

# REVISION OF THE GENUS *BATHYSCIDIUS* JEANNEL, 1910 (COLEOPTERA: LEIODIDAE: CHOLEVINAЕ: LEPTODIRINI), WITH A DESCRIPTION OF A NEW SUBGENUS AND THREE NEW SPECIES FROM CROATIA AND MONTENEGRO

SLAVKO POLAK<sup>1,\*</sup> & BRANKO JALŽIĆ<sup>2</sup>

<sup>1</sup>Notranjska museum Postojna, Kolodvorska cesta 3, SI-6230 Postojna, Slovenia

<sup>2</sup>Croatian Biospeleological Society, Demetrova 1, HR-10000 Zagreb, Croatia

**Polak, S. & Jalžić, B.: Revision of the genus *Bathyscidius* Jeannel, 1910 (Coleoptera: Leiodidae: Cholevinae: Leptodirini), with a description of a new subgenus and three new species from Croatia and Montenegro. *Nat. Croat.*, Vol. 28, No. 2., 359-402, 2019, Zagreb.**

The genus *Bathyscidius* is, according to the body size, one of the smallest leptodirines. Six species, one of them including two subspecies, have been described to date. This study has undertaken a taxonomical revision of the genus *Bathyscidius* s. str. Existing species are re-described, supported with detailed morphometry and, for the first time, with the description of male and female internal morphological characters. Three newly discovered species *B. mljetensis*, *B. komajiensis* and *B. orjensis* are described; one subspecies *B. t. fallaciosus* is elevated to species rank and one of the existing species *B. remyi* is synonymized. For the two geographically isolated species, *B. rambouseki* and *B. tomoricensis*, a new subgenus, *Ionobathyscidius*, is established.

**Key words:** Leptodirini, *Bathyscidius*, *Ionobathyscidius*, systematics, revision, new species, Dinaric Karst

**Polak, S. & Jalžić, B.: Revizija roda *Bathyscidius* Jeannel, 1910 (Coleoptera: Leiodidae: Cholevinae: Leptodirini), s opisom novog podroda i tri nove vrste iz Hrvatske i Crne Gore. *Nat. Croat.*, Vol. 28, No. 2., 359-402, 2019, Zagreb.**

Rod *Bathyscidius* je, s obzirom na veličinu tijela, jedan od najmanjih leptodirina. Dosad je opisano šest vrsta, jedna od njih s dvije podvrste. Rad donosi taksonomsku reviziju roda *Bathyscidius* s. str. Postojeće vrste su ponovno opisane, s detaljnom morfometrijom i po prvi put s opisom nekih morfoloških karakteristika mužjaka i ženki. Opisane su tri nove vrste: *B. mljetensis*, *B. komajiensis* and *B. orjensis*, jedna podvrsta, *B. t. fallaciosus*, podignuta je na rang vrste, a jedna je vrsta, *B. remyi*, sinonimizirana. Za dvije geografski izolirane vrste, *B. rambouseki* i *B. tomoricensis* ustanovljen je novi podrod *Ionobathyscidius*.

**Key words:** Leptodirini, *Bathyscidius*, *Ionobathyscidius*, sistematika, revizija, nove vrste, dinarski krš

## INTRODUCTION

The large leiodid beetle tribe Leptodirini (Leiodidae: Cholevinae) is known for its numerous subterranean taxa. The group has a distribution centered on the northern part of the Mediterranean basin (NEWTON, 1998; PERREAU, 2000, 2004, 2015; FRESNEDA *et al.*, 2011), the greatest diversity being in the Dinaric karst

\* corresponding author: slavko.polak@notranjski-muzej.si

(PRETNER, 1968; 1973; 1977), where some unusual adaptations to subterranean life have evolved. Besides the large, highly troglomorphic taxa with prolonged body and appendages (i.e. *Leptodirus* Schmidt, 1832; *Anthroherpon* Reitter, 1889; *Hadesia* Jeannel, 1911), there are also small and spherical, so-called bathyscioid, and mostly edaphic taxa in the area. Unlike the larger and gracile subterranean taxa, which were recognized as separate genera at first glance, the small edaphic bathyscioid species were usually put into the commonly distributed genera *Bathyscia* Schiødte, 1848 or *Bathysciola* Jeannel, 1910, which served as a dumping place. It was only after subsequent detailed scientific work that some new genera were established for numerous small bathyscioid species.

Specimens of one of the smallest leptodirini collected in a cave near the village Janjina on Pelješac peninsula in Dalmatia (Croatia) were described by APFELBECK (1905) as *Bathyscia* (s. str.) *tristicula*. Later on, MÜLLER (1910) described a separate subspecies *Bathyscia tristicula fallaciosa* from a cave at the source of the Ombla River near Dubrovnik. In one of his first revisions of leptodirines, JEANNEL (1910) established a new genus *Bathyscidius* for this species, and grammatically changed the species name to *B. tristiculus* with two recognized subspecies. The third subspecies, *B. tristiculus tomoricensis*, was found later on Mt Tomor in southern Albania, and was described by MÜLLER (1922). This subspecies was elevated to species rank by JEANNEL (1924). After that, two more species of this genus were described; *B. rambouseki* from Galičica Mountain above Ohrid (Northern Macedonia) described by KNIRSCH (1931) and *B. remyi*, from Bracanovića pećina on Bjelasica Mountain (Montenegro) described by JEANNEL (1934). Later on KARAMAN (1964) described *Bathyscidius* (*Pseudobathyscidius*) *serbicus* from the surroundings of Zaječar in Eastern Serbia and established a monotypical subgenus *Pseudobathyscidius*. The subgenus *Pseudobathyscidius* was elevated by GUÉORGUIEV (1976) to the genus rank. GIACHINO (2005) described a new significantly larger species (2.07–2.66 mm) *Bathyscidius comottiorum*, from the cave Shpella e Burmit in Kosovo. He synonymized the genus *Pseudobathyscidius* (Karaman 1964) with *Bathyscidius* Jeannel, 1910 in the same paper. Later PERREAU (2008) established a new genus *Pavicevicia* for the species *Bathyscidius comottiorum* (Gaichino, 2005) and described an additional species, *P. pretneri*, from Kosovo. In the same contribution (PERREAU, 2008), the author discussed the hardly justified synonymy of *Pseudobathyscidius* with *Bathyscidius* suggested by GIACHINO (2005), and proposed that *Pseudobathyscidius* should have the status of separate genus again.

Our recent cave explorations in Croatia, Montenegro and Northern Macedonia resulted in collection of individuals from the type localities and some new locations that enable us to review the group of species. The study focused on the revision of the genus *Bathyscidius* s. str. with re-descriptions of existing species. Descriptions are supported with detailed morphometry and, for the first time, with illustrations of some internal morphological characters for males and females.

## MATERIALS AND METHODS

**Specimen collected and material studied.** Over a period of 15 years, we collected representatives of the most described species of *Bathyscidius* from the type localities in caves, superficial subterranean habitats and leaf litter in Dalmatia (Croatia), Montenegro and Northern Macedonia. Depending on their habitat requirements, some of the taxa were collected by visual inspection, by deployment of baited pitfall traps, and in the case of edaphobionts by soil and leaf litter sifting. For the morphological analyses, the specimens were preserved in 10% vinegar and 40% or 50% ethanol. Additionally, some specimens were preserved in 96% ethanol for forthcoming molecular analyses. The fieldwork was undertaken with permits from the nature conservation authorities of Croatia (Ministarstvo zaštite okoliša i energetike; No. URBROJ: 517-07-1-1-1-16-4) and Montenegro (Agencija za zaštitu životne sredine; No. 02/UPI-341/6, No. 02/UPI-740/7). Since the search for topotype specimens of *B. tomoricensis* near Berat, Albania, was not successful, the small series of type and topotype specimens, preserved in the Natural History Museum of Trieste (NHMT), was loaned for the needs of the study. The type locality of *B. tristicula*, the small cave near Janjina on Pelješac, Croatia, was not found despite intensive efforts by the members of Croatian Biospeleological Society. However, they did find *Bathyscidius* specimens in three additional caves on the Pelješac peninsula. The two paratype specimens of *B. tristicula* from Janjina, preserved in Egon Pretner's Collection, which is now deposited in the Slovenian Museum of Natural History (PMSL) Ljubljana, have been dissected and studied. Small leptodirini specimens resembling *Bathyscidius* have been collected in Velika Bracanovića pećina and in the nearby cave Županska pećina on Mt Bjelasica, Montenegro. The holotype of *Bathyscidius remyi* has been checked and studied in the Collection of the Entomological Department of the National Museum of Natural History (MNHN) in Paris (France).

**Morphological analyses.** Specimens were dry card mounted, partly dissected, measured and in the case of the type series, designated as type specimens. The detail-studied specimens, originally placed in 96% ethanol, were dissected after maceration in 10% KOH at room temperature for 12 hours, washed in pure water and dehydrated with ethanol. The body lengths of dry prepared and glued specimens were measured under the stereomicroscope. All other measurements, including pronotum and elytra, were measured as dissected body parts on microscope slides, and measured under the microscope. Photographs were taken using a Leica MZ7.5 stereomicroscope (0.63–5.0 × 10 magnifications) and a Euromex microscope ME2665 (10 × 4, 10 × 10 and 10 × 40 magnifications). Taxonomically informative body parts (antenna, appendages, metaternal apparatus, metendosternite and genital parts) were separated and immersed in glycerine or Solakryl BMX media on classical microscope slides. Dissected genital parts were preserved by being immersed in Solakryl BMX media on a transparent label, and were pinned under the Holotype and some of the Paratype specimens. Photographs of dissected specimens were made using a Nikon Coolpix 4500

digital camera and measured with the freely available Image J software (accessible at <https://imagej.nih.gov/ij/>). Digital microscope images were additionally edited using Adobe Photoshop and CorelDraw.

#### Abbreviations – Institutes and Collections

Specimens are deposited in collections identified by the following acronyms:

**NMPO**: Notranjska museum Postojna, Postojna (Slovenia), **CNHM**: Croatian Natural History Museum, Zagreb (Croatia), **NHMM**: Zoological collection of Natural History Museum of Montenegro, Podgorica (Montenegro), **HBSD**: Croatian Biospeleological Society, Zagreb (Croatia), **NHMT**: Natural History Museum of Trieste, (Italy), **PMSL**: Egon Pretner Collection of the Slovenian Museum of Natural History, Ljubljana (Slovenia), **MNHN**: National Museum of Natural History, Paris (France).

#### – Measurements (in mm):

**BL**: Total body length measured from the anterior apex of head (in natural position, head not extended) to apex of elytra; **AL**: Antenna total length, measured without the first antennomere stalk; **AL/PL**: Antennal elongation index = antennal length / pronotum length; **AmL**: Lengths of antennomeres (1–11); **AmW**: Width of antennomeres (1–11); **AmL/W**: Antennal index (1–11) = antennomere length / antennomere width; **AL/AmL**: Antennal percentage index (1–11, in %); **PL**: Pronotum maximal length; **PW**: Pronotum maximal width; **EL**: Elytra maximal length; **EW**: Elytra maximal width; **PL/W**: Ratio width / length of pronotum; **EL/W**: Ratio width / length of elytra; **PtarL**: Protarsomere (total) length; **PtarW**: Protarsomeres width; **PtibL**: Protibia length; **PtibW**: Protibia max width; **AedL**: Aedeagus length; **AedMaxW**: Aedeagus median lobe maximal width; **AedMinW**: Aedeagus median lobe minimal width; **AedL/AedMaxW**: Aedeagus index1 = length of aedeagus / maximal median lobe width; **BlamL**: Aedeagus basal lamina maximal length; **BlamW**: Aedeagus basal lamina maximal width; **AedL/BlamL**: Aedeagus basal lamina length index = aedeagus length / basal lamina length; **BlamL/BlamW**: Aedeagus basal lamina index = basal lamina length / basal lamina width; **M**: mean number or average; **N**: number of measured samples; **Max**: maximal; **Min**: minimal; **HT**: Holotype; **PT**: Paratype.

## TAXONOMY

### Genus *Bathyscidius* Jeannel, 1910

*Bathyscidius* Jeannel, 1910: Arch. Zool. expe. gén., 45 (1): 15

**Type species: *Bathyscidius tristiculus* (Apfelbeck, 1905)**

*Bathyscidius* Jeannel, 1910: JEANNEL, 1911, Arch. Zool. exp. gén., 47 (1): 415.

*Bathyscia* (*Bathyscidius*) *tristicula* Apfelbeck: Jeannel, 1914, Coleopterum catalogus pars 60: 16.

*Bathyscidius* Jeannel: 1910: MÜLLER, 1917, Mathem.-naturw. Klasse, Abt 1, 126 (8) 32, 37.

*Bathyscidius* Jeannel, 1910: JEANNEL, 1924, Arch. Zool. expe. Gén., 63 (1): 268–269.

*Bathyscidius* Jeannel, 1910: LANEYRIE, R, 1967, Ann. De Spéléologie. 22 (3), 595, 611.

*Bathyscidius* Jeannel, 1910: PRETNER, 1968, Catalogus Faunae Jugoslaviae III. (6), 20.

*Bathyscidius* Jeannel, 1910: GUÉORGUIEV, 1974, C. R. Acad. Bul. Sci. 27(6): 839–842.

*Bathyscidius* Jeannel, 1910: GUÉORGUIEV, 1976, Dissertationes SAZU, 14(4): 14, 48

*Bathyscidius* Jeannel, 1910: NEWTON, 1998, Atti Museo Reg. di Scienze Natur., Torino, 127.

*Bathyscidius* Jeannel, 1910: PERREAU, 2000, Mémoires de la SEF, 4: 193.

*Bathyscidius* Jeannel, 1910: PERREAU, 2004, Catalogue of Palaearctic Coleoptera Vol 2: 153.

*Bathyscidius* Jeannel, 1910: PERREAU, 2015, Catalogue of Palaearctic Coleoptera Vol 2: 180–290.

*Bathyscidius* Jeannel, 1910: HLAVÁČ *et al.*, 2017, The Subterranean Beetles of the Balkan Peninsula, 100.

*Bathyscidius* Jeannel, 1910: PERREAU, 2019, Zootaxa 4590(3): 367–381.

#### REDESCRIPTION

Cavernicolous or endogeic, apterous and small-sized Leptodirini 1.27–1.80 mm in length. **Habitus**: Bathyscoid, prolonged elliptic (Fig. 1), strongly convex (Fig.

2). Depigmented, color yellowish brown to reddish brown (Figs. 15, 16, 45, 46).

**Head:** Anophthalmus and retractile. Occipital carina obliterated, not present but with evident straight border between the glabrous and pubescent part on the neck. Pubescence on the head set up randomly without order. Mandible short with 1–2 small dents. The 4<sup>th</sup> segment of maxillary palp shorter than the 3<sup>rd</sup>, small and conical. Antenna inserted on the median third of the head, relatively short. Ratio AL/PL is 0.98–1.43 depending on the species and sex. Antennomeres, especially the terminal ones, dorso-ventrally flattened. The 2<sup>nd</sup> antennomere significantly longer than the first in all species. The 7<sup>th</sup> Antennomere larger with a well-developed Hamman organ. Antennomeres 8, 9 and 10 transverse, significantly wider than long or oval to slightly longer than wide, depending on the species. The 11<sup>th</sup> antennomere is the longest, 1.5–2.0 times longer than wide (Figs. 79–92).

**Pronotum:** Strongly convex (Fig. 2), wider than long, with regularly rounded lateral edges, not sinuated before the base, widest at base, equally as wide as or slightly wider than elytra. (Figs. 1, 17, 18, 31, 32, 47, 48). Prosternum ventral face almost glabrous, dorsal face strongly pubescent with uniform short and recumbent pubescence set up without order, aligned in a transversal row only at the very basal edge.

**Elytra:** Elongated-oval, largely rounded at the basal apex, with maximum width (EW) on the anterior part of elytra, without sutural carina (Figs. 1, 19, 20, 33, 34, 49, 50). Pubescence on the elytra aligned in transversal striae along the whole elytral length, and in slightly undulating lateral rows. Transparent microscopic observation reveals the presence of large circular papillae on basal and lateral part of elytra. Scutellum widely triangular, pubescent on the posterior side only.

**Thorax:** Ventral face almost glabrous, shiny, with reticulate and leathery aspect. Mesocoxal cavities not confluent. Metacoxae separated with narrow and forked metasternal intercoxal apophysis (Fig. 3). Mesosternal carina well developed, elevated, moderately thick, not lamellar, flattened on the ventral edge and with a few, recumbent, backward oriented bristles. In lateral view highly elevated, widely rounded on anterior side, on posterior side the sharp beak of carina extended over the metasternum, almost reaching the metasternal intercoxal apophysis (Figs. 3, 21, 35, 51). Metendosternite (Crowson's organ) "V" shaped with dorsal arms longer than stalk and wide extended apical muscle disc. (Fig. 11) Metatergal apparatus with lateral processes strongly reduced, lanceolate and with moderate long posterior process (Figs. 9, 10).

**Legs:** Moderately short and robust. Protarsi with four not dilated segments in both sexes. First three protarsomeres of approximately the same length (first slightly longer than the 2<sup>nd</sup> and 3<sup>rd</sup>) and the 4<sup>th</sup> significantly longer. Mesotarsi and metatarsi with five not dilated segments (Figs. 7, 8). Claws simple, strong and sharp, empodium with one bifurcated seta. Protibias flattened, pubescent and with numerous spines towards the distal half (Figs. 5, 6). On the external lateral and apical side with the row of flattened spines of equal length forming a comb (pecten) stretching for approximately one to two apical thirds of the tibial length. On internal apical side with one smaller and one large and strong polident (5-toothed) spurs. Mesotibiae and metatibiae cylindrical with numerous spines towards the distal half and periapical ring of spines of unequal length and two large, strong 5-toothed spurs on the internal apical side (Figs. 7, 8). Metatibiae

with some additional stronger spines on the external-lateral side. Femora with reticulated aspect, almost glabrous or sparsely-haired according to the species.

**Male genitalia:** Aedeagus relatively small, elongated and more or less straight in dorsal and lateral view. Median lobe apex in dorsal view flattened, moderately rounded or pointed, according to the species, without or with a sharp beak. Inner sac without visible sclerotized structures. Basal lamina almost parallel with median lobe (Figs. 65–78) in some species relatively long (Figs. 73–78), simple rounded, not invaginated backwards on its apical part.

Parameres straight, parallel with median lobe, shorter than median lobe. Paramere apex armed with three erected setae of similar sizes and lengths. Setae insertion according to the species, one apical straight long seta and two subapical long setae oriented towards the median lobe (Fig. 24, 25, 38, 39, 54, 55, 61, 65–72, 77, 78) or three apical (subapical) erected long setae as in *B. rambouseki* and *B. tomoricensis* (Figs. 62, 73–76). Male genital segment partly reduced, on dorsal (tergal) side forming a hood (Fig. 13, 40, 56). In dorsal view para-ring-like (Figs. 12, 26). External edge on tergal and sternal side rounded, slightly acute, without hairs on tergal external side. On ventral (sternal) side, the internal lobe is hyaline (Fig. 12). In a lateral view, with a significant hood on the tergal part, prolonged to long and narrow dorso-lateral processes (Fig. 13).

**Female genitalia:** Female ventrite VIII (Fig. 14, 27, 41, 57) strongly haired on proximal part with anterior stout or slim apophysis of medium length. Urite IX (genital segment-ovipositor) with stylomeres relatively short, wide and bulky with straight outer and significantly convex inner edge (Figs. 28, 42, 58, 63) or basally concave outer and moderately convex inner edge as in *B. rambouseki* (Fig. 64) and *B. tomoricensis* where stylomeres are longer and narrower. Sub-gonocoxite with one stylus, gonocoxite with one basal, one lateral and two subapical styles, apical gonostylus is the longest. Spermatheca (Figs. 29, 43, 59) sack-like or sausage-like, curved, uniformly and weakly sclerotized, rounded distally. Hyaline gland attached to the spermathecal duct at the proximal part of spermatheca.

### *Bathyscidius tristiculus* (Apfelbeck, 1905)

*Bathyscia* (s. str.) *tristicula* Apfelbeck, 1905: Glas. Zemaljskog Muz. Bosni i Herceg., 17: 247.

lct : In einer unbenannte Höhle bei Janjina, Halbinsel Sabioncello (Pelješac), Dalmatien, Croatia.

*Bathyscia* (s. str.) *tristicula* Apfelbeck, 1907: Wiss. Mitt. Bosnien Herceg., 10: 642. (Second publication).

*Bathyscina tristiculus* Apfelb. JEANNEL, 1908: Arch. Zool. exp. Gén., 4e série, 8: 299.

*Bathyscidius tristiculus* Apfelbeck: JEANNEL, 1910: Arch. Zool. exp. Gén. 45 (1): 37.

*Bathyscidius tristiculus* Apfelbeck: JEANNEL, 1911: Arch. Zool. exp. Gén. 47 (1): 415.

*Bathyscia* (*Bathyscidius*) *tristicula* Apfelbeck: JEANNEL, 1914: Coleopterum catalogus pars 60: 16.

*Bathyscidius tristiculus*. Apfb: MÜLLER, 1917: Mathem.-naturw. Klasse, Abt 1,126 (8) 32, 37, 39.

*Bathyscidius tristiculus*. Apfb: MÜLLER, 1922: Estr. dal Boll. Soc. ent. ital., 54:89–90.

*Bathyscidius tristiculus* subsp. *tristiculus* Apfelbeck: 1907: JEANNEL, 1924, Arch. Zool. expe. Gén., 63 (1): 269.

