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New, remarkable and rare higher Basidiomycetes from Israel

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Wasser S.P. (1996): New, remarkable and rare higher Basidiomycetes from Israel – Czech Mycol. 48: 237–

Nine species and infraspecific taxa of Higher Basidiomycetes are recorded as new, remarkable and rare for Israel. One species is undescribed: Agaricus herinkii sp. nov., related to A. nevoi S. Wasser, A. pratulorum Romagn. and A. gennadii (Chat. et Boud.) P. D. Orton. Macowanites galileensis Mos., Binyam. et Hersh., Agaricus bonii S. Wasser and A. nevoi S. Wasser are endemics of Israel. Melanophyllum haematospermum (Bull.: Fr.) Kreisel, Agaricus geesteranii Bas et Heinem., A. xanthodermus Gen. var. lepiotoides R. Mre, A. gennadii (Chat. et Boud.) P. D. Orton var. microsporus (Bohus) S. Wasser and A. pequinii (Boud.) Konr. et Maubl. are new for Israel and some of them – for Asia or for the Near East. Synonyms, detailed descriptions, locations and dates of collections in Israel, ecological peculiarities, general distribution, as well as taxonomic remarks to all nine taxa are given.

Key words: Higher Basidiomycetes, Agaricales, taxonomy, ecology, taxa, sp. nov., Israel

Wasser S. P. (1996): Nové, význačné a vzácné vyšší bazidiomycety Izraele. – Czech Mycol. 48: 237–

Devět druhů a infraspecifických taxonů vyšších bazidiomycetů je zaznamenáno jako nové, významné nebo vzácné pro Izrael. Je popsán jeden nový druh: Agaricus herinkii sp. nov., příbuzný druhům Agaricus nevoi S. Wasser, A. pratulorum Romagn. a A. gennadii (Chat. et Boud.) P. D. Orton. Macowanites galileensis Mos., Biniam. et Hersh., Agaricus bonii S. Wasser, A. nevoi S. Wasser jsou izraelskými endemity. Melanophyllum haematospermum (Bull.: Fr.) Kreisel, Agaricus geesteranii Bas et Heinem., A. xanthodermus Gen. var. lepiotoides R. Mre, A. genadii (Chat. et Boud.) P. D. Orton var. microsporus (Bohus) S. Wasser a A. pequinii (Boud.) Konr. et Maubl. jsou nové pro Izrael a některé z nich nové pro Asii nebo pro Blízký Východ.

Jsou uvedena synonyma, podrobné popisy, lokality a data sběrů z Izraele, dále ekologické zvláštnosti, celkové rozšíření, jakož i taxonomické poznámky ke všem devíti taxonům.

INTRODUCTION

Inventory of Higher Basidiomycetes of Israel is as yet unfinished. Due to investigations of a number of authors (for example, Avizohar-Hershenzon 1961; Avizohar-Hershenzon and Binyamini 1972, 1974; Binyamini 1975, 1976a, b, c, 1980; Moser, Binyamini and Avizohar-Hershenzon 1977; Wasser and Binyamini 1992; Wasser 1995; Wasser et al. 1995) there are preliminary data on species composition of a number of taxa of Higher *Basidiomycetes* of Israel. However, many systematic groups (for example, *Agaricaceae, Crepidotaceae, Tricholomataceae, Amanitales, Russulales, Boletales*) of Israel mycobiota are still studied poorly. Their critical inventory has not been carried out.

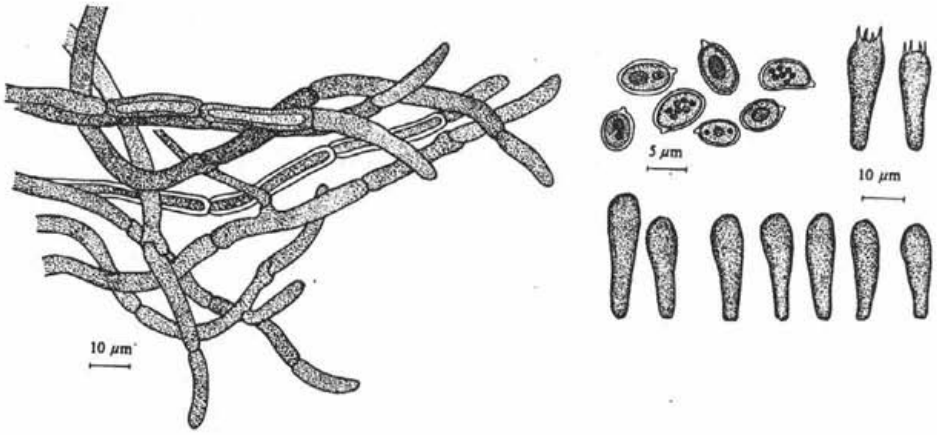

Fig. 1 *Agaricus herinkii* sp. nov.: a – elements of pileal cuticle, b – spores, c – basidia, d – cheilocystidia.

MATERIAL AND METHODS

Our investigations in the growing seasons of 1991, 1993–1995, the processing of an extensive herbarium material kept in the Herbarium of Tel-Aviv University (TELA, Israel) and in Herbarium of Innsbruck University (IB, Austria) as well as the analysis of the whole published literature on Higher *Basidiomycetes* of Israel serve as the scientific basis for analyzing the diversity of Higher *Basidiomycetes* in Israel. We have revealed among specimens collected in various botanical and geographical regions, mainly of the northern Israel, new for science, new, rare and remarkable for Israel and the Near East taxa of Higher *Basidiomycetes*.

