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# *DRUSUS CHRYSOTUS* (RAMBUR, 1842) (TRICHOPTERA: LIMNEPHILIDAE: DRUSINAE): A NEW CADDISFLY SPECIES IN THE CROATIAN FAUNA

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**Previšić, A., Cerjanec, D., Graf, W. & Kučinić, M.: *Drusus chrysotus* (Rambur, 1842) (Trichoptera: Limnephilidae: Drusinae): a new caddisfly species in the Croatian fauna. Nat. Croat., Vol. 21, No. 2., 419–425, 2012, Zagreb.**

*Drusus chrysotus* is a cold water stenotherm species inhabiting spring reaches and headwaters of mountain streams. It has a disjunct distribution range covering mountain ranges across central Europe, and has now been recorded for the first time in Croatia, in the Gorski kotar region, thus extending its distribution range to the Dinaric Western Balkan ecoregion (sensu Illies, 1978). *D. chrysotus* was collected at the spring of the Dobra River, which is heavily impacted by human activity. Due to the specific aquatic insect fauna of this spring, conservation and prevention of further habitat alteration of this section of the Dobra River should be a priority for the local community.

**Key words:** Gorski kotar, disjunct distribution, cold water stenotherm, conservation

**Previšić, A., Cerjanec, D., Graf, W. & Kučinić, M.: *Drusus chrysotus* (Rambur, 1842) (Trichoptera: Limnephilidae: Drusinae), nova vrsta tulara za faunu Hrvatske. Nat. Croat., Vol. 21, No. 2., 419–425, 2012, Zagreb.**

Vrsta *Drusus chrysotus* je stenoterm koji naseljava hladne vodotokove, tj. izvore i izvorišne dijelove planinskih potoka. Ima disjunktni areal i rasprostranjena je u planinskim područjima središnje Europe. Sada je prvi puta zabilježena u Hrvatskoj, u Gorskom kotaru, što predstavlja proširenje njezinog areala na ekoregiju Dinaridski zapadni Balkan (sensu Illies). Vrsta *D. chrysotus* prikupljena je na izvoru Dobre, koji je pod jakim antropogenim utjecajem te je značajno izmijenjen. Obzirom na vrlo specifičnu faunu vodenih kukaca ovog izvora, zaštita i sprječavanje daljnje degradacije staništa izvorišnog dijela rijeke Dobre trebala bi biti jedan od prioriteta lokalne uprave.

**Ključne riječi:** Gorski kotar, disjunktni areali, hladnovodni stenoterm, zaštita

## INTRODUCTION

Due to its geographic position, the Gorski kotar region in western Croatia represents the biogeographic link of alpine and Dinaric flora and fauna (SCHMITT, 2009). This, accompanied with the complex geological structure, hydrological network and landscape topography (BIONDIĆ *et al.*, 2006; BOGNAR, 1996) has resulted in a specific faunistic composition of aquatic insects, e.g. occurrence of range-restricted endemic caddisflies (MALICKY *et al.*, 2007) and springs acting as microrefugia for cold water stenotherms (POPIJAČ & SIVEC, 2009; PREVIŠIĆ *et al.*, 2009).

Ninety five species of Drusinae (Trichoptera: Limnephilidae) with different distribution ranges are known to inhabit the springs and headwaters of mountain streams throughout European mountain ranges (GRAF *et al.*, 2008a; KUČINIĆ *et al.*, 2011a; OLÁH 2010; PAULS *et al.*, 2008; unpublished data). In Croatia, 4 Drusinae species have previously been recorded (GRAF *et al.*, 2008a; HABDIJA, 1979; KUČINIĆ *et al.*, 2010; MARINKOVIĆ-GOSPODNETIĆ, 1979; PREVIŠIĆ, 2009; PREVIŠIĆ & POPIJAČ, 2010; GRAF W., KUČINIĆ M. & PREVIŠIĆ A. unpublished data). Among these, two are widely distributed over European mountain ranges; *Drusus discolor* (Rambur, 1842) and *Ecclisopteryx dalecarlica* Kolenati, 1848 (GRAF *et al.*, 2008a; PAULS *et al.*, 2006; VUČKOVIĆ *et al.*, 2011; WARINGER *et al.*, 2009), and one is a range-restricted endemic: *Drusus croaticus* Marinković-Gospodnetić, 1971 (distributed in Croatia and SE Slovenia; KUČINIĆ *et al.*, 2008; PREVIŠIĆ *et al.*, 2009, URBANIČ, 2004). The forth Drusinae species in Croatia is most probably the range-restricted endemic *Drusus vespertinus* Marinković-Gospodnetić, 1976 (distributed in Bosnia and Herzegovina; KUČINIĆ *et al.*, 2011b). However, only larvae were recorded in Croatia so far, thus this finding needs to be confirmed by the collection of adults (ĆUK R., KUČINIĆ M. & PREVIŠIĆ A., unpublished data).

**Fig. 1.** a) Heavily modified spring of the Dobra River; b) crenal section of the Dobra River where *Drusus chrysotus* was collected.

