Studies and Reports
Taxonomical Series 18 (2):469 - 474, 2022

New *Agaricophagus* Schmidt, 1841 (Coleoptera: Leiodidae: Leiodinae) from Crete with data about the association of *Agaricophagus* with *Tuber* fungi

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Taxonomy, new species, key, bionomics, Coleoptera, Leiodidae, Leiodinae, *Agaricophagus*, *Tuber*, Crete

Abstract. *Agaricophagus assingi* sp. nov., from Greece (Crete) is described and compared to the similar species. In the key to the identification of *Agaricophagus* Schmidt, 1841, all the known species are presented. Data about association of *Agaricophagus italicus* Hlisnikovský, 1964 with four species of the *Tuber* fungi are presented for the first time.

INTRODUCTION

Six species of the genus *Agaricophagus* Schmidt, 1841 have been known up to now. The seventh species, new to science, is described in this paper. The distribution of all known species of the genus, including the new one, is limited to the western Palaearctic Region.

With one exception (see below) all of the known *Agaricophagus* species are of unknown feeding habits.

MATERIAL AND METHODS

This paper is based on the material collected by Volker Assing (Hannover, Germany) in Crete Island and on leiodid material from Italy provided by G. M. Carpaneto (Università Roma, Italy).

Collecting data cited in quotation marks are taken from the locality labels accompanying the examined examples. The holotype and paratypes are indicated by a red label bearing the status of the specimen (holotypus or paratypus respectively), the name of the species, the name of the author and the year of the designation.

The dissected specimens were relaxed in 4% acetic acid first and rinsed in water. The male genitalia were mounted in polyvinylpyrrolidine (Lompe 1986) on a transparent label added to the dissected specimen.

The description is based on the holotype. The variability mentioned in the paragraph "Variation" includes features exhibited by the paratypes.

The measurements of the total body length were taken from all specimens examined. Specific measurements of the individual body parts were taken from the holotype only except of the data about the variation. The measurements of body parts were measured to the first decimal place of millimetre, the measurement of the genitalia was measured to the

second decimal place of millimetre.

Abbreviations:

ZSPC	Zdeněk Švec, Praha, private collection, Czech Republic.
A2-A11	antennomeres 2-11.
T1-T5	tarsomeres I-V.
L/W or W/L	Ratio between measurements of length (L) and width (W).

KEY AND DESCRIPTION

The key to the identification of the *Agaricophagus* Schmidt, 1841 species (according to Daffner 1983, modified)

1 Pronotum without transverse strigosity. 2
- Pronotum transversely strigose. 5

2(1) Head with strigosities developed at most on its tempora. 3
- Entire dorsal surface of head with strigosity. 2.0-3.0 mm. Italy, Turkey. ..... *A. italicus* Hlisnikovský, 1964 (female)

3(2) Pronotum widest before slightly obtuse posterior angles, lateral outlines narrowed toward base and anterior corners in dorsal view. A11 distinctly shorter than A9+A10 together. Length of tempora at most half of longitudinal diameter of eyes. 4
- Pronotum evenly rounded anteriorly from acute posterior angles in dorsal view. A11 long, almost as long as A9+A10 together. Length of tempora 2/3 of longitudinal diameter of eyes. 2.3 mm. Russia (Caucasus - North Ossetia). ..... *A. leiodoides* Perkovsky, 1996

4(3) Punctures in elytral intervals distinctly smaller and sparser than the punctures in the principal rows. Hind straight margin of posterior femur of male equipped with small unobtrusive triangular tooth. Median lobe of aedeagus rounded on its top, its lateral appendices feebly twisted apically (Fig. 1). Greece (Crete). 2.4-3.2 mm. ..... *A. assingi* sp. nov.
- Elytral interval punctures a little sparser and smaller than those in principal elytral rows. Posterior margin of hind femur deeply excavate in male with strong, long, medially oriented hook. Median lobe pointed on its tip, lateral appendices club-shaped (Fig. 2). 2.0-3.2 mm. Austria, Bosnia-Herzegovina, Greece (Corfu), Hungary, Italia, Romania, Slovakia. ..... *A. reitteri* Ganglbauer, 1899

5(1) Elytral interval punctures similar to those in principal rows, only a little sparser and smaller. 1.6-2.6 mm. Caucasus - Georgia, Russia. ..... *A. caucasicus* Hlisnikovský, 1964.
- Elytral interval punctures distinctly smaller and sparser than the punctures in the principal rows. 6

6(5) Pronotum finely and densely punctured. 2.0-3.0 mm. Italy, Turkey. ..... *A. italicus* Hlisnikovský, 1964 (male)
- Pronotum finely and very sparsely punctured. 7

7(6) Tempora at most 2/3 as long as longitudinal length of eyes. 1.8-3.0 mm. Austria, Bosnia, Caucasus, Croatia, Czechia, Denmark, England, France, Germany, Hungary, Italy, Netherlands Norway, Poland, Slovakia, Sweden. ..... *A. cephalotes* Schmidt, 1841
- Tempora as long as longitudinal length of eyes. 2.5-3.2 mm. Bulgaria, Greece, Italy, Macedonia, Montenegro. ..... *A. balcanicus* Hlisnikovský, 1964

Agaricophagus assingi sp. nov.

