

Studies on Hungarian *Lepiota* s. l. Species, V.

by M. BABOS, Budapest

Abstract — Description of a new Lepiotid species (*Leucoagaricus brunneolilacinus* sp. n.) fructifying in hothouse conditions. Discussion, based on a rich material from several localities, of two interesting mushrooms of high temperature requirements, growing in masses on decaying hot sawdust: *Leucoagaricus meleagris* (SOW. ex FR.) BON, and *Leucocoprinus cepaestipes* (SOW. ex FR.) PAT. var. *rorulentus* (PANIZZI) n. c. A brief report on *Macrolepiota olivascens* MOSER in MOSER et SINGER known from high mountains was found in a locust-tree wood on the plains. With 5 figures.

Leucoagaricus brunneolilacinus sp. n. (Figs. 1–2)

Pileus: 3–8.5 (–12) cm in diameter; hemispherical, convex then expanded; marginally occasionally undulating; covered with a brownish lilac to brownish purple-lilac velum universale; only quite young and small fruit bodies originally white; velum universale woolly-felty, later disrupting into fibrillose-lanuginous scales; pileus also with medially erect pyramidal scales; surface often whitely farinose owing to fallen spore dust. Lamellae: free, up to 4 mm deep, crowded, not furcately branching but with numerous lamellulae among gills; fragile; whitish-creamy, discolouring in spots (from rosy to brown), older specimens and herbarial material olive brown, tobacco brown, but edge of lamellae locally remaining whitish. Stipe: (1–)3–10 × (0.3–)0.5–1 cm; cylindrical or slightly thickened at base; usually curved owing to caespitose growth; ornamented with conspicuously brownish lilac to purple-lilac woolly-cottony to lanuginose-scaly zones, only quite young specimens revealing that cottony velum covering stipe originally white; also portion above ring ornamented; velum parziale thin, fugaceous, membranaceous, whitish then brownish lilac to purple-lilac, adhering to stipe and then zonately disrupting. Apex of stipe white, floccose. Base of stipe with mycelial rhizoids and strands cohering the soil granules. Flesh: cottony and soft in pileus, filamentose in stipe; white in young and fresh cap, brownish in stipe, when cut reddening through orange; flesh of more developed (or less fresh) fruit bodies brown to dark brown already when cut, but local reddening also observable. Smell occasionally disagreeable (as in *Lepiota cristata* or *Cystolepiota aspera*), yet not always perceptible. Spores: dextrinoid, discolouring metachromatically in cresyl-blue; elliptical; 4–5 (5.4) × 2.4–3.2 μm. Basidia: 4-spored; 4–5 μm wide. Cheilocystidia: numerous; cylindrical to clavate; 13.2–24 × 3.2–7.8 μm. Pleurocystidia: not observed. Velum universale: cells of hyphae purple-lilac, smooth or with a granular — occasionally spirally arranged — incrustation; width 3.9–10 (–14) μm. Pileus of quite young specimens occasionally with sphaerocysts, 6–14 μm in diameter.

Habitatio: single or in groups on ground among *Strelitzia* in subtropical glasshouse of Botanical Garden, Budapest.

Pileus 3–8.5 (–12) cm diam., semiglobosus, convexus, dilatatus, squamulis brunneolilacinis — brunneolilacopurpleolilacinis, lanuginoso-vellereis, fibrilloso-lanuginosis coopertus (in speciminibus velde juvenilibus tantum albus). Lamellae usque 4 mm latae, liberae, confertae, albae — cremeae, colorem per rosaceum usque brunneum maculose mutant, sicce olivaceobrunneae usque tabacinae, acie hinc inde albae. Stipes (1–)3–10 × (0.3–)0.5–1 cm, cylindricus, plerumque curvatus, superne albus, floccosus, infra collare pileo similiter ornatus. Velum parziale evanidum, membranaceum, albidum deinde brunneolilacinum — purpureolilacinum. Ad basin stipitis strangulae hypharum adsunt. Caro (in carposomate juvenili recentique) in pileo albus, in stipite brunneolus, post sectionem per colorem aurantiacum rubescens. Odor indistinctus vel parum insuavis. Sporae ellipsoideae, 4–5 (–5.4) × 2.4–3.2 μm, dextrinoideae, per cresyl-cyaneum metachromaticae tinctae. Basidia 4-sporea, 4–5 μm lata. Squamae pilei ex hyphis purpureolilacinis, levibus vel granulose incrustatis, 3.9–10 (–14) μm latis constructae.



