A REVIEW OF MAGDELAINELLA JEANNEL, WITH A DESCRIPTION OF M. STUDENICAЕ SP. N. (COLEOPTERA, LEIODIDAE, LEPTODIRINI), A NEW ENDOGEAN BEETLE FROM SERBIA

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Abstract — A new species of endogean leptodirine leiodids (Magdelainella studenicae sp. n.) from the valley of the Studenica River, village of Miliće, near Ušće in Southwest Serbia, is diagnosed and described. This new species differs clearly from all other closely related taxa. Magdelainella Jeannel belongs to a phyletic lineage which includes three more genera: Knirschiella Guéorguiev, Kosaniniella S. Ćurčić, Brajković & B. Ćurčić, and Derveniella Pavičević & Perreau. Derveniella is given full generic status in the present paper; its members are known from Southeast Serbia only. Magdelainella noesskei (Apfelbeck), M. winkleri Jeannel, M. bozidarcurcici S. Ćurčić & Brajković, M. mucanjenisis S. Ćurčić, Brajković, B. Ćurčić & Schönmann, M. milojebrajkovicisi S. Ćurčić & B. Ćurčić, M. zivojindjordjevici S. Ćurčić, Brajković, B. Ćurčić & Schönmann, and M. nikolateslai S. Ćurčić, Brajković, B. Ćurčić & Schönmann are sharply delimited and represent valid species. The following new combinations are proposed for three species of Magdelainella: Kosaniniella hussoni (Jeannel), comb. n., K. nonveilleri (Pavičević & Perreau), comb. n., and K. orientalis (Pavičević & Perreau), comb. n. The Magdelainella-Knirschiella-Kosaniniella-Derveniella complex is probably of Mesogeid age and origin; its species originated during the Alpine Orogeny, which affected vast areas of the Balkan Peninsula, their terra typica.

Key words: Coleoptera, Leiodidae, Magdelainella studenicae, new species, revision, endogean fauna, Serbia

INTRODUCTION

The subterranean and endogean invertebrates of Serbia have been the object of extensive and intensive investigations in the recent past and are well-known for their high specific diversity and exceptional specialization of many taxa (Čurčić, 2002). However, the leiodid fauna in Serbia is insufficiently known. A great number of endogean and cave taxa from the subfamily Cholevirinae were described in the first half of the 20th century, among which the three species of the genus Magdelainella Jeannel from Serbia – M. serbica (Müller), M. winkleri Jeannel, and M. hussoni Jeannel (Müller, 1904; Jeannel, 1924, 1934). M. serbica and M. hussoni were subsequently found in Montenegro (Pavičević and Perreau, 2008). Additional cave-dwellers and endogean species were found only recently – M. bozidarcurcici S. Ćurčić & Brajković, M. zivojindjordjevici S. Ćurčić, Brajković, B. Ćurčić & Schönmann, M. mucanjenisis S. Ćurčić, Brajković, B. Ćurčić & Schönmann, M. nikolateslai S. Ćurčić, Brajković, B. Ćurčić & Schönmann, M. orientalis Ćurčić & Perreau, and M. (Derveniella) stevanovici Ćurčić and Brajković, 2002; Ćurčić et al., 2004, 2005; Pavičević and Perreau, 2008). Apart from Serbia, this genus contains also two species from Bosnia-Herzegovina, M. kauti (Apfelbeck) and M. noesskei (Apfelbeck) (Apfelbeck, 1907, 1919). Knirschiella Guéorguiev is removed from the genus Magdelainella and is given full generic status (Čurčić et al., 2004a). Its members are presently known from Albania.

A thorough study of a sample of leptodirine beetles from Southwest Serbia has enabled us to establish a new species, Magdelainella studenicae sp. n. The description of this new species is based on the study of the holotype male, paratype male, and paratype female. The type specimens are deposited in the collection of the Centre for Biospeleology,
Institute of Zoology, Faculty of Biology, University of Belgrade, Serbia (CBIZ 250-252).

Since the present knowledge imposes the necessity of a critical revision of some *Magdelainella*, we propose new status and new combination for some taxa considered herein in this paper.

**MATERIALS AND METHODS**

The leiodid beetles were fixed on paper labels and then analyzed as dry specimens. Genital structures were removed from insect bodies and fixed on microscope slides in a medium composed of Canada balsam and xylol.

