

# A NEW SPECIES OF THE GENUS *ACHERONIOTES* LOHAJ & LAKOTA FROM LJUBIŠNJA MTS., BOSNIA & HERZEGOVINA (COLEOPTERA: CARABIDAE: TRECHINI)

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*Acheroniotes golovranicensis* sp. nov. from Golovranica pit (Ljubišnja mountain range, Radovina, SE Bosnia & Herzegovina), the second known species of the genus, is described, illustrated and compared with the congeneric species *Acheroniotes mlejneki* Lohaj & Lakota, 2010. This new species is characterised by the different shape of pronotum, wider head and by the shape of the apical part of the aedeagus. Data on the distribution and the ecology of this remarkable species are also provided.

**Key words:** *Acheroniotes golovranicensis* sp. nov., subterranean environment, Coleoptera, Carabidae, Trechinae, taxonomy, Golovranica pit, Ljubišnja Mts., Radovina Mts., Bosnia & Herzegovina

Lohaj, R. & Mlejnek, R.: Nova vrsta roda *Acheroniotes* Lohaj & Lakota s planine Ljubišnja, Bosna i Hercegovina (Coleoptera: Carabidae: Trechini). *Nat. Croat.*, Vol. 21, No. 1, 155–163, 2012, Zagreb.

U radu se opisuje *Acheroniotes golovranicensis* sp. nov. iz jame Golovranica (masiv planine Ljubišnje, Radovina, II Bosna i Hercegovina), druga poznata vrsta tog roda te se uspoređuje kongenerična vrsta *Acheroniotes mlejneki* Lohaj & Lakota, 2010. Novu vrstu odlikuje različiti oblik pronotuma, šira glava i oblik vršnog dijela muških genitalija. Također rad donosi podatke o rasprostranjenosti i ekologiji ove neobične vrste.

**Ključne riječi:** *Acheroniotes golovranicensis* sp. nov., podzemlje, Coleoptera, Carabidae, Trechinae, taksonomija, jama Golovranica, planina Ljubišnja, planina Radovina, Bosna i Hercegovina

## INTRODUCTION

Ten genera of aphaenopsoid Trechini beetles of the former »série phylétique d'*Aphaenops*« *sensu* JEANNEL (1922, 1928, 1930) and CASALE & LANEYRIE (1982) are currently known from the territory of the Dinaric range: *Aphaenopsis* G. Müller, 1913, *Scotoplanetes* Absolon, 1913, *Adriaphaenops* Noesske, 1928, *Dalmataphaenops* Monguzzi, 1993 (*Biokovoaphaenopsis* Jalžić, 1993, junior synonym), *Albanotrechus* Casale & Guéorguiev, 1994, *Croatotrechus* Casale & Jalžić, 1999, *Minosaphaenops* Quéinnec 2008, *Derossiella* Quéinnec, 2008, *Jalzicaphaenops* Lohaj & Lakota, 2010 and *Acheroniotes* Lohaj & Lakota, 2010. All genera are endemic, inhabiting subterranean environments (so far. they are known only from caves and pits) along the whole Dinaric range, from

northern Croatia (*Jalzacaphaenops*, *Croatotrechus*) to northern and central Albania (*Adriaphaenops*, *Albanotrechus*) (LOHAJ & LAKOTA, 2010).