Fig. 1. *Leucoagaricus brunneolilacinus* sp. n.: Fruit bodies (natural size)

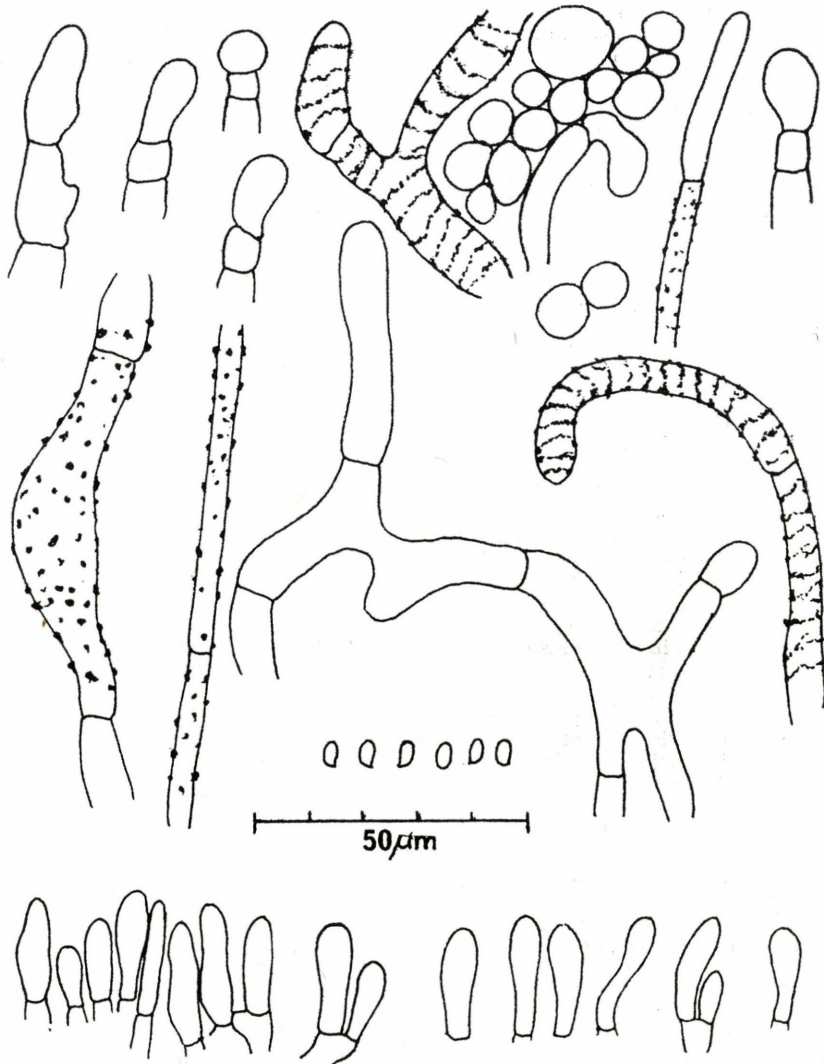


Fig. 2. *Leucoagaricus brunneolilacinus* sp. n.: Cells of velum universale from cap (above), spores and cheilocystidia (down) ($\times 700$)

Habitatio: ad terram in casa vitrea plantarum subtropicalium Horti Botanici Universitatis Horticulturae, Budapest.

Typus: 58.270 in Herbario Musei Historico-Naturalis Hungarici, Budapest. — Budapest: Soroksár, Hungaria, in Hort. Botc., in vaporario, ad terram, 16. VII. 1975, leg. RIMÓCZI.

Further herbarial data: same locality, 27 April 1976, leg. RIMÓCZI; 27 March 1979, leg. ALBERT & BABOS; 13 June 1979, leg. ALBERT.

Macroscopically our fungus resembles *Cystolepiota aspera*, but according to a letter communication by Mr. KNUDSEN (1979), the reddening and then browning of the flesh as well as the metachromatic discolouration of the spores in cresyl-blue, and some other microscopic characteristics, refer it to the sectio *Anomali* of the genus *Leucocoprinus*.

The interpretation of the systematic position of the section *Anomali*, of an intermediate position,

underwent considerable changes. SINGER (1975) discussed some species (*L. bresadolae*, *L. meleagris*) in the genus *Leucocoprinus*, while other species (e.g. *L. badhamii*) appear in the genus *Leucoagaricus*. MOSER (1978) published the species mentioned above in the genus *Leucocoprinus*, yet with the following remark: "Systematische Position unsicher, von SINGER z.B. teils zu *Leucoagaricus*... gestellt". On the other hand, BON (1977) reallocated the reddening species to the genus *Leucoagaricus*, so that the new species might as well be assigned to this alliance.

There was an interesting and chance observation concerning the autolysation of the fruit bodies. In the July heat, specimens at room temperature remained in a fine state also by the next day, whereas those stored at +5 °C in the refrigerator perished or "froze to death" by the next day. We found the same with respect to other highly thermophilous species, too, in *Volvariella volvaceae* and *Leucoagaricus meleagris*.

Leucoagaricus meleagris (Sow. ex Fr.) BON (Figs. 3–4)

Agaricus meleagris, described from England (1799) and excellently illustrated by SOWERBY (Tab. 171), became a disputed species in the twentieth century — indeed, it is missing from recent identification books. The probable reason is that the species is rare and highly varying with respect to the state of the fruit bodies, and thus the authors had confused it with other related species which tend to redden or turn black. It occurs in masses in sawdust deposits in Hungary and can therefore be studied in all its variability; a brief survey of the relevant literature should here be given.

