

First record of *Cordulegaster heros* in the Czech Republic, with notes on *Cordulegaster* spp. in southern Moravia (Odonata: Cordulegastridae)

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Abstract

On 19-viii-2009 a dead female of *Cordulegaster heros* was found in Buchlovický stream in Buchlovice village in the Chřiby hills of the Czech Republic. The potential occurrence of permanent populations of *C. heros* and records of other *Cordulegaster* species in southern Moravia are discussed.

Shrnutí

První nález *Cordulegaster heros* v České republice s poznámkami k výskytu dalších druhů *Cordulegaster* v oblasti jižní Moravy (Odonata: Cordulegastridae) – 19. srpna 2009 byl nalezen jeden mrtvý exemplář samice páskovce velkého *Cordulegaster heros* na Buchlovickém potoce v obci Buchlovice v Chřibech. Dále je diskutován potenciální výskyt trvalé populace *C. heros* a údaje o výskytu dalších druhů rodu *Cordulegaster* v oblasti jižní Moravy.

Zusammenfassung

Erster Nachweis von *Cordulegaster heros* in der Tschechischen Republik mit Anmerkungen zum Vorkommen weiterer *Cordulegaster*-Arten im südlichen Mähren (Odonata: Cordulegastridae) – Am 19.08.2009 wurde im Buchlovicer Bach, in der Ortschaft Buchlovice im tschechischen Marsgebirge, ein totes Weibchen von *C. heros* gefunden. Ein mögliches bodenständiges Vorkommen von *C. heros* und Vorkommen weiterer *Cordulegaster*-Arten in südmährischen Gebieten werden diskutiert.

Introduction

The Balkan Goldenring *Cordulegaster heros* is one of the largest dragonfly species in Europe; in fact – along with *Anax immaculifrons* – females of *C. heros* with a

hind wing length of up to 58 mm and a body length of up to 96 mm are the largest dragonflies in Europe (VAN PELT 2006). Interestingly, *C. heros* was not discovered and described until 1979 (THEISCHINGER 1979), and the type material originates from St. Andrä vor dem Hagenthale in Lower Austria, Central Europe. *Cordulegaster heros* prefers hilly landscapes, where it inhabits small meandering streams in the farmed landscape or in forest complexes (RAAB et al. 2006; JANSKÝ & DAVID 2008; HOLUŠA & KÚDELA 2010). Due to a relatively small distribution range and narrow habitat requirements, *C. heros* is listed in Annexes II and IV of the EC Habitats Directive 92/43/EEC.

The distribution of *C. heros* is limited to southeastern Europe and southeastern parts of central Europe, ranging from Greece northwards to Austria and Slovakia (BOUDOT 2001). The westernmost records originate from northeastern Italy (BEDJANIČ & ŠALAMUN 2003; UBONI et al. 2006), the easternmost ones from central Bulgaria (MARINOV 2000). VAN PELT (2006) stated that the north-eastern range limits are poorly understood and that records of *C. boltonii* from Romania and the Ukraine may in fact pertain to *C. heros*. In Romania at least the western parts are populated by the species (KIPPING 1998). In western Hungary records of *C. heros* exist (e.g. TÓTH 2006; CSORDÁS et al. 2009), whereas in the central and eastern parts the situation is not clear (BOUDOT 2001; VAN PELT 2006). In Austria the species reaches its north-western range limit in the southern Waldviertel, district Melk (RAAB et al. 2006; SCHWEIGHOFER 2008). In addition, an indigenous population of *C. heros* was recorded in 2008 near Gars am Kamp, district Horn (W. Schweighofer pers. Mitt.). The northernmost range limit is actually considered to run through north-eastern Austria and Slovakia where *C. heros* has been found in the Malé Karpaty mountains and the Borská nížina lowland in western Slovakia in the year 2001 (BLAŠKVIČ et al. 2003; JANSKÝ & DAVID 2008), as well as in central Slovakia near Revúca (HOLUŠA & KÚDELA 2010). Furthermore, *C. heros* was listed as a species with a potential occurrence in the Czech Republic in the comprehensive work by HOLUŠA (2007c).

Based on the known range, we assume that *C. heros* can also be expected to occur in regions with suitable habitats in the Czech Republic, especially in regions adjoining Slovakian populations. Therefore intensive investigations have been carried out since 1998 in potentially suitable habitats in regions either bordering on or being distant from the known species range.

Study area and methods

Investigations of potentially suitable aquatic habitats in south and central Moravia, including lowlands along the Dyje and Morava rivers, were carried out from 1998 to 2009 during the period May to September. Water courses where the occurrence of *Cordulegaster heros* could be expected, in particular localities up to an altitude of 400 m a.s.l. were chosen in the following areas: the Bílé Karpaty mountains, the Českomoravská vrchovina hills – National Park of Podyjí, the Chřiby hills, the Žďánický les hills, the Pálavské vrchy hills, and the surroundings of the villages Bzenec and Rohatec (Fig. 1).

