

**Zodarion ohridense (Araneae: Zodariidae) – a new record for Central Europe**

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**Abstract.** *Zodarion ohridense* Wunderlich, 1973 was found to be introduced in an abandoned stone quarry near Kolín in the Czech Republic. The Central European species of *Zodarion* are discussed.

**Keywords:** Czech Republic, faunistics, introduced species, new record, quarry

**Zusammenfassung.** *Zodarion ohridense* (Araneae: Zodariidae) – ein Neunachweis für Mitteleuropa. *Zodarion ohridense* Wunderlich, 1973 wurde in einen aufgelassenen Steinbruch bei Kolín, Tschechische Republik, eingeschleppt. Die mitteleuropäischen *Zodarion*-Arten werden diskutiert.

The family Zodariidae comprises 1126 species in 84 genera. The most species-rich genus, *Zodarion*, comprises 158 species, 100 species of which occur in Europe (World Spider Catalog 2017). Representatives of *Zodarion* are obligatory ant-eaters (each species being specialized on a certain group of ants), shelter themselves in silken retreats camouflaged by soil particles and morphologically, chemically and behaviourally mimic ants (Pekár et al. 2005). The centre of the distribution area for this genus is the Mediterranean: so far only four species – *Zodarion germanicum* (C. L. Koch, 1837), *Zodarion hamatum* Wiehle, 1964, *Zodarion italicum* (Canestrini, 1868) and *Zodarion rubidum* Simon, 1914 – are known to extend into Central Europe (Nentwig et al. 2017). Here we present the record of a fifth species of *Zodarion* in Central Europe.

**Material and methods**

*Zodarion ohridense* Wunderlich, 1973. CZECH REPUBLIC, Elbe Lowland, Nová Ves I, 3 km northwest of Kolín, natural monument Lom u Nové Vsi (abandoned stone quarry), 50.0549°N, 15.1323°E (grid no. 5956), 220 m a.s.l., 1 male, pitfall trap, 1–30 June 2015, leg. Jiří Skala, det. Milan Řezáč & Tomáš Krejčí. The male was preserved in 75 % ethanol and photographed using a HIROX RH-2000 digital microscope. The material is deposited in the collection of the second author at the Crop Research Institute, Prague.

**Results**

**Main morphological features.** The male of *Zodarion ohridense* is characterised by the following morphological features (Bosmans 2009, Nentwig et al. 2017): Body length 2.5–3.2 mm. Prosoma (Fig. 1a) reddish brown, fovea and margin darker. Legs yellowish brown, femora dark brown. Opisthosoma dorsally dark sepia brown, ventrally with whitish oval spot. Palp (Fig. 1b, c) with rather short tibial apophysis, with broad base, terminally pointed; tegulum with angularity at base; median apophysis with two large prolateral teeth; embolus linear, with subterminal bend.

The colouration of *Z. ohridense* is very similar to *Z. germanicum*, *Z. italicum* and *Z. hamatum* but it is easy to distinguish these species according to the shape of the copulatory organs

(Bosmans 1997, 2009). Only *Z. rubidum* distinctly differs in colouration from other species. It has a light brown prosoma and legs, and the opisthosoma is brown-violet (Bosmans 1997).

