

New species of the genus *Agaricus* (Agaricaceae) for Bulgaria

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Abstract. The current article presents data about seven species of *Agaricus*, new for Bulgaria, *A. deylii*, *A. impudicus*, *A. leucotrichus*, *A. maleolens*, *A. mediofuscus*, *A. spissicaulis*, and *A. subfloccosus*. The specimens were collected from the Forebalkan, Toundzha Hilly Country, Pirin Mts, Mt Sredna Gora, and the Western Rhodopes.

Key words: *Agaricus*, Bulgaria, macromycetes, new records, taxonomy

Introduction

The genus *Agaricus* has not been yet an object of taxonomic investigation in Bulgaria. There are only a few contributions concerning 29 taxa of that genus (Barsakov 1926, 1939; Hinkova 1950, 1955, 1958; Kreisel 1959; Hinkova & Fakirova 1970; Hinkova & Drumeva 1978; Hinkova *et al.* 1979; Drumeva & Stoichev 1980; Kuthan & Kotlaba 1981, 1989; Stoichev 1982, 1995; Stoichev & Dimcheva 1982, 1984, 1987, 1988; Vanev & Reid 1986; Stoichev & Anastasov 1988; Gyosheva & Dimcheva 1991; Dimcheva *et al.* 1992; Fakirova *et al.* 2000, 2002; Gyosheva & Denchev 2000; Stoichev & Lacheva in press; etc.).

The present contribution provides information about the macro- and micromorphological features of seven species of the genus *Agaricus* new for Bulgaria, as well as data for their distribution throughout the country.

Material and Methods

The investigated specimens were collected from the Forebalkan, Toundzha Hilly Country, Pirin Mts, Mt Sredna Gora, and the Rhodopes during the period August–November 2002. Microscopic features were studied on semipermanent slides in lactophenol as mounting medium. The drawings were made after the Bulgarian samples.

All the specimens cited in the article are kept in the Herbarium of the Agricultural University, Plovdiv (SOA).

The fungi were identified with the aid of works by Wasser (1980) and Cappelli (1984).

New records from Bulgaria

Agaricus deylii Pilát

(Fig. 1)

Pileus 5–13 cm, with thick flesh, at first campanulate, then semiglobose to plano-convex, white, slightly viscid, then plano-convex, with or without whitish floccose scales. Reddens at touch. Margin involute, thin, with fragments of the partial velum. **Lamellae** free, dense, thin, pink when young, then brown with reddish tinge, with light, sterile edge. **Hymenophoral trama** regular, then irregular. **Basidia** 20–30 × 8–11.5 µm, clavate, four-spored. Sterigmata 3 µm. **Cheilocystidia** 15–22 × 20–30 µm, clavate-ovate. **Pleurocystidia** absent. Spore print brown. **Basidiospores** 7.5–9.7 × 4.7–5.5 µm [according to Wasser (1980) 7.0–8.6 × 4.5–5.5 µm], light brown, ellipsoid, with fluorescent spots and lateral hilum. **Stipe** 7–14 × 2–2.5 cm, central, cylindrical, occasionally slightly arched at the base, with or without tuberiform enlargement, initially compact, then hollow, white under the pileus, glabrous, with white floccose-fibrous pruina under the ring, reddens at touch, then turns brown. Ring in the upper part of the stipe, white, with pale brownish floccose pruina. Flesh white, reddens strongly if injured, with fine taste and smell.

Forebalkan: in a coniferous forest of *Pinus nigra* Arnold, in the Poyasa locality close to Topilishte hamlet, near Glozhene village, distr. Lovech, alt. 650 m, 24 Aug 2002, M. Lacheva (ML) & G. Stoichev (GS) (SOA 50 001).

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Distribution: Europe (Czech Republic, Hungary, Bulgaria, and Ukraine) and Asia (Georgia).