(Figs. 1, 3)

Type material. Holotype (♂): "GR-Crete [27], E Agios Nikolaos, S Sfaka 35°09′00′′N 25°55′26′′E, 320 m, soil washing, 29.XII. 2019, V. Assing", (ZSPC). Paratypes (2 ♂♂), "GR-Crete [29], SW Ag. Nikolaos, SW Kroustas, 35°07′02′′N 25°37′56′′E / 810 m, soil washing, 30.XII. 2019, V. Assing", (ZSPC).

Description. Length 2.4 mm, head 0.3 mm, pronotum 0.7 mm, elytra 1.4 mm, antenna 0.6

mm, aedeagus 0.38 mm. Maximum width of head 0.7 mm, pronotum 1.1 mm, elytra 1.1 mm. Body oblong oval (Fig. 3). Dorsum shining, yellow-brown. Legs, antennomeres and ventral surface yellow-brown.

Head. Surface punctured without micro-sculpture except of longitudinally strigose tempora. Tempora short, half the longitudinal length of eyes. Puncturation coarse and dense, punctures separated by 1-2 times their diameter. Two larger punctures located on frons and two larger punctures present on vertex. Large punctures on vertex more distant from each other than those on frons. Eyes normally developed. Relative length of A2-A11 (A2 = 1.0): 1.0 - 1.8 - 0.9 - 0.9 - 0.9 - 1.3 - 0.8 - 1.3 - 1.3 - 1.9. Relative width of A2-A11 (A2 = 1.0): 1.0 - 1.1- 1.3 - 1.4 - 1.4 - 1.9 - 1.4 - 2.0 - 2.0 - 1.7. W/L of AII-AXI = 0.9 - 0.6 - 1.3 - 1.3 - 1.3 - 1.3 - 1.7 - 1.4 - 1.4 - 0.8.

Pronotum. Surface smooth without any strigosity.Broadest shortly before base, roundly narrowed to base and anterior angles. Base straight. Posterior angles slightly obtuse, rounded in dorsal view; distinctly obtuse broadly rounded in lateral view. Sides flatly rounded in lateral view. Punctures distinct, similar as those on head separated by about 1-3 times their diameter.

Elytra. Punctures arranged in rows. Principal rows consisting of coarse punctures separated by about one time their diameter longitudinally, interval punctures distinctly sparser and smaller than those in principal rows, separated by about 2 times their diameter. Punctures connected by transverse strigosity separated by about 0.03 mm. Sutural striae terminating close to scutellum.

Wings. Developed.

Legs. Protarsomeres T1-3 slightly widened with dense white setae ventrally, T1 of meso- and metatarsi distinctly widened. Posterior femur with very small unobtrusive triangular tooth on its straight hind margin.

Male genitalia. Aedeagus in Fig. 1.

Variation. The length of body varies between 2.4-3.2 mm. The ratio of length A9+A10:A11 varies between 1.3 and 1.5. The size of femoral tooth is constant in the type series regardless the size of the body.

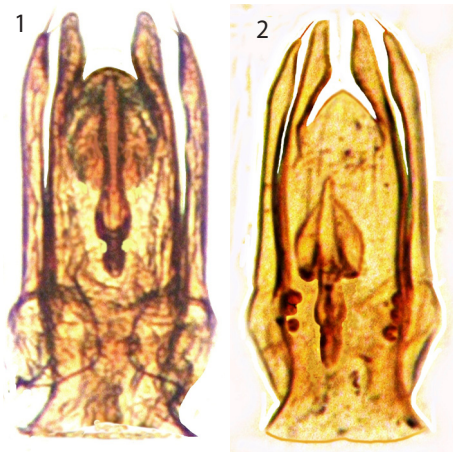
Biology. Not known. The species was collected by soil washing.

Etymology. The new species was named in honour of Volker Assing well known specialist in Staphylinidae who collected the species.

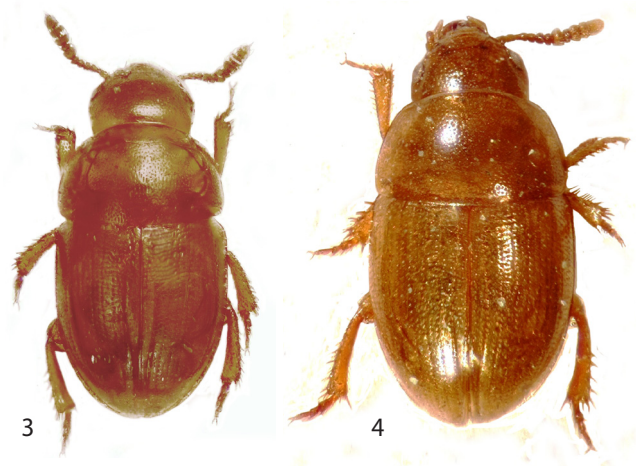
Differential diagnosis. *Agaricophagus assingi* sp. n. is most similar to *A. reitteri* Ganglbauer, 1899 in the head strigosity limited on tempora only, in the lack of pronotal transverse strigosity, in the length of A11 that is distinctly shorter than A9 +A10 together and in the density and strength of the head and pronotal puncturation. Both species differ by elytral sculpture. Interval punctures are distinctly smaller and sparser than the punctures in the principal rows in *A. assingi* sp. nov. while punctures in principal and interval rows are similar, only a little different in size and density. Posterior femur of male is equipped with