*Bathyscidius tristiculus* Apf.: LANEYRIE, R., 1967, Ann. De Spéléologie. 22 (3), 611.

*Bathyscidius tristiculus tristiculus* (Apfelbeck, 1907): PRETNER, 1968: Catalogus Faunae Jug. III. (6), 20.

*Bathyscidius tristiculus* Apfelbeck, 1907: Newton, 1998: Atti Museo Reg. di Scienze Natur., Torino, 127.

*Bathyscidius tristiculus tristiculus* (Apfelbeck, 1905): PERREAU, 2000: Mem. Sef, 4.: 193.

*Bathyscidius tristiculus tristiculus* (Apfelbeck, 1905): PERREAU, 2004: Catalogue of Palaearctic Coleoptera. Vol 2:153.

*Bathyscidius tristiculus*: Perreau, 2008, Inst. Nat. prot. Serbia, Monogr., 22: 179–180. DC PG ST

*Bathyscidius tristiculus tristiculus* (Apfelbeck, 1905): PERREAU, 2015: Catalogue of Palaearctic Coleoptera: 180–290.

*Bathyscidius tristiculus tristiculus* Apfelbeck, 1906: HLAVÁČ, P., PERREAU, M., ČEPLÍK, D., 2017: Czech Univ. of Life Sci, Pague, 100

*Bathyscidius tristiculus* Jeannel, 1910: PERREAU, 2019, Zootaxa 4590 (3): 367–381.

Victor Apfelbeck (APFELBECK, 1905) described the species as *Bathyscia* (s. str.) *tristicula* based on specimens collected by himself in a small cave, without a name near the village of Janjina in the Pelješac peninsula, Dalmatia, Croatia. Original diagnose is (in Latin): “*B. Lesinae affinis, corpore minus convexo et magis elongato, elytris subtilius transversim ruguloso-punctatis, striis suturalibus nullis, antennis multo longioribus, earum articulis 4°, 5° et 6° latitudine duplo longioribus, 9° et 10° haud transversis, articulo ultimo multo magis elongate, et in ♀ tarsis anticis simplicibus, haud dilatatis divergit. ♀ Tarsus anticus inconspicue quinque-articulatus, articulis omnibus simplicibus. In paeninsulae Sabioncello antro hucusque innominato prope Janjina a me detecta*”.

In the original description, Apfelbeck added (translated from Bosnian): “According to the tarsi, the species is similar to the species *B. Lesinae* Reitt. (*Phaneropella lesinae* today), but differs from it due to the lack of sutural carina, longer antenna according to the similar body size, being less gracile, with a somehow prolonged habitus and transversal punctuation of elytra; from the species *B. Erberi* Schauf. (*Pholeuonella erberi* today) and *B. curzolensis* Ganglb (*Dalmatiola curzolensis* today) it significantly differs in the simple shape of protarsi, compared to complex in last two species. From *B. erberi* besides this, it differs in the different shape of antenna, and from *B. curzolensis* due to reduction of pubescence on elytra.

First and second antenna articles are widened, prolonged, second slightly longer than first and three times longer than wide. Third and following articles half-width of second, third almost three times longer than wide. Articles 4 to 6 almost of same length and two times longer than wide. Article 6 widened at the apex, 7 enlarged, almost twice as long as wide, (8 -not written) rounded and not transverse, slightly narrower but much shorter than 7; 9 and 10 are gradually widened but not transversal; 9 is slightly longer than wide; 10 slightly longer than 9; last segment almost as long as 9 and 10 together. I collected it in Dalmatia on the Pelješac peninsula, in a small, unnamed cave near Janjina.”

**MATERIAL EXAMINED:** Pelješac (Croatia), Janjina, (no other data on label), Apfelbeck, 2 ♂♂ –Paratypes (PMSL); Pelješac (Croatia), Duba Pelješka, Tomasova spilja, 6 ♂♂ & 7 ♀♀, 05.04.2019, B. Jalžić leg. (CNHM, HBSD, NMPO); Pelješac (Croatia), Duba Pelješka, Pleće, Spilja Rupine, 6 ♂♂ & 3 ♀♀, 27.03.2019, B. Jalžić leg. (CNHM, HBSD, NMPO); Pelješac (Croatia), Ston, Vukasi donje, Ponikve, Špilja Bijelo jezero, 1 ♂♂ & 3 ♀♀, 29.03.2019, B. Jalžić leg. (CNHM, HBSD, NMPO).

#### REDESCRIPTION

**Size:** Total body length (BL): 1.36–1.61 mm (M= 1.47, N= 8, PT: 1.44, 1.61 mm) in ♂♂ and 1.48–1.80 mm (M= 1.59, N= 10) in ♀♀. **Colour:** Reddish-brown, antenna

and legs slightly paler. **Antenna:** Antenna (Figs. 79, 80) total length (AL): 0.590–0.720 mm (M= 0.646, N= 10, PT: 0.63, 0.69 mm) in ♂♂ and 0.531–0.716 mm (M= 0.649, N= 6) in ♀♀; **AL/PL:** 1.28–1.33 (M= 1.29) in ♂♂ and 1.13–1.23 (M= 1.20) in ♀♀.

**Aml** ♂♂: 0.065–0.085; 0.090–0.102; 0.054–0.066; 0.033–0.046; 0.036–0.046; 0.030–0.039; 0.049–0.059; 0.031–0.041; 0.045–0.059; 0.045–0.061; 0.099–0.121 (N = 10; PT: 0.078; 0.102; 0.059; 0.041; 0.043; 0.035; 0.057; 0.036; 0.047; 0.059; 0.110);

**Aml** ♀♀: 0.063–0.087; 0.093–0.120; 0.046–0.075; 0.031–0.048; 0.034–0.045; 0.028–0.045; 0.044–0.067; 0.025–0.037; 0.040–0.056; 0.040–0.056; 0.085–0.115 (N = 6).

**AL/Aml** (in %) ♂♂: 11.52; 15.31; 9.01; 6.08; 6.30; 5.40; 8.51; 5.49; 7.51; 8.11; 16.83.

**AL/Aml** (in %) ♀♀: 11.76; 15.95; 9.43; 6.14; 6.27; 5.86; 8.76; 4.93; 7.42; 7.53; 15.95.

**Aml/W** ♂♂: 2.00; 3.05; 2.69; 1.78; 1.66; 1.30; 1.47; 1.02; 1.08; 1.02; 1.82.

**Aml/W** ♀♀: 1.97; 3.09; 2.94; 1.73; 1.72; 1.32; 1.39; 1.27; 0.94; 0.78; 1.58.

**Pronotum:** Transverse, strongly concave with regularly rounded lateral edges, maximum width on posterior edge. **PL:** 0.464–0.535 mm (M= 0.500, N= 7) in ♂♂ and 0.465–0.583 mm (M=0.540, N= 5) in ♀♀; **PW:** 0.713–0.835 mm (M= 0.780, N= 7) in ♂♂ and 0.829–0.930 mm (M=0.920, N= 7) in ♀♀; **PL/PW:** 0.65–0.64 (M= 0.64) in ♂♂ and 0.56–0.64 (M= 0.59) in ♀♀.

**Thorax:** Mesosternal carina well developed, elevated, moderately thick, on ventral edge flattened not lanceolate, extended over the metasternum, almost reaching the metasternal intercoxal apophysis. Metendosternite as in other species of the genus. Metatergal apparatus with lateral processes strongly reduced and with moderate long apophysis as in other species of the genus.

**Elytra:** Elytra elongated-oval with maximum width on anterior part of elytra. Strongly pubescent with uniform short and decumbent pubescence inserted in strong lateral rows – transversal striae on complete elytra surface, without sutural carina. **EL:** 0.933–1.082 mm (M= 0.970, N= 5) in ♂♂ and 0.931–1.143 mm (M= 1.051, N= 5) in ♀♀; **EW:** 0.704–0.814 mm (M= 0.770, N= 5) in ♂♂ and 0.665–0.969 mm (M= 0.844, N= 5) in ♀♀; ratio **EL/EW:** 1.21–1.33 (M= 1.26) in ♂♂ and 1.18–1.66 (M= 1.25) in ♀♀.

**Legs:** Short and stout as in other species of the genus (Figs. 5–8). Male and female protarsi 4-segmented. **PtarL:** 0.163–0.184 mm (M= 0.170, N= 7) in ♂♂ and 0.163–0.207 mm (M= 0.179, N= 5) in ♀♀; **PtarW:** 0.018–0.024 mm (M= 0.020, N= 7) in ♂♂ & ♀♀, not dilated at both sexes; **PtibL:** 0.233–0.266 mm (M= 0.250, N= 7) in ♂♂, 0.229–0.300 mm (M= 0.265, N= 5) in ♀♀; **PtibW:** 0.043–0.055 mm (M= 0.050, N= 7) in ♂♂, 0.045–0.050 mm (M=0.049, N= 5) in ♀♀. Lateral side of protibia in both sexes armed with distinct comb of flat spines and two apical polident spurs as in other species of the genus (Figs. 5–6).

**Male genitalia:** Aedeagus elongated, extremely small, **AedL:** 0.312–0.353 mm (M= 0.340, N= 7, PT: 0.336, 0.339 mm) long. In dorsal view (Fig. 65) median lobe straight and slender, **AedMaxW:** at the apical third 0.044–0.054 mm (M= 0.050, N= 7, PT: 0.047, 0.049) wide; **AedMinW:** at the basal third 0.026–0.039 mm (M= 0.030, N= 7, PT: 0.036, 0.038) wide. Apex of median lobe moderately rounded, not pointed (Fig. 24). Inner sac without visible sclerotized structures. **AedL/AedMaxW:** 6.4–7.5. Basal lamina parallel with median lobe, relatively short compared to other



species of the genus. **BlamL**: 0.058–0.078 mm (M=0.070 PT: 0.064, 0.068 mm, N=10) long; **BlamW**: 0.057–0.078 mm (M= 0.070, N= 5 PT: 0.072, 0.072 mm) wide. **AedL/BlamL**: 4.6–5.6; **BlamL/BlamW**: 0.9–1.2. Aedeagus in lateral view (Fig. 66) almost straight, only slightly curved at the apical part. Parameres straight, parallel with median lobe, shorter than median lobe, with one apical and two subapical long setae, similar in size and length, protruding over the median lobe apex (Figs. 61, 65). Male genital segment in dorsal view ring-like, annular, in lateral view with significant hood on the side, similar to other species of the genus (Figs. 12, 13).

**Female genitalia**: Female ventrite VII strongly haired on proximal part with anterior stout or slim apophysis of medium length, like other species of the genus (Fig. 14, 27, 41, 57). Urite IX (genital segment-ovipositor) characteristic for the subgenus *Bathyscidius* s. str., stylomeres relatively short, wide with straight outer and convex inner edge (Fig. 63). Sub-gonocoxite with one stylus, gonocoxite with one basal, one lateral and two subapical styles, gonostylus with one longest stylus. Spermatheca sack-like or sausage-like, curved, uniformly and weakly sclerotized, rounded distally, as in other species of the genus (Figs. 29, 43, 59). Hyaline gland attached to the spermathecal duct at the proximal part of spermatheca.

#### Differential diagnosis.

*Bathyscidius tristiculus* differs from other *Bathyscidius* species by shape of aedeagus median lobe apex, which is not pointed as in *B. rambouseki* and *B. tomoricensis* (Figs. 62, 73–76) but elliptically rounded (Figs. 61, 65). *B. orjensis* has an extremely and for the genus unusually wide median lobe (Figs. 77, 78). *B. fallaciosus* and *B. komajiensis* have a relatively shorter aedeagus with significantly widened median lobes on apical third (Figs. 69–72). *B. tristiculus* has an aedeagus similar to *B. mljetensis* sp. n., which has the aedeagus slightly narrower (67, 68). The latter two species can be easily distinguished by significant differences in antenna length. *B. tristiculus* has relatively longer antenna (Figs. 79, 80), total length (AL): 0.590–0.720 mm in ♂♂ and 0.531–0.716 mm in ♀♀; as compared to *B. mljetensis* sp. n. (Figs. 22, 23, 81, 82) (AL) 0.515–0.591 mm in ♂♂ and 0.523–0.582 mm in ♀♀.

**Distribution.** The species is known from its type locality, the cave near Janjina, Pelješac (Croatia), according to the original description. Despite significant efforts of Croatian speleobiologists, the type locality has not yet been found and identified. It seems as if, some decades ago, the cave was destroyed or filled up during construction works. Recently, in 2019, populations that fit with the type specimens were found in the Pelješac peninsula in Tomasova spilja and Spila Rupine near Duba Pelješka approximately 20 km west of Janjina and in špilja Bijelo jezero near the village of Vukasi, Ponikve, approximately 12 km of Janjina (Fig. 95).

**Ecology.** Nothing is known about how the specimen was collected at the type locality except that the cave was small. The species was recently found at the bottom end? of the small, 41 meter long cave Tomasova spilja, which was once used as a shelter for domestic animals. The temperature 10.0 °C and humidity 94% were measured on 05.04.2019 in the main chamber of the cave. The specimens were mostly collected in the soil and organic debris under the rocks, close to the

entrance. In Spilja Rupine the specimens were collected near the entrance of the main chamber (66x34x14 m) among the rock debris and sinter deposits on the steep cave slope. In the cave the temperature of 9.1 °C and 90% air humidity were measured on 24.04.2019. The finding place was usually covered with bat guano deposits. In the cave Bijelo jezero (21 m long) the specimens were collected under rock debris and soil in the main cave chamber. In the cave the temperature of 12.4°C was measured on 29.03.2019.

***Bathyscidius mljetensis* Polak & Jalžić sp. n.**

Figs. 5–9, 15–29, 63, 64, 77, 78



**Figs. 15–16.** *Bathyscidius mljetensis* sp. n. in its natural habitat in the type locality Jama na Žutim kokom. (Photo: T. Čuković)

**Type locality:** Jama na Žutim kokom, (Synonyms: Vickova jama, Jama za Žutim kokom), situated near the village of Maranovići, Blato, Island of Mljet in Southern Dalmatia (Croatia) (Figs. 30, 95).

**MATERIAL EXAMINED:** specimens as declared in type series. Additional material: Otok Mljet, Ostaševica (Jama na Žutim kokom), 26.03.1993, 1 ♂, Rađa T. leg., (NMPO); Polače, Vriješće, Špilja kod vrha Spile, 1 ♂, 06.04.2015, Malenica M. leg., (HBSD).

**DESCRIPTION.**

**Size:** Total body length (BL): 1.27–1.44 mm (M= 1.345, N= 10) in ♂♂ and 1.42–1.54 mm (M= 1.48, N= 10) in ♀♀. **Colour:** Yellowish to yellowish brown, antenna and legs slightly paler (Figs. 15, 16). **Antenna:** (Figs. 22, 23, 81, 82) Antenna total length (AL): 0.515–0.591 mm (M= 0.553, N= 8) in ♂♂ and 0.523–0.582 mm (M= 0.554, N= 6) in ♀♀; **AL/PL:** 1.23–1.27 (M= 1.25) in ♂♂ and 1.19–1.21 (M= 1.19) in ♀♀.

**AmL** ♂♂: 0.061–0.069; 0.078–0.099; 0.040–0.55; 0.030–0.035; 0.032–0.037; 0.029–0.034; 0.041–0.049; 0.026–0.32; 0.033–0.041; 0.037–0.045; 0.084–0.103 (N= 8).

**AmL** ♀♀: 0.061–0.074; 0.087–0.099; 0.044–0.54; 0.032–0.037; 0.034–0.040; 0.028–0.035; 0.047–0.052; 0.026–0.031; 0.035–0.040; 0.037–0.039; 0.087–0.091 (N= 6).

**AL/AmL** (in %) ♂♂: 11.76; 16.26; 8.71; 5.90; 6.26; 5.77; 8.14; 5.34; 6.97; 7.44; 17.46.

**AL/AmL** (in %) ♀♀: 12.54; 16.87; 8.57; 6.07; 6.58; 5.80; 8.90; 5.08; 6.79; 7.83; 15.97.

**AmL/W** ♂♂: 1.89; 2.82; 2.10; 1.47; 1.41; 1.15; 1.15; 0.77; 0.83; 0.75; 1.62.

**AmL/W** ♀♀: 1.85; 2.97; 2.30; 1.62; 1.54; 1.27; 1.33; 0.77; 0.78; 0.69; 1.50.

**Pronotum:** Transverse, strongly concave with regularly rounded lateral edges, maximum width on posterior edge (Figs. 17, 18). Dorsal face strongly pubescent with uniform short and decumbent pubescence, without order. PL: 0.420–0.466 mm (M= 0.442, N= 7) in ♂♂ and 0.440–0.481 mm (M= 0.464, N= 6) in ♀♀; PW: 0.685–0.741 mm (M= 0.719, N= 7) in ♂♂ and 0.751–0.801 mm (M= 0.776, N= 6) in ♀♀; PL/PW on average M= 0.61 in ♂♂ and M= 0.60 in ♀♀.

**Thorax:** Mesosternal carina well developed, elevated, moderately thick, on ventral edge flattened not lanceolate, extended over the metasternum, almost reaching the metasternal intercoxal apophysis (Fig. 21). Metendosternite as in other species of the genus. Metatergal apparatus with lateral processes strongly reduced and with moderate long apophysis as in other species of the genus.

**Elytra:** Elytra elongated-oval with maximum width on anterior part of elytra (Figs. 19, 20). Strongly pubescent with uniform short and decumbent pubescence inserted in strong lateral rows – transversal striae on complete elytra surface, without sutural carina. EL: 0.875–0.951 mm (M= 0.918, N= 7) in ♂♂ and 0.954–1.043 mm (M= 0.988, N= 6 in ♀♀; EW: 0.752–0.760 mm (M= 0.756, N= 7) in ♂♂ and 0.762–0.824 mm (M= 0.782, N= 5) in ♀♀; ratio EL/EW: 1.21–1.24 (M= 1.21, N= 5) in ♂♂ and 1.25–1.28 (M= 1.26, N= 5) in ♀♀.

JAMA NA ŽUTIM KOKOM  
Maranovići, Otok Mljet  
Sinonim / Synonym: Vickova jama, Jama za Žutim kokom

Dubina/Depth: 39 m  
Tlocrtna dužina/Horizontal length: 12 m  
Topografski snimio/Survey by: B. Jalžić  
Mjerenje/Measuring: N. Mihaljević  
Nacrt uredila/Editing and design: M. Pavlek  
Datum istraživanja/Date of exploration: 02.05.2008.  
Broj pločice/No. number: 42/59  
Istraživač/Exploration by: Hrvatsko biospeleološko društvo, Speleološko društvo Špiljar



**Fig. 30** Speleological survey of the cave Jama na Žutim kokom, the type locality of *Bathyscidius mljetensis* sp. n.

**Legs:** Short and stout as in other species of the genus (Figs. 5–8). Male and female protarsi 4-segmented. **PtarL:** 0.176–0.196 (M= 0.185, N= 5) mm in ♂♂ and 0.170–0.190 (M= 0.182, N= 5) mm in ♀♀; **PtarW:** 0.019–0.024 (M= 0.020, N= 5) mm in ♂♂ & ♀♀, not dilated in either sex; **PtibL:** 0.224–0.253 (M= 0.241, N= 8) mm in ♂♂, 0.230–0.258 (M= 0.246, N= 6) mm in ♀♀; **PtibW:** 0.045–0.051 (M= 0.048, N= 5) mm in ♂♂, 0.046–0.049 (M= 0.047, N= 5) mm in ♀♀. Lateral side of protibia in both sexes armed with distinct comb of flat spines and two apical polident spur (Figs. 5–6) as in other species of the genus.

**Male genitalia:** Aedeagus elongated, extremely small, **AedL:** 0.309–0.347 (M= 0.321, N= 7) mm long. In dorsal view (Figs. 24, 67) median lobe straight and slender, **AedMaxW:** at the apical third 0.038–0.046 (M= 0.041, N= 5); **AedMinW:** at the basal third 0.027–0.035 (M= 0.031, N= 5) mm wide. Apex of median lobe moderately rounded, not pointed (Fig. 24, 67). Inner sac without visible sclerotized structures. **AedL/AedMaxW:** 7.4–8.3. Basal lamina parallel with median lobe, relatively short compared to other species of the genus (Figs. 24, 25, 67, 68). **BlamL:** 0.064–0.090 (M= 0.080, N= 5) mm long, **BlamW:** 0.058–0.085 (M= 0.072, N= 5) mm wide. **AedL/BlamL:** 3.6–4.9; **BlamL/BlamW:** 0.8–1.5. Aedeagus in lateral view (Fig. 25, 68) almost straight. Parameres straight, parallel with median lobe, shorter than median lobe, with one apical and two subapical long setae, similar in size and length, protruding over median lobe apex (Fig. 24, 25, 67, 68). Male genital segment (Fig. 26) in dorsal view ring-like, annular, in lateral view with significant hood on the side, similar to other species of the genus.

**Female genitalia:** Female ventrite VIII (Fig. 27) strongly haired on proximal part with anterior stout or slim apophysis of medium length. Urite IX characteristic for the genus, stylomeres relatively short, wide with straight outer and convex inner edge (Fig. 28). Sub-gonocoxite with one stylus, gonocoxite with one basal, one lateral and two subapical styles, gonostylus with one longest stylus. Spermatheca (Fig. 29) sack-like or sausage-like, curved, uniformly and weakly sclerotized, rounded distally. Hyaline gland attached to the spermathecal duct at the proximal part of spermatheca.

