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ENDOGEAN AND CAVERNICOLOUS COLEOPTERA OF THE BALKANS. X. TWO NEW SPECIES OF *MACHAERITES* (COLEOPTERA: STAPHYLINIDAE: PSELAPHINAE) FROM CROATIA

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Machaerites pavleki sp. nov. and *M. marjanaci* sp. nov., new cavernicolous species of the tribe Bythinini are described from Croatia. The catalogue of all species of the genus placed in two species-groups is provided.

Key words: Coleoptera, Staphylinidae, Pselaphinae, Bythinini, *Machaerites*, biospeleology, Croatia, taxonomy

Hlavač, P. & B. Jalžić: Endogejski i kavernikolni tvrdokrilci Balkana. X. Dvije nove vrste roda *Machaerites* (Coleoptera: Staphylinidae: Pselaphinae) iz Hrvatske. Nat. Croat., Vol. 19, No. 1, 111–119, 2010, Zagreb.

U radu se opisuju nove kavernikolne vrste tribusa Bythinini iz Hrvatske, *Machaerites pavleki* sp. nov. i *M. marjanaci* sp. nov. Također se donosi katalog svih vrsta ovoga roda, smještenih u dvije skupine.

Ključne riječi: Coleoptera, Staphylinidae, Pselaphinae, Bythinini, *Machaerites*, biospeleologija, Hrvatska, taksonomija

INTRODUCTION

One of the most interesting and rich genus of cavernicolous beetles of the Balkan peninsula is certainly the genus *Machaerites* L. Miller, 1855. The genus is strictly cavernicolous and its distribution is restricted to the northern Dinarids (HLAVÁČ *et al.*, 2008). In recent years *Machaerites* has been a subject of several studies (NONVEILLER

& PAVIĆEVIĆ, 2001; HLAVÁČ & LAKOTA, 2004; PAVIĆEVIĆ & OZIMEC, 2008) the result of which are 12 described species and one subspecies. Recent activities of the members of the Croatian Biospeleological Society have resulted with many new cavernicolous species of Pselaphinae and also two new species of *Machaerites*. These two species are described in this paper, raising the number of *Machaerites* species to 14, all catalogued here bellow.

MATERIALS AND METHODS

The material used for this study is deposited in the Croatian Natural History Museum, Zagreb (CNHM) and in the private collection of the senior author (CPH). Dissections were made using standard techniques, genitalia and small parts were mounted in Euparal on acetate labels which are pinned with the specimens. Leica S8APO microscope was used for the study. In the catalogue the following abbreviations are used: HR – Croatia, I – Italy, SLO – Slovenia.

Taxonomy

***Machaerites pavleki* sp. n.** (Fig. 1)

Fig. 1. *Machaerites pavleki* sp. n. (Photo: H. Bilandžija)

Etymology: Named after Martina Pavlek from Zagreb, young Croatian biospeleologist and collector of the holotype specimen.

Material studied (1♂)**:** HOLOTYPE, 1♂: CROATIA: Rakovica, Nova Kršlja, cave Baraćeva špilja donja, 21.VII.2007, M. Pavlek lgt. / HOLOTYPE *Machaerites pavleki* sp. n., P. Hlaváč det., 2008. CNHM.

Description: Body shiny, reddish-brown, sparsely pubescent, legs, maxillary palpi the same colour, antennae slightly lighter, length 1.75 mm, maximal width of

elytra 0.78 mm. Head rhombic, with well-developed antennal tubercles, 1.06 times as long as wide, rostrum narrow, 1.65 times narrower than maximal width of head, neck wide; eyes completely atrophied, vertexal foveae well-defined, frons between antennal tubercles with deep but short excavation, not reaching vertexal foveae; maxillary palpi very long, palpomeres II–III granulate, palpomere IV (0.42 mm) regularly and densely pubescent, about as long as palpomere II which is pedunculate; antennae long, about 0.96 mm long, reaching about first third of elytra when bent backwards, scape about 3.75 times as long as wide, expanded apically, about 3.75 times as long as pedicel, pedicel oval, 1.6 times as long as wide, antennomere III about twice as long as wide, almost twice narrower than II, antennomeres IV-VIII slightly elongate, IX globular and twice as large as VIII, antennomere X globular and twice as large as IX, apical segment about 1.43 times as short as scape, pointed at apex.

Pronotum 1.07 times as wide as long and 1.33 times as wide as head, widest in apical third, lateral antebasal foveae well-defined.

