

Hebeloma Studies, II. (Basidiomycetes, Cortinariaceae)

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Abstract — Description of two new taxa: *Hebeloma ammophilum* sp. n. and *H. psammocolum* sp. n., furthermore, floristical-taxonomical data of four known species. With 4 figures.

Further examination of *Hebeloma versipelle*

On the basis of the *H. versipelle* (FR.) GILL. ss. KONRAD & MAUBLANC materials collected on several occasions, it seemed that the problem of *Hebeloma versipelle* needed further investigation, in spite of the previous discussion (BOHUS 1972).

It could be inferred that *H. versipelle* with small spores which had been described by ROMAGNESI (1965) is not identical with the one described by FRIES (1836–1838*, 1874), since there are contradictions when the two diagnoses are compared with each other. For example, according to ROMAGNESI the pileus is “épais et charnu”, while the fungus of FRIES is with a thin flesh — “pileus tenuis” — and a further indication of a fungus with thicker flesh is that ROMAGNESI brings the species in relation with the thicker-fleshed *H. fastibile* of KONRAD & MAUBLANC (1924–1930, tab. 77). Or, for example, the stipe in the ROMAGNESI-type *H. versipelle* is “marquée en haut de flocons blancs plus ou moins persistans”, while in FRIES following can be read: “apice... pruinoso”. In studying our *H. versipelle* material, no contradiction emerged in comparison with FRIES’s diagnosis. It would be better if Prof. ROMAGNESI gave a new name to his fungus.

The real *H. versipelle* (FR.) GILL ss. KONR. & MAUBL. species with large spores are represented by KONRAD & MAUBLANC (1924–1930, tab. 78.) and COOKE (1884–1886, tab. 451/410, sub nomine *H. claviceps*).

Further publications using the *H. versipelle* designation in relation with other species are as follows: 1. RICKEN (1910–1915): p. 118, tab. 33/3. There are authors who consider the quoted description and plate related to *H. sarcophyllum*. Apparently, the place and time of growth are in contradiction with this: “An grasigen Orten, an Wegen, fast rasig, voreilend”, but this is taken from the description of *A. versipellis* by FRIES (“Locis graminosis, ad vias, praecox, subcaesp.”). — 2. BRESADOLA (1930): tab. 711. The spores are of different form: “ovato-fusoideae, amygdaliformes”, even are drawn as sublimoniform. Cheilocystidia are also different: “apice capitatae”, whereas in *H. versipelle*, according to the characterization by KONRAD & MAUBLANC: “cylindriques, ventrués en bas”, and again according to our description: “below mostly ventricose”. — 3. The species in BON & CHEVASSUT (1974): p. 3–4, can be taken as *H. testaceum* (BATSCH ex FR.) QUÉL. ss. BRUCHET. This is supported by the following statements of the description: “Spores subamygdaliformes... odeur agréable, cacaotée... saveur amarescente.” The same characteristics in *H. versipelle*: spo-

* FRIES, E. (1836–1838): *Epicrisis systematis mycologici* (p. 179.): *A. versipellis*, pileo carnoso, convexo plano, glutine tenaci viscoso, discoideo, versus ambitum adglutinato-sericeo, dein glabro, stipite fistuloso, tenaci albosericeo, apiceque pruinoso, lamellis rotundatis, confertis, latis (3–5 lin.!), ex albo-carneo argillaceis. *A. lubricus* Aman. *A. thelephor.* Secr. n. 576. *Clus. pern. g. XII. sp. 1.!* Sterb. t. 20. *B. Locis graminosis, ad vias, praecox, subcaesp. Ex aetate et jove mire mutatur. Serico et velo fibrilloso evanido stipes fibrilloso-striatus, intus fuscescens. Pileus tenuis, subpunctatus, regularis, crustullinus demum repandus, siccus alutaceus, opacus. Odor debilis, non ingratus.*