**Differential diagnosis.** *Bathyscidius mljetensis* sp. n. differs from other *Bathyscidius* species by the shape of the aedeagus median lobe apex, which is not pointed as in *B. rambouseki* and *B. tomoricensis* (Figs. 73, 75) but elliptically rounded. *B. orjensis* have extreme and for genus unusually wide median lobe (Fig. 77). *B. fallaciosus* and *B. komajiensis* have a relatively shorter aedeagus with is significantly widened median lobes on apical third (Figs. 69, 71). *B. mljetensis* sp. n. has an aedeagus similar to that of *B. tristiculus*, which has a slightly wider aedeagus. The latter two species can be easily distinguished by significantly differences in antenna length (Figs. 22, 23, 81, 82). *B. mljetensis* sp. n. has total antenna length (AL): 0.515–0.591 mm in ♂♂ and 0.523–0.582 mm in ♀♀, compared to *B. tristiculus* that has antenna longer 0.590–0.720 mm in ♂♂ and 0.531–0.716 mm in ♀♀.

**Etymology.** The species epithet is a toponym derived from the name of the island of Mljet.

**Distribution.** The new species is known only from its type locality, the cave “Jama na Žutim kokom” on Mljet island, Croatia. One studied male from Špilja

kod vrha Spile near Polače on the western part of the island fits with *B. mljetensis* too. Since it has slightly shorter terminal antennomeres, and a single specimen is known so far, the species determination of this specimen is only provisional. So far we consider *Bathyscidius mljetensis* to be the only species of the genus on the island of Mljet.

**Ecology.** Specimens of *B. mljetensis* **sp. n.** were collected in the 39 meter deep cave named Jama na Žutim kokom. In the cave, some other troglobiontic animals were discovered (ĆURČIĆ *et al.*, 2012a). The specimens were collected on the bottom of the pit among the rock debris filled with soil and leaf litter from the surface. Sunlight periodically penetrates from the entrance to the bottom of the cave. The temperature on the collecting site measured on 22.10.2015 was 12.6 °C and the air humidity was 95.8%.

**Type series.** Holotype ♂, glued to a white card, pinned dry, aedeagus dissected and preserved immersed in Solakryl BMX media on a transparent label pinned below the specimen, labeled: HOLOTYPE | *Bathyscidius mljetensis* **sp. n.** ♂ | Polak & Jalžić det., [rectangular red label, printed]. Second label: CROATIA: Otok Mljet, Maranovići, Jama na Žutim kokom, 2.9.2011, Jalžić, B. leg. [rectangular white label, printed], – (CNHM).

Paratypes: PARATYPE | *Bathyscidius mljetensis* **sp. n.** | Polak & Jalžić det. [rectangular yellow label, printed]. Second label: [rectangular white label, printed], specimen glued to white card, pinned dry, dissected genital parts and some body parts preserved immersed in Solakryl BMX on a transparent label, pinned below the specimens: 4 ♂♂ and 2 ♀♀, 2.9.2011, Jalžić, B. leg., same locality as the holotype – (CNHM); pinned dry, not dissected: 4 ♂♂ and 5 ♀♀, 2.8.2011, Jalžić, B. leg., same locality as the holotype; pinned dry, not dissected: 1 ♂ and 1 ♀, 2.5.2011, Jalžić, B. leg., same locality as the holotype, pinned dry, not dissected: – (HBSD).

Specimens dissected (body parts, aedeagus, genital segments, protarsi, and antenna) preserved immersed in glycerine on glass microscope slides: 6 ♂♂ and 7 ♀♀, 2.8.2011, Jalžić, B. leg., same locality as the holotype – (NMPO).

***Bathyscidius fallaciosus* (Müller, 1910) status nov.**

*Bathyscia tristicula fallaciosa* Müller, Zool. Anz., 36 (8/9): 184.

lct : Höhle oberhalb der Omblaquelle bei Ragusa (Dubrovnik), Dalmatien, Croatia.

*Bathyscidius tristiculus* subsp. *fallaciosus* J. Müller 1910: JEANNEL, 1911, Arch. Zool. exp. Gén, 47 (1): 415.

*Bathyscia* (*Bathyscidius*) *tristicula* subsp. *fallaciosa* J. Müller: JEANNEL, 1914, Coleopterum catalogus pars 60: 16.

*Bathyscidius tristiculus fallaciosus*: Müller 1917, Mathem.-naturw. Klasse, Abt 1, 126 (8) 32, 37.

*Bathyscidius tristiculus* subsp. *fallaciosus* J. Müller 1910: Estr. dal Boll. Soc. ent. ital., 54:89–90.

*Bathyscidius tristiculus* subsp. *fallaciosus* J. Müller, 1910: JEANNEL, 1924, Arch. Zool. expe. Gén., 63 (1): 269.

*Bathyscidius tristiculus fallaciosus* Müller: Winkler, 1925, Koleopterol. Rundsch., 11 (5-6): 141.

*Bathyscidius tristiculus fallaciosus* Müll.: Laneyrie, R., 1967, Ann. De Spéléologie. 22 (3), 611.

*Bathyscidius tristiculus fallaciosus* (J. Müller 1910): PRETNER, 1968: Catalogus Faunae Jug. III. (6), 20.

*Bathyscidius tristiculus fallaciosus* Müller 1910: PERREAU, 2000: Mem. Sef, 4.: 193.

*Bathyscidius tristiculus fallaciosus* Müller 1910: PERREAU, 2004: Catalogue of Palaearctic Coleoptera. Vol 2:153.

*Bathyscidius tristiculus fallaciosus* Müller 1910: PERREAU, 2015: Catalogue of Palaearctic Coleoptera: 180–290.

*Bathyscidius tristiculus fallaciosus* Müller 1910: HLAVÁČ, P., PERREAU, M., ČEPLÍK, D., 2017: Czech Univ. of Life Csci, Pague, 100.

**Type locality.** Vilina špilja – izvor Omble (OZIMEC *et al.*, 2015). (Synonyms: Vilin stan, Vilina kuća, Vilina pećina iznad izvora Omble, Vilinska špilja, Höhle von Vilina Kučina, Quelle der Rijeka Dubrovačka bei Dubrovnik, Ombla; Omblaquelle bei Dubrovnik, Rijeka Dubrovačka-Quellen, Vilina špilja – Ombla izvor sustav) near Dubrovnik in Southern Dalmatia (Croatia) (Fig. 95).

Joseph Müller (MÜLLER, 1910) described a subspecies on the basis of the specimens collected by H.F. Neumann in 1909 in the Cave above Ombla Spring in Dubrovnik, Dalmatia, Croatia.

The original description (translated from German) is as follows: “From the typ. *tristicula* Apfb. from Sabbioncello it differs by constantly different shape of antenna, but we have to understand this probably only as a geographical race.

All the antennomers shorter and broader than in the typical form, viewed from the broad side, the antennomers 4–7 appear barely longer than wide, the eighth and ninth distinctly transverse, and the tenth even wider than long. At the typical *tristicula*, the antennomers 4–7 are prolonged, the eighth, ninth and tenth are not or slightly wider than long.

Due to the less developed antenna construction, especially of its last article, this *Bath.* can easily be confused with *Bath. Erberi* (*Pholeuonella erberi* today), and only the simple 4-segmented ♂ protarsi enable reliable distinguish from it. Location: Cave above the Ombla Spring near Ragusa. Collected by Mr. Engineer H. F. Neumann (1909).”

**MATERIAL EXAMINED:** Dalmatia (Croatia), Rijeka Dubrovačka, Vilin stan, 9 ♂♂ & ♀♀, 06.11.1956 & 30.05.1957, E. Pretner leg & det. (PMSL, NMPO); Rijeka Dubrovačka, Vilin stan, 2 ♂♂ & 2 ♀♀, 08.09.2007, B. Jalžić leg. (NMPO).

#### DESCRIPTION.

**Size:** Total body length (BL): 1.46–1.55 mm (M= 1.48, N= 3) in ♂♂ and 1.55–1.64 mm (M= 1.62, N= 3) in ♀♀. **Colour:** Yellowish to reddish brown, antenna and legs slightly paler. **Antenna:** (Figs. 79, 80) Antenna total length (AL): 0.576–0.589 mm (M= 0.582, N= 3) in ♂♂ and 0.585–0.602 mm (M= 0.590, N= 3) in ♀♀; **AL/PL:** 1.22–1.29 (M= 1.24) in ♂♂ and 1.16–1.18 (M= 1.17) in ♀♀.

**AmL** ♂♂: 0.063–0.063; 0.098–0.103; 0.043–0.051; 0.032–0.032; 0.033–0.037; 0.034–0.034; 0.049–0.051; 0.027–0.030; 0.040–0.043; 0.045–0.053; 0.098–0.103 (N = 3).

**AmL** ♀♀: 0.070–0.073; 0.100–0.106; 0.044–0.053; 0.032–0.034; 0.034–0.039; 0.033–0.035; 0.050–0.052; 0.027–0.031; 0.040–0.042; 0.043–0.046; 0.093–0.102 (N = 3).

**AL/AmL** (in %) ♂♂: 10.82; 17.18; 8.19; 5.50; 6.13; 5.84; 8.65; 4.93; 7.16; 8.30; 17.30.

**AL/AmL** (in %) ♀♀: 12.16; 17.42; 8.26; 5.59; 6.23; 5.72; 8.69; 4.96; 6.91; 7.63; 16.44.

**AmL/W** ♂♂: 1.97; 2.73; 1.93; 1.35; 1.37; 1.20; 1.28; **0.77; 0.92; 0.87**; 1.60.

**AmL/W** ♀♀: 1.95; 3.02; 2.24; 1.55; 1.52; 1.31; 1.36; **0.79; 0.86; 0.85**; 1.76.

**Pronotum:** As in genus description. Transverse, strongly concave with regularly rounded lateral edges, maximum width on posterior edge (Figs. 1, 2). **PL:** 0.446–0.481 mm (M= 0.469, N=3) in ♂♂ and 0.497–0.516 mm (M= 0.507, N=3) in ♀♀; **PW:** 0.753–0.795 mm (M= 0.768, N=3) in ♂♂ and 0.820–0.854 mm (M= 0.837, N=3) in ♀♀; **PL/PW:** 0.59–0.60 (M= 0.61) in ♂♂ and 0.60–0.61 (M= 0.60) in ♀♀.

**Thorax:** As in genus description. Metendosternite (Fig. 11) as in other species of the genus.

**Elytra:** Elytra elongated-oval with maximum width on anterior part of elytra (Fig. 1). Strongly pubescent with uniform short and decumbent pubescence inserted in strong lateral rows – transversal striae on complete elytra surface, without sutural carina. EL: 1.002–1.021 mm (M= 1.014, N= 3) in ♂♂ and 1.102–1.124 mm (M= 1.013, N= 3) in ♀♀; EW: 0.753–0.795 mm (M= 0.768, N= 7) in ♂♂ and 0.840–0.841 mm (M= 0.040, N= 5) in ♀♀; ratio EL/EW: 1.28–1.36 (M= 1.32, N= 2) in ♂♂ and 1.31–1.34 (M= 1.32, N= 2) in ♀♀.

**Legs:** Short and stout as in other species of the genus (Figs. 5–8). **PtarL:** 0.172–0.179 (M= 0.175, N= 3) mm in ♂♂ and 0.176–0.192 (M= 0.182, N= 5) mm in ♀♀; **PtarW:** 0.020–0.025 (M= 0.023, N= 3) mm in ♂♂ & ♀♀, not dilated at both sexes; **PtibL:** 0.240–0.250 (M= 0.246, N= 3) mm in ♂♂, 0.248–0.29 (M= 0.254, N= 3) mm in ♀♀; **PtibW:** 0.047–0.052 (M= 0.050, N= 3) mm in ♂♂, 0.047–0.055 (M= 0.052, N= 3) mm in ♀♀.

**Male genitalia:** Aedeagus elongate, extremely small, **AedL:** 0.322–0.326 (M= 0.325, N= 3) mm long. In dorsal view (Fig. 69) median lobe straight and slender, **AedMaxW:** at the apical third 0.058–0.061 (M= 0.060, N= 3) mm wide; **AedMinW:** at the basal third 0.038–0.041 (M= 0.040, N= 3) mm wide. Apex of median lobe moderately rounded, not pointed (Fig. 69). Inner sac without visible sclerotized structures. **AedL/AedMaxW:** 5.3–5.6. Basal lamina parallel with median lobe, relatively short compared to other species of the genus but longer than in *B. tristiculus* and *B. mljetensis* sp. n. (Figs. 69, 70). **BlamL:** 0.085–0.091 (M= 0.087, N= 3) mm long; **BlamW:** 0.058–0.060 (M= 0.059, N= 3) mm wide. **AedL/BlamL:** 3.5–3.8; **BlamL/BlamW:** 1.4–1.5. Aedeagus in lateral view (Fig. 70) almost straight. Parameres straight, parallel with median lobe, shorter than median lobe, with one apical and two subapical long setae, similar in size and length, protruding over median lobe apex (Fig. 69, 70). Male genital segment as in genus description.

**Female genitalia:** Female ventrite VIII (Fig. 14) and spermatheca as in genus description. Urite IX characteristic for the subgenus *Bathyscidius* s. str., stylomeres relatively short, wide with straight outer and convex inner edge (as in Fig. 63).

According to evident morphological differences with *B. tristiculus*, especially aedeagus shape, we elevate the originally described subspecies *B. tristiculus fallaciosus* to species level = *B. fallaciosus*.

**Differential diagnosis.** *Bathyscidius fallaciosus* differs from other *Bathyscidius* species by the shape of the aedeagus median lobe apex, which is not pointed as in *B. rambouseki* and *B. tomoricensis* (Figs. 73, 75) but has a widely oval to semitriangular apex. *B. orjensis* has an extremely and for the genus unusually wide median lobe (Figs. 77, 78). *B. tristiculus* and *B. mljetensis* have a relatively longer aedeagus with its significantly narrow (subparallel) median lobes on the apical third (Figs. 65, 67). *B. fallaciosus* has a shorter and, on the apical third, a widened aedeagus median lobe similar to that of *B. komajiensis*. This two species can be easily distinguished by significant differences in antenna length compared to body size. *B. fallaciosus* has a significantly shorter antenna (AL): 0.576–0.589 mm in ♂♂ and 0.585–0.602 mm in ♀♀ than *B. komajiensis*, which has the longest antenna (AL): 0.700–0.749 mm in ♂♂ and 0.712–0.749 mm in ♀♀; among all known species of genus. In *B. fallaciosus* 8<sup>th</sup> – 10<sup>th</sup> antennomeres are shorter than wide, unlike *B.*

*komajiensis* where the 8<sup>th</sup> – 10<sup>th</sup> antennomeres are longer than wide. Otherwise, *B. fallaciosus* is of similar body size to *B. komajiensis*.

**Distribution.** The species is known only from its type locality Vilina špilja at Ombla Spring and reported from Jama kod Bosanke (Schacht bei Bosanka), Bosanka near Dubrovnik collected by V. 1925 Winkler on May 1925 (PRETNER, 1973).

**Ecology.** Specimens of *B. fallaciosus* were collected in Vilina špilja at Ombla Spring, which is a well-known extensive cave system measuring a total of 3063 m of passages (JALŽIĆ *et al.* 2013). The specimens were mostly collected in the upper part of the cave system, approximately 100 m from the entrance, on the bottom of a tunnel, in proximity to bat guano deposits. On the site 100% humidity, temperature 16.2 °C and CO<sub>2</sub> concentration 281 ppm were measured on 29.03.2008.

*Bathyscidius komajiensis* Polak & Jalžić **sp. n.**

Figs. 31-44, 71-72, 85-86.

**Type locality.** Bezdan (Synonyms: Jama Vignji, Bezdanka, Jama Bezdan Pit), situated near the village of Komaji, Konavle, near Dubrovnik in Southern Dalmatia (Croatia) (Figs. 44, 91).

MATERIAL EXAMINED: specimens as declared in the type series.

DESCRIPTION.

**Size:** Total body length (BL): 1.33–1.55 mm (M= 1.470, N= 6) in ♂♂ and 1.43–1.56 mm (M= 1.484, N= 8) in ♀♀. **Colour:** Yellowish to reddish brown, antenna and legs slightly paler. **Antenna:** (Figs. 36, 37, 85, 86) Antenna total length (AL): 0.700–0.749 mm (M= 0.719, N= 4) in ♂♂ and 0.712–0.765 mm (M= 0.733, N= 4) in ♀♀; **AL/PL:** 1.39–1.50 (M= 1.43) ♀♀ in and 1.42–1.43 (M= 1.42) in ♀♀.

**Aml** ♂♂: 0.077–0.081; 0.101–0.113; 0.064–0.066; 0.045–0.050; 0.047–0.052; 0.038–0.045; 0.061–0.069; 0.042–0.43; 0.054–0.060; 0.050–0.058; 0.108–0.1118 (N = 4).

**Aml** ♀♀: 0.081–0.090; 0.107–0.119; 0.059–0.076; 0.043–0.052; 0.046–0.053; 0.042–0.047; 0.062–0.069; 0.040–0.044; 0.051–0.057; 0.051–0.055; 0.109–0.112 (N = 4).

**AL/Aml** (in %) ♂♂: 10.99; 14.89; 9.04; 6.64; 6.78; 5.95; 8.94; 5.88; 7.93; 7.48; 15.48.

**AL/Aml** (in %) ♀♀: 11.87; 15.42; 8.90; 6.45; 6.92; 6.07; 8.97; 5.73; 7.30; 7.26; 15.11.

**Aml/W** ♂♂: 1.98; 3.32; 3.02; 2.17; 2.65; 1.63; 1.68; **1.16; 1.23; 1.08; 1.92.**

**Aml/W** ♀♀: 2.16; 3.70; 3.18; 2.22; 2.16; 1.76; 1.92; **1.29; 1.23; 1.10; 2.02.**

**Pronotum:** Transverse, strongly concave with regularly rounded lateral edges, maximum width on posterior edge (Figs. 31, 32). Dorsal face strongly pubescent with uniform short and decumbent pubescence, without order. PL: 0.466–0.539 mm (M= 0.503, N= 4) in ♂♂ and 0.494–0.537 mm (M= 0.516, N= 4) in ♀♀; PW: 0.735–0.788 mm (M= 0.762, N= 2) in ♂♂ and 0.822–0.831 mm (M= 0.827, N= 2) in ♀♀; PL/PW 0.60–0.61 (M= 0.61) in ♂♂ and 0.63–0.68 (M= 0.66) ♀♀.

**Thorax:** Mesosternal carina well developed, elevated, moderately thick, on ventral edge flattened not lanceolate, extended over the metasternum, almost reaching the metasternal intercoxal apophysis (Fig. 35). Metendosternite as in other species of the genus (Fig. 11). Metatergal apparatus with lateral processes strongly reduced and with moderately long apophysis as in other species of the genus (Figs. 9, 10).





**BEZDAN (JAMA VIGNJI)**  
 VUKOJE, KOMANA, ČUJIN

**Topografski snimci:** Topo Dal, Paolo Dobner, Miro Gubavac, Tih Rožman, Vedran Šušter, Anja Trigonović  
**Detaljni snimci:** Miro Gubavac, Vedran Šušter, Anja Trigonović, Tih Rožman, Vedran Šušter, Anja Trigonović  
**Detaljni snimci (većina):** 30-31. listopada 2016., 14.-18. travnja 2017.  
**Snimci:** HBSD, Čestita, BICL, SO Anja Trigonović, SO Miroz, SO Sigalčinac, SO Vuklje, SO Žaljevanac

**Travnjača odjela:** 795  
**Travnjača odjela:** 898 m  
**Duljina:** 142 m  
**Širina:** 10 m  
**Ukupna površina:** 1420 m<sup>2</sup>  
**Ukupna površina:** 1420 m<sup>2</sup>  
**Ukupna površina:** 1420 m<sup>2</sup>

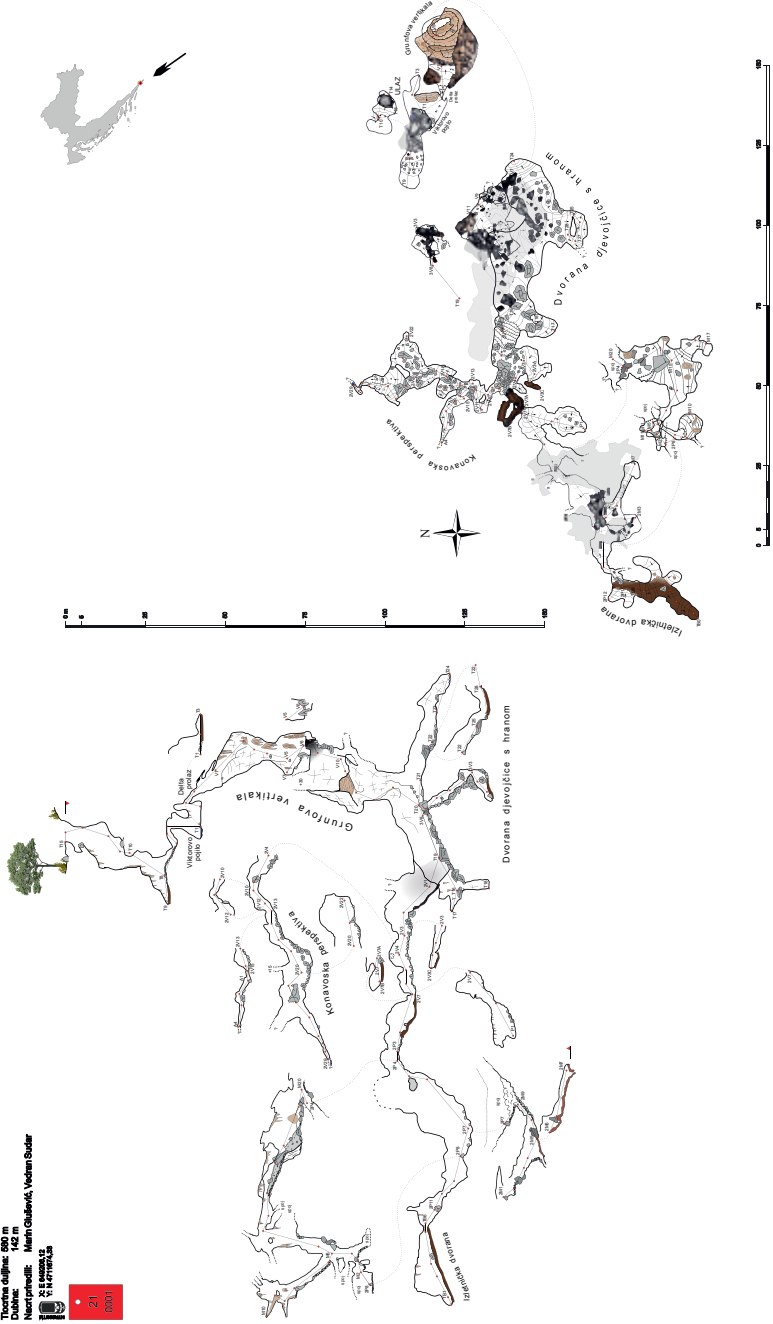


Fig. 44. Speleological survey of cave Bezdani (Jama Vignji), the type locality of *Bathysciadites komajeniensis* sp. n.