The collected material of Higher *Basidiomycetes* of Israel is kept at the Herbarium of the Institute of Evolution, University of Haifa (HAI) and at the Herbarium of the N. G. Kholodny Institute of Botany, National Academy of Sciences of Ukraine (KW).

The procedure for studying soluble proteins in fruit bodies of Higher *Basidiomycetes* by the method of electrophoresis is described in our paper (Wasser and Brun 1991).

DESCRIPTION OF THE TAXA

Below are presented the descriptions of one science in the genus *Agaricus*, new to sciences, three endemic species of Israel and five taxa new to Israel and some of them – new for Asia or to the Near East.

1. **Agaricus herinkii** S. Wasser, sp. nov. (Fig. 1).

Pileus 3–6 cm latus, valde carnosus, hemisphaericus, postea convexus, centro applanatus, sericeo-nitens, roseo-brunneus vel brunneus, tactus non flavescens,

squamis minutissimis, adpresis, dispersis, margine sterili 3mm crasso, diu involuto. Pileipellis hyphis 3–5 μm latis composita. Lamellae liberae, confertae, e roseis, denique brunneae. Basidia tetrasterigmatica, 22–25 × 7–8 μm, clavata. Sterigmata 2–3 μm longa. Cheilocystidia 23–30 × 6–8 μm, cylindrica, clavata. Sporae in cumulo obscure brunneae. Sporae 5–7,5 × 3–4,5 μm, pallidae, brunneae, subglobosae, ellipsoidieae. Stipes 2–4,5 × 1,2–1,8 cm, cylindraceus, solidus, albidus, exannulatus, cum volva rosea, roseo-brunnea, extra marginem 2–3 mm scindens. Caro albida, fracta erubescens. Odor et sapor acidulus. Reactio Schaefferi – .

Typus: Israel, legit in Nahal Nesher Horshat Arbaim, monte Carmel prope Haifa, sub *Pino halepensi* et *Querco calliprino*, 27. Nov. 1994, S. P. Wasser, in Herbario Inst. Evolution (HAI) conservatur. Isotypus in Herbario KW conservatur.

Etymology: *Agaricus herinkii* is named in honor of Dr. J. Herink (Czech Republic), dedicated taxonomist, in recognition of his contribution to the knowledge of *Agaricales* s.l. and in honor of his 80th anniversary.

Pileus 3–6 cm in diam., thick-fleshed, hemispherical, later convex, convex-expanded, sometimes flattened or slightly depressed at the centre, pale brownish-pinkish or brown, silky, shiny, covered with small appressed scales which are pale-brown, thin, radial, margin frequently with remnants of the veil. Pileal cuticle (and probably universal veil cuticle) consisting of hyaline and brownish, thin-walled, cylindrical, septate hyphae, without clamps, 3–5 μm in diam. Gills free, thin, densely crowded, pink, later brown. Gill trama regular, consisting of cylindric, thin-walled hyphae, colourless in water, 4–7(8) μm in diam. Basidia 4-sterigmata, 22–25 × 7–8 μm, clavate. Sterigmata 2–3 μm long. Cheilocystidia 23–30 × 6–8 μm, abundant, cylindric, clavate. Spore print brown. Spores 5–7.5 × 3–4.5 μm, light brown, ovate-ellipsoid, ellipsoid, with refractive droplets, with lateral apiculus. Stipe 2–4.5 × 1.2–1.8 cm, central, erect, cylindrical, white, whithout ring, with basal, pink, pale brownish-pink volva, covered with small appressed scales. Flesh compact, dense, white, on exposure becoming reddish. Odor and taste acid. Cross reaction with Schaeffer's reagent negative.

Specimens examined Israel, Mt Carmel National Park, Nahal Nesher Horshat Arbaim, under *Pinus halepensis* Mill. and *Quercus calliprinos* Webb., 7. 11. 1994, coll. S. P. Wasser.

Note: *Agaricus herinkii* should be placed in the Subsection *Chitonioides* (Romagn.) S. Wasser of the Sect. *Duploannulatae* S. Wasser (Wasser 1980, 1989). This new species is more closely related to *Agaricus nevoi* S. Wasser, *A. pratulorum* Romagn. and *A. gennadii* (Chat. et Boud.) P. D. Orton, but differs in colour, shape, size and surface of volva, color of flesh on exposure, in spore size (Cappelli 1984; Romagnesi 1986; Wasser 1989, 1995).

Fig. 2 *Macowanites galileensis* Mos., Binyam. et Hersh.: fruits bodies

Fig. 3 *Macowanites galileensis* Mos., Binyam. et Hersh.: section of fruit body.

