

*IRONOQUIA DUBIA* STEPHENS, 1837  
(INSECTA: TRICHOPTERA), A CADDISFLY  
SPECIES NEW FOR CROATIA

RENATA ĆUK & IVAN VUČKOVIĆ

Hrvatske vode, Central Water Management Laboratory, Ulica grada Vukovara  
220, 10000 Zagreb, Croatia (renata.cuk@voda.hr)

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During March 2010 research was conducted into, so far, uninvestigated rivers and streams in the catchment area of the Sava River. The caddisfly species *Ironoquia dubia* Stephens, 1837 was found for the first time in Croatia.

**Key words:** Trichoptera, *Ironoquia dubia*, continental part of Croatia

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U ožujku 2010. godine provedeno je istraživanje rijeka i potoka u slivnom području rijeke Save koji do tada nisu bili istraženi. Tijekom istraživanja zabilježena je vrsta tulara *Ironoquia dubia* Stephens, 1837, što je prvi nalaz ove vrste u Hrvatskoj.

**Ključne riječi:** Trichoptera, *Ironoquia dubia*, kontinentalni dio Hrvatske

## INTRODUCTION

Caddisflies (Trichoptera), together with dragonflies (Odonata), mayflies (Ephemeroptera), stoneflies (Plecoptera) and true flies (Diptera), compose the majority of freshwater benthic macroinvertebrates. They inhabit almost every type of habitats although their biodiversity is at the highest in streams and small rivers (WALLACE *et al.*, 1990). According to present databases which refer to caddisflies biodiversity, 15.754 species are known (MORSE, 2009). The European fauna consists of more than 1000 species (MALICKY, 2004; 2005). During the last 20 years dozens of new species have been described in Europe (e.g. GONZALES & MALICKY, 1999; KUMANSKI & MALICKY, 1999; MALICKY, 1995; 1999; PITSCH, 1993). Some of them are recorded in Croatia: *Rhyacophila schmidinarica* Urbanič, Krušnik & Malicky, 2000; *Hydropsyche incognita* Pitsch, 1993; *Psychomyia klapaleki* Malicky, 1995 (URBANIČ *et al.*, 2000; MALICKY, 1995; PITSCH, 1993). Considering all data, ca. 170 species of caddisflies have been recorded in Croatia so far (e.g. KUČINIĆ *et al.*, 2010; ĆUK & VUČKOVIĆ, 2009; WARINGER

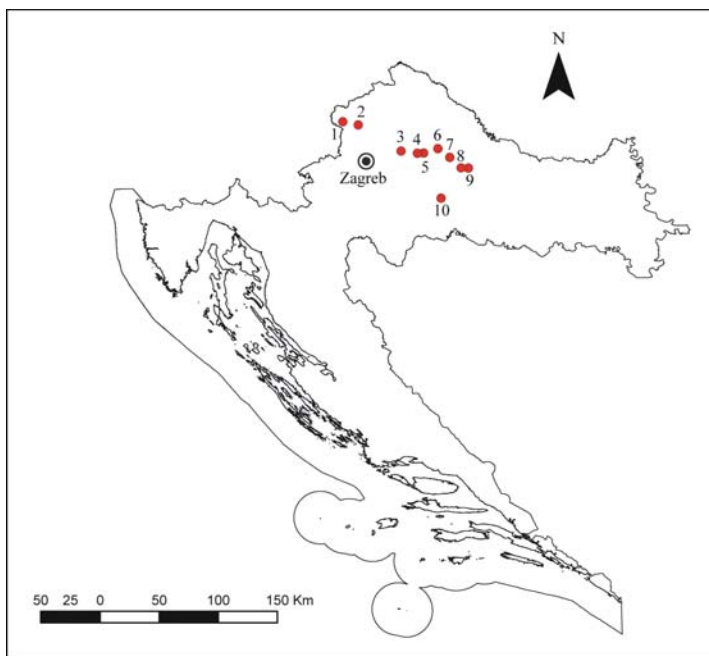
*et al.*, 2009; MALICKY, 2009; GRAF *et al.*, 2008; KUČINIĆ *et al.*, 2008; MALICKY *et al.*, 2007; PREVIŠIĆ *et al.*, 2007a; 2007b; KUČINIĆ, 2002; KUČINIĆ & MALICKY, 2002; MALICKY, 1996; KUČINIĆ & ILIĆ, 1992/93; RADOVANOVIĆ, 1935; M. KUČINIĆ, A. PREVIŠIĆ, I. VUČKOVIĆ, unpublished data) but the number is probably higher since the caddisfly fauna has not been investigated thoroughly.

