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STUDIES ON THE AGARICACEAE OF HOKKAIDO. I

By

Sanshi IMAI

Introduction

The most important scientific report of the Japanese Agaricaceae was published early in 1860 by M. J. BERKELEY and M. A. CURTIS under the title of "Characters of New Fungi, collected in North Pacific Exploring Expedition by Charles Wright", in the Proceedings of the American Academy of Arts and Sciences, Vol. IV, pp. 110–130. In this paper 64 species of the Agaricaceae of Japan were first described. Thereafter some fragmental studies of our agarics have been reported by J. SCHROETER, N. TANAKA, P. HENNINGS, P. HARIOT, N. PATOUILLARD, S. KAWAMURA and others.

As for the Agaricaceae of Hokkaido no conclusive report has been published up to the present time. BERKELEY and CURTIS, however, described two new species, *Agaricus* (*Collybia*) *adianticeps* and *Agaricus* (*Galera*) *japonicus*, collected in Hakodate, in their paper mentioned above, and the present writer dealt with several agarics collected from various localities in Hokkaido in his papers ever published.

The present studies were first undertaken in 1924 to dwell consistently upon the Agaricaceae of Hokkaido, under the direction of Prof. KINGO MIYABE, and then after his retirement, continued under the direction of Prof. SEIYA ITO.

The materials examined in this study were chiefly collected by the writer himself, supplemented partly by colleagues in our Institute and by other gentlemen in our district.

The specimens examined are preserved in the Herbarium of the Botanical Institute, Faculty of Agriculture, Hokkaido Imperial University.

[Jour. Facul. Agr. Hokkaido Imp. Univ. Sapporo, Vol. XLIII, Pt. 1, March, 1938]

The writer wishes to express his sincere thanks to Prof. Emer. K. MIYABE and Prof. S. ITO for their kind direction and constant encouragement, and to Prof. YOSHIHIKO TOCHINAI for his constant encouragement and kind help in various ways. The expenses of the undertaking between 1934 and 1936 for the botanical excursions of the writer have been mainly defrayed by the Tôshôgû 300nensai Kinenkai to which the writer is very much indebted. The writer also indebted to the gentlemen who have rendered assistance, directly or indirectly, in various ways to the present study.

Agaricaceae FR. emend. P. HENNINGS

in ENGLER & PR. Nat. Pflanzenfam. I, 1,** 189, 1897.

Agaricini FR. Syst. Orb. Veg. 65, 1825.
Polyphillei QUÉL. Ench. Fung. 2, 1886.
Agaricineae Auct. plur.

Fructification fleshy or coriaceous, fragile, firm or tough, putrescent or not, reviving with moisture or not, either with floccose trama or vesiculose trama, consisting of a pileus with, or without, a central or lateral stipe, and sometimes with, or without, universal and partial veils. Lamellae usually inseparable from the pileus, except in some genera; hymenium spreads over the surface of the lamellae or narrow and obtuse folds radiating from a stipe or central or lateral point.

Key to the subfamilies and tribes.

I. Hymenium spreads over the surface of acute lamellae.
  A. Trama floccose, not vesiculose, fleshy, waxy or coriaceous; spores white in mass ..... I. Subfam. Amanitoideae.
    1. Fructification fleshy or subfleshy, putrescent, usually not reviving with moisture.
      a. Pileus distinct from the fleshy stipe; lamellae soft, usually free from the stipe; fructification with volva and annulus, or with either volva or annulus ..... Tribe Amaniteae.
      b. Pileus confluent and homogeneous with the fleshy stipe; lamellae attached to the stipe, soft; fructification lacking volva when matured.
        i. Fructification with partial veil remaining as an annulus or arachnoidal veil ..... Tribe Armillarieae.
        ii. Fructification without an annulus or arachnoidal veil.

α. Stipe normally central; lamellae fleshy, soft ..... Tribe Tricholomateae.
β. Stipe excentric, lateral or none; lamellae fleshy ..... Tribe Pleuroteae.
γ. Stipe normally central; lamellae waxy ..... Tribe Hygrophoreae.

c. Pileus confluent with, but heterogenous from the cartilaginous stipe; lamellae attached or free; fructification putrescent, or rarely reviving with moisture, lacking volva and annulus ..... Tribe Collybieae.

2. Fructification fleshy-coriaceous or coriaceous, tough, reviving with moisture, not putrescent ..... Tribe Lentineae.

B. Trama floccose, not vesiculose, fleshy or subfleshy; spores rosy pink in mass ..... II. Subfam. Volvarioideae.

1. Pileus distinct from the fleshy central stipe; lamellae soft, usually free from the stipe; fructification with, or without, volva or annulus ..... Tribe Volvarieae.
2. Pileus confluent and homogeneous with the fleshy central stipe; lamellae attached to the stipe, soft; fructification without the veils .. .. Tribe Entolomateae.
3. Pileus with, or without, an excentric or lateral fleshy stipe; lamellae soft; fructification without the veils ..... Tribe Claudopeae.
4. Pileus confluent with, but heterogenous from the cartilaginous stipe; lamellae attached or free; fructification without veils ..... Tribe Leptonieae.

C. Trama floccose, not vesiculose, fleshy or subfleshy; spores brown in mass ..... III. Subfam. Pholiotoideae.

1. Pileus confluent and homogeneous with a fleshy stipe; lamellae normally attached to the stipe.....
   a. Fructification with either a partial veil or an arachnoidal or marginal veil.
      i. Fructification with a partial veil remaining as an annulus.. ..... Tribe Pholioteae.
      ii. Fructification usually with an arachnoidal or marginal veil ..... Tribe Cortinarieae.
   b. Fructification without veil.
      i. Lamellae normal.
         α. Stipe excentric or subcentral; lamellae sinuate or adnexed ..... Tribe Rhodoteae.
         β. Stipe excentric, lateral or none; lamellae more or less decurrent or radiating from a central or lateral point .. .. Tribe Crepidoteae.
      ii. Lamellae decurrent, separable or hardly separable, often venoso-connecting at the base or anastomosing behind .... Tribe Paxilleae.
2. Pileus confluent with, but heterogenous from the cartilaginous stipe; lamellae attached or free; fructification without veils .... Tribe Naucorieae.

D. Trama floccose, not vesiculose, fleshy or subfleshy; spores purple, fuscous or black in mass ..... IV. Subfam. Agaricoideae.
   1. Pileus fleshy, distinct from the fleshy stipe; lamellae soft, usually free from the stipe; fructification with volva or annulus; spores purple or fuscous in mass ..... Tribe Agariceae.
   2. Pileus fleshy, confluent and homogeneous with a fleshy stipe; lamellae attached to the stipe, fleshy or subfleshy; fructification with an annulus or marginal veil ..... Tribe Strophariceae.
   3. Pileus gelatinous-fleshy, confluent with a fleshy stipe; lamellae attached to the stipe, mucilaginous; spores greenish fuscous or blackish in mass ..... Tribe Gomphidieae.
   4. Pileus membranous or fleshy-membranous, confluent with, but in the majority heterogenous from the cartilaginous or subfleshy stipe; lamellae free or attached, deliquescent or not; spores fuscous- or blackish-purple, or black in mass ..... Tribe Coprineae.

E. Trama vesiculose, lactiferous or not, fleshy, brittle; spores white, yellow or ochraceous in mass ..... V. Subfam. Lactarioideae.

II. Hymenium spreads over the surface of narrow, obtuse lamellae or folds, or nearly smooth surface ..... VI. Subfam. Cantharelloideae.

Subfam. **Amanitoideae** IMAI, nom. nov.

Leucosporae Auct. plur. p. p.

Trama floccosa, carnosa, ceracea vel coriacea, non vesiculosa. Hymenium superficiem lamellae acris tegit. Sporae in cumulo albae. Cetera ut in Familia.

Tribe **Amaniteae** SINGER emend. IMAI.

Volvariées ROZE, Bull. Soc. Bot. Fr. XXIII, 51 & 111, 1876, p. p.
Lepiotées ROZE, Ibid. 51 & 111, 1876, p. p.
Amanitées ROZE, Ibid. 51 & 114, 1876.
Amanitées R. MAIRE, Rech. Cytol. Tax. Basid. 136 & 146, 1902, p. p.
Amanitées KONR. et MAUBL. Icon. Sel. Fung. 28 & 30, 1925.
Lepiotées KONR. et MAUBL. Ibid. 28 & 40, 1925.
Amaniteae SINGER, Ann. Myc. XXXIV, 352, 1936.
Lepioteae SINGER, Ibid. 353, 1936.

Fructificatio volvata vel annulata vel volvata annulataque. Pileus a stipite discretus separabilisque. Lamellae vulgo liberae, molles.

Key to the genera in Tribe Amaniteae.

1. Fructification with volva and annulus..... *Amanita.*
2. Fructification with volva, without annulus..... *Amanitopsis.*
3. Fructification with annulus, without volva..... *Lepiota.*

Amanita (PERS. ex FR.) QUÉL. emend. ROZE

Bull. Soc. Bot. Fr. XXIII, 51 & 114, 1876.

Amanita PERS. Syn. Fung. 246, 1801, p. p.

Agaricus § *Amanita* FR. Syst. Myc. I, 12, 1821, p. p.

Amanita QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 60 & 65, 1872, p. p.

Venenarius EARLE, Bull. N. Y. Bot. Gard. V, 450, 1909.

Leucomyces EARLE, Ibid. V, 451, 1909.

Fructification with volva and annulus. Pileus fleshy, regular, distinct from stipe. Stipe central, fleshy. Partial veil remaining as a membranous, persistent or rarely fugacious, adnate annulus when matured. Universal veil remaining as a membranous, free or adnate and persistent, or powdery friable volva at the base of stipe and patches or warts on the pileus when matured. Lamellae free, rarely subadnate or subdecurrent by a tooth. Spores white in mass.

Type species: *Agaricus phalloides* FR.

Key to the sections and species in Hokkaido.

I. Universal veil forming a large, deep and free cup-shaped volva at the base of stipe..... Sect. Volvatae.

A. Pileus, lamellae and stipe white.

1. Pileus at first conical then expanded to subumbonate; stipe evidently squamulose..... *A. virosa*(1).
2. Pileus at first semiglobose then expanded to obtuse convex; stipe smooth or fibrous..... *A. verna*(2).

B. Pileus yellow, orange or scarlet.

1. Pileus scarlet or orange; lamellae bright yellow; stipe and annulus yellow or bright orange..... *A. Caesarea*(3).
2. Pileus yellow or yellowish brown; lamellae and annulus white; stipe white or yellowish and with yellowish brown colored squamules..... *A. subjunquillea*(4).

C. Pileus gray, brown or bluish brown.

1. Pileus even or very shortly striate..... *A. phalloides*(5).
2. Pileus long striate..... *A. longistriata*(6).

II. Universal veil forming a circumscissile, shallow and thick volva or subvolvate volva..... Sect. Semilimbatae.
A. Pileus sulphur-yellow or yellowish..... *A. mappa*(7).
B. Pileus gray to brown..... *A. porphyria*(8).

III. Universal veil usually forming several concentric encircled rings on the bulbous base of stipe and numerous warts on the pileus.. Sect. Marginatae.
A. Pileus whitish or grayish; warts large, thick, pyramidal and separable; stipe fusiformly rooted..... *A. solitaria*(9).
B. Pileus scarlet, rarely orange; lamellae and annulus white; stipe white, rarely yellowish..... *A. muscaria*(10).
C. Pileus brownish or dark-brown.
1. Pileus striate; spores ellipsoidal..... *A. pantherina*(11).
2. Pileus not striate; spores globose..... *A. sepiacea*(12).

IV. Universal veil forming very fugacious, thin, powdery layer or warts on the base of stipe and on the pileus..... Sect. Incompletae.
A. Pileus yellow or brownish yellow.
1. Pileus small, 2.5–5 cm. broad, yellow or light orange; stipe white with yellowish powders..... *A. pulchella*(13).
2. Pileus medium in size, 6.5 cm. broad, brownish yellow; stipe yellow. ..... *A. flavipes*(14).
B. Pileus brownish, brown, reddish brown or dark brown.
1. Universal veil yellow-powdery..... *A. aspera*(15).
2. Universal veil gray-powdery; spores broadly ellipsoidal or subglobose.
a. Pileus brownish or reddish brown; flesh at first white, becoming reddish when bruised..... *A. rubescens*(16).
b. Pileus brown or dark brown; flesh white, not changing in color. ..... *A. spissa*(17).
3. Universal veil dark brown-powdery; pileus grayish brown or dark brown; flesh white, not changing in color; stipe evidently scaly below the annulus; spores globose..... *A. spissacea*(18).

Sect. Volvatae SCHROET.

Pilze Schles. I, 680, 1889.

Limbatae GILBERT, Genre Amanita, 17, 1918.

Universal veil forming a large, deep, free and persistent cup-shaped volva.

1. *Amanita virosa* (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 66, 1872—GILL. Hymen. Fr. 38, 1874—KARST. Hattsv. I, 1, 1879—SACC. Syll. Fung. V, 9,

1887; Fl. Ital. Crypt., Hymen. 55, 1915—BARLA, Champ. Alp. Marit. 11, pl. 3, f. 1–4, 1888—BOUD. Bull. Soc. Myc. Fr. XVIII, 258, 1902—KAWAMURA, Ill. Jap. Fung. pl. 2, f. 1–3, 1912—LANGE, Agar. Denm. II, 7, 1915—COKER, Journ. Elisha Mitchell Sci. Soc. XXXIII, 83, 1917—GILBERT, Bull. Soc. Myc. Fr. XLI, 288, 1925—KONR. & MAUBL. Icon. Sel. Fung. 33, pl. 1, 1927.

[YASUDA, Bot. Mag. (Tokyo), XXX, (51), 1916—SHIRAI, List Jap. Fung. ed. 2, 43, 1917; Ibid. ed. 3, 19, 1927—IMAI, Bot. Mag. (Tokyo), XLVII, 424, 1933]

Agaricus (*Amanita*) *virosus* FR. Epicr. Myc. 3, 1838; Hymen. Eur. 18, 1874.

Amanita phalloides subsp. *virosa* GILBERT, Genre Amanita, 52, 1918—VESELÝ, Ann. Myc. XXXI, 227, 1933.

Solitary or scattered, deadly poisonous. Pileus 6–15 cm. broad, conical, then campanulate, at length expanded to subumbonate; surface smooth, glabrous, viscid when wet, shining when dry, pure white, usually without patches of the fragments of volva and without any innate fibrils, even and not striate on the margin; context white, taste and odour none; lamellae free, white, crowded, ventricose, thin, floccose or fimbriate on the edge; stipe 8–25 cm. long, 8–25 mm. thick, nearly equal or slightly attenuated upward, enlarged or subbulbous at the base, split up into longitudinal fibrils and floccosely squamulose, white, hollow; annulus apical, membranous, ample, white, radially striate above, downy floccose on the under surface, persistent; volva white or yellowish, torn at the apical portion, membranous, persisting as a large sheathing cup, up to 5 cm. broad and 6 cm. high; spores white in mass, hyaline, smooth, subglobose or globose, 8–10 μ.

Hab. on the ground in woods. Autumn. Ishikari (Nopporo, Foot of Mt. Taisetsu), Iburi (Lake side of Shikotsu).

Distr. Japan (Hokkaido, Honshu), Europe and North America.

Jap. name. *Doku-tsurutake* (KAWAMURA).

2. *Amanita verna* (BULL. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 230, 1872—GILL. Hymen. Fr. 37, 1874—W. G. SM. Brit. Basid. 15, 1908—ROLLAND, Atlas Champ. 13, f. 4, 1910—RICKEN, Blätterp. 307, 1915, p. p.—SACC. Fl. Ital. Crypt., Hymen. 56, 1915—COKER, Journ. Elisha Mitchell Sci. Soc. XXXIII, 30, pl. 15, 1917—KAUFFM. Agar. Mich. 602, pl. 116, 1918.

[IMAI, Bot. Mag. (Tokyo), XLVII, 424, 1933]

Agaricus bulbosus SCHAEFF. Fung. Bavar. IV, Ind. 61, pl. 241, 1774 (teste FR.).

Agaricus bulbosus, vernus BULL. Champ. Fr. pl. 108, 1791 (teste FR.).
Amanita verna PERS. Syn. Fung. 250, 1801.
Agaricus vernus DC. Fl. Fr. II, 210, 1815.
Agaricus (Amanita) vernus FR. Syst. Myc. I, 13, 1821.
Agaricus (Amanita) virosus var. *vernus* FR. Epicr. Myc. 4, 1838.
Agaricus (Amanita) phalloides var. *vernus* FR. Hymen. Eur. 18, 1874.
Amanita phalloides var. *verna* BARLA, Champ. Alp. Marit. 12, pl. 1, f. 7–9, 1888.
Amanita bulbosa var. *albida* SCHROET. Pilze Schles. I, 681, 1889.
Amanita bisporigera ATKINS. Bot. Gaz. XLI, 348, 1906.
Amanita phalloides subsp. *verna* GILBERT, Genre Amanita, 49, 1918—VESELÝ, Ann. Myc. XXXI, 225, pl. 11, f. sinistra, pl. 12–13, 1933.
Amanita phalloides var. *verna* REA, Brit. Basid. 98, 1922.

Solitary or scattered, deadly poisonous. Pileus 4–10 cm. broad, semiglobose, then convex, finally expanded, obtuse; surface viscid when wet, glabrous or slightly streaked on the marginal zone with innate fibrils, pure white or scarcely colored with yellowish tint at the center, usually without patches of the fragments of volva, even on the margin; context white, taste and odour almost none; lamellae free, not broad, crowded, subventricose, white, flocculose or fimbriate on the edges; stipe 6–15 cm. long, 0.5–1.5 cm. thick, equal or slightly tapering upwards, subbulbous at the base, pure white, silky shining, subglabrous or subfloccose, uneven, stuffed or nearly hollow; annulus ample, apical, white, membranous, thin, reflexed, usually persistent, substriate or flocculose above, nearly smooth or flocculose below; volva white or yellowish, membranous, ensheathing the base of stipe, torn at the apical portion, thick below, thinning out toward lobed margin, forming an ample deep cup; spores white in mass, hyaline, globose or subglobose, 6–10 μ in diam.

Hab. on the ground in woods. Summer to autumn. Ishikari (Nopporo), Iburi (Lake side of Tôya, Lake side of Shikotsu), Oshima (Ônomura).

Distr. Japan (Hokkaido), Europe, North America and Australia.

Jap. name. *Shiro-tamagotengutake* (IMAI).

3. *Amanita Caesarea* (SCOP. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 66, 1872; Ench. Fung. 2, 1886—GILL. Hymen. Fr. 33, 1874—KARST. Hattsv. I, 1, 1879—

SACC. Syll. Fung. V, 8, 1887; Fl. Ital. Crypt., Hymen. 53, 1915—BARLA, Champ. Alp. Marit. 9, 1888—ATKINS. Mushrooms, ed. 2, 70, f. 72, 1903—ROLLAND, Atlas Champ. 10, f. 1, 1910—KAWAMURA, Ill. Jap. Fung. pl. 7, f. 15–17, 1913—RICKEN, Blätterp. 307, 1915—COKER, Journ. Elisha Mitchell Sci. Soc. XXXIII, 19, pl. 10–11, 1917—GILBERT, Genre Amanita, 18, 1918—SART. et MAIRE, Comp. Hym. Amanita, 159, 1922—BRES. Icon. Myc. I, pl. 1, 1927—VESELÝ, Ann. Myc. XXXI, 214, 1933.

[P. HENN. Hedw. XXXIX, (156), 1900—MATSUM. Ind. Pl. Jap. I, 130, 1904—SHIRAI, List Jap. Fung. 8, 1905; Ibid. ed. 2, 41, 1917; Ibid. ed. 3, 17, 1927—YASUDA, Bot. Mag. (Tokyo), XXXIV, (68), 1920—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 119, 1931—IMAI, Bot. Mag. (Tokyo), XLVII, 423, 1933]

Agaricus Caesareus SCOP. Fl. Carn. ed. 2, II, 419, 1772 (teste FR.).

Agaricus aureus BATSCH, Elench. Fung. 57, 1783 (teste FR.).

Amanita caesarea PERS. Syn. Fung. 252, 1801.

Amanita aurantiaca PERS. Ibid. 252, 1801 (teste FR.).

Agaricus (*Amanita*) *Caesareus* FR. Syst. Myc. I, 15, 1821; Epicr. Myc. 3, 1838; Hymen. Eur. 17, 1874—WINT. Die Pilze, I, 851, 1884.

Amanita pellucida BANN. et PK. 44 Ann. Rep. N. Y. State Mus. 178, 1892 (teste MURRILL).

Venenarius Caesareus MURRILL, Mycologia, V, 73, 1913; North Amer. Fl. X, 69, 1914.

Solitary or scattered, edible. Pileus 5.5–18 cm. broad, ovate or bell shaped, then umbonate, at length the margin of pileus upturned; surface dark scarlet, orange or yellow, rarely pale-yellow, darker at the center, lighter colored and strongly striate on the margin, smooth, subviscid when wet, shining when dry, occasionally provided with patches from the volva; context moderately thick, whitish or yellowish, under the pellicle at the center tinged with a reddish orange color, taste mild, odour none; lamellae free, subcrowded or subdistant, bright yellow, broader in front, edge entire or slightly wavy; stipe 10–17 cm. long, 6–20 mm. thick, slightly attenuated upward, not bulbous at the base, yellow, light orange or yellowish, silky, shining, slightly floccose, stuffed then hollow; annulus ample, yellowish or light orange, membranous, thin, apical, reflexed, persistent; volva whitish, reaching to 5 cm. high, membranous, forming a large, ample, free cup with lobed or toothed margin, free for upper four-fifths, persistent; spores white in mass, hyaline, ellipsoidal, smooth, 8–12 × 6–7 μ.

Hab. on the ground in woods. Summer to autumn. Ishikari (Nopporo, Atsubetsu, Foot of Mt. Taisetsu), Iburi (Lake side of Shikotsu), Kushiro (Mt. Meakan).

Distr. Japan (Hokkaido, Honshu), Hymaraya, Asia Minor, Europe, Tunisia and North America.

Jap. name. *Tamagotake* (KAWAMURA), *Ô-benitake* (SHIRAI ex P. HENNINGS).

4. *Amanita subjunquillea* IMAI

Bot. Mag. (Tokyo), XLVII, 424, 1933.

Solitary or scattered, edibility doubtful. Pileus 3–7 cm. broad, conical-convex, then nearly plane; surface smooth, glabrous, slightly viscid when wet, slightly silky shining when dry, anilin-yellow or yellow-ocher colored at the center, lighter and even or sometimes slightly striatulate on the margin, often provided with white floccose patches of the fragments of volva; context white, yellow under the pellicle, rather thin, taste and odour none; lamellae free, white, subcrowded, edge not entire; stipe 6–11 cm. long, 6–10 mm. thick, attenuated upward or nearly equal, subbulbous at the base, dry, fibrous, whitish or yellowish, with yellowish or brownish small fibrous scales, nearly solid; annulus apical, membranous, thin, white and striate above, yellowish below, persistent; volva white or brownish, torn at the apex in irregular 2–3 lobes, sheathing the base of stipe, membranous, thick below, thinning out toward lobed margin, up to 3 cm. long, 2.5 cm. thick; spores white in mass, hyaline, globose or subglobose, 7–8 μ or 7.5 $\times$ 7 μ, with a granular content.

Hab. on the ground in woods. Autumn. Ishikari (Nopporo, Sapporo).

Distr. Endemic (Hokkaido & Northern Honshu).

Jap. name. *Tamagotake-modoki* (IMAI).

5. *Amanita phalloides* (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 67, 1872; Ench. Fung. 2, 1886—SACC. Syll. Fung. V, 9, 1887, p. p.—MASS. Brit. Fung. Fl. III, 260, 1893, p. p.—ATKINS. Mushrooms, ed. 2, 55, f. 55–58, 1903—W. G. SM. Brit. Basid. 15, 1908—ROLLAND, Atlas Champ. 12, f. 3, 1910—KAWAMURA, Ill. Jap. Fung. pl. 7, f. 24–25, 1913—RICKEN, Blätterp. 307, pl. 75, f. 2, 1915—COKER, Journ. Elisha Mitchell Sci. Soc. XXXIII, 27, pl. 14, 1917—GILBERT, Genre Amanita, 38, 1918—KAUFFM. Agar. Mich. 600, 1918—REA, Brit. Basid. 98, 1922—BRES. Icon. Myc. I, pl. 3, 1927—VESELÝ, Ann. Myc. XXXI, 222, 1933, excl. subspp.

[KAWAMURA, Bot. Mag. (Tokyo), XXIII, (463), 1909—SHIRAI, List Jap. Fung. ed. 2, 43, 1917; ed. 3, 18, 1927—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 119, 1931—IMAI, Bot. Mag. (Tokyo), XLVII, 424, 1933]

Agaricus bulbosus BULL. Champ. Fr. pl. 2, 1791 (teste FR.).

Amanita viridis PERS. Tent. Disp. Fung. 67, 1797; Syn. Fung. 251, 1801 (teste FR.).

Amanita venenosa var. *viridis* PERS. Traite Champ. 181, 1819.

Agaricus verrucosus DC. Fl. Fr. II, 209, 1815, pro parte.

Agaricus (*Amanita*) *Phalloides* FR. Syst. Myc. I, 13, 1821, pro maj. parte; Epicr. Myc. 4, 1838, pro maj. parte; Hymen. Eur. 18, 1874, pro maj. parte—CKE. Ill. Brit. Fung. pl. 2, 1883—WINT. Die Pilze, I, 850, 1884.

Agaricus virescens KROMBH. Abbil. Schwamm. IV, 19, pl. 28, f. 1–3, 1836.

Agaricus viridis KROMBH. Ibid. IX, 22, pl. 69, f. 10–17, 1845.

Amanita bulbosa GILL. Hymen. Fr. 36, 1874, p. p.—KARST. Hattsv. I, 2, 1879, p. p.—SCHROET. Pilze Schles. I, 681, 1889, p. p.—SACC. Fl. Ital. Crypt., Hymen. 57, 1915.

Venenarius phalloides MURRILL, Mycologia, IV, 240, 1912; Ibid. V, 74 & 93, pl. 87, f. 1, 1913, p. p.; North Amer. Fl. X, 70, 1914, p. p.

Solitary or scattered, deadly poisonous. Pileus 8–18 cm. broad, ovate-campanulate, then convex to expanded, becoming nearly umbonate; surface smooth, subviscid when wet, silky shining when dry, glabrous or rarely provided with white fragments of volva, olive-brown, brown or gray, usually darker at the center, lighter colored and even or rarely striatulate on the margin, the pellicle easily separable; context white, moderately thick, taste and odour almost none; lamellae free or remote, white, ventricose, broader in front, close, entire or slightly wavy on the edges; stipe 10–32 cm. long, 1–3 cm. thick, attenuated upward, bulbous at the base, white, smooth or besprinkled with small cracks which appear to be small silky floccose-scales, stuffed or hollow; annulus white, membranous, thin, superior, reflexed, striate above, persistent; volva large, white or yellowish, free for half its depth, up to 11 cm. high, 6 cm. wide, splitting up into 3–4 limbs, persistent; spores white in mass, hyaline, smooth, globose, 9–10.5 μ, with a large central gutta.

Hab. on the ground in woods. Summer to autumn. Ishikari (Nopporo, Mt. Teine, Sôunbetsu).

Distr. Japan (Hokkaido, Honshu), China, Asia Minor, Europe and North America.

Jap. name. *Tamago-tengutake* (KAWAMURA).

6. *Amanita longistriata* IMAI, sp. nov.

Solitaria. Pileo 5–10 cm. lato, convexo, dein plano, viscido, subfuligineo (drab, buffy-brown or clove-brown), glabro, margine palli-

diore longe striato; carne alba, subtenui, odore saporeque nullo; lamellis liberis, confertis, albis, demum subcarnescentibus; stipite 10–18 cm. longo, 8–15 mm. crasso, sursum attenuato, basi non bulboso, albo, subglabro vel floccoso-squamuloso, e farcto cavo; annulo superno, albo, amplo, membranaceo; volva vaginata, laxa, alba, 2–5 cm. longa, 1–3.5 cm. crassa; sporis in cumulo albis, globosis vel subglobosis, levibus, 12.5–15 × 10–12.5 μ.

Hab. on the ground among grasses under trees. Late summer (Aug.). Ishikari (Sapporo).

Distr. Endemic.

Jap. name. *Tamagotengutake-modoki* (n. n.).

The present fungus closely resembles *Amanita phalloides* (FR.) QUÉL. from which it is distinguishable in the long striate pileus and not bulbous at the base of stipe, as well as in the larger spores.

Sect. Semilimbatae GILBERT

Genre Amanita 61, 1918.

Universal veil forming a circumscissile, shallow and thick volva or subvolvate volva.

7. *Amanita mappa* (BATSCH ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 67, 1872—SACC. Syll. Fung. V, 10, 1887; Fl. Ital. Crypt., Hymen. 52, 1915—MASS. Brit. Fung. Fl. III, 261, 1893—W. G. SM. Brit. Basid. 15, 1908—ROLLAND, Atlas Champ. 14, f. 5, 1910—KAWAMURA, Ill. Jap. Fung. pl. 7, f. 21–23, 1913—RICKEN, Blätterp. 309, pl. 77, f. 2, 1915—KAUFFM. Agar. Mich. 609, 1918—BRES. Icon. Myc. I, pl. 7, 1927.

[YASUDA, Bot. Mag. (Tokyo), XXIX, (117), 1915—SHIRAI, List Jap. Fung. ed 2, 41, 1917; ed. 3, 18, 1927—IMAI, Bot. Mag. (Tokyo), XLVII, 425, 1933]

Agaricus Mappa BATSCH, Elench. Fung. 57, 1783 (teste FR.).

Amanita citrina β *Mappa* PERS. Syn. Fung. 251, 1801.

Agaricus (*Amanita*) *Mappa* FR. Epicr. Myc. 6, 1838; Hymen. Eur. 19, 1874—CKE. Ill. Brit. Fung. pl. 4, 1881—WINT. Die Pilze, I, 849, 1884.

Amanita venenosa GILL. Hymen. Fr. 44, cum icone, 1874—KARST. Hattsv. I, 2, 1879.

Solitary or scattered, poisonous. Pileus 3–8 cm. broad, hemiglobose, then convex, expanded to nearly plane; surface dry, silky, nearly sulphur-yellow, then slightly paler, besprinkled with patches

of the fragments of volva, of which the color is sordid white, light brownish or sulphur-yellow, usually entire and not striate on the margin; context rather thin, whitish, fragile, taste and odour none; lamellae free, white, close, minutely serrulate on the edge; stipe 5–12 cm. long, 5–15 mm. thick, slightly attenuated upward or nearly equal, marginately bulbous at the base, yellowish or whitish, with sulphur-yellow colored fibrils, silky shining, often besprinkled with small sulphur-yellow colored scales on the basal part, solid; annulus membranous, sulphur-yellow and smooth above, tomentose below, superior, rather ample, thickened toward the margin, persistent; volva white or sordid white external, sulphur-yellow internal, thick, shallow, fragile, obtuse at the edge, evanescent, leaving a distinct groove around the base of stipe; spores white in mass, hyaline, globose, apiculate, 7.5–10 μ.

Hab. on the ground in woods. Summer to autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido, Honshu), Asia Minor, Europe, North America and Australia.

Jap. name. *Ko-tamagotengutake* (KAWAMURA).

8. *Amanita porphyria* (ALB. et SCHW. ex FR.) GILL.

Hymen. Fr. 35, 1874—QUÉL. Ench. Fung. 2, 1886—SACC. Syll. Fung. V, 11, 1887; Fl. Ital. Crypt., Hymen. 54, 1915—KARST. Hattsv. I, 2, 1879; Finl. Basidsv. 38, 1889—BARLA, Champ. Alp. Marit. 12, pl. 3, f. 5–6, 1888—SCHROET. Pilze Schles. I, 680, 1889—W. G. SM. Brit. Basid. 15, 1908—LANGE, Agar. Denm. II, 8, 1915—RICKEN, Blätterp. 308, pl. 75, f. 3, pl. 76, f. 1, 1915—GILBERT, Genre Amanita, 54, 1918; Bull. Soc. Myc. Fr. XL, 212, pl. 11, 1925—KAUFFM. Agar. Mich. 604, pl. 117, 1918—REA, Brit. Basid. 99, 1922—SART. & MAIRE, Comp. Hym. Amanita. 349, 1922—BRES. Icon. Myc. I, pl. 6, 1927—KONR. & MAUBL. Icon. Sel. Fung. I, 34, pl. 3, 1929—VESELÝ, Ann. Myc. XXXI, 233, 1933.

[MATSUURA, Fungi, I, 96, 1931—IMAI, Bot. Mag. (Tokyo), XLVII, 425, 1933]

Amanita porphyria ALB. et SCHW. Cònsp. Fung. Lusat. 142, pl. 11, f. 1, 1805 (teste FR.).

Agaricus (*Amanita*) *porphyria* FR. Syst. Myc. I, 14, 1821; Epicr. Myc. 4, 1838; Hymen. Eur. 19, 1874—WINT. Die Pilze, I, 849, 1884.

Agaricus (*Amanita*) *recutitus* FR. Epicr. Myc. 6, 1838; Hymen. Eur. 19, 1874—WINT. Die Pilze, I, 849, 1884.

Amanita recutita GILL. Hymen. Fr. 42, 1874—KARST. Hattsv. 3, 1879—QUÉL. Ench. Fung. 3, 1886—SACC. Syll. Fung. V, 11, 1887—BARLA, Champ. Alp. Marit. 13, pl. 8, f. 1–4, 1888—RICKEN, Blätterp. 309, 1915—REA, Brit. Basid. 99, 1922.

Amanita porphyria var. *recutita* QUÉL. Fl. Myc. 308, 1888—LANGE, Agar. Denm. II, 8, 1915.

Venenarius porphyrius MURRILL, Mycologia, V, 81, 1913; North Amer. Fl. X, 70, 1914.

Amanita porphyria f. *recutita* VESELÝ, Ann. Myc. XXXI, 235, 1933.

Solitary or scattered, poisonous. Pileus 5–8 cm. broad, conical or convex, then plane; surface avellaneous to drab or brown, moist or dry, subglabrous or flocculose, provided with whitish to avellaneous colored cottony patches of the fragments of volva, margin slightly incurved and not striate; context white, odour and taste almost none; lamellae nearly free, white, broader in front; stipe 9–13 cm. long, 6–10 mm. thick, equal or slightly attenuated upward, globosely bulbous at the base, whitish to avellaneous, silky above the annulus, stuffed or hollow; annulus membranous, drab-gray to sooty-black colored, superior, persistent; volva whitish or brownish, subvolvate or leaving a groove around the base of stipe; spores white in mass, hyaline, globose, 10–12.5 μ (in alcohol specimen).

Hab. on the ground in woods. Summer to autumn. Ishikari (Mt. Teine), Kushiro (Mt. Meakan).

Distr. Japan (Hokkaido, Honshu), Asia Minor, Europe and North America.

Jap. name. *Kotengutake* (MATSUURA).

Sect. Marginatae SCHROET.

Pilze Schles. I, 679, 1889.

Universal veil usually forming several concentric encircled rings on the bulbous base of stipe and numerous warts on the pileus.

9. *Amanita solitaria* (BULL. ex FR.) KARST.

Hattsv. I, 4, 1879—QUÉL. Ench. Fung. 3, 1886—SACC. Syll. Fung. V, 15, 1887; Fl. Ital. Crypt., Hymen, 51, 1915—BARLA, Champ. Alp. Marit. 15, pl. 4, f. 5–8, 1888—SCHROET. Pilze Schles. I, 679, 1889—MASS. Brit. Fung. Fl. III, 265, 1893—ATKINS. Mushrooms, ed. 2, 72, f. 75–76, 1903—W. G. SM. Brit. Basid. 16, 1908—ROLLAND, Atlas Champ. 17, f. 12, 1910—RICKEN, Blätterp. 312, 1915—COKER, Journ. Elisha Mitchell Sci. Soc. XXXIII, 68, pl. 45–47, 1917—GILBERT, Genre Amanita, 89, 1918—KAUFFM. Agar. Mich. 614, 1918—REA, Brit. Basid. 101, 1922—BRES. Icon. Myc. I, pl. 11, 1927.

Agaricus solitarius BULL. Champ. Fr. pl. 48, 1791 (teste FR.).

Hypophyllum pellitum PAULET, Traite Champ. pl. 156bis, 1793 (teste FR.).

Agaricus nitidus FR. Obs. Myc. I, 4, 1815.

Agaricus (Amanita) solitarius FR. Syst. Myc. I, 17, 1821; Epicr. Myc. 6, 1838; Hymen. Eur. 22, 1874—WINT. Die Pilze, I, 846, 1884.

Agaricus strobiliformis VITT. Fung. Mang. 59, 1835—FR. Epicr. Myc. 5, 1838; Hymen. Eur. 21, 1874—CKE. Ill. Brit. Fung. I, pl. 277, 1883—WINT. Die Pilze, I, 847, 1884.

Agaricus (Amanita) nitidus FR. Epicr. Myc. 8, 1838; Hymen. Eur. 24, 1874—WINT. Die Pilze, I, 845, 1884.

Agaricus polypyramis BERK. et CURT. Ann. Mag. Nat. Hist. 2 ser. XII, 417, 1853 (teste MURRILL).

Agaricus monticulosus BERK. et CURT. Ibid. XII, 418, 1853 (teste MURRILL).

Agaricus (Amanita) daucipes BERK. et MONT. in MONT. Syll. Crypt. 96, 1856 (teste MURRILL).

Agaricus (Amanita) Ravenelii BERK. et CURT. Ann. Nat. Hist. 3 ser. IV, 1, 1859 (teste MURRILL).

Amanita strobiliformis QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 68, 1872; Ench. Fung. 3, 1886—GILL. Hymen. Fr. 43, 1874—SACC. Syll. Fung. V, 15, 1887; Fl. Ital. Crypt., Hymen. 50, 1915—BARLA, Champ. Alp. Marit. 15, pl. 4bis, 1888—MASS. Brit. Fung. Fl. III, 264, 1893—W. G. SM. Brit. Basid. 16, 1908—RICKEN, Blätterp. 311, pl. 81, f. 1, 1915—COKER, Journ. Elisha Mitchell Sci. Soc. XXXIII, 73, pl. 50–53, 1917—GILBERT, Genre Amanita, 93, 1918—REA, Brit. Basid. 101, 1922—VESELÝ, Ann. Myc. XXXI, 247, 1933.

[MATSUM. Ind. Pl. Jap. I, 131, 1904—SHIRAI, List Jap. Fung. ed. 2, 43, 1917; ed. 3, 18, 1927]

Amanita nitida QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 69, 1872—GILL. Hymen. Fr. 49, cum icone, 1874—KARST. Hattsv. I, 6, 1879—SACC. Syll. Fung. V, 18, 1887; Fl. Ital. Crypt., Hymen. 47, 1915—BARLA, Champ. Alp. Marit. 16, pl. 6, f. 1–3, 1888—MASS. Brit. Fung. Fl. III, 266, 1893—W. G. SM. Brit. Basid. 17, 1908—COKER, Journ. Elisha Mitchell Sci. Soc. XXXIII, 87, pl. 69, 1917—REA, Brit. Basid. 104, 1922.

Amanita pellita GILL. Hymen. Fr. 43, cum icone, 1874.

Agaricus (Amanita) onustus HOWE, Bull. Torrey Bot. Club, V, 42, 1874 (teste MURRILL).

Amanita prairiicola PK. Bull. Torrey Bot. Club, XXIV, 138, 1897 (teste MURRILL).

Amanita multisquamosa PK. 53 Ann. Rep. N. Y. State Mus. 840, 1900 (teste MURRILL).

Amanita radicata PK. Bull. Torrey Bot. Club, XXVII, 609, 1900 (teste MURRILL).

Amanita cinereoconia ATKINS. Ann. Myc. VII, 366, 1909 (teste MURR.).

Venenarius solitarius MURRILL, Mycologia, IV, 240, 1912; North Amer. Fl. X, 76, 1914.

Amanita strobiliformis var. *nitida* GILBERT, Genre Amanita, 95, 1918.

Solitary, edible. Pileus 6–15 cm. broad, globose, then convex, finally depressed at the center; surface dry, white or gray, covered

with thick separable, angular, pyramidal, gray, wart-like fragments of volva, appendiculate and striate on the margin; context white, rather soft, taste and odour pleasant; lamellae free, decurrent by a tooth, white or tinged with cream color, crowded, narrow, often fimbriate on the edges; stipe 7–15 cm. long, 1–3 cm. thick, nearly equal or slightly attenuated upward, base bulbous and fusiformly rooted, white or whitish, at first covered with thick, floccose or farinose, imbricate large scales, which later become smaller and scattered, solid; annulus apical, white then dingy yellowish, pendulous, submembranous, striate above, floccose below, often torn, finally disappearing; volva white or grayish, at first concentrically arranged on the base of the stipe with thick, pointed, large, friable powdery scales, then evanescent; spores white in mass, ellipsoidal, 9–13 × 7–9 μ.

Hab. on the ground in woods. Summer to autumn. Iburi (Lake side of Shikotsu).

Distr. Japan (Hokkaido, Honshu), China, Europe, North America and Australia.

Jap. name. *Uroko-tengutake* (IMAI).

10. *Amanita muscaria* (L. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 67, 1872; Ench. Fung. 3, 1886—GILL. Hymen. Fr. 39, cum icone, 1874—KARST. Hattsv. I, 3, 1879—SACC. Syll. Fung. V, 13, 1887; Fl. Ital. Crypt., Hymen. 48, 1915—BARLA, Champ. Alp. Marit. 14, 1888—SCHROET. Pilze Schles. I, 680, 1889—MASS. Brit. Fung. Fl. III, 262, 1893—ATKINS. Mushrooms, ed. 2, 52, f. 52–54, 1903—W. G. SM. Brit. Basid. 16, 1908—ROLLAND, Atlas Champ. 14, pl. 5, 1910—KAWAMURA, Ill. Jap. Fung. pl. 2, f. 14–18, 1912—RICKEN, Blätterp. 311, pl. 79, 1915—COKER, Journ. Elisha Mitchell Sci. Soc. XXXIII, 49, pl. 27–28, 1917—GILBERT, Genre Amanita, 81, 1918—KAUFFM. Agar. Mich. 610, 1918—REA, Brit. Basid. 100, 1922—BRES. Icon. Myc. I, pl. 8, 1927—VESELÝ, Ann. Myc. XXXI, 250, 1933.

[TANAKA, Bot. Mag. (Tokyo), III, (50), 1889—SHIRAI, Bot. Mag. (Tokyo), III, (156), 1889; List Jap. Fung. 8, 1905; ed. 2, 43, 1917; ed. 3, 18, 1927—P. HENN. Hedw. XXXIX, (156), 1900—MATSUM. Ind. Pl. Jap. I, 131, 1904—YASUDA, Bot. Mag. (Tokyo), XXVIII, (476), 1914—UMEMURA, Pl. Fujiyama. 365, 1923—IMAI, Bot. Mag. (Tokyo), XLVII, 425, 1933]

Agaricus muscarius L. Sp. Pl. 1172, 1753 (teste FR.).

Amanita muscaria PERS. Syn. Fung. 253, 1801 (teste FR.).

Agaricus (Amanita) muscarius FR. Syst. Myc. I, 16, 1821; Epicr. Myc. 5, 1838; Hymen. Eur. 20, 1874—BARLA, Champ. Nice, 6, pl. 2, 1859—CKE. Ill. Brit. Fung. pl. 117, 1883—WINT. Die Pilze, I, 848, 1884.

Solitary or gregarious, poisonous. Pileus 6–15 cm. broad, globose, then convex to plane, at length depressed at the center; surface scarlet, dark scarlet or reddish orange, becoming pale scarlet when old, slightly viscid when wet, short striate on the margin, provided with yellowish, three- or many-sided, pyramidal and easily separable warts; context white, reddish or yellowish under the pellicle, thick, taste and odour none; lamellae free or remote, white, becoming yellowish, broader in front, crowded, edge slightly wavy; stipe 10–24 cm. long, 6–30 mm. thick, attenuated upward, bulbous at the base, up to 4 cm. or more thick, white or pale yellowish, at first white floccose, becoming fibrous and striate when old, stuffed with cottony mass or hollow, fleshy, rigid; annulus membranous, white, superior, reflexed, yellow-marginate below; volva adnate, usually encircled with 3 to 6 subconcentric rings or rarely with a spiral ring, white or yellowish; spores white in mass, hyaline, subellipsoidal, 9–12 × 7.5–9 μ, with a large central gutta.

Hab. on the ground in woods. Summer to autumn. Ishikari (Mt. Teine, Atsubetsu, Mt. Kurodake), Kushiro (Akan).

Distr. Japan (Hokkaido, Honshu), Asia Minor, Europe, North America, Australia, and Africa.

Jap. name. *Benitengutake* (KAWAMURA), *Ashitakabenitake* (SHIRAI).

11. *Amanita pantherina* (DC. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 68, 1872; Ench. Fung. 3, 1886—GILL. Hymen. Fr. 41, cum icone, 1874—KARST. Hattsv. I, 3, 1879—SACC. Syll. Fung. V, 14, 1887; Fl. Ital. Crypt., Hymen. 49, 1915—BARLA, Champ. Alp. Marit. 15, pl. 3, f. 1–4, 1888—MASS. Brit. Fung. Fl. III, 261, 1893—W. G. SM. Brit. Basid. 16, 1908—ROLLAND, Atlas Champ. 16, f. 10, 1910—KAWAMURA, Ill. Jap. Fung. pl. 16, f. 13–15, 1915—LANGE, Agar. Denm. II, 9, 1915—RICKEN, Blätterp. 309, pl. 78, f. 1, 1915—GILBERT, Genre Amanita, 104, 1918—REA, Brit. Basid. 103, 1922—BRES. Icon. Myc. I, pl. 13, 1927—VESELÝ, Ann. Myc. XXXI, 270, 1933.

[TANAKA, Bot. Mag. (Tokyo), II, (170), 1888; Ibid. III, (50), 1889; Mycogr. Nippon. I, No. 1, Pt. 1, pl. 1, 1890—KAWAMURA, Bot. Mag. (Tokyo), XXIII, (461), 1909—UMEMURA, Pl. Fujiyama. 365, 1923—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 119, 1931—IMAI, Bot. Mag. (Tokyo), XLVII, 426, 1933]

Amanita umbrina PERS. Syn. Fung. 254, 1801 (teste FR.).

Agaricus pantherinus DC. Fl. Fr. VI, 52, 1815 (teste FR.).

Agaricus (*Amanita*) *pantherinus* FR. Syst. Myc. I, 16, 1821; Epicr. Myc. 5, 1838; Hymen. Eur. 21, 1874—WINT. Die Pilze, I, 847, 1884.

Amanita umbrina SCHROET. Pilze Schles. I, 679, 1889.

[P. HENN. Hedw. XXXIX, (156), 1900—MATSUM. Ind. Pl. Jap. I, 131, 1904]

Solitary, poisonous. Pileus 5–26 cm. broad, convex, then plane, at length slightly depressed at the center; surface cinnamon-buff, cinnamon-brown, snuff-brown or bister, paler at the margin, slightly viscid when wet, besprinkled with three to many sided or pyramidal, easily separable, whitish or yellowish warts, or with whitish patches of the fragments of volva, margin striate or rarely tuberculate-striate; context white, taste and odour none; lamellae free, white, tapering to both ends, moderately crowded, edge not entire; stipe 5.5–35 cm. long, 1–3 cm. thick, attenuated upward or nearly equal, globosely bulbous at the base, white, then brownish, floccose or fibrous-scaly, stuffed or hollow; annulus median or subsuperior, membranous, white, then yellowish or brownish, persistent or somewhat fugacious; volva whitish or brownish, forming 1–3 concentric encircling rings at the apex of bulbous base of stipe; spores white in mass, hyaline, ellipsoidal, 9–12 × 6.5–9 μ.

Hab. on the ground in woods. Summer to autumn. Ishikari (Nopporo, Mt. Kurodake), Kushiro (Mt. Meakan).

Distr. Japan (Hokkaido, Honshu), Europe and North America.

Jap. name. *Tengu-take* (KAWAMURA), *Haitoritake* (KAWAMURA), *Hyô-take* (TANAKA).

12. *Amanita sepiacea* IMAI

Bot. Mag. (Tokyo), XLVII, 426, 1933.

Solitary, edibility doubtful. Pileus 6–10 cm. broad, convex then plane; surface snuff-brown to mummy-brown, darker at the center, subviscid when wet, smooth, besprinkled with grayish or brownish, polygonal or pyramidal warts, not striate on the margin; context white, fleshy, rather thin, taste and odour none, not changing in color when bruised; lamellae scarcely free or somewhat adnate, white, tapering to both ends, crowded, edge not entire; stipe 15–18 cm. long, 1–1.5 cm. thick, attenuated upwards, obovately bulbous at the base, up to 3 cm. thick at the base, grayish to smoky gray or avellaneous-buff, fibrous or flocculose-squamulose, solid or stuffed; annulus mem-

branous, apical, white and striate above, drab-color below, persistent; volva forming 1–4 concentric encircling rings on the bulbous base of stipe, subpersistent or fugacious, whitish or brownish; spores white in mass, hyaline, globose or subglobose, 8–10 μ in diam.

Hab. on the ground in woods. Autumn. Ishikari (Nopporo).

Distr. Endemic.

Jap. name. *Tengu-take-modoki* (IMAI).

Sect. Incompletae SCHROET.

Pilze Schles. I, 677, 1889.

Universal veil forming very fugacious, thin, powdery layer or warts on the base of stipe and on the pileus.

13. *Amanita pulchella* IMAI

Bot. Mag. (Tokyo), XLVII, 427, 1933.

Solitary or scattered, of doubtful edibility. Pileus 2.5–5 cm. broad, convex then plane, finally upturned at the margin; surface empire-yellow to apricot-yellow, lighter on the margin, viscid when wet, glabrous but besprinkled with egg-yellow powdery patches of the fragments of volva, shortly striate at the margin when old; context white, thin, taste and odour none; lamellae free, white, finally tinged with yellowish tint, rather crowded, ventricose-fusiform, narrow; stipe 8–10 cm. long, 4–7 mm. thick, slightly attenuated upward or nearly equal but slightly enlarged at the base, white or white with egg-yellow colored powders, stuffed; annulus membranous, superior, egg-yellow, persistent; volva egg-yellow colored powdery mass, surrounded at the base of the stipe, friable; spores white in mass, hyaline, broadly ellipsoidal, 7.5–10 × 5–6 μ.

Hab. on the ground in woods. Late summer. Ishikari (Nopporo).

Distr. Endemic

Jap. name. *Ko-koganetengutake* (IMAI).

14. *Amanita flavipes* IMAI

Bot. Mag. (Tokyo), XLVII, 428, 1933.

Solitary, of doubtful edibility. Pileus about 6.5 cm. broad, convex, then plane, at length slightly depressed at the center; surface buckthorn-brown at the center, paler at the margin, slightly viscid when wet, smooth, glabrous but besprinkled with sulphur-yellow colored small powdery masses of the fragments of volva, slightly short striatulate on the margin; context very thin, odour none; lamellae whitish or yellowish, free, floccose-serrulate on edge, rather close, broader in front; stipe about 10 cm. long, about 1 cm. thick, slightly attenuated upward or nearly equal but slightly enlarged at the base, buff-yellow or apricot-yellow colored powdery floccose below the annulus and becoming paler toward the base, warm-buff colored powdery scaly above the annulus, hollow; annulus membranous, superior, warm-buff and slightly striate above, persistent; volva pulverulent, surrounded at the base of stipe, apricot-yellow, empire-yellow or light cadomium, friable, fugacious; spores white in mass, hyaline, subglobose or broadly ellipsoidal, 8–9 × 6–7 μ.

Hab. on the ground in woods. Autumn. Ishikari (Nopporo).

Distr. Endemic.

Jap. name. *Koganetengutake* (IMAI).

15. *Amanita aspera* (FR. ?) QUÉL.

Ench. Fung. 4, 1886—BARLA, Champ. Alp. Marit. 17, 1888—SCHROET. Pilze Schles. I, 678, 1889—BOUD. Bull. Soc. Myc. Fr. XVIII, 266, 1902—ROLLAND, Atlas Champ. 16, f. 11, 1910—LANGE, Agar. Denm. II, 10, 1915—RICKEN, Blätterp. 314, pl. 80, f. 3, 1915—REA, Brit. Basid. 104, 1922—BRES. Icon. Myc. I, pl. 10, 1927—KONR. & MAUBL. Icon. Sel. Fung. I, pl. 8, 1930.

[MATSUM. Ind. Pl. Jap. I, 130, 1904—SHIRAI, List Jap. Fung. 8, 1905; ed. 2, 41, 1917; ed. 3, 17, 1927]

?*Agaricus* (*Amanita*) *asper* FR. Syst. Myc. I, 18, 1821; Hymen. Eur. 24, 1874.

Amanita virescens GILL. Hymen. Fr. 46, cum icone, 1874.

Solitary or scattered, poisonous. Pileus 2.5–8 cm. broad, convex or subconical, then subumbonate or plane; surface yellowish-brown, olive-brown or brown, lighter on the margin, dry, nearly smooth, provided with yellow or brownish colored polygonally or irregularly massed powdery or floccose warts, not striate at the margin; context white, rather thin, fleshy, brittle, taste and odour pleasant; lamellae white, free, crowded; stipe 4–8 cm. long, 3–10 mm. thick, attenuated upward, distinctly bulbous at the base, whitish or

brownish, floccose, subscaly above the annulus, stuffed then hollow; annulus whitish or brownish, membranous, superior; volva powdery, sulphur-yellow, becoming brownish, friable; spores white in mass, subglobose or subovate, 7.5–11 × 7–9.5 μ.

Hab. on the ground in woods. Autumn. Ishikari (Nopporo, Mt. Taisetsu), Kushiro (Akan).

Distr. Japan (Hokkaido, Honshu), Europe, and North America.

Jap. name. *Zaratsuki-tengutake* (SHIRAI).

Amanita aspera has been confused with the related species, *Am. spissa, Am. cariosa, Am. rubescens,* etc. There is some doubt whether FRIES' *Agaricus asper* is to be referred to our fungus.

16. *Amanita rubescens* (PERS. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 69, 1872—GILL. Hymen. Fr. 45, cum icone, 1874—KARST. Hattsv. I, 4, 1879—SACC. Syll. Fung. V, 16, 1887—BARLA, Champ. Alp. Marit. 17, pl. 5, f. 1–6, 1888—MASS. Brit. Fung. Fl. III, 265, 1893—ATKINS. Mushrooms, ed. 2, 71, f. 73–74, 1903—W. G. SM. Brit. Basid. 16, 1908—ROLLAND, Atlas Champ. 17, f. 13 (ut *rubens*), 1910—RICKEN, Blätterp. 313, pl. 80, f. 1, 1915—COKER, Journ. Elisha Mitchell Sci. Soc. XXXIII, 59, pl. 36–38, 1917—KAUFFM. Agar. Mich. 617, pl. 121, 1918—REA, Brit. Basid. 104, 1922—BRES. Icon. Myc. I, pl. 15, 1927.

[IMAI, Bot. Mag. (Tokyo), XLVII, 426, 1933]

Agaricus rubens SCOP. Fl. Carn. ed. 2, II, 416, 1772 (teste FR.).

Amanita rubescens PERS. Syn. Fung. 254, 1801 (teste FR.).

Agaricus (*Amanita*) *rubescens* FR. Syst. Myc. I, 18, 1821; Epicr. Myc. 7, 1838; Hymen. Eur. 23, 1874—CKE. Ill. Brit. Fung. pl. 9, 1883—WINT. Die Pilze, I, 846, 1884.

Amanita rubens QUÉL. Ench. Fung. 4, 1886—SACC. Fl. Ital. Crypt., Hymen. 44, 1915—GILBERT, Genre Amanita, 116, 1918—VESELÝ, Ann. Myc. XXXI, 240, 1933, p. p.

Amanita pustulata SCHROET. Pilze Schles. I, 678, 1889—RICKEN, Blätterp. 313, pl. 80, f. 1, 1915.

Solitary or scattered, edible. Pileus 6–18 cm. broad, convex, then plane, finally upturned at the margin; surface moist, light brownish-buff to dingy reddish-brown, darker at the center, provided with gray, mealy patches or three to many-sided subpyramidal and gray or reddish colored friable warts, even or slightly striatulate on the margin; context whitish, turning dull pinkish, thick at the center, thin at the margin, no taste and odour; lamellae free or remote, white, then spotted with reddish brown, rather close, soft; stipe

10–24 cm. long, 1–2.5 cm. thick, attenuated upward, obovately bulbous (up to 4.5 cm. thick) at the base, reddish-white, turning pinkish, dull-pinkish or light reddish-brown, squamulose above the annulus, fibrous below, stuffed or solid; annulus membranous, superior, whitish, avellaneous or wood-brown, turning to reddish or spotted with reddish brown, striate above, fugacious; volva powdery, gray or reddish, fugacious, mostly lacking on carelessly collected specimens; spores white in mass, hyaline, broadly ellipsoidal or subglobose. 7–9 × 5.5–7 μ.

Hab. on the ground in woods. Summer to autumn. Ishikari (Sapporo, Nopporo), Iburi (Lake side of Shikotsu), Kushiro (Akan).

Distr. Japan (Hokkaido, Honshu), Asia Minor, Europe, North America and Australia.

Jap. name. *Irogawari-tengutake* (IMAI), *Gan-take* (KAWAMURA).

17. *Amanita spissa* (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 69, 1872; Ench. Fung. 4, 1886—GILL. Hymen. Fr. 47, cum icone, 1874—KARST. Hattsv. I, 5, 1879—SACC. Syll. Fung. V, 17, 1887; Fl. Ital. Crypt., Hymen. 47, 1915—BARLA, Champ. Alp. Marit. 17, pl. 5, f. 7–11, 1888—SCHROET. Pilze Schles. I, 678, 1889—MASS. Brit. Fung. Fl. III, 266, 1893—W. G. SM. Brit. Basid. 16, 1908—ROLLAND, Atlas Champ. 16, f. 9, 1910—RICKEN, Blätterp. 313, pl. 80, f. 2, 1915—COKER, Journ. Elisha Mitchell Sci. Soc. XXXIII, 53, pl. 30–31, 1917—GILBERT, Genre Amanita, 108, 1918—KAUFFM. Agar. Mich. 620, pl. 124, 1918—REA, Brit. Basid. 103, 1922—KONR. et MAUBL. Icon. Sel. Fung. I, 36, pl. 4, 1924—BRES. Icon. Myc. I, pl. 16, 1927—VESELÝ, Ann. Myc. XXXI, 263, 1933.

[P. HENN. Hedw. XXXIX, (156), 1900—MATSUM. Ind. Pl. Jap. I, 131, 1904—SHIRAI, List Jap. Fung. 8, 1905; ed. 2, 43, 1917; ed. 3, 18, 1927—IMAI, Bot. Mag. (Tokyo), XLVII, 427, 1933]

Agaricus (*Amanita*) *spissus* FR. Epicr. Myc. 9, 1838; Hymen. Eur. 23, 1874—WINT. Die Pilze, I, 845, 1884.

Solitary or gregarious, said to be edible. Pileus 4–10 cm. broad, convex, then expanded to nearly plane; surface hair-brown at first, then becoming drab, olive-brown or buckthorn-brown, darker at the center, paler on the margin, covered with whitish or grayish, fugacious floccose or powdery patches or warts of the fragments of volva, usually even or rarely short and faintly striatulate on the margin; context white, firm, taste and odour almost none; lamellae free but reaching to the stipe by a decurrent line, broad, crowded,

white, obscurely flocculose on the edge; stipe 7–15 cm. long, 7–16 mm. thick, attenuated upward, bulbous at the base, white or grayish, pruinose and powdery-scaly above the annulus, nearly fibrous below, solid or stuffed; annulus membranous, superior, white or grayish, striate above; volva powdery, remaining loose powdery-floccose, gray mass, evanescent; spores white in mass, hyaline, broadly ellipsoidal or subglobose, 8–10 × 7–9 μ, usually with a large central gutta.

Hab. on the ground in woods. Summer to autumn. Ishikari (Sapporo, Nopporo), Iburi (Lake side of Shikotsu).

Distr. Japan (Hokkaido, Honshu), Asia Minor, Europe, North America and Australia.

Jap. name. *Hebi-kinoko* (SHIRAI ex P. HENNINGS).

18. *Amanita spissacea* IMAI

Bot. Mag. (Tokyo), XLVII, 427, 1933.

Solitary, of doubtful edibility. Pileus 6–10 cm. broad, convex, then expanded; surface drab to fuscous, darker at the center, concentrically arranged with fuscous or hair-brown colored polygonal or pyramidal small powdery or powdery-floccose warts or patches; context white, rather thick, compact, taste and odour none; lamellae remote, white, subcrowded, ventricose, attenuated both ends; stipe 10–15 cm. long, 1–2 cm. thick, attenuated upward, obovately bulbous at the base, grayish and flocculose-scaly or powdery-scaly above the annulus, hair-brown colored powdery scaly below the annulus but it appears to be concolorously fibrous just above the bulb, solid; annulus membranous, superior, whitish and striate above, grayish-white and floccose below, margin hair-brown; volva powdery, hair-brown, forming 1–3 concentric encircling rings on the bulb of the stipe, evanescent; spores white in mass, hyaline, globose, 7–8 μ, apiculate.

Hab. on the ground in woods. Autumn. Ishikari (Nopporo).

Distr. Endemic.

Jap. name. *Hebikinoko-modoki* (IMAI).

Amanitopsis ROZE

Bull. Soc. Bot. Fr. XXIII, 51 & 111, 1876; in KARST. Hattsv. I, xi, 1879.
Agaricus § *Vaginata* NEES v. ES. Syst. Pilze, 191, 1817.
Vaginata S. F. GRAY, Nat. Arr. Brit. Pl. I, 601, 1821.
Agaricus § *Amanita* FR. Syst. Myc. I, 12, 1821, p. p.
Amanita § *Vaginatae* QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 65, 1872.
Amanitella EARLE, Bull. N. Y. Bot. Gard. V, 449, 1909.
Amanita § *Amanitopsis* Auct. plur.

Fructification with universal veil remaining as a volva and without or rarely with very fugacious partial veil. Pileus fleshy, regular. Stipe central, fleshy, distinct and separable from the pileus. Universal veil usually remaining as a membranous or powdery friable volva at the base of stipe, and patches or rarely warts on the pileus. Partial veil very fugacious, usually lacking at maturity. Lamellae free, rarely subadnate or decurrent by a tooth. Spores white in mass.

Type species: *Agaricus* (*Amanita*) *vaginatus* BULL. ex FR.

Key to the sections and species in Hokkaido.