The specimens obtained were analyzed in detail in laboratories of the Institute of Zoology, Faculty of Biology, University of Belgrade. Carl Zeiss-Stemi 2000 and Carl Zeiss-Ergaval binocular stereomicroscopes were used in this study, together with a special monitor and accessories for drawing.

**RESULTS AND DISCUSSION**

**LEIODIDAE FLEMING, 1821**

*Magdelainella Jeannel, 1924*


*Magdelainella studenicae*, new species (Figs. 1-8)

Etymology. – After the valley of the Studenica River, its terra typica.

Material examined. – Holotype male from the valley of the Studenica River, from under rocks and leaf-litter, village of Milić, near Ušće, Southwest Serbia, collected by B. Ćurčić and D. Stojanović, 20 August 2006; paratype male and paratype female, from under stones, same locality, collected by S. Ćurčić, S. Makarov, and D. Stojanović, 8-9 September 2007.


From *M. serbica*, the new species clearly differs by the presence/absence of eyes (absent vs. present), length of last antennomere (shorter than the two precedent antennomeres taken together vs. as long as the two precedent antennomeres taken together), form of elytra (not narrowed backwards vs. somewhat narrowed backwards), form of mesosternal carina (almost right-angled vs. obtuse-angled), form of median lobe (dragged apically vs. obtuse apically), features of inner sac (without any gutter-like structures vs. with an inverse Y-formed gutter-like structure), form of aedeagus in lateral view (median lobe more curved apically and more convex dorsally, parameres narrower vs. median lobe less curved apically and less convex dorsally, parameres wider), form of gonostylus (somewhat rounded proximally vs. not rounded proximally), and form of spermatheca (angulosely curved, with a large apical lobe vs. roundly curved, with a small apical lobe).

From *M. winkleri*, the new species is clearly distinct by the form of the body (more parallel vs. more oval), presence/absence of eyes (absent vs. present), length of last antennomere (shorter vs. as long), form of elytra (not narrowed vs. somewhat narrowed), form of mesosternal carina (almost right-angled vs. obtuse-angled), and form of spermatheca (angulosely curved, with a large apical lobe vs. roundly curved, with a small apical lobe).
Fig. 1. *Magdelainella studenicae* sp. n. from the valley of the Studenica River, village of Miliće, near Ušće, Southwestern Serbia. Scale line = 1.00 mm.
From *M. bozidarcurcici*, *M. studenicae* sp. n. differs in body size (2.19 mm vs. 2.03 mm), presence/absence of eyes (absent vs. present), length of antenomere III (slightly shorter than the demi-antenomere II vs. as long as demi-antenomere II), length/width ratio of antenomeres VII and XI (1.33 and 2.00 vs. 1.20 and 1.50), form of mesosternal carina (with a less prominent tooth and straight margins vs. with a large, prominent tooth and convex margins), width/length ratio of elytra (0.89-0.97 vs. 0.86), maximum width of elytra (just below elytral base vs. at the level of elytral anterior quarter), form of apex of median lobe (pointed vs. blunt), form of tegmen (rounded vs. more elongated), features of inner sac (without any U-formed and gutter-like structures vs. both with U-formed and an inverse Y-formed gutter-like structure), form of male abdominal sternite IX (urite) (subovate, with two pointed processes vs. oval, ring-like), position of some female gonostyl setae (all inner setae equidistant vs. distalmost inner setae more distant from other two setae), and form of spermatheca (roundly curved, with a smaller proximal lobe vs. right-angulosely curved, with a larger proximal lobe).

From its phenetically close congener, *M. zivojinjordjevici*, the new species is clearly distinct by the body size (2.36 mm vs. 2.03 mm), presence/absence of eyes (absent vs. present), antennal length (not reaching the level of the pronotum base vs. reaching the level of the pronotum base), length of
antennomere III (slightly shorter than the demi-antennomere II vs. as long as demi-antennomere II), length/width ratio of antennomere VII (1.14 vs. 1.20), form of pronotal base medially (protruding backwards vs. straight), length/width ratio of elytra (1.25 vs. 1.16), maximum width of elytra (after their fore third vs. at the level of their anterior quarter), form of gonostylus (gradually narrowing apically, somewhat rounded proximally vs. sharply narrowing apically, not rounded proximally), and form of spermatheca (straight, with the lobes of almost same size vs. roundly curved, with the apical lobe better developed than the basal one).

