

***Berosus (Berosus) geminus* REICHE et SAULCY, 1856 recorded in Poland,
and a key to Polish species of the genus *Berosus* LEACH, 1817
(Coleoptera, Hydrophilidae)**

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ABSTRACT. Authors give the first record of *Berosus geminus* REICHE et SAULCY, 1856 in Poland (Gotówka near Chełm, 51°10'15,9" N, 23°33'32,3" E, dystrophic water body, 29 IV 2008, 2♂♂), describe the study site and co-occurring species. The new study site moves the boundary of the range of *B. geminus* in central-eastern Europe ca. 500 km towards the northern-east. However, the gap of ca. 2000 km between already known study sites of *B. geminus* in central and southern Europe (ca. 40 study sites) and *locus typicus* situated in Caucasus needs to be investigated. The paper also includes a completed and revised key to species from the genus *Berosus* occurring or possible to find in Poland.

KEY WORDS: Coleoptera, Hydrophilidae, *Berosus geminus*, first record, determination key, distribution area, Poland

INTRODUCTION

The genus *Berosus* LEACH, 1817 occurs in every geographical region and encompasses ca. 260 species divided into 3 subgenera. In Europe, 13 species has been recorded from the following subgenera: *Berosus* LEACH, 1817 and *Enoplurus* HOPE, 1838 (HANSEN 1999,

2004). From Poland four species have been given so far, two for every subgenera (PRZEWOŹNY 2004a).

Berosus geminus belongs to “forgotten species” of water scavenger beetles. For a long time, due to its high similarity to related *B. signaticollis* (CHARPENTIER, 1825), these species have not been distinguished. Good features which allow to differ between these two were given only by SCHÖDL (1993). Therefore, distribution, ecology and biology of this almost unknown species has been revealed recently.

In the paper the authors give first data on the recording of *Berosus geminus* in Poland. It is crucial for the knowledge about its geographical distribution – it extends its known range and provides new data on its environmental preferences.

MATERIAL AND METHODS

The collected material encompass 2♂♂ *Berosus geminus* and 27 specimens of co-occurring species (leg. P. BUCZYŃSKI, det et coll. M. PRZEWOŹNY). They were caught by the use of hand entomological net (semi-quantitative sample). Material was picked up in the field and conserved in 70% ethyl alcohol. For next analysis the specimens were prepared in dry conditions.

The localization of a study site was determined by using of Garmin GPSMap 60CS.

RESULTS

Description of the locality

Poland: Gotówka ad Chełm, 51°10'15,9" N, 23°33'32,3" E, UTM: FB77; according to the “Catalogue of Polish Fauna” (BURAKOWSKI et al. 1976) – the Lublin Upland, in geographic regionalization (KONDRACKI 2000) – the Wołyń Polesie (Fig. 1).

The study site is a small water body situated by the south-western edge of a fen of carbonated type which is protected by law as „Bagno Serebryskie” reserve. The water body is strongly elongated, with the area of ca. 1000 m² (10 x 100 m). From the north and east it shares border with unused and an overgrown by herbaceous plants apple orchard, from the west – with a dry and unused meadow, from the south – the road by farm buildings. Directly it was surrounded by the belt of old willows and alders which shaded the water table.

Water was seal, slightly muddy, bottom of sand and silt, covered with tyrfopel and – in some places – with tree branches. There were visible seasonal water level fluctuations (maximum depth of 0,1-1,0 m), however, the water body was not dried out and its area was unchangeable. Its shores were grown by patches of grasses and sedges (*Carex* sp.), some places were occupied by *Phragmites australis* (CAV.) TRIN. ex STEUD. Sedges formed clusters submersed while high water level. In turn, grasses, occupied water in many places

and overgrown by *Lemna minor* L., were the largest plant community in the water body in terms of the area.



Fig. 1. The dystrophic water body site in Gotówka (Phot. by P. BUCZYŃSKI).

Material collected

Berosus geminus REICHE et SAULCY, 1856: 29 IV 2008, 2♂♂ (Fig. 3). Both specimens were caught in flooded and situated just beneath water level grasses with the addition of *Lemna minor*.