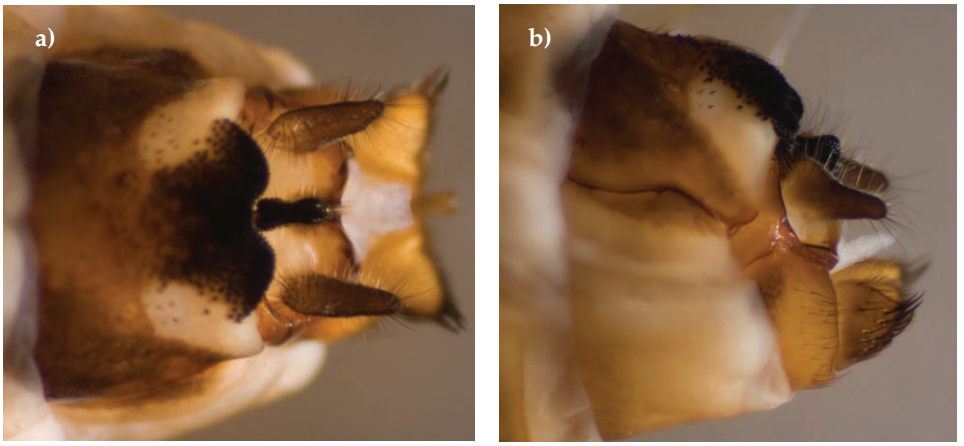


**Fig. 2.** a) Dorsal and b) right lateral view of male genitalia of *Drusus chrysotus.*

*Drusus chrysotus* (Rambur, 1842) is distributed in central European mountain ranges (BOTOSANEANU & MALICKY, 1978; GRAF *et al.*, 2008a) including the Alpine region of neighbouring Slovenia (URBANIČ, 2004); thus this record in western Croatia, Gorski kotar region, represents an extension of its distribution range to the southeast.


**Fig. 3.** *Drusus chrysotus* larva: a) larva in its case, left lateral view; b) head and thorax, dorsal view, c) head, thorax and first abdominal sternum, ventral view; d) head and thorax, left lateral view.

## METHODS

Adults and larvae of *D. chrysotus* were collected in the spring reach of the Dobra River, in Gorski kotar, western Croatia (Figs. 1a, b; geographic position: 45°25.796 N, 14°54.563 E; 700 m a.s.l.). One adult male was first collected using an UV light trap on 30 April 2010 during a faunistic and ecological survey of Trichoptera carried out by D.C. and M.K. Additionally, four last instar larvae and one female were collected by hand on 10 June 2010 (leg. A.P.).

For identification of both adults and larvae the keys of MALICKY (2004) and WARINGER & GRAF (1997, 2011) were used. In addition, both adults and larvae were compared with specimens collected in Austria deposited in the collection of W.G. (Vienna, Austria).

## RESULTS AND DISCUSSION

To exclude any possibility of misidentification due to the relatively similar morphology of some *Drusus* species potentially occurring in the region (MALICKY, 2004), we additionally compared all specimens collected in the spring of the Dobra River with *D. chrysotus* individuals collected in the Austrian Alps (W.G., unpublished data) and confirmed our identification. Morphological details of the male genitalia of *D. chrysotus* collected in the Dobra spring are presented in Fig. 2.

A record of *D. chrysotus* in Gorski kotar, the most western part of Croatia, has been expected, considering available data. It has a disjunct distribution and its range covers mountain ranges across central Europe (BOTOSANEANU & MALICKY, 1978; GRAF *et al.*, 2008a; LUBINI-FERLIN & VICENTINI, 2005). However, in neighbouring Slovenia it was only recorded in the Alpine region (URBANIČ, 2004), so this is the first record for the Dinaric Western Balkan ecoregion (sensu ILLIES, 1978), and an extension of its distribution range to the southeast.

Like the majority of Drusinae species, *D. chrysotus* is a cold water stenotherm inhabiting spring reaches and headwaters of mountain streams (GRAF *et al.*, 2008a). Regarding the feeding type, *D. chrysotus* belongs to the group of carnivorous filterers; thus its larvae are characterised by a highly specific morphology associated with such feeding behaviour (e.g. head capsule modifications, additional setae on the legs, long filtering bristles on the abdomen etc.) (Fig. 3; WARINGER *et al.*, 2007; WARINGER & GRAF, 1997; 2011).

Overall, the spring reach of the Dobra River is heavily affected by human activities. Probably due to its position very close to the town of Skrad (and literally 30 m away from the nearest house) the spring of the Dobra River has been heavily modified (Fig. 1 a). Although the hypocrenal section has remained relatively unchanged (Fig. 1 b), the stream has been channelled and thus hydromorphologically heavily modified very soon downstream (personal observation). Due to changes in substrate composition, water flow and community composition of macroinvertebrates within the downstream section, species such as *D. chrysotus* are only able to persist within the short, relatively unchanged crenal section of the stream (e.g. GRAF, *et al.* 2008a). So far, this is the only locality in Croatia where this species has been recorded. Consequently, conservation and prevention of further habitat degradation of this section of the Dobra River should be a priority for the local community.