From *M. mucanjensis*, the new species is clearly distinct by the body size (2.27 mm vs. 2.03 mm), body color (brownish vs. yellow-brownish), presence/absence of eyes (absent vs. present), antennal length (almost reaching the level of the pronotum base vs. reaching the level of the pronotum base), length/width ratios of some antennomeres (III: 1.50 vs. 2.00; VII: 1.14 vs. 1.20; XI: 1.60 vs. 1.50), length of antennomere XI (slightly longer than antennomeres IX + X together vs. as long as antennomeres IX + X together), width/length ratio of pronotum (1.84 vs. 1.75), form of pronotal base medially (protruding backwards vs. straight), form of tooth of mesosternal carina (less pronounced vs. prominent), length/width ratio of elytra (1.24 vs. 1.16), maximum width of elytra (just after their fore fifth vs. at the level of their anterior quarter), and form of spermatheca (moderately curved, with narrow proximal lobe vs. roundly curved, with wide proximal lobe).

From *M. nikolateslai*, the new species is clearly distinct by the body size (2.37 mm vs. 2.03 mm), body color (brownish vs. yellow-brownish), presence/absence of eyes (absent vs. present), length/width ratios of some antennomeres (III: 1.75 vs. 2.00; VII: 1.29 vs. 1.20; XI: 1.67 vs. 1.50), length of antennomere III (slightly longer than demi-antennomere II vs. as long as demi-antennomere II), shape of anterior pronotal angles (obtuse vs. prominent), maximum width of pronotum (at the level of its third fourth vs. at the level of its fourth fifth), form of parameral apex (rounded vs. more elongated), length of parameres (not reaching the level of the median lobe apex vs. reaching the level of the median lobe apex), form of parameral apex (convex exteriorly vs. flattened exteriorly), and features of inner sac (without a gutter-like structure, with two simple teeth vs. with an inverse Y-formed gutter-like structure, with two bifid teeth).

**Description.** – Small-sized. Body length (with straightened head) = 2.03 mm. Body bathyscioid, convex (Fig. 1); tegument yellow-brownish, shiny, with short yellow laid hairs.

Head subquadrate (Fig. 1), with tiny sculptures and small punctures. Eyes almost absent, scissure-formed. Occipital carina absent.

Antennae short, reaching the level of the pronotum base. Antennomeres I and II long; antennomere III small, twice as long as wide, as long as demi-antennomere II; IV-VI similar to III, gradually thickening from IV to VI; antennomere VII thickened, its length/width ratio 1.20; antennomere VIII small, almost twice as short as the preceding article; IX and X larger than VIII; antennomere XI 1.5 times as long as wide and as long as antennomeres IX + X together (Fig. 1). Maxillary palps each with a small conical distalmost article.

Pronotum convex, its maximum width/length ratio 1.75, with short laid discal pubescence. Anterior
pronotal angles prominent, almost sharp. Anterior pronotal margin convex medially. Lateral pronotal margins arcuate; pronotum base length greater than maximum elytral width. Pronotum widest at the level of its fourth fifth. Pronotum base straight in its median part. Pronotum disk with microsculpture and some tiny punctures.

Mesosternal carina high (Fig. 2), almost rectangular, with a large prominent apical tooth. Margins of mesosternal carina slightly convex. Seven setae are carried both on the tooth, as well as on the posterior margin of mesosternal carina. Intercoxal apophysis narrow.

Elytra short, ovoid (Fig. 1), widest at the level of their anterior quarter, rounded apically, their width/length ratio 0.86 (0.88 in males; 0.81 in female). Elytra inconspicuously impressed anteriorly and laterally. Lateral margins arcuate, narrowing apically. Elytral disk convex, covered with short laid setae and some impressed punctures. Elytra with transverse striae, as well as with two longitudinal sutural striae. Scutellum triangular, large (Fig. 1).

Legs attenuated (Fig. 1). Protarsi pentamerous and dilated in males. Protibiae dilated distally. Mesotibiae moderately arcuated, each with four spines on the exterior margin. Metatibiae straight.