Agaricus impudicus (Rea) Pilát (*Psalliota impudica* Rea, *Psalliota brunneola* J.E. Lange, *Psalliota variegata* F.H. Møller, *Agaricus variegans* F.H. Møller) (Fig. 2)

Pileus 5-10 cm, with thick flesh in the center, peripherally flesh-thin, at first semiglobose when young, then plano-convex, occasionally convex in the center, with small purple-brown or dark brown fibrillose scales on gray-brown background, dark brown in the center. Margin thin, involute, fibrillose, with fragments of the partial velum. **Lamellae** free, thin, dense, gray-brown, with light sterile edge. **Hymenophoral trama** regular, then irregular. **Basidia** 20-34 × 6-10 μm, clavate, four-spored. Sterigmata 3 μm. **Cheilocystidia** 23-50 × 8-14 μm, ovate. **Pleurocystidia** absent. Spore print brown. **Basidiospores** 5-6 (-7.5) × 3.5-4 μm [according to Cappelli (1984) 4.8-6 × 3-3.5 μm], ellipsoid-ovate, brown with 1-2 fluorescent spots, with lateral hilum. **Stipe** 7-10 × 1-1.5 cm, central, cylindrical, hollow, tapering at the top, often arched, bulbously expanded at the base, white with grayish tinge, glabrous or with floccose-fibrous pruina, ends in a root-like mycelial strand, slightly yellowing at touch. Ring in the upper part of the stipe, separable, wide, white with floccose pruina. Flesh white, slightly reddens if injured, taste and smell not distinctive.

Toundzha Hilly Country: in an artificial plantation of *Pinus nigra*, above Hlyabovo village, distr. Topolovgrad, alt. 300 m, 10 Sep 2002, ML & GS (SOA 50 002).

Distribution: Europe (UK, France, Denmark, Germany, and Bulgaria), Asia (Georgia), and Africa (Algeria and Morocco).

Agaricus leucotrichus (F.H. Møller) F.H. Møller (*Psalliota leucotricha* F.H. Møller) (Fig. 3)

Pileus 6-15 cm, with thick flesh, ovate, campanulate to rounded, then plano-convex, with occasionally depressed center, white to straw-yellow, then ochre, with white floccose pruina, strongly yellowing at touch. Margin thin, involute, then straight, with fragments of the partial velum. **Lamellae** free, thin, dense, gray-pink with a reddish tinge, then dark brown, with light sterile edge. **Hymenophoral trama** regular, then irregular. **Basidia** 20-30 × 8-10 μm, clavate, inamyloid, four-spored. Sterigmata 3 μm. **Cheilocystidia** 8-30 × 7-20 μm, ellipsoid, broadly clavate. **Pleurocystidia** absent. Spore print dark brown. **Basidiospores** 6.5-7 × 4-5.5 μm [according to Wasser (1980) (6-) 7-8 × 4.5-5 μm], ovate, brown, with fluorescent spots and lateral hilum. **Stipe** 6.5-10 × 1.5-2.5 cm, central, cylindrical, slightly tapering at the top, hollow or not, white to pale cream, glabrous above the ring, fibrillose under the ring, with white squamulose-floccose pruina, yellows at touch. Ring in the upper part of the stipe, initially wide, then narrow, white, with floccose-fibrous pruina. Flesh white, gets ochre-yellow if injured, with fine almond smell.

Toundzha Hilly Country: in a plantation of *Cedrus libani* A. Richart in the Yambol Bakadzhik locality, alt. 800 m, 15 Sep 2002, ML & GS (SOA 50 003).

Distribution: Europe (Denmark, Czech Republic, and Bulgaria).