**Elytra:** Elytra elongated-oval with maximum width on anterior part of elytra (Figs. 33, 34). Strongly pubescent with uniform short and decumbent pubescence inserted in strong lateral rows – transversal striae on complete elytra surface, without sutural carina. EL: 0.951–0.983 mm (M= 0.967, N= 5) in ♂♂ and 1.030–1.046 mm (M= 1.038, N= 5) in ♀♀; EW: 0.736–0.740 mm (M= 0.737, N= 5) in ♂♂ and 0.819–0.841 mm (M= 0.830, N= 5) in ♀♀; ratio EL/EW: 1.29–1.34 (M= 1.31) in ♂♂ and 1.24–1.26 (M= 1.25) in ♀♀.

**Legs:** Short and stout as in other species of the genus (Figs. 5–8). Male and female protarsi 4-segmented. **PtarL:** 0.180–0.185 (M= 0.183, N= 5) mm in ♂♂ and 0.174–0.190 (M= 0.183, N= 5) mm in ♀♀; **PtarW:** 0.019–0.023 (M= 0.021, N= 5) mm in ♂♂ & ♀♀, not dilated at both sexes; **PtibL:** 0.238–0.246 (M= 0.242, N= 5) mm in ♂♂, 0.244–0.265 (M= 0.254, N= 5) mm in ♀♀; **PtibW:** 0.048–0.050 (M= 0.050, N= 5) mm in ♂♂, 0.048–0.052 (M= 0.050, N= 5) mm in ♀♀. Lateral side of protibia at both sexes armed with distinct comb of flat spines and two apical polydent spur as in other species of the genus (Figs. 5–6).

**Male genitalia:** Aedeagus elongated, extremely small, **AedL:** 0.288–0.304 (M= 0.297, N= 4) mm long. In dorsal view (Figs. 38, 71) median lobe straight and slender, **AedMaxW:** at the apical third 0.055–0.058 (M= 0.057, N= 4) mm wide; **AedMinW:** at the basal third 0.031–0.035 (M= 0.033, N= 4) mm wide. Apex of median lobe moderately rounded, not pointed (Fig. 38, 71). Inner sac without visible sclerotized structures. **AedL/AedMaxW:** 7.4–8.3. Basal lamina parallel with median lobe, relatively short compared to other species of the genus (Figs. 38, 71). **BlamL:** 0.077–0.083 (M= 0.080, N= 4) mm long; **BlamW:** 0.065–0.074 (M= 0.069, N= 5) mm wide. **AedL/BlamL:** 3.5–3.9; **BlamL/BlamW:** 1.0–1.3. Aedeagus in lateral view (Fig. 39, 72) almost straight. Parameres straight, parallel with median lobe, shorter than median lobe, with one apical seta and two subapical long setae, similar in size and length, protruding over median lobe apex (Figs. 38, 39, 70, 71). Male genital segment in dorsal view annular, in lateral view (Fig. 40) with significant hood on the side, similar to other species of the genus.

**Female genitalia:** Female ventrite VIII (Fig. 41) strongly haired on proximal part with anterior stout or slim apophysis of medium length. Urite IX characteristic for the subgenus *Bathyscidius* s. str., stylomeres relatively short, wide with straight outer and convex inner edge (Fig. 42). Sub-gonocoxite with one stylus, gonocoxite with one basal, one lateral and two subapical styles, gonostylus with one longest stylus. Spermatheca (Fig. 43) sack-like or sausage-like, curved, uniformly and weakly sclerotized, rounded distally. Hyaline gland attached to the spermathecal duct at the proximal part of spermatheca.

**Differential diagnosis.** *Bathyscidius komajiensis* differs from other *Bathyscidius* species by the shape of the aedeagus median lobe apex, which is not pointed as in *B. rambouseki* and *B. tomoricensis* (Figs. 72, 75) but has a widely oval to semitriangular apex. *B. orjensis* has an extremely and for the genus unusually wide median lobe (Fig. 77). *B. tristiculus* and *B. mljetensis* have relatively longer aedeagus with significantly narrow (subparallel) median lobes on apical third (Figs. 65, 67). *B. komajiensis* has a shorter and on the apical third widened aedeagus median lobe like that of *B. fallaciosus*. These two species can be easily distinguished by the significant differences in antenna length compared to body size. *B. komajiensis* has the longest antenna (AL): 0.700–0.749 mm in ♂♂ and 0.712–0.749 mm in ♀♀;

among all known species of genus. *B. fallaciosus* has significantly shorter antenna (AL): 0.576–0.589 mm in ♂♂ and 0.585–0.602 mm in ♀♀.

In *B. komajiensis* 8<sup>th</sup>–10<sup>th</sup> antennomeres are longer than wide, unlike *B. fallaciosus* where the 8<sup>th</sup>–10<sup>th</sup> antennomeres are shorter than wide. Otherwise, *B. komajiensis* is of similar body size as *B. fallaciosus*.

**Etymology.** The species epithet is a toponym derived from the name of Komaji village near Čilipi (Croatia), where the type locality, the cave Bezdán, is situated.

**Distribution.** The new species is known only from its type locality, the cave Bezdán near Komaji.

**Ecology.** Specimens of *B. komajiensis* **sp. n.** were collected on the bottom of the first vertical pit, about 25 m deep, of the cave named Bezdán (Jama Vignji) (JANJANIN, 2019). In the cave some other troglobiontic fauna was found (ĆURČIĆ *et al.*, 2012b). The specimens were collected mostly under the rock debris. The soil, leaf litter and anthropogenic waste occur at the site. On 31.10.2016 air temperature of 13.1°C was measured in the cave.

**Type series.** Holotype ♂, glued to a white card, pinned dry, aedeagus dissected and preserved immersed in Solakryl BMX media on a transparent label pinned under the specimen, labeled: HOLOTYPE | *Bathyscidius komajiensis* **sp. n.** | Polak & Jalžić det., [rectangular red label, printed]. Second label: CROATIA, Cavtat, Čilipi, Komaji, Vignje, Bezdán (Jama Vignji), 6.6.2014, Jalžić, B. leg. [rectangular white label, printed], – (CNHM).

Paratypes: PARATYPE | *Bathyscidius komajiensis* **sp. n.** | Polak & Jalžić det. [rectangular yellow label, printed]. Second label: [rectangular white label, printed], specimen glued to white card, pinned dry, dissected genital parts and some body parts preserved immersed in Solakryl BMX media on a transparent label, pinned under the specimens: 4 ♂♂ and 9 ♀♀, 6.6.2014, Jalžić, B. leg., same locality as the holotype – (CNHM); pinned dry, not dissected: 1 ♂ and 1 ♀, 6.6.2014, Jalžić, B. leg., same locality as the holotype, pinned dry, not dissected: – (HBSD).

Specimens dissected (body parts, aedeagus, genital segments, protarsi, and antenna) preserved immersed in glycerine on glass microscope slides: 4 ♂♂ and 4 ♀♀, 2.8.2011, Jalžić, B. leg., same locality as the holotype – (NMPO).

***Bathyscidius orjensis* Polak & Jalžić **sp. n.****

Figs. 10, 12, 13, 45, 46, 47—59, 73, 74, 87, 88.

**Type locality.** In the soil or superficial subterranean habitat near village Kruševica, Orjen Mountain, Southwestern Montenegro.

**MATERIAL EXAMINED:** specimens as declared in type series.

**DESCRIPTION.**

**Size:** Total body length (BL): 1.20–1.39 mm (M= 1.324, N= 10) in ♂♂ and 1.32–1.51 mm (M= 1.407, N= 10) in ♀♀. **Colour:** reddish brown, antenna and legs slightly paler. **Antenna:** (Figs. 52, 53, 91, 92) Antenna total length (AL): 0.495–0.541 mm (M= 0.524, N= 5) in ♂♂ and 0.500–0.524 mm (M= 0.513, N= 5) in ♀♀; **AL/PL:** 1.13–1.38 (M= 1.27) in ♂♂ and 0.88–1.09 (M= 0.98) in ♀♀.

**AmL** ♂♂: 0.056–0.059; 0.079–0.091; 0.045–0.054; 0.028–0.038; 0.031–0.034; 0.028–0.030; 0.041–0.047; 0.023–0.028; 0.034–0.040; 0.038–0.042; 0.087–0.094 (N = 5).

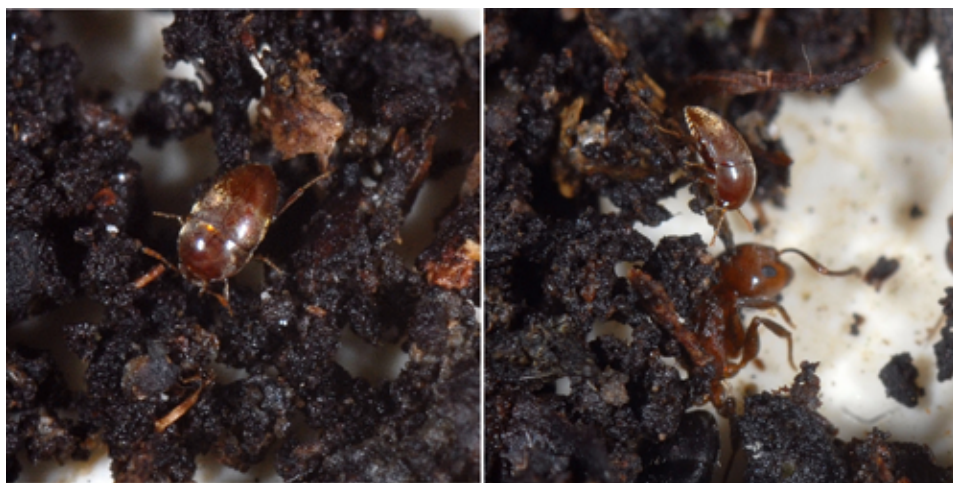
**A/mL** ♀♀: 0.058–0.065; 0.080–0.088; 0.039–0.044; 0.029–0.032; 0.032–0.037; 0.028–0.032; 0.042–0.045; 0.025–0.027; 0.034–0.037; 0.038–0.038; 0.084–0.091 (N = 5).

**AL/A/mL** (in %) ♂♂: 11.03; 16.67; 9.41; 6.16; 6.16; 5.54; 8.31; 4.87; 7.16; 7.64; 17.05.

**AL/A/mL** (in %) ♀♀: 12.15; 16.18; 8.25; 5.91; 6.76; 5.85; 8.38; 5.13; 6.82; 7.41; 17.15.

**A/mL/W** ♂♂: 1.65; 2.66; 2.32; 1.54; 1.33; 1.15; 1.21; 0.74; 0.85; 0.79; 1.50.

**A/mL/W** ♀♀: 1.76; 2.65; 2.05; 1.44; 1.44; 1.13; 1.09; 0.69; 0.74; 0.74; 1.55.



**Figs. 45–46.** *Bathyscidius orjensis* sp. n. in its natural habitat wet soil on type locality near village Kruševice, Orjen (Montenegro). In **Fig. 46.** The *Bathyscidius* next to an unknown ant species.

**Pronotum:** Transverse, strongly concave with regularly rounded lateral edges, maximum width on posterior edge (Figs. 47, 48). Dorsal face strongly pubescent with uniform short and decumbent pubescence, without order. PL: 0.358–0.479 mm (M= 0.411, N=10) in ♂♂ and 0.457–0.589 mm (M= 0.523, N=10) in ♀♀; PW: 0.618–0.768 mm (M= 0.665, N=4) in ♂♂ and 0.733–0.892 mm (M= 0.808, N=4) in ♀♀; PL/PW: 0.58–0.63 (M= 0.62) in ♂♂ and 0.62–0.76 (M= 0.65) in ♀♀.

**Thorax:** Mesosternal carina well developed, elevated, moderately thick, on ventral edge flattened not lanceolate, extended over the metasternum, almost reaching the metasternal intercoxal apophysis (Fig. 51). Metendosternite as in other species of the genus (Fig. 11). Metatergal apparatus with lateral processes strongly reduced and with moderately long apophysis (Fig. 10) as in other species of the genus.

**Elytra:** Elytra elongated-oval with maximum width on anterior part of elytra (Figs. 49, 50). Strongly pubescent with uniform short and decumbent pubescence inserted in strong lateral rows – transversal striae on complete elytra surface, without sutural carina. EL: 0.835–0.942 mm (M= 0.893, N= 5) in ♂♂ and 0.935–0.988 mm (M= 0.972, N= 5 in ♀♀; EW: 0.657–0.755 mm (M= 0.706, N= 5) in ♂♂ and 0.790–0.815 mm (M= 0.800, N= 5) in ♀♀; ratio EL/EW: 1.25–1.27 (M= 1.26) in ♂♂ and 1.18–1.21 (M= 1.21) in ♀♀.

**Legs:** Short and stout as in other species of the genus (Figs. 5–8). Male and female protarsi 4-segmented. **PtarL:** 0.157–0.188 (M= 0.167, N= 5) mm in ♂♂ and 0.169–0.170 (M= 0.170, N= 5) mm in ♀♀; **PtarW:** 0.019–0.022 (M= 0.020, N= 5) mm

in ♂♂ & ♀♀, not dilated at both sexes; **PtibL**: 0.217–0.240 (M= 0.226, N= 5) mm in ♂♂, 0.218–0.250 (M= 0.231, N= 5) mm in ♀♀; **PtibW**: 0.040–0.049 (M= 0.045, N= 5) mm in ♂♂, 0.039–0.050 (M=0.045, N= 5) mm in ♀♀. Lateral side of protibia in both sexes armed with distinct comb of flat spines and two apical polident spurs as in other species of the genus (Figs. 5–6).

**Male genitalia**: Aedeagus small, but bigger and wider than in other species of the genus. **AedL**: 0.372–0.406 (M= 0.389, N= 4) mm long. In dorsal view (Fig. 54, 77) median lobe straight and wide, **AedMaxW**: at mid-length 0.068–0.086 (M= 0.080, N= 4) mm wide; **AedMinW**: at the basal third 0.050–0.073 (M= 0.066, N= 4) mm wide. Apex of median lobe moderately rounded, not pointed and not flattened in lateral view (Fig 54, 55, 77, 78). Inner sac without visible sclerotized structures. **AedL/AedMaxW**: 4.8–5.5. Basal lamina parallel with median lobe, relatively long and wide compared to other species of the genus (Figs. 54, 77). **BlamL**: 0.117–0.152 (M= 0.139, N= 4) mm long, **BlamW**: 0.096–0.136 (M= 0.118, N= 5) mm wide. **AedL/BlamL**: 3.6–4.9; **BlamL/BlamW**: 0.8–1.5. Aedeagus in lateral view (Fig. 55, 78) almost straight, cylindrical not dorso-ventrally flattened. Parameres straight, parallel with median lobe, shorter than median lobe, with one apical and two subapical long setae, similar in size and length, hardly protruding over the median lobe apex (Figs. 54, 55, 77, 78). Male genital segment in dorsal view annular, in lateral view with significant hood on the side (Fig. 56), like other species of the genus.

**Female genitalia**: Female ventrite VIII (Fig. 57) strongly haired on proximal part with anterior slim and long apophysis. Urite IX characteristic for the subgenus *Bathyscidius* s. str., stylomeres relatively short, wide with straight outer and convex inner edge (Fig. 58). Sub-gonocoxite with one stylus, gonocoxite with one basal, one lateral and two subapical styles, gonostylus with one longest stylus. Spermatheca (Fig. 59) sack-like or sausage-like, curved, uniformly and weakly sclerotized, rounded distally. Hyaline gland attached to the spermathecal duct at the proximal part of spermatheca.

**Differential diagnosis**. *Bathyscidius orjensis* differs from other *Bathyscidius* species by the shape of the aedeagus median lobe apex, which is not elongated and narrow as in other species but has an unusually wide, cylindrical and not dorso-ventrally flattened median lobe (Figs. 54, 55, 77, 78). *B. orjensis* has the shortest antennae among all known species of the genus. In ♂♂ the antennae are just slightly longer than the pronotum (AL/PL: 1.13–1.38) and in ♀♀ antennae can be even shorter (AL/PL: 0.88–1.09) than the pronotum.

**Etymology**. The species epithet is a toponym derived from the name of the Orjen Mountain.

**Distribution**. The new species is so far known only from its type locality, MSS habitat near Kruševica village (Fig. 60), on the southern slope of Mt Orjen, Montenegro, at the altitude of ca 750 m a.s.l.

**Ecology**. Specimens of *B. orjensis* sp. n. were collected during sifting of the humid black soil and pitfall trapping among the rock crevices on the base of a calcareous hill (Figs. 45, 46, 60). The finding place of *B. orjensis* is characteristic, with a cooler environment than the surroundings, since some cold airflow can be detected in the collecting microhabitat in summer. This presumably indicates existence of some



**Fig. 60.** The type locality of *Bathyscidius orjensis* **sp. n.** on the base of an isolated hill near the village Kruševice, Orjen (Montenegro). Black arrow indicates exact finding place.

subterranean environment beneath the exact finding locality, so the original habitat of the new species is probably superficial underground compartment (CULVER & PIPAN, 2009) or MSS – the Milieu Souterrain Superficiel (JUBERTHIE *et al.*, 1980), terrestrial shallow subterranean habitat rather than leaf litter.

**Type series.** Holotype ♂, glued to a white card, pinned dry, aedeagus dissected and preserved immersed in Solakryl BMX media on a transparent label pinned below the specimen, labeled: HOLOTYPE | *Bathyscidius orjensis* **sp. n.** ♀ | Polak & Jalžić det., [rectangular red label, printed]. Second label: MONTENEGRO, Orjen Mt., Kruševice, MSS. 1.8.2011, Polak, S. leg. [rectangular white label, printed], – (NHMM).

Paratypes: PARATYPE | *Bathyscidius orjensis* **sp. n.** | Polak & Jalžić det. [rectangular yellow label, printed]. Second label: [rectangular white label, printed], specimen glued to white card, pinned dry, not dissected: 10 ♂♂ and 10 ♀♀, 2.5.2010–1.8.2011, Polak, S. leg., same locality as the holotype – (NHMM); same locality and date 5 ♂♂ and 5 ♀♀, – (CNHM); 5 ♂♂ and 5 ♀♀, – (NHMT); 5 ♂♂ and 5 ♀♀, – (NMPO);

Specimens dissected (body parts, aedeagus, genital segments, protarsi, and antenna) preserved immersed in glycerine on glass microscope slides: 2 ♂♂ and 1 ♀, 10.4.2009 & 4 ♂♂ and 2 ♀♀, 1.8.2011, Polak, S. leg., same locality as the holotype – (NMPO).

#### *Ionobathyscidius* subgenus nov.

Type species: *Bathyscidius rambouseki* Knirsch, 1930

**Differential diagnosis.** Species from subgenus *Ionobathyscidius* differs from subgenus *Bathyscidius* s. str. species by the shape of the aedeagus median lobe apex, which is moderately pointed (Figs. 62, 73, 75), and not rounded or subtriangular as in species of the subgenus *Bathyscidius* s. str. Paramere apex is armed with three subapical erected setae inserted almost together (Figs. 62, 73–76), and not one apical and two lateral setae as in *Bathyscidius* s. str. (Fig. 24, 25, 38, 39, 54, 55, 61, 65–72, 77, 78). Females of the species from subgenus *Ionobathyscidius* have urite IX (genital segment-ovipositor) significantly different shape than species from *Bathyscidius*

s. str. Stylomeres are longer and narrower, almost parallel sides of stylomeres have basally concave outer and straight or slightly convex inner edge. Contrary the *Bathyscidius* s. str. species have stylomeres relatively short, wide and bulky, appearing subtriangular in shape, with straight outer and significantly convex inner edges (Figs. 28, 42, 58, 63). On the lateral sides of the protibia in both sexes the distinct comb of flat spines is less strong and shorter, covering only the apical third of protibia, in contrast to the species of subgenus *Bathyscidius* s. str. where comb spines are stronger and cover approximately two apical thirds of the protibia.

