

New records of *Gomphus pulchellus* on the eastern edge of its range in the Czech Republic (Odonata: Gomphidae)

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Abstract

New records of *Gomphus pulchellus* are reported. It was observed in four new localities in the Czech Republic during July 2015. Individuals were probably migrants from Germany. It seems that the species is spreading eastward due to climate change.

Zusammenfassung

Neue Funde von *Gomphus pulchellus* am östlichen Rande seines Verbreitungsgebietes in der Tschechischen Republik (Odonata: Gomphidae) – Es wird über neue Funde von *Gomphus pulchellus* berichtet. Er wurde im Juli 2015 an vier neuen Orten in der Tschechischen Republik nachgewiesen. Die Exemplare waren vermutlich aus Deutschland eingewandert. Es hat den Anschein, dass die Art sich aufgrund des Klimawandels nach Osten ausbreitet.

Introduction

Gomphus pulchellus is a species originally endemic to Southwest and West Europe from the Iberian Peninsula to Germany (DIJKSTRA & LEWINGTON 2006). It inhabits slow-flowing and standing waters (DIJKSTRA & LEWINGTON 2006). Before 1990 there were several isolated observations of *G. pulchellus* in Central and Eastern Europe but most of them were doubtful (see discussion in BUCZYŃSKI et al. 2013). During the last decades, the range of this species has started to spread eastwards, northwards (RUDOLPH 1980), and to higher altitudes, probably due to the creation of artificial habitats (DIJKSTRA & LEWINGTON 2006) and climatic changes (OTT 2010). Range expansion in *G. pulchellus* has been documented in

Germany (WESTERMANN 2006; WILDERMUTH & MARTENS 2014). It occurs mostly in the western part of the country, south of the river Elbe. In Bavaria, the species is more common than at other eastern parts of Germany and it is spreading very close to the border with the Czech Republic (BN 2014; SUHLING 2015). In Austria, it occurs in the western part of the country mainly at the border with Switzerland (GROS 2006; RAAB et al. 2007). In Switzerland, the species is absent from the higher Alps in the south. However, in the lower Alps, it spreads from Geneva to the north part of Switzerland (WILDERMUTH et al. 2005). Additionally, in Southern Europe, the species is spreading even further – in 2010 larvae were observed as far south as Montenegro (BUCZYŃSKI et al. 2013).

For a long time there was only a single record of *G. pulchellus* from the Czech Republic, from South Bohemia, 1967 (FLÍČEK 2000; DOLNÝ et al. 2007). Recently, however, this finding was questioned as unreliable (JEZIORSKI & HOLUŠA 2011). In 2014, there was a new observation of a male near Prague (ČERNÝ et al. 2014).

Here, we report four new findings from the Czech Republic. It is, along with a record from the year 2014 (ČERNÝ et al. 2014), the edge of the distribution area of this species in Central and Eastern Europe.

Records

Material

- 1) Chvalšiny (48.8737°N, 14.1785°E; 590 m a.s.l.; grid square 7151), 7 July 2015, 1 ex (adult male), P. Vlašánek leg., det. et coll.
- 2) Kladská (50.0302°N, 12.6857°E; 810 m a.s.l.; grid square 5942), 10 July 2015, 1 ex (adult female bearing eggs), P. Tájková leg. et det.
- 3) Domažlice, Hořejší předměstí (49.4421°N, 12.9062°E; 440 m a.s.l.; grid square 6543), 11 July 2015, 1 ex (adult female), T. Vopat leg., M. Černý det.
- 4) Buršice (49.3279°N, 13.4648°E; 615 m a.s.l.; grid square 6646), 7 July and 31 July, 1 ex, P. Tájková et P. Tájek leg. et det. All records presented in this study are shown at Figure 1.