Co-occurring species (the same dates): *Haliplus furcatus* SEIDLITZ, 1887 – 1 ex.; *H. ruficollis* (DE GEER, 1774) – 1 ex.; *Agabus undulatus* (SCHRANK, 1776) – 1 ex.; *Acilius sulcatus* (LINNAEUS, 1758) – 1 ex.; *Dytiscus marginalis* LINNAEUS, 1758 – 1 ex.; *Hydaticus transversalis* (PONTOPPIDAN, 1763) – 1 ex.; *Graptodytes granularis* (LINNAEUS, 1767) – 1 ex.; *Hydroporus fuscipennis* SCHAUM, 1868 – 1 ex.; *Hyphydrus ovatus* (LINNAEUS, 1761) – 7 exx.; *Anacaena limbata* (FABRICIUS, 1772) – 2 exx.; *A. lutescens* (STEPHENS, 1829) – 4 exx.; *Berosus luridus* (LINNAEUS, 1760) – 2 exx.; *Enochrus coarctatus* (GREDLER, 1863) –

1 ex.; *Helochares obscurus* (O.F. MÜLLER, 1776) – 1 ex.; *Hydrobius fuscipes* (LINNAEUS, 1758) – 1 ex.

DISCUSSION

Berosus geminus in whole of its range is reported rarely. SCHÖDL (1993) arranged over 20 study sites from Austria, Germany, Hungary, Italy, Romania and Slovakia (mainly from the large vicinities of Vienna). Except for this area, *B. geminus* was recorded in Caucasus (*locus typicus*) (SCHÖDL 1993; HANSEN 1999, 2004).

Worth mentioning is the fact that SCHÖDL (1993) made a mistake by locating the site called Znojmo in Slovakia while it is south-eastern Czech Republic. However, two sites from Slovakia – Čičov and Bratislava were given correctly. Thus in 1993, *B. geminus* was known from 7 European countries.

The revision of SCHÖDL (1993) made European entomologists sensitive to the presence of *B. geminus*. Later, to three study sites given by this author from Hungary, at least 5 were added (revision in CSABAI 2005; MOLNÁR 2008). In Germany, except for Bavaria, this species was found in the vicinities of Dessau (Saxony-Anhalt) (BELLSTEDT, SKALE 1998) where was observed also in the years 1999 and 2001, usually in large numbers (SKALE pers. comm.). In Czech Republic its occurrence was confirmed by data from Pálava Biosphere Reserve (TRAVNIČEK et al. 1999). On distribution map of this species in “Fauna Europaea” (ALONSO-ZARANZAGA et al. 2004) Slovenia and Italian mainland were also marked, however, this species is not included in the checklist of Italy (IME 2008). At the same time ALONSO-ZARANZAGA et al. (2004) do not take Czech Republic, Slovakia and Romania into account on the map. Polish study site given by the authors in this paper is one of the sites that extend the knowledge about the distribution of this species. In general, after publishing the paper of SCHÖDL (1993), over next ten study sites have been given and the list of countries in which this species occurs was completed by adding Slovenia, Italy and – with this paper – Poland as well (Fig. 2).

According to Schödl (1993), the northern border of the range of *B. geminus* is marked by: Deggendorf (south-western Germany) Znojmo (Czech Republic) and Bratislava (Slovakia). Newer data from Saxony-Anhalt (Bellstedt, Skale 1998; Skale pers. comm.) and Poland (data in this paper) moves this line much farther: a study site in Gotówka is 500 km towards the north-east from Czech and Slovak sites. However, eastern and south-western boundary of the range is still unknown due to the lack of data. Probably the range of this species reaches Caucasus where its *locus typicus* is situated. Vast gap between Polish (over 2000 km) and Romanian sites (ca. 2000 km) and Caucasus is a challenge to European coleopterologists.

In many some countries *B. geminus* was included in Red lists. In Germany and lands Saxony-Anhalt and Bavaria it was included in “2” category (GEISER et al. 1998; HEBAUER

et al. 2003; SPITZENBERG 2004) which corresponds with the category “Endangered” in classification of IUCN.