Elytra 1.20 times as wide as long, broadly widened from base to apex, 1.6 times as long (at suture) as pronotum, two basal foveae present on each elytron, sutural stria well-defined in basal third.

Abdomen slightly narrower than elytra, first visible tergite longest.

Legs slender and relatively long, with all tibiae simple, posterior tibiae slightly curved in apical third.

Aedeagus (Fig. 2) short, elongate, parameres separated at apex, with three short preapical setae, endophallous with three sclerotized corpuscles.

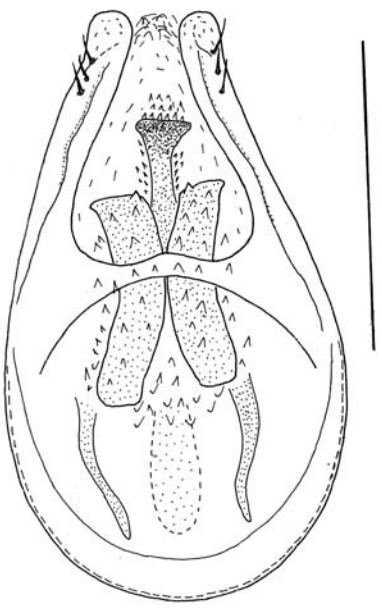

Fig. 2. *Machaerites pavleki* sp. n., aedeagus, dorsal aspect (scale = 0.2 mm)

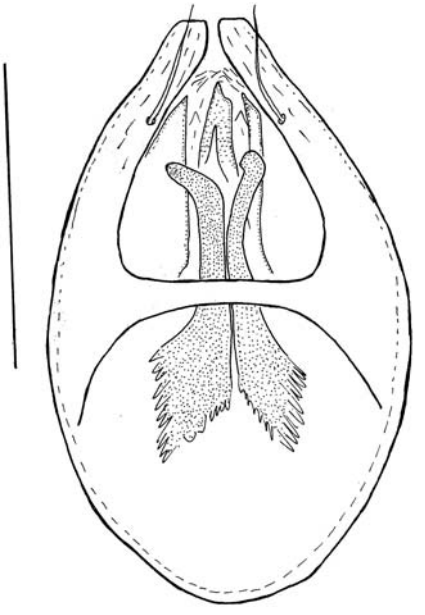

Fig. 6. *Machaerites marjanaci* sp. n., aedeagus, dorsal aspect (scale = 0.2 mm)

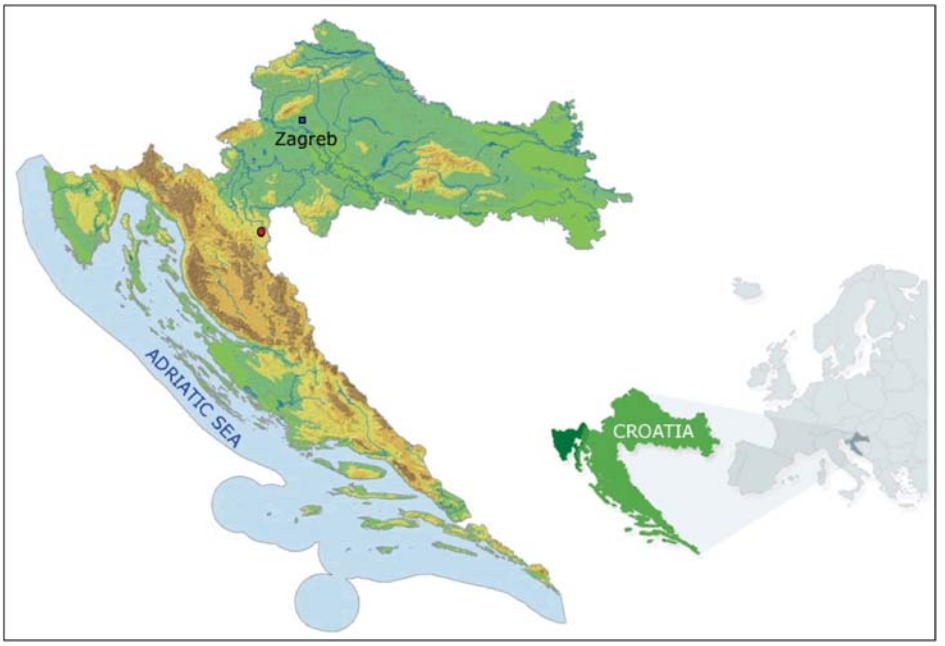

Fig. 3. The position of the Baraćeva špilja donja cave (marked by red dot).

