

A new cave-dwelling and endemic species of the genus *Pholeuonopsis* (Coleoptera, Leiodidae) from Serbia

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Abstract: In the present study, a new species of a cavernicolous beetle is described from Serbia: *Pholeuonopsis* (*Pholeuonopsis*) *zlatiborensis* sp. n. (Leptodirini, Cholevinae, Leiodidae). All important taxonomic features have been thoroughly analyzed and illustrated. The new species probably belongs to an old phyletic lineage of mesogeid origin, like other known *Pholeuonopsis* species inhabiting cave and endogean habitats in the western part of the Balkan Peninsula. Therefore, the species is both relict and endemic inhabitant of cave habitats in Serbia.

Key words: Leiodidae, *Pholeuonopsis*, *Pholeuonopsis* (*Pholeuonopsis*) *zlatiborensis* sp. n., cave fauna, Serbia.

Introduction

The genus *Pholeuonopsis* Apfelbeck, 1901 comprises 12 species which are distributed over a huge Dinaric area in Bosnia-Herzegovina, Montenegro, and Serbia (PERREAU, 2000; ČURČIĆ & BRAJKOVIĆ, 2002; LÖBL & SMETANA, 2004). This genus includes three subgenera: *Pholeuonopsis* s. str., *Scotosites* Knirsch, 1929, and *Silphanillus* Reitter, 1903 (GUÉORGUEV, 1976; PERREAU, 2000). All *Pholeuonopsis* species are endemic and inhabit either caves or some endogean mountain habitats (JEANNEL, 1924; PRETNER, 1968). Among these, there are four cave species, six endogean forms, and only two species which inhabit both caves and soil. Two species of *Pholeuonopsis* are presently known from Serbia: *P.* (*Pholeuonopsis*) *magdelainei* Jeannel, 1924, inhabiting the Mladenovića Megara Cave, village of Stapari, near Užice, W Serbia; and *P.* (*P.*) *cvijici* Čurčić et Brajković, 2002, from the Potpećka Pećina Cave, village of Potpeće, near Užice, W Serbia (JEANNEL, 1924; ČURČIĆ & BRAJKOVIĆ, 2002).

The present study is devoted to both description and diagnosis of a new species of the genus *Pholeuonopsis*. The diagnosis of *Pholeuonopsis* (*P.*) *zlatiborensis* sp. n. is based on a thorough analysis of the type series of two males and one female, collected during 2004 in the Ršumska (= Markova) Pećina Cave, village of Gornji Ljubiš, Mt. Zlatibor, W Serbia.

Material and methods

The specimens of the species described herein were collected by hand and from pitfall traps in the Ršumska (= Markova)

Pećina Cave, village of Gornji Ljubiš, Mt. Zlatibor, W Serbia.

All type specimens were analyzed in the laboratories of the Institute of Zoology, Faculty of Biology, University of Belgrade; these were dissected, thoroughly studied, and illustrated. Dry examples were stuck both on paper and plastic labels, and both male and female genital structures were fixed in the canada-balsam medium.

All taxonomically important morphological characters were studied for comparison. Figures of most important diagnostic features were done by a camera lucida and a digital camera attached to the stereomicroscope Stemi 2000 (Carl Zeiss, Jena).

Leiodidae Fleming, 1821

Pholeuonopsis Apfelbeck, 1901

Pholeuonopsis (*Pholeuonopsis*) *zlatiborensis* sp. n. (Figs 1–7, 9)

Description. Type specimens medium-sized (total body length 3.60 mm in the holotype male, and 3.90 mm in the paratype female). Body elyptic and elongated (length/width ratio 2.36), yellowish-brown to reddish-brown. Integument shiny and pubescent. Head, pronotum, and elytra each with microsculpture. Body pholeuonopsid, pronotum bell-shaped, and elytra sub-ovoid. Antennae shorter than the body, extending well beyond the mid-elytra level (Fig. 1).