SOWERBY (1799) described a mushroom ornamented with black squamae and squamules, collected in a hotbed, under the name *Agaricus meleagris*. He mentioned the reddening of the fruit body and the mycelrhizoids at the stipe base. The gills of the illustration shows a pale yellowish colour, and a ring is absent. BERKELEY & BROOME (1865) give a good description of *Agaricus (Lepiota) meleagris*, mentioning also its main features: "the gills are sometimes lemon-coloured", "ring soon ruptured, very fugacious". Site: "in a hothouse... amongst spent tan". FRIES (1874) discussed it on the basis of the preceding authors ("in cortice vaporariorum Angliae"). COOKE (1883) cites SOWERBY in his description, but his illustration is original, rendering a true picture of hothouse specimens. In this habitat, we have also seen such non-fresh or second-day specimens. The fresh white mushroom displays brownish squamae, squamules and granules of various shades, an ornamentation soon turning black. The squamules of the pileus and stipe darken owing to necropigments appearing in the cells. At this state even the strong reddening, characteristic of the fresh specimens, is hardly observable and only pale reddish to cyclamineous tints are visible. No microscopic characteristics (e.g. spore dimensions) had yet been given in the works cited so far. MASSEE (1893, 1902) added his own observations to SOWERBY'S and BERKELEY & BROOME'S descriptions: "spores elliptical, 6–7 × 4 μm". These erroneous, small spore dimension data appeared later in REA'S (1922) and KAUFMANN'S (1924) works. Probably this was the cause — the datum being on the lower border of the sporal dimensions — that the existence of the species was subsequently doubted. BRESADOLA (1927, Tab 29/1) submitted a figure depicting rather old specimens received from the Botanical Garden in Berlin, and he also gave spore data (7–10 × 5–7 μm). DENNIS, ORTON & HORA (1960) state that "spores of Berkeley's material measure 7–10 × 5–7 μm, exactly as given by Bres." The earlier French authors are not unanimous, but BON (1977) had recently published the species, collected near Paris (det. BATAILLE) in 1899, from BOUDIER'S herbarium. On the basis of his material, BON rehabilitated the species, assigning it to the genus *Leucoagaricus*.

Description of the Hungarian materials:

Pileus: 2–6(–9) cm in diameter; thimble-shaped to campanulate then expanded; often deformed and irregular owing to caespitose occurrence; margin when young not striate, later striate (0.5–1 cm); first white, finely granulo-floccose, later flocci — squamules — squamae covering surface of pileus tending to rosy — rosaceous-brown — brown — olive-greyish-brown — blackish-brown; centre of pileus very densely granulose — squamulose, hence darkest in that part. Cuticle occasionally radially disrupted. Intensely reddening when touched in fresh state, this colour of cap becoming less conspicuous by the next day. Pileus of older specimens a lilac-vinaceous — cyclamineous colour visible also in growth site; becoming blackish during desiccation. Margin of pileus often splitting. Lamellae: free; moderately crowded; width up to 5 mm; when young white to creamy, later lemon to sulphur yellow, lamellar colour of some collections also isabell-coloured; reddening on touch when young; lemon yellow, lilac-vinaceous, dirty brownish, etc., when dry. Stipe: 3–9(–12) × 0.2–0.8(–1.2) cm; attenuated basad, fusiform or cylindrical, usually curved or very curved owing to caespitose growth; colour white, granulose — floccose up to apex; these structural elements later discolouring to rosy — brownish — blackish-brown (as on pileus); when touched, both fresh and second-day stipes strongly reddening, or with orangered spots; basally with a mass of white mycelial strands bearing great numbers of fruit body primordia; basal mycelium remaining white or tending to cyclamineous.