Agaricus maleolens F.H. Møller (*Psalliota ingrata* F.H. Møller, *Agaricus ingratus* (F.H. Møller) Pilát)

(Fig. 4)

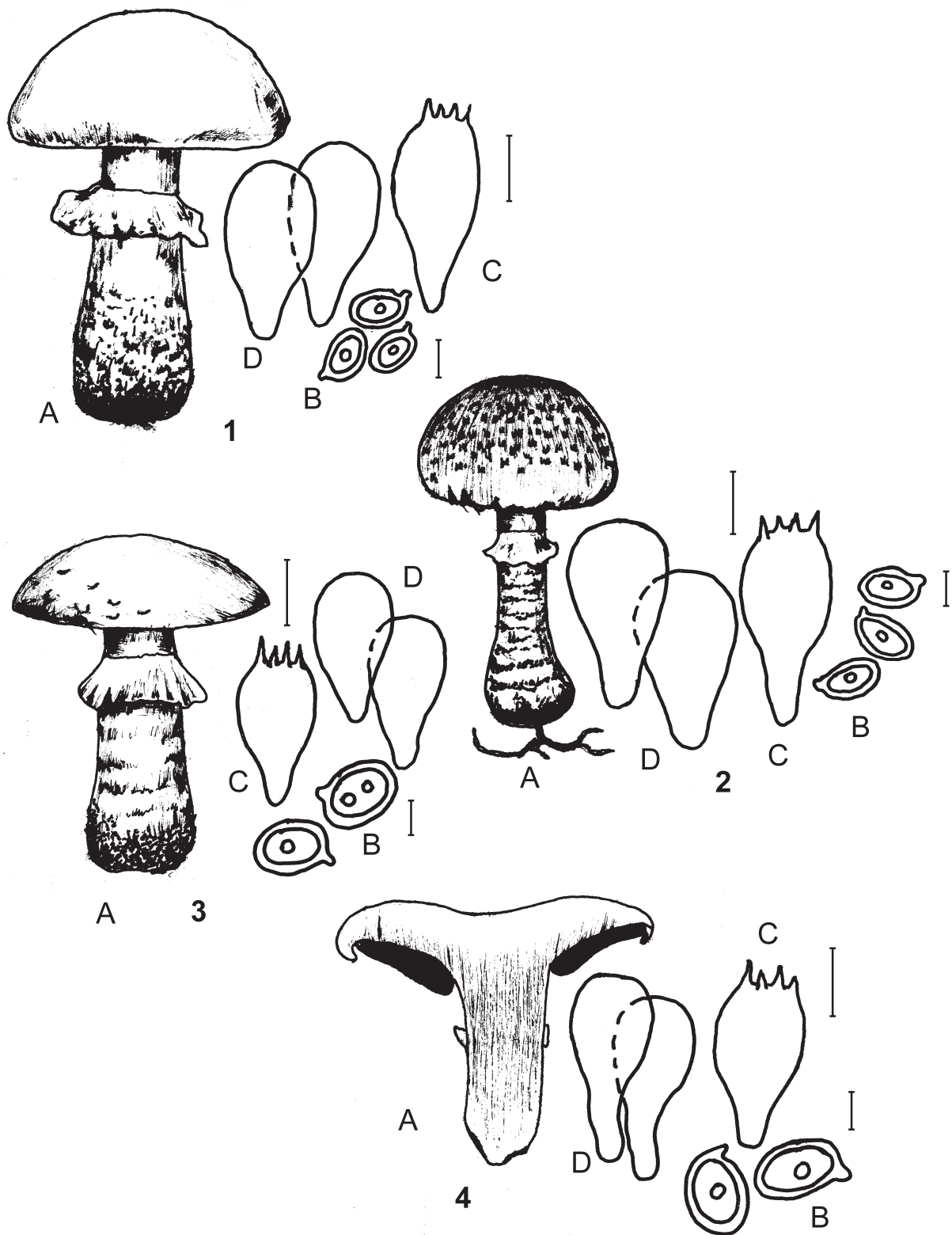
Pileus 5-9 cm, with thick flesh, at first semiglobose, then plano-convex, occasionally slightly depressed or convex in the center, light ochre to light brown in the center, fibrillose, then squamulose-fibrillose. Margin thin when young, strongly involute, then straight, often cracked. **Lamellae** free, thin, dense, with light sterile edge, initially pale brownish, then dark brown. **Hymenophoral trama** regular, then irregular. **Basidia** 22-40 × 7-9 μm, clavate, four-spored. Sterigmata 3-4 μm. **Cheilocystidia** 30-60 × 6-18 μm, clavate, spindle-shaped, inamyloid. Spore print dark brown. **Basidiospores** 5.5-7.5 × 4-5 μm [according to Wasser (1980) 6.3-7(-8) × 4.6-5 μm], brown, terete, ellipsoid, glabrous, with lateral hilum. **Stipe** 5-10 × 2 cm, central, cylindrical, tapering at the base, compact, white with red-brown tinge, glabrous above the ring, with or without floccose pruina under it. Ring at half-length of the stipe or in its lower part, initially wide, then narrower, white with floccose pruina. Flesh white, pinkish if injured, with unpleasant odour and flavor.