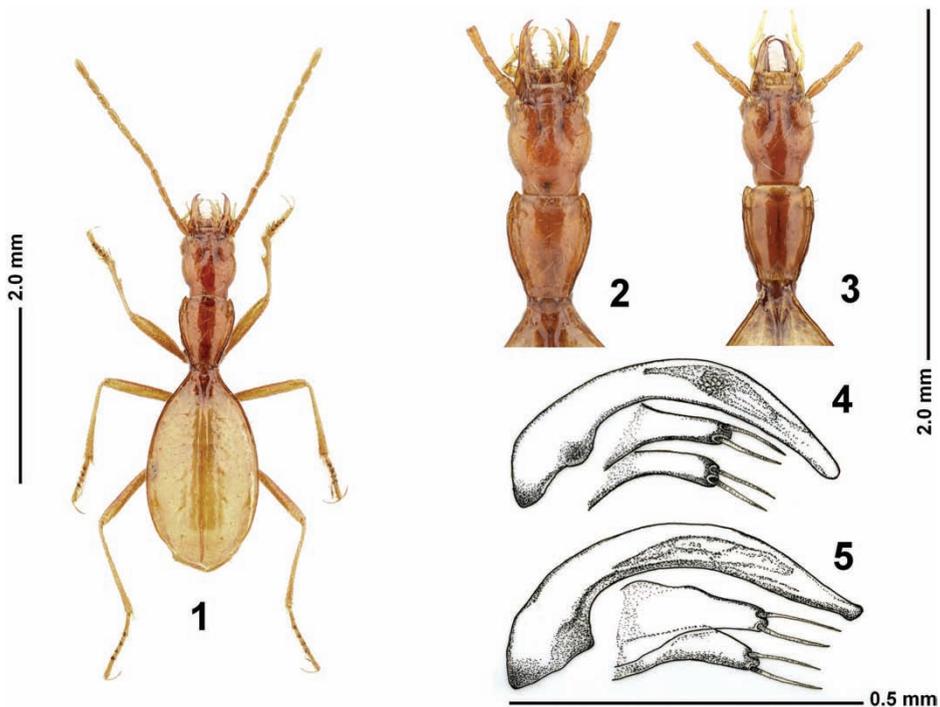
The genus *Acheroniotes* was described from a set of about 90 specimens collected in four deep pits located in the Prekornica Mountains, central Montenegro by the second author (RM) and so far known only from this mountain range. During speleological and biospeleological research in the Ljubišnja mountain range (Bosnia & Herzegovina and Montenegro) undertaken by members of the Czech Speleological Society in autumn 2009, a second undescribed species of this genus was discovered. This new species is described below.

## MATERIAL AND METHODS

The morphological features of the beetles were examined using an Olympus SZ 60 stereoscopic microscope. Aedeagi were dissected, cleaned and mounted in Euparal® on transparent slides. Drawings of aedeagi were made using a Leica DM 2500 transmitted-light microscope fitted with a drawing tube.

Abbreviations used in the text are as follows:

TL: total body length (measured from the anterior margin of clypeus to the apex of elytra)



**Fig. 1.** *Acheroniotes golovranicensis* sp. nov., habitus, **Figs. 2 and 3.** *Acheroniotes* sp., detail of the head and pronotum, **Fig. 2.** *A. golovranicensis* sp. nov., **Fig. 3.** *A. mlejneki*, **Figs. 4 and 5.** aedeagus, left lateral view, **Fig. 4.** *A. golovranicensis* sp. nov., **Fig. 5.** *A. mlejneki*.

AL: antennal length (measured from the base of antennal scape to the apex of terminal antennal segment)

HL: head length (measured from the base of neck to the front margin of the labrum)

HW: maximum width of head

PL: pronotum length (measured along median line)

PW: maximum width of pronotum

EL: elytral length (measured along sutura from the elytral base to the apex)

EW: maximum width of elytra

Forward slash indicates separate labels.

CRL – private collection of Roman Lohaj, Košice, Slovakia

CRM – private collection of Roman Mlejnek, Pardubice, Czech Republic

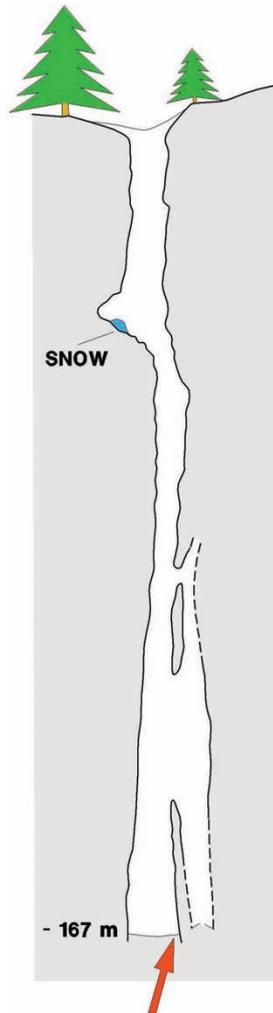


Fig. 6. Topographical scheme of Golovranica pit. Red arrow marks the position of finding of *Acheroniotes golovranicensis* sp. nov.