Fig. 1. *Hebeloma funariophilum* Mos. (natural size). — Fig. 2. *Hebeloma vaccinum* ROMAGN. spores ($\times 1000$); — Fig. 3. *Hebeloma ammophilum* sp. n. (natural size). — Fig. 4. *Hebeloma psammocolum* sp. n. (natural size)

res ellipsoid, smell absent or moderately rephanaceous, taste absent or slightly acid. An apparent difference is in the description by BON & CHEVASSUT: "la cortine plus marquée". (Cortina is weakly developed in *H. testaceum*.) We feel that this is probably an exception. As an analogy it should be mentioned that in the case of *H. versipelle* which can be characterized as having a well developed cortina, we collected some materials having a weak cortina — which on this basis could be considered *H. testaceum* — but their other characteristics referred them to *H. versipelle*.

Finally, we shall have to correct here an erroneous statement (BOHUS 1972, p. 77): "LANGE's *H. testaceum* . . . can be considered *H. versipelle*". This opinion was based, among others, on that the spores were described as "obliquely ellipsoid". But, on tab. 118/E. spores are drawn as amygdali-form and this form on the other hand is the characteristic of *H. testaceum* ss. BRUCHET.

Data on *Hebeloma funariophilum* Mos. (Fig. 1)

Since it was described (1970), its occurrence in France has been mentioned by BON & CHEVASSUT (1974). No such character could be found — even on the basis of the rich material occurring in Hungary — which had not been included in MOSER's description.

Herbarial data. 1. Szentendre Island: Horány, on charcoal heaps, among mosses (*Funaria*), 7 Sept. 1974 (spores $8.8-9.8 \times 4.4-5 \mu\text{m}$), 21 June 1975 (spores $8.7-10 \times 4.7-5 \mu\text{m}$, cheilocystidia $25-35 \times 4.5-7.5 \mu\text{m}$), 31 August 1975 (spores $8.8-9.8 \times 4-5 \mu\text{m}$), 3 Nov. 1975 (spores $9.5-12 \times 4.7-5.5 \mu\text{m}$) leg. BABOS. — 2. Mts. Bükk: near "Létrási-ház", on charcoal heaps, among mosses (*Funaria*), 28 August 1977 (spores $9-10.5 \times 4.5-5 \mu\text{m}$), leg. BABOS.

Recent occurrence of *Hebeloma vaccinum* ROMAGN. (Fig. 2)

Its habitat in Hungary is similar to that mentioned in previous descriptions (ROMAGNESI 1965, BRUCHET 1970), that is, in marshy soils, under *Populus*. In order to complete the literary data, it is worth while to mention that on the surface of the spores, which are "très ornées" according to BRUCHET, there were also crests and lentiform protrusions (up to $4.5 \times 2.5 \mu\text{m}$ in size).

Herbarial data. Hortobágy: Kónya, humid poplar wood, 16 Nov. 1966, leg. BOHUS et VÉSSEY; 9 Nov. 1976, leg. BABOS; humid mixed wood with poplar, 18 Sept. 1975, leg. BABOS.

Hebeloma ammophilum sp. n. (Fig. 3)

This species grows in barren sand. Its fruit bodies develop under the surface of soil, during growth they upwarp the soil, then become visible. This is why the viscid pileus is completely covered with sand.

Pileus 2–6 cm, primum convexus, deinde expansus, *Hebeloma*-brunneus, ochraceo-brunneus, interdum in margine pallidus, viscosus, cum sabulo toto obtectus. — Lamellae 4–8 mm latae, siccae, ex aquosocremeae argillaceae, argillaceo-ferruginascentes, sicco ± brunneae, adnatae-emarginatae, non raro ventricosae, cum acie pallido. — Stipes 3–6 × 0.5–1 cm, aequalis vel inferne incrassatus, interdum inferne tenuiescens, non raro curvus, albus, albidus, tactu ochraceus, sericeus, sub lamellis farinosus. Caro albida, alba. Odor nullus vel vix raphaneus. Sapor exiguus. — Spore magnae, 13–16 (17.5) × 7–8.5 (9.5) μm , amygdaliformes, interdum ventricosae, non raro in papillam elongatae, dense et insigniter punctatae-verruculosae, cum ectosporio non-vel haud decollatae, ochraceo-brunneolae. Cheilocystidiae claviformes, 33–50 × 8–17 μm . — In sabulo vasto, primitus hypogaeus.