Mt Sredna Gora: in an open glade with single trees of *Robinia pseudoacacia* L., near the water reservoir of Drangovo village, distr. Plovdiv, 6 Aug 2002, ML & GS (SOA 50 004).

Distribution: Europe (Denmark, Sweden, Czech Republic, Bulgaria, and Ukraine), Asia (Georgia), and Africa (Morocco).

Agaricus mediofuscus (F.H. Møller) Pilát (*Psalliota mediofuscus* F.H. Møller) (Fig. 5)

Pileus 5-10 cm, with thick flesh, semiglobose, then plano-convex, occasionally slightly depressed or convex in the center, light purple-brown, dark brown with purple tinge in the center, with evenly arranged dark brown velvet-fibrous scales on whitish background. Margin involute, thin, then straight, with tattered fragments of the partial velum. **Lamellae** free, thin, dense, pink with reddish tinge, then red-brown, with light sterile edge. **Hymenophoral trama** regular, then irregular. **Basidia** 20-27 × 6-8 μm, clavate, four-spored. Sterigmata 3 μm. **Cheilocystidia** clavate-ovate, 20-38 × 10-20 μm, inamyloid. **Pleurocystidia** absent. Spore print dark brown. **Basidiospores** 6-8.5 × 4 μm [according to Wasser (1980) 6-8 × 4-4.5 μm], ellipsoid, oblong-ovate, with lateral hilum. **Stipe** 6-8 × 2 cm, cylindrical, central, with or without tuberiform expansion at the base, often arched, hollow, white under the pileus, glabrous, under the ring covered with light brown floccose pruina. Ring in the upper part of the stipe, wide, thin, initially white, then with brown, floccose pruina. Flesh white, reddens strongly if injured, without specific smell.



Figs 1-4. 1. *Agaricus deylii* Pilát. A. Mature fruiting body. B. Basidiospores. C. Basidium. D. Cheilocystidia. Scale bars B-D = 10 μ m. 2. *Agaricus impudicus* (Rea) Pilát. A. Mature fruiting body. B. Basidiospores. C. Basidium. D. Cheilocystidia. Scale bars B-D = 10 μ m. 3. *Agaricus leucotrichus* (F.H. Møller) F.H. Møller. A. Mature fruiting body. B. Basidiospores. C. Basidium. D. Cheilocystidia. Scale bars B-D = 10 μ m. 4. *Agaricus maleolens* F.H. Møller. A. Sectioned mature fruiting body. B. Basidiospores. C. Basidium. D. Cheilocystidia. Scale bars B-D = 10 μ m

Balkan Range: in a glade with *Juniperus* sp., Sinite Kamuni Natural Park, above the Sliven town, alt. 1180 m, 11 Oct 2002, ML & GS (SOA 50 005).

Distribution: Europe (UK, France, Belgium, Denmark, Germany, Poland, Hungary, Bulgaria, and Ukraine), Asia (Georgia), and Africa (Morocco).