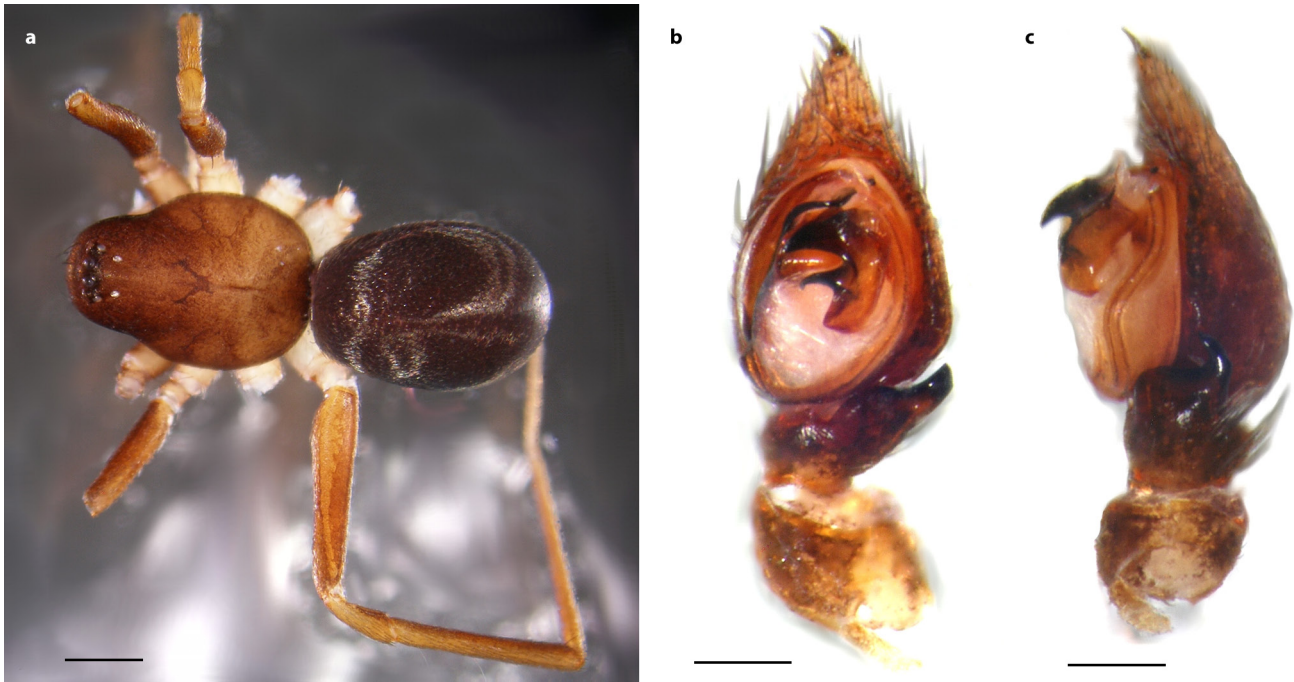
**Natural history.** *Zodarion ohridense* was described from the Ohrid region in Macedonia (Wunderlich 1973) and was considered an endemic species of the Balkan Peninsula. So far it is known from Croatia (Bosmans 2009), Bulgaria (Blagoev et al. 2001, Tzonev & Lazarov 2001, Deltshev 2004, Lazarov 2007), Greece (Bosmans 2009) and Macedonia (Komnenov 2002, 2003, Lazarov 2004, Bosmans 2009) (Fig. 2). In Macedonia it was found in the Shar Mountains (1200–1700 m) in *Acer* sp. and *Quercus cerris* forest and in *Picea abies* and *Fagus sylvatica* forests (Komnenov 2002) and in the Jakupica Mountains (1400–1900 m) on high mountain pastures or in *Fagus sylvatica* forests (Komnenov 2003). Deltshev (2004) found this species in southwestern Bulgaria in a *Pinus* forest (200–250 m). In Greece Bosmans (2009) found it in a riverine (430 m) and deciduous forest (600 m) and in grassland (1910 m).

**Discussion**

In Central Europe four species of the genus *Zodarion* have been found so far. The first, *Z. germanicum*, was described from Germany (Bosmans 1997) and is probably the only *Zodarion* species which can be considered an autochthonous component of the Central European fauna. The other three species are probably not native to Central Europe and because both ballooning ability and terrestrial migration are very low in *Zodarion* spiders, these species are believed to have been introduced into Central Europe via traffic (Bönsel et al. 2000, Pekár 2002, Pekár et al. 2005, Komposch 2009). The genus *Zodarion* is well preadapted for passive human transport thanks to its tolerance for dry environments and especially by attaching the silken shelters masked by soil particles (so-called igloos) to solid objects on the ground (Jocqué 1991). Spiders are thus transported with these objects and, if there are suitable conditions at their final destination, the spiders can establish new populations far from their continuous distribution area (Pekár 2002).