I. Universal veil usually forming a large, deep, free and membranous volva at the base of stipe..... Sect. Volvatae.
  A. Pileus smooth, but often besprinkled with patches of volva; spores globose.
    1. Volva forming an ample volvate sheath.
      a. Pileus gray to wood-brown..... *A. vaginata*(1).
      b. Pileus tawny or cinnamon..... *A. fulva*(2).
      c. Pileus white or slightly tinged with pale ochraceous color at the disc..... *A. albida*(3).
    2. Volva breaking up into rings at the base of stipe and patches on the pileus; pileus hair-brown or cinnamon..... *A. strangulata*(4).
  B. Pileus scaly; spores ellipsoidal.
    1. Pileus whitish to brownish, covered with reddish colored fibrous small scales; spores ellipsoidal, 8–11 × 5–6μ..... *A. agglutinata*(5).
    2. Pileus whitish to brownish, covered with reddish colored fibrous large scales; spores ellipsoidal oblong, 10–15 × 5–6μ..... *A. clarisquamosa*(6).
    3. Pileus covered with light pinkish buff to avellaneous colored easily separable small scales; spores ellipsoidal, 9–10 × 5–6μ..... *A. avellaneosquamosa*(7).

II. Universal veil forming a powdery, adnate, but friable volva on the bulbous base of stipe, and breaking up into squamules on the pileus..... Sect. Amanitellae.
  A. Pileus densely covered with drab-colored powders or powdery-squamules; spores globose..... *A. farinosa*(8).

Sect. Volvatae GILBERT

Amanita § *Amanitopsis* § *Volvatae* GILBERT, Genre Amanita, 136, 1918.
Amanitopsis sect. *Volvatae* IMAI, Bot. Mag. (Tokyo), XLVII, 428, 1933.

Universal veil usually forming a large, deep, free and membranous volva at the base of stipe.

1. *Amanitopsis vaginata* (BULL. ex FR.) ROZE

Bull. Soc. Bot. Fr. XXIII, 111, 1876; in KARST. Hattsv. I, 6, 1879, p. p.—SACC. Syll. Fung. V, 21, 1887, p. p.; Fl. Ital. Crypt., Hymen. 62, 1915, p. p.—BARLA, Champ. Alp. Marit. 18, 1888, p. p.—MASS. Brit. Fung. Fl. III, 256, 1893, p. p.—ATKINS. Mushrooms, ed. 2, 74, f. 77, 1903, p. p.—W. G. SM. Brit. Basid. 18, 1908, p. p.—MURRILL, Mycologia, I, 85, pl. 7, f. 5, 1909, p. p.—KAWAMURA, Ill. Jap. Fung. pl. 3, f. 14–17, 1912—COKER, Journ. Elisha Mitchell Sci. Soc. XXXIII, 6, pl. 3, 1917, p. p.—GILBERT, Genre Amanita, 136, 1918, p. p.—KAUFFM. Agar. Mich. 623, 1918, p. p.—REA, Brit. Basid. 92, 1922.

[SHIRAI, List Jap. Fung. 8, 1905; ed. 2, 45, 1917; ed. 3, 19, 1927—UMEMURA, Pl. Fujiyama. 365, 1923—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 119, 1931—IMAI, Bot. Mag. (Tokyo), XLVII, 429, 1933]

Agaricus plumbeus SCHAEFF. Fung. Bavar. IV, Ind. 37, pl. 85–86, 1774 (teste FR.).

Agaricus vaginatus BULL. Champ. Fr. pl. 98, 1791, p. p. (teste FR.).

Amanita livida PERS. Syn. Fung. 247, 1801 (teste FR.).

Agaricus (*Amanita*) *vaginatus* FR. Syst. Myc. I, 14, 1821, p. p.; Epicr. Myc. 11, 1838, p. p.; Hymen. Eur. 27, 1874, p. p.—BARLA, Champ. Nice, 9, pl. 5, f. 1–10, 1859, p. p.—CORDA, Champ. Fr. II, 12, pl. 5, 1870, p. p.—CKE. Ill. Brit. Fung. pl. 12, excl. f. dext. 1883—WINT. Die Pilze, I, 842, 1884.

Amanita vaginata QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 66, 1872, p. p.; Ench. Fung. 5, 1886, p. p.—GILL. Hymen. Fr. 50, cum icone, 1874, p. p.—ROLLAND, Atlas Champ. 18, f. 14, 1910, p. p.—RICKEN, Blätterp. 306, 1915—VESELÝ, Ann. Myc. XXXI, 274, 1933, p. p.

Amanitopsis plumbea SCHROET. Pilze Schles. I, 676, 1889, p. p.

[YASUDA, Bot. Mag. (Tokyo), XXX, (27), 1916]

Agaricus (*Amanitopsis*) *vaginatus* CKE. Handb. Austr. Fung. 4, 1892.

Vaginata vaginata MURRILL, Mycologia, III, 80, 1911, p. p.

Vaginata plumbea MURRILL, Ibid. V, 82, 1913, p. p.; North Amer. Fl. X, 65, 1914, p. p.

Amanita vaginata subsp. *plumbea* KONR. et MAUBL. Icon. Sel. Fung. I, 33, 1924.

Solitary or scattered, edible. Pileus 5–8 cm. broad, campanulate or subglobose, expanded to subplane or subumbonate, at length the margin upturned; surface gray, avellaneous or wood-brown, lighter

and deeply striate on the margin, smooth, glabrous but often besprinkled with white patches of the volva especially in young stage, slightly viscid when wet, shining, at length deprived; context white, rather thin, odour and taste none; lamellae white, free, moderately crowded, ventricose; stipe 8–15 cm. long, 1–2 cm. thick, attenuated upward, whitish, light-buff, avellaneous or wood-brown, floccosely squamulose, pruinose above, hollow or stuffed; volva membranous, white or grayish, sheathing the base of the stipe, large, ample, free about half above, lobed at the apex, persistent; spores white in mass, hyaline, globose or subglobose, rarely obovate, 12.5 μ, very rarely attaining to 15 μ, or 11–12.5 × 10 μ, with a large central gutta.

Hab. on the ground in woods. Summer to autumn. Ishikari (Mt. Teine, Sapporo, Nopporo, Mt. Taisetsu), Iburi (Lake side of Shikotsu), Kushiro (Mt. Meakan), Kitami (Oketo-forest).

Distr. Japan (Hokkaido, Honshu), China, Asia Minor, Europe, North America and Australia.

Jap. name. *Tsurutake* (SHIRAI).

2. *Amanitopsis fulva* (SCHAEFF. ex FR.) P. HENN.

in ENGLERS Bot. Jahrb. XXXI, 738, 1902—W. G. SM. Brit. Basid. 18, 1908—REA, Brit. Basid. 93, 1922.

[MATSUM. Ind. Pl. Jap. I, 131, 1904—SHIRAI, List Jap. Fung. 8, 1905; ed. 2, 45, 1917; ed. 3, 19, 1927—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 119, 1931—IMAI, Bot. Mag. (Tokyo), XLVII, 429, 1933]

Agaricus fulvus SCHAEFF. Fung. Bavar. IV, Ind. 41, pl. 95, 1774 (teste FR.).

Agaricus trilobus BOLT. Hist. Fung. I, 38, pl. 38, f. 2, 1788 (teste FR.).

Amanita spadicea β *fulva* PERS. Syn. Fung. 248, 1801.

Agaricus (*Amanita*) *vaginatus* e. p. *fulvo* FR. Syst. Myc. I, 14, 1821.

Agaricus (*Amanita*) *vaginatus* var. *fulvus* FR. Hymen. Eur. 27, 1874—WINT. Die Pilze, I, 843, 1884.

Amanita vaginata var. *fulva* GILL. Hymen. Fr. 51, 1874.

Amanitopsis plumbea var. *fulva* SCHROET. Pilze Schles. I, 677, 1889—GILBERT, Genre Amanita, 143, 1918.

Amanita vaginata subsp. *fulva* KONR. et MAUBL. Icon. Sel. Fung. I, 33, 1924.

Solitary or scattered, edible. Pileus 4–10 cm. broad, globose or campanulate, then expanded to umbonate; surface cinnamon-buff to cinnamon, slightly darker at the center, smooth, slightly viscid when wet, glabrous, sometimes besprinkled with fugacious patches of fragments of the volva, deeply striate on the margin; context white,

thin, taste and odour none; lamellae free, white, equally attenuated toward both ends, ventricose, rather crowded, very scarcely serrulate on the edges; stipe 7–15 cm. long, 5–10 mm. thick, attenuated upward, not bulbous at the base, powdery-squamulose, scales subconcolorous or paler, white and stuffed within; volva membranous, concolorous with the stipe or white with yellowish or orangish colored small dots, ensheathing the base, large, ample, up to 4–5 cm. long, persistent; spores white in mass, hyaline, globose, 12–14 μ, with a large central gutta or granular contents.

Hab. on the ground in woods. Summer to autumn. Ishikari (Mt. Taisetsu, Nopporo).

Distr. Japan (Hokkaido, Honshu), Europe and North America.

Jap. name. *Kabairo-tsurutake* (KAWAMURA).

3. *Amanitopsis albida* (FR.) IMAI

Bot. Mag. (Tokyo), XLVII, 429, 1933.

Agaricus (*Amanita*) *vaginatus* a pileo *albida* FR. Syst. Myc. I, 14, 1821.

Agaricus (*Amanita*) *vaginatus* var. *albida* FR. Epicr. Myc. 11, 1838.

Agaricus (*Amanita*) *vaginatus* b) tota *alba* FR. Hymen. Eur. 27, 1874.

Amanita vaginata var. *alba* GILL. Hymen. Fr. 51, 1874—GILBERT, Genre Amanita, 142, 1918.

Amanita vaginata subsp. *plumbea* var. *alba* KONR. et MAUBL. Icon. Sel. Fung. I, 33, 1924.

Solitary or scattered, edible. Pileus 5–10 cm. broad, campanulate, then convex to plane or slightly umbonate; surface white, besprinkled with white or grayish colored patches of volva, striate on the margin; context white, thin, taste and odour none; lamellae free, white, broader in front, moderately crowded; stipe 10–18 cm. long, 8–12 mm. thick, slightly attenuated upward or nearly equal, not bulbous at the base, concolorous; volva membranous, large, free, white or grayish, persistent; spores white in mass, hyaline, 10–12.5 μ, with a large central gutta.

Hab. on the ground in woods. Late summer to autumn. Ishikari (Sôunbetsu).

Distr. Japan (Hokkaido), Europe and North America.

Jap. name. *Yukitsurutake* (IMAI).

Amanita nivalis GREV. has been treated by many as a white form of *Amanitopsis vaginata*, but REA has described that the spores of *Amanitopsis nivalis* (GREV.) REA are oblong ellipsoidal, 11–12 × 9 μ,

with a large central gutta. The spores of our fungus are globose, 10–12.5 μ, containing a large central gutta.

4. *Amanitopsis strangulata* (FR.) ROZE

in KARST. Hattsv. I, 7, 1879—SACC. Syll. Fung. V. 23, 1887; Fl. Ital. Crypt., Hymen. 61, 1915—MASS. Brit. Fung. Fl. III, 258, 1893—W. G. SM. Brit. Basid. 19, 1908—COKER, Journ. Elisha Mitchell Sci. Soc. XXXIII, 8, pl. 4, 1917—KAUFFM. Agar. Mich. 624, 1918—REA, Brit. Basid. 93, 1922.

[YASUDA, Bot. Mag. (Tokyo), XXXVI, (146), 1922—SHIRAI, List Jap. Fung. ed. 3, 19, 1927]

Agaricus (*Amanita*) *strangulatus* FR. Epicr. Myc. 6, 1838; Hymen. Eur. 27, 1874—WINT. Die Pilze, I, 842, 1884.

Agaricus (*Amanita*) *Ceciliae* BERK. et BR. in BERK. Outl. Brit. Fung. 92, pl. 3, f. 5, 1860.

Amanita strangulata QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 66, 1872; Ench. Fung. 5, 1886—?BRES. Icon. Myc. I, pl. 18, 1927.

Amanita inaurata GILL. Hymen. Fr. 41, cum icone, 1874.

Amanitopsis inaurata GILBERT, Genre Amanita, 152, 1918.

Solitary or scattered, edible. Pileus 5–10 cm. broad, convex, then plane, finally upturned at the margin; surface slightly viscid when wet, dull or faintly shining when dry, hair-brown at the center, cinnamon-buff and deeply striate on the margin, often covered with flat, rather firmly adherent patches of fragments of the mealy, ashy-gray colored volva; context white, smoky near the surface, taste and odour none; lamellae free, crowded, white, edge gray colored and slightly fimbriate; stipe 8–15 cm. long, 8–15 mm. thick, attenuated upward, densely covered with ashy-gray colored powdery-fibrillose scales, base more or less incrusted with mealy patches of the friable and flocculent, mouse-gray volva, which usually forms a partial or complete ring one or two centimeter distant from the base, but rarely a sac or complete basal incrustation, hollow; spores white in mass, globose, smooth, 10–13 μ.

Hab. on the ground in woods or under trees. Summer to autumn. Ishikari (Sapporo).

Distr. Japan (Hokkaido, Honshu), China, Europe, North America.

Jap. name. *Tengu-tsurutake* (YASUDA).

5. *Amanitopsis agglutinata* (BERK. et CURT.) SACC.

Syll. Fung. V, 23, 1887—COKER, Journ. Elisha Mitchell Sci. Soc. XXXIII, 11, pl. 6, 1917.

[IMAZEKI, App. Mushr. Sci. I, 40, f. 1, 1935]

Agaricus agglutinatus BERK. et CURT. in HOOKERS Journ. Bot. I, 97, 1849.

Agaricus volvatus PK. 24 Ann. Rep. N. Y. State Mus. 59, 1872.

Agaricus soleatus HOWE, Bull. Torrey Bot. Club, V, 42, 1874.

Amanitopsis volvata SACC. Syll. Fung. V, 23, 1887—KAUFFM. Agar. Mich. 622, 1918.

Vaginata agglutinata O. K. Rev. Gen. Pl. III, 539, 1898—MURRILL, Mycologia, V, 83, & 94, pl. 86, 87, f. 2, 1913; North Amer. Fl. X, 66, 1914.

Solitary or scattered, said to be poisonous. Pileus 2–8 cm. broad, hemispherical, then expanded to plane; surface dull-white or yellowish, rarely reddish-brown at the center, besprinkled with whitish or brownish-red colored powders or floccose-scales, and sometimes with large patches of the volva, dry; context soft, white or light creamy, on drying or when bruised becoming rosy, taste and odour none; lamellae free, crowded, broad, white, on drying or when bruised becoming rosy or brownish; stipe 6–14 cm. long, 5–10 mm. thick, equal or attenuated upward, enlarged at the base, white, covered with small white, brownish or reddish, flocculent scales or patches, stuffed or solid; volva large, ample, volvate, persistent, firm, white or brownish, more or less lobed; spores white in mass, ellipsoidal, smooth, 8–11 × 5–6 μ.

Hab. on the ground in woods. Autumn. Ishikari (Mt. Sapporo), Iburi (Lake side of Shikotsu).

Distr. Japan (Hokkaido, Honshu), China, Europe and North America.

Jap. name. *Fukuro-tsurutake* (IMAZEKI).

6. *Amanitopsis clarisquamosa* IMAI

Bot. Mag. (Tokyo), XLVII, 430, 1933.

Solitary or scattered, of doubtful edibility. Pileus 4–6 cm. broad, hemispherical or convex, then plane; surface dry, dull-white, yellowish, brownish, pale pinkish cinnamon or vinaceous-cinnamon, silky fibrous and even at the center, margin white, slightly striatulate and covered with large, fibrous scales which are colored a buff-pink or onion-skin-pink color; context whitish or pinkish, fleshy, taste and

odour none; lamellae free, white, crowded, rounded behind, broad, broader in front, ventricose; stipe 6–10 cm. long, 8–12 mm. thick, slightly attenuated upward, whitish or brownish, densely covered by powdery-floccose scales or shaggy above the volva, scales colored with buff-pink or congo-pink, stuffed or solid; volva large, membranous, up to 4.5 cm. high, 2.5 cm. thick, persistent, firm or soft, ensheathing the base of stipe, about three-fourths of the length free, lobed at the apex, brownish or whitish; spores white in mass, hyaline, ellipsoidal-oblong or subcylindrical, 10–15 × 5–6 μ, smooth, granular in contents.

Hab. on the ground in woods. Autumn. Ishikari (Nopporo).

Distr. Endemic.

Jap. name. *Shiro-uroko-tsurutake* (IMAI).

The spores of this fungus are longer than those of the preceding species, *Am. agglutinata,* and the pileus is more scaly. But COKER's fungus of *A. agglutinata* is closely allied to this fungus. The two may be a single species but our fungus is a more scaly form.

Some European authors consider that *A. agglutinata* is identical with *Amanitopsis baccata* (FR.) SACC. If BRESADOLA's fungus is the true *A. baccata,* the figure suggests that it is a different species from ours.

7. *Amanitopsis avellaneosquamosa* IMAI

Bot. Mag. (Tokyo), XLVII, 430, 1933.

Solitary or scattered, edibility doubtful. Pileus 5–10 cm. broad, convex to plane, at length depressed at the center; surface dry, covered with light pinkish-buff to avellaneous colored, easily separable scales, densely coalescent at the center, striate on the margin; context white, thick, fleshy, taste and odour none; lamellae white, then tinged with yellowish color, free or remote, edge slightly wavy, moderately crowded, broader in front, nearly ventricose; stipe 9–17 cm. long, 6–20 mm. thick, equal or attenuated upward, scaly, subconcolorous or slightly paler, somewhat powdery floccose, hollow or stuffed; volva membranous, large, ensheathing the base of stipe, about two-thirds free above, up to 5 cm. long and 4 cm. thick, whitish or dull-pinkish, persistent; spores white in mass, hyaline, ellipsoidal, 9–10.5 × 5–6 μ.

Hab. on the ground in woods. Late summer. Ishikari (Nopporo).

Distr. Endemic.

Jap. name. *Akuiro-uroko-tsurutake* (IMAI).

Sect. **Amanitellae** (EARLE) GILBERT

Amanitella (ut gen.) EARLE, l. c. 1909.

Amanita § *Amanitopsis* § *Amanitellae* GILBERT, Genre Amanita, 156, 1918.

Amanitopsis sect. *Pulveratae* IMAI, Bot. Mag. (Tokyo), XLVII, 430, 1933.

Universal veil forming a powdery, adnate, but friable volva on the bulbous base of stipe, and breaking up into squamules on the pileus.

8. *Amanitopsis farinosa* (SCHW.) ATKINS.

Mushrooms, 76, f. 78, 1900—COKER, Journ. Elisha Mitchell Sci. Soc. XXXIII, 14, pl. 7, 1917—GILBERT, Genre Amanita, 156, 1918.

[IMAI, Bot. Mag. (Tokyo), XLVII, 430, 1933]

Amanita farinosa SCHW. Schr. Nat. Ges. Leipzig, I, 79, 1822.

Agaricus (*Amanita*) *farinosus* FR. Epicr. Myc. 11, 1838.

Amanitella farinosa EARLE, Bull. N. Y. Bot. Gard. V, 449, 1909.

Vaginata farinosa MURRILL, Mycologia, IV, 3, pl. 56, f. 5, 1912; North Amer. Fl. X, 67, 1914.

Solitary or scattered, edibility doubtful. Pileus 3–5.5 cm. broad, subglobose, then convex, at length becoming plane and slightly depressed at the center; surface dry, densely covered with drab-colored powders, darker colored and hairy squamulose at the center, paler and striate on the margin; context white, fleshy, thin, taste and odour none; lamellae free or remote, white, rounded behind, rather distant; stipe 4–7 cm. long, 5–6 mm. thick, nearly equal, bulbous at the base, reaching to 1 cm. or more in thickness, very rarely not bulbous, white or whitish, tinged with grayish or yellowish color, somewhat pruinose, fleshy, fragile, solid or nearly hollow; volva powdery, drab-colored, evanescent; spores white in mass, hyaline, globose, 6–7.5 μ.

Hab. on the grassy ground in woods, especially under conifers. Summer to autumn. Ishikari (Nopporo), Iburi (Lake side of Shikotsu).

Distr. Japan (Hokkaido, Honshu), China, North America.

Jap. name. *Hime-kona-kaburi-tsurutake* (IMAI).

Lepiota (PERS. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 60 & 70, 1872.

Agaricus § *Lepiota* PERS. Syn. Fung. 257, 1801, p. p.
Agaricus § *Lepiota* FR. Syst. Myc. I, 19, 1821.
Leucocoprinus PAT. Bull. Soc. Myc. Fr. IV, 26, 1888.
Cystoderma FAYOD, Ann. Sci. Nat., Bot. 7 sér. IX, 350, 1889.
Fusispora FAYOD, Ibid. 351, 1889.
Mastocephalus BATT. ex O. K. Rev. Gen. Pl. II, 859, 1891.
Limacella EARLE, Bull. N. Y. Bot. Gard. V, 447, 1909.

Fructification with partial veil remaining later as an annulus, and usually with very fugacious universal veil when young. Pileus fleshy, regular, distinct from the fleshy stipe. Stipe central, fleshy. Universal veil very fugacious. Partial veil remaining as an annulus. Lamellae free or rarely slightly attached. Spores white in mass.

Type species: *Agaricus* (*Lepiota*) *procerus* SCOP. ex FR.

Key to the subgenera, sections and species in Hokkaido.

I. Pileus dry, squarrose, squamulose, fibrillose or pruinose; lamellae usually free..... Subgen. Eulepiota.
  A. Pileus large with large scales; annulus large, movable, persistent, distinct from the universal veil..... Sect. Procerae.
    1. Pileus with prominent umbo; context white, unchanging in color; stipe usually with snake-like marking..... *L. procera*(1).
    2. Pileus not distinctly umbonate; context becoming reddish on exposure; stipe without snake-like marking..... *L. rhacodes*(2).
  B. Pileus squamulose; annulus distinct, fixed, homogeneous with universal veil which clothes the stipe..... Sect. Clypeolariae.
    1. Spores large, subcylindrical, subfusiform or turbinate.
      a. Pileus covered with small, rigid, apiculate, fuscous, deciduous warts; annulus rather large; stipe robust..... *L. acutesquamosa*(3).
      b. Pileus covered with yellow or brownish dense felt which later breaks up into floccose, torn patches or innate squamules, appendiculate at the margin..... *L. clypeolaria*(4).
      c. Pileus covered with cinnamon or reddish-brown small scales in concentric order..... *L. cristata*(5).
    2. Spores not elongated, but ellipsoidal.
      a. Stipe abruptly bulbous; pileus covered with reddish-brown scales..... *L. subamanitiformis*(6).
      b. Stipe not bulbous; pileus covered with reddish-brown, small scales..... *L. helveola*(7).

C. Pileus pruinose, fibrillose or pulverulent, rarely glabrous..... ..... Sect. Pruinosae.
1. Fructification large, 5–13 cm. in width of pileus; pileus white or sordid, subglabrous; stipe hollow..... *L. naucina* (8).
2. Fructification small, slender; pileus salmon, then whitish, powdery. ..... *L. seminuda* (9).

II. Pileus dry, granulose or verrucose, lamellae slightly attached to the stipe or nearly free..... Subgen. Cystoderma.
A. Spores ellipsoidal.
1. Pileus vinaceous-cinnamon, densely covered with warm-sepia colored sharply pointed warts..... *L. granulosa* (10).
2. Pileus ochraceous, densely covered with minute warts or granules.. ..... *L. amianthina* (11).
B. Spores long, bone-shaped; pileus olivaceous-black, densely covered with small warts..... *L. ossaeiformispora* (12).

III. Pileus dry, membranous, thin, farinaceous or fibrillose-squamulose, plicate-sulcate..... Subgen. Leucocoprinus.
A. Pileus white, yellowish or brownish, caespitose or gregarious..... ..... *L. cepaestipes* (13).
B. Pileus sulphur-yellow, lemon-yellow or deep yellow.
1. Stipe rather short and bulbous at the base..... *L. lutea* (14).
2. Stipe slender, attenuated upward but not bulbous at the base..... ..... *L. pseudolicmophora* (15).

IV. Pileus viscid..... Subgen. Limacella.
A. Pileus tawny to orangish..... *L. subglischra* (16).

Subgen. **Eulepiota** LANGE emend. IMAI

Lepiota § *Eulepiota* LANGE Agar. Denm. II, 19, 1915, pro max. parte.

Pileus dry, squarrose, squamulose, fibrillose or pruinose. Lamellae usually free from the stipe.

Sect. **Procerae** FR.

Epicr. Myc. 12, 1838 (ut *Proceri*).

Pileus large, with large scales; annulus large, movable, persistent, distinct from the universal veil.

1. *Lepiota procera* (SCOP. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 70, 1872; Ench. Fung. 5, 1886—GILL. Hymen. Fr. 56, cum icone, 1874—KARST. Hattsv. I, 7, 1879—SACC. Syll. Fung. V, 27, 1887; Fl. Ital. Crypt., Hymen. 74, 1915—

SCHROET. Pilze Schles. I, 675, 1889—BARLA, Champ. Alp. Marit. 21, pl. 9, f. 1–4, 1889—MASS. Brit. Fung. Fl. III, 234, 1893—ATKINS. Mushrooms, ed. 2, 79, f. 81, 1903—MORGAN, Journ. Myc. XIII, 7, 1907—W. G. SM. Brit. Basid. 20, f. 12, 1908—ROLLAND, Atlas Champ. 19, f. 15, 1910—MURRILL, Mycologia, V, 5, pl. 92, f. 2, 1913; North Amer. Fl. X, 63, 1914—KAWAMURA, Ill. Jap. Fung. pl. 12, f. 1–4, 1914—LANGE, Agar. Denm. II, 22, 1915—RICKEN, Blätterp. 317, pl. 83, f. 1, 1915—KAUFFM. Agar. Mich. 643, pl. 132, 1918—REA, Brit. Basid. 64, 1922—BRES. Icon. Myc. I, pl. 20, 1927.

[KAWAMURA, Bot. Mag. (Tokyo), XXIII, (67), 1 fig. 1909—SHIRAI, List Jap. Fung. ed. 2, 319, 1917; ed. 3, 186, 1927—UMEMURA, Pl. Fujiyama. 368, 1923—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 119, 1931]

Agaricus procerus SCOP. Fl. Carn. ed. 2, II, 418, 1772 (teste FR.)—SOW. Engl. Fung. pl. 190, 1799 (teste FR.).

Agaricus (*Lepiota*) *procerus* PERS. Syn. Fung. 257, 1801 (teste FR.).

Agaricus (*Lepiota*) *procerus* FR. Syst. Myc. I, 20, 1821; Epicr. Myc. 12, 1838; Hymen. Eur. 29, 1874—BARLA, Champ. Nice, 14, pl. 8, f. 1–8, 1859—CORDA, Champ. Fr. II, 20, pl. 7, 1870—CKE. Ill. Brit. Fung. pl. 21, 1883—WINT. Die Pilze, I, 842, 1884.

Solitary or gregarious, edible. Pileus 8–20 cm. broad, ovoid to expanded, umbonate; surface radiate-fibrillose and rufescent beneath the pellicle, the pellicle thick, at first smooth and continuous, rufous to umber in color, at length torn asunder, except the umbo, into large irregular scales which become scattered and gradually fall away, margin fimbriate, silky-fibrillose; context thick, soft, white, taste and odour pleasant; lamellae free or remote, white, at times yellowish, fuscous or pinkish, close, tapering slightly behind; stipe 15–30 cm. long, 10–20 mm. thick, attenuated upward, bulbous at the base, pellicle thin, flocculose, rufous or brownish, at length drawn apart into minute scales, which appear as snake-like markings, hollow or fibrous-stuffed; annulus white above, brownish on the exterior, thick, soft, subcoriaceous, movable, apical, persistent, fibrillose at the margin; spores white in mass, ellipsoidal, apiculate, 12–18 × 8–12 μ.

Hab. on the ground in meadows, pastures and open woods. Autumn. Oshima (Ônomura), Ishikari (Nopporo), Kushiro (Kawayu).

Distr. Japan (Hokkaido, Honshu), China, Asia Minor, Europe, North America, Africa and Australia.

Jap. name. *Karakasatake* (KAWAMURA).

2. *Lepiota rhacodes* (VITT.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 70, 1872—GILL. Hymen. Fr. 57, cum icone, 1874—KARST. Hattsv. I, 8, 1879—SACC. Syll.

Fung. V, 29, 1887; Fl. Ital. Crypt., Hymen. 70, 1915—SCHROET. Pilze Schles. I, 675, 1889—BARLA, Champ. Alp. Marit. 22, pl. 9, f. 1–5, 1889—MORGAN, Journ. Myc. XIII, 8, 1907—W. G. SM. Brit. Basid. 20, 1908—MURRILL, North Amer. Fl. X, 64, 1914—LANGE, Agar. Denm. II, 23, 1915—RICKEN, Blätterp. 317, pl. 84, f. 1, 1915—REA, Brit. Basid. 65, 1922.

Agaricus rhacodes VITT. Fung. Mang. 158, pl. 20, 1835—FR. Epicr. Myc. 13, 1838; Hymen. Eur. 29, 1874—BERK. Outl. Brit. Fung. 92, pl. 3, f. 6, 1860—CKE. Ill. Brit. Fung. I, pl. 22, 1883—WINT. Die Pilze, I, 841, 1884.

Solitary or gregarious, edible. Pileus 7–14 cm. broad, globose then flattened or depressed; surface dry, smooth and brown when young, becoming very coarsely scaly, except at the center, from the breaking up of the pellicle; context white, reddening on exposure to the air, especially in the stipe and the disc, odour and taste pleasant; lamellae free or remote, white, lanceolate, ventricose, crowded; stipe 7–20 cm. long, 1–2 cm. thick, equal or attenuated upward, strongly bulbous at the base, white, faintly reddening, smooth, hollow; annulus white or brownish, fixed, becoming movable, edge thick, double and fimbriate; spores white in mass, ellipsoidal, 9–12 × 6–7 μ.

Hab. on the ground under trees, especially in coniferous woods. Autumn. Ishikari (Sapporo).

Distr. Japan (Hokkaido), Europe, North America and Australia.

Jap. name. *Karakasatake-modoki* (n. n.).

Sect. **Clypeolariae** FR.

Epicr. Myc. 14, 1838 (ut *Clypeolarii*).

Pileus squamulose; annulus distinct, fixed, homogeneous with universal veil which clothes the stipe.

3. *Lepiota acutesquamosa* (WEINM.) GILL.

Hymen. Fr. 60, cum icone, 1874—KARST. Hattsv. I, 9, 1879—SACC. Syll. Fung V, 34, 1887—BARLA, Champ. Alp. Marit. 24, pl. 12, f. 4–7, 1889—MASS. Brit. Fung. Fl. III, 236, 1893—W. G. SM. Brit. Basid. 21, 1908—ROLLAND, Atlas Champ. 20, f. 20, 1910—KAWAMURA, Ill. Jap. Fung. pl. 11, f. 8–10, 1914—KAUFFM. Agar. Mich. 633, 1918—REA, Brit. Basid. 67, 1922.

[SHIRAI, List Jap. Fung. ed. 2, 319, 1917; ed. 3, 185, 1927]

Amanita aspera PERS. Syn. Fung. 256, 1801.

Agaricus acutesquamosus WEINM. Syll. Pl. Nov. I, 70, 1824—FR. Epicr. Myc. 14, 1838; Hymen. Eur. 31, 1874—CKE. Ill. Brit. Fung. pl. 14, 1883—WINT. Die Pilze, I, 840, 1884.

Lepiota Friesii var. *acutesquamosa* QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 72, 1872.

Lepiota aspera QUÉL. Ench. Fung. 5, 1886—MURRILL, North Amer. Fl. X, 63, 1914—SACC. Fl. Ital. Crypt., Hymen. 76, 1915.

Lepiota Friesii SCHROET. Pilze Schles. I, 674, 1889.

Solitary or gregarious, edible. Pileus 7–9 cm. broad, conical, then convex, at length umbonate; surface appressed-tomentose, pale ferruginous, provided with brown, compact, pointed, wart-like, deciduous scales on the whole surface, especially densely scattered on the center, margin at first incurved and with a small, whitish, appendiculate veil, then expanded, at length upturned and veil disappeared; context white, moderately thick, with unpleasant odour; lamellae free, white, then becoming yellowish, rather narrow, very crowded, lanceolate; stipe 8–10 cm. long, 8–12 mm. thick, equal or attenuated upward, subbulbous at the base, whitish, then pale pinkish cinnamon, darker downward, silky shining fibrillose, with spirals of concolorous scales of remnants of the universal veil, hollow; annulus white, becoming pale pinkish cinnamon, silky shining, with fragments of the universal veil, persistent; spores white in mass, hyaline, subcylindrical, rarely ellipsoidal, 5–7.5 × 3.5 μ.

Hab. on the ground or decayed wood in woods, gardens, roadsides, etc. Summer to autumn. Ishikari (Sapporo, Nopporo), Kitami (Oketo forest).

Distr. Japan (Hokkaido, Honshu), Asia Minor, Europe and North America.

Jap. name. *Onitake* (KAWAMURA).

4. *Lepiota clypeolaria* (BULL. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 72, 1872; Ench. Fung. 6, 1886—GILL. Hymen. Fr. 61, cum icone, 1874—KARST. Hattsv. I, 10, 1879—SACC. Sylt. Fung. V, 36, 1887; Fl. Ital. Crypt., Hymen. 82, 1915—SCHROET. Pilze Schles. I, 674, 1889—MASS. Brit. Fung. Fl. III, 240, 1893—W. G. SM. Brit. Basid. 22, 1908—RICKEN, Blätterp. 323, pl. 85, f. 2, 1915—KAUFFM. Agar. Mich. 631, pl. 128, 1918—REA, Brit. Basid. 69, 1922—BRES. Icon. Myc. I, pl. 31, 1927.

Agaricus clypeolarius BULL. Champ. Fr. pl. 405, 1791 (teste FR.).

Agaricus (*Lepiota*) *clypeolarius* FR. Syst. Myc. I, 21, 1821; Epicr. Myc. 15, 1838; Hymen. Eur. 32, 1874—WINT. Die Pilze, I, 839, 1884.

Lepiota magnispora MURRILL, Mycologia, IV, 237, 1912.

Scattered or solitary, edible. Pileus 3–7 cm. broad, campanulate, then convex and flattened, obtuse or umbonate; surface floccose-scaly, white or yellowish beneath the pellicle, which is thin, at first continuous and yellowish, ochraceous or rufous, soon broken up into floccose torn patches except in the center and drawn apart into small scales, often appendiculate with the remains of the annulus at the margin; context white, thin, floccose, taste and odour pleasant; lamellae free, white or yellowish, rather crowded, soft, minutely serrulate on the edge, rather broad; stipe 5–10 cm. long, 3–8 mm. thick, equal or slightly enlarged at the base, concolorous, conspicuously floccose-squamulose below the annulus, silky at the apex, hollow; annulus floccose, concolorous, fugacious; spores white in mass, subfusiform or elongated-ellipsoidal, smooth, hyaline, 11–15·× 4–6 μ.

Hab. on the ground in woods. Summer to autumn. Iburi (Lake side of Shikotsu), Kitami (Oketo forest).

Distr. Japan (Hokkaido, Honshu), Europe, North America and Australia(?).

Jap. name. *Wata-karakasatake* (n. n.).

5. *Lepiota cristata* (BOLT. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 72, 1872; Ench. Fung. 6, 1886—GILL. Hymen. Fr. 61, 1874—KARST. Hattsv. I, 10, 1879—SACC. Syll. Fung. V, 39, 1887; Fl. Ital. Crypt., Hymen. 77, 1915—SCHROET. Pilze Schles. I, 673, 1889—BARLA, Champ. Alp. Marit. 27, pl. 14, f. 1–4, 1889—MASS. Brit. Fung. Fl. III, 242, 1893—ATKINS. Mushrooms, ed. 2, 81, f. 83, 1903—W. G. SM. Brit. Basid. 23, 1908—ROLLAND, Atlas Champ. 20, f. 19, 1910—RICKEN, Blätterp. 322, pl. 84, f. 3, 1915—KAUFFM. Agar. Mich. 641, pl. 131, 1918—REA, Brit. Basid. 71, 1922—BRES. Icon. Myc. I, pl. 34, 1927.

[P. HENN. Hedw. XXXIX, (156), 1900—MATSUM. Ind. Pl. Jap. I, 150, 1904—SHIRAI, List Jap. Fung. 47, 1905; ed. 2, 319, 1917; ed. 3, 186, 1927]

Agaricus conspurcatus WILLD. Prodr. Fl. Berl. 382, 1787 (teste MORG.).

Agaricus cristatus BOLT. Hist. Fung. Halif. I, 7, 1788 (teste FR.).

Agaricus subantiquatus BATSCH, Elench. Fung. II, 59, 1789 (teste FR.).

Agaricus (*Lepiota*) *cristatus* FR. Syst. Myc. I, 22, 1821; Epicr. Myc. 15, 1838; Hymen. Eur. 32, 1874—BERK. Outl. Brit. Fung. 94, pl. 3, f. 7, 1860—CKE. Ill. Brit. Fung. pl. 29, 1883—WINT. Die Pilze, I, 839, 1884.

Agaricus miamensis MORG. Journ. Cinc. Soc. Nat. Hist. VI, 63, 1883; Journ. Myc. XII, 242, 1906.

Lepiota conspurcata MORG. Journ. Myc. XII, 243, 1906—MURRILL, North Amer. Fl. X, 56, 1914.

Lepiota castaneidisca MURRILL, Mycologia, IV, 232, 1912.

Gregarious or solitary. Pileus 1.7–4.5 cm. broad, subovoid, then convex to expanded; surface whitish, fibrous, covered with small cinnamon-colored scales in concentric order, not scaly at the center; context thin, white, with no taste and with an unpleasant odour; lamellae white, at length tinged with yellowish color, close, free; stipe 3.5–6.5 cm. long, 2.5–5 mm. thick, equal, white, silky fibrillose, tinged with light avellaneous color, not easily separable from the pileus, fragile as a cartilaginous stipe, hollow; annulus membranous, subpersistent, white, often tinged with reddish color, narrow, fixed; spores white in mass, yellowish hyaline, turbinate in shape, 5.5–7.5 × 2.5–4.5 μ.

Hab. on the rich soil or on the ground in woods. Summer to autumn. Ishikari (Sapporo, Mt. Teine, Nopporo).

Distr. Japan (Hokkaido, Honshu), China, Asia Minor, Europe, North America and Australia.

Jap. name. *Kitsune-no-karakasa* (SHIRAI ex P. HENN.).

6. *Lepiota subamanitiformis* IMAI, sp. nov.

Solitaria. Pileo 3.5–5.5 cm. lato, conico-convexo, dein umbonato vel subplano, sicco, radiato-fibrilloso, primo cute testacea continua tecto, dein squamoso, margine subtomentoso; carne alba, tenui, odore saporeque blando; lamellis liberis, albis, subventricosis, confertis, 5 mm. latis; stipite 3.5–5.5 cm. longo, 3–5 mm. crasso, sursum attenuato, basi bulboso, usque ad 1 cm. crasso, albo, subpruinoso vel subglabro, cavo; annulo albo, margine incarnato, adhaerente, persistente, tenui, membranaceo, subinferno; sporis in cumulo albis, oblongo-ellipsoideis vel oblongis, levibus, hyalinis, 6–10.5 × 3–5 μ.

Hab. on the ground in open woods. Summer to autumn. Ishikari (Sapporo).

Distr. Endemic.

Jap. name. *Hotei-karakasatake* (n. n.).

The present fungus is closely allied to *Lepiota amanitiformis* MURRILL, from which it is distinguishable by the character of stipe.

7. *Lepiota helveola* BRES.

Fung. Trid. I, 15, pl. 16, f. 2, 1882; Icon. Myc. I, pl. 32, f. 2, 1927—SACC. Syll. Fung. V, 38, 1887; Fl. Ital. Crypt., Hymen. 81, 1915—REA, Trans. Brit. Myc. Soc. IV, 307, pl. 8, 1914; Brit. Basid. 70, 1922—RICKEN, Blätterp. 326, 1915.

Gregarious or solitary, said to be poisonous in Europe. Pileus 3–4.5 cm. broad, conical, then umbonate or gibbous; surface covered with reddish brown or brown colored scales; context white, thin, tinged with reddish tint under the pellicle, odour and taste none; lamellae free, white, then slightly yellowish, close, 3 mm. wide; stipe 4–6 cm. long, 4–8 mm. thick, attenuated upward, rarely equal, whitish or pinkish and fibrillose at the upper portion, subconcolorous to the pileus and rarely scaly ringed at the base; annulus pendulous or scaly, distant, upper surface white, under surface subconcolorous; spores white in mass, smooth, ellipsoidal or subreniform, $8 \times 4\,\mu$.

Hab. on the grassy ground or on rich soil under trees. Summer to autumn. Ishikari (Sapporo).

Distr. Japan (Hokkaido), Europe.

Jap. name. *Doku-kitsunenokarakasa* (n. n.).

The Japanese fungus has rather smaller spores than the European, but it is very close to the description and figure of *L. helveola* published by REA. The writer identifies the two as identical species.

Sect. **Pruinosae** MURRILL

North Amer. Fl. X, 42, 1914.

Pileus pruinose, fibrillose or pulverulent, rarely glabrous.

8. *Lepiota naucina* (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 73, 1872—GILL. Hymen. Fr. 59, cum icone, 1874—KARST. Hattsv. I, 11, 1879—SACC. Syll. Fung. V, 43, 1887; Fl. Ital. Crypt., Hymen. 86, 1915—BARLA, Champ. Alp. Marit. 28, pl. 15, f. 1–4, 1889—MASS. Brit. Fung. Fl. III, 245, 1893—ATKINS. Mushrooms, ed. 2, 77, f. 79–80, 1903—W. G. SM. Brit. Basid. 23, 1908—ROLLAND, Atlas Champ. 19, f. 17, 1910—MURRILL, North Amer. Fl. X, 49, 1914—LANGE, Agar. Denm. II, 23, 1915—RICKEN, Blätterp. 319, pl. 84, f. 2, 1915—KAUFFM. Agar. Mich. 646, 1918—REA, Brit. Basid. 72, 1922—BRES. Icon. Myc. I, pl. 25, 1927.

Agaricus spherosporus KROMBH. Abbild. Schwamm. IV, 10, pl. 24, f. 19–23, 1836.

Agaricus laevis KROMBH. Ibid. 16, pl. 26, f. 16–17, 1936.

Agaricus (*Lepiota*) *naucinus* FR. Epicr. Myc. 16, 1838; Hymen. Eur. 34, 1874—CKE. Ill. Brit. Fung. pl. 15, 1883—WINT. Die Pilze, I, 838, 1884.

Agaricus (*Annularia*) *laevis* FR. Hymen. Eur. 184, 1874.

Agaricus (*Lepiota*) *naucinoides* PK. 29 Ann. Rep. N. Y. State Mus. 66, 1876.

Lepiota pudica QUÉL. Ench. Fung. 7, 1886.

Lepiota naucinoides MORG. Journ. Myc. XIII, 10, 1907.

Solitary or gregarious, edible. Pileus 5–13 cm. broad, conical or subglobose, then convex, at length slightly depressed in the center; surface white, sometimes light drab or yellowish, smooth, rarely cracked at the center, pruinose; context fleshy, thick, white, taste and odour mild; lamellae free or remote, close, white, gradually changing to pinkish, pinkish-brown when dried; stipe 8–15 cm. long, 7.5–17 mm. thick, almost equal, but enlarged at the base, white, pinkish brown when dried, silky shining, smooth, glabrous, hollow; annulus white, superior, narrow, somewhat thick, persistent, often fugacious; spores white or slightly pinkish in mass, obovate-ellipsoidal or rarely oblong, hyaline or faintly pinkish, 7–12.5 (rarely up to 18) × 4.5–7.5 μ, mostly 9–10 × 6 μ.

Hab. on the ground in pastures, fields, roadsides, etc. Summer to autumn. Ishikari (Sapporo).

Distr. Japan (Hokkaido), Europe, North America and Australia.

Jap. name. *Shiro-karakasatake* (IMAI).

9. *Lepiota seminuda* (LASCH) GILL.

Hymen. Fr. 71, 1874—QUÉL. Ench. Fung. 8, 1886—SACC. Syll. Fung. V, 50, 1887; Fl. Ital. Crypt., Hymen. 88, 1915—BARLA, Champ. Alp. Marit. 31, 1888—MASS. Brit. Fung. Fl. III, 252, 1893—W. G. SM. Brit. Basid. 25, 1908—MURRILL, North Amer. Fl. X, 48, 1914—RICKEN, Blätterp. 324, 1915—REA, Brit. Basid. 78, 1922.

Agaricus seminudus LASCH, Linnaea, III, 157, 1828—FR. Epicr. Myc. 18, 1838; Hymen. Eur. 38, 1874—CKE. Ill. Brit. Fung. pl. 19, f. a, 1883—WINT. Die Pilze, I, 835, 1884.

Gregarious. Pileus 1–2.5 cm. broad, hemiglobose or conical, then umbonate; surface dry, pulverulent, salmon-buff or onion-skin-pink in young stage, then turning to whitish, darker at the center,

margin slightly incurved and connected with the stipe by a onion-skin-pink colored membranous, but fugacious veil; veil subviscid and fugacious, not forming an annulus; context white, fleshy on the center, taste and odour none; lamellae white, free, rounded and broader behind, 4 mm. broad, rather crowded; stipe 2.5–3.5 cm. long, 1.5–2 mm. thick, equal, white or pinkish above, light-russet-vinaceous to sorghum-brown below, slightly pruinose, subelastic, rigid, subcartilaginous, hollow; spores white in mass, oblong or ellipsoidal, 4.5–5 × 2.5 μ, hyaline, with 1–4 small guttae.

Hab. on the humus ground in woods or under trees. Summer to autumn. Ishikari (Sapporo).

Distr. Japan (Hokkaido), Europe and North America.

Jap. name. *Hime-kona-karakasatake* (n. n.).

Subgen. **Cystoderma** (FAYOD) IMAI, nom. nov.

Agaricus § *Lepiota* § *Granulosae* FR. Hymen. Eur. 35, 1874.
Cystoderma (ut gen.) FAYOD. l. c. 1889.

Pileus granulosus vel verrucosus. Lamellae a stipite leviter adhaerentes.

10. *Lepiota granulosa* (BATSCH ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 73, 1872, p. p.—GILL. Hymen. Fr. 71, cum icone, 1874, p. p.—KARST. Hattsv. I, 14, 1879—SACC. Syll. Fung. V, 47, 1887; Fl. Ital. Crypt., Hymen. 84, 1915—SCHROET. Pilze Schles. I, 672, 1889—BARDA, Champ. Alp. Marit. 30, pl. 16, f. 5–8, 1889—MASS. Brit. Fung. Fl. III, 248, 1893—W. G. SM. Brit. Basid. 24, 1908—LANGE, Agar. Denm. II, 29, 1915—RICKEN, Blätterp. 327, pl. 81, f. 3, 1915—KAUFFM. Agar. Mich. 638, 1918—REA, Brit. Basid. 75, 1922.

Agaricus granulosus BATSCH, Elench. Fung. I, 79, 1783 (teste FR.).

Agaricus (*Lepiota*) *granulosus* PERS. Syn. Fung. 264, 1801 (teste FR.).

Agaricus (*Lepiota*) *granulosus* FR. Syst. Myc. I, 24, 1821, p. p.; Epicr. Myc. 17, 1838; Hymen. Eur. 36, 1874—CKE. Ill. Brit. Fung. pl. 18, 1883—WINT. Die Pilze, I, 837, 1884.

Gregarious or solitary, edible. Pileus 2.5–3.5 cm. broad, conical, then expanded to umbonate; surface dry, vinaceous-cinnamon, densely covered with warm-sepia colored sharply pointed warts, the warts longer and dense on the center, margin incurved at first; context thin, whitish, odour disagreeable, taste slightly bitter; lamellae

nearly free or adnexed, white then yellowish, moderately crowded; stipe 3.5–5 cm. long, 3–7 mm. thick, attenuated upward, concolorous, densely covered, below the annulus, with warts like those of the pileus and longitudinally sulcate in 2 to 4 lines, dry, brown-fibrillose above the annulus, hollow; annulus subsuperior, torn asunder into small pieces, subpendulous, subpersistent, concolorous with the warts; veil subconcolorous with warts, subpersistent; spores white in mass, ellipsoidal, smooth, 4–5.5 × 2.3–3.5 μ.

Hab. on the ground in woods or under trees. Summer to autumn. Ishikari (Sapporo).

Distr. Japan (Hokkaido, Honshu), Europe and North America.

Jap. name. *Hime-onitake* (n. n.).

11. *Lepiota amianthina* (Scop. ex Fr.) Karst.

Hattsv. I, 15, 1879—Quél. Ench. Fung. 7, 1886—Sacc. Syll. Fung. V, 48, 1887; Fl. Ital. Crypt., Hymen. 84, 1915—Barla, Champ. Alp. Marit. 30, pl. 16, f. 9–11, 1889—Schroet. Pilze Schles. I, 672, 1889—Mass. Brit. Fung. Fl. III, 249, 1893—W. G. Sm. Brit. Basid. 25, 1908—Murrill, North Amer. Fl. X, 45, 1914, p. p.—Ricken, Blätterp. 327, pl. 81, f. 4, 1915—Rea, Brit. Basid. 75, 1922—Bres. Icon. Myc. I, pl. 37, 1927.

Agaricus amianthinus Scop. Fl. Carn. ed. 2, II, 434, 1772 (teste Fr.).

Agaricus (*Lepiota*) *granulosus* Fr. Syst. Myc. I, 24, 1821, p. p.

Agaricus (*Lepiota*) *granulosus* var. *amianthinus* Fr. Epicr. Myc. 18, 1838.

Agaricus (*Lepiota*) *amianthinus* Fr. Hymen. Eur. 37, 1874—Cke. Ill. Brit. Fung. pl. 213, f. 2, 1883—Wint. Die Pilze, I, 836, 1884.

Solitary or scattered, edible. Pileus 2–5 cm. broad, convex, then expanded to gibbous or subumbonate; surface dry, ochraceous, darker at the center, pulverulent or granulose, radiately rugulose; context yellowish or yellow, rather thick, odour none; lamellae adnexed, white, then yellowish, crowded; stipe 2–6 cm. long, 3–5 mm. thick, slightly attenuated upward or nearly equal, whitish or yellowish and glabrous above the annulus, densely covered with ochraceous squamules below the annulus, hollow; annulus concolorous, squamulose on the outside, median; spores white in mass, ellipsoidal, 6–8 × 3–4 μ, smooth, hyaline; cystidia absent.

Hab. on the ground in woods. Autumn. Ishikari (Mt. Kurodake).

Distr. Japan (Hokkaido, Honshu), Europe and North America.

Jap. name. *Shiwa-karakasatake* (n. n.).

12. *Lepiota ossaeiformispora* IMAI, sp. nov.

Gregaria. Pileo 2–3 cm. lato, conico dein umbonato, sicco, olivaceo-nigro, dense squamuloso, margine pallidiore; carne alba, tenui, sapore nullo, odore foetido; lamellis subliberis, albidis dein subflavescentibus, confertis; stipite 4–7 cm. longo, 3–4 mm. crasso, subequali, albido vel olivaceo-griseo, fibrilloso vel squamuloso, cavo; annulo inferno, tomentoso, olivaceo-nigro-squamuloso; sporis in cumulo albis, ossaeiformibus, levibus, hyalinis, 10–12 × 3–4 μ.

Hab. on the ground in woods. Autumn. Ishikari (Sapporo).

Distr. Endemic.

Jap. name. *Hime-ao-onitake* (n. n.).

The present fungus is an intermediate form between *Lepiota Grangei* (EYRE) LANGE and *L. pseudofelina* LANGE. They, however, are distinct from one another.

Subgen. **Leucocoprinus** (PAT.) KONR. et MAUBL.

Icon. Sel. Fung. I, 41, 1924.

Leucocoprinus (ut gen.) PAT. l. c. 1888.

Pileus dry, membranous, thin, farinaceous or fibrillose-squamulose, plicate-sulcate on the margin.

13. *Lepiota cepaestipes* (SOW. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 73, 1872; Ench. Fung. 7, 1886—GILL. Hymen. Fr. 65, 1874—KARST. Hattsv. I, 13, 1879—SACC. Syll. Fung. V, 43, 1887; Fl. Ital. Crypt., Hymen. 69, 1915—SCHROET. Pilze Schles. I, 673, 1889—BARLA, Champ. Alp. Marit. 29, pl. 15, f. 7–11, 1889—MASS. Brit. Fung. Fl. III, 246, 1893—W. G. SM. Brit. Basid. 24, 1908—RICKEN, Blätterp. 320, 1915—KAUFFM. Agar. Mich. 640, pl. 130, 1918—REA, Brit. Basid. 74, 1922.

Agaricus cretaceus BULL. Champ. Fr. pl. 374, 1791 (teste FR.).

Agaricus cepaestipes SOW. Engl. Fung. pl. 2, 1797 (teste FR.).

Agaricus Copr.? cepaestipes PERS. Syn. Fung. 416, 1801 (teste FR.).

Agaricus (Vaginata) cepaestipes FR. Syst. Myc. I, 280, 1821.

Agaricus (Lepiota) cepaestipes FR. Epicr. Myc. 17, 1838; Hymen. Eur. 35, 1874—CKE. Ill. Brit. Fung. I, pl. 5 (p. p.) & 942, 1883—WINT. Die Pilze, I, 837, 1884.

Lepiota mammaeformis UNDERW. Bull. Torrey Bot. Club, XXIV, 82, 1897.

Lepiota cretacea MORGAN, Journ. Myc. XIII, 3, 1907—MURRILL, North Amer. Fl. X, 49, 1914.

Gregarious or caespitose, edible. Pileus 2–5 cm. broad, at first subovoid with an obtuse apex, then campanulate and expanded to umbonate; surface dry, white, yellowish or brownish, darker at the center, fibrillose or with densely floccose, fugacious scales and powders, plicate-sulcate on the margin; context thin, white, taste and odour none; lamellae free, white or whitish, narrow, crowded; stipe 5–8 cm. long, 4–6 mm. thick, attenuated upward, bulbous at the base, white, covered with fugacious, delicate flocci, hollow; annulus white, membranous, thin, fixed, inferior, persistent; spores white in mass, ellipsoidal, 7.5–9 × 4–5 μ, with a central gutta, smooth.

Hab. on humus ground under trees or in woods. Summer to autumn. Ishikari (Sapporo).

Distr. Japan (Hokkaido), Europe, North America and Australia.

Jap. name. *Kinu-karakasatake* (n. n.).

14. *Lepiota lutea* [BOLT.] GODFRIN,

Bull. Soc. Myc. Fr. XIII, 33, 1897—GUÉGUEN, Bull. Soc. Myc. Fr. XXIV, 121, 1908—REA, Brit. Basid. 74, 1922—KONR. et MAUBL. Icon. Sel. Fung. pl. 15, 1930—LANGE, Fl. Agar. Dan. I, 37, pl. 14, f. G, 1935.

Agaricus luteus BOLT. Hist. Fung. Halif. I, pl. 50, 1788 (teste FR.).

Agaricus cepaestipes var. *lutea* PERS. Syn. Fung. 416, 1801—FR. Hymen. Eur. 35, 1874.

Agaricus flammula ALB. et SCHW. Consp. Lusat. 149, 1805—KICKX, Fl. Crypt. Flandr. II, 133, 1867 (teste FR.).

Agaricus flos sulphuris SCHNIZEL. apud STURM, Deuts. Fl. III, fasc. 31, 1, pl. 1, 1851 (teste FR.).

Lepiota flammula GILL. Hymen. Fr. 63, cum icone, 1874.

Lepiota cepaestipes var. *lutea* QUÉL. Ench. Fung. 7, 1886—SACC. Syll. Fung. V, 44, 1887; Fl. Ital. Crypt., Hymen. 70, 1915.

Agaricus cepaestipes Auct. p. p.

Lepiota cepaestipes Auct. p. p.

Gregarious, caespitose or solitary. Pileus 1–3 cm. or more broad, at first conical, then campanulate, finally subumbonate; surface dry, sulphur-yellow to deep yellow, covered with concolorous minute granular fugacious flocci, long plicate-sulcate on the margin; context thin, membranous, concolorous, taste none, odour none or somewhat disagreeable; lamellae free, slightly paler or subconcolorous, rather narrow, rather crowded; stipe 4–8 cm. or more long, 2–4 mm. thick, attenuated upward, bulbous at the base, concolorous, powdery,

apex smooth; annulus membranous, apical, concolorous; spores white in mass, ovoid, smooth, 8–10 × 6–7.5 μ.

Hab. on cocoanut fibre of orchid bed in greenhouse. Summer to autumn, or all seasons. Ishikari (Sapporo).

Distr. Japan (Hokkaido), Europe, Ceylon?

Jap. name. *Kogane-kinukarakasatake* (n. n.).

15. *Lepiota pseudo-licmophora* REA

Brit. Basid. 74, 1922.

Lepiota licmophora (non B. et BR., SACC., nec PETCH) KAWAMURA, Ill. Jap. Fung. pl. 4, f. 20–23, 1912.

[SHIRAI, List Jap. Fung. ed. 2, 319, 1917; ed. 3, 186, 1927]

Solitary or gregarious. Pileus 2–4 cm. broad, conical, then campanulate, finally plane or slightly depressed, membranous, very thin; surface lemon-yellow, deep yellow or sometimes yellowish, radially plicate-sulcate nearly to the center, disc smooth, crests of the ridges of sulcations clothed with concolorous or darker colored flocci, margin crenate; lamellae remote, narrow, concolorous or slightly paler, distant; stipe 4–8 cm. or more long, 2–3 mm. thick, attenuated upward, concolorous, subglabrous or slightly furfuraceous, tomentose at the base, hollow; annulus median, subconcolorous, fugacious; spores white in mass, broadly ellipsoidal, 10–12.5 × 7.5–10 μ.

Hab. on the ground among the grass under trees or in hot houses. Summer. Teshio (Yakishiri Isl.).

Distr. Japan (Hokkaido, Honshu), Europe (England).

Jap. name. *Kitsune-no-hanagasa* (KAWAMURA).

Subgen. **Limacella** (EARLE) IMAI, nom. nov.

Limacella (ut gen.) EARLE, l. c. 1909.

Amanita § *Limacella* GILBERT, Genre Amanita, 158, 1918.

Pileus stipesque udo viscidus.

16. *Lepiota subglischra* IMAI, sp. nov.

Solitaria. Pileo 2.5–3.5 cm. lato, subumbonato dein expanso, umbonato, udo viscossissimo, flavido vel pallide aurantiaco, margine pallido, levi, glabro, cute facile separabili; velo viscido, concolori; carne grisea, carnosa, odore saporeque nullo; lamellis liberis, flavi-

dulis, confertis, 3 mm. latis; stipite 3.5–5.5 cm. longo, 3–5 mm. crasso, subaequali vel sursum liviter attenuato, supra annulam sicco albido, infra annulam cute viscida flavidula tecto, solido vel farcto; sporis in cumulo albis, globosis vel subglobosis, 3–4.5 μ.

Hab. on the ground in woods. Late summer. Ishikari (Sapporo).

Distr. Endemic.

Jap. name. *Numeri-karakasatake* (n. n.).

The present fungus is closely allied to *Lepiota glischra* MORG., from which it is distinguished by the brighter colored umbonate pileus. However, it may be only a form of this American species, and requires further critical studies on the relation between them.

Tribe **Armillarieae** IMAI, nom. nov.

Fructificatio juvenile vol universali fugacissime veloque partiali subpersistente tecto. Pileus cum stipite carnosi confluentus et homogeneus. Lamellae molles, carnosae, cum stipite adhaerentes. Sporae in cumulo albae.

Key to the genera.

1. Partial veil usually remaining as a subpersistent or persistent membranous annulus..... *Armillaria.*
2. Partial veil remaining as an arachnoidal, fugacious annulus on the stipe and as a submembranous veil on the margin of pileus..... *Cortinellus*

Armillaria (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 60 & 74, 1872.

Agaricus § *Armillaria* FR. Syst. Myc. I, 26, 1821.

Armillaria § *Armillariella* KARST. Hattsv. I, xii, 1879, p. p.

Armillariella KARST. Finl. Basidsv. 45, 1889, p. p.

Gyrophila § *Armillaria* QUÉL. Ench. Fung. 9, 1886.

Mucidula PAT. Hymen. Eur. 95, 1887.

Oudemansiella SPEG. emend. v. HÖHN. Sitzungsb. Kaiserl. Akad. Wiss. Wien, CXVII, Abt. I, 1007, 1908; Ibid. CXIX, Abt. 1, 885, 1910, p. p.

Chamaemyces BATT. ex EARLE, Bull. N. Y. Bot. Gard. V, 446, 1909.

Polymyces BATT. ex EARLE, Ibid. 447, 1909.

Sphaerocephalus BATT. ex EARLE, Ibid. 447, 1909.

Calathelasma LOVEJ. Bot. Gaz. L, 383, 1910.

Fructification with an annulus. Pileus fleshy, regular, confluent and homogeneous with the fleshy stipe. Stipe central or rarely excentric, fleshy. Partial veil remaining as a membranous, persistent or rarely fugacious, adnate annulus when matured. Universal veil very fugacious. Lamellae attached to the stipe, fleshy, soft. Spores white in mass.

Type species: *Agaricus* (*Armillaria*) *robustus* Al. et S. ex Fr.

Key to the subgenera and species in Hokkaido.

I. Stipe fleshy.
  A. Lamellae sinuato-adnexed..... Subgen. Verarmillaria.
    1. Fructification brown, large; stipe usually enlarged toward the base. ..... *A. Matsutake*(1).
    2. Fructification brown, medium in size; stipe usually attenuated at the base..... *A. caligata*(2).
  B. Lamellae attenuated behind, decurrent..... Subgen. Armillariella.
    1. Growing on wood.
      a. Stipe central; pileus honey-yellow to reddish or dark brown... ..... *A. mellea*(3).
      b. Stipe excentric; pileus white to avellaneous or yellowish; spores cylindrical oblong..... *A. corticata*(4).
      c. Stipe almost lateral; pileus variable in color; spores globose... ..... *A. japonica*(5).
    2. Growing on the ground; pileus whitish, yellowish or brownish; stipe ventricose..... *A. ventricosa*(6).

II. Stipe subcartilaginous external, rigid..... Subgen. Mucidula.
  A. Pileus white to yellowish, viscid when wet..... *A. mucida*(7).

Subgen. Verarmillaria Imai, nom. nov.

Agaricus § *Armillaria* § *Tricholomata annulata* Fr. Epicr. Myc. 20, 1838.

Stipes carnosus. Lamellae sinuato-adnexae.

1. *Armillaria Matsutake* S. Ito et Imai

Bot. Mag. (Tokyo), XXXIX, 327, 1925—Zeller & Togashi, Mycologia, XXVI, 545, cum 3 fig. 1934.

[Shirai, List Jap. Fung. ed. 3, 23, 1927—Matsuura & Kanada, Trans. Tottori Soc. Agr. Sci. III, 118, 1931]

Agaricus (*Armillaria*) *edodes* (non Berk.) Schroet. Gartenfl. XXXV, 135, 1886.