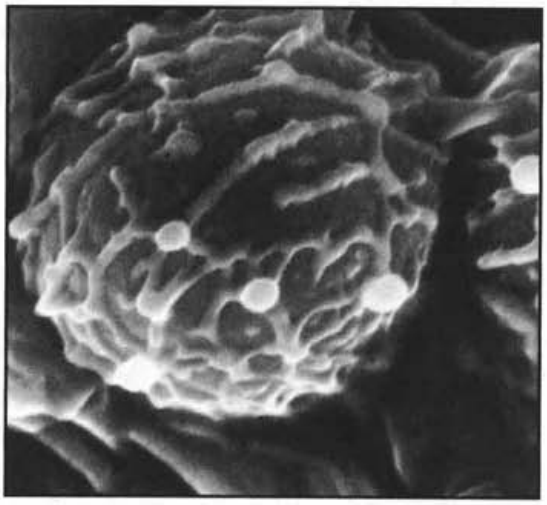

Fig. 4 *Macowanites galileensis* Mos., Binyam. et Hersh.: spore (× 12000).

2. **Macowanites galileensis** Mos., Binyam. et Hersh., Trans. Br. Mycol. Soc., 68, 3: 371, 1977 (Fig. 2–5).

Fruit body hypogeous, with the appearance of a small aborted *Russula*, stipitate, 1–6 (7) cm in diam., irregular and tuberous, appex sometimes depressed, completely closed by an arachnoid cortina or rarely at least with lacunose, indistinctly lamellate ("aborted" gills) gleba. Peridium in young carpophores whitish, yellowish-cream, then brownish, spotted. Epicutis of peridium consisting of hyaline, yellowish-cream,

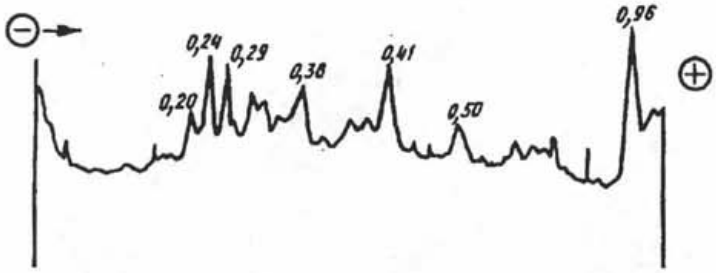

Fig. 5 Densitogram of soluble proteins *M. galileensis*.

cylindrical septated hyphae, 4–7 μm in diam. Gleba lacunose, cream, are ochraceous when muture. Basidia 4-sterigmata or more rarely 2-3-sterigmata. Spore print brown. Spores (9) 10–15 × 8–14 μm, globose, short ellipsoid, ornamentation usually about 0.5–1 μm high (Fig. 4) strongly amyloid. Pseudocystidia 40–60 × 10–15 μm. Stipe 0.5–5 × 0.5–1.5 (2) cm, central or lateral, cylindrical, narrowing toward the base, solid, later slightly fistulose, white, whitish. Flesh white, lacking a distinctive smell, taste mild.

Specimens examined: Israel, Mt Carmel National Park, Nahal Nesher Horshat Arbaim, under *Quercus calliprinos* Webb., 7. 4. 1991, coll. N. Binyamini and S. P. Wasser; 27. 11. 1994, 5. 12. 1994, 23. 12. 1994, 3. 1. 1995, 16. 2. 1995, 13. 3. 1995, coll. E. Nevo and S. P. Wasser.

Note: *Macowanites galileensis*, an endemic of Israel, is described only in 1977 (Moser et al. 1977). *M. galileensis* is closely related to *M. krjukowensis* (Buch.) Sing. et A. H. Sm. and *M. fulvescens* Sing. et A. H. Sm. from which it differs in ecology (this species seemingly associated with *Q. calliprinos)*, colour of gleba, stipe size, size and ornamentation of spores (Moser et al. l.c.).

First using the methods of electrophoresis in 10% polyacryl amide gel in the Laemmly system I have studied a soluble protein complex of *M. galileensis*. 15 protein fractions with relative electrophoretic mobility 0.08; 0.11; 0.13; 0.20; 0.24; 0.29; 0.38; 0.41; 0.43; 0.50; 0.60; 0.63; 0.79 and 0.96 were found on electrophoregrammes (Fig. 5).

The anatomical-morphological and biochemical data on *M. galileensis* supplment to the known evidence on relationship between *Asterogastraceae – Russulales* (Kreisel, 1969; Singer, 1986).

3. **Melanophyllum haematospermum** (Bull.: Fr.) Kreisel, Fedd. Repert., 95, 9–10 : 700, 1984 (Fig. 6).

Basionym: *Agaricus haematospermus* Bull., Herbier de la France, tab. 591/1 : 698, 1793.

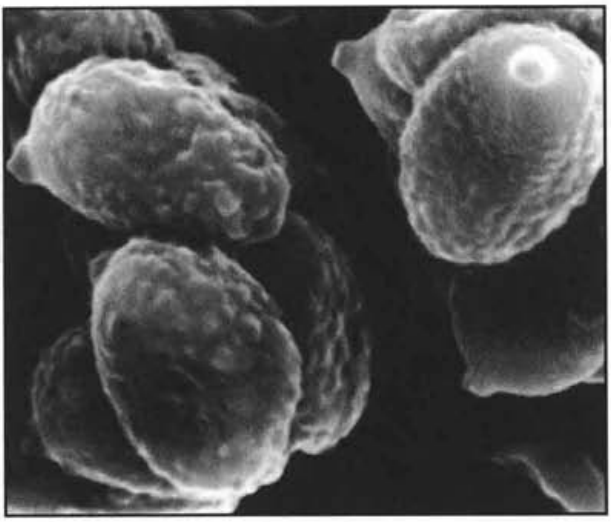

Fig. 6 *Melanophyllum haematospermum* (Bull.: Fr.) Kreisel: spores (× 10500).

