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# Taxonomic notes on the *Bryaxis splendidus* species group (Coleoptera: Staphylinidae: Pselaphinae), with the description of a new species from the Ukraine

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**Abstract.** Species of the *Bryaxis splendidus* group are studied. One new species, *Bryaxis cepliki* sp. nov. is described from the Transcarpathian Ukraine. *Bryaxis goliath* Jeannel, 1922 is elevated to the species rank. Aedeagi of all species of the group are illustrated. Known records are listed and a key to species is provided.

**Key words.** Staphylinidae, Pselaphinae, Goniaceritae, *Bryaxis*, new species, Carpathian mountains

## Introduction

The Carpathians host many endemic species of beetles inhabiting the soil or leaf-litter, including the staphylinids of the subfamily Pselaphinae. The most speciose genus of the Pselaphinae in the Carpathians is *Bryaxis* Kugelann, 1794, with 21 species and four subspecies known so far from the region. From this number, 16 are strictly endemic to the Carpathians (see below). Particular among these endemics are three previously described and one new species, all of very large body and with strongly reduced, or without eyes. These species are grouped here into the newly established *Bryaxis splendidus* species group. This paper provides a key for the group, lists known records of the four species belonging to the group and gives the description of a new species from the Transcarpathian Ukraine.

## Material and methods

Specimens prepared for morphological study were examined with a Leica S8APO stereomicroscope with diffuse lighting at magnifications up to 128×. Male genitalia and other dissected parts were studied using a Zeiss transmitted-light microscope at magnifications up to 500×. Genital segments were dissected and treated with KOH when necessary. All drawings were made using a drawing tube. The dissected and mounted parts were mounted in Euparal and pinned with the specimen.

The following symbols are used in the paper: the slash symbol (/) separates data from different labels; my remarks and clarifications are given in square brackets. All taxa are arranged alphabetically.

Head length is measured from the base to the anterior margin of the frontal rostrum; head width is measured across the eyes; elytra length is measured along the suture; the width of antennal segments is their maximum width.

The following acronyms are used to indicate the depository of specimens:

CPH Peter Hlaváč collection, Košice, Slovakia;
NMPC National Museum, Prague, Czech Republic (Jiří Hájek).

## Taxonomy

### *Bryaxis splendidus* species group

**Diffential diagnosis.** The group is defined within the genus by the following combination of characters: (1) body unicoloured, reddish brown; (2) pronotum gibbous; (3) median occipital carina present; (4) eyes reduced, in females sometimes entirely absent; (5) maxillary palpomeres II and III irregularly granulate; (6) terminal maxillary palpomere large and flat with dense setation; (7) scape in males long, with well-projected secretory nodule at inner side; (8) pedicel longer than wide, oval, extended inwards by elevated edge with thickened and apically dentate margin; (9) inner side of pro- and metatibiae dentate close to apex; (10) aedeagus with parameres narrowed apically and forming proximally oriented lobes with variable shape, although the lobes are almost absent in *B. monstrosetibialis* (Stolz, 1923).

**Biology.** All specimens have been found in caves or in deep, shady and cold cavities under wet leaves or large, deeply buried stones.

**Distribution.** The species of the group are endemic to the Carpathians and the area of their distribution extends from northern Romania to central Slovakia (Fig. 8).

### Key to species of the *Bryaxis splendidus* species group

**Note.** Because of the small number of specimens available for this study and that fact that the species are very similar in external features, the following key is only tentative. Reliable identification requires the study of the aedeagi.