Circumstances of the findings

1) The Chvalšiny site is adjacent to the protected area Blanský les. It is a system of six fish ponds. A male was observed (and caught afterwards) flying around the edge of the Potoční pond during the sampling of aquatic insects for laboratory experiments. In the same pond there were larval instars of *Chalcolestes viridis*, *Sympecma fusca*, *Coenagrion pulchellum*, *Ischnura elegans*, *Aeshna cyanea* and *Libellula quadrimaculata*. On 28 August 2015 there was an additional sampling of Odonata adults; the following species were recorded: *Lestes sponsa*, *I. elegans*, *A. cyanea*, *A. mixta*, *Somatochlora metallica*, *Sympetrum vulgatum*, and *S. sanguineum*. Trees and shrubs formed a covering of more than 50 % around all of the ponds. The dominant plant species were *Typha latifolia* and *Phragmites* sp. There was only a small amount of littoral growth, meaning strong pressure from fish

(common carp *Cyprinus carpius*). The bottoms of the ponds were muddy and the shores were very steep.

2) The Kladská site is adjacent to the protected landscape area Slavkovský les and is part of a national nature reserve Kladské rašeliny, 810 m.a.s.l. A female of *G. pulchellus* with ova was recorded here at a peat bog with treeless patches. No

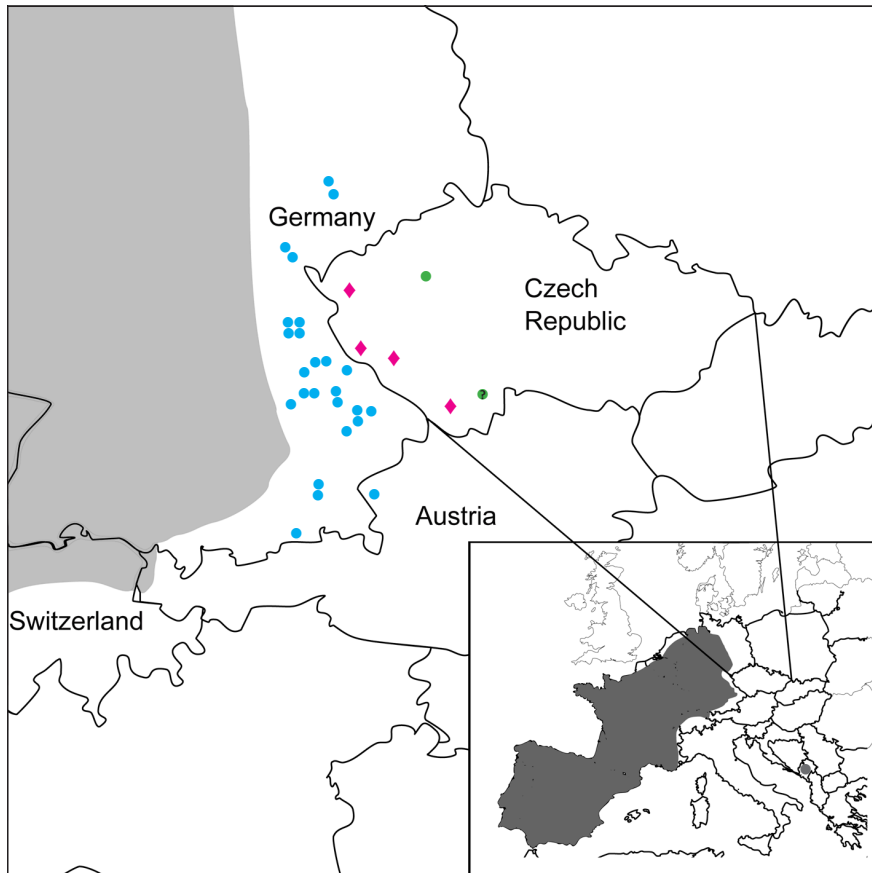


Figure 1. The range of *Gomphus pulchellus* based on GROS (2006), BUCZYŃSKI et al. (2013), and SUHLING (2015) and the known distribution in the Czech Republic. Green circle according to ČERNÝ et al. (2014), question mark: unreliable record from 1967 (FLÍČEK 2000), blue circles: closest occurrences of the species (BN 2014), red diamonds indicate new records from this paper. – Abbildung 1: Verbreitungsgebiet von *Gomphus pulchellus* nach GROS (2006), BUCZYŃSKI et al. (2013) und SUHLING (2015) und aktuelle Funde der Art in der Tschechischen Republik. Grüner Kreis: Nachweis aus ČERNÝ et al. (2014), Fragezeichen: fraglicher Fund von 1967 (FLÍČEK 2000), blaue Kreise: nächste Vorkommen der Art (BN 2014), rote Rauten: hier erwähnte Nachweise.