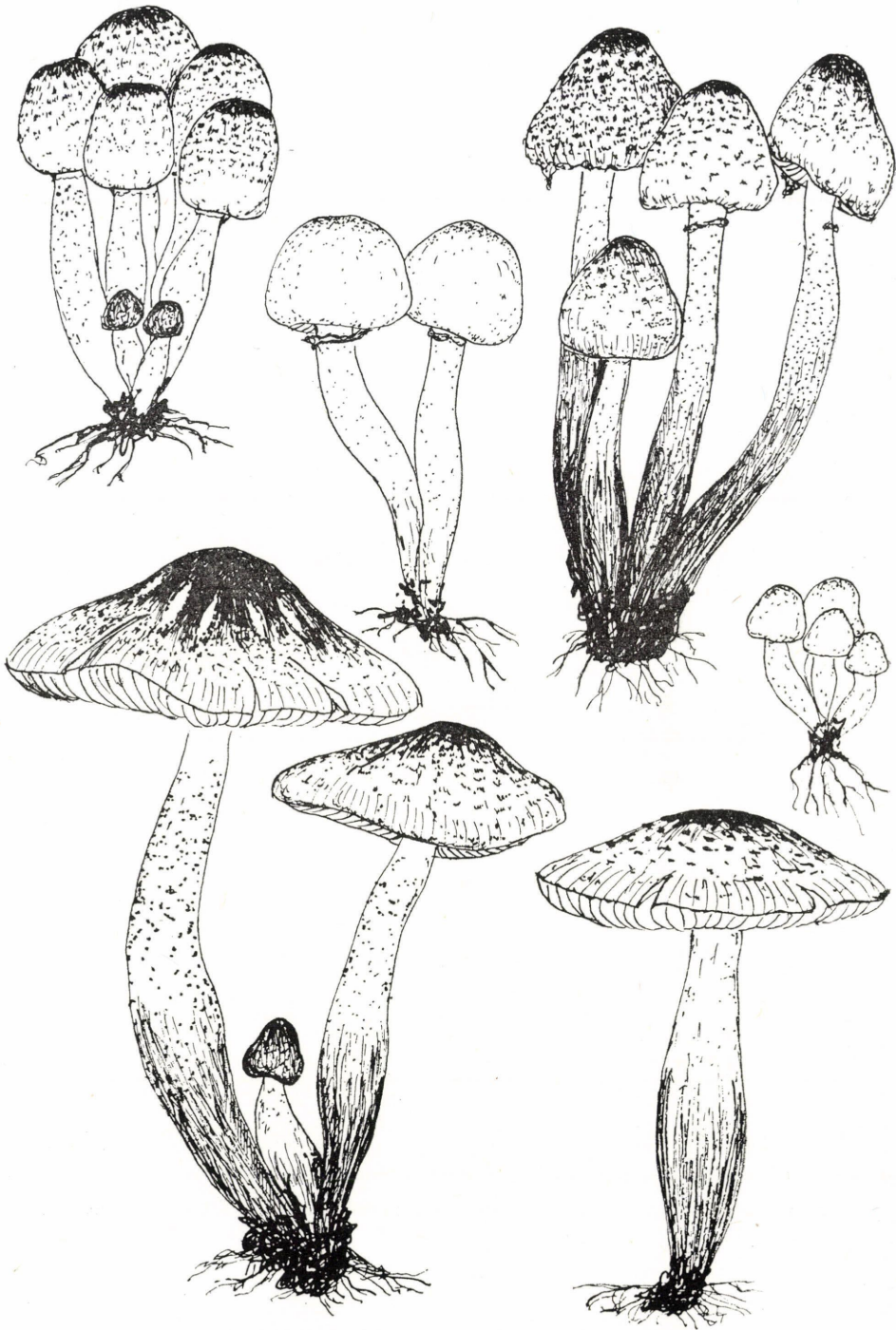


Fig. 3. *Leucoagaricus meleagris* (Sow. ex Fr.) BON: Fruit bodies (natural size)

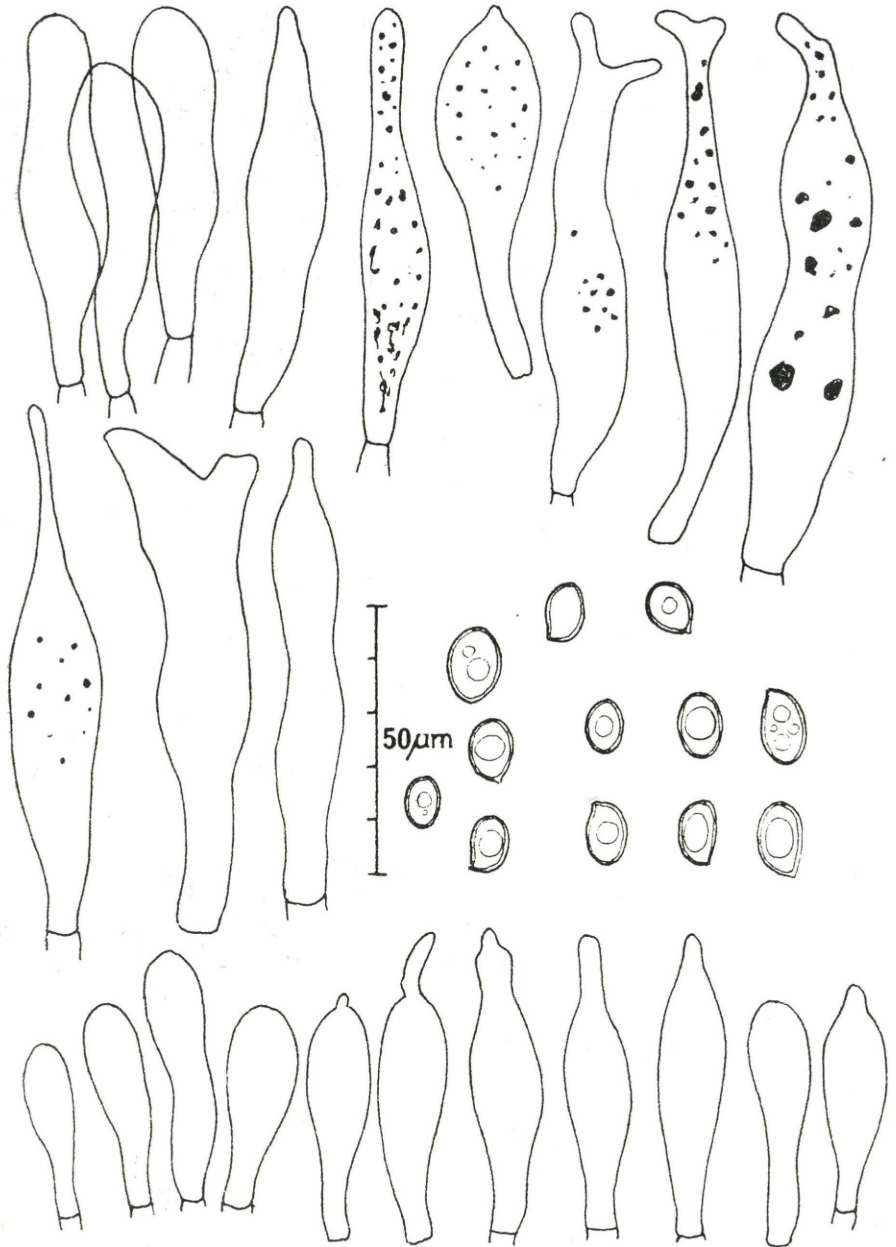


Fig. 4. *Leucoagaricus meleagris* (Sow. ex FR.) BON: Cells of cap-scales (above), spores and cheilocystidia (down) ($\times 700$)