Agaricus spissicaulis F.H. Møller (*Psalliota spissa* F.H. Møller) (Fig. 6)

Pileus 4.5-6 cm, with thick flesh, hemispherical, convex, then plano-convex, occasionally slightly depressed in the center, white, then whitish brown with grayish tinge, with wide yellowish brown fibrillose scales. Margin involute when young, then straight, with or without fragments of the partial velum. Pileus diameter exceeds the stipe length. **Lamellae** free, thin, dense, pink, then dark brown, with smooth and light sterile edge. **Hymenophoral trama** regular, then irregular. **Basidia** 24-42 × 6-10 μm, clavate, cylindrical, four-spored. **Pleurocystidia** absent. Spore print dark brown. **Basidiospores** 5-7.5 × 5.2-6 μm (according to Wasser (1980) (5.7-7.9 × 5.2-5.7 μm)), ovate, round, light brown, smooth, with lateral hilum. **Stipe** 3-3.2 × 2 cm, central, spindle-shaped, hollow or not, white with yellow-brown tinge, silk-fibrous, with or without mycelial strands. Ring in the upper part of the stipe, thin, narrow, white, often tattered, dorsally furrowed, ventrally with or without white floccose pruina. Flesh white, compact, firm, slightly yellowing in the center of the pileus and the stipe when injured, with fine fungoid smell.

The Rhodopes: in an opening in a mixed forest of *Fagus sylvatica* L. and *Pinus sylvestris* L., in the vicinity of Ravnogor village, distr. Pazardzhik, 17 Sep 2002, ML & GS (SOA 50 006).

Distribution: Europe (UK, France, Denmark, Bulgaria, and Ukraine), Asia (Georgia), and Africa (Algeria and Morocco).

Agaricus subfloccosus (J.E. Lange) Pilát (*Psalliota hortensis* var. *subfloccosa* J.E. Lange, *Psalliota subfloccosa* (J.E. Lange) J.E. Lange) (Fig. 7)

Pileus 5-8 cm, with thick flesh, semiglobose, then convex, occasionally slightly depressed in the center, dull white, light brown, darker in the center, smooth, fibrillose, often with small light russet scales, with small, light, floccose fragments of the velum scattered around the periphery. Margin involute, undulate, with or without fragments of the partial velum. **Lamellae** free, thin, dense, pale pink, then dark brown, with light sterile edge. Hymenophoral trama regular, then irregular. **Basidia** 22-30 × 6-10 μm, clavate, four-spored. Sterigmata 3 μm. **Cheilocystidia** 25-55 × 7-13 μm, wide-clavate, elongate, inamyloid. **Pleurocystidia** absent. Spore print dark brown. **Basidiospores** 5-7.2 × 3.5-4 μm [according to Wasser (1980) 5-7.3 × 3.5-4.5 μm], wide-ovate, oval, brown, smooth, with lateral hilum. **Stipe** 4.5-2 cm, central, cylindrical, often bulbously expanded at the base, white, then to