The aim of this study was to present the first record of *I. dubia* in Croatia with ecological and morphological features of larva. These results were established during the research of the composition and structure of macroinvertebrate communities, since this area is generally poorly investigated and no recent data exist. The research was conducted in March, 2010.

## RESEARCH AREA

The research area covers the Pannonic region from the border with the Republic of Slovenia to the town of Daruvar in Croatia and lies within the catchment area of the Sava River. The investigation sites are situated north and east of the city of Zagreb (Fig. 1).

All streams are small lowland streams in a silicate substrate. Furthermore, all streams have been hydromorphologically changed via canalization and substrate alteration (Fig. 2). Thus the dominant substrates were argyllal (sludge and clay), phytal (living parts of plants) and xylal (large logs of dead wood)



**Fig. 1.** Distribution of *I. dubia* in Croatia (numbers of sampling sites correspond to those in Tab. 1) (map: I. Stanković)

**Tab. 1.** List of streams, geographic position and a number of specimens of *I. dubia* recorded on each sampling station

	Stream	GPS position		number of individuals
		N	E	
1.	Žbiljski potok	46°06'17"	15°44'12"	3
2.	Pačetina	46°04'42"	15°54'07"	1
3.	Dulepski potok	45°52'34"	16°22'03"	5
4.	Velika	45°53'35"	16°27'09"	1
5.	Dunjara	45°51'20"	16°34'41"	8
6.	Bjelovacka	45°53'14"	16°46'07"	1
7.	Severinska	45°49'13"	16°53'37"	2
8.	Grđevica	45°44'46"	17°03'48"	4
9.	Barna	45°44'05"	17°05'31"	3
10.	Kutinica	45°30'39"	16°47'20"	5

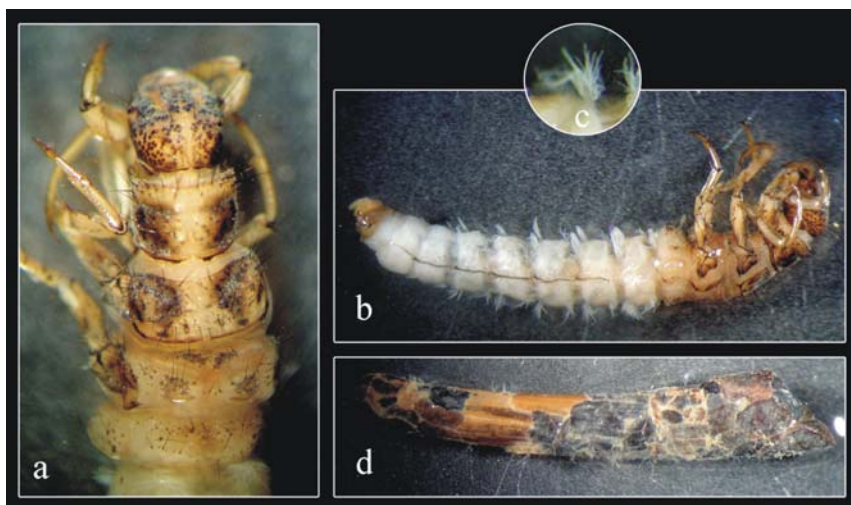
## MATERIAL AND METHODS

Macrozoobenthos samples were collected by using a hand net with a mesh size of 500 µm according to the AQEM sampling method (HERING *et al.*, 2004). All microhabitats represented with more than 5% coverage were sampled. The collected material was preserved with ethanol in the field and the final concentration was 70%. Separation and determination of benthic invertebrates were done in the laboratory by using a binocular stereomicroscope (Olympus SZX9). For determination the key of WARINGER & GRAF (1997) was used.