Within these regions, selected middle and lower reaches of streams were investigated. The main focus was on the search for larvae and exuviae from spring to autumn, while adults of *Cordulegaster* were also noted during the flight season from June to August. Streams sections 10 m in length were inspected for larvae and exuviae. Adult dragonflies of the family Cordulegastridae were caught or photographed for determination, larvae were caught by sluicing of sediments.

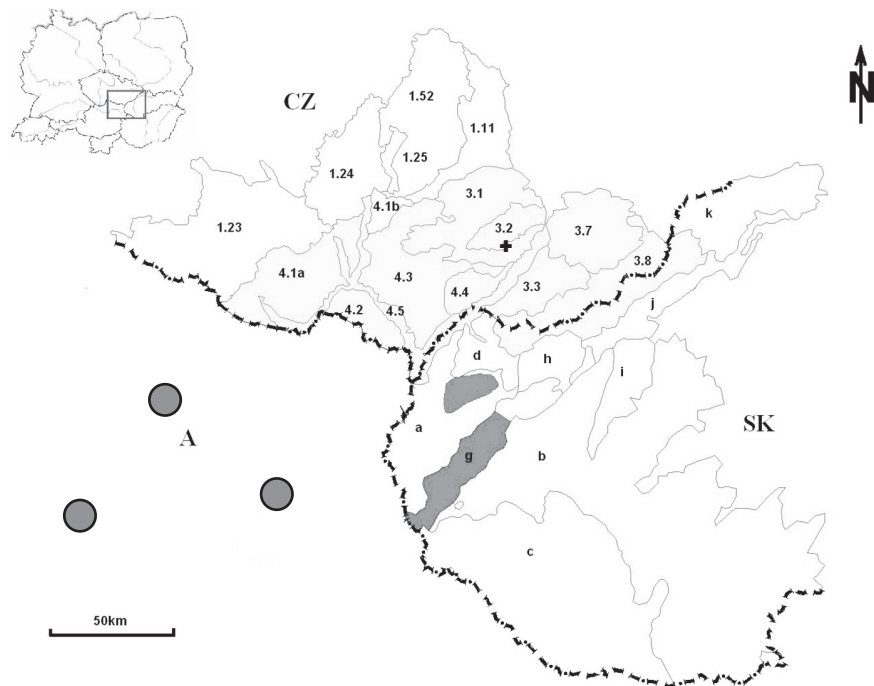


Figure 1: Study area (shaded light grey) in the Czech Republic (CZ) with particular regions. The dark grey shading and dots show the known occurrence of *Cordulegaster heros* in Slovakia (SK) and Austria (A), the black cross marks the first record from the Czech Republic near Buchlovice. – Abbildung 1: Das Untersuchungsgebiet (hellgrau) in der Tschechischen Republik (CZ) mit einzelnen naturräumlichen Regionen. Die dunkelgraue Markierung bzw. die Punkte kennzeichnen bekannte Vorkommen von *Cordulegaster heros* in der Slowakei (SK) und in Österreich (A), das schwarze Kreuz zeigt den ersten Nachweis in der Tschechischen Republik bei Buchlovice. Names of biogeographical regions (b.r.) in CZ (1.23-4.5) and physical regions in SK (a-k), Bezeichnungen der Naturräume (b.r.) in CZ und SK (CULEK 1996): 1.23 Jevišovický b.r., 1.24 Brněnský b.r., 1.25 Macošský b.r., 1.52 Dražanský b.r., 1.11 Prostějovský b.r., 3.1 Žďárnicko-litenský b.r., 3.2 Chřibský b.r., 3.3 Hlúcký b.r., 3.7 Zlínský b.r., 3.8 Hostýnský b.r., 4.1 Lechovický b.r., 4.2 Mikulovský b.r., 4.3 Hustopečský b.r., 4.4 Hodonínský b.r., 4.5 Dyjsko-moravský b.r.; in SK: a Borská nížina, b Podunajská pahorkatina, c Podunajská rovina, d Chvojnická pahorkatina, g Malé Karpaty, h Myjavská pahorkatina, i Považský Inovec, j Považské podolie, k Javorníky.

Results

During the research period one individual of *Cordulegaster heros* was found in the Chřiby hills in southern Moravia. On 19-viii-2009, a dead female (Fig. 2) was discovered in Buchlovický stream (Fig. 3) in Buchlovice village (49°05'08"N, 17°20'15"E; 248 m a.s.l.). The voucher specimen is stored in coll. M. Staufer, Vienna.

