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TWO NEW GENERA AND SPECIES OF APHAENOPSOID CAVE-DWELLING TRECHINI BEETLES FROM CROATIA AND MONTENEGRO (COLEOPTERA: CARABIDAE: TRECHINAE)

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Lohaj, R. & Lakota, J.: Two new genera and species of aphaenopsoid cave-dwelling Trechini beetles from Croatia and Montenegro (Coleoptera: Carabidae: Trechinae). Nat. Croat., Vol. 19, No. 1, 77–97, 2010, Zagreb.

Two new genera of cave-dwelling aphaenopsoid Trechini beetles, *Jalzicaphaenops* gen. nov. *poljaki* sp. nov. from Dumenčića špilja (cave) near Rakovica (central Croatia) and *Acheroniotes* gen. nov. *mlejneki* sp. nov. from pits on Prekornica mountain range (central Montenegro) are described and illustrated. Both new genera are characterized by the presence of posterior pronotal setae, *Jalzicaphaenops* gen. nov. also by the presence of a pair of setae on pronotal disc. The key to the identification of all hitherto known aphaenopsoid Trechini genera from Dinarids is given. Data on the distribution and ecology of these remarkable genera, complemented with descriptions of the type localities are also provided.

Key words: *Jalzicaphaenops* gen. nov. *poljaki* sp. nov., *Acheroniotes* gen. nov. *mlejneki* sp. nov., new genus, new species, subterranean environment, Coleoptera, Carabidae, Trechinae, taxonomy, Prekornica Mts., Croatia, Montenegro

Lohaj, R. & Lakota, J.: Dva nova roda i vrste afenopsoidnih kornjaša iz Hrvatske i Crne Gore (Coleoptera: Carabidae: Trechinae). Nat. Croat., Vol. 19, No. 1, 77–97, 2010, Zagreb.

U radu se opisuju i ilustriraju dva nova roda špiljskih afenopsoidnih kornjaša iz skupine Trechini, *Jalzicaphaenops* gen. nov. *poljaki* sp. nov. iz Dumenčića špilje kraj Rakovice (središnja Croatia) i *Acheroniotes* gen. nov. *mlejneki* sp. nov. iz jama s masiva Prekornice (središnja Crna Gora). Oba roda značajna su po posteriornim pronotalnim čekinjama, a *Jalzicaphaenops* gen. nov. također i po paru čekinja na pronotalnom disku. Daje se ključ za determinaciju svih dosad poznatih rodova trehina s Dinarida. Također se daju podaci o rasprostranjenosti i ekologiji ovih izuzetnih rodova, uz opise tipskih lokaliteta.

Ključne riječi: *Jalzicaphaenops* gen. nov. *poljaki* sp. nov., *Acheroniotes* gen. nov. *mlejneki* sp. nov., novi rod, nova vrsta, podzemlje, Coleoptera, Carabidae, Trechinae, taksonomija, planina Prekornica, Hrvatska, Crna Gora

INTRODUCTION

Up to the end of the 1980's, only three genera of aphaenopsoid Trechini beetles of the former »série phylétique d'*Aphaenops*« *sensu* JEANNEL (1922, 1928, 1930), CASALE & LANEYRIE (1982), were known from the territory of the Dinaric range: *Aphaenopsis* G. Müller, 1913 – with two species from central Bosnia (Bjelašnica, Treskavica and Visočica Planina Mts.); *Scotoplanetes* Absolon, 1913 with one species from southern Herzegovina (description of the second species, *S. aquacultor* Lakota *et al*. from Montenegro is in press, this issue of Nat. Croat.) and *Adriaphaenops* Noesske, 1928 – with currently seven described species from Herzegovina and Montenegro (PRETNER, 1959; PAVIĆEVIĆ, 1990, 2001; QUÉINNEC, 2008; QUÉINNEC & PAVIĆEVIĆ, 2008; QUÉINNEC *et al*., 2008). *Aphaenopsis* G. Müller, *Scotoplanetes* Absolon and *Adriaphaenops* Noesske – morphologically considerably different taxa – were unified by PRETNER (1959) into one heterogenous genus *Aphaenopsis* G. Müller. This concept has been followed also by CASALE & LANEYRIE (1982), but refused by SCIAKY & VIGNA TAGLIANTI (1980), MONGUZZI (1993) and CASALE & GUÉORGUIEV (1994) who recognized them as separate genera. This has been accepted by DROVENIK & PEKS (1994), MORAVEC *et al*. (2003) and QUÉINNEC (2008).

At the beginning of the 1990´s, two new monotypic genera were described: *Dalmataphaenops* Monguzzi, 1993 (*Biokovoaphaenopsis* Jalžić, 1993, junior synonym) from Biokovo Mt., central Dalmatia, and *Albanotrechus* Casale & Guéorguiev, 1994 from central Albania. Recently, two other new also monotypic genera have been described: *Minosaphaenops* Quéinnec – from Krivošje Mt., Montenegro and *Derossiella* Quéinnec from Mosor Mt., Croatia (QUÉINNEC, 2008). The latter species of the genus *Minosaphaenops* Quéinnec was described from Glogova jama pit, Sniježnica Mt., southeastern Croatia (LOHAJ & JALŽIĆ, 2009).

Biospeleological research done by Branko Jalžić (Croatian Biospeleological Society) in Dumenčića špilja cave (Rakovica near Slunj, central Croatia) led to the find of one female of blind Trechine beetle, representing an undescribed genus which is now described here below. Dumenčića špilja cave is, except for other troglobiont fauna, the type locality of *Duvalius* (*Neoduvalius*) *opermanni* Scheibel, 1933 (PRETNER, 1973; BEDEK *et al*., 2006; GOTTSTEIN MATOČEC *et al*., 2002). This discovery has confirmed the presumption that also in well-known, biospeleologically well-researched areas it is still possible to find new taxa. In fact, new taxa of cave dweller Trechine species have been recently also described from other known caves: *Adriaphaenops kevser* Quéinnec, Pavićević & Ollivier, 2008, from Vilina pećina cave on Lebršnik Mt. in the northeastern Herzegovina, and *Adriaphaenops perreaui* Quéinnec & Pavićević, 2008, from Pećina u Mravinjac on Bjelašnica Mt. near Popovo polje (Trebinje), in the southeastern Herzegovina. Another still undescribed species of the genus *Adriaphaenops* was found in the Novakova pećina near Nevesinje, Herzegovina, which is the type locality of *Anthroherpon ganglbaueri* (Apfelbeck, 1894) (LOHAJ, DUNAY & ČEPLÍK lgt., unpublished).

Speleological and biospeleological survey of the newly unearthed pits on Prekornica Mountain range, north of Podgorica in central Montenegro, by members of the Czech Speleological Society during years 2006, 2007 and 2009, led to the discovery of the second new, remarkable cave dweller genus of Trechine beetle, described in this contribution.

MATERIAL AND METHODS

The morphological structures of the beetles were examined using the stereoscopic microscopes Olympus SZ 60 and LEICA S8 APO. Photos were taken using the stereoscopic microscope LEICA S8 APO, with attached digital camera NIKON COOLPIX® E 4500. Male and female genitalia were dissected, cleansed and mounted in Euparal® on transparent slides under the examined specimens. Photos of genitalia were taken using microscope Leitz Ergolux with attached digital camera NIKON COOLPIX® E 4500 and were completed using Helicon Focus software program.