Head elongated. No ommatidia present, but small eye-spots developed (Fig. 2). Inconspicuous occipital carina present. Head covered with numerous densely distributed small impressed punctures dorsally. Clypeus

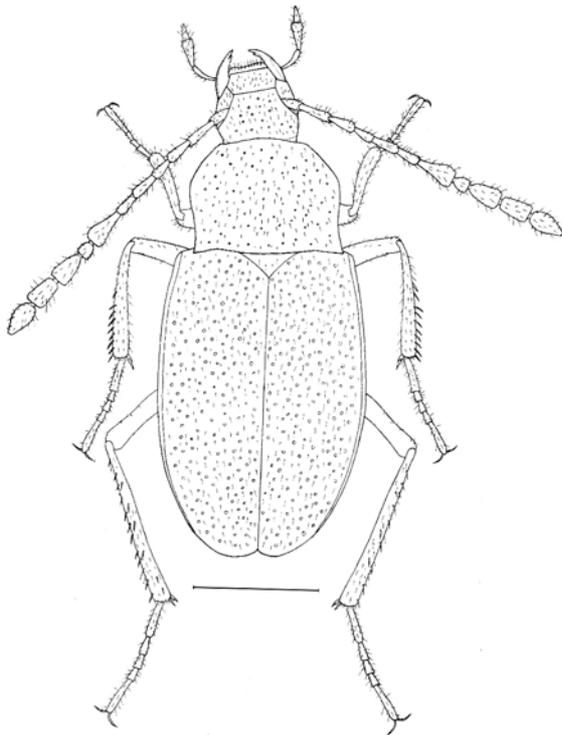


Fig. 1. *Pholeuonopsis (P.) zlatiborensis* sp. n. from the Ršumska (= Markova) Pećina Cave, village of Gornji Ljubiš, Mt. Zlatibor: Holotype male, habitus dorsally. Scale 1 mm.

and labrum both densely pubescent. Clypeal setae of moderate length; labrum with a few long setae. Penultimate labial palpomere thickened apically, much broader than the distalmost palpomere. Apical labial palpomere slender and elongated, narrowing apically. Antennae moderately long and slender, widening distally (Fig. 1); pronotum and elytra length to antenna length ratio: 1.33 (male) and 1.43 (female). Antennae inserted just after the middle of head, extending well beyond the mid-elytra level (Fig. 1). Antennomere I widened apically and shorter than antennomere II. Antennomere II somewhat longer than antennomere III. Antennomere VIII is the shortest, subspherical. Antennomeres I–VI moderately thickening towards apex, while antennal segments VII, IX, and X are strongly broadened apically. Distalmost antennomere (XI) ovoid, longer than antennomere X.

Pronotum small, bell-shaped, wider than long (length/width ratio 0.80), widest slightly before the mid-section, covered with both impressed punctures and dense and short pubescence (Fig. 1). The lateral margins bordered and sigmoidly-shaped, almost rounded. Posterior margin shorter than base of elytra. Anterior margin slightly convex. Fore angles rounded and obtuse; hind angles short, pointed and prominent. Median part of the posterior margin somewhat convex in both sexes. Disc slightly convex, with the middle part somewhat elevated. Mesosternal carina high, subtriangular, apically obtuse (Fig. 3); the anterior edge con-