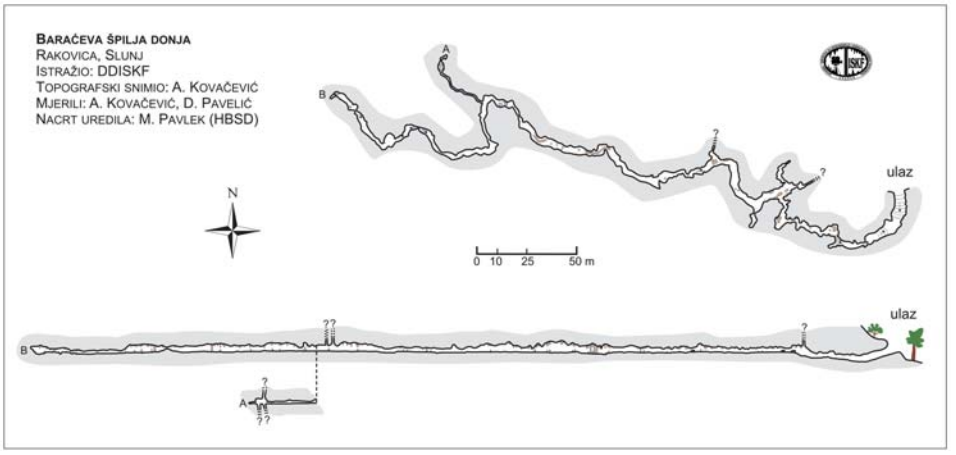

Fig. 4. Spelological of the Baraćeva špilja donja cave.

Sexual dimorphism: Female unknown.

Differential diagnosis: *M. pavleki* belongs to the species-group *ravasini* as defined here below. It is closely related to *M. mekotiensis* and *M. ravasinii* sharing with them elongate antennomeres III-VIII. It can be easily separated from both by the smaller size (1.75 mm, comparing to 1.8-1.9 mm for *M. ravasinii* and 2 mm for *M. mekotiensis*) and by the different structure of the aedeagus.

Ecology: The length of the Baraćeva špilja donja cave (UTM: WK58) is 565 m (Figs 3, 4). It was formed by erosion and corrosion of subterranean water in Lower Cretaceous layers of limestones, dolomites and breccias. Today it is hydrologically inactive (KOVAČEVIĆ, 2003). *Machaerites pavleki* was found under a stone in the frontal part of the cave. The air temperature on July 21st, 2008 was 10.1°C. Other cavernicolous fauna known from the cave: Gastropoda: *Zospeum isselianum* Polonera, 1886, *Zospeum likanum* Bole, 1960, (SLAPNIK & OZIMEC, 2004), Isopoda: *Titanethes albus* (C. Koch, 1841), *Androniscus* sp. (det. J. Bedek), Pseudoscorpiones: *Neobisium stygium* Beier, 1931, *Chthonius* sp., Araneae: *Parastalita stygia* (Joseph, 1882), *Troglohyphantes excavatus* Fage, 1919 (det. M. Pavlek), Coleoptera: *Typhlotrechus bilimekii* ssp. and *Parapropus sericeus sinuaticollis* Absolon & Mařan, 1943 (type locality of this subspecies).

***Machaerites marjanaci* sp. n.** (Fig. 5)

Etymology: Named after Slavko Marjanac (1922 – 2003), well-known Croatian speleologist.

Material studied (3♂, 3♀)**:** HOLOTYPE, 1>: CROATIA: Špilja pod Zimzelom, Potok Musulinski, Gorski kotar 26.VI.2008, B. Jalžić lgt. / HOLOTYPE *Machaerites marjanci* sp. n. P. Hlaváč det., 2008. CNHM. PARATYPES: 1♀: the same data as holotype, CNHM; 2♂, 2♀: same data as the holotype but collected on 14.XII.2008. CNHM, CPH. All paratypes bear the following red label: PARATYPE *Machaerites marjanci* sp. n. P. Hlaváč det., 2008.

