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ILLUSTRATIONS OF THE FLESHY FUNGI OF IOWA

II. THE WHITE-SPORED AGARICS

JOSEPH C. GILMAN

A year ago under this title the commoner mushrooms having purple-brown spores were presented. The present contribution, a continuation of that series, describes some gilled mushrooms that are included in the white-spored group.

The white-spored agarics comprise the largest number of any of the spore groups of gilled fungi. Therefore, it has been necessary to choose the species to be illustrated. The criteria are frequency of occurrence and ease of identification. On these grounds members of the genera *Russula* and *Lactarius*, which are very common, have been excluded because of the difficulties of differentiation of species. Persons interested in these genera should consult the more elaborate treatises. *Tricholoma* seems to be rather infrequent in central Iowa and has, therefore, no representatives among those illustrated.

Of the genera presented, *Cantharellus* can be distinguished from the others by the rounded edges of the gills. *Pleurotus* usually has an eccentric stem although *Pleurotus ulmarius* is an exception to the rule and can only be identified by its similarities to *Pleurotus ostreatus* in other aspects and by the lignicolous habit. It should not be confused with any other mushroom growing on the trunks of trees.

Clitocybe is characterized by its caespitose habit and decurrent gills. *C. multiceps* however often has notched gills which simulate those of *Tricholoma*. In *Amanita*, *Amanitopsis* and *Lepiota* the gills are all free. *Amanita* possesses both annulus (ring) and volva (cup), *Amanitopsis* only the volva, and *Lepiota* only the annulus. *Lepiota morgani* is a third exception in that its spores are pale green. *Collybia* is recognized by its cartilaginous stem, brittle and slightly translucent. *Armillaria* has adnexed gills and a rather cobwebby veil, remaining as a slight ring on the stem. *Marasmius* has distant gills and revives when moistened after drying. In consistency it is less fleshy, (more leathery) than the other genera described.

The specific descriptions as in the preceding paper follow Kauffman.

Cantharellus cibarius Fr. (Fig. 1)

Cap 3-8 cm. broad, firm convex then expanded, soon depressed in center or margin elevated, often irregular, sometimes top-shaped infundibuliform or one-sided, margin thick and at first in-rolled, chrome-yellow or pale egg-yellow, glabrous not striate. Flesh compact, thick, white or yellowish toward the surface. Gills long, decurrent, thick, dichotomously forked or anastomosing, narrow, rather distant, chrome-yellow, edge blunt. Stem 3-6 cm. long, stout, 6-12 mm. thick, narrower downwards, solid, fleshy, glabrous, chrome-yellow to pale yellow, often tunnelled by larvae. Spores elliptical 7-9 x 4-5 microns, smooth, faintly ochraceous tinged. Basidia 50-75 x 7-8 microns, 4-spored, sometimes 5-6 spored. Odor and taste mild, gregarious. On ground in woods. July-September.

Pleurotus ulmarius Fr. Elm mushroom (Fig. 2)

Cup 5-15 cm. or more broad, compact, firm, convex then expanded, obtuse, moist, *glabrous* or somewhat tomentose, *white* or *whitish*, becoming dull leather color in age, sometimes with yellowish or brownish shades, even on margin but often cracked in age. Flesh white, thick. Gills *sinuate-attached* becoming emarginate or rounded behind, broad, close to subdistant, *white* or *whitish*. Stem 3-7 cm. long, variable, 1-2 cm. thick, stout, solid, firm, eccentric, straight or curved, glabrous, sometimes slightly or densely tomentose, whitish. Spores spherical, 5-7 microns, in diameter, smooth, *white in mass*. Odor and taste pleasant.

Solitary or caespitose. On decayed or living wood of elm, hickory, maple trunks, etc.; often from a crack or wound of the living tree. September-November. Rather common in late fall. Edible.