Pileus 1–2.5 cm diam., thin-fleshy (1–2 mm in width), globose-campanulate, campanulate, later convex, in young specimens dark brown with pink tinge, later, especially when drying, smoky-brown, sometimes black with olive tinge, granular, with detersile punctate scales; margin with remnants of the universal veil. Pileal scales consisting of globose-elongate, almost polyhedric, 20–30 μm wide, smooth, thin-walled, cells. Gills free, crowded (20–25 gills per 1 cm), with an even edge, devoid of anastomoses, carmine-wine-greenish-brown, wine-brown, on drying brown or almost black. Gill trama regular. Hyphae of trama consisting of cylindric thin-walled cells, 10–22 μm diam., with clamps. Basidia 4-sterigmata, 14–20 × 5–6 μm, clavate-cylindrical, hyaline, thin-walled. Sterigmata 2–2.5 μm long. Spore print olive-green, when drying greyish-brown, pale-brownish-red. Spores 4–6.5 × 2.5–4 μm, pale-green-brown (under microscope umber-sepia), ellipsoid, ovoid, almost reniform, with lateral apiculus, thin-walled, rugose (Fig. 6). Stipe 2–4 × 0.3–0.5 cm, central, even, sometimes curved (often with reddish rhizoids at the base), fistullose, the upper part (one third) – purple-red, lower part (two thirds) covered by granular reddish-brown floccose remnants of the universal veil. Flesh in the pileus white, dark brown at the base of the stipe, with strong fruity odor, in old carpophores odor unpleasant, resembling *Cortinarius camphoratus* Fr., taste pleasant.

Specimens examined: Israel, Tel-Aviv, Park Hayarkon N, on lown under *Cupressus* trees, 2. 11. 1972 (TELA N72. 343a); Mt Carmel National Park, under *Quercus calliprinos* Webb., 2. 1. 1995, leg. E. Nevo.

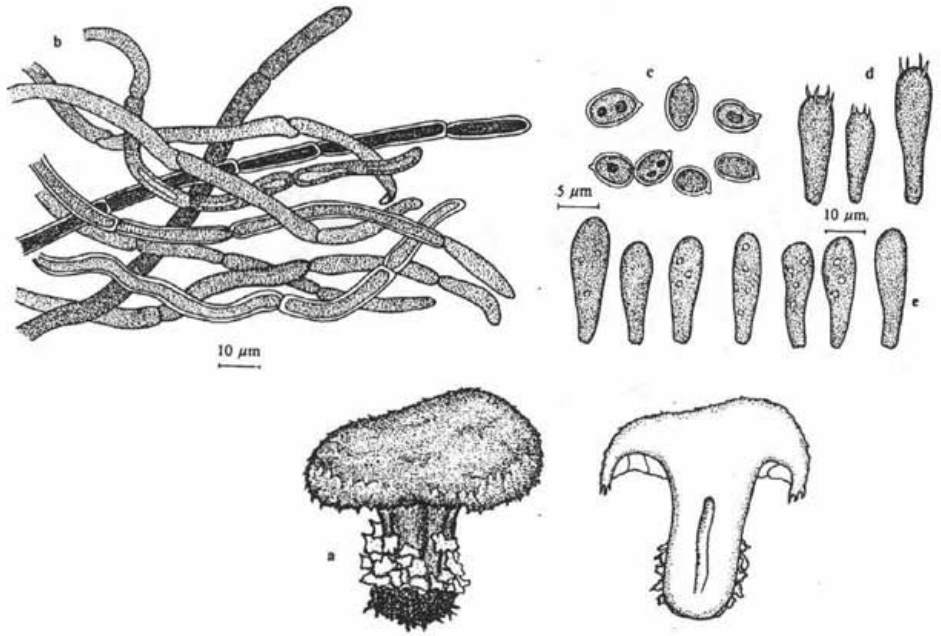

Fig. 7 *Agaricus bonii* S. Wasser: a – fruit bodies, b – elements of pileal cuticle, c – spores, d – basidia, e – cheilocystidia.

General distribution: Europe (British Isles, Spain, France, Belgium, Denmark, Czech Republic, Slovak Republic, Switzerland, Greece, Italy, Ukraine, Moldova, Lithuania, Russia); Asia (Japan, Israel, Russia), North America (USA), South America (Argentina; Africa (Algeria, Morocco, Ghana); Australia; New Zealand, New Guinea, Cuba.

4. **Agaricus bonii** S. Wasser, Doc. Mycol., 25, 98–100, 1995 (Fig. 7).