?*Armillaria edodes* P. HENN. in ENGLER & PR. Nat. Pflanzenfam. I, 1**, 270, 1897—KILLERM. Ibid. ed. 2, VI, 280, 1928.

Armillaria edodes P. HENN. Not. Königl. Bot. Gart. Mus. Berlin, II, 385, 1899; ENGLERS Bot. Jahrb. XXVIII, 270, 1901.

[SHIRAI, List Jap. Fung. 9, 1905; ed. 2, 51, 1917]

Cotrinellus edodes (non S. ITO et IMAI) P. HENN. Hedw. XXXIX, (156), 1900—KAWAMURA, Ill. Jap. Fung. pl. 8, f. 11–12, 1913.

[MATSUM. Ind. Pl. Jap. I, 137, 1904]

Armillaria caligata (non VIV.) HAR. et PAT. Bull. Mus. Hist. Nat. VIII, 132, 1902.

Solitary or gregarious, often forms a fairy ring, edible. Pileus 8–20 cm. or more broad, globose or hemiglobose, then convex to umbonate, finally plane; surface dry, covered with cinnamon-brown or chestnut-brown, appressed fibrous scales, usually continuous and darker at the center, margin paler, incurved and with brown or pallid woolly veil when young; context white, firm, thick, taste mild, odour pleasant and usually very strong; lamellae sinuate, white, then yellowish, broad, crowded, edge not entire; stipe 10–20 cm. or more long, 1.5–3 cm. or more thick, nearly equal or attenuated upward, usually enlarged at the base, covered with ochraceous-tawny to chestnut-brown, appressed fibrous scales below the annulus, white and mealy above the annulus, solid; annulus membranous, narrow, rarely cortinate, usually persistent as the remnant of the annulus, sometimes evanescent, superior, upper surface white, under surface subconconcolorous to the stipe; spores white in mass, broadly ellipsoidal or nearly oblong, hyaline, smooth, 6–7.5 × 5–6.5 μ.

Hab. on the ground in coniferous woods of *Pinus, Picea,* rarely in *Abies.* Autumn. Iburi (Lake side of Shikotsu), Kitami (Notoro forest).

Distr. Japan.

Jap. name. *Matsutake.*

2. *Armillaria caligata* (VIV.) GILL.

Hymen. Fr. 79, cum icone, 1874—SACC. Syll. Fung. V, 75, 1887; Fl. Ital. Crypt., Hymen. 102, 1915—BARLA, Champ. Alp. Marit. 34, pl. 18, f. 7–13, 1889—W. G. SM. Brit. Basid. 29, 1908—ROLLAND, Atlas Champ. 21, f. 21, 1910—KAUFFM. Agar. Mich. 650, pl. 137, 1918—REA, Brit. Basid. 106, 1922—KAWAMURA, Ill. Jap. Fung. pl. 18, f. 3–5, 1925—BRES. Icon. Myc. I, pl. 45, 1927.

[SHIRAI, List Jap. Fung. ed. 3, 23, 1927—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 118, 1931]

Agaricus caligatus VIV. Funghi Ital. 40, pl. 35, 1834–38.

Agaricus caussettus var. *guttatus* BARLA, Champ. Nice, 17, pl. 10, 1859.
Agaricus (*Armillaria*) *caligatus* FR. Hymen. Eur. 41, 1874—CKE. & QUÉL. Clavis Hymen. 7, 1878.
?*Gyrophila* (*Armillaria*) *rufa* QUÉL. Ench. Fung. 9, 1886.
Tricholoma caligatum RICKEN, Blätterp. 331, 1915.

Solitary or gregarious, edible. Pileus 4–10 cm. broad, convex then expanded; surface brown or chestnut-brown, covered with appressed, denticulate, darker squamules on the disc, margin paler and floccosely squamulose with white appendiculate veil; context white, firm, rather thick, odour not strong, taste mild or slightly bitterish; lamellae sinuate or adnexed with a decurrent tooth, white, crowded; stipe 5–10 cm. long, 1–2 cm. thick, nearly equal, but attenuated at the base, white and mealy above the annulus, concolorous and floccosely squamulose below the annulus, solid; annulus membranous, superior, white on the upper surface, concolorous and squamulose on the under surface, rather narrow; spores white in mass, short ellipsoidal or spherical-ovoid, 5–7 × 4–5 μ, smooth.

Hab. on the ground in coniferous woods. Autumn. Kushiro (Mt. Meakan).

Distr. Japan (Hokkaido, Honshu), Europe and North America.

Jap. name. *Matsutake-modoki* (KAWAMURA).

Subgen. **Armillariella** KARST.

l. c. 1879.
Agaricus § *Armillaria* § *Clitocybe annulatae* FR. Epicr. Myc. 22, 1838.

Stipe fleshy. Lamellae attenuate behind, decurrent.

3. **Armillaria mellea** (VAHL ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 75, 1872—GILL. Hymen. Fr. 83, cum icone, 1874—KARST. Hattsv. I, 21, 1879—SACC. Syll. Fung. V, 80, 1887; Fl. Ital. Crypt., Hymen. 94, 1915—BARLA, Champ. Alp. Marit. 38, pl. 21, 22, 1888—SCHROET. Pilze Schles. I, 668, 1889—MASS. Brit. Fung. Fl. III, 223, 1893—ATKINS. Mushrooms, ed. 2, 83, f. 85, 1903—W. G. SM. Brit. Basid. 30, 1908—KAWAMURA, Ill. Jap. Fung. pl. 6, f. 24–25, 1913—KAUFFM. Agar. Mich. 653, pl. 138–140, 1918—REA, Brit. Basid. 108, 1922.

[P. HENN. Hedw. XXXIX, (156), 1900—MATSUM. Ind. Pl. Jap. I, 131, 1904—SHIRAI, List Jap. Fung. 9, 1905; ed. 2, 51, 1917; ed. 3, 23, 1927—KAWAMURA, Bot. Mag. (Tokyo), XXIII, (166), f. 1, 1909]

Agaricus putridus SCOP. Fl. Carn. ed. 2, II, 420, 1772 (teste FR.).
Agaricus melleus VAHL, Fl. Dan. pl. 1013, 1792 (teste FR.).

Agaricus stipitis WITH. in SOW. Engl. Fung. pl. 101, 1797 (teste FR.).
Agaricus (*Lepiota*) *polymyces* PERS. Syn. Fung. 269, 1801 (teste FR.).
Agaricus (*Armillaria*) *melleus* FR. Syst. Myc. I, 30, 1821; Epicr. Myc. 22, 1838; Hymen. Eur. 44, 1874—BARLA, Champ. Nice, 18, pl. 11, f. 1–6, 1859—BERK. Outl. Brit. Fung. 96, pl. 4, f. 1, 1860—CORDA, Champ. Fr. II, 22, pl. 8, 1870—CKE. Ill. Brit. Fung. pl. 32, 1883—WINT. Die Pilze, I, 831, 1884.
Agaricus (*Armillaria*) *melleo-rubens* BERK. et CURT. Journ. Linn. Soc., Bot. X, 283, 1868.
Omphalia mellea QUÉL. Ench. Fung. 20, 1886.
Armillariella mellea KARST. Finl. Basidsv. 46, 1889.
Armillaria solidipes PK. Bull. Torrey Bot. Club, XXVII, 611, 1900.
Armillaria putrida MURRILL, North Amer. Fl. X, 39, 1914.
Clitocybe mellea RICKEN, Blätterp. 362, pl. 100, f. 1, 1915.
Lepiota mellea LANGE, Agar. Denm. II, 31, 1915.

Gregarious or caespitose, edible. Pileus 3.5–11 cm. broad, convex, then expanded to plane, occasionally slightly depressed at the center; surface pale-honey-yellow to tawny or bister, lighter on the margin, usually adorned with minute tufts of brown, blackish or light olivaceous colored hairs, that are more abundant on the center, usually dry, often slightly viscid when wet, striate on the margin; context white, whitish or yellowish, rather soft, taste and odour mild; lamellae adnate or decurrent by a tooth, moderately crowded; stipe 5–10 cm. long, 5–10 mm. thick, slightly attenuated upward, subbulbous at the base, up to 2 cm. thick, yellow, tawny or bister below, paler above, usually floccose scaly below the annulus, elastic, fibrous, nearly spongy within; annulus white or yellowish, cottony, rather thin, arachnoidal or submembranous, evanescent; spores white in mass, hyaline, ellipsoidal or nearly obovoid, $7.5 \times 5\,\mu$.

Hab. on the stumps and roots of trees of various kinds or on ground in fields, pastures or woods. Early summer to autumn. Oshima (Ônomura), Iburi (Chitose, Lake side of Shikotsu), Ishikari (Sapporo, Nopporo, Jôzankei, Mt. Kurodake), Tokachi (Lake side of Shikaribetsu), Kitami (Notoro forest, Oketo forest), Teshio (Otoineppu), Kushiro (Lake side of Kutcharo, Akan).

Distr. Japan (Hokkaido, Honshu), Asia Minor, Siberia, Europe, North America, Australia.

Jap. name. *Naratake* (KAWAMURA), *Hariganetake* (SHIRAI ex P. HENN.), *Kuritake* (SHIRAI).

4. *Armillaria corticata* (FR.) KARST.

Hattsv. I, 22, 1879—SCHROET. Pilze Schles. I, 668, 1889—KAUFFM. Agar. Mich. 655, 1918.

Agaricus dimidiatus SCHAEFF. Fung. Bavar. IV, Ind. 57, pl. 233, 1774.

Agaricus dryinus PERS. Syn. Fung. 478, 1801.

Agaricus (*Pleurotus*) *corticatus* FR. Syst. Myc. I, 179, 1821; Epicr. Myc. 129, 1838; Hymen. Eur. 166, 1874—CKE. Ill. Brit. Fung. pl. 290, 1883—WINT. Die Pilze, I, 739, 1884.

Agaricus (*Pleurotus*) *dryinus* FR. Ibid. I, 180, 1821; Epicr. Myc. 129, 1838; Hymen. Eur. 167, 1874—CKE. Ill. Brit. Fung. pl. 226, 1883—WINT. Die Pilze, I, 739, 1884.

Pleurotus corticatus QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 111, 1872—GILL. Hymen. Fr. 339, 1874—SACC. Syll. Fung. V, 339, 1887; Fl. Ital. Crypt., Hymen. 317, 1915—MASS. Brit. Fung. Fl. III, 364, 1893—RICKEN, Blätterp. 446, pl. 112, f. 5, 1915—REA, Brit. Basid. 441, 1922—LANGE, Agar. Denm. VIII, 25, 1830.

Pleurotus dryinus QUÉL. Ibid. 111, 1872; Ench. Fung. 146, 1886—GILL. Hymen. Fr. 340, 1874—SACC. Syll. Fung. V, 340, 1887—ATKINS. Mushrooms, ed. 2, 105, f. 109–110, 1903—RICKEN, Blätterp. 445, 1915—REA, Brit. Basid. 442, 1922.

Pleurotus corticatus var. *tephrotrichus* GILL. Hymen. Fr. 340, 1874—SACC. Syll. Fung. V, 340, 1887; Fl. Ital. Crypt., Hymen. 318, 1915—BRES. Icon. Myc. VI, pl. 277, 1928.

Armillaria corticata var. *tephrotricha* KARST. Hattsv. I, 23, 1879.

Armillaria dryina KARST. Ibid. 23, 1879—KAUFFM. Agar. Mich. 654, 1918.

Armillaria dimidiata SCHROET. Pilze Schles. I, 667, 1889.

Pleurotus dimidiatus MURRILL, North Amer. Fl. X, 35, 1914—SACC. Fl. Ital. Crypt., Hymen. 318, 1915.

Pleurotus corticatus var. *Albertinii* REA, Brit. Basid. 441, 1922.

Solitary or caespitose, edible. Pileus 5–20 cm. broad, convex, then expanded, obtuse or depressed, dimidiate to subcircular; surface dry, dull-white or grayish-white, sometimes tinged with yellowish color, finely flocculose at first, then the pellicle breaks up into scale-like areas or densely covered with gray or brownish-gray colored floccose scales, margin involute and appendiculate at first, then floccose; context white, thick, firm, odour slightly farinaceous, taste mild; lamellae deeply decurrent, anastomosing on the stipe, subdistant, white, then becoming yellowish, edge entire or slightly waved, rather broad; stipe excentric or nearly lateral, 2–12 cm. long, 1–3 cm. thick, subequal, radicate, stout, white or tinged with yellowish color, tomentose or floccose, firm, solid; annulus white, silky-floccose, moderately thick, soon becoming inconspicuous; spores white in mass, cylindrical-oblong, slightly curved and apiculate, 9–14 × 3.5–5 μ.

Hab. on wood in woods. Autumn. Ishikari (Jôzankei).

Distr. Japan (Hokkaido), Siberia, Europe, North America & Australia.

Jap. name. *Tsuba-hiratake* (n. n.).

5. *Armillaria japonica* (KAWAMURA) IMAI, comb. nov.

Pleurotus noctilucens (non LÉV.) INOKO, Mitteil. Med. Fac. Kaiserl. Jap. Univ. Tokyo, I, 210, 1889.

Pleurotus japonicus KAWAMURA, Journ. Coll. Sci. Imp. Univ. Tokyo, XXXV, (3), 2, pl. 1–2, 1915; Ill. Jap. Fung. pl. 18, f. 17–19, 1925.

[KAWAMURA, Bot. Mag. (Tokyo), XXIV, (278), 1910—YASUDA, Bot. Mag. (Tokyo), XXVIII, (356), 1914—SHIRAI, List Jap. Fung. ed. 2, 467, 1917; ed. 3, 285, 1927—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 116, 1931]

Caespitosely imbricate or gregarious, luminous, poisonous. Pileus 6–23 cm. broad, at first excentric, then almost lateral, at first sphaerical, then hemisphaerical or reniform, at first convex, then expanded to plane or slightly depressed; surface variable in color, when young orange-cinnamon and with ligulate squamules on the center and with fibrous squamules on the margin, then becoming somewhat paler, at length tinged with dark brown or dark purple colored spots and floccose-scaly which are distinct in the basal or central part and become smaller and less conspicuous toward the margin; context at first yellowish, then whitish, with a blackish tint at the stipe, thick, up to 2 cm. thick, taste none, odour at first none then somewhat foetid; lamellae yellow at first then whitish, broad, up to 2 cm. broad, at first long decurrent, at length sinuato-decurrent, adnato-decurrent or decurrent, often forked near the stipe and all ending abruptly in a line of the remnant of the partial veil in the upper part of stipe, or sometimes extending far down on the stipe in a line-like prominence, subdistant or somewhat crowded; stipe up to 2.5 cm. long and 3 cm. or more thick, at first excentric, then almost lateral, short, stout, firm, tough; annulus conspicuous when young, narrow thick membranous, remaining as a raised ring at the end of lamellae; spores white in mass or slightly tinged lilac, globose, 13–17 μ, smooth.

Hab. on dead beech and maple-trunks in woods. Autumn. Oshima (Ônomura), Iburi (Oshamambe), Ishikari (Mt. Soronuma).

Distr. Endemic.

Jap. name. *Tsukiyo-take* (KAWAMURA), *Kumabera* (KAWAMURA).

6. *Armillaria ventricosa* PK.

Bull. Torrey Bot. Club, XXXIV, 104, 1907—MURRILL, North Amer. Fl. X, 37, 1914—PATTERS. & CHARL. Mushrooms Comm. Fung. 12, pl. 9, 1915.

[KAWAMURA, Jap. Fung. no. 190, 1929—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 119, 1931]

Lentinus ventricosus PK. Bull. Torrey Bot. Club, XXIII, 414, 1896.

Armillaria gigantea YASUDA, Bot. Mag. (Tokyo), XXXII, (204), 1918, nom. seminud.; Ibid. XXXVI, 90, cum icone, 1922.

[SHIRAI, List Jap. Fung. ed. 3, 23, 1927]

Solitary or gregarious, edible. Pileus 8–20 cm. or more broad, convex, then expanded, obtuse; surface whitish, yellowish or brownish, sometimes brown in the center, smooth, slightly viscid when wet, glabrous or slightly silky fibrous especially on the margin, shining when dry, margin incurved and with white floccose veil when young; context white, fleshy, firm, taste mild, odour slight; lamellae long decurrent, white or yellowish, narrow, close, often forked; stipe 19–21 cm. or more long, 2–4 cm. thick, attenuated upward and downward, ventricose, subconcolorous, glabrous or slightly scaly or with drab-brown colored small patch-like scales just below the annulus, white and fibrous above the annulus, solid; annulus white or rarely faintly colored with yellow on the under surface, floccosely membranous, superior, subpersistent; spores white in mass, ellipsoidal, smooth, 9–11 × 5–6 μ.

Hab. on the ground in coniferous woods. Late summer to autumn. Ishikari (Mt. Soranuma), Kitami (Oketo forest), Kushiro (Akan).

Distr. Japan (South Saghalien, Hokkaido, Honshu), North America.

Jap. name. *Momitake* (KAWAMURA), *Sendai-samatsu* (YASUDA).

Subgen. **Mucidula** (PAT.) IMAI, nom. nov.

Agaricus § *Armillaria* § *Collybiae annulatae* FR. Epicr. Myc. 24, 1838.
Mucidula (ut gen.) PAT. l. c. 1887.
Chamaemyces BATT. in EARLE, l. c. 1909.
Oudemansiella SPEG. emend. v. HÖHN. l. c. 1910, p. p.

Stipes extus subcartilaginus.

7. *Armillaria mucida* (SCHRAD. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 75, 1872—GILL. Hymen. Fr. 77, cum icone, 1874—KARST. Hattsv. I, 24, 1879—SACC. Syll.

Fung. V, 85, 1887; Fl. Ital. Crypt., Hymen. 92, 1915—BARLA, Champ. Alp. Marit. 40, pl. 23, f. 4–8, 1889—MASS. Brit. Fung. Fl. III, 230, 1893—W. G. SM. Brit. Basid. 30, 1908—REA, Brit. Basid. 110, 1922.

[MATSUURA, Trans. Tottori Soc. Agr. Sci. II, 135, 1930; Ibid. III, 119, 1931]

Agaricus valens SCOP. Fl. Carn. ed. 2, II, 430, 1772 (teste FR.).

Agaricus mucidus SCHRAD. Spic. Fl. Germ. 116, 1794 (teste FR.).

Agaricus (Armillaria) mucidus FR. Syst. Myc. I, 28, 1821; Epicr. Myc. 24, 1838; Hymen. Eur. 46, 1874—CKE. Ill. Brit. Fung. pl. 16, 1883—WINT. Die Pilze, I, 829, 1884.

Collybia mucida QUÉL. Ench. Fung. 27, 1886—RICKEN, Blätterp. 401, pl. 106, f. 5, 1915—LANGE, Agar. Denm. II, 15, 1915.

Mucidula mucida PAT. Hymen. Eur. 95, 1887.

Lepiota mucida SCHROET. Pilze Schles. I, 671, 1889.

Chamaemyces mucida EARLE, Bull. N. Y. Bot. Gard. V, 446, 1909.

Oudemansiella mucida V. HÖHN. Sitzungsb. Kaiserl. Akad. Wiss. Wien, CXIX, Abt. I, 885, 1910—BRES. Icon. Myc. XII, pl. 600, 1929.

Gregarious or solitary, edible. Pileus 4–10 cm. broad, hemispherical, then convex, at length plane, slightly depressed at the center; surface white, light pinkish-cinnamon, light-buff or cartridge-buff at the center, viscid when wet, slightly pruinose with silky shining when dry, smooth, glabrous, with easily separable pellicle, margin incurved at first, slightly striate when matured; context white, thick, odour and taste pleasant; lamellae white or yellowish, adnate or decurrent by a tooth, very broad, distant; stipe 3–12 cm. long, 3–8 mm. thick, attenuated upward, white, silky, grayish or yellowish and striate below, rigid, subcartilaginous, solid; annulus white or yellowish, persistent but very rarely fugacious, superior; spores white in mass, globose, hyaline, 16–21 μ, mostly 18 μ; cystidia very rarely present, scattered, fusiform, 200 × 50 μ.

Hab. on decayed wood in woods. Summer to autumn. Ishikari (Jôzankei, Nopporo), Iburi (Lake side of Shikotsu).

Distr. Japan (Hokkaido, Honshu, Kyushu), Asia Minor, Europe, and North America.

Jap. name. *Numeritsubatake* (IMAI).

Cortinellus ROZE

Bull. Soc. Bot. Fr. XXIII, 51 et 113, 1876—KARST. Hattsv. I, xii, 1879—MURRILL, North Amer. Fl. X, 32, 1914.

Monomyces BATT. ex EARLE, Bull. N. Y. Bot. Gard. V, 442, 1909.

Fructification with fugacious floccose partial veil and sometimes in early stage with very fugacious universal veil. Pileus fleshy, regular, confluent and homogeneous with the fleshy stipe. Stipe central or excentric, fleshy. Universal veil very fugacious. Partial veil remaining as a floccose or arachnoidal veil or annulus, but usually disappearing when old. Lamellae attached to the stipe. Spores white in mass.

Type species: *Tricholoma vaccinum* (SCHAEFF. ex FR) QUÉL.

Key to the species in Hokkaido.

I. Growing on dead wood.
  A. Pileus brown or dark brown..... *C. edodes*(1).
  B. Pileus dark-red or purple..... *C. rutilans*(2).
  C. Pileus yellow or yellowish..... *C. decorus*(3).

II. Growing on the ground.
  A. Pileus white, whitish, grayish, yellowish or fuscous.
    1. Pileus whitish or grayish, adpressedly floccose or floccosely squamulose..... *C. scalpturatus*(4).
    2. Pileus white, rarely grayish, silky fibrillose, satiny shining..... *C. columbetta*(5).
    3. Pileus whitish or yellowish with numerous blackish squamules..... *C. squarrulosus*(6).
    4. Pileus gray, grayish-brown or fuscous, blackish at the center, innate fibrillose or fibrillose-squamulose..... *C. terreus*(7).
  B. Pileus some shade of brown or reddish brown.
    1. Stipe enlarged at the base but not bulbous; context becoming rufous when bruised.
      a. Stipe hollow..... *C. vaccinus*(8).
      b. Stipe solid..... *C. imbricatus*(9).
    2. Stipe bulbous at the base; context not changed in color..... *C. bulbiger*(10).

1. *Cortinellus edodes* (BERK.) S. ITO et IMAI (non P. HENN.)

Journ. Soc. Agr. Forest. Sapporo, XVII, 161, 1925; Bot. Mag. (Tokyo), XXXIX, 325, 1925—SAWADA, Trans. Nat. Hist. Soc. Formosa, XXVI, 264, 1936.

Agaricus (Armillaria) edodes BERK. Journ. Linn. Soc., Bot. XVI, 50, 1878.

Collybia Schiitake SCHROET. Gartenfl. XXXV, 105, 1886.

Armillaria edodes SACC. Syll. Fung. V, 79, 1887.

Lepiota Shiitake TANAKA, Bot. Mag. (Tokyo), III, (159), 1889.

Cortinellus Shiitake P. HENN. Not. Königl. Bot. Gart. Mus. Berlin, II, 385, 1899; in ENGLERS Bot. Jahrb. XXVIII, 270, 1901—SHIRAI, in MATSUM. & MIYOS. Crypt. Jap. Icon. Ill. III, pl. 46, 1900—KAWAMURA, Ill. Jap. Fung. pl. 10, f. 1–4, 1914.

[KUSANO, Bot. Mag. (Tokyo), XIV, (225), 1900—MATSUM. Ind. Pl. Jap. I, 137, 1904—SHIRAI, List Jap. Fung. 26, 1905; ed. 2, 177, 1917—UMEMURA, Bot. Mag. (Tokyo), XXVI, (152), 1912; Pl. Fujiyama. 366, 1923—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 118, 1931]

Tricholoma Shiitake RAMSB. Handb. Larger Brit. Fung. 73, 1923.

Shitaker cortinellus LLOYD, Myc. Notes, No. **71**, 1266, 1924.

Cortinellus Berkeleyanus S. ITO et IMAI, Journ. Soc. Agr. Forest. Sapporo, XVII, 161, 1925; Bot. Mag. (Tokyo), XXXIX, 326, pl. 6, 1925.

[SHIRAI, List Jap. Fung. ed. 3, 104, 1927]

Gregarious, edible. Pileus 4–20 cm. or more broad, convex, then plane, sometimes slightly depressed at the center, margin incurved at first, at length upturned; surface light brown or blackish brown, darker at the center, with dark colored scales, often provided with irrgeular, more or less reticulated deep fissures, whitish or light buff colored tomentose on the margin in young stage, in maturity the remnant of veil present on the peripheral part, about 5 mm. apart from the margin; context white, often becoming brownish, thick, fleshy, taste pleasant, odour slight but becoming very strong with drying; lamellae fleshy, white, but occasionally becoming blackish brown on old or wounded portions, rather broad, edge entire or slightly wavy, moderately crowded, generally sinuate; stipe 3–10 cm. long, 8–20 mm. thick, equal or slightly attenuated downward, rarely bulbous at the base, generally central, but often becoming excentric by the position of substratum, whitish or dull yellowish, fibrous externally, in young stage covered with woolly tomentum of the remnant of the annulus, often with partial fissures transversally, solid, fibrous within; annulus woolly, conspicuous when young, then evanescent, not membranous; veil conspicuous in young stage; spores white in mass, ellipsoidal, smooth, 5–7 × 3.5–4 μ; cystidia present on the edge of lamella, broadly clavate or capitate, 9–14 μ wide, colourless, contents granular.

Hab. on the trunks of various kinds of trees. Late spring to autumn. All over the Island of Hokkaido.

Distr. Japan and China.

Jap. name. *Shiitake* (BERKELEY).

The present writer, in cooperation with Prof. ITO, detected and reported in 1925 that the scientific name of "Shiitake" should be

called *Cortinellus edodes* deriving from *Agaricus edodes* BERK., but unfortunately P. HENNINGS had erroneously used its name for "Matsutake" owing to the misidentification by SCHROETER putting too much weight on the incomplete brief diagnosis of BERKELEY without examining the type specimen, and thus it seems needful to propose the new name *C. Berkeleyanus* in order to avoid confusion with *C. edodes* of P. HENNINGS for the Matsutake.

However, according to Article 54 of the International Rules of Botanical Nomenclature, edition 3, published in 1935, it is beyond question that the name of "Shiitake" is naturally *C. edodes* (BERK.) S. ITO et IMAI (not P. HENNINGS), and *C. Shiitake* and other are synonyms, as well as that *Armillaria edodes* P. HENN. and *Cortinellus edodes* P. HENN. for "Matsutake" should be discarded.

2. *Cortinellus rutilans* (SCHAEFF. ex FR.) KARST.

Hattsv. I, 24, 1879—MURRILL, North Amer. Fl. X, 33, 1914.

Agaricus variegatus SCOP. Fl. Carn. ed. 2, II, 434, 1772.

Agaricus rutilans SCHAEFF. Fung. Bavar. IV, Ind. 51, pl. 219, 1774 (teste FR.).

Agaricus xerampellinus SOW. Engl. Fung. pl. 31, 1797 (teste FR.).

Agaricus (Tricholoma) rutilans FR. Syst. Myc. I, 41, 1821; Epicr. Myc. 30, 1838; Hymen. Eur. 53, 1874—CKE. Ill. Brit. Fung. pl. 89, 1883—WINT. Die Pilze, I, 825, 1884—SCHROET. Pilze Schles. I, 663, 1889.

Agaricus (Tricholoma) variegatus FR. Epicr. Myc. 31, 1838; Hymen. Eur. 53, 1874.

Tricholoma rutilans QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 78, 1872—GILL. Hymen. Fr. 103, cum icone, 1874—KARST. Finl. Basidsv. 52, 1889—SACC. Syll. Fung. V, 96, 1887; Fl. Ital. Crypt., Hymen. 124, 1915—MASS. Brit. Fung. Fl. III, 188, 1893—ROLLAND, Atlas Champ. 24, f. 32, 1910—KAWAMURA, Ill. Jap. Fung. pl. 8, f. 6–7, 1913—RICKEN, Blätterp. 343, pl. 91, f. 1, 1915—KAUFFM. Agar. Mich. 689, 1918—REA, Brit. Basid. 219, 1922—BRES. Icon. Myc. II, pl. 69, 1927.

[MATSUM. Ind. Pl. Jap. I, 177, 1904—SHIRAI, List Jap. Fung. 100, 1905; ed. 2, 667, 1917; ed. 3, 398, 1927—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 118, 1931]

Gregarious, caespitose or solitary, edible. Pileus 4–23 cm. broad, campanulate, then convex, finally flattened and slightly depressed at the center, sometimes umbonate; surface dry, yellow, densely covered with granular, reddish-brown colored downy scales, denser and darker at the center, margin at first involute; context yellow, moderately thick, taste mild, odour none; lamellae yellow, variable in

attachment to the stipe, narrow, thin, crowded, edge sulphur-yellow colored flocculose and minutely serrulate; stipe 5–14 cm. long, 5–30 mm. thick, attenuated upward or subequal, curved, often excentric, light yellow or yellow, besprinkled with concolorous minute tomentose scales or subglabrous, yellow and hollow within; spores white in mass, globose, subglobose or subellipsoidal, 5–8 × 4–7 μ, smooth.

Hab. on dead wood in woods. Autumn. Oshima (Ônomura), Ishikari (Nopporo, Sapporo), Iburi (Lake side of Shikotsu), Kushiro (Lake side of Akan).

Distr. Japan (Hokkaido, Honshu), Asia Minor, Europe, North America and Australia.

Jap. name. *Samatsumodoki* (KAWAMURA).

3. *Cortinellus decorus* (FR.) KARST.

Hattsv. I, 25, 1879—MURRILL, North Amer. Fl. X, 33, 1914.

Agaricus flavovirens FR. Obs. Myc. I, 25, 1815 (teste FR.).

Agaricus (*Clitocybe*) *decorus* FR. Syst. Myc. I, 108, 1821.

Agaricus (*Pleurotus*) *decorus* FR. Epicr. Myc. 130, 1838; Hymen. Eur. 168, 1874—WINT. Die Pilze, I, 739, 1884.

Agaricus (*Tricholoma*) *multipunctus* PK. 25 Rep. N. Y. State Mus. 73, 1873.

Clitocybe decora GILL. Hymen. Fr. 171, 1874—KAUFFM. Agar. Mich. 724, 1918.

Tricholoma decorum QUÉL. Champ. Jura Vosg. 11 Suppl. 3, 1882—KARST. Finl. Basidsv. 52, 1889—REA, Brit. Basid. 219, 1922.

Gyrophila decora QUÉL. Ench. Fung. 11, 1886.

Tricholoma multipunctum SACC. Syll. Fung. V, 96, 1887.

Pleurotus decorus SACC. Syll. Fung. V, 342, 1887; Fl. Ital. Crypt., Hymen. 320, 1915—A. L. SM. & REA, Trans. Brit. Myc. Soc. II, 128, pl. 10, 1905—RICKEN, Blätterp. 448, 1915.

Gregarious, subcaespitose or solitary, edible. Pileus 3–6 cm. or more broad, convex, then expanded, depressed at the center, rather strongly incurved at the margin; surface moist, yellow, sometimes tinged with brownish or olivaceous colors, covered with dense, innate, fibrillose, minute, blackish or brownish scales, disc usually darker; context yellowish, rather thin, odour mild, taste mild or bitterish; lamellae adnate with a decurrent tooth or adnate, yellow, not change in color, crowded; stipe 3–6.5 cm. long, 4–7 mm. thick, equal or slightly enlarged toward the base, subconcolorous, then darker at the base, innately silky fibrillose, hollow; spores white in mass, broadly ellipsoidal, 5–6 × 4–5 μ.

Hab. on dead wood in woods. Summer to autumn. Ishikari (Sapporo, Nopporo, Mt. Kurodake), Kushiro (Lake side of Akan), Tokachi (Lake side of Shikaribetsu), Kitami (Oketo forest).

Distr. Japan (Hokkaido, Honshu), Asia Minor, Europe and North America.

Jap. name. *Ki-samatsumodoki* (n. n.).

4. *Cortinellus scalpturatus* (FR.) KARST.

Hattsv. I, 27, 1879.

Agaricus (*Tricholoma*) *scalpturatus* FR. Epicr. Myc. 31, 1838; Hymen. Eur. 55, 1874—BERK. Outl. Brit. Fung. 101, 1860—CKE. Handb. Brit. Fung. I, 24, 1871—WINT. Die Pilze, I, 823, 1884.

Tricholoma scalpturatum QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 232, 1872—GILL. Hymen. Fr. 104, 1874—SACC. Syll. Fung. V, 100, 1887; Fl. Ital. Crypt., Hymen. 123, 1915—MASS. Brit. Fung. Fl. III, 191, 1893—RICKEN, Blätterp. 337, pl. 92, f. 2, 1915—REA, Brit. Basid. 222, 1922—BRES. Icon. Myc. II, pl. 74, 1927.

Gregarious, edible. Pileus 3–8 cm. broad, conical or convex, then expanded to subumbonate or nearly plane; surface dry, whitish or grayish, darker at the center, becoming light drab, adpressedly floccose or floccosely squamulose, margin fibrillosely tomentose, white; context white or whitish, taste and odour mild; lamellae emarginate, adnexed or adnate, crowded, white or grayish white, becoming yellow or spotted with yellow, ventricose; stipe 3–7 cm. long, 4–10 mm. thick, equal or unequal, either thickened or attenuated at the base, whitish, adpressedly fibrillose, usually with a ring-like floccosely white mycelial swelling at the upper part of the stipe, solid; spores white in mass, ellipsoidal, 5–7 × 3–4 μ.

Hab. on humus ground in woods. Autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido), Europe.

Jap. name. *Akuge-shimeji* (n. n.).

5. *Cortinellus columbetta* (FR.) KARST.

Hattsv. I, 26, 1879.

Agaricus (*Tricholoma*) *columbetta* FR. Syst. Myc. I, 44, 1821; Epicr. Myc. 32, 1838; Hymen. Eur. 55, 1874—CKE. Ill. Brit. Fung. I, pl. 48, 1883—WINT. Die Pilze, I, 823, 1884—SCHROET. Pilze Schles. I, 663, 1889.

Tricholoma columbetta QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 78, pl. 2, f. 2, 1872—GILL. Hymen. Fr. 101, cum icone, 1874—

SACC. Syll. Fung. V, 99, 1887; Fl. Ital. Crypt., Hymen. 120, 1915—MASS. Brit. Fung. Fl. III, 190, 1893—ROLLAND, Atlas Champ. 26, f. 36, 1910—RICKEN, Blätterp. 336, pl. 89, f. 1, 1915—KAUFFM. Agar. Mich. 692, 1918—REA, Brit. Basid. 221, 1922—BRES. Icon. Myc. II, pl. 71, 1927.

Gyrophila (*Tricholoma*) *columbetta* QUÉL. Ench. Fung. 12, 1886.

Gregarious or solitary, edible. Pileus 3–10 cm. broad, convex, then expanded, subumbonate or plane, obtuse; surface pure white, rarely tinged with grayish or mouse-color, satiny-shining, dry, glabrous at first, then silky fibrillose or innately scaly, margin at first incurved and tomentose; context white, rather thin, taste and odour mild; lamellae sinuate or almost free, white, not changing in color, close, rather broad, often waved and transversely split at the edge; stipe 5–10 cm. long, 7–15 mm. thick, equal or unequal, not bulbous at the base, white, shining, fibrous externally or fibrillosely-striate, often longitudinally cracked, sometimes besprinkled with a remnant of a veil, solid; spores white in mass, subovate or broadly ellipsoidal, 6–7 × 4–5 μ.

Hab. on the ground in woods. Autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido), Europe and North America.

Jap. name. *Shiro-ke-shimeji* (n. n.).

6. *Cortinellus squarrulosus* (BRES.) IMAI, comb. nov.

Tricholoma squarrulosum BRES. Fung. Trid. II, 47, pl. 152, 1898; Icon. Myc. II, pl. 80, 1927—SACC. Syll. Fung. XVI, 21, 1902; Fl. Ital. Crypt., Hymen. 128, 1915—A. L. SM. & REA, Trans. Brit. Myc. Soc. II, 62, pl. 4, f. 1, 1904—W. G. SM. Brit. Basid. 36, 1908—ROLLAND, Atlas Champ. 25, f. 34, 1910—REA, Brit. Basid. 225, 1922.

Solitary or scattered, edible. Pileus 4–8 cm. broad, convex, then expanded, subumbonate; surface dry, whitish or yellowish in the ground color, besprinkled with numerous, blackish squamules, that become fuscous over the surface of pileus, squamules adhere with each other and are dense on the center, that give black color, margin floccose scaly and paler in color; context whitish or grayish, odour and taste none; lamellae almost free, white, 5–6 mm. broad, crowded; stipe 4–10 cm. long, 6–10 mm. thick, gradually enlarged toward the base, and subbulbous at the base, up to 1.5 cm. thick, concolorous, covered with blackish or fuscous, rather fibrous squamules, stuffed or slightly hollow; spores white in mass, pip-shaped or ellipsoidal, 7–9 × 4–5 μ, with a large central gutta.

Hab. on the ground in woods. Autumn. Ishikari (Nopporo).
Distr. Japan (Hokkaido), Europe.
Jap. name. *Kuroge-shimeji* (n. n.).

7. *Cortinellus terreus* (SCHAEFF. ex FR.) KARST.

Hattsv. I, 29, 1879.

Agaricus terreus SCHAEFF. Fung. Bavar. IV, Ind. 28, pl. 64, 1774 (teste FR.)—SOW. Engl. Fung. pl. 76, 1797 (teste FR.).

Agaricus argyraceus BULL. Champ. Fr. pl. 423, f. 1, pl. 513, f. 2, 1791 (teste FR.).

Agaricus (Tricholoma) terreus FR. Epicr. Myc. 34, 1838; Hymen. Eur. 57, 1874—WINT. Die Pilze, I, 821, 1884—SCHROET. Pilze Schles. I, 662, 1889.

Tricholoma terreum QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 79, 1872—GILL. Hymen. Fr. 100, cum icone, 1874—SACC. Syll. Fung. V, 104, 1887; Fl. Ital. Crypt., Hymen. 129, 1915—BARLA, Champ. Alp. Marit. 49, pl. 36, f. 1–13, 1890—MASS. Brit. Fung. Fl. III, 195, 1893—RICKEN, Blätterp. 339, pl. 92, f. 4, 1915—KAUFFM. Agar. Mich. 696, pl. 149, 1918—REA, Brit. Basid. 223, 1922—BRES. Icon. Myc. II, pl. 75, 1927—LANGE, Agar. Denm. IX, 21, 1933.

Cortinellus multiformis MURRILL, North Amer. Fl. X, 34, 1914.

Gregarious or subcaespitose, edible. Pileus 3–8 cm. broad, convex-campanulate, then expanded to umbonate; surface dry, gray, grayish-brown or fuscous, black at the center, innately fibrillose to fibrillose-squamulose, not striate; context white, tinged with gray near pellicle, rather thin, odour farinaceous, taste mild; lamellae emarginate or adnexed, crowded, rather broad, white, then grayish; stipe 4–8 cm. long, 7–15 mm. thick, equal, white, whitish or gray, floccosely fibrillose, apex white and pruinose, solid or fibrous-stuffed; spores white in mass, broadly ellipsoidal, 5–6 × 4–5 μ, smooth.

Hab. on the ground in woods. Late summer to autumn. Iburi (Lake side of Shikotsu).

Distr. Japan (Hokkaido), Europe and North America.

Jap. name. *Kuma-shimeji* (n. n.).

8. *Cortinellus vaccinus* (SCHAEFF. ex FR.) ROZE

Bull. Soc. Bot. Fr. XXIII, 113, 1876—KARST. Hattsv. I, 28, 1879—SCHROET. Pilze Schles. I, 667, 1889—MURRILL, North Amer. Fl. X, 35, 1914.

Agaricus vaccinus SCHAEFF. Fung. Bavar. IV, Ind. 13, pl. 25, 1774—PERS. Syn. Fung. 293, 1801.

Agaricus (Tricholoma) vaccinus FR. Syst. Myc. I, 42, 1821; Epicr. Myc. 33, 1838; Hymen. Eur. 56, 1874—CKE. Ill. Brit. Fung. pl. 60, 1883—WINT. Die Pilze, I, 822, 1884.

Agaricus (*Tricholoma*) *inodermeus* FR. Monogr. Hymen. Suec. I, 66, 1857; Hymen. Eur. 57, 1874.

Tricholoma vaccinum QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 79, 1872—GILL. Hymen. Fr. 97, cum icone, 1874—SACC. Syll. Fung. V, 102, 1887; Fl. Ital. Crypt., Hymen. 127, 1915—MASS. Brit. Fung. Fl. III, 191, 1893—ROLLAND, Atlas Champ. 23, f. 28, 1910—RICKEN, Blätterp. 340, pl. 90, f. 4, 1915—KAUFFM. Agar. Mich. 693, 1918—REA, Brit. Basid. 222, 1922—BRES. Icon. Myc. II, pl. 73, 1927.

Gyrophila (*Tricholoma*) *vaccina* QUÉL. Ench. Fung. 12, 1886.

Tricholoma inodermeum SACC. Syll. Fung. V, 103, 1887.

Gregarious, edible. Pileus 3–8 cm. broad, conical to campanulate, then expanded to umbonate; surface dry, cinnamon-rufous to dark reddish brown, lighter toward the margin, densely covered with adpressed fibrillose scales, disc adpressedly fibrillose, margin at first involute and light ochraceous-salmon colored woolly tomentose; context rather thin except the disc, at first white, becoming tinged with rufous hues when bruised, taste mild or astringentish, odour faint; lamellae adnate then sinuate, somewhat distant, pallid or yellowish, then rufescent in age or when bruised; stipe 5–8 cm. long, 6–15 mm. thick, equal or subequal, somewhat irregular, thickened and fusiformly attenuated at the base, fibrillose, white or whitish and mealy above, reddish-brown below, rufescent when bruised, stuffed at first, then hollow; spores white in mass, subglobose or broadly ellipsoidal, 6–8 × 4–6 μ, usually with a central gutta.

Hab. on the ground in woods, especially of conifers. Autumn. Oshima (Ônomura), Ishikari (Jôzankei, Nopporo), Kushiro (Lake side of Akan).

Distr. Japan (Hokkaido, Honshu), Europe and North America.

Jap. name. *Kuda-akage-shimeji* (n. n.).

9. *Cortinellus imbricatus* (FR.) KARST.

Hattsv. I, 27, 1879.

Agaricus (*Tricholoma*) *imbricatus* FR. Syst. Myc. I, 42, 1821; Epicr. Myc. 33, 1838; Hymen. Eur. 56, 1874—BERK. Outl. Brit. Fung. 99, pl. 4, f. 3, 1860—CKE. Ill. Brit. Fung. pl. 199, 1883—WINT. Die Pilze, I, 822, 1884—SCHROET. Pilze Schles. I, 662, 1889.

Tricholoma imbricatum QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 79, 1872—GILL. Hymen. Fr. 99, cum icone, 1874—SACC. Syll. Fung. V, 101, 1887; Fl. Ital. Crypt., Hymen. 127, 1915—RICKEN, Blätterp. 341, pl. 90, f. 1, 1915—KAUFFM. Agar. Mich. 693, 1918—REA, Brit. Basid. 222, 1922—BRES. Icon. Myc. II, pl. 72, 1927.

Gregarious or solitary, edible. Pileus 5–10 cm. broad, broadly convex, then expanded, obtuse or subumbonate; surface dry, brownish-red or pale reddish-umber, innately fibrilloso-squamulose, lacerately scaly on the center, margin thin, at first incurved and pubescent, then naked; context white, often becoming light red when bruised, firm, compact, thick, taste and odour mild; lamellae sinuate or adnexed, crowded, white or yellowish, then changing to reddish in age or rufescent-spotted; stipe 4–8 cm. long, 1–2 cm. thick, equal or subequal, sometimes ventricose or attenuated at the base, concolorous, white-furfuraceous at the apex, subfibrillose, solid at first, finally stuffed; spores white in mass, broadly ellipsoidal, 5–7 × 4–5 μ.

Hab. on the ground in coniferous and mixed woods. Autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido), Europe and North America.

Jap. name. *Akage-shimeji* (n. n.).

10. *Cortinellus bulbiger* (ALB. et SCHW. ex FR.) GILL.

Hymen. Fr. pl. (non in script.)—PAT. Essai Tax. 161, 1900—KONR. et MAUBL. Icon. Sel. Fung. II, pl. 108, 1924.

Agaricus bulbiger ALB. et SCHW. Consp. Lusat. 151, 1805 (teste FR.).

Agaricus (Armillaria) bulbiger FR. Syst. Myc. I, 27, 1821; Epicr. Myc. 20, 1838; Hymen. Eur. 40, 1874—CKE. Ill. Brit. Fung. pl. 20, 1883—WINT. Die Pilze, I, 833, 1884.

Armillaria bulbigera QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 231, 1872—GILL. Hymen. Fr. 80, 1874—SACC. Syll. Fung. V, 73, 1887; Fl. Ital. Crypt., Hymen. 102, 1915—SCHROET. Pilze Schles. I, 670, 1889—MASS. Brit. Fung. Fl. III, 225, 1893—REA, Brit. Basid. 105, 1922.

Gyrophila (Armillaria) bulbigera QUÉL. Ench. Fung. 9, 1886.

Tricholoma bulbigerum RICKEN, Blätterp. 331, pl. 87, f. 1, 1915.

Solitary or scattered, edible. Pileus 5–10 cm. broad, convex then expanded to nearly plane; surface dry, ochraceous-tawny, darker at the center, paler on the margin, nearly smooth, provided with whitish squamuloso-fibrillose fragments of veil; context white, fleshy, thick, taste and odour none; lamellae white, becoming brownish when dry, adnexed or sinuate-adnexed, moderately crowded, broad; stipe 4–8 cm. long, 8–15 mm. thick, equal but bulbous at the base, whitish or grayish, floccose above the annulus, fibrous below the annulus, solid; annulus white or grayish, somewhat inconspicuous, fibrous, fugacious, not membranous; spores whitish or light ochraceous in

mass, ellipsoidal or subobovate, 6.5–8.5 × 5 μ, with a large central gutta.

Hab. on the ground in woods, especially under conifers. Autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido), Europe.

Jap. name. *Hida-hoteitake* (IMAI).

Tribe **Trichotomateae** IMAI, nom. nov.

Tricholomées KONR. et MAUBL. Icon. Sel. Fung. 29 & 297, 1924–35, p. p.

Fructificatio juvenile velis universali partialique fugacissimis raro tecta vel nulla. Pileus cum stipite carnosi confluentus et homogeneus. Lamellae molles, carnosae, cum stipite adhaerentes. Sporae in cumulo albae vel raro leviter incarnatae.

Key to the genera.

I. Lamellae not becoming white powdery when dried.
  1. Lamellae sinuate, emarginate or adnexed..... *Tricholoma.*
  2. Lamellae decurrent, adnato-decurrent by a tooth..... *Clitocybe.*

II. Lamellae becoming white powdery when dried, adnexed or decurrent..... ..... *Laccaria.*

Tricholoma (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D' Emul. Montb. 2 sér. V, 61 & 76, 1872.

Agaricus § *Tricholoma* FR. Syst. Myc. I, 36, 1821.

Gyrophila § *Tricholoma* QUÉL. Ench. Fung. 10, 1886.

Melaleuca PAT. Hymen. Eur. 96, 1887.

Melanoleuca PAT. Tax. Hymen. 159, 1900.

Glutinaster EARLE, Bull. N. Y. Bot. Gard. V, 433, 1909.

Micromphale MURRILL, North Amer. Fl. IX, 307, 1916, p. p.

Fructification without volva and annulus. Pileus fleshy, regular, confluent and homogeneous with the fleshy stipe. Stipe central, fleshy. Universal veil adnate, very fugacious. Lamellae fleshy, sinuate, emarginate or adnexed, rarely varying to adnate, rarely separable from the context of pileus. Spores white in mass or rarely sordid white.

Type species: *Agaricus* (*Tricholoma*) *equestris* L. ex FR.

Key to the subgenera, sections and species in Hokkaido.

I. Stipe usually central, fibrous-fleshy; pileus fibrillose, dry, or more or less viscid, not hygrophanous..... Subgen. Eutricholoma.
  A. Pileus more or less viscid, innate fibrillose or squamulose..... Sect. Limacina.
    1. Lamellae not changing color.
      a. Pileus yellowish, sulphur-olive or olivaceous, smooth or subsquamose; lamellae bright yellow..... *T. equestre*(1).
      b. Pileus light yellow, streaked with innate fuscous fibrils; lamellae whitish, slightly tinged with yellow.. *T. sejunctum*(2).
    2. Lamellae changing color, generally with reddish spots.
      a. Pileus brown or chestnut, streaked with innate fibrils; growing in coniferous woods..... *T. albobrunneum*(3).
      b. Pileus bay-brown or rufescent, granulate or guttato-spotted; growing in coniferous woods..... *T. pessundatum*(4).
    3. Lamellae changing color, from purplish to brownish..... *T. porphyrophillum*(5).
  B. Pileus punctato-granulate or broken up into glabrous squamules when dry..... Sect. Rigida.
    1. Lamellae white or pallid, not spotted; pileus blackish, rigid..... *T. cartilagineum*(6).
  C. Pileus fleshy, soft, fragile, spotted or rivulose..... Sect. Guttata.
    1. Vernal; pileus whitish, ochraceous or yellowish; stipe glabrous, usually enlarged at the base; lamellae whitish.. *T. gambosum*(7).
    2. Occurs in summer to autumn; pileus whitish; stipe fuscous-verrucose..... *T. verrucipes*(8).
  D. Pileus tenaceous, glabrous, even; lamellae sinuate, adnexed or subdecurrent; fructification often caespitose..... Sect. Aggregata.
    1. Pileus whitish, grayish or blackish, white pruinose..... *T. conglobatum*(9).
    2. Pileus blackish, usually tigrinous, white pruinose..... *T. humosum*(10).

II. Stipe usually central, more or less subcartilaginous; pileus hygrophanous; spores white in mass..... Subgen. Melaleuca.
  A. Fructification usually large; pileus sayal-brown; stipe whitish, striate. ..... *T. grammopodium*(11).
  B. Fructification usually medium size; pileus fuliginous or avellaneous; stipe white..... *T. melaleucum*(12).

III. Stipe usually central; pileus usually dry; spores slightly tinged with rose hue in mass or whitish..... Subgen. Rhodopaxillus.
  A. Fructification usually large; pileus somewhat violaceous, soon fading to tan-color or whitish; lamellae violaceous soon fading; stipe usually subbulbous at the base..... *T. personatum*(13).
  B. Fructification usually of medium size, violaceous, then fading; lamellae blue or pale-lilac, then fading..... *T. nudum*(14).

IV. Stipe usually excentric or subcentral, truncigenous; pileus dry or moist, glabrous; spores white in mass..... Subgen. Micromphale.
1. Pileus glabrous, whitish, grayish, yellowish or brownish, often marbled with rounded livid spots..... *T. ulmarium*(15).

Subgen. **Eutricholoma** LANGE emend. IMAI

Tricholoma § *Eutricholoma* LANGE Agar. Denm. IX, 8, 1933, p. p.

Pileus fibrillosus, siccus vel viscidus, non hygrophanus. Stipes fibrilloso-carnosus. Sporae in cumulo albae.

Sect. **Limacina** (FR.) IMAI, nom. nov.

Agaricus § *Tricholoma* § *Tricholomata limacina* FR. Syst. Myc. I, 36, 1821.

Pileus viscidus, innato-fibrillosus vel squamulosus.

1. *Tricholoma equestre* (L. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 76, 1872—GILL. Hymen. Fr. 94, cum icone, 1874—KARST. Hattsv. I, 30, 1879—SACC. Syll. Fung. V, 87, 1887; Fl. Ital. Crypt., Hymen. 113, 1915—BARLA, Champ. Alp. Marit. 41, pl. 24, f. 1–12, 1890—MASS. Brit. Fung. Fl. III, 177, 1893—W. G. SM. Brit. Basid. 32, 1908—MURRILL, Mycologia, I, 2, pl. 1, f. 3, 1909—ROLLAND, Atlas Champ. 22, f. 24, 1910—KAWAMURA, Ill. Jap. Fung. pl. 7, f. 26–28, 1913—RICKEN, Blätterp. 335, pl. 90, f. 3, 1915—KAUFFM. Agar. Mich. 682, 1918—REA, Brit. Basid. 215, 1922—BRES. Icon. Myc. II, pl. 53, 1927—LANGE, Agar. Denm. IX, 16, 1933.

[SHIRAI, List Jap. Fung. ed. 2, 665, 1917; ed. 3, 397, 1927—UMEMURA, Pl. Fujiyama. 371, 1923—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 117, 1931]

Agaricus equestris L. Sp. Pl. 1173, 1753 (teste FR.).

Agaricus aureus SCHAEFF. Fung. Bavar. IV, Ind. 19, pl. 41, 1774 (teste FR.).

Agaricus (*Gymnopus*) *flavovirens* PERS. Syn. Fung. 319, 1801 (teste FR.).

Agaricus (*Tricholoma*) *equestris* FR. Elench. Fung. I, 6, 1828; Epicr. Myc. 26, 1838; Hymen. Eur. 48, 1874—BERK. Outl. Brit. Fung. 97, pl. 4, f. 2, 1860—CKE. Ill. Brit. Fung. pl. 72, 1883—WINT. Die Pilze, I, 829, 1884—SCHROET. Pilze Schles. I, 666, 1889.

Gyrophila (*Tricholoma*) *equestris* QUÉL. Ench. Fung. 10, 1886.

Melanoleuca equestris MURRILL, North Amer. Fl. X, 24, 1914.

Gregarious or subcaespitose, edible. Pileus 5–10 cm. broad, convex, then expanded to subumbonate; surface viscid when wet, pale yellow or lemon-yellow, besprinkled with reddish or fuscous squamules

especially on the center, margin even, naked; context whitish, tinged with yellow under the pellicle, odour almost none, taste at first farinaceous, then unpleasant; lamellae sinuate or nearly free, crowded, sulphur-yellow, rather broad, ventricose; stipe 5–10 cm. long, 1–2 cm. thick, equal or subbulbous at the base, white, pale-yellow or sulphur-yellow, squamulose or nearly glabrous, solid, then stuffed or nearly hollow; spores white in mass, 6–8 × 4–5 μ, ellipsoidal, smooth.

Hab. on the ground in coniferous or mixed woods. Autumn. Oshima (Ônomura).

Distr. Japan (Hokkaido, Honshu), Europe, North America.

Jap. name. *Kishimeji* (KAWAMURA).

2. *Tricholoma sejunctum* (SOW. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 76, 1872—GILL. Hymen. Fr. 96, cum icone, 1874—KARST. Hattsv. I, 31, 1879—SACC. Syll. Fung. V, 88, 1887; Fl. Ital. Crypt., Hymen. 113, 1915—MASS. Brit. Fung. Fl. III, 178, 1893—ATKINS. Mushrooms, ed. 2, 88, f. 89, 1903—W. G. SM. Brit. Basid. 32, 1908—ROLLAND, Atlas Champ. 22, f. 26, 1910—RICKEN, Blätterp. 335, pl. 89, f. 2, 1915—KAUFFM. Agar. Mich. 683, 1918—REA, Brit. Basid. 215, 1922—LANGE, Agar. Denm. IX, 16, 1933.

Agaricus sejunctus SOW. Engl. Fung. pl. 126, 1799 (teste FR.).

Agaricus leucozanthus PERS. Syn. Fung. 319, 1801 (teste FR.).

Agaricus (Tricholoma) sejunctus FR. Syst. Myc. I, 47, 1821; Epicr. Myc. 26, 1838; Hymen. Eur. 48, 1874—CKE. Ill. Brit. Fung. pl. 53, 1883—WINT. Die Pilze, I, 828, 1884—SCHROET. Pilze Schles. I, 666, 1889.

Gyrophila (Tricholoma) sejcunta QUÉL. Ench. Fung. 10, 1886.

Melanoleuca sejuncta MURRILL, North Amer. Fl. X, 25, 1914.

Gregarious or subcaespitose, edible. Pileus 4–10 cm. broad, conical or convex, then expanded to umbonate; surface subviscid when wet, streaked with innate brown or blackish fibrils, varying from whitish or yellowish to olivaceous or smoky-brownish; context white or faintly yellowish, fragile, odour and taste subfarinaceous; lamellae sinuate or emarginate, white with yellow tint, usually broad, subdistant, fragile; stipe 5–10 cm. long, 1–2 cm. thick, equal or variously thickened and flexuous, white or yellowish, subglabrous, solid; spores white in mass, globose or subglobose, smooth, 6 × 4 or 5 μ.

Hab. on the ground in woods. Late summer to autumn. Ishikari (Nopporo, Mt. Kurodake), Iburi (Lake side of Shikotsu).

Distr. Japan (Hokkaido, Honshu), Europe and North America.
Jap. name. *Ai-shimeji* (IMAI).

3. *Tricholoma albobrunneum* (PERS. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 77, 1872—GILL. Hymen. Fr. 93, cum icone, 1874—KARST. Hattsv. I, 34, 1879—SACC. Syll. Fung. V, 93, 1887—BARLA, Champ. Alp. Marit. 44, pl. 27, f. 7–11, 1890—MASS. Brit. Fung. Fl. III, 184, 1893—W. G. SM. Brit. Basid. 34, 1908—ROLLAND, Atlas Champ. 23, f. 29, 1910—RICKEN, Blätterp. 333, pl. 88, f. 4, 1915—REA, Brit. Basid. 218, 1922.

Agaricus striatus SCHAEFF. Fung. Bavar. IV, Ind. 18, pl. 38, 1774 (teste FR.).

Agaricus (*Cortinaria*) *albobrunneus* PERS. Syn. Fung. 293, 1801 (teste FR.).

Agaricus (*Tricholoma*) *albobrunneus* FR. Syst. Myc. I, 37, 1821; Epicr. Myc. 29, 1838; Hymen. Eur. 51, 1874—CKE. Ill. Brit. Fung. pl. 197, 1883—WINT. Die Pilze, I, 826, 1884.

Gyrophila (*Tricholoma*) *albobrunnea* QUÉL. Ench. Fung. 11, 1886.

Agaricus (*Tricholoma*) *striatus* SCHROET. Pilze Schles. I, 665, 1889.

Tricholoma striatum SACC. Fl. Ital. Crypt., Hymen. 118, 1915—LANGE, Agar. Denm. IX, 15, 1933.

Gregarious or solitary, edible. Pileus 3.5–7 cm. broad, conical to convex, then subumbonate; surface viscid when wet, rufous-brown or nearly chestnut color, margin paler, streaked with innate fibrils; context white, firm, tinged with brown under pellicle; taste mild, odour faint; lamellae sinuate or emarginate, rather crowded, white, becoming pale or rufescent with age, broad, firm; stipe 4–8 cm. long, 1–2 cm. thick, equal, dry, apex white-mealy, rufescent-striate below; solid; spores white in mass, subglobose or ovate-ellipsoidal, 4–6 × 3–4 μ, smooth, hyaline.

Hab. on the ground in woods, especially under *Pinus*. Autumn. Ishikari (Sapporo).

Distr. Japan (Hokkaido, Honshu), Europe.

Jap. name. *Matsu-shimeji* (n. n.).

4. *Tricholoma pessundatum* (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 77, 1872—GILL. Hymen. Fr. 92, cum icone, 1874—KARST. Hattsv. I, 34, 1879—SACC. Syll. Fung. V, 94, 1887; Fl. Ital. Crypt., Hymen. 117, 1915—BARLA, Champ. Alp. Marit. 45, pl. 28, f. 9–11, 1890—MASS. Brit. Fung. Fl. III, 184, 1893—W. G. SM. Brit. Basid. 34, 1908—ROLLAND, Atlas Champ. 26, f. 39, 1910—RICKEN, Blätterp. 333, pl. 88, f. 1, 1915—REA, Brit. Basid. 218, 1922—BRES. Icon. Myc. II, pl. 65, 1927.

Agaricus (*Tricholoma*) *pessundatus* FR. Syst. Myc. I, 38, 1821; Epicr. Myc. 29, 1838; Hymen. Eur. 52, 1874—WINT. Die Pilze, I, 826, 1884—SCHROET. Pilze Schles. I, 664, 1889.

Gregarious, edible. Pileus 6–12 cm. broad, convex, then expanded, subumbonate, finally plane or slightly depressed at the center; surface with separable viscid pellicle, testaceous to vinaceous-russet at the center, margin paler to light vinaceous-cinnamon or buff-pink, granulate with minute black dots especially on the center; context white, rather soft, taste bitterish, odour subfarinaceous; lamellae deeply emarginate, somewhat free, white, then spotted with orange-cinnamon, mikado-brown or snuff-brown color, crowded; stipe 5–8 cm. long, 1–2 cm. thick, enlarged or bulbous at the base, white, covered with small brownish granules, solid; spores white in mass, subglobose, about 5 ×4 μ.

Hab. on the ground in woods, especially under *Abies*. Autumn. Ishikari (Jôzankei).

Distr. Japan (Hokkaido, Honshu) and Europe.

Jap. name. *Ô-kaki-shimeji* (n. n.).

5. *Tricholoma porphyrophyllum* IMAI, sp. nov.

Gregarium vel subcaespitosum. Pileo 5.5–15 cm. lato, convexo, dein expanso, plano, viscidulo vel uvido, fulvo vel subcastaneo, levi, margine pallidiori, undulato; carne tenui, fragili; odore saporeque blando; lamellis sinuatis, subatropurpureis, dein discoloratibus, demum fulvidulis, subangustis, confertissimis; stipite 4.5–15 cm. longo, 6–25 mm. crasso, aequali vel deorsum subbulboso, albido, flavido vel fulvulo, fibrilloso, e farcto cavo, radice loriformi praedito; sporis in cumulo albis, subquadrangularibus, plus minusve cruciformibus vel subtriangularibus, 6–7.5 × 4.5–6 μ.

Hab. on the ground in woods or under trees. Summer to autumn. Ishikari (Nopporo, Sapporo).

Distr. Endemic.

Jap. name. *Ura-murasaki-shimeji* (n. n.).

The present fungus is closely allied to *Tricholoma goniospermum* BRES. from which it is distinguishable in the darker colored, thin and fragile pileus, and in the rather longer hollow stipe. It is also somewhat related to *T. sordidum* FR., of BRESADOLA's sense, in which *Agaricus calathus* FR. and *Agaricus cyanopheus* GONN. et RAB. are included, but it is easily distinguished by the shape of spores, because those of the latter species are described subcylindrical and smooth.

Sect. Rigida (Fr.) Imai, nom. nov.

Agaricus § *Tricholoma* § *Tricholomata rigida* Fr. Epicr. Myc. 35, 1838.

Pilei pellicula rigida punctato-granulata vel siccitate in squamulas glabras diffracta, non viscosa.

6. *Tricholoma cartilagineum* (Fr.) Quél.