Fig. 1. Cantharellus cibarius



Fig 2. Pleurotus ulmarius



Fig. 3. Pleurotus ostreatus

Pleurotus ostreatus Fr. Oyster mushroom (Fig. 3)

Cap 5-20 cm. or more broad, firm ascending or shelving, conchate, subdimidiate to elongated, convex or depressed, white or whitish becoming darker or brownish-ashy, moist, glabrous, margin thin and even, sometimes subrimose. Flesh thick, somewhat soft. Gills close to subdistant, *decurrent* and *running down the stem in raised lines which anastomose*, broad in the middle, narrowed at ends, white or whitish. Stem *lateral, short* or *almost lacking*, stout, solid, firm, often tomentose or strigose-hairy at base, whitish. Spores oblong, 7-10 x 4 microns, smooth, *white in mass*. Odor and taste agreeable.

Caespitously imbricated, often in large shelving clusters on standing dead trunks of poplar, willow, maple, birch, etc., often on sawed logs scarcely decayed. Throughout the state. May to November. Common. Edible.



Fig. 4. *Amanitopsis vaginata*

Amanitopsis vaginata Fr. (Fig. 4)

Cap 5-10 cm. broad, ovate to campanulate at first, then convex to plane, glabrous or rarely with fragments of the universal veil, slightly viscid when young or moist, *sulcate-striate* on the thin margin, *white, fulvous, or grayish-mouse-color* in the corresponding varieties. Flesh white. Gills free, white or whitish, close, broad, broadest in front, narrowed behind. Stem 8-18 cm. long, 4-8 mm. thick, rather slender, fragile, glabrous or mealy-squamulose, without an annulus, stuffed then hollow, subcylindrical, *base without a bulb*, and inserted deep into the ground with elongated, sheathing, flabby, white volva. Spores spherical, 8-10 microns, nucleate by a large oil-globule, smooth, white.

Solitary or scattered. In conifer or frondose forests; in open low woods; in copses. July, August, September, rarely earlier. Very common. Edible but care should be taken not to confuse it with the closely related *Amanita* species which are poisonous.

Three varieties are recognized as to color, *alba, fulva, and livida.*



Fig. 5. *Amanita bisporigera*

Amanita bisporigera Atk. (Fig. 5)

Cap 4-7 cm. broad, elongated ovate then convex to subcampanulate, finally expanded, *pure white*, rescid when moist, *glabrous*, without patches from veil, *even* on margin. Gills free or adnexed by a line, not broad, subventricose, crowded, white edge floccose or pulverulent. Stem pure white, 8-12 cm. long, 5-8 cm. thick above bulb which varies from 2-4 cm. in thickness, *stuffed*, then somewhat hollow, glabrous or floccose-scaly, bulb oval orbicular, *sunk in the ground*. Annulus ample, superior, pendant, white, membranous, not disappearing normally. Volva firm, thick below, thinning out toward lobed margin, derived from the entire universal veil, which dehisces at its apex, membranous, white forming a genuine cup the ample free margin of which is at first rigid, then appressed to stem. Spores spherical-ovate to ovate-pointed and terminating in a rather stout apiculus, granular within, white 9-12 x 8-9 microns, miniature spores smaller. Basidia 2 spored. Odor nauseous or slightly so.

Usually solitary. In hemlock or frondose woods. July to September. Frequent. Poisonous.



Fig. 6. *Amanita muscaria*

Amanita muscaria Fr. Fly agaric (Fig. 6)

Cap 8-20 cm. broad, at first ovate or hemispherical, then broadly convex to plane, viscid when young and moist, *yellow*, sometimes orange or orange-red, rarely whitish, *covered with numerous, whitish or pale yellowish warts*, margin at maturity *slightly striate*. Flesh white, or yellowish under the separable pellicle. Gills reaching the stem, but free or decurrent by a line, crowded, broadest toward front, *white*. Stem 10-20 cm. high, equal or tapering upward, loosely stuffed then hollow, ovate-bulbous below, *white* or tinged yellow, with a white annulus above, the lower half floccose-scaly or somewhat lacerate, and near the bulb *provided with prominent concentric scales or rings*, which are the remains of the broken veil. Annulus large, thick, superior, white. Volva is much torn and surrounds the bulb and the stem just above the bulb in the form of scales or rings. Spores broadly oval, 9-10 x 6-7.5 microns, smooth, usually with a large oil-globule, nearly filling the spore, obliquely apiculate, white. Odor and taste usually insipid in the fresh condition of the mushroom; its poison when extracted is, however, extremely bitter.