small unobtrusive triangular tooth located on its straight posterior margin in *A. assingi* sp. nov. whereas posterior margin of the posterior femur is deeply excavate with strong, long medially oriented hook in male of *A. reitteri.* The shape of the aedeagus is quite different in the both compared species. The median lobe is rounded on its top, lateral appendices are feebly twisted apically and the endophallus resembles an arrow turned by its tip toward base of median lobe in *A. assingi* sp. nov. (Fig. 1). The median lobe is pointed on its tip, lateral appendices clavate and the endophallus is linden leaf-shaped in *A. reitteri* (Fig. 2).

Discussion. Another *Agaricophagus* species - *A. leidoides* Perkovsky, 1996 similar to *A. assingi* sp. nov. was described by from the North Ossetia. The description was based on a single female specimen. Since the date of the original description, no further specimen of the species was found. According to the original description the species is extremely similar, perhaps identical with *A. reitteri*. The most important characters differing the both species mentioned in the original description were the shape of the pronotum, the length



Figs. 1-2. Aedeagus dorsally: 1- *Agaricophagus assingi* sp. nov.; 2- *A. reitteri* Ganglbauer, 1899



Figs. 3-4. Body dorsally: 3- *Agaricophagus assingi* sp. nov.; 4- *A. reitteri* Ganglbauer, 1899

of tempora, of the ultimate antennomere and the strongly bent tip of the spermatheca. The same characters apply as to the distinction *A. leiodoides* from *A. assingi* sp. nov. Among the characters mentioned above the shape of the tip spermatheca did not seem to be useful for the distinction on the species level as the shape of the spermatheca tip varies a little in *A. reitteri* from a simple sickle-shaped distal part of spermatheca to sickle-shaped spermatheca with more or less bent tip (Švec pers. observation). Variability of *A. leiodoides* is unknown, because the only female specimen (the holotype) is known. *A. leiodoides* was not included in the Palaearctic Catalogue (Perreau 2015). Until a male of the species will not be found and investigated, the status of the species is rather unclear. Despite some doubts the species, and its basal characters are included in the key to the identification of the genus *Agaricophagus* provided above.

DATA ON BIONOMY OF THE GENUS *AGARICOPHAGUS*

The species of the genus *Agaricophagus* supposedly associate with fruiting bodies or with mycelia of subterranean fungi. This hypothesis is supported by the findings of *A. italicus* in the *Tuber* fruiting bodies. The data concerning the collecting circumstances are presented bellow with the kind approval of Giuseppe Maria Carpaneto (Universitá Roma, Italy) who asked the author of the present paper for the determination of the leiodid material.

Agaricophagus italicus Hlisnikovský, 1964 found in the Italian localities on following *Tuber* species.

Mushroom species	Locality	Date
Tuber aestivum (Wulfen) Persoon 1801	Lazio, Alvito	4., 13., 14.x.2010
Tuber magnatum Picco 1788	Abruzzo, Civita d′Antino	14.x.2010
Tuber mesentericum Vittadini 1831	Lazio, Alvito	6.x.2010
Tuber mesentericum Vittadini 1831	Lazio, Settefrati	6., 12., 23.x.2010
Tuber brumale Vittadini 1831	Lazio, Campoli Apennino	5.iii. 2010

ERRATA

Erroneous abbreviation MMBC of the Moravian Museum in Brno should be replaced by the correct expression MZMB in the seventeenth line on the page 197 in the paper Švec Z. 2022: A review of the genus *Dermatohomoeus* Hlisnikovský, 1963 (Coleoptera: Leiodidae: Leiodinae) from Madagascar with the descriptions of seven new species. *Studies and Reports, Taxonomical Series* 18(1): 195-217.

ACKNOWLEDGEMENTS. My sincere thanks belong to Volker Assing (Hannover, Germany) who collected the new species. I also want to thank Jiří Hájek (curator in the National Museum in Prague, Czech Republic) for allowing me to study the necessary comparative leiodid material and last but not least Giuseppe Maria Carpaneto (Roma, Italy) for allowing me to present here some results of the investigation concerning the association of *Tuber* mushrooms and leiodids.

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Received: 2.6.2022
Accepted: 20.6.2022
Printed: 5.10.2022