Pileus 4–12 cm in diam., thick-fleshed (flesh up to 1–2 cm thick), in young carpophores hemispherical, later convex-applanate, occasionaly depressed in the center, whitish, later greyish, covered by orbicular, white, 1–3 mm in diam. granulated scales. Margin thick involute, later straight, undulating, with remnants of the veil covered by orbicular, white, up to 3–4 mm in diam. granulated scales. Pileal cuticle consisting of hyaline, greyish thin-walled cylindrical, septate hyphae, without clamps, 3–6 μm in diam. Gills free, thin, crowded, whitish, pale pink, later dark brown with pale sterile edge. Gill trama regular,consisting of cylindric, thin-walled hyphae 4-11 mm in diam. Basidia 4-sterigmata, 22–33 × 6–9 μm, clavate. Sterigmata 2–4 μm long. Cheilocystidia 25–31 × 7–9 μm, cylindrical, clavate, thin-walled. Spore print dark brown. Spores 5.0–7.5 × 3.8–4.7 μm, pale brown, ellipsoid,

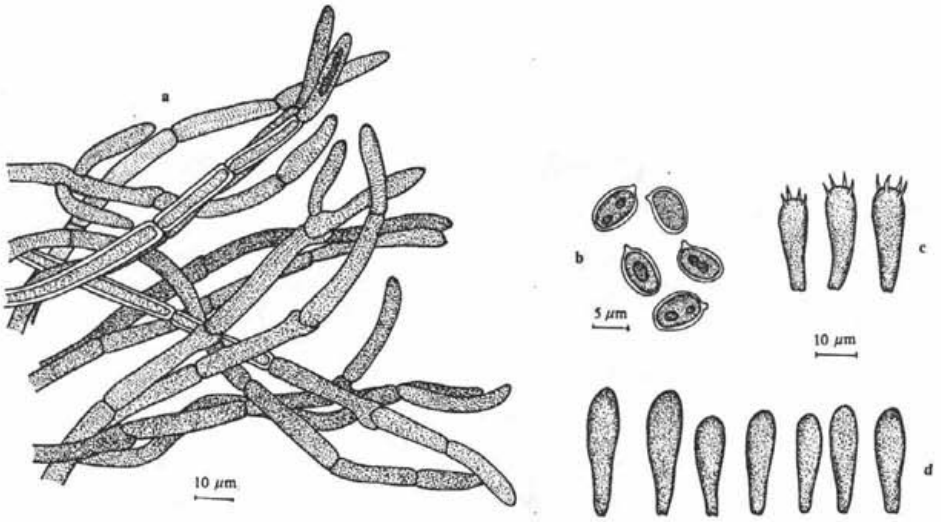

Fig. 8 *Agaricus nevoi* S. Wasser: a – elements of pileal cuticle, b – spores, c – basidia, d – cheilocystidia.

ovate-ellipsoid, with small apiculus, with 1–2 or without refractive droplets. Stipe 3–8 × 0.8–2 cm, central, cylindrical, narrowing toward the base, solid, later fistulous only in the centre, whitish, whitish-greyish, with 1/2 of stipe covered by orbicular, white, up to 5 mm in diam. granules. Ring apical, simple, white, thin, quickly disappearing. Flesh white, unchanging on exposure, then becoming pink in stipe and in the peripherical layers of the pileus, becoming pale yellow on drying. Odor and taste pleasant fungal. Cross reaction with Schaeffer's reagent negative.

Specimens examined: Israel, Mt Carmel National Park, Nahal Nesher, under *Quercus calliprinos* Webb., 5. 12. 1994, coll. S. P. Wasser.

Note: *Agaricus bonii*, an endemic of Israel, is described only in 1995 (Wasser 1995). This species is most closely related to *Agaricus floccipes* (Moell.) Bohus emend. Bohus (Bohus 1978) but differs in three striking features: 1) the presence of very specific granules on the surface of pileus and stipe, 2) presence of cheilocystidia and 3) lack of more or less lemon yellow colour when touched.

5. **Agaricus nevoi** S. Wasser, Doc. Mycol., 25, 98–100, 1995 (Fig. 8).

Pileus 5–7 cm diam., thick-fleshed (flesh up to 2 cm thick), hemispherical, later convex, convex-expanded, sometimes at the centre with a small depression, whitish, pale-greyish, silky, shiny, covered with wide, appressed scales which are greyish, sometimes pale-brown, thin radially, fibrillose toward the margin which often bears remnants of the universal veil. The pileal diam. is always larger than the length of the stipe. Pileal cuticle consisting of hyaline, greyish, thin-walled cylindrical,

septated hyphae, without clamps, 4–7 μm in diam. Gills free, thin, densely crowded, pink, later dark brown with whitish sterile edge. Gill trama regular, consisting of cylindric, thin-walled hyphae 5–8 μm in diam. Basidia 4-sterigmata, 24–27 × 7.5–8.5 μm, clavate. Sterigmata 3–4 μm long. Cheilocystidia 26–33 × 6.5–9 μm abundant, clavate, short-clavate. Spore print dark brown. Spores (6)7–8.5 × 4.5–5.5 μm light brown, ellipsoid, with or without refractive droplets, with lateral apiculus. Stipe 4–6 × 1.8–2.2 cm, central, erect, narrowing toward the base, solid, white, without ring, with broad basal, whitish, whitish-pink, covered with wide thin appressed scales volva. Flesh compact, dense, white, unchanging on exposure, often becoming slightly pink above the gills. Odor and taste pleasant, fungal. Cross reaction with Schaeffer's reagent negative.