Twenty specimens of both sexes from the type series of *Acheroniotes* gen. nov. *mlejneki* sp. nov. (eight exs. from Alexander the Great pit, seven exs. from Borova jama 2 pit, four exs. from Snežna jama pit and one ex. from Borova jama 1 pit) were measured to obtain head, pronotal and elytral indexes.

The following species have been also studied:

Adriaphaenops kevser Quéinnec, Pavićević & Ollivier, 2008: one female, Herzegovina, Lebršnik Mts., Vilina pećina, 10.8.2009, D. Čeplík lgt., CJL.

Adriaphaenops zupcense zupcense (Pavićević, 1990): one male and one female, Montenegro, Durmitor, Zupci env., Pećina u Zupcima, ca 2100 m, male 19.6.1998 – 29.6.2001 (prolonged traps), female individually, 16.8.2006, J. Lakota lgt. CJL.

Aphaenopsis apfelbecki (Ganglbauer, 1891): three males and four females, Bosnia, Sarajevo, Bjelašnica planina Mt., Gornja Bioča, Megara pećina cave, 24.9.2004, 20.7. 2006, individually, traps, D. Čeplík, G. Gunay, R. Lohaj lgt., CDC, DGD, CRL.

Aphaenopsis pfeiferi pfeiferi (Apfelbeck, 1908): one male, Bosnia, Sarajevo, Treskavica planina Mts., Insurgenten Höhle cave, 28.5.2005, D. Čeplík lgt. CRL.

Croatotrechus tvrtkovici Casale & Jalžić, 1999: one female, Croatia, Gorski kotar, Bjelolasica, Vrelo, Jasenak, Mačkova špilja, 17. 06. 2009, leg. A. Kirin. CNHM.

Dalmataphaenops chiarae Monguzzi, 1993: two males, Dalmatia, Biokovo Mt., Sveti Jure peak env., abyss, 1480 m a.s.l., 14.6.1999, R. Mlejnek lgt. CJL, CRL.

Derossiella nonveilleri Quéinnec, 2008: one male, Croatia, Split, Mosor Mt., Tukići, Kotlenice, Bradarića staje, Drinovčuša jama, 1.8.2007, B. Jalžić lgt., CNHM.

Minosaphaenops croaticus Lohaj & Jalžić, 2009: holotype male, Croatia, Konavle, Kuna, Sniježnica Mt., Glogova jama pit, 28.06.2000, lgt. B. Jalžić, CNHM.

Minosaphaenops ollivieri Quéinnec, 2008: paratypes two females, Montenegro, Orjen Mt., Jasenov Do env., Jasenovska jama (pit), -130 m, 5.6.2004 and 9.5.2005, R. Mlejnek lgt., CJL, CRL.

Scotoplanetes aquacultor Lakota *et al.*, in press (this issue): holotype male and two paratypes, male and female, Montenegro, Dvrsno (Dragaljsko) polje plateau, Umac env., Vodna jama pit, 615 m a. s. l., (-95 m), 10.6.2004 and 13.8.2005, R. Mlejnek, P. Zajíček lgt., CJL, CRL.

Scotoplanetes arenstorffianus arenstorffianus Absolon, 1913: two females, Bosna and Herzegovina, Popovo polje, Vjetrenica pećina cave, Radovanovićev kanal, 06.09. 2001, leg. B. Jalžić, CNHM, CRL, one male, idem, Gornji Absolonov kanal gallery, 18.8.2004, lgt. J. Bedek, CNHM, one male, idem, Leopardov kanal, 10.9.2007, leg. B. Jalžić, CNHM.

Scotoplanetes arenstorffianus weiratherianus Noesske, 1928: holotype female, »Mrzine-Höhle bei Grebci, Herzegowina, Weirather, 22. Dezember 1913, ex. coll. Noesske« (Collection Staatliches Museum für Tierkunde, Dresden, Germany).

Abbreviations used in the text are as follows:

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

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 the 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 the sutura from the elytral base to the apex)

EW: maximum width of elytra

Forward slash indicates separate labels.

Codens of the museums and private collections:

CACR – collection of the Caves Administration of the Czech Republic, Blansko, Czech Republic

CNHM – collection of the Croatian Natural History Museum, Zagreb, Croatia (B. Jalžić)

NMNHS – collection of the Natural Museum of Natural History Sofia, Bulgaria (B.Guéorguiev)

NMP – collection of the National Museum Prague, Czech Republic (J. Hájek)

CAC – private collection of Achille Casale, Torino, Italy

CDC – private collection of Dávid Čeplík, Košice, Slovakia

CGD – private collection of Gejza Dunay, Kráľovce, Slovakia

CJL – private collection of Ján Lakota, Ružomberok, Slovakia

CJP – private collection of Jaroslav Prouza, Hradec Králové, Czech Republic

CRL – private collection of Roman Lohaj, Košice, Slovakia

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

CVZ – private collection of Vladimír Zieris, Pardubice, Czech Republic

Classification of the Trechini used here follows MORAVEC *et al*. (2003) and QUÉINNEC (2008).

RESULTS

Genus *Jalzicaphaenops* gen. nov.

Type species: *Jalzicaphaenops poljaki* sp. nov., by monotypy

Description.

Medium-sized, apterous, depigmented trechine with aphaenopsoid characters: narrow and elongated head and pronotum with oval, on basis strongly narrowed

elytra, distinctly wider than fore-body, widest in the middle, body strongly flattened dorsoventrally. Head covered with very sparse pubescence, pronotum and elytra glabrous. Legs and antennae very long and slender, densely pubescent.

Head large sized, elongate, nearly parallel-sided, slightly wider than pronotum, constricted behind temporae, with distinctly marked neck. Eyes totally absent. Frontal furrows deeply impressed, complete, slightly divergent posteriorly, reaching posterior pair of supraorbital setae. Mandibles very long and slender, right one with acute tooth. Clypeus with two pairs of setae, labrum with three pairs. Mentum imperfectly fused with submentum, without median teeth, submentum with two pairs of setae. Antennae long and slender, covered with dense pubescence, antennomere 3 and 11 the longest, antennomere 5–10 nearly equally long.

Pronotum narrow and long, completely glabrous, median furrow distinct and deep, with three pairs of setae (two at lateral margins, one on disc); first pair situated in the anterior fifth of the pronotal length, second before hind angles. One pair of discal setae present, located near the median furrow, nearly at level of anterior lateral pair. Posterior and anterior angles not prominent, obtuse.

Elytra elongate oval, with effaced humeri, strongly flattened, completely glabrous; striae effaced, partially formed by rows of foveae; two pairs of discal setae and one pair of preapical setae present. Base of elytra with a pair of basal foveole near scutellum. Humeral group of umbilicate pores aggregated.

Legs very long and slender, pro- and mesotarsi relatively short, claws very long and acute. Protibiae pubescent on their internal portions, not grooved. Fourth segment of pro- and mesotarsi with ventral process formed by hyaline appendage.

Etymology.