Champ. Jura Vosg. II, in Mém. Soc. D'Emul. Montb. 2 sér. V, 339, 1873—Gill. Hymen. Fr. 109, cum icone, 1874—Karst. Hattsv. I, 37, 1879—Sacc. Syll. Fung. V, 107, 1887—Barla, Champ. Alp. Marit. 53, pl. 39, f. 6–10, 1890—Rea, Brit. Basid. 226, 1922.

Agaricus (*Tricholoma*) *cartilagineus* Fr. Epicr. Myc. 36, 1838; Hymen. Eur. 60, 1874—Berk. Outl. Brit. Fung. 101, 1860.

Clitocybe cartilaginea var. *Friesii* Sacc. Fl. Ital. Crypt., Hymen. 182, 1915.

Caespitose, edible. Pileus 3.5–10 cm. broad, convex, then expanded, gibbous, undulated; surface fuscous-black or clove-brown (blackish), often mixed in here and there with avellaneous or wood-brown spots, blackly dotted from the pellicle breaking up into minute black granules, margin almost parmanently incurved, pubescent at first; context thin, whitish at first, at length brownish, fragile, taste and odour pleasant; lamellae sinuate, broadly adnexed or almost free, white then gray or yellowish, finally darkening from the edge, crowded, 6–10 mm. broad, edge waved or minutely toothed; stipe 3–15 cm. long, 5–12 mm. thick, slightly attenuated upward or nearly equal with a slightly enlarged or somewhat rooting base, grayish white, then subconcolorous, darker at the base, subcartilaginous, furfuraceous at the apex, flocculose or coarsely villous at the base, solid or stuffed; spores white in mass, broadly ellipsoidal, smooth, 5–6 × 3–4 μ.

Hab. on the ground or around rotting wood or stumps in woods. Autumn. Ishikari (Nopporo, Jôzankei).

Distr. Japan (Hokkaido, Honshu), Europe.

Jap. name. *Kuro-shimeji* (n. n.).

Sect. Guttata (Fr.) Imai, nom. nov.

Agaricus § *Tricholoma* § *Tricholomata guttata* Fr. Epicr. Myc. 43, 1838.

Pileus carnosus, fragilis, guttato-maculosus rivulosusve.

7. *Tricholoma gambosum* (FR.) GILL.

Hymen. Fr. 116, cum icone, 1874—KARST. Hattsv. I, 45, 1879—SACC. Syll. Fung. V, 120, 1887; Fl. Ital. Crypt., Hymen. 141, 1915—BARLA, Champ. Alp. Marit. 54, pl. 41, f. 1–7, 1890—MASS. Brit. Fung. Fl. III, 208, 1893—W. G. SM. Brit. Basid. 40, 1908—REA, Brit. Basid. 232, 1922—LANGE, Agar. Denm. IX, 28, 1933.

[KAWAMURA, Jap. Fung. no. 237, 1929]

Agaricus Georgii L. Sp. Pl. 1173, 1753.

Agaricus mouceron BULL. Champ. Fr. pl. 142, 1791.

Agaricus graveolens SOW. Engl. Fung. pl. 281, 1803 (teste FR.).

Agaricus (*Tricholoma*) *gambosus* FR. Syst. Myc. I, 50, 1821; Epicr. Myc. 43, 1838; Hymen. Eur. 66, 1874—BERK. Outl. Brit. Fung. 104, pl. 4, f. 5, 1860—CKE. Handb. Brit. Fung. I, 31, 1871; Ill. Brit. Fung. pl. 63, 1883—WINT. Die Pilze, I, 814, 1884—SCHROET. Pilze Schles. I, 659, 1889.

Agaricus (*Tricholoma*) *Georgii* FR. Epicr. Myc. 43, 1838; Hymen. Eur. 67, 1874—WINT. Die Pilze, I, 814, 1884.

Agaricus (*Tricholoma*) *albellus* FR. Epicr. Myc. 43, 1838; Hymen. Eur. 67, 1874—WINT. Die Pilze, I, 814, 1884.

Tricholoma Georgii QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 81, 1872—SACC. Syll. Fung. V, 120, 1887—BARLA, Champ. Alp. Marit. 55, pl. 41, f. 8–11, 1890—ROLLAND, Atlas Champ. 25, f. 35, 1910—RICKEN, Blätterp. 350, pl. 95, f. 2, 1915—REA, Brit. Basid. 232, 1922.

Tricholoma albellum QUÉL. Ibid. 81, 1872—KARST. Hattsv. I, 45, 1879—SACC. Syll. Fung. V, 121, 1887; Fl. Ital. Crypt., Hymen. 142, 1915—BARLA, Champ. Alp. Marit. 55, pl. 41, f. 12–17, 1890—REA, Brit. Basid. 233, 1922.

Gyrophila (*Tricholoma*) *Georgii* QUÉL. Ench. Fung. 15, 1886.

Tricholoma Mouceron SACC. Fl. Ital. Crypt., Hymen. 140, 1915.

Gregarious or caespitose, edible. Pileus 4–12 cm. broad, hemispaerical, then convex to gibbous or nearly plane; surface white, whitish-gray, yellowish, yellowish-gray or ochraceous, undulate, smooth, subglabrous or subfloccose, margin incurved and subtomentose at first or almost naked; context white, thick, firm, odour farinaceous, taste mild; lamellae sinuate, white, then faintly yellowish, 3–6 mm. wide, ventricose, crowded; stipe 5–10 cm. long, 1–2 cm. thick, equal but enlarged at the base, white, then faintly yellowish, silky-fibrillose, apex white flocculose, solid; Spores white in mass, subellipsoidal, 5–6 × 3–4 μ.

Hab. on the ground in woods or under trees. Early summer. Ishikari (Sapporo).

Distr. Japan (Hokkaido, Honshu), China, Europe.

Jap. name. *Yukiwari* (KAWAMURA).

8. *Tricholoma verrucipes* (FR.) QUÉL.

Fl. Myc. 272, 1888—SACC. Fl. Ital. Crypt., Hymen. 141, 1915—RICKEN, Blätterp. 330, 1915—BRES. Icon. Myc. II, pl. 68, 1927.

Armillaria verrucipes FR. apud QUÉL. Champ. Jura Vosg., 1 Suppl., in Mém. Soc. D'Emul. Montb. 2 sér. V, 317, 1872; Ibid. II, in l. c., V, pl. 2, f. 1, 1873—SACC. Syll. Fung. V, 78, 1887.

Agaricus (*Armillaria*) *verrucipes* FR. Hymen. Eur. 43, 1874—WINT. Die Pilze, I, 832, 1884.

Gyrophila (*Armillaria*) *verrucipes* QUÉL. Ench. Fung. 10, 1886.

Gregarious or solitary, rarely subcaespitose, edible. Pileus 3–14 cm. broad, at first subconical, then expanded to umbonate or plane, at length slightly depressed at the center, but with a small umbo; surface milk-white, finally often yellowish, silky, glabrous or very slightly flocculose, rarely cracked scaly, margin incurved, shortly villous and uneven; context white, thick, odour farinaceous, taste mild; lamellae sinuate or sinuato-adnexed, rarely adnate with a little decurrent tooth, crowded, white, finally dingy-yellowish; stipe 4–13 cm. long, 4–15 mm. thick, almost equal but with enlarged base, white, often longitudinally sulcate, silky fibrillose, verrucose with blackish dot-like warts, solid; spores white in mass, ellipsoidal, verruculose, not smooth, 8.5–10 × 5 μ.

Hab. on humus ground in woods or under trees. Summer to autumn. Ishikari (Sapporo).

Distr. Japan (Hokkaido), Europe.

Jap. name. *Tsubu-e-no-shimeji* (n. n.).

Sect. Aggregata KONR. et MAUBL.

Icon. Sel. Fung. 304, 1935.

Pileus tenaceous, glabrous, even. Lamellae sinuate, adnexed or subdecurrent. Fructifications often caespitose.

9. *Tricholoma conglobatum* (VITT.) SACC.

Syll. Fung. V, 126, 1887—BARLA, Champ. Alp. Marit. 56, pl. 42, f. 8–15, 1890—RICKEN, Blätterp. 360, 1915.

[P. HENN. Hedw. XXXIX, (156), 1900—MATSUM. Ind. Pl. Jap. I, 177, 1904—SHIRAI, List Jap. Fung. 100, 1905; ed. 2, 665, 1917; ed. 3, 397, 1927—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 117, 1931]

Agaricus conglobatus VITT. Fung. Mang. 349, 1835—FR. Epicr. Myc. 46, 1838; Hymen. Eur. 69, 1874—WINT. Die Pilze, I, 814, 1884—SCHROET. Pilze Schles. I, 660, 1889.

Clitocybe conglobata BRES. Fung. Trid. I, 27, pl. 32, 1883—SACC. Fl. Ital. Crypt., Hymen. 181, 1915—REA, Brit. Basid. 279, 1922—LANGE, Agar. Denm. VIII, 59, 1930.

Tricholoma Shimeji KAWAMURA, Ill. Jap. Fung. pl. 13, f. 8–10, 1915.

Caespitose or gregarious, edible. Pileus 5–10 cm. broad, convex, then expanded, plane or slightly depressed; surface at first drab, olive-brown or blackish, then fading to avellaneous or drab at the center, paler on the margin, smooth, dry, but nearly viscid or hygrophanous in rainy weather, margin at first involute, thin and white pruinose, finally irregular and lobed; context white, fleshy, fragile, then tough, taste mild, odour faint; lamellae sinuate or adnate, sometimes with a decurrent tooth, whitish, then cream colored, crowded, narrow; stipe 5–10 cm. long, 1–2 cm. thick, equal or thickened toward the base, at first conspicuously bulbous, often connate at the tuberous base, white or grayish, floccosely pulverulent, then smooth, solid; spores white in mass, globose, slightly rough, 4–6 μ.

Hab. on the ground in woods. Autumn. Ishikari (Teinemura).

Distr. Japan (Hokkaido, Honshu), Europe, North America and Siberia.

Jap. name. *Shimeji* (KAWAMURA).

10. *Tricholoma humosum* (FR.) IMAI, comb. nov.

Agaricus (*Clitocybe*) *humosus* FR. Epicr. Myc. 66, 1838; Hymen. Eur. 92, 1874.

Clitocybe humosus QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 87, 1872—GILL. Hymen. Fr. 163, 1874—SACC. Syll. Fung. V, 162, 1887.

Caespitose or gregarious, edible. Pileus 3–10 cm. broad, convex then plane, gibbous, sometimes slightly umbonate, either circinate and regular or flexuose and undulate; surface light drab or drab to chaetura-drab when young, then discolered to drab or nearly cinnamon-buff at the center, often with powdery appearance to the naked eye, but under lens slightly silky adpressedly villose, margin shortly striate and grayish powdery but under lens it is silky adpressedly villose; context white, not blackening when touched or bruised, odour subfarinaceous or almost none, taste mild, firm, subcartilaginous;

lamellae adnexed, sinuate or decurrent, white, crowded, thin, rather narrow; stipe 5–10 cm. long, 1–2.5 cm. thick, equal or slightly enlarged or rarely slightly attenuated at the base, whitish or smoky-gray, nearly fibrous, apex white and pruinose, often whitish furfuraceous all over the surface, subcartilaginous, firm, solid; spores white in mass, globose, smooth, 6–7 μ.

Hab. on humus ground in woods or under trees or rarely on roadsides. Summer to autumn. Ishikari (Sapporo).

Distr. Japan (Hokkaido), Europe.

Jap. name. *Usuzumi-shimeji* (n. n.).

The identification of this fungus has been confused because of the related species. BRESADOLA formerly considered the present species as identical with *Agaricus conglobatus* VITT. and later with *Ag. cinerascens* BULL. KONRAD and MAUBLANC treated it as a synonym of *Ag. aggregatus* SCHAEFF. The specimens at hand answer very well to the description given by FRIES, except that they have a larger pileus.

Subgen. Melaleuca (PAT.) IMAI, nom. nov.

Melaleuca (ut gen.) PAT. l. c. 1887.
Melanoleuca (ut gen.) PAT l. c. 1900.

Pileus hygrophanus. Stipes leviter subcartilaginus. Sporae albae, verruculosae.

11. *Tricholoma grammopodium* (BULL. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 83, 1872—GILL. Hymen. Fr. 129, 1874—KARST. Hattsv. I, 51, 1879—SACC. Syll. Fung. V, 133, 1887; Fl. Ital. Crypt., Hymen. 154, 1915—BARLA, Champ. Alp. Marit. 60, pl. 46, f. 1–7, 1890—RICKEN, Blätterp. 354, pl. 96, f. 3, 1915—REA, Brit. Basid. 239, 1922—BRES. Icon. Myc. III, pl. 124, 1927—LANGE, Agar. Denm. IX, 32, 1933.

Agaricus grammopodius BULL. Champ. Fr. pl. 548, 1791 (teste FR.).

Agaricus (*Clitocybe*) *grammopodius* FR. Syst. Myc. I, 93, 1821—BERK. in SMITH, Brit. Fl. V, (2), 37, 1836.

Agaricus (*Tricholoma*) *grammopodius* FR. Epicr. Myc. 50, 1838; Hymen. Eur. 74, 1874—WINT. Die Pilze, I, 810, 1884.

Gyrophila (*Tricholoma*) *grammopodia* QUÉL. Ench. Fung. 17, 1886.

Solitary or gregarious, edible. Pileus 7–15 cm. broad, campanulate, then convex, at length flattened, obtusely umbonate; surface

smooth, moist, pellicle separable, sayal-brown, darker (verona-brown) at the center, margin incurved at first; context whitish, thick, spongy, taste none, odour farinaceous or mouldy; lamellae adnate with a decurrent tooth, adnexed or sinuate, whitish, then becoming brownish, very crowded, broad, edge wavy or denticulate, often branched behind; stipe 7–10 cm. long, 1–2 cm. thick, equal, but enlarged or subbulbous at the base, whitish, longitudinally striate with bister or brownish fibrils, elastic, firm, stuffed; spores white in mass, broadly ellipsoidal, verruculose, 7–8 × 5–6 μ.

Hab. on the ground in woods. Autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido), Europe.

Jap. name. *Ô-zarami-no-shimeji* (n. n.).

12. *Tricholoma melaleucum* (PERS. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 83, 1872—GILL. Hymen. Fr. 128, cum icone, 1874—KARST. Hattsv. I, 52, 1879—SACC. Syll. Fung. V, 134, 1887; Fl. Ital. Crypt., Hymen. 155, 1915—BARLA, Champ. Alp. Marit. 60, pl. 46, f. 8–15, 1890—MASS. Brit. Fung. Fl. III, 218, 1893—W. G. SM. Brit. Basid. 43, 1908—RICKEN, Blätterp. 355, pl. 93, f. 4, 1915—KAUFFM. Agar. Mich. 713, 1918—REA, Brit. Basid. 239, 1922—BRES. Icon. Myc. III, pl. 125, 1927—LANGE, Agar. Denm. IX, 32, 1933.

[P. HENN. in ENGLERS Bot. Jahrb. XXXII, 41, 1903—MATSUM. Ind. Pl. Jap. I, 177, 1904—SHIRAI, List Jap. Fung. 100, 1905; ed. 2, 665, 1917; ed. 3, 397, 1927]

Agaricus melaleucus PERS. Syn. Fung. 355, 1801 (teste FR.).

Agaricus (*Clitocybe*) *melaleucus* FR. Syst. Myc. I, 114, 1821.

Agaricus (*Tricholoma*) *melaleucus* FR. Epicr. Myc. 51, 1838; Hymen. Eur. 74, 1874—CKE. Ill. Brit. Fung. pl. 119, 1883—WINT. Die Pilze, I, 809, 1884—SCHROET. Pilze Schles. I, 658, 1889.

Gyrophila (*Tricholoma*) *melaleuca* QUÉL. Ench. Fung. 17, 1886.

Solitary or scattered, edible. Pileus 3–10 cm. broad, convex, then expanded, umbonate or nearly plane, depressed around the small umbo; surface hygrophanous, fuliginous when moist, fading (avellaneous) when dry, disc slightly darker, glabrous, margin incurved when young, usually entire; context white, thin, soft, odour very slightly farinaceous, taste mild; lamellae emarginate-adnexed, white, then tinged with yellowish tint, very crowded, rather narrow, waved on edge; stipe 4–10 cm. long, 4–10 mm. thick, cylindrical, equal, but usually subbulbous at the base, white and furfuraceous above, fuliginously fibrillose below, darker at the base, slightly fading when dry,

elastic, stuffed; spores white in mass, ellipsoidal, finly echinulate, 7.5–10 × 5–6 μ.

Hab. on the ground in woods. Autumn. Ishikari (Sapporo, Mt. Kurodake), Kushiro (Lake side of Akan), Iburi (Lake side of Shikotsu).

Distr. Japan (Hokkaido, Honshu), Europe, North America and Australia.

Jap. name. *Ko-zarami-no-shimeji* (n. n.).

Subgen. **Rhodopaxillus** (R. MAIRE) IMAI, nom. nov.

Rhodopaxillus (ut gen.) R. MAIRE, Ann. Myc. XI, 338, 1913.

Sporae in cumulo subincarnatae. Lamellae a carne pilei leviter separabiles.

13. *Tricholoma personatum* (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 82, 1872—GILL. Hymen. Fr. 119, cum icone, 1874—KARST. Hattsv. I, 50, 1879—SACC. Syll. Fung. V, 130, 1887; Fl. Ital. Crypt., Hymen. 149, 1915—BARLA, Champ. Alp. Marit. 58, pl. 45, f. 1–5, 1890—MASS. Brit. Fung. Fl. III, 215, 1893—ATKINS. Mushrooms, ed. 2, 87, f. 87–88, 1903—W. G. SM. Brit. Basid. 42, 1908—ROLLAND, Atlas Champ. 24, f. 30, 1910—KAWAMURA, Ill. Jap. Fung. pl. 6, f. 7–8, 1913—RICKEN, Blätterp. 352, pl. 95, f. 3, 1915—KAUFFM. Agar. Mich. 707, 1918—REA, Brit. Basid. 236, 1922—LANGE, Agar. Denm. IX, 30, 1933.

[YASUDA, Bot. Mag. (Tokyo), XXV, (442), 1911—SHIRAI, List Jap. Fung. ed. 2, 665, 1917]

Agaricus bicolor PERS. Syn. Fung. 281, 1801 (teste FR.)—SCHROET. Pilze Schles. I, 658, 1889.

[P. HENN. Hedw. XXXIX, (156), 1904—MATSUM. Ind. Pl. Jap. I, 176, 1904—SHIRAI, List Jap. Fung. 100, 1905; ed. 2, 665, 1917; ed. 3, 397, 1927—YASUDA, Bot. Mag. (Tokyo), XXV, (442), 1911]

Agaricus (*Tricholoma*) *personatus* FR. Syst. Myc. I, 50, 1821; Epicr. Myc. 48, 1838; Hymen. Eur. 72, 1874—BERK. Outl. Brit. Fung. 105, pl. 5, f. 1, 1860—WINT. Die Pilze, I, 810, 1884.

Lepista personata CKE. Handb. Brit. Fung. I, 193, 1871.

Rhodopaxillus personatus R. MAIRE, Ann. Myc. XI, 338, 1913.

Gregarious or solitary, edible. Pileus 10–15 cm. broad, convex, then plane, at length depressed at the center; surface reddish-drab, pale salmon color or whitish, moist in wet weather, opaque when dry, pruinose, smooth, margin whitish, incurved at first; context white,

tinged with light violet color, compact, then spongy, thick, taste mild, odour not strong; lamellae sinuate or broadly adnexed, violaceous, then light grayish violet, crowded; stipe 7–10 cm. long, 1.5–3 cm. thick, nearly equal, bulbous at the base, whitish, tinged with light violet color, covered with evanescent fibrils, solid; spores white or faintly drab colored, ellipsoidal, mostly ventricose, 6–9 × 4.5–6 μ, mostly 9 × 4.5 μ.

Hab. on the ground in woods. Autumn. Ishikari (Sapporo, Nopporo), Kushiro (Mt. Meakan), Kitami (Oketo forest), Oshima (Ôno-mura).

Distr. Japan (Hokkaido, Honshu), Siberia, Europe, North America and Australia.

Jap. name. *Ô-murasaki-shimeji* (KAWAMURA).

14. *Tricholoma nudum* (BULL. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 82, 1872—GILL. Hymen. Fr. 120, cum icone, 1874—KARST. Hattsv. I, 50, 1879—SACC. Syll. Fung. V, 131, 1887; Fl. Ital. Crypt., Hymen. 148, 1915—MASS. Brit. Fung. Fl. III, 216, 1893—W. G. SM. Brit. Basid. 43, 1908—ROLLAND, Atlas Champ. 24, f. 31, 1910—RICKEN, Blätterp. 352, pl. 95, f. 4, 1915—KAUFFM. Agar. Mich. 709, 1918—REA, Brit. Basid. 237, 1922—LANGE, Agar. Denm. IX, 30, 1933.

Agaricus nudus BULL. Champ. Fr. pl. 439, 1791 (teste FR.).

Agaricus (*Tricholoma*) *nudus* FR. Syst. Myc. I, 52, 1821; Epicr. Myc. 48, 1838; Hymen. Eur. 72, 1874—BERK. Outl. Brit. Fung. 105, pl. 4, f. 7, 1860—KICKX, Fl. Crypt. Flandr. II, 141, 1867—WINT. Die Pilze, I, 810, 1884—SCHROET. Pilze Schles. I, 658, 1889—CKE. Handb. Austr. Fung. 13, 1892.

Lepista nuda CKE. Handb. Brit. Fung. I, 192, 1871.

Rhodopaxillus nudus R. MAIRE, Ann. Myc. XI, 338, 1913.

Gregarious, subcaespitose or solitary, edible. Pileus 3.5–8 cm. broad, convex, then expanded to plane, sometimes depressed at the center; surface glabrous, even, moist, entirely purplish violaceous, soon discoloring to pale vinaceous-brown or dingy rose-color, margin incurved; context soft, thin, tinged with violet, becoming whitish when dry, odour and taste mild; lamellae truncated-adnate or rounded, then subdecurrent and slightly sinuate, crowded, narrow, violaceous or subconcolorous, becoming paler when dry; stipe 4–8 cm. long, 5–10 mm. thick, equal or slightly enlarged at the base, violaceous or subconcolorous, discoloring when dry or in age, subglabrous below, silky-pruinose above, subelastic, solid; spores sordid flesh-color in mass, ellipsoidal, verruculose, 6–8 × 3–5 μ.

Hab. on the ground in woods. Autumn. Ishikari (Sapporo).

Distr. Japan (Hokkaido, Honshu), Asia Minor, Europe, North America and Australia.

Jap. name. *Murasaki-shimeji* (KAWAMURA).

Subgen. **Micromphale** (MURRILL) IMAI, nom. nov.

Micromphale (ut gen.) MURRILL, l.c. 1916, p. p.
Pleurotus Auct. plur. p. min. parte.

Stipes plerumque subcentralis, excentricus centralisve, truncigenus. Pileus siccus vel udus, glaber. Sporae albae.

15. *Tricholoma ulmarium* (BULL. ex FR.) KARST.

Hattsv. I, 46, 1879.

Agaricus ulmarius BULL. Champ. Fr. pl. 510, 1791 (teste FR.)—SOW. Engl. Fung. pl. 67, 1797 (teste FR.).

Agaricus (*Pleurotus*) *ulmarius* FR. Syst. Myc. I, 186, 1821; Epicr. Myc. 130, 1838; Hymen. Eur. 167, 1874—CORDA, Champ. Fr. II, 82, pl. 18, f. 2, 1870—CKE. Ill. Brit. Fung. pl. 227, 1883—WINT. Die Pilze, I, 739, 1884.

Pleurotus ulmarius QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 111, 1872—GILL. Hymen. Fr. 342, 1874—SACC. Syll. Fung. V, 341, 1887; Fl. Ital. Crypt., Hymen. 320, 1915—MASS. Brit. Fung. Fl. III, 366, 1893—ATKINS. Mushrooms, ed. 2, 102, f. 105–106, 1903—RICKEN, Blätterp. 449, 1915—KAUFFM. Agar. Mich. 659, pl. 141, 1918—REA, Brit. Basid. 442, 1922—BRES. Icon. Myc. VI, pl. 281, f. 1, 1928—LANGE, Agar. Denm. VIII, 26, 1930.

Agaricus (*Tricholoma*) *ulmarius* SCHROET. Pilze Schles. I, 659, 1889.

Micromphale ulmarius MURRILL, North Amer. Fl. IX, 307, 1916.

Caespitose or solitary, edible. Pileus 4.5–15 cm. broad, convex, then expanded, disc-shaped, obtuse; surface glabrous, moist, whitish, grayish, yellowish or brownish, often marbled with rounded livid spots; context white, firm, compact, thick, odour farinaceous, taste pleasant; lamellae sinuate or adnexed, white, close to subdistant, broad; stipe 3–7 cm. long, 1–2 cm. thick, nearly equal, fusiformly attenuated or thickened at the base, subcentral, excentric or central, straight or curved, white or whitish, glabrous or slightly or densely tomentose, firm, elastic, solid; spores white in mass, globose, 4–6 μ, smooth.

Hab. on decaying or living wood of deciduous trees. Autumn. Ishikari (Nopporo), Kushiro (Lake side of Akan), Kitami (Oketo forest), Oshima (Shiriuchi).

Distr. Japan (Hokkaido, Honshu), Europe and North America.
Jap. name. *Shiro-tamogitake* (IMAI).

When the fungus grows from the side of a trunk, the stipe is more or less excentric and ascending, but when growing on top of a substratum the stipe is central and erect. The writer considers that the present fungus ought to be treated under the genus *Tricholoma*.

Clitocybe (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 61 & 85, 1872.

Agaricus § *Clitocybe* FR. Syst. Myc. I, 78, 1821, p. p.; Epicr. Myc. 55, 1838.
Paxillus § *Lepista* FR. Epicr. Myc. 315, 1838.
Lepista W. G. SM. in SEEM. Journ. Bot. VIII, 248, 1870.

Fructification without universal and partial veils. Pileus fleshy, regular, confluent and homogeneous with the fleshy stipe. Stipe central, fleshy. Lamellae fleshy, decurrent, rarely anastomosing and separable from the context of pileus. Spores white or sordid white in mass.

Type species: *Agaricus* (*Clitocybe*) *nebularis* BATSCH ex FR.

Key to the subgenera, sections and species in Hokkaido.

I. Lamellae not easily separable from the context of pileus..... Subgen. Euclitocybe.
  A. Pileus fleshy, not hygrophanous.
    1. Pileus fleshy, usually thick, convex then plane or depressed, regular, obtuse; lamellae at first adnate or regularly adnato-decurrent..... Sect. Disciformes.
      a. Pileus cinereous, fuliginous or fuscous, rarely white or whitish; lamellae whitish.
        α. Fructification large, 4.5–20 cm.; stipe enlarged at the base.. *C. nebularis*(1).
        β. Fructification medium in size, 3–6 cm.; stipe bulbous at the base..... *C. clavipes*(2).
      b. Pileus orange-ochraceous; lamellae orange, repeatedly, dichotomous-branching, crowded..... *C. aurantiaca*(3).
      c. Pileus entirely white, medium in size; lamellae white..... *C. cerussata*(4).

2. Pileus attenuated from a fleshy disc toward the margin, at length infundibuliform or deeply umbilicate; lamellae long decurrent..... ..... Sect. Infundibuliformes.
   a. Pileus medium in size, brownish or tan color..... ..... *C. infundibuliformis* (5).
   b. Medium in size; entirely white..... *C. catina* (6).

B. Pileus fleshy membranous, truly hygrophanous, thin, depressed, then cup-shaped..... Sect. Cyathiformes.
   1. Pileus 2–7 cm. broad, fuscous-cinereous or dark bister; spores 7–10 × 4.5–6 μ ..... *C. cyathiformis* (7).
   2. Pileus 2.5–4 cm. broad, light-drab to hair-brown; spores 5 × 2.5 μ .. .. *C. fallax* (8).

II. Lamellae rather easily separable from the pileus..... Subgen. Lepista.
   A. Large in size, without umbo, white or yellowish..... *C. gigantea* (9).
   B. Medium in size, with a slight obtuse umbo, whitish or yellowish..... ..... *C. extenuata* (10).

Subgen. **Euclitocybe** IMAI, subgen. nov.

Lamellae ab hymenophoro non facile secedentes.

Sect. **Disciformes** FR.

Epicr. Myc. 55, 1838.

Pileus fleshy, convex then plane or depressed, regular, obtuse. Lamellae at first adnate or regularly adnato-decurrent.

1. *Clitocybe nebularis* (BATSCH ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 85, 1872—GILL. Hymen. Fr. 157, cum icone, 1874—KARST. Hattsv. I, 57, 1879—SACC. Syll. Fung. V, 142, 1887; Fl. Ital. Crypt., Hymen. 170, 1915—BARLA, Champ. Alp. Marit. 63, pl. 48, f. 1–9, 1892—MASS. Brit. Fung. Fl. II, 405, 1893—W. G. SM. Brit. Basid. 46, 1908—ROLLAND, Atlas Champ. 29, f. 47, 1910—RICKEN, Blätterp. 375, pl. 103, f. 1, 1915—KAUFFM. Agar. Mich. 725, 1918—REA, Brit. Basid. 269, 1922—BRES. Icon. Myc. III, pl. 133, 1928—LANGE, Agar. Denm. VIII, 43, 1930.

Agaricus pileolarius BULL. Champ. Fr. pl. 400, 1788 (teste FR.).

Agaricus nebularis BATSCH, Elench. Fung. II, 25, f. 193, 1789 (teste FR.).

Agaricus mollis BOLT. Hist. Fung. Halif. I, 63, 1795 (teste FR.).

Agaricus (*Clitocybe*) *nebularis* FR. Syst. Myc. I, 86, 1821; Epicr. Myc. 55, 1838; Hymen. Eur. 79, 1874—BERK. Outl. Brit. Fung. 107, 1860—CKE. Handb. Brit. Fung. I, 35, 1871; Ill. Brit. Fung. pl. 79, 1883—WINT. Die Pilze, I, 806, 1884—SCHROET. Pilze Schles. I, 657, 1889.

Omphalia nebularis QUÉL. Ench. Fung. 20, 1886.

Clitocybe pileolaria MURRILL, Mycologia, VII, 268, 1915.

Gregarious or solitary, edible. Pileus 4.5–15 cm. broad, conical, convex, then nearly plane, at length depressed at the center, margin incurved when young, at length upturned; surface drab, gray or rarely whitish, dry, commonly pruinose, margin lighter; context fleshy, white, rather compact, thick, odour and taste pleasant; lamellae decurrent, white or rarely cream-colored, close, rather narrow; stipe 6–8 cm. long, 8–22 mm. thick, equal or attenuated upward, enlarged at the base, white or gray, grayish floccosely striate; context white, solid, fibrous, elastic, nearly spongy; spores white in mass, ellipsoidal, 6–9 × 4.5–6 μ, mostly 7.5 × 4.5 μ, smooth.

Hab. on the ground in woods, among fallen leaves. Autumn. Ishikari (Sapporo, Nopporo), Kushiro (Lake side of Akan), Kitami (Oketo-forest).

Distr. Japan (Hokkaido, Honshu), Asia Minor, Europe, North America.

Jap. name. *Haiiroshimeji* (IMAI).

Forma *alba* (LANGE) IMAI, comb. nov.

Clitocybe nebularis var. *alba* LANGE, Agar. Denm. VIII, 43, 1930.

Pileo albo; cetera ut in Specio.

Hab. on the ground in woods, among fallen leaves. Autumn. Kushiro (Lake side of Panketo).

Distr. Japan (Hokkaido), Europe.

Jap. name. *Shiro-no-haiiroshimeji* (n. n.).

2. *Clitocybe clavipes* (PERS. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 85, 1872—GILL. Hymen. Fr. 155, cum icone, 1874—KARST. Hattsv. I, 57, 1879—SACC. Syll. Fung. V, 143, 1887; Fl. Ital. Crypt., Hymen. 171, 1915—MASS. Brit. Fung. Fl. II, 405, 1893—W. G. SM. Brit. Basid. 47, 1908—ROLLAND, Atlas Champ. 29, f. 45, 1910—RICKEN, Blätterp. 375, pl. 103, f. 3, 1915—MURRILL, North Amer. Fl. IX, 410, 1916—KAUFFM. Agar. Mich. 726, 1918—REA, Brit. Basid. 269, 1922—BRES. Icon. Myc. III, pl. 135, 1928—LANGE, Agar. Denm. VIII, 46, 1930.

Agaricus (*Gymnopus*) *clavipes* PERS. Syn. Fung. 353, 1801 (teste FR.).

Agaricus (*Clitocybe*) *clavipes* FR. Syst. Myc. I, 86, 1821; Epicr. Myc. 56, 1838; Hymen. Eur. 79, 1874—CKE. Ill. Brit. Fung. pl. 80, 1883—WINT. Die Pilze, I, 805, 1884—SCHROET. Pilze Schles. I, 656, 1889.

Agaricus carnosior PK. 23 Ann. Rep. N. Y. State Cab. 76, 1872 (teste MURR.).

Omphalia clavipes QUÉL. Ench. Fung. 20, 1886.

Clitocybe carnosior SACC. Syll. Fung. V, 146, 1887.

Gregarious, solitary or rarely subcaespitose, edible. Pileus 2.5–7 cm. broad, convex, then plane, almost obconic, rarely umbonate, obtuse; surface grayish-brown or sooty-brown, sometimes darker at the center, dry, glabrous, even, margin thin, strongly incurved at first; context white, soft, thick at the center, taste and odour agreeable; lamellae deeply decurrent, white, sometimes yellowish, subdistant, flaccid, broad at the middle; stipe 3–6 cm. long, 6–10 mm. thick, attenuated upward, largely thickened or subbulbous at the base and up to 2 cm. thick, subconcolorous or paler, glabrous or slightly fibrillose, soft, elastic, solid; spores white in mass, ellipsoidal, smooth, 5.5–7.5 × 3.5–5 μ.

Hab. on the ground in woods. Autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido), Europe, North America.

Jap. name. *Hotei-shimeji* (n. n.).

3. *Clitocybe aurantiaca* (WULF. ex FR.) STUDER

Hedw. XXXIX, (7), 1900—REA, Brit. Basid. 273, 1922.

Agaricus aurantiacus WULF. in JACQ. Miscell. Austr. II, 101, pl. 14, f. 3, 1781 (teste FR.).

Cantharellus aurantiacus FR. Syst. Myc. I, 318, 1821; Epicr. Myc. 365, 1838; Monogr. Hymen. Suec. II, 206, 1863; Hymen. Eur. 455, 1874—BERK. Outl. Brit. Fung. 215, pl. 14, f. 1, 1860—CORDA, Champ. Fr. II, 129, pl. 32, f. 2, 1870—CKE. Handb. Brit. Fung. I, 227, 1871; Ill. Brit. Fung. pl. 1104, 1883; Handb. Austr. Fung. 80, 1892—GILL. Hymen. Fr. 352, cum icone, 1874—WINT. Die Pilze, I, 523, 1884—SACC. Syll. Fung. V, 483, 1887—SCHROET. Pilze Schles. I, 511, 1888—MASS. Brit. Fung. Fl. II, 320, cum fig., 1893—ATKINS. Mushrooms, ed. 2, 129, f. 127–128, 1903—ROLLAND, Atlas Champ. 53, f. 117, 1910—RICKEN, Blätterp. 4, pl. 2, f. 2, 1915—KAUFFM. Agar. Mich. 40, 1918—BRES. Icon. Myc. X, pl. 473, 1929.

Agaricus alectorolophoides SCHAEFF. Fung. Bavar. IV, Ind. 46, pl. 206, 1774 (teste FR.).

Merulius aurantiacus PERS. Syn. Fung. 488, 1801 (teste FR.).

Merulius nigripes PERS. Ibid. 489, 1801 (teste FR.).

Agaricus subcantharellus SOW. Engl. Fung. pl. 413, 1803 (teste FR.).

Cantharellus Ravenelii BERK. et CURT. Ann. Mag. Nat. Hist. 2 ser. XII, 425, 1853.

Chanterel alectrolophoides MURRILL, North Amer. Fl. IX, 169, 1910.

Gregarious, edible (after American authors). Pileus 2–9 cm. broad, convex, then plane, depressed, at length subinfundibuliform; surface orange-ochraceous to brownish-orange, sometimes paler, subtomentose, margin incurved and at length undulated; context soft, yellowish or ochraceous, thin, odour and taste mild; lamellae decurrent, bright orange or paler, rather regularly 3 to 5 times dichotomously branched, blunt at the edge, rather narrow, crowded; stipe 4–7 cm. long, 5–10 mm. thick, nearly equal or slightly attenuated upward, pale orange to ochraceous or brownish, fibrous or minutely tomentose, stuffed, sometimes hollow; spores white in mass, ellipsoidal, smooth, 5–7 × 3–5 μ.

Hab. on the ground in woods or under trees. Late summer to autumn. Iburi (Lake side of Shikotsu), Ishikari (Nopporo, Mt. Kurodake), Kushiro (Mt. Meakan), Kitami (Notoro forest, Oketo forest), Tokachi (Mt. Nupkaushinupuri).

Distr. Japan (Hokkaido) Europe, North America, Australia, Siberia and Asia Minor.

Jap. name. *Hiroha-anzutake* (n. n.).

A form occurs with yellowish white pileus and stipe, but we have not collected a white form which FRIES has noted. Many European authors have regarded it as poisonous or suspected, but KAUFFMAN, PECK, MCILVAIN and others have eaten it without bad results.

4. *Clitocybe cerussata* (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 86, 1872—GILL. Hymen. Fr. 151, cum icone, 1874—KARST. Hattsv. I, 64, 1879—SACC. Syll. Fung. V, 154, 1887; Fl. Ital. Crypt., Hymen. 167, 1915—BARLA, Champ. Alp. Marit. 67, pl. 51, f. 24–28, 1892—MASS. Brit. Fung. Fl. II, 413, 1893—W. G. SM. Brit. Basid. 49, 1908—REA, Brit. Basid. 275, 1922—BRES. Icon. Myc. III, pl. 142, 1928.

Agaricus (*Clitocybe*) *cerussatus* FR. Syst. Myc. I, 92, 1821; Epicr. Myc. 61, 1838; Hymen. Eur. 86, 1874—PERS. Myc. Eur. III, 119, 1822—BERK. Outl. Brit. Fung. 108, 1860—CKE. Ill. Brit. Fung. pl. 122, 1883—SCHROET. Pilze Schles. I, 654, 1889.

Caespitose or gregarious, edible. Pileus 4–8 cm. broad, convex or subcampanulate, then expanded, obtuse or gibbous, at length slightly depressed; surface white, with a white-lead appearance, at first floccoso-fibrillose, then subglabrous, margin involute, villous, often sublobate or undulate; context white, mild, inodorous; lamellae

adnate, then slightly decurrent, very crowded, white; stipe 3–8 cm. long, 5–10 mm. thick, equal or thickened and often subconnate at the base, subglabrous, but white-flocculose at the base, stuffed; spores white in mass, subglobose or broadly ovoid, 5–6 × 4–5 μ or 4–5 μ.

Hab. on the ground in woods. Autumn. Ishikari (Mt. Kurodake).

Distr. Japan (Hokkaido), Siberia, Europe.

Jap. name. *Kabu-inushimeji* (n. n.).

Sect. **Infundibuliformes** FR.

Epicr. Myc. 67, 1838.

Pileus fleshy, not hygrophanous, attenuated from a fleshy disc toward the margin, at length infundibuliform or deeply umbilicate; lamellae long decurrent.

5. *Clitocybe infundibuliformis* (SCHAEFF. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 88, 1872—GILL. Hymen. Fr. 144, cum icone, 1874—KARST. Hattsv. I, 71, 1879—SACC. Syll. Fung. V, 165, 1887; Fl. Ital. Crypt., Hymen. 191, 1915—BARLA, Champ. Alp. Marit. 71, pl. 57, f. 1–5, 1892—MASS. Brit. Fung. Fl. II, 425, 1893—W. G. SM. Brit. Basid. 52, 1908—ROLLAND, Atlas Champ. 30, f. 51, 1910—RICKEN, Blätterp. 373, pl. 101, f. 2, 1915—MURRILL, North Amer. Fl. IX, 408, 1916—KAUFFM. Agar. Mich. 736, pl. 158, 1918—REA, Brit. Basid. 281, 1922—BRES. Icon. Myc. IV, pl. 156, 1928—LANGE, Agar. Denm. VIII, 46, 1930.

[SHIRAI, List Jap. Fung. ed. 2, 145, 1917; ed. 3, 86, 1927—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 117, 1931]

Agaricus infundibuliformis SCHAEFF. Fung. Bavar. IV, Ind. 49, pl. 212, 1774 (teste FR.).

Agaricus (*Clitocybe*) *infundibuliformis* FR. Epicr. Myc. 68, 1838; Hymen. Eur. 93, 1874—BERK. Outl. Brit. Fung. 110, pl. 5, f. 2, 1860—CKE. Ill. Brit. Fung. pl. 107, 1883—WINT. Die Pilze, I, 795, 1884—SCHROET. Pilze Schles. I, 652, 1889.

Gregarious, subcaespitose or solitary, edible. Pileus 4–12 cm. broad, convex-umbilicate, at length infundibuliform; surface brownish, pale tan-color or flesh color, fading with age, usually darker at the center, silky fibrous or minutely squamulose, margin involute and silky; context white, thick at the center, soft, taste mild, odour agreeable; lamellae long decurrent, white or whitish, rather crowded, thin, rather narrow; stipe 4–12 cm. long, 4–8 mm. thick, nearly equal

or slightly attenuated upward, pinkish-buff, firm, elastic, base white tomentose, solid; spores white in mass, ellipsoidal with a bent end or ovoid, 8.5–12.5 × 4–5 μ, not quite smooth.

Hab. on the ground in woods. Autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido, Honshu), Siberia, Asia Minor, Europe, North America, ?Australia.

Jap. name. *Kayatake* (SHIRAI).

Some of the specimens at hand do not exactly agree in the spores with the description of the European and American species. These spores are ellipsoidal, 8.5–12.5 × 4–5 μ and not smooth. SACCARDO, however, has remarked in this species after BRESADOLA (M.S.) that the spores of this fungus are variable in size, namely, 5–8 × 3.5–4; 6–8 × 3.5–4.5; 7–9 × 4–5; 6–11 × 4–5.5 μ and in general 6–9 × 4–4.5 μ.

6. *Clitocybe catinus* (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 235, 1872—GILL. Hymen. Fr. 137, 1874—KARST. Hattsv. I, 76, 1879—SACC. Syll. Fung. V, 174, 1887; Fl. Ital. Crypt., Hymen. 187, 1915—BARLA, Champ. Alp. Marit. 75, pl. 61, f. 3–5, 1892—MASS. Brit. Fung. Fl. II, 431, 1893—W. G. SM. Brit. Basid. 54, 1908—RICKEN, Blätterp. 364, pl. 99, f. 5, 1915—MURRILL, North Amer. Fl. IX, 402, 1916—KAUFFM. Agar. Mich. 735, 1918—REA, Brit. Basid. 284, 1922.

Agaricus (*Clitocybe*) *catinus* FR. Epicr. Myc. 72, 1838; Hymen. Eur. 99, 1874—CKE. Ill. Brit. Fung. pl. 111, 1883—WINT. Die Pilze, I, 792, 1884.

Gregarious or scattered, edible. Pileus 2–6 cm. broad, convex, then depressed, at length nearly infundibuliform, rather regular; surface white, becoming discolored with age, dry, glabrous, smooth, margin incurved; context white, thin, flaccid, taste mild, odour farinaceous; lamellae decurrent, crowded, white, becoming dull whitish or dull yellowish when dried, narrow; stipe 3–6 cm. long, 2–6 mm. thick, equal or rarely slightly thickened at the base, terete, straight, white, becoming sordid, glabrous above, tomentose below, elastic, tough, stuffed then hollow; spores whitish in mass, ovate or subellipsoidal, smooth, 4–5 × 4 μ.

Hab. on the ground in woods. Autumn. Ishikari (Nopporo), Oshima (Ônomura).

Distr. Japan (Hokkaido), Europe, North America.

Jap. name. *Ko-shiro-inushimeji* (n. n.).

Sect. Cyathiformes Fr.

Epicr. Myc. 73, 1838.

Pileus fleshy-membranous, thin, depressed, then cup-shaped, truly hygrophanous.

7. *Clitocybe cyathiformis* (Bull. ex Fr.) Quél.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 89, 1872—Gill. Hymen. Fr. 148, cum icone, 1874—Karst. Hattsv. I, 77, 1879—Sacc. Syll. Fung. V, 176, 1887; Fl. Ital. Crypt., Hymen. 198, 1915—Barla, Champ. Alp. Marit. 76, pl. 62, f. 6–10, 1892—Mass. Brit. Fung. Fl. II, 433, 1893—W. G. Sm. Brit. Basid. 55, 1908—Rolland, Atlas Champ. 31, f. 52, 1910—Ricken, Blätterp. 376, pl. 104, f. 1, 1915—Kauffm. Agar. Mich. 739, pl. 159, 1918—Rea, Brit. Basid. 285, 1922—Bres. Icon. Myc. IV, pl. 175, 1928—Lange, Agar. Denm. VIII, 53, 1930.

Agaricus cyathiformis Bull. Champ. Fr. pl. 575, f. M, 1791.

Agaricus (*Omphalia*) *cyathiformis* Fr. Syst. Myc. I, 173, 1821—Berk. in Smith, Engl. Fl. V, (2), 68, 1836.

Agaricus (*Clitocybe*) *cyathiformis* Fr. Epicr. Myc. 73, 1838; Hymen. Eur. 100, 1874—Cke. Ill. Brit. Fung. pl. 113, 1883—Wint. Die Pilze, I, 791, 1884—Schroet. Pilze Schles. I, 651, 1889.

Gregarious, subcaespitose or solitary, edible. Pileus 2–7 cm. broad, depressed convex with strongly involute margin, then broadly infundibuliform or cup-shaped; surface hygrophanous, fuligineous-brown when young and moist, becoming brownish-gray when dry or old, glabrous or innately fibrillose, opaque, margin involute; context watery, concolorous, spongioso-fibrillose, odour and taste none; lamellae adnate, then decurrent, not crowded, grayish-brown, connate at the base, sometimes branched, narrow; stipe 4–8 cm. long, 4–8 mm. thick, attenuated upward or nearly equal, paler than the pileus or concolorous, fibrillosely reticulated, white tomentose at the base, elastic, spongy-stuffed; spores white in mass, ellipsoidal or elliptic-ovate, smooth, 7–10 × 4.5–6 μ.

Hab. on rotten wood, logs, etc., or in humus, in woods. Autumn. Ishikari (Nopporo, Sapporo), Iburi (Lake side of Shikotsu), Kushiro (Lake side of Akan), Kitami (Oketo forest), Oshima (Ônomura).

Distr. Japan (Hokkaido, Honshu), Asia Minor, Europe, North America.

Jap. name. *Kuro-sakazuki-shimeji* (n. n.).

8. *Clitocybe fallax* IMAI, sp. nov.

Gregaria. Pileo 2.5–4 cm. lato, depresso vel umbilicato, dein subinfundibuliformi, hygrophano, subumbrino vel umbrino, pallescente, glabro, margine involuto, leve vel vix striatulo; carne pallida, tenuissima; lamellis decurrentibus vel adnatis, confertis, pallidis vel subcinereis, arcuatis; stipite 2.5–4 cm. longo, 2–4 mm. crasso, aequali, subconcolori, leviter fibrilliso, obscure reticulato, cavo; sporis in cumulo albis, ellipsoideis, $5 \times 2.5\,\mu$, laevibus.

Hab. on decayed wood in coniferous woods. Autumn. Ishikari (Nopporo).

Distr. Endemic.

Jap. name. *Nise-kuro-sakazuki* (n. n.).

The present species is closely related to *Clitocybe subconcava* PECK, from which it is distinguishable by its darker colored and almost non-striate pileus, and by the evidently hollow stipe. The fungus also is allied to *Cl. concava* (FR.) QUÉL. in the macroscopic features but quite differs in the microscopic characters.

Subgen. **Lepista** (FR.) IMAI, nom. nov.

Paxillus § *Lepista* FR. Epicr. Myc. 315, 1838.

Lamellae usually anastomosing behind, discreting and easily separable from the pileus.

9. *Clitocybe gigantea* (SOW. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 88, 1872—GILL. Hymen. Fr. 143, cum icone, 1874—KARST. Hattsv. I, 70, 1879—BARLA, Champ. Alp. Marit. 70, pl. 56, 1892—MASS. Brit. Fung. Fl. II, 423, 1893—KAUFFM. Agar. Mich. 719, 1918—LANGE, Agar. Denm. VIII, 42, 1930.

Agaricus giganteus SOW. Engl. Fung. pl. 244, 1803 (teste FR.).

Agaricus (*Clitocybe*) *giganteus* FR. Monogr. Hymen. Suec. II, 118, 1863—CKE. Ill. Brit. Fung. pl. 106, 1883.

Paxillus giganteus FR. Hymen. Eur. 401, 1874—WINT. Die Pilze, I, 574, 1884—SACC. Syll. Fung. V, 983, 1887; Fl. Ital. Crypt., Hymen. 665, 1916—RICKEN, Blätterp. 93, 1915—REA, Brit. Basid. 549, 1922.

[T. ITO, Journ. Jap. Bot. VII, 1, 1931]

Solitary or scattered, edible. Pileus 3–20 cm. or more broad, convex, soon expanded to plane, finally infundibuliform, without

umbo; surface white or tinged tan or clay, silky flocculose, minutely adpresso-squamulose, often guttate, margin strongly involute and pubescent at first, then spreading and becoming almost smooth, at length revolute and sulcate, often splitting; context relatively thin, soft, fleshy, white; odour and taste mild; lamellae long decurrent, subdecurrent or adnato-decurrent, very crowded, narrow, whitish, then tan-color, somewhat furcate and anastomosing, easily separable from the pileus; stipe rather short and stout, 2–7 cm. or more long, 2–5 cm. thick, equal, smooth or minutely pubescent, whitish, subconcolorous or slightly darker and longitudinally striate when old, solid; spores white in mass, ellipsoidal, 8–10 × 5–6 μ, rough.

Hab. on the ground in woods. Late summer to autumn. Ishikari (Sapporo, Nopporo).

Distr. Japan (Hokkaido, Honshu), Europe, North America.

Jap. name. *Ô-itchô-take* (T. ITO).

10. *Clitocybe extenuata* (FR.) IMAI, comb. nov.

Paxillus extenuatus FR. Epicr. Myc. 316, 1838; Hymen. Eur. 402, 1874—SACC. Syll. Fung. V, 985, 1887—MASS. Brit. Fung. Fl. II, 6, 1893—RICKEN, Blätterp. 93, pl. 27, f. 2, 1915—REA, Brit. Basid. 549, 1922.

Lepista extenuata KARST. Hattsv. I, 480, 1879.

?*Clitocybe piceina* PK. Bull. Torrey Bot. Club, XXXI, 178, 1904—KAUFFM. Agar. Mich. 720, pl. 154, 1918.

?*Melanoleuca albissima* MURRILL, North Amer. Fl. X, 8, 1914.

Gregarious, caespitose or solitary, edible. Pileus 3–11 cm. broad, convex, subumbonate or gibbous, then plane with a slightly obtuse umbo; surface whitish or yellowish, the center darker and colored buff-yellow, dry, smooth, subglabrous, margin involute, pubescent, rigid-fragile, obscurely striate when matured; context white, compact or rather spongy-fleshy, thick, taste mild, odour not strong; lamellae emarginate with a long decurrent tooth or decurrent, decurrent lines or ridges running down the stipe and anastomosing, separable from the trama of pileus and stipe, transversely split in edge, whitish or slightly yellowish, close, rather narrow, thin, tough, edge entire or waved especially near the stipe; stipe 6–11 cm. long, 8–18 mm. thick, nearly equal, or slightly attenuated upward and swollen at the base, slightly rooting, whitish or yellowish, paler than the pileus, fibrous, obscurely pruinose at the apex, often tomentose at the base, stout, solid, firm, elastic, slightly spongy; spores white in mass, broadly ellipsoidal, 6–8 × 4–6 μ, rough.

Hab. on the ground in woods or under trees. Late summer to autumn. Ishikari (Sapporo, Nopporo, Jôzankei), Iburi (Lake side of Shikotsu).

Distr. Japan (Hokkaido), Europe and North America.

Jap. name. *Shiro-itchô-take* (n. n.).

Laccaria BERK. et BR.

Ann. Mag. Nat. Hist. 5 ser. XII, 370, 1883.
Agaricus § *Clitocybe* Auct. plur. p. min. parte.
Clitocybe Auct. plur. p. min. parte.
Camarophyllum KARST. Hattsv. I, xvii, 1879, p. min. parte.
Russuliopsis SCHROET. Pilze Schles. I, 622, 1889.

Fructification without universal and partial veils. Pileus fleshy, regular, confluent and homogeneous with the fleshy stipe. Stipe central, subfleshy, externally fibrous. Lamellae subfleshy, adnate or adnexed with a decurrent tooth, pulverulent. Spores white in mass, globose, rarely ellipsoidal, echinulate or verrucose.

Type species: *Agaricus laccatus* SCOP. ex FR.

Key to the species in Hokkaido.

I. Fructification, especially lamellae, salmon or flesh color.
  A. Pileus large, 2–5 cm. or more broad..... *L. laccata* (1).
  B. Pileus small, 5–10 mm. broad, margin almost not striate..... *L. laccata* f. *minuta* (1a).
II. Fructification, especially lamellae, dark-state-purple.... *L. amethystea* (2).
III. Fructification gray..... *L. murina* (3).

1. *Laccaria laccata* (SCOP. ex FR.) BERK. et BR.

Ann. Mag. Nat. Hist. 5 ser. XII, 371, 1883—MASS. Brit. Fung. Fl. II, 443, 1893—ROLLAND, Atlas Champ. 31, f. 53, 1910, p. p.—REA, Brit. Basid. 290, 1922.

Agaricus laccatus SCOP. Fl. Carn. ed. 2, II, 444, 1772 (teste FR.).

Agaricus (*Clitocybe*) *laccatus* FR. Syst. Myc. I, 106, 1821; Epicr. Myc. 79, 1838; Hymen. Eur. 108, 1874—RABENH. Deut. Krypt. Fl. I, 537, 1844—BERK. Outl. Brit. Fung. 113, pl. 5, f. 3, 1860—CKE. Handb. Brit. Fung. I, 44, 1871; Ill. Brit. Fung. pl. 139, 1883, p. p.—WINT. Die Pilze, I, 785, 1884, p. p.

Clitocybe laccata QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 91, 1872, p. p.—GILL. Hymen. Fr. 174, cum icone, 1874, p. p.—SACC.

Syll. Fung. V, 197, 1887; Fl. Ital. Crypt., Hymen. 206, 1915—BARLA, Champ. Alp. Marit. 79, pl. 64, f. 1–10, 1892, p. p.—RICKEN, Blätterp. 382, pl. 100, f. 2, 1915, p. p.—KAUFFM. Agar. Mich. 747, 1918—BRES. Icon. Myc. IV, pl. 187, f. 1, 1928.

[SHIRAI, List Jap. Fung. 22, 1905; ed. 2, 145, 1917; ed. 3, 86, 1927—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 117, 1931]

Camarophyllus laccatus KARST. Hattsv. I, 231, 1879, p. p.

Russuliopsis laccata SCHROET. Pilze Schles. I, 622, 1889.

Gregarious or solitary, edible. Pileus 2–5 cm. or more broad, convex, then plane, more or less umbilicato-depressed; surface hygrophanous, salmon-buff, salmon, apricot-buff, vinaceous-pink or buff-pink in color, becoming pale when dry, glabrous, furfuraceous or minutely squamulose, sometimes silky, margin even or undulato-crisped and irregularly shaped; context concolorous, somewhat thin, firm in the stipe, taste mild; lamellae adnate, adnexed, subsinuate or adnate with a decurrent tooth, rather broad, thick, subdistant, flesh-colored, then white mealy; stipe 5–10 cm. long, 5–10 mm. thick, nearly equal, straight or flexuous, concolorous, fibrous, firm, stuffed; spores white in mass, globose, 8–9 μ, echinulate.

Hab. on the ground in woods or under trees. Summer to autumn. Ishikari (Sapporo, Nopporo, Mt. Taisetsu, Mt. Teine), Tokachi (Lake side of Shikaribetsu), Kushiro (Lake side of Kutcharo, Lake side of Akan, Mt. Meakan, Mt. Oakan), Iburi (Lake side of Shikotsu), Kitami (Oketo forest).

Distr. Japan (Hokkaido, Honshu), China, Asia Minor, Europe, North America, Australia.

Jap. name. *Kitsune-take* (KAWAMURA).

Forma *minuta* IMAI, form. nov.

Gregaria. Pileo 5–10 mm. lato, astriato vel vix striatulo; stipite 25–35 mm. longo, 1–2 mm. crasso, basi leviter incrassato; cetera ut in Specio.

Hab. on the ground in woods. Summer. Ishikari (Nopporo).

Distr. Endemic.

Jap. name. *Hime-kitsunetake* (n. n.).

The present form closely resembles *Russuliopsis laccata, rosella, pusilla* SCHROET. from which it may be distinguished by the smaller size of fructification, as well as by the almost astriate pileus. The fungus is also similar to *Laccaria tortilis* (FR.) BOUD. in the smaller

size of fructification, but it is distinguishable in the almost astriate pileus and by the quadri-spored basidium.

2. *Laccaria amethytea* [BULL.] MURRILL

North Amer. Fl. X, 1, 1914.
Agaricus amethystinus BOLT. Hist. Fung. Halif. pl. 63, 1788 (teste FR.).
Agaricus amethysteus BULL. Champ. Fr. pl. 198, 1791 (teste FR.).
Collybia amethystina QUÉL. Fl. Myc. 238, 1888.
Russuliopsis laccata f. *amethystina* SCHROET. Pilze Schles. I, 623, 1889.
Clitocybe amethystea SACC. Fl. Ital. Crypt., Hymen. 206, 1915.
Agaricus laccatus var. *amethystinus* Auct. plur.
Clitocybe laccata var. *amethystina* Auct. plur.
Laccaria laccata var. *amethystina* Auct. plur.
[KAWAMURA, Jap. Fung. no. 28, 1929—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 117, 1931]

Solitary or gregarious, edible. Pileus 1.5–3 cm. broad, broadly convex, umbilicate or depressed at the center; surface hygrophanous, cames-brown, Hay's brown or dark purple-drab when moist, grayish when dry, unpolished, pellicle often breaking up into mealy squamules or sometimes silky, sometimes undulato-crisped and irregularly shaped and slightly striate at the margin; context concolorous, somewhat thin, firm; lamellae adnate or decurrent, dark state-purple, color more persistent than in the pileus, subdistant; stipe 3–7 cm. long, 2–5 mm. thick, equal, flexuous, concolorous or slightly paler than the lamellae, hollow; spores white in mass, globose, 7.5–10 μ, verruculose.

Hab. on the ground in woods or under trees. Summer to autumn. Ishikari (Sapporo, Nopporo, Mt. Teine).

Distr. Japan (Hokkaido, Honshu), Asia Minor, Europe, North America.

Jap. name. *Uramurasaki* (KAWAMURA).

3. *Laccaria murina* IMAI, sp. nov.

Gregaria. Pileo 1–1.5 cm. lato, convexo vel hemigloboso, dein expanso, plano, udo et juvenile fuligineo, sicco murino vel subavellaneo, leviter velutinullo, margine primo involuto, udo striatulo sicco laevi; carne murina; lamellis adnatis, griseis, demum albopruinosis, distantibus, crassis; stipite 1.5–2.5 cm. longo, 1.5–2.5 mm. crasso, aequali vel sursum leviter attenuato, subconcolori vel leviter

pallidiori, striatulo, deorsum albo-villoso; sporis in cumulo albis, globosis, 7.5–10 μ, verruculosis.

Hab. on the ground in woods. Summer. Ishikari (Nopporo).

Distr. Endemic.

Jap. name. *Ginko-take* (n. n.).

The present fungus is easily distinguished from other species in this genus by the color of fructification.

Tribe **Pleuroteae** IMAI, nom. nov.

Pleurotées KONR. et MAUBL. Icon. Sel. Fung. 29, 1924.

Fructificatio sine velo, plerumque epixyla. Stipes excentricus, lateralis vel nullus. Lamellae adnexae, adnatae vel decurrentes.

Pleurotus (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 111, 1872, p. p.

Crepidopus S. F. GRAY, Nat. Arr. Brit. Pl. I, 616, 1821—MURRILL, North Am. Fl. IX, 304, 1916.

Agaricus § *Pleurotus* FR. Syst. Myc. I, 178, 1821, p. p.

Phyllotus KARST. Hattsv. I, xiv, 1879.

Calathinus QUÉL. Ench. Fung. 46, 1886.

Geopetalum PAT. Hymen. Eur. 127, 1887, p. p.

Geopetalum MURRILL, North Amer. Fl. IX, 298, 1916.

Fructification without universal and partial veils. Pileus fleshy or submembranous, regular or irregular. Stipe excentric, lateral or wanting. Lamellae adnexed, adnate, decurrent or radiating from a central or lateral point. Spores white in mass, rarely tinged with yellowish or lilac hues.

Type species: *Agaricus ostreatus* JACQ. ex FR.

Key to the subgenera and species in Hokkaido.

I. Stipe excentric or lateral; lamellae decurrent..... Subgen. Concharia.
  A. Stipe usually distinct and branched; pileus whitish, yellowish, yellow or brownish, usually glabrous..... *P. cornucopiae* (1).
  B. Stipe usually distinct but short, often caespitose-imbricate; pileus white, whitish-gray or brownish, usually glabrous..... *P. ostreatus* (2).

C. Stipe usually distinct but very short, usually caespitose-imbricate; pileus distinctly viscid when wet and young, variously colored, dingy-yellow, reddish-brown, greenish-brown or olivaceous..... *P. serotinus*(3).

II. Stipe usually wanting, sessile or resupinate..... Subgen. Phyllotus.

A. Growing on coniferous wood; pileus 2–7 cm. broad, white; lamellae crowded and narrow..... *P. porrigens*(4).

Subgen. **Concharia** IMAI, Subgen. nov.

Agaricus § *Pleurotus* § *Concharia* FR. Epicr. Myc. 132, 1838.
Agaricus § *Pleurotus* § *Dimidiati* FR. Ibid. 134, 1838, p. p.

Stipes excentricus vel lateralis; lamellae decurrentes.

1. *Pleurotus cornucopiae* (PAUL. ex PERS.) ROLLAND

Atlas Champ. 45, f. 95, 1910—SACC. Fl. Ital. Crypt., Hymen. 324, 1915—BRES. Icon. Myc. VI, pl. 288, 1928.

[IMAI, Botany & Zoology, IV, 1131, f. 1–2, 1936]

Dendrosarcos cornucopiae PAUL. Traite Champ. II, 119, pl. 28, 1793.

Agaricus cornucopiae PERS. Myc. Eur. III, 37, 1828.

