



# HOKKAIDO UNIVERSITY

Title	STUDIES ON THE AGARICACEAE OF HOKKAIDO. II
Author(s)	IMAI, Sanshi
Citation	Journal of the Faculty of Agriculture, Hokkaido Imperial University, 43(2), 179-378
Issue Date	1938-08-30
Doc URL	<a href="https://hdl.handle.net/2115/12730">https://hdl.handle.net/2115/12730</a>
Type	departmental bulletin paper
File Information	43(2)_p179-378.pdf



# STUDIES ON THE AGARICACEAE OF HOKKAIDO. II

By

Sanshi IMAI

## Subfam. Pholitoideae IMAI, nom. nov.

*Cortinaria* FR. Syst. Myc. I, 10, 1821.

*Derminus* FR. Ibid. 10, 1821.

*Dermini* FR. Epicr. Myc. 160, 1838.

*Ochrosporées* GILL. Hymen. Fr. 428, 1874.

*Phaeospori* QUÉL. Ench. Fung. 66, 1886.

*Ochrosporae* SACC. Syll. Fung. V, 735, 1887.

*Pholiotanae* MURRILL, North Amer. Fl. X, 145, 1917.

*Trama floccosa*, *carnosa* vel *subcartilaginea*, non *vesiculosa*;  
sporangia in cumulo ochraceae vel subferrugineae.

## Tribe Pholiotae IMAI, nom. nov.

*Pholiotées* KONR. et MAUBL. Icon. Sel. Fung. 28 & 102, 1924, p.p.

Fructificatio *carnosa*, *annulata* vel *annulata subvolvataque*.  
Pileus cum stipite *carnosus* *confluentus* et *homogeneous*. Lamellae  
*molles*, *carnosae*, cum stipite *adhaerentes*.

### Key to the genera.

1. Fructification with subsistent universal veil and annulus..... *Rozites*.
2. Fructification with annulus, and either without or with very fugacious universal veil..... *Pholiota*.

## *Rozites* KARST.

Hattsv. I, xx, 1879.

*Agaricus* § *Pholiota* Auct. plur. pro min. p.

*Pholiota* Auct. plur. pro min. p.

*Dryophila* § *Pholiota* QUÉL. Ench. Fung. 66, 1886, pro min. p.

*Togaria* W. G. Sm. Brit. Basid. 121, 1908, pro min. p.

Fructification with a subsistent universal veil and a membranous annulus. Pileus fleshy, regular, confluent and homogeneous with the fleshy stipe. Stipe central, fleshy. Universal veil often cohering in the form of a volva at the base of stipe and remaining as a floccose-powder on the pileus. Partial veil remaining as a membranous, persistent annulus. Lamellae attached to the stipe, fleshy, soft. Spores ferruginous in mass.

Type species: *Agaricus caperatus* PERS. ex FR.

***Rozites caperatus* (PERS. ex FR.) KARST.**

Hattsv. I, 290, 1879; Finl. Basid. 158, 1889—SCHROET. Pilze Schles. I, 612, 1889—REA, Brit. Basid. 111, 1922.

*Agaricus caperatus* PERS. Obs. Myc. I, 48, 1796; Syn. Fung. 273, 1801 (teste FR.).

*Agaricus (Pholiota) caperatus* FR. Syst. Myc. I, 241, 1821; Hymen. Eur. 215, 1874—BERK. in SMITH, Engl. Fl. V, (2), 90, 1836—WINT. Die Pilze, I, 704, 1884.

*Cortinarius (Phlegmacium) caperatus* FR. Epicr. Myc. 256, 1838—RABENH. Deut. Krypt. Fl. I, 502, 1844—BERK. Outl. Brit. Fung. 183, 1860—CKE. Handb. Brit. Fung. I, 172, 1871.

*Pholiota caperata* GILL. Hymen. Fr. 435, cum icone, 1874—SACC. Syll. Fung. V, 736, 1887; Fl. Ital. Crypt., Hymen. 676, 1916—MASS. Brit. Fung. Fl. II, 210, 1893—ROLLAND, Atlas Champ. 60, f. 132, 1910—HARPER, Trans. Wisc. Acad. Sci. Arts & Lett. XVII, 476, pl. 24, 1913—KAWAMURA, Ill. Jap. Fung. pl. 9, f. 11-13, 1914—RICKEN, Blätterp. 197, pl. 55, f. 2, 1915—KAUFFM. Agar. Mich. 294, 1918—LANGE, Agar. Denm. IV, 5, 1921—OVERH. Ann. Mo. Bot. Gard. XIV, 123, pl. 13, 1927—BRES. Icon. Myc. XIV, pl. 683, 1930.

[SHIRAI, List Jap. Fung. ed. 2, 429, 1917; ed. 3, 258, 1927]

*Dryophila (Pholiota) caperata* QUÉL. Ench. Fung. 66, 1886.

*Togaria caperata* W. G. SM. Brit. Basid. 122, 1908.

Gregarious or solitary, edible. Pileus 4-15 cm. broad, hemispherical or ovate, then campanulate or convex to nearly plane, obtuse; surface ochraceous-buff to ochraceous-tawny, sometimes blackish at the center in dried plants, dry or moist, at first covered with adpressed white fibrils that give the pileus a gray appearance and may be more or less arranged in scales, finally more glabrous, especially on the margin, and then likely to be considerably wrinkled and corrugate, margin even, at first incurved and often veiled; context white or yellowish, taste mild; lamellae sinuate-adnate or adnate to slightly decurrent, crowded, at first whitish, then clay-colored, finally ferruginous, becoming cinnamon in dried plants, usually

variegated with close, narrow, light and dark cross-bands and appearing transversely wrinkled, the edge floccose-crenate; stipe 6–15 cm. long, 7–25 mm. thick, equal, white or slightly yellowish, floccose-tomentose above the annulus, glabrous or slightly fibrillose below, sometimes with a definite submembranous remain of the universal veil at the base, solid; annulus forming a persistent, superior or almost median, white or yellowish, deflexed, membranous annulus, sometimes striate on the upper side; spores ferruginous in mass, broadly and inequilaterally ellipsoidal, echinulate,  $11-19 \times 7-11 \mu$ ; cystidia none.

Hab. on the ground in woods. Autumn. Iburi (Lake side of Shikotsu), Shiribeshi (Zenibako), Ishikari (Nopporo), Kitami (Oketo), Kushiro (Lake side of Akan).

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

Jap. name. *Shōunji* (KAWAMURA).

### *Pholiota* (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 62 & 124, 1872.

*Agaricus* § *Pholiota* FR. Syst. Myc. I, 240, 1821.

*Pholiotina* FAYOD, Ann. Sci. Nat., Bot. 7 sér. IX, 357, 1889.

*Dryophila* § *Pholiota* QUÉL. Ench. Fung. 66, 1886.

*Togaria* W. G. SM. Brit. Basid. 121, 1908.

*Pholiotopsis* EARLE, Bull. N. Y. Bot. Gard. V, 443, 1909.

Fructification with a membranous annulus. Pileus fleshy, regular, confluent and homogeneous with a fleshy stipe. Stipe central, fleshy. Universal veil none or very fugacious. Partial veil remaining as a membranous, persistent or subpersistent annulus. Lamellae attached to the stipe, fleshy, soft. Spores ochraceous, ferruginous or dull brown in mass.

Type species: *Agaricus durus* BOLT. ex FR.

#### Key to the sections, subsections and species in Hokkaido.

- I. Fructification growing on the ground..... Sect. *Humigenae*.
- A. Pileus with a powdery bloom..... Subsect. *Velatae*.
- 1. Pileus warm-buff to dingy gold-yellow, densely covered with friable powders..... *P. Vahlüi* (1).

- B. Pileus smooth, naked..... Subsect. Nudae.
1. Spores ferruginous in mass..... Euderminae.
    - a. Cystidia none; spores truncate at the apex; pileus watery-brown when fresh, ochraceous when dry.
      - i. Spores 6.5–9 $\mu$  long..... *P. blattaria*(2).
      - ii. Spores 9–10.5 $\mu$  long..... *P. Arrhenii*(3).
    2. Spores dull brown in mass..... Phaeotae.
      - a. Spores truncate at the apex; pileus whitish or yellowish.....  
..... *P. praecox*(4).
      - b. Spores not truncate.
        - i. Pileus 1–5 cm. broad, at first brown or blackish-brown, then ochraceous-tawny, viscid when moist; annulus superior, or apical..... *P. erebia*(5).
        - ii. Pileus 4–10 cm. broad, at first brown or blackish-brown, then ochraceous-tawny, viscid when moist; annulus median or distant..... *P. togularis*(6).
- C. Pileus scaly..... Subsect. Squamosae.
1. Spores ferruginous in mass; cystidia rather indefinite but some sterile cells present and recognizable; spores not truncate; pileus 2–8 cm. broad, yellowish with cinnamon or sayal-brown colored fibrous scales..... *P. terrestris*(7).
- II. Fructification growing on or around stumps or trees.....  
..... Sect. Truncigenae.
- A. Pileus fleshy, rather compact, not hygrophanous..... Subsect. Carnosae.
1. Spores ferruginous in mass..... Euderminae.
    - a. Pileus usually large, more or less or distinctly viscid when moist; spores smooth.
      - i. Spores 3–6 $\mu$  long.
        - $\alpha$ . Pileus pallid to cinnamon, densely scaly with erect or suberect pointed concolorous scales.....  
..... *P. squarrosoides*(8).
      - ii. Spores 6–9 $\mu$  long; pileus antimony-yellow to zinc-orange, decorated with medium-sized darker colored squamules....  
..... *P. adiposa*(9).
      - iii. Spores 9–14 $\mu$  long; pileus yellowish-brown to testaceous, decorated with erect or suberect brown or blackish, floccose, friable scales..... *P. albocrenulata*(10).
    - b. Pileus usually large, dry.
      - i. Spores 3–6 $\mu$  long; pileus lemon-yellow to tawny, decorated with fibrous, superficial, sulphur-yellow scales.....  
..... *P. flammans*(11).
      - ii. Spores 6–9 $\mu$  long.
        - $\alpha$ . Pileus yellow to ochraceous-orange, decorated with conspicuous scales..... *P. squarrosa*(12).
        - $\beta$ . Pileus with distinct shades of green or ashy-green and with fibrillose scales..... *P. aeruginosa*(13).

- iii. Spores 7.5–10 $\mu$  long; pileus buff-yellow to apricot-orange..  
..... *P. spectabilis* (14).
- c. Pileus small, dry, tawny-brown, with minute, granular, tawny  
scales..... *P. erinaceella* (15).
- 2. Spores dull brown in mass..... Phaeotae.
  - a. Pileus viscid or glutinous viscid.
    - i. Pileus drab or clay colored; stipe fusiform-rooted and long,  
scaly..... *P. radicata* (16).
    - ii. Pileus bay-brown, very glutinous; stipe subconcolorous and  
glutinous when young..... *P. Nameko* (17).
- B. Pileus slightly fleshy, hygrophanous, smooth.... Subsect. Hygrophanae.
  - 1. Pileus 2–5 cm. broad; annulus fugacious..... *P. marginata* (18).
  - 2. Pileus 0.5–2 cm. broad; annulus at first funnel-shaped, persistent  
and conspicuous..... *P. unicolor* (19).

### Sect. *Humigenae* FR.

Epicr. Myc. 160, 1838.

Fructification growing on the ground.

### Subsect. *Velatae* LANGE

Agar. Denm. IV, 4, 1921.

Pileus with a powdery bloom or set with fibrous scales.

#### 1. *Pholiota Vahlia* (SCHUM. ex FR.) LANGE

Agar. Denm. IV, 5, 1921.

*Agaricus aureus* MATT. Fl. Siles. II, 351, 1779 (teste FR.).

*Agaricus Vahlia* SCHUM. Fl. Dan. pl. 1496, 1813 (teste FR.).

*Agaricus (Pholiota) Vahlia* FR. Syst. Myc. I, 240, 1821; Epicr. Myc. 161, 1838.

*Agaricus (Pholiota) aureus* FR. Ibid. 241, 1821; Epicr. Myc. 160, 1838; Hymen. Eur. 214, 1874—CKE. Ill. Brit. Fung. pl. 346, 1888.

*Agaricus aureus* var. *Vahlia* FR. Hymen. Eur. 214, 1874.

*Agaricus aureus* var. *Herefordensis* CKE. Ill. Brit. Fung. pl. 347, 1888.

*Pholiota aurea* GILL. Hymen. Fr. 435, 1874—KARST. Hattsv. I, 291, 1879—SACC. Syll. Fung. V, 736, 1887; Fl. Ital. Crypt., Hymen. 677, 1916—SCHROET. Pilze Schles. I, 610, 1889—MASS. Brit. Fung. Fl. II, 210, 1893—RICKEN, Blätterp. 197, pl. 55, f. 1, 1915—REA, Brit. Basid. 111, 1922—OVERH. Ann. Mo. Bot. Gard. XIV, 121, pl. 12, 1927.

*Pholiota aurea* var. *Vahlia* SACC. Syll. Fung. V, 736, 1887.

*Pholiota aurea* var. *Herefordensis* SACC. Syll. Fung. V, 736, 1887.

*Togaria aurea* W. G. SM. Brit. Basid. 122, 1908.

Gregarious or subcaespitose, edible. Pileus 5–15 cm. or more broad, hemiglobose or conical, then convex, sometimes subumbonate; surface dry, warm-buff to dingy gold-yellow or xanthine-orange, paler at the margin, densely covered with easily separable, subconcolorous or gray or brown colored powders or spiny verrucules, sometimes wrinkled on the center, margin incurved at first, often veiled; context whitish, then yellowish, firm, thick, taste mild, odour agreeable; lamellae almost free or slightly adnexed, rather narrow, white, then cream to ocher, crowded, rarely a few times forked, edge waved or serrulate; stipe 5–15 cm. or more long, 1.5–3 cm. thick, nearly equal or slightly attenuated upward, often enlarged at the base, concolorous or slightly paler, powdery or verruculose, sometimes with longitudinal wrinkles which extend down from annulus, yellow and glabrous above the annulus, solid; annulus membranous, persistent, superior, white above, concolorous and powdery or verruculose and sometimes wrinkled on the under surface; spores nearly clay-color in mass, ellipsoidal or subfusiform, nearly smooth or sparingly warted,  $11-12.5 \times 4-6 \mu$ ; cystidia none.

Hab. On the ground under trees, on roadsides, in pastures, etc. Autumn. Ishikari (Sapporo, Nopporo), Iburi (Lake side of Shikotsu).

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

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

#### Subsect. *Nudae* LANGE

Agar. Denm. IV, 4, 1921.

Pileus smooth.

### 2. *Pholiota blattaria* (FR.) QUÉL.

Champ. Jura Vosg. 1 Suppl., in Mém. Soc. D'Emul. Montb. 2 sér. V, 319, 1872—GILL. Hymen. Fr. 433, 1874—KARST. Hattsv. I, 293, 1879—SACC. Syll. Fung. V, 738, 1887—SCHROET. Pilze Schles. I, 608, 1889—MASS. Brit. Fung. Fl. II, 213, 1893—REA, Brit. Basid. 113, 1922—KONR. et MAUBL. Icon. Sel. Fung. pl. 69, f. 2, 1929.

*Agaricus* (*Pholiota*) *blattarius* FR. Syst. Myc. I, 246, 1821; Epicr. Myc. 162, 1838; Hymen. Eur. 216, 1874—CKE. Ill. Brit. Fung. pl. 1172, f. B, 1891; Handb. Austr. Fung. 43, 1892.

- Dryophila (Pholiota) blattaria* QUÉL. Ench. Fung. 66, 1886.  
*Pholiotina blattaria* FAYOD, Ann. Sci. Nat., Bot. 7 sér. IX, 359, 1889.  
*Togaria blattaria* W. G. SM. Brit. Basid. 123, 1908.  
*Pholiota togularis* RICKEN, Blätterp. 199, pl. 56, f. 5, 1915.  
*Pholiota teneroides* LANGE, Agar. Denm. IV, 7, 1921.  
*Pholiota togularis* OVERH. Ann. Mo. Bot. Gard. XIV, 114, 1927.

Solitary or subgregarious. Pileus 1.5–3 cm. broad, conical or subcampanulate, then umbonate or convex; surface glabrous, hygrophanous, ochraceous-ferruginous when wet, becoming paler and slightly rugulose when dried, margin paler, striate; context very thin, concolorous, odour and taste none; lamellae sinuate then free, pale yellowish-ocher or watery-cinnamon, ventricose; stipe 2.5–5 cm. long, about 2 mm. thick, equal or slightly enlarged toward the base, white or slightly yellowish, concolorous at the base, silky then glabrous, fistulose; annulus membranous, white, distant, silky, entire, striate on upper surface; spores ferruginous in mass, ellipsoidal to ovoid, smooth, one end usually truncate,  $10\text{--}12 \times 5\text{--}6 \mu$ , cystidia none, but sterile hyaline fusiform cells present on edge of lamellae.

Hab. on the ground among grasses in woods or pastures. Summer. Ishikari (Sapporo, Nopporo).

Distr. Japan (Hokkaido), Europe, North America, Australia.  
 Jap. name. *Kusa-ajirogasa* (n. n.).

### 3. *Pholiota Arrhenii* (FR.) IMAI, comb. nov.

*Agaricus togularis* BULL. Champ. Fr. pl. 595, f. 2, 1793—PERS. Syn. Fung. 262, 1801 (teste FR.).

*Agaricus (Pholiota) Arrhenii* FR. Epicr. Myc. 161, 1838.

*Agaricus (Pholiota) togularis* FR. Hymen. Eur. 216, 1874—CKE. Ill. Brit. Fung. pl. 350, 1886; Handb. Austr. Fung. 43, 1892.

*Pholiota togularis* GILL. Hymen. Fr. 435, cum icone, 1874—KARST. Hattsv. I, 293, 1879—SACC. Syll. Fung. V, 738, 1887; Fl. Ital. Crypt., Hymen. 678, 1916—SCHROET. Pilze Schles. I, 608, 1889—MASS. Brit. Fung. Fl. II, 212, 1893—LANGE, Agar. Denm. IV, 7, 1921—REA, Brit. Basid. 113, 1922—KONR. et MAUBL. Icon. Sel. Fung. I, pl. 69, f. 1, 1929.

*Dryophila (Pholiota) togularis* QUÉL. Ench. Fung. 66, 1886.

*Hylophila togularis* QUÉL. Fl. Myc. 96, 1888; Champ. Jura Vosg. 19 Suppl., in Assoc. Fr. XXII, 485, 1893.

*Pholiotina togularis* FAYOD, Ann. Sci. Nat., Bot. 7 sér. IX, 356, pl. 6, f. 6, h, 1889.

*Togaria togularis* W. G. SM. Brit. Basid. 123, 1908.

Subgregarious. Pileus 2–4 cm. broad, campanulate, then convex or subumbonate, obtuse; surface glabrous, slightly hygrophanous, cinnamon-buff or pallid ochraceous, darker at the disc, not striate; context yellowish, odour and taste none; lamellae adnato-sinuate then free, yellow at first, then pallid ferruginous, moderately crowded, attenuated at both ends; stipe 3–7 cm. long, 3–7 mm. thick, nearly equal or slightly enlarged at the base, yellowish, paler at the apex, brownish at the base, fibrously striate, hollow; annulus membranous, distant or median, subconcolorous with the stipe, striate; spores ferruginous in mass, ellipsoidal, smooth, sometimes with a very slightly truncated end,  $9 \times 5 \mu$ ; cystidia none, but sterile hyaline and cylindrical cells present.

Hab. on the ground in woods or pastures. Spring to autumn. Ishikari (Nopporo), Kitami (Oketo forest).

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

Jap. name. *Tsuchi-ichimegasa-take* (n. n.).

#### 4. *Pholiota praecox* (PERS. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 124, 1872—GILL. Hymen. Fr. 434, cum icone, 1874—KARST. Hattsv. I, 294, 1879—SACC. Syll. Fung. V, 738, 1887; Fl. Ital. Crypt., Hymen. 678, 1916—MASS. Brit. Fung. Fl. II, 214, 1893—ATKINS. Mushrooms, ed. 2, 150, f. 145, 1903—ROLLAND, Atlas Champ. 60, f. 134, 1910—HARPER, Trans. Wisc. Acad. Sci. Arts & Lett. XVII, 478, pl. 27, 28, f. A–B, 1913; Ibid. XVIII, 397, pl. 14, f. C–D, 1916—RICKEN, Blätterp. 191, pl. 55, f. 4, 1915—KAUFFM. Agar. Mich. 293, pl. 59, 1918—LANGE, Agar. Denm. IV, 6, 1921—REA, Brit. Basid. 114, 1922—OVERH. Ann. Mo. Bot. Gard. XIV, 106, pl. 9, 1927—BRES. Icon. Myc. XIV, pl. 690, 691, 1930.

[MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 116, 1931]

*Agaricus candicans* SCHAEFF. Fung. Bavar. IV, Ind. 50, pl. 217, 1774 (teste FR.).

*Agaricus praecox* PERS. Comm. Fung. Bavar. 89, 1800; Syn. Fung. 420, 1801 (teste FR.).

*Agaricus (Psalliota) praecox* FR. Syst. Myc. I, 282, 1821—BERK. in SMITH, Engl. Fl. V, (2), 107, 1836.

*Agaricus (Pholiota) praecox* FR. Epicr. Myc. 162, 1838; Hymen. Eur. 217, 1874—RABENH. Deut. Krypt. Fl. I, 487, 1844—BERK. Outl. Brit. Fung. 149, pl. 8, f. 1, 1860—KICKX, Fl. Crypt. Flandr. II, 164, 1870—CKE. Handb. Brit. Fung. I, 105, 1871; Ill. Brit. Fung. pl. 360, 1886; Handb. Austr. Fung. 43, 1892—WINT. Die Pilze, I, 703, 1884.

*Dryophila (Pholiota) praecox* QUÉL. Ench. Fung. 67, 1886.

*Agrocybe praecox* FAYOD, Ann. Sci. Nat., Bot. 7 sér. IX, 358, 1889.

*Pholiota candicans* SCHROET. Pilze Schles. I, 608, 1889—OVERH. North Am. Fl. X, 264, 1924.

*Togaria praecox* W. G. SM. Brit. Basid. 124, 1908.

Gregarious or solitary, edible. Pileus 4–8 cm. broad, subglobose to convex, then plane; surface smooth, glabrous, sometimes provided with a few fissures on the center in maturity, cream-color or straw color, ochraceous-buff at the center, viscid when wet, pellicle not separable, margin incurved, with remnant of the whitish cottony veils; veil distinct when young; context white, fleshy, thick, taste and odour none; lamellae adnate, moderately crowded, dull white or yellowish at first, then umber-colored, 3–5 mm. wide; stipe 5–10 cm. long, 7–10 mm. thick, equal, white or creamy, fibrous external, hollow; annulus persistent or fugacious, nearly fibrous, superior; spores dull brown in mass, ellipsoidal,  $10-13 \times 6-9 \mu$ , slightly truncate at the one end, with 1–3 small guttae; cystidia present, flask-shaped or ventricose, sometimes rare, projecting.

Hab. on the ground, especially in grassy places. Summer. Ishikari (Sapporo).

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

Jap. name. *Fumizuki-take* (IMAI).

##### 5. *Pholiota erebia* (FR.) GILL.

Hymen. Fr. 432, 1874—KARST. Hattsv. I, 292, 1879—SACC. Syll. Fung. V, 737, 1887; Fl. Ital. Crypt., Hymen. 677, 1916—SCHROET. Pilze Schles. I, 608, 1889—MASS. Brit. Fung. Fl. II, 211, 1893—RICKEN, Blätterp. 198, pl. 56, f. 1, 1915—REA, Brit. Basid. 112, 1922—OVERH. Ann. Mo. Bot. Gard. XIV, 118, 1927—BRES. Icon. Myc. XIV, pl. 685, 1930.

*Agaricus (Pholiota) erebius* FR. Syst. Myc. I, 246, 1821; Epicr. Myc. 162, 1838; Hymen. Eur. 216, 1874—CKE. Ill. Brit. Fung. pl. 358, 1886; Handb. Austr. Fung. 43, 1892.

*Togaria erebia* W. G. SM. Brit. Basid. 122, 1908.

Gregarious or subcaespitose, edible. Pileus 1–5 cm. broad, convex, then becoming plane or slightly depressed, rarely slightly umbonate; surface at first brown or blackish brown, drying out to umber, then ochraceous-tawny or buckthorn-brown, hygrophanous and subviscid when moist, with a few white fibers on the margin, even or rugulose, or reticulate; margin slightly striatulate at times; context pallid, odour and taste none; lamellae adnate or slightly decurrent,

crowded or slightly distant, 2–4 mm. broad, pallid or grayish, becoming rusty-brown, edge at first white-fimbriate; stipe 2.5–7 cm. long, 3–8 mm. thick, equal or slightly enlarged at the base, brownish below, white and pruinose above the annulus, fibrillose or glabrous below, or at times slightly squamulose at the base, solid; annulus superior, apical, membranous, often reflexed, striate, white; spores dull brown in mass, elongate-ellipsoidal or ellipsoidal-fusoid, smooth, 10–15 × 5–7.5  $\mu$ ; cystidia present, usually abundant, hyaline, 7–12  $\mu$  broad at the enlarged base, projecting.

Hab. on the ground by road sides and in woods. Autumn. Ishikari (Sapporo, Nopporo).

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

Jap. name. *Tsuchi-nameko* (n. n.).

6. *Pholiota togularis* (FR.) IMAI, comb. nov.  
(non GILL. nec Auct. plur.)

*Agaricus* (*Pholiota*) *togularis* (non BULL. nec PERS.) FR. Syst. Myc. 1, 241, 1821; Epicr. Myc. 161, 1838.

*Agaricus* (*Pholiota*) *ombrophilus* FR. Hymen. Eur. 216, 1874.

*Pholiota ombrophila* KARST. Hattsv. I, 292, 1879—QUÉL. Ench. Fung. 66, 1886—SACC. Syll. Fung. V, 737, 1887; Fl. Ital. Crypt., Hymen. 674, 1916—MASS. Brit. Fung. Fl. II, 212, 1893—RICKEN, Blätterp. 460, 1915—REA, Brit. Basid. 112, 1922—OVERH. North. Am. Fl. X, 263, 1924; Ann. Mo. Bot. Gard. XIV, 120, 1927.

*Pholiota ombrophila* var. *brunneola* KARST. Ibid. 293, 1879—MASS. l. c. II, 212, 1893—REA, l. c. 113, 1922.

*Agaricus ombrophilus* var. *brunneolus* FR. Icon. Hymen. II, 2, pl. 103, f. 2, 1887.

*Pholiota washingtonensis* MERRILL, Mycologia, IV, 259, 1912.

Gregarious or solitary, edible. Pileus 4–8 cm. broad, convex, then becoming plane or slightly depressed, rarely slightly umbonate; surface at first brown or dark-brown, discolored to paler by drying, hygrophanous and somewhat viscid when wet, at first with a few white floccose fibers or scales on the margin, even or substriate on the margin; context whitish or pallid, odour and taste none; lamellae adnate or slightly decurrent, subcrowded or subdistant, pallid or grayish, then rusty-brown, edge at first white-fimbriate; stipe 5–8 cm. long, 5–10 mm. thick, equal or slightly enlarged at the base, whitish or brownish, darker below, absolutely fibrillose or striate,

stuffed; annulus membranous, median or distant, striate above, white; spores dull brown in mass, elongate-ellipsoidal or ellipsoidal-fusoid, smooth,  $10-15 \times 5-7.5 \mu$ ; cystidia present, usually abundant, hyaline, flask-shaped, projecting.

Hab. on the ground in woods, under trees or roadsides, etc. Autumn. Ishikari (Sapporo, Nopporo), Iburi (Lake side of Shikotsu), Oshima (Ōnomura).

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

Jap. name. *Ō-tsuchi-nameko* (n. n.).

Subsect. **Squamosae** IMAI, subsect. nov.

*Pileus squamosus*.

7. *Pholiota terrestris* OVERH.

North Amer. Fl. X, 268, 1924; Ann. Mo. Bot. Gard. XIV, 126, 1927.

?*Agaricus* (*Pholiota*) *terrigena* FR. et Auct. plur.

?*Pholiota terrigena* Auct. plur.

Caespitose or gregarious, edible. Pileus 2–8 cm. broad, convex or subconical, then expanded, obtuse; surface dry, yellowish (cream color or straw-yellow) with cinnamon or sayal-brown colored, triangular fibrous scales, scales erected on the center, adpressed on the margin; context yellowish, taste and odour mild; veil floccose-membranous, not forming a distinct annulus, but sometimes adhering considerably to the margin of pileus; lamellae adnate or adnexed and with a decurrent tooth or subsinuate, yellowish at first, then olivaceous-ferruginous, moderately crowded; stipe 2.5–8 cm. long, 3–13 mm. thick, equal, concolorous, with small pointed fibrous scales colored with cinnamon or sayal-brown, whitish or yellowish and subfurfuraceous above the annulus, stuffed then hollow; annulus thin, fibrous, torn, cinnamon; spores ferruginous in mass, oblong ellipsoidal, smooth,  $5.5-6.5 \times 3.5-4.5 \mu$ ; cystidia of several inconspicuous types, none projecting strongly, some brown or with a brown mass within.

Hab. on the ground among grasses or along roadsides in woods, in pastures, etc. Summer to autumn. Ishikari (Sapporo, Nopporo), Iburi (Chitose).

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

Jap. name. *Tsuchi-sugitake* (n. n.).

Sect. *Truncigenae* FR.

Epicr. Myc. 163, 1838.

Fructification growing on or around stumps or trees.

Subsect. *Carnosae* LANGE

Agar. Denm. IV, 4, 1921.

Pileus fleshy, rather compact, not hygrophanous.

8. *Pholiota squarrosoides* (PK.) SACC.

Syll. Fung. V, 750, 1887—ATKINS. Mushrooms, ed. 2, 152, f. 148, 1903—HARPER, Trans. Wisc. Acad. Sci. Arts & Lett. XVII, 486, pl. 36-37, 1913—KAUFFM. Agar. Mich. 299, 1918—OVERH. Ann. Mo. Bot. Gard. XIV, 155, pl. 22, 1927.

*Agaricus squarrosoides* PK. 31 Ann. Rep. N. Y. State Mus. 33, 1879.

*Hypodendrum squarrosoides* OVERH. North Amer. Fl. X, 278, 1932.

Caespitose, edible. Pileus 3-13 cm. broad, subglobose to convex or nearly plane; surface light-colored, usually pinkish-buff to cinnamon-buff, covered with erect, pointed, cinnamon to hazel-colored scales that give color to the pileus, sometimes disappearing on the margin, viscid; context whitish or slightly yellowish, taste and odour pleasant; lamellae sinuate-adnate, crowded, 4-7 mm. broad, whitish, becoming cinnamon; stipe 5-15 cm. long, 5-14 mm. thick, equal, brownish, with cinnamon-buff or cinnamon colored floccose scales below the annulus, whitish and glabrous above, solid or stuffed; annulus floccose-membranous, fugacious, cinnamon-buff; spores tawny or russet in mass, ellipsoidal or oblong-ellipsoidal, smooth,  $4-6 \times 3-4 \mu$ , cystidia present, (a) hyaline, pointed at the apex, projecting slightly; (b) with yellowish contents, obtuse or pointed.

Hab. on stumps and trunks of deciduous trees. Autumn. Ishikari (Sapporo).

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

Jap. name. *Sugi-take-modoki* (n. n.).

9. *Pholiota adiposa* (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 126, 1872—GILL. Hymen. Fr. 442, 1874—KARST. Hattsv. I, 300, 1879—SACC. Syll. Fung.

V, 752, 1887; Fl. Ital. Crypt., Hymen. 685, 1916—SCHROET. Pilze Schles. I, 612, 1889—MASS. Brit. Fung. Fl. II, 223, 1893—ATKINS. Mushrooms, ed. 2, 151, f. 146, 1903—W. G. SM. Brit. Basid. 128, 1908—HARPER, Trans. Wisc. Acad. Sci. Arts & Lett. XVII, 487, pl. 40, 1913—KAWAMURA, Ill. Jap. Fung. pl. 8, f. 15-16, 1913—RICKEN, Blätterp. 194, 1915—KAUFFM. Agar. Mich. 305, 1918—LANGE, Agar. Denm. IV, 9, 1921—REA, Brit. Basid. 119, 1922—OVERH. Ann. Mo. Bot. Gard. XIV, 154, pl. 20-21, 1927—BRES. Icon. Myc. XIV, pl. 699, 1930.

[SHIRAI, List Jap. Fung. ed. 2, 427, 1917; ed. 3, 258, 1927—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 115, 1931—IMAI, Bot. Mag. (Tokyo), XLVII, 385, 1933]

*Agaricus (Pholiota) adiposus* FR. Syst. Myc. I, 243, 1821; Epicr. Myc. 166, 1838; Hymen. Eur. 222, 1874—BERK. in SMITH, Engl. Fl. V, (2), 91, 1836; Outl. Brit. Fung. 151, pl. 8, f. 2, 1860—RABENH. Deut. Krypt. Fl. I, 486, 1844—CKE. Handb. Brit. Fung. I, 108, 1871; Ill. Brit. Fung. pl. 353, 1886—WINT. Die Pilze, I, 698, 1884.

*Hypodendrum adiposum* OVERH. North Amer. Fl. X, 279, 1932.

Caespitose or gregarious, sometimes solitary, edible. Pileus 3.5-15 cm. broad, convex, then plane or somewhat gibbous; surface very viscid when wet, slightly shining when dry, margin yellowish and veiled, center nearly ferruginous, scaly, scales ferruginous to russet colored, tufted fibrous, triangular, separable, larger at the margin; veil membranous, thin, dingy yellow; context whitish or yellowish, fleshy, thick, compact, then spongy, taste and odour mild; lamellae adnate or adnexed, broad, yellowish then nearly ferruginous, close; stipe 4-12 cm. long, 5-20 mm. thick, equal or slightly attenuated upward, subbulbous at the base, citron-yellow, covered with squamuloso-reflexed ferruginous scales, especially near the annulus, dull yellowish above the annulus, solid; annulus floccose, submembranous, dull yellow, persistent, sometimes fugacious; spores ferruginous in mass, oblong,  $7-9 \times 3-5 \mu$ ; cystidia present, not conspicuous, not projecting, dark brown, clavate,  $20-35 \times 5-9 \mu$ .

Hab. on the trunks of deciduous trees. Spring to autumn. Ishikari (Sapporo), Tokachi (Lake side of Shikaribetsu).

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

Jap. name. *Numeri-sugi-take* (KAWAMURA).

#### 10. *Pholiota albocrenulata* (PK.) SACC.

Syll. Fung. V, 760, 1887—HARPER, Trans. Wisc. Acad. Sci. Arts & Lett. XVII, 490, pl. 42-43, 1913—KAUFFM. Agar. Mich. 301, 1918—OVERH. Ann. Mo. Bot. Gard. XIV, 150, pl. 19, 1927.

*Agaricus albocrenulatus* PK. Bull. Buffalo Soc. Nat. Sci. I, 49, 1873.

*Pholiota fusca* QUÉL. Champ. Jura Vosg. 4 Suppl., in Bull. Soc. Bot. Fr. XXIII, 327, pl. 3, f. 12, 1876.

*Hypodendrum albocrenulatum* OVERH. North Amer. Fl. X, 281, 1932.

Solitary or two or three in a cluster. Pileus 2.5–12 cm. broad, conico-campanulate to convex or umbonate, finally nearly plane; surface yellowish-brown to testaceous or Sanford's-brown (or Kaiser-brown), paler (vinaceous-tawny) on the margin, darker (burnt umber) at the umbo or center, viscid, with erect or suberect, brown or blackish, floccose scales that are easily separable and sometimes disappear in old plants, margin even, at length reflexed, often partly appendiculate with cinnamon-buff colored floccoso-membranous veil; context whitish, thick; lamellae adnate with a decurrent tooth or sinuate-adnate, crowded, light drab or whitish, then ferruginous or cinnamon-brown, distinctly white-crenulate on the edge remaining so at least in part in the dried plants; stipe 5–15 cm. long, 5–15 mm. thick, equal or somewhat enlarged at the base, brownish, abundantly fibrilloso-squamulose, colored cinnamon or sayal-brown up to the annulus, white or brownish and furfuraceous above the annulus; annulus apical, fugacious; spores ferruginous in mass, fusoid-ellipsoidal or broadly ellipsoidal, smooth,  $10-13 \times 6-7.5 \mu$ ; cystidia none.

Hab. growing on trunks of deciduous trees, especially of *Ulmus japonica* SARG. Summer to autumn. Ishikari (Sapporo).

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

Japan name. *Shibu-iro-sugitake* (n. n.).

### 11. *Pholiota flammans* (BATSCH ex FR.) QUÉL.

Champ. Jura Vosg. 4 Suppl. 3, 1876—KARST. Hattsv. I, 301, 1879—SACC. Syll. Fung. V, 753, 1887—MASS. Brit. Fung. Fl. II, 224, 1893—W. G. SM. Brit. Basid. 129, 1908—HARPER, Trans. Wisc. Acad. Sci. Arts & Lett. XVII, 488, pl. 41, f. C, 1913—KAWAMURA, Ill. Jap. Fung. pl. 10, f. 11–12, 1914—RICKEN, Blätterp. 196, pl. 55, f. 5, 1915—KAUFFM. Agar. Mich. 306, 1918—LANGE, Agar. Denm. IV, 10, 1921—REA, Brit. Basid. 120, 1922—OVERH. Ann. Mo. Bot. Gard. XIV, 148, pl. 19, 1927.

[SHIRAI, List Jap. Fung. ed. 2, 429, 1917; ed. 3, 258, 1927]

*Agaricus flammans* BATSCH, Elench. Fung. 87, pl. 7, f. 3, 1783 (teste FR.).

*Agaricus (Pholiota) flammans* FR. Syst. Myc. I, 244, 1821 (excl. syn.); Epicr. Myc. 167, 1838; Hymen. Eur. 222, 1874—BERK. in SMITH, Engl. Fl. V, (2), 92, 1836; Outl. Brit. Fung. 151, 1860—RABENH. Deut. Krypt. Fl. I, 485, 1844—CKE. Handb. Brit. Fung. I, 108, 1871; Ill. Brit. Fung. pl. 368, 1886—WINT. Die Pilze, I, 698, 1884.

*Dryophila (Pholiota) flammans* QUÉL. Ench. Fung. 68, 1886.

*Hypodendrum flammans* MURRILL, Mycologia, IV, 261, 1912—OVERH. North Amer. Fl. X, 278, 1932.

Caespitose, gregarious or solitary. Pileus 2–10 cm. broad, convex then plane, sometimes umbonate; surface lemon-yellow or tawny-yellow, zinc-orange or tawny in dried plants, dry, adorned with somewhat concentric arranged yellow, superficial floccose-fibrillose scales that may in large part disappear with age; context thin, yellow; lamellae adnate or very slightly uncinatate, crowded, yellow then ferruginous; stipe 4–8 cm. long, 4–12 mm. thick, equal, sometimes flexuose, pale yellow or yellowish, with yellow, recurved, floccose scales or scarcely more than densely yellow floccose up to the annulus, stuffed or hollow; annulus lemon-yellow, floccose, apical, fugacious; spores ferruginous in mass, oblong, smooth,  $3-6 \times 2-3 \mu$ ; cystidia abundant, flask-shaped or clavate-fusoid, brown or hyaline, projecting slightly.

Hab. on dead wood of coniferous and deciduous trees. Autumn. Ishikari (Mt. Kurodake), Kitami (Oketo forest).

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

Jap. name. *Hanagasa-take* (KAWAMURA).

## 12. *Pholiota squarrosa* (MÜLL. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 126, 1872—GILL. Hymen. Fr. 441, 1874—KARST. Hattsv. I, 298, 1879—SACC. Syll. Fung. V, 749, 1887; Fl. Ital. Crypt., Hymen. 689, 1916—SCHROET. Pilze Schles. I, 611, 1889—MASS. Brit. Fung. Fl. II, 221, 1893—W. G. SM. Brit. Basid. 128, 1908—ROLLAND, Atlas Champ. 61, f. 137, 1910—RICKEN, Blätterp. 195, pl. 54, f. 3, 1915—LANGE, Agar. Denm. IV, 9, 1921—REA, Brit. Basid. 117, 1922—OVERH. Ann. Mo. Bot. Gard. XIV, 157, pl. 21, 1927—BRES. Icon. Myc. XIV, pl. 697, 1930.

[SHIRAI, List Jap. Fung. ed. 2, 429, 1917; ed. 3, 258, 1927]

*Agaricus floccosus* SCHAEFF. Fung. Bavar. IV, Ind. 27, pl. 61, 1774—SOW. Engl. Fung. III, pl. 284, 1803 (teste FR.).

*Agaricus squarrosus* MÜLL. Fl. Dan. pl. 491, 1783—PERS. Syn. Fung. 268, 1801 (teste FR.).

*Agaricus squamosus* BULL. Champ. Fr. pl. 266, 1791 (teste FR.).

*Agaricus (Pholiota) squarrosus* FR. Syst. Myc. I, 243, 1821; Epicr. Myc. 165, 1838; Hymen. Eur. 221, 1874—BERK. in SMITH, Engl. Fl. V, (2), 91, 1836; Outl. Brit. Fung. 150, 1860—RABENH. Deut. Krypt. Fl. I, 486, 1844—KICKX, Fl. Crypt. Flandr. II, 165, 1867—CKE. Handb. Brit. Fung. I, 107, 1871; Ill. Brit. Fung. pl. 367, 1886—WINT. Die Pilze, I, 699, 1884.

*Dryophila (Pholiota) squarrosa* QUÉL. Ench. Fung. 68, 1886.

*Hypodendrum floccosum* OVERH. North Amer. Fl. X, 280, 1932.

Usually caespitose, edible. Pileus 3–10 cm. broad, campanulate to convex, or plane; surface yellowish (straw-yellow) or yellowish-brown (clay or tawny) or antimony-yellow, covered with recurved, crowded, darker persistent scales, dry; context yellowish, taste and odour mild; lamellae sinuate-adnate or adnate with a decurrent tooth, crowded, 3–6 mm. broad, pallid olivaceous then ferruginous; stipe 5–20 cm. long, 5–16 mm. thick, equal, pallid, yellow or brown, with crowded, recurved darker scales up to the annulus, smooth and yellowish above the annulus, solid; annulus superior, fibrillose, lacinate, persistent, concolorous with the scales; spores ferruginous in mass, oblong or ellipsoidal, smooth,  $6-8 \times 3.5-5 \mu$ ; cystidia present, variable, of two general types: (a) hyaline, abundant, ventricose-clavate, blunt or pointed at the apex, projecting, and (b) yellow, blunt or truncate at the apex, mostly projecting.

Hab. on dead trunks or stumps of various trees, both deciduous and evergreen. Autumn. Ishikari (Nopporo).

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

Jap. name. *Sugi-take* (KAWAMURA).

### 13. *Pholiota aeruginosa* PK.

43 Ann. Rep. N. Y. State Mus. 81(35), 1890—KAUFFM. Agar. Mich. 308, pl. 62, 1918—OVERH. North Amer. Fl. X, 269, 1924; Ann. Mo. Bot. Gard. XIV, 147, pl. 18, 1927.

*Flammula viridans* MURRILL, Mycologia, IV, 262, 1912.

Gregarious or caespitose. Pileus 2–10 cm. broad, convex; surface greenish, becoming tinged with yellow or brown, drab to cinnamon or ochraceous-buff, often variegated with dark-olive or dusky-drab color in dried specimens, dry, at first glabrous, then becoming rather distinctly fibrillose-scaly or squamulose, finally usually becoming more or less areolate or squarrose without areolae, margin thin, at length slightly upturned; context with a greenish tint, yellowish in dried specimens, odour pleasant, taste bitterish; lamellae adnate, sinuate-adnate or adnexed, easily separating, 3–7 mm. broad, broader behind, pale-ochraceous when young, becoming ochraceous-orange or apricot-buff on drying; stipe 3–8 cm. long, 3–10 mm. thick, central or excentric, equal or nearly so, glabrous or slightly fibrillose, some-

times sulcate-striate, concolorous, solid; spores mars-yellow in mass, ellipsoidal, echinulate when matured,  $6-9.5 \times 3.5-6 \mu$ ; cystidia none.

Hab. on coniferous wood. Late summer to autumn. Ishikari (Iwamizawa).

Distr. Japan (Hokkaido), North America.

Jap. name. *Midori-sugitake* (n. n.).

#### 14. *Pholiota spectabilis* (FR.) GILL.

Hymen. Fr. 443, 1874—KARST. Hattsv. I, 299, 1879—SACC. Syll. Fung. V, 751, 1887; Fl. Ital. Crypt., Hymen. 686, 1916—MASS. Brit. Fung. Fl. II, 222, 1893—W. G. SM. Brit. Basid. 128, 1908—HARPER, Trans. Wisc. Acad. Sci. Arts & Lett. XVII, 490, pl. 44, 1913—KAUFFM. Agar. Mich. 304, pl. 61, 1918—LANGE, Agar. Denm. IV, 10, 1921—REA, Brit. Basid. 119, 1922—OVERH. North Amer. Fl. X, 270, 1924; Ann. Mo. Bot. Gard. XIV, 144, pl. 16-17, 1927—BRES. Icon. Myc. XIV, pl. 698, 1930.

[KAWAMURA, Edible & Poisonous Mushrooms, 171, f. 151-152, 1931]

*Agaricus aureus* SOW. Engl. Fung. I, pl. 77, 1797 (teste FR.)—PERS. Syn. Fung. 269, 1801—BERK. in SMITH, Engl. Fl. V, (2), 90, 1836; Outl. Brit. Fung. 149, 1860—BERK. & BR. Ann. Mag. Nat. Hist. 3 ser. VII, 374, 1861.

*Agaricus (Pholiota) spectabilis* FR. Elench. Fung. I, 28, 1828; Epicr. Myc. 166, 1838; Hymen. Eur. 221, 1874—RABENH. Deut. Krypt. Fl. I, 486, 1844—CKE. Handb. Brit. Fung. I, 108, 1871; Ill. Brit. Fung. pl. 352, 1886; Handb. Austr. Fung. 45, 1892—WINT. Die Pilze, I, 699, 1884.

*Pholiota lutea* PK. 51 Ann. Rep. N. Y. State Mus. 288, 1898.

*Pholiota ventricosa* EARLE, Bull. N. Y. Bot. Gard. II, 341, 1902.

*Pholiota aurea* RICKEN, Blätterp. 197, pl. 55, f. 1, 1915.

Usually subcaespitose or caespitose, said to be poisonous in Japan. Pileus 4-15 cm. broad, convex, becoming nearly plane; surface buff-yellow to apricot-orange or zinc-orange, becoming at times slightly more brownish (tawny) in dried specimens, dry or moist, finely silky or subglabrous at first, then distinctly fibrillose or rivulose, finally subsquamulose; context yellow, thick, compact, taste bitter or amygdaline; lamellae adnexed to adnate or with a decurrent tooth or line, subcrowded, 3-8 mm. broad, yellow becoming ferruginous; stipe 3-15 cm. long, 5-30 mm. thick, equal to decidedly ventricose or bulbously enlarged at the base, yellow or tawny, yellow and floccose above the annulus, fibrillose or furfuraceous below, solid; annulus apical or superior, subpersistent, yellowish then discolored, reflexed, striate; spores ferruginous in mass, ellipsoidal, asperulate,  $7-10 \times 4.5-6 \mu$ ; cystidia none.

Hab. on stumps and trunks of deciduous or, rarely, coniferous trees, or growing on buried wood. Summer to autumn. Ishikari (Sapporo, Nopporo).

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

Jap. name. *Ô-waraitake* (KAWAMURA).

### 15. *Pholiota erinaceella* PK.

122 Bull. N. Y. State Mus. 152, 1908—HARPER, Trans. Wisc. Acad. Sci. Arts & Lett. XVII, 495, pl. 51, 1913—KAUFFM. Agar. Mich. 303, 1918—OVERH. North Amer. Fl. X, 269, 1924; Ann. Mo. Bot. Gard. XIV, 161, 1927.

*Agaricus detersibilis* (non BERK. et CURT.) PK. 28 Ann. Rep. N. Y. State Mus. 49, 1876.

*Agaricus erinaceellus* PK. 30 Ann. Rep. N. Y. State Mus. 70, 1878.

Solitary. Pileus 0.5–4 cm. broad, hemispherical, then convex to nearly plane; surface tawny, not changing color in drying, dry, densely covered with minute, erect, pyramidal, spine-like or granular, tawny scales; lamellae adnexed or adnate, crowded or subdistant, pallid then ochraceous-tawny or cinnamon-brown, yellowish and minutely serrulate on the edge; stipe 1.5–4.5 cm. long, 1–5 mm. thick, equal or slightly attenuated downward, tawny, with numerous, floccose scales or granules below the annulus, smooth and yellowish above, stuffed or hollow; annulus superior, floccose, evanescent, concolorous with the stipe; spores ferruginous in mass, ellipsoidal or naviculoid, smooth, 6–8 × 4–5  $\mu$ ; cystidia none, sterile hyaline clavate cells present on the edge of lamellae.

Hab. on dead wood of deciduous trees. Summer. Ishikari (Sapporo).

Distr. Japan (Hokkaido), North America.

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

### 16. *Pholiota radicata* (BULL. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 125, 1872—GILL. Hymen. Fr. 438, cum icone, 1874—KARST. Hattsv. I, 295, 1879—SACC. Syll. Fung. V, 741, 1887; Fl. Ital. Crypt., Hymen. 684, 1916—SCHROET. Pilze Schles. I, 610, 1889—MASS. Brit. Fung. Fl. II, 215, 1893—W. G. SM. Brit. Basid. 126, 1908—ROLLAND, Atlas Champ. 61, f. 136, 1910—LANGE, Agar. Denm. IV, 8, 1921—REA, Brit. Basid. 115, 1922—BRES. Icon. Myc. XIV, pl. 693, 1930.

*Agaricus radicosus* BULL. Champ. Fr. pl. 160, 1791—PERS. Syn. Fung. 266, 1801 (teste FR.).

*Agaricus (Pholiota) radicosus* FR. Syst. Myc. I, 242, 1821; Epicr. Myc. 163, 1838; Hymen. Eur. 218, 1874—BERK. in SMITH, Engl. Fl. V, (2), 90, 1836; Outl. Brit. Fung. 150, 1860—RABENH. Deut. Krypt. Fl. I, 487, 1844—KICKX, Fl. Crypt. Flandr. II, 165, 1867—CKE. Handb. Brit. Fung. I, 105, 1871; Ill. Brit. Fung. pl. 361, 1886—WINT. Die Pilze, I, 702, 1884.

*Dryophila (Pholiota) radicosus* QUÉL. Ench. Fung. 67, 1886.

*Hebeloma radicosum* RICKEN, Blätterp. 115, pl. 33, f. 1, 1915.

Solitary or gregarious, edible. Pileus 5–10 cm. or more broad, convex, obtuse, then nearly plane; surface smooth, glabrous, viscid when wet, shining when dry, nearly drab or clay color, then spotted rufous; context whitish, moderately thick, odour pleasant, taste submild; lamellae rounded behind, somewhat free, pallid, then rufescent ferruginous, very crowded, ventricose, edge white-pruinose and subserrulate; stipe 8–15 cm. long, 1–2 cm. thick, thickened at the base, and fusiform-rooted, subconcolorous or whitish, white pruinose above the annulus, concentrically scaly below the annulus, the scales often floccose and erect and becoming rufous, solid or stuffed, at length subhollow; annulus membranous, medial or subinferior, distant, rather erect, entire, scaly, whitish; spores dull brown in mass, fusoid-amygdaloid, apiculate, punctate-scabrate,  $8-10 \times 5-6 \mu$ ; cystidia none, sterile hyaline cells on edge of lamellae cylindrical-clavate, subcapitate.

Hab. about stumps in woods, especially about frondose ones. Autumn. Ishikari (Sapporo).

Distr. Japan (Hokkaido), Europe.

Jap. name. *Naga-e-no-sugitake* (n. n.).

### 17. *Pholiota Nameko* (T. ITO) S. ITO et IMAI

Bot. Mag. (Tokyo), XLVII, 388, 1933.

*Collybia Nameko* T. ITO, Proceed. Imp. Acad. Tokyo, V, 145, cum icone, 1929.

Densely caespitose or gregarious, edible. Pileus 2.5–10 cm. broad, hemispherical then convex to plane; surface bay-brown at the center, paler on the margin, then becoming paler with age, smooth, glabrous, glutinous, margin thin, incurved at first, not striate, at times appendiculate with glutinous veil; context yellowish, very thin at the margin, taste and odour pleasant; lamellae adnate with a decurrent

tooth, emarginate or adnexed, yellowish then ochraceous-buff, very crowded, often waved on edge; stipe 2.5–7 cm. long, 3–15 mm. thick, equal, slightly enlarged at the base, cinnamon-buff or concolorous with the margin of pileus, or slightly paler, glutinous below the annulus, whitish and silky fibrous above, solid or slightly hollow; annulus thin, glutinous, superior, cinnamon-buff, fugacious; spores dull brown (tawny-olive or dresden-brown) in mass, ellipsoidal, oblong or subovate, obtuse, not truncate at the ends,  $5-6 \times 2.5-3 \mu$ ; cystidia none, sterile cells on the edge of lamellae clavate-cylindrical or cylindrical, slightly longer than the paraphyses, hyaline,  $5-7.5 \mu$  thick, usually vacuolate.

Hab. on the trunks of deciduous trees, of *Fagus*, *Broussonetia*, *Betula*, *Quercus*, etc. Autumn. Ishikari (Jôzankei, Nakayama-tôge).

Distr. Endemic (Hokkaido, Honshu):

Jap. name. *Nameko* (T. ITO).

#### Subsect. *Hygrophanae* FR. emend. LANGE

Agar. Denm. IV, 5, 1921.

*Agaricus* § *Pholiota* § *Truncigeni* § *Hygrophani* FR. Hymen. Eur. 224, 1874.

Pileus slightly fleshy, hygrophaneous, smooth.

#### 18. *Pholiota marginata* (BATSCH ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 127, 1872—GILL. Hymen. Fr. 436, 1874—KARST. Hattsv. I, 305, 1879—SACC. Syll. Fung. V, 758, 1887; Fl. Ital. Crypt., Hymen. 679, 1916—SCHROET. Pilze Schles. I, 609, 1889—MASS. Brit. Fung. Fl. II, 229, 1893—ATKINS. Mushrooms, ed. 2, 151, f. 147, 1903—W. G. SM. Brit. Basid. 130, 1908—HARPER, Trans. Wisc. Acad. Sci. Arts & Lett. XVII, 496, pl. 55–56, 1913—RICKEN, Blätterp. 200, pl. 56, f. 7, 1915—KAUFFM. Agar. Mich. 311, 1918—LANGE, Agar. Denm. IV, 10, 1921—REA, Brit. Basid. 123, 1922—OVERH. North Amer. Fl. X, 273, 1924; Ann. Mo. Bot. Gard. XIV, 132, pl. 14, 1927—BRES. Icon. Myc. XV, pl. 704, 1930.

*Agaricus marginatus* BATSCH, Elench. Fung. Cont. II, 65, pl. 37, f. 207, 1789 (teste FR.).

*Agaricus* (*Pholiota*) *mutabilis* b. *denudatus* FR. Syst. Myc. I, 245, 1821.

*Agaricus* (*Pholiota*) *marginatus* FR. Epicr. Myc. 169, 1838; Hymen. Eur. 225, 1874—BERK. Outl. Brit. Fung. 151, 1860—CKE. Handb. Brit. Fung. I, 109, 1871; Ill. Brit. Fung. pl. 372, 1886; Handb. Austr. Fung. 45, 1892—WINT. Die Pilze, I, 696, 1884.

*Dryophila* (*Pholiota*) *marginata* QUÉL. Ench. Fung. 69, 1886.