Fig. 7. Entrance of Golovranica pit.



Fig. 8. Bottom of Golovranica pit, place of finding of *Acheroniotes golovranicensis* sp. nov.

## RESULTS

### Genus *Acheroniotes* Lohaj & Lakota, 2010

*Acheroniotes* Lohaj & Lakota, 2010: 86, by monotypy; type species: *Acheroniotes mlejneki* Lohaj & Lakota, 2010: 87.

#### *Acheroniotes golovranicensis* sp. nov.

(Figs. 1, 2, 4)

**Material examined:** Holotype male labelled as follows: »BOSNIA, Foča env., Radovina Mountains. near Ljubišnja Mountains., Ždrebeće polje, Golovranica (abyss), (170 meters deep), ca 1690 m a.s.l. 21.09.2009, R. Mlejnek lgt. (white label, printed) / HOLOTYPE *Acheroniotes golovranicensis* n.sp. R. Lohaj & R. Mlejnek det. 2011 (red label, printed)« (CRM).

**Additional specimens examined:** Holotype and 20 Paratypes of *Acheroniotes mlejneki* (Figs. 3, 5): »Montenegro, Prekornica Mountains., Kamenik Mt. env., Konjič hill, Alexander the Great (abyss), (–150 m) (HT, PTT), Montenegro, Prekornica Mountains, Kamenik Mt. env., Markovički katun env., Borova jama 1 (abyss), (–40 m), Borova jama 2 (abyss), (–50 m), Jamski katun env., Snežna jama (abyss), (–30 m), all R. Mlejnek lgt. (PTT), (CRL, CRM).

#### Diagnosis.

A medium-sized trechine beetle with aphaenopsoid features: head and pronotum elongate; elytra ovoid, strongly narrowed at the base, obviously wider than head and pronotum; body depigmented, strongly flattened (fig. 1). This new species is characterised by the different shape of pronotum, wider head and by the different shape of the apical part of the aedeagus.

#### Description.

TL 4.26 mm (male holotype). Colour yellowish-red, head, pronotum and base of elytra darker, antennae, mandibles and palpi pale-yellow. Head with distinct isodiametric microsculpture, microsculpture of pronotum and elytra with isodiametric and transverse meshes; elytra shiny. Head and pronotum covered with short and sparse pubescence, elytra glabrous (Fig. 1).

Head large and elongate, almost as long and wide as pronotum, index HL/HW 1.26, widest in the middle; neck very distinct. Frontal furrows incomplete, deep, slightly exceeding half of length of head, anteriorly parallel-sided, before the level of anterior supraorbital setae strongly divergent. Dorsal part of head covered with relatively long pale pubescence, denser anteriorly than posteriorly, genae sparsely pubescent. Head with two pairs of long supraorbital setae, anterior pair before middle of head, near furrows, posterior pair at hind part of head near the neck. Eyes absent. Mandibles long and slender, acutely pointed, the right one with simple small basal teeth. Antennae long and slender, covered with dense ducebent pubescence, antennomere 3 and 11 longest, scape and antennomeres 5–10 nearly equally long. AL 2.60 mm, lengths of antennal segments (from scape to terminal segment): 0.22, 0.20, 0.27, 0.24, 0.23, 0.23, 0.23, 0.20, 0.23, 0.22 and 0.30 mm.

Pronotum narrower, elongate, on base distinctly narrower than on anterior margin, index PL/PW 1.15. Propleura visible from dorsal aspect only in basal third.

Anterior angles of pronotum distinctly protruding, pointed, posterior angles obtuse. Lateral furrows developed, deep, with two pairs of setae; anterolateral setae situated in the anterior fifth, basolateral pair before hind angles. Pronotum dorsally very sparsely pubescent, setae short, suberect; median furrow weakly marked, visible in the middle part of pronotum.