Specimens examined: Israel, Mt Carmel National Park, under *Pinus halepensis* Mill., 14. 12. 1994, coll. S. P. Wasser.

Note: *Agaricus nevoi*, an endem of Israel, is described in 1995 (S. Wasser 1995). This species is more closely related to *Agaricus pratulorum* Romagn., *A. gennadii* (Chat. and Boud.) P. D. Orton and *A. volvatus* (Pears.) Heinem., but differs in shape, size and surface of volva, colour of flesh on exposure and in spore size (Cappelli 1984; Romagnesi 1986; Wasser 1989).

6. **Agaricus gennadii** (Chat. et Boud.) P. D. Orton var. **microsporus** (Bohus) S. Wasser, The Tribe Agariceae Pat. of the Soviet Union: 100, 1989. (Fig. 9).

Basionym: *Agaricus gennadii* (Chat. and Bould.) P. D. Orton ssp. *microsporus* Bohus, Ann. Hist.-Nat. Mus. Nat. Hung. 67: 38, 1975.

Description and illustration: Bohus, Ann. Hist-Nat. Mus. Nat. Hung., 67, fig. 1, 1975

Pileus 3–7 cm in diam., thick-fleshed, at first spherical or hemisphaerical, then convex plane, sometimes with a central depression, white or whitish, sometimes dirty ochraceus in the centre, with appressed fibrillose scales, margin frequently with remnants of the veil. Pileal cuticle consisting of hyaline, greyish, thin-walled, cylindrical septate hyphae, without clamps, 3–6 μm in diam. Gills free, thin, crowded, with an even sterile margin, at first pink, later dark brown, chocolate-brown. Gill trama regular. Basidia 4-sterigmata (sometimes 1–3-sterigmata), 23–28 × 7–10 μm, clavate. Sterigmata 3–4 μm long. Cheilocystidia 23–33 × 7–10 μm, abundant clavate, hyaline. Spore print dark brown. Spores 5.7–7.5 × 4–5.5 μm, pale-brown, broadly ovoid, with lateral apiculus, with refractive droplets. Stipe 2–6 × 1–1.5 cm, central, cylindrical, narrowing toward the base, solid, whitish, fibrous, with whitish basal volva. Flesh white, unchanging on exposure, or becoming slightly pinkish. Odor disappearable. Taste acidulous. Cross reaction with Schaeffer's reagent negative.

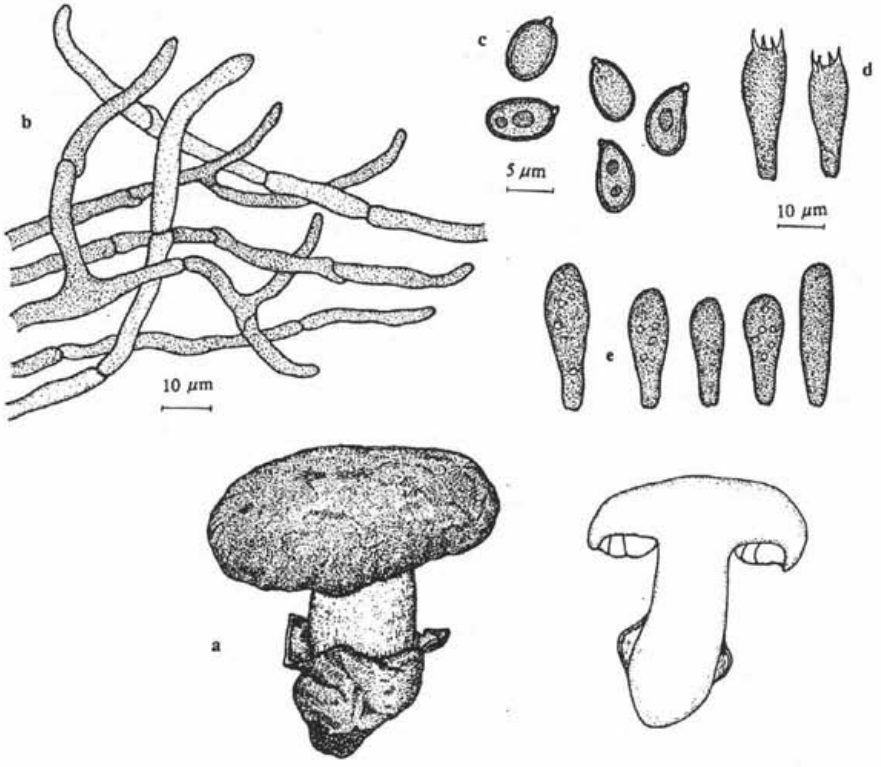

Fig. 9 *Agaricus gennadii* (Chat. et Boud.) P.D. Orton var. *microsporus* (Bohus) S. Wasser: a – fruit bodies, b – elements of pileal cuticle, c – spores, d – basidia, e – cheilocystidia.

Specimens examined: Israel, Mt Carmel National Park, Lower Nahal Oren, "Evolution Canyon", valley bottom, 13. 11. 1994, coll. S. P. Wasser; campus of the University of Haifa, on lawns, 5. 1. 1995, coll. E. Nevo.

General distribution: Europe (British Isles, Hungary, Italy, France, Ukraine), North Africa (Morocco), Asia (Uzbekistan, Turkmenistan, ?China, Israel).