Gregarious or solitary. Pileus 1–7 cm. broad, convex then plane or slightly depressed, sometimes somewhat umbilicate, more rarely slightly umbonate; surface argus-brown, cinnamon-brown or sudan-brown when moist, warm-buff to ochraceous-orange when dry, hygrophanous, glabrous, margin usually striatulate when moist, often extending somewhat beyond the lamellae; context thin, concolorous with the pileus, taste and odour farinaceous; lamellae sinuate-adnate to adnate or slightly decurrent, crowded to slightly distant, 2–7 mm. broad, subconcolorous with the pileus; stipe 2–8 cm. long, 2–8 mm. thick, nearly equal, fibrillose, pruinose at the top and with a white tomentum at the base, concolorous with or paler than the pileus, hollow; annulus membranous, superior, fugacious or subpersistent, pale yellow then cinnamon; spores ferruginous in mass, ellipsoidal or fusiform-ellipsoidal, often smooth when young, with a rough wall when matured,  $7-10 \times 4.5-6 \mu$ ; cystidia present, but usually not abundant, fusoido-ventricose or flask-shaped with a long apex, projecting, hyaline.

Hab. on rotten wood, either exposed or buried, of either deciduous or coniferous trees. Summer to autumn. Ishikari (Nopporo), Iburi (Chitose).

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

Jap. name. *Hime-ajirogasa-take* (n. n.).

### 19. *Pholiota unicolor* (VAHL ex FR.) GILL.

Hymen. Fr. 436, cum icone, 1874—KARST. Hattsv. I, 305, 1879—SACC. Syll. Fung. V, 759, 1887; Fl. Ital. Crypt., Hymen. 679, 1916—SCHROET. Pilze Schles. I, 609, 1889—MASS. Brit. Fung. Fl. II, 230, 1893—W. G. SM. Brit. Basid. 130, 1908—RICKEN, Blätterp. 200, pl. 56, f. 4, 1915—KAUFFM. Agar. Mich. 311, 1918—LANGE, Agar. Denm. IV, 10, 1921—REA, Brit. Basid. 123, 1922—OVERH. North Amer. Fl. X, 273, 1924; Ann. Mo. Bot. Gard. XIV, 134, 1927—BRES. Icon. Myc. XV, pl. 705, f. 1, 1930.

*Agaricus unicolor* VAHL, Fl. Dan. Fasc. 18, 7, pl. 1071, f. 1, 1792 (teste FR.).

*Agaricus (Pholiota) unicolor* FR. Epicr. Myc. 170, 1838; Hymen. Eur. 225, 1874—CKE. Ill. Brit. Fung. pl. 356, f. B, 1886—WINT. Die Pilze, I, 696, 1884.

*Dryophila (Pholiota) unicolor* QUÉL. Ench. Fung. 69, 1886.

Subcaespitose or gregarious. Pileus 0.5–3 cm. broad, campanulate to conico-campanulate or somewhat convex, often sharply umbonate; surface cinnamon-buff to ochraceous-buff or ochraceous-orange,

glabrous, hygrophanous, margin densely striatulate or fluted; context thin, concolorous, taste somewhat farinaceous, odour subearthy; lamellae squarely adnate, often becoming somewhat free with the expansion of the pileus, rather crowded, sub-triangular in shape, subconcolorous with the pileus; stipe 2.5–5 cm. long, 2–4 mm. thick, equal, subconcolorous or bister brown at the base, decidedly floccose-mealy above the annulus, fibrillose below or the base white-tomentose, hollow; annulus persistent, median or superior, upright, funnel-shaped, pallid; spores deep ochraceous in mass, ovoid or ellipsoidal, smooth or slightly rough when matured,  $7.5\text{--}10 \times 5\text{--}6 \mu$ ; cystidia rare, projecting, flask-shaped or subfusoid with ventricose base, hyaline, pointed.

Hab. on rotten wood of coniferous or deciduous trees. Summer to autumn. Ishikari (Sapporo, Nopporo).

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

Jap. name. *Hime-ichimegasa-take* (n. n.).

### Tribe Cortinariæ IMAI, nom. nov.

*Cortinariæ* KONR. et MAUBL. Icon. Sel. Fung. 28 & 122, 1924, pro maj. parte.

Fructificatio carnosa, cum velo arachnoideo vel marginato. Pileus cum stipite carnosus confluentus et homogeneous. Lamellae molles, carnosae, cum stipite adhaerentes.

#### Key to the genera.

- I. With an arachnoidal or filamentous and dry or viscid veil.
  - A. Veil forming an arachnoidal, fugacious annulus on the stipe..... *Cortinarius*.
  - B. Veil concrete with the epidermis of the pileus..... *Inocybe*.
- II. With a fugacious, viscid or dry veil, or none.
  - A. Lamellae sinuate or adnexed..... *Hebeloma*.
  - B. Lamellae decurrent or adnate with a decurrent tooth..... *Gymnopilus*.

### *Cortinarius* FR.

Epicr. Myc. 255, 1838.

*Agaricus* § *Cortinaria* PERS. Syn. Fung. 276, 1801, pro parte.

*Cortinaria* S. F. GRAY, Nat. Arr. Brit. Pl. I, 627, 1821.

- Agaricus* § *Telamonia* FR. Syst. Myc. I, 210, 1821.  
*Agaricus* § *Inoloma* FR. Ibid. 216, 1821.  
*Agaricus* § *Phlegmacium* FR. Ibid. 226, 1821.  
*Agaricus* § *Dermocybe* FR. Ibid. 227, 1821.  
*Agaricus* § *Myxacium* FR. Ibid. 247, 1821.  
*Cortinarius* § *Plegmacium* FR. Epicr. Myc. 256, 1838.  
*Cortinarius* § *Myxacium* FR. Ibid. 273, 1838.  
*Cortinarius* § *Inoloma* FR. Ibid. 278, 1838.  
*Cortinarius* § *Dermocybe* FR. Ibid. 283, 1838.  
*Cortinarius* § *Telamonia* FR. Ibid. 291, 1838.  
*Cortinarius* § *Hydrocybe* FR. Ibid. 303, 1838.  
*Dermocybe* FAYOD, Ann. Sci. Nat., Bot. 7 sér. IX, 372, 1889.  
*Hydrocybe* FAYOD, Ibid. 372, 1889.  
*Telamonia* FAYOD, Ibid. 373, 1889.  
*Myxacium* FAYOD, Ibid. 374, 1889.  
*Sphaerotrachys* FAYOD, Ibid. 374, 1889.  
*Phlegmacium* FAYOD, Ibid. 375, 1889.  
*Inoloma* KARST. Medd. Soc. Faun. Fl. Fenn. XVIII, 70, 1891.  
*Hydrocybium* EARLE, Bull. N. Y. Bot. Gard. V, 440, 1909.  
*Bulbopodium* EARLE, Ibid. 441, 1909.

Fructification with or without universal veil, and with cortina. Pileus fleshy, regular, confluent and homogeneous with fleshy stipe. Stipe central, fleshy. Lamellae adnate, sinuate or decurrent. Universal veil present or lacking, usually evanescent, either gelatinous or filiform-interwoven in texture. Spores cinnamon-brown or ferruginous in mass.

Type species: *Agaricus violaceus* L. ex FR.

**Key to the subgenera, Sections and species in Hokkaido.**

- I. Universal veil glutinous; pileus fleshy, glutinous, somewhat thin; stipe scarcely bulbous, viscid; lamellae adnate or decurrent. Subgen. *Myxacium*.
  - A. Stipe floccoso-peronate, the flocci at first covered with gluten. . . . . Sect. *Colliniti*.
    1. Pileus clay-brown, radiately wrinkled; stipe usually long and ventricose. . . . . *C. elatus*(1).
  - B. Stipe not floccoso-peronate, viscid, with a varnished appearance when dry, veil entirely viscid. . . . . Sect. *Delibuti*.
    1. Lamellae pallid at first then pale ochraceous-cinnamon; pileus yellow or orange-yellow; stipe pure white. . . . . *C. vibratilis*(2).
    2. Lamellae violaceous at first then gray-cinnamon; pileus dark-violet; stipe violaceous. . . . . *C. iodes*(3).

- II. Partial veil arachnoidal, dry; pileus equally fleshy, viscid; stipe firm, dry..... Subgen. Phlegmacium.
- A. Partial veil superior, ring-likely pendulous from the apex of the subequal or clavate stipe..... Sect. Cliduchii.
1. Lamellae at first yellow, then cinnamon or ferruginous; pileus tan-color; stipe white..... *C. latus*(4).
  2. Lamellae at first olivaceous, then concolorous; pileus dark-olive; stipe concolorous..... *C. infractus*(5).
- B. Bulb of the base of the stipe depressed or turbinate, marginate; stipe fleshy, fibrous; cortina arising from the margin of the bulb, commonly inferior; pileus equally fleshy; lamellae subsinuate.... Sect. Scauri.
1. Lamellae whitish, then clay colored or pale cinnamon; pileus ochraceous-buff, becoming clay-color; stipe whitish, becoming yellowish..... *C. multiformis*(6).
  2. Lamellae violaceous, dark-blue or purplish, at length cinnamon.
    - a. Pileus light mouse-gray; lamellae white then bluish, finally cinnamon; stipe concolorous..... *C. caesiocyaneus*(7).
    - b. Pileus dark-purplish-umber, then discolored and variegated with clay color; lamellae azure-blue at first; stipe pallid azure-blue; context becoming purple when bruised..... *C. purpurascens*(8).
  3. Lamellae yellow at first, finally ferruginous; pileus orange-fulvous; stipe yellow..... *C. fulgens*(9).
- C. Cortina simple, thin, fugacious, median or inferior; stipe at first exerted, somewhat thin, rigid-elastic, never marginato-bulbous nor peronate, externally subcartilaginous, polished, shining, naked at the apex; pileus thin, often hygrophanous..... Sect. Elastici.
1. Lamellae whitish or grayish lavender, then clay color or dirty cinnamon; pileus cinnamon; stipe whitish.... *C. decoloratus*(10).
- III. Pileus equally fleshy, dry, at first silky with innate scales or fibrils, becoming smooth, flesh continuous, not hygrophanous; veil simple; stipe fleshy, subbulbous..... Subgen. Inoloma.
- A. Lamellae, as well as stipe and veil, violaceous; pileus, stipe and lamellae dark violaceous..... *C. violaceus*(11).
- IV. Pileus thin and equally fleshy, at first silky with subinnate villose down, becoming glabrous when old, dry, not hygrophanous; flesh watery or colored when moist; stipe equal or attenuated, externally rigid-elastic or fragile, internally stuffed or hollow; veil simple, fibrillose..... Subgen. Dermocybe.
- A. Lamellae bright cinnamon, red or yellow; stipe and cortina fibrillose, colored.
1. Pileus convex or obtusely umbonate.
    - a. Pileus cinnamon; lamellae yellow at first; stipe yellow..... *C. cinnamomeus*(12).

- b. Pileus, lamellae and stipe dark blood-red.....  
 ..... *C. sanguineus* (13).
2. Pileus conico-campanulate, persistently acute; fulvous-cinnamon;  
 stipe and lamellae yellowish at first..... *C. croceoconus* (14).
- V. Pileus moist, hygrophanous, at first glabrous or besprinkled with super-  
 ficial whitish fibers of the veil, thin fleshed or abruptly thin at the  
 margin, splitting; stipe annulate from the inferior universal veil or  
 peronate with scales, subcortinate at the apex, hence the veil is some-  
 what double..... Subgen. *Telamonia*.
- A. Lamellae very broad, rather thick, more or less distant; stipe spongy  
 or wholly fibrous..... Sect. *Mollipodes*.
1. Pileus brick-colored, hoary with very small squamules; stipe  
 whitish..... *C. macropus* (15).
- VI. Pileus glabrous or wholly covered with white superficial fibrils, not viscid,  
 but moist when fresh, changing color when dry; context very thin or  
 scissile, rarely more compact in the disc; stipe slightly rigid, not peronate;  
 cortina thin, fibrillose, rarely collapsing and forming an irregular zone  
 on the stipe..... Subgen. *Hydrocybe*.
- A. Pileus subfleshy convex or campanulate-convex, then expanded, obtuse  
 or at length gibbous, margin at first incurved; stipe for the most  
 part attenuated upward..... Sect. *Firmiores*.
1. Pileus watery cinnamon or tawny-cinnamon; cortina white and  
 fugacious; stipe brownish..... *C. jubarinus* (16).
- B. Pileus submembranous, conical then expanded, umbonate, umbo acute,  
 or rarely obtuse or indistinct, margin straight at first; stipe subequal  
 or attenuated toward the base..... Sect. *Tenuiores*.
1. Pileus acutely umbonate, brick colored; stipe paler, fibrillose  
 fissile..... *C. fasciatus* (17).

### Subgen. *Myxacium* FR.

Epicr. Myc. 273, 1838.

*Agaricus* § *Myxacium* FR. Syst. Myc. I, 247, 1821.

*Myxacium* FAYOD, Ann. Sci. Nat., Bot. 7 sér. IX, 374, 1889.

Pileus fleshy, glutinous, somewhat thin. Stipe scarcely bulbous,  
 viscid. Lamellae adnate or decurrent. Veil universal glutinous.

### Sect. *Colliniti* FR.

Epicr. Myc. 273, 1838.

Stipe floccoso-peronate, the flocci at first covered with gluten.

1. *Cortinarius (Myxadium) elatus* (PERS. ex FR.) SACC.

Fl. Ital. Crypt., Hymen. 605, 1916.

*Agaricus elatus* PERS. Syn. Fung. 332, 1801 (teste FR.).

*Agaricus (Myxadium) elatus* FR. Syst. Myc. I, 248, 1821.

*Cortinarius (Myxadium) elatior* FR. Epicr. Myc. 274, 1838; Hymen. Eur. 355, 1874—BERK. Outl. Brit. Fung. 186, 1860—CKE. Handb. Brit. Fung. I, 177, 1871; Ill. Brit. Fung. pl. 741, 1888—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 167, 1872; Ench. Fung. 78, 1886—GILL. Hymen. Fr. 456, cum icone, 1874—KARST. Hattsv. I, 334, 1879—SACC. Syll. Fung. V, 917, 1887—MASS. Brit. Fung. Fl. II, 87, 1893—W. G. SM. Brit. Basid. 223, 1908—KAWAMURA, Ill. Jap. Fung. pl. 7, f. 18–20, 1913—REA, Brit. Basid. 150, 1922—KAUFFM. North Amer. Fl. X, 290, 1932—LANGE, Agar. Denm. X, 22, 1935.

[SHIRAI, List Jap. Fung. ed. 2, 175, 1917; ed. 3, 104, 1927—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 115, 1931]

*Myxadium elatius* RICKEN, Blätterp. 124, pl. 35, f. 1, 1915.

Gregarious or solitary, edible. Pileus 5–10 cm. broad, campanulate or obtusely conical, then expanded to discoid or subumbonate; surface viscid, olive-ocher to medal-bronze when moist, darker at the disk, fading to dingy-yellowish-ocher, radiately wrinkled with coarse grooves on the submembranous margin; context whitish or yellowish, soft, thin except the disk, odour and taste mild; lamellae adnate or adnexed, at first pale-campanula-blue, then cinnamon, finally becoming much darker, crowded, broad, the edge remaining bluish longer, then white-flocculose; stipe 7–15 cm. long, 1–2 cm. or more thick, ventricose-elongate, attenuated toward both ends, deeply imbedded in humus and soil, sheathed at first by a viscid, pale-campanula-blue, adpressed, subfloccose universal veil, white at the apex and base, striate-sulcate above the sheath, solid; cortina concolorous, viscid, fugacious; spores ferruginous in mass, almond-shaped, coarsely tuberculate,  $12\text{--}15 \times 7\text{--}9 \mu$ .

Hab. on humus ground among fallen leaves. Autumn. Iburi (Lake side of Shikotsu).

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

Jap. name. *Abura-shimeji* (KAWAMURA).

Sect. *Delibuti* FR.

Epicr. Myc. 275, 1838.

Stipe not floccoso-peronate, viscid, with a varnished appearance when dry, veil entirely viscid.

## 2. *Cortinarius (Myxacium) vibratilis* FR.

*Epicr. Myc.* 277, 1838; *Hymen. Eur.* 358, 1874—QUÉL. *Champ. Jura Vosg. I*, in *Mém. Soc. D'Emul. Montb.* 2 sér. V, 351, 1872; *Ench. Fung.* 79, 1886—GILL. *Hymen. Fr.* 459, cum icone, 1874—KARST. *Hattsv. I*, 339, 1879—SACC. *Syll. Fung.* V, 922, 1887; *Fl. Ital. Crypt., Hymen.* 608, 1916—CKE. *Ill. Brit. Fung.* pl. 744, 1888—SCHROET. *Pilze Schles. I*, 597, 1889—MASS. *Brit. Fung. Fl. II*, 92, 1893—W. G. SM. *Brit. Basid.* 224, 1908—KAUFFM. *Agar. Mich.* 333, 1918; *North Amer. Fl. X*, 293, 1932—REA, *Brit. Basid.* 152, 1922—BRES. *Icon. Myc. XIII*, pl. 633, 1930—LANGE, *Agar. Denm. X*, 25, 1935.

*Agaricus (Phlegmacium) vibratilis* FR. *Syst. Myc. I*, 227, 1921.

*Cortinarius (Phlegmacium) amarum* PK. 32 *Ann. Rep. N. Y. State Mus.* 30, 1880 (teste KAUFFM.).

*Myxacium amarum* PK. 1 *Bull. N. Y. State Mus.* 14, 1888.

*Myxacium vibratile* RICKEN, *Blätterp.* 127, pl. 35, f. 2, 1915.

Gregarious or solitary. Pileus 2–5 cm. broad, campanulate or convex, then expanded to gibbous or subumbonate; surface glabrous, even, with a very glutinous pellicle, hygrophanous, yellow or bright orange-yellow, paler and shining when dry; context soft, thin except disk, white or pallid, taste bitter; lamellae adnate or decurrent by a tooth, pallid or yellowish, then pallid ochraceous-cinnamon, crowded, thin, rather narrow; stipe 3–8 cm. long, 4–10 mm. thick, nearly equal or slightly attenuated upwards, but subfusiformly thickened at the base, pure white, shining, clothed when young by a glutinous, hyaline, universal veil which soon dries, often viscid only at the base, soft, stuffed; cortina glutinous, fibrous, white, fugacious; spores ferruginous in mass, ovate, coarsely verrucose, about  $10 \times 7.5 \mu$ .

Hab. on the ground in woods. Autumn. Kitami (Oketo forest).

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

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

## 3. *Cortinarius (Myxacium) iodes* BERK. et CURT.

*Ann. Mag. Nat. Hist.* 2 ser. XII, 423, 1853—SACC. *Syll. Fung.* V, 920, 1887—KAUFFM. *Agar. Mich.* 335, 1918; *North Amer. Fl. X*, 294, 1932.

Solitary, gregarious or subcaespitose. Pileus 2–5 cm. broad, campanulate-convex, then expanded; surface glabrous, even, with viscid, separable pellicle, dark-violet to purplish, at length often yellowish at the disk; context thick at the disk, thin on the margin, violaceous, then paler, taste and odour none; lamellae adnate, crowded,

moderately broad, violaceous at first, then gray-cinnamon, fuscous-ferruginous in dried specimens; stipe 5–7 cm. long, 4–10 mm. thick, equal or slightly attenuated upward, viscid, fibrillose, violaceous, solid; cortina pale olivaceous; spores ferruginous in mass, broadly ellipsoidal, verrucose,  $8-10 \times 5-6 \mu$ .

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

Distr. Japan (Hokkaido), North America.

Jap. name. *Murasaki-aburashimeji* (n. n.).

### Subgen. *Phlegmacium* FR.

Epicr. Myc. 256, 1838.

*Agaricus* § *Phlegmacium* FR. Syst. Myc. I, 226, 1821.

*Phlegmacium* FAYOD, Ann. Sci. Nat., Bot. 7 sér. IX, 375, 1889.

Pileus equally fleshy, viscid. Stipe firm, dry. Partial veil arachnoidal, dry.

### Sect. *Cliduchii* FR.

Epicr. Myc. 256, 1838.

Partial veil superior, ring-like pendulous from the apex of the subequal or clavate stipe.

### 4. *Cortinarius (Phlegmacium) latus* [PERS.] FR.

Epicr. Myc. 260, 1838; Hymen. Eur. 340, 1874—GILL. Hymen. Fr. 468, 1874—KARST. Hattsv. I, 313, 1879—QUÉL. Ench. Fung. 73, 1886—SACC. Syll. Fung. V, 895, 1887; Fl. Ital. Crypt., Hymen. 588, 1916—REA, Brit. Basid. 127, 1922—BRES. Icon. Myc. XIII, pl. 609, 1930.

*Agaricus latus* PERS. Syn. Fung. 276, 1801 (teste FR.).

*Agaricus (Telamonia) latus* FR. Syst. Myc. I, 215, 1821.

*Phlegmacium latum* RICKEN, Blätterp. 141, 1915.

Gregarious, edible. Pileus 6–10 cm. broad, convex, then expanded, obtuse; surface tan color, disc darker, slightly viscid, soon dry, fibrillose, then glabrous; context white or yellowish, taste mild, odour pleasant; lamellae emarginate, pallid, then clay-cinnamon, crowded, distantly dentate, 6 mm. broad; stipe 5–7 cm. long, 1–2 cm. thick, equal, base ovately bulbous, rarely emarginately bulbous, white,

somewhat squarrose, then fibrillose; cortina white, superior, forming an annulus, fugacious; spores ochraceous in mass, oblong-ellipsoidal, about  $10 \times 5-6 \mu$ , minutely rough.

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

Distr. Japan (Hokkaido), Europe.

Jap. name. *Cha-ôfûsentake* (n. n.).

### 5. *Cortinarius (Phlegmacium) infractus* [PERS.] FR.

Epicr. Myc. 261, 1838; Hymen. Eur. 341, 1874—QUÉL. Champ. Jura Vosg. 2 Suppl., in Mém. Soc. D'Emul. Montb. 2 sér. V, 350, 1873; Ench. Fung. 74, 1886—GILL. Hymen. Fr. 467, 1874—KARST. Hattsv. I, 314, 1879—SACC. Syll. Fung. V, 896, 1887; Fl. Ital. Crypt., Hymen. 587, 1916—CKE. Ill. Brit. Fung. pl. 704, 1888—SCHROET. Pilze Schles. I, 601, 1889—MASS. Brit. Fung. Fl. II, 101, 1893—W. G. SM. Brit. Basid. 217, 1908—KAUFFM. Agar. Mich. 365, pl. 73, 1918; North Amer. Fl. X, 308, 1932—REA, Brit. Basid. 138, 1922—BRES. Icon. Myc. XIII, pl. 610, 1930—LANGE, Agar. Denm. X, 21, 1935.

*Agaricus infractus* PERS. Obs. Myc. II, 42, 1799; Syn. Fung. 283, 1801 (teste FR.).

*Agaricus (Inoloma) infractus* FR. Syst. Myc. I, 223, 1821.

*Cortinarius anfractus* FR. Epicr. Myc. 262, 1838; Hymen. Eur. 341, 1874—CKE. Handb. Brit. Fung. I, 173, 1871; Ill. Brit. Fung. pl. 705, 1888—QUÉL. Champ. Jura Vosg. 2 Suppl., in Mém. Soc. D'Emul. Montb. 2 sér. V, 350, 1873—GILL. Hymen. Fr. 468, 1874—MASS. Brit. Fung. Fl. II, 101, 1893—W. G. SM. Brit. Basid. 217, 1908.

*Phlegmacium infractum* RICKEN, Blätterp. 143, pl. 43, f. 2, 1915.

Gregarious. Pileus 5–10 cm. broad, convex, then expanded, gibbous; surface viscid when moist, glabrous, even, dark-olive or sooty-olive, then becoming fulvous, often fuscous-zoned near the margin, margin undulate and broken, often finally revolute; context whitish, somewhat tinged with blue at the apex of the stipe, firm, thick, odour somewhat nauseous, taste bitterish; lamellae sinuate-adnexed or sometimes emarginate, crowded or subdistant, undulate-cripsed, subconcolorous with the pileus, at length becoming umber; stipe 4–8 cm. long, 8–15 mm. or more thick, ovate-clavate or elongate and subbulbous, rather stout, subconcolorous, adpressedly fibrillose, often tinged violaceous at the apex, solid; cortina subolivaceous, fugacious; spores ferruginous in mass,  $10-12.5 \times 6-7.5 \mu$ , broadly ellipsoidal or subovate, verrucose.

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

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

Jap. name. *Yabure-ôfûsentake* (n. n.).

### Sect. *Scauri* FR.

Epicr. Myc. 262, 1838.

Pileus equally fleshy. Lamellae subsinuate. Stipe fleshy, fibrous, bulb of the base depressed or turbinate, marginate.

### 6. *Cortinarius (Phlegmacium) multiformis* FR.

Epicr. Myc. 263, 1838; Hymen. Eur. 343, 1874—BERK. Outl. Brit. Fung. 184, 1860—CKE. Handb. Brit. Fung. I, 174, 1871; Ill. Brit. Fung. pl. 708, 1888—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D' Emul. Montb. 2 sér. V, 164, 1872; Ench. Fung. 74, 1886—GILL. Hymen. Fr. 466, 1874—KARST. Hattsv. I, 315, 1879—SACC. Syll. Fung. V, 898, 1887; Fl. Ital. Crypt., Hymen. 589, 1916—SCHROET. Pilze Schles. I, 601, 1889—MASS. Brit. Fung. Fl. II, 102, 1893—KAUFFM. Agar. Mich. 357, pl. 72, 1918; North Amer. Fl. X, 302, 1932—REA, Brit. Basid. 138, 1922—KONR. & MAUBL. Icon. Sel. Fung. pl. 114, 1928—LANGE, Agar. Denm. X, 14, 1935.

[KAWAMURA, Jap. Fungi, no. 132, 1929]

*Agaricus turbinatus* SOWERB. Engl. Fung. pl. 102, 1797 (teste FR.).

*Agaricus multiformis* FR. Obs. Myc. II, 63, 1818.

*Agaricus (Inoloma) varius* FR. Syst. Myc. I, 225, 1821, pro parte.

*Phlegmacium multiforme* RICKEN, Blätterp. 136, pl. 39, f. 1, 1915.

Gregarious, edible. Pileus 5–10 cm. broad, convex, then expanded to gibbous or nearly plane; surface viscid when moist, ochraceous-buff, becoming clay-color, sometimes besprinkled with white, fugacious fragments of the universal veil; context white, becoming slightly discolored; odour and taste mild; lamellae emarginate or adnexed, crowded, at first whitish, then argillaceous, finally subferruginous, serrulate on the edge; stipe 5–10 cm. long, 1–2 cm. thick, equal or attenuated upward, with a somewhat emarginate bulb at the base, at first white, then yellowish, adpressedly fibrillose, solid; cortina white, fibrillose, fugacious; spores ochraceous-tawny in mass, ellipsoidal, 8–10 × 5–6  $\mu$ , slightly rough.

Hab. on the ground in woods, mostly in coniferous or mixed. Autumn. Kushiro (Lake side of Akan).

Distr. Japan (Hokkaido, Honshu), Europe, North America.  
Jap. name. *Manjûgasa* (KAWAMURA).

### 7. *Cortinarius (Phlegmacium) caesiocyaneus* BRITZ.

Bot. Centralbl. LXII, 307, 1895, nom. nud.; Ibid. LXXX, 58, 1899, pro parte—R. MAIRE, Bull. Soc. Myc. Fr. XXVI, 176, f. 5, pl. 8, f. 1-2, 1910—KAUFFM. Agar. Mich. 342, 1918; North Amer. Fl. X, 297, 1932—REA, Brit. Basid. 140, 1922.

Solitary. Pileus 5-7 cm. broad, convex, then expanded; surface pallid-mouse-gray to light-mouse-gray or light quaker drab, smooth, glabrous, viscid when wet, spotted with warm-buff or pinkish-buff, margin incurved at first, then repand and wavy, pellicle separable; context thick, whitish, not changing in color when bruised, taste and odour mild; lamellae adnexed, whitish then bluish, finally cinnamon, crowded, 4 mm. broad, edge wavy and serrulate; stipe 5-7 cm. long, 1-1.3 cm. thick, subequal or slightly attenuated upward, base bulbous, reaching to 3 cm. thick and 2 cm. high, marginate, fibrillose from the cortina, concolorous, the bulbous base covered with whitish or purplish, volvate, very thin membrane, stuffed or nearly hollow; cortina whitish or purplish, fibrillose, fugacious; spores cinnamon in mass, ellipsoidal or nearly short fusiform, verrucose,  $9-12.5 \times 5-6.5 \mu$ .

Hab. among the fallen needles of conifers. Autumn. Ishikari (Nopporo).

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

Jap. name. *Asagi-fûsentake* (n. n.).

### 8. *Cortinarius (Phlegmacium) purpurascens* FR.

Epicr. Myc. 265, 1838; Hymen. Eur. 345, 1874—BERK. Outl. Brit. Fung. 185, 1860—CKE. Handb. Brit. Fung. I, 175, 1871; Ill. Brit. Fung. pl. 723-724, 1888—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 165, 1872; Ench. Fung. 75, 1886—GILL. Hymen. Fr. 464, cum icone, 1874—KARST. Hattsv. I, 319, 1879—SACC. Syll. Fung. V, 902, 1887; Fl. Ital. Crypt., Hymen. 598, 1916—SCHROET. Pilze Schles. I, 600, 1889—MASS. Brit. Fung. Fl. II, 106, 1893—W. G. SM. Brit. Basid. 218, 1908—KAWAMURA, Ill. Jap. Fung. pl. 4, f. 7-10, 1912—KAUFFM. Agar. Mich. 345, pl. 71, 1918; North Amer. Fl. X, 297, 1932—REA, Brit. Basid. 141, 1922—BRES. Icon. Myc. XIII, pl. 619, 1930—LANGE, Agar. Denm. X, 14, 1935.

[SHIRAI, List Jap. Fung. ed. 2, 175, 1917; ed. 3, 104, 1927—YASUDA, Bot. Mag. (Tokyo), XXXVIII, (148), 1924]

*Agaricus purpurascens* FR. Obs. Myc. II, 70, 1818.

*Phlegmacium purpurascens* RICKEN, Blätterp. 130, pl. 36, f. 3, 1915.

Gregarious, solitary or subcaespitose, edible. Pileus 5–10 cm. or more broad, convex then expanded, obtuse; surface glabrous, viscid, dark-purplish-umber or entirely violet-purple when young, soon discolored and variegated with clay color or brown, margin long left violaceous, at first inflexed; context thick, tinged azure or purplish color, fading to whitish in age, taste and odour mild; lamellae emarginate or rounded-adnexed, crowded, at first azure-blue, then argillaceous to cinnamon, changing to deep purple when bruised; stipe 4–8 cm. long, 1–2 cm. thick, usually short and stout, nearly equal, with a submarginate or marginate bulb at the base, pallid azure-blue, becoming darker when bruised, fibrillose, solid; cortina fibrillose, violaceous, fugacious; spores ferruginous in mass, broadly ellipsoidal,  $10\text{--}12 \times 6\text{--}7.5 \mu$ , verrucose.

Hab. on the ground in woods, mostly coniferous or mixed. Autumn. Kushiro (Lake side of Akan).

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

Jap. name. *Fûsen-take* (KAWAMURA).

### 9. *Cortinarius (Phlegmacium) fulgens* [ALB. et SCHW.] FR.

Epicr. Myc. 267, 1838; Hymen. Eur. 347, 1874—CKE. Handb. Brit. Fung. I, 176, 1871; Ill. Brit. Fung. pl. 716, 1888—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 165, 1872; Ench. Fung. 75, 1886—GILL. Hymen. Eur. 462, cum icone, 1874—KARST. Hattsv. I, 321, 1879—SCHROET. Pilze Schles. I, 599, 1889—MASS. Brit. Fung. Fl. II, 108, 1893—W. G. SM. Brit. Basid. 219, 1908—ROLLAND, Atlas Champ. 64, f. 145, 1910—KAUFFM. Agar. Mich. 354, 1918; North Amer. Fl. X, 301, 1932—REA, Brit. Basid. 142, 1922—LANGE, Agar. Denm. X, 16, 1935.

*Agaricus fulgens* ALB. et SCHW. Consp. Lus. 160, 1805 (teste FR.).

*Phlegmacium fulgens* RICKEN, Blätterp. 135, 1915.

Gregarious, edible. Pileus 5–10 cm. or more broad, broadly convex, then expanded to nearly plane; surface orange-fulvous or orange-yellow, darker at the center, paler on the margin, viscid when wet, fibrillose or somewhat virgate-streaked or squamulose; context thick, yellowish, then alutaceous, odour and taste mild; lamellae emarginate, broad, crowded, yellow or deep yellow, then tawny, finally ferruginous; stipe 4–8 cm. long, 1.5–2 cm. thick, equal, with large, marginate-depressed bulb at the base, yellow, paler above, densely

covered with rusty stained fibrils of the cortina, solid; spores ferruginous in mass, almond-shaped, verrucose, apiculate at both ends,  $15-18 \times 8-10 \mu$ .

Hab. on the ground in woods, mostly coniferous or mixed. Autumn. Kitami (Oketo forest).

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

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

### Sect. *Elastici* FR.

Epicr. Myc. 269, 1838.

Pileus thin, often hygrophanous. Stipe at first exerted, somewhat thin, rigid-elastic, never marginate-bulbous nor peronate, externally subcartilaginous, polished, shining, naked at the apex, more often hollow.

### 10. *Cortinarius (Phlegmacium) decoloratus* FR.

Epicr. Myc. 270, 1838; Hymen. Eur. 351, 1874—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Month. 2 sér. V, 166, 1872; Ench. Fung. 76, 1886—GILL. Hymen. Fr. 475, cum icone, 1874—KARST. Hattsv. I, 327, 1879—SACC. Syll. Fung. V, 911, 1887; Fl. Ital. Crypt., Hymen. 602, 1916—CKE. Ill. Brit. Fung. pl. 729, 1888—SCHROET. Pilze Schles. I, 598, 1889—MASS. Brit. Fung. Fl. II, 113, 1893—W. G. SM. Brit. Basid. 221, 1908—KAUFFM. Agar. Mich. 365, 1918; North Amer. Fl. X, 308, 1932—REA, Brit. Basid. 146, 1922.

*Agaricus (Inoloma) decoloratus* FR. Syst. Myc. I, 224, 1821.

*Phlegmacium decoloratum* RICKEN, Blätterp. 145, 1915.

*Cortinarius (Dermocybe) decoloratus* LANGE, Agar. Denm. X, 31, 1935.

Gregarious or solitary. Pileus 4–6 cm. broad, convex, then plane or subumbonate; surface cinnamon or orange-cinnamon on the disk, paler on the margin, slightly viscid; context at first purplish, then whitish, thick, odour not strong, taste mild; lamellae adnexed or emarginate, grayish-lavender at first, then light cinnamon-drab, finally cinnamon, subcrowded; stipe 5–7 cm. long, 4–8 mm. thick, equal or enlarged at the base, white with paler violaceous tint and brownish fibrils, then becoming slightly darker; cortina white, fibrillose, fugacious; spores cinnamon in mass, subglobose or subovate, punctate-verrucose,  $7-8 \times 5-6 \mu$ .

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

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

Jap. name. *Cha-fûsentake* (n. n.).

The writer with some hesitation refers the fungus in hand to the above mentioned species, *C. decoloratus*, because in the color of pileus and lamellae there are darker and violet hues respectively, than those of the European and American specimens.

### Subgen. *Inoloma* FR.

Epicr. Myc. 278, 1838.

*Agaricus* § *Inoloma* FR. Syst. Myc. I, 216, 1821.

*Inoloma* KARST. Medd. Soc. Faun. Fl. Fenn. XVIII, 70, 1891.

Pileus equally fleshy, dry, at first silky with innate scales or fibrils, becoming smooth, flesh continuous, not hygrophanous. Veil simple. Stipe fleshy, subbulbous.

### 11. *Cortinarius (Inoloma) violaceus* [L.] FR.

Epicr. Myc. 279, 1838; Hymen. Eur. 360, 1874—BERK. Outl. Brit. Fung. 187, 1860—KICKX, Fl. Crypt. Flandr. II, 191, 1867—CKE. Handb. Brit. Fung. I, 179, 1871—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 168, 1872; Ench. Fung. 79, 1886—GILL. Hymen. Fr. 477, cum icone, 1874—KARST. Hattsv. I, 342, 1879—SACC. Syll. Fung. V, 924, 1887; Fl. Ital. Crypt., Hymen. 619, 1916—SCHROET. Pilze Schles. I, 596, 1889—MASS. Brit. Fung. Fl. II, 75, 1893—W. G. SM. Brit. Basid. 226, 1908—KAUFFM. Agar. Mich. 380, 1918; North Am. Fl. X, 312, 1932—REA, Brit. Basid. 155, 1922—BRES. Icon. Myc. XIII, pl. 635, 1930.

*Agaricus violaceus* L. Sp. Pl. 1173, 1753.

*Agaricus (Cortinaria) violaceus* PERS. Syn. Fung. 277, 1801 (teste FR.).

*Agaricus (Cortinaria) hercynicus* PERS. Ibid. 278, 1801 (teste FR.).

*Agaricus (Inoloma) violaceus* FR. Syst. Myc. I, 217, 1821.

*Inoloma violaceum* RICKEN, Blätterp. 149, pl. 44, f. 4, 1915.

Solitary or scattered, edible. Pileus 5–10 cm. broad, convex, obtuse, subexpanded, regular; surface dry, dark violet, covered with villose, minute, suberect tufts or scales, at length metallic-shining, margin at first involute; context rather thick, varying gray or blue to dark-violet, not becoming purple when bruised, taste and odour mild; lamellae adnate, becoming sinuate or emarginate, very dark violet, then colored ferruginous with the spores and again violaceous when these are rubbed off, thick, broad, distant, connected by veins; stipe 6–10 cm. long, 1–2 cm. thick, long and stout, clavate or clavate-bulbous at the base, at first tomentose, then fibrillose, dark violet, violaceous

within; cortina azure blue, wooly, then ferruginous with the spores; spores ferruginous in mass, broadly ellipsoidal,  $12-15 \times 8-10 \mu$ , verrucose.

Hab. on the ground among mosses, fallen leaves and debris of coniferous wood. Autumn. Kushiro (Lake side of Akan).

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

Jap. name. *Murasaki-fûsentake* (n. n.).

### Subgen. *Dermocybe* FR.

Epicr. Myc. 283, 1838.

*Agaricus* § *Dermocybe* FR. Syst. Myc. I, 227, 1821.

*Dermocybe* FAYOD, Ann. Sci. Nat., Bot. 7 sér. IX, 372, 1889.

Pileus thin and equally fleshy, at first silky with subinnate villose down, becoming glabrous when old, dry, not hygrophanous, flesh watery or colored when moist. Stipe equal or attenuated, externally rigid-elastic or fragile, internally stuffed or hollow. Veil simple, fibrillose.

### 12. *Cortinarius (Dermocybe) cinnamomeus* [L.] FR.

Epicr. Myc. 288, 1838; Hymen. Eur. 370, 1874—BERK. Outl. Brit. Fung. 190, 1860—CKE. Handb. Brit. Fung. I, 184, 1871; Ill. Brit. Fung. pl. 777-778, 1888—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 171, 1872; Ench. Fung. 83, 1886—GILL. Hymen. Fr. 487, cum icone, 1874—KARST. Hattsv. I, 357, 1879—SACC. Syll. Fung. V, 941, 1887; Fl. Ital. Crypt., Hymen. 630, 1916—SCHROET. Pilze Schles. I, 593, 1889—MASS. Brit. Fung. Fl. II, 67, 1893—W. G. SM. Brit. Basid. 232, 1908—ROLLAND, Atlas Champ. 63, f. 142, 1910—KAUFFM. Agar. Mich. 396, 1918; North Amer. Fl. X, 322, 1932—REA, Brit. Basid. 165, 1922—BRES. Icon. Myc. XIII, pl. 647, 1930—LANGE, Agar. Denm. X, 35, 1935.

[P. HENN. Hedw. XXXIX, (156), 1900—MATSUM. Ind. Pl. Jap. I, 137, 1904—SHIRAI, List Jap. Fung. 25, 1905; ed. 2, 175, 1917; ed. 3, 103, 1927]

*Agaricus cinnamomeus* L. Sp. Pl. 1173, 1753.

*Agaricus (Dermocybe) cinnamomeus* FR. Syst. Myc. I, 229, 1821.

*Dermocybe cinnamomea* RICKEN, Blätterp. 160, pl. 47, f. 6, 1915.

Gregarious or subcaespitose. Pileus 2-5 cm. broad, campanulate-convex, then expanded, obtusely umbonate; surface yellowish-cinnamon, or tawny-ochraceous, silky or minutely and densely scaly from the innate or adpressed yellowish fibrils, shining, at length becoming smooth; context yellowish or straw-yellow, rarely deep-yellow, thin,

taste and odour mild; lamellae adnate, varying to adnexed-emarginate or slightly subdecurrent, rather broad, crowded, yellow or bright yellow, then cinnamon, shining; stipe 3–8 cm. long, 3–8 mm. thick, equal, yellowish, citron-yellow or chrome when fresh, darker when handled, fibrillose, stuffed, becoming hollow, olive-cinnamon-yellow within, attached to yellow mycelium; cortina yellowish or citron-yellow, fibrillose; spores dark ochraceous in mass, broadly ellipsoidal, smooth,  $6-8 \times 4-5 \mu$ .

Hab. on the moist ground among very decayed wood or mosses, in coniferous woods. Autumn. Iburi (Lake side of Shikotsu), Kushiro (Lake side of Akan), Kitami (Oketo forest).

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

Jap. name. *Sasa-take* (SHIRAI ex P. HENN.).

### 13. *Cortinarius (Dermocybe) sanguineus* [WULF.] FR.

Epicr. Myc. 288, 1838; Hymen. Eur. 370, 1874—BERK. Outl. Brit. Fung. 190, 1860—CKE. Handb. Brit. Fung. I, 183, 1871—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 171, 1872; Ench. Fung. 82, 1886—GILL. Hymen. Fr. 485, cum icone, 1874—KARST. Hattsv. I, 356, 1879—SACC. Syll. Fung. V, 940, 1887; Fl. Ital. Crypt., Hymen. 627, 1916—SCHROET. Pilze Schles. I, 593, 1889—MASS. Brit. Fung. Fl. II, 66, 1893—W. G. SM. Brit. Basid. 232, 1908—KAUFFM. Agar. Mich. 402, 1918; North Amer. Fl. X, 321, 1932—REA, Brit. Basid. 164, 1922—BRES. Icon. Myc. XIII, pl. 645, f. 2, 1930—LANGE, Agar. Denm. X, 33, 1935.

[P. HENN. Hedw. XXXIX, (156), 1900—MATSUM. Ind. Pl. Jap. I, 137, 1904—SHIRAI, List Jap. Fung. 25, 1905; ed. 2, 175, 1917; ed. 3, 104, 1927]

*Agaricus santalinus* SCOP. Fl. Carn. ed. 2, II, 444, 1772 (teste FR.).

*Agaricus sanguineus* WULF. in JACQ. Coll. II, 107, pl. 15, f. 3, 1788—Sow. Engl. Fung. pl. 43, 1797 (teste FR.).

*Agaricus (Dermocybe) sanguineus* FR. Syst. Myc. I, 229, 1821.

*Dermocybe sanguinea* RICKEN, Blätterp. 159, 1915.

Gregarious or scattered. Pileus 2–5 cm. broad, convex, then plane, obtuse or slightly umbonate, sometimes depressed; surface dry, dark blood-red, becoming paler when dry, innately silky or minutely scaly, opaque; context blood-red, thin on margin, pouring out a blood red juice when pressed, odour pleasant, taste mild; lamellae adnate or sinuate, dark blood-red, then rust color, rather broad, crowded; stipe 5–10 cm. long, 3–7 mm. thick, equal or slightly attenuated downward, flexuose, concolorous or darker, clothed with concolorous fibrils,

base sometimes white; cortina blood-red, fibrillose, fugacious; spores pale ferruginous in mass, narrow-ellipsoidal,  $7-9 \times 4-6 \mu$ , rough.

Hab. on the ground among deep moss or sphagnum in coniferous woods. Autumn. Kitami (Oketo forest), Ishikari (Nopporo).

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

Jap. name. *Akatake* (SHIRAI ex P. HENN.).

#### 14. *Cortinarius (Dermocybe) croceo-conus* FR.

Monogr. Hymen. Suec. II, 67, 1863; Hymen. Eur. 371, 1874—QUÉL. Champ. Jura Vosg. 2 Suppl., in Mém. Soc. D'Emul. Montb. 2 sér. V, 352, 1873—GILL. Hymen. Fr. 487, cum icone, 1874—SACC. Syll. Fung. V, 942, 1887; Fl. Ital. Crypt., Hymen. 628, 1916—CKE. Ill. Brit. Fung. pl. 780, f. B, 1888—MASS. Brit. Fung. Fl. II, 68, 1893—W. G. SM. Brit. Basid. 232, 1908—KAUFFM. Agar. Mich. 397, 1918—REA, Brit. Basid. 165, 1922.

Gregarious. Pileus 1–3 cm. or more broad, conical, then campanulate, with a persistent acute umbo; surface fulvous-cinnamon, silky, dry, incurved at the margin; context whitish, thin except the umbo; lamellae adnate, ascending, narrow, crowded, yellowish at first, then cinnamon, minutely eroded on the edge; stipe 5–12 cm. long, 2–4 mm. thick, equal, yellowish, fibrillose, stuffed; cortina fibrillose, pale rufous-fulvous, becoming paler; spores ferruginous in mass, ellipsoidal,  $8-10 \times 4-5 \mu$ , verruculose.

Hab. on the ground in woods. Autumn. Iburi (Lake side of Shikotsu).

Distr. Japan (Hokkaido), Europe.

Jap. name. *Ko-kintake* (n. n.).

#### Subgen. *Telamonia* FR.

Epicr. Myc. 291, 1838.

*Agaricus* § *Telamonia* FR. Syst. Myc. I, 210, 1821.

*Telamonia* FAYOD, Ann. Sci. Nat., Bot. 7 sér. IX, 373, 1889.

Pileus moist, hygrophanous, at first glabrous or besprinkled with superficial whitish fibers of the veil, thinly fleshy or abruptly thin at the margin, splitting. Stipe annulate from the inferior universal veil or peronate with scales, subcortinate at the apex, hence the veil is somewhat double.

Sect. *Mollipodes* FR.

Epicr. Myc. 291, 1838.

Lamellae very broad, rather thick, more or less distant. Stipe spongy or wholly fibrous.

15. *Cortinarius (Telamonia) macropus* [PERS.] FR.

Epicr. Myc. 291, 1838; Hymen. Eur. 374, 1874—GILL. Hymen. Fr. 490, 1874—KARST. Hattsv. I, 362, 1879—QUÉL. Ench. Fung. 84, 1886—SACC. Syll. Fung. V, 947, 1887—MASS. Brit. Fung. Fl. II, 36, 1893—W. G. SM. Brit. Basid. 235, 1908—REA, Brit. Basid. 168, 1922.

*Agaricus macropus* PERS. Syn. Fung. 275, 1801 (teste FR.).

*Agaricus (Telamonia) macropus* FR. Syst. Myc. I, 215, 1821.

*Telamonia macropus* RICKEN, Blätterp. 168, pl. 50, f. 1, 1915.

Gregarious. Pileus 5–8 cm. or more broad, convex, then expanded, obtuse; surface dry, brick-colored, then becoming ferruginous, hoary with very small squamules, then almost glabrous, margin paler in color and at first incurved; context whitish; lamellae adnexed, pallid then cinnamon, broad, distant, sometimes crenate on the edge; stipe 5–10 cm. or more long, 8–15 mm. or more thick, equal, whitish or subconcolorous, fibrillose, solid; cortina white, forming at first a very thin, membranous annulus, then remaining as a narrow woven annulus; spores ferruginous in mass, broadly ellipsoidal, almost smooth or slightly rough,  $8-10 \times 6-7 \mu$ .

Hab. on the ground in woods. Autumn. Oshima (Ônomura), Kushiro (Lake side of Akan).

Distr. Japan (Hokkaido), Europe.

Jap. name. *Nagae-no-fûsentake* (n. n.).

Subgen. *Hydrocybe* FR.

Epicr. Myc. 303, 1838.

*Hydrocybe* FAYOD, Ann. Sci. Nat., Bot. 7 sér. IX, 372, 1889.

Pileus glabrous or wholly covered with white superficial fibrils, not viscid, but moist when fresh, changing color when dry; flesh very thin, or scissile, rarely more compact in the disk. Stipe slightly rigid, not peronate. Cortina thin, fibrillose, rarely clasping and forming an irregular zone on the stipe.

## Sect. Firmiores FR.

Epicr. Myc. 303, 1838.

Pileus subfleshy, convex or campanulate-convex, then expanded, obtuse or at length gibbous, margin at first incurved. Stipe for the most part attenuated upward.

16. *Cortinarius (Hydrocybe) jubarinus* FR.

Epicr. Myc. 309, 1838; Hymen. Eur. 393, 1874—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 176, 1872; Ench. Fung. 89, 1886—GILL. Hymen. Fr. 507, 1874—KARST. Hattsv. I, 392, 1879—SACC. Syll. Fung. V, 975, 1887; Fl. Ital. Crypt., Hymen. 652, 1916—MASS. Brit. Fung. Fl. II, 27, 1893—W. G. SM. Brit. Basid. 246, 1908—KAUFFM. Agar. Mich. 436, 1918; North Amer. Fl. X, 343, 1932—REA, Brit. Basid. 188, 1922.

*Hydrocybe jubarina* RICKEN, Blätterp. 179, 1915.

Gregarious or solitary. Pileus 2–4 cm. broad, campanulate, then flattened, obsolete umbonate; surface glabrous, even, watery-cinnamon or tawny-cinnamon, subhygrophanous, becoming paler and silky shining when dry, margin at first incurved and white-silky from the cortina; context thin, concolorous, odour and taste none; lamellae adnate, subdistant, brownish, then cinnamon; stipe 3–6 cm. long, 3–5 mm. thick, equal or slightly attenuated upward, pallid at first, then brownish, innately silky-fibrillose, stuffed, then hollow; cortina white, fibrillose, fugacious; spores ferruginous in mass, broadly ellipsoidal, verrucose,  $7-8.5 \times 5-6.5 \mu$ .

Hab. on the ground in woods, mostly of conifers. Autumn. Kitami (Oketo forest).

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

Jap. name. *Cha-nise-fûsentake* (n. n.).

## Sect. Tenuiore FR.

Epicr. Myc. 310, 1838.

Pileus submembranous, conical then expanded, umbonate, umbo acute or rarely obtuse or indistinct, margin straight at first. Stipe subequal or attenuated toward the base.

17. *Cortinarius (Hydrocybe) fasciatus* [SCOP.] FR.

Epicr. Myc. 315, 1838; Hymen. Eur. 399, 1874—GILL. Hymen. Fr. 511, cum icone, 1874—KARST. Hattsv. I, 400, 1879—QUÉL. Ench. Fung. 91, 1886—CKE. Ill. Brit. Fung. pl. 814, 1888—SACC. Syll. Fung. V, 982, 1887—SCHROET. Pilze Schles. I, 588, 1889—MASS. Brit. Fung. Fl. II, 35, 1893—W. G. SM. Brit. Basid. 249, 1908—REA, Brit. Basid. 194, 1922—BRES. Icon. Myc. XIV, pl. 670, 1930—LANGE, Agar. Denm. X, 51, 1935.

*Agaricus fasciatus* SCOP. Fl. Carn. ed. 2, II, 456, 1772, p. p. (teste FR.).

*Agaricus acutus* (non PERS.) ALB. et SCHW. Consp. Fung. Lus. 166, 1805 (teste FR.).

*Hydrocybe fasciata* RICKEN, Blätterp. 187, pl. 53, f. 7, 1915.

Gregarius. Pileus 1.5–3 cm. broad, at first acute conical, then expanded, acutely umbonate; surface glabrous, hygrophanous, brick-colored, darker at the umbo, becoming paler and silky when dry; context subconcolorous, thin, taste and odour none; lamellae sinuato-adnate or adnate, pale ochraceous, then cinnamon, subdistant, subventricose; stipe 4–7 cm. long, 2–4 mm. thick, equal, straight or flexuous, paler, with brown fibrous flush, fibrillose fissile, whitish below, stuffed then hollow; spores ferruginous in mass, ellipsoidal, 8–12 × 5–7  $\mu$ , verruculose.

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

Dist. Japan (Hokkaido), Europe.

Jap. name. *Tobicha-nise-fûsentake* (n. n.).

*Inocybe* (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 62 & 178, 1872.

*Agaricus* § *Inocybe* FR. Syst. Myc. I, 254, 1821.

*Astrosporina* SCHROET. Pilze Schles. I, 576, 1889.

*Agmocybe* EARLE, Bull. N. Y. Bot. Gard. V, 439, 1909.

*Inocibium* EARLE, Ibid. V, 439, 1909.

Fructification with a marginal veil. Pileus fleshy, regular, fibrous, confluent and homogeneous with fleshy stipe. Stipe central, fleshy. Lamellae adnate, sinuato-adnate or adnexed. Spores ochraceous, ferruginous, olivaceous or fuscous in mass.

Type species: *Agaricus rimosus* BULL. ex FR.

## Key to the subgenera, and species in Hokkaido.

- I. Spores smooth, not angular, nodose, verrucose, nor echinulate .....  
 ..... Subgen. *Euinorybe*
- A. Cystidia present.
1. Stipe whitish or pallid; lamellae whitish, then fuscous.
    - a. Pileus antimony-yellow to cinnamon-brown..... *I. rimosa*(1).
    - b. Pileus white or whitish, sometimes tinged with yellowish or brownish color..... *I. geophylla*(2).
  2. Stipe colored with fuscous; lamellae umber colored.
    - a. Pileus fuscous or bay-brown..... *I. lacera*(3).
- II. Spores angular, nodose, verrucose or echinulate..... Subgen. *Astrosporina*.
- A. Cystidia present.
1. Stipe whitish or pallid.
    - a. Entirely white..... *I. umbratica*(4).
    - b. Pileus yellowish-umber..... *I. praetervisa*(5).
  2. Stipe colored with brown.
    - a. Pileus fuliginous-brown..... *I. plumosa*(6).

Subgen. *Euinocybe* IMAI, nom. nov.

*Agaricus* § *Inocybe* Auct. plur. p. p.

*Inocybe* Auct. plur. p. p.

*Inocybe* SCHROET. Pilze Schles. I, 584, 1889.

Spores laeves, nec angulares verrucosaeque, non echinulatae.

1. *Inocybe rimosa* (BULL. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 180, 1872; Ench. Fung. 96, 1886—GILL. Hymen. Fr. 519, cum icone, 1874—KARST. Hattsv. I, 462, 1879—SACC. Syll. Fung. V, 775, 1887; Fl. Ital. Crypt., Hymen. 736, 1916—SCHROET. Pilze Schles. I, 585, 1889—MASS. Brit. Fung. Fl. II, 194, 1893—W. G. SM. Brit. Basid. 137, 1908—KAWAMURA, Ill. Jap. Fung. pl. 7, f. 1-4, 1913—RICKEN, Blätterp. 111, pl. 30, f. 8, 1915—KAUFFM. Agar. Mich. 455, 1918; North Amer. Fl. X, 249, 1924—REA, Brit. Basid. 195, 1922—BRES. Icon. Myc. XV, pl. 741, 1930.

[P. HENN. Hedw. XXXIX, (156), 1900—MATSUM. Ind. Pl. Jap. I, 148, 1904—SHIRAI, List Jap. Fung. 44, 1905; ed. 2, 299, 1917; ed. 3, 174, 1927]

*Agaricus rimosus* BULL. Champ. Fr. pl. 388, 1791—PERS. Syn. Fung. 310, 1801—SOW. Engl. Fung. III, pl. 323, 1803 (teste FR.).

*Agaricus (Inocybe) rimosus* FR. Syst. Myc. I, 258, 1821; Hymen. Eur. 232, 1874—BERK. in SMITH, Engl. Fl. V, (2), 97, 1836—RABENH. Deut. Krypt. Fl. I, 482, 1844—WINT. Die Pilze, I, 691, 1884—CKE. Ill. Brit. Fung. pl. 384, 1886.

*Agaricus (Hebeloma) rimosus* FR. Epier. Myc. 174, 1838—BERK. Outl. Brit. Fung. 155, pl. 8, f. 5, 1860—CKE. Handb. Brit. Fung. I, 118, 1871.