The genus is named after Branko Jalžić from Zagreb, Croatian biospeleologist and caver, discoverer of many new taxa of troglobiont animals. It is combined with »*Aphaenops*«[1], a generic name of the Pyrenean cave dwelling Trechine beetles. Gender is masculinum.

Distribution.

So far known only from the type locality, Dumenčića špilja near Rakovica, Central Croatia.

Jalzicaphaenops poljaki, sp. nov.

(Figs. 1, 3, 5)

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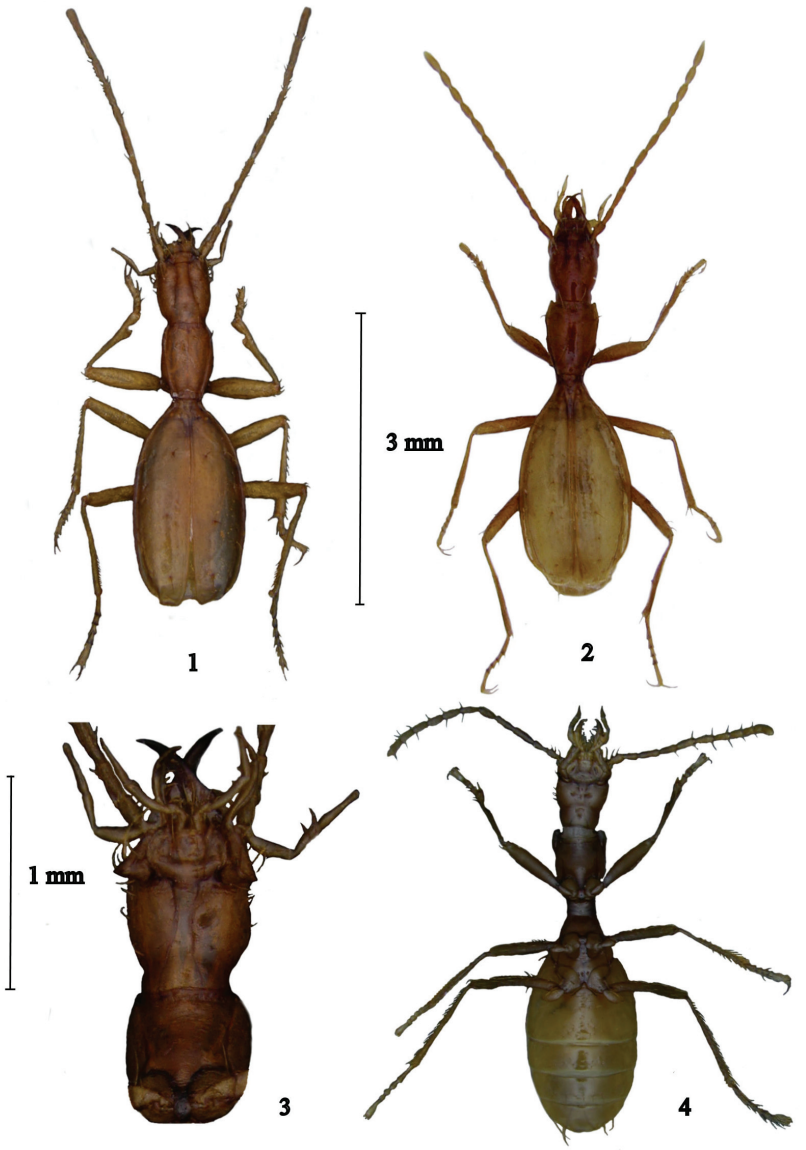
[1] Note: Genus was originally described by BONVOULOIR (1862) as *Aphoenops* with the type species *A. leschenaulti.* Later, the genus name was written as *Aphaenops* (Grenier, 1864) and this spelling was consecutively used by almost all following authors. MORAVEC *et al*. (2003) ressurected the original name *Aphoenops.* According to FAILLE *et al*. (2010:105, Appendix A), prepared opinion to the ICZN is to conserve the name *Aphaenops*, which was used for nearly 150 years with hundreds of usages. Also another aphaenopsoid Dinaric genera *Dalmataphaenops* Monguzzi, 1993 and recently described *Minosaphaenops* Quéinnec, 2008 were named after *Aphaenops*. Because of the above mentioned reasons, authors have decided to use the widely accepted name *Aphaenops* instead of the almost unused *Aphoenops*.



Figs. 1–4: Figs 1, 3: *Jalzicaphaenops* gen. nov. *poljaki* sp. nov., Fig. 1 – habitus, holotype, dorsal, Fig. 3 – head and pronotum, Holotype, ventral. Figs 2,4: *Acheroniotes* gen. nov. *mlejneki* sp. nov., Fig. 2 – habitus, Holotype, dorsal, Fig. 4 – habitus, Paratype, ventral.

Type series.

Holotype, female labelled: »Croatia, Slunj, Rakovica, Stara Kršlja, Keseri, Dumenčića špilja, 21.07.2007, B. Jalžić leg. (white label, printed) / HOLOTYPUS Jalzicaphaenops gen. nov. poljaki sp. nov. R. Lohaj & J. Lakota det. 2009 (red label, printed)« CNHM.

Description.

Total body length 3.9 mm, colour reddish-brown, antennae and legs paler, palpi pale-yellow. Head shiny, pronotum and elytra matte, with microsculpture formed by isodiametric and transverse fields. Head covered with short and very sparse pubescence, pronotum and elytra glabrous (Fig. 1).

Head elongate, 0.71 mm long and 0.57 mm wide, index HL/HW 1.25, widest in middle, constricted behind temporae. Head with two pairs of supraorbital setae, anterior pair before middle, posterior pair at hind part of head near neck. Frontal furrows complete, deep, ending in posterior pair of supraorbital setae, on anterior third parallel-sided, after level of anterior pair of supraorbital setae divergent. Dorsal part of head covered with very sparse and short pubescence, genae sparsely pubescent. Ventral part of the head (Fig. 3) more densely pubescent, eyes totally absent. Mandibles very long and slender, acutely pointed, right mandible at base with distinct, cone-shaped, acute tooth. Clypeus transverse, with two pairs of setae, outer pair nearly two-times longer than inner. Labrum transverse, shallowly emarginated at anterior part, with three pairs of short setae. Mentum imperfectly fused with submentum, without median teeth. Submentum with two pairs of setae, outer pair very long, inner pair shorter, about half the length of outer pair. Maxillar palpi slender, ultimate segment almost as long as penultimate, before apex slightly constricted. Antennae long and slender, AL 2.98 mm, covered with fine, dense, decumbent pubescence. Lengths of antennal segments (from scape to terminal segment): 0.21, 0.19, 0.32, 0.26, 0.29, 0.28, 0.29, 0.28, 0.28, 0.26 and 0.32 mm.

Figs 5–8: Fig. 5 – *Jalzicaphaenops* gen. nov. *poljaki* sp. nov. – female genitalia, Holotype; Fig. 6–8 – *Acheroniotes* gen. nov. *mlejneki* sp. nov.: Fig. 6 – female genitalia, Paratype; Fig. 7 – aedeagus, Paratype, dorsal view; Fig. 8 – aedeagus, Paratype, left lateral view. Scale 0.5 mm.