Discussion

The specimen was found at the end of the flight season of *Cordulegaster heros*, when adults on the wing are usually rare. The female's body was floating in water lifelessly, however its eye colour corresponded to that of living individuals, i.e. bright green. Hence, at this time the specimen can not have been dead for a long time (Fig. 2). The specimen was discovered under a small bridge in a section of



Figure 2: Female of *Cordulegaster heros* found dead on 19-viii-2009 in the Buchlovický stream near Buchlovice, the first record of the sp. for the Czech Republic. – Abbildung 2: Weibchen von *Cordulegaster heros*, Totfund am 19.08.2009 im Buchlovicer Bach bei Buchlovice, Erstnachweis der Art für die Tschechische Republik. Photo: MS

the Buchlovický stream where it is channelled through a man-made riverbed with no sediment (Fig. 3). This microhabitat does not fulfil the demands of the species' larvae nor the requirements of adult *C. heros*. Downstream it continues through the park of the Buchlovice castle, where the riverbed has a more natural appearance and is surrounded partly by shading forests and partly by meadows in full sunshine. Although the whole stream was investigated for larvae, the occurrence of *C. heros* could not be proved - even at the most promising places. The female was probably not part of an indigenous population but migrated to a hitherto uninhabited region. The locality in which the specimen was found lends support to this theory.

Several hundred meters downstream in the park one adult male of *C. bidentata* was observed on 19-viii-2009 and 21-viii-2009. Occurrence of *C. bidentata* in this area could also be confirmed in the upper reaches of the stream within a large forest, including records of larvae (OH unpubl.).

Records of the third central European *Cordulegaster* species, *C. boltonii*, in the respective regions of the Chřiby mountains still remain ambiguous (HOLUŠA



Figure 3: Buchlovický stream, Buchlovice, Czech Republic, recording site of the dead female of *Cordulegaster heros* (21-viii-2009). – Abbildung 3: Buchlovicer Bach, Buchlovice, Tschechische Republik, Fundort des toten Weibchens von *Cordulegaster heros* (21.08.2009). Photo: MS

2007b). These records are based purely on observations of flying adults and no photographs or collected specimens exist. Detailed investigations of water courses in this area in the last three years did not confirm the occurrence of larvae (OH unpubl.).

Extensive investigations conducted along all water courses in the Chřiby area and the adjoining Ždánický les mountains did not yield any additional records of *C. heros*, whereas *C. bidentata* was found in these localities (OH unpubl.). The next potentially suitable region close to the recording site in the Czech Republic is the Bílé Karpaty mountains. This massif provides suitable habitats for *C. bidentata*, which has established numerous populations there (OH unpubl.). Potential habitats for *C. heros* are very rare and can be found only in the higher regions of the Bílé Karpaty mountains where they are frequently situated in the agricultural landscape (e.g. Rybnický stream near Velička nad Veličkou village, Sudoměřice village – Mlýnský stream, Radějov village – Radějovka stream). However, *C. heros* could not be found despite very intensive investigations along these water courses. Furthermore, the occurrence of *C. heros* can be excluded with confidence in adjacent lowland areas along the rivers Dyje and Morava and also in the Pálavské vrchy hills. Due to the absence of streams or availability of only anthropologically modified ditches, no *Cordulegaster* species can occur there (HOLUŠA 2007a, b, c). Should there be a permanent population of *C. heros* in the territory of the Czech Republic, especially in the region of the Chřiby mountains, it would therefore be in an isolated area separated from other populations by the Dyje and Morava lowlands. The population would probably be confined locally and would also be extremely difficult to find. On the basis of these facts it seems more realistic that in the Czech Republic *C. heros* is an occasional migrant with permanent populations only in Slovakian territory.

The nearest known breeding sites are in Slovakia at a distance of approximately 50 km in the Borská nížina lowland (BLAŠKOVIČ et al. 2003; JANSKÝ & DAVID 2008; HOLUŠA & KÚDELA 2010). The nearest Austrian localities (LANG 1999; MÜLLER 1999; RAAB et al. 2006) are 110 km away. The exact range limit of the species is still not known, not even in Slovakia. The northern range margin is likely to run across Austria (Lower Austria), towards western Slovakia and into the southern Carpathian mountains (HOLUŠA & KÚDELA 2010). Even if breeding is not confirmed in the Czech Republic, the current record is the northernmost occurrence known so far. However, the records from Slovakia (BLAŠKOVIČ et al. 2003; JANSKÝ & DAVID 2008; HOLUŠA & KÚDELA 2010) and also from Austria (SCHWEIGHOFER 2008) are rather recent, which may suggest a recent northward shift of the range limit.

With respect to the new records presented here, the authors hold the view that *C. heros* will probably remain an occasional migrant in the Czech Republic. Nevertheless, populations of *Cordulegaster* species in southern and central Moravia should be investigated further, as these areas together with the Austrian and Slovakian distributions form the region where the ranges of all three central European *Cordulegaster* species meet or overlap (HOLUŠA 2005, 2007a).

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