Gregarious or scattered, poisonous. Pileus 2–7 cm. broad, conical, then campanulate, at length umbonate; surface antimony-yellow to cinnamon-brown, often becoming date-brown when old, darker at the center, dry, innately fibrillose, at first usually even, then becoming longitudinally rimose, sometimes cracked in a tessellated manner, usually remaining even on the center, fibrils buckthorn-brown to cinnamon-brown; context white, thin, odour and taste not unpleasant; lamellae sinuate-adnexed or almost free, whitish at first, then ferruginous, slightly wavy and white fimbriate at the edge, crowded, somewhat ventricose; stipe 5–15 cm. long, 4–8 mm. thick, slightly attenuated upward, subbulbous at the base and up to 1 cm. thick, whitish at first, then scarcely or slightly tinged with ochraceous or brownish tints, innately fibrillose, mealy at the apex, solid; spores ferruginous in mass, ellipsoidal, ventricose, smooth,  $9\text{--}13 \times 5\text{--}7 \mu$ ; cystidia cylindrical, oblong or clavate, obtuse at the apex, hyaline, abundant on the edge of lamellae.

Hab. on the ground in woods. Late summer to autumn. Ishikari (Nopporo, Mt. Kurodake), Oshima (Ônomura), Tokachi (Lake side of Shikaribetsu), Kushiro (Akan), Kitami (Oketo forest), Nemuro (Ochiishi).

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

Jap. name. *Dokusugi-take* (SHIRAI ex P. HENN.), *Asetake* (KAWAMURA).

## 2. *Inocybe geophylla* (SOW. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 182, 1872; Ench. Fung. 97, 1886—GILL. Hymen. Fr. 520, cum icone, 1874—KARST. Hattsv. I, 464, 1879—SACC. Syll. Fung. V, 784, 1887; Fl. Ital. Crypt., Hymen. 727, 1916—SCHROET. Pilze Schles. I, 585, 1889—MASS. Brit. Fung. Fl. II, 199, 1893; Ann. Bot. XVIII, 477, 1904—W. G. SM. Brit. Basid. 140, 1908—RICKEN, Blätterp. 105, pl. 30, f. 2, 1915—KAUFFM. Agar. Mich. 465, 1918; North Amer. Fl. X, 252, 1924—REA, Brit. Basid. 196, 1922—BRES. Icon. Myc. XVI, pl. 752, 1930—HEIM, *Inocybe*, 139, f. 110, pl. 1, f. 1–2, 1931.

*Agaricus geophyllus* Sow. Engl. Fung. II, pl. 124, 1799 (teste FR.).

*Agaricus (Inocybe) geophyllus* FR. Syst. Myc. I, 258, 1821; Hymen. Eur. 235, 1874—BERK. in SMITH, Engl. Fl. V, (2), 98, 1836—RABENH. Deut. Krypt. Fl. I, 482, 1844—WINT. Die Pilze, I, 688, 1884—CKE. Ill. Brit. Fung. pl. 401, 1886.

*Agaricus (Hebeloma) geophyllus* FR. Epicr. Myc. 176, 1838—BERK. Outl. Brit. Fung. 156, 1860—CKE. Handb. Brit. Fung. I, 119, 1871.

*Tricholoma lilacinum* GILL. Hymen. Fr. 113, cum icone, 1874.

Gregarious or scattered. Pileus 1–3.5 cm. broad, conical, then expanded to umbonate; surface white or whitish, sometimes tinged with yellowish or brownish color when old, dry, very silky and glossy, then fibrillose, often cracking radially; context white, thin, taste very slightly bitter; lamellae adnate, adnexed or nearly sinuate, becoming almost free, whitish, then pale-grayish-clay color, rather broad, crowded, ventricose; stipe 3–7 cm. long, 2–6 mm. thick, subequal or slightly attenuated upward, slightly thickened at the base, concolorous, silky, floccose or fibrillose external, pruinose at the apex, stuffed; cortina white, scarce, fugacious; spores umber color in mass, ellipsoidal, smooth, inequilateral,  $7.5\text{--}10 \times 5 \mu$ ; cystidia moderately thick-walled, hyaline, ventricose-fusiform, abundant on the sides and edge of the lamellae.

Hab. on the ground in woods. Late summer to autumn. Oshima (Ônomura), Ishikari (Nopporo, Mt. Kurodake), Kushiro (Lake side of Akan), Kitami (Oketo forest, Biwaushizawa).

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

Jap. name. *Shiro-tomaya-take* (n. n.).

### 3. *Inocybe lacera* (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 180, 1872; Ench. Fung. 95, 1886—GILL. Hymen. Fr. 516, 1874—KARST. Hattsv. I, 457, 1879—SACC. Syll. Fung. V, 767, 1887; Fl. Ital. Crypt., Hymen. 711, 1916—MASS. Brit. Fung. Fl. II, 187, 1893; Ann. Bot. XVIII, 483, 1904—W. G. SM. Brit. Basid. 135, 1908—RICKEN, Blätterp. 108, pl. 30, f. 4, 1915—KAUFFM. Agar. Mich. 452, 1918; North Amer. Fl. X, 246, 1924—REA, Brit. Basid. 200, 1922—BRES. Icon. Myc. XV, p. 731, 1930—HEIM, *Inocybe*, 239, f. 157–158, pl. 19, f. 1–4, 1931.

*Agaricus (Inocybe) lacerus* FR. Syst. Myc. I, 257, 1821; Hymen. Eur. 229, 1874—WINT. Die Pilze, I, 693, 1884—CKE. Ill. Brit. Fung. pl. 583, 1886.

*Agaricus (Hebeloma) lacerus* FR. Epicr. Myc. 173, 1838—BERK. Outl. Brit. Fung. 154, 1860—CKE. Handb. Brit. Fung. I, 115, 1871.

Gregarious or solitary. Pileus 2–4 cm. broad, subconical or subcampanulate, then expanded to umbonate; surface at first nearly smooth, soon adpressed-fibrillose, then fibrillose-scaly, becoming ragged around the umbo, fuscous or bone-brown at the umbo, natal brown or drab and having a few cracks on the margin; context whitish, thin, odour and taste none; lamellae adnato-decurrent, grayish at first, then umber, edge white-fimbriate, crowded; stipe 3–

6 cm. long, 2–4 mm. thick, equal or slightly enlarged at the base, concolorous or slightly paler, white powdery at the apex, floccose-scaly below, stuffed then hollow; spores umber in mass, ellipsoidal to subcylindrical, smooth,  $10\text{--}14 \times 5\text{--}6.5 \mu$ ; cystidia present, fusiform, ventricose, hyaline, smooth or slightly crystalate at the apex.

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

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

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

Our fungus has not such distinct squarrosio-scales on the pileus as COOKE and BRESADOLA illustrated, and the context and lamellae do not change color to red as in the European fungus. The color is also darker than the European. KAUFFMAN has reported in the American specimen darker color of plant and non reddening of context and lamellae. The spores are very variable in form and size; they vary from typical ellipsoidal or pip shape being about  $10 \times 5 \mu$  in size to subcylindrical or long ellipsoidal form which are  $12.5\text{--}14 \times 5\text{--}6 \mu$  in size.

#### Subgen. *Astrosporina* IMAI, nom. nov.

*Agaricus* § *Inocybe* Auct. plur. p. p.

*Inocybe* Auct. plur. p. p.

*Astrosporina* SCHROET. Pilze Schles. I, 576, 1889.

Sporae angulares, verrucosae vel echinulatae.

#### 4. *Inocybe umbratica* QUÉL.

Champ. Jura Vosg. 12 Suppl., in Assoc. Fr. XII, 500, pl. 6, f. 7, 1883—SACC. Syll. Fung. V, 787, 1887—RICKEN, Blätterp. 101, 1915—BRES. Icon. Myc. XV, pl. 734, f. 2, 1930—KONR. et MAUBL. Icon. Sel. Fung. pl. 104, f. 3, 1930—HEIM, *Inocybe*, 143, f. 111, 1931.

*Inocybe geophila* var. *umbratica* QUÉL. Ench. Fung. 97, 1886.

*Inocybe commixta* BRES. Fung. Trid. I, 53 & 103, pl. 58, f. 2, 1884—SACC. Syll. Fung. V, 787, 1887; Fl. Ital. Crypt., Hymen. 727, 1916.

*Inocybe leucocephala* BOUD. Bull. Soc. Bot. Fr. XXXII, 282, pl. 9, f. 1, 1885—SACC. Syll. Fung. V, 765, 1887.

*Inocybe umbratica* var. *leucocephala* QUÉL. Fl. Myc. Fr. 103, 1888.

*Inocybe infida* MASS. Ann. Bot. XVIII, 467, 1904.

*Astrosporina infida* REA, Brit. Basid. 209, 1922.

Solitary. Pileus 2–5 cm. broad, conico-campanulate, then expanded to umbonate; surface white or whitish, silky-fibrillose, sometimes rimose, dry, subshining, margin incurved at first, often splitting; context white, odour earthy-nauseous, taste almost none; lamellae sinuate or almost free, very crowded, at first whitish, then ferruginous; stipe 3–6 cm. long, 3–7 mm. thick, subequal, turbinate-bulbous at the base, white or whitish, nearly smooth, glabrous, not fibrillose, solid; spores umber in mass, subellipsoid and angular-tuberculate,  $8-10 \times 5-7.5 \mu$ ; cystidia present, ventricose, hyaline, thick-walled.

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

Distr. Japan (Hokkaido), Europe.

Jap. name. *Shiro-nise-tomaya-take* (n. n.).

### 5. *Inocybe praetervisa* QUÉL.

in BRES. Fung. Trid. I, 35, pl. 38, 1883; Champ. Jura Vosg. 12 Suppl., l. c., 500, 1883; Ench. Fung. 96, 1886—SACC. Syll. Fung. V, 782, 1887; Fl. Ital. Crypt., Hymen. 729, 1916—REA, Trans. Brit. Myc. Soc. II, 62, pl. 5, f. 2, 1903—MASS. Ann. Bot. XVIII, 466, 1904—RICKEN, Blätterp. 100, pl. 29, f. 3, 1915—KONR. et MAUBL. Icon. Sel. Fung. pl. 106, 1930—BRES. Icon. Myc. XVI, pl. 760, 1930—HEIM, *Inocybe*, 315, f. 187, pl. 30, f. 1–2, 1931.

*Agaricus divulgatus* BRITZ. Derm. et Melanosp. 149, pl. 232, f. 140, 1883.

*Inocybe divulgata* SACC. Syll. Fung. V, 782, 1887.

*Astrosporina praetervisa* SCHROET. Pilze Schles. I, 576, 1889—REA, Brit. Basid. 209, 1922.

Solitary. Pileus 2–6 cm. broad, conico-campanulate, then expanded, umbonate or gibbous; surface slightly viscid when wet, yellowish-umber (clay or tawny-olive) at the disc, yellow-ocher on the margin, fibrillose, center glabrous, margin longitudinally virgate and often splitting; context white, odour not agreeable, taste none; lamellae attenuated-adnexed or almost free, white, then grayish to dirty cinnamon, subcrowded or subdistant, white-fimbriate on edge; stipe 4–8 cm. long, 4–8 mm. thick, equal, subbulbous at the base, whitish, then pale straw color, silky, apex white pruinose, solid; spores umber in mass, ellipsoidal, angulate,  $10-12 \times 7.5-8 \mu$ ; cystidia present, ventricose-fusiform, crystalate on the apex, hyaline.

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

Distr. Japan (Hokkaido), Europe.

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

### 6. *Inocybe plumosa* (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 179, 1872; Ench. Fung. 94, 1886—GILL. Hymen. Fr. 515, 1874—SACC. Syll. Fung. V, 763, 1887—KONR. et MAUBL. Icon. Sel. Fung. pl. 103, 1924.

*Agaricus (Inocybe) plumosus* FR. Syst. Myc. I, 256, 1821; Hymen. Eur. 228, 1874—WINT. Die Pilze, I, 694, 1884.

*Agaricus (Hebeloma) plumosus* FR. Epicr. Myc. 172, 1838—BERK. Outl. Brit. Fung. 153, 1860—CKE. Handb. Brit. Fung. I, 114, 1871.

*Inocybe carpta* BRES. Fung. Trid. I, 50, pl. 54, 1884; Icon. Myc. XVI, pl. 756, 1930—RICKEN, Blätterp. 102, pl. 29, f. 2, 1915—SACC. Fl. Ital. Crypt., Hymen. 723, 1916.

*Astrosporina plumosa* REA, Brit. Basid. 214, 1922.

?*Inocybe Rickeni* HEIM, Inocybe, 346, f. 200, pl. 32, f. 1-2, 1931.

Gregarious or solitary. Pileus 3-5 cm. broad, campanulate-convex, then umbonate; surface fuliginous-brown, darker at the disc, dry, non-hygrophanous, fibrillose, squamulose with recurved scales especially at the darker disc, not rimose; context pallid or whitish, concolorous under the pellicle of the pileus and stipe, taste none, odour earthy; lamellae sinuato-adnate, whitish, then cinnamon-ferruginous, crowded, ventricose; stipe 3-6 cm. long, 4-8 mm. thick, subequal, concolorous or paler, fibrillose or slightly fibrillose-squamulose, glabrous or slightly pruinose at the apex, stuffed then hollow; spores ferruginous in mass, ellipsoidal, angulate, nodulate-verrucose or trapezium-shaped, 8-12 × 5-6 μ; cystidia ventricose, fusiform, hyaline, yellowish-crystalate at the apex.

Hab. on the ground in coniferous woods or under coniferous trees, usually in alpine or subalpine regions. Late summer to autumn. Ishikari (Mt. Taisetsu).

Distr. Japan (Hokkaido), Europe.

Jap. name. *Kuro-nise-tomayatake* (n. n.).

The present fungus has been somewhat puzzling as to its real identification. The writer depends mainly upon KONRAD and MAUBLANC's opinion.

*Hebeloma* (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 62 & 128, 1872.

*Agaricus* § *Hebeloma* FR. Syst. Myc. I, 249, 1821.

*Roumegueria* KARST. Hattsv. I, xxiv, 1879.

*Hylophila* § *Hebeloma* QUÉL. Ench. Fung. 98, 1886.

*Derminus* § *Hebeloma* SCHROET. Pilze Schles. I, 583, 1889.

*Hebelomatis* EARLE, Bull. N. Y. Bot. Gard. V, 430, 1909.

*Picromyces* EARLE, Ibid. V, 438, 1909.

Fructification with or without a fugacious viscid or dry veil. Pileus fleshy, regular, confluent and homogeneous with fleshy stipe. Stipe central, fibrous-fleshy. Lamellae sinuate, sinuato-adnate or adnexed. Spores ochraceous, ferruginous or fuscous in mass.

Type species: *Agaricus mesophaeus* PERS. ex FR.

## Key to the sections and species in Hokkaido.

- I. Fructification furnished with a cortina from the manifest veil, by which the pileus is often superficially silky around the margin. . . . . Sect. *Indusiata*.
  - A. Pileus hazel color on the disc, margin paler and with a yellow, silky-fibrous cortina or veil; stipe yellow and floccoso-squamulose. . . . . *H. Tomoeae*(1).
  - B. Pileus carob-brown or pecan-brown on the center, margin cinnamon with a buff colored fugacious, fibrous squamules; stipe whitish with brownish fibrils. . . . . *H. mesophaeum*(2).
  - C. Pileus small (1.5-3 cm. broad), ochraceous-tawny, margin paler and with a white fugacious veil; stipe yellowish. . . . . *H. fmicolum*(3).
- II. Pileus glabrous, at first with no cortina. . . . . Sect. *Denudata*.
  - A. Pileus pale-tan color, disc brick-red, odour of radish; cystidia none. . . . . *H. fastibile*(4).
  - B. Pileus pale-ochraceous-tan, disc sometimes fuscous, odour none; cystidia none. . . . . *H. longicaudum*(5).
  - C. Pileus cinnamon; odour subfarinaceous; cystidia lanceolate. . . . . *H. helvolescens*(6).
  - D. Pileus nearly honey-yellow, odour subfarinaceous; cystidia subfusiform. . . . . *H. humosum*(7).

Sect. *Indusiata* FR.

Hymen. Eur. 237, 1874.

Fructification furnished with a cortina from the manifest veil, by which the pileus is often superficially silky around the margin.

1. *Hebeloma Tomoeae* IMAI, sp. nov.

Caespitosum vel gregarium. Pileo 3–5 cm. lato, conico-convexo, dein plano, subumbonato, obtuso, glutinoso, levi, glabro, "Hazel-color", margine pallidiore et luteo-fibrilloso; carne lutea, sapore miti; lamellis attenuato-adnexis vel attenuato-subliberis, confertis, lanceolatis, e pallidi subferrugineis; stipite 3–6 cm. longo, 5–10 mm. crasso, basi subbulboso, "citron-yellow" vel "primrose-yellow", floccoso-squamuloso, apice luteo et furfuraceo, basi fulvescente, farcto-cavo; cortina "citron-yellow", primo submembranacea, fugaci; sporis in cumulo fulvis, ellipsoideis, levibus,  $6.5-10 \times 4.5-6 \mu$ ; cystidiis fusiformibus, ventricosis, hyalinis vel flavidulis,  $30-60 \times 10-15 \mu$ .

Hab. on the humus ground or decayed wood under trees, in gardens or roadsides. Summer to autumn. Ishikari (Sapporo).

Distr. Endemic.

Jap. name. *Tomoe-take* (n. n.).

The present fungus somewhat resembles *H. testaceum* (BATSCH ex FR.) QUÉL. from which it is easily distinguished by the more viscid pileus and yellow stipe as well as by the presence of cystidia.

The specific name is derived from the name of Miss TOMOE KAWAMURA who first discovered the fungus in her home garden.

2. *Hebeloma mesophaeum* (PERS. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 128, 1872—GILL. Hymen. Fr. 524, 1874—SACC. Syll. Fung. V, 795, 1887; Fl. Ital. Crypt., Hymen. 700, 1916—MASS. Brit. Fung. Fl. II, 174, 1893—W. G. SM. Brit. Basid. 144, 1908—RICKEN, Blätterp. 115, pl. 32, f. 3, 1915—MURRILL, North Amer. Fl. X, 220, 1917—KAUFFM. Agar. Mich. 473, 1918—REA, Brit. Basid. 256, 1922—BRES. Icon. Myc. XVI, pl. 712, 1930.

*Agaricus fastibilis* var. *mesophaeus* PERS. Myc. Eur. III, 173, 1828.

*Agaricus (Hebeloma) mesophaeus* FR. Epicr. Myc. 179, 1838; Hymen. Eur. 240, 1874—BERK. et BR. Ann. Mag. Nat. Hist. 2 ser. VII, 374, 1861—CKE. Handb. Brit. Fung. I, 112, 1871; Ill. Brit. Fung. pl. 412, 1886; Handb. Austr. Fung. 48, 1892—WINT. Die Pilze, I, 685, 1884.

*Inocybe mesophaea* KARST. Hattsv. I, 470, 1879.

*Hylophila (Hebeloma) mesophaea* QUÉL. Ench. Fung. 99, 1886.

*Hylophila versipellis* var. *mesophaea* QUÉL. Fl. Myc. Fr. 95, 1888.

*Hebeloma versipelle* subsp. *mesophaeum* KONR. et MAUBL. Icon. Sel. Fung. pl. 78, f. 1, 1929.

Gregarious, caespitose in small groups, edible. Pileus 2–5 cm. broad, subconical at first, then expanded to umbonate or nearly plane; surface at first carob-brown with buff to cinnamon colored sub-fibrous margin, then slightly paler and finally orange-cinnamon to pecan-brown at the center, margin incurved at first and with buff colored fugacious fibrous squamules which disappear when old; context whitish, but brownish lower part of the stipe, odour faint and somewhat unpleasant, taste slightly bitter; lamellae subadnate with a decurrent tooth or sinuate-adnate, grayish or brownish at first, then clay-ferruginous, crowded, thin; stipe 4–8 cm. long, 4–7 mm. thick, equal, whitish and pruinose above, brownish fibrillose below, stuffed then nearly hollow; cortina whitish, at first fibrous-submembranous, fugacious; spores pale ferruginous in mass, ellipsoidal, faintly rough,  $8-10 \times 5-6 \mu$ .

Hab. on the ground in woods, especially coniferous woods. Autumn. Ishikari (district near Sapporo), Kitami (Oketo forest).

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

Jap. name. *Wakafusatake* (n. n.).

### 3. *Hebeloma fmicolum* IMAI, sp. nov.

Subcaespitosum vel gregarium. Pileo 1.5–3 cm. lato, hemisphaerico vel convexo, dein subplano, viscidulo, glabro, "ochraceous-tawny", margine pallidiore et glabro vel leviter albo-sericeo; carne albida vel flavidula, tenui, odore subfarinaceo, sapore nullo; lamellis sinuatis, confertis, ventricosis, e albido cinnamomeis, acie fimbriatis; stipite 4–6 cm. longo, 4–5 mm. crasso, subaequali, pallidiore, fibrilloso, cavo; velo albo, fugaci; sporis in cumulo fulvo-ferrugineis, late ellipsoideis,  $12.5-16.5 \times 8-10 \mu$ , laevibus; cystidiis fusiformibus, hyalinis.

Hab. on horse dung under trees. Summer. Ishikari (Sapporo).

Distr. Endemic.

Jap. name. *Baba-wakafusatake* (n. n.).

The present fungus is somewhat allied to *H. gregarium* PK. from which it is distinguishable by the larger spores and the presence of cystidia.

Sect. *Denudata* FR.

Hymen. Eur. 240, 1874.

Pileus glabrous, no cortina at first.

4. *Hebeloma fastibile* (PERS. ex FR.) IMAI, comb. nov.  
(nec FR. in 1838, nec QUÉL. non Auct. plur.)

*Agaricus crustuliniformis* BULL. Champ. Fr. pl. 308, 546, 1786 (teste FR.).

*Agaricus fastibilis* PERS. Syn. Fung. 326, 1801 (teste FR.).

*Agaricus (Hebeloma) fastibilis* FR. Syst. Myc. I, 249, 1821.

*Agaricus (Hebeloma) crustuliniformis* FR. Epicr. Myc. 180, 1838; Hymen. Eur. 241, 1874—BERK. Outl. Brit. Fung. 157, pl. 9, f. 1, 1860—CKE. Handb. Brit. Fung. I, 112, 1871; Ill. Brit. Fung. pl. 414, 507, 1886—WINT. Die Pilze, I, 685, 1884.

*Hebeloma crustuliniforme* QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 128, 1872—GILL. Hymen. Fr. 525, cum icone, 1874—KARST. Hattsv. I, 471, 1879—SACC. Syll. Fung. V, 799, 1887; Fl. Ital. Crypt., Hymen. 692, 1916—MASS. Brit. Fung. Fl. II, 176, 1893—W. G. SM. Brit. Basid. 145, 1908—ROLLAND, Atlas Champ. 66, f. 152, 1910—RICKEN, Blätterp. 119, pl. 32, f. 2, 1915—MURRILL, North Amer. Fl. X, 223, 1917—KAUFFM. Agar. Mich. 476, pl. 97, 1918—REA, Brit. Basid. 257, 1922—BRES. Icon. Myc. XV, pl. 714, 1930.

*Hylophila (Hebeloma) crustuliniformis* QUÉL. Ench. Fung. 99, 1886.

*Derminus (Hebeloma) crustuliniformis* SCHROET. Pilze Schles. I, 583, 1889.

Gregarious or solitary, edible. Pileus 3–8.5 cm. broad, convex, then expanded to plane, obtuse or slightly gibbous; surface glabrous, viscid when young and fresh, pale-tan (pinkish-buff, apricot-buff or warm-buff), darker (ferruginous or pecan-brown) at the center, zoneless; context white, odour of radish, taste not unagreeable, thick, rather firm; lamellae deeply sinuate, close, whitish, then clay color or tawny-olive, spotted by the mass of spores when dry, distilling watery drops in wet weather or when young, edge wavy and white crenulate; stipe 4–10 cm. long, 5–15 mm. thick, equal, slightly bulbous at the base, white or whitish, white-mealy or squamulose at the apex, glabrous or slightly adpressed-fibrillose below, solid or stuffed; spores pale brown (cinnamon) in mass, ellipsoidal with acute ends, subamygdaliform, slightly granuloso-asperulate or nearly smooth,  $10\text{--}13.5 \times 6\text{--}7.5 \mu$ ; cystidia none; sterile cells on edge of lamellae cylindrical-clavate, hyaline, often with granular contents.

Hab. on the ground in woods, especially coniferous woods.  
 Autumn. Ishikari (Nopporo, district neighbouring to Sapporo).  
 Distr. Japan (Hokkaido), Asia Minor, Europe, North America.  
 Jap. name. *Ô-wakafusatake* (n. n.).

### 5. *Hebeloma longicaudum* (PERS. ex FR.) QUÉL.

Champ. Jura Vosg. 2 Suppl., in Mém. Soc. D'Emul. Montb. 2 sér. V, 345, 1873—GILL. Hymen. Fr. 526, cum icone, 1874—KARST. Hattsv. I, 472, 1879—SACC. Syll. Fung. V, 800, 1887; Fl. Ital. Crypt., Hymen. 694, 1916—MASS. Brit. Fung. Fl. II, 176, 1893—W. G. SM. Brit. Basid. 146, 1908—RICKEN, Blätterp. 119, pl. 33, f. 2, 1915—KAUFFM. Agar. Mich. 478, 1918—REA, Brit. Basid. 258, 1922.

*Agaricus longicaudus* PERS. Syn. Fung. 332, 1801.

*Agaricus (Myxaciium) longicaudus* FR. Syst. Myc. I, 248, 1821.

*Agaricus (Hebeloma) longicaudus* FR. Epicr. Myc. 181, 1838; Hymen. Eur. 241, 1874—RABENH. Deut. Krypt. Fl. I, 480, 1844—BERK. Outl. Brit. Fung. 157, pl. 9, f. 2, 1860—CKE. Handb. Brit. Fung. I, 113, 1871;—Ill. Brit. Fung. pl. 415, 1886—WINT. Die Pilze, I, 684, 1884.

*Hylophila (Hebeloma) crustuliniformis* var. *longicauda* QUÉL. Ench. Fung. 99, 1886.

Solitary or gregarious. Pileus 3–6 cm. broad, convex, then expanded, subumbonate, at length repand; surface smooth, glabrous, viscid when wet, pale ochraceous-tan, becoming whitish, margin whitish, pruinose; context white, soft, watery, thin at the margin, odour and taste almost none; lamellae arcuate-adnate, then emarginate, whitish, then pale clay color, at length cinnamon, crowded, edge minutely fimbriate; stipe 5–10 cm. long, 5–10 mm. thick, equal or thickened at the base, white, at length becoming tawny at the base, obsoletely fibrillose or fibrilloso-striate, mealy at the apex or throughout, fragile, stuffed then subhollow; spores tawny-ochraceous in mass, oblong-ellipsoidal, inequilateral narrow at the ends, verruculose, 10–12.5 × 5–7.5  $\mu$ ; cystidia none; sterile cells on edge of lamellae long, filamentous-clavate, numerous.

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

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

Jap. name. *Nagae-no-wakafusatake* (n. n.).

### 6. *Hebeloma helvolescesns* IMAI, sp. nov.

Caespitosum. Pileo 4–8 cm. lato, conico-convexo, dein umbonato, glabro, non viscido, cinnamomeo, margine pallidiore; carne roseola,

odore subfarinaceo, sapore acri; lamellis emarginatis vel adnexis, confertis, primo "vinaceous-buff", dein fulvis; stipite 5–8 cm. longo, 8–16 mm. crasso, aequali vel attenuato, albo, obsolete fibrilloso, apice furfuraceo, cavo; sporis in cumulo fulvo-ferrugineis, ellipsoideis, laevibus, 8–10 × 4–5  $\mu$ ; cystidiis lanceolatis vel subcylindrico-clavatis, saepe cristallatis, subhyalinis, 50–72.5 × 10–14  $\mu$ .

Hab. on the ground around the tree trunks in open woods. Summer. Ishikari (Sapporo).

Distr. Endemic.

Jap. name. *Ko-wakafusatake* (n. n.).

The present fungus somewhat resembles *H. fastibile* and its allies, but it is easily distinguished by the dry pileus and the presence of cystidia.

#### 7. *Hebeloma humosum* IMAI, sp. nov.

Gregarium vel subcaespitosum. Pileo 3–7 cm. lato, hemisphaerico vel gibboso, dein subplano, laevi, submelleo, raro hygrophano, margine nudo; carne albida, sapore subacri, odore subfarinaceo; lamellis sinuatis vel emarginatis, confertis, primo griseis, dein cinnamomeis, acie albo-fimbriatis; stipite 2.5–6 cm. longo, 3–10 mm. crasso, aequali, basi incrassato, albido vel subconcolori, fibrilloso, apice subfurfuraceo, cavo; velo nullo; sporis in cumulo cinnamomeis, ellipsoideis, 10–11.5 × 7–8  $\mu$ , asperulis; cystidiis subfusoideo-ventricosis.

Hab. on badly decayed wood or on humus in gardens. Summer. Ishikari (Sapporo).

Distr. endemic.

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

#### *Gymnopilus* KARST.

Hattsv. I, xxi, 1879.

*Agaricus* § *Flammula* FR. Syst. Myc. I, 250, 1821.

*Flammula* (non DC.) QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 62 & 129, 1872.

*Gymnocybe* KARST. Hattsv. I, xxii, 1879.

*Derminus* § *Flammulina* SCHROET. Pilze Schles. I, 582, 1889.

*Ryssonospora* FAYOD, Ann. Sci. Nat., Bot. 7 sér. IX, 361, 1889.

*Visculus* EARLE, Bull. N. Y. Bot. Gard. V, 437, 1909.

Fructification with or without a fugacious, viscid or dry veil. Pileus fleshy, regular, confluent and homogeneous with fleshy stipe. Stipe central, fibrous-fleshy. Lamellae decurrent or adnate with a decurrent tooth. Spores ochraceous, ferruginous or fuscous in mass.

Type species: *Agaricus liquiritiae* PERS. ex FR.

**Key to the sections and species in Hokkaido.**

- I. Pileus covered with a continuous, somewhat separable, smooth, viscid pellicle; cortina manifest fibrillose; spores ferruginous, not tawny..... Sect. *Lubrici*.
  - A. Pileus brick-red..... *G. lubrica*(1).
  - B. Pileus whitish or buff, besprinkled with white, superficial, fugacious squamules..... *G. lenta*(2).
  - C. Pileus yellow, glabrous.....*G. spumosa*(3).
- II. Pellicle of the pileus continuous, not distinct, non separable, smooth (here and there with a superficial covering), moist or a little viscid in wet weather; cortina manifest, appendiculate; spores not tawny, non-ochraceous..... Sect. *Udi*.
  - A. Pileus scarlet-saffron color..... *G. astragalina*(4).
- III. Pileus scarcely pelliculose, flesh scissile, or torn above into scales, not viscid, at first somewhat hoary; veil fibrillosely adpressed to the stipe, not furnished with an appendiculate cortina, almost none or forming an annular zone on the stipe; lamellae light yellow or yellow, then tawny; spores ochraceous or tawny in mass.....Sect. *Sapinei*.
  - A. Pileus yellowish tawny to golden yellow, paler at the margin; spores smooth..... *G. penetrans*(5).
  - B. Pileus bay-brown or orange-tawny; spores verruculose or asperulate.. .. *G. liquiritiae*(6).

**Sect. *Lubrici* FR.**

Epicr. Myc. 184, 1838.

Pileus covered with a continuous, somewhat separable, smooth viscid pellicle; cortina manifest fibrillose; spores ferruginous, not tawny.

**1. *Gymnopilus lubricus* (FR.) IMAI, comb. nov.**

*Agaricus (Flammula) lubricus* FR. Syst. Myc. I, 252, 1821; Epicr. Myc. 185, 1838; Hymen. Eur. 246, 1874—RABENH. Deut. Krypt. Fl. I, 479, 1844—WINT. Die Pilze, I, 682, 1884.

*Flammula lubrica* QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 251, 1872—GILL. Hymen. Fr. 534, 1874—KARST. Hattsv. I, 402, 1879—SACC. Syll. Fung. V, 815, 1887; Fl. Ital. Crypt., Hymen. 739, 1916—MASS. Brit. Fung. Fl. II, 131, 1893—W. G. SM. Brit. Basid. 149, 1908—RICKEN, Blätterp. 203, pl. 57, f. 4, 1915—KAUFFM. Agar. Mich. 486, 1918—REA, Brit. Basid. 315, 1922—BRES. Icon. Myc. XVI, pl. 770, 1930—IMAI, Bot. Mag. (Tokyo), XLVII, 386, 1933.

*Dryophila (Flammula) lubrica* QUÉL. Ench. Fung. 70, 1886.

*Naucoria (Flammula) lubrica* SCHROET. Pilze Schles. I, 606, 1889.

Gregarious, sometimes caespitose in small group, edible. Pileus 4–10 cm. broad, convex, then expanded, obtuse or umbonate, sometimes depressed and repand; surface brick-red or bright cinnamon, sometimes pallid with tawny disc, viscid, smooth, sometimes spotted with glued down scales, margin paler and sometimes striate; context white, thick at the disc, tough, taste mild, odour rather strong; lamellae adnate, subdecurrent or subsinuate, pallid, then clay color, crowded; stipe 5–10 cm. long, 5–10 mm. thick, equal or slightly attenuated upward, subbulbous at the base, whitish, at length becoming fuscous, dry, laxly fibrillose, pubescent at the base; spores pale rusty-brown in mass, ellipsoidal, smooth,  $5-6 \times 3-3.5 \mu$ ; cystidia lanceolate-fusiform, abundant.

Hab. on or around the tree trunks in woods. Autumn. Ishikari (Nopporo, Jôzankei).

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

Jap. name. *Cha-name-tsumutake* (IMAI).

## 2. *Gymnopilus lentus* (PERS. ex FR.) MURRILL

North Amer. Fl. X, 204, 1917.

*Agaricus lentus* PERS. Syn. Fung. 287, 1801 (teste FR.).

*Agaricus (Flammula) lentus* FR. Syst. Myc. I, 253, 1821; Epicr. Myc. 184, 1838; Hymen. Eur. 246, 1874—BERK. in SMITH, Engl. Fl. V, (2), 95, 1836; Outl. Brit. Fung. 158, 1860—RABENH. Deut. Krypt. Fl. I, 479, 1844—CKE. Handb. Brit. Fung. I, 121, 1871; Ill. Brit. Fung. pl. 439–440, 1886—WINT. Die Pilze, I, 682, 1884.

*Flammula lenta* GILL. Hymen. Fr. 533, cum icone, 1874—KARST. Hattsv. I, 401, 1879—SACC. Syll. Fung. V, 815, 1887; Fl. Ital. Crypt., Hymen. 739, 1916—MASS. Brit. Fung. Fl. II, 130, 1893—W. G. SM. Brit. Basid. 149, 1908—RICKEN, Blätterp. 202, pl. 57, f. 3, 1915—KAUFFM. Agar. Mich. 487, 1918—LANGE, Agar. Denm. VII, 11, 1928—BRES. Icon. Myc. XVI, pl. 769, 1930—IMAI, Bot. Mag. (Tokyo), XLVII, 386, 1933.

*Dryophila (Flammula) lenta* QUÉL. Ench. Fung. 70, 1886.

*Naucoria (Flammula) lenta* SCHROET. Pilze Schles. I, 606, 1889.

*Flammula betulina* PK. Bull. Torrey Bot. Club, XXXIV, 100, 1907 (teste MURRILL).

*Hebeloma glutinosum* REA, Brit. Basid. 254, 1922.

Gregarious or caespitose in small groups, edible. Pileus 3–8 cm. broad, convex, then plane, regular; surface viscid, whitish or buff, slightly darker at the center, besprinkled with white, superficial, fugacious squamules, especially on the margin; context whitish, becoming light yellow, thick at the disc, taste mild, odour not unpleasant; lamellae adnate or adnexed with a decurrent tooth or sinuate-adnate, crowded, broad, whitish, then light yellowish, at length clay-cinnamon, ventricose; stipe 4–8 cm. long, 5–10 mm. thick, equal, subbulbous at the base, whitish, becoming ferruginous downward, fibrillose, white squamulose, apex white mealy, base strigose, stuffed; veil manifest, fugacious; spores pale cinnamon in mass, ellipsoidal, smooth,  $5-7 \times 3.5-4 \mu$ ; cystidia abundant, lanceolate-fusiform.

Hab. on or about dead tree trunks. Autumn. Ishikari (Noporo).

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

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

### 3. *Gymnopilus spumosos* (FR.) MURRILL

Mycologia, IV, 254, 1911; North Amer. Fl. X, 198, 1917.

*Agaricus (Flammula) spumosos* FR. Syst. Myc. I, 252, 1821; Epicr. Myc. 185, 1838; Hymen. Eur. 247, 1874—CKE. Handb. Brit. Fung. I, 122, 1871.

*Flammula spumosa* KARST. Hattsv. I, 404, 1879—QUÉL. Champ. Jura Vosg. 12 Suppl., in Assoc. Fr. XII, 499, 1883—SACC. Syll. Fung. V, 817, 1887; Fl. Ital. Crypt., Hymen. 740, 1916—MASS. Brit. Fung. Fl. II, 132, 1893—W. G. SM. Brit. Basid. 150, 1908—RICKEN, Blätterp. 204, pl. 57, f. 5, 1915—KAUFFM. Agar. Mich. 489, 1918—REA, Brit. Basid. 316, 1922—KONR. & MAUBL. Icon. Sel. Fung. pl. 60, 1928—BRES. Icon. Myc. XVI, pl. 773, 1930.

*Dryophila (Flammula) spumosa* QUÉL. Ench. Fung. 70, 1886.

Caespitose or gregarious, edible. Pileus 3–7 cm. broad, convex, then plane, finally slightly depressed at the center; surface when young sulphur-yellow, martius-yellow or citron-yellow at the margin and warm-buff to ochraceous-buff on the disc, then becoming darker, very viscid when wet, pellicle separable, at first glabrous, when old

becomes brownish-squamulose caused by breaking up of pellicle into small pieces, margin incurved and with fugacious, yellowish-white, floccose-membranous veil, at length naked and slightly upturned; context yellowish, taste none, odour faint; lamellae adnate or adnate with a decurrent tooth, crowded, whitish or yellowish at first, then pale-brownish; stipe 4–8 cm. long, 5–10 mm. thick, equal or slightly enlarged at the base, whitish or yellowish, white-powdery at the apex, brownish below, fibrous, stuffed; spores pale ferruginous in mass, oblong or ellipsoidal,  $6-8 \times 3-4.5 \mu$ , smooth; cystidia lanceolate-ventricose, hyaline.

Hab. on the ground, around or on decaying tree trunks. Autumn. Ishikari (Nopporo, district neighbouring to Sapporo).

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

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

#### Sect. Udi Fr.

Epicr. Myc. 186, 1838.

Pellicle of the pileus continuous, not distinct, non-separable, smooth (here and there with a superficial covering), moist or a little viscid in wet weather; cortina manifest, appendiculate; spores not tawny, nor ochraceous.

#### 4. *Gymnopilus astragalinus* (FR.) IMAI, comb. nov.

*Agaricus (Flammula) astragalinus* FR. Syst. Myc. I, 251, 1821; Epicr. Myc. 186, 1838; Hymen. Eur. 248, 1874.

*Agaricus Neesii* BARLA, Champ. Nice, 46, pl. 23, 1859.

*Flammula astragalina* QUÉL. Champ. Jura Vosg. 2 Suppl., in Mém. Soc. D'Emul. Montb. 2 sér. V, 347, 1873—GILL. Hymen. Fr. 537, 1874—KARST. Hattsv. I, 405, 1879—SACC. Syll. Fung. V, 819, 1887; Fl. Ital. Crypt., Hymen. 746, 1916—MASS. Brit. Fung. Fl. II, 135, 1893—W. G. SM. Brit. Basid. 151, 1908—RICKEN, Blätterp. 206, 1915—REA, Brit. Basid. 318, 1922—KONR. & MAUBL. Icon. Sel. Fung. pl. 62, 1926—LANGE, Agar. Denm. VII, 12, 1928—BRES. Icon. Myc. XVI, pl. 776, 1930.

*Dryophila (Flammula) astragalina* QUÉL. Ench. Fung. 71, 1886.

Subcaespitose or gregarious, rarely solitary. Pileus 3–8 cm. broad, convex, then expanded, obtuse; surface scarlet-saffron, paler at the circumference, somewhat moist when wet, glabrous but at first

superficially silky round the margin and with the very thin, adpressed, subappendiculate, whitish veil; context firm, rather thick, concolorous, becoming black when wounded or bruised, taste bitter; lamellae adnate, crowded, yellowish at the edge, concolorous with the pileus at the base, edge obtuse and flocculose when young; stipe 5–10 cm. long, 4–8 mm. thick, equal or attenuated at the base, flexuous, yellowish or paler, floccosely fibrillose, at length subglabrous, hollow; cortina fugacious, white appendiculate; spores pale ferruginous in mass, ellipsoidal, smooth,  $6-7.5 \times 3-4.5 \mu$ .

Hab. on the trunks of coniferous trees. Autumn. Iburi (Lake side of Shikotsu).

Distr. Japan (Hokkaido, Honshu), Europe.

Jap. name. *Aka-tsumutake* (n. n.).

### Sect. *Sapinei* FR.

Epicr. Myc. 188, 1838.

Pileus scarcely pelliculose, flesh scissile, or torn above into scales, not viscid, at first somewhat hoary; veil fibrillosely adpressed to the stipe, not furnished with an appendiculate cortina, almost none or forming an annular zone on the stipe; lamellae light yellow or yellow, then tawny; spores ochraceous or tawny in mass.

### 5. *Gymnopilus penetrans* (FR.) MURRILL

Mycologia, IV, 254, 1912; North Amer. Fl. X, 203, 1917.

*Agaricus penetrans* FR. Obs. Myc. I, 23, 1815.

*Agaricus (Dermocybe) sapineus* FR. Syst. Myc. I, 239, 1821, p. p.

*Agaricus (Flammula) penetrans*, FR. Epicr. Myc. 189, 1838; Hymen. Eur. 250, 1874—WINT. Die Pilze, I, 680, 1884—CKE. Handb. Austr. Fung. 52, 1892.

*Flammula penetrans* QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 252, 1872—GILL. Hymen. Fr. 532, 1874—KARST. Hattsv. I, 409, 1879—SACC. Syll. Fung. V, 823, 1887; Fl. Ital. Crypt., Hymen. 744, 1916—RICKEN, Blätterp. 207, 1915—REA, Brit. Basid. 321, 1922—LANGE, Agar. Denm. VII, 12, 1928—BRES. Icon. Myc. XVI, pl. 780, 1930.

*Dryophila (Flammula) penetrans* QUÉL. Ench. Fung. 71, 1886.

Gregarious or sometimes caespitose. Pileus 3–7 cm. broad, conical or convex, then plane, obtuse, often irregular; surface dry, yellowish-tawny, golden-yellow, becoming paler, smooth, hoary under a lens when young; context whitish, thick at the disc, taste bitter,

odour not strong; lamellae adnate or emarginate, whitish, then pale yellow, spotted tawny when old or ferruginous to fulvous colored, crowded; stipe 4–8 cm. long, 3–6 mm. thick, equal or slightly attenuated upward, silky, whitish-fibrillose, streaked with yellow or brown, often much darker below with age, base white villous or myceloid and often rooting, sometimes fusiform when growing on the ground; cortina white, floccose, at first submembranous, very fugacious; spores ochraceous in mass, ellipsoidal or ovoid,  $7-9 \times 3.5-5 \mu$ , smooth.

Hab. on dead coniferous wood in woods. Autumn. Ishikari (Nopporo).

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

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

#### 6. *Gymnopilus liquiritiae* (PERS. ex FR.) KARST.

Hattsv. I, 400, 1879.

*Agaricus liquiritiae* PERS. Syn. Fung. 306, 1801 (teste FR.).

*Agaricus (Flammula) liquiritiae* FR. Epicr. Myc. 190, 1838; Hymen. Eur. 251, 1874.

*Flammula liquiritiae* QUÉL. Champ. Jura Vosg. 2 Suppl., in Mém. Soc. D'Emul. Montb. 2 sér. V, 347, 1873—SACC. Syll. Fung. V, 825, 1887; Fl. Ital. Crypt., Hymen. 744, 1916—MASS. Brit. Fung. Fl. II, 140, 1893—W. G. SM. Brit. Basid. 152, 1908—RICKEN, Blätterp. 208, pl. 57, f. 2, 1915—REA, Brit. Basid. 322, 1922—BRES. Icon. Myc. XVI, pl. 783, 1930.

*Dryophila (Flammula) liquiritiae* QUÉL. Ench. Fung. 71, 1886.

Subcaespitose or scattered. Pileus 2–5 cm. or more broad, convex, then expanded, subumbonate; surface glabrous, bay-brown or orange-tawny, then becoming paler, moist, margin at length striatulate; context yellow, taste slightly bitter, odour slight; lamellae obtusely adnate, sometimes rounded, crowded, golden-yellow, then cinnamon; stipe 4–6 cm. long, 3–6 mm. thick, unequal or attenuated upward, often curved, tawny, then ferruginous, fibrous, striate, thickened and villous at the base, hollow; cortina none; spores ochraceous in mass, ellipsoidal,  $5-6 \times 3-4 \mu$ , verruculose or asperulate.

Hab. on decayed coniferous wood in woods. Autumn. Ishikari (Mt. Kurodake).

Distr. Japan (Hokkaido), Siberia, Asia Minor, Europe.

Jap. name. *Cha-tsumutake* (n. n.).

Tribe *Rhodoteae* IMAI, trib. nov.

Fructificatio sine velo. Stipes excentricus. Lamellae sinuatae vel adnexae. Sporae in cumulo subochraceae vel dilute roseae.

*Rhodotus* R. MAIRE

Bull. Soc. Myc. Fr. XL, 308, 1924.

Pileus subgelatinous-fleshy, regular or subirregular, confluent and subhomogeneous with fibrous-fleshy stipe, without veil. Stipe excentric. Lamellae sinuate or adnexed, subgelatinous-fleshy. Spores subochraceous or pale rose color in mass.

Type species: *Agaricus subpalmatus* FR.

*Rhodotus subpalmatus* (FR.) IMAI, comb. nov.

*Agaricus palmatus* (non BULL.) SOW. Engl. Fung. I, pl. 62, 1797.

*Agaricus palmatus* (non BULL.) PERS. Syn. Fung. 474, 1801, p. p.

*Agaricus (Pleurotus) palmatus* (non BULL.) FR. Syst. Myc. I, 186, 1821, p. p.—BERK. in SMITH, Engl. Fl. V, (2), 73, 1836—RABENH. Deut. Krypt. Fl. I, 517, 1844.

*Agaricus (Pleurotus) subpalmatus* FR. Epier. Myc. 131, 1838; Hymen. Eur. 168, 1874—BERK. Outl. Brit. Fung. 135, 1860—CKE. Handb. Brit. Fung. I, 46, 1871; Ill. Brit. Fung. pl. 255, 1883—WINT. Die Pilze, I, 738, 1884.

*Pleurotus subpalmatus* GILL. Hymen. Fr. 343, 1874—SACC. Syll. Fung. V, 343, 1887—MASS. Brit. Fung. Fl. II, 367, 1893—LLOYD, Myc. Writ. I, 51, f. 23-24, 1901—W. G. SM. Brit. Basid. 91, 1908—RICKEN, Blätterp. 449, 1915—KAUFFM. Agar. Mich. 662, 1918.

*Clitocybe subpalmata* KARST. Hattsv. I, 85, 1879.

*Pleurotus palmatus* QUÉL. Ench. Fung. 147, 1886—REA, Brit. Basid. 443, 1922.

*Rhodotus palmatus* R. MAIRE, Bull. Soc. Myc. Fr. XL, 308, 1924.

Caespitose or gregarious, rarely solitary, not poisonous. Pileus 1-6 cm. broad, convex then flattened; surface orange-pink to light salmon-orange, pellicle thick and gelatinous, exuding limpid rufescent drops, reticulate-corrugated, corrugated or smooth, powdery when dry, margin incurved; context white, then tinged with pale salmon color, very thick at the center, gelatinous-fleshy, taste none, odour strong; lamellae adnexed or often sinuate, usually paler than the pileus, rarely deeper colored, subgelatinous-fleshy, somewhat

tough, entire, broad, crowded; stipe 3.5–10 cm. long, 5–11 mm. thick, excentric, equal or attenuated up and downward, whitish, then pinkish, fibrillose-striate, pruinose at the upper part, curved ascending, solid or partly hollow; spores pale ochraceous-buff to ochraceous-tawny in mass, globose, about  $6.5 \mu$ , echinulate.

Hab. on rotten wood, especially of *Ulmus japonica* SARG. Late summer to autumn. Ishikari (Sapporo, Nopporo, Jôzankei), Kushiro, (Lake side of Akan).

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

Jap. name. *Hoshi-anzu-take* (n. n.).

### Tribe *Crepidoteae* IMAI, trib. nov.

Fructificatio sine velo. Stipes excentricus, lateralis vel nullus. Lamellae subdecurrentae. Sporae in cumulo ochraceae, ferrugineae vel fuscae.

### *Crepidotus* (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 62 & 138, 1872.

*Agaricus* § *Crepidotus* FR. Syst. Myc. I, 272, 1821, p. p.

*Phialocybe* KARST. Hattsv. I, xxii, 1879.

*Derminus* § *Crepidotus* SCHROET. Pilze Schles. I, 578, 1889.

Pileus fleshy or submembranous, regular or irregular. Stipe excentric, lateral or none. Lamellae more or less decurrent or radiating from a central or lateral point. Spores ochraceous, ferruginous or fuscous in mass.

Type species: *Agaricus mollis* SCHAEFF. ex FR.

### Key to the species in Hokkaido.

- I. Spores ellipsoidal.
  - A. Growing on logs, trunks, etc.
    - 1. Pileus white, whitish or grayish white.
      - a. Pileus gelatinous or viscid when wet.
        - i. Pileus 2–6 cm. broad..... *C. mollis* (1).
        - ii. Pileus 1–2.5 cm. broad..... *C. haerens* (2).
      - b. Pileus dry, 5–12 mm. broad..... *C. herbarum* (3).

2. Pileus ivory-yellow to chamois in color, dry, with minute brownish tomentum..... *C. viticolus* (4).  
 B. Growing on ground; pileus dry, whitish, minutely flucculose.....  
 ..... *C. terrestris* (5).  
 II. Spores globose or subglobose.  
 A. Spores smooth.  
 1. Lamellae broad, rounded behind..... *C. malachus* (6).  
 2. Lamellae very narrow, decurrent..... *C. applanatus* (7).  
 B. Spores rough..... *C. longistriatus* (8).

### 1. *Crepidotus mollis* (SCHAEFF. ex Fr.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 138, 1872; Ench. Fung. 108, 1886—GILL. Hymen. Fr. 557, 1874—KARST. Hattsv. I, 413, 1879—SACC. Syll. Fung. V, 877, 1887; Fl. Ital. Crypt., Hymen. 754, 1916—MASS. Brit. Fung. Fl. II, 117, 1893—W. G. SM. Brit. Basid. 167, 1908—RICKEN, Blätterp. 231, pl. 61, f. 1, 1915—MURRILL, North Amer. Fl. X, 151, 1917—KAUFFM. Agar. Mich. 519, 1918—REA, Brit. Basid. 454, 1922—BRES. Icon. Myc. XVI, pl. 789, 1930.

*Agaricus mollis* SCHAEFF. Fung. Bavar. IV, Ind. 49, pl. 213, 1774—Sow. Engl. Fung. I, pl. 98, 1797—PERS. Syn. Fung. 480, 1801 (teste FR.).

*Agaricus (Crepidotus) mollis* FR. Syst. Myc. I, 274, 1821; Epicr. Myc. 210, 1838; Hymen. Eur. 275, 1874—BERK. in SMITH, Engl. Fl. V, (2), 102, 1836; Outl. Brit. Fung. 164, pl. 9, f. 6, 1860—RABENH. Deut. Krypt. Fl. I, 471, 1844—CKE. Handb. Brit. Fung. I, 125, 1871; III. Brit. Fung. pl. 498, 1886; Handb. Austr. Fung. 58, 1892—WINT. Die Pilze, I, 661, 1884.

*Derminus (Crepidotus) mollis* SCHROET. Pilze Schles. I, 578, 1889.

Gregarious, imbricate, edible. Pileus 2–6 cm. broad, sessile or subsessile, obovate or reniform, convex, soon plane; surface glabrous, with a gelatinous pellicle which gives it a gelatinous feel, sometimes subviscid, pallid then ochraceous-white or cream-color, margin even or substrate, undulate and lobed when large; context subgelatinous especially under the pellicle, watery white, thin, odour and taste none; stipe when present short, strigose, up to 1.2 cm. long; lamellae decurrent to the base, radiating, narrow, sublinear, crowded, whitish, then watery cinnamon; spores ochraceous in mass, ellipsoidal or oblong, smooth,  $8-10 \times 5-6 \mu$ .

Hab. on decaying logs, limbs or trunks, in woods. Autumn. Kitami (Oketo forest).

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

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

## 2. *Crepidotus haerens* (PK.) SACC.

Syll. Fung. V, 880, 1887—MURRILL, North Amer. Fl. X, 150, 1917—KAUFFM. Agar. Mich. 518, 1918.

*Agaricus haerens* PK. 35 Ann. Rep. N. Y. State Mus. 132, 1884.

Gregarious and imbricate. Pileus 1–2.5 cm. broad, sessile, convex, dimidiate or flabellate; surface glabrous or slightly squamulose, hygrophanous, watery-white or gray and viscid when wet, white or whitish when dry, margin striatulate when wet; lamellae moderately crowded, narrow, attenuated toward both ends, subcinereous, becoming ferruginous; spores ferruginous-brown in mass, ellipsoidal,  $7.5\text{--}8.5 \times 5 \mu$ .

Hab. on rotten wood in woods. Summer. Ishikari (Nopporo).

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

Jap. name. *Ko-chahiratake* (n. n.).

## 3. *Crepidotus herbarum* (PK.) SACC.

Syll. Fung. V, 888, 1887—MURRILL, North Amer. Fl. X, 149, 1917—KAUFFM. Agar. Mich. 519, 1918.

[MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 116, 1931]

*Agaricus herbarum* PK. Bull. Buffalo Soc. Nat. Sci. I, 53, 1873.

Gregarious and usually imbricate. Pileus 5–12 mm. broad, sessile, suborbicular, dimidiate; surface white, dry, covered with white downy villi or velveting, incurved on the margin when young, sometimes becoming reflexed; lamellae radiating from an excentric or lateral point, moderately crowded, white, then subferruginous; spores subferruginous in mass, broadly ellipsoidal, smooth,  $6\text{--}7.5 \times 3.75\text{--}4.5 \mu$ .

Hab. on decaying wood, dead stems of herbs, etc., in woods. Summer. Ishikari (Nopporo).

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

Jap. name. *Konakaburi-modoki* (MATSUURA).

## 4. *Crepidotus viticolus* IMAI, sp. nov.

Gregarius vel subcaespitosus, imbricatus. Pileo 1–3.5 cm. lato, subsessili, reniformi vel cuneiformi, basi albo-tomentoso, “ivory-yellow” vel “chamois”, juvenile et margine pallidiori, sicco, minute

brunneo-tomentoso, margine non striato; carne alba, subcarnosa; lamellis adnatis vel determinatis, e albido fulvo-cinnamomeis, confertis; sporis in cumulo fulvis, late ellipsoideis, levibus,  $7.5-9 \times 5-6 \mu$ .

Hab. on twigs of *Vitis Kaemperi* K. KOCH. Autumn. Ishikari (Nopporo).

Distr. Endemic.

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

The present fungus somewhat resembles *C. applanatus* in general appearance, but it is distinguished from the latter by the smaller, yellow pileus and broadly ellipsoidal spores.

##### 5. *Crepidotus terrestris* IMAI, sp. nov.

Gregarius, imbricatus. Pileo 7-40 mm. lato, sessili, suborbiculari, reniformi, dimidiato, cuneiformi vel subcampanulato penduloque, albido, minute flocculoso, basi albo-villoso, margine undulato, non striato; carne tenui, albida; lamellis e albido avellaneis, subdistantibus vel subconfertis, latiusculis; sporis in cumulo subferrugineis, ellipsoideis, levibus,  $7.5-10 \times 5 \mu$ .

Hab. on clay soil on hill sides in woods. Autumn. Ishikari (Nopporo, Mt. Kurodake).