1 Scape robust, short, 1.4–1.6 times as long as wide, with triangular extension on inner side. ..... 2
– Scape slender and longer, 1.8–2.0 times as long as wide, almost parallel on inner side. ..... 3
2 Eyes very small, composed of two facets in male (female unknown), last segment of maxillary palpus 0.45 mm long, Ukraine. ..... ***B. cepliki* sp. nov.**
– Eyes large, composed of seven facets in males and 4–5 facets in females, last segment of maxillary palpus 0.38 mm long, Slovakia. .....***B. montrosetibialis*** (Stolz, 1923)
3 Large species, body length 2.6 mm, Romania. ..... ***B. goliath*** (Jeannel, 1922)
– Smaller species, body length 2.0–2.1 mm, Ukraine. ..... ..... ***B. splendidus*** (Croissandeau, 1891)

## *Bryaxis cepliki* sp. nov.

(Figs. 1–4, 8)

**Type locality.** Ukraine, Transcarpathian Ruthenia, Mala Ugolka, Zhemchuzhnaya cave

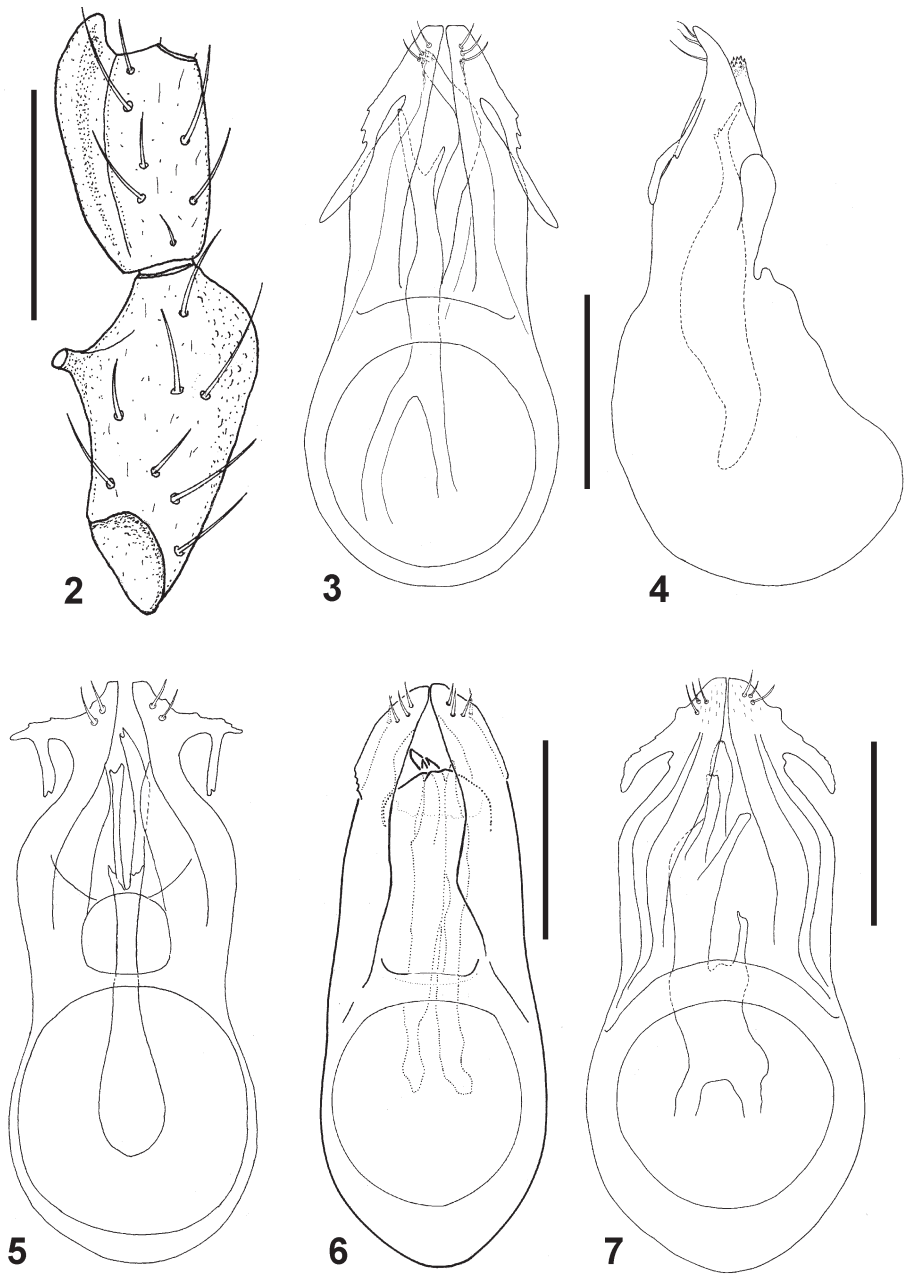
**Type material.** Holotype: ♂, 'UKRAINE: Zakarpattya, Mala Ugolka, Žemčužnaja cave, 16.VII.2007, D. Čeplík lgt. / HOLOTYPE *Bryaxis cepliki* sp. nov., P. Hlaváč det., 2008' (NMPC). Paratype: ♂, 'UKRAINE: Zakarpattya, Velika Ugolka, cave Moločnyj kameň, 15.VII.2007, D. Čeplík lgt.' (CPH).