Agaricus (*Pleurotus*) *sapidus* SCHULZ. in KALCHB. Icon. Hym. Hung. pl. 8, f. 1, 1873—FR. Hymen. Eur. 171, 1874—WINT. Die Pilze, I, 737, 1884.

Agaricus (*Pleurotus*) *cornucopioides* FR. Hymen. Eur. 172, 1874.

Pleurotus cornucopioides GILL. Hymen. Fr. 345, 1874—SACC. Syll. Fung. V, 348, 1887—RICKEN, Blätterp. 447, 1915.

Pleurotus ostreatus var. *cornucopiae* QUÉL. Ench. Fung. 148, 1886.

Pleurotus sapidus SACC. Syll. Fung. V, 348, 1887—MASS. Brit. Fung. Fl. III, 370, 1893—ATKINS. Mushrooms, ed. 2, 104, f. 108, 1903—W. G. SM. Brit. Basid. 92, 1908—KAUFFM. Agar. Mich. 665, 1918—REA, Brit. Basid. 444, 1922.

[UMEMURA Pl. Fujiyama. 369, 1927]

Caespitose, edible. Pileus 4–12 cm. broad, convex, depressed at the center, excentric, lateral or rarely almost subsessile, ascending or shelving, subdimidiate or elongated; surface glabrous, rarely tomentose with a white tufted short hair, primuline-yellow, yellow or whitish, rarely brownish, margin often irregular and wavy; context rather thin, white, firm, taste mild, odour subfarinaceous; lamellae decurrent, rather distant, rarely anastomosing at the base, broad, white or whitish; stipe 2–10 cm. long, 5–15 mm. thick, varying from subsessile to long stipitate, subequal or attenuated upward but dilated in the pileus, white, whitish or yellowish, firm, entirely glabrous or slightly tomentose at the base, usually branched, curved or straight, ascending, arising from a fleshy bulbous base, solid; spores white, usually tinged lilac in mass, narrow-oblong, smooth, 7–11 × 3–5 μ.

Hab. on the trunk of deciduous trees, especially *Ulmus*. Summer to autumn. Ishikari (Sapporo, Nopporo, Sôunbetsu), Kushiro (Lake side of Akan), Kitami (Oketo), Teshio (Otoineppu).

Distr. Japan (Hokkaido, Honshu), Europe, North America, China, Siberia, Asia Minor.

Jap. name. *Nire-take* (SAKAMOTO ex IMAI), *Tamogi-take* (IMAI), *Himehira-take* (UMEMURA).

2. *Pleurotus ostreatus* (JACQ. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mem. Soc. D'Emul. Montb. 2 sér. V, 112, 1872; Ench. Fung. 148, 1886—GILL. Hymen. Fr. 346, cum icone, 1874—SACC. Syll. Fung. V, 355, 1887; Fl. Ital. Crypt., Hymen. 332, 1915—MASS. Brit. Fung. Fl. III, 371, 1893—ATKINS. Mushrooms, ed. 2, 104, f. 107, 1903—W. G. SM. Brit. Basid. 93, 1908—ROLLAND, Atlas Champ. 44, f. 93, 1910—KAWAMURA, Ill. Jap. Fung. pl. 8, f. 1–2, 1913—RICKEN, Blätterp. 450, pl. 112, f. 1, 1915—KAUFFM. Agar. Mich. 663, pl. 142, 1918—REA, Brit. Basid. 445, 1922—BRES. Icon. Myc. VI, pl. 290, 1928—LANGE, Agar. Denm. VIII, 25, 1930.

[P. HENN. Hedw. XXXIX, (156), 1900—SHIRAI, in MATSUM. & MIYOS. Crypt. Jap. Icon. Ill. I, pl. 3, 1900; List Jap. Fung. 71, 1905; ed. 2, 467, 1917; ed. 3, 286, 1927—MATSUM. Ind. Pl. Jap. I, 162, 1904—YASUDA, Bot. Mag. (Tokyo), XXVIII, (389), 1914—NAKAJI, Bot. Mag. (Tokyo), XXX, (102), 1916—UMEMURA, Pl. Fujiyama. 370, 1923—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 116, 1931]

Agaricus ostreatus JACQ. Fl. Austr. III, pl. 288, 1775 (teste FR.)—PERS. Syn. Fung. 477, 1801—SOW. Engl. Fung. pl. 241, 1803.

Crepidopus ostreatus S. F. GRAY, Nat. Arr. Brit. Pl. I, 616, 1821—MURRILL, North Amer. Fl. IX, 304, 1916.

Agaricus (*Pleurotus*) *ostreatus* FR. Syst. Myc. I, 182, 1821; Epicr. Myc. 133, 1838; Hymen. Eur. 173, 1874—BERK. in SMITH, Engl. Fl. V, (2), 71, 1836; Outl. Brit. Fung. 135, 1860—RABENH. Deutschl. Crypt. Fl. I, 516, 1844—KICKX, Fl. Crypt. Flandr. II, 158, 1867—CORDA, Champ. Fr. II, 80, 1870—CKE. Handb. Brit. Fung. I, 48, 1871; Ill. Brit. Fung. pl. 195, 1883; Handb. Austr. Fung. 31, 1892—WINT. Die Pilze, I, 735, 1884.

Clitocybe ostreatus KARST. Hattsv. I, 87, 1879.

Agaricus (*Clitocybe*) *ostreatus* SCHROET. Pilze Schles. I, 649, 1889.

Crepidopus subsapidus MURRILL, Mycologia, IV, 216, 1912.

Caespitosely imbricate, edible. Pileus 5–15 cm. or more broad, excentric or sublateral, conchate, subdimidiate to elongated, convex or depressed; surface moist, silky to glabrous, white, whitish or avellaneous to snuff-brown, (usually when young almost black, soon becoming pale, fuscous-cinereous, passing into yellow when old), margin thin, even, sometimes subrimose; context white, rather thin,

soft, taste and odour pleasant; lamellae long decurrent, anastomosing on the stipe, subclose to subdistant, white, becoming yellowish or grayish in age, broad; stipe 1–4 cm. long, 1–2 cm. thick, lateral, sometimes excentric, short or almost lacking, stout, often tomentose or strigose-hairy at the base, whitish, firm, solid; spores white or lilac-tinged in mass, elliptical-oblong, smooth, 8–12 × 3–4 μ.

Hab. on dead trunks of deciduous trees, or, rarely, of coniferous trees. Spring to autumn. Ishikari (Sapporo, Nopporo), Iburi (Tomakomai, Lake side of Shikotsu), Oshima (Ônomura), Kushiro (Lake side of Akan), Kitami (Oketo forest).

Distr. Japan (Hokkaido, Honshu, Kiushu), Europe, Siberia, Asia Minor, North America, Australia.

Jap. name. *Hira-take* (SHIRAI ex P. HENN.).

3. *Pleurotus serotinus* (PERS. ex FR.) GILL.

Hymen. Fr. 337, 1874—KARST. Hattsv. I, 89, 1879—QUÉL. Ench. Fung. 149, 1886—SACC. Syll. Fung. V, 363, 1887; Fl. Ital. Crypt., Hymen. 314, 1915—MASS. Brit. Fung. Fl. II, 374, 1893—W. G. SM. Brit. Basid. 94, 1908—RICKEN, Blätterp. 451, pl. 112, f. 3, 1915—KAUFFM. Agar. Mich. 668, 1918—REA, Brit. Basid. 447, 1922—LANGE, Agar. Denm. VIII, 27, 1930—BRES. Icon. Myc. XXV, pl. 1247, 1933.

[KAWAMURA, Journ. Jap. Bot. V, (96), 1928]

Agaricus serotinus PERS. in HOFFM. Abb. Schwamm. III, 1790 (sec. PERS.); Syn. Fung. 479, 1801.

Agaricus (*Pleurotus*) *serotinus* FR. Syst. Myc. I, 187, 1821; Epicr. Myc. 135, 1838; Hymen. Eur. 176, 1874—RABENH. Deutschl. Krypt. Fl. I, 515, 1844—BERK. Outl. Brit. Fung. 136, 1860—CKE. Handb. Brit. Fung. I, 49, 1871; Ill. Brit. Fung. pl. 258, f. B, 1883—WINT. Die Pilze, I, 734, 1884—SCHROET. Pilze Schles. I, 625, 1889.

Agaricus serotinoides PK. 23 Ann. Rept. N. Y. State Cab. 86, 1872 (teste MURRILL).

Crepidopus serotinus MURRILL, Mycologia, IV, 216, 1912; North Amer. Fl. IX, 304, 1916.

Caespitosely imbricate or gregarious, edible. Pileus 3–24 cm. broad, 2–15 cm. wide, convex to plane, dimidiate-reniform or suborbicular; surface variable in color, dingy yellow, reddish-brown, greenish-brown or olivaceous, viscid when wet in young stage, velvety or villous, pellicle easily separable, margin incurved at first, at length upturned; context white, soft, rather compact when young, thick, taste mild, odour pleasant; lamellae decurrent, close, yellowish; stipe

1.5–3.5 cm. long, 1.5–4 cm. thick, lateral, very rarely excentric, short, thick, yellowish, minutely tomentose or squamulose, with or without blackish or brownish points; spores white in mass, sausage-shaped, curved, 5.5 × 1.8 μ.

Hab. on the trunks of various deciduous trees in woods. Autumn, especially in late autumn. Oshima (Ônomura, Shiriuchi), Iburi (Chitose, Lake side of Shikotsu), Ishikari (Sapporo, Nopporo, Mt. Teine, Jôzankei, Mt. Kurodake), Tokachi (Lake side of Shikaribetsu), Kushiro (Lake side of Akan, Mt. Meakan), Kitami (Oketo-forest), Kurile (Matsuwa).

Distr. Japan (Hokkaido, Honshu), Europe, North America, Siberia.

Jap. name. *Muki-take* (IMAI, KAWAMURA).

Subgen. **Phyllotus** (KARST.) IMAI, nom. nov.

Agaricus § *Pleurotus* § *Dimidiati* FR. Epicr. Myc. 134, 1838, p. p.
Agaricus § *Pleurotus* § *Resupinati* FR. Ibid. 136, 1838.
Phyllotus KARST. l. c. 1879.

Fructificatio non stipitata, sessilis vel resupinata.

4. *Pleurotus porrigens* (PERS. ex FR.) GILL.

Hymen. Fr. 334, 1874—SACC. Syll. Fung. V, 374, 1887; Fl. Ital. Crypt., Hym. 311, 1915—MASS. Brit. Fung. Fl. II, 378, 1893—W. G. SM. Brit. Basid. 95, 1908—RICKEN, Blätterp. 455, 1915—KAUFFM. Agar. Mich. 671, 1918—REA, Brit. Basid. 449, 1922—BRES. Icon. Myc. VI, pl. 281, f. 2, 1928—HEMMI, Bot. Mag. (Tokyo), XLVI, 162, 1932.

Agaricus abietinus SCHRAD. Spic. Fl. Germ. 132, 1794 (teste FR.).

Agaricus porrigens PERS. Obs. Myc. I, 54, 1796 (teste FR.); Syn. Fung. 480, 1801; Myc. Eur. III, 21, 1828.

Agaricus (*Pleurotus*) *porrigens* FR. Syst. Myc. I, 184, 1821; Epicr. Myc. 136, 1838; Hymen. Eur. 178, 1874—BERK. in SMITH, Engl. Fl. V, (2), 72, 1836; Outl. Brit. Fung. 137, 1860—RABENH. Deut. Krypt. Fl. I, 514, 1844—CKE. Handb. Brit. Fung. I, 50, 1871; Ill. Brit. Fung. pl. 259, f. A, 1883—WINT. Die Pilze, I, 733, 1884—SCHROET. Pilze Schles. I, 625, 1889.

Phyllotus porrigens KARST. Hattsv. I, 92, 1879.

Pleurotus niphetus ELLIS, Bull. Torrey Bot. Club, IX, 18, 1882.

Calathinus porrigens QUÉL. Ench. Fung. 46, 1886.

Geopetalum porrigens MURRILL, Mycologia, IV, 215, 1912.

Geopetalum abietinum MURRILL, North Amer. Fl. IX, 300, 1916.

Caespitosely imbricate, edible. Pileus 2–6 cm. broad, 3–8 cm. long, at first resupinate and suborbicular with persistently inrolled margin, sessile, adnate behind, then reflexed and prolonged, ascending or horizontal, elongated ear-shaped, obovate or fan-shaped; surface pure white, glabrous except the base which is villous-tomentose, margin regular or lobed; context thin, rather brittle, white, at length creamy-yellowish, odour and taste none; lamellae at first concurrent, then decurrent, radiating, very narrow, crowded, thin, linear, forked or even, anastomosing at the base; spores white in mass, globose or subglobose, smooth, 6–7 × 6 μ.

Hab. on decayed wood of conifers. Autumn. South Saghalien (Horo). Ishikari (Nopporo), Tokachi (Lake side of Shikaribetsu).

Distr. Japan (Saghalien, Hokkaido, Honshu), Europe, North America.

Jap. name. *Sugi-hiratake* (HEMMI).

Tribe **Hygrophoreae** P. HENN. emend. IMAI

Hygrophoreae P. HENN. in ENGLER & PR. Naturl. Pflanzenf. I, 1**, 209, 1897, p. p.
Hygrophorées R. MAIRE, Rech. Cyt. Tax. Basid. 114, 1902, p. p.
Hygrophorées KONR. et MAUBL. Icon. Sel. Fung. 26, 1924.

Fructificatio carnosa vel ceracea, cum vel sine volo universali. Pileus cum stipite contiguus. Lamellae molles, crassae, ceraceae, vulgo distantes. Sporae in cumulo albae.

Hygrophorus FR.

Genera Hymen. 8, 1836, p. p.; Epicr. Myc. 320, 1838.
Agaricus § *Limacium* FR. Syst. Myc. I, 31, 1821.
Agaricus § *Clitocybe* § *Camarophylli* FR. Ibid. 98, 1821.
Agaricus § *Clitocybe* § *Hygrocybe* FR. Ibid. 101, 1821.
Hygrophorus § *Limacium* FR. Epicr. Myc. 320, 1838.
Hygrophorus § *Camarophyllus* FR. Ibid. 325, 1838.
Hygrophorus § *Hygrocybe* FR. Ibid. 329, 1838.
Camarophyllus KARST. Hattsv. I, xvii, 1879.
Hydrocybe KARST. Ibid. xvii, 1879.
Hygrocybe FAYOD, Ann. Sci. Nat., Bot. 7 sér. IX, 307, 1889.

Limacium SCHROET. Pilze Schles. I, 530, 1889—LANGE, Agar. Denm. V, 12, 1923.

Godfrinia R. MAIRE, Rech. Cyt. Tax. Basid. 116, 1902.

Fructification with, or without, universal veil. Pileus waxy or fleshy, regular, confluent with the stipe. Stipe central, fleshy or waxy. Lamellae attached to the stipe, waxy, soft, thick, but acute at the edge, usually distant. Spores white in mass.

Type species: *Hygrophorus chrysodon* [BATSCH] FR.

Key to the subgenera, sections and species in Hokkaido.

I. Fructification usually with a viscid universal veil..... Subgen. Limacium.
  A. Pileus white or yellowish-white.
    1. Pileus and stipe white or yellowish, covered with evanescent yellow floccose squamules..... *H. chrysodon*(1).
    2. Entirely shining white, but becoming yellowish with age, very viscid; odour almost none..... *H. eburneus*(2).
    3. Pileus white, but disc ochraceous, very viscid; odour strong..... ..... *H. Cossus*(3).
  B. Pileus reddish.
    1. Pileus and stipe whitish with rose spots; growing in coniferous woods..... *H. erubescens*(4).
    2. Pileus densely covered with ochre-red, small punctations..... ..... *H. capreolarius*(5).
    3. Pileus bright reddish color, deeper at the center; growing in coniferous woods..... *H. pudorinus*(6).
  C. Pileus citron-yellow, 2–5 cm. broad..... *H. lucorus*(7).
  D. Pileus brownish or brown.
    1. Pileus brownish at the center, pale on margin; stipe white, viscid when wet..... *H. arbustivus*(8).
    2. Pileus drab or buffy-brown.
      a. Stipe white or grayish, usually not glutinous-peronate..... ..... *H. agathosmus*(9).
      b. Stipe white, glutinous peronate..... *H. mesotephrus*(10).

II. Fructification without veil; pileus firm, opaque, moist in rainy weather, not viscid..... Subgen. *Camarophyllus*.
  A. Lamellae descending, generally deeply decurrent.. Sect. Subturbinatae.
    1. Pileus white or whitish.
      a. Pileus rather fleshy, medium-sized, white or dingy whitish.... ..... *H. virgineus*(11).
      b. Pileus very thin, small, pure white.
        i. Growing on ground..... *H. niveus*(12).
        ii. Growing on dead coniferous wood..... *H. subniveus*(13).
  B. Lamellae more or less emarginate, with or without a decurrent tooth.. ..... Sect. Emarginatae.
    1. Pileus avellaneous in color; context turning from white to pale-orange-pink when exposed to air..... *H. carnescens*(14).

III. Fructification without veil, thin, watery, succulent; pileus fragile, viscid when wet, shining when dry, rarely floccosely squamulose..... ..... Subgen. Hygrocybe.

A. Lamellae adnato-decurrent or deeply decurrent..... ..... Sect. Adanato-decurrentes.

1. Pileus smooth, viscid.

a. Pileus lemon-yellow or waxy-yellow; lamellae yellow..... ..... *H. ceraceus* (15).

b. Pileus blood-red or bright scarlet and becoming yellow..... ..... *H. coccineus* (16).

2. Pileus more or less squamulose, dry.

a. Pileus scarlet or vermilion; lamellae yellow.. *H. miniatus* (17).

B. Lamellae adnexed or emarginate, somewhat separating..... ..... Sect. Emarginato-subliberae.

1. Pileus scarlet, yellow, sulphur-greenish; pileus and stipe becoming black..... *H. conicus* (18).

Subgen. **Limacium** FR.

l. c. 1838.

Universal veil viscid, with occasionally a floccose partial one, which is annular, or marginal. Stipe clothed with scales or more frequently rough with dots above. Pileus viscid, fleshy. Lamellae adnato-decurrent.

1. *Hygrophorus chrysodon* [BATSCH] FR.

Epicr. Myc. 320, 1838; Monogr. Hym. Suec. II, 123, 1863; Hymen. Eur. 405, 1874—BERK. Outl. Brit. Fung. 197, 1860—CKE. Handb. Brit. Fung. I, 195, 1871; Ill. Brit. Fung. pl. 885, 1888—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 185, 1872; Ench. Fung. 48, 1886—GILL. Hymen. Fr. 178, cum icone, 1874—KARST. Hattsv. I, 216, 1879—WINT. Die Pilze, I, 571, 1884—SACC. Syll. Fung. V, 387, 1887; Fl. Ital. Crypt., Hymen. 340, 1915—MASS. Brit. Fung. Fl. II, 353, 1893—ATKINS. Mushrooms, ed. 2, 111, fig. 115, 1903—W. G. SM. Brit. Basid. 256, 1908—ROLLAND, Atlas Champ. 32, f. 54, 1910—KAUFFM. Agar. Mich. 178, 1918—REA, Brit. Basid. 291, 1922—BRES. Icon. Myc. VII, pl. 301, 1928.

[KAWAMURA, Jap. Fungi, no. 45, 1929]

Agaricus Mugnaius SCOP. Fl. Carn. ed. 2, II, 429, 1772 (teste FR.).

Agaricus chrysodon BATSCH, Elench. Fung. Cont. II, 79, f. 212, 1789 (teste FR.).

Agaricus (*Limacium*) *chrysodon* FR. Syst. Myc. I, 32, 1821.

Limacium chrysodon SCHROET. Pilze Schles. I, 531, 1889—RICKEN, Blätterp. 15, pl. 6, f. 4, 1915—LANGE, Agar. Denm. V, 16, 1923.

Hygrophorus mugnaius MURRILL, North Amer. Fl. IX, 391, 1916.

Gregarious or solitary, edible. Pileus 4–7 cm. broad, convex, then plane; surface viscid, white or yellowish, covered with evanescent, yellow, floccose squamules, which are more permanent at the involute margin; context white, sometimes reddish, rather thick, taste mild, odour not unpleasant; lamellae decurrent or adnate, white, somewhat yellowish at the edge, broad, distant, sometimes crisped; stipe 4–7 cm. long, 6–15 mm. thick, subequal, white, covered with minute, light yellow squamules, which form a zone at the apex, stuffed; spores white in mass, ellipsoidal, smooth, 7–10 × 4–6 μ.

Hab. on the ground in woods, especially in conifers. Autumn. Ishikari (Nopporo), Kitami (Oketo forest).

Distr. Japan (Hokkaido, Honshu), Europe, North America, Africa.

Jap. name. *Ukon-gasa* (KAWAMURA).

2. *Hygrophorus eburneus* [BULL.] FR.

Epicr. Myc. 321, 1838; Monogr. Hymen. Suec. II, 123, 1863; Hymen. Eur. 406, 1874—BERK. Outl. Brit. Fung. 197, pl. 15, f. 1, 1860—KICKX, Fl. Crypt. Flandr. II, 195, 1867—CKE. Handb. Brit. Fung. I, 196, 1871; Ill. Brit. Fung. pl. 886, 1888—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 185, 1872; Ench. Fung. 49, 1886—GILL. Hymen. Fr. 180, cum icone, 1874—KARST. Hattsv. I, 217, 1879—WINT. Die Pilze, I, 570, 1884—SACC. Syll. Fung. V, 388, 1887; Fl. Ital. Crypt., Hymen. 340, 1915—MASS. Brit. Fung. Fl. II, 353, 1893—W. G. SM. Brit. Basid. 256, 1908—KAUFFM. Agar. Mich. 178, 1918—REA, Brit. Basid. 292, 1922—BRES. Icon. Myc. VII, pl. 303, 1928.

Agaricus Jozzolus SCOP. Fl. Carn. ed. 2, II, 431, 1772 (teste FR.).

Agaricus lacteus SCHAEFF. Fung. Bavar. IV, Ind. 19, pl. 39, 1774 (teste FR.).

Agaricus eburneus BULL. Champ. Fr. pl. 551, f. 2, 1791 (teste FR.)—PERS. Syn. Fung. 364, 1801.

Agaricus nitens SOW. Engl. Fung. pl. 71, 1797 (teste FR.).

Agaricus (Limacium) eburneus FR. Syst. Myc. I, 33, 1821, excl. var. b.

Limacium eburneum SCHROET. Pilze Schles. I, 530, 1889—RICKEN, Blätterp. 16, pl. 6, f. 5, 1915—LANGE, Agar. Denm. V, 15, 1923.

Gregarious, edible. Pileus 3–7 cm. broad, convex, then expanded to plane or subumbonate; surface viscid, glabrous, pure white when fresh, becoming yellowish with age, shining, margin at first involute and floccose-pubescent; context white, rather thick, firm, odour and taste mild; lamellae decurrent or adnato-decurrent, subdistant, white, often becoming dingy-yellowish with age, veined at

the base; stipe 5–10 cm. long, 5–10 mm. thick, subequal or slightly attenuated or fusiform at the base, white, often becoming dingy with age, viscid, shining-spotted when dry, rough at the spex with dots in the form of squamules, persistently stuffed or becoming hollow; spores white in mass, ellipsoidal, 6–8 × 4–5 μ, smooth.

Hab. on the ground in woods, especially in frondose woods. Autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido), Europe, North America, Africa, Asia Minor, Siberia.

Jap. name. *Shiro-numeri-kasa* (n. n.).

3. *Hygrophorus Cossus* [SOW.] FR.

Epicr. Myc. 321, 1838; Monogr. Hymen. Suec. II, 124, 1863; Hymen. Eur. 406, 1874—BERK. Outl. Brit. Fung. 197, 1860—CKE. Handb. Brit. Fung. I, 196, 1871; Ill. Brit. Fung. pl. 887, 1888—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 185, 1872; Ench. Fung. 49, 1886—GILL. Hymen. Fr. 179, cum icone, 1874—KARST. Hattsv. I, 217, 1879—WINT. Die Pilze, I, 570, 1884—SACC. Syll. Fung. V, 389, 1887; Fl. Ital. Crypt., Hymen. 341, 1915—MASS. Brit. Fung. Fl. II, 354, 1893—W. G. SM. Brit. Basid. 257, 1908—ROLLAND, Atlas Champ. 32, f. 55, 1910—REA, Brit. Basid. 292, 1922—BRES. Icon. Myc. VII, pl. 304, 1928.

Agaricus Cossus SOW. Engl. Fung. pl. 121, 1799 (teste FR.).

Agaricus (*Limacium*) *eburneus* var. b. FR. Syst. Myc. I, 33, 1821.

Agaricus (*Limacium*) *Cossus* BERK. in SMITH, Engl. Fl. V, (2), 13, 1836.

Limacium Cossum RICKEN, Blätterp. 16, 1915—LANGE, Agar. Denm. V, 16, 1923.

Gregarious or solitary. Pileus 4–8 cm. broad, convex, then plane, subumbonate or depressed; surface very viscid, ivory-yellow, marguerite-yellow or pale-olive-buff, disc darker and colored with dark-olive-buff or buffy-brown or only slightly darker, margin naked; context white, then yellowish or yellow, taste mild, odour strong; lamellae subdecurrent or subadnate, distant, white, then slightly yellowish, thick, connected by veins; stipe 6–12 cm. long, 6–12 mm. thick, equal but attenuated at the base, whitish, then yellowish or subconcolorous, viscid, furfuraceous and granular at the apex, stuffed, then hollow; spores white in mass, broadly ellipsoidal, 7–9 × 5–6 μ.

Hab. on the ground in woods. Autumn. Ishikari (Nopporo), Iburi (Lake side of Shikotsu).

Distr. Japan (Hokkaido), Europe, Africa.

Jap. name. *Kusa-numeri-kasa* (n. n.).

4. *Hygrophorus erubescens* FR.

Epicr. Myc. 322, 1838; Monogr. Hymen. Suec. II, 125, 1863; Hymen. Eur. 407, 1874—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 186, pl. 11, f. 1, 1872—GILL. Hymen. Fr. 181, 1874—KARST. Hattsv. I, 219, 1879—WINT. Die Pilze, I, 569, 1884—SACC. Syll. Fung. V, 390, 1887—CKE. Ill. Brit. Fung. pl. 888, 1888—MASS. Brit. Fung. Fl. II, 355, 1893—W. G. SM. Brit. Basid. 257, 1908—REA, Brit. Basid. 293, 1922—BRES. Icon. Myc. VII, pl. 306, 1928.

Agaricus rubescens PERS. Disp. Meth. Fung. 21, 1797; Syn. Fung. 366. 1801 (teste FR.).

Agaricus (*Limacium*) *erubescens* FR. Syst. Myc. I, 32, 1821.

Limacium rubescens SCHROET. Pilze Schles. I, 531, 1889.

Limacium erubescens RICKEN, Blätterp. 10, pl. 4, f. 2, 1915.

Hygrophorus rubescens SACC. Fl. Ital. Crypt., Hymen. 342, 1915.

Gregarious or solitary, edible. Pileus 5–10 cm. broad, gibbous, then convex-plane, at length slightly upturned at the margin; surface slightly viscid, whitish, spotted or colored with orange-vinaceous or ocher-red, glabrous, naked at the margin; context yellowish, taste bitterish, then sometimes slightly acrid; lamellae slightly decurrent, white, spotted or tinged with pinkish-vinaceous or orange-vinaceous, somewhat distant; stipe 5–15 cm. long, 8–15 mm. thick, nearly equal, whitish, stained or spotted concolorously, slightly fibrous external, solid; spores white in mass, ellipsoidal, 7.5–10 × 5–6 μ.

Hab. on the ground in woods, especially in coniferous woods. Autumn. Ishikari (Toyohira), Oshima (Ônomura).

Distr. Japan (Hokkaido, Honshu), Europe, North America, Africa, Siberia.

Jap. name. *Ô-sakura-shimeji* (n. n.).

5. *Hygrophorus capreolarius* (KALCHBR.) SACC.

Fl. Ital. Crypt., Hymen. 342, 1915—BRES. Icon. Myc. VII, pl. 307, 1928.

Hygrophorus erubescens var. *capreolarius* KALCHBR. Icon. Hymen. Hung. 35, pl. 18, f. 3, 1874—FR. Hymen. Eur. 407, 1874—SACC. Syll. Fung. V, 391, 1887.

Hygrophorus erubescens subsp. *capreolarius* WINT. Die Pilze, I, 569, 1884.

Gregarious or solitary. Pileus 3–5 cm. broad, convex then expanded to umbonate, at length slightly upturned at the margin; surface dry, densely covered with ochre-red colored small punctations which lie close together at the center, but at the margin they become

pale, fuse and become pale-ochre-red; context subconcolorous or paler, odour farinaceous; lamellae long decurrent, distant, nearly concolorous to the pileus, rigid, thick, somewhat veinly conjugated; stipe 3–6 cm. long, 5–12 mm. thick, nearly equal, concolorous, slightly fibrillose-subreticulated, subsquamulose at the apex, white tomentose at the base, solid; spores white in mass, ellipsoidal, minutely rough, 6–10 × 4–5 μ (majority 7.5 × 5 μ).

Hab. on the ground in woods. Autumn. Ishikari (Nopporo).

Distr. Japan (Hakkaido), Europe.

Jap. name. *Ko-sakura-shimeji* (n. n.).

Macroscopic features of the present fungus coincide well with those of *H. capreolarius* which was described by BRESADOLA in his Iconographia Mycologica, but the spores are minutely rough.

6. *Hygrophorus pudorinus* FR.

Epicr. Myc. 322, 1838; Monogr. Hymen. Suec. II, 126, 1863; Hymen. Eur. 407, 1874—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 186, 1872; Ench. Fung. 49, 1886—GILL. Hymen. Fr. 181, cum icone, 1874—KARST. Hattsv. I, 219, 1879—WINT. Die Pilze, I, 569, 1884—SACC. Syll. Fung. V, 391, 1887; Fl. Ital. Crypt., Hymen. 343, 1915—MASS. Brit. Fung. Fl. II, 356, 1893—W. G. SM. Brit. Basid. 258, 1908—ROLLAND, Atlas Champ. 33, f. 58, 1910—MURRILL, North Amer. Fl. IX, 393, 1916—KAUFFM. Agar. Mich. 186, 1918—REA, Brit. Basid. 294, 1922—BRES. Icon. Myc. VII, pl. 308, 1928.

Agaricus (*Limacium*) *pudorinus* FR. Syst. Myc. I, 33, 1821.

Limacium pudorinum RICKEN, Blätterp. 10, pl. 4, f. 3, 1915.

Gregarious or scattered, edible. Pileus 5–10 cm. broad, convex, then expanded to nearly plane, obtuse; surface viscid when wet, bright reddish flesh color (pale ochraceous-buff to pale ochraceous-salmon), deeper (avellaneous, wood-brown or buffy-brown) at the center, glabrous, even, margin at first involute and minutely downy; context white or tinged flesh color especially under the pellicle, thick, compact, taste mild, odour of resin of coniferous leaves and rather disagreeable; lamellae adnato-decurrent at first, then slightly decurrent, distant, whitish at first, then tinged flesh-color, thick, often crisped; stipe 5–10 cm. long, 1–2 cm. thick, equal or attenuated downward, white or flesh color, viscid when wet, apex sometimes contracted, white and rough with floccose granules, but usually flesh coloured and floccose fibrillose or glabrescent below, stout, compact, solid; spores white in mass, cylindric-ellipsoidal, smooth, 6–9 × 4–5 μ.

Hab. on the ground in woods, especially coniferous woods (*Abies*). Autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido, Honshu), Europe, North America.

Jap. name. *Fuki-sakura-shimeji* (n. n.).

7. *Hygrophorus lucorus* KALCHBR.

Icon. Hymen. Hung. 35, pl. 19, f. 4, 1874—FR. Hymen. Eur. 409, 1874—WINT. Die Pilze, I, 567, 1884—QUÉL. Ench. Fung. 50, 1886—SACC. Syll. Fung. V, 394, 1887; Fl. Ital. Crypt., Hymen. 346, 1915—RICKEN, Blätterp. 13, pl. 5, f. 3, 1915—BRES. Icon. Myc. VII, pl. 314, 1928.

Gregarious, edible. Pileus 3–6 cm. broad, conico-convex, then expanded and slightly depressed around the little umbo; surface glabrous or adpressed silky fibrillose, viscid, yellow, paler at the margin; context white, but yellowish under the pellicle, odour and taste none; lamellae adnato-decurrent, distant or subdistant, whitish or yellowish; stipe 3–7 cm. long, 5–10 mm. thick, equal, white above, yellowish or yellow below, enclosed by viscid fibrous veil, solid; spores white in mass, ellipsoidal, 9–11 × 5–6 μ.

Hab. on the ground in woods. Autumn. Oshima (Ônomura).

Distr. Japan (Hokkaido), Europe.

Jap. name. *Ki-numeri-kasa* (n. n.).

8. *Hygrophorus arbustivus* FR.

Epicr. Myc. 323, 1838; Monogr. Hymen. Suec. II, 126, 1863; Hymen. Eur. 408, 1874—CKE. Handb. Brit. Fung. I, 196, 1871; Ill. Brit. Fung. pl. 896, f. A, 1888—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 186, 1872; Ench. Fung. 49, 1886—GILL. Hymen. Fr. 182, 1874—KARST. Hattsv. I, 220, 1879—WINT. Die Pilze, I, 568, 1884—SACC. Syll. Fung. V, 493, 1887; Fl. Ital. Crypt., Hymen. 344, 1915—MASS. Brit. Fung. Fl. II, 357, 1893—W. G. SM. Brit. Basid. 258, 1908—REA, Brit. Basid. 294, 1922—BRES. Icon. Myc. VII, pl. 309, 1928.

Limacium arbustivum RICKEN, Blätterp. 12, 1915.

Gregarious or caespitose, edible. Pileus 2–5 cm. broad, convex or subumbonate, then expanded to plane or slightly upturned at the margin but disc with a little umbo; surface very viscid when wet, disc liver-brown or chestnut-brown, margin paler, slightly darker when young, disc with somewhat velvety appearance, margin with innate fibrils; context tinged with reddish brown, odour none, taste

pleasant; lamellae adnate with a decurrent tooth or scarcely decurrent, white, moderately crowded; stipe 5–10 cm. long, 4–10 mm. thick, equal, cylindrical, white, slightly viscid when wet and fresh, apex with white granules; spores white in mass, ellipsoidal, 8–10 × 4–6 μ.

Hab. on the ground in woods. Autumn. Ishikari (Jôzankei).

Distr. Japan (Hokkaido, Honshu), Europe, Africa.

Jap. name. *Ko-kuri-no-kasa* (n. n.).

9. *Hygrophorus agathosmus* FR.

Epicr. Myc. 325, 1838; Monogr. Hymen. Suec. II, 129, 1863; Hymen. Eur. 411, 1874—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 188, 1872; Ench. Fung. 50, 1886—GILL. Hymen. Fr. 184, cum icone, 1874—KARST. Hattsv. I, 222, 1879—WINT. Die Pilze, I, 566, 1884—SACC. Syll. Fung. V, 397, 1887; Fl. Ital. Crypt., Hymen. 348, 1915—MASS. Brit. Fung. Fl. II, 361, 1893—W. G. SM. Brit. Basid. 259, 1908—REA, Brit. Basid. 297, 1922—BRES. Icon. Myc. VII, pl. 319, 1928.

Agaricus agathosmus FR. Obs. Myc. I, 16, 1815.

Agaricus (*Limacium*) *pustulatus* FR. Syst. Myc. I, 34, 1821, p. p.

Limacium agathosmus SCHROET. Pilze Schles. I, 533, 1889—RICKEN, Blätterp. 14, pl. 6, f. 1, 1915—LANGE, Agar. Denm. V, 14, 1923.

Gregarious, edible. Pileus 4–10 cm. broad, convex, then plane or gibbous; surface viscid, drab or buffy-down, darker at the disc, slightly paler on the margin, margin at first incurved and villous, at length reflexed and often undulate; context white, odour pleasant, taste none; lamellae deeply decurrent, white, at length yellowish, distant, soft, somewhat veined at the base, 6–8 mm. broad; stipe 5–12 cm. long, 6–15 mm. thick, equal or slightly thickened toward the base, whitish or grayish, furfuraceous-pruinose at the apex, but finally glabrescent, fibrillosely striate, solid or stuffed; spores white in mass, ellipsoidal, smooth 7.5–10 × 4–6 μ.

Hab. on the ground in woods. Autumn. Ishikari (Jôzankei).

Distr. Japan (Hokkaido), Europe, Africa.

Jap. name. *Usucha-numerikasa* (n. n.).

10. *Hygrophorus mesotephrus* BERK. et BR.

Ann. Mag. Nat. Hist. 2 ser. XIII, 7, pl. 15, f. 2, 1854; BERK. Outl. Brit. Fung. 198, 1860—CKE. Handb. Brit. Fung. I, 197, 1871—FR. Hymen. Eur. 411, 1874—SACC. Syll. Fung. V, 398, 1887; Fl. Ital. Crypt., Hymen. 349, 1915—MASS.

Brit. Fung. Fl. II, 362, 1893—W. G. Sm. Brit. Basid. 259, 1908—Rea, Brit. Basid. 297, 1922.

Limacium mesotephrum Lange, Agar. Denm. V, 14, 1923.

Solitary or scattered, edible. Pileus 1.5–3 cm. broad, slightly umbonate; surface thickly covered with dark-olive-buff or buffy-brown colored gluten which gives a pale-isabelle color on the margin and olive-brown color at the center, margin slightly white-flocculose, not striate; context white, odour and taste none; lamellae decurrent, white, moderately crowded; stipe 3–4 cm. long, 4–5 mm. thick, equal, white, thickly covered with the gluten, which gives the concolorous appearance, but apex not covered with gluten and dry, white mealy, solid; spores white in mass, ellipsoidal, 7.5–10 × 5–6 μ.

Hab. on the ground in woods. Autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido), Europe.

Jap. name. *Hime-numeri-kasa* (n. n.).

Subgen. Camarophyllus Fr.

l. c. 1838.

Veil none. Stipe even, glabrous or fibrillose, not rough with dots. Pileus moist, hardly viscous. Lamellae arcuate, distant.

Sect. Subturbinatae Lange

Agar. Denm. V, 17, 1923.

Lamellae descending, generally deeply decurrent in the mature plant.

11. *Hygrophorus virgineus* [Wulf.] Fr.

Epicr. Myc. 327, 1838; Monogr. Hymen. Suec. II, 133, 1863; Hymen. Eur. 413, 1874—Berk. Outl. Brit. Fung. 199, 1860—Kickx, Fl. Crypt. Flandr. II, 196, 1869—Cke. Handb. Brit. Fung. I, 199, 1871; Ill. Brit. Fung. pl. 892, 1888; Handb. Austr. Fung. 74, 1892—Quél. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 189, 1872; Ench. Fung. 51, 1886—Gill. Hymen. Fr. 187, cum icone, 1874—Wint. Die Pilze, I, 563, 1884—Sacc. Syll. Fung. V, 402, 1887; Fl. Ital. Crypt., Hymen. 355, 1915—Mass. Brit. Fung. Fl. II, 346, 1893—W. G. Sm. Brit. Basid. 261, 1908—Rolland, Atlas Champ. 33, f. 59, 1910—Ricken, Blätterp. 18, 1915—Kauffm. Agar. Mich. 191, 1918—Rea, Brit. Basid. 300, 1922—Bres. Icon. Myc. VII, pl. 328, 1928.

Agaricus virgineus WULF. in JACQ. Misc. Austr. II, 104, pl. 15, f. 1, 1781 (teste FR.)—SOW. Engl. Fung. pl. 32, 1797—PERS. Syn. Fung. 456, 1801.

Agaricus ericeus BULL. Champ. Fr. pl. 188, 1791 (teste FR.).

Agaricus (Clitocybe) virgineus FR. Syst. Myc. I, 100, 1821, p. p.

Camarophyllus virgineus KARST. Hattsv. I, 225, 1879—MURRILL, North Amer. Fl. IX, 386, 1916—LANGE, Agar. Denm. V, 19, 1923.

Hygrophorus ericeus SCHROET. Pilze Schles. I, 529, 1889.

Gregarious or solitary, edible. Pileus 1.5–5 cm. broad, convex, then plane, obtuse, subumbonate, finally depressed at the center; surface white, moist or dry, often cracked into areolate-rimose when moist, floccose and becoming yellowish when dry; context white, taste and odour pleasant; lamellae decurrent, distant, white, rather thick; stipe 3–5 cm. long, 5–12 mm. thick, attenuated downward, white, glabrous or pruinose, dry, solid or stuffed; spores white in mass, ellipsoidal, smooth, 6–8 × 4–5 μ.

Hab. on the ground in woods. Autumn. Oshima (Ônomura), Ishikari (Sapporo).

Distr. Japan (Hokkaido, Honshu), Europe, North & South America, Africa, Australia.

Jap. name. *Otome-no-kasa* (n. n.).

12. *Hygrophorus niveus* [SCOP.] FR.

Epicr. Myc. 327, 1838; Monogr. Hymen. Suec. II, 133, 1863; Hymen. Eur. 414, 1874—BERK. Outl. Brit. Fung. 199, 1860—KICKX, Fl. Crypt. Flandr. II, 197, 1867—CKE. Handb. Brit. Fung. I, 199, 1871; Ill. Brit. Fung. pl. 900, f. A, 1888—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 189, 1872; Ench. Fung. 51, 1886—GILL. Hymen. Fr. 186, 1874—WINT. Die Pilze, I, 563, 1884—SACC. Syll. Fung. V, 403, 1887; Fl. Ital. Crypt., Hymen. 354, 1915—SCHROET. Pilze Schles. I, 529, 1889—MASS. Brit. Fung. Fl. II, 347, 1893—W. G. SM. Brit. Basid. 261, 1908—KAUFFM. Agar. Mich. 191, 1918—REA, Brit. Basid. 300, 1922—BRES. Icon. Myc. VII, pl. 329, 1928.

Agaricus niveus SCOP. Fl. Carn. ed. 2, II, 430, 1772 (teste FR.).

Agaricus (Clitocybe) virgineus FR. Syst. Myc. I, 100, 1821, p. p.

Camarophyllus niveus KARST. Hattsv. I, 232, 1879—LANGE, Agar. Denm. V, 19, 1923.

Hydrocybe nivea MURRILL, North Amer. Fl. IX, 377, 1916.

Gregarious, edible. Pileus 1–3 cm. broad, convex or campanulate, then expanded to umbilicate; surface viscid, snow-white, glabrous, striatulate when wet; context white, thin, odour none, taste mild; lamellae decurrent, white, distant, narrow, thin, subvenose;

stipe 2–8 cm. long, 2–5 mm. thick, equal or attenuated downward, white, glabrous, smooth, stuffed, then hollow; spores white in mass, broadly ellipsoidal, smooth, 7–8 × 4–6 μ.

Hab. on the ground in woods. Autumn. Ishikari (Nopporo), Oshima (Ônomura), Iburi (Lake side of Shikotsu), Kushiro (Lake side of Akan).

Distr. Japan (Hokkaido, Honshu), Europe, North America, Africa, ?Australia.

Jap. name. *Ko-otome-no-kasa* (n. n.).

13. *Hygrophorus subniveus* IMAI, sp. nov.

Gregarius vel solitarius. Pileo 5–15 mm. lato, convexo, dein leviter depresso, albo, glabro, vix viscido, udo hygrophano striatoque, carne alba, tenui, odore nullo, sapore miti; lamellis longe decurrentibus, albis, distantibus, tenuis; stipite 1–2 cm. longo, 1–2 mm. crasso, equali, albo, sericeo-nitente; sporis in cumulo albis, ellipsoideis, asperulatis, 7.5–10 × 4–5 μ.

Hab. on rotting coniferous wood (*Abies Mayriana* MIYABE et KUDO) in woods. Autumn. Ishikari (Nopporo).

Distr. Endemic.

Jap. name. *Hime-otome-no-kasa* (n. n.).

The present fungus is closely allied to *H. nieveus* from which it is distinguished by its habitat and the form of pileus, as well as by the asperulate spores.

Sect. **Emarginatae** LANGE

Agar. Denm. V, 17, 1923.

Lamellae more or less emarginate, with or without a decurrent tooth.

14. *Hygrophorus carnescens* IMAI, sp. nov.

Gregarius. Pileo 5–10 cm. lato, convexo, dein expanso, obtuso, avellaneo, sicco, pulverulento, demum saepe fisso, margine leviter pallidiore incurvatoque; carne crassa, compacta, primo albida, fracta rubescente sed non nigrescente, odore farinaceo, sapore miti; lamellis sinuatis, albidulis vel flavidulis, fracta rubescentibus, distantibus,

latis; stipite 4–8 cm. longo, 1–2 cm. crasso, utrimque attenuato, albidulo, fibrilloso-striato, fracta carnescente, solido; sporis in cumulo albis, late ellipsoideis vel subobovatis, levibus, 5–6.25 × 4–5 μ.

Hab. On the ground in woods. Autumn. Ishikari (Nopporo).

Distr. Endemic.

Jap. name. *Hime-no-kasa* (n. n.).

The present fungus is related to *H. metapodius* FR. from which it is distinguishable by the paler colored pileus.

Subgen. Hygrocybe FR.

l. c. 1838.

Hygrocybe (ut Gen.) FAYOD, l. c. 1889.

Godfrinia (ut Gen.) R. MAIRE, l. c. 1902.

Veil none. Whole fungus thin, watery-succulent, fragile. Pileus viscid when wet, shining when dry, rarely floccosely squamose. Stipe hollow, soft, not punctate. Lamellae soft.

Sect. Adnato-decurrentes LANGE

Agar. Denm. V, 22, 1923.

Lamellae adnato-decurrent.

15. *Hygrophorus ceraceus* [WULF.] FR.

Epicr. Myc. 330, 1838; Monogr. Hymen. Suec. II, 138, 1863; Hymen. Eur. 417, 1874—BERK. Outl. Brit. Fung. 201, 1860—KICKX, Fl. Crypt. Flandr. II, 197, 1867—CKE. Handb. Brit. Fung. I, 201, 1871; Ill. Brit. Fung. pl. 904, f. B, 1888; Handb. Autsr. Fung. 75, 1892—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 191, 1872; Ench. Fung. 52, 1886—GILL. Hymen. Fr. 193, 1874—WINT. Die Pilze, I, 561, 1884—SACC. Syll. Fung. V, 412, 1887; Fl. Ital. Crypt., Hymen. 360, 1915—SCHROET. Pilze Schles. I, 528, 1889—MASS. Brit. Fung. Fl. II, 334, 1893—W. G. SM. Brit. Basid. 263, 1908—MURRILL, Mycologia, II, 160, pl. 27, f. 2, 1910—RICKEN, Blätterp. 24, 1915—KAUFFM. Agar. Mich. 193, 1918—REA, Brit. Basid. 304, 1922—BRES. Icon. Myc. VII, pl. 342, 1928.

Agaricus ceraceus WULF. in JACQ. Misc. Austr. II, 105, pl. 15, f. 2, 1781 (teste FR.)—SOW. Engl. Fung. pl. 20, 1797.

Agaricus (Clitocybe) ceraceus FR. Syst. Myc. I, 102, 1821.

Hygrocybe ceracea KARST. Hattsv. I, 234, 1879—MURRILL, North Amer. Fl. IX, 378, 1916.

Godfrinia ceracea R. MAIRE, Rech. Cyt. Tax. Basid. 123, 1902.

Gregarious, edible. Pileus 1–4 cm. broad, convex to plane, obtuse; surface viscid, pale-yellow or waxy-yellow, sometimes tinged orange, not pallescent, pellucid, glabrous, slightly striate on the margin; context concolorous, fragile; lamellae broadly adnate to subdecurrent, broad behind to subtriangular, thickish, distant, concolorous, connected by veins; stipe 2–6 cm. long, 2–5 mm. thick, equal or sometimes unequal, terete, at length compressed, straight or flexuous, concolorous, glabrous, slightly viscid, soon dry, shining, undulate, hollow; spores white in mass, ellipsoidal, smooth, 6–8 × 4 μ.

Hab. on the ground in woods. Autumn. Ishikari (Nopporo), Kushiro (Lake side of Akan).

Distr. Japan (Hokkaido, Honshu), Europe, North America, Australia, Asia.

Jap. name. *Ki-yama-take* (n. n.).

16. *Hygrophorus coccineus* [SCHAEFF.] FR.

Epicr. Myc. 330, 1838; Monogr. Hymen. Suec. II, 139, 1863; Hymen. Eur. 417, 1874—BERK. Outl. Brit. Fung. 201, 1860—KICKX, Fl. Crypt. Flandr. II, 197, 1867—CKE. Handb. Brit. Fung. I, 201, 1871; Ill. Brit. Fung. pl. 920, 1888; Handb. Austr. Fung. 75, 1892—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 191, 1872; Ench. Fung. 53, 1886—GILL. Hymen. Fr. 194, cum icone, 1874—WINT. Die Pilze, I, 560, 1884—SACC. Syll. Fung. V, 412, 1887—MASS. Brit. Fung. Fl. II, 335, 1893—W. G. SM. Brit. Basid. 264, 1908—MURRILL, Mycologia, II, 162, pl. 27, f. 7, 1910—RICKEN, Blätterp. 23, 1915—KAUFFM. Agar. Mich. 196, pl. 30, 1918—REA, Brit. Basid. 304, 1922—BRES. Icon. Myc. VII, pl. 344, 1928.

Agaricus miniatus SCOP. Fl. Carn. ed. 2, II, 442, 1772 (teste FR.).

Agaricus coccineus SCHAEFF. Fung. Bavar. IV, Ind. 70, pl. 302, 1774 (teste FR.).

Agaricus (*Clitocybe*) *coccineus* FR. Syst. Myc. I, 105, 1821.

Hydrocybe coccinea KARST. Hattsv. I, 234, 1879—LANGE, Agar. Denm. V, 25, 1923.

Hygrophorus miniatus (non FR.) SCHROET. Pilze Schles. I, 528, 1889.

Hydrocybe miniata (non KARST.) MURRILL, North Amer. Fl. IX, 380, 1916.

Gregarious, said to be edible. Pileus 2–6 cm. broad, campanulate or convex, then expanded, finally subumbonate; surface viscid when wet, bright scarlet, fading to pale-red, and finally yellowish, glabrous, even, margin incurved at first, not upturned when mature; context thin, yellowish, fragile, odour and taste none; lamellae adnate with a decurrent tooth, subdistant to distant, pale-yellow to reddish,

broad, connected by veins; stipe 5–9 cm. long, 5–10 mm. thick, nearly equal or slightly attenuated upward, concolorous, becoming yellow, paler at the base, often compressed and furrowed, undulate-uneven, fibrous or glabrous, stuffed then hollow; spores white in mass, broadly ellipsoidal, smooth, 6–10 × 4–6 μ.

Hab. on the ground in woods. Kushiro (Mt. Meakan). Autumn.

Distr. Japan (Hokkaido, Honshu), Europe, North America, Australia.

Jap. name. *Beni-yamatake* (n. n.).

17. *Hygrophorus miniatus* FR.

Epicr. Myc. 330, 1838; Monogr. Hymen. Suec. II, 139, 1863; Hymen. Eur. 418, 1874—BERK. Outl. Brit. Fung. 201, 1860—KICKX, Fl. Crypt.Flandr. II, 198, 1867—CKE. Handb. Brit. Fung. I, 202, 1871; Ill. Brit. Fung. pl. 921, f. A, 1888; Handb. Austr. Fung. 76, 1892—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 191, 1872; Ench. Fung. 53, 1886—GILL. Hymen. Fr. 194, cum icone, 1874—WINT. Die Pilze, I, 560, 1884—SACC. Syll. Fung. V, 413, 1887—MASS. Brit. Fung. Fl. II, 336, 1893—W. G. SM. Brit. Basid. 264, 1908—MURRILL, Mycologia, II, 163, pl. 27, f. 9, 1910—KAWAMURA, Ill. Jap. Fung. pl. 1, f. 27–29, 1912—RICKEN, Blätterp. 24, pl. 8, f. 9, 1915—KAUFFM. Agar. Mich. 195, 1918—REA, Brit. Basid. 305, 1922—BRES. Icon. Myc. VII, pl. 337, f. 2, 1928.

[P. HENN. Hedw. XXXIX, (156), 1900—MATSUM. Ind. Pl. Jap. I, 148, 1904]

Agaricus flammeus SCOP. Fl. Carn. ed. 2, II, 443, 1772 (teste FR.).

Agaricus (Clitocybe) miniatus FR. Syst. Myc. I, 105, 1821.

Hydrocybe miniata KARST. Hattsv. I, 234, 1879—LANGE, Agar. Denm. V, 27, 1923.

Hygrophorus flammans SCHROET. Pilze Schles. I, 528, 1889.

Hydrocybe flammea MURRILL, North Amer. Fl. IX, 381, 1916.

Gregarious or subcaespitose, edible. Pileus 0.5–3 cm. or more broad, convex, then expanded to plane, at length umbilicate; surface slightly viscid when wet, vermilion, rarely yellow, then becoming pale and opaque, minutely tomentose, at length minutely squamulose, sometimes glabrous, even, fragile; context yellow, thin, odour and taste mild; lamellae adnate or very slightly decurrent, yellow or orange-red, at length paler, distant or subdistant, thickish; stipe 2–7 cm. long, 2–5 mm. thick, equal, concolorous or slightly paler, glabrous, shining, stuffed, then hollow; spores white in mass, broadly ellipsoidal, 6–9 × 4–6 μ.

Hab. on the ground in woods. Summer to autumn. Ishikari (Matsuyama).

Distr. Japan (Hokkaido, Honshu), Europe, India, North America, Australia.

Jap. name. *Akanuma-benitake* (SHIRAI, ex P. HENN.).

Sect. **Emarginato-subliberae** LANGE

Agar. Denm. V, 22, 1923.

Lamellae emarginato-subliberate.

18. *Hygrophorus conicus* [SCOP.] FR.

Epicr. Myc. 331, 1838; Monogr. Hymen. Suec. II, 142, 1863; Hymen. Eur. 419, 1874—BERK. Outl. Brit. Fung. 202, 1860—KICKX, Fl. Crypt. Flandr. II, 198, 1867—CKE. Handb. Brit. Fung. I, 203, 1871; Ill. Brit. Fung. pl. 908, 1888; Handb. Austr. Fung. 76, 1892—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 192, 1872; Ench. Fung. 53, 1886—GILL. Hymen. Fr. 192, cum icone, 1874—WINT. Die Pilze, I, 559, 1884—SACC. Syll. Fung. V, 418, 1887, Fl. Ital. Crypt., Hymen. 366, 1915—MASS. Brit. Fung. Fl. II, 339, 1893—SCHROET. Pilze Schles. I, 526, 1889—W. G. SM. Brit. Basid. 265, 1908—MURRILL, Mycologia, II, 162, pl. 27, f. 8, 1910—ROLLAND, Atlas Champ. 33, f. 57, 1910—KAWAMURA, Ill. Jap. Fung. pl. 4, f. 18–19, 1912—RICKEN, Blätterp. 21, pl. 8, f. 4, 1915—KAUFFM. Agar. Mich. 200, 1918—REA, Brit. Basid. 307, 1922.

[P. HENN. Hedw. XXXIX, (156), 1900—MATSUM. Ind. Pl. Jap. I, 148, 1904—UMEMURA, Pl. Fujiyama. 367, 1923—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 113, 1931]

Agaricus conicus SCOP. Fl. Carn. ed. 2, II, 443, 1772 (teste FR.).

Agaricus (*Clitocybe*) *conicus* FR. Syst. Myc. I, 103, 1821.

Hydrocybe conica KARST. Hattsv. I, 236, 1879—MURRILL, North Amer. Fl. IX, 379, 1916—LANGE, Agar. Denm. V, 24, 1923.

Godfrinia conica R. MAIRE, Rech. Cyt. Tax. Basid. 117, 1902.

Gregarious or solitary, edible. Pileus 2–5 cm. broad, campanulate, conical, usually acute, not fully expanded; surface viscid when wet, some shade of red or yellow, at times tinged with green, almost always turning black on drying or in age, margin often splitting-expanded or lobed; context concolorous, very thin, becoming black when bruised or old; lamellae almost free, pallid to sulphur-yellow, sometimes reddish at the base, becoming black, ventricose, thin, rather crowded to somewhat distant; stipe 3–10 cm. long, 3–7 mm. thick, equal or slightly enlarged toward the base, terete, concolorous or citron to golden-yellow, becoming black, straight or twisted, fibril-

losely-striate, often splitting longitudinally, hollow; spores white in mass, broadly ellipsoidal, smooth, 8–11 × 6–8 μ.

Hab. on the ground in woods. Summer to autumn. Ishikari (Nopporo, Mt. Kurodake), Iburi (Lake side of Shikotsu), Kushiro (Mt. Meakan).

Distr. Japan (Hokkaido, Honshu), Asia Minor, Europe, North America, Australia.

Jap. name. *Akayama-take* (SHIRAI ex P. HENNINGS).

Tribe Collybieae IMAI, nom. nov.

Collybiées KONR. et MAUBL. Icon. Sel. Fung. 28 & 235, 1924–35, p. p.

Fructificatio putrescens vel revivescens, sine volva annuloque. Pileus cum stipite cartilagine confluentus sed a stipite heterogenus. Lamellae cum stipite adhaerentes vel liberae. Sporae in cumulo albae.

Key to the genera.

I. Fructification fleshy, subfleshy or membranous, putrescent.
  A. Lamellae adnate or sinuato-adnate.
    1. Margin of pileus at first incurved or exceeding the lamellae..... *Collybia.*
    2. Margin of pileus straight, at first adpressed to the stipe..... *Mycena.*
  B. Lamellae decurrent..... *Omphalia.*

II. Fructification subfleshy or membranous, tough, not putrescent, reviving with moisture..... *Marasmius.*

Collybia (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 61 & 92, 1872.

Gymnopus ROUSSEL, Fl. Calvados, ed. 2, 62, 1806—EARLE, Bull. N. Y. Bot. Gard. V, 428, 1909—MURRILL, North Amer. Fl. IX, 352, 1916.

Agaricus § *Collybia* FR. Syst. Myc. I, 9 & 129, 1821, p. p.

Agaricus § *Collybia* FR. Epicr. Myc. 81, 1838; Hymen. Eur. 3 et 109, 1874.

Lyophyllum KARST. Acta Soc. Faun. Fl. Fenn. II, 3, 1881.

Marasmius § *Collybia* KARST. Finl. Basidsv. 96, 1889.

Tephrophana EARLE, Bull. N. Y. Bot. Gard. V, 427, 1909.

Collybidium EARLE, Ibid. V, 428, 1909.

Fructification without volva and annulus. Pileus fleshy or membranous, regular, margin at first incurved. Stipe central, cartilaginous. Lamellae adnate, adnexed or free, usually white or bright colored, sometimes gray or blackish. Spores white in mass, rarely colored with yellowish or other hues.

Type species: *Agaricus radicatus* RELH. ex FR.

Key to the sections and species in Hokkaido.

I. Stipe stout or rarely slender, sulcate or fibrillosely striate..... Sect. Striaepedes.
   A. Lamellae broad, subdistant.
      1. Fructification usually large; pileus glabrous, viscid when wet; stipe usually long-rooting..... *C. radicata*(1).
      2. Pileus usually streaked with dark colored fibrils, not viscid; stipe usually not long-rooted.
         a. Fructification usually large, and solitary or scattered; stipe with white mycelial strands..... *C. platyphylla*(2).
         b. Fructification usually small, caespitose or densely gregarious on coniferous wood..... *C. lacerata*(3).
   B. Lamellae narrow, crowded.
      1. Fructification usually large; pileus and stipe white then spotted with reddish color..... *C. maculata*(4).
      2. Fructification medium-sized; pileus variable in color, usually brown when wet and paler when dry; stipe rufous or bister..... *C. butyracea*(5).

II. Stipe usually slender, equal, velvety, floccose or pruinose..... Sect. vestipedes.
   A. Pileus yellow or brown, rarely yellowish, viscid when wet; stipe umber, blackish or yellow, densely velvety; lamellae broad, subdistant..... *C. velutipes*(6).

III. Stipe slender, equal, fistulose, glabrous..... Sect. Laevipedes.
   A. Lamellae broad, rather distant; pileus brown or paler; stipe long, rooting, strigose below, mostly growing on cones of conifers..... *C. esculenta*(7)
   B. Lamellae narrow and crowded; pileus incarnate when wet, whitish when dry; stipe rufous.....*C. acervata*(8).

Sect. Striaepedes FR.

Epicr. Myc. 81, 1838; Hymen. Eur. 109, 1874.

Stipe stout, hollow or stuffed, sulcate or fibrillosely striate.

1. *Collybia radicata* (RELH. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 92, 1872; Ench. Fung. 27, 1886—GILL. Hymen. Fr. 311, cum icone, 1874—KARST. Hattsv. I, 140, 1879—SACC. Syll. Fung. V, 200, 1887—MASS. Brit. Fung. Fl. III, 120, 1893—ATKINS. Mushrooms, ed. 2, 92, f. 94, 1903—W. G. SM. Brit. Basid. 59, 1908—ROLLAND, Atlas Champ. 46, f. 98, 1910—KAWAMURA, Ill. Jap. Fung. pl. 3, f. 1–4, 1912—RICKEN, Blätterp. 406, pl. 106, f. 1, 1915—KAUFFM. Agar. Mich. 766, pl. 167, 1918—REA, Brit. Basid. 326, 1922—BRES. Icon. Myc. IV, pl. 189, 1928.

[UMEMURA, Pl. Fujiyama. 366, 1923]

Agaricus macrourus var. α SCOP. Fl. Carn. ed. 2, II, 423, 1772 (teste FR.).

Agaricus radicatus RELH. Fl. Cantabr. no. 1040, 1785 (teste FR.)—SOW. Engl. Fung. pl. 48, 1797.

Agaricus (Clitocybe) radicatus FR. Syst. Myc. I, 118, 1821.

Agaricus (Collybia) radicatus FR. Epicr. Myc. 81, 1838; Hymen. Eur. 109, 1874—BERK. Outl. Brit. Fung. 114, pl. 5, f. 4, 1860—KICKX, Fl. Crypt. Flandr. II, 145, 1867—CKE. Handb. Brit. Fung. I, 53, 1871; Ill. Brit. Fung. pl. 140, 1883; Handb. Austr. Fung. 17, 1892—WINT. Die Pilze, I, 783, 1884.

Agaricus (Collybia) Macrourus SCHROET. Pilze Schles. I, 648, 1889.

Collybia macroura GRAMBERG, Pilze Heimat, I, 38, pl. 39, 1913—SACC. Fl. Ital. Crypt., Hymen. 230, 1915.

Gymnopus radicatus MURRILL, North Amer. Fl. IX, 366, 1916.