Distr. Endemic.

Jap. name. *Tsuchi-chahiratake* (n. n.).

The present fungus resembles *C. epigaeus* (B. et C.) SACC. in its habitat on the ground. It is however distinguished from the latter by the larger white pileus.

##### 6. *Crepidotus malachus* (B. et C.) SACC.

Syll. Fung. V, 883, 1887—MURRILL, North Amer. Fl. X, 151, 1917—KAUFFM. Agar. Mich. 523, 1918.

*Agaricus malachus* BERK. et CURT. Ann. Mag. Nat. Hist. 3 ser. IV, 291, 1859.

Gregarious and imbricate. Pileus 1.5-4.5 cm. broad, 1.5-3.5 cm. long, commonly plane, sessile or with a very short, inconspicuous, white, tomentose, lateral stipe; surface glabrous or slightly tomentose at the base, hygrophanous, watery-white or grayish-white, striatulate and avellaneous colored on the margin when wet; context white, taste and odour none; lamellae crowded, rounded behind or adnate

with a decurrent tooth, rather broad, whitish, becoming avellaneous; spores cinnamon in mass, globose, 6.5–7.5  $\mu$ .

Hab. on decayed or prostrate tree trunks. Summer. Ishikari (Nopporo).

Distr. Japan (Hokkaido), North America.

Jap. name. *Hiroha-chahiratake* (n. n.).

### 7. *Crepidotus applanatus* (PERS. ex FR.) KARST.

Hattsv. I, 414, 1879—QUÉL. Ench. Fung. 108, 1836—SACC. Syll. Fung. V, 878, 1887; Fl. Ital. Crypt., Hymen. 755, 1916—MASS. Brit. Fung. Fl. II, 117, 1893—W. G. SM. Brit. Basid. 168, 1908—RICKEN, Blätterp. 231, 1915—MURRILL, North Amer. Fl. X, 150, 1917—KAUFFM. Agar. Mich. 524, 1918—BRES. Icon. Myc. XVI, pl. 790, 1930.

*Agaricus applanatus* PERS. Obs. Myc. I, 8, 1796 (teste FR.).

*Agaricus planus* PERS. Syn. Fung. 480, 1801 (teste FR.).

*Agaricus (Crepidotus) applanatus* FR. Epicr. Myc. 210, 1838; Hymen. Eur. 275, 1874—RABENH. Deut. Krypt. Fl. I, 470, 1844—WINT. Die Pilze, I, 661, 1884.

Gregarious and imbricate. Pileus 1–5 cm. broad, variable in form, suborbicular, reniform, cuneiform or spathulate, convex, soon plane, often depressed behind, sessile or with a short, compressed, white tomentose base; surface glabrous, hygrophane, watery-cinnamon when moist, whitish when dry, striatulate on the margin when moist; context white, watery, soft; lamellae decurrent but ending determinately behind, whitish, then watery-cinnamon, very narrow, crowded; spores subferruginous in mass, globose or subglobose, smooth, 5–6.5  $\mu$ .

Hab. on decayed wood, logs, stumps, etc. Autumn. Ishikari (Nopporo).

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

Jap. name. *Maru-mi-no-chahiratake* (n. n.).

### 8. *Crepidotus longistriatus* IMAI, sp. nov.

Gregarius, subimbricatus. Pileo 1–2 cm. lato, laterale breveque stipitato vel subsessili, convexo-plano, demum leviter depresso, margine undulato lobatoque, albido, glabro, longe striato; carne tenui, molli; lamellis decurrentibus, e albido cinnamomeis, confertis; stipite

brevissimo, albo-tomentoso; sporis in cumulo laete ochraceis, subglobosis, globosis vel subovatis, 6–8  $\mu$ , verruculosis.

Hab. on rotten wood in woods. Summer. Ishikari (Nopporo).

Dists. Endemic.

Jap. name. *Zarami-no-chahiratake* (n. n.).

### Tribe Paxilleae P. HENN. emend. HEIM

Fungi Iberici, 67, 1834.

*Paxillées* FAYOD, Ann. Sci. Nat., Bot. 7 sér. IX, 384, 1889, p. p.

*Paxilleae* P. HENN. in ENGLER & PR. Nat. Pflanzenfam. I, 1\*\*, 202, 1897.

*Paxillaceae* KONR. et MAUBL. Icon. Sel. Fung. 27, 1924—SINGER, Ann. Myc. XXXIV, 326, 1936.

Fructification usually without veils. Pileus fleshy, regular, excentric, dimidiate or resupinate. Stipe central, excentric, lateral or none. Lamellae decurrent, soft, separable or almost not separable, often venoso-connected at the base or anastomosed behind. Spores ochraceous or ferruginous in mass.

#### Key to the genera.

1. Pileus incurved at the margin; lamellae easily separable from the pileus....  
..... *Paxillus*.
2. Pileus not incurved at the margin; lamellae almost not separable from the pileus..... *Phylloporus*.

### *Paxillus* FR.

Genera Hymen. 8, 1836; Epicr. Myc. 315, 1838, p. p.

*Agaricus* § *Tapinia* FR. Syst. Myc. I, 269, 1821, p. p.

*Paxillus* § *Tapinia* FR. Epicr. Myc. 317, 1838.

*Tapinia* KARST. Hattsv. I, xxiii, 1879.

Pileus fleshy, regular, excentric, dimidiate or resupinate, confluent with fibrous-fleshy stipe. Stipe central, excentric, lateral or none. Lamellae decurrent, soft, mostly furcate and anastomosing next the stipe, easily separable from the pileus. Spores ochraceous or ferruginous in mass.

Type species: *Agaricus involutus* BATSCH ex FR.

## Key to the subgenera and species in Hokkaido.

- I. Pileus with stipe and mostly regular or excentric.... Subgen. *Veripaxillus*.  
 1. Pileus regular, convex then depressed, clay or reddish-brown, margin at first involute and villose..... *P. involutus* (1).  
 II. Pileus without distinct stipe, dimidiate or resupinate.... Subgen. *Tapinia*.  
 1. Entirely dingy yellow, sessile and at first resupinate... *P. panuoides* (2).

Subgen. *Veripaxillus* IMAI, nom. nov.

Pileus stipitatus, plerumque regularis vel excentricus.

1. *Paxillus involutus* [BATSCH] FR.

Epicr. Myc. 317, 1838; Hymen. Eur. 403, 1874—BERK. Outl. Brit. Fung. 195, pl. 12, f. 5, 1860—KICKX, Fl. Crypt. Flandr. II, 194, 1867—CKE. Handb. Brit. Fung. I, 194, 1871; Ill. Brit. Fung. pl. 875, 1888—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 183, 1872; Ench. Fung. 93, 1886—GILL. Hymen. Fr. 529, cum icone, 1874—KARST. Hattsv. I, 450, 1879—WINT. Die Pilze, I, 573, 1884—SACC. Syll. Fung. V, 987, 1887—SCHROET. Pilze Schles. I, 516, 1889—MASS. Brit. Fung. Fl. II, 9, 1893—ATKINS. Mushrooms, ed. 2, 166, f. 159, 1903—W. G. SM. Brit. Basid. 253, 1908—ROLLAND, Atlas Champ. 67, f. 153, 1910—RICKEN, Blätterp. 96, pl. 28, f. 2, 1915—MURRILL, North Amer. Fl. X, 147, 1917—KAUFFM. Agar. Mich. 286, 1918—REA, Brit. Basid. 551, 1922—BRES. Icon. Myc. XIV, pl. 677, 1930.

*Agaricus lateralis* SCHAEFF. Fung. Bavar. IV, Ind. 31, pl. 71-72, 1774 (teste FR.).

*Agaricus contiguus* BULL. Champ. Fr. pl. 240, 576, f. 2, 1784—Sow. Engl. Fung. pl. 56, 1797 (teste FR.).

*Agaricus involutus* BATSCH, Elench. Cont. I, 39, pl. 13, f. 61, 1786—PERS. Syn. Fung. 448, 1801 (teste FR.).

*Agaricus (Tapinia) involutus* FR. Syst. Myc. I, 271, 1821.

*Cortinaria involuta* SICARD, Hist. Nat. Champ. 150, f. 206, 1884.

*Paxillus lateralis* SACC. Fl. Ital. Crypt., Hymen. 669, 1916.

Gregarious or solitary, edible. Pileus 4-10 cm. broad, convex, then depressed in the center, at length subinfundibuliform, variable in color, i.e. grayish, clay color, dark brown or reddish brown, viscid when wet, shining when dry, margin involute, verruculose-striatulate, inconspicuously villose; context spongy-soft, yellowish, changing to brownish when bruised, taste and odour none; lamellae decurrent, pallid, then ferruginous, rarely reticulated on the stipe, but commonly united near the stipe; stipe 3-8 cm. long, 6-12 mm. thick, equal

or slightly attenuated downward, pallid with reddish tinge, then dingy yellow or cinnamon-brown, velvety, usually central, sometimes excentric, solid, stout, context brownish; spores cinnamon to clay color in mass, ellipsoidal, with a central gutta,  $7.5-10.5 \times 4.5-6 \mu$ .

Hab. on the ground or on decayed wood under ground or rarely on the bark of living elder tree trunk. Late summer to autumn. Ishikari (Nopporo, Mt. Teine, Mt. Soranuma, Sapporo, Mt. Taisetsu), Tokachi (Lake side of Shikaribetsu), Kushiro (Lake side of Kutcharo, Mt. Meakan, Lake side of Akan), Kitami (Oketo forest).

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

Jap. name. *Hida-ha-take* (n. n.).

### Subgen. *Tapinia* (FR. emend. KARST.) IMAI, nom. nov.

*Agaricus* § *Tapinia* FR. Syst. Myc. I, 269, 1821, p. min. p.

*Tapinia* KARST. Hattsv. I, xxiii, 1879.

Pileus sine stipite manifesto, dimidiatus vel resupinatus.

## 2. *Paxillus panuoides* FR.

Epier. Myc. 318, 1838; Hymen. Eur. 404, 1874—BERK. Outl. Brit. Fung. 196, pl. 12, f. 6, 1860—CKE. Handb. Brit. Fung. I, 195, 1871; Ill. Brit. Fung. pl. 878, 1888; Handb. Austr. Fung. 73, 1892—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul Montb. 2 sér. V, 183, 1872—WINT. Die Pilze, I, 571, 1884—SACC. Syll. Fung. V, 889, 1887—MASS. Brit. Fung. Fl. II, 11, 1893—ATKINS. Mushrooms, ed. 2, 170, f. 162-163, 1903—W. G. SM. Brit. Basid. 255, 1908—ROLLAND, Atlas Champ. 67, f. 155, 1910—RICKEN, Blätterp. 95, pl. 28, f. 3, 1915—KAUFFM. Agar. Mich. 288, 1918—REA, Brit. Basid. 553, 1922—BRES. Icon. Myc. XIV, pl. 681, 1930.

[LLOYD, Myc. Writ. V, Letter No. 63, p. 9, 1916—YASUDA, Bot. Mag. (Tokyo), XXX, (419), 1916—SHIRAI, List Jap. Fung. ed. 3, 243, 1927]

*Agaricus acheruntius* HUMB. Fl. Frib. 73, 1793 (teste SCHROET.).

*Merulius lamellosus* SOW. Engl. Fung. pl. 403, 1803 (teste FR.).

*Agaricus panuoides* FR. Obs. Myc. II, 227, 1818.

*Agaricus (Crepidotus) panuoides* FR. Syst. Myc. I, 273, 1821.

*Rhymovis panuoides* RABENH. Deut. Krypt. Fl. I, 453, 1844.

*Paxillus rudis* BERK. et CURT. Ann. Mag. Nat. Hist. 3 ser. IV, 296, 1859 (teste MURRILL).

*Paxillus ligneus* BERK. et CURT. Journ. Linn. Soc., Bot. IX, 423, 1867 (teste MURRILL).

*Paxillus lamellirugus* QUÉL. Ench. Fung. 93, 1886.

*Paxillus acheruntius* SCHROET. Pilze Schles. I, 515, 1889—SACC. Fl. Ital. Crypt., Hymen. 666, 1916.

[P. HENN. in ENGLERS Bot. Jahrb. XXXII, 40, 1902—MATSUM. Ind. Pl. Jap. I, 157, 1904—SHIRAI, List Jap. Fung. 61, 1905; ed. 2, 407, 1917; ed. 3, 243, 1927]

*Tapinia panuoides* KARST. Hattsv. I, 452, 1879.

*Tapinia lamellosa* MURRILL, North Amer. Fl. X, 146, 1917.

Imbricate. Pileus 2–6 cm. broad, 1.5–5 (–10) cm. long, sessile or subsessile, at first resupinate, soon conchate, dimidiate and obovate, at length broadly expanded, undulate-lobate; surface dingy yellow, ochraceous or cinnamon, pubescent or squamulose, becoming smooth and glabrous, somewhat rivulose, base tomentose, often colored with purple tint; context cream color, becoming whitish, soft, thin, odour none, taste slight; lamellae decurrent at the base, anastomosing behind, branched, crisped, crowded, narrow, yellow or orange; spores ochraceous in mass, subellipsoidal or subglobose,  $4-6 \times 3-4 \mu$ , smooth.

Hab. on the rotten coniferous stumps and wood. Late summer to autumn. Ishikari (Sapporo, Nopporo, Mt. Kurodake), Iburi (Lake side of Shikotsu), Kushiro (Lake side of Akan).

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

Jap. name. *Ichô-take* (YASUDA).

### *Phylloporus* QUÉL.

Fl. Myc. Fr. 409, 1888.

Pileus fleshy, regular, confluent with fibrous-fleshy stipe. Stipe central or nearly so. Lamellae decurrent, venoso-connected at the base, or poroso-anastomosed behind, concrete with the pileus. Spores ochraceous in mass.

Type species: *Agaricus Pelletieri* LÉV.

### *Phylloporus rhodoxanthus* (SCHW.) BRES.

Fungi Trid. II, 95, 1900; Icon. Myc. XVI, pl. 768, 1930—MURRILL, North Amer. Fl. X, 193, 1917.

*Agaricus rhodoxanthus* SCHEW. Schr. Nat. Ges. Leipzig, I, 83, 1822 (teste BRES.).

*Paxillus flavidus* BERK. London Journ. Bot. VI, 315, 1847 (teste BRES.).

*Agaricus (Flammula) Tammii* FR. Monogr. Hymen. Suec. II, 301, 1863; Hymen. Eur. 244, 1874 (teste BRES.).

*Agaricus Pelletieri* LÉV. in CROUAN, Fl. Finist. 81, 1867 (teste BRES.).

*Agaricus paradoxus* KALCHBR. Icon. Hung. pl. 16, f. 1, 1873—FR. Hymen. Eur. 244, 1874 (teste BRES.).

*Clitocybe Pelletieri* GILL. Hymen. Fr. 170, cum icone, 1874—KAWAMURA, Ill. Jap. Fung. pl. 11, f. 3-4, 1914.

[SHIRAI, List Jap. Fung. ed. 2, 145, 1917; ed. 3, 86, 1927]

*Paxillus paradoxus* CKE. et QUÉL. Clavis Hymen. 131, 1878—QUÉL. Ench. Fung. 93, 1886—MASS. Brit. Fung. Fl. II, 8, 1893—W. G. SM. Brit. Basid. 253, 1908—REA, Brit. Basid. 551, 1922.

*Gymnocybe Tammii* KARST. Hattsv. I, 412, 1879.

*Paxillus Tammii* PAT. Tab. Anal. Fung. no. 354, 1885.

*Flammula Tammii* SACC. Syll. Fung. V, 810, 1887; Fl. Ital. Crypt., Hymen. 742, 1916.

*Gomphidius rhodoxanthus* SACC. Syll. Fung. V, 1139, 1887.

*Phylloporus Pelletieri* QUÉL. Fl. Myc. Fr. 409, 1888.

*Paxillus rhodoxanthus* RICKEN, Blätterp. 95, pl. 28, f. 1, 1915—KAUFFM. Agar. Mich. 285, 1918.

*Phylloporus paradoxus* LANGE, Agar. Denm. XI, 37, 1936.

Solitary or gregarious. Pileus 3-8 cm. broad, convex, then plane, depressed or obtuse, somewhat turbinate; surface densely velvety-tomentose, glabrescent, dry, often rimosely cracked, varying in color, yellowish, reddish, ferruginous or olivaceous, margin not striate, often lobed and sinuate; context thick at the disc, pale reddish, then yellow, taste and odour mild; lamellae decurrent, bright yellow, at length tinged brownish color, distant to subcrowded, sometimes forked, very intervenose, sometimes poroso-anastomosed toward stipe; stipe 3-8 cm. long, 5-10 mm. thick, equal or subventricose, somewhat rooted, yellow or reddish-yellow, adpressedly fibrillose, punctate with small, reddish-brown scales or dots, solid; spores ochraceous in mass, elongated-oblong or oblong-cylindrical, smooth,  $10-13 \times 3-5 \mu$ ; cystidia fusiform, yellowish.

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

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

Jap. name. *Kihida-take* (KAWAMURA).

**Tribe Naucoriae IMAI, nom. nov.**

*Naucoriés* FAYOD, Ann. Sci. Nat., Bot. 7 sér. IX, 357, 1889, p. p.

*Naucoriées* KONR. et MAUBL. Icon. Sel. Fung. 28 & 185, 1924.

Fructificatio vulgo sine velo. Pileus carnosus vel submembranaeus, fragilis, cum stipite cartilagineo confluentus. Stipes centralis, cartilagineus vel subcartilagineus. Lamellae liberae, sinuatae, adnexae, adnatae vel decurrentae. Sporae in cumulo ochraceae, ferrugineae vel fulvae.

**Key to the genera.**

- I. Lamellae adnate or sinuato-adnate.
  - A. Pileus at first incurved on the margin or exceeding the lamellae..... *Naucoria*.
  - B. Pileus straight and at first adpressed to the stipe..... *Gelerula*.
- II. Lamellae free..... *Pluteolus*.

***Naucoria* (FR.) QUÉL.**

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 62 & 131, 1872.

*Agaricus* § *Naucoria* FR. Syst. Myc. I, 260, 1821.

*Simocybe* KARST. Hattsv. I, xxii, 1879.

*Agrocybe* FAYOD, Ann. Sci. Nat., Bot. 7 sér. IX, 358, 1889.

*Bulla* EARLE, Bull. N. Y. Bot. Gard. V, 424, 1909.

Pileus fleshy, heterogenous from the cartilaginous stipe, regular, margin at first incurved. Stipe central, cartilaginous. Lamellae adnate, sinuate-adnate or adnexed. Spores ochraceous, ferruginous or fuscous in mass.

Type species: *Agaricus melinoides* BULL. ex FR.

**Key to the sections and species in Hokkaido.**

- I. Pileus smooth, veil none; spores ferruginous..... Sect. Gymnotae.
  - A. Lamellae nearly free or slightly adnexed.
    - 1. Pileus acutely conical, then umbonate, viscid, vinaceous-tawny or pinkish-cinnamon; stipe darker..... *N. Christinae*(1).
  - B. Lamellae adnate.
    - 1. Pileus convex, then plane, viscid, wood-brown or fawn-color; stipe cinnamon..... *N. abstrusa*(2).

- II. Pileus floccose or squamulose, veil manifest; spores ferruginous.....  
 ..... Sect. Lepidotae.  
 A. Pileus densely covered by small amber-brown colored scales or  
 granules; stipe cinnamon..... *N. conspersa* (3).

### Sect. *Gymnotae* FR.

Epicr. Myc. 191, 1838.

Pileus glabrous, veil none. Spores ferruginous, not becoming fuscous.

#### 1. *Naucoria Christinae* (FR.) SACC.

Syll. Fung. V, 829, 1887; Fl. Ital. Crypt., Hymen. 766, 1916—RICKEN, Blätterp. 215, 1915—MURRILL, North Amer. Fl. X, 173, 1917—BRES. Icon. Myc. XVI, pl. 793, 1930.

*Agaricus (Naucoria) Christinae* FR. Epicr. Myc. 192, 1838; Hymen. Eur. 254, 1874.

Gregarious. Pileus 1.5–3 cm. broad, acutely conical when young, then expanded to umbonate with a sharp umbo; surface subhygrophanous, vinaceous-tawny when moist, becoming pinkish-cinnamon when dry, viscid, smooth; context thin, yellowish or subconcolorous; lamellae nearly free or slightly adnexed, crowded, pallid, then pinkish-cinnamon or cinnamon; stipe 6–10 cm. long, 3–5 mm. thick, cylindrical, radicate at the base, glabrous, cartilaginous, very tough, vinaceous-brown to dark livid-brown or dark vinaceous-brown, paler (vinaceous-tawny) at the apex, fistulose; spores cinnamon in mass, amygdaliform,  $8-10 \times 5-6 \mu$ , smooth.

Hab. on the ground among mosses in woods. Autumn. Iburi (Lake side of Shikotsu).

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

Jap. name. *Name-nise-mukuetake* (n. n.).

#### 2. *Naucoria abstrusa* (FR.) SACC.

Syll. Fung. V, 835, 1887—MASS. Brit. Fung. Fl. II, 156, 1893—W. G. SM. Brit. Basid. 156, 1908—RICKEN, Blätterp. 216, 1915—REA, Brit. Basid. 351, 1922.

*Agaricus (Naucoria) abstrusus* FR. Epicr. Myc. 194, 1838; Hymen. Eur. 257, 1874—CKE. Ill. Brit. Fung. pl. 456, 1886.

*Simocybe abstrusa* KARST. Hattsv. I, 421, 1879.

Gregarious or solitary. Pileus about 2 cm. broad, convex or slightly subumbonate, then plane; surface glabrous, smooth, viscid, nearly polished when dry, wood-brown or fawn color in dry weather but darker at the disc; context subconcolorous, becoming paler; lamellae adnate or adnexed, crowded, pinkish-buff to cinnamon; stipe 3–4 cm. long, 1.5–2 mm. thick, equal, cinnamon in dry weather, darker at the base, cartilaginous, naked, polished, hollow; spores cinnamon in mass, ellipsoidal,  $8.5\text{--}11 \times 4\text{--}5 \mu$ ; sterile cells on the edge of lamellae flask-shaped, pointed,  $25\text{--}30 \times 7.5\text{--}10 \mu$ .

Hab. on the ground in woods. Summer. Iburi (Tomakomai).

Distr. Japan (Hokkaido), Europe.

Jap. name. *Nise-mukuetake* (n. n.).

### Sec. Lepidotae FR.

Epicr. Myc. 199, 1838.

Pileus floccose or squamulose, veil manifest. Spores ferruginous.

### 3. *Naucoria conspersa* (PERS. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 133, 1872—GILL. Hymen. Fr. 543, 1874—KARST. Hattsv. I, 433, 1879—SACC. Syll. Fung. V, 854, 1887; Fl. Ital. Crypt., Hymen. 762, 1916—MASS. Brit. Fung. Fl. II, 167, 1893—W. G. SM. Brit. Basid. 160, 1908—REA, Brit. Basid. 359, 1922—BRES. Icon. Myc. XVI, pl. 800, f. 2, 1930.

*Agaricus conspersus* PERS. Icon. Descr. Fung. II, 50, pl. 12, f. 3, 1800; Syn. Fung. 318, 1801 (teste FR.).

*Agaricus (Naucoria) conspersus* FR. Syst. Myc. I, 260, 1821; Epicr. Myc. 201, 1838; Hymen. Eur. 264, 1874—RABENH. Deut. Krypt. Fl. I, 474, 1844—CKE. Handb. Brit. Fung. I, 130, 1871; Ill. Brit. Fung. pl. 512, f. A, 1886—WINT. Die Pilze, I, 671, 1884.

*Hylophila (Naucoria) conspersa* QUÉL. Ench. Fung. 103, 1886.

Solitary or gregarious. Pileus 1.5–2.5 cm. broad, subconical or convex, then subplane; surface dry, densely covered with small amber-brown colored scales or granules, scales longer on the disc, minute on the margin, margin not striate; context very thin, odour faintly mealy; lamellae ascending adnate, then emarginate-separating, ventricose, rather broad, attenuated to the margin of pileus, subcrowded, clay color to tawny-olive, edge white-crenulate; stipe 2.5–3 cm. long, 1.5–2 mm. thick, equal, nearly cinnamon-colored. fib-

rous, subshining, nearly pruinose above, stuffed or hollow; spores clay color in mass, yellowish under microscope, oblong or ellipsoidal,  $6-8 \times 3.5-4.5 \mu$ ; sterile cells on edge of lamellae long-pyriform, broadly clavate or subcapitate, hyaline.

Hab. on humid ground or on badly decayed wood under ground in woods. Summer. Ishikari (Nopporo).

Distr. Japan (Hokkaido), Europe.

Jap. name. *Cha-mukuetake* (n. n.).

### *Galerula* KARST.

Hattsv. I, xxiii, 1879.

*Agaricus* § *Galera* FR. Syst. Myc. I, 264, 1821.

*Galera* (non BLUME) QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 62 & 135, 1872.

*Derminus* § *Galera* SCHROET. Pilze Schles. I, 579, 1889.

*Conocybe* FAYOD, Ann. Sci. Nat., Bot. 7 sér. IX, 357, 1889.

*Galerella* EARLE, Bull. N. Y. Bot. Gard. V, 422, 1909.

*Galerina* EARLE, Ibid. 423, 1909.

Pileus fleshy or submembranous, margin straight, at first adpressed to the stipe. Stipe central, cartilaginous. Lamellae adnate or adnexed. Spores cinnamon or ferruginous in mass.

Type species: *Agaricus ovalis* FR.

#### Key to the species in Hokkaido.

1. Pileus small (1-2 cm. broad); lamellae linear, narrow..... *G. tenera*(1).
2. Pileus large (2-3 cm. broad); lamellae broad, ventricose.....  
..... *G. campanulata*(2).

#### 1. *Galerula tenera* (SCHAEFF. ex FR.) MURRILL

North Amer. Fl. X, 166, 1917.

*Agaricus tener* SCHAEFF. Fung. Bavar. IV, Ind. 31, pl. 70, f. 6-8, 1774—Sow. Engl. Fung. I, pl. 33, 1797—PERS. Syn. Fung. 386, 1801 (teste FR.).

*Agaricus (Galera) tener* FR. Syst. Myc. I, 265, 1821; Epicr. Myc. 204, 1838; Hymen. Eur. 267, 1874—BERK. in SMITH, Engl. Fl. V, (2), 100, 1836; Outl. Brit. Fung. 162, 1860—RABENH. Deut. Krypt. Fl. I, 473, 1844—KICKX, Fl. Crypt. Flandr. II, 170, 1867—CKE. Handb. Brit. Fung. I, 133, 1871; Ill. Brit. Fung. pl. 461, 1886; Handb. Austr. Fung. 56, 1892—WINT. Die Pilze, I, 668, 1884.

*Galera tenera* QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb.

2 sér. V, 136, 1872; Ench. Fung. 106, 1886—GILL. Hymen. Fr. 553, 1874—KARST. Hattsv. I, 437, 1879—SACC. Syll. Fung. V, 860, 1887; Fl. Ital. Crypt., Hymen. 785, 1916—MASS. Brit. Fung. Fl. II, 144, 1893—W. G. SM. Brit. Basid. 162, f. 38, A, 1908—RICKEN, Blätterp. 225, pl. 60, f. 12, 1915—KAUFFM. Agar. Mich. 498, 1918—REA, Brit. Basid. 407, 1922—BRES. Icon. Myc. XVII, pl. 806, 1931.

*Dermimus (Galera) tener* SCHROET. Pilze Schles. I, 580, 1889.

*Conocybe tenera* FAYOD, Ann. Sci. Nat., Bot. 7 sér. IX, 357, 1889.

*Galera cubensis* EARLE, Inform. An. Estac. Centr. Agron. Cuba, I, 237, 1906 (teste MURRILL).

Solitary or gregarious in small groups. Pileus 1–2 cm. broad and high, conical to campanulate; surface glabrous or slightly pubescent, pale ochraceous-buff and atomate in dry weather, pale ochraceous-buff or light ochraceous-buff to pinkish-buff or cinnamon-buff, opaque and slightly striatulate when moist, hygrophanous, slightly darker at the center; context thin, yellowish; lamellae ascending adnate, then almost free, linear, clay color, somewhat crowded or moderately crowded; stipe 7–10 cm. long, 1–2 mm. thick, equal, straight, subconcolorous or slightly paler than the pileus, darker at the base, somewhat shining, striate and powdery above, hollow; spores ferruginous in mass, ellipsoidal or almond shaped, smooth,  $10\text{--}12.5 \times 5\text{--}7.5 \mu$ ; cystidia flask-shaped.

Hab. on lawn, manured pasture or on ground in woods. Summer to autumn. Ishikari (Sapporo, Nopporo), Ihuri (Chitose).

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

Jap. name. *Ko-gasa-take* (KAWAMURA).

## 2. *Galerula campanulata* (BULL. ex FR.) IMAI, comb. nov.

*Agaricus campanulatus* (non L., SCHAEFF. nec BOLT.) BULL. Champ. Fr. pl. 552, f. 1, 1791 (teste FR.).

*Agaricus (Psilocybe) campanulatus* FR. Syst. Myc. I, 295, 1821.

*Agaricus (Galera) campanulatus* FR. Epicr. Myc. 205, 1838.

*Agaricus (Galera) ovalis* FR. Monogr. Hymen. Suec. I, 389, 1857; Hymen. Eur. 268, 1874—BERK. Outl. Brit. Fung. 162, 1860—CKE. Handb. Brit. Fung. I, 132, 1871; Ill. Brit. Fung. pl. 462, 1886—WINT. Die Pilze, I, 663, 1884.

*Galera ovalis* GILL. Hymen. Fr. 554, 1874—QUÉL. Ench. Fung. 106, 1886—SACC. Syll. Fung. V, 862, 1887; Fl. Ital. Crypt., Hymen. 786, 1916—MASS. Brit. Fung. Fl. II, 146, 1893—W. G. SM. Brit. Basid. 163, 1908—REA, Brit. Basid. 408, 1922—BRES. Icon. Myc. XVI, pl. 808, 1931.

*Galerula ovalis* KARST. Hattsv. I, 443, 1879.

Solitary or gregarious in small groups. Pileus 2–3 cm. broad, ovato-campanulate, obtuse; surface ferruginous, becoming yellow when dry, smooth, margin at first straight and adpressed to the stipe; context thin, reddish; lamellae somewhat free, ferruginous, ventricose, broad, crowded; stipe 8–10 cm. long, 2–3 mm. thick, equal, concolorous, tense and straight, slightly striate, very fragile; veil here and there in the form of an annulus, fugacious; spores ferruginous in mass, ellipsoidal, about  $10 \times 6 \mu$ .

Hab. on dung in pasture or in woods. Autumn. Ishikari (Nopporo).

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

Jap. name. *Hiro-ha-kogasa* (n. n.).

### *Pluteolus* (FR.) GILL.

Hymen. Fr. 549, 1874.

*Agaricus* § *Pluteolus* FR. Hymen. Eur. 266, 1874.

Pileus fleshy, very thin, viscid, margin at first straight, adpressed to the stipe. Stipe central, subcartilaginous. Lamellae free, rounded behind. Spores ochraceous or ferruginous in mass.

Type species: *Agaricus reticulatus* PERS. ex FR.

### *Pluteolus coprophilus* PK.

46 Ann. Rep. N. Y. State Mus. 59, 1893—MURRILL, North Amer. Fl. X, 187, 1917—KAUFFM. Agar. Mich. 506, 1918.

?*Bolbitius radians* MORGAN, Journ. Cinc. Soc. Nat. Hist. XVIII, 37, 1895.

Solitary or gregarious. Pileus 2–4 cm. broad, conico-campanulate, then expanded nearly plane, depressed on disc; surface glutinous when moist and fresh, light pinkish-cinnamon and with a glutinous pellicle which forms slightly reticulate and radiate veins on the disc, margin striate so far as half length of the radius with avellaneous or wood-brown color; context whitish, very thin, submembranous on the margin, taste and odour none; lamellae free, crowded, pale-cinnamon; stipe 4–8 cm. long, 2–4 mm. thick, slightly enlarged toward the base, pure white, powdery above, powdery or floccose below, hollow; spores cinnamon in mass, ellipsoidal, smooth, slightly truncate at one end,  $10\text{--}13 \times 6\text{--}8 \mu$ .

Hab. on horse-dung. Late summer to autumn. Ishikari (Sapporo).

Distr. Japan (Hokkaido), North America.

Jap. name. *Okina-take* (n. n.).

The fungus in hand seems to have a somewhat intermediate form between *P. coprophilus*, *P. reticulatus* (PERS. ex FR.) GILL. and *P. aleuriatus* (FR.) SACC. The writer, however, identifies it with *P. coprophilus* according to the color of fructification, the size of spores and the habitat which are more similar than to those of the later two species.

#### Subfam. Agaricoideae IMAI, nom. nov.

*Pratella* FR. Syst. Myc. I, 11, 1821.

*Pratellus* FR. Syst. Orb. Veg. I, 74, 1825; Epicr. Myc. 212, 1838.

*Coprinarius* FR. Ibid. 75, 1825.

*Pratelli* FR. Hymen. Eur. 6 & 277, 1874.

*Coprinarii* FR. Ibid. 7 & 309, 1874.

*Melanosporées* GILL. Hymen. Fr. 28, 1874.

*Janthinospori* QUÉL. Ench. Fung. 109, 1886.

*Melanospori* QUÉL. Ibid. 118, 1886.

*Coprineae* P. HENN. in ENGLER & PR. Nat. Pflanzenfam. I, 1\*\*, 204, 1900.

*Atrospora* P. HENN. Ibid. 232, 1900.

*Amaurospora* P. HENN. Ibid. 234, 1900.

Trama floccosa, carnosa, subcarnosa vel submembranacea, in stipite carnosa vel cartilaginea, non vesiculosa. Sporae in cumulo atro- vel fusco-purpureae, nigricantes.

#### Tribe Agariceae IMAI, nom. nov.

*Volvariées* ROZE, Bull. Soc. Bot. Fr. XXIII, 51, 1876, p. p.

*Psalliotées* ROZE, Ibid. 51 & 113, 1876.

*Psalliotés* FAYOD, Ann. Sci. Nat., Bot. 7 sér. IX, 352, 1889.

*Agaricées* KONR. et MAUBL. Icon. Sel. Fung. 28 & 57, 1924.

*Psallioideae* SINGER, Ann. Myc. XXXIV, 340, 1936.

Fructificatio carnosa, annulata vel volvata. Pileus cum stipite carnosus distinctus. Lamellae molles, carnosae, liberae. Sporae in cumulo fusco- vel atro-purpureae.

*Agaricus* L. ex FR. emend. KARST.

Hattsv. I, xxv, 1879.

*Agaricus* L. Sp. Pl. 1171, 1753, p. p.*Pratella* S. F. GRAY, Nat. Arr. Brit. Pl. I, 626, 1821.*Agaricus* § *Psalliota* FR. Syst. Myc. I, 11 & 280, 1821, p. p.; Hymen. Eur. 278, 1874.*Psalliota* QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D' Emul. Montb. 2 sér. V, 63 & 139, 1872.*Pratella* GILL. Hymen. Fr. 553, 1874.*Pratella* § *Psalliota* QUÉL. Ench. Fung. 109, 1886.*Micropsalliota* v. HÖHN. Sitzb. Kais. Akad. Wiss. Wien, CXXIII, 1 Abt. 31, 1914.

Fructification with persistent, rarely fugarious, adnate annulus. Pileus fleshy or subfleshy, regular, distinct and easily separable from the fleshy stipe. Stipe central. Lamellae free. Annulus membranous, adnate, persistent, rarely fugacious. Spores fuscous-purple, reddish-purple, blackish-purple or fuscous in mass.

Type species: *Agaricus campestris* L. ex FR.

## Key to the sections and species in Hokkaido.

- I. Fructification larger, fleshy..... Sect. Edules.
  - A. Annulus simple or nearly simple.
    1. Pileus white.
      - a. Pileus white, then becoming light reddish brown..... *A. campestris*(1).
      - b. Pileus white, then becoming yellowish..... *A. silvicola*(2).
    2. Pileus ochraceous-orange..... *A. jezoensis*(3).
    3. Pileus brownish or brown.
      - a. Growing in farm (probably escaped species) ... *A. hortensis*(4).
      - b. Growing in woods..... *A. silvaticus*(5).
  - B. Annulus double.
    1. Pileus white, becoming yellowish with age or drying..... *A. arvensis*(6).
    2. Pileus with blackish-brown, fibrous scales..... *A. placomyces*(7).
    3. Pileus with ochraceous-tawny, fibrous scales... *A. subrufescens*(8).
- II. Fructification smaller; pileus thinly fleshy..... Sect. Minores.
  - A. Pileus white, whitish or yellowish.
    1. Pileus 3-4 cm. broad..... *A. comtulus*(9).
    2. Pileus 1.5-2.2 cm. broad..... *A. comptulellus*(10).
  - B. Pileus with reddish-brown scales.
    1. Pileus 2.5-5 cm. broad..... *A. diminutivus*(11).
    2. Pileus 1-2.3 cm. broad..... *A. semotellus*(12).

## Sect. Edules FR.

Hymen. Eur. 278, 1874.

Fructification larger, fleshy.

1. *Agaricus campestris* L. ex FR.

Syst. Myc. I, 281, 1821; Epicr. Myc. 213, 1838; Hymen. Eur. 279, 1874—BERK. in SMITH, Engl. Fl. V, (2), 106, 1836; Outl. Brit. Fung. 165, pl. 10, f. 2, 1860—RABENH. Deut. Krypt. Fl. I, 469, 1844—KICKX, Fl. Crypt. Flandr. II, 171, 1867—CORDA, Champ. Fr. 89, pl. 20, f. 1, 1870—CKE. Handb. Brit. Fung. I, 137, 1871; Ill. Brit. Fung. pl. 526, 1886; Handb. Austr. Fung. 60, 1892—KARST. Hattsv. I, 484, 1879—WINT. Die Pilze, I, 658, 1884—SACC. Syll. Fung. V, 997, 1887; Fl. Ital. Crypt., Hymen. 799, 1916 (ut *A. campester*)—MASS. Brit. Fung. Fl. I, 410 1892—PK. 68 Ann. Rep. N. Y. State Mus. 134, pl. 6, 1895 (ut *A. campester*)—MURRILL, Mycologia, XIV, 205, 1922 (ut *A. campester*).

[TANAKA, Bot. Mag. (Tokyo), II, (159), 1889]

*Agaricus campestris* L. Sp. Pl. 1173, 1753—PERS. Syn. Fung. 418, 1801—Sow. Engl. Fung. III, pl. 305, 1803 (teste FR.).

[THUNB. Fl. Jap. 346, 1784]

*Psalliota campestris* QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 140, 1872—SCHROET. Pilze Schles. I, 574, 1889—W. G. SM. Brit. Basid. 172, 1908—ROLLAND, Atlas Champ. 69, f. 157, 1910—RICKEN, Blätterp. 237, pl. 61, f. 6, 1915—KAUFFM. Agar. Mich. 240, 1918—REA, Brit. Basid. 87, 1922—LANGE, Agar. Denm. VI, 9, 1926—BRES. Icon. Myc. XVII, pl. 823, 1931—KILLERM. Pilze Bayer. VI, 48, 1936.

[P. HENN. ENGLERS Bot. Jahrb. XXXII, 41, 1903—MATSUM. Ind. Pl. Jap. I, 165, 1904]

*Pratella campestris* GILL. Hymen. Fr. 561, cum icone, 1874—QUÉL. Ench. Fung. 110, 1886.

Gregarious or solitary, edible. Pileus 5–10 cm. broad, globose, then convex, at length becoming plane; surface dry, white, then yellowish or rufescent, silky-even or floccose-squamulose, rarely scaly, margin incurved and with a silky whitish veil at the young stage; context white, rarely becoming reddish or sometimes fuscous when old, fleshy, compact, becoming soft, thick, taste and odour pleasant; lamellae free, whitish, then pinkish, at length purplish brown or blackish brown, broad, tapering toward both ends, ventricose, crowded; stipe 5–10 cm. long, 7–20 mm. thick, equal, white, smooth, solid, hard; annulus white, membranous, rather thick, persistent, sometimes evanescent, rather superior; spores blackish brown in mass, broadly ellipsoidal, smooth, 6–9.5 × 4.5–7  $\mu$ .

Hab. on the ground in pastures, lawns and grassy ground. Summer to autumn. Ishikari (Sapporo, Nopporo).

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

Jap. name. *Hara-take* (TANAKA).

## 2. *Agaricus silvicola* (VITT.) SACC.

Syll. Fung. V, 998, 1887; Fl. Ital. Crypt., Hymen. 801, 1916—MURRILL, Mycologia, XIV, 209, 1922.

*Agaricus campestris* var. *silvicola* VITT. Fung. Mang. 49, pl. 7, f. 7-9, 1835—FR. Epicr. Myc. 213, 1838; Hymen. Eur. 280, 1874—BERK. Outl. Brit. Fung. 166, 1860—CKE. Handb. Brit. Fung. I, 138, 1871; Ill. Brit. Fung. pl. 529, 1888—KARST. Hattsv. I, 485, 1879—WINT. Die Pilze, I, 658, 1884—MASS. Brit. Fung. Fl. I, 412, 1892.

*Psalliota campestris* var. *silvicola* QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 140, 1872—W. G. SM. Brit. Basid. 172, 1908—KAWAMURA, Ill. Jap. Fung. pl. 14, f. 1-2, 1915.

*Pratella campestris* var. *silvicola* GILL. Hymen. Fr. 562, cum icone, 1874.

*Agaricus abruptus* (non FR.) PK. Mem. N. Y. State Mus. III, 163, pl. 59, f. 8-14, 1901.

*Agaricus abruptibulbus* PK. 94 Bull. N. Y. State Mus. 36, 1905.

*Psalliota silvicola* ROLLAND, Atlas Champ. 70, f. 160, 1910—REA, Brit. Basid. 88, 1922—KILLERM. Pilze Bayer. VI, 49, 1936.

[SHIRAI, List Jap. Fung. ed. 3, 304, 1927—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 115, 1931]

*Psalliota abruptibulba* KAUFFM. Agar. Mich. 237, pl. 47, 1918.

*Psalliota arvensis* var. *silvicola* LANGE Agar. Denm. VI, 7, 1926.

Solitary, edible. Pileus 5-12 cm. broad, subglobose, then convex and umbonate; surface whitish or yellowish, tinged with straw-color at the center or when bruised, or almost entirely colored with yellowish tint when dried, smooth, shining, glabrous or slightly decorated with small fibrous scales or fibrils; margin often appendiculate with partial veil; context white, then brownish, rather thin, odour and taste pleasant; lamellae free, whitish at first, then pinkish, finally blackish-brown, rather narrow, crowded; stipe 6-15 cm. long, 6-15 mm. thick, slightly attenuated upward from the subbulbous base, paler or concolorous, smooth, hollow; annulus membranous, thin, ample, superior, simple or often decorated with floccose patches below; spores dark-brown in mass, ellipsoidal, smooth, 6-7 × 3-4  $\mu$ .

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

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

Jap. name. *Shiro-morinokasa* (n. n.).

### 3. *Agaricus jezoensis* IMAI, sp. nov.

Gregarius vel caespitulus, edulis. Pileo 8–18 cm. lato, subglobo, dein convexo vel subumbonato, demum subplano, sicco, ochraceo, furfuraceo; carne albida vel flavidula, non mutabili, crassa; odore saporeque nullo; lamellis liberis, albidis, dein roseis, demum atro-purpureis, confertis; stipite 10–18 cm. longo, 10–25 mm. crasso, subaequali, deorsum leviter incrassato, albo vel albido, sericeo, e farcto cavo; annulo membranaceo, amplo, subtus flavo-furfuraceo, supero; sporis in cumulo atrobrunneis, ellipsoideis, levibus,  $6.5-8 \times 4-5 \mu$ .

Hab. on the ground in open woods or on lawns. Early autumn. Ishikari (Sapporo).

Distr. Endemic.

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

The present fungus somewhat resembles *A. augustus* FR. and *A. perrarus* (SCHULZ.) SACC., but it is easily distinguishable by the white stipe and less squamulose pileus.

### 4. *Agaricus hortensis* (CKE.) IMAI, comb. nov.

*Agaricus campestris* var. *hortensis* CKE. Handb. Brit. Fung. I, 138, 1871; Ill. Brit. Fung. pl. 527, 1886.

*Psalliota arvensis* var. *hortensis* W. G. SM. Brit. Basid. 171, 1908—REA, Brit. Basid. 84, 1922.

*Psalliota hortensis* LANGE, Agar. Denm. VI, 8, 1926.

*Agaricus campestris* subsp. *hortensis* KONR. et MAUBL. Icon. Sel. Fung. 60, 1927.

Gregarious or caespitose, edible. Pileus 8–11 cm. broad, gibbous or convex, then expanded, finally plane; surface dry, avellaneous, drab or woody-brown, even or cracked at the center, breaking up into fibrous-scales on the margin, with white or whitish veil at first; context fleshy, very thick, compact, whitish, becoming reddish, then brownish when cut, 1.5–2 cm. thick; lamellae free, whitish, then

vinaceous-buff, finally natal-brown, ventricose, equally attenuated at the both ends, crowded; stipe 5–7 cm. long, 14–23 mm. thick, equal or slightly attenuated upward, bulbous when young, whitish, slightly mealy above, even or squamulose below, firm, solid or stuffed; annulus membranous, white, median or slightly inferior, often fugacious, simple; spores dark purple-brown in mass, ellipsoidal, smooth, 6–7.5 × 4.5–5.5  $\mu$ .

Hab. on manured ground in farm. Autumn. Ishikari (Sapporo).

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

Jap. name. *Tsukuri-take* (n. n.).

The present fungus may probably be an escaped one from the cultivation-bed.

##### 5. *Agaricus silvaticus* SCHAEFF. ex FR.

Epicr. Myc. 214, 1838; Hymen. Eur. 280, 1874—RABENH. Deut. Krypt. Fl. I, 468, 1844—BERK. Outl. Brit. Fung. 167, 1860—KICKX, Fl. Crypt. Flandr. II, 173, 1867—CORDA, Champ. Fr. 91, 1870—CKE. Handb. Brit. Fung. I, 138, 1871; Ill. Brit. Fung. pl. 530, 1886; Handb. Austr. Fung. 60, 1892—KARST. Hattsv. I, 485, 1879—WINT. Die Pilze, I, 658, 1884—SACC. Syll. Fung. V, 1000, 1887; Fl. Ital. Crypt., Hymen. 800, 1916—MASS. Brit. Fung. Fl. I, 413, 1892—MURRILL, Mycologia, XIV, 218, 1922.

*Agaricus silvaticus* SCHAEFF. Fung. Bavar. IV, Ind. 62, pl. 242, 1774 (teste FR.).

*Psalliota silvatica* QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 140, 1872—SCHROET. Pilze Schles. I, 575, 1889 (ut *silvatica*)—W. G. SM. Brit. Basid. 173, 1908—RICKEN, Blätterp. 237, pl. 62, f. 4, 1915 (ut *silvatica*)—KAUFFM. Agar. Mich. 242, 1918 (ut *silvatica*)—REA, Brit. Basid. 89, 1922—KILLERM. Pilze Bayer. VI, 50, 1936 (ut *silvatica*).

*Pratella silvatica* GILL. Hymen. Fr. 564, cum icone, 1874—QUÉL. Ench. Fung. 110, 1886 (ut *silvatica*).

*Psalliota sanguinaria* KARST. Hattsv. II, 232, 1882 (teste LANGE)—LANGE, Agar. Denm. VI, 9, 1926.

Solitary or gregarious, edible. Pileus 7–10 cm. broad, ovate to campanulate, then flattened, often somewhat umbonate, at length very rarely slightly depressed at the center and upturned at the margin; surface at first grayish, then yellowish-white, covered with brown floccose scales, continuous and madder-brown at the center; context white, thick, taste and odour agreeable; lamellae free, whitish at first, then reddish, finally fuscous, ventricose, equally attenuated

at both ends, thin, crowded; stipe 6–10 cm. long, 8–15 mm. thick, equal, but swollen at the base, white or dingy white, glabrous above the annulus, fibrillose below the annulus, hollow; annulus membranous, ample, white, simple, but floccose on the under side; spores fuscous in mass, ellipsoidal, smooth,  $5-6.5 \times 3.5-4 \mu$ .

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

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

Jap. name. *Ômorinokasa* (n. n.).

### 6. *Agaricus arvensis* SCHAEFF. ex FR.

Epicr. Myc. 213, 1838; Hymen. Eur. 278, 1874—RABENH. Deut. Krypt. Fl. I, 468, 1844—BERK. Outl. Brit. Fung. 166, pl. 10, f. 4, 1860—KICKX, Fl. Crypt. Flandr. II, 172, 1867—CORDA, Champ. Fr. 88, pl. 20, f. 2, 1870—CKE. Handb. Brit. Fung. I, 137, 1871; Ill. Brit. Fung. pl. 523, 1886; Handb. Austr. Fung. 62, 1892—KARST. Hattsv. I, 483, 1879—WINT. Die Pilze, I, 659, 1884—SACC. Syll. Fung. V, 994, 1887; Fl. Ital. Crypt., Hymen. 802, 1916—MASS. Brit. Fung. Fl. I, 412, 1892—PK. 68 Ann. Rep. N. Y. State Mus. 140, pl. 8, 1895.

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

*Agaricus arvensis* SCHAEFF. Fung. Bavar. IV, Ind. 73, pl. 310–311, 1774 (teste FR.).

*Agaricus Georgii* WITH. Bot. Arr. Brit. Pl. IV, 206, 1796—Sow. Engl. Fung. III, pl. 304, 1803 (teste FR.).

*Agaricus edulis* PERS. Syn. Fung. 418, 1801.

*Agaricus exquisitus* VITT. Fung. Manger. 146, pl. 18, 1833 (teste FR.).

*Agaricus (Psalliota) Georgii* BERK. in SMITH, Engl. Fl. V, (2), 105, 1836 (teste FR.).

*Psalliota arvensis* QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 139, 1872—SCHROET. Pilze Schles. I, 575, 1889—W. G. SM. Brit. Basid. 171, 1908—ROLLAND, Atlas Champ. 69, f. 159, 1910—KAUFFM. Agar. Mich. 236, pl. 46, 1918—REA, Brit. Basid. 84, 1922—LANGE, Agar. Denm. VI, 7, 1926—BRES. Icon. Myc. XVII, pl. 821, 1931—KILLERM. Pilze Bayer. VI, 47, 1936.

*Pratella arvensis* GILL. Hymen. Fr. 563, cum icone, 1874—QUÉL. Ench. Fung. 109, 1886.

*Agaricus pratensis* SCOP. ex MURRILL, Mycologia, XIV, 208, 1922.

Solitary or gregarious, edible. Pileus 6–16 cm. broad, conical or convex, then expanded; surface dry, subshining, glabrous or fibrilloso-squamulose, whitish, becoming yellowish with age or on drying, slightly darker at the disc; context white or tinged with yellow, thick, compact, firm, at length softer, odour pleasant, taste mild; lamellae free,

crowded, broad, ventricose, at first pallid, becoming grayish pink, finally blackish-brown; stipe 5–15 cm. long, 8–20 mm. thick, equal, bulbous at the base, whitish, often stained with yellow, shining, glabrous or with small fibrous scales, stuffed or hollow; annulus membranous, large, superior, whitish above, provided with pale-ochraceous-buff colored and radiately splitting thicker patches on the under surface; spores bister color in mass, broadly ellipsoidal, smooth,  $7-9 \times 4-5 \mu$ .

Hab. on the ground in pastures, fields and woods borders. Summer to autumn. Ishikari (Sapporo, Nopporo), Kushiro (Lake side of Akan).

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

Jap. name. *Ôharatake* (KAWAMURA).

### 7. *Agaricus placomyces* PK.

29 Ann. Rep. N. Y. State Mus. 40, 1878; 48 Ann. Rep. N. Y. State Mus. 142, pl. 9, f. 7–12, 1895—SACC. Syll. Fung. V, 1003, 1887—ATKINS. Mushrooms, ed. 2, 23, f. 21–23, 1903—KAWAMURA, Ill. Jap. Fung. pl. 2, f. 5–7, 1914—PATTERS. & CHARL. Bull. U. S. Dept. Agr. No. 175, 32, pl. 25, f. 1, 1915—KAUFFM. Agar. Mich. 238, 1918—MURRILL, Mycologia, XIV, 218, 1922.

Gregarious or solitary, edible. Pileus 5–15 cm. broad, conical to umbonate, at length sometimes becoming subinfundibuliform by upturning of the margin; surface dry, whitish, covered with fibrous scales of blackish brown, darker and continuous at the center, paler or whitish at the margin; context white, rather thin, taste and odour none; lamellae free, whitish, then pinkish, at length blackish brown, crowded, broader in front; stipe 5–15 cm. long, 6–20 mm. thick, equal or attenuated upward, bulbous at the base, at first whitish, later becoming brownish, silky, powdery above the annulus, striate below, hollow; annulus large, membranous, white, double in young stage; spores blackish brown in mass, broadly ellipsoidal, smooth,  $4.5-6 \times 3-3.5 \mu$ .

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

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

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

8. *Agaricus subrufescens* PK.

46 Ann. Rep. N. Y. State Mus. 25, 1893; 48 Ann. Rep. N. Y. State Mus. 138, pl. 7, 1895—SACC. Syll. Fung. XI, 70, 1895—ATKINS. Mushrooms, ed. 2, 23, 1903—PATTERS. & CHARL. Bull. U. S. Dept. Agr. No. 175, 33, pl. 26, 1915—MURRILL, Mycologia, XIV, 219, 1922.

Solitary, gregarious or subcaespitose, edible. Pileus 5–15 cm. broad, at first hemispherical, then convex, finally plane, sometimes becoming wavy and split on the margin; surface silky-fibrillose, then becoming conspicuously squamulose with numerous, adpressed small ochraceous-tawny or pale tawny fibrillose scales, disc mars-brown color and not scaly; context white, unchanging color, soft, fragile when matured; lamellae free, crowded, at first whitish, then pinkish, finally blackish-brown; stipe 6–15 cm. long, 1–15 mm. thick, attenuated upward, subbulbous at the base, white and subglabrous above the annulus, floccose-fibrillose to somewhat scaly below the annulus, discolored to brownish with age, stuffed with soft white pith, then hollow; annulus membranous, ample, rather distant, double, glabrous and white above, ornamented with floccose, pale tawny scales below; spores blackish-brown in mass, broadly ellipsoidal, smooth,  $6-7.5 \times 4-5 \mu$ .

Hab. on humus ground under trees, or on leaf-mold in woods. Autumn. Ishikari (Sapporo), Kushiro (Mt. Meakan).

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

Jap. name. *Nise-mori-no-kasa* (n. n.).

Sect. *Minores* FR.

Hymen. Eur. 281, 1874.

Fructification smaller. Pileus thinly fleshy.

9. *Agaricus comtulus* FR.

Epicr. Myc. 215, 1838; Monogr. Hymen. Suec. I, 407, 1857; Hymen. Eur. 281, 1874—KARST. Hattsv. I, 486, 1879—WINT. Die Pilze, I, 657, 1884—CKE. Ill. Brit. Fung. pl. 533, 1886—SACC. Syll. Fung. V, 1006, 1887; Fl. Ital. Crypt., Hymen. 797, 1916 (ut *comptulus*)—MASS. Brit. Fung. Fl. I, 416, cum fig., 1892 (ut *comptulus*)—MURRILL, Mycologia, XIV, 202, 1922—LANGE, Agar. Denm. VI, 11, 1926.

*Psalliota comtula* QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 140. pl. 24, f. 2, 1872—W. G. SM. Brit. Basid. 173, 1908—

KAUFFM. Agar. Mich. 244, 1918—REA, Brit. Basid. 90, 1922—BRES. Icon. Myc. XVII, pl. 833, 1931—KILLERM. Pilze Bayer. VI, 51, 1936.

*Pratella comtula* GILL. Hymen. Fr. 565, 1874—QUÉL. Ench. Fung. 110, 1886.

*Psalliota rusiophylla* RICKEN, Blätterp. 238, pl. 62, f. 1, 1915.