**Etymology.** The subgenus name is a toponym derived from the name of the Ionian Sea and *Bathyscidius*. The distribution of species of subgenus *Bathyscidius* s. str. is influenced by the SE Adriatic Sea, unlike species belonging to subgenus *Ionobathyscidius*, which live more to the south in mountains regions, influenced by the Ionian Sea.

**Distribution.** Like the distribution of the species *B (I) rambouseki* and *B (I) tomoricensis*, in the SW part of Northern Macedonia and SE Albania.

***Bathyscidius (Ioniobathyscidius) rambouseki* Knirsch, 1931**

*Bathyscidius Rambouseki* Knirsch, 1931, Čas. Cesk. Spol. Entomol., 28 (1-2): 3.

lct : Höhle oberhalb der Omblaquelle bei Ragusa (Dubrovnik), Dalmatien, Croatia.

*Bathyscidius rambouseki* Kn.: Laneyrie, R., 1967, Ann. De Spéléologie. 22 (3), 611.

*Bathyscidius rambouseki* Knirsch, 1931: PRETNER, 1968: Catalogus Faunae Jug. III. (6), 20.

*Bathyscidius rambouseki* Knirsch, 1931: PERREAU, 2000: Mem. Sef, 4.: 193.

*Bathyscidius rambouseki* Knirsch, 1931: PERREAU, 2004: Catalogue of Palaearctic Coleoptera. Vol 2:153.

*Bathyscidius rambouseki* Knirsch, 1931: PERREAU, 2015: Catalogue of Palaearctic Coleoptera: 180–290.

*Bathyscidius rambouseki* Knirsch, 1931: HLAVÁČ, P., PERREAU, M., ČEPLÍK, D., 2017: Czech Univ. of Life Csci, Pague, 100.

The species was described by Edmund Knirsch (KNIRSCH, 1931) on the basis of one male and 3 females, collected by F. Rambousek in Galičica Mountain in Northern Macedonia. The original description (translated from German) is follows: "The copulation organ very slender, 0.45 mm long, with almost parallel sides and in the apical parts with two lateral dorsally curved longitudinal lobes before the short, rounded and at the end suddenly narrowed tip. The basal plate (basal lamina) long and narrow, tapering backwards. Parameres straight, on the end with three setae pointed together. Bright, reddish yellow. Antenna short, slender, the 8<sup>th</sup> antennomere rounded, 9<sup>th</sup> and 10<sup>th</sup> transverse. Long 1.4 mm. On the Galičica planina above the village of Trpezica at Ochrid Lake in Macedonia at an altitude of some 1500 m, sifted from the hollow of a horse chestnut at the beginning of October 1926. One male and 3 females in my collection."

Because of the shorter antennas and the very slender copulation organ, and considering the long basal plate in *B. tomoricensis* easily distinguished from this, as well as from the other *Bathyscidius* species according to wholly different copulation organ, and the other constitution of the 8<sup>th</sup> -10<sup>th</sup> antennomeres.

**MATERIAL EXAMINED:** Ohrid (Northern Macedonia), Galičica Mountain, southern slope above Trpezica village in leaf litter at ca 800 m a.s.l., 1 ♂ & 2 ♀♀, 01.05.2009, S. Polak leg., (NMPO); 4 ♂♂ & 6 ♀♀, 23.07.2009, S. Polak leg., (NMPO).

## REDESCRIPTION.

**Size:** Total body length (BL): 1.35–1.37 mm (N=3) in ♂♂ and 1.46–1.53 mm (N=3) in ♀♀. **Colour:** Reddish brown, antenna and legs slightly paler. **Antenna:** (Figs. 36, 37, 81, 82) Antenna length (AL): 0.557–0.579 mm (M= 0.569, N= 4) in ♂♂ and 0.560–0.578 mm (M= 0.569, N= 4) in ♀♀; **AL/PL:** 1.23–1.26 (M= 1.24) in ♂♂ and 1.07–1.18 (M= 1.11) in ♀♀.

**Aml:** ♂♂: 0.060–0.066; 0.081–0.090; 0.043–0.048; 0.036–0.038; 0.035–0.041; 0.030–0.035; 0.048–0.053; 0.027–0.32; 0.039–0.043; 0.043–0.045; 0.102–0.103 (N = 4).

**Aml:** ♀♀: 0.062–0.065; 0.087–0.089; 0.041–0.049; 0.036–0.037; 0.039–0.046; 0.033–0.035; 0.051–0.052; 0.029–0.043; 0.041–0.041; 0.042–0.045; 0.094–0.096 (N = 4).

**AL/Aml** (in %) ♂♂: 11.08; 15.17; 7.92; 6.46; 6.77; 5.63; 8.93; 5.01; 7.21; 7.83; 17.99.

**AL/Aml** (in %) ♀♀: 11.16; 15.51; 7.86; 6.41; 7.29; 5.93; 9.09; 5.14; 7.21; 7.64; 16.47.

**Aml/W** ♂♂: 1.55; 2.65; 2.22; 1.88; 1.67; 1.25; 1.29; 0.75; 0.87; 0.82; 1.53.

**Aml/W** ♀♀: 1.73; 2.82; 2.21; 1.87; 1.84; 1.31; 1.40; 0.87; 0.96; 0.92; 1.96.

**Pronotum:** Transverse, strongly concave with regularly rounded lateral edges, maximum width on posterior edge. **PL:** 0.452–0.459 mm (M= 0.456, N=3) in ♂♂ and 0.471–0.540 mm (M= 0.510, N=3) in ♀♀; **PW:** 0.726–0.758 mm (M= 0.742, N=3) in ♂♂ and 0.749–0.770 mm (M= 0.759, N=3) in ♀♀; **PL/PW:** 0.60–0.62 (M= 0.61) in ♂♂ and 0.63–0.70 (M= 0.67) in ♀♀.

**Thorax:** Mesosternal carina well developed, elevated, moderately thick, extended over the metasternum, almost reaching the metasternal intercoxal apophysis. Metendosternite and metatergal apparatus as in other species of the genus.

**Elytra:** Elytra elongated-oval with maximum width on anterior part of elytra. Strongly pubescent with uniform short and decumbent pubescence inserted in strong lateral rows – transversal striae on complete elytra surface, without sutural carina. **EL:** 0.937–0.975 mm (M= 0.955, N= 3) in ♂♂ and 0.969–1.024 mm (M= 0.997, N= 3) in ♀♀; **EW:** 0.706–0.750 mm (M= 0.730, N= 3) in ♂♂ and 0.820–0.860 mm (M= 0.840, N= 3) in ♀♀; ratio **EL/EW:** 1.30–1.33 (M= 1.31) in ♂♂ and 1.18–1.19 (M= 1.19) in ♀♀.

**Legs:** Short and stout as in other species of the genus (Figs. 5–8). Male and female protarsi 4-segmented. **PtarL:** 0.160–0.173 (M= 0.167, N= 5) mm in ♂♂ and 0.175–0.185 (M= 0.181, N= 5) mm in ♀♀; **PtarW:** 0.019–0.020 (M= 0.020, N= 5) mm in ♂♂ & ♀♀, not dilated at both sexes; **PtibL:** 0.238–0.246 (M= 0.241, N= 8) mm in ♀♀, 0.243–0.248 (M= 0.245, N= 6) mm in ♂♂; **PtibW:** 0.043–0.051 (M= 0.047, N= 5) mm in ♀♀, 0.046–0.051 (M= 0.048, N= 5) mm in ♂♂. Lateral side of protibia at both sexes armed with distinct comb of flat spines (less strong and shorter than in species of subgenus *Bathyscidius* s. str.) and two apical polident spurs as in other species of the genus (Figs. 5–6).

**Male genitalia:** Aedeagus elongated, narrow. **AedL:** 0.365–0.392 (M= 0.380, N= 3) mm long. In dorsal view (Fig. 75) median lobe straight and slender, **AedMaxW:** median lobe widest at the central third 0.054–0.056 (M= 0.055, N= 4) mm wide; **AedMinW:** at the basal third 0.043–0.047 (M= 0.045, N= 4) mm wide. Apex of median lobe in the apical part with two lateral dorsally curved longitudinal lobes. Apex rounded at the end suddenly narrowed with rounded, not pointed tip. (Figs. 62, 75). Inner sac without visible sclerotized structures. **AedL/AedMaxW:**



6.8–7.1. Basal lamina parallel with median lobe, relatively long compared to other species of the genus (Figs. 75, 76). **BlamL**: 0.099–0.123 (M= 0.112, N= 4) mm long; **BlamW**: 0.062–0.090 (M= 0.082, N= 5) mm wide. **AedL/BlamL**: 3.2–3.7; **BlamL/BlamW**: 1.1–1.4. Aedeagus in lateral view (Fig. 76) almost straight, parallel, only slightly curved at the medial part. Apex pointed. Parameres straight, parallel with median lobe, shorter than median lobe, with three subapical long setae, similar in size and length, protruding almost to the median lobe apex (Figs. 62, 75, 76). Male genital segment in dorsal view ring-like, annular, in lateral view with significant hood on the side, like other species of the genus.

**Female genitalia**: Female ventrite VIII strongly haired on proximal part with anterior stout or slim apophysis of medium length. Urite IX (Fig. 64) is characteristic for the subgenus *Ionobathyscidius*, stylomeres basally concave or straight outer and moderately convex inner edge (Fig. 64). Sub-gonocoxite with one stylus, gonocoxite with one basal, one lateral and two subapical styles, gonostylus with one longest stylus. Spermatheca sack-like or sausage-like, curved, uniformly and weakly sclerotized, rounded distally similar to the other species of the genus.

***Bathyscidius (Ionobathyscidius) tomoricensis* Müller, 1922**

*Bathyscidius tristiculus* sbsp. *tomoricensis* Müller, 1922: Boll. Soc. entomol. Ital., 54: 89.

lct : Monte Tomorica et Toik regionis "Tomor"

*Bathyscidius tomoricensis* J. Müller, 1922: JEANNEL, 1924, Arch. Zool. exp. Gén., 63 (1): 269.

*Bathyscidius tomoricensis* Müll.: LANEYRIE, R., 1967, Ann. De Spéléologie. 22 (3), 611.

*Bathyscidius tomoricensis* J. Müller, 1922: PERREAU, 2000: Mem. Sef, 4.: 193.

*Bathyscidius tomoricensis* Müller, 1922: PERREAU, 2004: Catalogue of Palaearctic Coleoptera. Vol 2:153.

*Bathyscidius tomoricensis* Müller, 1922: PERREAU, 2015: Catalogue of Palaearctic Coleoptera: 180–290.

*Bathyscidius tomoricensis* J.(G.) Müller, 1922: HLAVÁČ, P., PERREAU, M., ČEPLÍK, D., 2017: Czech Univ. of Life Csci, Pague, 100.

The species was described by Joseph (Giuseppe) Müller (MÜLLER, 1922) as a subspecies of *B. tristiculus* based on specimens collected by C. Lona and G. Ravasini and from Trieste on July 1922 in Albania.

The original diagnosis is follows (in Latin): "*A forma typica antennis brevioribus peneque, a subspecie fallaciosa m. tantummodo pene magnis elongato, exilliori di stincta (with 2 aedeagus drawings). Habit in monte Tomorica et Toik regionis "Tomor" dictae, sub lapidus.*" In the original description Müller added (translated from Italian): "Despite careful microscopic examination, I find no other difference between this *Bathyscidius* from Albania and other races from southern Dalmatia, which has slightly slender and narrower penis shape. Unfortunately, due to an inaccuracy in my paper published in Sitzungsber, Akad, Wien, 1917, Taf. I, fig. 11, I reproduce here the penis images of all three known forms of *B. tristiculus* based on new original drawings".

**Type locality**. Tomorica and Toik Mountain on Tomor Mountain range in southern Albania near Berat (Southern Albania) (Fig. 95).

**MATERIAL EXAMINED**: Berat (Southern Albania), Toik, Tomorica, Tomor, under the stones on cca 1500 m a.s.l., 3 ♂ & 4 ♀, 1922, Ravasini leg., (NHMT); Tomor: Tomor, Alb. Mer. 1 ♂♂ & 1 ♀♀, 5.1931, Winkler, Lona, Bishoff leg., (NHMT).

## REDESCRIPTION.

**Size:** Total body length (BL): 1.35–1.37 mm (N=3) in ♂♂ and 1.46–1.53 mm (N=3) in ♀♀. **Colour:** Reddish brown, antenna and legs slightly paler. **Antenna:** (Figs. 36, 37, 81, 82) Antenna length (AL): 0.566–0.590 mm (M= 0.578, N=4) in ♂♂ and 0.572–0.580 mm (M= 0.576, N=4) in ♀♀; **AL/PL:** 1.23–1.27 (M= 1.25) in ♂♂ and 1.20–1.26 (M= 1.23) in ♀♀.

**AmL** ♂♂: 0.063–0.069; 0.092–0.094; 0.042–0.044; 0.035–0.036; 0.037–0.040; 0.035–0.035; 0.053–0.054; 0.022–0.26; 0.039–0.041; 0.042–0.044; 0.107–0.108 (N = 4).

**AmL** ♀♀: 0.063–0.068; 0.092–0.097; 0.045–0.047; 0.034–0.034; 0.040–0.040; 0.033–0.035; 0.053–0.057; 0.029–0.030; 0.038–0.041; 0.041–0.043; 0.095–0.097 (N = 4).

**AL/AmL** (in %) ♂♂: 11.42; 16.09; 7.44; 6.14; 6.57; 6.06; 9.29; 4.15; 6.92; 7.44; 18.51 (N = 4).

**AL/AmL** (in %) ♀♀: 11.37; 16.41; 7.99; 5.90; 6.94; 5.90; 9.55; 5.12; 6.86; 7.29; 16.67 (N = 4).

**AmL/W** ♂♂: 1.96; 3.10; 2.10; 1.69; 1.69; 1.35; 1.32; **0.57; 0.79; 0.77**; 1.74.

**AmL/W** ♀♀: 1.62; 2.95; 2.19; 1.66; 1.78; 1.28; 1.31; **0.68; 0.75; 0.73**; 1.51.

**Pronotum:** Transverse, strongly concave with regularly rounded lateral edges, maximum width on posterior edge. **PL:** 0.445–0.480 mm (M= 0.462, N=2) in ♂♂ and 0.452–0.485 mm (M= 0.468, N=2) in ♀♀; **PW:** 0.760–0.782 mm (M= 0.771, N=2) in ♂♂ and 0.770–0.830 mm (M= 0.800, N=2) in ♀♀; **PL/PW:** 0.58–0.61 (M= 0.59) in ♂♂ and 0.58–0.59 (M= 0.59) in ♀♀.

**Thorax:** Mesosternal carina well developed, elevated, moderately thick, on ventral edge flattened not lanceolate, extended over the metasternum, almost reaching the metasternal intercoxal apophysis. Metendosternite (Crowson's organ) and metatergal apparatus as in other species of the genus.

**Elytra:** Elytra elongated-oval with maximum width on anterior part of elytra. Strongly pubescent with uniform short and decumbent pubescence inserted in strong lateral rows – transversal striae on complete elytra surface, without sutural carina. **EL:** 0.983–0.985 mm (M= 0.984, N= 2) in ♂♂ and 1.015–1.024 mm (M= 1.019, N= 2 in ♀♀; **EW:** 0.770–0.780 mm (M= 0.775, N= 2) in ♂♂ and 0.822–0.830 mm (M= 0.826, N= 2) in ♀♀; ratio **EL/EW:** 1.26–1.27 (M= 1.27) in ♂♂ and 1.23–1.23 (M= 1.23) in ♀♀.

**Legs:** Short and stout as in other species of the genus. Male and female protarsi 4-segmented. **PtarL:** 0.188–0.189 (M= 0.189, N= 2) mm in ♂♂ and 0.188–0.199 (M= 0.195, N= 5) mm in ♀♀; **PtarW:** 0.019–0.023 (M= 0.021, N= 5) mm in ♂♂ & ♀♀, not dilated in both sexes; **PtibL:** 0.254–0.263 (M= 0.259, N= 8) mm in ♂♂, 0.259–0.274 (M= 0.265, N= 6) mm in ♀♀; **PtibW:** 0.050–0.051 (M= 0.051, N= 5) mm in ♂♂, 0.046–0.051 (M= 0.074, N= 5) mm in ♀♀. Lateral side of protibia at both sexes armed with distinct comb of flat spines (less strong than in species of subgenus *Bathyscidius* s. str.) and two apical polident spurs similar to those in other species of the genus (Figs. 5–6).

**Male genitalia:** Aedeagus extremely elongated, straight, slim and long, **AedL:** 0.393–0.397 (M= 0.395, N= 4) mm long. In dorsal view (Fig. 73) median lobe straight parallel and slender, **AedMaxW:** in the medial third 0.040–0.047 (M= 0.044, N= 4) mm wide; **AedMinW:** at the basal third 0.034–0.037 (M= 0.036, N= 4) mm wide. Apex of median lobe rounded at the end slowly narrowed (subtriangular) with

rounded, not pointed tip. (Fig. 73). Inner sac without visible sclerotized structures. **AedL/AedMaxW**: 9.1–9.8. Basal lamina parallel with median lobe, extremely long and narrow compared to other species of the genus (Figs. 73, 74). **BlamL**: 0.145–0.149 (M= 0.147, N=4) mm long. **BlamW**: 0.047–0.048 (M= 0.048, N=5) mm wide. **AedL/BlamL**: 2.7; **BlamL/BlamW**: 3.0–3.1. Aedeagus in lateral view (Fig. 74) almost straight. Parameres straight, parallel with median lobe, shorter than median lobe, with three subapical long setae, similar in size and length, protruding almost to median lobe apex (Figs. 73, 74). Male genital segment in dorsal view annular, in lateral view with significant hood on the side, similar to other species of the genus.

**Female genitalia**: Female ventrite VIII strongly haired on proximal part with anterior stout or slim apophysis of medium length. The urite IX characteristic is similar to that of *B. rambouseki* (Fig. 64) and characteristic of the subgenus *Ionobathyscidius*. Stylomeres have basally concave outer and moderately convex inner edges. Sub-gonocoxite with one stylus, gonocoxite with one basal, one lateral and two subapical styles, gonostylus with one longest stylus. Spermatheca sack-like or sausage-like, curved, uniformly and weakly sclerotized, rounded distally similar to the other species of the genus.

***Bathyscidius remyi* Jeannel 1934 = *Laneyriella andrijevicensis* (Jeannel, 1924) syn. nov.**

*Bathyscidius Remyi* Jeannel, 1934, Rev. fr. Entomol., 1: 100.

Ict : Sandjak de Novi Pazar, Brečanovića pećina, a Gornjo Selo

*Bathyscidius remyi* Jeann.: LANEYRIE, R., 1967, Ann. De Spéléologie. 22 (3), 611.

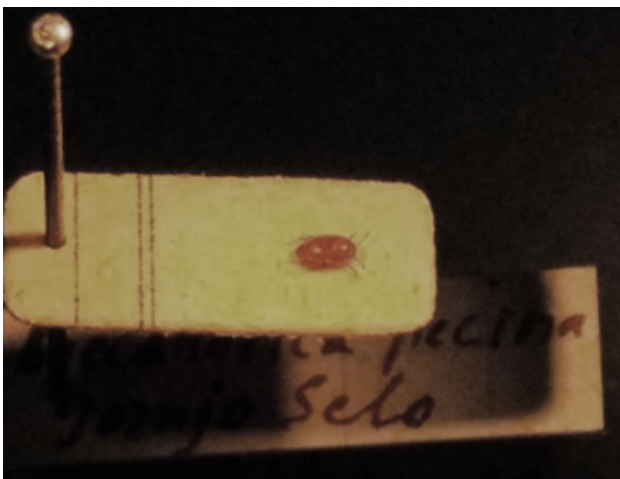
*Bathyscidius remyi* Jeannel, 1934: PRETNER, 1968: Catalogus Faunae Jug. III. (6), 20.

*Bathyscidius remyi* Jeannel, 1934: PERREAU, 2000: Mem. Sef, 4.: 193.

*Bathyscidius remyi* Jeannel, 1934: PERREAU, 2004: Catalogue of Palaearctic Coleoptera. Vol 2:153.

*Bathyscidius remyi* Jeannel, 1934: PERREAU, 2015: Catalogue of Palaearctic Coleoptera: 180–290.

*Bathyscidius remyi* Jeannel, 1934: HLAVÁČ, P., PERREAU, M., ČEPLÍK, D., 2017: Czech Univ. of Life Csci, Pague, 100.



**Fig. 94.** Holotype female specimen of *B. remyi* = *Laneyriella andrijevicensis* in MNHN. (Photo: M. Perreau)

René Jeannel (JEANNEL, 1934) described *B. remyi* based on single female collected on 30.08.1933 by M.P. Remy and M.R. Husson in a cave called Brecanovića pećina near Gornjo Selo, Sandjak de Novi Pazar in Northern Montenegro. (Type in MNHN).

The original description (translated from French) is follows: "Long 1.5 mm. Reddish brown brilliant. Ovoid, very convex, the elytra almost "cuneiform", very attenuated on posterior side and very compressed laterally in the apical region, so that the suture is prominent, in carina. Short and recumbent pubescence. Strioles of elytra confused in the apical half. Short antennae, not reaching the posterior angles of the pronotum, of the same structure as in *B. tristiculus*, the clearly transverse article 8<sup>th</sup>. Pronotum broad and convex, its sides regularly arched, its widest width to the base. Elytra gradually narrowed from base to summit, without suture streak. Mesosternal keel is very high and very round, similar to that of other species of the genus. Male unknown. This species differs markedly from *B. tristicula* and *B. tomoricensis* in the form of elytra, its large size and its elytral strioles confused on the apical part. Its very short antenna separates it from *B. tomoricensis*. Perhaps it is closer to *B. rambouseki* Knirsch from the vicinity of Lake Ochrid, but in this species the 8<sup>th</sup> antennomere is rounded and not transverse, which seems to be very characteristic".