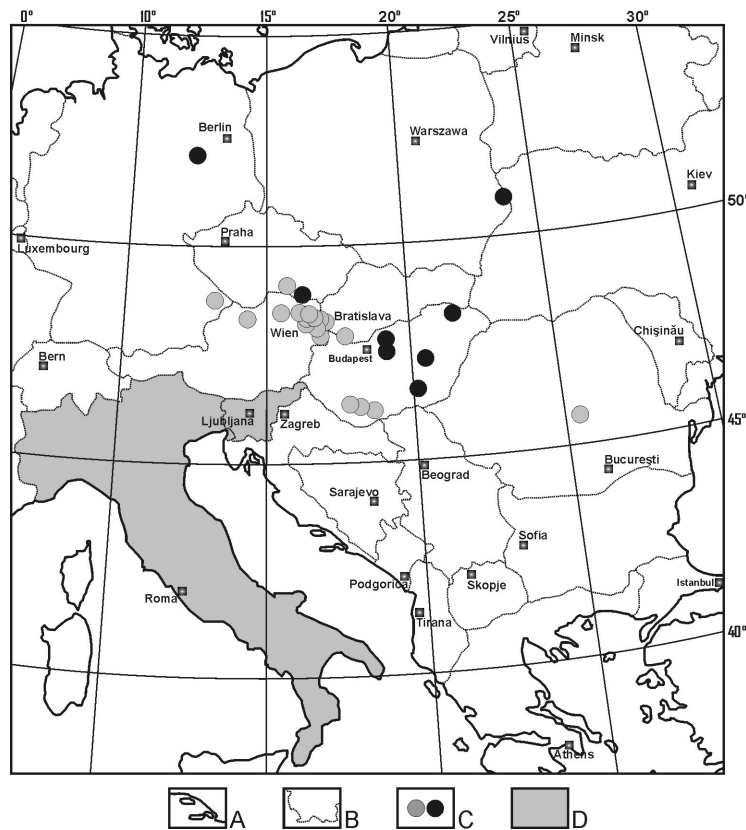


Fig. 2. Localities of *Berosus geminus* known in Europe: A – sea coast; B – state borders; C – localities (grey – in SCHÖDL (1993), black – newer ones); D – countries with a general record in the “Fauna Europaea” (ALONSO-ZARANZAGA et al. 2004).

In Czech Republic the discussed species is in one degree lower category – “Vulnerable” (TRÁVNÍČEK et al. 2005). In this situation it is worth to reconsider if the estimation of such species with uncertain number of study sites and undefined ecology is arguable. Perhaps the further revisions from particular countries should be needed. Who knows how many specimens from different study sites are described as *B. signaticollis* in many collections? From this point of view the attitude of Slovak authors, who have not included *B. geminus* in their Red list, seems to be very reasonable (HOLECOVA, FRANC 2001).

Biology of *B. geminus* is not known. There is little data on its habitat preferences. KLAUSNITZER (1996) regards this species as acidophilous and detritophilous one. For congeneric *B. signaticollis* belongs to tyrophiles (KLAUSNITZER 1996; KOCH 1989) and *B. geminus* in Poland was caught in a dystrophic water body, it seems to be possible. However, in Hungary this species prefers pools and floodings in the valleys of larger rivers (CSABAI 2005), in Czech Republic it is considered as a species of lentic habitats (TRAVNIČEK et al. 1999). Thus, its acidophilous character can be regional, limited to the northern part of its range and the last conclusions on the subject should be confirmed by more data.

In connection with the fact that in Polish literature no note on this species was included as well as the lack of this species in the Polish key to water scavenger beetle (GALEWSKI 1990), we find it advisable to provide this paper with a completed and revised key to Polish species from this genus. All the more, the species from this genus in Poland have been misidentified: for many years *Berosus frontifoveatus* KUWERT, 1888 was given as *B. bispina* REICHE et SAULCY, 1856 (PRZEWOŹNY 2004b). Except for the species already known from Poland, we included in the key the sixth species that can be found in the future.

Key to polish species of the genus *Berosus*

1. Ending of elytra with spines. Subgenus *Enoplurus* HOPE, 1838. **2.**
- Ending of elytra rounded. Subgenus *Berosus* LEACH, 1817. **4.**
2. Punctures on pronotum clearly obscured (Fig. 10). Habitus as in Fig. 9. Aedeagus as in Fig. 11. ***B. frontifoveatus* KUWERT, 1888.**
- Pronotum completely bright, punctures not obscured (Fig. 13). **3.**
3. Labrum black. Possible to find in north-western Poland, the nearest sites are coastlines of the Baltic Sea (southern coastline of Sweden, Schleswig-Holstein in Germany). ***B. fulvus* KUWERT, 1888.**
- Labrum yellow. Habitus as in Fig. 12. Aedeagus as in Fig. 14. ***B. spinosus* STEVEN, 1808.**
4. Smaller species (body length to 4,6 mm). Spots on pronotum very wide (Fig. 5). First sternite of abdomen with clear keel in the middle. Habitus as in Fig. 5. Aedeagus as in Fig. 6. ***B. luridus* (LINNAEUS, 1761).**
- Bigger species (minimum body length 5 mm). Spots on pronotum in shape of narrow stripes (Fig. 3, 7). First abdominal sternite at least on the base with small keel or without. **5.**
5. Interval 4 of elytra with regular row of punctures, bigger punctures visible on elytra interval 3 only. At the sides of elytra – a clear and isolated spot (Fig. 3). Habitus as in Fig. 3. Aedeagus as in Fig. 4. ***B. geminus* REICHE et SAULCY, 1856.**
- Elytra evenly spotted, bigger punctures on elytra intervals 3, 5 and 7. A spot at the sides of elytra unclear or none (Fig. 7). Habitus as in Fig. 7. Aedeagus as in Fig. 8. ***B. signaticollis* (CHARPENTIER, 1825).**