Solitary or somewhat gregarious, edible. Pileus 3–4 cm. broad, conical to convex, then plane; surface whitish, yellowish or light drab, darker at the center, with adpressed silky fibrils, dry; context subfleshy, thin, white, tinged with yellow, taste and odour mild; lamellae free, crowded, flesh color, then rose, at length becoming dark-brown; stipe 3–5 cm. long, 3–7 mm. thick, attenuated upward, swelling at the base, whitish, tinged with yellow or pink, smooth, with silky stripes above the annulus, silky downy below, hollow; annulus membranous, thin, delicate, superior, yellowish white, often fugacious, irregularly ruptured; spores sooty-brown in mass, broadly ellipsoidal, smooth,  $4.5-5 \times 3-3.5 \mu$ .

Hab. on the ground in woods or grassy places under trees.  
Autumn. Ishikari (Nopporo).

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

Jap. name. *Ko-haratake* (n. n.).

#### 10. *Agaricus comptulellus* IMAI, sp. nov.

Gregarius vel solitarius. Pileo 1.5–2.2 cm. lato, e conico convexo, dein plano, demum leviter depresso, sicco, albo, adpresso-fibrilloso, siccitate ochroleuco; lamellis liberis, confertis, e albis roseis, demum fuscis; stipite 2–4 cm. longo, 2–2.5 mm. crasso, aequali, albo, siccitate flavescente, supra annulo glabro, infra fibrilloso; annulo membrano, tenui, supero, albido, fugaci; sporis in cumulo fuscis, late ellipsoideis, levibus,  $5-6 \times 3-4 \mu$ .

Hab. on the rotting fallen broad leaves on the ground in woods.  
Summer to autumn. Ishikari (Nopporo).

Distr. Endemic.

Jap. name. *Hime-shiro-morinokasa* (n. n.).

The present fungus is an intermediate form between *Ag. com-tulus* and *Ag. minimus* (RICK.), but it is easily distinguished from the former by the smaller size and its habitat, and from the latter by the larger size and its habitat.

**11. *Agaricus diminutivus* PK.**

Bull. Buffalo Soc. Nat. Sci. I, 53, 1873—KAUFFM. Agar. Mich. 245, pl. 50, f. 2, 1918—MURRILL, Mycologia, XIV, 214, 1922.

Solitary or gregarious in small groups. Pileus 2.5–5 cm. broad, convex or conico-convex, then expanded to subumbonate or plane; surface dry, whitish, provided with adpressed reddish-brown silky squamules, but continuous on the center; context whitish, not changing in color, thin, taste and odour none; lamellae free, whitish, then pinkish to brownish, finally dark brown, thin, crowded, ventricose; stipe 3–5 cm. long, 3–7 mm. thick, attenuated upward, slightly enlarged at the base, whitish or yellowish, often tinged with brownish when old or rubbed, glabrous or innately silky floccose, stuffed; annulus membranous, white, superior, thin, fugacious; spores dark purple-brown in mass, ellipsoidal, smooth,  $4.5-6.5 \times 3-4 \mu$ .

Hab. on the ground under trees. Autumn. Ishikari (Sapporo).

Distr. Japan (Hokkaido), North America.

Jap. name. *Ko-mori-no-kasa* (n. n.).

**12. *Agaricus semotellus* IMAI, sp. nov.**

Gregarius vel solitarius. Pileo 1–2.3 cm. lato, e conico convexo, dein umbonato, demum plano, sicco, fibrilloso vel fibrilloso-squamuloso, badio vel castaneo, margine pallidiore, carne alba, tenuissima; lamellis liberis, confertis, e albis fulvis, demum subcastaneis, angustissimis; stipite 2–6 cm. longo, 1.5–3 mm. crasso, sursum leviter attenuato, albo, subflavescente vel subfulvescente, supra annulo glabro sericeo-lucidoque, infra annulo fibrilloso; annulo membrano, fugaci, supero, albo; sporis in cumulo atro-purpureis, late ellipsoideis, levibus,  $5-6 \times 3-4 \mu$ .

Hab. among the fallen leaves on the ground in woods. Late summer to autumn. Ishikari (Nopporo).

Distr. Endemic.

Jap. name. *Hime-mori-no-kasa* (n. n.).

Tribe *Stropharieae* HEIM

Fungi Iberici, 131, 1934.

*Armillariées* ROXE, Bull. Soc. Bot. Fr. XXIII, 51, 1876, p. p.

*Nematolomés* FAYOD, Ann. Sci. Nat., Bot. 7 sér. IX, 369, 1889.

*Strophariées* KONR. et MAUBL. Icon. Sel. Fung. 28 & 92, 1924, p. p.

*Stropharioideae* SINGER, Ann. Myc. XXXIV, 340, 1936, p. p.

Fructification fleshy, with annulus or marginal veil. Pileus confluent and homogeneous with the fibrous-fleshy stipe. Lamellae attached with the stipe, fleshy, soft. Spores fuscous- or blackish-purple in mass.

## Key to the genera.

1. Fructification with an annulus..... *Stropharia*.
2. Fructification with a marginal veil..... *Hypholoma*.

*Stropharia* (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 63 et 141, 1872.

*Agaricus* § *Stropharia* FR. Summa Veg. Scand. 295, 1849.

*Geophila* § *Stropharia* QUÉL. Ench. Fung. 111, 1886.

*Psalliota* § *Stropharia* SCHROET. Pilze Schles. I, 573, 1889.

Fructification with a persistent or fugacious, membranous annulus. Pileus fleshy, regular, confluent and homogeneous with the fibrous stipe. Stipe central. Lamellae adnate. Spores fuscous-purple or blackish in mass.

Type species: *Agaricus aeruginosus* CURT. ex FR.

## Key to the sections and species in Hokkaido.

- I. Pellicle of the pileus even or scaly, most frequently viscid.....  
..... Sect. *Viscipelles*.
  - A. Pileus ornamented with scattered floccose scales.
    1. Pileus greenish; scales white..... *S. aeruginosa* (1).
    2. Pileus orange-rufous; scales yellowish..... *S. aurantiaca* (2).
  - B. Pileus adpressed fibrillose.
    1. Pileus whitish or yellowish, with brownish fibrils; stipe bulbous....  
..... *S. bulbosa* (3).

2. Pileus with reddish brown colored fibrils; stipe not bulbous.....  
 ..... *S. rugoso-annulata* (4).
- C. Pileus glabrous.
1. Pileus large (up to 15 cm. or more broad).
- a. Pileus cream-buff to cinnamon; stipe conspicuously fibrillose-scaly  
 ..... *S. Hornemanni* (5).
2. Pileus rather small (less than 6 cm. broad).
- a. Context becoming blue when bruised..... *S. venenata* (6).
- b. Context not changing color.
- i. Stipe rather thick.
- α. Pileus yellow, not hygrophanous..... *S. coronilla* (7).
- β. Pileus ochraceous, hygrophanous..... *S. merdaria* (8).
- ii. Stipe slender and long.
- α. Pileus not umbonate or slightly obtusely umbonate.  
 \* Pileus remaining hemispheric..... *S. semiglobata* (9).  
 \*\* Pileus more or less expended..... *S. stercoraria* (10).
- β. Pileus decidedly umbonate..... *S. umbonatescens* (11).

### Sect. *Viscipelles* FR.

Hymen. Eur. 283, 1874.

Pellicle of the pileus even or scaly, most frequently viscid.

#### 1. *Stropharia aeruginosa* (CURT. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 141, 1872  
 —GILL. Hymen. Fr. 577, cum icone, 1874—KARST. Hattsv. I, 488, 1879—SACC.  
 Syll. Fung. V, 1013, 1887—MASS. Brit. Fung. Fl. I, 397, 1892—W. G. SM.  
 Brit. Basid. 176, 1908—ROLLAND, Atlas Champ. 72, f. 167, 1910—HARPER, Trans.  
 Wisc. Acad. Sci. Arts & Lett. XVII. 1017, pl. 64, 1914—RICKEN, Blätterp. 239,  
 pl. 63, f. 4, 1915—KAUFFM. Agar. Mich. 247, 1918—REA, Brit. Basid. 125, 1922—  
 LANGE, Agar. Denm. V, 32, 1923—BRES. Icon. Myc. XVII, pl. 835, 1931.

[KAWAMURA, Jap. Fung. no. 57, 1929]

*Agaricus acuminatus* SCOP. Fl. Carn. ed. 2, II, 447, 1772 (teste FR.).

*Agaricus viridulus* SCHAEFF. Fung. Bavar. IV, Ind. 1, pl. 1, 1774 (teste  
 FR.).

*Agaricus aeruginosus* CURT. Fl. Lond. 70, 1788—PERS. Syn. Fung. 419,  
 1801—SOW. Engl. Fung. III, pl. 264, 1803 (teste FR.).

*Agaricus (Psalliota) aeruginosus* FR. Syst. Myc. I, 286, 1821; Epicr. Myc.  
 218, 1838—BERK. in SMITH, Engl. Fl. V, (2), 109, 1836; Outl. Brit. Fung. 168,  
 1860—RABENH. Deut. Krypt. Fl. I, 467, 1844.

*Agaricus (Stropharia) aeruginosus* FR. Summa Veg. Scand. 295, 1849;  
 Hymen. Eur. 284, 1874—KICKX, Fl. Crypt. Flandr. II, 173, 1867—CKE. Handb.

Brit. Fung. I, 140, 1871; Ill. Brit. Fung. pl. 551, 1886—WINT. Die Pilze, I, 656, 1884.

*Geophila (Stropharia) aeruginosa* QUÉL. Ench. Fung. 111, 1886.

*Psalliota (Stropharia) viridula* SCHROET. Pilze Schles. I, 573, 1889.

*Stropharia acuminata* SACC. Fl. Ital. Crypt., Hymen. 813, 1916—MURRILL, Mycologia, XIV, 128, 1922.

Solitary or gregarious, said to be poisonous. Pileus 4–8 cm. broad, convex, then plane or subumbonate; surface lumiere-green to verdigris-green, then yellowish when dried, smooth, slimy, besprinkled with scattered fugacious scales in young stage, especially on the margin, taste and odour none; lamellae adnate or decurrent by a tooth, rather broad, moderately crowded, whitish or grayish, then purplish brown; stipe 5–10 cm. long, 5–15 mm. thick, attenuated upward or equal, blue then yellowish, viscid, covered with white, fugacious scales below the annulus in young stage, not smooth above, hollow, with white rhizoids at the base; annulus white, fugacious, rather inferior; spores dark brown in mass, ellipsoidal,  $7.5-9 \times 4.5-6 \mu$ .

Hab. on the ground in woods. Autumn. Ishikari (Nopporo, Jôzankei), Oshima (Ônomura), Kitami (Oketo), Kushiro (Akan).

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

Jap. name. *Moegitake* (KAWAMURA).

## 2. *Stropharia aurantiaca* (CKE.) IMAI, comb. nov.

*Agaricus thraustus* var. *aurantiacus* CKE. Ill. Brit. Fung. pl. 555, 1886.

*Stropharia Percevali* var. *aurantiaca* SACC. Syll. Fung. V, 1016, 1887.

*Stropharia squamosa* var. *aurantiaca* MASS. Brit. Fung. Fl. I, 402, 1892—W. G. SM. Brit. Basid. 177, 1908—REA, Brit. Basid. 128, 1922.

*Stropharia squamosa* var. *thrausta* LANGE, Agar. Denm. V, 33, 1923.

Gregarious or solitary. Pileus 3–7 cm. broad, hemispherical, then expanding subumbonate; surface subviscid to dry, orange-rufous or mars-orange, besprinkled with superficial, fugacious, pilosofasciculate, light-yellow, concentric scales; context white, slightly reddish immediately beneath pellicle, rather thin; lamellae adnate or sinuate, crowded, cinereous, then dark seal-brown, ventricose, white on the edge; stipe 6–12 cm. long, 4–6 mm. thick, white above the annulus, either squarrose with fibrillose reflexed concolorous scales,

or covered over with dense, strigose concolorous down below the annulus, darker at the base, stuffed or hollow; annulus membranous, thin, distant, persistent; spores purple-brown in mass, oblong-ellipsoid, smooth,  $10-14 \times 5-7 \mu$ .

Hab. on the ground or on humus in woods, fields and gardens. Autumn. Ishikari (Sapporo), Iburi (Lake side of Shikotsu).

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

Jap. name. *Kabairo-take* (n. n.).

### 3. *Stropharia bulbosa* IMAI, sp. nov.

Solitaria. Pileo circa 6 cm. lato, convexo, dein plano, leviter depresso, viscidulo, brevi sicco, albido, flavidulo vel fulvidulo, margine albo, squamuloso vel tesserullato-squamuloso, fulvidulo; carne alba, crassa; lamellis adnexis, primo albidis, dein purpureo-cinereis, confertissimis, acie albo-crenulatis; stipite circa 6 cm. longo et 1 cm. crasso, basi bulboso usque at 2 cm. in diam., albo, sericeo-nitente, glabro, apice leviter furfuraceo, farcto; annulo albo, angusto, supero striato-sulcato, persistente; sporis in cumulo atro-purpureis, late ellipsoideis, laevibus,  $11-12.5 \times 6-7.5 \mu$ .

Hab. on the ground among grasses in field. Autumn. Ishikari (Nopporo).

Distr. Endemic.

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

The present fungus somewhat resembles *St. squamosa* (FR.) QUÉL. from which it is distinguishable by the bulbous stipe. From *S. coronilla* (BULL. ex FR.) QUÉL., *S. melasperma* (BULL. ex FR.) QUÉL., etc., the fungus is easily distinguished by the nature of pileus and the bulbous stipe.

*S. versicolor* (FR.) SACC. having a bulbous stipe differs from this fungus by the color of the lamellae.

### 4. *Stropharia rugosoannulata* FARLOW

in MURRILL, Mycologia, XIV, 139, 1922—BURT, Icon. Farlowiana, pl. 65, 1929.

Solitary or gregarious. Pileus 3-17 cm. broad, convex, then plane, at length upturned at the margin; surface subviscid when wet, shining when dry, densely covered with reddish-brown or dark

brown colored easily separable fibrous scales, sometimes with paler colored scales, or wholly covered on the surface with innate fibrils, margin paler and at first with a distinct white veil; context soft, rather thick, white, taste and odour none; lamellae adnate, at first whitish, then dark purplish gray, crowded; stipe 3–15 cm. long, 5–25 mm. thick, attenuated upward, whitish, then yellowish, silky fibrous, shining, slightly striate, stuffed or slightly hollow, with white rhizoids; annulus white or yellowish, median or superior, narrow, thick, easily separable, radiately ragged on the edge; spores purple-brown in mass, oblong-ellipsoidal or ellipsoidal, smooth,  $12-14 \times 7-8 \mu$ .

Hab. on the ground, on rotting straw or on dung in woods.  
Autumn. Ishikari (Noppero), Oshima (Ônomura).

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

Jap. name. *Saketsubatake* (n. n.).

##### 5. *Stropharia Hornemanni* (FR.) LUNDELL et NANNF.

Fung. Exsic. Suec. Fasc. I, no. 19, 1934.

*Agaricus depilatus* PERS. Syn. Fung. 408, 1801 (teste FR.).

*Agaricus (Psalliota) Hornemanni* FR. Syst. Myc. I, 285, 1821; Epicr. Myc. 218, 1838.

*Agaricus (Stropharia) Hornemanni* FR. Summa Veg. Scand. 295, 1849.

*Agaricus (Stropharia) depilatus* FR. Hymen. Eur. 283, 1874.

*Stropharia depilata* KARST. Hattsv. I, 487, 1879—SACC. Syll. Fung. V, 1012, 1887—HARPER, Trans. Wisc. Acad. Sci. Arts & Lett. XVII, 1016, pl. 62–63, 1914—KAUFFM. Agar. Mich. 249, 1918—REA, Brit. Basid. 125, 1922.

*Geophila (Stropharia) depilata* QUÉL. Ench. Fung. 111, 1886.

Subcaespitose or solitary. Pileus 3–15 cm. or more broad, convex to plane, or broadly umbonate, obtuse; surface viscid, smooth, cream-buff or light drab at first, then cinnamon-buff to cinnamon, glabrous, margin incurved, even and appendiculate when young; context firm, whitish, odour none, with somewhat disagreeable taste; lamellae adnate-decurrent, crowded, whitish, soon pale purple-drab or ashy, at length purplish-black, broad; stipe 4–20 cm. long, 8–15 mm. thick, subequal, white to pale yellow, floccose-scaly above the annulus, clothed below the annulus with subsquarrose, lacerate, fibrillose whitish or creamy-yellow scales, often deeply immersed in the substratum at the base, stuffed to hollow; annulus superior, submembranous, persistent, at first white, firm and erect, then becom-

ing deflected and clove-brown, radiately furrowed above, floccose below; spores purple-brown in mass, ellipsoidal, smooth,  $9-12 \times 5-6.5 \mu$ .

Hab. on rotting roots, logs and stumps of trees, mostly of conifers. Autumn. Ishikari (Mt. Kuradake).

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

Jap. name. *Tsuzuretake* (n. n.).

### 6. *Stropharia venenata* IMAI, nom. nov.

*Stropharia caerulescens* IMAI [non (PAT.) SINGER] Trans. Sapporo Nat. Hist. Soc. XII, 148, cum iconé, 1932.

Gregarious or caespitose, poisonous. Pileus 1.5–6 cm. or more broad, subconical or convex, then subumbonate, at length plane, slightly upturned at the margin; surface slightly viscid when wet, warm-buff or pinkish-buff to cinnamon-buff or buckthorn-brown at first, then becoming paler, often tinged with green, glabrous, smooth, almost non-striate on the margin; context whitish or grayish, turning to azure-blue when bruised, taste and odour none; lamellae adnate or adnexed, whitish or dingy-yellowish, then purplish-brown, crowded, slightly white-flocculose on the edge; stipe 3–9 cm. long, 5–9 mm. thick, equal, frequently compressed, uneven, silky white, dry, fibrous, especially below the annulus, fibrously stuffed or hollow, with white rhizoids at the base; annulus superior, membranous, or fibrous, very thin, early evanescent, white, silky; spores fuscous or purplish-brown in mass, ellipsoidal, subfusiform or broadly ellipsoidal, smooth,  $7-10.5 \times 4.25-7 \mu$ ; cystidia none.

Hab. on rotten wood or straw, or on horse-dung. Summer to autumn. Ishikari (Sapporo, District neighbouring to Asahigawa).

Distr. Japan (Hokkaido, Honshu).

Jap. name. *Shibiretake* (IMAI), *Waraitake-modoki* (MATSU-URA).

*Nematoloma caerulescens* PAT. was transferred by R. SINGER to the genus *Stropharia*, therefore it antedates for the Japanese fungus.

### 7. *Stropharia coronilla* (BULL. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 255, 1872—GILL. Hymen. Fr. 578, cum icone, 1874—SACC. Syll. Fung. V, 1014, 1887; Fl.

Ital. Crypt., Hymen. 812, 1916—MASS. Brit. Fung. Fl. I, 399, 1892—W. G. SM. Brit. Basid. 177, 1908—ROLLAND, Atlas Champ. 72, f. 168, 1910—RICKEN, Blätterp. 241, pl. 63, f. 5, 1915—KAUFFM. Agar. Mich. 250, 1918—REA, Brit. Basid. 127, 1922—LANGE, Agar. Denm. V, 33, 1923—BRES. Icon. Myc. XVII, pl. 836, 1931.

*Agaricus coronillus* BULL. Champ. Fr. pl. 597, 1793 (teste FR.).

*Agaricus (Psalliota) coronillus* FR. Syst. Myc. I, 282, 1821; Hymen. Eur. 285, 1874—WINT. Die Pilze, I, 655, 1884.

Solitary. Pileus 2–5 cm. broad, hemispherical to convex, at length expanded; surface glabrous, slightly viscid, smooth, whitish or ochraceous, margin even and white floccose or appendiculate; context white, firm, rather thick, odour faint, unpleasant; lamellae adnate or sinuate, crowded, rather broad, pallid to dark violet and at length purplish-black, white fimbriate on the edge; stipe 3–5 cm. long, 3–7 mm. thick, equal or slightly attenuated at the base, dry, smooth, white or slightly yellowish, fibrillose, solid or stuffed then subhollow; annulus distant, thick-membranous, persistent, plicate-sulcate above, white, becoming purplish by deposit of spores; Spores purple-brown in mass, ellipsoidal, smooth,  $8-10 \times 4-5 \mu$ .

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

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

Jap. name. *Ko-shiwatsubatake* (n. n.).

### 8. *Stropharia merdaria* (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 142, 1872—GILL. Hymen. Fr. 576, cum icone, 1874—KARST. Hattsv. I, 491, 1879—SACC. Syll. Fung. V, 1020, 1887; Fl. Ital. Crypt., Hymen. 810, 1916—MASS. Brit. Fung. Fl. I, 403, 1892—W. G. SM. Brit. Basid. 178, 1908—REA, Brit. Basid. 129, 1922—MURRILL, Mycologia, XIV, 138, 1922—KILLERM. Pilze Bayer. VI, 57, 1936—LANGE, Agar. Denm. XI, 32, 1936.

*Agaricus (Psilocybe) merdarius* FR. Syst. Myc. I, 291, 1821.

*Agaricus (Psalliota) merdarius* FR. Epier. Myc. 220, 1838.

*Agaricus (Stropharia) merdarius* FR. Hymen. Eur. 286, 1874—CKE. Ill. Brit. Fung. pl. 537, 1886; Handb. Austr. Fung. 62, 1892.

*Psilocybe merdaria* RICKEN, Blätterp. 251, pl. 66, f. 1, 1915.

Gregarious or somewhat caespitose. Pileus 2.5–5 cm. broad, convex to plane, obtuse; surface glabrous, with a viscid pellicle, moist, hygrophaneous, ochraceous-orange at the center, paler on the margin, margin becoming striatulate, often with appendiculate veil; context

whitish, thick at the disc; lamellae adnate with a decurrent tooth, very broad, subcrowded, pallid at the first, then fuscous; stipe 4–7 cm. long, 3–6 mm. thick, equal, tough, ivory-yellow above, cinnamon-buff below, stuffed or hollow; annulus concolorous, incomplete, torn, for the most part commonly adhering to the margin of pileus; spores brownish-black in mass, broadly ellipsoidal,  $10\text{--}12.5 \times 5\text{--}7.5 \mu$ , smooth.

Hab. on horse-dung. Autumn. Iburi (Lake side of Shikotsu), Oshima (Ōnomura).

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

Jap. name. *Kawari-ko-shiwatsubatake* (n. n.).

### 9. *Stropharia semiglobata* (BATSCH ex FR.) QUEL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 143, 1872—GILL. Hymen. Fr. 576, cum icone, 1874—KARST. Hattsv. I, 492, 1879—SACC. Syll. Fung. V, 1022, 1887; Fl. Ital. Crypt., Hymen. 809, 1916—MASS. Brit. Fung. Fl. I, 404, 1892—ATKINS. Mushrooms, ed. 2, 31, f. 30, 1903—W. G. SM. Brit. Basid. 178, 1908—HARPER, Trans. Wisc. Acad. Sci. Arts & Lett. XVII, 1022, 1914—RICKEN, Blätterp. 242, pl. 63, f. 2, 1915—KAUFFM. Agar. Mich. 252, 1918—REA, Brit. Basid. 129, 1922—MURRILL, Mycologia, XIV, 132, 1922—LANGE, Agar. Denm. V, 34, 1923—BRES. Icon. Myc. XVII, pl. 839, 1931.

*Agaricus semiglobatus* BATSCH, Elench. Fung. Cont. I, 141, pl. 21, f. 110, 1786—SOW. Engl. Fung. III, pl. 248, 1803—PERS. Syn. Fung. 407, 1801 (teste FR.).

*Agaricus (Psalliota) semiglobatus* FR. Syst. Myc. I, 284, 1821; Epicr. Myc. 220, 1838—BERK. in SMITH, Engl. Fl. V, (2), 108, 1836; Outl. Brit. Fung. 169, 1860—RABENH. Deut. Krypt. Fl. I, 466, 1844.

*Agaricus (Stropharia) semiglobatus* FR. Summa Veg. Scand. 295, 1849; Hymen. Eur. 287, 1874—CKE. Handb. Brit. Fung. I, 142, 1871; Ill. Brit. Fung. pl. 539, 1886; Handb. Austr. Fung. 62, 1892—WINT. Die Pilze, I, 653, 1884.

*Geophila (Stropharia) semiglobata* QUEL. Ench. Fung. 112, 1886.

Solitary or gregarious. Pileus 1–4 cm. broad, subglobose to hemispherical; surface straw-yellow, glabrous, smooth, glutinous, shining when dry; context pallid, then becoming yellowish, soft, odour and taste none; lamellae adnate, very broad, white or olive-gray, soon clouded with the ripening spores, white-floccose on the edge, plane; stipe 5–10 cm. long, 2–4 mm. thick, cylindrical, equal, rarely enlarged at the base, light yellow, smooth, glutinous, fistulose; annulus glutinous when wet, incomplete, superior; spores purplish-brown in mass,

ellipsoidal, smooth,  $12-18 \times 7-10 \mu$ ; sterile cells on the edge of lamellae short-filamentous,  $5-6 \mu$  thick, apex obtuse.

Hab. on horse-dung or manured ground in woods or fields. Summer to autumn. Ishikari (Sapporo, Nopporo).

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

Jap. name. *Shikon-manjugasa* (n. n.).

### 10. *Stropharia stercoraria* (BULL. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 143, 1872—GILL. Hymen. Fr. 577, 1874—KARST. Hattsv. I, 492, 1879—SACC. Syll. Fung. V, 1021, 1887; Fl. Ital. Crypt., Hymen. 810, 1916—MASS. Brit. Fung. Fl. I, 404, 1892—W. G. SM. Brit. Basid. 178, 1908—HARPER, Trans. Wisc. Acad. Sci. Arts & Lett. XVII, 1021, pl. 67, 1914—RICKEN, Blätterp. 242, 1915—REA, Brit. Basid. 129, 1922—LANGE, Agar. Denm. V, 34, 1923—BRES. Icon. Myc. XVII, pl. 838, 1931.

*Agaricus adnatus* HUDS. Fl. Angl. ed. 2, 619, 1778 (teste FR. ac MURR.).

*Agaricus stercorarius* BULL. Champ. Fr. pl. 566, f. 4, 1791—SCHUM. Enum. Pl. Saell. II, 286, 1803 (teste FR.).

*Agaricus (Psilocybe) stercorarius* FR. Syst. Myc. I, 291, 1821—BERK. in SMITH, Engl. Fl. V, (2), 111, 1836.

*Agaricus (Psalliota) stercorarius* FR. Epier. Myc. 220, 1838—RABENH. Deut. Krypt. Fl. I, 467, 1844—BERK. Outl. Brit. Fung. 168, 1860.

*Agaricus (Stropharia) stercorarius* FR. Summa Veg. Scand. 295, 1849; Hymen. Eur. 287, 1874—CKE. Handb. Brit. Fung. I, 142, 1871; Ill. Brit. Fung. pl. 533, 1886—WINT. Die Pilze, I, 654, 1884.

*Geophila (Stropharia) stercoraria* QUÉL. Ench. Fung. 112, 1886.

*Psalliota (Stropharia) stercoraria* SCHROET. Pilze Schles. I, 573, 1889.

*Stropharia adnata* MURRILL, Mycologia, XIV, 133, 1922.

Gregarious or solitary. Pileus 2–5 cm. broad, conico-campanulate or hemispherical, then expanded to broadly convex or convex, obtuse; surface straw-yellow or citron-yellow, glutinous, buff or whitish and shining or often cracking when dry, glabrous, smooth, pellicle separable, margin paler or whitish; context white or yellowish, taste slightly bitterish, odour none; lamellae adnate with a decurrent tooth, very broad, crowded, white to brownish or greenish black, whitish-flocculose on the edges; stipe 6–14 cm. long, 2–6 mm. thick, equal or slightly enlarged at the base, elongate, white-pruinose above the annulus, citron-yellow or yellowish-white-flocculose, viscid below the annulus, stuffed then hollow; annulus superior, viscid, thin, nar-

row, yellowish, floccose, spreading, evanescent; spores blackish-brown in mass, elongate-ellipsoidal, smooth,  $15-20 \times 7.5-10 \mu$ ; sterile cells on the sides and edge of lamellae lanceolate.

Hab. on horse-dung in woods. Summer to autumn. Ishikari (Sapporo, Jōzankei).

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

Jap. name. *Shikon-azirōgasatake* (n. n.).

### 11. *Stropharia umbonatescens* (PK.) SACC.

Syll. Fung. V, 1021, 1887 (ut *umbonescens*)—HARPER, Trans. Wisc. Acad. Sci. Arts & Lett. XVII, 1023, pl. 65, f. B, 1914—KAUFFM. Agar. Mich. 252, pl. 51, 1918—MURRILL, Mycologia, XIV, 128, 1922.

*Agaricus umbonatescens* PK. 30 Ann. Rep. N. Y. State Mus. 41, 1878.

Gregarious or solitary. Pileus 1–2.5 cm. broad, conico-campulate, at length more or less mammilately umbonate; surface yellow (antimony yellow to ochraceous-tawny or buckthorn-brown), brown or reddish-brown (vandyke-brown) at the disc, glabrous, smooth, even or obscurely striate, with viscid pellicle, shining; context thin, pallid; lamellae adnate, crowded, at first whitish, then gray, finally blackish-brown with a slight olivaceous tint; stipe 5–10 cm. long, 1–3 mm. thick, equal or slightly enlarged at the base, yellowish or brownish (paler than the pileus), covered at first with thin, obscure, scaly remnants of the veil up to the fugacious annulus, stuffed then hollow; spores purplish-black in mass, ellipsoidal, smooth,  $17.5-20 \times 10 \mu$ .

Hab. on horse-dung in woods. Autumn. Ishikari (Nopporo), Tokachi (Lake side of Shikaribetsu), Ihuri (Lake side of Shikotsu).

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

Jap. name. *Shikon-tsuzura-gasatake* (n. n.).

LANGE included the present species in the synonym of *Str. luteonitens* FR. in sensu RICKEN. HARPER suggested that the fungus is very close to *S. mammillata* KALCH. and probably identical with it. KAUFFMAN stated that the present fungus is distinguished from the others by rather foetid odour and larger spores, and especially from *S. paradoxa* P. HENN. which is closely allied, by the shape of pileus and the size of spores.

For the identification with one another of the species mentioned above further critical studies would be required.

*Hypholoma* (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 63 & 143, 1872.

*Agaricus* § *Hypholoma* FR. Syst. Myc. I, 287, 1821.

*Naematoloma* KARST. Hattsv. I, xxv, 1879.

*Drosophila* § *Hypholoma* QUÉL. Ench. Fung. 115, 1886.

*Lacrymaria* PAT. Hymen. Eur. 122, 1887.

*Cortiniopsis* SCHROET. Pilze Schles. I, 566, 1889.

*Hypholomopsis* EARLE, Bull. N. Y. Bot. Gard. V, 436, 1909.

Pileus fleshy, firm or fragile, regular, with a marginal veil, confluent and subhomogeneous with fleshy or subfleshy stipe. Stipe central, fleshy or fibrous-fleshy. Lamellae sinuate, sinuato-adnate or adnexed. Spores fuscous-purple or purple-black in mass.

Type species: *Agaricus lateritius* SCHAEFF. ex FR.

## Key to the subgenera, sections and species in Hokkaido.

- I. Spores purplish-fuscous in mass, smooth, pellucid.... Subgen. *Euhypholoma*.
  - A. Fructification more or less yellow (ochraceous or brick-red); pileus somewhat fleshy, not hygrophanous..... Sect. *Flammuloides*.
    1. Pileus 3-10 cm. or more broad, fleshy, center brick-red.....  
..... *H. lateritium*(1).
    2. Pileus 3-7 cm. broad, yellowish; lamellae without greenish tint....  
..... *H. epixanthum*(2).
    3. Pileus 1.5-5 cm. broad, yellowish; lamellae with greenish tint.....  
..... *H. fasciculare*(3).
  - B. Fructification white, date-brown or fuscous; pileus rather thin, hygrophanous..... Sect. *Psathyroides*.
    1. Pileus date-brown when moist, fading when dry.
      - a. Lamellae at first whitish, soon violaceous, at length fuscous-purple..... *H. Candolleianum*(4).
      - b. Lamellae at first whitish, then pinkish, at length fuscous.....  
..... *H. stipatum*(5).
      - c. Lamellae at first whitish, then fawn-color, at length fuscous....  
..... *H. hydrophyllum*(6).
- II. Spores almost black in mass, verrucose, obscure..... Subgen. *Lacrymaria*.
  - A. Pileus fibrillose, tawny-brick-red..... *H. velutinum*(7).

Subgen. *Euhypholoma* LANGE

Agar. Denm. V, 38, 1923.

Spores purplish-fuscous in mass, smooth, pellucid.

Sect. *Flammuloides* LANGE

Agar. Denm. V, 38, 1923.

Fructification more or less yellow; pileus somewhat fleshy, not hygrophanous.

1. *Hypholoma lateritium* (SCHAEFF. ex FR.) SCHROET.

Pilze Schles. I, 572, 1889—SACC. Fl. Ital. Crypt., Hymen. 288, 1916.

[P. HENN. Hedw. XXXIX, (156), 1900—MATSUM. Ind. Pl. Jap. I, 148, 1904—SHIRAI, List Jap. Fung. 43, 1905; ed. 2, 291, 1917; ed. 3, 169, 1927]

*Agaricus lateritius* (p. p.) SCHAEFF. Fung. Bavar. IV, Ind. 22, pl. 49, f. 6-7, 1774 (teste FR.).

*Agaricus (Hypholoma) lateritius* FR. Syst. Myc. I, 288, 1821—BERK. in SMITH, Engl. Fl. V, (2), 110, 1836—RABENH. Deut. Krypt. Fl. I, 466, 1844—KICKX, Fl. Crypt. Flandr. II, 174, 1867.

*Agaricus (Hypholoma) sublateritius* FR. Epicr. Myc. 221, 1838; Hymen. Eur. 290, 1874—BERK. Outl. Brit. Fung. 169, 1860—CKE. Handb. Brit. Fung. I, 143, 1871; Ill. Brit. Fung. pl. 557, 1886.

*Hypholoma sublateritium* QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 143, 1872—GILL. Hymen. Fr. 572, cum icone, 1874—SACC. Syll. Fung. V, 1028, 1887—MASS. Brit. Fung. Fl. I, 380, 1892—ATKINS. Mushrooms, ed. 2, 26, f. 25, 1903—W. G. SM. Brit. Basid. 180, 1908—ROLLAND, Atlas Champ. 70, f. 162, 1910—KAWAMURA, Ill. Jap. Fung. pl. 1, f. 24-26, 1912—HARPER, Trans. Wisc. Acad. Sci. Arts & Lett. XVII, 1147, pl. 72, 1914—RICKEN, Blätterp. 248, pl. 65, f. 2, 1915—KAUFFM. Agar. Mich. 256, 1918—REA, Brit. Basid. 261, 1922—LANGE, Agar. Denm. V, 40, 1923—BRES. Icon. Myc. XVII, pl. 843-844, 1931—PARKER, Mycologia, XXV, 192, pl. 26, f. 8, 1933—KILLERM. Pilze Bayer. VI, 61, 1936.

[KAWAMURA, Bot. Mag. (Tokyo), XXIII, (166), f. 1, 1909—SHIRAI, List Jap. Fung. ed. 2, 291, 1917; ed. 3, 170, 1927—UMEMURA, Pl. Fujiyama. 373, 1923]

*Naematoloma sublateritium* KARST. Hattsv. I, 495, 1879.

*Geophila (Stropharia) sublateritia* QUÉL. Ench. Fung. 113, 1886.

Gregarious or caespitose, edible. Pileus 3-10 cm. or more broad, convex to conical, then conical-umbonate or convex, finally nearly plane; surface tawny-brick-red, paler on the margin, dry or slightly viscid when wet, covered with a superficial, somewhat silky, whitish cloudiness, then smooth, glabrous, margin often provided with a veil in young stage; context thick, compact, white then yellowish, taste mild or slightly bitterish, odour faint; lamellae adnate or sinuate, yellowish, then light brownish drab, at length deep brownish drab; stipe 7-12 cm. or more long, 7-12 mm. thick, attenuated downward

or upward, rarely equal, yellow or yellowish, ferruginous downward, firm, fibrilloso-squamulose, stuffed then hollow; cortina white or yellowish, soon lost; spores bay-brown in mass, ellipsoidal,  $6-8 \times 4-5 \mu$ .

Hab. on rotten trunks of deciduous trees in woods. Autumn. Oshima (Ônomura), Iburi (Lake side of Shikotsu, Chitose), Ishikari (Sapporo, Nopporo, Jôzankei, Mt. Taisetsu), Tokachi (Urimappu, Lake side of Shikaribetsu), Kushiro (Lake side of Akan, Mt. Meakan), Kitami (Oketo forest).

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

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

## 2. *Hypholoma epixanthum* (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 144, 1872—GILL. Hymen. Fr. 574, 1874—SACC. Syll. Fung. V, 1029, 1887; Fl. Ital. Crypt., Hymen. 823, 1916—MASS. Brit. Fung. Fl. I, 381, 1892—W. G. SM. Brit. Basid. 180, 1908—RICKEN, Blätterp. 248, 1915—REA, Brit. Basid. 262, 1922—BRES. Icon. Myc. XVII, pl. 846, 1931.

*Agaricus* (*Hypholoma*) *epixanthus* FR. Epicr. Myc. 122, 1838; Hymen. Eur. 291, 1874—CKE. Handb. Brit. Fung. I, 143, 1871; Ill. Brit. Fung. pl. 560, 1886.

*Naematoloma epixanthum* KARST. Hattsv. I, 495, 1879.

*Geophila* (*Stropharia*) *epixantha* QUÉL. Ench. Fung. 113, 1886.

Caespitose. Pileus 3-7 cm. broad, convex-plane, obtuse or gibbous, sometimes depressed at the center; surface wet, light yellow, usually darker at the center, slightly silky, then becoming smooth, margin appendiculate with fugacious veil; veil white, silky, fugacious; context yellowish at the pileus, odour unpleasant; lamellae sinuato-adnate, yellowish-white or citrin-yellow, then cinereous or cinereous-purple, crowded, rather broad, edge white-fimbriate; stipe 5-10 cm. long, 6-10 mm. thick, subequal or attenuated from the thickened base, often compressed, floccose-fibrillose, pallid above, fuscous below, apex pruinose, hollow; spores fuscous-purple in mass, ellipsoidal, smooth,  $7-8 \times 4-5 \mu$ .

Hab. on or about the trunks of trees. Autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido), Europe.

Jap. name. *Kachiguritake* (n. n.).

### 3. *Hypholoma fasciculare* (HUDS. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 144, 1872—GILL. Hymen. Fr. 573, cum icone, 1874—SACC. Syll. Fung. V, 1029, 1887; Fl. Ital. Crypt., Hymen. 823, 1916—SCHROET. Pilze Schles. I, 572, 1889—MASS. Brit. Fung. Fl. I, 382, 1892—W. G. SM. Brit. Basid. 181, 1908—ROLLAND, Atlas Champ. 71, f. 163, 1910—HARPER, Trans. Wisc. Acad. Sci. Arts & Lett. XVII, 1149, pl. 75, 1914—RICKEN, Blätterp. 249, pl. 65, f. 1, 1915—KAWAMURA, Ill. Jap. Fung. pl. 16, f. 16-17, 1915—REA, Brit. Basid. 262, 1922—LANGE, Agar. Denm. V, 40, 1923—BRES. Icon. Myc. XVII, pl. 847, 1931—PARKER, Mycologia, XXV, 194, 1933.

[P. HENN. Hedw. XXXIX, (156), 1900; in ENGLERS Bot. Jahrb. XXXII, 40, 1903—MATSUM. Ind. Pl. Jap. I, 148, 1904—SHIRAI, List Jap. Fung. 43, 1905; ed. 2, 289, 1917; ed. 3, 169, 1927—UMEMURA, Bot. Mag. (Tokyo), XXVI, (152), 1912—YASUDA, Bot. Mag. (Tokyo), XXXVII, (205), 1923—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 115, 1931]

*Agaricus lateritius* (p. p.) SCHAEFF. Fung. Bavar. IV, Ind. 22, pl. 49, f. 1-5, 1774.

*Agaricus fascicularis* HUDS. Fl. Angl. ed. 2, 615, 1778—Sow. Engl. Fung. III, pl. 285, 1803 (teste FR.).

*Agaricus (Hypholoma) fascicularis* FR. Syst. Myc. I, 288, 1821; Epicr. Myc. 122, 1838; Hymen. Eur. 291, 1874—BERK. in SMITH, Engl. Fl. V, (2), 111, 1836; Outl. Brit. Fung. 169, pl. 11, f. 1, 1860—RABENH. Deut. Krypt. Fl. I, 465, 1844—KICKX, Fl. Crypt. Flandr. II, 175, 1867—CKE. Handb. Brit. Fung. I, 144, 1871; Ill. Brit. Fung. pl. 561, 1886; Handb. Austr. Fung. 62, 1892.

*Naematoloma fasciculare* KARST. Hattsv. I, 496, 1879.

*Geophila (Stropharia) fascicularis* QUÉL. Ench. Fung. 113, 1886.

Caespitose, usually harmless, but at times poisonous. Pileus 1.5-5 cm. broad, convex to expanded, obtuse, or umbonate; surface light yellow, center darker or brownish, often with bluish tint, dry, smooth, glabrous, sometimes with radiate shrinkages at the center, often provided with a fibrillose veil at the margin; context yellow, thin, taste slightly bitter; lamellae adnexed, very crowded, linear, 2-3 mm. wide, sulphur-yellow, then greenish, finally olive-brown; stipe 3-8 cm. long, 2-5 mm. thick, equal, smooth, glabrous, or fibrillose, sulphur-color to lemon color, hollow; cortina yellow-white, fibrillose, soon disappearing; spores purple-brown in mass, ellipsoidal, 5-7.5 × 4-5  $\mu$ .

Hab. on dead wood in woods. Summer to autumn. Ishikari (Sapporo, Nopporo, Jôzankei, Asahigawa, Sôunbetsu), Kushiro (Lake side of Akan), Kitami (Oketo forest), Oshima (Ônomura), Iburi (Lake side of Shikotsu, Chitose).

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

Jap. name. *Niga-kuritake* (KAWAMURA), *Yanagitake* (SHIRAI ex P. HENN.).

#### Sect. *Psathyroides* LANGE

Agar. Denm. V, 38, 1923.

Fructification white, date-brown or fuscous; pileus rather thin, hygrophaneous.

#### 4. *Hypholoma Candolleianum* (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 146, 1872—GILL. Hymen. Fr. 570, 1874—KARST. Hattsv. I, 501, 1879—SACC. Syll. Fung. V, 1038, 1887; Fl. Ital. Crypt., Hymen. 819, 1916—MASS. Brit. Fung. Fl. I, 391, 1892—W. G. SM. Brit. Basid. 183, 1908—HARPER, Trans. Wisc. Acad. Sci. Arts & Lett. XVII, 1156, pl. 80, 1914—RICKEN, Blätterp. 246, pl. 64, f. 4, 1915—KAUFFM. Agar. Mich. 264, 1918—REA, Brit. Basid. 266, 1922—LANGE, Agar. Denm. V, 42, 1923—KONR. & MAUBL. Icon. Sel. Fung. pl. 43, 1924, p. p.—BRES. Icon. Myc. XVIII, pl. 852, 1931—PARKER, Mycologia, XXV, 177, pl. 26, f. 12; pl. 27, f. 18; pl. 28, f. 29, 1933.

*Agaricus violaceo-lamellatus* DC. Fl. Fr. II, 143, 1815 (teste FR.).

*Agaricus Candollianus* FR. Obs. Myc. II, 182, 1818.

*Agaricus (Psathyra) Candollianus* FR. Syst. Myc. I, 296, 1821, p. p.—BERK. in SMITH, Engl. Fl. V, (2), 113, 1836.

*Agaricus (Hypholoma) Candollianus* FR. Epicr. Myc. 224, 1838; Hymen. Eur. 295, 1874 (ut *Candolleianus*)—RABENH. Deut. Krypt. Fl. I, 465, 1844—BERK. Outl. Brit. Fung. 170, 1860—CKE. Handb. Brit. Fung. I, 145, 1871; Ill. Brit. Fung. pl. 546, 1886; Handb. Austr. Fung. 63, 1892.

*Drosophila (Hypholoma) Candolleana* QUÉL. Ench. Fung. 115, 1886.

Caespitose or densely gregarious, edible. Pileus 3–7 cm. broad, campanulate then expanded to convex, at length flattened, obtuse; surface at first pale honey-yellow or date-brown, then fading to whitish, but remaining ochraceous at the disc, glabrous, but pruinose under lens, even or slightly wrinkled when dry, margin at first appendiculate with the fragments of white fugacious veil; veil white, fugacious, appendiculate; context white, thin, odour and taste none; lamellae rounded-adnexed, then separating, at first whitish, rather soon violaceous, at length fuscous-purple, crowded, narrow, edge at

first white-fimbriate; stipe 4–7 cm. long, 4–8 mm. thick, equal, cylindrical, white, fibrillose, apex striate and furfuraceous, hollow, rigid, fragile; spores fuscous-purple in mass, ellipsoidal, smooth, 10–12.5 × 6–7  $\mu$ .

Hab. on the ground or around dead tree trunks. Summer to autumn. Ishikari (Sapporo, Nopporo), Oshima (Ônomura).

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

Jap. name. *Ô-itachitake* (n. n.).

### 5. *Hypholoma stipatum* (PERS. ex FR.) IMAI, comb. nov.

*Agaricus appendiculatus* BULL. Champ. Fr. pl. 392, 1791—Sow. Engl. Fung. III, pl. 324, 1803 (teste FR.).

*Agaricus stipatus* PERS. Syn. Fung. 423, 1801 (teste FR.).

*Agaricus (Psathyra) stipatus* FR. Syst. Myc. I, 296, 1821, p. maj. p.

*Agaricus (Hypholoma) appendiculatus* FR. Epicr. Myc. 224, 1838; Hymen. Eur. 296, 1874—BERK. Outl. Brit. Fung. 170, pl. 11, f. 3–4, 1860—CKE. Handb. Brit. Fung. I, 146, 1871; Ill. Brit. Fung. pl. 547, 1886.

*Hypholoma appendiculatum* QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 146, 1872—GILL. Hymen. Fr. 570, cum icone, 1874—KARST. Hattsv. I, 502, 1879—SACC. Syll. Fung. V, 1039, 1887; Fl. Ital. Crypt., Hymen. 820, 1916—SCHROET. Pilze Schles. I, 571, 1889—MASS. Brit. Fung. Fl. I, 392, 1892—ATKINS. Mushrooms, ed. 2, 27, f. 26–27, 1903—W. G. SM. Brit. Basid. 183, 1908—RICKEN, Blätterp. 247, pl. 64, f. 5, 1915—KAWAMURA, Ill. Jap. Fung. pl. 16, f. 1–5, 1915—HARPER, Trans. Wisc. Acad. Sci. Arts & Lett. XVIII, 413, pl. 22, f. A, B, C, 1916—KAUFFM. Agar. Mich. 264, 1918—REA, Brit. Basid. 267, 1922—BRES. Icon. Myc. XVIII, pl. 853, 1931—PARKER, Mycologia, XXV, 183, 1933.

[P. HENN. ENGLERS Bot. Jahrb. XXXI, 738, 1902; Ibid. XXXII, 40, 1903; Ibid. XXXIV, (600), 1905—SHIRAI, List Jap. Fung. 43, 1905; ed. 2, 289, 1917; ed. 3, 169, 1927—UMEMURA, Pl. Fujiyama. 373, 1923]

*Drosophila (Hypholoma) appendiculata* QUÉL. Ench. Fung. 116, 1886.

Caespitose or densely gregarious, edible. Pileus 2–6 cm. broad, campanulate-hemispherical, then expanded, at length nearly plane, obtuse; surface varying in color, from white or pale-yellow to light brown or dark honey-brown, fading when dry or old, hygrophonous, glabrous or whitish-pulverulent, rarely floccose-scaly, slightly wrinkled and almost atomate when dry, margin slightly striatulate, appendiculate with the fragments of white, flocculent, fugacious veil; veil white, appendiculate, fugacious or rarely subpersistent; context pallid, subconcolorous, thin, odour and taste none; lamellae subadnate or broadly adnate, white at first, then pinkish, at length fuscous, at first fimbriate on the edge, crowded, narrow; stipe 3–

8 cm. long, 3–6 mm. thick, equal, cylindrical, fistulose, straight or curved, white, glabrous, silky-shining, pruinose at the apex, fragile; spores fuscous-purple in mass, ellipsoidal, smooth,  $7-8 \times 4-5 \mu$ .

Hab. on the ground or around dead tree trunks. Summer to autumn. Ishikari (Sapporo, Nopporo, Jôzankei).

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

Jap. name. *Itachi-take* (KAWAMURA).

### 6. *Hypholoma hydrophilum* (BULL. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul Montb. 2 sér. V, 146, 1872—KARST. Hattsv. I, 502, 1879—SACC. Syll. Fung. V, 1041, 1887; Fl. Ital. Crypt., Hymen. 821, 1916—MASS. Brit. Fung. Fl. I, 394, 1892—W. G. SM. Brit. Basid. 184, 1908—RICKEN, Blätterp. 247, pl. 64, f. 6, 1915—HARPER, Trans. Wisc. Acad. Sci. Arts & Lett. XVIII, 417, pl. 24, 1916—KAUFFM. Agar. Mich. 266, 1918—REA, Brit. Basid. 268, 1922—LANGE, Agar. Denm. V, 43, 1923—KONR. Bull. Soc. Myc. Fr. XLI, 57, 1925; KONR. et MAUBL. Icon. Sel. Fung. pl. 42, 1927—BRES. Icon. Myc. XVIII, pl. 854, 1931—PARKER, Mycologia, XXV, 181, pl. 26, f. 10; pl. 27, f. 22; pl. 28, f. 28; pl. 30, f. 36, 1933.

*Agaricus hydrophilus* BULL. Champ. Fr. pl. 511, 1791 (teste FR.).

*Agaricus (Psathyra) stipatus*  $\beta$  *hydrophilus* FR. Syst. Myc. I, 296, 1821.

*Agaricus (Hypholoma) hydrophilus* FR. Epicr. Myc. 225, 1838; Monogr. Hymen. Suec. I, 427, 1857—CKE. Handb. Brit. Fung. I, 146, 1871; Ill. Brit. Fung. pl. 605, f. B, 1886.

*Bolbitius hydrophilus* FR. Hymen. Eur. 333, 1874—GILL. Hymen. Fr. 594, cum icone, 1874.

*Drosophila (Hypholoma) hydrophila* QUÉL. Ench. Fung. 116, 1886.

Caespitose or densely gregarious. Pileus 2.5–5 cm. broad, convex, or slightly umbonate, then expanded; surface date-brown (sayal-brown to snuff-brown) when wet, ochraceous-buff or light ochraceous-buff and darker on the disc when dry, hygrophanous, subpruinose, even or pellucid-substrate on the margin when dry, wrinkled when dry, margin entire at first, finally often undulate and splitting, appendiculate with a white, very fugacious veil; context thin, watery-brownish when wet, whitish when dry, odour and taste almost none; lamellae adnexed, whitish at first, then fawn color, finally sorghum-brown, crowded, ventricose, thin; stipe 3–6 cm. long, 2.5–5 mm. thick, equal or slightly attenuated upward, shining, white or whitish, becoming somewhat brownish, especially below, subpruinose above, fibrillose below, rigid, fragile, hollow; spores purplish-brown in mass, ellipsoidal,  $5-6.5 \times 2.5-3.5 \mu$ .

Hab. on or around rotten trunks in woods. Autumn. Ishikari (Noppero, Sapporo), Ihuri (Lake side of Shikotsu).

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

Jap. name. *Musasabi-take* (n. n.).

### Subgen. *Lacrymaria* LANGE

Agar. Denm. V, 39, 1923.

*Lacrymaria* PAT. Hymen. Eur. 122, 1887.

Spores almost black in mass, verrucose, obscure.

### 7. *Hypholoma velutinum* (PERS. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 145, 1872—GILL. Hymen. Fr. 569, cum icone, 1874—KARST. Hattsv. I, 499, 1879—SACC. Syll. Fung. V, 1034, 1887; Fl. Ital. Crypt., Hymen. 817, 1816—MASS. Brit. Fung. Fl. I, 388, 1892—W. G. SM. Brit. Basid. 182, 1908—HARPER, Trans. Wisc. Acad. Sci. Arts & Lett. XVII, 1154, pl. 79, 1914—KAUFFM. Agar. Mich. 260, pl. 53, 1918—REA, Brit. Basid. 265, 1922—PARKER, Mycologia, XXV, 200, pl. 31, f. 38, 1933.

?*Agaricus lacrymabundus* SOW. Engl. Fung. I, pl. 41, 1797 (teste FR.).

*Agaricus velutinus* PERS. Syn. Fung. 409, 1801 (teste FR.).

*Agaricus (Hypholoma) lacrymabundus*  $\beta$  *velutinus* FR. Syst. Myc. I, 288, 1821.

*Agaricus (Hypholoma) velutinus* FR. Epicr. Myc. 223, 1838; Monogr. Hymen. Suec. I, 424, 1857; Hymen. Eur. 293, 1874—RABENH. Deut. Krypt. Fl. I, 465, 1844—BERK. Outl. Brit. Fung. 170, pl. 11, f. 2, 1860—CKE. Handb. Brit. Fung. I, 145, 1871; Ill. Brit. Fung. pl. 563, 1886.

*Geophila (Stropharia) lacrymabunda* QUÉL. Ench. Fung. 113, 1886—MURRILL, Mycologia, XIV, 67, 1922.

?*Lacrymaria lacrymabundum* PAT. Hymen. Eur. 123, 1887.

*Lacrymaria velutinum* PAT. Ibid. 123, 1887—KONR. et MAUBL. Icon. Sel. Fung. 90, 1924-35.

*Cortiniopsis lacrymabundus* SCHROET. Pilze Schles. I, 566, 1889.

*Hypholoma lacrymabundum* RICKEN, Blätterp. 245, pl. 64, f. 3, 1915.

*Hypholoma lacrymabundum* LANGE, Agar. Denm. V, 44, 1923.

*Hypholoma lacrymabundum* BRES. Icon. Myc. XVII, pl. 849, 1931.

Gregarious, caespitose or rarely solitary, not poisonous. Pileus 5-11 cm. broad, campanulate then convex, or at times obtusely umbonate; surface fulvous to isabelline with intermediate shades, darker at the center, covered when young with adpressed, matted fibrils,

which may disappear with age, or collect into small squamules, the pellicle cracking areolately at times, margin not striate, lanoso-fimbriate with veil which disappears with age; context thin, yellowish or brownish, taste mild or slightly disagreeable, odour not characteristic; lamellae sinuato-adnexed or adnate, somewhat ventricose, rather crowded, yellowish, shading to umber and spotted with black and rusty-brown as the spores mature, whitish on the edges; stipe 5–14 cm. long, 5–14 mm. thick, equal or slightly enlarged below, subconcolorous, nearly white-furfuraceous at the apex, silky fibrillose, hollow; spores almost black in mass, very dark purplish-umber under lens, lemon or amygdaline shaped, tuberculate, apiculate,  $8-12 \times 5-7.5 \mu$ ; cystidia scattered on the sides of lamellae, abundant, cylindrical-subcapitate.

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

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

Jap. name. *Mujina-take* (IMAZEKI).

### Tribe Gomphidieae HEIM

Fungi Iberici 68, 1934.

*Gomphidiaceae* SINGER, Ann. Myc. XXXIV, 326, 1936.

Fructification fleshy, with a fugacious marginal veil or cortina. Pileus viscid or dry, confluent and subhomogeneous with the subfleshy stipe. Lamellae decurrent, gelatinous-fleshy, soft. Spores fuscous, olivaceous or blackish in mass.

### *Gomphidius* FR.

Genera Hymen. 8, 1836; Epicr. Myc. 319, 1838.

*Agaricus* § *Gomphus* FR. Syst. Myc. I, 314, 1821.

Fructification fleshy, with a fugacious marginal veil or cortina. Pileus usually viscid, rarely dry, confluent and subhomogeneous with the subfleshy stipe. Lamellae decurrent, gelatinous-fleshy, soft. Spores fuscous, olivaceous or blackish in mass.

Type species: *Agaricus gelatinosus* SCHAEFF. ex FR.