Ring: weak, membranaceous, white, marginally brownish, usually disrupting without traces (cf. SOWERBY's figure, 1799), or with weak remnants on margin of pileus. Flesh: thin; soft in pileus and filamentose but fragile in stipe; white in pileus, brownish in stipe; when cut discolouring through lemon yellow and orange red. Flesh of older specimens occasionally also cyclamineous-lilac — lilac-vinaceous. In ammonia fume: more or less greenish. Taste weak, resembling meal. Smell not distinctive. Spores: more or less elliptical or slightly almond-shaped; germ pore weak; discolouring meta-chromatically in cresyl-blue; $7.8-12.4 \times 5.4-7.8 \mu\text{m}$, but often larger: $14(-16.4) \times 7.8(-9.3) \mu\text{m}$ (from 2-spored basidia). Basidia: with 4- and 2-spores; $16-28(-31) \times 7.8-13(-15.6) \mu\text{m}$. Cheilocystidia: when young clavate without appendage, later of diverse shapes (ventricose, clavate, fusiform with shorter to longer appendage); $28-60 \times 10-15.6 \mu\text{m}$. Cells of cap-scales: diverse (clavate, ventricose, attenuating, apically bifurcate, with shorter to longer appendage, etc.) as also their size [$47-120 \times 10.9-20(-41) \mu\text{m}$]; with brownish membrane pigment and dark brown vacuolar necropigment.

The species fructifies in masses during summer and autumn in sawdust deposits in Hungary. Since the water economy of sawdust is favourable for fungi, species can be collected in these sites even at times when the surrounding forest is dry and poor in fruit bodies. It occurs on the sawdust of both conifers and deciduous trees if the sawdust is heaped in layers deep enough to establish a suitably warm and humid environment by its decomposition. According to our observations, the decaying sawdust, richly interwoven with mycelia, invariably had a higher temperature than the surrounding atmosphere. Temperature values measured at the time of collectings in diverse parts of the country were as follows:

	atmospheric temperature: 16–22 C°
sawdust temperature	10 cm deep: (26–)30,5–41.5 C°
	20 cm deep: (27.5–)32–44 C°

Herbarial data: on decaying sawdust in the localities mentioned. 1. Miskolc, Com. Borsod-Abaúj-Zemplén, 18 June 1979, leg. BABOS et RÉPÁSI. — 2. Visegrádi Mts.: Lepence-valley near Visegrád, Com. Pest, 26 June 1979, leg. BABOS. — 3. Budai Mts.: Budakeszi, Com. Pest, 2 July 1978, leg. OTTÓ; 24 August 1978, leg. BABOS; 3 Sept. 1978, leg. OTTÓ; 5 Sept. 1978, leg. OTTÓ; 14 June 1979, leg. OTTÓ; 17 June 1979, leg. OTTÓ; 20 June 1979, leg. BABOS et OTTÓ; 24 August 1979, leg. ALBERT; 29 August 1979, leg. BABOS et FRIESZ; 8 Sept. 1979, leg. BABOS. — 4. Lenti, Com. Zala, 14 Sept. 1979, leg. BABOS.

It is rather easy to identify *L. meleagris*; the distinguishing features are as follows:

- the site (hothouse, sawdust), the interesting discolouration (lamellae occasionally lemon yellow or cyclamineous), and the sporal dimensions differ from the related silvicolous species with smaller spores and intensely reddening when touched or blackening when drying (e.g. *L. badhamii*)
- the small stature, fragility, the fugacious and weak ring and its fine blackish-brown squamules as well as its blackening separates the species from the other similarly reddening species growing also on sawdust or in greenhouses and which have similar spore dimensions but a larger stature (*L. bresadolae*, *L. bresadolae* var. *biornatus*); when fresh, *L. meleagris* reddens intensely when touched, while the fruit bodies of *L. bresadolae* and *L. bresadolae* var. *biornatus* show first vivid yellow spots then an overall orange red discolouration.

***Leucocoprinus cepaestipes* (Sow. ex Fr.) PAT. var. *rorulentus* (PANIZZI) n. c. (Fig. 5)**

Basionym: *Agaricus (Lepiota) rorulentus* PANIZZI, Comm. Soc. Critt. Italiana, No. 3. 1862, p. 172–173.

The mushroom resembling *cepaestipes*, locally fructifying in masses on the sawdust deposits of sawmill plants, cannot, if one desists from the wide interpretation of the species concept, be identified as the above species owing to its lamellar colour. The lamellae of the very young specimens are white, but they discolour during development, turning through dirty rosy to pale olivegreenish-brown. The lamellar colour of herbarial materials is a lighter or darker dirty olive-green, greyish-green, dirty brown, more or less mixed with rosy spots. The rate of discolouration of the lamellae of certain materials is especially conspicuous.