Gregarious or closely massed, often in large fairy rings. In thickets of poplar, wood-lots of oak and maple, forests of pine or hemlock, cemeteries, roadsides, etc., widely distributed. July-October. Frequent. Poisonous.



Fig. 7. *Clitocybe illudens*

Clitocybe illudens Schw. Jack-o'-lantern (Fig. 7)

Cap 8-20 cm. broad, thick, convex to expanded plane or depressed glabrous, often umbonate, bright golden or saffron yellow, irregular, or lobed, margin elevated in age, but often decurved. Flesh white to yellowish. Gills unequally long decurrent, close, yellow becoming discolored, narrowed to both ends, sometimes forked. Stem long 7-20 cm. long, 1-1.5 cm. thick, firm solid, glabrous, irregularly and variously curved or twisted, narrowed at base, concolor, becoming darker at base. Spores, globose, 4-5 microns in diameter, white, copious. Odor and taste strong and disagreeable.

Caespitose. On and around old stumps or decaying wood, forming large clusters of 25-50 individuals. August-October. Frequent. Unsafe.

Clitocybe multiceps Pk. (Fig. 8)

Cap 3-8 cm. broad, thick on disk, firm, *convex*, *white* or *whitish*, sometimes tinged gray or yellowish-gray, even moist, glabrous, regular or irregular. Flesh pure white. Gills *close*, *adnate to slightly decurrent*, sometimes sinuate, whitish, medium broad. Stem 5-10 cm. long, 6-12 mm. thick, stout, solid, equal or slightly thickened at base, glabrous or pruinose at apex, white or whitish. Spores globose, 5-8 microns, in diameter, smooth, white. Taste slightly unpleasant.

Very caespitose. Pastures, fields, grassy roadsides, open woods usually of broad-leaved trees. June to October. Frequent. Edible but not of best variety for culinary purposes.

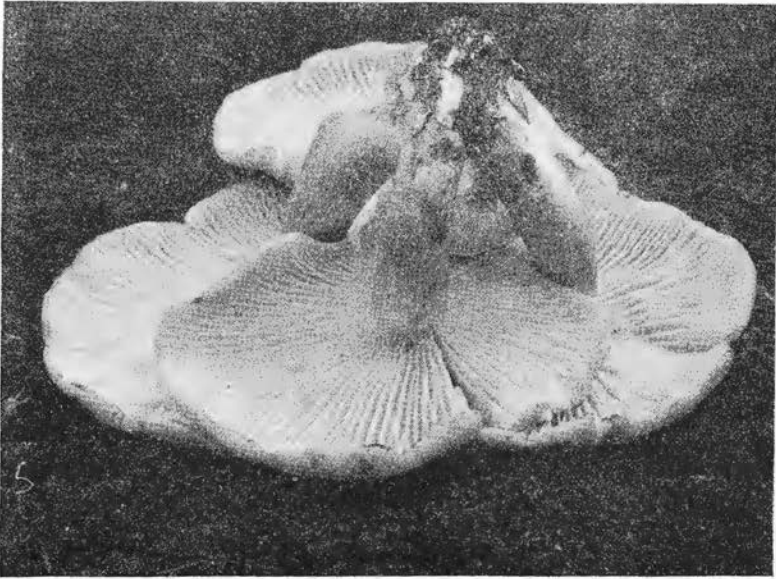
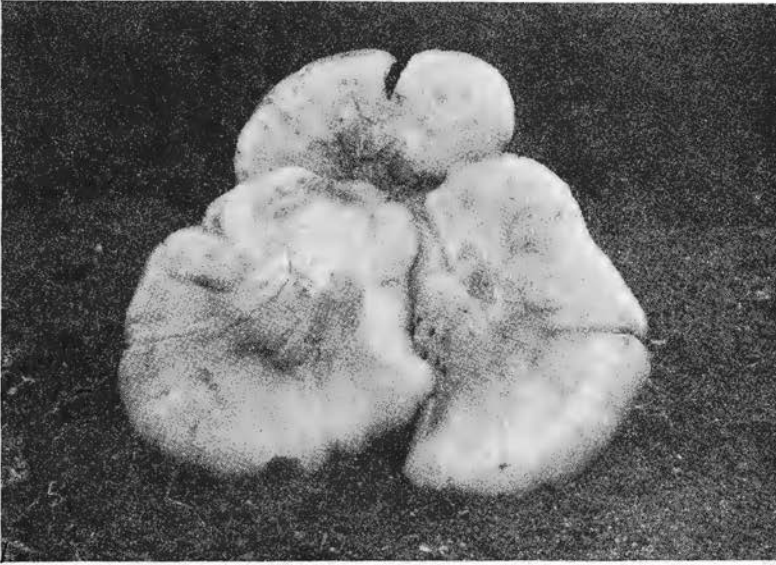