In these samples we collected 33 specimens of *I. dubia* larvae (Tab. 2) which have been deposited in the collection of caddisflies in the Central Water Management Laboratory of the 'Hrvatske vode'.



**Fig. 2.** Streams (a) Velika; (b) Bjelovacka (photos: M. Miličić)



**Fig. 3.** *Ironoquia dubia* Stephens 1837, larva. (a) dorsal view; (b) lateral view; (c) abdominal gill in detail; (d) case (photos: I. Stanković)

## RESULTS AND DISCUSSION

The species *Ironoquia dubia* Stephens 1837 was present at ten out of thirty streams investigated (Tab. 1; Fig. 1). Considering all available data this species was not recorded in Croatia so far (MALICKY & BERNARD, 2009; EURO-LIMPACS consortium, 2007). Although larvae exclusively were found, these records are reliable since its morphology is very unique and cannot be misinterpreted. The gills consist of 8–24 filaments (Fig. 3b, 3c) unlike in other species of Limnephilidae whose gills consist of 1–4 filaments only (WARINGER & GRAF, 1997). Furthermore the typical pale median section of pronotum and mesonotum is characteristic (Fig. 3a).

The larva inhabits woodland streams, ditches and ponds in which the bottom is covered with dead leaves. The case is made of pieces of dead leaf and other vegetable debris arranged rather like tiles on the roof of a house (imbricate) and the case is strongly curved and narrowing posteriorly (Fig. 3d) (HICKIN, 1967).

The area of distribution for species *I. dubia* is Great Britain, Central and Northern Europe and areas of Belarus and Romania, while finding for Portugal is not assured according to MALICKY & BERNARD, 2009.

According to GRAF *et al.* (2002) *I. dubia* does not have a specific saprobic value. It appears not only in temporary (periodic) streams which are less organically polluted but also in permanent and more polluted streams (up to the  $\alpha$ -mesosaprobic level). Chemical analyses confirm this statement since the results show a wide variation (COD from 2,5–11,2 mgO<sub>2</sub>/l; BOD<sub>5</sub> from 1,3–3,7 mgO<sub>2</sub>/l; nitrates from 0,09–1,13 mgN/l; total phosphorus from 0,041–0,188 mgP/l).

Regarding the feeding type *I. dubia* is a shredder. The pupal stage prospers best in semi-terrestrial area (GRAF *et al.*, 2002).

Some of the frequent species found together with *I. dubia* were *Asellus aquaticus* (Linnaeus, 1758), *Synurella ambulans* (F. Müller, 1846), *Nemoura cinerea* (Retzius, 1873), *Siphonurus lacustris* (Eaton, 1870).

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## S A Ž E T A K

***Ironoquia dubia* Stephens, 1837 (Insecta: Trichoptera), nova vrsta tulara za faunu Hrvatske**

R. Ćuk &amp; I. Vučković

Fauna tulara u Hrvatskoj nije u potpunosti istražena. Djelomična istraživanja tulara započela su 50-ih godina prošlog stoljeća i tada je utvrđeno 40-tak vrsta tulara. Posljednjih godina počinju detaljnija istraživanja (Cetina, Drava, Kupa, Kupica i druge rijeke) koja su zabilježila cca 170 vrsta tulara. Vrsta *Ironoquia dubia* Stephens, 1837 pripada porodici Limnephilidae i po prvi puta je zabilježena u Hrvatskoj. Vrsta je pronađena na području sliva rijeke Save, i to na lijevim pritocima na potezu od granice s Republikom Slovenijom do Daruvara (sjeverni i sjeveroistočni dio kontinentalne Hrvatske).