Some gleaning in the literature of *L. cepaestipes* results in the following lamellar colours:

In want of the illustration given by SOWERBY (1798, Tab. 2), I was unable to evaluate FRIES' (1836–1838) remark: "A. cepaestipes . . . (an Sowerb. t.2. a nostro stipitis basi attenuata, lamell. decolor. et sporid. obscuris divers.)". Later works contain the following statements: according to FRIES (1874) "lamellis . . . albis"; PATOULLARD (1889) "Lames . . . blanches"; GILLET (1874) "Feuillets blancs"; HALLER (1951), who separated the true *L. cepaestipes* from the species-group, states that "Lamellen weiss. Die Schneide bräunt im Alter leicht." MOSER (1978) is of the same opinion: "L. weiss, Schn. alt etw. bräunend". LANGE (1935) has nothing to say about the colour of the lamellae,

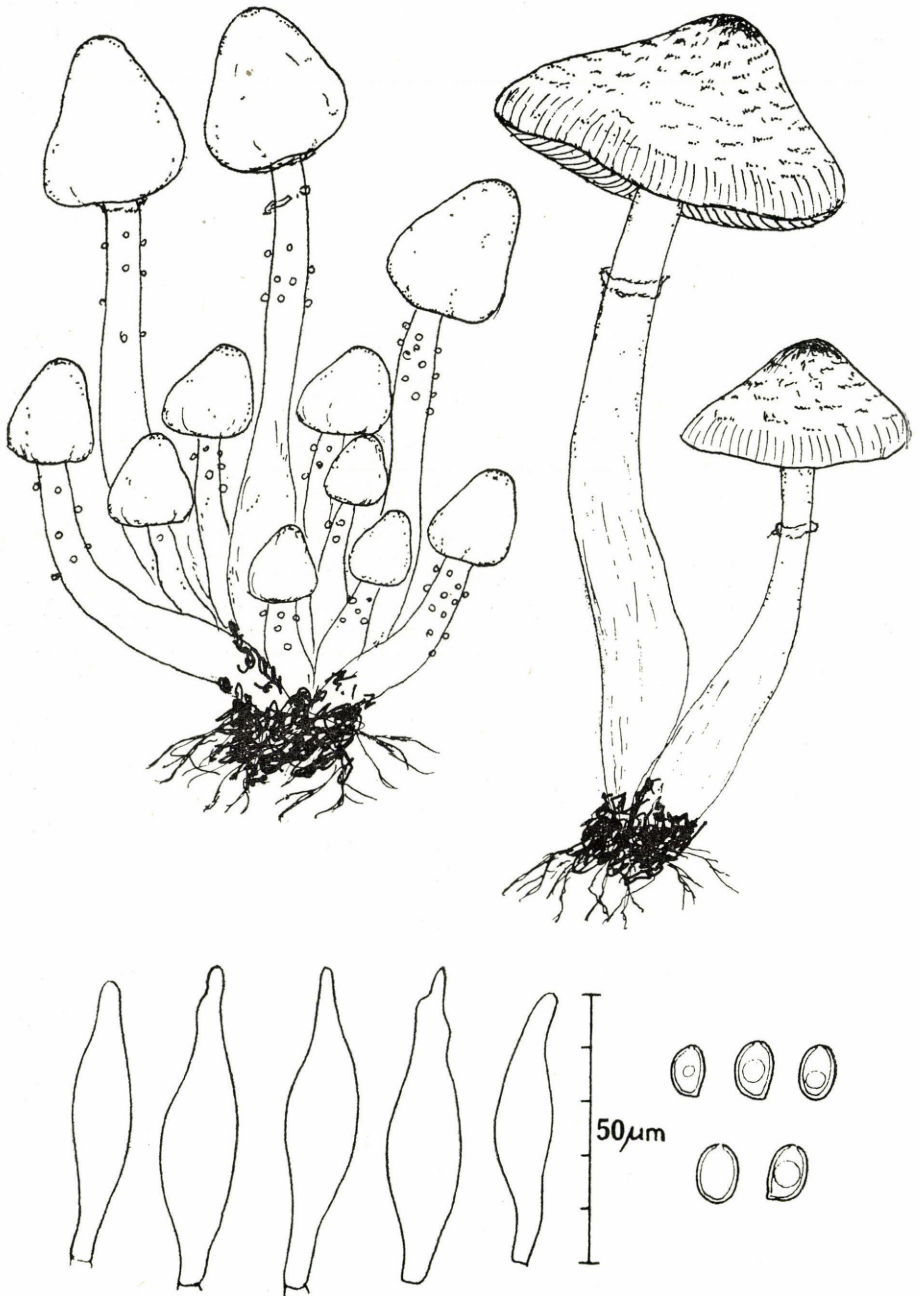


Fig. 5. *Leucocoprinus cepaestipes* (Sow. ex FR.) PAT. var. *rorulentus* (PANIZZI): Fruit bodies (natural size) cheilocystidia and spores ($\times 700$)

but they are white in the illustration (14 F). HORÁK (1968) states that the colour of the lamellae are "weiss bis creme, mit flockiger, gleichfarbiger Lamellenschneide". A number of other literature data could yet be enumerated, but owing to the confusion of *L. cepaestipes* with the related species most of these reports cannot be evaluated.