Note: For *Agaricus gennadii*, G. Bohus described the new subspecies *microsporus* (Bohus 1975). Cappelli (1984) reduced this taxon to a synonym of *A. pequinii* (Boud.) Konr. et Maubl., in my opinion erroneously. It was mostly based on the size of spores.

In 1989, this taxa was left by myself (Wasser 1989) in *A. gennadii* at the varietal rank, viz. var. *microsporus*. Having studied all the available material on *A. gennadii* and *A. pequinii*, I consider *A. gennadii* var. *microsporus* to be a good taxon.

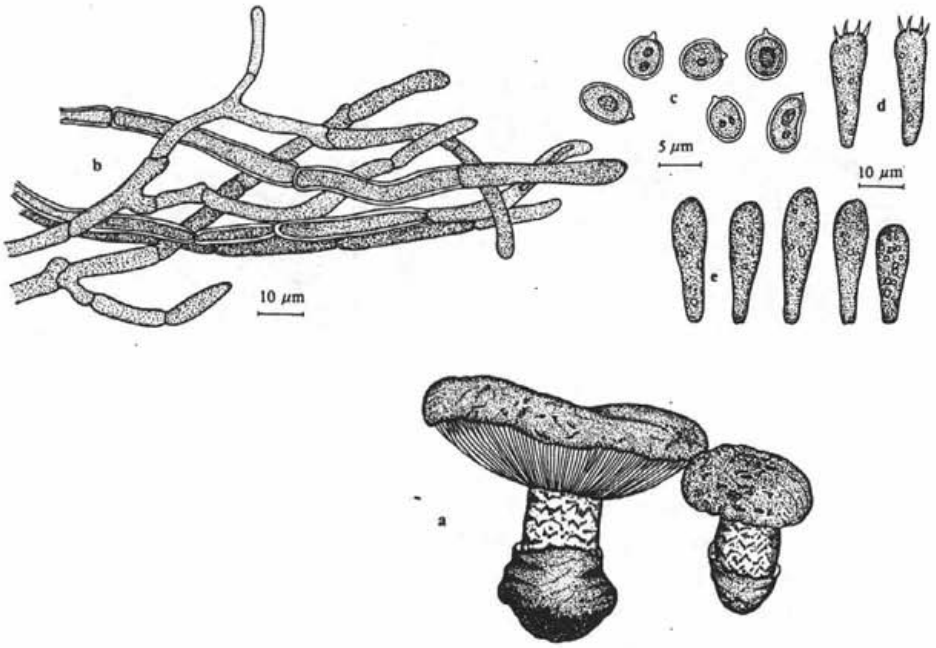

Fig. 10 *Agaricus pequinii* (Boud.) Konr. et Maubl.: a – fruit bodies, b – elements of pileal cuticle, c – spores, d – basidia, e – cheilocystidia.

7. **Agaricus pequinii** (Boud.) Konr. et Maubl., Icon. Sel. Fung., VI:61, 1937 (Fig. 10).

Basionym: *Chitonia pequinii* Boud., BSMF, 17: pl. 1, 1901.

Description and illustration: Cappelli, Agaricus L.:Fr. :pl.6, 1984.

Pileus 6–10 cm in diam.,thick-fleshed, hemisphaerical, later convex-plane, often depressed at the centre, whitish, greyish-white, with scattered membranaceous patches from velar material; margin fibrillose, involute, later expanding, undulating,often cracked, with remnants of the veil. Pileal cuticle consisting of greyish, greyish-white, thin-walled, cylindrical, septate hyphae, without clamps, 3–6 μm in diam. Gills free, thin, crowled, pink, later chocolate brown, with paler sterile edge. Gill trama regular. Basidia 4-sterigmata, 23–29 × 7–9 μm, clavate. Sterigmata 2–3 μm long. Cheilocystidia 23–32 × 7–9 μm, abundant, clavate-fusiform, hyaline. Spore print dark brown. Spores 5–7 × 4.5–5.5 μm, pale brown, ovoid, rounded with lateral apiculus and refractive droplets. Stipe 4–7 × 1.8–2-(2.5) cm, central, equal, in the centre slightly inflated, solid, narrowing toward the base, whitish, below the volva covered with peculiar greyis-purple, appressed and transversely arranged scales, with basal, membranaceous, whitish, whitish-greyish volva. Flesh

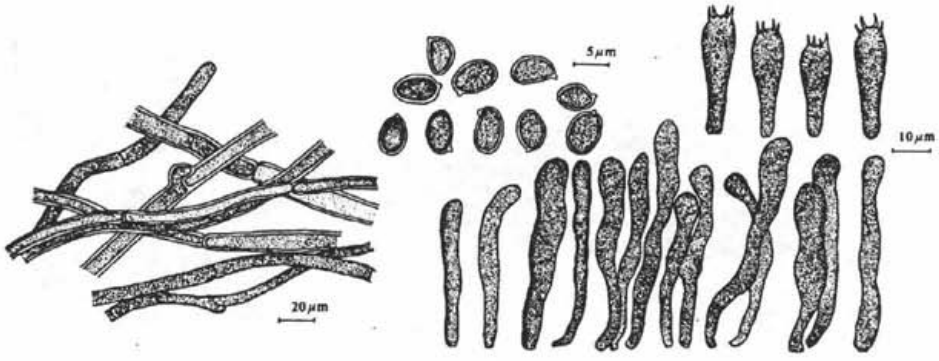

Fig. 11 *Agaricus geesteranii* Bas et Heinem.: a – elements of pileal cuticle, b – spores, c – basidia, d – cheilocystidia.

white, becoming pink or slightly brown on exposure. Odor and taste faint and agreeable. Cross reaction with Schaeffer's reagent negative.