## Key to the sections and species in Hokkaido.

- I. Surface of pileus viscid..... Sect. Viscigomphus.  
 1. Pileus 5-15 cm. broad, pileus and stipe fuscous-rufous; lamellae olivaceous then fuscous-purple..... *G. rutilus*(1).  
 2. Pileus 2-5 cm. broad, pinkish-cinnamon or apricot-buff with paler margin; lamellae whitish, then cinereous..... *G. gracilis*(2).  
 II. Surface of pileus dry, tomentose..... Sect. Floccigomphus.  
 1. Pileus and stipe pale yellow-orange or ochraceous, cottony tomentose....  
 ..... *G. tomentosus*(3).

Sect. *Viscigomphus* IMAI, sect. nov.

*Pileus viscidus*.

1. *Gomphidius rutilus* (SCHAEFF. ex FR.) IMAI, comb. nov.

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

*Agaricus rutilus* SCHAEFF. Fung. Bavar. IV, Ind. 24, pl. 55, 1774 (teste FR.).

*Agaricus* (*Gomphus*) *rutilus* FR. Syst. Myc. I, 315, 1821.

*Gomphidius viscidus* FR. Epier. Myc. 319, 1838; Monogr. Hymen. Suec. II, 150, 1863; Hymen. Eur. 400, 1874—BERK. Outl. Brit. Fung. 196, 1860—KICKX, Fl. Crypt. Flandr. II, 194, 1867—CKE. Handb. Brit. Fung. I, 205, 1871; Ill. Brit. Fung. pl. 881, 1888—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 184, 1872; Ench. Fung. 91, 1886—GILL. Hymen. Fr. 624, cum icone, 1874—KARST. Hattsv. I, 526, 1879—WINT. Die Pilze, I, 575, 1884—SACC. Syll. Fung. V, 1138, 1887; Fl. Ital. Crypt., Hymen. 663, 1916—SCHROET. Pilze Schles. I, 524, 1889—MASS. Brit. Fung. Fl. I, 347, 1892—W. G. SM. Brit. Basid. 250, 1908—ROLLAND, Atlas Champ. 72, f. 166, 1910—KAWAMURA, Ill. Jap. Fung. pl. 5, f. 13-15, 1913—RICKEN, Blätterp. 8, pl. 3, f. 3, 1915—REA, Brit. Basid. 325, 1922—BRES. Icon. Myc. XIV, pl. 673, 1930.

[SHIRAI, List Jap. Fung. ed. 2, 261, 1917; ed. 3, 152, 1927—YASUDA, Bot. Mag. (Tokyo), XXXVI, (22), 1922]

Solitary or gregarious, edible. Pileus 5-15 cm. broad, campanulate or obconical, then expanded, umbonate; surface slightly viscid, fuscous-rufous, paler and shining when dry; context reddish, deep yellow in the lower two-thirds of the stipe, taste mild, often slightly astringent; lamellae deeply decurrent, olivaceous, then fuscous-purple, distant, often branched, edge often paler; stipe 7-12 cm. long, 2-3 cm. thick, equal or attenuated downward, concolorous, paler, yellowish at the base, fibrillose-scaly, slightly viscid; cortina floccose, forming a fugacious ring; spores brownish olivaceous, subfusiform, 18-22 × 6-7  $\mu$ ; cystidia obtusely cylindrical, apex often subcapitate.

Hab. on the ground in woods, especially in coniferous woods.  
Autumn. Oshima (Ônomura), Ishikari (Sapporo).

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

Jap. name. *Kugi-take* (KAWAMURA).

## 2. *Gomphidius gracilis* BERK. et BR.

in BERK. Outl. Brit. Fung. 196, pl. 12, f. 7, 1860—FR. Hymen. Eur. 400, 1874—CKE. Ill. Brit. Fung. pl. 883, 1888—SACC. Syll. Fung. V, 1138, 1887; Fl. Ital. Crypt., Hymen. 662, 1916—MASS. Brit. Fung. Fl. I, 349, 1892—W. G. SM. Brit. Basid. 251, 1908—REA, Brit. Basid. 326, 1922—BRES. Icon. Myc. XIV, pl. 675, 1930.

Gregarious, edible. Pileus 2.5–5 cm. broad, conical or convex, then nearly plane, finally slightly depressed at the center; surface smooth, glabrous, glutinous, pinkish-cinnamon or apricot-buff at the center, light pinkish-cinnamon at the margin, at length spotted with blackish or dark-brownish color, especially near the margin, finally the spots often become a large irregular black border; context whitish, yellowish or reddish; lamellae decurrent, whitish, cinereous, arched, forked, thick, obtuse, clothed with short, washy bister hairs which are visible under a lens; stipe 5–10 cm. long, 4–8 mm. thick, almost equal, flexuous, pale above, yellowish below, apex white squamulose, floccose or slightly scaly at the median and basal parts, at length becoming black spotted or streaked, hollow or stuffed; spores olive-brown in mass, fusiform,  $15\text{--}22.5 \times 6.25\text{--}7.5 \mu$ .

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

Distr. Japan (Hokkaido), Europe.

Jap. name. *Ki-ôgitake* (n. n.).

## Sect. *Floccigomphus* IMAI, sect. nov.

Pileus siccus, tomentosus.

## 3. *Gomphidius tomentosus* MURRILL

Mycologia, IV, 307, 1912—KAUFFM. Mycologia, XVII, 124, 1925—TROT. in SACC. Syll. Fung. XXIII, 293, 1925.

Gregarious or solitary, edible. Pileus 2–9 cm. broad, mostly 3–5 cm., conical to umbonate, sometimes then becoming umbilicate and finally subinfundibuliform; surface dry, capucin-buff or pale yellow-orange to ochraceous-color, darker at the disc, becoming pinkish brown on drying, cottony tomentose, margin incurved, tomentose and with fibrillose veil; context soft, ochraceous, becoming pinkish on drying, taste mild, odour agreeable; lamellae decurrent, distant, at times forked near the stipe and median portion of lamellae, rather thick, entire, subochraceous, then drab color; stipe 6–20 cm. long, 7–20 mm. thick, attenuated upward, or sometimes nearly attenuated at the base, subconcolorous and tomentose, stuffed or solid, ochraceous and soft within; cortina fibrillose at first, fugacious; spores black in mass, oblong or oblong-fusiform,  $15\text{--}20 \times 7.5\text{--}8.75 \mu$ .

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

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

Jap. name. *Fusa-kugi-take* (n. n.).

To judge from the description and figures Humbolt's fungus from France hardly belongs here.

### Tribe. Coprineae HEIM

Fungi Iberici, 132, 1934.

*Coprinidées* ROZE, Bull. Soc. Bot. Fr. XXIII, 51, 1876.

*Pratellés* FAYOD, Ann. Sci. Nat., Bot. 7 sér. IX, 376, 1889, p. p.

*Coprinoidées* FAYOD, Ibid. 378, 1889.

*Coprinées* KONR. et MAUBL. Icon. Sel. Fung. 28 & 63, 1924, p. p.

Fructification with or without partial or universal veil. Pileus fleshy or membranous, confluent with, but for the most part heterogeneous from, the subfleshy or cartilaginous stipe. Stipe central, subfleshy or cartilaginous. Lamellae free or attached, deliquescent or not. Spores fuscous- or blackish-purple or black in mass.

#### Key to the genera.

- I. Pileus fleshy or fleshy-membranous; lamellae adnate or sinuate-adnate, not autodigested.
  - A. Margin of pileus at first incurved or exceeding the lamellae.
    1. Spores purple or fuscous in mass. . . . . *Psilocybe*.
    2. Spores blackish or black in mass. . . . . *Panaeolus*.

B. Margin of pileus straight, at first adpressed to the stipe.

1. Spores purple or fuscous in mass..... *Psathyra*.
2. Spores blackish or black in mass..... *Psathyrella*.

II. Pileus membranous or fleshy-membranous, fragile; lamellae autodigested; spores blackish or black in mass..... *Coprinus*.

### *Psilocybe* (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 63 & 147, 1872.

*Agaricus* § *Psilocybe* FR. Syst. Myc. I, 289, 1821.

Pileus fleshy, regular, margin at first incurved. Stipe central cartilaginous. Lamellae adnate, sinuato-adnate or adnexed. Spores fuscous-purple in mass.

Type species: *Agaricus foeniseii* PERS. ex FR.

### Sect. *Rigidae* FR.

Syst. Myc. I, 294, 1821; Epicr. Myc. 225, 1838.

Pileus scarcely with a pellicle, but the flesh most frequently scissile, hygrophanous. Veil none. Stipe rigid. Lamellae adnexed, very rarely adnate.

### *Psilocybe foeniseii* (PERS. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 147, 1872—GILL. Hymen. Fr. 583, cum icone, 1874—KARST. Hattsv. I, 508, 1879—SACC. Syll. Fung. V, 1055, 1887; Fl. Ital. Crypt., Hymen. 833, 1916—MASS. Brit. Fung. Fl. I, 377, 1892—W. G. SM. Brit. Basid. 189, 1908—RICKEN, Blätterp. 256, pl. 66, f. 8, 1915—KAUFFM. Agar. Mich. 283, pl. 54, 1918—REA, Brit. Basid. 369, 1922—BRES. Icon. Myc. XVIII, pl. 862, 1931.

*Agaricus foeniseii* PERS. Icon. Desc. Fung. II, 42, pl. 11, f. 1, 1800; Syn. Fung. 411, 1801 (teste FR.).

*Agaricus* (*Psilocybe*) *foeniseii* FR. Syst. Myc. I, 295, 1821; Epicr. Myc. 227, 1838; Hymen. Eur. 303, 1874—BERK. in SMITH, Engl. Fl. V, (2), 112, 1836; Outl. Brit. Fung. 171, pl. 11, f. 5, 1860—RABENH. Deut. Krypt. Fl. I, 464, 1844—KICKX, Fl. Crypt. Flandr. II, 177, 1867—CKE. Handb. Brit. Fung. I, 149, 1871; Ill. Brit. Fung. pl. 590, 1886; Handb. Austr. Fung. 64, 1892—WINT. Die Pilze, I, 644, 1884.

*Drosophila* (*Psathyra*) *foeniseii* QUÉL. Ench. Fung. 117, 1886.

*Coprinarius foeniseccii* SCHROET. Pilze Schles. I, 565, 1889.

*Panaeolus foeniseccii* KÜHNER, Contr. Etude Hymen. 187, 1926—KONR. et MAUBL. Icon. Sel. Fung. pl. 50, f. 2, 1929—LANGE, Agar. Denm. XI, 24, 1936.

Gregarious or scattered, edible. Pileus 1–3 cm. broad, campanulato-convex or subhemispherical, obtuse, seldom finally plane; surface hygrophanous, smooth, glabrous, dark grayish-brown to smoky-fuscous and even when moist, sometimes rufescent, zonate on drying, drab-tan-color to buff when dry, veil entirely lacking; context pallid, thin, taste and odour none; lamellae adnate or adnexed, subdistant, broad, ventricose, wood-brown, then natal-brown or bone-brown, white fimbriate on edges; stipe 3–8 cm. long, 1.5–4 mm. thick, equal, rigid-elastic, glabrous, even, pruinose at the apex, pallid to subrufescent, hollow; spores cinereous-purple in mass, broadly ellipsoidal or almond-shaped, slightly punctate,  $12.5\text{--}16 \times 7.5\text{--}9 \mu$ .

Hab. on the ground among grasses in lawns, roadsides, grassy places in woods, meadows, and pastures. Late spring to autumn. Ishikari (Sapporo).

Distr. Japan (Hokkaido), Europe, North America, Australia. Jap. name. *Hime-shibafu-take* (n. n.).

### *Panaeolus* (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 63 & 151, 1872.

*Campanularius* ROUSSEL, Fl. Calvados ed. 2, 64, 1806 (sec. EARLE).

*Agaricus* § *Panaeolus* FR. Epicr. Myc. 234, 1838.

*Chalymmota* KARST. Hattsv. I, xxvii, 1879.

*Coprinarius* § *Panaeolus* QUÉL. Ench. Fung. 118, 1886.

Pileus slightly fleshy, regular, margin exceeding the lamellae. Stipe central, cartilaginous. Lamellae adnate or adnexed, usually variegated with the dark spores. Spores black or fuscous-black in mass.

Type species: *Agaricus campanulatus* L. ex FR.

#### Key to the sections and species in Hokkaido.

- I. Pileus without a marginal darker belt; the edge of the pileus overreaching the lamellae, often splitting up into appendiculate denticles..... Sect. *Appendiculati*.

- A. Pileus campanulate or parabolic, tan to clay colored.
1. Pileus not reticulate, often irregularly cracked and becoming shiny.  
..... *P. Linnaeanus* (1).
  2. Pileus everywhere minutely reticulate from raised ribs.....  
..... *P. retirugis* (2).
- B. Pileus campanulate-convex or semiglobose, whitish-pallid, smooth or pellicle cracking into irregular patches..... *P. papilionaceus* (3).
- II. Pileus with a more or less distinct marginal belt; no overreaching free edge.  
..... Sect. Nudi.
- A. Pileus fuliginous to nearly black, campanulate..... *P. fimicola* (4).

### Sect. *Appendiculati* LANGE

Agar. Denm. XI, 21, 1936.

Pileus without a marginal darker belt; the edge of the pileus overreaches the lamellae, often splitting up into appendiculate denticles.

#### 1. *Panaeolus Linnaeanus* IMAI, nom. nov.

*Agaricus campanulatus* L. Sp. Pl. 1175, 1753 (teste Fr.).

*Agaricus (Coprinarium) papilionaceus* FR. Syst. Myc. I, 301, 1821, p. p.

*Agaricus (Panaeolus) campanulatus* (non in 1821) FR. Epicr. Myc. 236, 1838; Hymen. Eur. 311, 1874—BERK. Outl. Brit. Fung. 175, 1860—KICKX, Fl. Crypt. Flandr. II, 179, 1867—CKE. Handb. Brit. Fung. I, 157, 1871; Ill. Brit. Fung. pl. 629, 1888; Handb. Austr. Fung. 67, 1892—WINT. Die Pilze, I, 639, 1884.

*Panaeolus campanulatus* QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 151, 1872—GILL. Hymen. Fr. 622, cum icone, 1874—SACC. Syll. Fung. V, 1121, 1887; Fl. Ital. Crypt., Hymen. 877, 1916—MASS. Brit. Fung. Fl. I, 336, 1892—W. G. SM. Brit. Basid. 197, 1908—RICKEN, Blätterp. 267, pl. 69, f. 8, 1915—KAUFFM. Agar. Mich. 230, 1918—REA, Brit. Basid. 371, 1922—KONR. et MAUBL. Icon. Sel. Fung. pl. 48, 1929—BRES. Icon. Myc. XVIII, pl. 893, 1931—LANGE, Agar. Denm. XI, 22, 1936.

*Chalymnota campanulata* KARST. Hattsv. I, 519, 1879—SCHROET. Pilze Schles. I, 566, 1889.

[YASUDA, Bot. Mag. (Tokyo), XXVIII, (476), 1914—SHIRAI, List Jap. Fung. ed. 2, 127, 1917; ed. 3, 77, 1927]

*Coprinarium (Panaeolus) campanulatus* QUÉL. Ench. Fung. 118, 1886.

Gregarious or solitary. Pileus 1–4 cm. broad, conico-campanulate, often umbonate, never expanded; surface glabrous, often somewhat silky-shining, rugulose or squamosely-rugose when dry, neither hygrophanous nor viscid, brownish-gray, yellowish-gray or subrufescent, margin somewhat appendiculate or fimbriate because of

the fugacious veil; context grayish, thin, odour and taste none; lamellae adnate, ventricose-ascending, broad, close, variegated gray to black by the spores, white-fimbriate on the edge; stipe 6–10 cm. long, 1–3 mm. thick, equal or slightly enlarged at the base, cylindrical, straight, rigid-fragile, reddish-brown or concolorous, white-pruinose then black-pulverulent, apex striate, hollow; spores black in mass, lemon-shaped,  $12-18 \times 8-12 \mu$ , smooth; sterile cells on the edge of lamellae cylindric or subclavate, hyaline.

Hab. on dung-hills, manured ground, etc. in pastures or fields. Summer to autumn. Ishikari (Sapporo).

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

Jap. name. *Hikage-take* (YASUDA).

## 2. *Panaeolus retirugis* (FR.) GILL.

Hymen. Fr. 621, cum icone, 1874—SACC. Syll. Fung. V, 1120, 1887—MASS. Brit. Fung. Fl. I, 334, 1892—ATKINS. Mushrooms, ed. 2, 45, f. 45–48, 1903—W. G. SM. Brit. Basid. 197, 1908—MURRILL, Mycologia, III, 100, pl. 40, f. 1, 1911—RICKEN, Blätterp. 268, pl. 69, f. 6, 1915—KAWAMURA, Ill. Jap. Fung. pl. 16, f. 6–8, 1915—KAUFFM. Agar. Mich. 229, 1918—REA, Brit. Basid. 370, 1922—BRES. Icon. Myc. XVIII, pl. 892, 1931—LANGE, Agar. Denm. XI, 22, 1936.

[SHIRAI, List Jap. Fung. ed. 3, 243, 1927]

*Agaricus carbonarius* BATSCH, Elench. Cont. I, 107, pl. 18, f. 91, 1786 (teste Fr.).

*Agaricus (Panaeolus) retirugis* FR. Epicr. Myc. 235, 1838; Hymen. Eur. 310, 1874—BERK. Outl. Brit. Fung. 175, 1860—CKE. Handb. Brit. Fung. I, 156, 1871; Ill. Brit. Fung. pl. 627, 1888; Handb. Austr. Fung. 66, 1892—WINT. Die Pilze, I, 639, 1884.

*Coprinarius (Panaeolus) campanulatus* var. *retirugis* QUÉL. Ench. Fung. 119, 1886.

*Panaeolus carbonarius* SACC. Fl. Ital. Crypt., Hymen. 875, 1916.

Solitary or gregarious. Pileus 1–3 cm. broad, ovate or subglobose, then campanulate-hemispherical, often subumbonate, obtuse; surface flesh-tan-color or dark smoky when young and wet, becoming paler, or in dry weather grayish, pale clay color or creamy-white, usually reticulate-veined on the disc, sometimes even, atomate, opaque; margin connected with stipe in young stage by a floccose-submembranous ring-like veil, veil soon broken and margin markedly denticulato-appendiculate in expanded pileus; context thin, pallid, odour and taste none; lamellae adnato-ascending, broad, ventricose,

close, white then variegated-spotted with the black spores, white-floccose on edge; stipe 5–15 cm. long, 2–6 mm. thick, equal, cylindrical, sometimes flexuous, whitish, rufescent or tinged with purplish within or without, dark below, often pruinose, hollow; spores black in mass, nearly lemon-shaped, smooth, apiculate on the ends,  $12\text{--}16 \times 8\text{--}10 \mu$ ; sterile cells on edge of lamellae subcylindrical or subclavate, hyaline.

Hab. on dung-hills, manured lawns, fields, roadsides, etc. Summer to autumn. Ishikari (Sapporo, Nopporo).

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

Jap. name. *Saigyo-gasa* (KAWAMURA).

### 3. *Panaeolus papilionaceus* (BULL. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 152, 1872—GILL. Hymen. Fr. 622, 1874—SACC. Syll. Fung. V, 1122, 1887; Fl. Ital. Crypt., Hymen. 876, 1916—MASS. Brit. Fung. Fl. I, 335, 1892—W. G. SM. Brit. Basid. 197, 1908—RICKEN, Blätterp. 267, pl. 69, f. 3, 1915—KAUFFM. Agar. Mich. 231, 1918—REA, Brit. Basid. 371, 1922—KONR. & MAUBL. Icon. Sel. Fung. pl. 49, 1929—LANGE, Agar. Denm. XI, 22, 1936.

*Agaricus papilionaceus* BULL. Champ. Fr. pl. 561, f. 2, M, N, 1791 (teste FR.).

*Agaricus (Coprinarius) papilionaceus* FR. Syst. Myc. I, 301, 1821, p.p.—BERK. in SMITH, Engl. Fl. V, (2), 116, 1836—RABENH. Deut. Krypt. Fl. I, 460, 1844.

*Agaricus (Panaeolus) papilionaceus* FR. Epicr. Myc. 236, 1838; Hymen. Eur. 311, 1874—BERK. Outl. Brit. Fung. 175, 1860—KICKX, Fl. Crypt. Flandr. II, 179, 1867—CKE. Handb. Brit. Fung. I, 157, 1871; Ill. Brit. Fung. pl. 630, 1888; Handb. Austr. Fung. 67, 1892—WINT. Die Pilze, I, 639, 1884.

*Chalymnota papilionacea* KARST. Hattsv. I, 519, 1879—SCHROET. Pilze Schles. I, 567, 1889.

[P. HENN. in ENGLERS Bot. Jahrb. XXXII, 40, 1903—MATSUM. Ind. Pl. Jap. I, 134, 1904—SHIRAI, List Jap. Fung. 19, 1905; ed. 2, 127, 1917; ed. 3, 77, 1927]

*Coprinarius (Panaeolus) papilionaceus* QUÉL. Ench. Fung. 119, 1886.

?*Copelandia papilionacea* BRES. Hedw. LIII, 51, 1913; Icon. Myc. XVIII, pl. 897, 1931.

Solitary or gregarious, said to be poisonous. Pileus 1.5–4 cm. broad, hemispherical, then expanded; surface glabrous, rimoso-squamose or areolate when dry, never viscid nor hygrophanous, pallid or pale-gray to smoke gray, reddish or yellowish at the disc, margin with evanescent pallid veil; context grayish, odour and taste

none; lamellae broadly adnate, often very broad, ventricose, crowded or subdistant, variegated gray-blackish from the spores, at length black, white-fimbriate on the edge; stipe 4–8 cm. long, 2–5 mm. thick, equal, cylindrical, whitish or concolorous, brownish at the base, white powdery above, cartilaginous-toughish, rigid, hollow; spores black in mass, lemon-shaped, smooth,  $11-16 \times 8-11 \mu$ .

Hab. on dung-hills, manured fields, or in woods. Summer to autumn. Ishikari (Sapporo).

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

Jap. name. *Warai-take* (KAWAMURA).

#### Sect. *Nudi* LANGE

Agar. Denm. XI, 21, 1936.

Pileus with a more or less distinct marginal belt; no over-reaching free edge.

#### 4. *Panaeolus fimicola* (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 257, 1872—GILL. Hymen. Fr. 621, cum icone, 1874—KARST. Hattsv. I, 520, 1879—SACC. Syll. Fung. V, 1124, 1887—MASS. Brit. Fung. Fl. I, 338, 1892—W. G. SM. Brit. Basid. 198, 1908—RICKEN, Blätterp. 269, pl. 69, f. 2, 1915—REA, Brit. Basid. 372, 1922—LANGE, Agar. Denm. XI, 23, 1936.

[KAWAMURA, Jap. Fung. no. 119, 1929—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 114, 1931]

*Agaricus varius* BOLT. Fung. Halif. 66, pl. 66, f. 1, 1788 (teste FR.).

?*Agaricus* (*Coprinus*) *fimicola* PERS. Syn. Fung. 412, 1801.

*Agaricus* (*Coprinarius*) *fimicola* FR. Syst. Myc. I, 301, 1821—RABENH. Deut. Krypt. Fl. I, 459, 1844.

*Agaricus* (*Panaeolus*) *fimicola* FR. Epicr. Myc. 237, 1838; Hymen. Eur. 312, 1874—BERK. Outl. Brit. Fung. 175, 1860—KICKX, Fl. Crypt. Flandr. II, 180, 1867—CKE. Handb. Brit. Fung. I, 158, 1871; Ill. Brit. Fung. pl. 632, f. B, 1888; Handb. Austr. Fung. 67, 1892—WINT. Die Pilze, I, 638, 1884.

*Coprinarius* (*Panaeolus*) *fimicola* QUÉL. Ench. Fung. 119, 1886.

*Panaeolus varius* SACC. Fl. Ital. Crypt., Hymen. 879, 1916.

Solitary or gregarious. Pileus 1–2 cm. broad, campanulate, then convex, obtuse; surface smooth, fuliginous-gray, clay hoary when dry, opaque, marked around the margin with a narrow fuscous zone, and inside this with a white one; context thin, grayish, taste and odour none; lamellae adnate, slightly rounded, somewhat ventricose,

broad, almost semi-ovate, variegated gray and fuliginous, white fimbriate on edge; stipe 5–10 cm. long, 1–3 mm. thick, equal, dingy pale, obsoletely slightly silky striate, white pruinose at the apex, hollow; spores black in mass,  $10-12 \times 7-8 \mu$ , ellipsoidal, smooth.

Hab. on horse-dung, manured ground, etc. in pastures, fields, gardens or in woods. Summer to autumn. Ishikari (Sapporo, Nopporo).

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

Jap. name. *Maguso-take* (KAWAMURA).

### *Psathyra* (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2. sér. V, 63 & 148, 1872.

*Agaricus* § *Psathyra* FR. Syst. Myc. I, 295, 1821, p. p.

Pileus fleshy or submembranous, regular, margin straight, at first adpressed to the stipe. Stipe central, cartilaginous. Lamellae adnate, adnexed or free. Spores fuscous-purple or cinereous-purple in mass.

Type species: *Agaricus fibrillosus* PERS. ex FR.

#### Key to the species in Hokkaido.

1. Fructification densely caespitose..... *P. multissima* (1).
2. Fructification solitary or gregarious..... *P. microspora* (2).

### Sect. *Obtusatae* FR.

Epicr. Myc. 232, 1838.

Pileus campanulate-convex, then expanded, glabrous or atomate. Lamellae plano- or arcuato-adnexed. Veil none.

#### 1. *Psathyra multissima* IMAI, sp. nov.

Dense caespitosa. Pileo 2–5 cm. lato, 1.5–3 cm. alto, conico, dein conico-campanulato, hygrophano, udo umbrino, exsiccate ochroleuco, ruguloso, margine velati figacissimi albique; carne tenui, concolora; lamellis adnatis, 3–5 mm. latis, confertis, demum fusco-purpureis, acie albo-fimbriatis; stipite 10–17 cm. longo, 2–4 mm.

crasso, subaequali, rigide-fragili, flexuoso, nonnumquam contorto, albo-nitente, pallescente, surum glabro, deorsum albo-tomentoso; sporis in cumulo fusco-purpureis, ellipsoideis, levibus,  $7-9 \times 3.5-5 \mu$ ; cystidiis nullis; cellulis sterilibus aciae lamellae cystidiiformibus, subfusiformibus apice obtusis, nonnumquam projectiis, hyalinis.

Hab. on decayed wood in woods. Autumn. Ishikari (Noporo).

Distr. Endemic.

Jap. name. *Senbon-kuzutake* (n. n.).

The present fungus somewhat resembles *P. stipatissima* LANGE, and *P. microsperma* PK. from which it is distinguishable by the larger pileus and spores, as well as by the rugulose nature of the pileus when dried.

## 2. *Psathyra microspora* IMAI, sp. nov.

Solitaria vel gregaria, non dense caespitosa. Pileo 1-2 cm. lato, conico, dein campanulato, non convexo, glabro, ruguloso, hygrophano, udo "Saccardo's umber", exsiccate margine "cartridge-buff", disco "warm-buff", udo striatulato, exsiccate atomato et subnitente; carne concolora, tenui; lamellis adnexis, confertis, "verona-brown", acie non albo-fimbriatis; stipite 2-3.5 cm. longo, 1.5-2 mm. crasso, aequali vel deorsum leviter incrassato, albido, flavescente, nitente, glabro, basi albo-tomentoso, cavo; sporis in cumulo fusco-purpureis, ellipsoideis, utrimque obtusis, levibus,  $5-6.5 \times 3-4 \mu$ ; cystidiis nullis.

Hab. on decayed wood in woods. Autumn. Ishikari (Noporo).

Distr. Endemic.

Jap. name. *Kotsubu-kuzutake* (n. n.).

The present fungus is related to *P. obtusata* (FR.) GILL. from which it is distinguishable by the minor spores and the pileus not becoming convex even when matured.

## *Psathyrella* (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 63 & 152, 1872.

*Agaricus* § *Psathyrella* FR. Epicr. Myc. 237, 1838.

*Coprinarius* § *Psathyrella* QUÉL. Ench. Fung. 119, 1886.

Pileus fleshy or submembranous, regular, margin straight, at first adpressed to the stipe. Stipe central, confluent with the pileus. Lamellae adnate or free. Spores black or fuscous-black in mass.

Type species: *Agaricus disseminatus* PERS. ex FR.

**Key to the species in Hokkaido.**

1. Stipe 2–4 cm. long; densely gregarious or caespitose; pileus white or gray, furfuraceous..... *P. disseminata*(1).
2. Stipe 4–6 cm. long, gregarious; pileus grayish or reddish, becoming pale fleshy-color, atomate..... *P. atomata*(2).

**Sect. *Pruinatipedes* IMAI, nom. nov.**

Stipes flexuosus, apice pruinatus.

**1. *Psathyrella disseminata* (PERS. ex FR.) QUÉL.**

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 153, pl. 8, f. 5, 1872—GILL. Hymen. Fr. 618, cum icone, 1874—KARST. Hattsv. I, 524, 1879—SACC. Syll. Fung. V, 1134, 1887—MASS. Brit. Fung. Fl. I, 345, 1892—ATKINS. Mushrooms, ed. 2, 48, f. 49, 1903—W. G. SM. Brit. Basid. 201, 1908—KAUFFM. Agar. Mich. 227, 1918—REA, Brit. Basid. 422, 1922—BRES. Icon. Myc. XVIII, pl. 889, f. 2, 1931.

[KAWAMURA, Jap. Fung. no. 135, 1929—SAWADA, Descr. Cat. Formosan Fung. V, 81, 1931—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 115, 1931]

*Agaricus minutulus* SCHAEFF. Fung. Bavar. IV, Ind. 72, pl. 308, 1774 (teste FR.).

*Agaricus disseminatus* PERS. Syn. Fung. 403, 1801 (teste FR.).

*Agaricus (Coprinarius) disseminatus* FR. Syst. Myc. I, 305, 1821—BERK. in SMITH, Engl. Fl. V, (2), 118, 1836—RABENH. Deut. Krypt. Fl. I, 458, 1844.

*Agaricus (Psathyrella) disseminatus* FR. Epicr. Myc. 240, 1838; Hymen. Eur. 316, 1874—BERK. Outl. Brit. Fung. 176, 1860—KICKX, Fl. Crypt. Flandr. II, 180, 1867—CKE. Handb. Brit. Fung. I, 160, 1871; Ill. Brit. Fung. pl. 657, f. B, 1888; Handb. Austr. Fung. 68, 1892—WINT. Die Pilze, I, 635, 1884.

*Coprinarius (Psathyrella) disseminatus* QUÉL. Ench. Fung. 120, 1886.

*Coprinus disseminatus* RICKEN, Blätterp. 67, pl. 23, f. 4, 1915.

*Psathyrella minutula* SACC. Fl. Ital. Crypt., Hymen. 868, 1916.

Caespitose or densely gregarious. Pileus 5–20 mm. broad, ovate, then campanulate; surface whitish or yellowish at first, then gray or grayish-brown, prominently sulcate-plicate to the small buff umbo, at first covered with microscopic, erect, one-celled hairs, scurfy,

glabrescent; context very thin, membranous; lamellae adnate, ascending, rather broad, ventricose, subdistant or subcrowded, at first white, then ashy, and finally uniformly black; stipe 2–4 cm. long, 1–2 mm. thick, equal or slightly attenuated upward, cylindrical-filiform, fistulose, subflexuous, white, pellucid, at first minutely hairy with spreading hairs, glabrescent, strigose at the base; spores purplish-black in mass, ellipsoidal, smooth,  $6-8 \times 3.75-5 \mu$ .

Hab. on rotten wood, in gardens, pastures, woods, etc. Summer to autumn. Ishikari (Sapporo, Nopporo).

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

Jap. name. *Inusembontake* (KAWAMURA).

## 2. *Psathyrella atomata* (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 153, 1872—GILL. Hymen. Fr. 617, 1874—KARST. Hattsv. I, 524, 1879—SACC. Syll. Fung. V, 1132, 1887; Fl. Ital. Crypt., Hymen. 869, 1916—MASS. Brit. Fung. Fl. I, 344, 1892—W. G. SM. Brit. Basid. 200, 1908—RICKEN, Blätterp. 265, pl. 68, f. 5, 1915—REA, Brit. Basid. 421, 1922—BRES. Icon. Myc. XVIII, pl. 889, f. 1, 1931.

*Agaricus (Psathyra) atomatus* FR. Syst. Myc. I, 298, 1821.

*Agaricus (Psathyrella) atomatus* FR. Epicr. Myc. 239, 1838; Hymen. Eur. 315, 1874—BERK. Outl. Brit. Fung. 176, 1860—CKE. Handb. Brit. Fung. I, 159, 1871; Ill. Brit. Fung. pl. 638, 1888—WINT. Die Pilze, I, 636, 1884.

*Coprinarius (Psathyrella) atomata* QUÉL. Ench. Fung. 120, 1886.

*Psathyra (Psathyrella) atomata* LANGE, Agar. Denm. XI, 17, 1936.

Gregarious. Pileus 1–3 cm. broad, campanulate or convex-campanulate, obtuse; surface hygrophaneous, slightly viscid, pellucid-striate when wet, slightly wrinkled and without striae when dry, besprinkled with shining atoms, reddish or grayish, becoming pale tan or pale flesh color when dry; context thin, subconcolorous, fragile, odour and taste none; lamellae adnate, subdistant, rather broad, ventricose, whitish, then cinereous-blackish, edge at first white, then concolorous; stipe 4–6 cm. long, 1–3 mm. thick, equal, cylindrical-filiform, fistulose, slender, fragile, often flexuous, whitish or grayish, adpressed-fibrillose, white furfuraceous at the apex; spores black in mass, ellipsoidal, smooth,  $11-13 \times 6-8 \mu$ .

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

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

Jap. name. *Kirara-inusenbontake* (n. n.).

**Coprinus PERS. ex FR.**

Syst. Orb. Veg. I, 75, 1825; Epicr. Myc. 241, 1838.

*Coprinus* PERS. Tent. Disp. Fung. 62, 1797 (sec. EARLE).

*Agaricus* § *Coprinus* PERS. Syn. Fung. 395, 1801.

*Agaricus* § *Coprinus* FR. Syst. Myc. I, 306, 1821.

*Onchopus* KARST. Hattsv. I, xxviii, 1879.

*Pselliophora* KARST. Ibid. I, xxviii, 1879.

*Coprinellus* KARST. Ibid. I, xxviii, 1879.

*Coprinopsis* KARST. Acta Soc. Faun. Fl. Fenn. II, 26, 1881.

Fructification with or without an annulus or volva. Pileus fleshy, or membranous, regular. Stipe central, confluent or distinct from the pileus. Lamellae free, adnate or attached to a collar, very thin, parallel-sided or subparallel-sided and auto-digested from below upward. Spores black, violet-black or fuscous-black in mass.

Type species: *Agaricus comatus* MÜLL. ex FR.

**Key to the sections, subsections and species in Hokkaido.**

- I. Pileus covered above with a distinct fleshy or membranous pellicle, therefore the pileus does not split along the lines of the lamellae, but become lacerated and revolute..... Sect. Pelliculosi.
  - A. Fructification volvato-annulate, pellicle of pileus lacerated into scales. . . . . Subsect. Comati.
    1. Pileus large; spores 12–15  $\mu$  long..... *C. comatus*(1).
  - B. Fructification subannulate, not volvate; pileus dotted or spotted with minute, innate squamules..... Subsect. Atramentarii.
    1. Pileus large..... *C. atramentarius*(2).
  - C. Pileus at first covered with minute glistening micaceous squamules or granules which at length disappear; annulus none.... Subsect. Micacei.
    1. Pileus 3–6 cm. broad, yellow-ferruginous; stipe 5–10 cm. long..... *C. micaceus*(3).
    2. Pileus 2–3 cm. broad, yellow-tawny; stipe 2–4 cm. long, arising from a dense mass of tawny mycelium..... *C. radians*(4).
- II. Pileus very thin, without pellicle, plicate-sulcate, at length splitting along the lines of the lamellae; stipe slender, hollow..... Sect. Veliformes.
  - A. Pileus furfuraceous or micaceous; lamellae commonly adnate to the apex of the stipe which is dilated into a ring or collar; stipe ringless..... Subsect. Furfurelli.
    1. Apex of the stipe not evidently dilated into a ring or collar.
      - a. Usually without sclerotium..... *C. stercorarius*(5).
      - b. Springing from sclerotium..... *C. tuberosus*(6).
    2. Apex of the stipe dilated into a ring or collar; pileus cinnamon-brown..... *C. plicatilis*(7).

Sect. *Pelliculosi* FR.

Epicr. Myc. 242, 1838.

Pileus covered above with a distinct fleshy or membranous pellicle, therefore the pileus does not split along the lines of the lamellae, but becomes lacerated and revolute.

Subsect. *Comati* FR.

Epicr. Myc. 242, 1838.

Fructification volvato-annulate, pellicle of pileus lacerated into scales.

1. *Coprinus comatus* PERS. ex FR.

Epicr. Myc. 242, 1838; Hymen. Eur. 320, 1874—BERK. Outl. Brit. Fung. 177, 1860—KICKX, Fl. Crypt. Flandr. II, 181, 1867—CKE. Handb. Brit. Fung. I, 161, 1871; Ill. Brit. Fung. pl. 658, 1888; Handb. Austr. Fung. 68, 1892—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 154, 1872; Ench. Fung. 121, 1886—GILL. Hymen. Fr. 601, cum icone, 1874—WINT. Die Pilze, I, 633, 1884—SACC. Syll. Fung. V, 1079, 1887—MASS. Brit. Fung. Fl. I, 305, 1892; Ann. Bot. X, 142, 1896—ATKINS. Mushrooms, ed. 2, 33, f. 31-38, 1903—W. G. SM. Brit. Basid. 203, 1908—ROLLAND, Atlas Champ. 73, f. 170, 1910—KAWAMURA, Ill. Jap. Fung. pl. 3, f. 18-22, 1912—RICKEN, Blätterp. 56, pl. 20, f. 1, 1915—LANGE, Agar. Denm. II, 39, 1915—KAUFFM. Agar. Mich. 209, 1918—REA, Brit. Basid. 499, 1922—BRES. Icon. Myc. XVIII, pl. 874, 1931.

[MEMMURA, Bot. Mag. (Tokyo), XXVIII, (358), 1914—SHIRAI, List Jap. Fung. ed. 2, 171, 1917; ed. 3, 100, 1927]

*Agaricus porcellaneus* SCHAEFF. Fung. Bavar. IV, Ind. 21, pl. 46-47, 1774 (teste FR.).

*Agaricus comatus* MUELL. Fl. Dan. pl. 834, 1780 (teste FR.).

*Coprinus comatus* PERS. Tent. Disp. Fung. 62, 1797 (teste FR.).

*Agaricus cylindricus* Sow. Engl. Fung. pl. 189, 1799 (teste FR.).

*Agaricus (Coprinus) comatus* PERS. Syn. Fung. 395, 1801 (teste FR.).

*Agaricus (Coprinus) comatus* FR. Syst. Myc. I, 307, 1821—BERK. in SMITH, Engl. Fl. V, (2), 118, 1836—RABENH. Deut. Krypt. Fl. I, 458, 1844.

*Pseliophora comata* KARST. Hattsv. I, 528, 1879.

*Coprinus porcellanus* SCHROET. Pilze Schles. I, 322, 1889—SACC. Fl. Ital. Crypt., Hymen. 898, 1916.

[MATSUM. Ind. Pl. Jap. I, 137, 1904—SHIRAI, List Jap. Fung. 25, 1905; ed. 2, 171, 1917; ed. 3, 101, 1927]

Gregarious, rarely solitary, edible. Pileus 5–10 cm. high, 3–5 cm. across, cylindrical, then campanulate, at length umbonate or plane and margin revolute; surface white, becoming pinkish from the margin and finally black, pellicle soon broken up into adpressed, shaggy scales, the scales ochraceous at their apices, center whitish to pinkish-buff, smooth or with very fine clay colored scales, finally striate, margin slightly inrolled at first, then straight, at length revolute and often torn into several lobes; context whitish, thin, taste mild; lamellae white, then changing to pink color from the front, at length black and deliquescent, free, 10 mm. wide, edge thick and wrinkled; stipe 15–25 cm. long, 8–15 mm. thick, slightly attenuated upward, silky white, fibrillose, shining, enlarged at the base, rigid, hollow or stuffed with silky wool; annulus white, membranous, movable, narrow, fugacious; spores black in mass, smooth,  $12-15 \times 6-8 \mu$ .

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

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

Jap. name. *Sasakure-hitoyotake* (KAWAMURA).

### Subsect. *Atramentarii* FR.

Epicr. Myc. 243, 1838.

Fructification subannulate, not volvate. Pileus dotted or spotted with minute, innate squamules.

### 2. *Coprinus atramentarius* [BULL.] FR.

Epicr. Myc. 243, 1838; Hymen. Eur. 322, 1874—BERK. Outl. Brit. Fung. 177, pl. 12, f. 1, 1860—KICKX, Fl. Crypt. Flandr. II, 182, 1867—CKE. Handb. Brit. Fung. I, 162, 1871; Ill. Brit. Fung. pl. 622, 1888—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 155, 1872—GILL. Hymen. Fr. 602, cum icone, 1874—WINT. Die Pilze, I, 632, 1884—SACC. Syll. Fung. V, 1081, 1887; Fl. Ital. Crypt., Hymen. 855, 1916—SCHROET. Pilze Schles. I, 521, 1889—MASS. Brit. Fung. Fl. I, 308, 1892; Ann. Bot. X, 143, 1896—ATKINS. Mushrooms, ed. 2, 40, f. 39–42, 1903—W. G. SM. Brit. Basid. 204, 1908—ROLLAND, Atlas Champ. 73, f. 172, 1910—RICKEN, Blätterp. 62, pl. 22, f. 1, 1915—LANGE, Agar. Denm. II, 39, 1915—KAUFFM. Agar. Mich. 212, 1918—REA, Brit. Basid. 501, 1922—BRES. Icon. Myc. XVIII, pl. 877, 1931.

*Agaricus atramentarius* BULL. Champ. Fr. pl. 164, 1791 (teste FR.).

*Agaricus (Coprinus) atramentarius* FR. Syst. Myc. I, 308, 1821—BERK. in SMITH, Engl. Fl. V, (2), 119, 1836.

*Pselliophora atramentaria* KARST. Hattsv. I, 529, 1879.

*Coprinus fuscescens* QUÉL. Ench. Fung. 121, 1886.

Gregarious, sometimes subcaespitose or solitary, edible. Pileus 5–10 cm. broad when expanded, ovate then cylindric to expanded, at length subumbonate; surface grayish, later becoming darker, wholly longitudinally and deeply sulcate and ribbed, silky fibrous or minutely mealy, disc yellowish or brownish and often minutely squamulose, margin slightly incurved at first, finally recurved at the digesting time of lamellae; context grayish, very thin, subfleshy, fragile, taste mild; lamellae free, broad, ventricose, white, then brownish-black, finally deliquescent, flocculose on the edge; stipe 8–18 cm. long, 7.5–15 mm. thick, at first ventricose and fusiform, attenuated upward and shortly downward, white, longitudinally fibrillose, silky shining, smooth on the apex, often with a few tawny squamules at the base; annulus sometimes present near the base of stipe, very fugacious; spores black in mass, ellipsoidal,  $9-11 \times 5-6 \mu$ , smooth.

Hab. on rich soil, on lawn or elsewhere. Summer to autumn. Ishikari (Sapporo).

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

Jap. name. *Hitoyo-take* (KAWAMURA).

### Subsect. *Micacei* FR.

Epicr. Myc. 247, 1838.

Pileus at first covered with minute glistening micaceous squamules or granules which at length disappear. Annulus none.

### 3. *Coprinus micaceus* [BULL.] FR.

Epicr. Myc. 217, 1838; Hymen. Eur. 325, 1874—BERK. Outl. Brit. Fung. 179, 1860—KICKX, Fl. Crypt. Flandr. II, 185, 1867—CKE. Handb. Brit. Fung. I, 165, f. 39, 1871; Ill. Brit. Fung. pl. 673, 1888; Handb. Austr. Fung. 69, 1892—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 156, 1872; Ench. Fung. 123, 1886—GILL. Hymen. Fr. 606, cum icone, 1874—KARST. Hattsv. I, 537, 1879—WINT. Die Pilze, I, 629, 1884—SACC. Syll. Fung. V, 1090, 1887; Fl. Ital. Crypt., Hymen. 861, 1916—MASS. Brit. Fung. Fl. I, 317, 1892;

Ann. Bot. X, 166, 1896—ATKINS. Mushrooms, ed. 2, 42, f. 43-44, 1903—W. G. SM. Brit. Basid. 206, 1908—ROLLAND, Atlas Champ. 73, f. 169, 1910—RICKEN, Blätterp. 63, pl. 22, f. 4, 1915—LANGE, Agar. Denm. II, 46, 1915—KAUFFM. Agar. Mich. 218, pl. 39-40, 1918—REA, Brit. Basid. 506, 1922—BRES. Icon. Myc. XVIII, pl. 880, 1931.

[P. HENN. in ENGLERS Bot. Jahrb. XXXIV, (600), 1905—SHIRAI, List Jap. Fung. 25, 1905; ed. 2, 171, 1917; ed. 3, 100, 1927—YASUDA, Bot. Mag. (Tokyo), XXXVII, (204), 1923—UMEMURA, Pl. Fujiyama. 374, 1923]

*Agaricus micaceus* BULL. Champ. Fr. pl. 246, 1791 (teste FR.).

*Agaricus (Coprinus) micaceus* FR. Syst. Myc. I, 309, 1821—BERK. in SMITH, Engl. Fl. V, (2), 120, 1836—RABENH. Deut. Krypt. Fl. I, 456, 1844.

Densely caespitose, edible. Pileus 3-6 cm. broad when expanded, ovate, then campanulate; surface yellow-ferruginous, yellow-livid, darker at the disc, at length date-brown-fuscous, ferruginous-ochraceous when dry, undulate-lobate, rimosely split, striate, at first covered with glistening micaceous particles, soon naked and becoming sulcate, even at the disc; margin plicate and irregular; context thin, pallid, taste mild; lamellae adnexed, white or isabelline at first, then brown, or livid at the edge, finally fuscous-black, lanceolate, deliquescent; stipe 5-10 cm. long, 3-8 mm. thick, equal or faintly attenuated upward, white or whitish, silky, often curved, fibrillose, becoming smooth; spores fuscous-black in mass, ellipsoidal,  $8-10 \times 4-5 \mu$ .

Hab. on or around the base of stumps or trees or in grassy or denuded places, in woods, pastures or hedgerows. Summer to autumn. Ishikari (Sapporo, Nopporo).

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

Jap. name. *Kirara-take* (KAWAMURA).

#### 4. *Coprinus radians* (DESM.) FR.

Epicr. Myc. 248, 1838; Hymen. Eur. 326, 1874—BERK. Outl. Brit. Fung. 179, 1860—KICKX, Fl. Crypt. Flandr. II, 186, 1867—CKE. Handb. Brit. Fung. 166, 1871; Ill. Brit. Fung. pl. 676, f. A, 1888—GILL. Hymen. Fr. 607, 1874—QUÉL. Ench. Fung. 123, 1886—SACC. Syll. Fung. V, 1092, 1887; Fl. Ital. Crypt., Hymen. 860, 1916—MASS. Brit. Fung. Fl. I, 319, 1892; Ann. Bot. X, 167, pl. 10, f. 6-8, 1896—W. G. SM. Brit. Basid. 206, 1908—RICKEN, Blätterp. 64, 1915—KAUFFM. Agar. Mich. 219, 1918—REA, Brit. Basid. 507, 1922.

*Agaricus radians* DESM. Ann. Sci. Nat., Bot. XIII, 214, pl. 10, f. 1, 1828.

Caespitose. Pileus 2–3 cm. broad, ovate, then campanulate and expanded; surface yellow-tawny, becoming pale, micaceous, disc granular, sulcate, margin striate; context white, tawny under the pellicle of the pileus and in the stipe, thin; lamellae adnate, white, then violaceous black, linear, 3–4 mm. wide; stipe 2–4 cm. long, 4–8 mm. thick, slightly attenuated upward from the swollen base, and arising from a dense mass of tawny mycelium, white in color; spores black in mass, ellipsoidal-fusiform,  $9-10 \times 4-5 \mu$ , with a hyaline germpore at each end.

Hab. on stumps, especially of *Ulmus japonica* SARG., or old stacked logs, etc. Summer. Ishikari (Mt. Moiwa, near Sapporo).

Distr. Japan (Hokkaido), China, Europe.

Jap. name. *Ko-kiraratake* (n. n.).

### Sect. Veliformes FR.

Epicr. Myc. 250, 1838.

Pileus very thin, without pellicle, plicate-sulcate, at length splitting along the lines of the lamellae. Stipe slender, hollow.

### Subsect. Furfurelli FR.

Epicr. Myc. 251, 1838.

Pileus furfuraceous or micaceous. Lamellae commonly adnate to the stipe which is dilated into a ring or collar. Stipe ringless.

### 5. *Coprinus stercorarius* [SCOP.] FR.

Epicr. Myc. 251, 1838; Hymen. Eur. 330, 1874—KICKX, Fl. Crypt. Flandr. II, 187, 1867—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 159, 1872—GILL. Hymen. Fr. 613, 1874—KARST. Hattsv. I, 539, 1879—WINT. Die Pilze, I, 625, 1884—CKE. Ill. Brit. Fung. pl. 685, 1888; Handb. Austr. Fung. 70, 1892—SACC. Syll. Fung. V, 1103, 1887; Fl. Ital. Crypt., Hymen. 853, 1916—MASS. Brit. Fung. Fl. I, 326, 1892; Ann. Bot. X, 167, 1896—W. G. SM. Brit. Basid. 210, 1908—KAUFFM. Agar. Mich. 220, 1918—REA, Brit. Basid. 513, 1922.

*Agaricus stercorarius* SCOP. Fl. Carn. ed. 2, II, 427, 1772 (teste FR.).

Solitary or gregarious. Pileus 1–3 cm. broad, ovate, then campanulate, at length expanded and rolling up at the margin; surface whitish, pellucid, covered with dense, micaceous, somewhat persistent, shining white meal, striate at the margin; context white, grayish at the disc, very thin; lamellae adnexed, white at first, soon black, deliquescent, attenuated behind, ventricose, 1–3 mm. broad; stipe 4–10 cm. long, 1–3 mm. thick, attenuated upward from the thickened base, shining white, at first pruinose, then smooth, sometimes springing from a dark sclerotium, hollow; spores black in mass, broadly ellipsoidal or subglobose,  $8-10 \times 5-6 \mu$ .

Hab. on horse-dung or rich soil at roadside, etc. Summer to autumn. Ishikari (Sapporo).

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

Jap. name. *Bahun-hitoyotake* (n. n.).

#### 6. *Coprinus tuberosus* QUÉL.

Champ. Jura Vosg. 6 Suppl., in Bull. Soc. Bot. Fr. XXIV, 289, pl. 3, f. 2, 1878; Ench. Fung. 126, 1886—SACC. Syll. Fung. V, 1110, 1887—MASS. Ann. Bot. X, 164, pl. 11, f. 26–30, 1896—REA, Brit. Basid. 513, 1922.

Gregarious or solitary. Pileus 5–10 mm. broad and high, at first globose, then oblong or cylindrical to campanulate, at length expanded to subumbonate; surface at first wholly covered with umber to sooty colored short spiny warts, which then disappear, then becoming whitish and floccose or powdery, but with the warts remaining on the center, margin whitish, floccose and striatulate, often splitting and upturned; context very thin, light smoky; lamellae almost free, white then black, deliquescent, somewhat veined; stipe 2–4 cm. long, about 1.5 mm. thick, attenuated upward, at first covered with spiny umber colored warts which soon disappear, white, shining, smooth and glabrous above, white pruinose or floccose below, but white woolly at the base, springing from small subglobose or compressed subglobose black sclerotium; spores black in mass, oblong-ellipsoidal,  $9-10 \times 5.5-6.5 \mu$ .

Hab. on decaying vegetable matters or on dung. Late autumn. Ishikari (Sapporo).

Distr. Japan (Hokkaido), Europe.

Jap. name. *Tama-hitoyotake* (n. n.).

7. *Coprinus plicatilis* [CURT.] FR.

Epicr. Myc. 252, 1838; Hymen. Eur. 331, 1874—BERK. Outl. Brit. Fung. 181, 1860—KICKX, Fl. Crypt. Flandr. II, 189, 1867—CKE. Handb. Brit. Fung. I, 169, 1871; Ill. Brit. Fung. pl. 686, f. A, 1888; Handb. Austr. Fung. 70, 1892—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 159, 1872; Ench. Fung. 125, 1886—GILL. Hymen. Fr. 612, cum icone, 1874—KARST. Hattsv. I, 541, 1879—WINT. Die Pilze, I, 624, 1884—SACC. Syll. Fung. V, 1108, 1887; Fl. Ital. Crypt., Hymen. 850, 1916—MASS. Brit. Fung. Fl. I, 328, 1892; Ann. Bot. X, 177, pl. 11, f. 23-25, 1896—W. G. SM. Brit. Basid. 210, 1908—RICKEN, Blätterp. 65, pl. 23, f. 2, 1915—LANGE, Agar. Denm. II, 48, 1915—KAUFFM. Agar. Mich. 226, 1918—REA, Brit. Basid. 516, 1922—BRES. Icon. Myc. XVIII, pl. 884, 1931.

[MATSUM. Ind. Pl. Jap. I, 137, 1904—SHIRAI, List Jap. Fung. 25, 1905; ed. 2, 171, 1917; ed. 3, 101, 1927]

*Agaricus plicatilis* CURT. Fl. Lond. pl. 200, 1777—Sow. Engl. Fung. III, pl. 364, 1803 (teste FR.).

*Agaricus pulcher* PERS. Tent. Disp. Fung. 63, 1797; Syn. Fung. 404, 1801 (teste FR.).

*Agaricus (Coprinus) plicatilis* FR. Syst. Myc. I, 312, 1821.

Gregarious or solitary. Pileus 1-3 cm. broad, conical or ovate-cylindrical, then campanulate, soon expanded; surface furrowed and sulcate-plicate, for the most part smooth, disc broad, even and at length depressed, cinnamon-brown or wood-brown, then grayish and with radiating dark brown colored striations, disc darker, then rufescent; context very thin; lamellae remote from the stipe and adnate to a collar formed by the dilated apex of the stipe, gray, at length gray-black, distant; stipe 4-7 cm. long, 1-2 mm. thick, slightly attenuated upward or subequal, smooth, whitish above, brownish below, subvillous at the base, hollow; spores black in mass, broadly ellipsoidal,  $10-12.5 \times 7.5-9 \mu$ .

Hab. on the ground among grasses at roadsides, under trees or in woods. Ishikari (Sapporo).

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

Jap. name. *Hime-higasa-hitoyo* (nov.).

## Subfam. Lactarioideae IMAI, nom. nov.

*Asterospori* QUÉL. Ench. Fung. 126, 1886.

*Russulei* SCHROET. Pilze Schles. I, 533, 1889.

*Lactariaceae* P. HENN. in ENGLER & PR. Nat. Pflanzenfam. I, 1\*\*, 213, 1897.  
*Russulacées* KONR. et MAUBL. Icon. Sel. Fung. 26 & 391, 1924.  
*Russulaceae* HEIM, Fungi Iberici, 75, 1934.

*Trama vesiculosa*, *carnosa*, *fragilis*. Sporae in cumulo albae, *flavidulae* vel *ochraceae*, *globosae* vel *subglobosae*, *asperulae*.

#### Key to the genera.

- I. Fructification where bruised exuding a milky or colored juice.... *Lactarius*.  
 II. Fructification not exuding a juice where bruised..... *Russula*.

#### *Lactarius* FR.

Genera Hymen. 8, 1836; Epicr. Myc. 333, 1838.

*Lactaria* PERS. Tent. Disp. Fung. 63, 1797 (sec. EARLE).  
*Agaricus* § *Lactifluus* PERS. Syn. Fung. 429, 1801.  
*Lactifluus* ROUSSEL, Fl. Calvados, ed. 2, 66, 1806 (sec. EARLE).  
*Agaricus* § *Galorrhheus* FR. Syst. Myc. I, 61, 1821.  
*Galorrhheus* FR. Syst. Orb. Veg. I, 75, 1825.  
*Lactariella* SCHROET. Pilze Schles. I, 544, 1889.  
*Gloeocybe* EARLE, Bull. N. Y. Bot. Gard. V, 409, 1909.