Aedeagus moderately long (Figs. 3-5), slightly arcuated, narrowing and pointing apically (Figs. 3 and 4). Tegmen rounded, elongated. Median lobe constricted in its posterior part and with a rounded apex. Paramerae long, slender, reaching the level of the median lobe apex. Parameral apex broad, with an outer process and three curved setae: one latero-exterior seta, one latero-dorsal internal seta, and one dorsal sub-apical seta (Fig. 5). Dorsal sub-apical seta somewhat more distant from latero-dorsal internal seta than the latter seta is distant from latero-exterior seta.

Internal sac with a sclerified complex armature (Fig. 3). Two bifid teeth situated above the medium part of the inner sac. Two lamellar parts exist just below the teeth. A chitinized basal U-formed structure situated at the base of the inner sac. An inverse Y-formed gutter-like structure present above the teeth.

Male abdominal sternite IX (urite) oval, ring-like (Fig. 6).

Female gonostyli elongated, thin, pointed, straight, somewhat widened basally (Fig. 7). Each stylus with a single apical seta, three inner setae, and one outer seta. The third inner seta situated more dorsally, and is somewhat distant from other inner setae. Spermatheca small, curved, constricted medially, but roundly widening distally (Fig. 8).

Bionomy and distribution. – The type specimens of the new species were found under rocks and from leaf-litter on the right bank of the Studenica River, village of Miloče, near Ušće, Southwestern Serbia. *Magdelainella studenicae* sp. n. is known only from the locality mentioned and represents an endemic and relict form of the Tertiary origin and age.

Derveniella Pavićević & Perreau, 2008, STAT. N.


**Type species.** – *Derveniella stefanovici* (Pavićević & Perreau, 2008).

**Other species.** – None.

**Type localities.** – Known from endogean habitats from Mts. Srđjške Planine (Prekonoge, Ribarška Korita, Modro Buče-Pleš) and Suva Planina (Mosor), as well as from the vicinity of Dimitrovgrad (Petraš), Serbia.

**Type series.** – Holotype male from the village of Prekonoge, 800 m a. s. l., *Fagetum*, Mt. Srđjške Planine, Southeast Serbia, collected by D. Pavićević, 10 August 1998; paratypes: two females from the village of Prekonoge, 900 m a. s. l., Mt. Srđjške Planine, Southeast Serbia, collected by D. Pavićević, 10 August 1998; one male and two females from Ribarška Korita, village of Prekonoge, 850 m a. s. l., Mt. Srđjške Planine, Southeast Serbia, collected by M. Stevanović, 5 June 1997; 19 males and 56 females from Ribarška Korita, village of Prekonoge, 850 m a. s. l., Mt. Srđjške Planine, Southeast Serbia, collected by M. Stevanović, 8 June - 11 July 1998;
two males and three females from the village of Prekonoge, 700 m a. s. l., Mt. Svrliške Planine, Southeast Serbia, collected by D. Pavićević and G. Nonveiller, 10 July 1998; one male and three females from Modro Buć-Pleš, 1.100 m a. s. l., Mt. Svrliške Planine, Southeast Serbia, collected by D. Pavićević, 13 May 2005; one male and three females from Petrlaš, near Dimitrovgrad, 770 m a. s. l., Southeast Serbia, collected by M. Stevanović and M. Popović, 2 February 2002; and one male from Mosor, Mt. Suva Planina, 700 m a. s. l., collected by M. Stevanović, 23 May 2002.

Diagnosis. – As presented in the paper of Pavićević and Perreau (2008).

Distribution. – The genus Derveniella is presently known only from endogean localities on Mts. Svrliške Planine and Mt. Suva Planina, as well as from the vicinity of Dimitrovgrad in the southeastern part of Serbia.

Remarks. – The genus Derveniella probably belongs to a separate phyletic lineage which originated during the Paleogene. The endemic differentiation of Derveniella and its related genera (Magdelainella, Knirschiella, and Kosaniniella) in the central part of the Balkan Peninsula was facilitated by the great Alpine Orogeny, paleoclimatic events, and subsequent evolution of the underground karstic relief which yielded many new epigean hypogean niches suitable for preserving this old and autochthonous fauna. Thus, the genus Derveniella represents an endemic and relict taxon inhabiting Serbia and the Balkan Peninsula.