**Description.** Body (Fig. 1) length 2.1–2.3 mm, maximum width of elytra 0.85–0.90 mm. Head 1.3 times as long as wide, almost smooth and shining, slightly narrowed anteriorly. Frons with large, elongate excavation between antennal tubercles; the excavation almost reaching middle of head, bordered with two lateral carinae. Median longitudinal occipital carina well defined. Eyes well visible dorsally, composed of 5–6 facets, vertexal foveae well defined, in line of eyes. Maxillary palpi long, segment I pedunculate, segment II very small, both irregularly granulated, segment III 0.40–0.42 mm long, almost as long as head. Antennae short, slightly exceeding base of elytra, scape (Fig. 2) 1.4 times as long as wide and 1.1 times as long as pedicel, pedicel twice as long as wide, antennomeres III–VII subequal in length, elongate, antennomere VIII–X subspherical, terminal segment 1.9 times as long as wide, acute at apex, relative lengths of antennomeres I–XI equal to 22 : 20 : 7 : 6 : 6 : 6 : 6 : 5 : 6 : 8 : 21. Scape oval, with well-defined triangular, projecting secretory nodule at inner side, pedicel extended inward by elevated oblique edge. Pronotum gibbous, smooth, glossy, covered with long, sparse setae, about as long as head and 1.25 times as wide as long, antebasal sulcus well defined, widest at two fifths from anterior margin. Elytra at suture about 1.75 times as long as pronotum. Legs robust, femora swollen. Pro- and metatibiae with internal dentation located close to apex. Aedeagus 0.55–0.61 mm long (Figs. 3, 4).

Fig. 1. *Bryaxis cepliki* sp. nov., habitus.

**Sexual dimorphism.** Female unknown.

**Differential diagnosis.** *Bryaxis cepliki* sp. nov. can be easily recognized within




Figs. 2–7. 2–4 – *Bryaxis cepliki* sp. nov. 2 – scape and pedicel; 3 – aedeagus, dorsal aspect; 4 – aedeagus, ventral aspect. 5 – *B. goliath* (Jeannel, 1922), aedeagus, dorsal aspect (reproduced from Jeannel 1955: 40). 6 – *B. monstrosetibialis* (Stolz, 1923), aedeagus, dorsal aspect (from Hlaváč 2000: 38). 7 – *B. splendidus* (Croissandeau, 1891), aedeagus, dorsal aspect. Scale bars = 0.2 mm.

the *B. splendidus* species group by the shape of the aedeagus (Figs. 3, 4).

**Etymology.** Named after my friend David Čeplík, Košice, a very enthusiastic biospeleologist and collector of both specimens of the new species.

**Biology.** The holotype was collected in wet scree near the wall at the end of the Zhemchuzhnaya cave, about 50 m from the entrance. The paratype was collected under large stones at the end of the Molochniy kamen cave, about 80 m from the entrance.

**Distribution.** Ukraine (Transcarpathian Ruthenia).

### *Bryaxis goliath* (Jeannel, 1922), stat. restit.

(Figs. 5, 8)

*Megalobythus goliath* Jeannel, 1922: 233. Type locality: Romania, cave Corobana Mandraţului, comm. de Scărişoara, jud. Turda-Arieş.

*Bryaxis splendidus goliath* Jeannel: Machulka (1935: 131).