Fructification fleshy, brittle, exuding latex where injured. Pileus regular. Stipe central, rarely excentric, fleshy, brittle. Lamellae adnate or decurrent, subrigid, brittle. Spores white, yellowish or subochraceous in mass, usually rough.

Type species: *Agaricus torminosus* SCHAEFF. ex FR.

#### Key to the sections, subsections and species in Hokkaido.

- I. Lamellae unchangeable, naked, not changing color and not white-pruinose; latex at first white, acrid (not acrid in *L. flavidulus*)..... Sect. Piperites.  
 A. Pileus viscid when moist, margin at first involute, tomentose..... Subsect. *Tricholomoidei*.  
 1. Latex changing color to sulphur-yellow; pileus yellow-ochre; stipe subconcolorous, with scrobiculate spots..... *L. scrobiculatus*(1).  
 2. Latex unchanging in color.  
 a. Pileus flesh-color; stipe subconcolorous or paler..... *L. torminosus*(2).  
 b. Pileus olive-green or umber; stipe subconcolorous..... *L. necator*(3).  
 3. Latex changing color to sage-green, taste mild; pileus whitish then buff-yellow; stipe whitish..... *L. flavidulus*(4).

- B. Pileus viscid when moist, pelliculose, naked at the margin..... Subject. *Limacini*.
1. Pileus cinnamon-buff or rufous, zonate.
    - a. Stipe paler than the pileus, stuffed then hollow..... *L. insulsus* (5).
    - b. Stipe paler than the pileus, solid..... *L. zonarius* (6).
  2. Pileus gray or purplish.
    - a. Latex not changing color to dark lilac.
      - i. Pileus livid-gray to smoky-gray or with purple tint..... *L. trivialis* (7).
      - ii. Pileus purplish-sooty..... *L. akanensis* (8).
    - b. Latex changing to dark lilac..... *L. uvidus* (9).
- C. Pileus without a pellicle, hence absolutely dry, most frequently unpolished..... Subject. *Piperati*.
1. Pileus glabrous, white, yellowish or brownish.... *L. piperatus* (10).
  2. Pileus minutely tomentose or velvety, white or whitish..... *L. vellereus* (11).
- II. Lamellae pallid then discolored, afterwards darker, glancing when turned to the light, at length white pruinose; latex at first white, mild or mild becoming acrid..... Sect. *Russularia*.
- A. Pileus at first viscid..... Subject. *Viscidi*.
1. Latex not changing or scarcely changing color.
    - a. Pileus small sized, light chestnut color at the center..... *L. avellaneus* (12).
    - b. Pileus medium sized.
      - i. Pileus avellaneous..... *L. vietus* (13).
      - ii. Pileus cinnamon or reddish cinnamon..... *L. quietus* (14).
  2. Latex changing color to sulphur-yellow..... *L. theiogalus* (15).
- B. Pileus unpolished, squamulose, villose or pruinose... Subject. *Impoliti*.
1. Latex not changing color.
    - a. Lamellae crowded.
      - i. Pileus ocher-red, minutely floccose-silky, then glabrous... *L. rufus* (16).
      - ii. Pileus densely covered with small isabelline colored scales. *L. helvus* (17).
      - iii. Pileus pinkish-buff, velvety; stipe glabrous..... *L. griseus* (18).
      - iv. Pileus densely covered with olivaceous-black colored minute fibrous scales..... *L. Sakamotoi* (19).
    - b. Lamellae distant; pileus ochraceous-buff..... *L. hygrophoroides* (20).
  2. Latex changing color to flesh or salmon-pink.
    - a. Pileus dark-brown or sooty, plicately rugose or wrinkled sulcate. *L. lignyotus* (21).
    - b. Pileus whitish, grayish or avellaneous..... *L. fuliginosus* (22).

3. Latex staining the wounds brown; pileus pinkish-cinnamon.....  
 ..... *L. luteolus* (23).
- C. Pileus polished, glabrous..... Subsect. *Glabrati*.
1. Pileus large, orange-buff; latex mild, abundant... *L. volemus* (24).
2. Pileus small, reddish fulvous; latex mild or slowly acrid.....  
 ..... *L. subdulcis* (25).
- III. Lamellae naked; latex always deeply colored..... Sect. *Dapetes*.
- A. Latex orange or scarlet..... *L. deliciosus* (26).
- B. Latex blood-red or dark-red..... *L. sanguifluus* (27).

### Sect. *Piperites* Fr.

Epicr. Myc. 333, 1838.

Lamellae unchangeable, naked, not changing color and not white-pruinose; latex at first white, acrid (except *L. fluvidulus*).

### Subsect. *Tricholomoidei* Fr.

Epicr. Myc. 333, 1838.

Pileus viscid when moist, margin at first involute, tomentose.

#### 1. *Lactarius scrobiculatus* [SCOP.] Fr.

Epicr. Myc. 334, 1838; Monogr. Hymen. Suec. II, 152, 1863; Hymen. Eur. 422, 1874—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 194, 1872; Ench. Fung. 126, 1886—GILL. Hymen. Fr. 206, cum icone, 1874—KARST. Hattsv. I, 178, 1879—WINT. Die Pilze, I, 556, 1884—SACC. Syll. Fung. V, 424, 1887; Fl. Ital. Crypt., Hymen. 383, 1915—CKE. Ill. Brit. Fung. pl. 971, 1888—MASS. Brit. Fung. Fl. III, 4, 1893—W. G. SM. Brit. Basid. 268, 1908—ROLLAND, Atlas Champ. 34, f. 60, 1910—RICKEN, Blätterp. 27, pl. 9, f. 2, 1915—KAUFFM. Agar. Mich. 90, 1918—REA, Brit. Basid. 479, 1922—BRES. Icon. Myc. VIII, pl. 356, 1928.

[IMAI, Bot. Mag. (Tokyo), XLIX, 603, 1935]

*Agaricus scrobiculatus* SCOP. Fl. Carn. ed. 2, II, 450, 1772 (teste Fr.).

*Agaricus (Galorrheus) scrobiculatus* Fr. Syst. Myc. I, 62, 1821—RABENH. Deut. Krypt. Fl. I, 554, 1844—BARLA, Champ. Nice, 32, pl. 18, f. 3-6, 1859.

*Lactaria scrobiculata* SCHROET. Pilze Schles. I, 541, 1889—BURLINGH. Lactariae U. S. 32, 1908; North Amer. Fl. IX, 179, 1910.

Solitary or gregarious. Pileus 6-15 cm. or more broad, convex-umbilicate, at length infundibuliform; surface yellow-ocher or anti-

mony-yellow, zoned or zoneless, viscid when moist, center at first covered with agglutinated down, then becoming subglabrous, margin at first involute and tomentose, then spreading or upturned and sometimes nearly naked; context somewhat firm, yellowish, taste acrid; latex white, soon changing to sulphur-yellow, acrid; lamellae decurrent or slightly adnate, whitish or pale yellowish, becoming darker when old, crowded, sometimes forking near the stipe, darker where wounded; stipe 4–9 cm. long, 1.5–3.5 cm. thick, equal, subconcolorous or paler, slightly viscid, spotted with brighter colored elliptic or orbicular scrobiculate spots, covered with very short agglutinated down below, subglabrous above, stuffed then hollow; spores white or slightly yellowish in mass, subglobose, or broadly ellipsoidal, minutely echinulate,  $8-10 \times 7.5-8 \mu$ .

Hab. on the ground in woods, mostly in coniferous regions. Autumn. Kitami (Oketo forest).

Distr. Japan (Hokkaido), Asia Minor, Europe, North America. Jap. name. *Ki-karahatsudake* (IMAI).

## 2. *Lactarius torminosus* [SCHAEFF.] FR.

Epicr. Myc. 334, 1838; Monogr. Hymen. Suec. II, 153, 1863; Hymen. Eur. 422, 1874—BERK. Outl. Brit. Fung. 203, 1860—CKE. Handb. Brit. Fung. I, 207, 1871; III. Brit. Fung. pl. 972, 1888—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 194, 1872; Ench. Fung. 127, 1886—GILL. Hymen. Fr. 211, cum icone, 1874—KARST. Hattsv. I, 179, 1879—WINT. Die Pilze, I, 556, 1884—SACC. Syll. Fung. V, 424, 1887; Fl. Ital. Crypt., Hymen. 383, 1915—MASS. Brit. Fung. Fl. III, 5, 1893—ATKINS. Mushrooms, ed. 2, 119, f. 121, 1903—W. G. SM. Brit. Basid. 268, 1908—KAWAMURA, Bot. Mag. (Tokyo), XXIII, (492), 1909; Ibid. XXV, 113, pl. 3, 1911—ROLLAND, Atlas Champ. 34, f. 63, 1910—RICKEN, Blätterp. 27, pl. 9, f. 3, 1915—KAUFFM. Agar. Mich. 91, 1918—REA, Brit. Basid. 479, 1922—BRES. Icon. Myc. VIII, pl. 357, 1928.

[IMAI, Bot. Mag. (Tokyo), XLIX, 603, 1935]

*Agaricus torminosus* SCHAEFF. Fung. Bavar. IV, Ind. 7, pl. 12, 1774—Sow. Engl. Fung. pl. 103, 1797 (teste FR.).

*Agaricus (Galorrhæus) torminosus* FR. Syst. Myc. I, 63, 1821—BERK. in SMITH, Engl. Fl. V, (2), 24, 1836—RABENH. Deut. Krypt. Fl. I, 553, 1844—BARLA, Champ. Nice, 33, pl. 18, f. 7–10, 1859—CORDA, Champ. Fr. II, 114, pl. 27, f. 1, 1870.

*Lactaria torminosa* SCHROET. Pilze Schles. I, 539, 1889—BURLINGH. Lactariae U. S. 30, 1908; North Amer. Fl. IX, 178, 1910.

Gregarious or solitary, not poisonous. Pileus 5–13.5 cm. broad, convex, then depressed in the center with incurved margin, finally

nearly infundibuliform with the margin merely deflexed; surface pallid-flesh-color, flesh-color or ochraceous-salmon color, concentric zoned with deeper color, sometimes nearly white and azonate, viscid when wet, tomentose but the center glabrous, margin involute at first, whitish woolly tomentose; context nearly white or orangish, firm; latex white, unchanging, very acrid; lamellae decurrent, whitish, light buff or pale ochraceous-salmon, crowded, some forking near the stipe; stipe 4–8 cm. long, 1–2.5 cm. thick, subequal or attenuated downward, paler than the pileus, sometimes faintly spotted with yellow, glabrous or pruinose, smooth, uneven, somewhat stuffed, soon becoming hollow; spores white in mass, broadly ellipsoidal, echinulate,  $8.5\text{--}9.5 \times 7\text{--}8 \mu$ .

Hab. on the ground in woods or under trees. Late summer to autumn. Ishikari (Nopporo, Mt. Teine, Tsukisappu).

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

Jap. name. *Kara-hatsudake* (KAWAMURA).

### 3. *Lactarius necator* (PERS. ex FR.) KARST.

Hattsv. I, 179, 1879—SACC. Fl. Ital. Crypt., Hymen. 384, 1915.

*Agaricus necator* (non BULL.) PERS. Syn. Fung. 435, 1801 (teste FR.).

*Agaricus (Galorrhheus) necator* FR. Syst. Myc. I, 64, 1821.

*Agaricus turpis* WEINM. Syll. Pl. Nov. II, 85, 1828.

*Lactarius turpis* FR. Epicr. Myc. 335, 1838; Monogr. Hymen. Suec. II, 154, 1863; Hymen. Eur. 423, 1874—BERK. Outl. Brit. Fung. 203, 1860—CKE. Handb. Brit. Fung. I, 207, 1871; Ill. Brit. Fung. pl. 987, 1888; Handb. Austr. Fung. 77, 1892—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 194, 1872—GILL. Hymen. Fr. 209, cum icone, 1874—WINT. Die Pilze, I, 555, 1884—SACC. Syll. Fung. V, 426, 1887—MASS. Brit. Fung. Fl. III, 7, 1893—W. G. SM. Brit. Basid. 269, 1908—RICKEN, Blätterp. 28, pl. 9, f. 4, 1915—KAUFFM. Agar. Mich. 88, 1918—REA, Brit. Basid. 480, 1922—BRES. Icon. Myc. VIII, pl. 358, 1928.

[IMAI, Bot. Mag. (Tokyo), XLIX, 604, 1935]

*Lactarius plumbeus* QUÉL. Ench. Fung. 127, 1886.

*Lactaria necator* SCHROET. Pilze Schles. I, 540, 1889.

*Lactaria turpis* BURLINGH. Lactariae U. S. 44, 1908; North Amer. Fl. IX, 183, 1910.

Gregarious or solitary, said to be edible. Pileus 6–15 cm. broad, convex, then plane, depressed at the center, at length nearly infundibuliform; surface olive-green or umber, darker at the center, azonate, viscid when wet, glabrous and agglutinated-fibrous or somewhat

roughened, margin involute at first and yellow-villose, then glabrous; context white, firm, thick; latex white, unchanging, acrid; lamellae somewhat decurrent, yellowish, then darker yellow, becoming fuscous where bruised, then ash-colored from the spores, many forking near the stipe, crowded, narrow; stipe 3–8 cm. long, 1–2.5 cm. thick, subequal or attenuated at the base, subconcolorous, viscid when wet, glabrous, smooth or somewhat scrobiculate or sometimes merely spotted, spots becoming nearly black in dried specimens, firm, stuffed, becoming hollow; spores white in mass, globose or subglobose, echinulate, 6.5–8.5  $\mu$  in diam.

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

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

Jap. name. *Uguisucho-chichitake* (IMAI).

#### 4. *Lactarius flavidulus* IMAI

Bot. Mag. (Tokyo), XLIX, 604, 1935.

Gregarious or solitary, edible. Pileus 6–15 cm. broad, convex, then convex-umbilicate, at length broadly infundibuliform; surface at first whitish, then cream color to buff-yellow, slightly zoned, viscid when moist, subglabrous, somewhat roughened, margin paler, involute and minutely villous when young, then arched and at length upturned and glabrous; context white, thick, rigid; latex white, becoming sage-green on exposure to air, taste mild, odour pleasant; lamellae decurrent or adnate-decurrent, white, then yellowish, tinged with green where bruised after the latex, moderately crowded, attenuated to both ends; stipe 4–6 cm. long, 1.5–3 cm. thick, equal, milky white, then cream-color, slightly velvety at first, then glabrous, hollow; spores white in mass, subglobose or globose, echinulate, 7.5–10  $\times$  7–8.5  $\mu$ .

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

Distr. Endemic (Hokkaido, Honshu).

Jap. name. *Ki-hatsudake* (IMAI).

The species does not strictly belong here because of the mild latex, but the writer tentatively places it in this subsection.

Subsect. *Limacini* FR.

Epicr. Myc. 336, 1838.

Pileus viscid when moist, pelliculose, naked at the margin.

5. *Lactarius insulsus* FR.

Epicr. Myc. 336, 1838; Monogr. Hymen. Suec. II, 157, 1863; Hymen. Eur. 424, 1874—BERK. Outl. Brit. Fung. 204, pl. 13, f. 2, 1860—KICKX, Fl. Crypt. Flandr. II, 199, 1867—CKE. Handb. Brit. Fung. I, 208, 1871; Ill. Brit. Fung. pl. 975, 1888—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D' Emul. Montb. 2 sér. V, 195, 1872—GILL. Hymen. Fr. 213, cum icone, 1874—KARST. Hattsv. I, 181, 1879—WINT. Die Pilze, I, 554, 1884—SACC. Syll. Fung. V, 427, 1887; Fl. Ital. Crypt., Hymen. 389, 1915—MASS. Brit. Fung. Fl. III, 9, 1893—W. G. SM. Brit. Basid. 270, 1908—RICKEN, Blätterp. 28, 1915—KAUFFM. Agar. Mich. 98, pl. 10, 1918—REA, Brit. Basid. 481, 1922—BRES. Icon. Myc. VIII, pl. 362, 1928—LANGE, Agar. Denm. VII, 30, 1928.

[IMAI, Bot. Mag. (Tokyo), XLIX, 604, 1935]

*Agaricus insulsus* FR. Syst. Myc. I, 68, 1821—RABENH. Deut. Krypt. Fl. I, 552, 1844.

*Lactaria insulsa* P. HENN. in ENGLER & PR. Nat. Pflanzenfam. I, 1\*\*, 216, 1898—BURLINGH. Lactariae U. S. 51, 1908; North Amer. Fl. IX, 180, 1910.

Gregaricus or solitary, edible. Pileus 4.5–12 cm. broad, convex-umbilicate, then becoming depressed at the center, finally infundibuliform; surface glabrous, viscid when moist, at first vinaceous-tawny or rufous and with deeper colored concentrically ringed zones, then becoming slightly paler, margin at first strongly incurved and with slightly white soft down which at length almost disappears, then often becoming lobate; context white, no odour, taste slightly acrid, not changing in color; latex white, unchanging color, acrid; lamellae decurrent, very distant, whitish at first, becoming light ochraceous-buff, frequently forking near the stipe, rather thick, fragile, 1 cm. broad at the middle portion; stipe 2–5 cm. long, 1.5–2.5 cm. thick, attenuated downward, paler than the pileus, sometimes spotted with deeper color, glabrous or white pruinose, stuffed, then hollow; spores yellow in mass, subglobose, echinulate,  $7.5-9 \times 6-7.5 \mu$ .

Hab. on the ground in woods. Late summer to autumn. Ishikari (Sapporo, Mt. Teine, Nopporo).

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

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

6. *Lactarius zonarius* [BULL.] FR.

Epicr. Myc. 336, 1838; Monogr. Hymen. Suec. II, 158, 1863; Hymen. Eur. 425, 1874—BERK. Outl. Brit. Fung. 204, 1860—CKE. Handb. Brit. Fung. I, 209, 1871—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 196, 1872; Ench. Fung. 127, 1886—GILL. Hymen. Fr. 214, 1874—KARST. Hattsv. I, 182, 1879—WINT. Die Pilze, I, 553, 1884—SACC. Syll. Fung. V, 428, 1887; Fl. Ital. Crypt., Hymen. 388, 1915—MASS. Brit. Fung. Fl. III, 10, 1893—W. G. SM. Brit. Basid. 270, 1908—REA, Brit. Basid. 481, 1922—BRES. Icon. Myc. VIII, pl. 363, 1928.

[IMAI, Bot. Mag. (Tokyo), XLIX, 605, 1935]

*Agaricus zonarius* BULL. Champ. Fr. pl. 104, 1791 (teste FR.).

*Agaricus flexuosus* PERS. Syn. Fung. 430, 1801 (teste FR.).

*Agaricus (Galorrhheus) flexuosus* FR. Syst. Myc. I, 74, 1821, p. p.

*Lactaria zonaria* SCHROET. Pilze Schles. I, 538, 1889.

Gregarious, edible. Pileus 5–10 cm. broad, convex-umbilicate, at length infundibuliform; surface slightly viscid when moist, warm-buff or cinnamon-buff, with alternate narrow zones of cinnamon and warm-buff color on the marginal zone, glabrous, margin incurved and white-pruinose tomentose; context whitish, then slightly tinged with yellow; latex white, unchanging, but after some hours slightly stains the lamellae with a brownish tint where bruised, very acrid, abundant; lamellae decurrent, pinkish-buff at first, then becoming slightly darker, very distant, rather thick, about 5–6 mm. broad, almost not forked; stipe 3.5–5 cm. long, 1.5–2 cm. thick, equal, glabrous, white above, paler than the pileus below, solid; spores yellowish in mass, globose or subglobose, echinulate or subreticulate,  $8\text{--}10 \times 7.5\text{--}10 \mu$ .

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

Distr. Japan (Hokkaido), Asia Minor, Europe.

Jap. name. *Ki-karahatsumodoki* (IMAI).

7. *Lactarius trivialis* FR.

Epicr. Myc. 337, 1838; Monogr. Hymen. Suec. II, 160, 1863; Hymen. Eur. 426, 1874—CKE. Handb. Brit. Fung. I, 210, 1871; Ill. Brit. Fung. pl. 976, 1888—QUÉL. Champ. Jura Vosg. 2 Suppl., in Mém. Soc. D'Emul. Montb. 2 sér. V, 354, 1873; Ench. Fung. 128, 1886—GILL. Hymen. Fr. 214, 1874—KARST. Hattsv. I, 184, 1879—WINT. Die Pilze, I, 552, 1884—SACC. Syll. Fung. V, 430, 1887; Fl. Ital. Crypt., Hymen. 390, 1915—MASS. Brit. Fung. Fl. III, 11, 1893—W. G. SM. Brit. Basid. 270, 1908—RICKEN, Blätterp. 33, 1915—KAUFFM. Agar.

Mich. 100, 1918—REA, Brit. Basid. 483, 1922—BRES. Icon. Myc. VIII, pl. 366, 1928.

[IMAI, Bot. Mag. (Tokyo), XLIX, 605, 1935]

*Agaricus (Galorrhheus) trivialis* FR. Syst. Myc. I, 65, 1821—RABENH. Deut. Krypt. Fl. I, 552, 1844.

*Lactaria trivialis* SCHROET. Pilze Schles. I, 538, 1889—BURLINGH. Lactariae U. S. 53, 1908; North Amer. Fl. IX, 181, 1910.

Gregarious or solitary, edible. Pileus 5–15 cm. broad, convex, then subumbilicate to subinfundibuliform; surface azonate, viscid, glabrous, variable in color: livid-gray to smoky-gray or with a lilac-purplish tint, lead-color or pinkish-brown, margin soon arched, at first pruinose, thin; context white, thick, rigid-fragile; latex white or creamy-white, unchanging or sometimes faintly yellowish, acrid; lamellae slightly decurrent, whitish or creamy to yellowish, crowded, thin, some forked; stipe 3–12 cm. long, 1–2 cm. thick, nearly equal but often inflated at the base, concolorous or paler, not spotted, glabrous, viscid, smooth, stuffed then hollow; spores subochraceous in mass, subglobose or broadly ellipsoidal, echinulate,  $8-10 \times 7-9 \mu$ .

Hab. on the ground in woods. Autumn. Iburi (Lake side of Shikotsu).

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

Jap. name. *Kihada-chichitake* (IMAI).

### 8. *Lactarius akanensis* IMAI

Bot. Mag. (Tokyo), XLIX, 605, 1935.

Gregarious. Pileus 4–10 cm. broad, convex at first, then depressed to convex-umbilicate; surface glutinous, glabrous, smooth, pale purplish-sooty, a few times and slightly zoned with darker lines when young, later usually azonate, margin incurved, naked; context white, thick; latex white, becoming greenish-yellowish or dusky-viridescent when dried on the lamellae, at first mild, then subacid, conspicuous; lamellae adnate with a slightly decurrent tooth, whitish or faintly tinged with yellowish color, rather distant, rarely forked near the stipe; stipe 2–5 cm. long, 1–1.5 cm. thick, usually slightly attenuated downward, white or whitish, slightly viscid when moist, polished when dry, solid then hollow; spores white in mass, broadly ellipsoidal or subglobose, echinulate,  $8-10 \times 6-8 \mu$ .

Hab. on the ground in woods. Autumn. Kushiro (Lake side of Akan).

Distr. Endemic.

Jap. name. *Umenezu-chichitake* (IMAI).

### 9. *Lactarius uvidus* FR.

Epicr. Myc. 338, 1838; Monogr. Hymen. Suec. II, 162, 1863; Hymen. Eur. 426, 1874—BERK. Outl. Brit. Fung. 205, 1860—CKE. Handb. Brit. Fung. I, 210, 1871—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 196, 1872; Ench. Fung. 128, 1886—GILL. Hymen. Fr. 202, cum icone, 1874—KARST. Hattsv. I, 185, 1879—WINT. Die Pilze, I, 552, 1884—SACC. Syll. Fung. V, 431, 1887; Fl. Ital. Crypt., Hymen. 385, 1915—MASS. Brit. Fung. Fl. III, 12, 1893—W. G. SM. Brit. Basid. 271, 1908—RICKEN, Blätterp. 32, pl. 11, f. 4, 1915—KAUFFM. Agar. Mich. 101, 1918—REA, Brit. Basid. 483, 1922—BRES. Icon. Myc. VIII, pl. 367, 1928.

[IMAI, Bot. Mag. (Tokyo), XLIX, 606, 1935]

*Agaricus lividorubescens* BATSCH, Elench. Fung. Cont. II, 51, 1789 (teste FR.).

*Agaricus (Galorrhæus) uvidus* FR. Syst. Myc. I, 66, 1821.

*Lactaria uvida* SCHROET. Pilze Schles. I, 543, 1889.

*Lactaria lividorubescens* BURLINGH. Lactariae U. S. 49, 1908; North Amer. Fl. IX, 184, 1910.

Gregarious or solitary, said by BRESADOLA to be edible. Pileus 4–9 cm. broad, convex, then plane to depressed, at length nearly infundibuliform; surface variable in color, cinereous to light chestnut color, concentric zoned especially when young, or spotted, zones becoming inconspicuous when old, viscid when moist, glabrous, margin involute and minutely downy at first, then becoming straight to upturned and striatulate; context whitish, changing after the latex to lilac or dark lilac where wounded, rigid, firm, rather thin; latex white, changing to dark lilac or chocolate color where in contact with the flesh, bitterish-acrid, disagreeable; lamellae adnate or decurrent, white to yellowish, changing to lilac or dark lilac after the latex, forking next the stipe, crowded, narrow; stipe 3–8 cm. long, 1–1.5 cm. thick, equal or attenuated at the base, whitish, becoming yellowish, viscid, glabrous, sometimes tomentose at the base, stuffed, then hollow; spores white or tinged somewhat yellowish, subellipsoid, echinulate,  $8.5\text{--}11 \times 7\text{--}8.5 \mu$ .

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

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

Jap. name. *Tobicha-chichitake* (IMAI).

### Subsect. *Piperati* FR.

Epicr. Myc. 338, 1838.

Pileus without a pellicle, hence absolutely dry, most frequently unpolished.

### 10. *Lactarius piperatus* [SCOP.] FR.

Epicr. Myc. 340, 1838; Monogr. Hymen. Suec. II, 166, 1863; Hymen. Eur. 430, 1874—BERK. Outl. Brit. Fung. 205, 1860—KICKX, Fl. Crypt. Flandr. II, 200, 1867—CKE. Handb. Brit. Fung. I, 212, 1871; Ill. Brit. Fung. pl. 979, 1888; Handb. Austr. Fung. 77, 1892—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 198, 1872; Ench. Fung. 128, 1886—GILL. Hymen. Fr. 215, 1874—KARST. Hattsv. I, 187, 1879—WINT. Die Pilze, I, 548, 1884—SACC. Syll. Fung. V, 436, 1887; Fl. Ital. Crypt., Hymen. 378, 1915—MASS. Brit. Fung. Fl. III, 17, 1893—ATKINS. Mushrooms, ed. 2, 120, f. 122, 1903—W. G. SM. Brit. Basid. 273, 1908—KAWAMURA, Bot. Mag. (Tokyo), XXII, (411), 1 fig., 1908; Ill. Jap. Fung. pl. 19, f. 1-4, 1925—ROLLAND, Atlas Champ. 35, f. 66, 1910—RICKEN, Blätterp. 29, pl. 10, f. 3, 1915—KAUFFM. Agar. Mich. 95, pl. 9, 1918—REA, Brit. Basid. 486, 1922—BRES. Icon. Myc. VIII, pl. 371, 1928.

[SHIRAI, List Jap. Fung. 45, 1905; ed. 2, 309, 1917; ed. 3, 180, 1927—UMEMURA, Pl. Fujiyama. 368, 1923—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 113, 1931—IMAI, Bot. Mag. (Tokyo), XLIX, 606, 1935]

*Agaricus piperatus* SCOP. Fl. Carn. ed. 2, II, 449, 1772 (teste FR.).

*Agaricus (Galorrheus) piperatus* FR. Syst. Myc. I, 76, 1821—BERK. in SMITH, Engl. Fl. V, (2), 30, 1836—RABENH. Deut. Krypt. Fl. I, 550, 1844—BARLA, Champ. Nice, 42, pl. 22, f. 1-5, 1859—CORDA, Champ. Fr. II, 111, pl. 18, f. 1, 1870.

*Lactaria piperata* SCHROET. Pilze Schles. I, 536, 1889—BURLINGH. Lactariae U. S. 18, 1908; North Amer. Fl. IX, 176, 1910.

[P. HENN. Hedw. XXXIX, (156), 1900—MATSUM. Ind. Pl. Jap. I, 149, 1904]

Gregarious or solitary, edible. Pileus 3.5-22 cm. broad, convex-umbilicate, then expanded and depressed at the center, at length infundibuliform; surface white, then mixed with yellowish or brownish

colors, azonate, dry, glabrous, even or wrinkled, margin involute at first and naked, at length spreading or elevated; context white, compact, thick, becoming yellowish when cut and exposed to the air; latex white, unchanging or rarely creamy or greenish when dry, very acrid, abundant; lamellae decurrent or slightly adnate, white or creamy white, or pale ochraceous, at length becoming brown, narrow, very crowded, 1–3 mm. wide, dichotomously forked, edge obtuse; stipe 3–9 cm. long, 1–5 cm. thick, equal, often attenuated downward or subconical, milky white, glabrous or pruinose, dry, firm, solid; spores white in mass, subglabrous or broadly ellipsoidal, echinulate,  $7-9 \times 6-7.5 \mu$ .

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

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

Jap. name. *Tsuchikamuri* (KAWAMURA).

**Forma *pergamenus* (SWARTZ ex FR.) IMAI, comb. nov.**

*Agaricus pergamenus* SWARTZ, Sv. Vet.-Akad. Nya Handl. XXX, 90, 1809 (teste FR.).

*Agaricus (Galorrheus) pergamenus* FR. Syst. Myc. I, 76, 1821—RABENH. Deut. Krypt. Fl. I, 551, 1844.

*Lactarius pergamenus* FR. Epicr. Myc. 340, 1838; Monogr. Hymen. Suec. II, 166, 1863; Hymen. Eur. 430, 1874—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 198, 1872—GILL. Hymen. Fr. 216, cum icone, 1874—KARST. Hattsv. I, 187, 1879—WINT. Die Pilze, I, 549, 1884—SACC. Syll. Fung. V, 436, 1887; Fl. Ital. Crypt., Hymen. 377, 1915—CKE. Ill. Brit. Fung. pl. 978, 1888—MASS. Brit. Fung. Fl. III, 16, 1893—W. G. SM. Brit. Basid. 273, 1908.

*Lactaria pergamena* SCHROET. Pilze Schles. I, 537, 1889—BURLINGH. Lactariae U. S. 21, 1908; North Amer. Fl. IX, 176, 1910.

[YASUDA, Bot. Mag. (Tokyo), XXXVI, (103), 1922]

*Lactarius piperatus* var. *pergamenus* REA, Brit. Basid. 486, 1922.

Differs from the type in that the pileus is rugose wrinkled, the stipe long and slender and the lamellae adnate and horizontal.

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

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

Jap. name. *Kawa-chichitake* (YASUDA).

### 11. *Lactarius vellereus* FR.

Epicr. Myc. 340, 1838; Monogr. Hymen. Suec. II, 167, 1863; Hymen. Eur. 430, 1874—BERK. Outl. Brit. Fung. 206, 1860—KICKX, Fl. Crypt. Flandr. II, 201, 1867—CKE. Handb. Brit. Fung. I, 212, 1871; Ill. Brit. Fung. pl. 980, 1888—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 198, 1872; Ench. Fung. 128, 1886—GILL. Hymen. Fr. 215, cum icone, 1874—KARST. Hattsv. I, 188, 1879—WINT. Die Pilze, I, 548, 1884—SACC. Syll. Fung. V, 437, 1887—MASS. Brit. Fung. Fl. III, 18, 1893—W. G. SM. Brit. Basid. 273, 1908—RICKEN, Blätterp. 29, pl. 10, f. 2, 1915—KAUFFM. Agar. Mich. 92, 1918—REA, Brit. Basid. 486, 1922—BRES. Icon. Myc. VIII, 372, 1928.

[IMAI, Bot. Mag. (Tokyo), XLIX, 606, 1935]

*Agaricus Listeri* SOW. Engl. Fung. pl. 104, 1797 (teste FR.).

*Agaricus (Galorrhheus) vellereus* FR. Syst. Myc. I, 76, 1821—BERK. in SMITH, Engl. Fl. V, (2), 31, 1836—RABENH. Deut. Krypt. Fl. I, 550, 1844—BARLA, Champ. Nice, 43, pl. 22, f. 6-8, 1859—CORDA, Champ. Fr. II, 115, pl. 28, f. 2, 1870.

*Lactaria vellerea* SCHROET. Pilze Schles. I, 538, 1889—BURLINGH. Lactariae U. S. 22, 1908; North Amer. Fl. IX, 177, 1910.

[YASUDA, Bot. Mag. (Tokyo), XXXVIII, (47), 1924]

*Lactarius Listeri* SACC. Fl. Ital. Crypt., Hymen. 377, 1915.

Solitary or gregarious, edible. Pileus 6-12 cm. or more broad, convex-umbilicate with strongly inrolled then expanded margin, at length infundibuliform; surface white or whitish, tinged with grayish or yellowish in places, dry, minutely tomentose or velvety; context white at first, yellowish on exposure to air after the latex; latex white, becoming cream color when dry, acrid; lamellae adnate-decurrent, whitish, then yellowish, changing to brownish where injured, distant, rather broad, rather thick; stipe 3-6 cm. long, 2-4 cm. thick, equal, white or whitish, becoming yellowish or brownish, pruinose-velvety, solid; spores white in mass, subglobose or broadly ellipsoidal, nearly smooth,  $7.5-9 \times 6.25-7.5 \mu$ ; cystidia cylindrical, with blunt or short acute tip, not smooth.

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

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

Jap. name. *Ke-shirohatsudake* (YASUDA).

Sect. *Russularia* FR.

Epicr. Myc. 341, 1838.

Lamellae pallid, then discolored, afterwards darker, glancing when turned to the light, at length white pruinose; latex at first white, mild, or mild becoming acrid.

Subsect. *Viscidi* IMAI

Bot. Mag. (Tokyo), XLIX, 608, 1935.

*Pileus primitus viscosus.*

12. *Lactarius avellaneus* IMAI

Bot. Mag. (Tokyo), XLIX, 608, 1935.

Solitary or somewhat gregarious. Pileus 2–4 cm. broad, convex then plane, at length slightly depressed at the center, sometimes with a small umbo; surface smooth, glabrous, slightly viscid when moist, slightly polished, pale chestnut color at the center, margin paler; context whitish or grayish, rather thick; latex white, becoming a yellowish-white mass when dried, acrid, odour none; lamellae adnate-decurrent, white, then dingy, pruinose when dry, crowded; stipe 2–4 cm. long, 5–7 mm. thick, equal or slightly enlarged at the base, yellowish or brownish, uneven, glabrous, but appears as powdery, hollow; spores white in mass, broadly ellipsoidal or subglobose, echinulate,  $8-10 \times 7.5-8 \mu$ .

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

Distr. Endemic.

Jap. name. *Kôiro-chichitake* (IMAI).

13. *Lactarius vietus* FR.

Epicr. Myc. 344, 1838; Monogr. Hymen. Suec. II, 171, 1863; Hymen. Eur. 432, 1874—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 200, 1872; Ench. Fung. 129, 1886—GILL. Hymen. Fr. 206, cum icone, 1874—KARST. Hattsv. I, 191, 1879—WINT. Die Pilze, I, 546, 1884—SACC. Syll. Fung. V, 441, 1887; Fl. Ital. Crypt., Hymen. 391, 1915—CKE. Ill. Brit. Fung. pl. 1009, f. A, 1888—MASS. Brit. Fung. Fl. III, 24, 1893—W. G. SM. Brit. Basid. 275, 1908

—RICKEN, Blätterp. 37, pl. 14, f. 1, 1915—KAUFFM. Agar. Mich. 109, 1918—REA, Brit. Basid. 489, 1922—BRES. Icon. Myc. VIII, pl. 379, 1928—LANGE, Agar. Denm. VII, 31, 1928.

[IMAI, Bot. Mag. (Tokyo), XLIX, 608, 1935]

*Agaricus (Galorrhheus) vietus* FR. Syst. Myc. I, 66, 1821—RABENH. Deut. Krypt. Fl. I, 548, 1844.

*Lactaria vieta* SCHROET. Pilze Schles. I, 541, 1889.

Solitary or gregarious. Pileus 3–6 cm. broad, convex, then depressed, sometimes subpapillate, to umbilicate, at length subinfundibuliform; surface avellaneous, cinnamon-buff, dark-olive-buff or pinkish buff, paler at the margin, viscid when wet, azonate, glabrous, silky or minutely silky-tomentose when dry, margin involute at first, then elevated and arched; context whitish, then gray; latex watery-white, then gray or unchanging, very slowly acrid; lamellae adnate-decurrent or subdecurrent, white then yellowish, subcrowded or subdistant, often forking next the stipe, thin; stipe 4–7 cm. long, 5–12 mm. thick, equal or attenuated upward, concolorous or paler, glabrous, rivulose-wrinkled, stuffed then hollow; spores whitish in mass, globose, subglobose or broadly ellipsoidal, echinulate,  $7-10 \times 7-8 \mu$ .

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

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

Jap. name. *Ko-kihada-chichitake* (IMAI).

#### 14. *Lactarius quietus* FR.

Epicr. Myc. 343, 1838; Hymen. Eur. 431, 1874—BERK. Outl. Brit. Fung. 207, 1860—CKE. Handb. Brit. Fung. I, 214, 1871; Ill. Brit. Fung. pl. 983, 1888—GILL. Hymen. Fr. 220, 1874—KARST. Hattsv. I, 189, 1879—QUÉL. Ench. Fung. 129, 1886—SACC. Syll. Fung. V, 440, 1887; Fl. Ital. Crypt., Hymen. 392, 1915—MASS. Brit. Fung. Fl. III, 21, 1893—W. G. SM. Brit. Basid. 274, 1908—RICKEN, Blätterp. 38, pl. 14, f. 2, 1915—REA, Brit. Basid. 488, 1922—LANGE, Agar. Denm. VII, 37, 1928—BRES. Icon. Myc. VIII, pl. 376, 1928.

*Agaricus (Galorrhheus) quietus* FR. Syst. Myc. I, 69, 1821.

*Lactaria quieta* SCHROET. Pilze Schles. I, 537, 1889—BURLINGH. Lactariae U. S. 63, 1908; North Amer. Fl. IX, 188, 1910.

Gregarious or solitary, edible. Pileus 3–7 cm. broad, convex, then depressed; surface cinnamon or reddish-cinnamon, disc darker, obscurely zonate with darker color, slightly viscid at first, soon dry,

glabrous; context white, becoming brownish; latex white, unchanging, mild; lamellae adnate-decurrent, white, becoming reddish-brownish, crowded, somewhat forking near the stipe; stipe 3–7 cm. long, 4–10 mm. or more thick, equal, subconcolorous, then becoming rubiginous or darker, glabrous, smooth, stuffed then hollow; spores white in mass, subglobose,  $8\text{--}10 \times 8 \mu$ , echinulate.

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

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

Jap. name. *Chôji-chichitake* (n. n.).

### 15. *Lactarius thejogalus* [BULL.] FR.

Epicr. Myc. 342, 1838; Monogr. Hymen. Suec. II, 170, 1863; Hymen. Eur. 432, 1874—BERK. Outl. Brit. Fung. 206, 1860—KICKX, Fl. Crypt. Flandr. II, 202, 1867—CKE. Handb. Brit. Fung. I, 214, 1871—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 199, 1872; Ench. Fung. 129, 1886—GILL. Hymen. Fr. 208, cum icone, 1874—KARST. Hattsv. I, 190, 1879—WINT. Die Pilze, I, 547, 1884—SACC. Syll. Fung. V, 441, 1887; Fl. Ital. Crypt., Hymen. 390, 1915—MASS. Brit. Fung. Fl. III, 22, 1893—W. G. SM. Brit. Basid. 275, 1908—ROLLAND, Atlas Champ. 34, f. 61, 1910—RICKEN, Blätterp. 36, pl. 13, f. 5, 1915—KAUFFM. Agar. Mich. 97, 1918—REA, Brit. Basid. 489, 1922—BRES. Icon. Myc. VIII, pl. 378, 1928.

[IMAI, Bot. Mag. (Tokyo), XLIX, 608, 1935]

*Agaricus thejogalus* BULL. Champ. Fr. pl. 567, f. 2, 1791 (teste FR.).

*Agaricus (Galorrhheus) thejogalus* FR. Syst. Myc. I, 71, 1821—BERK. in SMITH, Engl. Fl. V, (2), 28, 1836—RABENH. Deut. Krypt. Fl. I, 549, 1844—BARLA, Champ. Nice, 39, pl. 20, f. 14–18, 1859—CORDA, Champ. Fr. II, 114, pl. 27, f. 2, 1870.

Gregarious or solitary, edible after BRESADOLA. Pileus 2–8 cm. broad, convex, then expanded to umbilicate or subinfundibuliform; surface incarnate-isabelline to pale tawny-reddish or fulvous, zonate to azonate, glabrous, viscid when moist, glossy when dry, even or wrinkled-uneven, margin at first involute soon spreading, pruinose to very minutely pruinose-downy on the extreme edge; context white, becoming yellow from the latex, moderately thick, compact; latex white, changing to sulphur-yellow, bitterish, then acrid; lamellae adnate-subdecurrent, crowded, rather narrow, whitish to yellowish, reddish-brown when old or where bruised, some forking near the stipe; stipe 3–6 cm. long, 5–12 mm. thick, subequal, subconcolorous or paler, sometimes faintly spotted, undulate-uneven, glabrous but often

slightly tomentose at the base, stuffed, then hollow; spores white in mass, subglobose or broadly ellipsoidal, echinulate,  $8-10 \times 7-8 \mu$ .

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

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

Jap. name. *Ki-chichitake* (IMAI).

### Subsect. *Impoliti* IMAI

Bot. Mag. (Tokyo), XLIX, 609, 1935.

*Pileus impolitus, squamulosus, villosus vel pruinosis.*

### 16. *Lactarius rufus* [SCOP.] FR.

Epicr. Myc. 347, 1838; Monogr. Hymen. Suec. II, 173 1863; Hymen. Eur. 433, 1874—BERK. Outl. Brit. Fung. 208, 1860—CKE. Handb. Brit. Fung. I, 215, 1871; Ill. Brit. Fung. pl. 985, 1888—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2<sup>e</sup> sér. V, 200, 1872; Ench. Fung. 130, 1886—GILL. Hymen. Fr. 225, cum icone, 1874—KARST. Hattsv. I, 192, 1879—WINT. Die Pilze, I, 545, 1884—SACC. Syll. Fung. V, 442, 1887; Fl. Ital. Crypt., Hymen. 381, 1915—MASS. Brit. Fung. Fl. III, 25, 1893—W. G. SM. Brit. Basid. 275, 1908—ROLLAND, Atlas Champ. 37, f. 71, 1910—RICKEN, Blätterp. 36, pl. 13, f. 3, 1915—KAUFFM. Agar. Mich. 107, 1918—REA, Brit. Basid. 490, 1922—BRES. Icon. Myc. VIII, pl. 381, 1928—LANGE, Agar. Denm. VII, 35, 1928.

[IMAI, Bot. Mag. (Tokyo), XLIX, 609, 1935]

*Agaricus rufus* SCOP. Fl. Carn. ed. 2, II, 451, 1772 (teste FR.).

*Agaricus (Galorrheus) rufus* FR. Syst. Myc. I, 71, 1821—BERK. in SMITH, Engl. Fl. V, (2), 28, 1836—RABENH. Deut. Krypt. Fl. I, 546, 1844—CORDA, Champ. Fr. II, 113, 1870.

*Lactaria rufa* SCHROET. Pilze Schles. I, 539, 1889—BURLINGH. Lactariae U. S. 75, 1908; North Amer. Fl. IX, 192, 1910.

Solitary or gregarious. Pileus 3–10 cm. broad, convex with an umbo, or umbonate, then depressed with an umbo, at length sub-infundibuliform; surface vinaceous-tawny to ocher-red, not fading; azonate, dry, minutely flocculoso-silky, then glabrous and shining, margin involute at first, whitish-tomentose, then glabrous; context pallid, or tinged with pink, not compact, inodorous; latex white, unchanging, very acrid; lamellae decurrent, light pinkish-cinnamon or ochraceous, then buff-pink or rufous, crowded, sometimes forking; stipe 3–10 cm. long, 6–10 mm. thick, nearly equal or attenuated down-

ward, subconcolorous or paler than the pileus, dry, glabrous or sometimes pruinose and white pubescent at the base, stuffed, at length sometimes hollow; spores white in mass, subglobose or broadly ellipsoidal, echinulate,  $8-10 \times 7-8 \mu$ .

Hab. on the ground under conifers. Late summer to autumn. Ishikari (Alpine region of Mt. Taisetsu), Kushiro (Alpine region of Mt. Meakan).

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

Jap. name. *Aka-chichitake* (IMAI).

### 17. *Lactarius helvus* FR.

Epicr. Myc. 347, 1838; Monogr. Hymen. Suec. II, 174, 1863; Hymen. Eur. 433, 1874—QUÉL. Champ. Jura Vosg. 3 Suppl., in Mém. Soc. D'Emul. Montb. 2 sér. V, 440, 1875; Ench. Fung. 130, 1886—KARST. Hattsv. I, 192, 1879—WINT. Die Pilze, I, 545, 1884—SACC. Syll. Fung. V, 443, 1887; Fl. Ital. Crypt., Hymen. 395, 1915—MASS. Brit. Fung. Fl. III, 25, 1893—W. G. SM. Brit. Basid. 275, 1908—RICKEN, Blätterp. 35, pl. 13, f. 2, 1915—KAUFFM. Agar. Mich. 106, 1918—REA, Brit. Basid. 490, 1922—BRES. Icon. Myc. VIII, pl. 382, 1928—LANGE, Agar. Denm. VII, 34, 1928.

[IMAI, Bot. Mag. (Tokyo), XLIX, 609, 1935]

*Agaricus (Galorrheus) helvus* FR. Syst. Myc. I, 72, 1821—RABENH. Deut. Krypt. Fl. I, 546, 1844.

*Lactaria helva* SCHROET. Pilze Schles. I, 539, 1839—BURLINGH. Lactariae U. S. 74, 1908; North Amer. Fl. IX, 191, 1910.

Solitary or gregarious, said to be edible. Pileus 4–10 cm. broad, convex, then plane to depressed; surface dry, azonate, densely covered with isabelline colored short hairs, fine scales or wart-like small scales, darker at the center; margin involute at first, then spreading; context whitish at first, finally yellowish, almost mild; latex white, watery, mild to subacid, unchanging in color; lamellae decurrent, very crowded, white, then becoming ochraceous, sometimes forking elsewhere especially near the stipe; stipe 3–8 cm. long, 1–1.5 cm. thick, equal or slightly attenuated upward, subconcolorous or paler, pruinose, pubescent at the base, stuffed, then hollow; spores pale ochraceous in mass, subglobose or broadly ellipsoidal,  $7-9 \times 5.5-6.5 \mu$ , echinulate.

Hab. on the ground under conifers, *Pinus pumila* REGEL. in our cases. Autumn. Kushiro (Alpine region of Mt. Meakan).

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

Jap. name. *Aka-chichi-modoki* (IMAI).

18. *Lactarius griseus* PK.

23 Ann. Rep. N. Y. State Cab. 119, 1872—SACC. Syll. Fung. V, 444, 1887.

[IMAI, Bot. Mag. (Tokyo), XLIX, 609, 1935]

*Lactaria grisea* BURLINGH. Lactariae U. S. 80, f. 14, 1908; North Amer. Fl. IX, 192, 1910.

Gregarious or solitary. Pileus 1–5 cm. broad, convex, then plane, at length depressed, with a small umbo; surface avellaneous (sec. SACCARDO), pinkish-buff (sec. RIDGWAY), minute-tomentose or velvety, dry, azonate, margin involute, then spreading, entire; context whitish, thin, unchanging; latex white, unchanging color, acrid, odour slight but not cinnamon-like; lamellae decurrent, crowded, whitish or straw-colored, then ochraceous; stipe 1.5–5 cm. long, 3–7 mm. thick, nearly equal, subconcolorous or paler, glabrous, but appears as powdery, uneven, hollow; spores white in mass, broadly ellipsoidal, echinulate,  $7.5-10 \times 5-7.5 \mu$ .

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

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

Jap. name. *Haiiro-chichitake* (IMAI).

19. *Lactarius Sakamotoi* IMAI

Bot. Mag. (Tokyo), XLIX, 609, 1935.

Gregarious or solitary. Pileus 2–3 cm. broad, umbilicate then infundibuliform; surface dry, densely covered with minute fibrous scales, at first dark mouse-gray, blackish mouse-gray or olivaceous-black, then becoming slightly paler and changing to deep mouse-gray on the center and more pale on the margin; margin incurved; context pallid, thin, unchanging color; latex white, unchanging, acrid; lamellae decurrent, pallid, then light ochraceous-buff or salmon-buff and slightly pruinose, connected or forking near the stipe, crowded; stipe 2–4.5 cm. long, 3–4 mm. thick, equal or slightly attenuated upward, light drab to hair-brown, naked, hollow; spores ochraceous in mass, broadly ellipsoidal or subglobose, echinulate,  $6-8 \times 5-7 \mu$ .

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

Distr. Endemic.

Jap. name. *Hime-aiiro-chichitake* (IMAI).

20. *Lactarius hygrophoroides* BERK. et CURT.

Ann. Mag. Nat. Hist. 3 ser. IV, 293, 1859—SACC. Syll. Fung. V, 448, 1887; Fl. Ital. Crypt., Hymen. 398, 1915—KAUFFM. Agar. Mich. 114, 1918.

*Lactarius distans* PK. 23 Ann. Rep. N. Y. State Cab. 117, 1872; Mem. N. Y. State Mus. No. 4, III, 151, pl. 53, f. 7-11, 1900—SACC. Syll. Fung. V, 448, 1887.

*Lactaria hygrophoroides* P. HENN. in ENGLER & PR. Nat. Pflanzenfam. I, 1\*\*, 214, 1898—BURLINGH. Lactariae U. S. 92, 1908; North Amer. Fl. IX, 196, 1910.

Gregarious or solitary, edible. Pileus 3-10 cm. broad, convex, then expanded, depressed at the center, finally umbilicate or sub-*infundibuliform*; surface dry, subglabrous or very minutely pruinose-velvety, sometimes rugose-wrinkled or rimose-areolate, ochraceous-buff or brownish-orange to fulvous or bister, azonate, margin involute, then spreading or uplifted; context whitish, thick, brittle; latex white, unchanging, not staining the lamellae or context, mild, odour none, somewhat abundant; lamellae adnate-subdecurrent, whitish, then cream or yellowish, not discoloring where injured, not forking, distant, often intervenose, rather narrow; stipe 2-5 cm. long, 5-15 mm. thick, equal or attenuated downward, concolorous, glabrous or pruinose, solid or stuffed; spores white in mass, globose or broadly ellipsoidal, minutely echinulate, 8-11  $\mu$  in diam.

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

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

Jap. name. *Hiroba-chichitake* (n. n.).

21. *Lactarius lignyotus* FR.

Monogr. Hymen. Suec. II, 177, 1863; Hymen. Eur. 434, 1874—QUÉL. Ench. Fung. 130, 1886—KARST. Hattsv. I, 194, 1879—WINT. Die Pilze, I, 544, 1884—SACC. Syll. Fung. V, 445, 1887; Fl. Ital. Crypt., Hymen. 396, 1915—MASS. Brit. Fung. Fl. III, 29, 1893—ATKINS. Mushrooms, ed. 2, 117, f. 119, 1903—W. G. SM. Brit. Basid. 277, 1908—RICKEN, Blätterp. 35, 1915—KAUFFM. Agar. Mich. 106, 1918—REA, Brit. Basid. 492, 1922—BRES. Icon. Myc. VIII, pl. 386, 1928.

[IMAI, Bot. Mag. (Tokyo), XLIX, 610, 1935]

*Lactarius fuliginosus* var. *major* FR. Epicr. Myc. 348, 1838.

*Lactariella lignyota* SCHROET. Pilze Schles. I, 544, 1889.

*Lactaria lignyota* BURLINGH. Lactariae U. S. 86, 1908; North Amer. Fl. IX, 194, 1910.

Solitary or gregarious, edible. Pileus 3–8 cm. broad, convex, then plane to slightly depressed, umbonate; surface plicately rugulose or wrinkled sulcate, dark-brown or sooty (chocolate to seal-brown), dry, azonate, pruinose velvety, margin at first incurved, sometimes plicate; context rather firm, white, becoming slowly pinkish or salmon where wounded; latex watery-white, changing to salmon-pink or saffron color where in contact with the broken context, mild or finally slightly acrid; lamellae decurrent, white or ochraceous, becoming pinkish or salmon where wounded, rather not crowded, of various lengths, about 5 mm. broad, thin; stipe 6–12 cm. long, 7–15 mm. thick, equal or abruptly smaller and plicate at the apex, smooth, concolorous, paler at the base, pruinose velvety, stuffed; spores ochraceous in mass, globose, echinulate, 9–10  $\mu$ .

Hab. on the ground in woods, especially in coniferous woods. Late summer to autumn. Ishikari (Mt. Taisetsu), Iburi (Lake side of Shikotsu), Kushiro (Mt. Meakan), Kitami (Oketo forest).

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

Jap. name. *Kuro-chichitake* (IMAI).

## 22. *Lactarius fuliginosus* FR.

Epicr. Myc. 348, 1838; Monogr. Hymen. Suec. II, 178, 1863; Hymen. Eur. 434, 1874—BERK. Outl. Brit. Fung. 209, 1860—CKE. Handb. Brit. Fung. I, 215, 1871; Ill. Brit. Fung. pl. 996, 1888—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 201, 1872—GILL. Hymen. Fr. 207, cum icone, 1874—KARST. Hattsv. I, 194, 1879—WINT. Die Pilze, I, 544, 1884—SACC. Syll. Fung. V, 446, 1887; Fl. Ital. Crypt., Hymen. 393, 1915—MASS. Brit. Fung. Fl. III, 27, 1893—W. G. SM. Brit. Basid. 276, 1908—RICKEN, Blätterp. 34, pl. 12, f. 5, 1915—KAUFFM. Agar. Mich. 105, 1918—REA, Brit. Basid. 492, 1922—BRES. Icon. Myc. VIII, pl. 385, 1928—LANGE, Agar. Denm. VII, 33, 1928.

[IMAI, Bot. Mag. (Tokyo), XLIX, 610, 1935]

*Agaricus azonites* BULL. Champ. Fr. pl. 567, f. 3, 1791 (teste FR.).

*Agaricus plinthogalus* OTTO, Versuch. Agar. 75, 1816 (teste BURLINGH.).

*Agaricus (Galorrheus) fuliginosus* FR. Syst. Myc. I, 73, 1821—RABENH. Deut. Krypt. Fl. I, 546, 1844.

*Lactarius fumosus* PK. 24 Ann. Rep. N. Y. State Mus. 74, 1872 (teste BURLINGH.).

*Lactarius azonites* QUÉL. Ench. Fung. 130, 1886.

*Lactariella azonites* SCHROET. Pilze Schles. I, 544, 1889.

*Lactaria plinthogala* BURLINGH. Lactariae U. S. 84, 1908; North Amer. Fl. IX, 194, 1910.

Solitary or gregarious. Pileus 2–7 cm. broad, convex, then plane, depressed at the center, finally subinfundibuliform; surface at first whitish, grayish, pale olive-buff, avellaneous, pinkish-buff, or cinnamon-buff, then darkening to buffy-brown, Saccardo's umber or snuff-brown, dry, glabrous, but appears slightly velvety and blooming, uneven or rugulose, especially when matured or drying, margin paler, entire or wavy, inflexed at first; context white, changing to flesh-color or fleshy-ocher where exposed to air; latex white then flesh color or salmon-pink, becoming whitish-powdery when dried, mild then acrid; lamellae adnate, adnexed or slightly decurrent, nearly white at first, then tinged with pale yellow-ochraceous, rather crowded, thin, finally or on drying becoming slightly pruinose, sometimes connected by vein-like reticulations, sometimes forking near the stipe, becoming pinkish or salmon where wounded; stipe 3–8 cm. long, 5–10 mm. thick, nearly equal, rugulose, dead white, then shell-pink, pinkish-buff or vinaceous-buff or subconcolorous, glabrous or slightly pruinose, downy at the base, firm, stuffed then hollow; spores ochraceous in mass, globose, echinulate, 6–10  $\mu$ .