Fig. 8. *Clitocybe multiceps*



Fig. 9. *Collybia radicata*

Collybia radicata Fr. Rooting collybia (Fig. 9)

Cap 3-10 cm. broad, convex to nearly plane sometimes umbonate, *viscid*, glabrous, grayish brown to smoky-brown or umber, sometimes nearly white, even or rugose. Flesh rather thin, white. Gills *adnexed*, broad, thick, subdistant, white. Stem elongated, 5-20 cm. long above the surface of the ground, with a long root-like prolongation penetrating the earth, tapering upward, 4-8 mm. thick, rigid-erect, *glabrous*, *twisted-striate* to sulcate, white above, usually brownish or smoky-brownish elsewhere, cartilaginous. Spores broadly elliptical, smooth, 14-17 x 9-11 microns. Cystidia scattered, on edge and sides of gills, 60-80 x 15-18 microns. Odor and taste mild.

Gregarious or solitary. On the ground in woods, groves, clearings, etc., throughout the state. June-October. Common.



Fig. 10. *Lepiota naucina*

Lepiota naucina Fr. Smooth lepiota (Fig. 10)

Cap 4-8 cm. broad, at first sub-globose, to ovoid, then convex to sub-expanded, obtuse, soft, *glabrous*, rarely broken into scales on the surface, white or smoky-white. Flesh white, thick, rather firm, abruptly thin on margin. Gills free, not remote, close, moderately broad, narrowed behind, white at first, *slowly changing to pinkish then dingy-brown*, edge minutely flocculose. Stem 5-10 cm. long, 6-12 mm. thick above tapering upward from a thickened base, sometimes sub-equal, stuffed then hollow, glabrous or silky below the ring, pruinose above, *white within and without*. Annulus formed from the membranous veil and outer layer of stem. It is white, rolled together in the form of a collar, persistent and superior, in age it often becomes movable. Spores elliptic-oval, 7-9 x 5-6 microns, but variable, some longer, occasionally abnormal and then spherical, nucleate, smooth, white. Odor and taste mild. Gregarious, grassy ground, in pastures, fields, roadsides, and parks. September-November. Common. Edible.



Fig. 11. *Lepiota morgani*

Lepiota morgani Pk. Green gilled parasol (Fig. 11)

Cap 10-20 cm. broad, at first globose then convex and expanded, cuticle at first continuous, buff to pale umber, soon broken up except on disk, into irregular scales or patches which are drawn apart and disappear in part. Flesh thick, firm, white. Gills free, remote (4-5 mm.) from stem, close, rather broad, ventricose, at first white then changing to dull green. Stem stout, 10-20 cm. long, 1-2 cm. thick above, 2-4 cm. at base, tapering upward from a clavate base, stuffed with fibrils, hard and firm, glabrous, whitish or grayish white to pale umber. Annulus thick, movable, superior, toughish but soft. Spores bright to dull green in mass, sub-elliptical, obliquely apiculate, 9-12 x 6-8 microns, nucleate.

Gregarious, often in large fairy rings. In meadows, pastures and open woods. Frequent but local. Poisonous.