**Note.** Machulka (1935) treated this species as a variety of *B. splendidus*. I had not the posibility to see the species but the shape of the apices of the parameres as illustrated in Jeannel (1955: 40, Fig. 17b) and reproduced in Fig. 5 combined with the large body size indicate that *B. goliath* is a distinct species.

**Distribution.** Known only from the type locality, Corobana Mandraţului cave in Munti Apuseni, Romania

### *Bryaxis monstrosetibialis* (Stolz, 1923)

(Figs. 6, 8)

*Bythinus monstrosetibialis* Stolz, 1923: 71–72. Type locality: Bad Rosenau in Ungarn (Komitat Gömör [Gemer region in southern Slovakia]).

*Bythinus Trojani* Fleischer, 1925: 17–18. Type: Slovakia, ‘okraj Demänovských jeskyň [edge of Demänovská cave]’, synonymised by Machulka (1929c: 120–121).

*Megalobythus Trojani* Fleischer: Machulka (1929a: 22; 1929b: 23–24).

*Bythinus* (*Macrobythus*) *monstrosetibialis* Stolz: Roubal (1930: 507–508).

*Bythinus monstrosetibialis* Stolz var. *ocularis* Machulka, 1935: 131. Type locality: Slovakia, ‘okolie dobšinské jeskyně [surroundings of Dobšiná cave]’, synonymised by Löbl & Besuchet (2004: 307).

*Balcanobythus* (*Megalobythus*) *monstrosetibialis* Stolz: Karaman (1957: 187, 208, Fig. 6 (aedeagus)).

*Bryaxis monstrosetibialis* Stolz: Besuchet (1974: 349, Fig. F. Basis 18: 26 (first two antennal segments)); Hlaváč, (2000: 37, new records, biology, aedeagus and habitus drawings); Franc & Mlejnek (2000: 31–34, new records, biology).

**New records** (all data provided by Martin Švarc; all specimens deposited in his collection). **SLOVAKIA:** 13 ♂♂ 17 ♀♀: Hrochoť, Hrochoťská dolina [valley], sifting of leaf-litter in cave, Švarc lgt.; 4 ♂♂ 2 ♀♀: Liptovský Mikuláš, Demänovská jaskyňa [cave], under stones and sifting leaf-litter in cave, Švarc lgt.; 2 spec.: Muráňska planina, jaskyňa Maretkina [cave], Orszulík lgt.; 1 ♂: Slovenský raj, jaskyňa Duča [cave], trap, Košel lgt.; 3 ♂♂: Závadka nad Hronom, Veľká Stožka, Machnatá dolina [valley], sifting of litter near spring, Krátky lgt.; 1 ♀: Muráň, Javorníkova dolina [valley], sifting *Fagetum*, Mantič lgt.; 1 ♂: Kremnické vrchy, Diera pod oknom, 1190m, Mlejnek lgt.; 1 ♂: Nízke Tatry Mts., jaskyňa nad Patočinami [cave above Patočiny], 3,700 m a.s.l., Mlejnek lgt.; 1 ♂: Malá Fatra, Veľký Rozsutec, Brestovanský lgt.; 2 ♀♀: Nízke Tatry Mts., Demänovská dolina [valley], Orszulík lgt.

**Records from the literature.** Roubal (1930) and Machulka (1929a,b,c, 1935) summarized old data from the following localities: near Rožňava, near Košice, Gemer (exact locality not available), Krupina, Nová Baňa, Muráň, and Dobšiná. Additional recent record was published from Zádieľ in the eastern Slovakia by Majzlan & Rychlík (1994). A decade ago I summarized all old data and added some other localities: Slovenský kras (exact locality not available), Tisovec env. (Michňová jama), Handlová, Plešivecká planina (Lastovičia jama) (Hlaváč 2000). Finally, Franc & Mlejnek (2000) studied the ecology and distribution of the species and mentioned the following localities:

Malá Fatra (lúky nad Hornými dierami [meadows above Horné diery]); Sokolec; Fačkovské sedlo [saddle], Plešivecká planina (Lastovičia priepasť [abyss]), Revúcka vrchovina (jaskyňa [cave] Burda, Veľká driencanská jaskyňa [cave]), Poľana (Hrochoťská jaskyňa [cave]), Horehronské podolie: Valaská (jaskyňa v kameňolome [cave in stone-pit] Potôčky), Horehronské podolie: Červená skala (Márnikova jaskyňa [cave]), Starohorské vrchy (jaskyňa pri Uľanke [cave near Uľanka]), Nízke Tatry (Demänovská dolina [valley], Tunelová jaskyňa [cave]).