Solitary or gregarious, edible. Pileus 5–11.5 cm. broad, convex, then becoming nearly plane; surface viscid when wet, avellaneous, drab or tawny, rarely whitish, with radiate or anastomose wrinkles at the center, margin slightly incurved, with anastomosing wrinkles or smooth; context white, thin, taste and odour none; lamellae white or yellowish, adnate or adnexed, with a decurrent tooth, distant, broad; stipe 7–33 cm. long, 5–15 mm. thick, attenuated upward, usually with a long tail-like fusiform root, yellowish or grayish, with bister colored powdery spots, at length striate-sulcate, cartilaginous, hollow; spores white in mass, subglobose or broadly ellipsoidal, rarely globose, 15–16.5 × 12–13.5 μ, apiculate, smooth.

Hab. on the ground, especially on humus soil of decayed wood or on decaying tree trunks. Summer to autumn. Ishikari (Sapporo, Nopporo, Jôzankei, Mt. Teine, Mt. Taisetsu), Iburi (Chitose, Lake side of Shikotsu), Kushiro (Mt. Meakan).

Distr. Japan (Hokkaido, Honshu), China, Asia Minor, Europe, North America, Australia.

Jap. name. *Tsue-take* (KAWAMURA).

The present fungus varies greatly in size and color. The fusiform root is commonly observed on the fungus growing on the soil

or on much decayed wood, while on the fungus growing on less decayed wood, it is not observed usually. The latter form may be mistaken for as *Collybia retigera* BRES. from which it is distinguished by the larger spores.

2. *Collybia platyphylla* (PERS. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 93, 1872 —GILL. Hymen. Fr. 313, cum icone, 1874—KARST. Hattsv. I, 141, 1879—SACC. Syll. Fung. V, 203, 1887—MASS. Brit. Fung. Fl. III, 121, 1893—ATKINS. Mushrooms, ed. 2, 93, 1903—W. G. SM. Brit. Basid. 60, 1908—RICKEN, Blätterp. 406, pl. 107, f. 1, 1915—KAUFFM. Agar. Mich. 767, 1918—REA, Brit. Basid. 328, 1922.

Agaricus grammocephalus BULL. Champ. Fr. pl. 594, 1793 (teste FR.).

Agaricus platyphyllus PERS. Obs. Myc. I, 47, 1796 (teste FR.); Syn. Fung. 362, 1801.

Agaricus repens FR. Obs. Myc. I, 14, 1815.

Agaricus (Clitocybe) platyphyllus FR. Syst. Myc. I, 117, 1821.

Agaricus (Collybia) platyphyllus FR. Epicr. Myc. 82, 1838; Hymen. Eur. 110, 1874—BERK. Outl. Brit. Fung. 114, 1860—KICKX, Fl. Crypt. Flandr. II, 146, 1867—CKE. Handb. Brit. Fung. I, 54, 1871; Ill. Brit. Fung. pl. 128, 1883—WINT. Die Pilze, I, 782, 1884.

Collybia grammocephala QUÉL. Ench. Fung. 27, 1886—SACC. Fl. Ital. Crypt., Hymen. 229, 1915—BRES. Icon. Myc. IV, pl. 191, 1928.

Agaricus (Collybia) grammocephalus SCHROET. Pilze Schles. I, 648, 1889.

Gymnopus platyphyllus MURRILL, North Amer. Fl. IX, 367, 1916.

Solitary or gregarious, edible. Pileus 7–14 cm. broad, papillate-convex or convex, then plane; surface dry, moist in wet, grayish brown to blackish, streated with dark brown fibrils, center darker, margin incurved at first; context thin, fragile, whitish; lamellae adnate or slightly sinuate, obliquely truncate behind, white, broad, distant, soft, edge wavy or subserrate and tinged with dark-brown color; stipe 8–10 cm. long, 1–1.5 cm. equal, whitish, grayish, silky, apex somewhat pruinose, fibrillosely striate, often striated sulcate, stout, base blunt and attached to white mycelial strands, pellicle cartilaginous, fibrous-fleshy, stuffed or hollow; spores white in mass, broadly ellipsoidal, 7.5–10 × 6–7.5 μ.

Hab. on or around decayed wood in woods. Early summer to autumn. Ishikari (Sapporo, Nopporo, Mt. Tengu), Kushiro (Mt. Meakan), Kuriles (Kunashiri Is.).

Distr. Japan (Hokkaido, Honshu), China, Siberia, Asia Minor, Europe, North America.

Jap. name. *Hirohida-take* (KAWAMURA).

3. *Collybia lacerata* (LASCH) GILL.

Hymen. Fr. 310, 1874—QUÉL. Ench. Fung. 33, 1886—SACC. Syll. Fung. V, 247, 1887; Fl. Ital. Crypt., Hymen. 214, 1915—MASS. Brit. Fung. Fl. III, 149, 1893—W. G. SM. Brit. Basid. 68, 1908—RICKEN, Blätterp. 405, 1915—REA, Brit. Basid. 341, 1922—BRES. Icon. Myc. V, pl. 217, 1928.

Agaricus (*Collybia*) *laceratus* LASCH, in FR. Epicr. Myc. 97, 1838; Hymen. Eur. 127, 1874—BERK. Outl. Brit. Fung. 120, 1860—CKE. Handb. Brit. Fung. I, 62, 1871; Handb. Austr. Fung. 21, 1892.

?*Agaricus familia* PK. 23 Ann. Rep. N. Y. State Cab. 79, 1872.

?*Agaricus oculus* PK. Ibid. 84, 1872.

?*Agaricus abundans* PK. 29 Ann. Rep. N. Y. State Mus. 38, 1878.

?*Collybia familia* SACC. Syll. Fung. V, 241, 1887—KAUFFM. Agar. Mich. 757, pl. 163, 1918.

?*Collybia abundans* SACC. Syll. Fung. V, 241, 1887—KAUFFM. Agar. Mich. 764, pl. 166, 1918.

?*Omphalia oculus* SACC. Syll. Fung. V, 336, 1887.

?*Gymnopus familia* MURRILL, North Amer. Fl. IX, 365, 1916.

?*Gymnopus oculus* MURRILL, Ibid. 367, 1916.

Caespitose or densely gregarious, edible. Pileus 2–5 cm. broad, convex, then plane, depressed at the center; surface smoky-gray, light-smoky-gray or avellaneous, usually darker at the center, innate-fibrillose, often splitting or striate or fimbriately torn at the margin, somewhat moist; context thin, grayish white; lamellae adnate, subcrowded, rather narrow, often veiny, white or grayish-white; stipe 3–8 cm. long, 3–5 mm. thick, subequal or slightly attenuated upward, subconcolorous or paler than the pileus, subglabrous or fibrillosely striate, but floccose-pruinose at the apex and white tomentose at the base, often curved and contorted, easily splitting, hollow; spores white in mass, globose, or subglobose, 4–5 μ.

Hab. on decaying wood, especially on coniferous wood in woods. Ishikari (Nopporo, Jôzankei, Mt. Kurodake), Kushiro (Lake side of Akan), Kitami (Oketo forest).

Distr. Japan (Hokkaido), Asia Minor, Europe, North America?, Australia.

Jap. name. *Hime-hirohidatake* (n. n.).

FRIES described the lamellae of this fungus as "distantibus", and many other authors have also ascribed distant lamellae to this fungus. But BRESADOLA has described them "subconfertae", RICKEN "fast gedrängt" and REA "somewhat crowded or distant". The specimens at hand have subcrowded lamellae. To judge from the descriptions PECK's fungi cited above probably belong here.

4. *Collybia maculata* (ALB. et SCHW. ex FR.) QUÉL.

Champ. Jura Vosg. 2 Suppl., in Mém. Soc. D'Emul. Montb. 2 sér. V, 341, 1873; Ench. Fung. 28, 1886—GILL. Hymen. Fr. 315, cum icone, 1874—KARST. Hattsv. I, 144, 1879—SACC. Syll. Fung. V, 207, 1887; Fl. Ital. Crypt., Hymen. 233, 1915—MASS. Brit. Fung. Fl. III, 123, 1893—W. G. SM. Brit. Basid. 60, 1908 RICKEN, Blätterp. 410, pl. 107, f. 3, 1915—KAUFFM. Agar. Mich. 768, 1918—REA, Brit. Basid. 330, 1922—BRES. Icon. Myc. IV, pl. 194, 1928.

Agaricus carnosus CURT. Fl. Lond. Fasc. 5, pl. 71, 1777–1787—SOW. Engl. Fung. pl. 246, 1803 (teste FR.).

Agaricus maculatus ALB. et SCHW. Consp. Fung. Lus. 186, 1805 (teste FR.).

Agaricus (*Tricholoma*) *maculatus* FR. Syst. Myc. I, 45, 1821.

Agaricus (*Collybia*) *maculatus* FR. Epicr. Myc. 84, 1838; Hymen. Eur. 112, 1874—BERK. Outl. Brit. Fung. 115, 1860—KICKX, Fl. Crypt. Flandr. II, 147, 1867—CKE. Handb. Brit. Fung. I, 55, 1871; Ill. Brit. Fung. pl. 142, 1883—WINT. Die Pilze, I, 781, 1884—SCHROET. Pilze Schles. I, 647, 1889.

Gymnopus carnosus MURRILL, North Amer. Fl. IX, 358, 1916.

Gregarious, edible. Pileus 5–10 cm. broad, convex, then expanded to nearly plane; surface white or whitish, then spotted or stained with reddish color, usually becoming wholly yellowish, brownish or rufescent when matured, smooth, glabrous, margin thin involute at first; context white, thick, firm, with farinaceous odour and mild taste; lamellae adnexed or emarginate-free, white, whitish or yellowish, often spotted with reddish color, narrow, very crowded, denticulate on the edge; stipe 6–12 cm. long, 6–15 mm. thick, somewhat equal or slightly attenuated upward and downward from the portion at ground level, praemorsely radicate, often curved at the base, white, spotted with reddish color, striate, often contorted, stout, firm, cartilaginous, hollow; spores white or pale flesh color in mass, subglobose, sometimes slightly apiculate at one end, 4–6 μ.

Hab. on the ground or on much decayed wood in woods. Autumn. Ishikari (Nopporo), Iburi (Lake side of Shikotsu), Tokachi (Lake side of Shikaribetsu).

Distr. Japan (Hokkaido, Honshu), Siberia, Asia Minor, Europe, North America.

Jap. name. *Aka-aza-take* (n. n.).

5. *Collybia butyracea* (BULL. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 93, 1872; Ench. Fung. 28, 1886—GILL. Hymen. Fr. 316, 1874—KARST. Hattsv. I, 144, 1879—SACC. Syll. Fung. V, 209, 1887; Fl. Ital. Crypt., Hymen. 233, 1915—MASS. Brit. Fung. Fl. III, 125, 1893—W. G. SM. Brit. Basid. 61, 1908—ROLLAND, Atlas

Champ. 47, f. 99, 1910—RICKEN, Blätterp. 408, pl. 107, f. 2, 1915—KAUFFM. Agar. Mich. 753, 1918—REA, Brit. Basid. 331, 1922—BRES. Icon. Myc. IV, pl. 200, 1928.

Agaricus butyraceus BULL. Champ. Fr. pl. 572, 1791 (teste FR.).

Agaricus (Clitocybe) butyraceus FR. Syst. Myc. I, 121, 1821—BERK. in SMITH, Engl. Fl. V, (2), 46, 1836.

Agaricus (Collybia) butyraceus FR. Epicr. Myc. 84, 1838; Hymen. Eur. 113, 1874—BERK. Outl. Brit. Fung. 115, 1860—KICKX, Fl. Crypt. Flandr. II, 147, 1867—CKE. Handb. Brit. Fung. I, 55, 1871; Ill. Brit. Fung. pl. 143, 1883; Handb. Austr. Fung. 18, 1892—WINT. Die Pilze, I, 780, 1884—SCHROET. Pilze Schles. I, 646, 1889.

[YASUDA, Bot. Mag. (Tokyo), XXIII, (402), 1909]

Gregarious or solitary, edible. Pileus 3–6 cm. broad, convex, then nearly plane or umbonate, sometimes with irregularly elevated margin, obtuse; surface glabrous, subhygrophanous, varying in color, commonly some shade of bay-red or tan-color (bay-brown-rufous, then becoming yellowish, ochraceous or whitish); context thin, white, slightly fleshy, tough, taste and odour none; lamellae adnexed or almost free, white or whitish, narrow, crowded; stipe 2–8 cm. long, 4–8 mm. thick, attenuated upward, enlarged at the base, sometimes subbulbous at the base, up to 2 cm. thick, glabrous, yellowish, brownish or rufescent, commonly concolorous, striate, cartilaginous, hollow; spores white in mass, ellipsoidal, 6–9 × 3.5–4.5 μ.

Hab. on the ground in woods, especially under conifers. Autumn. Ishikari (Nopporo), Iburi (Lake side of Shikotsu).

Distr. Japan (Hokkaido, Honshu), Siberia, Europe, North America, Africa.

Jap. name. *Ese-orimiki* (n. n.), *Orimiki* (YASUDA).

Sect. **Vestipedes** FR.

Epicr. Myc. 86, 1838.

Stipe slender, equal, fistulose or medullate, even, velvety, floccose or pruinose.

6. *Collybia velutipes* (CURT. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 94, 1872—GILL. Hymen. Fr. 318, cum icone, 1874—KARST. Hattsv. I, 147, 1879—SACC. Syll. Fung. V, 212, 1887; Fl. Ital. Crypt., Hymen. 235, 1915—MASS. Brit. Fung. Fl. III, 127, 1893—ATKINS. Mushrooms, ed. 2, 92, f. 95, 1903—W. G. SM. Brit. Basid. 62, 1908—ROLLAND, Atlas Champ. 48, f. 103, 1910—KAWAMURA, Ill. Jap. Fung. pl. 10, f. 5–6, 1914—RICKEN, Blätterp. 415, pl. 108, f. 5, 1915—KAUFFM.

Agar. Mich. 769, pl. 168, 1918—REA, Brit. Basid. 332, 1922—BRES. Icon. Myc. V, pl. 201, 1928.

[P. HENN. ENGLERS Bot. Jarb. XXXII, 41, 1903—MATSUM. Ind. Pl. Jap. I, 137, 1904—UMEMURA, Bot. Mag. (Tokyo), XXVIII, (358), 1914; Pl. Fujiyama. 366, 1923—YASUDA, Bot. Mag. (Tokyo), XXXV, (270), 1921—MATSUU. & KANADA, Trans. Tottori Soc. Agr. Sci. III, 117, 1931]

Agaricus velutipes CURT. Fl. Lond. pl. 70, 1778 (teste FR.)—SOW. Engl. Fung. pl. 384, f. 3, 1803.

Agaricus nigripes BULL. Champ. Fr. pl. 344, 1791 (teste FR.).

Agaricus (Clitocybe) velutipes FR. Syst. Myc. I, 119, 1821—BERK. in SMITH, Engl. Fl. V, (2), 44, 1836.

Agaricus (Collybia) velutipes FR. Epicr. Myc. 86, 1838; Hymen. Eur. 115, 1874—BERK. Outl. Brit. Fung. 116, 1860—KICKX, Fl. Crypt. Flandr. II, 148, 1867—CKE. Handb. Brit. Fung. I, 55, 1871; Ill. Brit. Fung. pl. 184, f. A, 1883; Handb. Austr. Fung. 19, 1892—WINT. Die Pilze, I, 779, 1884—SCHROET. Pilze Schles. I, 646, 1889.

Pleurotus velutipes QUÉL. Ench. Fung. 147, 1886.

Gymnopus velutipes MURRILL, North Amer. Fl. IX, 361, 1916.

Caespitose, gregarious or rarely solitary, edible. Pileus 2.5–10 cm. broad, convex, then plane; surface smooth, viscid when wet, fulvous, tawny, rarely ochraceous-orange or orange to cream or cream-buff, margin paler, slightly incurved at first, later upturned or wavy and slightly striate; context whitish or yellowish, rather thick at the center, watery, soft, taste mild, odour agreeable; lamellae whitish or yellowish, adnexed or sinuate-adnexed, broader and rounded behind, rather distant; stipe 3.5–12 cm. long, 3–15 mm. thick, equal or slightly attenuated upward, lemon-yellow, then umber to bister, lighter colored or yellowish above, with dense velvety hairs, especially at the base, cartilaginous, tough, hollow or nearly stuffed; spores white in mass, ellipsoidal, hyaline, smooth, 6.5–7.5 × 3.5–4 μ.

Hab. on rotting wood and at the base of trunks of various frondose trees. Nearly all seasons. Oshima (Ônomura), Iburi (Tomakomai, Chitose, Lake side of Shikotsu), Ishikari (Sapporo, Nopporo), Tokachi (Lake side of Shikaribetsu), Kitami (Oketo forest).

Distr. Japan (Hokkaido, Honshu), China, Siberia, Asia Minor, Europe, North America, Africa, Australia.

Jap. name. *Enoki-take* (KAWAMURA).

Sect. Laevipedes FR.

Epicr. Myc. 90, 1838.

Stipe slender, equal, fistulose, naked, glabrous (except the base), not conspicuously striate.

7. *Collybia esculenta* (WULF. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 97, 1872—GILL. Hymen. Fr. 325, 1874—KARST. Hattsv. I, 154, 1879—SACC. Syll. Fung. V, 227, 1887; Fl. Ital. Crypt., Hymen. 221, 1915—MASS. Brit. Fung. Fl. III, 138, 1893—W. G. SM. Brit. Basid. 65, 1908—RICKEN, Blätterp. 414, pl. 109, f. 1, 1915—BRES. Icon. Myc. V, pl. 210, f. 1, 1928.

Agaricus esculentus WULF. in JACQ. Miscell. II, 103, pl. 14, f. 4, 1778 (teste FR.)—PERS. Syn. Fung. 388, 1801.

Agaricus tenacellus PERS. Obs. Myc. I, 50, 1796; Syn. Fung. 387, 1801; Myc. Eur. III, 152, 1828.

[YASUDA, Bot. Mag. (Tokyo), XXVIII, (30), 1914—NAKAJI, Bot. Mag. (Tokyo), XXX, (102), 1916]

Agaricus (*Collybia*) *esculentus* FR. Syst. Myc. I, 131, 1821; Epicr. Myc. 92, 1838; Hymen. Eur. 121, 1874—BERK. in SMITH, Engl. Fl. V, (2), 50, 1836; Outl. Brit. Fung. 118, 1860—CKE. Handb. Brit. Fung. I, 60, 1871; Ill. Brit. Fung. pl. 152, f. A, 1883—WINT. Die Pilze, I, 774, 1884—SCHROET. Pilze Schles. I, 644, 1889.

Agaricus (*Collybia*) *tenacellus* FR. Syst. Myc. I, 131, 1821; Epicr. Myc. 92, 1838; Hymen. Eur. 121, 1874—SCHROET. Pilze Schles. I, 643, 1889.

Agaricus clavus PERS. Myc. Eur. III, 150, 1828.

Agaricus stolonifer JUNGH. Linnaea, V, 396, 1830—FR. Epicr. Myc. 92, 1838.

Collybia tenacellus QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 97, 1872—GILL. Hymen. Fr. 325, cum icone, 1874—SACC. Syll. Fung. V, 227, 1887; Fl. Ital. Crypt., Hymen. 223, 1915—MASS. Brit. Fung. Fl. III, 139, 1893—W. G. SM. Brit. Basid. 65, 1908—KONRAD, Bull. Soc. Myc. Fr. XLVII, 129, 1931; KONRAD & MAUBL. Icon. Sel. Fung. III, pl. 206, 1932.

Collybia tenacellus var. *stolonifer* QUÉL. Ibid. V, 97, 1872—GILL. Hymen. Fr. 325, 1874.

Agaricus plumipes KALCHBR. Icon. Hymen. Hung. I, 15, pl. 6, f. 3, 1873—FR. Hymen. Eur. 121, 1874.

Agaricus (*Collybia*) *tenacellus* var. *stolonifer* FR. Hymen. Eur. 121, 1874—CKE. Handb. Brit. Fung. ed. 2, I, 70, 1883; Ill. Brit. Fung. pl. 152, f. B, 1883.

Collybia clavus QUÉL. Ench. Fung. 30, 1886.

Collybia stolonifera SACC. Syll. Fung. V, 228, 1887; Fl. Ital. Crypt., Hymen. 222, 1915.

Collybia plumipes SACC. Ibid. V, 228, 1887.

?*Marasmius conigenus* KARST. Finl. Basidsv. 102, 1889—REA, Brit. Basid. 521, 1922.

Marasmius esculentus KARST. Finl. Basidsv. 103, 1889—REA, Brit. Basid. 521, 1922.

Marasmius esculentus var. *tenacellus* KARST. Ibid. 103, 1889.

Marasmius esculentus var. *stolonifer* KARST. Ibid. 103, 1889.

Collybia conigena BRES. Fung. Trid. II, 86, pl. 198, f. 2, 1900; Icon. Myc. V, pl. 210, f. 2, 1928—RICKEN, Blätterp. 413, pl. 109, f. 3, 1915—BREBIN, Bull. Soc. Myc. Fr. XLII, 125, 1926.

[KAWAMURA, Jap. Fung. no. 8, 1929]

Solitary, gregarious or subcaespitose, edible. Pileus 1–2.5 cm. broad, at first conico-campanulate or convex, then plane or subumbonate; surface glabrous, variable in color, whitish, ochraceous to fuscous, usually darker at the center; context white, very thin on the margin, taste and odour almost none; lamellae sinuato-adnexed or rounded-adnexed, white, then discolored, crowded; stipe 2–6 cm. or more long, 2–3 mm. thick, equal, whitish, ochraceous to clay color or subconcolorous, white-pruinose above, base long-rooted and tomentosely fibrillose; spores white in mass, ellipsoidal, 5–7.5 × 3–4.5 μ; cystidia ventricosely fusiform or obovately clavate, capitately thickened or pointed at the apices, thick-walled.

Hab. on buried cones of conifers in woods. Late-spring to summer (or to autumn?). Ishikari (Sapporo).

Distr. Japan (Hokkaido, Honshu), Europe, North America, Australia.

Jap. name. *Matsukasa-shimeji* (YASUDA), *Matsukasa-tsuetake* (KAWAMURA).

8. *Collybia acervata* (FR.) GILL.

Hymen. Fr. 329, cum icone, 1874—KARST. Hattsv. I, 154, 1879—SACC. Syll. Fung. V, 234, 1887; Fl. Ital. Crypt., Hymen. 225, 1915—MASS. Brit. Fung. Fl. III, 140, 1893—W. G. SM. Brit. Basid. 65, 1908—RICKEN, Blätterp. 412, 1915—KAUFFM. Agar. Mich. 759, 1918—REA, Brit. Basid. 337, 1922—BRES. Icon. Myc. V, pl. 211, 1928.

Agaricus (*Clitocybe*) *acervatus* FR. Syst. Myc. I, 122, 1821.

Agaricus (*Collybia*) *acervatus* FR. Epicr. Myc. 92, 1838; Hymen. Eur. 122, 1874—BERK. Outl. Brit. Fung. 119, 1860—CKE. Handb. Brit. Fung. I, 58, 1871; Ill. Brit. Fung. pl. 267, 1883—WINT. Die Pilze, I, 773, 1884—SCHROET. Pilze Schles. I, 643, 1889.

Collybia erythropus var. *acervata* QUÉL. Ench. Fung. 31, 1886.

Gymnopus acervatus MURRILL, North Amer. Fl. IX, 362, 1916.

Densely caespitose, edible. Pileus 2–6 cm. broad, convex, then plane, obtuse; surface pinkish-cinnamon to vinaceous-tawny when wet, paler or whitish when dry, glabrous, hygrophanous, margin involute at first, then flattened and scarcely striatulate when wet; con-

text thin, pallid, reddish in the stipe; lamellae adnexed or free, whitish or tinged with flesh-color, narrow, linear, plane, very crowded; stipe 4–8 cm. long, 2–5 mm. thick, subequal or slightly attenuated upward, rarely compressed, slender, rigid, glabrous, smooth, reddish, reddish-brown, often whitish at the apex, especially when young, commonly with a white mycelial tomentum at the base, hollow; spores white in mass, ellipsoidal, 6–8 × 2.5–4 μ.

Hab. on the ground among fallen leaves or on decaying wood in woods. Autumn. Ishikari (Nopporo), Tokachi (Lake side of Shikaribetsu).

Distr. Japan (Hokkaido, Honshu), Europe, North America.

Jap. name. *Kabu-beni-cha* (n. n.).

Mycena (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 61 & 102, 1872.

Prunulus S. F. GRAY, Nat. Arr. Brit. Pl. I, 630, 1821—EARLE, Bull. N. Y. Bot. Gard. V, 427, 1909—MURRILL, North Amer. Fl. IX, 319, 1916.

Agaricus § *Mycena* FR. Syst. Myc. I, 140, 1821; Epicr. Myc. 99, 1838; Hymen. Eur. 129, 1874.

Mycenula KARST. Medd. Soc. Faun. Fl. Fenn. XVI, 89, 1889.

Insitica EARLE, Bull. N. Y. Bot. Gard. V, 425, 1909.

Basidopus EARLE, Ibid. V, 426, 1909.

Collopus EARLE, Ibid. V, 426, 1909.

Galactopus EARLE, Ibid. 426, 1909—MURRILL, North Amer. Fl. IX, 318, 1916.

Stereopodium EARLE, Ibid. V, 426, 1909.

Linopodium EARLE, Ibid. V, 427, 1909.

Fructification without volva and annulus. Pileus fleshy or membranous, regular, margin straight, never incurved. Stipe central, cartilaginous, usually slender. Lamellae adnate, adnexed or sinuato-adnate with a decurrent tooth, white or rarely bright colored, sometimes changing to gray or reddish. Spores white in mass.

Type species: *Agaricus galericulatus* SCOP. ex FR.

Key to the sections and species in Hokkaido.

I. Stipe juiceless, not dilated into a disc at the base.

A. Lamellae unicolorous, not changing color; Pileus pure colored, bright, not fuscous, nor cinereous..... Sect. Adonideae.

1. Pileus rose-red, rose-purple, violet, lilac or whitish.... *M. pura*(1).

B. Lamellae changing color, from white to gray or reddish, commonly at length connected by veins; pileus not hygrophanous; generally lignicolous and caespitose; stipe strigose and rooted at the base..... ..... Sect. Rigidipedes.

1. Pileus pale grayish to grayish-brown, long striate; stipe smooth... ..... *M. galericulata*(2).

2. Pileus drab, grayish or whitish, striate; stipe longitudinally striate. ..... *M. polygramma*(3).

C. Lamellae changing color, paler at the edges, distant; pileus not hygrophanous, fuscous or rarely orange; stipe filiform, flaccid, rooting, dry; solitary, terrestrial or muscigenous..... ..... Sect. Filipedes.

1. Pileus orange or vermilion..... *M. acicula*(4).

D. Lamellae changing color, at length decurrent with a tooth; pileus and stipe glutinous or viscid..... Sect. Glutinipedes.

1. Pileus whitish or grayish.

a. Lamellae white, usually not becoming reddish in age..... ..... *M. epipterygia*(5).

b. Lamellae white, then becoming flesh-colored or spotted with reddish-brown..... *M. viscosa*(6).

2. Pileus yellow..... *M. citrinella*(7).

II. Stipe and lamellae exuding a milky, usually colored juice when broken.... ..... Sect. Lactipedes.

A. Juice blood-red colored..... *M. haematopus*(8).

B. Juice orange-chrome colored..... *M. crocata*(9).

Sect. Adonideae Fr.

Epicr. Myc. 101, 1838; Hymen. Eur. 133, 1874.

Stipe juiceless, base not dilated into a disc; lamellae unicolorous, not changing color; pileus pure-colored, bright, not becoming fuscous, not cinereous; fructification simple, terrestrial.

1. *Mycena pura* (Pers. ex Fr.) Quél.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 103, 1872; Ench. Fung. 34, 1886—Gill. Hymen. Fr. 282, cum icone, 1874—Karst. Hattsv. I, 100, 1879—Sacc. Syll. Fung. V, 256, 1887; Fl. Ital. Crypt., Hymen. 259, 1915—Mass. Brit. Fung. Fl. III, 113, 1893—Atkins. Mushrooms, ed. 2, 95, f. 97, 1903—W. G. Sm. Brit. Basid. 72, 1908—Rolland, Atlas Champ. 52, f. 113, 1910—Ricken, Blätterp. 432, pl. 110, f. 2, 1915—Kauffm. Agar. Mich. 794, 1918—Rea, Brit. Basid. 377, 1922—Bres. Icon. Myc. V, pl. 226, 1928.

Agaricus roseus BULL. Champ. Fr. pl. 507, 1791 (teste FR.)—SOW. Engl. Fung. pl. 72, 1797—SCHROET. Pilze Schles. I, 637, 1889.

Agaricus purus PERS. Tent. Disp. Fung. 21, 1797; Syn. Fung. 339, 1801 (teste FR.).

Agaricus (*Mycena*) *purus* FR. Syst. Myc. I, 151, 1821; Epicr. Myc. 102, 1838; Hymen Eur. 133, 1874—BERK. in SMITH, Engl. Fl. V, (2), 60, 1836; Outl. Brit. Fung. 122, 1860—KICKX, Fl. Crypt. Flandr. II, 152, 1867—CKE. Handb. Brit. Fung. I, 65, 1871; Ill. Brit. Fung. pl. 157, 1883; Handb. Austr. Fung. 22, 1892—WINT. Die Pilze, I, 765, 1884.

Prunulus purus MURRILL, North Amer. Fl. IX, 332, 1916.

Solitary or gregarious, edible. Pileus 2–5 cm. or more broad, campanulate or convex, then expanded, at length nearly plane or umbonate; surface smooth, glabrous, varying in color, rosy-red, rose-purple, violet, lilac, or whitish, margin striatulate and finally sometimes upturned; context thin, white, odour somewhat of radish; lamellae adnate or sinuate, sometimes wavy and crenate on the edge, venoso-connected, rather broad, subdistant to crowded, varying from white to shades of rose or violet, sometimes white on edges; stipe 5–8 cm. or more long, 2–7 mm. thick, equal or slightly attenuated upward when large, often compressed and twisted, smooth, polished, sometimes silky flocculose, concolorous or darker or paler, somewhat villous at the base, firm, hollow; spores white in mass, ellipsoidal-oblong, 6–8 × 3–4 μ.

Hab. on the ground in woods. Summer to autumn. Ishikari (Nopporo, Sapporo, Mt. Kurodake), Oshima (Ônomura), Iburi (Lake side of Shikotsu), Kushiro (Lake side of Akan), Kitami (Oketo forest).

Distr. Japan (Hokkaido, Honshu), Asia Minor, Europe, North America, Australia, Africa.

Jap. name. *Sakura-take* (n. n.).

Sect. Rigidipedes FR.

Epicr. Myc. 104, 1838; Hymen. Eur. 136, 1874.

Stipe firm, rigid, somewhat tough, juiceless, somewhat strigose and rooted at the base; lamellae changing color, from white to gray or reddish, commonly at length connected by veins; pileus not hygrophanous; generally lignicolous and caespitose.

2. *Mycena galericulata* (SCOP. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 104, 1872; Ench. Fung. 36, 1886—GILL. Hymen. Fr. 276, cum icone, 1874—KARST. Hattsv. I, 106, 1879—SACC. Syll. Fung. V, 268, 1887; Fl. Ital. Crypt. Hymen. 274, 1915—MASS. Brit. Fung. Fl. III, 107, 1893—ATKINS. Mushrooms, ed. 2, 94, 1903—W. G. SM. Brit. Basid. 75, 1908—ROLLAND, Atlas Champ. 51, f. 112, 1910—RICKEN, Blätterp. 439, pl. 111, f. 1, 1915—KAUFFM. Agar. Mich. 797, 1918—REA, Brit. Basid. 383, 1922—BRES. Icon. Myc. V, pl. 234, 1928.

Agaricus galericulatus SCOP. Fl. Carn. ed. 2, II, 455, 1772 (teste FR.).

Agaricus (*Mycena*) *galericulatus* FR. Syst. Myc. I, 143, 1821; Epicr. Myc. 106, 1838; Hymen. Eur. 138, 1874—BERK. in SMITH, Engl. Fl. V, (2), 58, 1836; Outl. Brit. Fung. 124, 1860—KICKX, Fl. Crypt. Flandr. II, 153, 1867—CKE. Handb. Brit. Fung. I, 67, 1871; Ill. Brit. Fung. pl. 222, 1883; Handb. Austr. Fung. 23, 1892—WINT. Die Pilze, I, 761, 1884—SCHROET. Pilze Schles. I, 641, 1889.

Prunulus galericulatus MURRILL, North Amer. Fl. IX, 336, 1916.

Gregarious or caespitose. Pileus 2–5 cm. broad, conico-campanulate, then expanded, umbonate; surface dry, glabrous, pale grayish to grayish-brown, often with brown or blackish-ferruginous stains, usually darker when young, ashy white when old or dried, striate to the umbo; context whitish, thin, tough, odour and taste none; lamellae adnate or decurrent with a tooth, subdistant, moderately broad, connected by veins, dull-white or whitish, usually tinged with fleshy color in age, often stained when old, edge entire or crenulate-eroded; stipe 4–10 cm. or more long, 2–5 mm. thick, fistulose, glabrous, polished, often fusiform-rooted and white tomentose at the base, concolorous, often becoming yellowish or brownish, sometimes twisted or curved; spores white in mass, broadly ellipsoidal, 8–11 × 6–8 μ.

Hab. on rotten wood, old logs, stumps, etc. in woods, rarely on ground in woods. Summer to autumn. Ishikari (Nopporo, Mt. Kurodake), Kushiro (Mt. Meakan), Kitami (Oketo forest).

Distr. Japan (Hokkaido, Honshu), Asia Minor, Europe, North America, Africa, Australia.

Jap. name. *Ô-ashinaga-take* (n. n.).

3. *Mycena polygramma* (BULL. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 104, 1872; Ench. Fung. 36, 1886—GILL. Hymen. Fr. 272, 1874—KARST. Hattsv. I, 106, 1879—SACC. Syll. Fung. V, 269, 1887; Fl. Ital. Crypt., Hymen. 269, 1915—MASS. Brit. Fung. Fl. III, 108, 1893—ATKINS. Mushrooms, ed. 2, 94, f. 96, 1903—W.

G. SM. Brit. Basid. 75, 1908—RICKEN, Blätterp. 438, pl. 111, f. 7, 1915—KAUFFM. Agar. Mich. 801, 1918—REA, Brit. Basid. 384, 1922—BRES. Icon. Myc. V, 237, 1928.

[KAWAMURA, Jap. Fung. no. 89, 1929]

Agaricus polygrammus BULL. Champ. Fr. pl. 395, 1791 (teste FR.)—SOW. Engl. Fung. pl. 222, 1799—PERS. Syn. Fung. 377, 1801.

Agaricus (*Mycena*) *polygrammus* FR. Syst. Myc. I, 146, 1821; Epicr. Myc. 107, 1838; Hymen. Eur. 139, 1874—BERK. in SMITH, Engl. Fl. V, (2), 58, 1836; Outl. Brit. Fung. 124, 1860—KICKX, Fl. Crypt. Flandr. II, 153, 1867—CKE. Handb. Brit. Fung. I, 68, 1871; Ill. Brit. Fung. pl. 223, f. B, 1883—WINT. Die Pilze, I, 761, 1884—SCHROET. Pilze Schles. I, 641, 1889.

Gregarious, caespitose or solitary. Pileus 2–5 cm. broad, campanulate or conico-campanulate, subumbonate; surface dry, drab, grayish or whitish, glabrous, rarely pruinose, striate, margin white when young, sulcate-striate and often toothed; context white, thin; lamellae narrowly adnate or nearly free, not uncinate, ascending or arcuate, broader in the middle, subdistant, white with a faint flush of pink, edge even; stipe 5–10 cm. long, 2–4 mm. thick, equal or slightly attenuated upward, concolorous, longitudinally striate throughout or at the apex, sometimes twisted, straight or flexuous, cartilaginous, firm and rigid but fragile, glabrous, shining, strigose-rooted at the base, hollow; spores white in mass, broadly ellipsoidal, 8–10 × 6–8 μ, smooth; cystidia fusiform-acuminate or flask-shaped with a prolonged apex.

Hab. on decaying logs or wood in woods. Summer to autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido, Honshu), Siberia, Europe, North America, Asia Minor.

Jap. name. *Ashi-naga-take* (KAWAMURA).

Sect. **Filipedes** FR.

Epicr. Myc. 111, 1838; Hymen. Eur. 144, 1874.

Stipe filiform, scarcely 2 mm. thick (and not more), flaccid, somewhat tough, rooting, dry, juiceless, commonly very long in proportion to the pileus; lamellae changing color, paler at the edge, distant; fructification very slender, tense and straight, terrestrial, muscigenous, inodorous, solitary (not caespitose); pileus fuscous or rarely orange, becoming somewhat pale, not hygrophanous.

4. *Mycena acicula* (SCHAEFF. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 107, 1872; Ench. Fung. 39, 1886—GILL. Hymen. Fr. 277, 1874—KARST. Hattsv. I, 117, 1879—SACC. Syll. Fung. V, 288, 1887—MASS. Brit. Fung. Fl. III, 90, 1893—ATKINS. Mushrooms, ed. 2, 97, f. 100, 1903—W. G. SM. Brit. Basid. 79, 1908—RICKEN, Blätterp. 431, pl. 109, f. 7, 1915—KAUFFM. Agar. Mich. 812, 1918—REA, Brit. Basid. 393, 1922.

Agaricus coccineus SCOP. Fl. Carn. ed. 2, II, 436, 1772 (teste FR.).

Agaricus aciculus SCHAEFF. Fung. Bavar. IV, Ind. 52, pl. 222, 1774.

Agaricus (*Mycena*) *aciculus* FR. Epicr. Myc. 114, 1838; Hymen. Eur. 147, 1874—BERK. Outl. Brit. Fung. 127, 1860—KICKX, Fl. Crypt. Flandr. II, 155, 1867—CKE. Handb. Brit. Fung. I, 71, 1871—WINT. Die Pilze, I, 754, 1884—SCHROET. Pilze Schles. I, 633, 1889.

Mycena coccinea SACC. Fl. Ital. Crypt., Hymen. 276, 1915.

Solitary or scattered. Pileus 2–6 mm. broad, campanulate, then convex, sometimes papillate; surface glabrous, glaucous, striatulate on the margin, vermilion, reddish-orange or yellowish with red center; context very thin, membranous, reddish; lamellae rounded-adnexed or almost free, yellow, yellowish, creamy-white or white, rather broad, ventricose, subdistant to distant, the alternate ones shorter, edge minutely crenulate; stipe 2–5 cm. long, about 1 mm. thick, filiform, equal, more or less rooting, glabrous or minutely pulverulent at first especially at the apex, shining, bright yellow, becoming pale, villous at the base, hollow; spores white in mass, oblong-fusiform, smooth, 8–11 × 2–4 μ.

Hab. on rotten wood, or among fallen leaves and grass in woods, meadows etc. Summer to autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido, Honshu), China, Europe, North America.

Jap. name. *Beni-kanoashi-take* (n. n.).

Sect. **Glutinipedes** FR.

Epicr. Myc. 116, 1838; Hymen. Eur. 149, 1874.

Stipe juiceless, glutinous or viscid; lamellae at length decurrent with a tooth.

5. *Mycena epipterygia* (SCOP. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 108, 1872, p. p.—R. MAIRE, Bull. Soc. Myc. Fr. XXVI, 161, f. 1A, 1910—RICKEN, Blätterp. 419, pl. 109, f. 12, 1915—REA, Brit. Basid. 396, 1922.

Agaricus epipterygius Scop. Fl. Carn. ed. 2, II, 455, 1772—Pers. Syn. Fung. 382, 1801 (excl. var. γ).
Agaricus nutans Sow. Engl. Fung. pl. 92, 1797.
Prunulus epipterygius Murrill, North Amer. Fl. IX, 335, 1916.
Agaricus (Mycena) epipterygius Auct. plur. p. p.
Mycena epipterygia Auct. plur. p. p.

Gregarious or caespitose. Pileus 1–3 cm. broad, conico-ovate, then campanulate or subhemispherical, at length subumbonate; surface hygrophanous, covered with a viscid separable pellicle, at first whitish, grayish or yellow, becoming whitish when dried, striate, margin often denticulate; context white, not changing to reddish in age, very thin; taste and odour almost none; lamellae adnate with a decurrent tooth, straight or slightly arcuate, subdistant, rather broad, white at first, grayish in age, edge almost entire; stipe 5–10 cm. long, 1–2 mm. thick, fistulose, equal, straight or flexuous, sometimes twisted or compressed, rooted, glabrous, viscid, citron-yellow or pale citron-color, sometimes cinereous, pallid or whitish, white fibrillose at the base; spores white in mass, ellipsoidal, smooth, 8–11 × 4–5 μ; cystidia none.

Hab. on the ground among fallen leaves in woods. Autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido), Europe, North America, Asia Minor, Siberia, Australia.

Jap. name. *Name-ashi-take* (n. n.).

6. *Mycena viscosa* (Secr.) R. Maire

Bull. Soc. Myc. Fr. XXVI, 162, f. 1B, 1910—Ricken, Blätterp. 419, 1915—Rea, Brit. Basid. 396, 1922.
Agaricus (Mycena) epipterygius Fr. Syst. Myc. I, 155, 1821, p. p.
Agaricus alcalinus var. *viscosus* Secr. Mycogr. Suisse, II, 312, 1833.
Agaricus epipterygius Auct. plur. p. p.
Mycena epipterygia Auct. plur. p. p.

Gregarious or caespitose. Pileus 1–3 cm. broad, conical or campanulate, then expanded; surface hygrophanous, whitish, grayish, then drab, finally reddish-brown, especially darker at the center, long remaining whitish at the margin, long striate, covered with a easily separable viscid pellicle; context whitish, becoming reddish-brown with age, thin, membranous, odour farinaceous; lamellae adnate, with a decurrent tooth, then grayish or flesh color, rarely spotted with reddish-brown, subdistant to subcrowded; stipe 4–10 cm. long,

1–3 mm. thick, equal, citron-yellow, sulphur yellow or golden yellow, viscid, white fibrillose at the base, hollow; spores white in mass, broadly ellipsoidal, smooth, 8–10 × 6–8 μ; cystidia numerous, capitate, 45–55 × 16–18 μ.

Hab. on or around rotten stumps of coniferous wood or among fallen leaves in woods. Autumn. Ishikari (Nopporo, Jôzankei, Mt. Kurodake), Kushiro (Mt. Meakan), Kitami (Oketo forest).

Distr. Japan (Hokkaido), Europe.

Jap. name. *Akaha-nameashitake* (n. n.).

7. *Mycena citrinella* (PERS. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 108, 1872; Ench. Fung. 40, 1886—GILL. Hymen. Fr. 258, 1874—KARST. Hattsv. I, 120, 1879—SACC. Syll. Fung. V, 296, 1887—MASS. Brit. Fung. Fl. III, 84, 1893—W. G. SM. Brit. Basid. 80, 1908—RICKEN, Blätterp. 419, 1915—REA, Brit. Basid. 397, 1922.

Agaricus tenellus BATSCH, Elench.Fung. Cont. I, 103, pl. 18, f. 88, 1786 (teste FR.).

Agaricus citrinellus PERS. Icon. Desc. II, 44, pl. 11, f. 3, 1800; Syn. Fung. 384, 1801 (teste FR.).

Agaricus (*Mycena*) *citrinellus* FR. Syst. Myc. I, 155, 1821; Epicr. Myc. 116, 1838; Hymen. Eur. 150, 1874—CKE. Handb. Brit. Fung. I, 74, 1871—WINT. Die Pilze, I, 751, 1884—SCHROET. Pilze Schles. I, 631, 1889.

Mycena tenella SACC. Fl. Ital. Crypt., Hymen. 245, 1915.

Solitary or in small clusters. Pileus 5–15 mm. broad, campanulate or conical-campanulate, then expanded to hemispherical or convex; surface picric-yellow at first, then becoming paler and nearly whitish, viscid, striate on the margin; context white, thin; lamellae subdecurrent, white, distant, rather broad; stipe 4–9 cm. long, 0.8–1.2 mm. thick, subequal, fistulose, concolorous, viscid, white fibrillose at the base; spores white in mass, oblong or ellipsoidal, 7.5–10 × 4–5 μ.

Hab. on the ground among fallen leaves in woods. Summer to autumn. Ishikari (Nopporo, Mt. Teine, Mt. Kurodake), Iburi (Lake side of Shikotsu), Kushiro (Lake side of Akan), Tokachi (Lake side of Shikaribetsu), Kitami (Oketo forest).

Distr. Japan (Hokkaido, Honshu), Europe.

Jap. name. *Ki-nameashitake* (n. n.).

Sect. Lactipedes Fr.

Epicr. Myc. 114, 1838; Hymen. Eur. 148, 1874.

Stipe and lamellae exuding a milky, usually colored juice when broken; stipe dry, rooting.

8. *Mycena haematopus* (Pers. ex Fr.) Quél.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 244, 1872; Ench. Fung. 39, 1886—Gill. Hymen. Fr. 260, cum icone, 1874—Karst. Hattsv. I, 117, 1879—Sacc. Syll. Fung. V, 291, 1887; Fl. Ital. Crypt., Hymen. 253, 1915—Mass. Brit. Fung. Fl. III, 90, 1893—Atkins. Mushrooms, ed. 2, 98, f. 102, 1903—W. G. Sm. Brit. Basid. 79, 1908—Ricken, Blätterp. 421, 1915—Kauffm. Agar. Mich. 783, 1918—Rea, Brit. Basid. 394, 1922—Bres. Icon. Myc. V, pl. 247, f. 2, 1928.

[Kawamura, Jap. Fung. no. 60, 1929]

Agaricus haematopus Pers. Obs. Myc. II, 56, 1799; Syn. Fung. 379, 1801 (teste Fr.).

Agaricus (*Mycena*) *haematopus* Fr. Obs. Myc. I, 33, 1815; Syst. Myc. I, 149, 1821; Epicr. Myc. 114, 1838; Hymen. Eur. 148, 1874—Cke. Handb. Brit. Fung. I, 72, 1871; Ill. Brit. Fung. pl. 162, 1883; Handb. Austr. Fung. 24, 1892—Wint. Die Pilze, I, 754, 1884—Schroet. Pilze Schles. I, 633, 1889.

Galactopus haematopus Earle, Bull. N. Y. Bot. Gard. V, 426, 1909—Murrill, North Amer. Fl. IX, 319, 1916.

Gregarious, subcaespitose or solitary, exuding blood-like juice from every wounded part. Pileus 1.5–4.5 cm. broad, conical, then campanulate; surface whitish to dark reddish color with a purplish tinge, smooth, dry, margin slightly striate and with denticulate veil; context subfleshy, thin, taste and odour none; lamellae white, then flesh color or vinaceous, adnate with a small decurrent tooth, subdistant; stipe 9–11 cm. long, 2–3 mm. thick, slightly attenuated upward, subconcolorous, smooth, but white-downy at the base, hollow, rigid, cartilaginous; spores white in mass, ellipsoidal, 9–11 × 5.5–6.5 μ.

Hab. on humus soil or much decayed wood in woods. Summer to autumn. Ishikari (Nopporo, Mt. Teine, Sapporo, Mt. Kurodake), Oshima (Ônomura), Iburi (Lake side of Shikotsu), Kushiro (Lake side of Akan, Mt. Meakan).

Distr. Japan (Hokkaido, Honshu), Europe, North America, Australia.

Jap. name. *Chishio-take* (Imai, Kawamura).

9. *Mycena crocata* (SCHRAD. ex FR.) GILL.

Hymen. Fr. 260, 1874—QUÉL. Champ. Jura Vosg. 3 Suppl., in Mém. Soc. D'Emul. Montb. 2 sér. V, 435, 1875; Ench. Fung. 39, 1886—KARST. Hattsv. I, 118, 1879—SACC. Syll. Fung. V, 292, 1887—MASS. Brit. Fung. Fl. III, 88, 1893—W. G. SM. Brit. Basid. 79, 1908—RICKEN, Blätterp. 421, 1915—REA, Brit. Basid. 395, 1922.

Agaricus crocatus SCHRAD. Spic. Fl. Germ. 127, 1794 (teste FR.)—PERS. Syn. Fung. 380, 1801.

Agaricus (*Mycena*) *crocatus* FR. Syst. Myc. I, 148, 1821; Epicr. Myc. 115, 1838; Hymen. Eur. 148, 1874—BERK. Outl. Brit. Fung. 127, 1860—CKE. Handb. Brit. Fung. I, 73, 1871—WINT. Die Pilze, I, 753, 1884.

Gregarious or solitary, exuding orange-chrome or flame-scarlet colored juice from every wounded part. Pileus 2–4 cm. broad, conical, then campanulate, at length subumbonate; surface grayish, olive-buff, reddish, light-buckthorn-brown or clay colored, darker at the umbo, smooth, dry, long striate on the margin, margin very thin; context thin, whitish, soon flame-scarlet colored, taste mild, odour none; lamellae white, adnate or slightly decurrent by a tooth, rather distant, broader in front, subventricose; stipe 10–15 cm. long, 2–3.5 mm. thick, slightly attenuated upward, with rooted, creeping and woolly base, orange-buff or flame-scarlet, especially toward the base, cartilaginous, hollow; spores white in mass, ellipsoidal, 7.5–10.5 × 4.5–6 μ.

Hab. on humus soil or much decayed wood in woods. Autumn. Ishikari (Sapporo, Nopporo), Iburi (Ônomura).

Distr. Japan (Hokkaido, Honshu), Europe, Asia Minor.

Jap. name. *Aka-chishio-take* (n. n.).

Omphalia (PERS. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 61 & 99, 1872.

Agaricus § *Omphalia* PERS. Syn. Fung. 447, 1801, p. p.

Agaricus § *Omphalia* FR. Syst. Myc. I, 9 & 162, 1821; Epicr. Myc. 119, 1838.

Omphalina QUÉL. Ench. Fung. 42, 1886.

Delicatula FAYOD, Ann. Sci. Nat., Bot. 7 sér. IX, 313, 1889.

Omphalopsis EARLE, Bull. N. Y. Bot. Gard. V, 425, 1909.

Fructification without volva and annulus. Pileus fleshy or membranous, regular, often umbilicate; margin incurved, or straight and

adpressed to the stipe. Stipe central, cartilaginous, usually slender. Lamellae decurrent. Spores white in mass.

Type species: *Agaricus hydrogrammus* BULL. ex FR.

Key to the sections and species in Hokkaido.

I. Pileus at first spread out, margin incurved..... Sect. Collybiariae.
  A. Fructification medium-sized; lamellae rather distant, narrow, attenuated at both ends; pileus cinereous-fuliginous and striate when moist, becoming pale, silky or floccosely-squamulose when dry; stipe cinereous.. ..... *O. epichysium*(1).

II. Pileus at first campanulate, margin straight, adpressed to the stipe..... ..... Sect. Mycenariae.
  A. Lamellae broad, perfect, unequal.
    1. Pileus yellow-ferruginous; stipe date brown, polished..... ..... *O. campanella*(2).
    2. Pileus black-fuscous or umber-fuscous; stipe concolorous..... ..... *O. umbratilis*(3).

Sect. Collybiariae FR.

Epicr. Myc. 120, 1838.

Pileus at first spread out, margin incurved.

Subsect. Pyxidati FR.

Ibid. 122, 1838.

Medium-sized; lamellae rather distant, narrow, attenuated at both ends.

1. *Omphalia epichysium* (PERS. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 100, 1872—KARST. Hattsv. I, 130, 1879—SACC. Syll. Fung. V, 314, 1887; Fl. Ital. Crypt., Hymen. 287, 1915—ATKINS. Mushrooms, ed. 2, 101, f. 104, 1903—W. G. SM. Brit. Basid. 85, 1908—RICKEN, Blätterp. 388, 1915—KAUFFM. Agar. Mich. 818, pl. 171, 1918—REA, Brit. Basid. 426, 1922—BRES. Icon. Myc. VI, pl. 261, 1928—CEIJ, Rev. Cent. Eur. Sp. Omphalia-Mycena, II, 34, 1929.

[MATSUM. Ind. Pl. Jap. I, 156, 1904]

Agaricus (*Omphalia*) *epichysium* PERS. Syn. Fung. 462, 1801 (teste FR.).

Agaricus (*Omphalia*) *epichysium* FR. Syst. Myc. I, 169, 1821; Epicr. Myc. 123, 1838; Hymen. Eur. 158, 1874—WINT. Die Pilze, I, 746, 1884—SCHROET. Pilze Schles. I, 628, 1889—CKE. Handb. Austr. Fung. 27, 1892.

Omphalina epichysium QUÉL. Ench. Fung. 43, 1886.

Gregarious or solitary. Pileus 1–4 cm. broad, convex, then expanded to umbilicate or umbilicato-infundibuliform; surface dark-cinereous to smoky-brown, becoming paler when dry, center flocculoso-subsquamulose, then glabrous, margin striatulate when wet, often undulate-lobate; context subconcolorous, odour and taste none; lamellae subdecurrent or plano-decurrent, distant, whitish-cinereous; stipe 1.5–3 cm. long, 1.5–4 mm. thick, equal, smoky-cinereous, glabrous, base white floccose, almost solid or subfistulose; spores white in mass, ellipsoidal, smooth, 7.5–10 × 4–6 μ.

Hab. on rotten wood in woods. Autumn. Ishikari (Nopporo), Kitami (Oketo forest).

Distr. Japan (Hokkaido), China, Asia Minor, Europe, North America, Australia.

Jap. name. *Hida-sakazukitake* (n. n.).

Sect. **Mycenariae** Fr.

Epicr. Myc. 126, 1838.

Pileus at first campanulate, margin straight, at first adpressed to the stipe.

Subsect. **Campanullae** Fr.

Ibid. 126, 1838.

Lamellae broad, perfect, unequal.

2. *Omphalia campanella* (Batsch ex Fr.) Quél.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 240, 1872—Gill. Hymen. Fr. 299, 1874—Karst. Hattsv. I, 135, 1879—Sacc. Syll. Fung. V, 327, 1887—Mass. Brit. Fung. Fl. II, 397, 1893—Atkins. Mushrooms, ed. 2, 101, f. 103, 1903—W. G. Sm. Brit. Basid. 87, 1908—Ricken, Blätterp. 397, 1915—Kauffm. Agar. Mich. 823, pl. 172, 1918—Rea, Brit. Basid. 431, 1922—Bres. Icon. Myc. VI, pl. 273, 1928—Ceij, Rev. Cent. Eur. Sp. Omphalia-Mycena, II, 55, 1929—Lange, Agar. Denm. VIII, 15, 1930.

[Matsuura & Kanada, Trans. Tottori Soc. Agr. Sci. III, 117, 1931]

Agaricus fragilis Schaeff. Fung. Bavar. IV, Ind. 56, pl. 230, 1774 (teste Fr.)—Schroet. Pilze Schles. I, 627, 1889.

Agaricus campanella Batsch, Elench. Fung. 74, 1783 (teste Fr.).

Agaricus (*Omphalia*) *campanella* Pers. Syn. Fung. 469, 1801 (teste Fr.).

Agaricus (*Omphalia*) *campanella* Fr. Syst. Myc. I, 166, 1821; Epicr. Myc. 126, 1838; Hymen. Eur. 162, 1874—Berk. in Smith, Engl. Fl. V, (2), 66, 1836;

Outl. Brit. Fung. 133, 1860—CKE. Handb. Brit. Fung. I, 81, 1871—WINT. Die Pilze, I, 742, 1884.

Omphalina campanella QUÉL. Ench. Fung. 45, 1886.

Omphalia fragilis SACC. Fl. Ital. Crypt., Hymen. 297, 1915.

Omphalopsis campanella MURRILL, North Amer. Fl. IX, 313, 1916.

Caespitose or gregarious. Pileus 8–20 mm. broad, campanulate or convex, then umbilicate or subinfundibuliform; surface yellow-ferruginous, dull orange-yellow or tinged reddish, glabrous, striate, hygrophanous; context concolorous, thin, membranous, taste and odour none; lamellae adnate-decurrent to deeply decurrent, yellowish-white, somewhat crowded to subdistant, prominently connected by veins; stipe 1–3 cm. long, 0.5–2 mm. thick, equal, fistulose, at first yellow above and date-brown below, at length date-brown at all, glabrous, rigid, polished, base whitish or yellowish hairy; spores white in mass, ellipsoidal, smooth, 6–7.5 × 3–3.5 μ.

Hab. on decorticated rotten coniferous wood in woods. Summer to autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido, Honshu), Siberia, Asia Minor, Europe, North America.

Jap. name. *Hime-kabairo-take* (MATSUURA & KANADA).

3. *Omphalia umbratilis* (FR.) GILL.

Hymen. Fr. 299, cum icone, 1874—KARST. Hattsv. I, 137, 1879—SACC. Syll. Fung. V, 330, 1887; Fl. Ital. Crypt., Hymen. 298, 1915—MASS. Brit. Fung. Fl. II, 399, 1893—W. G. SM. Brit. Basid. 88, 1908—RICKEN, Blätterp. 399, 1915—KAUFFM. Agar. Mich. 824, 1918—REA, Brit. Basid. 432, 1922—BRES. Icon. Myc. VI, pl. 267, f. 1, 1928—CEIJ, Rev. Cent. Eur. Sp. Omphalia-Mycena, II, 68, 1929.

Agaricus (*Mycena*) *umbratilis* FR. Syst. Myc. I, 157, 1821.

Agaricus (*Omphalia*) *umbratilis* FR. Epicr. Myc. 127, 1838; Hymen. Eur. 164, 1874—WINT. Die Pilze, I, 742, 1884.

Omphalina umbratilis QUÉL. Ench. Fung. 45, 1886.

Gregarious or solitary. Pileus 1–3 cm. broad, subcampanulate to convex, then convex-umbilicate; surface glabrous, hygrophanous, black-fuscous or umber-fuscous when moist, hoary when dry, margin striatulate; context concolorous, odour and taste none; lamellae adnate-decurrent, crowded, becoming fuscous-white, broad; stipe 2–5 cm. long, about 2 mm. thick, equal, stuffed, glabrous, subconcolorous; spores white in mass, long-ellipsoidal, 7–9 × 4–5 μ.

Hab. on the ground in woods. Autumn. Ishikari (Mt. Kurodake).

Distr. Japan (Hokkaido, Honshu), Europe, North America.

Jap. name. *Ko-kuro-sakazuki-take* (n. n.).

Marasmius FR.

Gen. Hymen. 9, 1836; Epicr. Myc. 372, 1838.
Androsaceus PAT. Hymen. Eur. 105, 1887.
Marasmius § *Eumarasmius* KARST. Finl. Basidsv. 96, 1889.
Mycetinis EARLE, Bull. N. Y. Bot. Gard. V, 414, 1909.
Collybiopsis EARLE, Ibid. V, 415, 1909.
Scorteus EARLE, Ibid. V, 415, 1909.

Fructification without volva and annulus, usually reviving with moisture, not putrescent. Pileus subfleshy, subcoriaceous or coriaceous, usually membranous, regular or resupinate; margin incurved or not. Stipe central or wanting, cartilaginous or horny. Lamellae adnate, adnexed, decurrent or free, pliant, rather tough. Spores white in mass.

Type species: *Agaricus androsaceus* LINN. ex FR.

Key to the sections, subsections and species in Hokkaido.

I. Pileus fleshy-tough, at length subcoriaceous, sulcate or corrugate, at first involute at the margin; stipe subcartilaginous..... Sect. Collybiae.
  A. Stipe solid or stuffed to hollow, externally villose.....Subsect. Scortei.
    1. Stipe pubescent with white villous down; pileus pinkish-buff, smooth..... *M. confluens*(1).
    2. Stipe nearly smooth or slightly villous-pubescent; pileus reddish-brown, becoming yellowish-buff..... *M. oreades*(2).

II. Pileus submembranous, at first straight and adpressed to the stipe at the margin; stipe coriaceous..... Sect. Mycenae.
  A. Stipe rigid, rooting or dilated at the base.....Subsect. Chordales.
    1. Stipe glabrous, shining, blackish-brown; pileus ochraceous or cinnamon, radiate-sulcate; lamellae few, very distant..... *M. siccus*(3).
  B. Stipe filiform, flaccid, inserted at the base; pileus soon becoming plane or umbilicate; epiphyllous..... Subsect. Rotulae.
    1. Stipe glabrous, shining; lamellae attached to a collor free from the stipe.
      a. Pileus white or whitish; stipe shining, blackish-brown..... ..... *M. rotula*(4);
      b. Pileus pale-rufous; stipe shining-black..... *M. graminum*(5).

Sect. Collybiae Fr.

Epicr. Myc. 373, 1838.
Agaricus § *Clitocybe* § *Scortei* Fr. Syst. Myc. I, 126, 1821.

Pileus fleshy-tough, at length subcoriaceous, sulcate or corrugate, margin at first involute. Stipe subcartilaginous.

Subsect. Scortei Fr.

Ibid. 373, 1838.

Stipe solid or stuffed, then hollow, internally fibrous, externally cartilaginous and covered with villous down which is easily removed. Lamellae separating-free.

1. *Marasmius confluens* (Pers. ex Fr.) Ricken

Blätterp. 72, pl. 24, f. 2, 1915—Murrill, North Amer. Fl. IX, 269, 1915.

Agaricus confluens Pers. Obs. Myc. I, 10, 1796; Icon. Descr. Fung. Fasc. I, 15, pl. 5, f. 1, 1798; Syn. Fung. 368, 1801 (teste Fr.).

Agaricus (*Clitocybe*) *confluens* Fr. Syst. Myc. I, 123, 1821—Berk. in Smith, Engl. Fl. V, (2), 46, 1836.

Agaricus (*Collybia*) *confluens* Fr. Epicr. Myc. 88, 1838; Hymen. Eur. 117, 1874—Berk. Outl. Brit. Fung. 116, 1860—Cke. Handb. Brit. Fung. I, 56, 1871; Ill. Brit. Fung. pl. 150, f. B, 1883—Wint. Die Pilze, I, 777, 1884—Schroet. Pilze Schles. I, 645, 1889.

Collybia confluens Quél. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 95, 1872—Gill. Hymen. Fr. 322, cum icone, 1874—Karst. Hattsv. I, 150, 1879—Sacc. Syll. Fung. V, 222, 1887; Fl. Ital. Crypt., Hymen. 238, 1915—Mass. Brit. Fung. Fl. III, 130, 1893—Kauffm. Agar. Mich. 775, 1918—Kawamura, Ill. Jap. Fung. pl. 17, f. 19–21, 1925.

[P. Henn. Englers Bot. Jahrb. XXXI, 738, 1902—Matsum. Ind. Pl. Jap. I, 136, 1904]

Collybia hariolorum Quél. Ench. Fung. 29, 1886.

Marasmius hariolorum Rea, Brit. Basid. 522, 1922.

Caespitose or gregarious. Pileus 1–5 cm. broad, convex, then plane, obtuse, rather depressed at the center; surface smooth, pinkish-buff, nearly pinkish-cinnamon at the center when wet, becoming paler or almost white when dry, margin very thin, often involute, even when mature, but often reflexed when old; context very thin, subconcolorous, taste and odour almost none; lamellae free or remote,

very narrow and crowded, whitish, then slightly discolored; stipe 4–12 cm. long, 1.5–4 mm. thick, equal or slightly enlarged at the base, often compressed, concolorous or light chestnut-brown, pubescent with white villous down, confluent at the base, hollow; spores white in mass, ellipsoidal, about $7 \times 3.5\ \mu$.