Specimens examined: Israel, Mt Carmel National Park, campus of the University of Haifa, in park, on lawns, near *Pinus halepensis* trees, 26. 11. 1994, 13. 01. 1995, 21. 02. 1995, coll. S. P. Wasser.

General distribution: Europe (Italy, France, Hungary, Ukraine), Asia (Israel).

8. **Agaricus geesteranii** Bas et Heinem., Persoonia, 13 (1):114, 1986 (Fig. 11).

Description and illustration: Persoonia, 13(1): 1–3, Plate 1, 1986.

Pileus 7–12 cm in diam., thick-fleshed, campanulate, semiglobose, later convex, plane, sometimes with a depressed disk, at first with involute, then inflexed, finally straight margin with conspicuous, 5 mm thick, pinkish-brown, red-brown, with fibrillose purple-brown scales. The entire surface of pileus is covered with a veil, which later disappears and margin frequently with remnants of the veil. Pileal cuticle consisting of brown, pinkish-brown, thick-walled cylindrical hyphae, without clamps, (3)5 – 13(16) μm in diam. Gills free, thin, crowded, narrowing toward the margin of pileus, with an even adge, white, later pinkish, then reddish-brown, brown. Gill trama regular, consisting of cylindric, thin-walled hyphae, 4–9 μm in diam. Basidia 4-sterigmata, 29–36 × 8–11 μm, clavate. Sterigmata 2–3 μm long. Cheilocystidia 40–95 × 6–11, 46–70 x 3–9.5 μm, clavate, lageniform, filiform, often capitate, thin-walled, hyaline. Spore print dark-brown. Spores (6.5) 7–8 × 4.5–5.5 μm, pale brown, ovate, ovate-ellipsoid, with apiculus and 1–3 refractive droplets. Stipe 4–12 × 1.5–3 cm, central, cylindrical, sometimes curved, often narrowings toward the base, solid, concolorous with the cap, volval layer breaking up into rings (1-3) and volval remnants. Flesh whitish, becoming yellow, then purple-brown on exposure. Odor of anise. Taste sweetish. Cross reaction with Schaeffer's reagent positiv (purple-brown).

Specimens examined: Israel, Golan Height, Masaada, oak forest, under *Quercus calliprinos* Webb. trees, 4. 1. 1995, coll. E. Nevo, 20. 1. 1995, coll. S. P. Wasser.

General distribution: Europe (The Netherlands), Asia (Israel).

Note: *Agaricus geesteranii* is very rare species only described in 1986. It is known from 3 localities in the Netherlands (Bas and Heinemann 1986) and one in Israel (Wasser 1995).

9. **Agaricus xanthodermus** Gen. var. **lepiotoides** R. Mre, BSMF, 26: 109, 1911.

Basionym: *Agaricus lepiotoides* (R. Mre) Konr. et Maubl., Les Agaricales, Pl.XIXb: 106, 1948.

Pileus 2–10 cm in diam., thick-fleshy, globose or hemispherical, later convex or applanate, grey, greyish or dark greyish-brown, with deep cracks, sometimes smooth toward the margin; at first cracks form radially, later transversely, the surface of the cracks sometimes with scales. On handling becoming yellow, 2–6 h later yellow colour disappears and only dingy-brown spots remain. When drying the pileus becomes brown or dingy-brownish with greyish spots. Gills free, thin, crowded, with even sterile edge, whitish, later pink-purple, brownish-purple. Gill trama regular. Basidia 4-sterigmata, 20–28 × 5–7 μm, clavate. Sterigmata 3–3.5 μm long. Cheilocystidia 20–35 × 8–12 μm, abundant, globose-ovoid or pyriform, hyaline. Spore print dark brown. Spores 5–7 × 3.3–4 μm, brownish, ellipsoid-ovate, ovate, apiculus lateral, smooth, with one-two refractive droplets. Stipe 6–17 × 1–2 cm, central, cylindrical, erect, occasionally slightly twisted, with a small basal bulb (often with white mycelial cords), solid, later often fistulose in the centre, whitish, in the centre with pinkish-crimson tinge, silky, smooth (often the stipe surface is cracked), on handling becoming yellow. Ring apical, wide (1–1.5 cm), simple, infundibuliform, toward the edge enlarged, white (along the edge yellowish, grooved above, with small brownish scales beneath. Flesh white, on exposure at the base of the stipe staining yellowish-orange. Odor of carbolic acis. On drying odor pleasant, fungal. Cross reaction with Schaeffer's reagent negative.

Specimens examined: Israel, Akko, in park and gardens in grass, 27. 12. 1994, 19. 2. 1995, coll. S. P. Wasser.

General distribution: Europe (Czech Republic, Ukraine, Hungary, France, Italy, Austria); Asia (Israel).

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