water pools are present and there was only a wet peat moss substrate. The female was sitting, and probably resting, on peat moss. It was caught using an entomological net, photographically documented and subsequently released. These peat bogs are mainly surrounded by spruce forests, but there is a system of five ponds about 800 m away. A medium sized river, the Teplá flows 11 km east of the site. In the peat bogs, *S. arctica* was recorded along with *G. pulchellus*. However we also encountered *Pyrrhosoma nymphula*, *A. juncea*, *S. alpestris*, *S. danae* and *S. vulgatum* on separate occasions.

3) The Domažlice site is a small artificial pond near a sandpit with a few small pools. It is possible that this migrant was from a better quality habitat with more vegetation or from the nearest artificial canal. The individual of *G. pulchellus* was recorded and subsequently identified from a photo (AOPK ČR 2016).

4) The Buršice site is an abandoned stone quarry with a water pool and steep banks, with almost no shore vegetation except for a 3 m long strip of *T. latifolia*. The water is clear, with a few individuals of the common roach *Rutilus rutilus* and the european perch *Perca fluviatilis*. Around the pool is an approximately 25 m high steep and stony wall of quarry, from one side there is a slow flowing water inlet with a sand and gravel bed. In the wider surroundings there are trees and shrubs. No fish ponds or rivers are present in the near distance, but there is another quarry pool 1.3 km away. On 7 July 2015 the individual of *G. pulchellus* was observed from a very close distance sitting on vegetation on the water surface, but we were unable to get a photograph. Therefore a second visit was made on 31 July 2015 during optimal weather (sunny, 25°C, low wind). The locality was surveyed for two hours, and one individual of Gomphidae was recorded flying over the pool to the high edge of the quarry, but no trapping or photo was managed. Other species, such as *Calopteryx virgo*, *L. sponsa*, *C. puella*, *I. elegans*, *P. nymphula*, *P. pennipes*, *A. grandis*, *Anax imperator*, *L. depressa*, *L. quadrimaculata*, and *S. sanguineum* were also recorded.

Discussion

The individuals of *G. pulchellus* recorded here are probably migrants. This species usually inhabits clear stagnant waters; peat bogs or heavily used fishponds are unlikely to be its preferred habitats. However, the observation of a female bearing eggs indicates attempts to oviposit. Peat bogs are not the appropriate habitat for this behaviour, but nearby lakes could serve as potential sites for oviposition. In the Czech Republic, where there is long tradition of artificial fishponds (IUCN 1997), migrants could be attracted and stay near ponds which are unsuitable for immature stages (ŠIGUTOVÁ et al. 2015). This could be the case for the individual found at the Chvalšiny site. The water in all of the adjacent ponds was turbid and the bottom was too muddy, and not sandy, which is the preferred habitat of *G. pulchellus* (DIJKSTRA & LEWINGTON 2006). The only suitable locality seems to be the abandoned quarry of Buršice, which has clear water and a partly sandy shore.

In the case that individuals were migrants, their origin is probably Bavaria as this is where the closest existing records are from. In this case, individuals had to cross the Šumava or Český les mountains. The nearest findings of *G. pulchellus* in Bavaria are about 30 km or more from our study sites (BN 2014). As the female with eggs was found at an elevation 810 m a.s.l., it seems that *G. pulchellus* is capable of crossing higher elevations, or even staying there. Before all of the findings there was a very hot summer in the Czech Republic, as well as in the rest of Central Europe. This could play a role in *G. pulchellus*' expansion (OTT 2010; BUCZYŃSKI et al. 2013).

It is likely that much of the current expansion remains undetected, as the southwestern part of the Czech Republic is relatively unexplored by odonatologists (DOLNÝ et al. 2007; WALDHAUSER & ČERNÝ 2014; AOPK ČR 2016). In any case, it seems that *G. pulchellus* is becoming a regular part of the Czech fauna. Hence, it is probably only a matter of time before not only single individuals but also breeding colonies will be discovered.

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