Hab. among fallen leaves, mostly in deciduous woods. Summer to autumn. Ishikari (Nopporo), Iburi (Lake side of Shikotsu).

Distr. Japan (Hokkaido, Honshu), Asia Minor, Europe, North America.

Jap. name. *Ama-take* (KAWAMURA).

2. *Marasmius oreades* [BOLT.] FR.

Epicr. Myc. 375, 1838; Hymen. Eur. 467, 1874—BERK. Outl. Brit. Fung. 219, pl. 14, f. 5, 1860—KICKX, Fl. Crypt. Flandr. II, 210, 1867—CKE. Handb. Brit. Fung. I, 233, 1871; Ill. Brit. Fung. pl. 1118, 1890—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 219, 1872; Ench. Fung. 142, 1886—GILL. Hymen. Fr. 368, cum icone, 1874—KARST. Hattsv. I, 166, 1879—WINT. Die Pilze, I, 512, 1884—SACC. Syll. Fung. V, 510, 1887—MASS. Brit. Fung. Fl. III, 156, 1893—ATKINS. Mushrooms, ed. 2, 131, f. 129, 1903—W. G. SM. Brit. Basid. 301, 1908—ROLLAND, Atlas Champ. 50, f. 107, 1910—RICKEN, Blätterp. 75, pl. 24, f. 5, 1915—KAUFFM. Agar. Mich. 61, 1918—REA, Brit. Basid. 519, 1922—BRES. Icon. Myc. X, pl. 490, 1929.

Agaricus caryophyllaeus SCHAEFF. Fung. Bavar. IV, Ind. 33, pl. 77, 1774 (teste FR.).

Agaricus oreades BOLT. Hist. Fung. Halif. pl. 151, 1791 (teste FR.).

Agaricus pratensis SOW. Engl. Fung. pl. 247, 1803 (teste FR.).

Agaricus (*Clitocybe*) *oreades* FR. Syst. Myc. I, 127, 1821—BERK. in SMITH, Engl. Fl. V, (2), 48, 1836.

Marasmius caryophylleus SCHROET. Pilze Schles. I, 561, 1889—MURRILL, North Amer. Fl. IX, 271, 1915—SACC. Fl. Ital. Crypt., Hymen. 472, 1915.

Scorteus oreades EARLE, Bull. N. Y. Bot. Gard. V, 415, 1909.

Gregarious, usually forming a fairy ring or arc, edible. Pileus 2–6 cm. broad, convex, obtuse or broadly umbonate; surface hygrophanous, reddish brown when young or wet, fading to yellowish flesh-color or yellowish buff or rarely whitish when dry, glabrous, margin at first involute, even or substriate when wet; context pallid or pale-ochraceous, rather thick at the disk, somewhat tough, odour and taste agreeable; lamellae free or rounded behind, whitish or pale yellowish, broad, distant; stipe 4–8 cm. long, 2–5 mm. thick, equal, very tough, whitish, slightly villous-pubescent or nearly smooth, solid; spores white in mass, ellipsoidal, $7–9 \times 4–5\ \mu$, smooth.

Hab. on grassy ground in gardens, pastures or roadsides. Summer to autumn. Ishikari (Sapporo).

Distr. Japan (Hokkaido), Europe, North America, Siberia, Asia Minor, Australia.

Jap. name. *Shibafu-take* (n. n.).

Sect. Mycenae Fr.

Epicr. Myc. 381, 1838.

Stipe leathery, fistulose, sometimes stuffed, tough, arid, with corticated rhizomorphoid mycelium. Pileus submembranous, campanulate, then expanded, margin at first straight and adpressed to the stipe.

Subsect. Chordales Fr.

Ibid. 381, 1838.

Stipe rigid, rooting or adnate by a dilated disc. Pileus campanulate or convex.

3. *Marasmius siccus* (Schw.) Fr.

Epicr. Myc. 382, 1838—Sacc. Syll. Fung. V, 535, 1887—Kawamura, Ill. Jap. Fung. pl. 4, f. 24–28, 1912—Murrill, North Amer. Fl. IX, 283, 1915.

[Lloyd, Letter, No. 54, p. 3, 1915—Yasuda, Bot. Mag. (Tokyo), XXIX, (192), 1915—Shirai, List Jap. Fung. ed. 2, 341, 1917; ed. 3, 201, 1927]

Agaricus siccus Schw. Schr. Nat. Ges. Leipzig, I, 84, 1822.

Marasmius campanulatus Pk. 23 Ann. Rep. N. Y. State Cab. 126, 1872—Sacc. Syll. Fung. V, 535, 1887 (teste Murrill).

Marasmius fulviceps Clements, Bot. Surv. Nebr. IV, 20, 1896 (teste Murr.).

Marasmius Clementsianus Sacc. et Syd. in Sacc. Syll. Fung. XIV, 101, 1899.

Solitary or scattered. Pileus 5–12 mm. broad, convex or campanulate; surface dry, glabrous, ochraceous or cinnamon, somewhat orange-rufous, radiato-sulcate on the margin, thin, membranous; lamellae nearly free, narrowed behind, few, very distant, rather broad, white; stipe 3.5–6 cm. long, 0.5–1.5 mm. thick, blackish-brown, tough, hollow, glabrous, shining; spores white in mass, fusiform or lanceolate, 18–22 × 3.5–5.5 μ.

Hab. on rotting fallen leaves in woods. Summer to autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido, Honshu), North America.

Jap. name. *Harigane-ochibatake* (KAWAMURA).

Subsect. **Rotulae** FR.

Epicr. Myc. 384, 1838.

Stipe filiform, flaccid, inserted at the base. Pileus soon becoming somewhat plane or umbilicate. Growing on leaves.

4. *Marasmius rotula* [SCOP.] FR.

Epicr. Myc. 385, 1838; Hymen. Eur. 477, 1874—BERK. Outl. Brit. Fung. 222, pl. 14, f. 7, 1860—KICKX, Fl. Crypt. Flandr. II, 211, 1867—CKE. Handb. Brit. Fung. I, 238, 1871; Ill. Brit. Fung. pl. 1129, f. A, 1890; Handb. Austr. Fung. 86, 1892—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D' Emul. Montb. 2 sér. V, 223, 1872; Ench. Fung. 145, 1886—GILL. Hymen. Fr. 363, cum icone, 1874—KARST. Hattsv. I, 176, 1879—WINT. Die Pilze, I, 505, 1884—SACC. Syll. Fung. V, 541, 1887; Fl. Ital. Crypt., Hymen. 482, 1915—SCHROET. Pilze Schles. I, 558, 1889—MASS. Brit. Fung. Fl. III, 168, 1893—W. G. SM. Brit. Basid. 305, 1908—ROLLAND, Atlas Champ. 50, f. 109, 1910—MURRILL, North Amer. Fl. IX, 282, 1915—RICKEN, Blätterp. 80, pl. 25, f. 10, 1915—KAUFFM. Agar. Mich. 78, 1918—BRES. Icon. Myc. XI, pl. 502, f. 1, 1929.

Agaricus rotula SCOP. Fl. Carn. ed. 2, II, 456, 1772 (teste FR.)—SOW. Engl. Fung. pl. 95, 1797—PERS. Syn. Fung. 467, 1801.

Agaricus androsaceus BULL. Champ. Fr. pl. 64 & 569, f. 3, 1791 (teste FR.).

Agaricus nigripes SCHRAD. Spic. Fl. Germ. 129, 1794 (teste FR.).

Agaricus (*Collybia*) *Rotula* FR. Syst. Myc. I, 136, 1821.

Androsaceus rotula PAT. Hymen. Eur. 105, 1887—REA, Brit. Basid. 531, 1922.

Gregarious or solitary. Pileus 2–5 mm. or more broad, convex, umbilicate, membranous; surface white or whitish, becoming brownish when dry, plicate, not polished, margin undulato-crenate; lamellae attached to a collar free from the stipe, white or whitish, becoming yellowish when dry, few, broad, distant; stipe 1–5 cm. long, filiform, fistulose, equal, blackish-brown, smooth, horny, shining; spores white in mass, ovate-oblong or lanceolate-fusiform, acutely attenuated at one end, 6–9 × 3–4 μ.

Hab. on fallen leaves, twigs in woods. Summer to autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido, Honshu), Asia Minor, Siberia, Europe, North America, Africa, Australia.

Jap. name. *Shiro-hime-hôraitake* (n. n.).

5. *Marasmius graminum* (LIBERT) BERK. et BR.

in BERK. Outl. Brit. Fung. 222, pl. 14, f. 8, 1860—CKE. Handb. Brit. Fung. I, 239, 1871—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 223, 1872; Ench. Fung. 145, 1886—FR. Hymen. Eur. 477, 1874—GILL. Hymen. Fr. 363, cum icone, 1874—KARST. Hattsv. I, 176, 1879—WINT. Die Pilze, I, 504, 1884—SACC. Syll. Fung. V, 542, 1887; Fl. Ital. Crypt., Hymen. 481, 1915—SCHROET. Pilze Schles. I, 557, 1889—MASS. Brit. Fung. Fl. III, 169, 1893—W. G. SM. Brit. Basid. 305, 1908—RICKEN, Blätterp. 80, pl. 25, f. 9, 1915—MURRILL, North Amer. Fl. IX, 283, 1915—KAUFFM. Agar. Mich. 79, 1918.

[YASUDA, Bot. Mag. (Tokyo), XXIX, (169), 1915]

Agaricus graminum LIBERT, Pl. Crypt. Ard. Exs. no. 119, 1832.

Androsaceus graminum PAT. Hymen. Eur. 105, 1887—REA, Brit. Basid. 531, 1922.

Gregarious. Pileus 2–5 mm. or more broad, convex to plane, umbonate; surface pale rufous, paler at the furrows, brown at the umbo, sulcate; lamellae attached to a collar free from the stipe, whitish or cream-colored, few, subventricose, distant; stipe 1–4 cm. long, capillary, shining-black, whitish at the apex, glabrous; spores white in mass, ellipsoidal, 8–10 × 4–5 μ.

Hab. on leaves and culms of grasses. Summer to autumn. Ishikari (Sapporo).

Distr. Japan (Hokkaido, Honshu), Europe, North America.

Jap. name. *Hime-hôrai-take* (YASUDA).

Tribe Lentineae IMAI, nom. nov.

Fructificatio carnoso-coriacea, coriacea vel lignea, lenta, revivescens, persistens, velata vel avelata. Stipes praesens vel nullus. Lamellae acie dentatae, integerrimae, obtusae crispaeque, vel longitudinaliter fissae. Sporae in cumulo albae vel sordide albae.

Key to the genera in the tribe.

1. Edge of lamellae toothed..... *Lentinus.*
2. Edge of lamellae entire..... *Panus.*
3. Edge of lamellae obtuse and crisped..... *Trogia.*
4. Edge of lamellae split lengthwise..... *Schizophyllum.*

Lentinus FR.

Syst. Orb. Veg. I, 77, 1825; Elench. Fung. I, 45, 1828; Genera Hymen. 9, 1836; Epicr. Myc. 387, 1838; Hymen. Eur. 480, 1874.

Agaricus § *Omphalia* § *Lentiscyphi* FR. Syst. Myc. I, 174, 1821.

Lentinellus KARST. Hattsv. I, xviii, 1879.

Hemicybe KARST. Ibid. xviii, 1879.

Pocillaria O. KUNTZE, Rev. Gen. Pl. II, 865, 1891.

Lentodium MORG. Journ. Cinn. Soc. Nat. Hist. XVIII, 36, 1895.

Lentinula EARLE, Bull. N. Y. Bot. Gard. V, 416, 1909.

Fructification with or without universal or partial veil, fleshy-coriaceous or coriaceous, pliant, stipitate or sessile. Pileus more or less irregular. Stipe central, excentric, lateral or wanting, confluent with the pileus. Partial veil, when present, sometimes remaining as a fugacious annulus. Lamellae tough, adnate or decurrent, usually toothed at the edge. Spores white or sordid white in mass.

Type species: *Agaricus tigrinus* BULL. ex FR.

Key to the sections, subsections and species in Hokkaido.

I. Pileus nearly entire, stipe distinct..... Sect. Mesopodes.
   A. Pileus scaly, more or less manifestly veiled..... Subsect. Lepidei.
      1. Fructification large, pileus pallid ochraceous, variegated with darker, adpressed spot-like scales becoming brownish or blackish.. ..... *L. lepideus*(1).
   B. Pileus villose or pulverulent..... Subsect. Pulverulenti.
      1. Pileus warm buff with tawny colored slender radial lines and mealy with white powders..... *L. pulverulentus*(2).
   C. Pileus glabrous..... Subsect. Cochleati.
      1. Fructification caespitose and imbricate; pileus light ochraceous buff. ..... *L. cochleatus*(3).

II. Pileus dimidiate, sessile or furnished with a sublateral stipe..... ..... Sect. Pleuroti.
   A. Fructification large, sessile and usually imbricate.
      1. Pileus corrugate, longitudinally costate, floccose-scrupose all over the surface, alutaceous..... *L. vulpinus*(4).

2. Pileus coarsely tomentose on the base, glabrous and even on the margin, pinkish-cinnamon or pale reddish brown.... *L. ursinus*(5).

B. Fructification small, subsessile or sessile; pileus glabrous, fawn colored. ..... *L. flabelliformis*(6).

Sect. Mesopodes FR.

Hymen. Eur. 481, 1874.

Pileus nearly entire; stipe distinct.

Subsect. Lepidei FR.

Ibid. 481, 1874.

Pileus scaly, more or less manifestly veiled.

1. *Lentinus lepideus* FR.

Syst. Orb. Veg. I, 78, 1825; Epicr. Myc. 390, 1838; Hymen. Eur. 481, 1874—BERK. Outl. Brit. Fung. 225, 1860—CKE. Handb. Brit. Fung. I, 242, 1871; Ill. Brit. Fung. pl. 1140, 1890; Handb. Austr. Fung. 91, 1892—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 225, 1872; Ench. Fung. 150, 1886—GILL. Hymen. Fr. 381, cum icone, 1874—KARST. Hattsv. I, 245, 1879—WINT. Die Pilze, I, 501, 1884—SACC. Syll. Fung. V, 581, 1887—MASS. Brit. Fung. Fl. II, 313, 1893—W. G. SM. Brit. Basid. 309, 1908—KAWAMURA, Ill. Jap. Fung. pl. 10, f. 13–15, 1914—RICKEN, Blätterp. 83, 1915—KAUFFM. Agar. Mich. 53, pl. 6, 1918—HARPER, Trans. Wisc. Acad. Sci. Arts & Lett. XX, 371, pl. 14, 16, 17, 1921—REA, Brit. Basid. 537, 1922.

[KAWAMURA, Bot. Mag. (Tokyo), XXIII, (356), 1909—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 114, 1931]

Agaricus squamosus SCHAEFF. Fung. Bavar. IV, Ind. 15, pl. 29–30, 1774 (teste FR.).

Agaricus lepideus FR. Obs. Myc. I, 21, 1815; Syst. Myc. I, 176, 1821.

Lentinus suffrutescens FR. Syst. Orb. Veg. I, 78, 1825; Epicr. Myc. 393, 1838 (teste MURRILL).

Lentinus squamosus QUÉL. Fl. Myc. 328, 1888—SCHROET. Pilze Schles. I, 556, 1889—SACC. Fl. Ital. Crypt., Hymen. 495, 1915—BRES. Icon. Myc. XI, pl. 510, 1929.

Lentinus magnus PK. Bull. Torrey Bot. Club, XXIII, 413, 1896 (teste MURRILL).

Lentinus spretus PK. 105 Bull. N. Y. State Mus. 24, 1906 (teste MURRILL).

Lentodium squamosum MURRILL, Mycologia, III, 27, 1911; North Amer. Fl. IX, 296, 1915.

Solitary or caespitose, edible. Pileus 5–15 cm. broad, convex, then expanded to nearly plane, sometimes slightly depressed in the center and sometimes umbonate; surface white or pale-ochraceous, the pellicle cracking and usually forming brownish, spot-like scales, which are sometimes almost black, dry; context white, thick, fleshy to

tough, compact, hard when dry, with agreeable odour; lamellae sinuate or sinuato-decurrent, subdistant, broad, transversely lacerate and dentate-serrate on the edges, white, then yellowish; stipe 2–8 cm. long, 10–15 mm. thick, subequal, often pointed and rooted at the base, concolorous, blackish at the base, fibrillose-squamose, solid, sometimes excentric; annulus fixed, white, often disappearing; spores white in mass, long-oblong or subcylindric, smooth, 10–15 × 4–5 μ.

Hab. on structural timbers or living or rotting trunks, especially of coniferous trees. Summer to autumn. Ishikari (Sapporo), Kuriles (Matsuwa Is.).

Distr. Japan (Hokkaido, Honshu), Europe, North America, Siberia, Asia Minor, Australia.

Jap. name. *Matsu-ôji* (KAWAMURA).

Subsect. **Pulverulenti** FR.

Hymen. Eur. 482, 1874.

Pileus villose or pulverulent.

2. *Lentinus pulverulentus* [SCOP.] FR.

Epicr. Myc. 391, 1838; Hymen. Eur. 483, 1874—WINT. Die Pilze, I, 500, 1884—QUÉL. Ench. Fung. 151, 1886—SACC. Syll. Fung. V, 588, 1887—MASS. Brit. Fung. Fl. II, 314, 1893—REA Brit. Basid. 538, 1922.

Agaricus pulverulentus SCOP. Fl. Carn. ed. 2, II, 434, 1772 (teste FR.).

Subcaespitose. Pileus 3.5–6 cm. broad, convex, then plane; surface mikado-brown and mealy with white powders when young, then becoming warm-buff and with tawny colored slender radial lines on the center and paler with mealy powders on the margin, margin incurved at first, then upturned, paler, having white villi; context white, fleshy, pliant, taste and odour pleasant; lamellae long decurrent, whitish or pallid, rather distant, serrate on the edge, broad; stipe 4–6 cm. long, 1–2 cm. thick, attenuated downward or subequal, paler than the pileus, pulverulently tomentose, stuffed; spores white in mass, long elliptical or subcylindrical-elliptic, smooth, 6–10 × 2.5–3 μ.

Hab. on structural timbers or dead wood of conifers. Spring to summer. Ishikari (Sapporo, Mt. Teine), Kitami (Naetaro).

Distr. Japan (Hokkaido), Europe, ?North America.

Jap. name. *Namiha-take* (n. n.).

Subsect. Cochleati Fr.

Hymen. Eur. 483, 1874.

Pileus glabrous.

3. *Lentinus cochleatus* [Pers.] Fr.

Syst. Orb. Veg. I, 78, 1825; Epicr. Myc. 394, 1838; Hymen. Eur. 484, 1874—Berk. Outl. Brit. Fung. 226, pl. 19, f. 4, 1860—Cke. Handb. Brit. Fung. I, 242, 1871; Ill. Brit. Fung. pl. 1142, f. A, 1890; Handb. Austr. Fung. 93, 1892—Quél. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 225, 1872; Ench. Fung. 150, 1886—Gill. Hymen. Fr. 381, cum icone, 1874—Wint. Die Pilze, I, 498, 1884—Sacc. Syll. Fung. V, 594, 1887; Fl. Ital. Crypt., Hymen. 489, 1915—Mass. Brit. Fung. Fl. II, 315, 1893—W. G. Sm. Brit. Basid. 310, 1908—Ricken, Blätterp. 86, pl. 26, f. 1, 1915—Kauffm. Agar. Mich. 55, 1918—Harper, Trans. Wisc. Acad. Sci. Arts & Lett. XX, 379, pl. 23, 1921—Rea, Brit. Basid. 539, 1922—Bres. Icon. Myc. XI, pl. 513, 1929.

Agaricus cornucopioides Bolt. Hist. Fung. Half. 8, pl. 8, 1788 (teste Fr.).

Agaricus cochleatus Pers. Disp. Fung. 22, 1797; Syn. Fung. 450, 1801 (teste Fr.); Myc. Eur. III, 51, 1828.

Agaricus confluens Sow. Engl. Fung. pl. 168, 1799 (teste Fr.).

Agaricus (Omphalia) cochleatus Fr. Syst. Myc. I, 177, 1821.

Lentinellus cochleatus Karst. Hattsv. I, 247, 1879.

Lentinus cornucopioides Schroet. Pilze Schles. I, 555, 1889.

Lentinellus cornucopioides Murrill, North Amer. Fl. IX, 295, 1915.

Caespitose and imbricate. Pileus 3–9 cm. broad, irregular, very unequal, ear-shaped, spathulate, nearly plane or depressed at the center and cyathiform or infundibuliform-umbilicate; surface glabrous, light-ochraceous-buff, light pinkish-cinnamon or pinkish-cinnamon to mikado-brown, paler when dry, somewhat lobed or contorted; context whitish or subconcolorous, odour anise, taste mild; lamellae decurrent, close, whitish tinged with flesh color, edge serrulate, thin; stipe 2–8 cm. long, 5–15 mm. thick, excentric, sublateral or central, branched, confluent at the base, deeply sulcate, glabrous, firm, solid, concolorous or slightly darker; spores white in mass, subglobose, smooth, 3–5 μ.

Hab. on or about old stumps or buried wood in woods. Summer to autumn. Ishikari (Nopporo, Mt. Kurodake).

Distr. Japan (Hokkaido, Honshu), Asia Minor, Europe, North America, Australia.

Jap. name. *Mimi-namihatake* (n. n.).

Sect. Pleuroti Fr.

Hymen. Eur. 485, 1874.

Dimidiate, sessile or laterally stipitate.

4. *Lentinus vulpinus* [Sow.] Fr.

Syn. Gen. Lentin. 12, 1836; Epicr. Myc. 395, 1838; Hymen. Eur. 486, 1874—Berk. Outl. Brit. Fung. 226, 1860—Cke. Handb. Brit. Fung. I, 243, 1871; Handb. Austr. Fung. 95, 1892—Quél. Ench. Fung. 151, 1886—Sacc. Syll. Fung. V, 609, 1887; Fl. Ital. Crypt., Hymen. 487, 1915—Mass. Brit. Fung. Fl. II, 317, 1893—Atkins. Mushrooms, ed. 2, 134, f. 131, 1903—W. G. Sm. Brit. Basid. 310, 1908—Ricken, Blätterp. 87, 1915—Kauffm. Agar. Mich. 56, 1918—Harper, Trans. Wisc. Acad. Sci. Arts & Lett. XX, 383, pl. 27, 1921—Rea, Brit. Basid. 540, 1922—Bres. Icon. Myc. XI, pl. 516, 1929.

Agaricus vulpinus Sow. Engl. Fung. pl. 361, 1803 (teste Fr.).

Agaricus (*Crepidotus*) *vulpinus* Fr. Syst. Myc. I, 273, 1821.

Hemicybe vulpina Karst. Hattsv. I, 249, 1879.

Panellus vulpinus Murrill, North Amer. Fl. IX, 246, 1915.

Imbricate-multiplex. Pileus 5–10 cm. broad, sessile, reniform-conchate, convex; surface corrugate, longitudinally costate, floccose-scrupose, nearly flesh color or alutaceous, margin incurved, entire, discolored with age; context fleshy to somewhat tough, white then subalutaceous; lamellae crowded, broad, dentate-lacerate, white then reddish; spores white in mass, subglobose, smooth, 4–4.5 × 2.5–3.5 μ, or 3–4 μ.

Hab. on stumps and logs of frondose wood. Autumn. Kushiro (Mt. Meakan).

Distr. Japan (Hokkaido), Europe, North America, Australia.

Jap. name. *Kitsune-namihatake* (n. n.).

5. *Lentinus ursinus* Fr.

Epicr. Myc. 395, 1838; Hymen. Eur. 486, 1874—Wint. Die Pilze, I, 498, 1884—Sacc. Syll. Fung. V, 608, 1887; Fl. Ital. Crypt., Hymen. 488, 1915—Ricken, Blätterp. 84, 1915—Kauffm. Agar. Mich. 56, 1918—Harper, Trans. Wisc. Acad. Sci. Arts & Lett. XX, 383, pl. 28, 1921—Bres. Icon. Myc. XI, pl. 515, f. 1, 1929.

Agaricus (*Pleurotus*) *ursinus* Fr. Syst. Myc. I, 185, 1821.

Hemicybe ursina Karst. Hattsv. I, 248, 1879.

Lentinus hyracinus Kalchbr. Grev. X, pl. 143, f. 18 (teste Bres.)—Sacc. Syll. Fung. V, 608, 1887.

Panellus ursinus Murrill, North Amer. Fl. IX, 246, 1915.

Imbricate-multiplex. Pileus 1–4 cm. or more broad, sessile, subreniform or conchate to semiorbicular, convex; surface pinkish-cinnamon, pale reddish brown or subalutaceous, coarsely tomentose on the base, even and glabrous on the margin; context subfleshy or fleshy-tough, whitish or brownish; lamellae subcrowded or crowded, broad, dentate-lacerate, whitish then discolored to brownish or pinkish; spores white in mass, subglobose or broadly ellipsoidal, 3.5–4.5 × 3–4 μ, smooth.

Hab. on stumps and logs of frondose wood. Autumn. Oshima (Shiriuchi).

Distr. Japan (Hokkaido), Europe, North America.

Jap. name. *Itachi-namiha-take* (n. n.).

6. *Lentinus flabelliformis* [BOLT.] FR.

Syst. Orb. Veg. I, 78, 1825; Epicr. Myc. 395, 1838; Monogr. Hymen. Suec. II, 239, 1863; Hymen. Eur. 487, 1874—BERK. Outl. Brit. Fung. 226, 1860—CKE. Handb. Brit. Fung. I, 243, 1871—WINT. Die Pilze, I, 497, 1884—QUÉL. Ench. Fung. 151, 1886—SACC. Syll. Fung. V, 610, 1887; Fl. Ital. Crypt., Hymen. 487, 1915—SCHROET. Pilze Schles. I, 555, 1889—MASS. Brit. Fung. Fl. II, 317, 1893—RICKEN, Blätterp. 87, 1915—HARPER, Trans. Wisc. Acad. Sci. Arts & Lett. XX, 380, pl. 24, 1921—REA, Brit. Basid. 540, 1922.

Agaricus flabelliformis BOLT. Hist. Fung. Halif. 157, pl. 157, 1791 (teste FR.)—PERS. Syn. Fung. 479, 1801.

Agaricus (*Pleurotus*) *flabelliformis* FR. Syst. Myc. I, 185, 1821.

Hemicybe flabelliformis KARST. Hattsv. I, 250, 1879.

Imbricated. Pileus 1–3 cm. broad, sessile or subsessile, orbicular or reniform, plane or somewhat depressed behind, even, glabrous, fawn-colored or pale cinnamon, margin more or less crenulate; lamellae whitish or pallid, rather broad, somewhat distant, toothed at the edges; stipe usually rudimentary or wanting; spores white in mass, subglobose or broadly ellipsoidal, 5–6 × 3–4 μ.

Hab. on dead wood in woods. Autumn. Kushiro (Lake side of Akan).

Distr. Japan (Hokkaido), Europe, North America.

Jap. name. *Hime-ôgi-namiha* (n. n.).

Panus FR.

Epicr. Myc. 396, 1838; Hymen. Eur. 487, 1874.
Panellus KARST. Hattsv. I, xiv, 1879.

Fructification without annulus and volva, fleshy-coriaceous or coriaceous, reviving with moisture, stipitate or sessile. Pileus excentric, dimidiate or resupinate. Stipe when present lateral or excentric, confluent with the pileus. Lamellae soft, then coriaceous, decurrent or arising from a central point. Spores white in mass.

Type species: *Agaricus stipticus* BULL. ex FR.

Key to the sections and species in Hokkaido.

I. Pileus irregular; stipe excentric..... Sect. Conchati.
  1. Pileus ochraceous fawn color, strigose with erect, fascicled, concolorous hairs..... *P. rudis*(1).
II. Stipe definitely lateral..... Sect. Stiptici.
  1. Pileus pinkish-buff to cinnamon, taste very astringent.. *P. stipticus*(2).

Sect. Conchati QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 226, 1872.

At first more soft, excentric, not furfuraceous.

1. *Panus rudis* FR.

Epicr. Myc. 398, 1838; Hymen. Eur. 489, 1874—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 226, pl. 14, f. 1, 1872—GILL. Hymen. Fr. 383, 1874—KARST. Hattsv. I, 96, 1879—WINT. Die Pilze, I, 496, 1884—SACC. Syll. Fung. V, 616, 1887; Fl. Ital. Crypt., Hymen. 500, 1915—W. G. SM. Brit. Basid. 312, 1908—RICKEN, Blätterp. 88, pl. 26, f. 4, 1915—KAUFFM. Agar. Mich. 48, pl. 5, 1918—REA, Brit. Basid. 535, 1922—BRES. Icon. Myc. XI, pl. 519, 1929—MALKOV. Ann. Myc. XXX, 36, pl. 1, 2, 1932.

[YASUDA, Bot. Mag. (Tokyo), XXVII, (305), 1913]

Agaricus crinitus SCHW. Schr. Nat. Ges. Leipzig, I, 89, 1822 (teste MURRILL).

Agaricus strigosus SCHW. Ibid. I, 89, 1822 (teste MURRILL).

Lentinus Lecomtei FR. Syst. Orb. Veg. I, 77, 1825.

Lentinus strigosus FR. Ibid. 77, 1825—MURRILL, North Amer. Fl. IX, 292, 1915.

[LLOYD, Letter, No. 60, p. 6, 1915; No. 61, p. 5, 1916; No. 65, p. 5, 1917—HORIKAWA, Trans. Form. Nat. Hist. Soc. No. 37, p. 136, 1918—SAWADA, Descrip. Cat. Form. Fung. V, 87, 1931]

Agaricus hirtus SECR. Myc. Suisse, no. 1073, 1833 (teste FR.).

Lentinus chaetophorus LÉV. Ann. Sci. Nat., Bot. 3 sér. II, 177, 1844.

?*Panus levis* BERK. et CURT. Ann. Mag. Nat. Hist. 2 ser. XII, 427, 1853.

Lentinus sparsibarbis BERK. et CURT. Journ. Linn. Soc., Bot. X, 301, 1868.

Panus hirtus QUÉL. Ench. Fung. 152, 1886.

Lentinus substrigosus P. HENN. et SHIRAI, in P. HENN. ENGLERS Bot. Jahrb. XXVIII, 270, 1900—SACC. Syll. Fung. XVI, 64, 1902.

Lentinus rudis P. HENN. ENGLERS Bot. Jahrb. XXXII, 40, 1902.

[MATSUM. Ind. Pl. Jap. I, 150, 1904—YASUDA, Bot. Mag. Tokyo, XXVII, (305), 1913—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 114, 1931]

Gregarious or caespitose. Pileus 2–8 cm. broad, excentric, convex, then cyathiform or subinfundibuliform; surface strigose with erect, fascicled, concolorous hairs, purplish or fleshy-lilac color, becoming ochraceous fawn colored, margin slightly incurved or subexpanded; context subcoriaceous, thin, tough, taste mild; lamellae decurrent, crowded, narrow, nearly entire, pallid, not anastomosing; stipe 1–3 cm. long, 2–6 mm. thick, densely strigose, subconcolorous, solid, tough; spores white in mass, oblong-subclavate, slightly curved, smooth, 6–8 × 3–4 μ.

Hab. on old logs and stumps of both coniferous and deciduous trees. Summer to autumn. Ishikari (Sapporo), Iburi (Lake side of Shikotsu).

Distr. Japan (Hokkaido, Honshu), China, Siberia, Asia Minor, Europe, North America.

Jap. name. *Arage-Kawaki-take* (YASUDA).

Sect. **Stiptici** QUÉL.

Ibid. V, 227, 1872.

At first coriaceous, lateral or resupinate, pellicle powdery-breaking.

2. *Panus stipticus* [BULL.] FR.

Epicr. Myc. 399, 1838; Hymen. Eur. 489, 1873—BERK. Outl. Brit. Fung. 227, 1860—KICKX, Fl. Crypt. Flandr. II, 212, 1867—CKE. Handb. Brit. Fung. I, 245, 1871; Ill. Brit. Fung. pl. 1144, f. A, 1890; Handb. Austr. Fung. 97, 1892—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 227, 1872; Ench. Fung. 152, 1886—GILL. Hymen. Fr. 383, cum icone, 1874—WINT. Die Pilze, I, 495, 1884—SACC. Syll. Fung. V, 622, 1887—MASS. Brit. Fung. Fl. II, 309, 1893—W. G. SM. Brit. Basid. 312, 1908—ROLLAND, Atlas Champ. 51, f. 111, 1910—RICKEN, Blätterp. 88, pl. 26, f. 3, 1915—KAUFFM. Agar. Mich. 48, 1918—REA, Brit. Basid. 535, 1922—BRES. Icon. Myc. XI, pl. 521, 1929—MALKOV. Ann. Myc. XXX, 29, 1932.

[YASUDA, Bot. Mag. (Tokyo), XVI, (419), 1912—LLOYD, Letter, No. 63, p. 9, 1916]

Agaricus semipetiolatus SCHAEFF. Fung. Bavar. IV, Ind. 47, f. 208, 1774 (teste FR.).

Agaricus stipticus BULL. Champ. Fr. pl. 140, 1791 (teste FR.)—PERS. Syn. Fung. 481, 1801.

Agaricus (*Pleurotus*) *stipticus* FR. Syst. Myc. I, 188, 1821—BERK. in SMITH, Engl. Fl. V, (2), 73, 1836.

Panellus stipticus KARST. Hattsv. I, 96, 1879—MURRILL, North Amer. Fl. IX, 244, 1915.

Lentinus stipticus SCHROET. Pilze Schles. I, 554, 1889.

[YASUDA, Bot. Mag. (Tokyo), XXX, 395, 1916]

Panus semipetiolatus SACC. Fl. Ital. Crypt., Hymen. 498, 1915.

Gregarious, caespitose, densely imbricated, said to be poisonous. Pileus 1–2 cm. broad, convex, reniform; surface dry, variable in color, pinkish-buff to cinnamon, margin incurved, rarely undulate, pellicle broken up into mealy granules; context thin, elastic, yellowish, taste very astringent; lamellae ochraceous or cinnamon, becoming darker when dry, very narrow, crowded, thin, ending determinately, connected by veins; stipe 2–4 mm. long, 2–4 mm. thick, lateral, dilated upward, flattened, ascending, pruinose, grayish or paler then the lamellae, coriaceous, solid; cystidia present on the edge of lamellae, lanceolate, about 30–50 × 2.5–3.5 μ; spores white in mass, ellipsoidal, about 5 × 2.5 μ.

Hab. on the rotten bark of various kinds of trees in woods. Summer to autumn. Oshima (Ônomura), Iburi (Chitose, Lake side of Shikotsu), Ishikari (Sapporo, Nopporo, Jôzankei, Mt. Kurodake), Kushiro (Lake side of Akan, Mt. Meakan), Kitami (Oketo forest).

Distr. Japan (Hokkaido, Honshu), Siberia, Asia Minor, Europe, North America, Australia.

Jap. name. *Wasabi-take* (KAWAMURA), *Hime-Kawaki-take* (YASUDA).

Trogia FR.

Genera Hymen. 10, 1836, p. p.; Epicr. Myc. 402, 1838, p. p.; Hymen. Eur. 491, 1874.

Plicatura PK. 24 Ann. Rept. N. Y. State Mus. 75, 1872—MURRILL, North Amer. Fl. IX, 163, 1910, p. p.—REA, Brit. Basid. 625, 1922.

Fructification without universal and partial veils, spongy-coriaceous or coriaceous, reviving with moisture, sessile or substipitate. Pileus soft, faccid, dimidiate. Lamellae obtusely veined, fold-like, lamella-like in front, crisped and branched behind, fertile on the edge; spores white in mass.

Type species: *Cantharellus crispus* [PERS.] FR.

Trogia crispa [PERS.] FR.

Monogr. Hymen. Suec. II, 244, 1863; Hymen. Eur. 492, 1874—CKE. Handb. Brit. Fung. I, 246, 1871; Ill. Brit. Fung. pl. 1114, f. A, 1890; Handb. Austr. Fung. 100, 1892—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 227, 1872—KARST. Hattsv. I, 244, 1879—WINT. Die Pilze, I, 494, 1884—SACC. Syll. Fung. V, 636, 1887—MASS. Brit. Fung. Fl. II, 303, 1893—ATKINS. Mushrooms, ed. 2, 137, f. 134, 1903—W. G. SM. Brit. Basid. 314, 1908—RICKEN, Blätterp. 6, pl. 2, f. 5, 1915—KAUFFM. Agar. Mich. 41, 1918.

[LLOYD, Letter, No. 47, p. 9, 1913; Myc. Notes No. 71, p. 1265, 1924—YASUDA, Bot. Mag. (Tokyo), XXVII, (503), 1913]

Merulius fagineus SCHRAD. Spic. Fl. Germ. 137, 1794 (teste FR.).

Merulius crispus PERS. Icon. Desc. Fung. 32, pl. 8, f. 7, 1800 (teste FR.); Syn. Fung. 495, 1801; Myc. Eur. II, 23, 1825.

Cantharellus crispus FR. Syst. Myc. I, 323, 1821; Epicr. Myc. 369, 1838—GILL. Hymen. Fr. 356, cum icone, 1874.

Trogia faginea SCHROET. Pilze Schles. I, 508, 1889—SACC. Fl. Ital. Crypt., Hymen. 503, 1915.

Plicatura faginea KARST. Finl. Basidsv. 342, 1889—MURRILL, North Amer. Fl. IX, 164, 1910.

Plicatura crispa REA, Brit. Basid. 626, 1922.

Gregarious. Pileus 5–30 mm. broad, cup-shaped, sessile or substipitate, then reflexed, dimidiate, often lobed, villose, glabrescent, slightly zoned, light yellow, rufescent, whitish at the margin, becoming bluish leather color when dry; lamellae decurrent, white or subconcolorous with the pileus or bluish-leather-colored, vein-like, dichotomous, narrow, crisped, very much swollen, edge obtuse; context whitish, fibrillose, firm, tough, odour and taste none; spores white in mass, cylindrical, 3–5 × 1–2 μ, smooth.

Hab. on dead trunks of various trees in woods. Summer to autumn. Ishikari (Sapporo, Jôzankei), Iburi (Lake side of Shikotsu).

Distr. Japan (Hokkaido, Honshu), Asia Minor, Europe, North America.

Jap. name. *Chijire-take* (YASUDA).

Schizophyllum Fr.

Obs. Myc. I, 103, 1815; Syst. Myc. I, 5 & 330, 1821.
Schizonia Pers. Myc. Eur. III, 14, 1828.
Hyponevris Paul. ex Earle, Bull. N. Y. Bot. Gard. V, 411, 1909.

Fructification without universal and partial veils, coriaceous, reviving with moisture, sessile or substipitate. Pileus resupinate, sessile or lateral. Lamellae radiating from a central point, becoming longitudinally split and revolute at the edge. Spores white in mass.

Type species: *Schizophyllum commune* Fr.

Schizophyllum commune Fr.

Obs. Myc. I, 103, 1915; Syst. Myc. I, 330, 1821; Epicr. Myc. 403, 1838; Hymen. Eur. 492, 1874—Berk. in Smith, Engl. Fl. V, (2), 130, 1836; Outl. Brit. Fung. 228, 1860—Kickx, Fl. Crypt. Flandr. II, 213, 1867—Cke. Handb. Brit. Fung. I, 247, f. 60, 1871; Ill. Brit. Fung. pl. 1114, f. B, 1890; Handb. Austr. Fung. 100, 1892—Quél. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 228, 1872; Ench. Fung. 154, 1886—Gill. Hymen. Fr. 375, cum icone, 1874—Karst. Hattsv. I, 245, 1879—Wint. Die Pilze, I, 493, 1884—Sacc. Syll. Fung. V, 655, 1887—Mass. Brit. Fung. Fl. II, 302, 1893—W. G. Sm. Brit. Basid. 314, f. 71, 1908—Rolland, Atlas Champ. 49, f. 105, 1910—Kawamura, Ill. Jap. Fung. pl. 15, f. 4–7, 1915—Ricken, Blätterp. 90, pl. 26, f. 6, 1915—Kauffm. Agar. Mich. 43, 1918—Rea, Brit. Basid. 452, 1922—Bres. Icon. Myc. XI, pl. 522, 1922—Linder, Amer. Journ. Bot. XX, 555, pl. 33, f. 6, pl. 34, f. 1, pl. 35, f. 1–6, 1933.

[Ôkubo, Bot. Mag. (Tokyo), II, (1), 1888—Lloyd, Myc. Writ. III, Letter, No. 38, p. 10, 1911; Ibid. No. 42, p. 13, 16, 1912; Ibid. No. 63, p. 7, 1916; Ibid. No. 65, p. 6, 1917—Umemura, Pl. Fujiyama. 372, 1923—Matsuura & Kanada, Trans. Tottori Soc. Agr. Sci. III, 114, 1931]

Agaricus alneus L. Sp. Pl. 1176, 1753 (teste Fr.).
Schizonia vulgaris Pers. Myc. Eur. III, 14, 1828.
Schizophyllum alneum Schroet. Pilze Schles. I, 553, 1889—Sacc. Fl. Ital. Crypt., Hymen. 511, 1915—Murrill, North Amer. Fl. IX, 237, 1915.

[P. Henn. Englers Bot. Jahrb. XXVIII, 270, 1901; Ibid. XXXII, 40, 1903—Matsum. Ind. Pl. Jap. I, 172, 1904—Umemura, Bot. Mag. (Tokyo), XXVI, (153), 1912—Yasuda, Bot. Mag. (Tokyo), XXVI, (20), 1912—Nakaji, Bot. Mag. (Tokyo), XXX, (102), 1916—Sawada, Descr. Cat. Formosan Fung. I, 515, 1919]

Gregarious, caespitose, imbricated. Pileus 1–3 cm. broad and long, flabelliform or suborbicular or often much lobed, sessile by the narrowed base, often pendulous; surface whitish, grayish or brownish, very hairy, tomentose or strigose, reviving with moisture; context very arid, whitish or brownish; lamellae radiating from the point

of attachment of the pileus, longitudinally splitting and revolute at edge, narrow, whitish, grayish, or brownish, hirsute on the abhymenial side; spores white in mass, cylindrical and obliquely apiculate, 4–7 × 1.5–2 μ.

Hab. on dead wood of various kinds of trees and stems of herbs. All seasons. Common in our district.

Distr. Cosmopolitan in the temperate regions.

Jap. name. *Suehiro-take* (ÔKUBO).

Subfam. **Volvarioideae** IMAI, nom. nov.

Hyporhodii FR. Epicr. Myc. 138, 1838; Hymen. Eur. 182, 1874.
Rhodospori QUÉL. Ench. Fung. 54, 1886.
Rhodosporae SACC. Syll. Fung. V, 656, 1887.

Trama floccosa, carnosa, mollis, non vesiculosa. Hymenium superficiem lamellae acris tegit. Sporae in cumulo rosae vel roseo-rubiginosae, in plurimis angulosae.

Tribe **Volvarieae** IMAI, nom. nov.

Volvariées ROZE, Bull. Soc. Bot. Fr. XXIII, 51 & 111, 1876, p. p.
Pluteinées ROZE, Ibid. 51 & 111, 1876, p. p.
Pluteides FAYOD, Ann. Sci. Nat., Bot. 7 sér. IX, 363, 1889.
Volvariées KONRAD et MAUBL. Icon. Sel. Fung. 28 & 51, 1925.

Fructificatio juvenile volo universali partialive clausa vel nulla. Pileus a stipite discretus separabilisque. Lamellae vulgo liberae.

Key to the genera in Tribe Volvarieae.

1. Fructification with volva and without annulus..... *Volvaria.*
2. Fructification without annulus and volva..... *Pluteus.*

Volvaria (FR.) QUÉL.

Champ. Jura Vosg. in Mém. Soc. D'Emul. Montb. 2 sér. V, 62 & 114, 1872.

Volvarius ROUSSEL, Fl. Calvados, ed. 2, 59, 1806.

Agaricus § *Volvaria* FR. Syst. Myc. I, 11 & 277, 1821; Epicr. Myc. 138, 1838; Hymen. Eur. 182, 1874.

Pseudofarinaceus BATT. ex EARLE, Bull. N. Y. Bot. Gard. V, 449, 1909.

Volvariopsis MURRILL, Mycologia, III, 280, 1911; North Amer. Fl. X, 140, 1917.

Fructification with universal veil remaining as a volva, usually without partial veil. Pileus fleshy, regular. Stipe central, fleshy, distinct and separable from the pileus. Universal veil usually remaining as a membranous volva at the base of stipe and patches or rarely warts on the pileus. Partial veil usually lacking. Lamellae free, rarely subadnate. Spores rose or pink in mass.

Type species: *Agaricus bombycinus* SCHAEFF. ex FR.

Key to the sections and species in Hokkaido.

I. Pileus dry, silky or fibrillose..... Sect. Siccae.
  1. Pileus large, white, becoming yellowish, silky, squamuloso-villose..... ..... *V. bombycina*(1).
  2. Pileus medium to large, cinereous, black-streaked with adpressed fibrils. ..... *V. volvacea*(2).

II. Pileus more or less viscid, glabrous..... Sect. Viscosae.
  1. Pileus medium to large, whitish, but grayish or umber at the disc, viscid. ..... *V. speciosa*(3).
  2. Pileus medium to large, fuliginous, viscid..... *V. gloiocephala*(4).

Sect. Siccae SACC.

Fl. Ital. Crypt., Hymen. 514, 1915.

Pileus dry, silky or fibrillose.

1. *Volvaria bombycina* (SCHAEFF. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 114, 1872; Ench. Fung. 54, 1886—GILL. Hymen. Fr. 387, cum icone, 1874—KARST. Hattsv. I, 250, 1879—SACC. Syll. Fung. V, 656, 1887; Fl. Ital. Crypt., Hymen. 518, 1915—SCHROET. Pilze Schles. I, 621, 1889—MASS. Brit. Fung. Fl. II, 292, 1893—ATKINS. Mushrooms, ed. 2, 140, f. 137, 1903—W. G. SM. Brit. Basid. 98, 1908—RICKEN, Blätterp. 275, 1915—KAUFFM. Agar. Mich. 527, pl. 100, 1918—REA, Brit. Basid. 94, 1922—LANGE, Agar. Denm. VII, 4, 1928—BRES. Icon. Myc. XI, pl. 526, 1929. [IMAI, Bot. Mag. (Tokyo), XLVII, 431, 1933]

Agaricus bombycinus SCHAEFF. Fung. Bavar. IV, Ind. 42, pl. 98, 1774 (teste FR.).

Agaricus incarnatus BATSCH, Elench. Fung. 51, 1783 (teste FR.).

Amanita incarnata PERS. Syn. Fung. 248, 1801 (teste FR.).

Agaricus (*Volvaria*) *bombycinus* FR. Syst. Myc. I, 277, 1821; Epicr. Myc. 138, 1838; Hymen. Eur. 182, 1874—BERK. in SMITH, Engl. Fl. V. (2), 104, 1836; Outl. Brit. Fung. 139, pl. 7, f. 1, 1860—RABENH. Deut. Krypt. Fl. I, 512, 1844—BARLA, Champ. Nice, 50, pl. 25, f. 1–5, 1859—CKE. Handb. Brit. Fung. I, 84, 1871; Ill. Brit. Fung. pl. 293, 1886; Handb. Austr. Fung. 37, 1892—WINT. Die Pilze, I, 730, 1884.

Volvariopsis bombycina MURRILL, Mycologia, III, 281, 1911; North Amer. Fl. X, 143, 1917.

Volvaria bombycina var. *Maxima* PILÁT, Bull. Soc. Myc. Fr. XLVIII, 293, pl. 30–31, 1932.

Solitary. Pileus 10–23 cm. or more broad, globose, then campanulate, finally nearly umbonate; surface dry, white, densely covered with white or yellowish silky-fibrous hairs, disc rarely becoming smooth and darker, often provided with patches of the volva; context white, becoming yellowish, taste and odour none; lamellae free or remote, white at first, then pinkish, broad, crowded, ventricose, waved at the edge; stipe 10–20 cm. long, 8–20 mm. thick, attenuated upward, bulbous at the base, usually curved, white, silky-fibrous; volva large, persistent, white or whitish at first, then discolored to yellowish or brownish, ensheathing the base of stipe, membranous, lax, torn irregularly at the top, up to 10 cm. long; spores pink in mass, broadly ellipsoidal, 7.5–9 × 6–6.5 μ.

Hab. on dead wood or bark of living trees. Summer to autumn. Ishikari (Sapporo).

Distr. Japan (Hokkaido, Honshu, Bonin Islands), Europe, North America, Australia, Africa, Siberia, Asia Minor.

Jap. name. *Kinu-ô-fukuro-take* (IMAI).

PILÁT reported a gigantic variety from Asia Minor whose pileus is 25 cm. broad. It was growing on *Abies Bornmuelleriana* MATTF. Our gigantic specimen was 23 cm. in width of the pileus and growing on the bark of living *Ulmus japonica* SARG.

2. *Volvaria volvacea* (BULL. ex FR.) QUÉL.

Ench. Fung. 54, 1886—SACC. Syll. Fung. V, 657, 1887; Fl. Ital. Crypt., Hymen. 517, 1915—SCHROET. Pilze Schles. I, 621, 1889—MASS. Brit. Fung. Fl. II, 293, 1893—W. G. SM. Brit. Basid. 98, 1908—ROLLAND, Atlas Champ. 56, f. 122, 1910—RICKEN, Blätterp. 273, 1915—REA, Brit. Basid. 94, 1922.

[IMAI, Bot. Mag. (Tokyo), XLVII, 431, 1933]

Agaricus volvaceus BULL. Champ. Fr. pl. 262, 1791 (teste FR.)—SOW. Engl. Fung. pl. 1, 1797.

Amanita virgata PERS. Syn. Fung. 249, 1801 (teste FR.).

Agaricus (*Volvaria*) *volvaceus* FR. Syst. Myc. I, 278, 1821; Epicr. Myc. 138, 1838; Hymen. Eur. 182, 1874—BERK. in SMITH, Engl. Fl. V, (2), 104, 1836; Outl. Brit. Fung. 140, 1860—RABENH. Deut. Krypt. Fl. I, 512, 1844—BARLA, Champ. Nice, 51, pl. 25, f. 6–13, 1859—KICKX, Fl. Crypt. Flandr. II, 161, 1867—CKE. Handb. Brit. Fung. I, 84, 1871; Ill. Brit. Fung. pl. 294, 1886—WINT. Die Pilze, I, 730, 1884.

Volvaria virgata QUÉL. Champ. Jura Vosg. 2 Suppl., in Mém. Soc. D'Emul. Montb. 2 sér. V, 344, 1873—GILL. Hymen. Fr. 387, 1874—KARST. Hattsv. I, 250, 1879.

Volvariopsis volvacea MURRILL, North Amer. Fl. X, 144, 1917.

Solitary or scattered. Pileus 5–10 cm. broad, campanulate, then expanded, obtuse; surface dry, fuliginous, darker at the center, densely covered with adpressed black or dark-brown fibrils, black when dry; context white, soft, floccose-fleshy; lamellae free, white at first, then flesh-colored, ventricose, attenuated toward both ends; stipe 5–12 cm. long, 5–10 mm. thick, slightly attenuated upward, white or yellowish, smooth, glabrous or white-downy-flocculose, solid; volva membranous, thin, ensheathing the base of the stipe, large, persistent, whitish or fuliginous, torn irregularly; spores pink in mass, ellipsoidal, smooth, 5–8 × 3–5 μ.

Hab. on the ground. Autumn. Ishikari (Nopporo, Sapporo).

Distr. Japan (Hokkaido, Honshu, Formosa), Europe, North America, Ceylon, China.

Jap. name. *Fukuro-take* (KAWAMUR,).

Sect. Viscosae SACC.

Fl. Ital. Crypt., Hymen. 514, 1915.

Pileus viscid, glabrous.

3. *Volvaria speciosa* (FR.) GILL.

Hymen. Fr. 388, 1874—KARST. Hattsv. I, 251, 1879—QUÉL. Ench. Fung. 54, 1886—SACC. Syll. Fung. V, 661, 1887; Fl. Ital. Crypt., Hymen. 515, 1915—SCHROET. Pilze Schles. I, 621, 1889—MASS. Brit. Fung. Fl. II, 295, 1893—W. G. SM. Brit. Basid. 98, 1908—ROLLAND, Atlas Champ. 56, f. 123, 1910—RICKEN, Blätterp. 274, pl. 70, f. 1, 1915—KAUFFM. Agar. Mich. 528, 1918—REA, Brit. Basid. 95, 1922—LANGE, Agar. Denm. VII, 3, 1928—BRES. Icon. Myc. XI, pl. 528, 1929.

[IMAI, Bot. Mag. (Tokyo), XLVII, 431, 1933]

Agaricus (*Volvaria*) *speciosus* FR. Syst. Myc. I, 278, 1821; Epicr. Myc. 139, 1838; Hymen. Eur. 183, 1874—RABENH. Deut. Krypt. Fl. I, 512, 1844—CKE. Handb. Brit. Fung. I, 85, 1871; Ill. Brit. Fung. pl. 297, 1886; Handb. Austr. Fung. 38, 1892—WINT. Die Pilze, I, 729, 1884.

Volvariopsis speciosa MURRILL, North Amer. Fl. X. 143, 1917.

Solitary. Pileus 6–8 cm. broad, globose, then campanulate, at length plane; surface whitish, grayish or drab, glabrous, viscid when wet, context white, taste and odour none; lamellae free, white, becoming pinkish or yellowish, attenuated to both ends, moderately crowded; stipe 10–12 cm. long, 8–20 mm. thick, equal or slightly attenuated upward, subbulbous at the base, white, covered with white powdery small scales, solid; volva large, white, membranous, edge deeply free and torn irregularly; spores pink in mass, ellipsoidal, 13.5–15.5 × 7–8.5 μ.

Hab. on the ground in woods. Summer to autumn. Ishikari (Sapporo, Nopporo).

Distr. Japan (Hokkaido), Europe, North America, Australia.

Jap. name. *Shiro-fukuro-take* (IMAI).

4. *Volvaria gloiocephala* (DC. ex FR.) GILL.

Hymen. Fr. 387, 1874—QUÉL. Ench. Fung. 54, 1886—SACC. Syll. Fung. V, 662, 1887; Fl. Ital. Crypt., Hymen. 514, 1915—MASS. Brit. Fung. Fl. II, 295, 1893—W. G. SM. Brit. Basid. 98, 1908—ROLLAND, Atlas Champ. 57, f. 124, 1910—RICKEN, Blätterp. 272, pl. 70, f. 2, 1915—KAUFFM. Agar. Mich. 529, 1918—REA, Brit. Basid. 95, 1922—BRES. Icon. Myc. XI, pl. 529, 1929.

[IMAI, Bot. Mag. (Tokyo), XLVII, 432, 1933]

Agaricus gloiocephalus DC. Fl. Fr. VI, 52, 1815 (teste FR.).

Agaricus (*Volvaria*) *gloiocephalus* FR. Syst. Myc. I, 278, 1821; Epicr. Myc. 140, 1838; Hymen. Eur. 183, 1874—BARLA, Champ. Nice, 52, pl. 26, f. 1–8, 1859—CKE. Handb. Brit. Fung. I, 86, 1871; Ill. Brit. Fung. pl. 298, 1886—WINT. Die Pilze, I, 729, 1884.

Volvariopsis gloiocephala MURRILL, North Amer. Fl. X, 144, 1917.

Solitary. Pileus 7.5–12.5 cm. broad, campanulate, then expanded, becoming plane with a little umbo; surface slightly viscid, smooth, cinereous, densely covered with dark brown streaked adpressed fibrils, margin short striate; context fleshy, soft, silky-spongy, white, thick, but very thin at the margin, taste and odour none; lamellae free, white at first, then flesh color, ventricose, crowded, slightly serrulate at the edge; stipe 10–16 cm. long, 1–1.5 cm. thick, attenuated upward, subbulbous at the base, white, smooth and subglabrous at first, then villose and discolored, solid; volva membranous, rather thin, not large, white or yellowish, persistent, irregularly torn, ensheathing the base of stipe, villous outside; spores pink in mass, ellipsoidal, 10–14 × 6–8 μ.

Hab. on the ground in woods. Summer to autumn. Ishikari (Nopporo, Sôunbetsu).

Distr. Japan (Hokkaido, Honshu), Europe, North America, Africa, Australia.

Jap. name. *Ô-fukuro-take* (IMAI).

Pluteus FR. emend. QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 62 & 115, 1872.

Pluteus FR. Genera Hymen. 6, 1836, p. p.

Agaricus § *Pluteus* FR. Epicr. Myc. 140, 1838; Hymen. Eur. 185, 1874.

Rhodosporus § *Pluteus* SCHROET. Pilze Schles. I, 618, 1889.

Fructification without distinct universal and partial veils. Pileus fleshy, regular. Stipe central, fleshy or subfleshy, distinct and separable from the pileus. Lamellae free. Spores rose or pink in mass.

Type species: *Agaricus cervinus* SCHAEFF. ex FR.

Key to the sections and species in Hokkaido.

I. Pellicle of the pileus separating into fibrils or flocci..... Sect. Fibrillosi.
   A. Pileus grayish or brownish, but darker at the center.
      1. Pileus large; stipe white, covered with blackish fibrils; spores 6.5–7.5 × 5–6 μ ..... *P. cervinus* (1).
      2. Pileus small; stipe whitish at first, then becoming white-azur-blue; spores 7.5–9 × 5–7 μ ..... *P. salicinus* (2).
   B. Pileus white or whitish.
      1. Pileus large; spores large, 13.75–15.5 × 8–10 μ ..... *P. macrosporus* (3).
      2. Pileus small to medium in size; spores 6–8 × 4.5–5.5 μ ..... *P. pellitus* (4).

II. Pileus atomato-pruinose, somewhat pulverulent..... Sect. Pruinosi.
   A. Pileus small, umber, covered with veined radiating wrinkles; stipe equal..... *P. nanus* (5).
   B. Pileus small, umber, without wrinkles, but shortly striate on the margin; stipe bulbous at the base..... *P. bulbosus* (6).

III. Pileus naked, glabrous..... Sect. Nudi.
   A. Pileus yellow, lemon-yellow or vermilion..... *P. leoninus* (7).
   B. Pileus umber or dark cinnamon..... *P. phlebophorus* (8).

Sect. Fibrillosi IMAI, nom. nov.

Pilei cute in fibrillas vel floccos secedente.

1. *Pluteus cervinus* (SCHAEFF. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 115, 1872; Ench. Fung. 55, 1886—GILL. Hymen. Fr. 393, cum icone, 1874—KARST. Hattsv. I, 252, 1879—SACC. Syll. Fung. V, 665, 1887; Fl. Ital. Crypt., Hymen. 525, 1915—MASS. Brit. Fung. Fl. II, 284, 1893—ATKINS. Mushrooms, ed. 2, 138, f. 135, 1903—W. G. SM. Brit. Basid. 100, f. 23, 1908—ROLLAND, Atlas Champ. 57, f. 125, 1910—RICKEN, Blätterp. 276, pl. 71, f. 1, 1915—MURRILL, North Amer. Fl. X, 134, 1917—KAUFFM. Agar. Mich. 537, pl. 103, 1918—REA, Brit. Basid. 56, 1922—BRES. Icon. Myc. XI, pl. 534, 1929.

Agaricus cervinus SCHAEFF. Fung. Bavar. IV, Ind. 6, pl. 10, 1774 (teste FR.).

Agaricus lividus BULL. Champ. Fr. pl. 382, 1787 (teste FR.).

Agaricus latus BOLT. Hist. Fung. Halif. 2, pl. 2, 1788 (teste FR.)—SOW. Engl. Fung. pl. 108, 1797.

Agaricus pluteus PERS. Syn. Fung. 357, 1801 (teste FR.).

Agaricus (*Clitopilus*) *Pluteus* FR. Syst. Myc. I, 199, 1821—BERK. in SMITH, Engl. Fl. V, (2), 79, 1836.

Agaricus (*Pluteus*) *cervinus* FR. Epicr. Myc. 140, 1838; Hymen. Eur. 185, 1874—RABENH. Deut. Krypt. Fl. I, 511, 1844—BERK. Outl. Brit. Fung. 141, 1860—KICKX, Fl. Crypt. Flandr. II, 161, 1867—CKE. Handb. Brit. Fung. I, 87, 1871; Ill. Brit. Fung. pl. 301, 1886; Handb. Austr. Fung. 38, 1892—WINT. Die Pilze, I, 728, 1884.

Rhodosporus (*Pluteus*) *cervinus* SCHROET. Pilze Schles. I, 620, 1889.

Solitary, edible. Pileus 5–9 cm. broad, campanulate to nearly plane; surface avellaneous to subfuliginous, darker at the center, nearly smooth or with radiating fibrils or minute scales, slightly viscid when wet; context white, rather thin, soft, no taste; lamellae free, white at first, then pinkish or flesh colored, rounded behind, broad, crowded; stipe 6–12 cm. long, 6–12 mm. thick, equal, subbulbous at the base, white above, concolorous at the base, subglabrous, context white, solid, brittle; spores salmon-colored in mass, broadly ellipsoidal, smooth, 6.5–7.5 × 5–6 μ.

Hab. on the ground or on much decayed wood in woods. Summer to autumn. Ishikari (Sapporo, Mt. Teine, Mt. Moiwa, Jôzankei, Nopporo, Sôunbetsu), Iburi (Chitose, Lake side of Shikotsu), Oshima (Ônomura), Kushiro (Lake side of Akan), Kitami (Oketo forest).

Distr. Japan (Hokkaido, Honshu), Asia Minor, Europe, North America, Australia.

Jap. name. *Shikatake* (IMAI).

2. *Pluteus salicinus* (PERS. ex FR.) QUÉL.

Champ. Jura Vosg. in I, Mém. Soc. D'Emul. Montb. 2 sér. V, 115, 1872; Ench. Fung. 55, 1886—GILL. Hymen. Fr. 393, 1874—KARST. Hattsv. I, 254,

1879—SACC. Syll. Fung. V, 668, 1887—MASS. Brit. Fung. Fl. II, 286, 1893—W. G. SM. Brit. Basid. 101, 1908—RICKEN, Blätterp. 280, pl. 70, f. 5, 1915—KAUFFM. Agar. Mich. 539, 1918—REA, Brit. Basid. 59, 1922.

Agaricus salicinus PERS. Icon. Descr. Fung. I, 9, 1798; Syn. Fung. 344, 1801 (teste FR.).

Agaricus (*Leptonia*) *salicinus* FR. Syst. Myc. I, 202, 1821.

Agaricus (*Pluteus*) *salicinus* FR. Epicr. Myc. 141, 1838; Hymen. Eur. 186, 1874—RABENH. Deut. Krypt. Fl. I, 511, 1844—WINT. Die Pilze, I, 727, 1884—CKE. Ill. Brit. Fung. pl. 1169, f. A, 1891.