KOSANINIELLA S. ĆURČIĆ, BRAJKOVIĆ & B. ĆURČIĆ, 2004

KOSANINIELLA HUSSONI (JEANNEL, 1934), COMB. N.

Old combinations. – Magdelainella Hussoni: Jeannel, Rev. Fr. Ent., 1934, 1, 97.


Type locality. – Hanjet Cave, Beljeva Glava, village of Ugao, 1.350 m a. s. l., Mt. Žilindar, Pešter plateau, Southwestern Serbia.

Other localities. – Small "unnamed" cave, village of Ugao, 1.200 m a. s. l., Pešter plateau, Southwestern Serbia; Fagetum, 1.250 m a. s. l., Mt. Trojan, Pešter plateau, Southwestern Serbia; Mala Pečina Cave, small valley, village of Cetanovići, Pešter plateau, Southwestern Serbia; Holeva Jama Pit, Stračijevac, village of Derekare, 1.400 m a. s. l., Pešter plateau, Southwestern Serbia; Pečina u Stračijevcu Cave, Stračijevac, village of Derekare, 1.350 m a. s. l., Pešter plateau, Southwestern Serbia; Pečina u Dubokom Potoku Cave, village of Bijela Crkva, Rožaje, Northeastern Montenegro.

Description and diagnosis. – As presented in the paper of Jeannel (1934).

Distribution. – This species is presently known both from caves and endogean localities on Pešter plateau (Southwestern Serbia), as well as from a single cave in Northeastern Montenegro.

Remarks. – After analyzing some new, previously not used morphological features of „M.” hussoni (shape of parameral apex, form of parameres laterally, position of parameral setae, structure of teeth from the inner sac, shape of spermatheca), we concluded that this species actually belongs in the genus Kosaniniella S. Ćurčić, Brajković & B. Ćurčić. This species is not present on Mts. Javor, Stari Vlah, Murtenica, and Goč, as Pavićević and Perreau (2008) stated. The mentioned paper comprises superfluous descriptions of two new „Magdelainella” species, their diagnoses missing, and the manuscript is overloaded with technical mistakes and misunderstandings. We stay at the opinion that Magdelainella nikolateslai S. Ćurčić, Brajković, B. Ćurčić & Schönmann, M. zivojindjordjevici S. Ćurčić, Brajković, B. Ćurčić & Schönmann, and Kosaniniella javorenzis S. Ćurčić, Brajković & B. Ćurčić are good, well-recognizable
species belonging to two separate genera (Čurčić et al., 2004, 2004a). They are not the synonyms of "Magdelainella" hussoni, like Ćavićević and Perreau (2008) erroneously stated.

KOSANINIELLA NONVEILLERI (PAVIČEVIĆ & PERREAU, 2008), COMB. N.


Type localities. – 540 m a. s. l., Mt. Bukulja, Central Serbia; village of Tresije, Mt. Kosmaj, Central Serbia; village of Donja Satornja, Mt. Rudnik, Central Serbia; village of Gruža, near Kragujevac, Central Serbia; Pećina u Brezacima Cave, village of Brezaci, 690 m a. s. l., Rajac, Mt. Suvobor, Western Serbia.

Description and diagnosis. – As presented by Ćavićević and Perreau (2008), but lacking numerous data on morphology and morphometric ratios and linear measurements of the species mentioned.

Distribution. – This species is presently known mainly from endogean localities from the mountains (Bukulja, Kosmaj, and Rudnik) and lower areas of the Šumadija Region.

Remarks. – Shape of parameral apex (narrowed), form of parameres in lateral view (slightly sigmoid), position of parameral setae (one inner seta borne below two other setae), and structure of teeth from the inner sac (two pairs of subequal teeth) indicate that this form actually belongs in the genus Kosaniniella. Both the original description and diagnosis should be further enriched with numerous missing data since they lack any information about main features of this taxon.

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REFERENCES


 novo врсте ендогејских лептодирина лејодиде (Magdelainella studenticae sp. n.) из долине реке Студенице, село Милиће, близу Ушћа у југоисточном Србији је јасно различије од свих својих сродника на основу већег броја корелативних особина.


Комплекс Magdelainella-Knirschiella- Kosaninella - Derveniella је вероватно мезогеидне старости и порекла. Алпска орогенеза је деловала на простране области Балканског полуострва, где су се населиле врсте које припадају споменутом комплексу родова.