At the spring of the Dobra River we collected adults and larvae of one more Drusinae species, *Drusus discolor*, a species with a disjunct distribution within European mountain ranges even more extended than in *D. chrysotus* (PAULS *et al.*, 2006). In addition, we also collected the following species inventory: *Agapetus ochripes*

Curtis, 1834, *Allogamus auricollis* (Pictet, 1834), *Goera pilosa* (Fabricius, 1775), *Hydropsyche cf. incognita* Pitsch, 1993, *Odontocerum albicorne* (Scopoli, 1763), *Plectrocnemia conspersa* (Curtis, 1834), *Plectronemia brevis* McLachlan, 1871, *Potamophylax pallidus* (Klapálek, 1899), *Rhyacophila fasciata* Hagen, 1859, *Rhyacophila laevis* Pictet, 1834, *Rhyacophila schmidinarica* Urbanic, Krusnik & Malicky, 2000, *Rhyacophila tristis* Pictet, 1834, *Sericostoma flavicorne* Schneider, 1845, *Silo piceus* (Brauer, 1857), *Tinodes braueri* McLachlan, 1878, *Wormaldia occipitalis* (Pictet, 1834) and *Wormaldia subnigra* McLachlan, 1865.

Based on the aquatic insect fauna of its springs, the Gorski kotar region contains very important sites in a biogeographical context, harbouring microrefugia for cold water stenotherms (POPIJAČ & SIVEC, 2009; PREVIŠIĆ *et al.*, 2009: PREVIŠIĆ & POPIJAČ, 2010). At these locations, exclusively Central European species (e.g. *D. chrysotus*, this study; *Protonemura julia*, POPIJAČ & SIVEC, 2009) and exclusively Balkan species (*Tinodes braueri*, GRAF *et al.*, 2008b; *D. croaticus*, PREVIŠIĆ *et al.*, 2009) intermix. Thus, the importance of the conservation of these habitats is further underlined.

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# SAŽETAK

## *Drusus chrysotus* (Rambur, 1842) (Trichoptera: Limnephilidae: Drusinae), nova vrsta tulara za faunu Hrvatske

A. Previšić, D. Cerjanec, W. Graf & M. Kučinić

Izvori i izvorišna područja u Gorskom kotaru od izuzetne su važnosti za faunu vodenih kukaca u biogeografskom pogledu, s obzirom da predstavljaju mikrorefugije za hladnovodne stenotermne organizme (POPIJAČ & SIVEC, 2009; PREVIŠIĆ *et al.*, 2009) te područja preklapanja areala alpskih i balkanskih vrsta (GRAF *et al.*, 2008a; POPIJAČ & SIVEC, 2009; PREVIŠIĆ *et al.*, 2009; ovo istraživanje).

Od ukupno poznatih 95 vrsta potporodice Drusinae (Limnephilidae: Trichoptera) koje naseljavaju planinska područja diljem Euroazije i imaju različite areale (GRAF *et al.*, 2008a; KUČINIĆ *et al.*, 2011a; OLÁH 2010; PAULS *et al.*, 2008), u Hrvatskoj su bile zabilježene 4 vrste, od toga dvije široko rasprostranjene i najvjerojatnije dvije endemske za područje Dinarida (GRAF *et al.*, 2008a; HABDIJA 1979; KUČINIĆ *et al.*, 2010; MARINKOVIĆ-GOSPODNETIĆ, 1979; PREVIŠIĆ & POPIJAČ, 2010; ĆUK R., GRAF W., KUČINIĆ M. & PREVIŠIĆ A., neobjavljeni podaci).

Vrsta *Drusus chrysotus* je stenoterm koji naseljava hladne vodotokove, tj. izvore i izvorišne dijelove planinskih potoka (GRAF *et al.*, 2008). Ima disjunktni areal i rasprostranjena je u planinskim područjima Središnje Europe. Sada je prvi puta zabilježena u Hrvatskoj, u Gorskom kotaru, što predstavlja proširenje njezinog areala na ekoregiju Dinaridski zapadni Balkan (sensu ILLIES; GRAF *et al.*, 2008). Vrsta *D. chrysotus* zabilježena je na izvoru Dobre, pri čemu su prikupljeni odrasli primjerci (mužjak i ženka) i ličinke. Na navedenom izvoru do sada je ukupno zabilježena 21 vrsta tulara.

Kako se nalazi vrlo blizu naselja, izvor rijeke Dobre pod jakim je antropogenim utjecajem te je značajno izmijenjen. Obzirom na vrlo specifičnu faunu vodenih kukaca ovog izvora, ali i općenito izvorišnih područja u Gorskom kotaru, zaštita i sprječavanje daljnje degradacije staništa izvorišnog dijela Dobre trebala bi biti jedan od prioriteta lokalne uprave.