Typus: 56,934 in Herbario Musei Historico-naturalis Hungarici, Budapest. Inter Örkény et Tatárszentgyörgy, in *Junipero-Populeto*, 8 Nov. 1975, leg. BABOS et FRIESZ.

Further herbarial data. 1. Between Örkény and Tatárszentgyörgy in *Junipero-Populeto*, 11 Nov. 1976, leg. BABOS et FRIESZ. — 2. Szentendre Island: Horány, in *Festucetum vaginatae danubiale*, 14 Nov. 1975, 12 Sept. 1976, leg. BABOS.

Polytomic key of psammocol *Hebeloma* species

Name of species	Sectio <i>Hebeloma</i>				Sectio <i>Denudata</i>		
	<i>dunense</i>	<i>psammocolum</i>	<i>versipelle</i>	<i>xerophilum</i>	<i>ammophilum</i>	<i>hiemale</i>	<i>ochroalbidum</i>
Special character	Pileus purple to ochraceous reddish	Stipe with \pm large sand-bulb			First subterranean. Pileus completely covered with sand		Pileus whitish or pallid
Time of fructification	April, May	Autumn	From April to November	Summer	Autumn	From spring to autumn	Summer, autumn
Habitat	In barren sand	In barren sand	Especially under Populus	Under Salix	In barren sand	Under trees	Under Populus
Diam. of pileus (cm)	1—3	3—6.5	2.5—6	—2.5	2—6	1—4	5.5—10
Length of stipe (cm)	1.5—3	5—8	3—8	4—5	3—6	2—4	4—8
Width of stipe (cm)	0.3—0.6	0.7—1.2	0.3—1.3	0.8	0.5—1	0.4—0.7	1—2
Colour of flesh at base of stipe		\pm brown	\pm brown		Whitish	Whitish	White, whitish
Smell		Weak	Mostly none	None	Weak	Weak	Mostly none
Shape of spores		Ellipsoid	Mostly ellipsoid	Ellipsoid	Amygdali-form	Amygdali-form	Amygdali-form
Measure of spores (μ m)	10—12.5 \times 6—7.5	10—12.5 \times 6—6.8	10—13 \times 5—7	6—9 \times 3—6	13—16 \times 7—8.5	12—13.5 \times 6—6.5	10.5—12.5 \times 5.5—7
Shape of cheilocystidia	Cylindrical	Cylindrical	Ventricose	Clavate	Clavate	Cylindrical to vesiculose	Cylindrical to clavate

Hebeloma psammocolum sp. n. (Fig. 4)

It grows in *Junipero-Populetum* in barren sand soil, similarly to the former species. No small pits occur around the fruit bodies since the fruit bodies do not develop in the soil. This is the reason why the pilei are not completely — only slightly — covered with sand.

Pileus 3–6.5 cm, carnosulus, convexus, deinde expansus, saepe umbonatus, brunneolo-ochraceus, ochraceo-brunneus, testaceo-pallens, margine pallidior, primo velo obtectus, deinde circa marginem maculis e fibrillis albidis, demum saepe glabratus; viscosus. — **Lamellae** 4–8 mm latae, demum ventricosae, sicci, e pallidis brunneolo-ochraceae, argillaceo-brunneae, adnatae-emarginatae, acie pallido. **Stipes** ± subcavus, 5–8×0.7–1.2 cm, aequalis, basi fusiformi-subradicatus, curvus, apice albidus, deorsum pallide ochraceus, basi ochraceo-brunneus, fibrillis cortinae obtectus, ad dimidium in arenam demersus, basi cum bulbo ex arena non raro magno. **Caro** albida in pileo et parte in stipite, deorsum in stipite ± brunnea, odore debili. — **Spores** 10–12.5×6–6.8 μm, ellipsoideae, obtusae, sublevés vel subtiliter verrucosae, pallide ochraceae. **Cheilocystidia** cylindraceae, 40–70×5–8 μm, numerosissimae. — In sabulo vasto.