Elytra subovate elongate, with maximum width behind middle, index EL/EW 1.83. Basal part strongly narrowed, pedunculate; scutellum small, flat; single pair of basal scutellar setiferous pores present. Elytral striae vanished, reduced to rows of foveae. Elytral chaetotaxy formed by long, erected macrochetæ and microchetæ. Macrochetæ 1 and 2 located in basal half of elytral length, macrocheta 3 in the middle of elytral length. Position of setae: four discal and one preapical macrochetæ present in putative stria 3, one microcheta located before macrocheta 1, two microchetæ between macrochetæ 1–2, one – two microchetæ between macrochetæ 2–3, one microcheta located between macrochetæ 3–4, preapical seta shorter and thinner. Seven (left elytron) – nine (right elytron) microchetæ present in putative stria 2, seven (left elytron) – eight (right elytron) in stria 5. Umbilicate series consists of eight setae on both elytra, humeral group of umbilicate pores aggregated, all pores regularly situated along lateral elytral gutter, setae 2 and 8 longest. Ventrites 4–6 very sparsely pubescent, each with five pairs of setae on their posterior margins. Anal ventrite with two pairs of setae (male holotype), outer pair longer.

Legs long, slender, densely pubescent, pro- and mesotarsi short. First two tarsomeres of protarsi distinctly dilated and toothed at their internal margins. Tarsal claws very long and slender, pointed at apex. Metatrochanters reniform, each with one long and 4–5 shorter setae.

Aedeagus (Fig. 4) 0.46 mm long, elongate, slender, moderately curved, with basal part of medial lobe wider, narrowed towards apex. Endophallus lacking sclerified internal structures. Apex obtuse, widely rounded dorsally. Parameres slender, length of parameres about half of length of aedeagus, each paramere with two apical thick setae.

Female unknown.

### Etymology.

Referred to the type locality of the species, the Golovranica pit.

### Distribution.

So far known only from the type locality, located in Bosnia & Herzegovina.

### Topographic location and ecology.

The Ljubišnja mountain range, with its highest peak Dernjačišta (2238 m a.s.l.), is situated in southeastern Bosnia & Herzegovina and western Montenegro (the larger part of the range belongs to the territory of Montenegro), north of Tara River and the Durmitor mountains. The southern part of these mountains, divided from main ridge by Konsko polje, is formed by a lower range called Radovina (highest peak, Velika Radovina, 1992 m a.s.l.).

Pit Golovranica (Fig. 6, altitude of entrance 1690 m) is situated in the Radovina mountains, in what is called Ždrebeće polje. Entrance of the pit, ca 7 x 7 m (Fig. 7), is formed by a vertical tunnel down to the depth of 38 m, where it continues with a ca 10 m long steep slope and a final vertical shaft down to a total depth of 167 m.

A small snow patch, ca 2 x 3 m, was observed on the slope. The bottom of the pit (ca 11 x 7 m) was at the time of exploration (on 21th of September 2009) filled by mud and a shallow lake with organic debris containing branches and trunks of trees, needles, plant remnants etc. It is very probable that in spring the lower part of the pit is filled by water from melted snow and rain, which is indicated by the presence of mud over the bottom. The only individual of the new species here described was collected at the bottom of the pit, in rock debris with wet, cold soil near the wall (Fig. 8). Subterranean conditions were the same as those observed for *Acheroniotes mlejneki*, the type species of *Acheroniotes* (see LOHAJ & LAKOTA, 2010, p. 91). Together with *Acheroniotes golovranicensis* sp. nov. there were also other arthropods present, such as the carabid beetles *Trechus priapus priapus* K. Daniel, 1902, *Nebria dahli montenegrina* Apfelbeck, 1904 and *Nebria aetolica* Apfelbeck, 1901 (sensu lato), staphylinid beetles (*Lesteva* sp., very abundant), as well as a specialized pseudoscorpion species of the genus *Neobisium*.