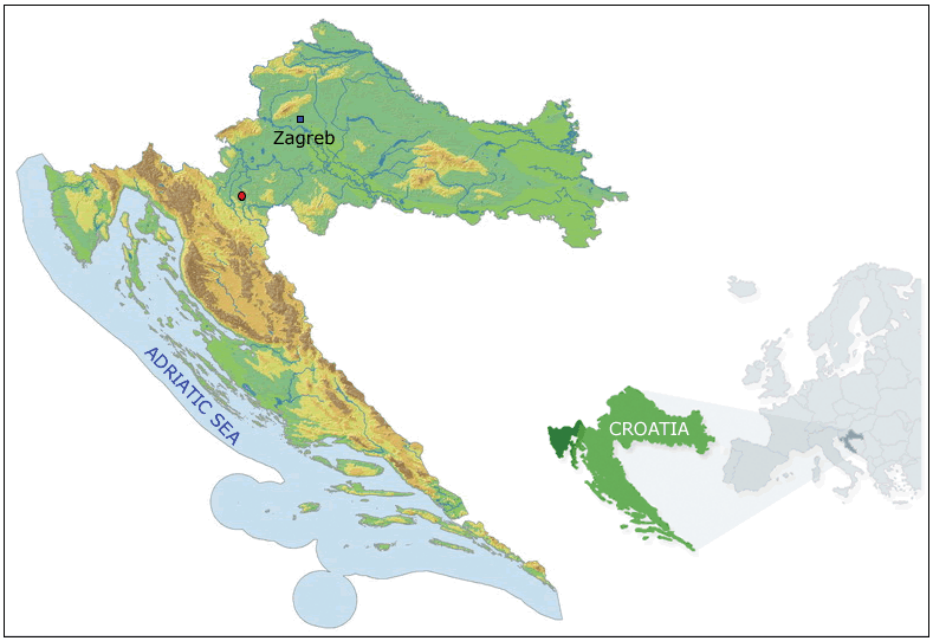


Fig. 9. Position of the Dumenčića špilja cave.

Pronotum, narrow, elongate, subparallel, 0.79 mm long and 0.55 mm wide, index PL/PW 1.44, slightly narrower than head, glabrous, propleura narrowly visible from dorsal aspect. Anterior angles not protruding, obtuse, posterior angles obtuse. Lateral furrows deep, with a pair of anterior setae situated on basal sixth, and posterior pair near hind angles. Median furrow distinct, well defined, deep. Disc of pronotum with a pair of shorter setae (about half as long as the length of lateral setae), situated near median line in basal fifth of pronotal length, near level of anterior lateral setae.

Elytra subovate elongate, with maximum width at middle, 2.14 mm long and 1.23 mm wide, index EL/EW 1.74. Basal part strongly narrowed, pedunculate, scutellum small, single pair of basal scutellar pores present. Elytral striae vanished, partially formed by the rows of foveae. Elytral chetotaxy formed by two pairs of dorsal and one pair of preapical setae, first pair is situated in basal fourth, second pair behind the middle of elytral length. Ventral surface glabrous, ventrites 4–6 as well as anal ventrite in female with two pairs of setae. Humeral group of umbilicate pores aggregated, consists of five setae, first one at the level of first dorsal setae, removed from marginal gutter. Median group of three setae aggregated, situated behind level of second dorsal setae.

Legs very long, slender, densely pubescent. First two tarsomeres of protarsi not dilated. Tarsal claws long and slender.

Female genitalia (Fig. 5): without peculiar features, apical segments of gonostyli elongated and slender, not curved, at apex pointed, with two dorsal and one ventral spines.

Male unknown.

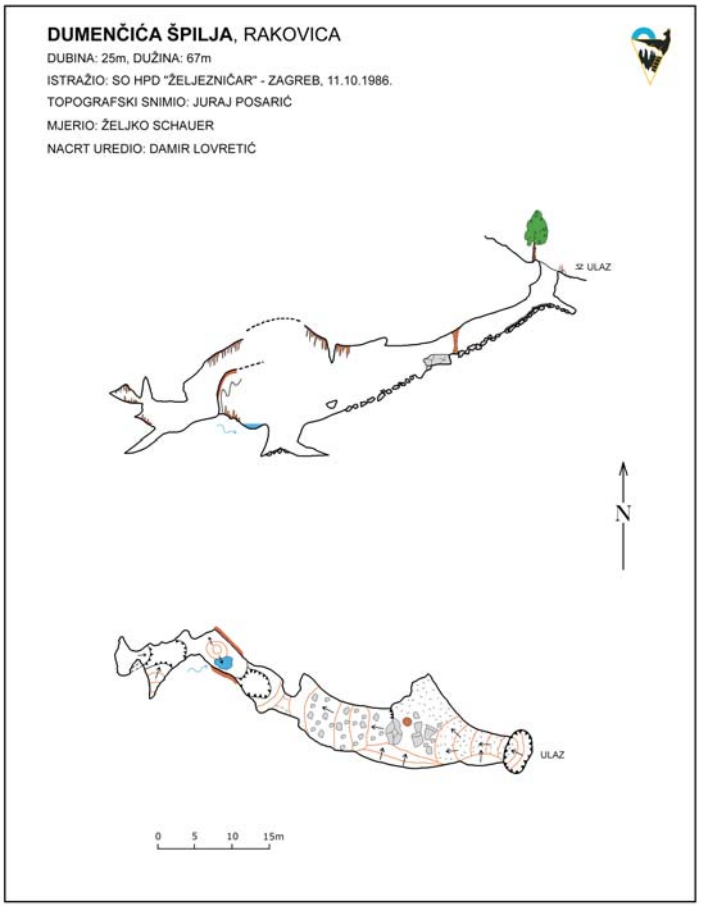


Fig. 10. Scheme of the Dumenčića špilja cave.

Etymology.

Patronymic, dedicated to dr. Josip Poljak (15.11.1882, Orahovica – 20.8.1962, Zagreb), famous Croatian geologist and speleologist, author of numerous studies on geology and caves of the Dinarids, an excellent photographer and long-time director of the Geological and Paleontological Museum in Zagreb.

Topographic location and ecology:

Dumenčića špilja (UTM: WK58, Figs. 9, 10) is situated in a shallow karst area of Kordun, near settlement of Keseri, Rakovica village. The cave is 67 m long and 25 m deep, with a relatively small underground space. In the back of the cave there are numerous tiny streams that together form a small shallow pond. The entrance part of the cave is covered with soil alluvium, organic debris and rock fragments. Speleothems are mostly found in its rear part. The type specimen was found walking on limestone crust at the end of the cave.

Temperatures measured on June 18th, 2005 – air: 7.6°C, water: 7.2°C, on July, 21st, 2007 – air: 8.1°C, water: 8.1°C.

Fauna found in Dumenčića špilja:

Isopoda: *Titanethes albus*, *Monolistra caeca* ssp. (det. J. Bedek)

Amphipoda: *Niphargus* sp.

Pseudoscorpiones: *Neobisium* sp.