The species under discussion is not identical with *L. cretatus* LOCQ. (HALLER 1951, CETTO 1976, BON 1977) with completely white and erable squamae and of a bitter taste; the colour of its lamellae contain a rosy tint, but some other characteristics are different.

However, there is a species among the "synonyms" of *L. cepaestipes* which agrees satisfactorily with our fungus, namely *Agaricus (Lepiota) rorulentus* PANIZZI (1862, in literature erroneously as 1861). FRIES (1874) gives the description of both species; concerning *Agaricus rorulentus*, he says that "lamellis... demum in roseum vergentibus", while those of *A. cepaestipes*, as already given also above, are "albis".

QUÉLET (1888) considers the two fungi identical, so that in his description of *L. cepaestipes* the colour of the lamellae are "blanches, puis incarnates". BARLA's (1886, 1889) *L. cepaestipes* cannot be taken into consideration; it is not identical with the species discussed by SOWERBY and FRIES, but in the same works he submits a diagnosis and an illustration of *Lepiota rorulenta* which agree with the material from Hungary. Similarly to PANIZZI's observations BARLA also observed the discolouration of the lamellae: "Lamelles... d'abord blanches, puis à reflet rosé, enfin grisâtres".

On the fruit bodies occurring in large clusters on the sawdust we have often seen great numbers of drops of water of a silvery or pinkish tint. This phenomenon was reported also by the two preceding authors. It is connected probably with the evaporating moisture of the amount of water derived from the decaying sawdust of rising temperature. We have seen drops of water occasionally on *Leucoagaricus meleagris*, too.

The separation of PANIZZI's fungus as a variety is not new, KONRAD & MAUBLANC (1937) cited it as a variety with a questionmark.

Description of the Hungarian materials:

Pileus: 2-7 cm in diameter; campanulate, slightly gibbous, expanded; often deformed owing to caespitose growth; first white or dirty greyish, medially isabell-coloured, smooth and mat; later white, medially isabell-coloured to brownish isabell-coloured, surface covered with squamules (white or tinted as middle of pileus); margin initially not striate, later striate and also more or less splitting. Lamellae: free, distant from stipe; densely arranged with few lamellulae; when young white, later through dirty rosaceous to pale olive-greenish — greyish-greenish — brownish; when dry (herbarial specimens) all colours in a darker shade. Stipe: 3-16 × 0.2-0.7 cm; curved, clavately incrassate basad; first white, remaining whitish or turning fleshy rosaceous; covered with white pruina. Ring: white, initially erect; its remnants often visible at margin of pileus. Base of stipe with white mycelial rhizoids. Flesh: white, thin and fragile in pileus; with rosy tint in rind of stipe; with loose white fibrils within stipe. Taste slightly bitterish. Spores: with rosy tint; ellipsoid — ovoid — short ovoid; with germ pore; 7.5-10.9(-11.7) × 6.2-7.8-(8.5) μm; metachromatically coloured with cresyl-blue. Basidia: 4-spored; 15.6-23(-26) × 7.8-10.1(-11.7) μm. Chilocystidia: (30-40)-62 × (7.8-11)-16(-18) μm; with shorter or longer appendage.

The sawdust is densely interwoven with white mycelium.

Its temperature requirements are similar to those of *Leucoagaricus meleagris*. According to WASSER (1978), it grows in tropical to subtropical hothouses where the summer temperature reaches 45 °C and in winter is not colder than 15 °C.

Herbarial data: on decaying sawdust in the localities mentioned. 1. Mátészalka, Com. Szabolcs, 5 July 1974, leg. JÓNI et KOMLÓSSY. — 2. Miskolc, Com. Borsod-Abaúj-Zemplén, 18 June 1979, leg. BABOS & RÉPÁSI. — 3. Visegrádi Mts.: Lepence-valley near Visegrád, Com. Pest, 26 June, 7 July 1979, leg. BABOS. — 4. Vértes Mts.: near Szárliget Com. Komárom, 8 August 1976, leg. ZIRKELBACH; 11 August 1976, leg. BABOS, BOHUS et VIRÁG; 26 June 1977, leg. VIRÁG; 3 July 1977, leg. VIRÁG; 6 July 1977, leg. BABOS et FRIESZ; 25 Sept. 1977, leg. KAPUS; 9 Oct. 1977, leg. VIRÁG et ZIRKELBACH; 25 Oct. 1977, leg. BABOS, BOHUS, GRÚSZ et RIMÓCZI; 16 July 1978, leg. VIRÁG et ZIRKELBACH. — 5. LENTI, Com. Zala, 14 Sept. 1979, leg. BABOS.

Macrolepiota olivascens MOSER in MOSER et SINGER

MOSER (1978) reports the species from a coniferous forest of the Alp (GFR); it resembles *M. procera*, but the spores are smaller and, when pressed, the pileus shows greenish — olive-greenish — olive-greyish spots after some time.