## DISCUSSION

Intensive biospeleological research performed in the Dinaric karst during the last twenty years led to the discovery of many new subterranean taxa of trechine beetles, including not only species but also genera (MONGUZZI, 1993; CASALE & GUÉORGUIEV, 1994; CASALE & JALŽIĆ, 1999; QUÉINNEC, 2008; QUÉINNEC & PAVIČEVIĆ, 2008; QUÉINNEC *et al.*, 2008; LOHAJ & JALŽIĆ, 2009; LOHAJ & LAKOTA, 2010; LAKOTA *et al.*, 2010).

The recently described genus *Acheroniotes* is morphologically close to the genera *Minosaphaenops* and *Adriaphaenops*. It can easily be distinguished from both by the presence of a pair of long posterior pronotal setae (missing in *Minosaphaenops* and *Adriaphaenops*) and the presence of two pairs of long setae on the last abdominal segment in males and females vs. a different number (one pair in males and two pairs in females) of setae in *Minosaphaenops* and *Adriaphaenops*. *Acheroniotes* and *Minosaphaenops* have very similar elytral chaetotaxy, formed by macro- and microchaetae, while *Adriaphaenops* has pubescent elytra<sup>1</sup>. Possible close phylogenetical affinities of these three genera were also indicated by the very similar shape of the aedeagus, with narrow and elongated median lobe and parameres both with two thick apical setae. The species of the two aphaenopsoid genera *Scotoplanetes* and *Aphaenopsis* have a more robust median lobe, with a longer apex, and parameres with 4–5 apical setae in *Scotoplanetes* and 5–6 in *Aphaenopsis*. The genera *Dalmataphaenops*, *Derosiella* and especially *Croatotrechus* show peculiar shapes of aedeagi, different from those of the above mentioned taxa. *Croatotrechus* (Croatia, Ogulin) and *Jalzicaphaenops* (Croatia, Rakovica, the male features of this genus are unknown) are the northernmost distributed genera of the group. According to CASALE & JALŽIĆ (1999: 141), male genitalia in Trechinae are highly phylogenetically informative and conservative, because they are not, or only very slightly, affected by selective environmental pressures. Observed different characters can indicate that this lineage of Dinaric subterranean Trechini is not monophyletic (i.e.: »northern« vs. »southern« genera). On the other hand, based on recent biomolecular studies, the common

<sup>1</sup> Note: For the identification of all so far known ten aphaenopsoid trechine genera of Dinaric range, see LOHAJ & LAKOTA (2010: 94).

monophyletic origin was confirmed for the three Pyrenean subterranean trechine genera, i.e. *Aphaenops* Bonvouloir, 1862, *Hydraphaenops* Jeannel, 1926 and *Geotrechus* Jeannel, 1919 (FAILLE *et al.*, 2010). Representatives of these genera are very different to each other in external features, and have rather variable shapes of median lobe of aedeagus, with different numbers of setae on parameres. The taxonomy of Dinaric Trechini (together with other Balkan and Alpine representatives) needs to be clarified by careful phylogenetic analysis, complemented by genetic studies.

*Acheroniotes golovranicensis* sp. nov. is strikingly similar to the type species of the genus, *Acheroniotes mlejneki* Lohaj & Lakota, 2010. However, these two species can be easily separated using the following key:

**Key for identification of the two species of *Acheroniotes* known so far:**

- 1(2) Pronotum wider, index PL/PW 1.15, in anterior part distinctly widened, with maximum width in anterior third, sides slightly rounded. Head wider, index HL/HW 1.26 (Fig. 2). Aedeagus in lateral view with apex widely rounded (Fig. 4). 4.26 mm. Ljubišnja Mts., Bosnia & Herzegovina..... *Acheroniotes golovranicensis* sp. nov.  
 2(1) Pronotum narrower, index PL/PW 1.24 – 1.43, with maximum width in anterior sixth, sides almost straight. Head narrower, index HL/HW 1.07–1.24 (Fig. 3). Aedeagus in lateral view before apex slightly sinuated, tip markedly narrowed (Fig. 5) 3.62–4.55 mm. Prekornica Mts., Montenegro..... *Acheroniotes mlejneki* Lohaj & Lakota, 2010

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