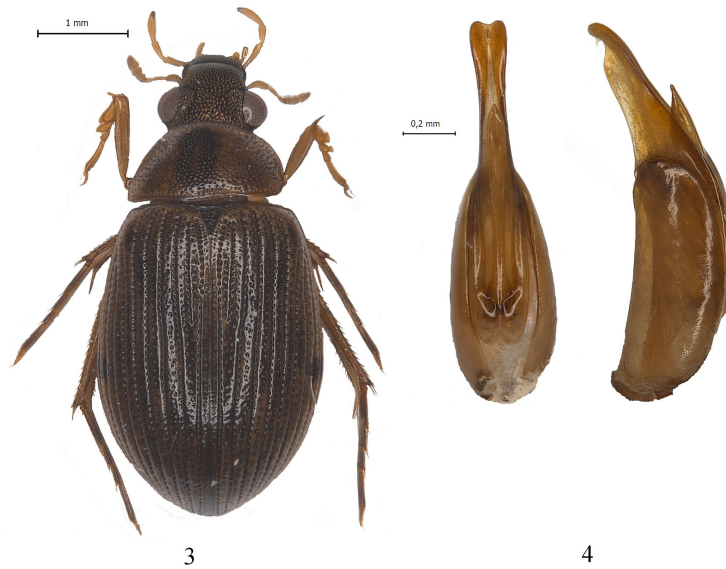


Fig. 3-4. *Berosus geminus* REICHE & SAULCY (3 – habitus, 4 – aedagus) (Phot. by M. PRZEWOŹNY).

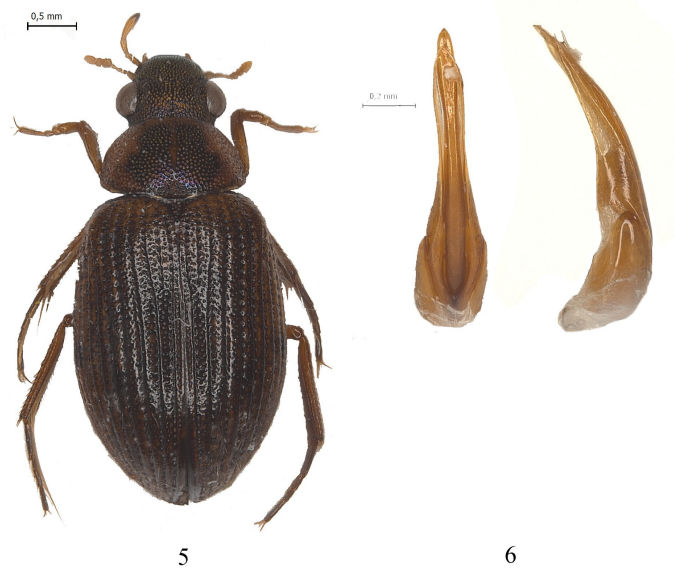


Fig. 5-6. *Berosus luridus* (L.) (5 – habitus, 6 – aedagus) (Phot. by M. PRZEWOŹNY).