Coleoptera: *Duvalius* (*Neoduvalius*) *opermanni* Scheibel, 1933, locus typicus
Typhlotrechus bilimeki cf. *kiesenwetteri* (Schaum, 1862)
Parapropus sericeus sinuaticollis Absolon & Mařan, 1943
Troglorrhynchus anophthalmoides Reitter, 1914 (det. P. Hlavač)

Genus *Acheroniotes* gen. nov.

Type species: *Acheroniotes mlejneki* sp. nov., by monotypy

Description.

Medium-sized trechine with aphaenopsoid characters: elongated head and pronotum with ovoid, on base strongly narrowed elytra, distinctly wider than forebody. Eyeless, depigmented, strongly flattened dorsoventrally. Head and pronotum covered with very sparse pubescence, elytra glabrous, with only a very few short setae. Legs and antennae shorter and slender, densely pubescent.

Head large, elongated, nearly parallel-sided, slightly narrower than pronotum, constricted behind temporae. Eyes totally absent. Frontal furrows deeply impressed, short, incomplete, slightly divergent posteriorly, not reaching posterior pair of supraorbital setae. Mandibles very long and slender, without tooth or retinaculum. Clypeus with three to four pairs of setae, labrum with three pairs. Mentum imperfectly fused with submentum, with a pair of setae, without median teeth, submentum with two pairs of setae. Antennae long and slender, covered with dense pubescence, antennomere 3 and 11 the longest, antennomere 4–10 nearly equally long.

Pronotum narrow and long, covered with very sparse pubescence more or less forming rows, median furrow weakly marked, visible in the middle part of pronotum. Lateral furrows distinct and complete, with two pairs of setae; first pair situated in the anterior fifth of the pronotal length, second pair before hind angles, disc without setae. Anterior angles prominent, not pointed, posterior angles obtuse.

Elytra elongate oval, with effaced humeri, strongly flattened, completely glabrous, striae effaced, partially formed by rows of foveae; with four to five pairs of discal setae and one pair of preapical ones, situated in putative stria 3, and with microchetae situated between macrochetae in stria 3, and also in stria 5. Base of elytra with a pair of basal foveoles near scutellum, humeral group of umbilicate pores aggregated. Ventral surface very sparsely pubescent, ventrites 4–6 with five pairs of setae, anal vetrite with two pairs of long setae in males and females.

Legs relatively long and slender, pro- and mesotarsi short, claws very long and acute, without denticulation, densely pubescent. First two tarsomeres of male protarsi dilated at internal margins.

Aedeagus elongated and slender, apex obtuse. Parameres long, with two pairs of setae at apex.

Etymology.

Named after »Acheron«, in ancient Greek mythology one of the five rivers of the Greek underworld. Ending -iotes is a Greek noun derivative suffix. Gender is masculinum.

Distribution.

So far known only from four pits located on Prekornica Mts., central Montenegro.

Acheroniotes mlejneki, sp. nov.

(Figs. 2, 4, 6, 7, 8)

Type series.

Holotype, male labelled: »Crna Gora, Prekornica Mts., Kamenik Mt. env., Konjič hill, Alexander the Great (abyss), (–150 m), 2.9.2006, R. Mlejnek lgt. (white label, printed / HOLOTYPUS ACHERONIOTES gen. nov. mlejneki sp. nov., R. Lohaj & J. Lakota det. 2009 (red label, printed)« (CRM), Paratypes (51 ♂♂ 41 ♀♀): 2 ♂♂ 5 ♀♀, the same data as Holotype (CJL, CJP, CRL, CVZ), 8 ♂♂ 6 ♀♀, the same data as Holotype, but 1.8.2007 (CJL), 14 ♂♂ 14 ♀♀, the same data as Holotype, but 28.7.2009 (1 ♂ CACR, 1 ♂ CNHM, 1 ♂ NMP, 1 ♂ NMNHS, 1 ♂ CAC, CRL, CRM), 1 ♂ labelled: »Crna Gora, Prekornica Mts., Kamenik Mt. env., Markovički katun env., Borova jama 1 (abyss), (–40 m), 31.7.2009, R. Mlejnek lgt.« (CRM), 23 ♂♂ 15 ♀♀ labelled: »Crna Gora, Prekornica Mts., Kamenik Mt. env., Markovički katun env., Borova jama 2 (abyss), (-50 m), 31.7.2009, R. Mlejnek lgt.« (1 ♂ CACR, CRL, CRM), 3 ♂♂ 1 ♀ Crna Gora, Prekornica Mts., Kamenik Mt. env., Jamski katun env., Snežna jama (abyss), (–30 m), 27.7.2009, R. Mlejnek lgt. (CRL, CRM). All paratypes are labelled with white, printed locality labels and with red printed labels »PARATYPUS ACHERONIOTES gen. nov. mlejneki sp. nov., R. Lohaj & J. Lakota det. 2009«.

Description.

Total body length 3.62–4.55 mm in males, 3.63–4.45 mm in females; holotype 3.85 mm. Colour reddish-brown, antennae, head, pronotum and legs darker, mandibles and palpi pale-yellow, elytra shiny. Head with distinct isodiametric microsculpture, microsculpture of pronotum and elytra with isodiametric and transverse meshes. Head and pronotum covered with short and sparse pubescence, elytra glabrous (Fig. 2).

Head large and elongate, almost as long and wide as pronotum, index HL/HW 1.07–1.24, holotype 1.12, widest behind middle, neck well-defined. Frontal furrows incomplete, deep, reaching behind half of head length, almost parallel-sided, after level of anterior supraorbital setae strongly divergent. Dorsal part of head covered with short pale pubescence, anteriorly denser than posteriorly, genae sparsely pubescent. Head with two pairs of long supraorbital setae, anterior pair in front of the middle of head, near furrows, posterior pair at hind part of head near neck. Eyes totally absent. Mandibles long and slender, acutely pointed, without tooth or retinaculum. Antennae relatively long and slender, covered with dense ducembent pubescence, antennomere 3 and 11 the longest, scape and antennomeres 5–10 nearly

Fig. 11. Position of the Prekornica mountain range.

equally long. Holotype: AL 2.38 mm, lengths of antennal segments (from scape to terminal segment): 0.2, 0.19, 0.26, 0.24, 0.21, 0.21, 0.21, 0.2, 0.2, 0.2 and 0.26 mm.

Pronotum narrow, elongate, slightly narrower than head, on base distinctly narrower than on posterior margin, index PL/PW 1.24–1.43, holotype 1.31. Propleura visible from dorsal aspect only in the basal third. Anterior angles of pronotum distinctly protruding, rounded at apex, posterior angles obtuse. Lateral furrows well-developed, deep, with two pairs of setae, first situated in anterior sixth, posterior pair near hind angles. Pronotum dorsally sparsely pubescent, setae short, suberect, median line weakly marked, visible in middle part of pronotum.