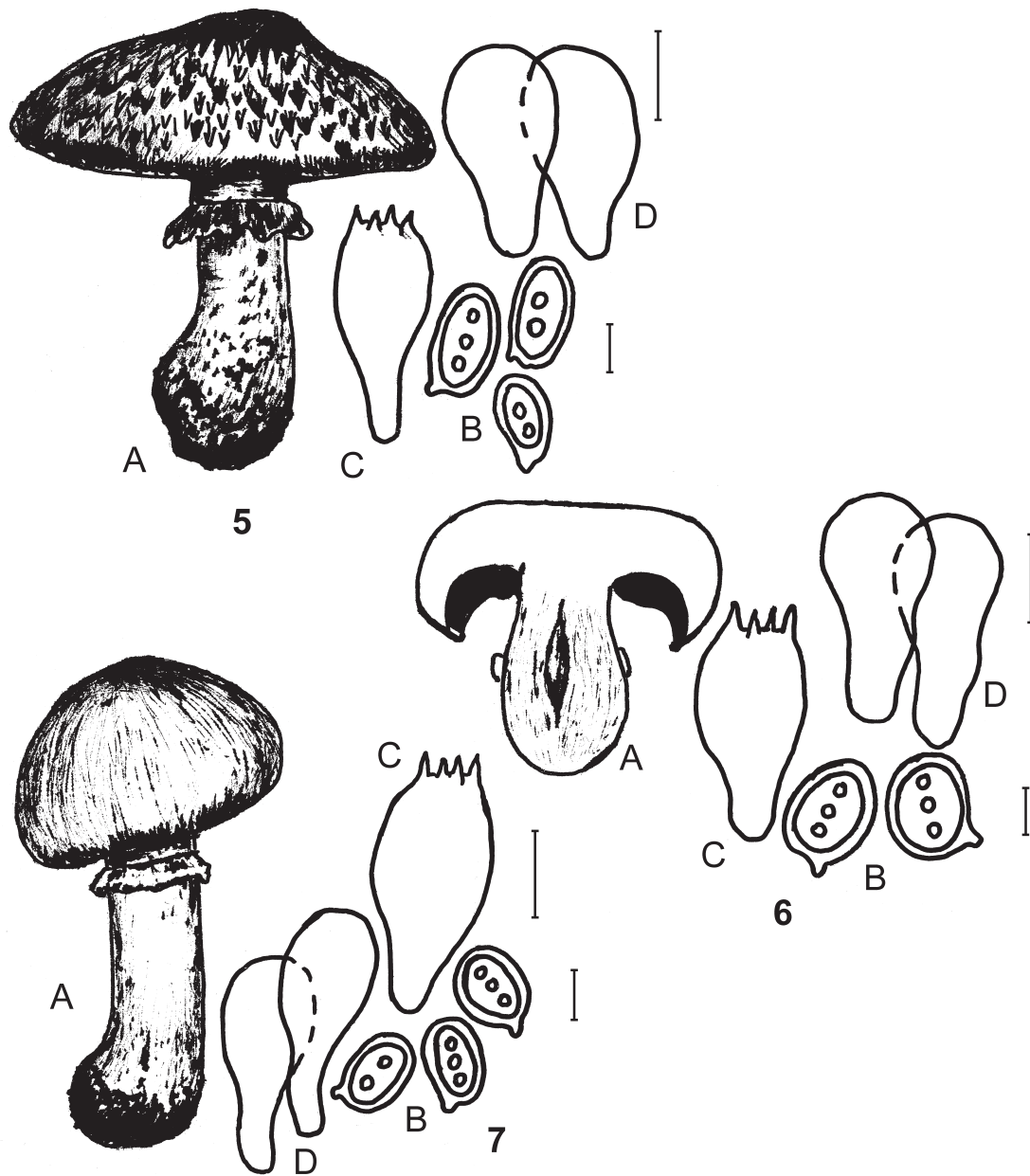
gray-red-russet, with white floccose pruina, compact, then hollow. Ring white, in the upper part of the stipe, with floccose pruina. Flesh whitish, reddening if injured, with unpleasant odour and taste.

Pirin Mts: in a coniferous forest of *Picea abies* (L.) Karsten, in the Piknika locality, under the ski tow-lift nearly to Bansko town, 6 Oct 2002, ML & GS (SOA 50 007).

Distribution: Europe (UK, Denmark, Norway, Belgium, Switzerland, Czech Republic, Bulgaria, and Ukraine), and Asia (Georgia).

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Figs 5-7. 5. *Agaricus mediofuscus* (F.H. Møller) Pilát. A. Mature fruiting body. B. Basidiospores. C. Basidium. D. Cheilocystidia. Scale bars B-D = 10 μ m. 6. *Agaricus spissicaulis* F.H. Møller. A. Sectioned mature fruiting body. B. Basidiospores. C. Basidium. D. Cheilocystidia. Scale bars B-D = 10 μ m. 7. *Agaricus subfloccosus* (J.E. Lange) Pilát. A. Mature fruiting body. B. Basidiospores. C. Basidium. D. Cheilocystidia. Scale bars B-D = 10 μ m

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