**Distribution.** Slovakia.

### *Bryaxis splendidus* (Croissandeau, 1891)

(Figs. 7, 8)

*Bythinus splendidus* Croissandeau, 1891: 134. Type locality: not provided.
*Bythinus splendidus* Croissandeau: Machulka (1935: 131, new record).

**Material examined. UKRAINE:** ♂: Kuzy. 1930. / *Bythinus splendidus* Croiss. Det. Ing. Machulka / 1 / Nár. Mus. Praha coll. Machulka / *Bryaxis splendidus* Croiss. Cl. Besuchet dét. I. 1977; ♀: Kuzy / *Bythinus splendidus* Croiss. Det. Ing. Machulka / Nár. Mus. Praha coll. Machulka; ♂ [only aedeagus on a plastic slide, the whole body is missing]: Kuzy / 3 / Nár. Mus. Praha coll. Machulka. All specimens are deposited in NMPC and bear my identification label.

**Distribution.** Known only from the locality of Kuzy in the Transcarpathian Ukraine.

## Discussion

*Bryaxis splendidus* was described from an unknown locality based on one male stored together with *B. reitteri* Saulcy, 1875 (Croissandeau 1891: 134). *Bryaxis reitteri* is an endemic species of the eastern Carpathians, known from Poland, Slovakia, the Ukraine and Romania. This information helped the excellent Czech entomologist, Václav Machulka, to find one male in a small park in the village of Kuzy, near Velikij Bichkiv, during his trips to the Transcarpathian Ukraine in 1932. Another specimen was found by Mr. Klička at the same locality (Machulka 1935). These are the only two specimens for which the locality is known.

The second species of this group, *B. goliath*, was described by Jeannel (1922) based on a single male found in the cave Corobana Mandrațului in Romania. Jeannel (1922) even erected a separate genus, *Megalobythus* Jeannel, 1922, for this extraordinary species, but obviously ignored Croissandeau's *B. splendidus*. Although the Corobana Mandrațului cave has been repeatedly explored by Slovakian entomologists from Košice, this species was not found again.

The third species of the *B. splendidus* group, *B. monstrosetibialis*, was described by Stolz (1923) based on 12 ♂♂ and 2 ♀♀ from Gömör [= Gemer, southern Slovakia]. Machulka (1935: 131) considered *Megalobythus* as a valid genus but treated *B. goliath* as a variety of *B. splendidus*. Karaman (1957) considered *Megalobythus* as a subgenus of *Balcanobythus* Karaman, 1957 and included there also other species together with three species mentioned above: *B. weisei* Saulcy, 1875, *B. carpathicus* Saulcy, 1875, *B. femoratus* Aubé, 1844, *B. troglodytes* Fiori, 1900 and *B. elephas* Reitter, 1880 (now a synonym to *B. crassicornis* Motschulsky, 1835). In my opinion, the antennal and aedeagal characters exclude the latter five species from the *B. splendidus* species group.

The efforts of the biospeleological group from Košice (D. Čeplík, R. Lohaj and G. Dunay) in Ukraine enabled the discovery of the fourth species from the group, which is described above.