Elytra subovate elongate, with maximum width behind middle, index EL/EW 1.58–1.90, holotype 1.74. Basal part strongly narrowed, pedunculate, scutellum small, flat, single pair of basal scutellar setiferous pores present. Elytral striae invisible, particulary formed by rows of foveae. Elytral chaetotaxy very similar to that of the genus *Minosaphaenops* Quéinnec, formed by long, erected macrochetae and microchetae. Macrocheta 1 located in basal fifth of elytral length, macrocheta 2 in the

middle of elytra. Position of setae: four (exceptionally five) discal and one preapical macrochetae present in putative stria 3, one to two microchetae located before macrocheta 1, two microchetae between macrochetae 1–2, interspace between macrochetae 2–3 with no or one microcheta, one or two microchetae located between macrochetae 3–4, preapical seta shorter and thinner. Six to eight microchetae present in putative stria 2, about five in stria 5, one to three in putaive stria 1. Humeral group of umbilicate pores aggregated, all pores regularly situated along lateral elytral gutter. Ventrites 4–6 very sparsely pubescent, with five pairs of setae on their hind margins, two longer and three shorter pairs. Anal ventrite in both sexes with two pairs of setae, outer pair longer.

Legs long, slender, densely pubescent, pro- and mesotarsi short. First two tarsomeres of male protarsi distinctly dilated and protracted at their internal margins, female tarsomeres equally narrow, not dilated. Tarsal claws very long and slender. Hind trochanters reniform, each with one long and 4–5 shorter setae.

Aedeagus (Figs. 7, 8) 0.5 mm long in Holotype, elongate, slender, moderately curved, with basal part of medial lobe wider, narrowed towards apex. Apex obtuse, without thickened tip, from dorsal view widely rounded. Parameres slender, length of parameres about half of length of aedeagus, each paramere with two setae at apex.

Female genitalia (Fig. 6): without peculiar features, apical segments of gonostyli elongated and slender, slightly curved, at apex rounded, with one dorsal and one ventral spines.

Etymology.

Patronymic, dedicated to our dear friend Roman Mlejnek from Pardubice (Czech Republic), enthusiastic caver and biospeleologist, discoverer of this new genus and species.

Topographic location and ecology:

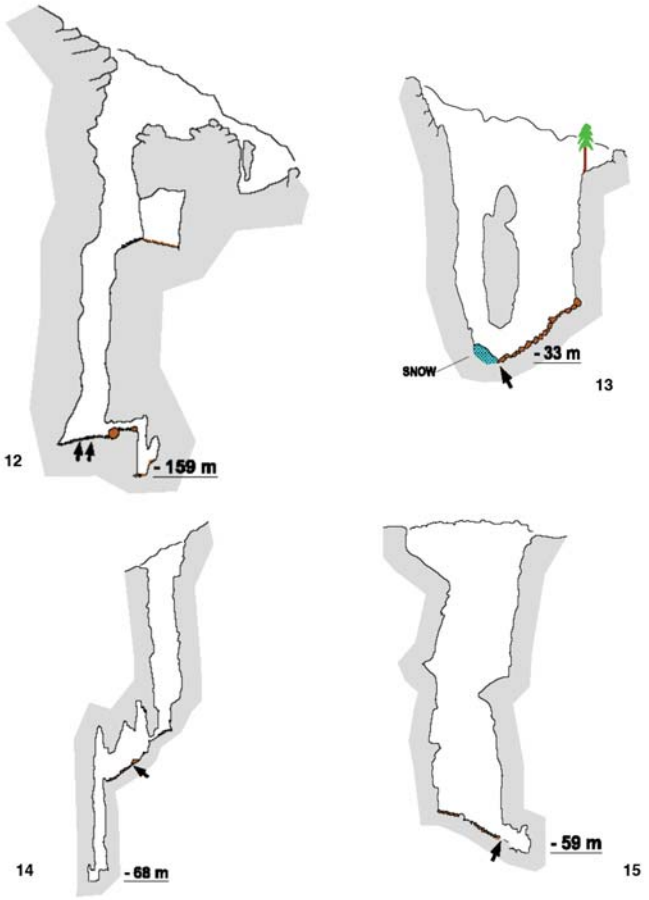
Mountain range Prekornica with its highest peak Kula (1927 m a.s.l.) is situated north of the Montenegrian capital Podgorica (Fig. 11). On the southeast it is bordered by the river Zeta, from the east by the river Morača, on the north by mountain range Maganik (2139 m a.s.l.). Speleological research was focused on its eastern part, between peak Kamenik (1815 m a.s.l.) and plain field Radovče (about 850 m a.s.l.). During years 2006, 2007 and 2009, four pits were localized and examined.

Pit Alexander Veliky (Alexander the Great, Fig. 12): entrance of the pit, formed by a large orifice (ca 15 x 18 m) is situated on the southern slopes of Konjić hill, on the bottom of about 30 metres deep rock depression, on altitude of about 1340 m. Entrance of the pit is formed by a vertical shaft, up to the depth of about 140 m, where an area of about 20 x 10 m is formed and continues through a narrow meander to the final, 20 m deep shaft. Total depth of the pit is 159 m. The type specimens, holotype and paratypes (50 exs.) were collected at the depth of about 145 m, in rock debris (Fig. 16).

Snežna jama (Snow pit, Fig. 13): Entrance of the pit (altitude ca. 1255 m) is situated near the top of the peak Snežna glava (1356 m a.s.l.). Relatively large entrance (ca 29 x 25 m) is interrupted by a rocky bridge, which divides the pit into two parallel shafts, connected at the bottom. A small snow patch, ca 4 x 3 m has been ob-

served at the lowest part of the pit (-33 m) on the 27th of July, 2009. Four paratypes were collected in wet, cold soil near the snow.

Pits Borova jama 1 and Borova jama 2: both pits were localised by a local inhabitant Mr. Borislav Marković (called Boro), and were named after him. Entrances are situated between the peak Čukov vrh and chalet Markovićki Katun. Pit Borova jama 1 (Fig. 14, altitude of entrance about 1340 m) is formed of a vertical shaft to the depth of about 36 m, where there is a tiny bottom (ca 5 x 7 m) formed by rock blocks and debris. Pit continues with a narrow, 18 m deep shaft and a short 4 m high step up to the bottom of the pit, covered with mud. Total depth of the pit is 68 m. A single specimen was found at a depth of about 42 m among rock debris. Pit Borova jama 2 (Fig. 15, altitude of entrance about 1400 m) is formed by an indented entrance shaft to the depth of 41 m, followed by a sloping bottom, covered in rock debris, ending in a small hall. The total depth of the pit is 59 m. Paratype speci-



Figs. 12–15. Topographical schemes of pits: Fig. 12 – Alexander Veliky, Fig. 13 – Snežna jama, Fig. 14 – Borova jama 1, Fig. 15 – Borova jama 2. Black arrows mark the positions of findings of *Acheroniotes* gen. nov. *mlejneki* sp. nov.

mens (38 exs.) were collected at the depth of about 55 m, in wet, cold soil among rocks and debris.