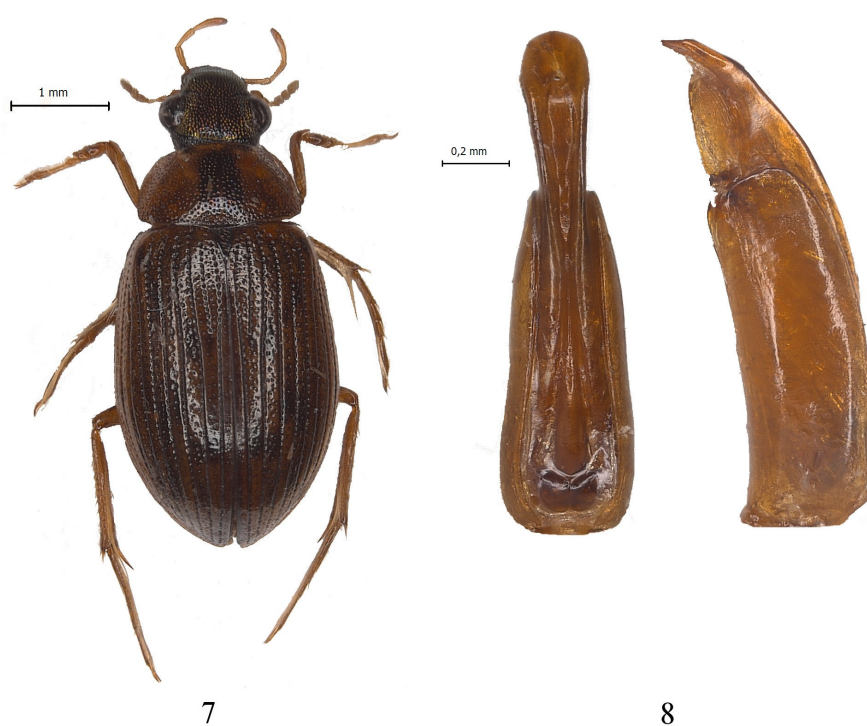


Fig. 7-8. *Berosus signaticollis* (CHARP.) (7 – habitus, 8 – aedagus) (Phot. by M. PRZEWOŹNY).

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Fig. 9-11. *Berosus frontifoveatus* KUWERT (9 – habitus; 10 – pronotum; 11 – aedagus) (Phot. by M. PRZEWOŹNY).

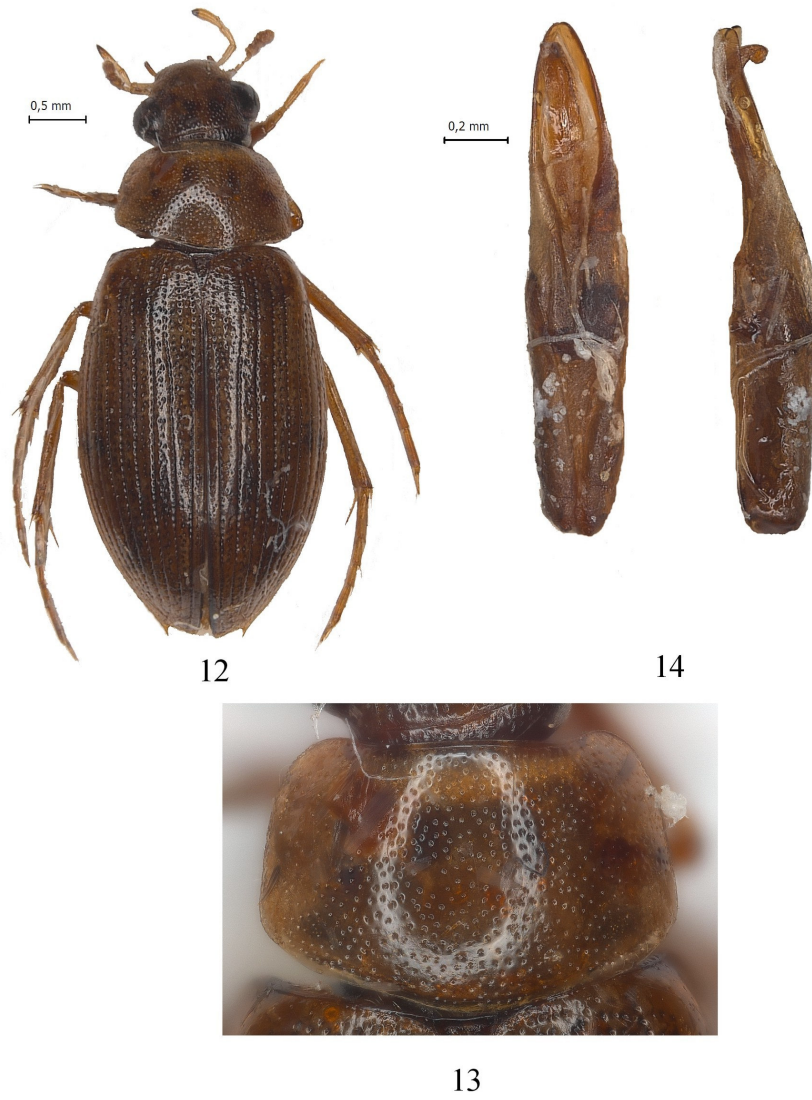


Fig. 12-14. *Berosus spinosus* STEVEN (12 – habitus; 13 – pronotum; 14 – aedagus) (Phot. by M. PRZEWOŹNY).

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