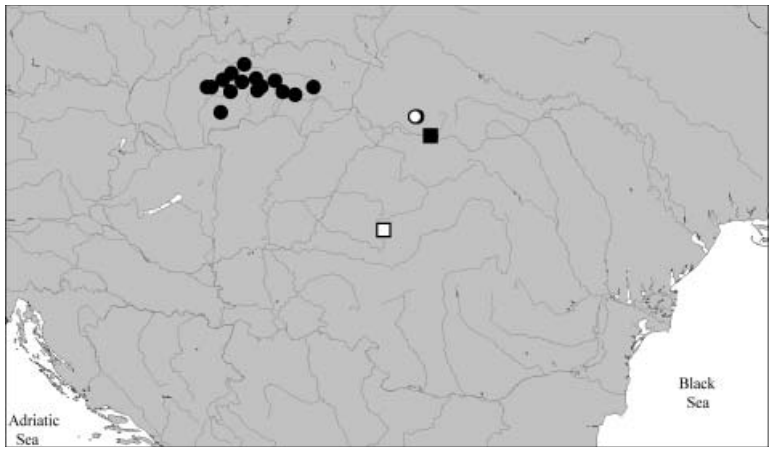



Fig. 8. *Bryaxis splendidus* species-group, distribution (black circle – *B. monstrosetibialis* (Stolz, 1923); white circle – *B. cepliki* sp. nov.; black square – *B. splendidus* (Croissandeau, 1891); white square – *B. goliath* (Jeannel, 1922)).

## List of species of the genus *Bryaxis* of the Carpathian mountains

**Note:** A key to species of the Czech and Slovak Republic was provided by Löbl (1961).

A. Endemic species:

| | | |
|---|---|---|
| 1. | *attila* Saulcy, 1878: 43 (*Bythinus*) | Romania |
| 2. | *bajulus* Hampe, 1863: 287 (*Bythinus*) | Hungary, Romania, Serbia |
| 3. | *carpathicus* Saulcy, 1875: 358 (*Bythinus*) | Poland, Romania, Slovakia, Ukraine |
| 4. | *curtisii hungaricus* Reitter, 1881: 498 (*Bythinus*) | Hungary, Romania |
| 5. | *cepliki* sp. nov. | Ukraine |
| 6. | *frivaldszkyi frivaldszkyi* Reitter, 1887: 504 (*Bythinus*) | Hungary, Poland, Ukraine |
| 7. | *frivaldszkyi slovenicus* Machulka, 1926: 48 (*Bythinus*) | Slovakia |
| 8. | *goliath* Jeannel, 1922: 233 (*Megalobythus*) | Romania |
| 9. | *monstrosetibialis* Stolz, 1923: 71 (*Bythinus*) | Slovakia |
| 10. | *reitteri* Saulcy, 1875a: 358 (*Bythinus*) | Poland, Romania, Slovakia, Ukraine |
| 11. | *ruthenus deubeli* Ganglbauer, 1896: 179 (*Bythinus*) | Romania |
| 12. | *ruthenus ruthenus* Saulcy, 1877: 12 (*Bythinus*) | Poland, Romania, Slovakia, Ukraine |
| 13. | *sculptifrons* Reitter, 1880: 535 (*Bythinus*) | Slovakia, Romania, Serbia, Ukraine |
| 14. | *splendidus* Croissandeau, 1891: 134 (*Bythinus*) | Ukraine |

15. *transsilvanicus* Ganglbauer, 1897: 568 (*Bythinus*) — Romania
16. *viertli* Reitter, 1881: 542 (*Bythinus*) — Hungary, Romania, Serbia
17. *weisei* Saulcy, 1875: 358 (*Bythinus*) — Poland, Romania, Slovakia, Ukraine

B. Widespread European species:

18. *bulbifer* Reichenbach, 1816: 37 (*Pselaphus*)
19. *carinula* Rey, 1888: 4 (*Bythinus*)
20. *clavicornis* Panzer, 1809: 3 (*Pselaphus*)
21. *curtisii orientalis* Karaman, 1952: 106 (*Bythinus*)
22. *femoratus* Aubé, 1844: 132 (*Bythinus*)
23. *nigripennis* Aubé, 1844: 131 (*Bythinus*)
24. *nodicornis* Aubé, 1833: 37 (*Bythinus*)
25. *puncticollis* Denny, 1825: 26 (*Arcopagus*)
26. *ullrichii* Motschulsky, 1851: 496 (*Bythinus*)

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