Bionomy of *Acheroniotes* gen. nov. is identical to other endogenuous species of Trechine genera like *Duvalius* Delarouzée, *Duvaliopsis* Jeannel or *Trechus* Clairville. No specimens were found outside of the clay, on the walls or stones. Therefore, its bionomy markedly differs from that observed in other Dinaric genera of aphaenopsoid Trechine beetles such as *Adriaphaenops* Noesske, *Aphaenopsis* G. Müller, *Dalmataphaenops* Monguzzi, as well as *Minosaphaenops* Quéinnec and *Derossiella* Quéinnec, but also from *Jalzicaphaenops* gen. nov. Representatives of these taxa were mostly found walking or running on wet walls, speleothems and stones in the caves and pits. Morphology of the mandibles and mouthparts indicates that they are predators. This has been also confirmed by the fact that they are not attracted by the baited traps. The only exception to this is probably *Aphaenopsis apfelbecki* (Ganglbauer, 1891). This species has been collected (see Material and Methods) in Megara

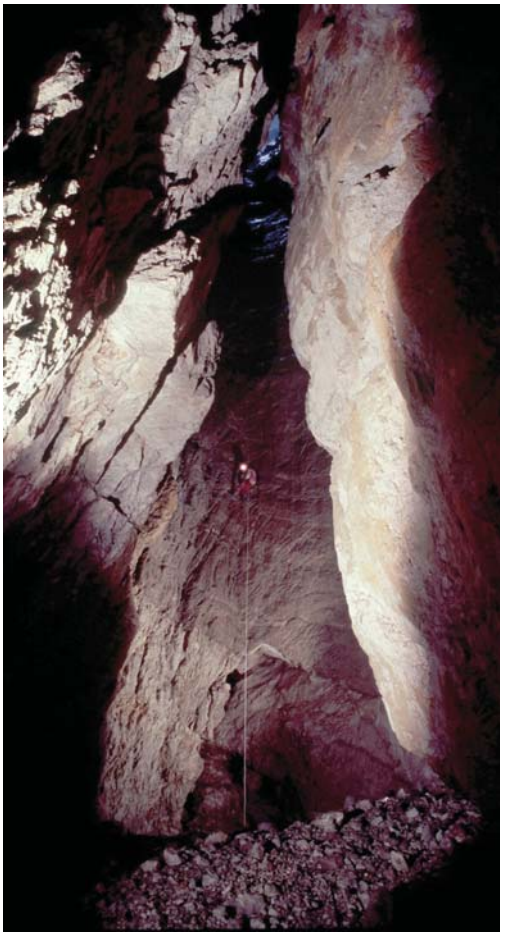


Fig. 16. Bottom of the Alexander Veliky Pit.

pećina cave (Bjelašnica planina Mt, central Bosnia), except for free walking specimens, also by traps baited with meat and cheese together with Leptodirinae beetle *Apholeuonus longicollis* Reitter, 1904. One male of *Adriaphaenops zupcense zupcense* (Pavićević, 1990) was also found in a trap, placed in Pećina u Zupcima, Durmitor Mt., Montenegro, which is the type locality for this species. Owing to the fact that the trap was in use for three years, it could be only coincidence that a specimen of this species has been also collected by pitfall trapping. Special behaviour was observed in *Scotoplanetes* Absolon. Most of the known specimens were found in cave hygropetric environment (SKET, 2004), in Vjetrenica cave and Vodna jama pit together with Leptodirine beetle *Hadesia* G. Müller (MLEJNEK & ZAJÍČEK, 2006; Mlejnek, Jalžić, pers. comm.). *Acheroniotes* gen. nov. is also remarkable by the size of its populations observed in two pits: Alexander the Great and Borova jama 2 (together 88 exs.). Most of the known taxa of Dinaric aphaenopsoid Trechini, perhaps with the exception of *Aphaenopsis apfelbecki* (Ganglbauer, 1891), were collected only individually and are known only from very small series. Together with *Acheroniotes* gen. nov. there were also other cave dwelling Coleoptera present, such as Leptodirinae *Anthroherpon latipenne* (Apfelbeck, 1907) and *Anthroherpon* sp. nov., Carabidae *Neotrechus suturalis* (Schaufuss, 1864), *Neotrechus hilfi* (Reitter, 1903) and *Laemostenus (Antisphodrus) cavicola* (Schaum, 1858), as well as troglophile *Laemostenus (Antisphodrus) elongatus* (Dejean, 1828).

DISCUSSION

Presence of the posterior pronotal setae in *Jalzicaphaenops* gen. nov. and *Acheroniotes* gen. nov. is a unique feature found in aphaenopsoid Trechini of the Dinaric range. All hitherto known genera, namely *Aphaenopsis* G. Müller, *Scotoplanetes* Absolon, all seven described species (but also four undescribed species, see below) of the genus *Adriaphaenops* Noesske, *Dalmataphaenops* Monguzzi, *Albanotrechus* Casale & Guéorguiev, both species of *Minosaphaenops* Quéinnec and also *Derossiella* Quéinnec lack them. On the other side, posterior pronotal setae are present in blind Trechinae genus *Croatotrechus* Casale & Jalžić, 1999 from Gorski kotar (cave Pećinik near Ogulin – type locality, and Mačkova špilja near Jasenak, Ogulin, central Croatia). Based on described morphological features (presence of the posterior pronotal setae, mentum fused with submentum, both with only one pair of setae and peculiar shape of aedeagus, very similar to epigeal species of *Trechus pulchellus* species group, namely *T. croaticus* Dejean, 1931 and *T. jezerensis* Apfelbeck, 1908), authors have placed the latter genus between »*Neotrechus*« and »*Aphaenops*« phyletic lineages (CASALE & JALŽIĆ, 1999: 141).

Presence of the posterior pronotal setae is widely shared with the Pyrenean genera *Geotrechus* Jeannel, 1919, *Aphaenops* Bonvouloir, 1861 and *Hydraphaenops* Jeannel, 1926, as well as with *Boldoriella* Jeannel, 1928, *Doderotrechus* Vigna Taglianti, 1968 and *Lessinodytes* Vigna Taglianti, 1980 from Alpes, *Speotrechus* Jeannel, 1922 from Cévennes (Massif Central, France), Carpathian *Chaetoduvalius* Jeannel, 1930, as well as Crimean *Pseudaphaenops* Winkler, 1912 and Caucasian *Taniatrechus* Belousov & Dolzhansky, 1994. On the other hand, the genera *Paraphaenops* Jeannel, 1916, *Sardaphaenops* Cerruti & Henrot, 1956, *Allegrettia* Jeannel, 1928 and *Italaphaenops* Ghidini,

1964 do not possess them. According to JEANNEL (1930: 16), presence or absence of pronotal setae in Trechini is not taxonomically informative. He elucidated this opinion by the fact, that in species-rich genera as *Anophthalmus* Sturm, 1844 and *Aphaenops* Bonvouloir, 1861, but also in *Typhlotrechus* G. Müller, 1913, which have the posterior pronotal setae (very variable in length and thickness), there are also single species, which lack them (*Anophthalmus amplus* Joseph, 1870, *Aphaenops leschenaulti* Bonvoulair, 1862, *Typhlotrechus bilimeki* (Sturm, 1847) and *T. velebiticus* (Ganglbauer, 1904). On the other side, in the same work (1930: 21) JEANNEL used the position of the posterior pronotal setae (situated in the hind angles vs. the lateral gutter before hind angles) as a characteristic for the separation of the two different phyletic lines of Trechini (North American *Trechus* vs. Dinaric *Neotrechus*). Jeannel´s opinion on the heterogenous genus *Typhlotrechus* G. Müller has not been accepted later by VIGNA TAGLIANTI (1968). This author has erected genus *Doderotrechus*, based on Alpine species *Typhlotrechus ghilianii* (Fairmaire, 1859) and *crissolensis* (Dodero, 1924) with posterior pronotal setae and separated them from other two remaining Dinaric species, *T. bilimeki* (Sturm, 1847) and *T. velebiticus* (Ganglbauer, 1904), which lack them.