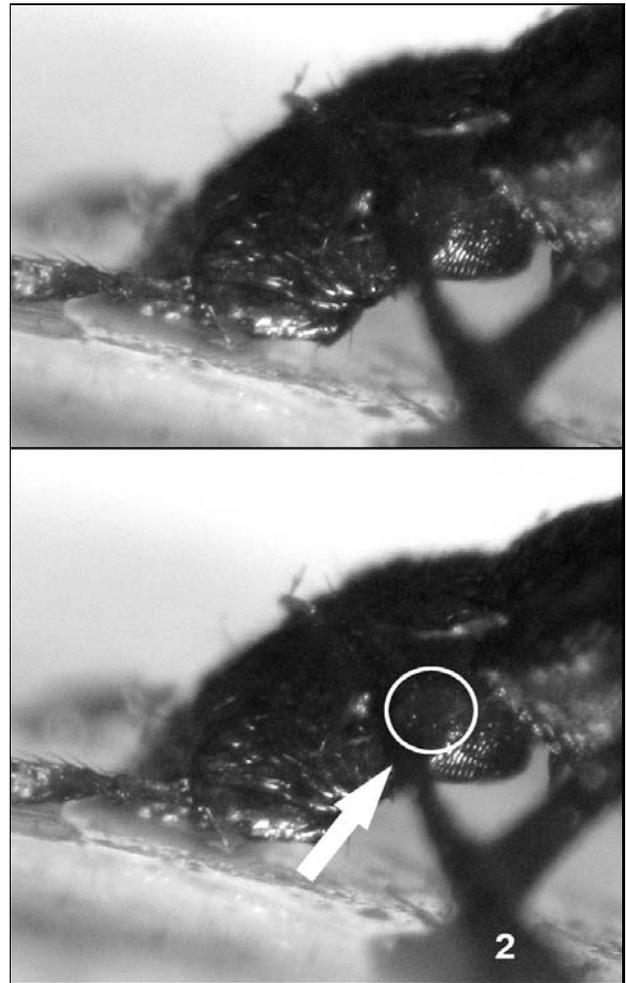
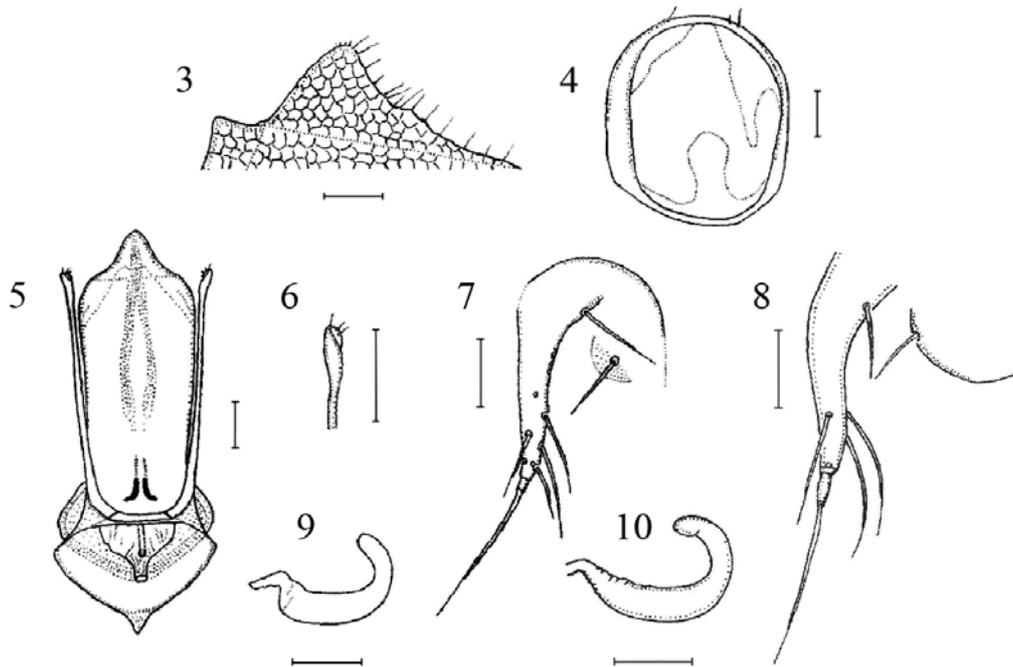


Fig. 2. *Pholeuonopsis (P.) zlatiborensis* sp. n.: holotype male, head with eye-spots (lateral view).

vex and the posterior edge concave. Mesosternal carina squamose, with 7–19 setae on the border. Posterior edge of mesosternal carina with a strong median tooth and some tiny and irregular teeth. Metasternum with no carina.

Elytra elongated and ovoid (length/width ratio 1.51), wider in females than in males (female/male elytral width ratio 1.11) (Fig. 1). The maximum width reached at mid-elytral level (in males) or slightly anterior to mid-elytral level (in female). Lateral edges distinctly sclerotized. Anterolateral sides inconspicuously impressed. Epipleura shallow, narrowing towards elytral apex. Humerus obtuse. Disc convex, shiny, with short and regularly distributed hairs and covered with many impressed punctures. Scutellum well-developed, large, and triangular (length 0.22 mm, width 0.50 mm). Elytral apex rounded.