Description. Body shiny, reddish-brown, densely and evenly pubescent, legs, maxillary palpi, antennae slightly lighter, length 1.80–1.92 mm, maximal width of elytra 0.72–0.78 mm. Head rhombic, with well-developed antennal tubercules, wider

Fig. 5. *Machaerites marjanaci* sp. n. (Photo: H. Bilandžija)

than long, ratio 0.80–0.97, rostrum wider, same width for both sexes, neck wide; eyes completely atrophied, vertexal foveae well-defined, frons between antennal tubercles with ill-defined, shallow excavation, not reaching vertexal foveae; maxillary palpi shorter, palpomeres II–III granulate, palpomere IV (0.38–0,40 mm) regularly and densely pubescent, about as long as palpomere II which is pedunculate; antennae short, about 0.8 mm long, slightly exceeding base of elytra when bent backward, scape about 3.5 times as long as wide, expanded apically, about 3.5 times as long as pedicel, pedicel oval, 1.4 times as long as wide, antennomere III about 1.3 times as long as wide, almost twice narrower than II, antennomeres IV–VIII equal, globular, IX globular, slightly larger than VIII, antennomere X globular and twice as large as IX, apical segment 1.25 times as short as scape, pointed at apex.

Pronotum 1.02–1.12 times as wide as long and about 1.0–1.2 times as wide as head, widest in apical third, lateral antebasal foveae well-defined.

Elytra about 1.33 times as wide as long, broadly widened from base to apex, 1.38–1.43 times as long (at suture) as pronotum, two basal foveae present on each elytron, sutural stria well-defined through the whole length.

Abdomen slightly narrower than elytra, first visible tergite the longest.

Legs slender and relatively long, with all tibiae simple, posterior tibiae slightly curved in apical third.

Aedeagus (Fig. 6), short, large, elongate, parameres meeting apically, with one long preapical seta, endophallous with two unequal, and in shape variable, sclerotized corpuscles.

Sexual dimorphism: Female smaller, only 1.78 mm long with much narrower head, maximal width of head only 0.35 mm, maximal width of head of the male is 0.42 mm.

Differential diagnosis: *M. marjanaci* belongs to the species-subgroup *udrzali* as defined here below. It is very closely related to *M. jurinaci* by head wider than long but it can be readily separated from late by the larger body (1.80–1.92 mm, comparing to 1.7–1.8 mm for *M. jurinaci*) and the different structure of the aedeagus with parameres bearing only one long preapical seta.

Ecology: The length of the Špilja pod Zimzelom cave **(**UTM: WL01) (Figs 7, 8) is about 160 m. It is a sub-fossile cave with a large channel, rich with speleothems and moon milk formations. In the rainy period it is full of seeping water. *Machaerites marjanaci* was found under stones in the hall at the end of the cave. The air temperature on June 25th, 2008 was 8.6°C, water temperature was 8.7°C and the relative humidity was 96.6 %. The conditions on December 14th, 2008 were the following: air temperature was 8.0°C, water temperature 7.9°C and the relative humidity 100 %. Other cavernicolous fauna known from the cave: Amphipoda: *Niphargus* sp., Isopoda: *Titanethes albus* (C. Koch, 1841) (det. J. Bedek), Diplopoda: *Brachydesmus inferus* Latzel, 1884 (det. T. Dražina), Pseudoscorpiones: *Neobisium* sp., *Chtonius* sp., Araneae: *Parastalita stygia* (Joseph, 1882), *Troglohyphantes* sp. (det. M. Pavlek), Collembola: *Tritomurus scutellatus* Frauenfeld, 1855, *Pseudosinella* sp. (det. M. Lukić), Coleoptera: *Bathyscimorphus* sp., *Parapropus sereiceus* ssp., *Leptodirus hochenwartii* ssp., *Typhlotrechus bilimeki* ssp.