The first Hungarian records refer to deciduous forests on acidic substrate and a comparatively colder microclimate. However, fine specimens have been collected in locust-tree forests on calciferous sand in the Great Plain in the summer of 1979. Its distribution is therefore possible within very

wide ecological limits. It is also probably more frequent than presumed, but often confused with *M. procer* if the characteristic greenish discoloration is not taken into account. I have seen specimens with greenish spots on the pileus, therefore probably those of *M. olivascens*, among masses of *M. procer* offered on the markets.

Herbarial data: 1. Visegrádi Mts.: Lomhegy, in acidophilous beechwood (*Deschampsia flexuosae-Fagetum subcarpathicum*), 10 Sept. 1975, leg. BABOS. — 2. Between Felsőpakony and Csévharaszt, in locust-tree forest, 22 July 1979, leg. GÖNCZÖL, rev. MOSER.

References

- BARLA, J. B. (1886): Liste des champignons nouvellement observés dans le département des Alpes-Maritimes. — *Soc. Myc. Fr. Bull.*, 3, 2: 112–119.
- BARLA, J. B. (1889): Flore mycologique illustrée les champignons des Alpes-Maritimes II. — Nice, p. 21–32, Pl. 9–16.
- BERKELEY, M. J. & BROOME, C. E. (1865): Notices of British Fungi. — *Ann. & Mag. Nat. Hist.*, Ser. 3, 15. Nos. 986–1103, p. 1–22 in *Bibliotheca Mycologica* 1. Lehre (reprint 1967).
- BON, M. (1977): Les Lepiotes de l'herbier "Boudier" au Muséum national d'Histoire naturelle de Paris. — *Doc. Myc.*, 7(27–28): 11–22.
- BRESADOLA, J. (1927): *Iconographia Mycologica* I. — Mediolani, Tab 1–50.
- CETTO, B. (1976): I funghi dal vero II. — Trento, 1–714.
- COOKE, M. C. (1881–1883): *Illustrations of British Fungi* I. — London, Pl. 1–75.
- COOKE, M. C. (1883): *Handbook of British Fungi*. — London, 2. ed., p. 1–398.
- DENNIS, R. W. G., ORTON, P. D. & HORA, F. B. (1960): New check list of British Agarics and Boleti II. — *Suppl. Trans. Brit. mycol. Soc.*, p. 169–225.
- FRIES, E. (1836–1838): *Epicrisis systematis mycologici, sru synopsis Hymenomycetum*. — Upsaliae, p. 1–610.
- FRIES, E. (1874): *Hymenomyces Europaei sive Epicriseos systematis mycologici*. — Upsaliae, 2. ed., p. 1–755.
- GILLET, C. C. (1874): Les Hyménomycètes ou description de tous les champignons (Fungi) qui croissent en France. — Alençon, p. 1–828.
- HALLER, R. (1951): *Lepiota cepaestipes* (Fries ex Sowerby) Quélet sensu Lange. Braunschuppiger Zwiebelschirmling. — *Schw. Zschr. Pilzk.*, 29(2): 32–36.
- HORAK, E. (1968): Synopsis generum Agaricalium. — *Beitr. Kryptogamenflora der Schweiz*, 13, p. 1–741.
- KAUFMANN, C. H. (1924): The genus *Lepiota* in the United States. — *Papers Mich. Acad. of Sci. Arts Lett.* 4(1): 311–344.
- KONRAD, P. & MAUBLANC, A. (1937): *Icones selectae Fungorum* VI. (Texte général) — Paris, p. 1–558.
- LANGE, J. E. (1935): *Flora Agaricina Danica* I. — Copenhagen, p. 1–90, Tab. 1–40.
- MASSEE, G. (1893): *British Fungus Flora* III. — London, New York, p. 1–512.
- MASSEE, G. (1902): *European Fungus Flora Agaricaceae*. — London, p. 1–274.
- MOSER, M. (1978): Die Röhrlinge und Blätterpilze. — in GAMS, H.: *Kleine Kryptogamenflora* II b/2, Jena, 4. Aufl., p. 1–532.
- PANIZZI, F. (1862): Degli Imenomiceti che crescono nel circondario di San Remo. — *Commentario della Società Crittogamologica Italiana*, 3: 166–175.
- PATOUILLARD, N. (1889): *Tabulae analyticae fungorum*. — Paris, No. 606–700.
- QUÉLET, L. (1888): *Flore mycologique de la France*. — Paris, p. 1–492.
- REA, C. (1922): *British Basidiomycetaceae*. — *Bibliotheca Mycologica* 15, Lehre (reprint 1968), p. 1–799.
- SINGER, R. (1975): *The Agaricales in modern taxonomy*. — Vaduz, 3. ed., p. 1–912.
- SOWERBY, J. (1799): *Coloured figures of British fungi or mushrooms* II. — London, Tab. 121–240.
- WASSER, S. P. (1978): *Leucocoprinus* Pat. (Agaricales Clem.) in URSS. — *Novitates systematicae plantarum vascularium et non vascularium* 1977, Acad. Sci. RSS UCR, p. 207–225.

Author's address: MARGIT BABOS

Botanical Department
Hungarian Natural History Museum
H-1476 Budapest, pf. 222
Budapest