Legs long and slender, with basally thickened femora (Fig. 1). Tibiae somewhat curved, moderately thickening apically. Meso- and metatibiae with some fine spines. In both sexes, protarsi with four tarsomeres each. The first protarsal segment almost three times as wide as long. In both sexes, this segment is shorter than



Figs 3–10. *Pholeuonopsis* (*P.*) *zlatiborensis* sp. n.: 3 – paratype female, mesosternal carina (lateral view); 4 – holotype male, abdominal sternite IX (urite); 5 – holotype male, aedeagus with copulatory piece (dorsal view); 6 – holotype male, left paramere apex (dorsal view); 7 – paratype female, right gonostylus (dorsal view); 9 – paratype female, spermatheca. *Pholeuonopsis* (*P.*) *magdelainei* Jeannel from the Mladenovića Megara Cave, village of Stapari, nr. Užice: 8 – topotype female, right gonostylus (dorsal view); 10 – topotype female, spermatheca. Scales 0.1 mm.

segments II + III together. Tarsal claws long, slender, and sharply pointed.

Abdominal sternite IX (urite) well-developed, oval (Fig. 4).

Male genitalia (Figs 5, 6). Aedeagus (Fig. 5) medium-sized, well-sclerotized, and stout. Penis with a strong bulbous. Median lobe somewhat dilated distally, then narrowing apically, longer than parameres. Apex prominent and sharp dorsally (Fig. 5). Each paramere with three apical setae. The two inner setae closer than the apical and intermedian seta (Figs 5, 6). Inner sac elongated and tubular. Copulatory piece consisting of two basal well-sclerotized curved structures and two anterior weakly sclerotized bands (Fig. 5).

Female genitalia (Figs 7, 9). Gonostyli elongated, almost straight. Each stylus with a single apical seta, three inner setae, and one outer seta (Fig. 7). Three inner setae close-set, of which seta III is somewhat distanced. Outer seta situated up to the level of the second inner seta. Spermatheca small, unique, kidney-shaped, strongly curved (Fig. 9), weakly sclerotized.

Type material. **Holotype (male):** Ršumska (= Markova) Pećina Cave, village of Gornji Ljubiš, Mt. Zlatibor, W Serbia (19°51' E, 43°37' N), 4.VIII.2004, leg. S.B. Čurčić et N.B. Čurčić; **paratypes:** female, same data as holotype; male, same locality as holotype, 1.V.2004, leg. S.B. Čurčić. All type specimens are deposited in collection of the Centre for Biospeleology of Southeast Europe, Belgrade, Serbia (SBSEE-06/15-17).

Etymology. After Mt. Zlatibor (Western Serbia), its terra typica.

Differential diagnosis. The new species clearly differs from all its congeners. The species morphologically most similar to it are *Pholeuonopsis* (*P.*) *magdelainei* and *P.* (*P.*) *cvijici* from underground habitats in Serbia. However, there are numerous distinctions between the three analyzed species, which are presented below. Thus, *Pholeuonopsis* (*P.*) *zlatiborensis* sp. n. clearly differs from *P.* (*P.*) *magdelainei* in the presence/absence of eyes (reduced, spot-like vs. absent); antennal length (extending beyond the mid-elytra level in both sexes vs. not extending beyond the mid-elytra level in females and reaching two thirds of elytra in males); shape of the lateral and basal margins of pronotum (lateral pronotal margins sigmoidly-shaped, but almost rounded; basal margin somewhat convex medially vs. lateral pronotal margins sigmoidly-shaped, but almost angulose; basal margin distinctly convex medially); form of the posterior pronotal angles (short vs. elongate, well-extending on elytra); size of the scutellum [large (length 0.22 mm; width 0.50 mm) vs. small (length 0.15 mm; width 0.50 mm)]; shape of the mesosternal carina (high vs. low); shape of the elytra [ovoid (length/width ratio 1.51) vs. oval (length/width ratio 1.44)]; position of parameral setae [two close-set inner setae vs. two close-set upper setae (JEANNEL, 1924)]; form of the gonostyli (almost straight vs. clearly curved); position of the gonostyl setae [three close-set inner setae, of which seta III is some-

what distanced; outer seta up to the level of the second inner seta vs. three inner setae, with seta III well distanced; outer seta at the level of the second inner seta (Fig. 8)]; and shape of the spermatheca [less curved vs. more curved (Fig. 10)] (JEANNEL, 1924; present study).