After this description, no males or additional females were described. Type locality Velika Bracanovića pećina, cca 500 m SW from the village of Lubnice (Gornje selo) was visited by E. Pretner who set up pitfall traps and on 29.05.1968 collected two specimens, unfortunately both females. Similarly, on 31.07.1971, B. Deeleman collected an additional one female in the same cave. At the entrance of another cave Županska (Džupanska) pećina, which is in the close vicinity of Bracanovića pećina, we collected 7 specimens, among them males that turned out to be of the species *Lanyriella andrijevicensis* (Jeannel, 1924). We checked the three females from Bracanovića pećina in the E. Pretner collection and they proved to be all females of *L. andrijevicensis*. M. Perreau (Paris) checked the holotype female specimen of *B. remyi* in MNHN. Unfortunately, according to present policy of the curatorship of the museum entomological collection, no type loan was allowed and no dissection was made. According to superficial morphological characters, checked on the dorsal and ventral site of the specimen by M. Perreau (Fig. 94) we conclude that the species *B. remyi* Jeannel 1934 is a new junior synonym for *Lanyriella andrijevicensis* (Jeannel, 1924).

### *Lanyriella andrijevicensis* (Jeannel, 1924)

Figs. 4, 93.

MATERIAL EXAMINED: HT: Brecanovića pećina, Gornjo Selo, Sandjak de Novi Pazar in Northern Montenegro, 30.08.1933, M.P. Remy & M.R. Husson leg. (Type in MNHN). Montenegro, Berane, Mt Bjelasica, Lubnice, Velika Bracanovića pećina, 2 ♀, 29.05.1968, E. Pretner leg. (labelled as *Bathyscidius remyi*, E. Pretner det. 1976) (PMSL); Montenegro, Mojkovac, Mt Bjelasica, Biogradsko jezero, 1 ♀, 14.05.1964, E. Pretner leg., (Labelled as *Pholeuonella andrijevicensis*, E. Pretner det. 1976) (PMSL); Berane, Mt Bjelasica, Lubnice, Županjska pećina, 5 ♂♂ & 4 ♀♀, 02.07.2007, Polak, S., & Trontelj P., leg. (NMPO); Andrijević, Komovi, 6 ♂♂ &

7 ♀♀, 02.07.2007, Polak, S., & Trontelj P., leg. (NMPO); Mojkovac, Mt Bjelasica, Biogradsko jezero, 1 ♂, 02.07.2007, Polak, S., & Trontelj P., leg. (NMPO); Bijelo Polje, Korita, Sipanje, 3 ♂♂ & 2 ♀♀, 01.07.2007, Polak, S., & Trontelj P., leg. (NMPO).

REDESCRIPTION OF THE FEMALE.

**Size:** Total body length (BL): 1.60–1.80 mm (N=4) in ♀♀. **Colour:** Reddish brown, antenna and legs slightly paler. **Antenna:** (Fig. 93) Antenna length (AL): 0.627–0.630 mm (M= 0.629, N= 4) in ♀♀; **AL/PL:** 1.13–1.17 (M= 1.15) in ♀♀.

**Aml** ♀♀: 0.072–0.072; 0.094–0.097; 0.059–0.059; 0.040–0.041; 0.041–0.042; 0.040–0.040; 0.055–0.057; 0.033–0.034; 0.046–0.049; 0.049–0.049; 0.094–0.094 (N = 4).

**AL/Aml** (in %) ♀♀: 11.46; 15.19; 9.39; 6.44; 6.60; 6.36; 8.91; 5.33; 7.56; 7.80; 14.96 (N = 4).

**Aml/W** ♀♀: 2.12; 2.89; 2.75; 1.84; 1.69; 1.51; 1.45; 0.94; 1.03; 0.86; 1.49.

**Pronotum:** Transverse, concave with regularly rounded lateral edges, maximum width on posterior edge (Fig. 4). Dorsal face strongly pubescent with uniform short and decumbent pubescence, without order. PL: 0.535–0.558 mm (M= 0.546, N= 3) in ♀♀; PW: 0.890–0.957 mm (M= 0.920, N= 3) in ♀♀; Pronotum somewhat longer than in *Bathyscidius* species PL/PW 0.58–0.60 (M= 0.59) in ♀♀.

**Thorax:** Mesosternal carina well developed, elevated, moderately thick, on ventral edge flattened not lanceolate, extended over the metasternum, almost reaching the metasternal intercoxal apophysis (Fig. 4). Metendosternite and metatargal apparatus similar to species of the genus *Bathyscidius* (as in Figs. 9–11).

**Elytra:** Elytra elongate, not oval as in *Bathyscidius* spp. moderately narrowed toward the apex, subtriangular, very attenuate on posterior side and very compressed laterally in the apical region with maximum width on anterior part of elytra (Figs. 4, 94). Strongly pubescent with uniform short and decumbent pubescence inserted in strong lateral rows – transversal striae on elytra surface, obliterated toward the apex, without sutural carina. EL: 1.150–1.180 mm (M= 1.165, N= 2) in ♀♀; EW: 0.930–0.957 mm (M= 0.943, N= 2) in ♀♀; ratio EL/EW: 1.23–1.24 (M= 1.23) in ♀♀.

**Legs:** Short and stout (Fig. 4) similar to that of species of the genus *Bathyscidius* (Figs. 5–8), more pubescent than in *Bathyscidius*. Male protarsi 5-segmented, strongly dilated, female protarsi 4-segmented, not dilated with exception of first article, which is slightly wider than others (Fig. 4). Lateral side of protibia in both sexes armed with a distinct comb of flat spines, which are limited to the first apical third of the protibia and not as strong as in *Bathyscidius*. On apex two polident spurs are present, as in genus *Bathyscidius*. **PtarL:** 0.206–0.210 (M= 0.208, N= 3) mm in ♀♀; **PtarW:** 0.033–0.034 (M= 0.034, N= 3) mm wide in ♀♀, (strongly dilated in ♂♂); **PtibL:** 0.284–0.291 (M= 0.288, N= 3) mm in ♀♀; **PtibW:** 0.063–0.071 (M= 0.067, N= 3) mm wide in ♀♀.

**Female genitalia:** Female ventrite VIII strongly haired on proximal part with anterior stout or slim apophysis of medium length, similar to species of the genus *Bathyscidius* (as in Figs. 14). Urite IX different than in *Bathyscidius*, with narrow and slim stylomeres. Sub-gonocoxite with one stylus, gonocoxite with one basal, one lateral and two subapical styles, gonostylus with one longest stylus.

Spermatheca sack-like or sausage-like, curved, uniformly and weakly sclerotized, rounded, similar to species of the genus *Bathyscidius*. Hyaline gland attached to the spermathecal duct at the proximal part of spermatheca, similar to species of the genus *Bathyscidius*.

***Bathyscidius (Pseudobathyscidius) serbicus* Karaman 1964 = *Pseudobathyscidius serbicus* (Karaman 1964) **comb. nov.****

*Bathyscidius (Pseudobathyscidius) serbicus* Karaman, 1964, Bull. soc. entomol. Mulhouse, (2): 30. lct : Sibirie [Serbie] orientale, environs de Zaječar

*Pseudobathyscidius serbicus* Z. Karaman: V. B. GUÉORGUIEV, 1974, C. R. Acad. Bulg. Sci., 27 (6): 841.

*Pseudobathyscidius serbicus* Z. Karaman: V. B. GUÉORGUIEV, 1976, Razprave Sazu, 19 (4): 14, 48

*Pseudobathyscidius serbicus* Karaman 1964: NONVEILLER, 1981, Acta entomol. Jugosl., 17 (1-2): 153.

*Pseudobathyscidius serbicus* Karaman 1964: NEWTON, 1998: Atti Museo Reg. di Scienze Natur., Torino, 127.

*Pseudobathyscidius serbicus* Karaman 1964: PERREAU, 2000: Mem. Sef, 4.: 193.

*Bathyscidius serbicus* Karaman, 1964: GIACHINO, 2005 (2006): Riv. Mus. civ. Sci. Nat., Bergamo, 24 [2005]: 15.

*Pseudobathyscidius serbicus* Karaman 1964: PERREAU, 2004: Catalogue of Palaearctic Coleoptera. Vol 2:154.

*Pseudobathyscidius serbicus* Karaman 1964: PERREAU, 2008, Inst. Nat. prot. Serbia, Monogr., 22: 179–180.

*Pseudobathyscidius serbicus* Karaman 1964: PERREAU, 2015: Catalogue of Palaearctic Coleoptera: 180–290.

*Pseudobathyscidius serbicus* Karaman 1964: HLAVÁČ, P., PERREAU, M., ČEPLÍK, D., 2017: Czech Univ. of Life Csci, Pague, 101.

*Pseudobathyscidius serbicus* Karaman 1964: PERREAU, 2019, Zootaxa 4590 (3): 367–381.

Zora Karaman (KARAMAN, 1964) described *Bathyscidius (Pseudobathyscidius) serbicus* from the surroundings of Zaječar in Eastern Serbia and established a new subgenus *Pseudobathyscidius* Karaman 1969 for this species. GUÉORGUIEV (1976) elevated the subgenus *Pseudobathyscidius* to the rank of genus but later (GIACHINO, 2005) synonymized this genus. PERREAU (2008) discussed as very improbable the synonymy with *Bathyscidius* suggested by GIACHINO (2005) and suggested the status of *Pseudobathyscidius* as a separate genus again, but he does not formally declare the new combination in the paper.

According to the morphological characters described in the original description by KARAMAN (1964), namely antennomere proportions, lack of evident transversal striae on elytra, shape of mesosternal carina (according to illustration in original description), that reaches mesocoxa i.e. middle part of metasternum but does not extend over the metasternum (almost reaching the metasternal intercoxal apophysis) and especially the aedeagus characters, curved in lateral view, short basal lamina and some sclerotized structures in the basal part of internal sack of median lobe resembling the “Y piece”, the species *Bathyscidius serbicus* deserves the ranking of a separate genus, *Pseudobathyscidius*, as proposed by GUÉORGUIEV (1967). So here, we propose formally again a new combination i.e., the justification of *Pseudobathyscidius* as a separate genus in concordance with GUÉORGUIEV (1967) and PERREAU (2008, 2019).

### Identification key to the species of the genus *Bathyscidius* Jeannel 1910

Identification key for the genus *Bathyscidius* is based on the lengths of antennomeres in females and males, the distinctive aedeagus shape and proportions in males and female genital parts. The key requires morphometric measurements.

Cavernicolous or endogeic small-sized Leptodirini 1.27–1.70 mm in length, distributed along the south-eastern Adriatic coast, in south-eastern Albania and south-western Northern Macedonia. Pubescence on elytra aligned in transversal striae. Mesosternal carina well developed, elevated, on posterior side the sharp beak of carina extended over the metasternum, almost reaching the metasternal intercoxal apophysis. Protarsi with four segments and not dilated in either sex. Protibias on the external lateral and apical side with the row of flattened spines, equally long, forming a comb (pecten). Aedeagus relatively small, inner sac without visible sclerotized structures. Parameres straight, parallel with a median lobe, shorter than the median lobe. Paramere apex armed with three erected setae similar in size and length. ....*Bathyscidius* (Jeannel).

- 1 Aedeagus elongated, small 0.29–0.34 mm long, median lobe basal lamina relatively short, shorter than 29.0 % of aedeagus length (Figs. 65–72). Paramera apex with one apical erected and two subapical long setae oriented toward the median lobe, similar in size and length (Fig. 61). Female urite IX (genital segment-ovipositor) stylomeres with straight outer and moderately convex inner edge (Fig. 63). .....2
- 1' Aedeagus elongated, bigger 0.37–0.41 mm long, median lobe basal lamina prolonged, longer than 29.5 % of aedeagus length (Figs. 73–78). .....5
- 2 Aedeagus median lobe in dorsal view slender, narrow lanceolate, slightly widened on its apical third. Index Aedeagus length/Median lobe Max. width > 6.5. Median lobe apical tip moderately sub-oval (Figs. 65–68).....3
- 2' Aedeagus median lobe in dorsal view less narrow, lanceolate, significantly widened on its apical third. Index Aedeagus length/Median lobe Max. width < 5.6. Median lobe apical tip moderately sub-triangular (Figs. 69–72).....4
- 3 Larger body size, total body length (BL): 1.38–1.61 mm in ♂♂ and 1.40–1.72 mm in ♀♀. Ratio of Aedeagus L/Median lobe Max. W 6.5–7.5. Antenna longer, 0.59–0.72 mm in ♂♂ and 0.54–0.73 mm in ♀♀ (Figs. 79, 80). Antennal elongation index (Antenna L/Pronotum L) 1.28–1.33 (M= 1.29) in ♂♂ and 1.13–0.23 (M= 1.20) in ♀♀. Antennomeres 8<sup>th</sup>, 9<sup>th</sup> and 10<sup>th</sup> equally as long as wide or slightly longer.....*tristiculus* (Apfelbeck)
- 3' Smaller body size, total body length (BL): 1.31–1.39 mm in ♂♂ and 1.39–1.52 mm in ♀♀. Ratio of Aedeagus L/Median lobe Maximal W 7.4–8.3. Antenna shorter 0.51–0.59 in ♂♂ and 0.52–0.58 in ♀♀ (Figs. 81, 82). Antennal elongation index (Antenna L/Pronotum L) 1.23–1.27 (M= 1.25) in ♂♂ and 1.18–1.21 (M= 1.19) in ♀♀. Antennomeres 8<sup>th</sup>, 9<sup>th</sup> and 10<sup>th</sup> significantly shorter than wide .....*mljetensis* sp. n.

- 4 Larger body size, total body length (BL): 1.46–1.50 mm in ♂♂ and 1.60–1.64 mm in ♀♀. Ratio Aedeagus L / Median lobe Max. W 5.3–5.6. Antenna shorter, 0.576–0.589 mm in ♂♂ and 0.585–0.602 mm in ♀♀ (Figs. 83, 84) Antenna slightly longer than pronotum length, antennal elongation index (Antenna L/Pronotum L) 1.24 in ♂♂ and 1.16 in ♀♀. Antennomeres 8<sup>th</sup>, 9<sup>th</sup> and 10<sup>th</sup> significantly shorter than wide ..... *fallaciosus* Müller
- 4' Smaller body size, total body length (BL): 1.42–1.52 mm in ♂♂ and 1.45–1.57 mm in ♀♀. Ratio Aedeagus L / Median lobe Maximal W 5.0–5.4. Antenna longer, 0.700–0.749 mm in ♂♂ and 0.712–0.765 mm in ♀♀ (Figs. 85, 86). Antenna significantly longer than pronotum length, antennal elongation index (Antenna L/Pronotum L) 1.43 in ♂♂ and 1.42 in ♀♀. Antennomeres 8<sup>th</sup>, 9<sup>th</sup> and 10<sup>th</sup> equally as long as wide or longer. .... *komajiensis* sp. n.
- 5 Aedeagus median lobe in dorsal and lateral view wide, cylindrical, basal lamina wide and relatively long (Figs. 77, 78). Index Aedeagus L / Median lobe Maximal W 4.3–5.5. Paramere apex armed with three erected, one apical straight long seta and two subapical long setae oriented toward the median lobe similar in size and length. Antennomeres 8<sup>th</sup>, 9<sup>th</sup> and 10<sup>th</sup> significantly shorter as wide. Female urite IX (genital segment-ovipositor) stylomeres with straight outer and moderately convex inner edge (Fig. 63). .... *orjensis* sp. n.
- 5' Aedeagus median lobe in dorsal and lateral view narrow, elongated, dorso-laterally flattened, basal lamina wide and relatively long (Figs. 73–76). Median lobe apex rounded at the end, gradually tapered (subtriangular) with rounded, not pointed tip. Paramere apex armed with three subapical long erected setae of similar in size and length. Female urite IX (genital segment-ovipositor) stylomeres with concave outer and straight or moderately convex inner edge (Fig. 64). .... **6. *Ionobathyscidius*** subgenus nov.
- 6 Aedeagus median lobe in dorsal and lateral view extremely elongated, lanceolate, basal lamina extremely long (Fig. 73, 74). Index Aedeagus L / Median lobe Maximal W 8.4–9.8. Median lobe rounded at the end slowly narrowed (subtriangular) with rounded, not pointed tip. .... *tomoricensis* Müller
- 6' Aedeagus median lobe in dorsal and lateral view lanceolate, basal lamina shorter (Fig. 75, 76) Index Aedeagus L / Median lobe Maximal W 6.8–7.1. Median lobe apex rounded at the end abruptly tapered with rounded, not pointed tip. Median lobe in the apical part with two lateral dorsally curved longitudinal lobes. .... *rambouseki* Knirsch

## DISCUSSION

The genus *Bathyscidius* is one of the smallest of the leptodirines. Such small leptodirines are mostly edaphobionts i.e. live in forest leaf litter and the upper parts of soil, “muscoles” in French and in some works (VANDEL, 1965). The species *B. rambouseki* and *B. tomoricensis* can be found in such leaf litter habitats, soil or under deeply embedded stones, even in summer months. The type localities of *B. rambouseki* and *B. tomoricensis* are situated on Mt Galičica and Mt Tomori, respectively, at higher elevations, within leaf litter habitats. In such altitudes, the climatic conditions are expected to be more humid and not very dry in summer



periods, unlike the usual situation in Mediterranean forested environments. *B. rambouseki* and *B. tomoricensis* have similar body sizes and antenna length proportions i.e. short antenna, mostly not protruding over the pronotum posterior edge, characteristic for edaphobiontic leptodirines.

Similarly, the newly found and described species, *B. orjensis* sp. n., is of similar body proportions. Unlike the previous species, it was not found in leaf litter habitat in the forest but in humid black soil among the rock crevices on the base of a small calcareous hill. The hill near the village of Kruševica is isolated in the middle of a flat valley, filled with fluvioglacial sediments in consequence of the Pleistocene glaciation of Mt Orjen (KOMAR, 1995). The locality on the southern slope of Orjen, at an altitude of ca 750 m a.s.l., is otherwise in a relatively dry area with a strong sub-Mediterranean influence (Fig. 60). The microhabitat of *B. orjensis* sp. n. is characterised by its having a cooler environment than the surroundings, due to the cold airflow that can be detected also in the summer time. The situation indicates that there is some subterranean environment beneath the exact finding locality. A similar environment, characterized by rock crevices accompanied with strong and cold airflows are known from many places in Orjen, and are called "puvaljka" in the local language. Sometimes, "puvaljke" are used by locals for cooling water and food during summer fieldwork (G. Čulafić, personal comm.). The terrestrial subsurface habitats, often occurring in the vicinity of caves, and the superficial zone of rock fissures and even rock debris slopes are scientifically known as Shallow Subterranean Habitats – SSH (CULVER & PIPAN, 2009; 2014). Special terrestrial type of such SSH, was originally described as Milieu Souterrain Superficiel – MSS (JUBERTHIE *et al.*, 1980) and translated to English as the Superficial Underground Compartment or Mesovoid Shallow Substratum (CULVER & PIPAN, 2009). MSS, which is the mostly used term among entomologists, generally occurring at the junction of the soil and rock layer at a depth of one to few meters, consists of a system of micro places among the rocks and must be covered by soil (CULVER & PIPAN, 2014). It is generally found in mountains of the temperate zones, but in the Mediterranean environment as well (GIACHINO & VAILATI, 2010). Since the exact borders among the leaf litter, soil, MSS and caves are thin and since subterranean fauna show some seasonal vertical migration among these habitats (PIPAN *et al.*, 2011; POLAK, 2012) the exact primary habitat of *B. orjensis* sp. n. cannot be yet defined.

In contrast, the rest of the known *Bathyscidius* species distributed along the Adriatic coast are found in deeper subterranean environments, at cave entrances and in caves. They share adaptations to the subterranean habitats such as less pubescent teguments and exhibit significantly longer antenna. To a certain degree, this can be considered an adaptation to the subterranean life style (JEANNEL, 1911; 1924). Since the leaf litter and upper parts of the soil in the Mediterranean area in summer time usually suffer exceptional droughts, the cave environments can be considered as probable refugia for at least some of *Bathyscidius* species.

It is generally accepted that edaphobitic species of leptodirini have better dispersal abilities and have thus wider ranges. The species of the genera *Pholeuonella*, *Laneyriella* and *Phaneropella* present in the same region as *Bathyscidius* and are found in leaf litter habitats, occupying wider ranges (PRETNER, 1968; 1973;

1977). By contrast, the *Bathyscidius* species are known from a single cave or just couple of caves in a small area. Observing some other internal morphological structures as metendosternite, which is narrow and not similar to that in typical leaf litter species as *Bathyscia* sp., *Bathysciola* sp. or *Phaneropella lesinae*, and especially the metatergal apparatus which is reduced and not broad winged as in the mentioned genera, we can consider the genus *Bathyscidius* to be rather primarily cavernicolus than edaphobitic. Adaptations to life in edaphic habitats in some *Bathyscidius* species as *B. orjensis* or *B. rambouseki* can, therefore, be considered to be secondary lifestyle adaptations. That is another example of the small bathyscioid habitus not necessarily meaning that taxa are not specialized, as has been demonstrated by VAILATI (1988) in the case of some *Boldoria* and *Cryptobathyscia* from the Italian Alps.