Rhodosporus (*Pluteus*) *salicinus* SCHROET. Pilze Schles. I, 620, 1889.

Solitary or in small clusters. Pileus 2–5 cm. broad, convex to expanded, broadly umbonate; surface bluish-gray, then cinereous or smoky-umber, darker at the disc, pruinose-velvety, (sometimes floccose-rugulose), disc flocculose, margin subglabrous and slightly striate; context white, tinged with green; lamellae free, rather close, white at first, then flesh-colored, edge concolorous; stipe 2–5 cm. long, 2–6 mm. thick, nearly equal, often enlarged at the base, usually curved, whitish at first, soon or then becoming white-azure-blue, shining, fragile, stuffed; spores flesh-colored in mass, broadly ellipsoidal, smooth, 7.5–9 × 5–7 μ; cystidia fusoid, hyaline, 2–4-prolonged at the apex, stout.

Hab. on decaying deciduous wood in woods. Summer. Ishikari (Nopporo).

Distr. Japan (Hokkaido), Europe, North America.

Jap. name. *Birôdo-benihidatake* (n. n.).

Our fungus may be a form of this species, because the pileus is pruinose-velvety and not flocculose-rugulose which has been stated by many authors. It, however, is identical in habit with the typical species in all other respects.

3. *Pluteus macrosporus* IMAI, sp. nov.

Solitarius. Pileo circa 8 cm. lato, subconico, dein umbonato, sicco, levi, sericeo-fibrilloso, albido vel disco fumoso, margine albo, integri vel leviter sulcato; carne albida, molli, crassa; lamellis liberis, primo albis, dein roseis, distantibus, acie leviter serrulatis; stipite usque ad 15 cm. longo, 1 cm. crasso, sursum attenuato, albido, supra floccoso, subtus fibroso vel floccoso, solido; sporis in cumulo roseis, ellipsoideis, levibus, 13.75–15.5 × 8–10 μ.

Hab. on the ground in woods. Autumn. Ishikari (Nopporo).

Distr. Endemic.

Jap. name. *Shiro-benihidatake* (n. n.).

The present fungus somewhat resembles *P. cervinus* f. *albus* from which it is easily distinguished by the larger spores.

4. *Pluteus pellitus* (PERS. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 115, pl. 5, f. 4, 1872; Ench. Fung. 56, 1886—GILL. Hymen. Fr. 392, cum icone, 1874—KARST. Hattsv. I, 255, 1879—SACC. Syll. Fung. V, 668, 1887; Fl. Ital. Crypt., Hymen. 522, 1915—MASS. Brit. Fung. Fl. II, 287, 1893—W. G. SM. Brit. Basid. 101, 1908—RICKEN, Blätterp. 277, pl. 71, f. 2, 1915—REA, Brit. Basid. 59, 1922—BRES. Icon. Myc. XI, pl. 536, 1929.

Agaricus pellitus PERS. Syn. Fung. 366, 1801 (teste FR.).

Agaricus (*Clitopilus*) *pellitus* FR. Syst. Myc. I, 198, 1821.

Agaricus (*Pluteus*) *pellitus* FR. Epicr. Myc. 141, 1838; Hymen. Eur. 187, 1874—RABENH. Deut. Krypt. Fl. I, 511, 1844—WINT. Die Pilze, I, 727, 1884—CKE. Ill. Brit. Fung. pl. 597, 1886.

Rhodosporus (*Pluteus*) *pellitus* SCHROET. Pilze Schles. I, 619, 1889.

Solitary. Pileus 2–5 cm. or more broad, convex, then expanded to plane or subumbonate; surface smooth, somewhat dry or somewhat viscid, white, at length becomes slightly dingy, perhaps because of the spores, with separable silky shining pellicle; context white, soft, odour faint, taste none; lamellae free, 8 mm. broad, rather long remain white, then flesh color, crowded, rather rounded or broader behind, ventricose; stipe 4–12 cm. long, 4–8 mm. thick, slightly attenuated upward, slightly enlarged at the base, often curved, white, silky shining, subfloccose, striate (not smooth nor glabrous), fragile, solid; spores flesh-colored in mass, broadly ellipsoidal, smooth, 6–8 × 4.5–5.5 μ; cystidia fusoid, apex 2–3-corniculate.

Hab. on trunk of *Ulmus*. Late summer to autumn. Ishikari (Sapporo, Nopporo).

Distr. Japan (Hokkaido), Asia Minor, Europe.

Jap. name. *Hana-yome-take* (n. n.).

Sect. **Pruinosi** IMAI, nom. nov.

Pileus atomato-pruinosus, subpulverulentus.

5. *Pluteus nanus* (PERS. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 116, 1872; Ench. Fung. 56, 1886—GILL. Hymen. Fr. 394, 1874—KARST. Hattsv. I, 256, 1879

—SACC. Syll. Fung. V, 672, 1887; Fl. Ital. Crypt., Hymen. 527, 1915—MASS. Brit. Fung. Fl. II, 287, 1893—W. G. SM. Brit. Basid. 101, 1908—RICKEN, Blätterp. 279, pl. 70, f. 6, 1915—KAUFFM. Agar. Mich. 542, 1918—REA, Brit. Basid. 60, 1922—BRES. Icon. Myc. XI, pl. 542, f. 2, 1929.

Agaricus nanus PERS. Syn. Fung. 357, 1801 (teste FR.).

Agaricus (*Clitopilus*) *nanus* FR. Syst. Myc. I, 200, 1821.

Agaricus (*Pluteus*) *nanus* FR. Epicr. Myc. 141, 1838; Hymen. Eur. 187, 1874—RABENH. Deut. Krypt. Fl. I, 511, 1844—BERK. Outl. Brit. Fung. 141, 1860—CKE. Handb. Brit. Fung. I, 88, 1871; Ill. Brit. Fung. pl. 305, 1886—WINT. Die Pilze, I, 726, 1884.

Rhodosporus (*Pluteus*) *pyrrhospermus* SCHROET. Pilze Schles. I, 619, 1889.

Solitary or scattered. Pileus 2–3 cm. or more broad, hemispherical or convex, then expanded, applanato-umbonate, obtuse; surface at first light seal-brown, bone-brown or clove-brown, then Rood's-brown (fuliginous or umber), velvety-pruinose, granulose or pulverulent, covered with veined, radiating wrinkles on the center; context white, thin; lamellae free, white at first, then flesh-color, ventricose, edge white-fimbriate; stipe 2–4 cm. or more long, 2–4 mm. or more thick, nearly equal or slightly attenuated upward, whitish, slightly striate, slightly besprinkled with brown colored powders, rigid, solid; spores flesh-colored in mass, subglobose or broadly ellipsoidal, smooth, 5–7.5 × 5–6 μ; sterile cells on edge of lamellae obovate, hyaline.

Hab. on the ground or on decaying logs, sticks, etc., under trees. Autumn. Ishikari (Sapporo).

Distr. Japan (Hokkaido), Europe, North America, Australia, Asia Minor.

Jap. name. *Hime-benihida-take* (n. n.).

Our fungus is identical in size with *P. nanus* f. *minor* BRES. which was illustrated in BRESADOLA's Iconographia Mycologica.

6. *Pluteus bulbosus* IMAI, sp. nov.

Subgregarius. Pileo 3–5 cm. lato, e convexo plano, anguste depresso, umbrino ("dresden-brown", "Saccardo's umber" or "snuff-brown"), pruinoso, margine breve striatulo; carne alba, tenuissima; lamellis liberis, primo albis, dein carneis, ventricosis, utrimque attenuatis; stipite 4–7 cm. longo, 3–4 mm. crasso, deorsum incrassato basique bulboso, albido vel flavidulo, striato, glabro, basi pruinoso; sporis in cumulo carneis, globosis vel subglobosis, levibus, 6.5–7.5 μ.

Hab. on rotting wood in woods. Autumn. Ishikari (Nopporo).

Distr. Endemic.

Jap. name. *Hotei-benihida-take* (n. n.).

The present species is allied to *P. nanus* from which it is easily distinguished by the even pileus and bulbous stipe. From *P. semibulbosus* (LASCH) GILL. the fungus is easily distinguishable by the darker pileus.

Sect. Nudi IMAI, nom. nov.

Pileus nudus, glabrus.

7. *Pluteus leoninus* (SCHAEFF. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 115, 1872; Ench. Fung. 56, 1886—GILL. Hymen. Fr. 396, cum icone, 1874—KARST. Hattsv. I, 257, 1879—SACC. Syll. Fung. V, 675, 1887; Fl. Ital. Crypt., Hymen. 530, 1915—MASS. Brit. Fung. Fl. II, 290, 1893—W. G. SM. Brit. Basid. 102, 1908—RICKEN, Blätterp. 278, pl. 71, f. 5, 1915—MURRILL, North Amer. Fl. X, 132, 1917—KAUFFM. Agar. Mich. 545, 1918—REA, Brit. Basid. 61, 1922—BRES. Icon. Myc. XI, pl. 541, 1929.

Agaricus leoninus SCHAEFF. Fung. Bavar. IV, Ind. 21, pl. 48, 1774—PERS. Icon. Descr. Fung. 22, pl. 7, f. 3–4, 1798; Syn. Fung. 337, 1801 (teste FR.).

Agaricus (*Clitopilus*) *leoninus* FR. Syst. Myc. I, 199, 1821—BERK. in SMITH, Engl. Fl. V, (2), 78, 1836.

Agaricus (*Pluteus*) *leoninus* FR. Epicr. Myc. 142, 1838; Hymen. Eur. 188, 1874—RABENH. Deut. Krypt. Fl. I, 510, 1844—BERK. Outl. Brit. Fung. 142, pl. 7, f. 4, 1860—CKE. Handb. Brit. Fung. I, 88, 1871; Ill. Brit. Fung. pl. 421, 1886—WINT. Die Pilze, I, 726, 1884.

Rhodosporus (*Pluteus*) *leoninus* SCHROET. Pilze Schles. I, 619, 1889.

Gregarious or caespitose. Pileus 2–7 cm. broad, campanulate or conical, then expanded, subumbonate, nearly plane; surface yellow, lemon-yellow, crimson-orange or vermilion, brighter in the younger stage, glabrous, nearly moist, scarcely striate on the margin at maturity; context, thin, fragile, whitish or yellowish, reddish under the pellicle in the vermilion specimen; lamellae free, white, then flesh-color, margin often light yellow, crowded, ventricose; stipe 3.5–7.5 cm. long, 3–10 mm. thick, equal or slightly attenuated upward, rarely compressed, whitish, light yellow, often nearly vermilion at the base, fragile, glabrous or fibrillose, longitudinally silky-striatulate, solid; spores flesh color in mass, subglobose to broadly ellipsoidal, 5–7 × 5–6 μ, smooth.

Hab. on decayed wood of deciduous trees. Autumn. Ishikari (Sapporo).

Distr. Japan (Hokkaido), Asia Minor, Europe, North America.

Jap. name. *Beni-hida-take* (n. n.).

8. *Pluteus phlebophorus* (DITM. ex FR.) GILL.

Hymen. Fr. 397, 1874—KARST. Hattsv. I, 257, 1879—QUÉL. Ench. Fung. 56, 1886—SACC. Syll. Fung. V, 676, 1887; Fl. Ital. Crypt., Hymen. 529, 1915—MASS. Brit. Fung. Fl. II, 291, 1893—W. G. SM. Brit. Basid. 102, 1908—RICKEN, Blätterp. 280, pl. 71, f. 6, 1915—REA, Brit. Basid. 61, 1922—BRES. Icon. Myc. XI, pl. 545, 1929.

Agaricus phlebophorus DITM. in STURM, Deut. Fl. III, 31, pl. 15, 1813.

Agaricus (*Clitopilus*) *phlebophorus* FR. Syst. Myc. I, 200, 1821—BERK. in SMITH, Engl. Fl. V, (2), 79, 1836.

Agaricus (*Pluteus*) *phlebophorus* FR. Epicr. Myc. 142, 1838; Hymen. Eur. 188, 1874—RABENH. Deut. Krypt. Fl. I, 510, 1844—BERK. Outl. Brit. Fung. 142, 1860—CKE. Handb. Brit. Fung. I, 89, 1871; Ill. Brit. Fung. pl. 422, f. A, 1886—WINT. Die Pilze, I, 725, 1884.

Solitary. Pileus 3–5 cm. broad, convex or subhemispherical, then expanded, subumbonate; surface umber, then dark-cinnamon, glabrous, wrinkled with black veins, center nearly even; context whitish, odour and taste none, fragile; lamellae free, crowded, ventricose, rather broad, white, then flesh color; stipe 3–6 cm. long, 4–5 mm. thick, subcylindrical, slightly enlarged below, sometimes incurved, white, glabrous, silky-shining, fistulose below; spores flesh color in mass, subglobose or broadly ellipsoidal, 6–7 μ or 6–8 $\times$ 6–7 μ, smooth.

Hab. on rotten wood in woods. Summer. Ishikari (Nopporo).

Distr. Japan (Hokkaido, Honshu), Europe.

Jap. name. *Ko-shiwa-beni-hidatake* (n. n.).

Tribe **Entolomateae** IMAI, nom. nov.

Entolomées KONRAD et MAUBL. Icon. Sel. Fung. 28 & 207, 1924–35, p. p.

Velum nullum distinctum. Pileus a stipite carnosi confluentus homogeneusque. Lamellae molles, stipite adhaerentes. Sporae in cumulo rosae.

Key to the genera.

1. Lamellae sinuate..... *Entoloma.*
2. Lamellae decurrent or adnate-decurrent by a tooth.....*Clitopilus.*

Entoloma (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 62 & 116, 1872.

Agaricus § *Entoloma* FR. Epicr. Myc. 143, 1838.
Rhodophyllus § *Entoloma* QUÉL. Ench. Fung. 57, 1886.
Hyporhodius § *Entoloma* SCHROET. Pilze Schles. I, 616, 1889.

Fructification without volva and annulus. Pileus fleshy, regular or irregular. Stipe central, fibrous or fleshy. Lamellae sinuate, sinuato-adnate or adnexed. Spores pink in mass.

Type species: *Agaricus lividus* BULL. ex FR.

Key to the sections and species in Hokkaido.

I. Pileus glabrous, moist or viscid, not hygrophanous..... Sect. Genuina.
   A. Pileus brownish-white, yellowish-white or grayish.
      1. Pileus large, not umbonate, avellaneous..... *E. lividum*(1).
      2. Pileus medium in size.
         a. Pileus yellowish-white or whitish, subumbonate..... ..... *E. prunuloides*(2).
         b. Pileus brownish or grayish, venose-striate and virgate, not umbonate..... *E. erophilum*(3).
   B. Pileus dark-violet..... *E. subnitidum*(4).

II. Pileus floccose, subsquamulose, absolutely dry, not hygrophanous..... ..... Sect. Leptonidea.
   1. Pileus small, vinaceous-purple..... *E. cyaneum*(5).

III. Pileus thin, hygrophanous, rather silky when dry, often irregular and repand..... Sect. Nolanidea.
   A. Stipe fibrous; pileus rather large, pinkish-buff to fuscous when wet, becoming pallid when dry, variegated with darker spots..... ..... *E. clypeatum*(6).
   B. Stipe not fibrous.
      1. Odour farinaceous; pileus avellaneous to fuscous when wet..... ..... *E. rhodopolium*(7).
      2. Odour strong, but not farinaceous; pileus fawn-cinereous..... ..... *E. nidorosum*(8).

Sect. Genuina Fr.

Epicr. Myc. 143, 1838.

Pileus glabrous, moist or viscid, not hygrophanous, nor innato-floccose or squamulose.

1. *Entoloma lividum* (Bull. ex Fr.) Quél.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 116, pl. 6, f. 1, 1872—Gill. Hymen. Fr. 401, cum icone, 1874—Karst. Hattsv. I, 258, 1879—Sacc. Syll. Fung. V, 680, 1887; Fl. Ital. Crypt., Hymen. 535, 1915—Mass. Brit. Fung. Fl. II, 268, 1893—W. G. Sm. Brit. Basid. 103, 1908—Rolland, Atlas Champ. 58, f. 127, 1910—Ricken, Blätterp. 284, pl. 72, f. 2, 1915—Kauffm. Agar. Mich. 548, 1918—Rea, Brit. Basid. 243, 1922.

Agaricus lividus Bull. Champ. Fr. pl. 382, 1791 (teste Fr.).

Agaricus (*Entoloma*) *lividus* Fr. Monogr. Hymen. Suec. I, 269, 1857; Hymen. Eur. 189, 1874—Cke. Ill. Brit. Fung. pl. 311, 1886—Wint. Die Pilze, I, 725, 1884.

Rhodophyllus (*Entoloma*) *lividus* Quél. Ench. Fung. 57, 1886—Lange, Agar. Denm. IV, 29, 1921.

Hyporhodius (*Entoloma*) *lividus* Schroet. Pilze Schles. I, 617, 1889.

Solitary or gregarious, said to be poisonous. Pileus 5–16 cm. broad, convex then plane, somewhat gibbous; surface smooth, glabrous, silky shining, nearly avellaneous, slightly viscid when wet; context white, rather thin, brittle, odour farinaceous, taste mild; lamellae adnexed, rounded behind, somewhat free, white, then flesh color, attenuated in front, up to 13 mm. wide, distant; stipe 8–13 cm. long, 8–30 mm. thick, equal, shining white, apex faintly pruinose, slightly striate, nearly elastic, sometimes sulcate; spores pink in mass, globose or ellipsoidal, angular, 7.5–10 × 7.5 μ.

Hab. on the ground in woods. Autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido, Honshu), Europe, North America.

Jap. name. *Nise-shimeji* (Kawamura).

2. *Entoloma prunuloides* (Fr.) Quél.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 117, 1872—Gill. Hymen. Fr. 400, cum icone, 1874—Karst. Hattsv. I, 259, 1879—Sacc. Syll. Fung. V, 680, 1887; Fl. Ital. Crypt., Hymen. 536, 1915—Mass. Brit.

Fung. Fl. II, 269, 1893—W. G. SM. Brit. Basid. 104, 1908—RICKEN, Blätterp. 285, 1915—REA, Brit. Basid. 244, 1922—BRES. Icon. Myc. XI, pl. 548, f. 2, 1929.

[YASUDA, Bot. Mag. (Tokyo), XXXVII, (208), 1923]

Agaricus (*Clitopilus*) *Prunuloides* FR. Syst. Myc. I, 198, 1821.

Agaricus (*Entoloma*) *prunuloides* FR. Epicr. Myc. 143, 1838; Hymen. Eur. 189, 1874—BERK. Outl. Brit. Fung. 143, 1860—CKE. Handb. Brit. Fung. I, 90, 1871—WINT. Die Pilze, I, 724, 1884.

Rhodophyllus (*Entoloma*) *prunuloides* QUÉL. Ench. Fung. 57, 1886—LANGE, Agar. Denm. IV, 30; 1921.

Solitary. Pileus 5–8 cm. broad, campanulate, then convex to plane, finally depressed around the little umbo, subumbonate; surface whitish or faintly yellowish, smooth, silky shining, almost glabrous but appears slightly silky fibrillose, slightly viscid when wet, margin entire or slightly waved or lobed, incurved, concolorous; context white, rather thin, taste mild, odour farinaceous; lamellae sinuate, somewhat free, whitish at first, then salmon-color, slightly waved on the edge, not entire, tapering in front, distant; stipe 5–10 cm. long, 5–8 mm. thick, subequal, narrowed at the base, concolorous or whitish, slightly flocculose or fibrous external, slightly shining, floccose or villous at the base, hollow or loosely stuffed; spores onion-skin-pink or Japan-pink in mass, globosely ovoid or subellipsoidal, obtusely angular, 8–10 × 7–8 μ.

Hab. on the ground in woods. Autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido, Honshu), Europe.

Jap. name. *Ko-ippon-shimeji* (YASUDA).

3. *Entoloma erophilum* (FR.) KARST.

Hattsv. I, 259, 1879—SACC. Syll. Fung. V, 681, 1887; Fl. Ital. Crypt., Hymen. 533, 1915—W. G. SM. Brit. Basid. 104, 1908—RICKEN, Blätterp. 284, 1915—REA, Brit. Basid. 244, 1922—BRES. Icon. Myc. XI, pl. 547, 1929.

Agaricus (*Entoloma*) *erophilus* FR. Hymen. Eur. 190, 1874.

Solitary. Pileus 2–4 cm. broad, convex, then expanded, obtuse; surface glabrous, yellowish-gray, slightly viscid when wet, venosely striate and virgate, margin involute; context white, thin, slightly fleshy; lamellae adnate, adnate-subsinuate or adnate-subdecurrent, grayish, then flesh color, wide, distant; stipe 3–5 cm. long, 4–6 mm. thick, equal, white, becoming grayish, silky fibrous external, stuffed,

then nearly hollow; spores flesh color in mass, angular, subglobose or broadly oblong, 8–10 × 7.5–8 μ.

Hab. on the ground in woods. Autumn. Kitami (Oketo forest).

Distr. Japan (Hokkaido), Siberia, Europe.

Jap. name. *Hime-ippon-shimeji* (n. n.).

4. *Entoloma subnitidum* IMAI, sp. nov.

Solitarium vel gregarium. Pileo 4–7 cm. lato, conico vel convexo, dein expanso, subumbonato, violaceo-atrocyaneo ("dusky-violet" or "dusky-blue-violet"), asperulato vel velutinullo, sicco; carne ablida; lamellis sinuato-adnexis, albis dein carneis, distantibus, latis, ventricosis; stipite 7–10 cm. longo, 4–7 mm. crasso, equali, basi subincrassato, concolori vel pallidiori, sursum pruinoso, deorsum fibrilloso; sporis in cumulo carneis, ellipsoideis vel obovatis, tuberculosis vel angulatis, 10–12.5 × 7.5–10 μ.

Hab. on the ground in woods. Late summer to autumn. Ishikari (Nopporo), Kitami (Oketo forest).

Distr. Endemic.

Jap. name. *Murasaki-ipponshimeji* (n. n.).

The present fungus is closely allied to *E. nitidum* QUÉL. and *E. madidum* (FR.) GILL. It, however, is quite distinguishable from these species by the ellipsoidal spores.

Sect. Leptonidea FR.

Epicr. Myc. 145, 1838.

Pileus floccose, subsquarrose, absolutely dry, not hygrophanous.

5. *Entoloma cyaneum* (PK.) SACC.

Syll. Fung. V, 692, 1887—KAUFFM. Agar. Mich. 551, 1918.
Agaricus cyaneus PK. Bull. Buffalo Soc. Nat. Sci. I, 49, 1873.
Entoloma violaceum MURRILL, North Amer. Fl. X, 115, 1917.

Solitary or gregarious. Pileus 2–3.5 cm. broad, convex, then umbonate; surface dry, vinaceous-drab, deep-purplish-vinaceous, vinaceous-purple or mars-violet, minutely squamulose or powdery-

squamulose; context white, purplish under pellicle, thin; lamellae sinuate, whitish then tinged with pink, moderately crowded; stipe 3.5–6 cm. long, 2–4 mm. thick, equal or slightly enlarged at the base, paler than the pileus (rhodonite-pink), nearly whitish at both ends, powdery-squamulose, hollow; spores pink in mass, angular, obovate or subellipsoidal, 8.5–10 × 6.5–7.5 μ.

Hab. on humus ground in woods. Autumn. Ishikari (Sapporo).

Distr. Japan (Hokkaido), North America.

Jap. name. *Ko-murasaki-ippon* (n. n.).

Sect. Nolanidea Fr.

Epicr. Myc. 146, 1838.

Pileus thin, hygrophanous, rather silky when dry, often irregular and repand.

6. *Entoloma clypeatum* (L. ex Fr.) Quél.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 118, 1872—Gill. Hymen. Fr. 402, cum icone, 1874—Karst. Hattsv. I, 265, 1879—Sacc. Syll. Fung. V, 694, 1887; Fl. Ital. Crypt., Hymen. 541, 1915—Mass. Brit. Fung. Fl. II, 278, 1893—W. G. Sm. Brit. Basid. 107, 1908—Rolland, Atlas Champ. 58, f. 129, 1910—Ricken, Blätterp. 287, pl. 73, f. 1, 1915—Kauffm. Agar. Mich. 552, 1918—Rea, Brit. Basid. 249, 1922—Bres. Icon. Myc. XII, pl. 558, 1929.

[Matsuura, Trans. Tottori Soc. Agr. Sci. IV, 96, 1932]

Agaricus clypeatus L. Sp. Pl. 1174, 1753 (teste Fr.).

Agaricus (*Entoloma*) *clypeatus* Fr. Epicr. Myc. 146, 1838; Hymen. Eur. 194, 1874—Rabenh. Deut. Krypt. Fl. I, 509, 1844—Berk. Outl. Brit. Fung. 144, pl. 7, f. 6, 1860—Kickx, Fl. Crypt. Flandr. II, 162, 1867—Cke. Handb. Brit. Fung. I, 93, 1871; Ill. Brit. Fung. pl. 319, 1886—Wint. Die Pilze, I, 721, 1884.

Rhodophyllus (*Entoloma*) *clypeatus* Quél. Ench. Fung. 59, 1886—Lange, Agar. Denm. IV, 30, 1921.

Hyporhodius (*Entoloma*) *clypeatus* Schroet. Pilze Schles. I, 616, 1889.

Gregarious or caespitose, edible. Pileus 2–10 cm. broad, convex, then umbonate; surface snuff-brown or drab color, usually streaked with fine ashy colored lines at the periphery, or irregularly variegated or spotted with ashy and hair-brown color on the center, glabrous, slightly viscid when wet, hygrophanous, margin spreading,

sometimes shortly striate; context white, rather thin, taste mild, odour mealy; lamellae obtusely adnate or sinuate, white, then dingy-flesh color, broad, subdistant; Stipe 3–11 cm. long, 4–20 mm. thick, equal or slightly thickened at the base, pallid or white, becoming grayish, with grey fibrils, fragile, stuffed or hollow; spores pink in mass, subglobose, coarsely warted or angular, 7.5–11 μ or 7.5–11 × 7–10 μ.

Hab. on the ground among the grass in woods or under trees. Spring. Ishikari (Sapporo, Nopporo).

Distr. Japan (Hokkaido, Honshu), Europe, North America.

Jap. name. *Shimeji-modoki* (MATSUURA).

7. *Entoloma rhodopolium* (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 246, 1872—GILL. Hymen. Fr. 403, cum icone, 1874—KARST. Hattsv. I, 265, 1879—SACC. Syll. Fung. V, 694, 1887; Fl. Ital. Crypt., Hymen. 540, 1915—MASS. Brit. Fung. Fl. II, 279, 1893—W. G. SM. Brit. Basid. 107, 1908—ROLLAND, Atlas Champ. 58, f. 128, 1910—RICKEN, Blätterp. 287, pl. 73, f. 2, 1915—MURRILL, North Amer. Fl. X, 122, 1917—KAUFFM. Agar. Mich. 553, pl. 105, 1918—REA, Brit. Basid. 250, 1922—KAWAMURA, Ill. Jap. Fung. pl. 18, f. 6–8, 1925—BRES. Icon. Myc. XII, pl. 560, 1929.

Agaricus (*Clitopilus*) *rhodopolius* FR. Syst. Myc. I, 197, 1821.

Agaricus (*Entoloma*) *rhodopolius* FR. Epicr. Myc. 147, 1838; Hymen. Eur. 195, 1874—RABENH. Deut. Krypt. Fl. I, 509, 1844—BERK. Outl. Brit. Fung. 145, 1860—CKE. Handb. Brit. Fung. I, 94, 1871; Ill. Brit. Fung. pl. 342, 1886—WINT. Die Pilze, I, 721, 1884.

Rhodophyllus (*Entoloma*) *rhodopolius* QUÉL. Ench. Fung. 59, 1886—LANGE, Agar. Denm. IV, 30, 1921.

Hyporhodius (*Entoloma*) *hydrogrammus* SCHROET. Pilze Schles. I, 616, 1889.

Solitary. Pileus 3–8 cm. broad, campanulate, then expanded and subumbonate or gibbous, at length somewhat plane, and sometimes depressed; surface avellaneous to fuscous, becoming pale, isabelline-livid, silky-shining when dry, fibrillose when young, then smooth, hygrophanous, margin incurved, undulate when large specimen, sometimes lobed; context white, dark under the pellicle, taste mild, odour mealy; lamellae adnexed, then separating, somewhat sinuate, white, then rose color, rather narrow, distant; stipe 5–10 cm. long, 0.5–1.5 cm. thick, equal or attenuated upward, slightly striate, apex white-

pruinose, white or whitish, hollow; spores pink in mass, subglobose or globose, angular, 8–9 × 7–8 μ or 7–9 μ.

Hab. on the ground in woods. Autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido), Asia Minor, Europe, North America.

Jap. name. *Kusa-urabenitake* (KAWAMURA).

8. *Entoloma nidorosum* (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 119, 1872—GILL. Hymen. Fr. 402, 1874—KARST. Hattsv. I, 268, 1879—SACC. Syll. Fung. V, 697, 1887; Fl. Ital. Crypt., Hymen. 541, 1915—MASS. Brit. Fung. Fl. II, 282, 1893—W. G. SM. Brit. Basid. 108, 1908—RICKEN, Blätterp. 287, 1915—REA, Brit. Basid. 251, 1922—BRES. Icon. Myc. XII, pl. 563, 1929.

Agaricus (*Entoloma*) *nidorosus* FR. Epicr. Myc. 148, 1838; Hymen. Eur. 196, 1874—BERK. Outl. Brit. Fung. 145, 1860—CKE. Handb. Brit. Fung. I, 95, 1871; Ill. Brit. Fung. pl. 321, 1886—WINT. Die Pilze, I, 720, 1884.

Rhodophyllus (*Entoloma*) *nidorosus* QUÉL. Ench. Fung. 59, 1886—LANGE, Agar. Denm. IV, 31, 1921.

Solitary. Pileus 3–6 cm. broad, convex, then expanded, at length often concave, and irregularly shaped, rimose; surface fawn-cinereous, livid, hygrophanous, silky shining when dry; context white, odour strong, taste mild; lamellae emarginate-free, pallid, then flesh-color, distant, sometimes undulate-flexuous; stipe 5–10 cm. long, 3–10 mm. thick, equal or attenuated upward, whitish, glabrous, white-pruinose at the apex; spores pink in mass, angular, subglobose, 8–10 × 7–9 μ.

Hab. on the ground in woods. Late summer to autumn. Kitami (Oketo forest).

Distr. Japan (Hokkaido), Europe.

Jap. name. *Ko-kusaurabenitake* (n. n.).

Clitopilus (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 62 & 120, 1872.

Pleuropus REUSSEL, Fl. Calvados, ed. 2, 67, 1806—MURRILL, North Am. Fl. X, 102, 1917.

Agaricus § *Clitopilus* FR. Syst. Myc. I, 10 & 194, 1821, p. p.; Epicr. Myc. 148, 1838.

Rhodosporus § *Clitopilus* SCHROET. Pilze Schles. I, 618, 1889.

Hexajuga FAYOD, Ann. Sci. Nat., Bot. 7 sér. IX, 389, 1889.

Fructification without volva and annulus. Pileus fleshy, regular or irregular. Stipe central or rarely subexcentric, fleshy. Lamellae decurrent. Spores pink in mass.

Type species: *Agaricus prunulus* SCOP. ex FR.

1. *Clitopilus caespitosus* PK.

41 Ann. Rept. N. Y. State Mus. 65, 1888—KAUFFM. Agar. Mich. 570, pl. 112–113, 1918.

Pleuropus caespitosus MURRILL, North Amer. Fl. X, 104, 1917.

Caespitose, edible. Pileus 2.5–10 cm. broad, at first convex, soon expanded and plane, finally depressed at the center; surface glabrous, whitish to grayish when young, then becoming watery-dingy-white when wet, dull whitish to pale tan and silky shining when dry, even, margin at first incurved, often recurved and split in age; context white to pallid, thin, somewhat firm, but brittle, fragile, taste mild, odour slightly fragrant; lamellae adnate-decurrent or sinuate-decurrent, thin, very crowded, whitish, then dingy-pale fleshy-color, edge sometimes minutely crenulate; stipe 2.5–7 cm. long, 3–8 mm. thick, equal or attenuated upward, rarely downward, silky-fibrillose, scurfy at apex, pallid, stuffed, fragile in age, easily splitting; spores sordid white with a pink tinge in mass (very pale pink), short oblong, smooth, $6 \times 4\,\mu$.

Hab. on the ground under trees. Late summer to autumn. Ishikari (Sapporo).

Distr. Japan (Hokkaido), North America.

Jap. name. *Kabu-urabenitake* (n. n.).

2. *Clitopilus abortivus* (BERK. et CURT.) SACC.

Syll. Fung. V, 701, 1887—KAUFFM. Agar. Mich. 564, pl. 111, 1918.

Agaricus (*Clitopilus*) *abortivus* BERK. et CURT. Ann. Mag. Nat. Hist. 3 ser. IV, 289, 1859.

Pleuropus abortivus MURRILL, Mycologia, III, 280, 1911; Ibid. IV, 6, pl. 56, f. 12, 1912; North Amer. Fl. X, 108, 1917.

Solitary, gregarious or subcaespitose, usually growing with an imperfectly developed subglobose, whitish, sterile mass of mycelium, edible. Pileus 3–10 cm. broad, convex, then nearly plane to subdepressed, regular or irregular; surface dry, at first covered with a delicate silky tomentum, glabrescent, gray or grayish-brown (light-drab), dull, becoming isabelline, margin even; context white, odour and taste farinaceous; lamellae decurrent or adnate with a decurrent tooth, thin, crowded, whitish or pale grayish, changing to rosy or salmon-color, rather narrow; stipe 3–9 cm. long, 4–10 mm. thick, subequal, subconcolorous or paler than the pileus, slightly flocculose, sometimes fibrous-striate, solid; spores salmon-pink in mass, elongated angular, irregular, 8–10 × 5–7 μ.

Hab. on the ground or old prostrate trunks of trees in woods and open places. Autumn. Ishikari (Nopporo), Iburi (Chitose, Lake side of Shikotsu).

Distr. Japan (Hokkaido), North America.

Jap. name. *Tama-urabenitake* (n. n.).

Tribe **Claudopeae** IMAI, nom. nov.

Vellum nullum distinctum. Pileus excenticus, lateralis vel resupinatus. Lamellae molles. Sporae in cumulo rosae vel roseo-rubiginosae.

Claudopus (W. G. SM.) GILL.

Hymen. Fr. 426, 1874.
Agaricus § *Claudopus* W. G. SM. in SEEM. Journ. Bot. VIII, 215, 1870.
Dochmiopus PAT. Hymen. Eur. 113, 1887.
Octojuga FAYOD, Ann. Sci. Nat., Bot. 7 sér. IX, 390, 1889.

Fructification without universal and partial veils. Pileus fleshy, excentric, lateral or resupinate. Stipe excentric, lateral or wanting. Lamellae radiating from a central point or decurrent. Spores pink in mass.

Type species: *Agaricus variabilis* PERS. ex FR.

Claudopus nidulans (PERS. ex FR.) KARST.

Hattsv. I, 288, 1879—ATKINS. Mushrooms, ed. 2, 149, f. 144, 1903—MURRILL, North Amer. Fl. X, 79, 1917—KAUFFM. Agar. Mich. 591, pl. 115, 1918.

Agaricus nidulans PERS. Icon. Descr. Fung. 19, pl. 6, f. 4, 1798; Syn. Fung. 482, 1801 (teste FR.).

[YASUDA, Bot. Mag. (Tokyo), XXIX, (263), 1915]

Agaricus (*Pleurotus*) *nidulans* FR. Syst. Myc. I, 189, 1821; Epicr. Myc. 138, 1838; Hymen. Eur. 178, 1874—RABENH. Deut. Krypt. Fl. I, 514, 1844—WINT. Die Pilze, I, 732, 1884—SCHROET. Pilze Schles. I, 624, 1889.

Pleurotus nidulans GILL. Hymen. Fr. 384, 1874—SACC. Syll. Fung. V, 375, 1887; Fl. Ital. Crypt., Hymen. 311, 1915—RICKEN, Blätterp. 455, pl. 112, f. 6, 1915.

Crepidotus nidulans QUÉL. Ench. Fung. 108, 1886—REA, Brit. Basid. 454, 1922.

Panus nidulans PILÁT, Mykologia, VII, 90, 1930—MALKOV. Ann. Myc. XXX, 44, f. 13–16, 1932.

Gregarious or caespitose, sometimes imbricate, edible. Pileus 2–9 cm. broad, 1.5–5 cm. long, shelving, sessile or narrowed behind into a short stem-like base, nearly orbicular, dimidiate or reniform; surface coarsely hairy or tomentose, warm-buff, antimony-yellow or ochraceous-buff in color, margin inrolled, even or lobed and orange colored and more distinctly and long tomentose; context yellowish, becoming whitish when dry, rather thick, soft, odour pleasant; lamellae decurrent, light-ochraceous-buff, crowded, narrow; stipe short or lacking, stipe or attached base tomentose next to the lamellae beneath; spores pink in mass, elongated, slightly curved, 5–6 × 2.5–3.5 μ.

Hab. on decayed or dead wood of various trees in woods or gardens, etc. Summer to autumn. Ishikari (Sapporo, Jôzankei).

Distr. Japan (Hokkaido, Honshu), Europe, North America.

Jap. name. *Ki-hiratake* (YASUDA).

Tribe **Leptonieae** IMAI, nom. nov.

Vellum nullum distinctum. Pileus cum stipite cartilagine confluentus sed a stipite heterogenus. Lamellae cum stipite adhaerentes vel liberae. Sporae in cumulo rosae.

Key to the genera.

I. Lamellae adnate or sinuate-adnate.
  1. Margin of pileus at first incurved or exceeding the lamellae..... ..... *Leptonia.*
  2. Margin of pileus straight, at first adpressed to the stipe..... ..... *Nolanea.*

Leptonia (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 62 & 121, 1872.

Agaricus § *Leptonia* FR. Syst. Myc. I, 201, 1821.
Rhodophyllus § *Leptonia* QUÉL. Ench. Fung. 59, 1886.
Hyporhodius § *Leptonia* SCHROET. Pilze Schles. I, 614, 1889.
Leptoniella EARLE, Bull. N. Y. Bot. Gard. V, 424, 1909.

Fructification without universal and partial veils. Pileus slightly fleshy, regular, incurved at the margin. Stipe central, cartilaginous. Lamellae adnate, sinuato-adnate or adnexed. Spores pink in mass.

Type species: *Agaricus anatinus* LASCH.

Key to the species in Hokkaido.

I. Stipe not white nor yellow.
  1. Pileus blackish-blue, velvety-floccose; lamellae at first white; stipe dark blue..... *L. lampropus*(1).
  2. Pileus and stipe pale umber, almost glabrous; lamellae at first white... ..... *L. umbrinella*(2).

II. Stipe white; pileus whitish or slightly ochraceous..... *L. sericella*(3).

1. *Leptonia lampropus* (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 121, 1872 —GILL. Hymen. Fr. 416, cum icone, 1874—KARST. Hattsv. I, 274, 1879—SACC. Syll. Fung. V, 707, 1887; Fl. Ital. Crypt., Hymen. 557, 1915 (ut *lampropoda*)—MASS. Brit. Fung. Fl. II, 251, 1893 (ut *lampropoda*)—W. G. SM. Brit. Basid. 112, 1908—RICKEN, Blätterp. 293, pl. 73, f. 7, 1915—KAUFFM. Agar. Mich. 574, 1918 (ut *lampropoda*)—REA, Brit. Basid. 344, 1922—BRES. Icon. Myc. XII, pl. 570, f. 1, 1929 (ut *lampropoda*).

Agaricus (*Leptonia*) *lampropus* FR. Syst. Myc. I, 203, 1821; Epicr. Myc. 152, 1838; Hymen. Eur. 202, 1874—BERK. Outl. Brit. Fung. 146, 1860—CKE. Handb. Brit. Fung. I, 99, 1871; Ill. Brit. Fung. pl. 331, 1886—WINT. Die Pilze, I, 715, 1884.

Rhodophyllus (*Leptonia*) *lampropus* QUÉL. Ench. Fung. 60, 1886—LANGE, Agar. Denm. IV, 33, 1921.

Hyporhodius (*Leptonia*) *lampropus* SCHROET. Pilze Schles. I, 615, 1889.

Gregarious or solitary. Pileus 1–3 cm. broad, convex, then plane, subumbilicate or depressed, not papilate; surface mouse-color or steel-blue, then fuliginous-gray, silky-flocculose, then becoming fuscous-squamulose, squamules dense in center, never striate, sometimes rimose, margin inflexed then raised; context at first bluish-black, then gray to white, subhygrophanous, thin, odour and taste none; lamellae adnate, readily separating, then free, subdistant, broad, ventricose, white, then flesh-color, edge entire and concolorous; stipe 2.5–5 cm. long, 2–4 mm. thick, equal or attenuated upward, azure-blue at first, becoming fuscous, commonly steel-blue-violaceous, glabrous, even, white floccose at the base, elastic, firm, stuffed then hollow; spores rosy in mass, variable in size, ellipsoidal, angular, 9–13 × 6–8 μ.

Hab. on the ground in woods. Autumn. Ishikari (Nopporo), Kushiro (Lake side of Akan).

Distr. Japan (Hokkaido, Honshu), Europe, North America, Australia.

Jap. name. *Ao-e-no-momiuratake* (n. n.).

2. *Leptonia umbrinella* IMAI, sp. nov.

Solitaria. Pileo 1.5–5 cm. lato, convexo, demum leviter depresso, glabro, sicco, pallide umbrino, centro obscuriore, non striato, margine primo inflexo; carne tenera, cinerea, odore nullo; lamellis adnexis vel sinuatis, confertis, primo albidis, dein incarnatis; stipite 3–7 cm. longo, 2–4 mm. crasso, aequali vel basi leviter incrassato, subconcolori vel pallidiori, sericeo-fibrilloso, saepe flexuoso, cavo; sporis in cumulo roseis, angularibus, ellipsoideis vel oblongis, 10–12.5 × 7–10 μ.

Hab. on the ground in woods. Autumn. Ishikari (Mt. Kurodake).

Distr. Endemic.

Jap. name. *Cha-momiuratake* (n. n.).

The present fungus is somewhat allied to *L. solstitialis* (FR.) GILL. and *Eccilia polita* (FR.) QUÉL., but it is easily distinguished from the former species by the non-papillate pileus, and from the latter by the non-striate pileus and less attached lamellae.

3. *Leptonia sericella* (FR.) BARBIER.

Bull. Soc. Myc. Fr. XXVII, 178, 1911—RICKEN, Blätterp. 289, pl. 73, f. 4, 1915—REA, Brit. Basid. 346, 1922.

Agaricus (*Clitopilus*) *sericellus* FR. Syst. Myc. I, 196, 1821—BERK. in SMITH, Engl. Fl. V, (2), 76, 1836.

Agaricus (*Entoloma*) *sericellus* FR. Epicr. Myc. 146, 1838; Hymen. Eur. 194, 1874—BERK. Outl. Brit. Fung. 144, 1860—CKE. Handb. Brit. Fung. I, 93, 1871; Ill. Brit. Fung. pl. 307, 1886—WINT. Die Pilze, I, 722, 1884.

Entoloma sericellum QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 118, pl. 5, f. 5, 1872—GILL. Hymen. Fr. 405, 1874—KARST. Hattsv. I, 264, 1879—SACC. Syll. Fung. V, 691, 1887; Fl. Ital. Crypt., Hymen. 537, 1915—MASS. Brit. Fung. Fl. II, 277, 1893—W. G. SM. Brit. Basid. 106, 1908—KAUFFM. Agar. Mich. 550, 1918—BRES. Icon. Myc. XII, pl. 557, 1929.

Rhodophyllus (*Leptonia*) *sericellus* QUÉL. Ench. Fung. 61, 1886—LANGE, Agar. Denm. IV, 34, 1921.

Gregarious. Pileus 1.5–3 cm. broad, convex, then plane, obtuse, at length depressed, often unequal; surface white or becoming yellowish-white, silky shining or minutely squamulose, margin inflexed, floccose; context white, thin, inodourous; lamellae at first adnate, slightly decurrent by a tooth, then separating and somewhat sinuate, rather distant, broad, white then flesh-colored; stipe 2–5 cm. long, 2–3 mm. thick, equal, cylindrical, shining, white, then becoming pale, subwaxy, fibrillose, at length somewhat polished, pellucid, subfistulose; spores flesh color in mass, angular, variable in shape and size, 9–10 μ in diam. or 9–11 $\times$ 6–8 μ.

Hab. on the ground in woods. Autumn. Iburi (Lake side of Shikotsu).

Distr. Japan (Hokkaido), Europe, North America.

Jap. name. *Kinu-momiüuratake* (n. n.).

Nolanea (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 62 & 122, 1872.

Agaricus § *Nolanea* FR. Syst. Myc. I, 204, 1821.

Rhodophyllus § *Nolanea* QUÉL. Ench. Fung. 63, 1886.

Hyporhodius § *Nolanea* SCHROET. Pilze Schles. I, 613, 1889.

Fructification without volva and annulus. Pileus fleshy or submembranous, regular; margin straight, at first adpressed to the stipe. Stipe central, cartilaginous. Lamellae adnate, adnexed or sinuate-adnate. Spores pink in mass.

Type species: *Agaricus pascus* PERS. ex FR.

Nolanea mammosa (L. ? ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 122, 1872—GILL. Hymen. Fr. 419, cum icone, 1874—KARST. Hattsv. I, 281, 1879—SACC. Syll. Fung. V, 718, 1887; Fl. Ital. Crypt., Hymen. 564, 1915—MASS. Brit. Fung. Fl. II, 259, 1893—W. G. SM. Brit. Basid. 115, 1908—RICKEN, Blätterp. 299, pl. 74, f. 6, 1915—MURRILL, North Amer. Fl. X, 101, 1917—KAUFFM. Agar. Mich. 583, 1918—REA, Brit. Basid. 403, 1922—BRES. Icon. Myc. XII, pl. 582, 1929.

?*Agaricus mammosus* L. Sp. Pl. 1174, 1753 (teste FR.).

Agaricus (*Nolanea*) *mammosus* FR. Epicr. Myc. 156, 1838; Hymen. Eur. 207, 1874—WINT. Die Pilze, I, 710, 1884.

Rhodophyllus (*Nolanea*) *mammosus* QUÉL. Ench. Fung. 64, 1886—LANGE, Agar. Denm. IV, 36, 1921.

Hyporhodius (*Nolanea*) *mammosus* SCHROET. Pilze Schles. I, 614, 1889.

Solitary. Pileus 2–4 cm. broad, conical to broadly campanulate, papillate; surface hygrophanous, almost glabrous, olive-brown or bister when moist, paler and shining when dry, margin incurved, faintly striatulate; context thin, subconcolorous, odour none; lamellae sinuate, gray, then flesh-color, moderately crowded, edge uneven, ventricose; stipe 7–11 cm. long, 2–4 mm. thick, cylindrical, nearly equal, but slightly enlarged at the base, paler than the pileus (drab color), rigid, cartilaginous, fibrillose-striate, white-mealy at the apex, white tomentose at the base, otherwise glabrous, shining, fistulose; spores pink in mass, tuberculate-angular, 4–7-angulate-elongate, 8–12 × 6–7.5 μ.

Hab. among fallen leaves on the ground in woods. Autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido), Europe, North America.

Jap. name. *Momiura-modoki* (n. n.).

PLATE I

Explanation of Plate I

Fig. 1. *Amanita Caesarea* (SCOP. ex FR.) QUÉL.

Fig. 2. *Amanita subjunquillea* IMAI.

Fig. 3. *Amanita phalloides* (FR.) QUÉL.

Fig. 4. *Amanita mappa* (BATSCH ex FR.) QUÉL.

Fig. 5. *Amanita pantherina* (DC. ex FR.) QUÉL.

Fig. 6. *Amanita spissacea* IMAI.

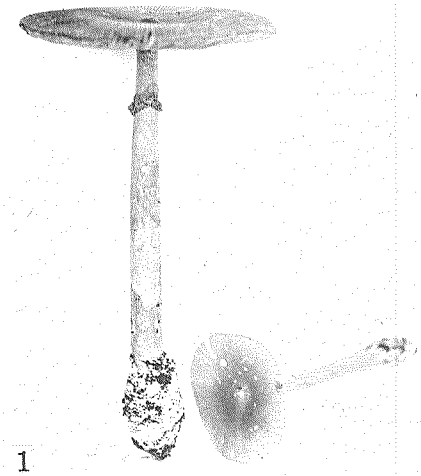
Fig. 7. *Amanitopsis vaginata* (BULL. ex FR.) ROZE.

Fig. 8. *Amanitopsis clarisquamosa* IMAI.

Fig. 9. *Lepiota procera* (SCOP. ex FR.) QUÉL.

Fig. 10. *Lepiota subamanitiformis* IMAI.

Fig. 11. *Armillaria Matsutake* S. ITO et IMAI.
(from Notoro forest in Hokkaido)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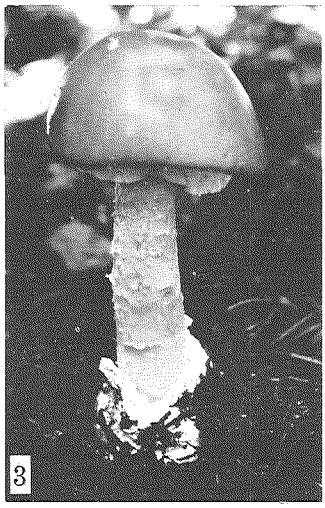
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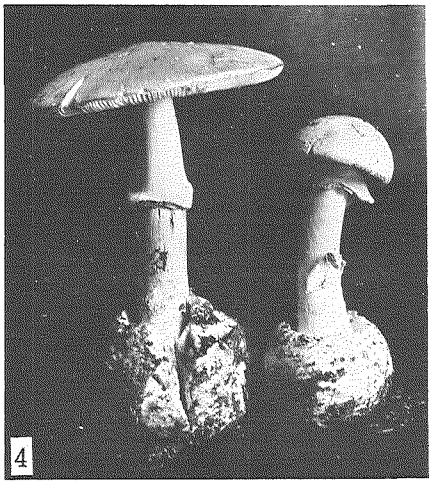
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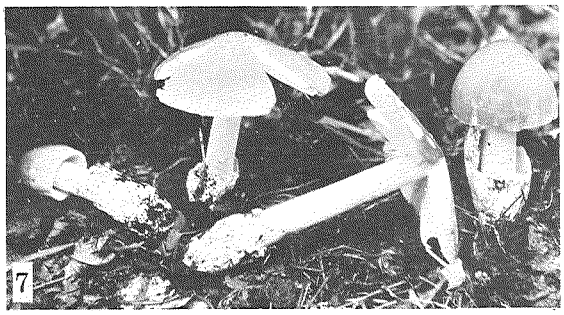
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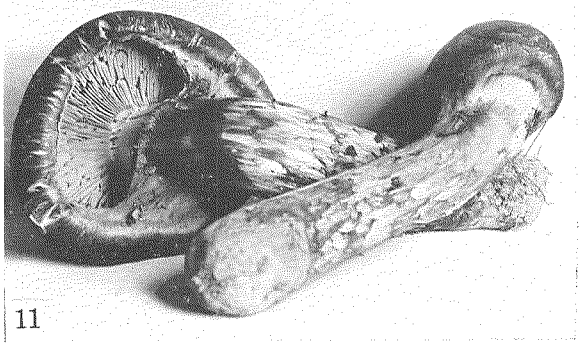
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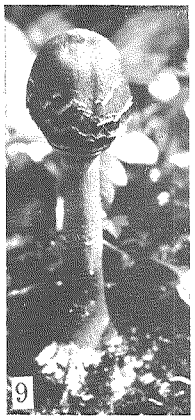
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PLATE II

Explanation of Plate II

Fig. 1. *Armillaria ventricosa* PK.

Fig. 2. *Armillaria mellea* (VAHL ex FR.) QUÉL.

Fig. 3. *Cortinellus bulbiger* (ALB. et SCHW. ex FR.) GILL.

Fig. 4. *Tricholoma equestre* (L. ex FR.) QUÉL.

Fig. 5. *Tricholoma porphyrophyllum* IMAI.

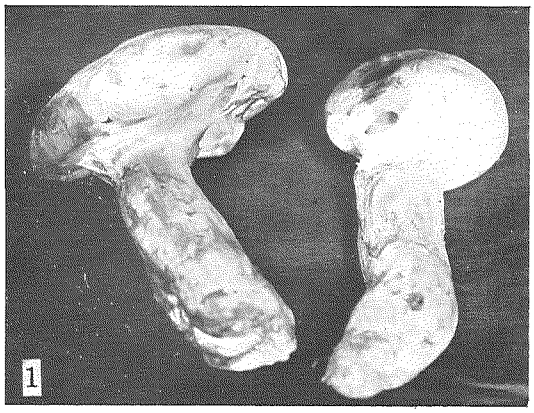
Fig. 6. *Tricholoma humosum* (FR.) IMAI.

Fig. 7. *Tricholoma personatum* (FR.) QUÉL.

Fig. 8. *Tricholoma ulmarium* (BULL. ex FR.) KARST.

Fig. 9. *Clitocybe extenuata* (FR.) IMAI.

Fig. 10. *Armillaria japonica* (KAWAMURA) IMAI.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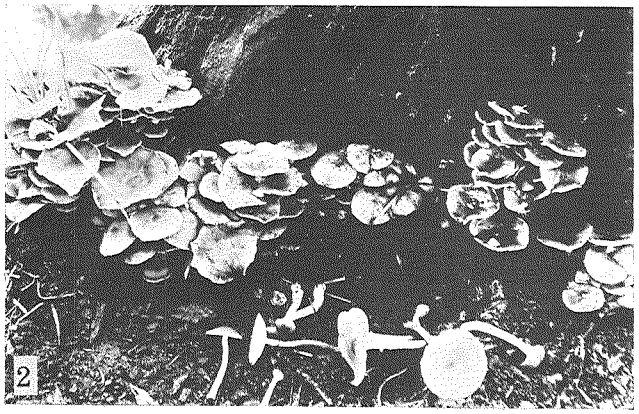
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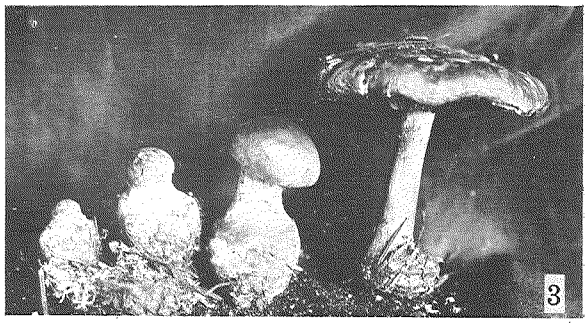
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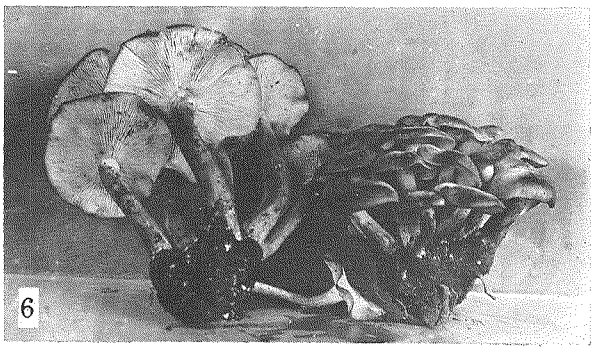
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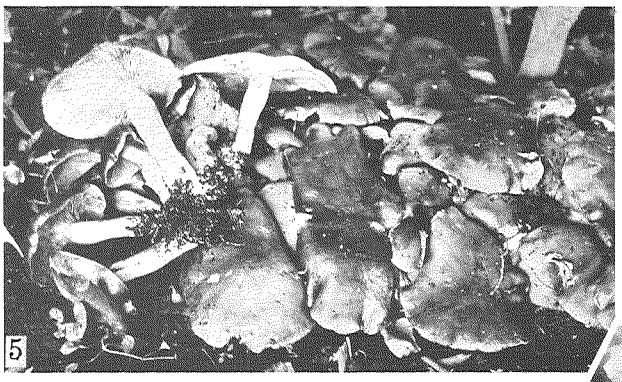
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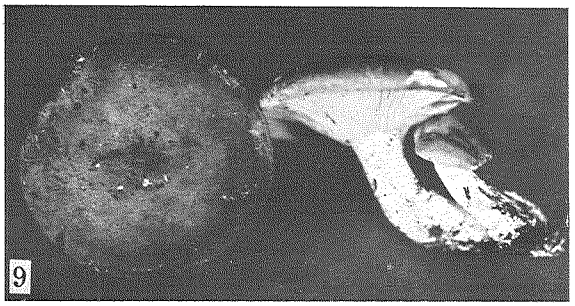
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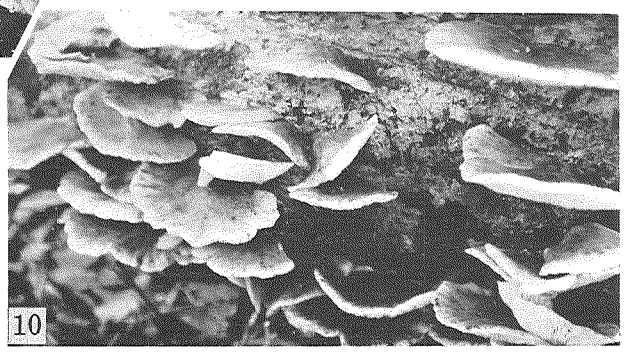
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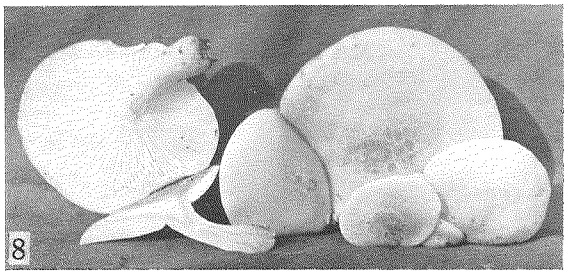
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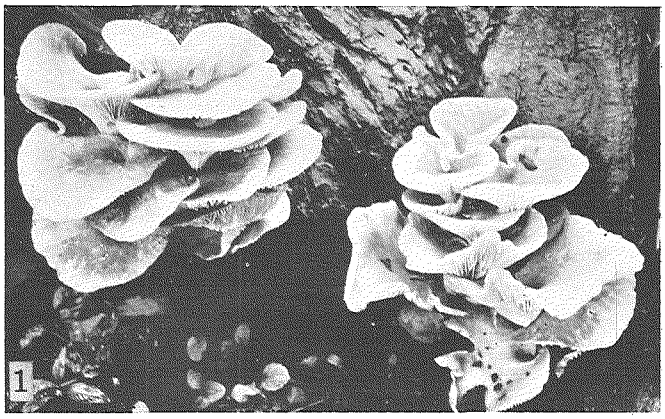
PLATE III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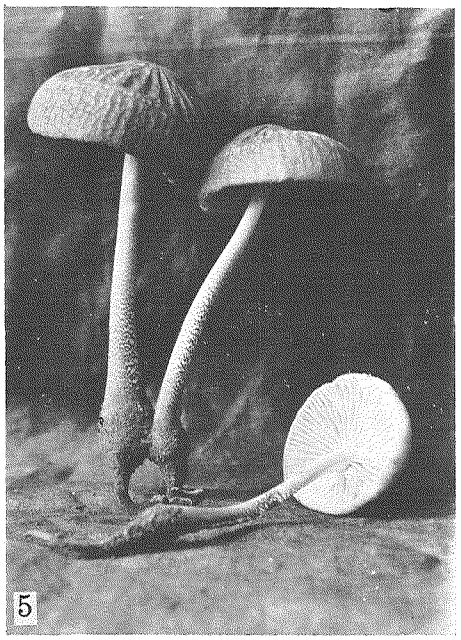
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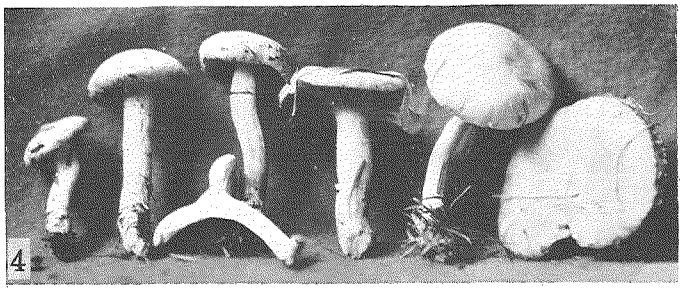
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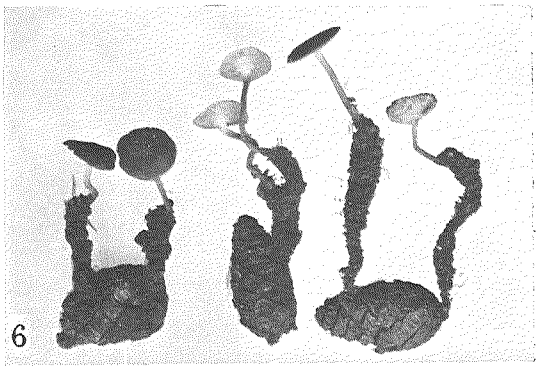
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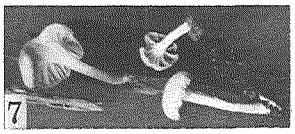
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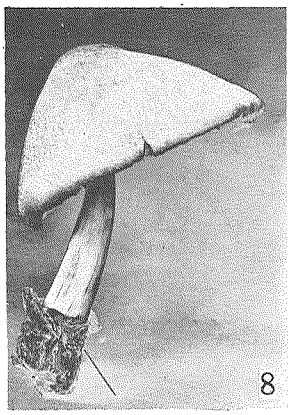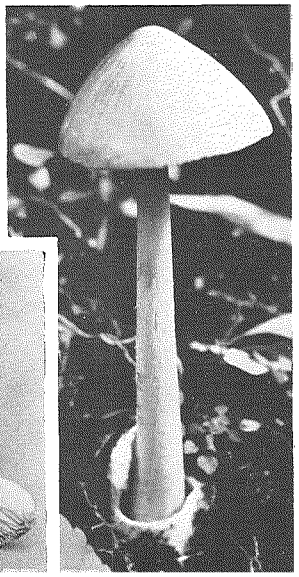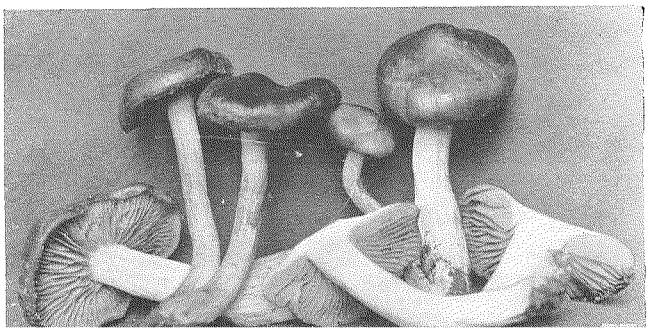
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