Genus *Acheroniotes* gen. nov. is, with its elytral chetotaxy, strikingly similar to the genus *Minosaphaenops* Quéinnec, from which it can be separated (besides for the presence of posterior pronotal setae) by the combination of following characters: (1) presence of two pairs of long setae on last abdominal segments in males and females vs. one pair of setae in males and two in females, (2) right mandible without teeth vs. right mandible with distinct teeth, (3) submentum with two pairs of setae vs. submentum with three pairs, (4) hind angles of pronotum not protruding, obtuse vs. hind angles protruding and acute, (5) frontal furrows longer vs. frontal furrows very short, (6) smaller body size (3.62–4.55 vs. 5.10–5.65 mm).

Presence of an additional pair of discal setae on pronotum in *Jalzicaphaenops* gen. nov. is a unique character between aphaenopsoid Trechini, firstly observed in this genus. *Jalzicaphaenops* gen. nov. is relatively most similar to the above mentioned genus *Croatotrechus* Casale & Jalžić, 1999, from which it differs, except for the pronotal setation, by mentum without teeth vs. mentum with bifid median teeth, submentum imperfectly fused with mentum, with two pairs of setae vs. submentum fused with mentum, with only one pair of setae, right mandible with simple teeth vs. right mandible bidentate, as well as with totally vanished elytral striae, body strongly fattened dorsoventrally and longer legs vs. elytral striae 1–3 superficially indicated, body more convex and legs shorter.

Described features, found here in both new Dinaric genera, confirmed a wide morphological variability among the cave dwelling Coleoptera, previously called »ultra-evolved«, »archaic«, or »hyper-specialised«. Common morphological troglomorphic characteristics, including specialisation of sensory organs (touch chemoreceptors, hygroreceptors, thermoreceptors, pressure receptors), elongation of appendages and foot modifications, pseudophysogastry, eyes reduction, pigment and wings reduction and increased egg volume were presented by CHRISTIANSEN (1992: 463). QUÉINNEC (2008: 170) presented a very wide variability of external morphological characters in Trechini, found exclusively in cave environments, including size and body shape, thickness of teguments, length of appendices (legs, antennae), presence/absence of pubescence on the body, number and position of elytral setae, length and shape of frontal furrows, presence of teeth on mandibles and mentum

etc.; with the conclusion, that so-called »troglomorphic characters« of this group are not readily defined, and there are no constant specific morphological features concerning the adaptability to the underground environment. Taxonomy of Trechini needs to be clarified by the phylogenetic analytical studies, preferably including the larval characters (usual problem with the cave dwelling species) as well as by DNA analysis (which was done by FAILLE *et al*. (2010) for Pyrenean Trechine genera) in order to understand the importance of the above mentioned morphological characters for the systematics of this group and to classify them on supraspecific levels.

Discovery of newly described genera confirms the Dinarids as the world's »hot spot« for troglobiont animals. Despite the fact that cave fauna of this region has been studied systematically for more than one and a half century, new taxa of Coleoptera, including not only species, but also genera (among the most recent: Leptodirine *Rozajella* Ćurčić *et al*., 2007, *Pavicevicia* Perreau, 2008, *Nonveilleriella* Perreau & Pavićević, 2008, above mentioned Trechine *Minosaphaenops* Quéinnec, 2008 and *Derossiella* Quéinnec, 2008) and tribes (Pselaphinae *Thaumastocephalini* Poggi *et al*., 2001, with type genus *Thaumastocephalus*) are described constantly. Authors have already studied another new genus of Trechini from Northern Croatia, and four new species of genus *Adriaphaenops* Noesske from caves and pits of Montenegro, Herzegovina and Northern Albania. Descriptions of these taxa are in progress.

Including the above described two new genera, Dinaric aphaenopsoid Trechini, all endemic, geographically isolated and morphologically well-defined, are now classified into ten genera. They can be separated using the following key.

Key to the identification of aphaenopsoid Trechini genera of the Dinaric range:

1 (6) Pronotum with posterior pair of long setae situated near hind angles.

2 (3) Pronotal disc with pair of setae near middle furrow, situated in anterior fifth, anterior angles of pronotum not protruding, obtuse, elytra with three pairs of setae (two discal and one preapical), without microchaetae. Small size: 3.90 mm, Rakovica, Central Croatia ..... *Jalzicaphaenops*, gen. nov.

3 (2) Pronotal disc without pair of setae.

4 (5) Elytra with five pairs of setae, four discal and one preapical, with additional microchetae, anterior angles of pronotum protruding, acute. Small size: 3.62–4.55 mm, Prekornica Mts., Montenegro ..... *Acheroniotes*, gen. nov.

5 (4) Elytra with three pairs of setae (two discal and one preapical), without microchaetae. Anterior angles of pronotum not protruding, obtuse. Small size: 4.3–4.4 mm, one species in Ogulin, Croatia ..... *Croatotrechus* Casale & Jalžić, 1999

6 (1) Hind angles of pronotum without setae.

7 (10) Head and pronotum pubescent.

8 (9) Elytra with three pairs of setae (two discal and one preapical), without microchetae, densely pubescent. Small to medium size: 3.80–5.00 mm, currently 7 described species in Herzegovina and Montenegro …. *Adriaphaenops* Noesske, 1928

9 (8) Elytra with five pairs of setae, four discal and one preapical, with additional microchetae, almost glabrous. Medium size: 5.10 – 5.65 mm, two species in Montenegro and Croatia ..... *Minosaphaenops* Quéinnec, 2008

10 (7) Head and pronotum glabrous.

11 (12) Elytra with 7–11 setae in stria 3 and 3–6 setae in stria 5. Mentum without median teeth. Medium size: 5.50–6.80 mm, two (see Introduction) species in Herzgovina and Montenegro ..... *Scotoplanetes* Absolon, 1913

12 (11) Elytra with 3–4 setae in stria 3, stria 5 without setae. Mentum with simple or bifid median teeth.

13 (16) Head wide, robust, globe-shaped, mentum with bifid median teeth.

14 (15) Elytra with three pairs of setae (two discal and one preapical). Small to medium size: 4.50–6.00 mm, two species in Bosnia ..... *Aphaenopsis* Müller, 1913

15 (14) Elytra with four pairs of setae (three discal and one preapical). Very large size: 10.20–10.50 mm, one species in Croatia ..... *Dalmataphaenops* Monguzzi, 1993

16 (13) Head elongated, mentum with simple median teeth.

17 (18) Elytra strongly narrowed on basis, humeri effaced. Hind angles of pronotum not protruding, obtuse. Small to medium size: 5.10–5.30 mm, one species in Croatia ..... *Derossiella* Quéinnec, 2008

18 (17) Elytra ovoid, with distinct humeri. Hind angles of pronotum protruding, acute. Large size: 7.30–8.00 mm, one species in Albania .... *Albanotrechus* Casale & Guéorguiev, 1994

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