Further, *Pholeuonopsis* (*P.*) *zlatiborensis* sp. n. also differs from *P.* (*P.*) *cvijici* in body shape [less elongated (body length/width ratio 2.36) vs. more elongated (body length/width ratio 2.44)]; presence/absence of eyes (reduced, spot-like vs. absent); antennal length (extending beyond the mid-elytra level in both sexes vs. extending over a mid-third of the elytra in both sexes); shape of the lateral and basal margins of pronotum [lateral pronotal margins sigmoidly-shaped, but almost rounded; basal margin somewhat convex medially vs. lateral pronotal margins sigmoidly-shaped; basal margin straight (in males) or convex (in female)]; shape of the mesosternal carina (high vs. low); shape of the elytra [ovoid (length/width ratio 1.51) vs. elongately ovate (length/width ratio 1.49)]; form of the urite (oval vs. subovate); form of the aedeagus (thickened distally vs. not thickened distally); length of the parameres (slightly shorter than median lobe vs. much shorter than median lobe); position of parameral setae (two close-set inner setae vs. all setae equidistant); form of the copulatory piece (two basal short curved structures vs. two median interrupted long structures); form of the gonostyli (almost straight vs. clearly curved); position of the gonostyl setae (three close-set inner setae, of which seta III is slightly distanced; outer seta up to the level of the second inner seta vs. three inner setae, with seta III well distanced; outer seta somewhat lower to the level of the second inner seta); and shape of the spermatheca (less curved vs. more curved, narrowing apically) (ČURČIĆ & BRAJKOVIĆ, 2002; present study) (Figs 1–10).

Remarks. The new troglobitic beetle described herein is presently known from a single cave – the Ršumska (= Markova) Pećina Cave. This underground habitat is situated in the village of Gornji Ljubiš, about 4 km west of the Užice-Podgorica road. It is about 500 m long and lies at 860 m a.s.l. (PETROVIĆ, 1976). The specimens of the new species were collected under stones and from modified pitfall traps in the anterior part of the cave. We noticed that the new species prefers wet cave walls and floor around the bed of the Ljubiška Reka River, which runs through the cave. This beetle feeds on filtrated organic matter found on wet cave walls and floor.

Apart from *P.* (*P.*) *zlatiborensis* sp. n., the Ršumska (= Markova) Pećina Cave is also inhabited by *Rascioduvalius zlatiborensis* S. B. Čurčić, Brajković et B. Čurčić, 2005 (Coleoptera, Carabidae), *Quediuss (Microsaurus) mesomelinus* (Marsham, 1802), and *Atheta spelaea* (Erichson, 1840) (Coleoptera, Staphylinidae), some springtails (Collembola, Onychiuridae), and dipterans (ČURČIĆ et al., 2005).

Distribution. The new species probably belongs to an old phyletic lineage of mesogeid origin. This species is both relict and endemic to Serbia and the Balkan Peninsula, like other known *Pholeuonopsis* species inhabiting some cave and endogean habitats in the western part of the Balkan Peninsula (GUÉORGUIEV, 1977).

Key to the species of the genus *Pholeuonopsis* from Serbia

- 1 Eyes absent; mesosternal carina low; gonostyli clearly curved; spermatheca more curved 2
- Eyes reduced, spot-like; mesosternal carina high; gonostyli almost straight; spermatheca less curved *P.* (*P.*) *zlatiborensis* sp. n.
- 2 Body less elongated; posterior pronotal angles elongated, well extending on elytra; scutellum small; elytra oval; two parameral setae upper and close-set; outer gonostyl seta at the level of the second inner seta *P.* (*P.*) *magdelainei* Jeannel, 1924
- Body more elongated; posterior pronotal angles short; scutellum large; elytra elongately ovate; all parameral setae equidistant; outer gonostyl seta somewhat lower to the level of the second inner seta *P.* (*P.*) *cvijici* Čurčić et Brajković, 2002

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