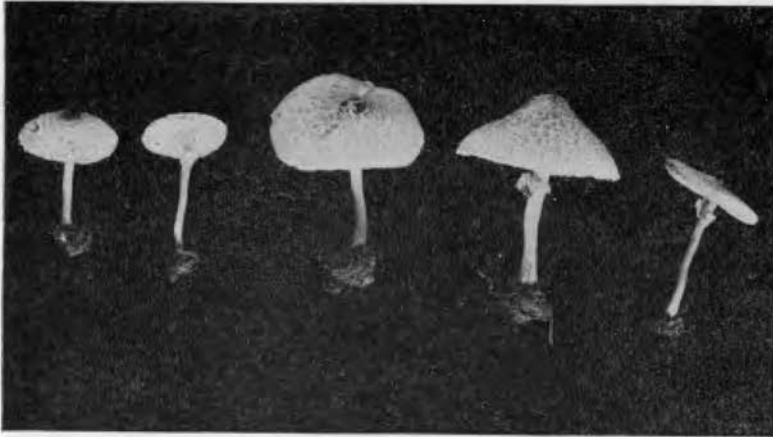


Fig. 12. *Lepiota cristata*

Lepiota cristata Fr. (Fig. 12)

Cap 1.5-4 cm. broad, thin, ovate then campanulate-convex or expanded, obtuse or umbonate, cuticle at first continuous, and entirely dull reddish or reddish-brown, then broken into small concentric reddish-brown scales except the darker umbo, the cracks white, margin often denuded of cuticle. Flesh white, thin. Gills free, rather close, narrow to subventricose, white, edge minutely crenulate. Stem 3-5 cm. long, 2-5 mm. thick, slender equal, hollow or stuffed with loose pith, glabrous or silky-fibrillose below ring, whitish or tinged dingy lavender, pinkish within. Annulus white, small, soon broken and deciduous. Spores somewhat wedge shaped, or angular, sometimes irregularly fusiform to oblong, depending on the view, white, 6-7 x 3-4 microns. Odor rather disagreeable.

Gregarious. In grassy places or on ground in low woods, etc., often on lawns. Common.



Fig. 13. *Marasmius oreades*

Marasmius oreades Fr. Fairy ring (Fig. 13)

Cap 2-5 cm. broad, thickish, pliant, campanulate-convex, obtuse or broadly umbonate, dull brick-red when young or moist, fading to yellowish-flesh color, or yellowish-buff when dry, glabrous, even or substrate when moist. Flesh rather thick on disk, pallid. Gills rounded behind or almost free, broad, rather distant whitish or tinged yellowish, inter spaces often venose. Stem 3-7 cm. long, 3-5 mm. thick, equal, *solid*, even, tough, whitish, covered with a fine interwoven dense, detersile, villosity. Odor somewhat fragrant, agreeable. Taste pleasant.

Gregarious, usually growing in rings or arcs, in grassy spaces, lawns, roadsides, pastures, etc., attached to grass or roots of other plants. June-October. Common. While the ring formation is characteristic of the growth of this mushroom, many other species, some of them poisonous, also grow in rings. The green gilled parasol is one of the commoner in Iowa.



Fig. 14. *Armillaria mellea*
(Photo by D. Cation)

Armillaria mellea Fr. Honey-mushroom (Fig. 14)

Cap. 3-10 cm. and more broad, oval to subhemispherical at first, then convex to almost plane, obtuse, normally honey-colored, varying to yellowish-brown, rusty-brown, or quite pale, adorned with dark-brown or blackish pointed tufts or scales, sometimes glabrescent, striate on margin in age. Flesh whitish. Gills *adnate* or *decurrent*, *subdistant*, whitish or dingy yellowish, becoming rusty-stained in age, not broad, at length powdered by the white spores. Stem variable in length, 5-15 cm. long, 6-20 mm. thick, *equal*, stuffed then hollow, often spongy within, fibrous without, elastic, floccose-scaly, glabrescent, glabrous or striate and mealy at apex, whitish above, dingy yellowish, brownish or rusty-stained below. The veil is usually well-developed, membranous, and at first conceals the gills, at length collapsing to form a superior *annulus*; sometimes both veil and annulus are almost or entirely lacking; they are white or whitish, sometimes stained like cap and stem. Spores elliptical-ovate, 8-9.5 x 5-6.5 microns, white smooth, nucleate, basidia 4-spored; trama of gills composed of divergent hyphae. Taste somewhat disagreeable or acrid.

Caespitose. At base of living tree trunks, around stumps, decaying roots, etc., of all sorts of trees, both conifer and broad leaved. July-November. Very common. Parasitic and saprophytic. Edible.

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