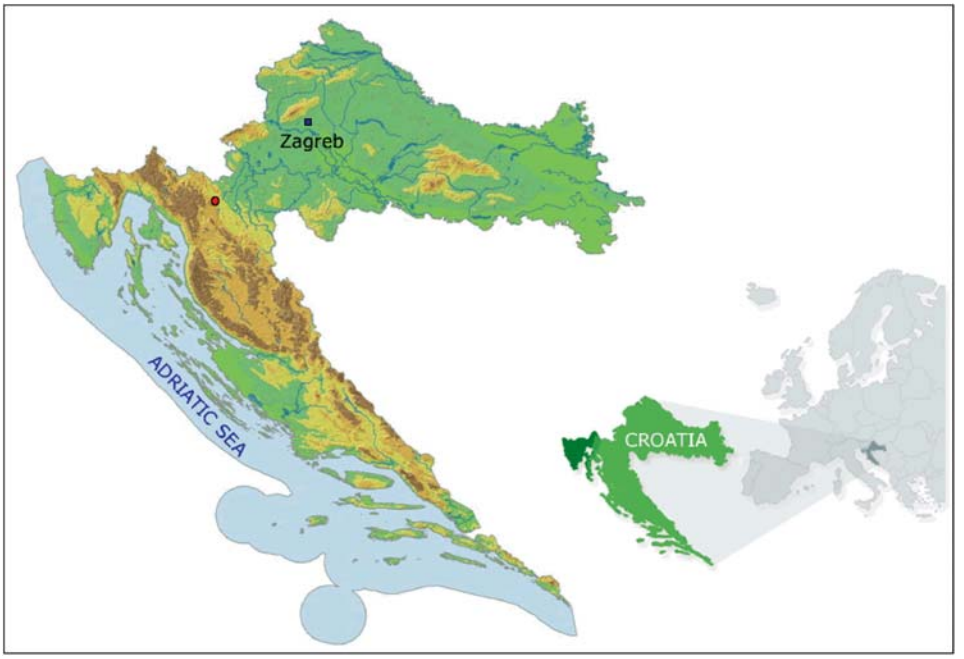

Fig. 7. The position of the Špilja pod Zimzelom cave (marked by red dot).

Updated list of the genus *Machaerites*:

***Machaerites spelaeus* species-group**
[aedeagus with parameres meeting apically]

subgroup ***udrzali***
[posterotibia simple]

jurinaci Pavičević & Ozimec, 2008: 282	HR
marjanaci sp. n.	HR
udrzali Hlaváč & Lakota, 2004: 139	HR

subgroup ***spelaeus***
[posterotibia modified close to apex]

spelaeus spelaeus Miller, 1855: 509	SLO, HR
spelaeus orientalis Nonveiller & Pavičević, 2001: 323	SLO
curvistylus Nonveiller & Pavičević, 2001: 325	HR

***Machaerites ravasini* species-group**
[aedeagus with parameres separated]

kastavensis Pavičević & Ozimec, 2008: 284	HR
mekotiensis Nonveiller & Pavičević, 2001: 328	HR
novissimus Nonveiller & Pavičević, 2001: 330	SLO

pavleki sp. n.	HR
ravasinii Müller, 1922: 32 (*Bythinus*)	SLO, I

Species not assigned to any group
[male unknown]

cognatus Nonveiller & Pavičević, 2001: 329	HR
croaticus Nonveiller & Pavičević, 2001: 320	HR
intermedius Nonveiller & Pavičević, 2001: 327	HR
nehaji Pavičević & Ozimec, 2008: 286	HR

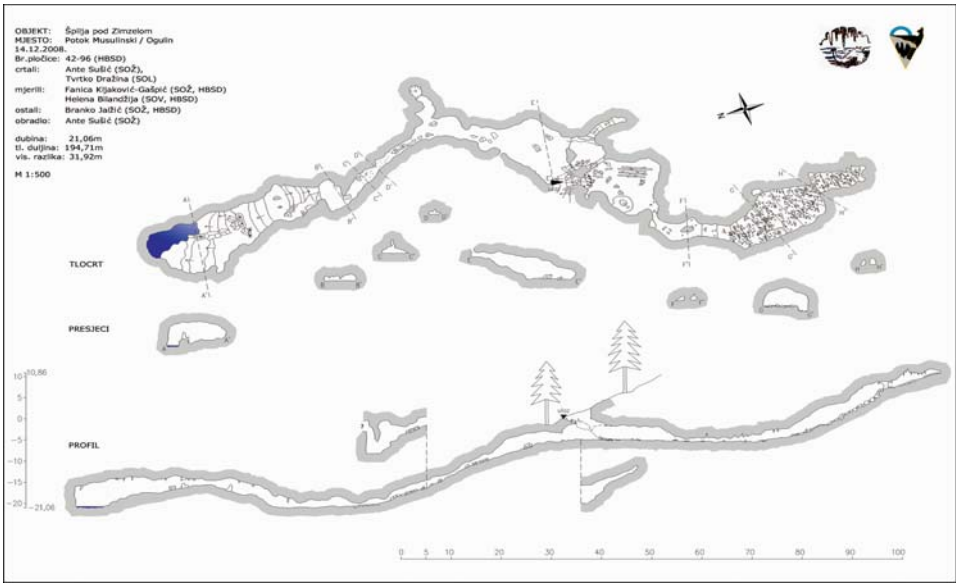

Fig. 8. Spelological of the Špilja pod Zimzelom cave.

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