Excluding synonymized species as *B. remyi* and *B. (Pseudobathyscidius) serbicus*, from the genus, the range of the rest of the species in the subgenus *Bathyscidius* s. str. is small and geographically comprehensive, including the Dalmatia coastal regions southern from Pelješac to Mt Orjen in Montenegro. The distributions of *B. rambouseki* and *B. tristiculus* are rather remote and isolated from others. The morphological characters we describe in the description of the subgenus *Ionobathyscidius* support the probable genetic isolation and split of the genus into two subgenera groups of species. Such geographical and ecological separations can be result of Pleistocene events in the region i.e., the glaciation of the high

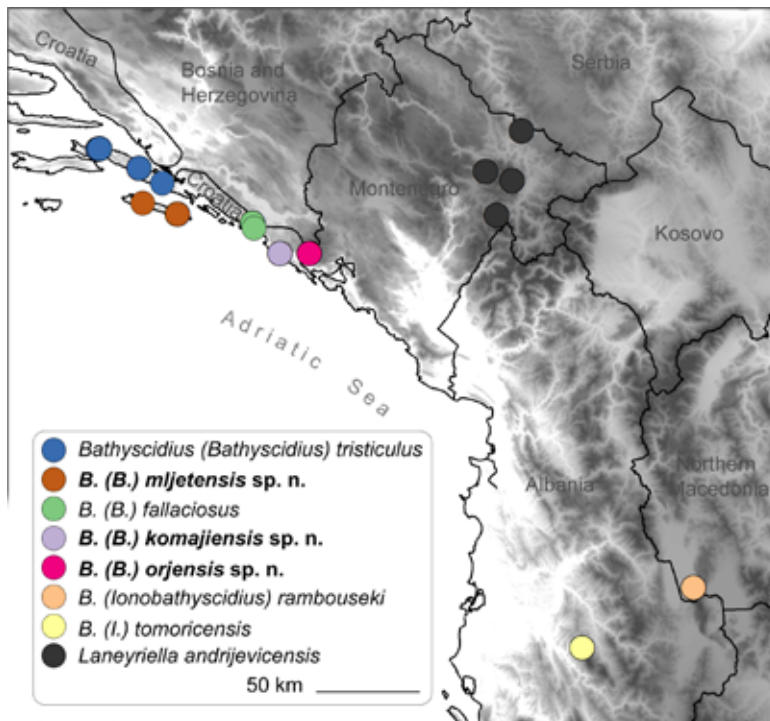


Fig. 95. Distribution map of known localities of the genus *Bathyscidius* and *Laneyriella andrijevicensis*.

mountain ranges in the past. However, this remains at the level of hypothesis and only the forthcoming molecular analyses will clarify the phylogenetic relation of the focal taxa and their evolutionary development.

Cave adaptations in species of *Bathyscidius* s. str. and patterns of their geographical and geological isolation can also be used as a promising tool in prediction of the discovery of new species. Based on previous findings, new species can be expected in the coastal region of Southern Dalmatia, assuming, of course, vigorous collecting efforts and considerable amount of luck. During the searching for the *B. tristiculus* type locality, the small cave near Janjina on Pelješac peninsula, Croatian speleobiologists investigated numerous cave objects without recording any presence of *Bathyscidius* specimens. A single male specimen collected recently and studied from Špilja kod vrha Splje near Polače on the western part of Mljet island fits with *B. mljetensis* sp. n. in its body proportions and aedeagus shape but has slightly shorter antennae. The exact meaning of this difference is not validated in the present study, but we cannot exclude the possibility that this specimen (along with its population), forms an isolated geographical race, a subspecies or even a separate species. Nevertheless, since additional specimens need to be collected and studied, the position of this specimen within *B. mljetensis* sp. n. is only provisional. By contrast, it is to be expected that only one species, *B. orjensis* sp. n., exists in the wider Orjen Mountain area. Surrounding mountain ranges such as Krivošije and Snježnica in Croatia are promising as well, especially, since this species, it is believed, lives in the MSS habitat and has better dispersal possibilities. We expect, based on habitat preferences, that focused studies on MSS habitats will reveal significantly larger distribution ranges for edaphic species of *Bathyscidius*, *B. rambouseki* and *B. tristiculus*. Similarly, the new taxa from the subgenus *Ionobathyscidius* from other less investigated places in southern Albania, south-western parts of Northern Macedonia and North Greece will probably be found. The great subterranean biodiversity of leptodirines recently found in MSS habitats in Greece is promising and already reported by GIACHINO & VAILATI (2010).

The use of modern molecular phylogenetic techniques is at this point urgent so as to clarify the organic higher systematics of the studied leptodirines. The genus *Bathyscidius* is at present knowledge listed in tribus Bathysciae, Group Théléomorphes and division III according to JEANNEL (1924) and in subtribe Bathysciotina according to GUÉORGUIEV (1974, 1976). Subtribe division on the Supraflagellates and Infraflagellates according JEANNEL (1955), GIACHINO *et al.* (1998) and CASALE *et al.* (1991) is ambiguous since *Bathyscidius* has not sclerotized structures or dorsal flagellum in the aedeagus inner sac at all. Supra-generic position of the genus *Bathyscidius* is thus confusing and has not been studied or discussed in this genus revision.

#### ACKNOWLEDGEMENTS

We are grateful to Peter Trontelj (Ljubljana), Helena Bilandžija (Zagreb), Miloš Pavićević (Podgorica) who accompanied us during field collections and Lara Jogan Polak (Ljubljana) for support during long field excursions. We want to

thank to the participants of the 2nd Biospeleological expedition - Pelješac 2019, namely the leaders, Nikolina Kuharić and Alen Kirin, as well as other members of Croatian Biospeleological Society, Speleološki odsjek HPD Sniježnica from Dubrovnik and Marijana Miljac Đuračić for their support. Special thanks to the guides for their willingness, enthusiasm and help in the field; without them many caves and pits on the island would have remained forgotten. In alphabetical order they are: Osvin Pečar, Damjan Aljinović, Martina Aljinović, Jakov Nodilo, Ante Rogulj, Baldo Hazdovac, Nikola Hazdovac, Vicko Zvone, Marija and Željko Hazdovac, Pero Hazdovac, Marijo Franić, Nikola Sršen, Ivan Sršen, Vid Radulj, Dragan Dabelić and Davor Stražičić. We are grateful to Tonči Rađa (Split), Petra Bregović (Varaždin) for furnishing some additional specimens studied in the revision. Snežana Dragičević (Podgorica) helped us to obtain permits to collect specimens in Montenegro and in some text improvements. We are further deeply indebted to Andrea Colla (Trieste) for enabled us to study topo-type specimens of *B. tomoricensis* from Natural History Museum of Trieste (Italy) and Michel Perreau who has checked the type specimen of *B. remyi* in Collection of Entomological department of the National Museum of Natural History (MNHN) in Paris (France). Jasminko Mulaomerović (Sarajevo) and Tonči Rađa (Split) and Snežana Dragičević (Podgorica) provided us with requested literature. Tamara Čuković gave us *B. mljetensis* photographs taken in its natural habitat. Finally, we wish to thank Teo Delić (Ljubljana) for some critical draft text improvements and for elaborating the taxa distribution map for this paper.

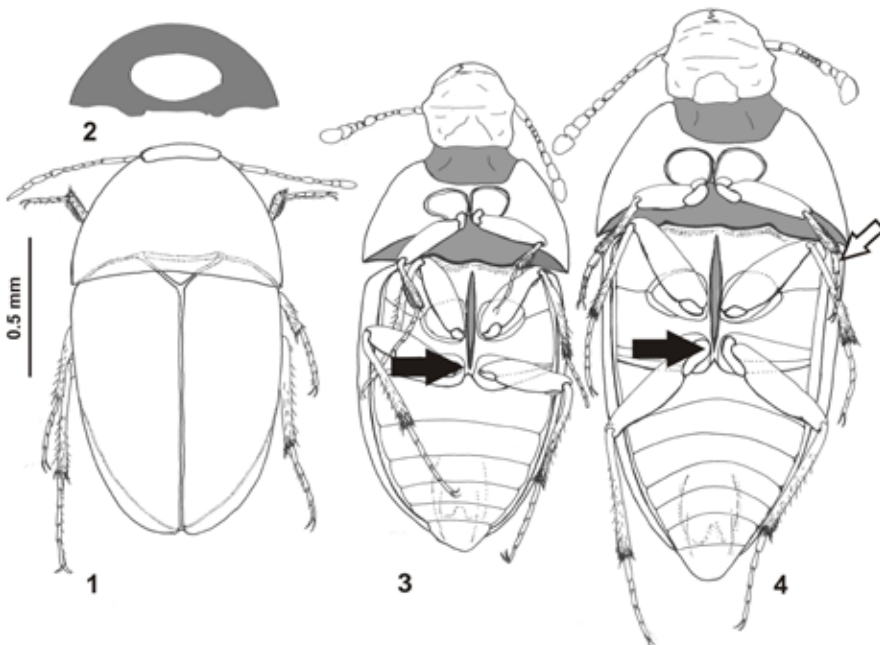
Received September 2, 2019

## REFERENCES

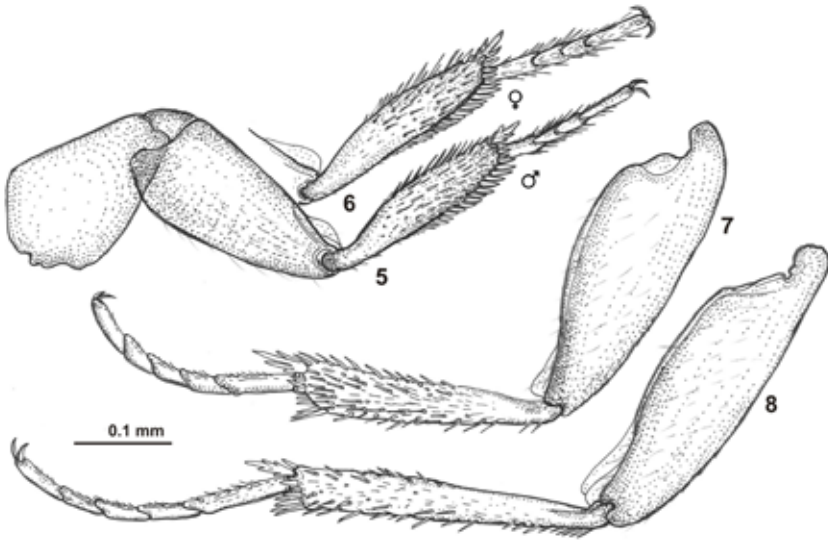
- APFELBECK, V., 1905: Paeinsulae balcanicae coleopterum species novae. Glasnik zemaljskog muzeja u Bosni i Hercegovini, **17**, 245–251.
- CULVER, D. C. & PIPAN, T., 2009: The Biology of Caves and Other Subterranean Habitats. Oxford University press, Inc. New York, 254 pp.
- CULVER, D. C. & PIPAN, T., 2014: Shallow Subterranean Habitats. Ecology, Evolution, and Conservation. Oxford University Press, Oxford, 257 pp.
- ČIRČIĆ, B. P. M., MAKAROV, S., E., RAĐA, T., ILIĆ, B. S. & D. Ž. ANTIĆ, 2012a: *Roncus meledae* n. sp. and *Neobisium oculatum* n. sp., from the Island of Mljet, Dalmatia (Neobisidae, Pseudoscorpiones). Arch. Biol. Sci., Belgrade **64**(4), 1567–1576.
- ČIRČIĆ, B.P.M., RAĐA, B., DIMITRIJEVIĆ, R.N. & ČURČIĆ, S.B., 2012b: On two new cave pseudoscorpions from Dalmatia, Croatia (Chthoniidae and Neobisiidae, Pseudoscorpiones). Arch. Biol. Sci. Belgrade **64**(3), 1099-1108.
- FRESNEDA, J., GREBENNIKOV, V.V. & RIBERA, I., 2011: The phylogenetic and geographic limits of Leptodirini (Insecta: Coleoptera: Leiodidae: Cholevinae), with a description of *Sciaphyes shestakovi* sp. n. from the Russian Far East. – Arthropod Systematic & Phylogeny **69**(2), 99–123.
- GIACHINO, P.M., 2005 (2006): *Bathyscidius comottiorum* N. Sp. del Kosovo (Coleoptera, Cholevidae, Leptodirinae). Rivista del Museo Civico di Scienze Naturali "Enrico Caffi", Bergamo, **24**, 11–15.
- GIACHINO, P.M. & VAILATI, D., 2010: The Subterranean Environment. Hypogean life, concepts and collecting techniques. WBA Handbooks, Verona, 3, 132 pp.
- GIACHINO, P.M., VAILATI, D. & CASALE, A., 1998: Major questions in the phylogeny and biogeography of Cholevidae (Coleoptera), with emphasis on the subfamily Leptodirinae. Pp. 179–120 in: GIACHINO P.M. & PECK S.B. (eds), Phylogeny and Evolution of Subterranean and Endogean Cholevidae (= Leiodidae Cholevinae). – Proceedings of a Symposium (30 August, 1996, Florence, Italy) at XX

- International Congress of Entomology. Atti Museo Regionale di Scienze Naturali. Torino.
- GUÉORGUEV, V.B., 1976: Recherches sur la taxonomie, la classification et la phylogénie des Bathysciinae (Coleoptera: Catopidae). – Razprave SAZU, Ljubljana **19**(4), 91–129.
- HLAVÁČ, P., PERREAU, M. & ČEPLÍK, D., 2017: The Subterranean Beetles of the Balkan peninsula. Czech University of Life Sciences, Faculty of Forestry and Wood Sciences, Department of Forest Protection and Entomology, Praha, 267 pp.
- JALŽIĆ, B., BEDEK, J., BILANDŽIJA, H., BREGOVIĆ, P., CVITANOVIĆ, H., ČUKOVIĆ, T., ČUKUŠIĆ, A., DRAŽINA, T., ĐUD, L., GOTTSTEIN, S., HMURA, D., KLJAKOVIĆ GAŠPIĆ, F., KOMERIČKI, A., KUTLEŠA, P., LUKIĆ, M., MALENICA, M., MICULINIĆ, K., OZIMEC, R., PAVLEK, M., RAGUŽ, N., SLAPNIK, R. & ŠTAMOL, V., 2013: Atlas špiljskih tipskih lokaliteta faune Republike Hrvatske, svezak 2. Hrvatsko biospeleološko društvo, Zagreb. pp. 238.
- JANJANIN, Ž., 2019: Istraživanje jame Bezdán – Konavle 2017. Subterr. Croat. **17**, **26**(1), 21–25.
- JEANNEL, R., 1911: Biopelologica. XIX. Révision des Bathysciinae (Coléoptères Silphides). Monographie; distribution géographique, systématique. Archives de Zoologie Expérimentale et Générale **47**(1), 641 pp.
- JEANNEL, R., 1924: Monographie des Bathysciinae. Archives de Zoologie Expérimentale et Générale **63**(1), 434 pp.
- JEANNEL, R., 1934: Bathysciinae recueillis par MM. P. Remy et R. Husson dans le Sandjak de Novi – Pazar et la Macédoine grecque. Revue française d'Entomologie **1**(1), 89–103.
- JEANNEL, R., 1910: Essai d'une nouvelle classification des Silphides cavernicoles. Archives de Zoologie expérimentale et générale **45**(1), 1–48.
- JUBERTHIE, C., DELAY, B. & BOUILLON, M., 1980: Extension du milieu souterrain en zone non-calcaire: description d'un nouveau milieu et de son peuplement par les coléoptères troglobies. Mémoires de Biospéologie **7**, 19–52.
- KARAMAN, Z., 1964: Nouvelle espèce de *Bathyscidius* de Sibérie orientale, et remarques sur l'expansion de l'espèce myrmécophile *Reitteria balcanica* Karaman. Bulletin de la Société entomologique de Mulhouse **(2)**, 30–33.
- KNIRSCH, E., 1931: Zwei neue von Dr. Fr. Rambousek in Mazedonien gesammelte Bathysciinae (Col.). Časopis Československé Společnosti Entomologické **28**(1–2), 2–4.
- KOMAR, G., 1995: Orjenski masiv. Herceg Novi. pp. 290
- LANEYRIE, R., 1967: Nouvelle classification des Bathysciinae (Coléoptères Catopidae). Annales de Spéléologie **22**(3), 645 pp.
- MÜLLER, J., 1911: Zwei neue Höhlensilphiden aus den österreichischen Karstländern. – Wiener Entomologische Zeitung **30**(6–7), 175–176.
- MÜLLER, J., 1910: Diagnosen neuer Höhlensilphiden. Zoologische Anzeiger **36**(8/9), 184–186.
- MÜLLER, J., 1917: Systematisch-faunistische Studien über Blindkäfer. Sitzungsberichte der Akademie der Wissenschaften in Wien. Mathematisch-naturwissenschaftliche Klasse **126**(8), 607–656.
- MÜLLER, J., 1922: Risultati scientifici della spedizione Ravasini-Lona in Albania. Anoftalmi e Silfidi ciechi I, Estrato dal Bolletino della Società entomologica italiana **54**, 87–91.
- NEWTON, A.F., 1998: Phylogenetic problems, current classification and generic catalog of world Leiodidae (Including Cholevidae). Pp. 41–178 in: GIACHINO P.M. & PECK S.B. (eds.), Phylogeny and Evolution of Subterranean and Endogean Cholevidae (= Leiodidae Cholevinae). – Proceedings of a Symposium (30 August 1996, Florence, Italy) at XX International Congress of Entomology. Atti Museo Regionale di Scienze Naturali. Torino.
- OZIMEC, R., RNJAK, G., JALŽIĆ, B., LACKOVIĆ, D., CVITANOVIĆ, H., BASARA, D., KOVAČEVIĆ, A., POLIĆ, G., GRGUREV, M., HANŽEK, N., RADE, P., KLJAKOVIĆ-GAŠPIĆ, F. & O. ANTONIĆ, 2015: Spelaeologia Ragusina 1: Katastar speleoloških objekata, podzemnih građevina, krških izvora I krških bunara kopnenog dijela Dubrovačko-neretvanske županije. Subterranea Croatica **13**, suppl. 1, 1–152.
- PERREAU, M., 2000: Catalogue des Coléoptères Leiodidae Cholevinae et Platypsyllinae. – Mémoires de la Société Entomologique de France **4**, 469 pp.
- PERREAU, M., 2004: Leiodidae, 133–203; in LÖBL, I. & SMETANA, A. (eds): Catalogue of Palearctic Coleoptera, Vol. 2 (Hydrophiloidea - Histeroidea - Staphylinoidea). Stenstrup: Apollo Books, 942 pp.
- PERREAU, M., 2008: *Pavicevicia* N. Gen., a new Genus with one new species of Bathyciotina from Kosovo (Coleoptera, Leiodidae, Cholevinae, Leptodirini). Advances in studies of the fauna of the Balkan Peninsula. Papers dedicated to the memory of Guido Nonveiller, Institute for Nature

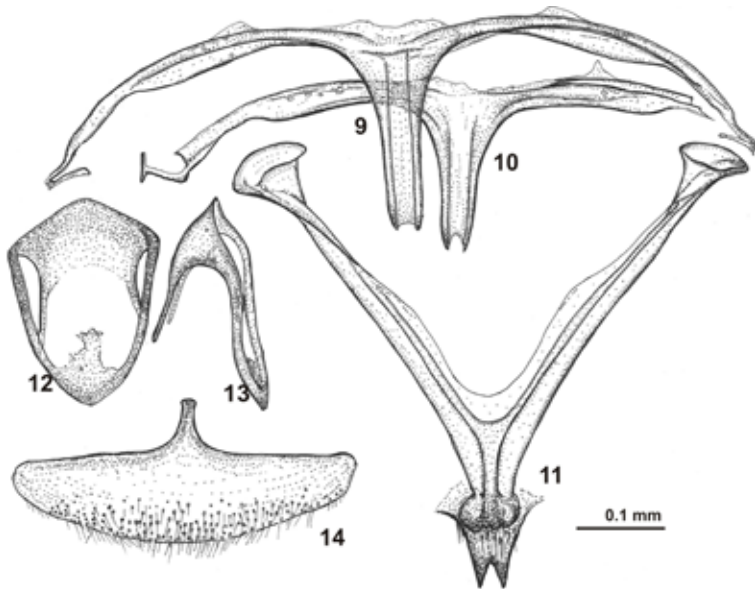
- Conservation of Serbia, Belgrade. Monograph 22, 177–182.
- PERREAU, M., 2015: Leiodidae, 180–290 - in LÖBL, I. & LÖBL, D. (Eds.): Catalogue of Palearctic Coleoptera. (Hydrophiloidea - Staphylinioidea). Revised und Updated Edition. Brill: Leiden, Boston.
- PERREAU, M., 2019: Phylogeny of Bathysciotina Guérougiev, 1974, based on morphology with a special emphasis to Italian genera and with the description of a new species of *Halbheria* (Coleoptera Leiodidae Cholevinae Leptodirini). *Zootaxa* 4590(3), 367–381.
- PIPAN, T., LÓPEZ, H., OROMÍ, P., POLAK, S. & CULVER, D.C., 2011: Temperature variation and the presence of troglobionts in terrestrial shallow subterranean habitats. *Journal of Natural History* 45(3–4), 253–273.
- POLAK, S., 2012: Vertical migration of the subterranean beetles as a respond to annual temperature fluctuations. 21<sup>st</sup> International Conference on Subterranean Biology (ICSB). 02.- 07. september 2012, Košice, Slovakia, Book of Abstracts p. 90.
- PRETNER, E., 1968: Catalogus Faunae Jugoslaviae, Coleoptera: Catopidae: Bathysciinae. Slovenska akademija znanosti in umetnosti, 3(6), 59 pp.
- PRETNER, E., 1973: Koleopterološka fauna pećina i jama Hrvatske s historijsim pregledom istraživanja. Krš Jugoslavie, Jugoslovsanska akademija znanosti i umjetnosti 8(6), 101–239.
- PRETNER, E., 1977: Pregled podzemne faune koleoptera Crne Gore. – The Montenegrin Academy of Sciences and Arts, Glasnik 2, 91–186.
- VAILATI, D., 1988: Studi dui Bathysciinae delle Prealpi centro-occidentali. Revisione sistematica, ecologia, biogeografia dell "serie filetica di *Boldoria*" (Coleoptera Catopidae). Monografie di "Natura Bresciana" 11, 1–331.
- VANDEL, A. 1965: Biospeleology. The Biology of Cavernicolous Animals. Pergamon Press. Ltd. Oxford / London. 524 pp.



