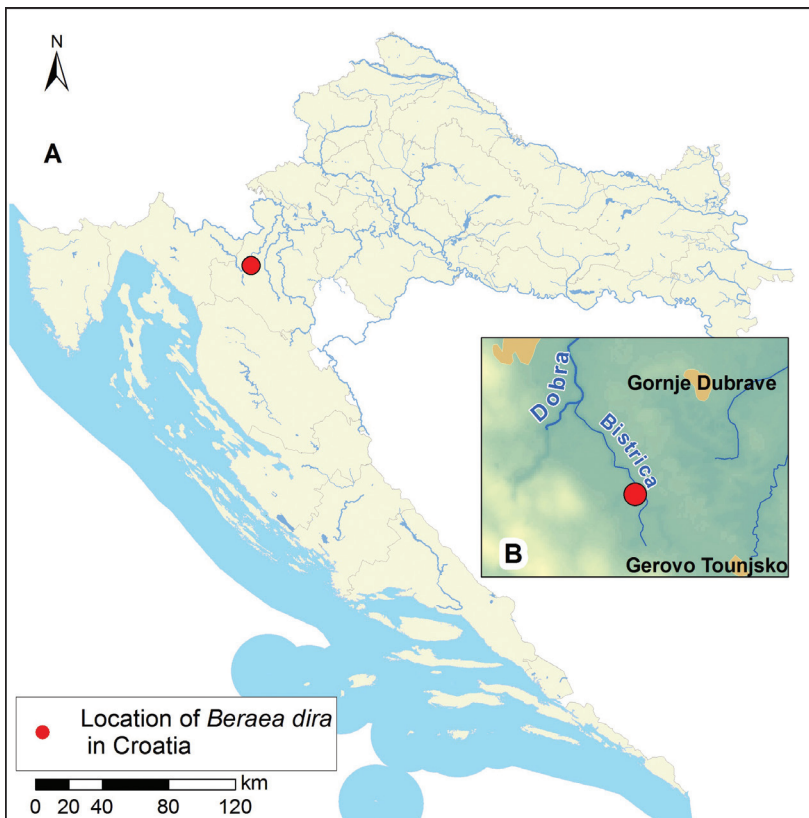


Fig. 1a. A map of Croatia with a record of *B. dira* (red spot); b) detail of the study area



Fig. 2. The study site at the Bistrac River (photo: D. Valić)

MATERIAL AND METHODS

Samples of macrozoobenthos were collected with the use of a hand net with a mesh size of 500 μm according to the AQEM sampling method (HERING *et al.*, 2004). All microhabitats represented with a more than 5% coverage were sampled. The collected material was preserved with ethanol in the field so the final concentration was cca 70%. Determination of benthic macroinvertebrates was done in the laboratory with the use of a binocular stereomicroscope (Olympus SZX10). For determination, the keys of WARRINGER & GRAF (2011) and LECHTHALER & STOCKINGER (2007) were used.

All specimens have been deposited in the collection of caddisflies in the Central Water Management Laboratory of Hrvatske vode.

RESULTS AND DISCUSSION

In October 2014 four larval specimens of *B. dira* were recorded in the upper course of the Bistrac River. According to Fauna Europaea (MALICKY, 2013), the species does occur in Croatia. However, due to the lack of data on locality of records in this database, as well as the absence of the species from any other available literature data and previous research, we consider this finding to be the first reliable record.

The characteristics of the larva are the following: posterior case opening is without a semicircular, lip-like prominence (Fig. 3a), posterior third of frontoclypeus broadly triangular (Fig. 3b), pronotum contains a broadly rounded lateral fold (Fig. 3c), only one carina is present at each side of the head capsule (Fig. 3c), thick terminal setae on basal sections of anal prolegs originates from yellowish-brown plates sclerotized only on ventral half of the base of seta and anterolateral setal group consists of 12 or more long setae (Fig. 3d).



Fig. 3. *Beraea dira*, a) larva in its case; b) head, frontal view; c) head and prothorax, lateral view; d) anal proleg (photos: R. Ćuk)

According to GRAF *et al.* (2008a) 18 species of the genus *Beraea* are present in Europe, 2 of which are widely distributed: *B. maurus* (Curtis, 1834) and *B. pullata* (Curtis, 1834), including Croatia (KUČINIĆ *et al.*, unpublished data), while the others are restricted to smaller regions. *B. dira* is recorded only in Ecoregions 4, 5 and 13 (GRAF *et al.*, 2008a). The species is cold stenotherm, preferring temperatures below 10 °C (GRAF *et al.*, 2008a). It mostly occurs in the eucrenal and hypocrenal zones, less in the epirhithral zone. It prefers madicol habitats (edge of water bodies, moist substrates) avoiding current so it usually inhabits slowly flowing streams and standing waters (GRAF *et al.*, 2008a).

The caddisfly fauna was explored in the catchment area of the Dobra River in the period 2009-2010 with around 80 species recorded (CERJANEC, 2012), which represents the largest number of caddisfly species recorded in one systematic study in Croatia (e.g. KUČINIĆ, 2002; KUČINIĆ *et al.*, 2011; VUČKOVIĆ, 2011). This indicates the high faunistic diversity of the catchment area of the Dobra River due to habitat diversity and high water quality (CERJANEC, 2012). Therefore, protection and prevention of further degradation of this area should be considered a priority.

At the study site at the Bistrac River 44 benthic macroinvertebrate taxa were recorded, of which the most abundant were: *Sadleriana* sp., *Gammarus fossarum* Koch, in Panzer 1835, *Echinogammarus* sp., *Elmis* sp. and *Ancylus fluviatilis* O.F. Muller 1774. Besides *B. dira*, six caddisfly taxa were recorded: *Odontocerum albicorne* (Scopoli 1763), *Sericostoma* sp., *Rhyacophila* sp., *Hydropsyche dinarica* Marinkovic-Gospodnetic 1979, *Lype reducta* (Hagen 1868) and *Plectrocnemia conspersa* (Curtis 1834).

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SAŽETAK

Prvi nalaz vrste *Beraea dira* McLachlan 1875 (Insecta, Trichoptera, Beraeidae) u Hrvatskoj

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U posljednja dva desetljeća provode se detaljnija istraživanja faune tulara u Hrvatskoj (Cetina, Drava, Dobra, Krka, Kupa, Kupica i druge rijeke) prema kojima je, uz postojeće literaturne podatke i pojedinačne nalaze, do sada zabilježeno oko 200 vrsta tulara. S obzirom na nedovoljnu istraženost tulara u Hrvatskoj, procjenjuje se da bi ukupan broj vrsta mogao biti oko 220–240. Ovaj rad daje prikaz nove vrste tulara u fauni Hrvatske koja je utvrđena na temelju prikupljenih ličinki: *Beraea dira* McLachlan 1875 iz porodice Beraeidae. Vrsta je zabilježena u listopadu 2014. godine u rijeci Bistrac koja pripada slivu rijeke Dobre, a cijelo se područje sliva odlikuje velikom raznolikošću tulara s obzirom na brojnost različitih staništa i dobru kakvoću vode. Navedeni nalaz važan je doprinos za faunu tulara Hrvatske.