The most frequently found species in the vicinity of railways tracks is *Zodarion rubidum* (Pekár 2002). It was described from the south-eastern French Pyrenees (Simon 1914) and in 1971 it was found for the first time outside France, in central Austria (Wunderlich 1973). In 1979 this species

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**Fig. 1:** *Zodarion ohridense* Wunderlich, 1973; **a.** Male, habitus, dorsal view; **b.** Male left palp, ventral view; **c.** Male left palp, retrolateral view. Scales: 500  $\mu$ m (a), 100  $\mu$ m (b, c)

was recorded in the Czech Republic (Kůrka 1981) and in the 1980s also in Germany (Broen & Moritz 1987, Renner 1992, Bosmans 1994), Belgium (Bara 1984, Hermanns & Bastin 1989, Couvreur 1990) and Spain (Bosmans 1994). Thereafter it has been spread across the other western, central and eastern European countries (Pekár 2002) up to the Baltic Sea in the north (Scharff et al. 2007) and Ukraine in the east (Fedorjak et al. 2010). It has been also introduced into the USA (Vogel 1968) and Canada (Paquin & Dupérré 2006).

*Zodarion italicum* and *Z. hamatum* are also often found close to railways (Horak & Kropf 1999, Pekár et al. 2005). *Zodarion hamatum* occurs in Italy, Slovenia and Croatia (Bosmans 1997) and in 1995 it was found for the first time in the southern part of Austria (Horak & Kropf 1999). *Zodarion italicum* was described from Italy (Canestrini 1868) from where it expanded into Western and Central Europe (Bosmans 1997). In the 1970s it was found in Germany (Misiach 1977) and in 2000 on the western boundary of the distribution area,

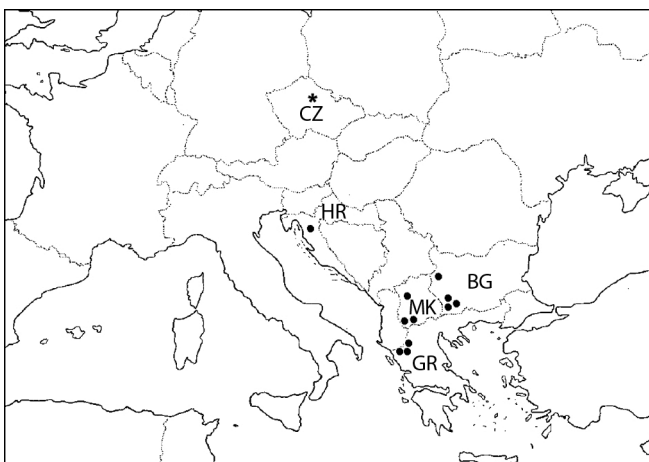
in the Czech Republic (Řezáč 2002, Pekár et al. 2005). The distribution area of this species is still enlarging and nowadays it is also known from Spain, the Netherlands and Denmark (Nentwig et al. 2017). East European records from Bulgaria (Drensky 1936), Ukraine and Azerbaijan (Dunin 1984, Mikhailov 1997) are erroneous (Deltshev 1987, Bosmans pers. com.). It often occurs in abandoned stone quarries and sand pits (Harvey & Murphy 1985, Řezáč 2002, Heneberg & Řezáč 2014).

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**Fig. 2:** Records of *Zodarion ohridense* Wunderlich, 1973. The new record is marked by asterisk. BG – Bulgaria, CZ – Czech Republic, GR – Greece, HR – Croatia, MK – Macedonia. Base map adopted from Bosmans (1997)

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