Type: 56.935 in Herbario Musei Historico-naturalis Hungarici, Budapest. Inter Örkény et Tatárszentgyörgy, in *Junipero-Populetum*, 11 Nov. 1976, leg. BABOS et FRIESZ.

It is very characteristic the stipe similar to that of *Psathyrella ammophila* (DUR. & LÉV) ORTON.

The sandy species with cortina, *H. xerophilum* RUDN.–JEZ. (1967) has small spores (6–9×3–6 μm) pileus small (–3.5 cm), cheilocystidia clavate. The other cortinate sandy fungus, *H. dunense* CORB. & HEIM is small, the colours of pileus and lamellae are quite different.

KEY TO THE *HEBELOMA CRUSTULINIFORME*-GROUP

(Species recently described and with pale pileus not included in the monograph by BRUCHET, 1970)

Characteristics: pileus in the middle ± ochre, towards the margin white, whitish; lamella beaded with drops (at *H. eburneum* only sometimes); spores large, amygdaliform; cheilocystidia claviform.

1. Under *Cedrus libanotica* (probably under *Quercus ilex* and *Pinus halepensis*, too). Pileus 6–10 cm. Stipe 6–8×1–2 cm. Flesh white or light yellowish. Taste sweetish. Smell weakly but persistently raphanaceous. Spores 11–13×6–7.2 μm.
H. eburneum MALENC. (1970)
- Under other trees 2
2. Under various trees. Pileus 3–8 cm; may be innato fibrillose. Stipe 3–9×0.4–1 cm. Flesh white, finally a little brownish at the base of stipe. Taste tartish or sweetish. Smell pleasant, cocoa-like. Spores 13–15–16×6–7 μm.
H. perpallidum Mos. (1970)
- Under *Populus* 3
3. On humid soil (often moory meadows and on lake shores). Pileus 2–6 cm. Stipe 2–6×0.3–0.8 cm. Flesh pale, in stipe brownish. Taste bitter. Smell strong, rather cocoa-like than radish-like. Spores (11)–12–13.7–(15)×6.7–8–(8.5) μm.
H. populinum ROMAGN. (1965)
- On drier soil. Pileus 5–10 cm. Stipe 4–8×1–2 cm. Flesh white, whitish. Taste insignificant. Smell absent or slightly raphanaceous. Spores 10.5–12.5–(14)×5.5–7–(8.5) μm.
H. ochroalbidum BOHUS (1972)

Of the species belonging to this group two have been discovered in the Carpathian Basin: *H. ochroalbidum* in some localities and *H. perpallidum* from one habitat. The description of *H. perpallidum* given below was made on the basis of two gatherings (between Dunakeszi and Göd, on sandy soil under *Betula*, 12 and 26 Sept. 1976, leg. FRIESZ).

Pileus 3–6 cm in diam.; convex-expanded; towards the margin white, whitish, towards the centre light ochre, may be entirely white; here and there innato-fibrillose; slightly viscid; margin at first incurved. Lamellae at first whitish, then creamy, at length milk-coffee coloured; edge minutely dentate; edges densely set with white drops. Stipe 3–6×0.5–1 cm; cylindrical and more or less bulbous; entirely fine-floccose or mealy; without cortina. Flesh white, remaining white or becoming brownish: Taste slightly bitterish-subacid or hazel-nut like. Smell sweetish, fruit-like. Spores small amygdali-form; 12–15.5–(16.5)×6–7.2 μm ; densely punctate. Cheilocystidia crowded; clavate-capitate, about 50 μm long, 9–12 μm wide.

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