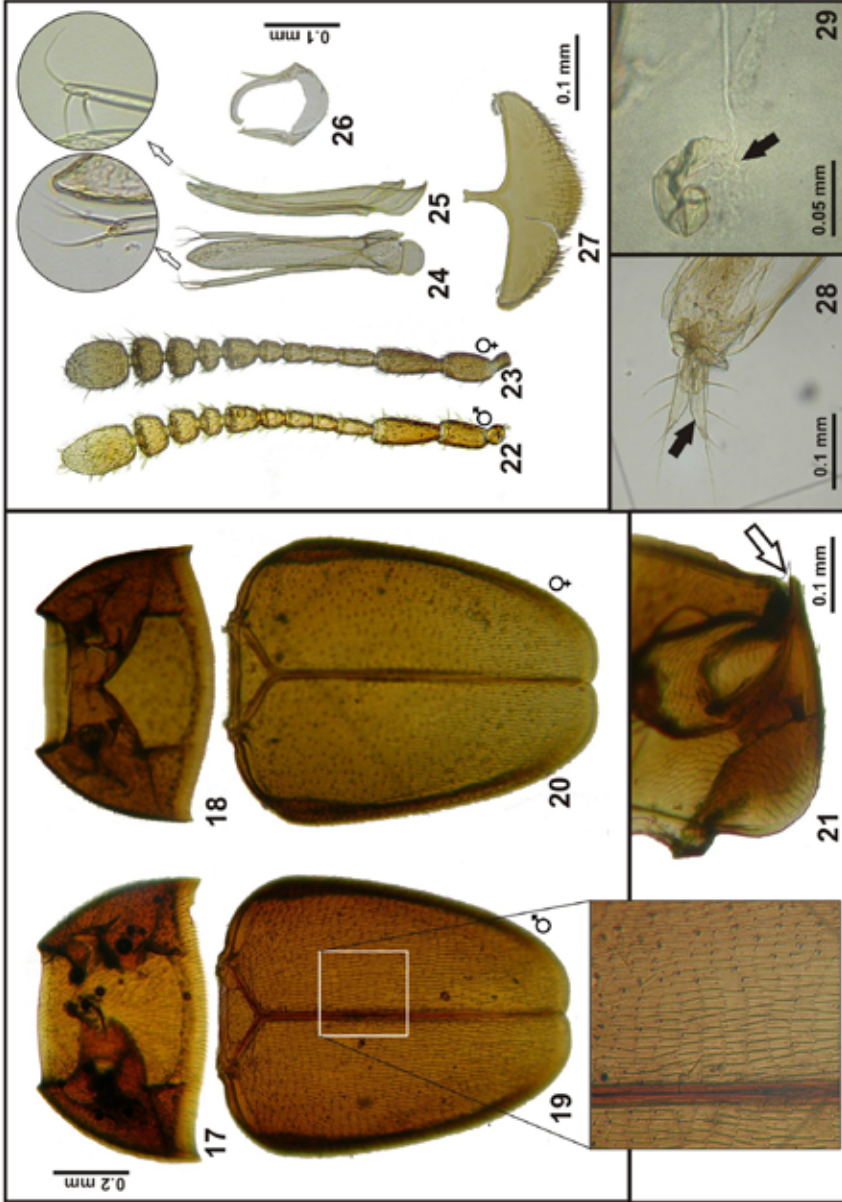
**Figs. 1–4.** Dorsal and ventral habitus: 1: *Bathyscidius fallaciosus* Müller, ♀ dorsal side. 2: *B. fallaciosus* Müller, ♀ pronotum, apical view- cross-section. 3: *B. fallaciosus* Müller, ♀ ventral side. 4: *Laneyriella andrijevicensis* (Jeannel), ♀ ventral view (black arrow indicates mesosternal carina proximal beak extension over the metasternum, white arrow indicates widened first protarsomere in *Laneyriella*).



**Figs. 5–8.** *Bathyscidius mljetensis* sp. n., right legs, dorsal view: 5: First leg, ♂. 6: First leg, ♀. 7: Middle leg, ♂. 8: Hind leg, ♂.

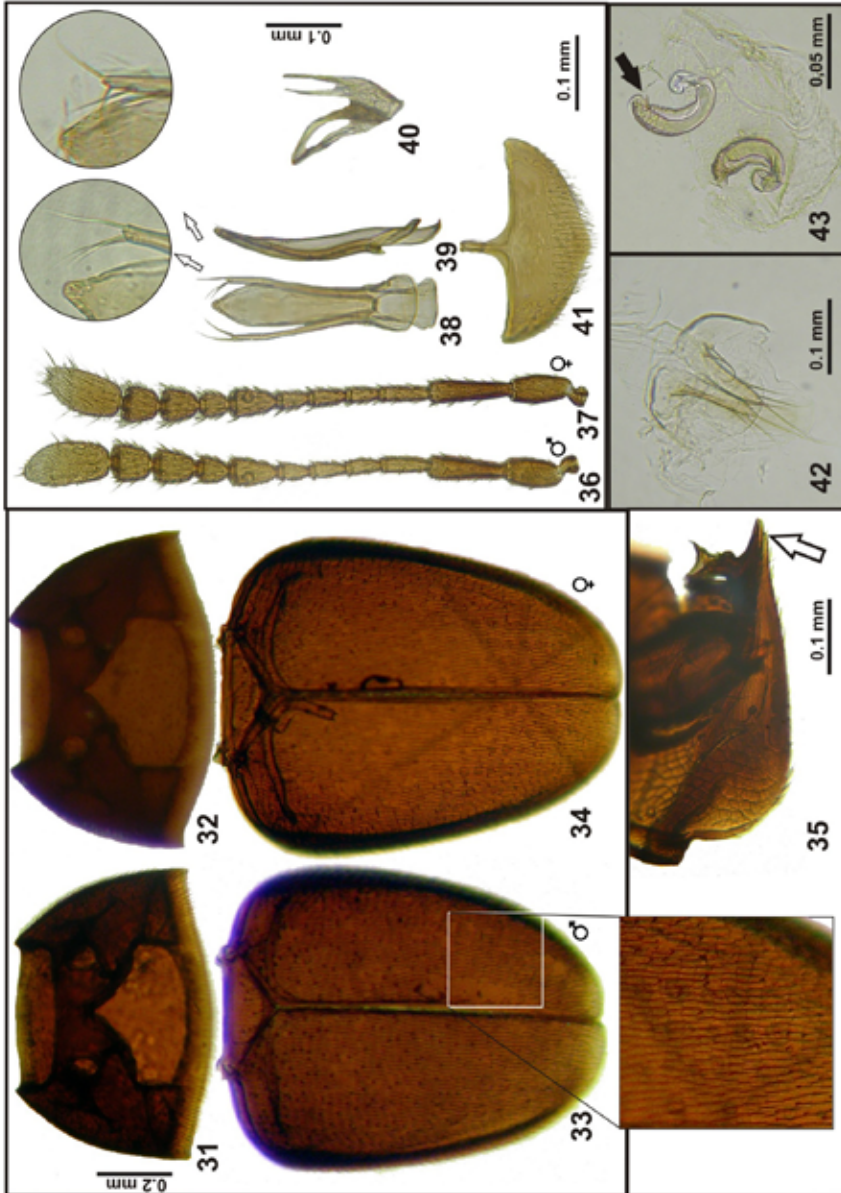


**Figs. 9–14.** *Bathyscidius* sp. internal structures: 9: *Bathyscidius mljetensis* sp. n., Metatergal apparatus. 10: *Bathyscidius orjensis* sp. n., Metatergal apparatus. 11: *Bathyscidius fallaciosus*, metendosternite. 12: *Bathyscidius orjensis* sp. n., male genital segment, dorsal view. 13: *Bathyscidius orjensis* sp. n., male genital segment, lateral view. 14: *Bathyscidius fallaciosus*, female ventrite VIII, dorsal view.

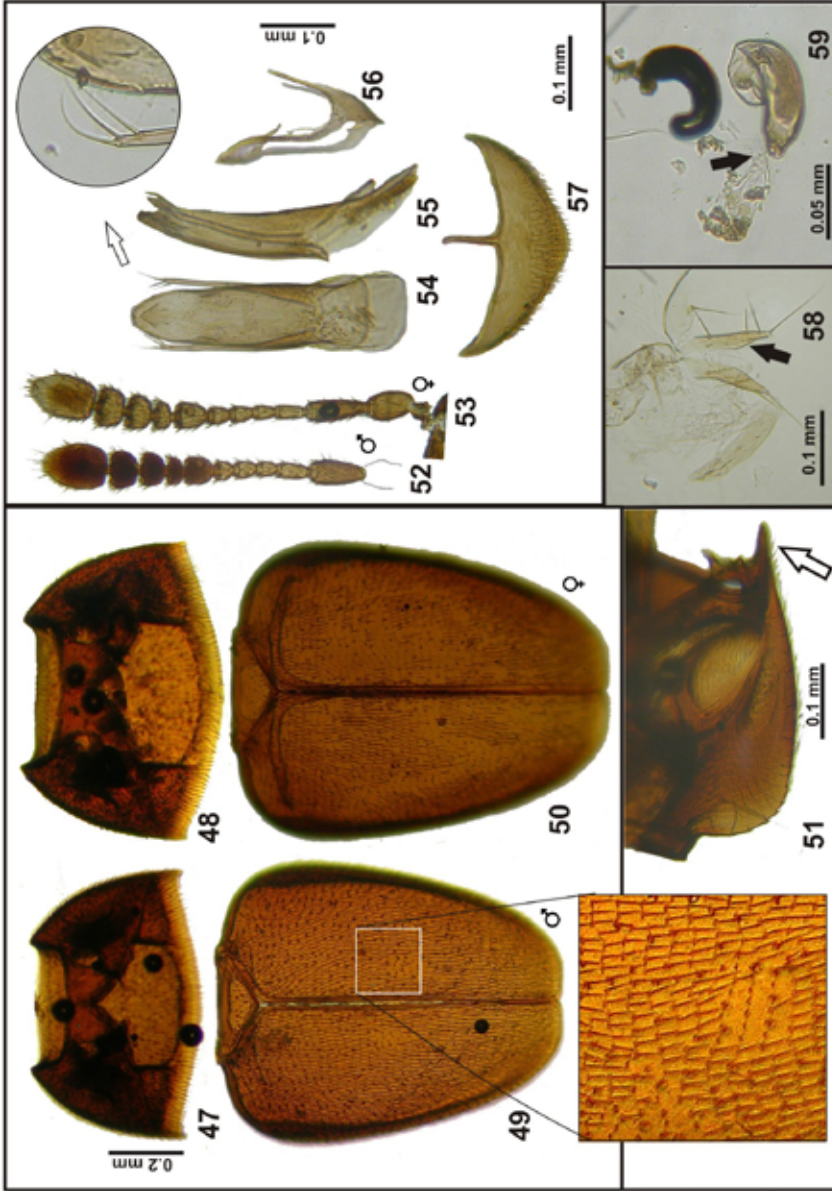


**Figs. 17–29.** *Bathysciidius mtjetensis* sp. n.: 17: Pronotum ♀ dorsal view. 18: Pronotum ♀ dorsal view. 19: Elytra, ♂ dorsal view. 20: Thorax with mesosternal carina, lateral view (white arrow indicates proximal carina beak extended over the metasternum). 21: Elytra, ♀ dorsal view. 22: Antenna ♀. 23: Antenna ♂. 24: Aedeagus shape, dorsal view (paramere apex in the circular enlargement). 25: Aedeagus shape, lateral view. 26: Male genital segment, dorsal view. 27: Female ventrite IX, dorsal view. 28: Female ventrite IX - genital segment-ovipositor (black arrow indicates convex inner edge of stylomeres. 29: Spermatheca (black arrow indicates hyaline gland attachment to the spermathecal duct at the proximal part).

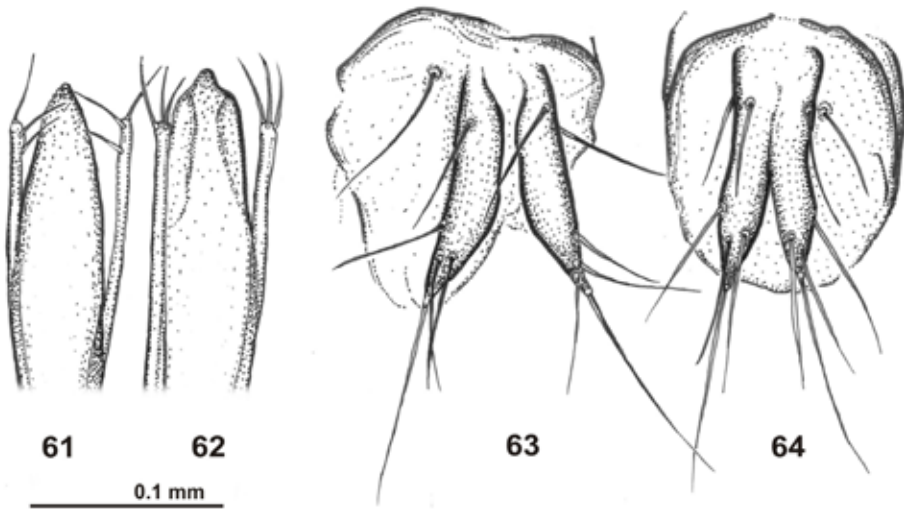




**Figs. 31-43.** *bathysciatus komajensis* sp. n.: 31: Pronotum, ♂ dorsal view. 32: Pronotum, ♀ dorsal view. 33: Thorax with mesosternal carina, lateral view (white arrow indicates proximal carina beak extended over the metasternum). 34: Thorax shape, ♀. 35: Antenna shape, ♂. 36: Antenna shape, ♀. 37: Aedeagus shape, dorsal view (paramere apex in the circular enlargement). 38: Aedeagus shape, lateral view. 39: Female ventrite VIII<sup>th</sup>, dorsal view. 40: Female ventrite IX<sup>th</sup> - genital segment-ovipositor (black arrow indicate convex inner edge of stylomeres. 41: Spermatheca (black arrow indicates hyaline gland attachment to the spermathecal duct at the proximal part). 42: Spermatheca (white arrow indicates proximal carina beak extended over the metasternum). 43: Spermatheca (black arrow indicates hyaline gland attachment to the spermathecal duct at the proximal part). 44: Spermatheca (white arrow indicates proximal carina beak extended over the metasternum).



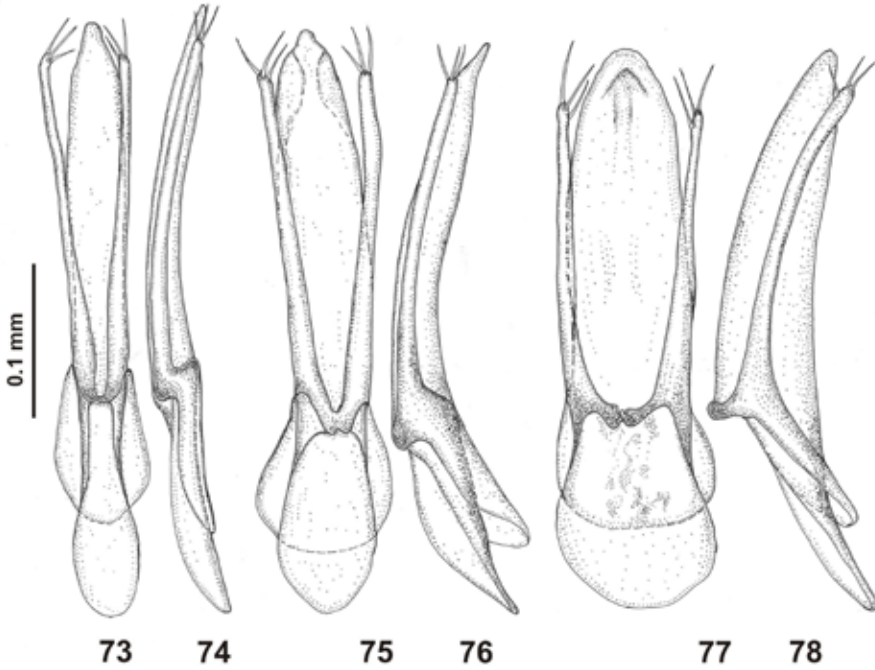
**Figs. 47–59.** *Bathysciidius orjensis* sp. n.: 47: Pronotum, ♂ dorsal view. 48: Pronotum, ♀ dorsal view. 49: Elytra, ♂ dorsal view. 50: Elytra, ♀ dorsal view. 51: Thorax with mesosternal carina, lateral view (white arrow indicates proximal carina beak extended over the metasternum). 52: Antenna shape, ♂. 53: Antenna shape, ♀. 54: Aedeagus shape, dorsal view (paramere apex in the circular enlargement). 55: Aedeagus shape, lateral view. 56: Male genital segment, dorsal view. 57: Female ventrite VIII<sup>th</sup>, dorsal view. 58: Female ventrite IX<sup>th</sup> - genital segment-ovipositor (black arrow indicates convex inner edge of stylomeres. 59: Spermatheca (black arrow indicates hyaline gland attachment to the spermathecal duct at the proximal part).



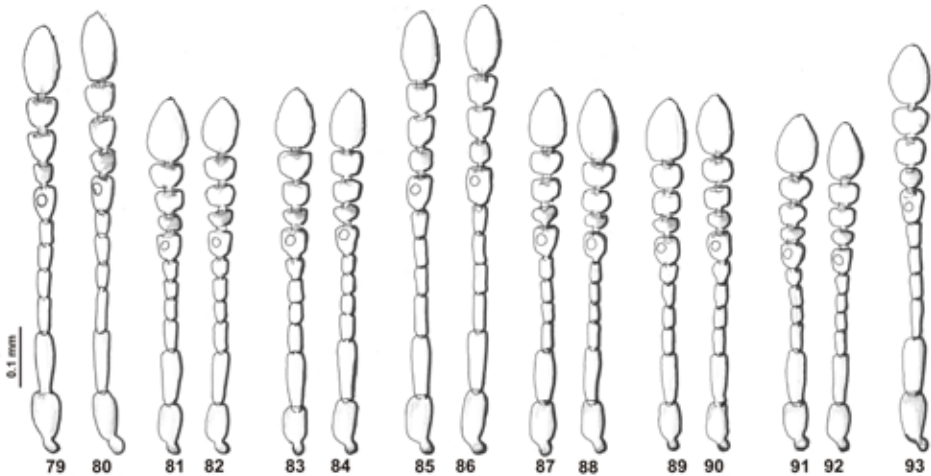
**Figs. 61–62.** Paramere apex with insertion of three erected setae. **61:** *Bathyscidius tristiculus*. **62: *Bathyscidius rambouseki*. **Figs. 63–64:** Female genital segment-ovipositor. **63:** *Bathyscidius tristiculus*. **64: *Bathyscidius rambouseki*.****



**Figs. 65–72.** *Bathyscidius* edeagus shape in dorsal and ventral view: **65:** *B. tristiculus*, dorsal view. **66:** *B. tristiculus*, ventral view. **67:** *B. mljetensis* sp. n., dorsal view. **68:** *B. mljetensis* sp. n., ventral view. **69:** *B. fallaciosus*, dorsal view. **70:** *B. fallaciosus*, ventral view. **71:** *B. komajiensis* sp. n., dorsal view. **72:** *B. komajiensis* sp. n., ventral view.



**Figs. 73–78.** *Bathyscidius* edeagus shape in dorsal and ventral view: 73: *B. tomoricensis*, dorsal view. 74: *B. tomoricensis*, ventral view. 75: *B. rambouseki*, dorsal view. 76: *B. rambouseki*, ventral view. 77: *B. orjensis* sp. n., dorsal view. 78: *B. orjensis* sp. n., ventral view.



**Figs. 79–93.** *Bathyscidius* Antenna shape of males and females (in dorso-ventral view): 79: *B. tristiculus*, ♂. 80: *B. tristiculus*, ♀. 81: *B. mljetensis* sp. n., ♂. 82: *B. mljetensis* sp. n., ♀. 83: *B. fallaciosus*, ♂. 84: *B. fallaciosus*, ♀. 85: *B. komajiensis* sp. n., ♂. 86: *B. komajiensis* sp. n., ♀. 87: *B. tomoricensis*, ♂. 88: *B. tomoricensis*, ♀. 89: *B. rambouseki*, ♂. 90: *B. rambouseki*, ♀. 91: *B. orjensis* sp. n., ♂. 92: *B. orjensis* sp. n., ♀. 93: *Laneyriella andrijevicensis*, ♀.