Hab. on the ground in woods, deciduous, mixed or coniferous. Late summer to autumn. Ishikari (Nopporo, Mt. Kurodake), Ihuri (Lake side of Shikotsu), Kushiro (Lake side of Akan).

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

Jap. name. *Usuzumi-chichitake* (IMAI).

### 23. *Lactarius luteolus* PK.

Bull. Torrey Bot. Club, XXIII, 412, 1896—SACC. Syll. Fung. XIV, 94, 1899—KAUFFM. Agar. Mich. 115, 1918.

*Lactarius foetidus* PK. 54 Bull. N. Y. State Mus. 949, 1902 (teste PECK).

*Lactaria luteola* BURLINGH. Lactariae U. S. 95, 1908; North Amer. Fl. IX, 197, 1910.

Solitary or gregarious, edible. Pileus 4–6 cm. or more broad, convex, then nearly plane, somewhat depressed at the center; surface dry, pinkish-cinnamon or cinnamon-buff, or paler, azonate, minutely pruinose-velvety, sometimes slightly rugose, margin involute, then arched; context whitish, staining brown where injured; latex white, mild, abundant, staining the context and lamellae brown when exposed to the air; lamellae adnate or adnexed with a slightly decurrent tooth, whitish then yellowish, becoming brown where injured, close,

narrow; stipe 3–4 cm. or more long, 7–15 mm. thick, subequal, concolorous, dry, rugulose, pruinose-velvety, stuffed; spores white in mass, subglobose or broadly ellipsoidal, echinulate,  $7-8 \times 6.5-7.5 \mu$ .

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

Distr. Japan (Hokkaido), North America.

Jap. name. *Birôdo-chichitake* (n. n.).

#### Subsect. *Glabrati* IMAI

Bot. Mag. (Tokyo), XLIX, 610, 1935.

Pileus politus, glabrus.

#### 24. *Lactarius volemus* FR.

Epicr. Myc. 344, 1838; Monogr. Hymen. Suec. II, 178, 1863; Hymen. Eur. 435, 1874—BERK. Outl. Brit. Fung. 207, 1860—KICKX, Fl. Crypt. Flandr. II, 202, 1867—CKE. Handb. Brit. Fung. I, 216, 1871; Ill. Brit. Fung. pl. 999, 1888—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 201, 1872—GILL. Hymen. Fr. 221, cum icone, 1874—KARST. Hattsv. I, 196, 1879—WINT. Die Pilze, I, 543, 1884—SACC. Syll. Fung. V, 447, 1887; Fl. Ital. Crypt., Hymen. 398, 1915—MASS. Brit. Fung. Fl. III, 31, 1893—ATKINS. Mushrooms, ed. 2, 115, f. 118, 1903—W. G. SM. Brit. Basid. 277, 1908—KAWAMURA, Bot. Mag. (Tokyo), XXII, (409), 1908; Ill. Jap. Fung. pl. 6, f. 21–23, 1913—ROLLAND, Atlas Champ. 38, f. 72, 1910—RICKEN, Blätterp. 38, pl. 14, f. 3, 1915—KAUFFM. Agar. Mich. 112, pl. 12, 1918—REA, Brit. Basid. 493, 1922—BRES. Icon. Myc. VIII, pl. 390, 1928—LANGE, Agar. Denm. VII, 35, 1928.

[SHIRAI, List Jap. Fung. ed. 2, 309, 1917; ed. 3, 181, 1927—UMEMURA, Pl. Fujiyama. 368, 1923—IMAI, Bot. Mag. (Tokyo), XLIX, 610, 1935]

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

*Agaricus oedematopus* SCOP. Fl. Carn. ed. 2, II, 453, 1772 (teste FR.).

*Agaricus testaceus* ALB. et SCHW. Consp. Fung. Lusat. 209, 1805 (teste FR.).

*Agaricus (Galorrheus) volemus* FR. Syst. Myc. I, 69, 1821—BERK. in SMITH, Engl. Fl. V, (2), 27, 1836—RABENH. Deut. Krypt. Fl. I, 548, 1844—BARLA, Champ. Nice, 36, pl. 20, f. 1–3, 1859—CORDA, Champ. Fr. II, 116, pl. 26, f. 2, 1870.

*Lactarius lactifluus* QUÉL. Ench. Fung. 131, 1886.

*Lactaria volema* SCHROET. Pilze Schles. I, 535, 1889.

[MATSUM. Ind. Pl. Jap. I, 149, 1904]

*Lactaria lactiflua* BURLINGH. Lactariae U. S. 90, 1908; North Amer. Fl. IX, 195, 1910.

Gregarious or solitary, edible. Pileus 2.5–13 cm. broad, convex then expanded to nearly plane or slightly depressed; surface buff-yellow to orange-buff, sometimes paler, azonate, dry, glabrous, even or at length rimoso-rivulose; context yellowish or whitish, firm, rather thin, becoming brownish on exposure to air, taste mild, odour pleasant; latex white, rather sticky, unchanging or at length becoming yellowish, mild, abundant, staining the context and lamellae brown; lamellae slightly decurrent or adnato-decurrent, white, then yellowish, changing brownish where injured, often forked and connected, crowded, narrow; stipe 4–11 cm. long, 6–25 mm. thick, nearly equal, dry, concolorous, glabrous, pruinose, even, uneven or subrivulose, stuffed; spores white in mass, subglobose, echinulate, 7.5–10  $\mu$  in diam.

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

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

Jap. name. *Chichitake* (KAWAMURA).

## 25. *Lactarius subdulcis* [PERS.] FR.

Epicr. Myc. 345, 1838; Monogr. Hymen. Suec. II, 180, 1863; Hymen. Eur. 437, 1874—BERK. Outl. Brit. Fung. 208, 1860—KICKX, Fl. Crypt. Flandr. II, 203, 1867—CKE. Handb. Brit. Fung. I, 217, 1871; Ill. Brit. Fung. pl. 1002, 1888—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 202, pl. 11, f. 3, 1872; Ench. Fung. 131, 1886—GILL. Hymen. Fr. 224, cum icone, 1874—KARST. Hattsv. I, 198, 1879—WINT. Die Pilze, I, 541, 1884—SACC. Syll. Fung. V, 450, 1887; Fl. Ital. Crypt., Hymen. 402, 1915—MASS. Brit. Fung. Fl. III, 33, 1893—W. G. SM. Brit. Basid. 278, 1908—ROLLAND, Atlas Champ. 38, f. 73, 1910—RICKEN, Blätterp. 39, 1915—KAUFFM. Agar. Mich. 115, 1918—REA, Brit. Basid. 494, 1922—BRES. Icon. Myc. VIII, pl. 393, 1928—LANGE, Agar. Denm. VII, 37, 1928.

[IMAI, Bot. Mag. (Tokyo), XLIX, 610, 1935]

*Agaricus subdulcis* PERS. Syn. Fung. 433, 1801 (teste FR.).

*Agaricus* (*Galorrhheus*) *subdulcis* FR. Syst. Myc. I, 70, 1821, excl.  $\beta$ —BERK. in SMITH, Engl. Fl. V, (2), 28, 1836—RABENH. Deut. Krypt. Fl. I, 547, 1844—BARLA, Champ. Nice, 37, pl. 20, f. 4–10, 1859—CORDA, Champ. Fr. II, 113, pl. 26, f. 1, 1870.

*Lactaria subdulcis* SCHROET. Pilze Schles. I, 535, 1889—BURLINGH. Lactariae U. S. 100, 1908; North Amer. Fl. IX, 198, 1910.

*Lactarius subserifluus* LONGYEAR, Rep. Mich. Acad. Sci. III, 57, 1902 (teste BURLINGH.).

Gregarious or solitary, edible. Pileus 1–6 cm. broad, convex, papillate, then depressed to subinfundibuliform; surface fulvous, isabelline or reddish-fulvous, not fading, azonate, dry, glabrous, smooth or slightly rugulose, margin involute at first, then spreading, sometimes flexuous; context thin, firm, fragile, whitish or tinged with isabelline or fulvous, odourless, taste mild; latex white or watery-white, unchanging, mild or slowly acrid to bitterish; lamellae adnate or adnate with a decurrent tooth, whitish or tinged with isabelline, becoming pruinose, crowded; stipe 1–7 cm. long, 2–10 mm. thick, equal, subconcolorous or slightly paler, glabrous, sometimes white pubescent at the base, dry, stuffed then hollow; spores white in mass, broadly ellipsoidal or subglobose,  $7-10 \times 6.5-7.5 \mu$ , echinulate.

Hab. on the ground in woods. Summer to autumn. Ishikari (Nopporo, Mt. Moiwa), Iburi (Lake side of Shikotsu), Tokachi (Mt. Nupukaushinupri), Kitami (Oketo forest, Biwaushizawa).

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

Jap. name. *Hime-chichitake* (IMAI).

#### Sect. *Dapetes* FR.

Epicr. Myc. 341, 1838.

Lamellae naked; latex always deeply colored.

#### 26. *Lactarius deliciosus* [L.] FR.

Epicr. Myc. 341, 1838; Monogr. Hymen. Suec. II, 168, 1863; Hymen. Eur. 431, 1874—BERK. Outl. Brit. Fung. 206, 1860—KICKX, Fl. Crypt. Flandr. II, 201, 1867—CKE. Handb. Brit. Fung. I, 213, 1871; Ill. Brit. Fung. pl. 982, 1888—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 199, 1872; Ench. Fung. 129, 1886—GILL. Hymen. Fr. 204, cum icone, 1874—KARST. Hattsv. I, 188, 1879—WINT. Die Pilze, I, 548, 1884—SACC. Syll. Fung. V, 438, 1887; Fl. Ital. Crypt., Hymen. 373, 1915—TANAKA, Bot. Mag. (Tokyo), IV, 394, 1890—MASS. Brit. Fung. Fl. III, 19, 1893—ATKINS. Mushrooms, ed. 2, 123, pl. 39, f. 1, 1903—W. G. SM. Brit. Basid. 274, 1908—ROLLAND, Atlas Champ. 36, f. 69, 1910—KAWAMURA, Ill. Jap. Fung. pl. 10, f. 19–22, 1914—RICKEN, Blätterp. 31, 1915—KAUFFM. Agar. Mich. 103, pl. 11, 1918—REA, Brit. Basid. 487, 1922—BRES. Icon. Myc. VIII, pl. 373, 1928—LANGE, Agar. Denm. VII, 41, 1928.

[MATSUM. Ind. Pl. Jap. I, 149, 1904—YASUDA, Bot. Mag. (Tokyo), XXVII, (561), 1913]

*Agaricus deliciosus* L. Sp. Pl. 1172, 1753—Sow. Engl. Fung. pl. 202, 1799 (teste FR.).

*Agaricus (Galorrhheus) deliciosus* FR. Syst. Myc. I, 67, 1821—BERK. in SMITH, Engl. Fl. V, (2), 26, 1836—RABENH. Deut. Krypt. Fl. I, 550, 1844—BARLA, Champ. Nice, 34, pl. 19, f. 1-5, 1859—CORDA, Champ. Fr. II, 110, 1870.

*Lactaria deliciosa* SCHROET. Pilze Schles. I, 543, 1889—BURLINGH. Lactariae U. S. 58, 1908; North Amer. Fl. IX, 186, 1910.

[MATSUM. Ind. Pl. Jap. I, 149, 1904]

*Lactarius Akahatsu*. TANAKA, Bot. Mag. (Tokyo), IV, 394, pl. 16, 1890—SACC. Syll. Fung. XIV, 95, 1899—KAWAMURA, Ill. Jap. Fung. pl. 7, f. 11-14, 1913.

[SHIRAI, List Jap. Fung. 45, 1905; ed. 2, 309, 1917; ed. 3, 180, 1927—SAWADA, Descr. Catalog. Formosan Fung. I, 512, 1919]

*Lactaria Akahatsu* MATSUM. Ind. Pl. Jap. I, 149, 1904.

*Lactarius deliciosus* var. *japonicus* KAWAMURA, Jap. Fung. no. 50, 1929.

[MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 113, 1931]

Gregarious or solitary, edible. Pileus 4-15 cm. broad, convex with a depressed center, then depressed plane, at length broadly infundibuliform; surface viscid when moist, glabrous, somewhat roughened, orange, yellow-orange or paler, zoned with deeper orange, becoming paler with age, sometimes not zoned especially when old or dried, rarely mixed with grayish or greenish tints, margin naked, incurved at first, finally upturned; context firm, rigid, orangish or whitish, often becoming greenish, taste mild or slightly aromatic and acrid; latex orange or scarlet, mild or slightly aromatic and acrid; lamellae subdecurrent, crowded, narrow, many forking near the stipe, ochraceous-salmon, paler when old or dried, often stained with grayish or greenish tints when old or bruised; stipe 3-10 cm. long, 8-17 mm. thick, equal or attenuated downward, concolorous or brighter or paler, spotted with brighter orange, glabrous or sometimes a little tomentose at the base, stuffed then hollow, fragile, rarely stained with greenish tint; spores yellowish in mass, subellipsoidal or subglobose, 8-10 × 7-8  $\mu$ , echinulate.

The present species varies in color from bright orange to pale yellow and in zonation from distinctly zonate to nearly azonate. In general, the color and zonation of the pileus are conspicuous in the younger stage. The color of the context and lamellae changes rapidly to greenish when bruised or wounded and the whole plant often becomes greenish in the older stage. There is also a form without such greening which is usually brighter in color. The latter form is collected mostly in *Abies* woods, while the other is found in

pine or *Picea* woods. The present writer formerly separated these two as two forms:

**Forma *laeticolorus* IMAI**

Bog. Mag. (Tokyo), XLIX, 607, 1935.

Pileus brighter in color; wounds hardly or very slightly greenish.

Hab. on the ground in woods, especially in *Abies* woods. Late summer to autumn. Ishikari (Nopporo, Mt. Teine, Jôzankei, Mt. Kurodake), Kushiro (Lake side of Akan), Oshima (Ônomura), Iburi (Lake side of Shikotsu).

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

Jap. name. *Akamomitake* (KAWAMURA).

**Forma *virescens* IMAI**

Bot. Mag. (Tokyo), XLIX, 607, 1935.

Pileus darker or sordid in color; wounds greenish.

Hab. on the ground in woods, especially of *Pinus* or *Picea*. Late summer to autumn. Ishikari (Mt. Kurodake, Sapporo, Nopporo), Iburi (Lake side of Shikotsu), Oshima (Ônomura).

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

Jap. name. *Akahatsu* (TANAKA).

**27. *Lactarius sanguifluus* [PAUL.] FR.**

Epicr. Myc. 341, 1838; Hymen. Eur. 431, 1874—GILL. Hymen. Fr. 202, 1874—QUÉL. Champ. Jura Vosg. 10 Suppl., in Assoc. Fr. IX, 667, 1880; Ench. Fung. 129, 1886—SACC. Syll. Fung. V, 439, 1887; Fl. Ital. Crypt., Hymen. 374, 1915—W. G. SM. Brit. Basid. 274, 1908—ROLLAND, Atlas Champ. 37, f. 70, 1910—RICKEN, Blätterp. 31, pl. 11, f. 5, 1915—REA, Brit. Basid. 488, 1922—BRES. Icon. Myc. VIII, pl. 374, 1928.

[IMAI, Bot. Mag. (Tokyo), XLIX, 607, 1935]

*Hypophyllum sanguifluum* PAUL. Traité Champ. pl. 81, f. 3-5, 1793 (teste FR.).

*Lactarius sanguifluus* var. *vinosus* QUÉL. Champ. Jura Vosg. 10 Suppl., in Assoc. Fr. IX, 668, pl. 8, f. 8, 1880; Ench. Fung. 129, 1886.

*Lactarius subpurpureus* PK. 29 Ann. Rep. N. Y. State Mus. 43, 1878—SACC. Syll. Fung. V, 439, 1887.

*Lactarius Hatsudake* TANAKA, Bot. Mag. (Tokyo), IV, 393, pl. 15, 1890—SACC. Syll. Fung. XIV, 95, 1899—KAWAMURA, Ill. Jap. Fung. pl. 7, f. 5-7, 1913.

[SAWADA, Descrip. Catal. Formosan. Fung. I, 513, 1919—UMEMURA, Pl. Fujiyama. 368, 1923]

*Lactaria Hatsudake* MATSUM. Ind. Pl. Jap. I, 149, 1904.

*Lactaria subpurpurea* BURLINGH. Lactariae U. S. 60, 1908; North Amer. Fl. IX, 187, 1910.

Gregarious or solitary, edible. Pileus 4-17 cm. broad, convex-umbilicate, then plane and depressed, finally infundibuliform; surface slightly viscid, glabrous, onion-skin-pink or light-reddish brown or purplish brown, zoned with darker color, sometimes with a grayish luster, zones becoming less marked with age, margin at first involute and white pruinose or with a grayish luster, then plane to uplifted, the whole spotted more or less with emerald-green when matured or rubbed; context whitish, tinged with blood-red after the latex especially near the pellicle of the stipe and next the lamellae, becoming greenish after some time, firm, odour pleasant, taste slightly acrid and not mild; latex blood-red or dark-red (morocco-red or claret-brown), slightly acrid not mild; lamellae concolorous with pileus, often forking and often mixed with short ones on the peripheral portion, subdecurrent, very crowded, staining emerald-green where bruised; stipe 2-8 cm. long, 8-25 mm. thick, equal or attenuated upward and at the base, glabrous or pruinose, concolorous, sometimes tomentose at the base, often spotted with dark-red or emerald-green, stuffed then hollow; spores yellowish in mass, subglobose or broadly ellipsoidal, echinulate,  $8-10 \times 7-8 \mu$ .

Hab. on the ground in woods, especially in coniferous woods. Late summer to autumn. Ishikari (Sapporo), Iburi (Lake side of Shikotsu).

Distr. Japan (Hokkaido, Honshu, Bonin Islands, Formosa), Europe, North America.

Jap. name. *Hatsudake* (TANAKA).

### *Russula* PERS. ex FR.

Genera Hymen. 9, 1836; Epicr. Myc. 349, 1838.

*Russula* PERS. Obs. Myc. I, 100, 1796 (sec. EARLE).

*Agaricus* § *Russula* PERS. Syn. Fung. 438, 1801.

*Agaricus* § *Russula* FR. Syst. Myc. I, 54, 1821.

*Russulina* SCHROET. Pilze Schles. I, 550, 1889.

*Lactarelis* EARLE, Bull. N. Y. Bot. Gard. V, 409, 1909.

*Dixophyllum* EARLE, Ibid. 410, 1909.

*Omphalomyces* BATT. ex EARLE, Ibid. 410, 1909.

Pileus fleshy, rigid, regular. Stipe central, fleshy, rigid. Lamellae adnate, sinuato-adnate, adnexed, free or decurrent, rigid, fragile. Spores white, cream, yellow, ochraceous or saffron-yellow in mass, globose, subglobose or ellipsoidal, echinulate, verrucose or subreticulate.

Type species: *Agaricus emeticus* SCHAEFF. ex FR.

**Key to the sections, subsections and species in Hokkaido.**

- I. Pileus variously colored, viscid, not pruinose, not velvety, nor pubescent; context white, remaining white or becoming yellow. . . . . Sect. Constantes.
  - A. Spore-mass ochraceous to saffron-yellow.
    1. Fructification small, mild. . . . . Subsect. Chamaeleontinae.
      - a. Pileus olivaceous or yellow; lamellae white, becoming cream or light ochraceous-buff; stipe whitish. . . . . *R. olivascens* (1).
    2. Fructification large, mild. . . . . Subsect. Alutaceinae.
      - a. Pileus dark reddish-purple or blood-red, sometimes mixed with other shades; lamellae becoming deep ochraceous; stipe white, usually tinged with red. . . . . *R. alutaceus* (2).
      - b. Pileus orange, yellow or red; lamellae becoming light ochraceous, vivid lemon-yellow on the edge; stipe lemon-yellow. . . . . *R. aurata* (3).
  - B. Spore-mass cream or pale ochraceous; fructification medium to large sized, not slender, red, golden or brown, mild or slightly acrid. . . . . Subsect. Integrinae.
    1. Pileus carmine or dark carmine; taste mild; lamellae white, then ochraceous; stipe white. . . . . *R. integra* (4).
  - C. Spore-mass whitish; context acrid, margin very blunt. . . . . Subsect. Emeticinae.
    1. Pileus deep blood-red, almost black at the center, hardly striate on the margin. . . . . *R. atropurpurea* (5).
    2. Pileus lilac, violet or dark red, short striate on the margin. . . . . *R. lilacea* (6).
    3. Pileus rosy, blood-red, then ochraceous or tawny, striate-tuberculate to sulcate on the margin. . . . . *R. emetica* (7).
    4. Pileus white, margin tuberculate-striate. . . . . *R. fragilis* f. *nivea* (8).
  - D. Spore-mass cream or white; margin sharp; taste acrid. . . . . Subsect. Foetentinae.
    1. Pileus ochraceous-buff, citron-yellow or yellow-ocher.
      - a. Margin tuberculate-striate.

- i. Pileus not rugose.
  - α. Pileus dingy-yellow or ochraceous-buff; stipe whitish or yellowish; odour foetid, taste acrid.....  
..... *R. foetens* (9).
  - β. Pileus warm-buff or light ochraceous-buff; stipe whitish or cream color; odour somewhat foetid, taste acrid...  
..... *R. subfoetens* (10).
  - γ. Pileus bright citron-yellow; stipe white; taste mild, odour none..... *R. citrina* (11).
- ii. Pileus evidently rugose, especially when young, ochraceous-tawny, then ochraceous-buff; stipe yellowish with dark-brown dots..... *R. senecis* (12).
- b. Margin not striate; pileus yellow or yellow-ocher; stipe white or yellowish; odour none, taste acrid..... *R. ochroleuca* (13).
- 2. Pileus drab, wood-brown or tawny-olive; stipe white, somewhat sooty at the base; taste almost mild or slightly acrid.....  
..... *R. sororia* (14).
- E. Spore-mass white; taste mild or slightly acrid, margin of pileus sharp.  
..... Subsect. Cyanoxanthinae.
  - 1. Pileus mixed with purple, pink, olive, green or yellow; lamellae white; stipe white, rarely tinged with pink or lilac; taste mild, odour none..... *R. cyanoxantha* (15).
- II. Pileus mostly dry, ordinarily intensely colored, pruinose, velvety, asperulate or sometimes areolately cracked; context white, unchanging color...  
..... Sect. Rigidae.
  - A. Spore-mass white to cream; pileus areolately cracked.....  
..... Subsect. virescentinae.
    - 1. Pileus green or grayish-green; stipe white; taste mild, odour none.  
..... *R. virescens* (16).
  - B. Spore-mass white to cream; pileus velvety or pruinose, not evidently cracked..... Subsect. Lepidinae
    - 1. Pileus white, then tinged with alutaceous; lamellae white; stipe white..... *R. lactea* (17).
    - 2. Pileus pink to blood-red; lamellae white; stipe white with partly pinkish flush..... *R. uncialis* (18).
- III. Pileus viscid, yellow, brown or white, margin glabrous or pubescent; context white, at length becoming brown or black, more rarely remaining white, frequently becoming reddish on lamellae and also on context by exposure to air..... Sect. Compactae.
  - A. Context becoming brown, blue, red or black by exposure to the air; taste mild or very frequently slightly acrid, rarely very acrid; pellicle not differentiated..... Subsect. Nigrescentinae.
    - 1. Pileus white or tinged with smoky-brown, becoming blackish or black; lamellae white, becoming black; stipe white or pallid, at length black..... *R. nigricans* (19).

- B. Context becoming brick-color or not changing color by exposure to the air; lamellae ordinarily becoming slightly red, often becoming slightly blue or glaucous-green; pellicle not distinct or clearly breaking up into crusts..... Subsect. *Delicinae*.
1. Pileus white, then ochraceous; lamellae white; stipe concolorous...  
..... *R. delica* (20).
- a. Lamellae and the apex of the stipe slightly tinged with blue or glaucous-green..... *R. delica* f. *chloroides* (20b).

### Sect. *Constantes* SING.

Hedw. LXVI, 176, 1926.

Pileus variously colored, viscid, not pruinose, not velvety, nor pubescent. Context white, remaining white or becoming yellow.

### Subsect. *Chamaeleontinae* SING.

Beih. Bot. Cent. XLIX, 2 Abt. 236, 1932.

Pileus 2–7 cm. broad. Stipe 2–15(–18) mm. thick. Context fragile or very soft, brittle, absolutely mild. Spores ochraceous to saffron-yellow in mass. Margin obtuse.

### 1. *Russula olivascens* PERS. ex FR.

Epicr. Myc. 361, 1838 (non in Monogr. Hymen. Suec. & Hymen. Eur.)  
—BRES. Icon. Myc. X, pl. 464, 1929—SING. Beih. Bot. Cent. XLIX, 2 Abt. 251,  
1932—J. SCHAEFF. Ann. Myc. XXXI, 407, 1933.

*Russula olivascens* PERS. Obs. Myc. I, 103, 1796 (teste FR.).

*Agaricus (Russula) olivascens* PERS. Syn. Fung. 447, 1801 (teste FR.).

*Agaricus (Russula) alutaceus* d. *pileo olivaceo* FR. Syst. Myc. I, 55, 1821.

*Russula subolivascens* BURLINGH. North Amer. Fl. IX, 223, 1915.

*Russula alutacea* var. *olivascens* REA, Brit. Basid. 475, 1922.

*Russula alutacea* var. *olivascens* SING. Hedw. LXVI, 189, 1926.

Solitary or rarely gregarious. Pileus 5–10 cm. broad, convex to plane; surface olivaceous or light-olivaceous, yellowish at the center, without pinkish or reddish tint, glabrous, viscid when moist, pellicle separable on the marginal zone, margin even; context white, becoming yellowish when dried, taste mild; lamellae adnate or nearly free, whitish, then becoming cream-color or light ochraceous-buff in

drying, almost equal, rarely forked behind, broader in front, crowded; stipe 4–7 cm. long, 1–1.5 cm. thick, nearly equal or attenuated upward, whitish, nearly smooth, firm, spongy within; spores deep ochraceous in mass, broadly ellipsoidal or subglobose,  $7.5\text{--}9 \times 6\text{--}7.5 \mu$ , echinulate.

Hab. on the ground in woods. Summer to autumn. Ishikari (Nopporo), Kitami (Oketo forest).

Distr. Japan (Hokkaido), Asia Minor, Europe, North America. Jap. name. *Kokeiro-take* (n. n.).

### Subsect. *Alutaceinae* M. et Zv. emend. SING.

Beih. Bot. Cent. XLIX, 2 Abt. 236, 1932.

Pileus 4–15 cm. broad. Stipe 8–40 mm. thick. Context elastic, firm, brittle, rather robust, mild or bitter. Spores ochraceous to saffron-yellow in mass. Margin obtuse.

## 2. *Russula alutacea* PERS. ex FR.

Epier. Myc. 362, 1838; Hymen. Eur. 453, 1874—BERK. Outl. Brit. Fung. 214, pl. 13, f. 8, 1860—KICKX, Fl. Crypt. Flandr. II, 207, 1867—CKE. Handb. Brit. Fung. I, 225, 1871; Ill. Brit. Fung. pl. 1096, 1890—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 213, 1872; Ench. Fung. 137, 1886—GILL. Hymen. Fr. 249, cum icone, 1874—KARST. Hattsv. I, 213, 1879—SACC. Syll. Fung. V, 479, 1887; Fl. Ital. Crypt., Hymen. 416, 1915—MASS. Brit. Fung. Fl. III, 39, 1893—W. G. SM. Brit. Basid. 292, 1908—BURLINGH. North Amer. Fl. IX, 231, 1915—RICKEN, Blätterp. 49, 1915—KAUFFM. Agar. Mich. 150, 1918—REA, Brit. Basid. 474, 1922—SING. Hedw. LXVI, 187, 1926, p. p.; Beih. Bot. Cent. XLIX, 2 Abt. 252, 1932—LANGE, Agar. Denm. VI, 43, 1926—BRES. Icon. Myc. X, pl. 459–461, 1929—CRAWS. Spore Orn. Russulas, 120, 1930—KILLERM. Pilze Bayern. VI, 35, 1936.

*Russula alutacea* PERS. Obs. Myc. I, 107, 1796 (teste FR.).

*Agaricus* (*Russula*) *alutacea* PERS. Syn. Fung. 441, 1801 (teste FR.).

*Agaricus* (*Russula*) *alutacea* FR. Syst. Myc. I, 55, 1821, p. p.

*Russula subalutacea* BURLINGH. North Amer. Fl. IX, 229, 1915 (teste J. SCHAEFF.).

Gregarious or solitary, edible. Pileus 4–10 cm. or more broad, globose, then convex to plane, depressed at the center; surface slightly viscid when wet, with somewhat separable pellicle, glabrous, soon dry, pruinose or subgranulose, variable in color: dark reddish-purple, blood-red, sometimes mixed with other shades, margin at first even,

then slightly tuberculato-striate; context white, thick, taste mild, odour none; lamellae attenuato-adnate or nearly free, at first yellowish or ochraceous, soon deep-yellow or deep ochraceous, subdistant, broad, equal; stipe 5–10 cm. long, 1–3 cm. or more thick, equal, white, usually tinged with red, solid; spores ochraceous in mass, subglobose or broadly ellipsoidal, echinulate,  $8-10 \times 7-9 \mu$ .

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

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

Jap. name. *Akane-take* (n. n.).

### 3. *Russula aurata* [WITH.] FR.

Epicr. Myc. 360, 1838; Hymen. Eur. 452, 1874—BERK. Outl. Brit. Fung. 213, 1860—CKE. Handb. Brit. Fung. I, 224, 1871; Ill. Brit. Fung. pl. 1080, 1890—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 212, 1872; Ench. Fung. 136, 1886—GILL. Hymen. Fr. 247, cum icone, 1874—KARST. Hattsv. I, 212, 1879—SACC. Syll. Fung. V, 477, 1887; Fl. Ital. Crypt., Hymen. 428, 1915—MASS. Brit. Fung. Fl. III, 45, 1893—W. G. Sm. Brit. Basid. 291, 1908—KAWAMURA, Bot. Mag. (Tokyo), XXII, (380), 1908; Ill. Jap. Fung. pl. 6, f. 4–6, 1913—ROLLAND, Atlas Champ. 43, f. 91, 1910—RICKEN, Blätterp. 48, pl. 17, f. 4, 1915—REA, Brit. Basid. 475, 1922—KONR. et MAUBL. Icon. Sel. Fung. pl. 358, 1924—SING. Hedw. LXVI, 185, 1926; Beih. Bot. Cent. XLIX, 2 Abt. 257, 1932—LANGE, Agar. Denm. VI, 42, 1926—BRES. Icon. Myc. X, pl. 453, 1929—CRAWS. Spore Ornam. Russulas, 119, 1930—J. SCHAEFF. Ann. Myc. XXXI, 406, 1933—KILLERM. Pilze Bayern. VI, 34, 1936.

[SHIRAI, List Jap. Fung. ed. 2, 591, 1917; ed. 3, 346, 1927]

*Agaricus auratus* WITH. Bot. Arr. Brit. Pl. IV, 184, 1776 (teste FR.).

?*Agaricus esculentus* PERS. Syn. Fung. 350, 1801.

Solitary or gregarious, edible. Pileus 7–11 cm. broad, globose, becoming convex, then plane, finally depressed at the center; surface glabrous, smooth, viscid when wet, varying in color: orange, red or yellow, usually darker at the center, often unicolored a light cadmium to cadmium-yellow, pellicle not separable, margin slightly striate with age; context lemon-yellow, margin thin, taste and odour mild; lamellae free, whitish or yellowish, becoming light ochraceous, vivid lemon-yellow or empire-yellow on the edge, broader in front, equal, very rarely mixed shorter ones, often connected near the stipe; stipe 6–9 cm. long, 1–2 cm. thick, equal or slightly attenuated upward, lemon-yellow, yellow or whitish, glabrous, obsoletely striate

or rugose, stuffed; spores light-ochraceous or ochraceous in mass, subglobose or broadly ellipsoidal,  $8-10 \times 8-9 \mu$ , echinulate.

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

Distr. Japan (Hokkaido, Honshu), Europe.

Jap. name. *Nishikitake* (KAWAMURA).

#### Subsect. *Integrinae* SING.

Beih. Bot. Cent. XLIX, 2 Abt. 238, 1932.

Medium to very large sized. Diameter of pileus of small species: length of stipe = 1. General habit of *R. integra* or *R. paludosa*. Absolutely mild or rarely slightly acrid in young lamellae, often bitter. Spores cream or pale ochraceous in mass. Context bitter, not becoming yellow. Margin obtuse. Pellicle glabrous, viscid or dry, often rimose, ordinarily bright or deep red, yellow or brown, without green color.

#### 4. *Russula integra* [L.] FR.

Epicr. Myc. 360, 1838; Hymen. Eur. 450, 1874—BERK. Outl. Brit. Fung. 213, 1860—KICKX, Fl. Crypt. Flandr. II, 206, 1867—CKE. Handb. Brit. Fung. I, 224, 1871; Ill. Brit. Fung. pl. 1093, 1890—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 211, 1872; Ench. Fung. 136, 1886—KARST. Hattsv. I, 211, 1879—SACC. Syll. Fung. V, 475, 1887; Fl. Ital. Crypt., Hymen. 424, 1915—MASS. Brit. Fung. Fl. III, 40, 1893—KAWAMURA, Bot. Mag. (Tokyo), XXII, (382), 1908; Ill. Jap. Fung. pl. 8, f. 3-5, 1913—BURLINGH. North Amer. Fl. IX, 228, 1915—KAUFFM. Agar. Mich. 161, 1918—REA, Brit. Basid. 470, 1922—LANGE, Agar. Denm. VI, 48, 1926—SING. Hedw. LXVI, 225, 1926; Beih. Bot. Cent. XLIX, 2 Abt. 278, 1932—BRES. Icon. Myc. IX, pl. 451, 1929—CRAWS. Spore Ornam. Russulas, 122, 1930—KILLERM. Pilze Bayern. 32, pl. 25, f. A, 1936.

[SHIRAI, List Jap. Fung. ed. 2, 591, 1917; ed. 3, 346, 1927]

*Agaricus integer* L. Sp. Pl. 1171, 1753 (teste FR.).

*Ressulina integra* SCHROET. Pilze Schles. I, 550, 1889.

Solitary or gregarious, edible. Pileus 5-10 cm. broad, convex, then plane, depressed at the center; surface subviscid when wet, with separable pellicle, glabrous, carmine or dark carmine, margin tuberculato-striate; context white, taste mild, odour none; lamellae nearly free, white at first, then ochraceous, equal, broad, distant; stipe 4-8 cm. long, 1-2 cm. thick, subequal or clavate or ventricose, white,

spongy-stuffed; spores ochraceous in mass, subglobose, echinulate,  $8-10 \times 8-9 \mu$ .

Hab. on the ground in woods. Summer to early autumn. Kitami (Oketo).

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

Jap. name. *Yoheiji* (KAWAMURA).

Subsect. *Emeticinae* M. et Zv. emend. SING.

Beih. Bot. Cent. XLIX, 2 Abt. 239, 1932.

Small to large sized. Taste acrid, rarely mild. Margin at first sharp or obtuse, then obtuse. Lamellae pure white, not becoming cream. Spores whitish in mass. Context brittle, unchanging in color or becoming yellow. Pellicle glabrous or velvety, ordinarily viscid, variously colored.

5. *Russula atropurpurea* (KROMBH.) R. MAIRE

Bull. Soc. Myc. Fr. XXVI, 167, 1910—KAUFFM. Agar. Mich. 142, 1918—REA, Brit. Basid. 469, 1922—SING. Hedw. LXVI, 218, 1926; Beih. Bot. Cent. XLIX, 2 Abt. 298, 1932—LANGE, Agar. Denm. VI, 42, 1926—CRAWES. Spore Ornam. Russulas, 89, 1930—ZVARA, Bull. Soc. Myc. Fr. XLVII, 44, 1931—J. SCHAEFF. Ann. Myc. XXXI, 450, 1933—KILLERM. Pilze Bayern. VI, 15, 1936.

*Agaricus (Russula) atropurpureus* KROMBH. Abbild. Schwamm. IX, 6, pl. 64, f. 5-6, 1845 (teste R. MAIRE).

?*Russula purpurea* GILL. Tabl. Anal. Hymen. Fr. 47, 1884—CKE. Ill. Brit. Fung. pl. 1022, 1890.

*Russula purpurea* KAWAMURA, Bot. Mag. (Tokyo), XXII, (381), 1908; Ill. Jap. Fung. pl. 1, f. 10-13, 1912.

*Russula depallens* (non FR.) BRES. Icon. Myc. IX, pl. 409, 1929, p. p.

Solitary or gregarious. Pileus 4-10 cm. or more broad, hemispherical, becoming convex, then plane, finally depressed at the center; surface viscid when wet, shiny when dry, Indian-purple or deep blood-red, darker and almost black at the center, paler on the margin, margin thin and hardly striate with age; context white, rather thin, taste mild or slightly acrid; lamellae attenuated-adnate or subdecurrent, white, then slightly yellowish, equal, rather distant; stipe 3-7 cm. long, 8-15 mm. or more thick, equal, white, sometimes

slightly tinged with brown or ochraceous, pruinose above; spores whitish or faintly cream colored, subglobose, echinulate, about  $9 \times 8 \mu$ .

Hab. on the ground in woods. Late summer to autumn. Ishikari (Sapporo, Mt. Kurodake).

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

Jap. name. *Murasaki-hatsu* (KAWAMURA).

### 6. *Russula lilacea* QUÉL.

Champ. Jura Vosg. 4 Suppl., in Bull. Soc. Bot. Fr. XXIII, 330, pl. 2, f. 8, 1876; Ench. Fung. 134, 1886—SACC. Syll. Fung. V, 465, 1887—W. G. SM. Brit. Basid. 287, 1908—RICKEN, Blätterp. 45, 1915—REA, Brit. Basid. 462, 1922—LANGE, Agar. Denm. VI, 33, 1926—J. SCHAEFF. Ann. Myc. XXXI, 360, 1933—KILLERM. Pilze Bayern. VI, 27, 1936.

*Russula lilacea* var. *carnicola* BRES. Fung. Trid. II, 23, pl. 128, 1892—SACC. Syll. Fung. XI, 30, 1895.

*Russula carnicola* BRES. (teste J. SCHAEFF) apud REA, Brit. Basid. 477, 1922—LANGE, Agar. Denm. VI, 33, 1926—BRES. Icon. Myc. IX, pl. 429, 1929—CRAWS. Spore Ornam. Russulas, 86, 1930—KILLERM. Pilze Bayern. VI, 27, 1936.

Solitary or somewhat gregarious, edible. Pileus 3–8 cm. broad, convex, then plane, depressed at the center; surface viscid when wet, lilac, violet, or dark-red, sometimes flesh-color, margin at length shortly striate; context white, taste mild, odour none; lamellae free or adnexed, white, forked, subdistant; stipe 3–6 cm. long, 6–15 mm. thick, equal, white or slightly tinged with pink, pruinose at the apex, subrugulose at the base, stuffed; spores white in mass, broadly ellipsoidal or subglobose, echinulate,  $7.5\text{--}9 \times 7\text{--}8 \mu$ .

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

Distr. Japan (Hokkaido), Europe.

Jap. name. *Usu-murasaki-hatsu* (n. n.).

The writer adopts the fungus in sensu J. SCHAEFFER to the present species.

### 7. *Russula emetica* [SCHAEFF.] FR.

Epicr. Myc. 357, 1838; Hymen. Eur. 448, 1874—BERK. Outl. Brit. Fung. 212, 1860—CKE. Handb. Brit. Fung. I, 223, 1871; Ill. Brit. Fung. pl. 1030, 1890—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 210, 1872

(misspelled as *eintica*); Ench. Fung. 135, 1886—GILL. Hymen. Fr. 243, cum icone, 1874—KARST. Hattsv. I, 209, 1879—SACC. Syll. Fung. V, 469, 1887; Fl. Ital. Crypt., Hymen. 439, 1915—MASS. Brit. Fung. Fl. III, 73, 1893—W. G. SM. Brit. Basid. 289, 1908—ROLLAND, Atlas Champ. 41, f. 84, 1910—KAWAMURA, Ill. Jap. Fung. pl. 1, f. 7-9, 1912—RICKEN, Blätterp. 53, 1915—BURLINGH. North Amer. Fl. IX, 234, 1915—KAUFFM. Agar. Mich. 151, 1918—REA, Brit. Basid. 468, 1922—SING. Hedw. LXVI, 212, 1926, p. p.; Beih. Bot. Cent. XLIX, 2 Abt. 303, 1932, p. p.—LANGE, Agar. Denm. VI, 42, 1926—BRES. Icon. Myc. IX, pl. 435, 1929—CRAWS. Spore Ornam. Russulas, 128, 1930—J. SCHAEFF. Ann. Myc. XXXI, 455, 1933—KILLERM. Pilze Bayern. VI, 26, 1936.

[TANAKA, Mycogr. Nippon. I, No. 1, pt. 1, pl. 2, 1890—P. HENN. Hedw. XXXIX, (156), 1900—MATSUM. Ind. Pl. Jap. I, 172, 1904—SHIRAI, List Jap. Fung. 88, 1905; ed. 2, 591, 1917; ed. 3, 346, 1927—KAWAM. Bot. Mag. (Tokyo), XXII, (381), 1908—YASUDA, Bot. Mag. (Tokyo), XXVIII, (193), 1914—UMEMURA, Pl. Fujiyama. 370, 1923]

*Agaricus emeticus* SCHAEFF. Fung. Bavar. IV, Ind. 9, pl. 15, f. 4-6, 1774 (teste FR.).

*Agaricus (Russula) emeticus* FR. Syst. Myc. I, 56, 1821, p. p.

Solitary or gregarious, poisonousness doubtful. Pileus 4-10 cm. broad, convex, then expanded to plane, finally depressed at the center; surface glabrous, viscid, variable in color; rosy, becoming blood-red, then ochraceous or tawny, rarely whitish, margin striate-tuberculate to sulcate; context white, reddish under the separable pellicle, taste very acrid, odour almost none; lamellae free or slightly adnexed, white, equal, subdistant, broad; stipe 4-8 cm. long, 1-2.2 cm. thick, subequal or slightly attenuated upward, white, whitish or reddish, even or rugulose, stuffed; spores whitish or faintly yellowish, globose or subglobose, echinulate, 8-10  $\mu$ .

Hab. on the ground in woods. Summer to autumn. Ishikari (Sapporo, Nopporo, Mt. Kurodake), Oshima (Ônomura), Kitami (Oketo), Kushiro (Akan).

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

Jap. name. *Doku-beni-take* (TANAKA).

### 8. *Russula fragilis* PERS. ex FR.

form. *nivea* (PERS. ex CKE.) SING. emend. J. SCHAEFF.

Ann. Myc. XXXI, 461, 1933.

*Agaricus (Russula) niveus* PERS. Syn. Fung. 438, 1801 (teste CKE.).

*Agaricus (Russula) fragilis* c. *pileo albo* FR. Syst. Myc. I, 58, 1821.

*Russula fragilis* var. *nivea* CKE. Ill. Brit. Fung. pl. 1060, f. B, 1890—MASS. Brit. Fung. Fl. III, 75, 1893—KAWAMURA, Bot. Mag. (Tokyo), XXII, (382), 1908; Ill. Jap. Fung. pl. 1, f. 4-6, 1912—REA, Brit. Basid. 468, 1922—LANGE, Agar. Denm. VI, 31, 1926.

[SHIRAI, List Jap. Fung. ed. 2, 591, 1917; ed. 3, 346, 1927]

*Russula subfragilis* BURLINGH. North Amer. Fl. IX, 233, 1915, p. p.

*Russula emetica* subsp. *fragilis* SING. f. *nivea* SING. Hedw. LXVI, 216, 1926; Beih. Bot. Cent. XLIX, 2 Abt. 308, 1932.

*Russula fragilis* Auct. plur. p. p.

Solitary or gregarious in small groups. Pileus 2-4 cm. broad, convex, then plane, depressed at the center; surface white, slightly viscid when wet, polished, with a separable pellicle, glabrous, margin tuberculato-striate; context white, taste acrid, odour none; lamellae slightly adnexed, pure-white, equal, crowded; stipe 2-4 cm. long, 5-10 mm. thick, equal, white, pruinose, spongy-stuffed; spores white in mass, subglobose,  $7-9 \times 6-8 \mu$ , echinulate.

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

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

Jap. name. *Shiro-no-kobenitake* (KAWAMURA).

#### Subsect. *Foetentinae* M. et Zv. emend. SING.

Beih. Bot. Cent. XLIX, 2 Abt. 239, 1932.

Small to large sized. Taste acrid, rarely disagreeable or mild. Odour of fruit, or of special odour, rarely mild or none. Margin at first somewhat sharp or obtuse, often long pectinate or rimose, glabrous except tomentose margin. Spores whitish or cream in mass. Context brittle or elastic.

### 9. *Russula foetens* [PERS.] FR.

Epicr. Myc. 359, 1838; Hymen. Eur. 447, 1874—BERK. Outl. Brit. Fung. 213, 1860—CKE. Handb. Brit. Fung. I, 222, 1871; Ill. Brit. Fung. pl. 1046, 1890—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 209, 1872; Ench. Fung. 135, 1886—GILL. Hymen. Fr. 239, cum icone, 1874—KARST. Hattsv. I, 208, 1879—WINT. Die Pilze, I, 531, 1884—SACC. Syll. Fung. V, 467, 1887; Fl. Ital. Crypt., Hymen. 438, 1915—SCHROET. Pilze Schles. I, 547, 1889—MASS. Brit. Fung. Fl. III, 70, 1893—W. G. SM. Brit. Basid. 288, 1908—ROLLAND,

Atlas Champ. 42, f. 87, 1910—BURLINGH. North Amer. Fl. IX, 214, 1915—  
 RICKEN, Blätterp. 51, pl. 19, f. 4, 1915—KAUFFM. Agar. Mich. 136, pl. 17, 1918—  
 REA, Brit. Basid. 464, 1922—SING. Hedw. LXVI, 207, 1926; Beih. Bot. Cent.  
 XLIX, 2 Abt. 319, 1932—LANGE, Agar. Denm. VI, 34, 1926—BRES. Icon. Myc.  
 IX, pl. 426, 1929—CRAWS. Spore Ornam. Russulas, 139, 1930—J. SCHAEFF. Ann.  
 Myc. XXXI, 434, 1933—KILLERM. Pilze Bayern. VI, 23, 1936.

[UMEMURA, Pl. Fujiyama. 371, 1923—SHIRAI, List Jap. Fung. ed. 3, 346,  
 1927—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 113, 1931]

*Agaricus (Russula) foetens* PERS. Syn. Fung. 443, 1801 (teste FR.).

*Agaricus (Russula) foetens* FR. Syst. Myc. I, 59, 1821.

*Russula foetentula* PK. 116 Bull. N. Y. State Mus. 85, 1907.

Solitary or gregarious, poisonousness doubtful. Pileus 7–12 cm. broad, globose, then expanded and depressed at the center; surface dingy yellow to ochraceous-buff, darker at the center, viscid when wet, margin involute at first, tuberculately striate, pellicle separable only on the marginal zone; context rigid, whitish or yellowish, taste bitter, odour foetid; lamellae remote or free, white, then yellowish, at length dingy with white powders; stipe 5–9 cm. long, 13–20 mm. thick, equal or attenuated downward, whitish or yellowish with cinnamon colored stripes, hollow; spores whitish in mass, globose or subglobose, 7–9 × 6–7  $\mu$  or 8  $\mu$  in diam., echinulate.

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

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

Jap. name. *Hekuso-hatsu* (KAWAMURA).

#### 10. *Russula subfoetens* W. G. SM.

Journ. Bot. XI, 337, 1873; Brit. Basid. 288, 1908—CKE. Ill. Brit. Fung. pl. 1047, 1890—REA, Brit. Basid. 466, 1922.

*Russula foetens* var. *subfoetens* MASS. Brit. Fung. Fl. III, 70, 1893.

*Russula fellea* (?non FR.) BRES. Icon. Myc. IX, pl. 427, 1929.

?*Russula farinipes* ROM. apud. BRITZ. sensu J. SCHAEFF. Ann. Myc. XXXI, 428, 1933.

Solitary. Pileus 3–10 cm. broad, convex, then plane, depressed at the center; surface viscid when wet, with a separable pellicle, light-buff on the margin, light ochraceous-buff or warm-buff at the center, glabrous, margin tuberculato-sulcate; context white, taste acrid; lamellae adnate, subcrowded or subdistant, white, becoming

yellowish, equal, sometimes forked near the stipe; stipe 5–9 cm. long, 1–2.5 cm. thick, nearly equal or attenuated at the base, white, becoming slightly tinged with cream-color, subpruinose below, subrugose, stuffed then hollow; spores whitish or pale ochraceous in mass, subglobose, echinulate,  $7.5-10 \times 6.5-7.5 \mu$ .

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

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

Jap. name. *Ko-kusahatsu* (KAWAMURA ex SUZUKI).

### 11. *Russula citrina* GILL.

Rev. Myc. III, 5, 1881; Tab. Anal. Hymen. Fr. 47, 1884—SACC. Syll. Fung. V, 471, 1887; Fl. Ital. Crypt., Hymen. 437, 1915—CKE. Ill. Brit. Fung. pl. 1078, 1890—MASS. Brit. Fung. Fl. III, 54, 1893—W. G. SM. Brit. Basid. 290, 1908—REA, Brit. Basid. 462, 1922—SING. Hedw. LXVI, 226, 1926; Beih. Bot. Cent. XLIX, 2 Abt. 310, 1932—BRES. Icon. Myc. IX, pl. 438, 1929—KILLERM. Pilze Bayern. VI, 22, 1936.

Solitary or gregarious. Pileus 3–7 cm. or more broad, convex, then expanded, more or less depressed at the center; surface slightly viscid when wet, with a separable pellicle, uniformly bright citron-yellow or more or less isabel-color at the center, and pale honey-yellow on the margin, margin thin, becoming tuberculato-striate with age; context white, taste mild, odour none; lamellae white, slightly decurrent, forked near the stipe, crowded; stipe 4–6 cm. long, 8–15 mm. thick, nearly equal or slightly attenuated upward and at the base, white, sometimes slightly tinged with ochraceous at the base, substriate, stuffed; spores white in mass, broadly ellipsoidal or subglobose,  $8.5-10 \times 7.5-8.5 \mu$ , echinulate.

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

Distr. Japan (Hokkaido), Europe.

Jap. name. *Natane-hatsu* (n. n.).

### 12. *Russula senecis* IMAI, sp. nov.

Gregaria vel solitaria. Pileo 4–10 cm. vel ultra lato, subgloboso, dein convexo, demum plano centro depresso, udo viscido, apelliculoso,

primo "ochraceous-tawny", dein "ochraceous-buff" vel "antimony-yellow", cum ruga "ochraceous-tawny-" vel "mars-brown-" colorata, margine primo astriato demum leviter striatulado; carne alba, fragile, crassiuscula, sapore acerrimo, odore valido; lamellis adnatis vel leviter decurrentibus, subaequalibus, subconfertis, albis, acie atrobrunneis; stipite 5–10 cm. longo, 9–15 mm. crasso, aequali, flavidulo vel albido, atrobrunneo-punctato, e farcto cavo; sporis in cumulo albidis, globosis, echinulatis,  $8\ \mu$  in diam.

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

Distr. Endemic (Hokkaido, Honshu).

Jap. name. *Okina-kusahatsu* (n. n.).

### 13. *Russula ochroleuca* PERS. ex FR.

Epicr. Myc. 358, 1838; Hymen. Eur. 449, 1874—BERK. Outl. Brit. Fung. 212, 1860—CKE. Handb. Brit. Fung. I, 223, 1871; Ill. Brit. Fung. pl. 1049, 1890—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Month. 2 sér. V, 210, 1872—GILL. Hymen. Fr. 244, cum icone, 1874—KARST. Hattsv. I, 210, 1879—SACC. Syll. Fung. V, 471, 1887; Fl. Ital. Crypt., Hymen. 439, 1915—MASS. Brit. Fung. Fl. III, 68, 1893—W. G. SM. Brit. Basid. 290, 1908—RICKEN. Blätterp. 51, pl. 18, f. 7, 1915—BURLINGH. North Amer. Fl. IX, 218, 1915—REA. Brit. Basid. 465, 1922—SING. Hedw. LXVI, 210, 1926; Beih. Bot. Cent. XLIX, 2 Abt. 311, 1932—BRES. Icon. Myc. IX, pl. 437, 1929—CRAWS. Spore Orn. Russulas, 131, 1930—KILLERM. Pilze Bayern. VI, 28, 1936.

*Russula ochroleuca* PERS. Obs. Myc. I, 102, 1796 (teste FR.).

*Agaricus (Russula) ochroleuca* PERS. Syn. Fung. 443, 1801 (teste FR.).

Solitary or gregarious. Pileus 4–8 cm. or more broad, convex, then expanded to plane or depressed; surface viscid, yellow or yellow-ocher, slightly darker at the center, becoming paler with age, margin not striate; context white, yellowish under the pellicle, taste acrid, odour none; lamellae attenuato-free or adnexed, broader in front, white, then faintly yellowish, somewhat equal; stipe 3–6 cm. long, 1–1.5 cm. thick, equal or slightly enlarged at the base, white or yellowish at the base, slightly rugulose, stuffed; spores white in mass, globose or subglobose,  $8\text{--}10 \times 7\text{--}9\ \mu$ , echinulate.

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

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

Jap. name. *Yamabuki-hatsu* (n. n.).

14. *Russula sororia* FR.

Epicr. Myc. 359, 1838; Hymen. Eur. 447, 1874—SACC. Syll. Fung. V, 466, 1887; Fl. Ital. Crypt., Hymen. 436, 1915—J. SCHAEFF. Ann. Myc. XXXI, 440, 1933.

*Russula consobrina* var. *sororia* GILL. Hymen. Fr. 238, 1874—SING. Hedw. LXVI, 205, 1926; Beih. Bot. Cent. XLIX, 2 Abt. 317, 1932.

*Russula pectinata* (non FR.) ROLLAND, Atlas Champ. 39, f. 75, 1910—BURLINGH. North Amer. Fl. IX, 213, 1915—BRES. Icon. Myc. IX, pl. 440, 1929.

Solitary or gregarious. Pileus 3–9 cm. broad, at first subglobose, becoming convex, then plane, depressed at the center; surface viscid when wet, shining when dry, drab, wood-brown or tawny-olive at the center, margin paler and striato-tuberculate; context whitish, rather thin, odour subfarinaceous, taste almost mild or slightly acrid; lamellae attenuato-adnate or nearly free, white, then becoming yellowish, mixed with long and short ones, frequently forked near the stipe, crowded; stipe 3–7 cm. long, 6–15 mm. thick, equal, sometimes attenuated at the base, white, but somewhat sooty at the base, glabrous, stuffed or spongy-stuffed; spores white or faintly yellowish in mass, subglobose or broadly ellipsoidal, 7–9 × 6–8  $\mu$ , echinulate.

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

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

Jap. name. *Kicha-hatsu* (n. n.).

Subsect. *Cyanoxanthinae* SING.

Beih. Bot. Cent. XLIX, 2 Abt. 240, 1932.

Pileus glabrous or slightly silky, viscid when moist, veined, lilac or green, sharp on the margin. Taste mild or acrid. Spores white in mass. Context elastic, unchanging color, white.

15. *Russula cyanoxantha* [SCHAEFF.] FR.

Monogr. Hymen. Suec. II, 194, 1863; Hymen. Eur. 446, 1874—CKE. Handb. Brit. Fung. I, 222, 1871; Ill. Brit. Fung. pl. 1043, 1890—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 208, 1872; Ench. Fung. 135, 1886—GILL. Hymen. Fr. 242, cum icone, 1874—KARST. Hattsv. I, 206, 1879—

SACC. Syll. Fung. V, 465, 1887; Fl. Ital. Crypt., Hymen. 442, 1915—MASS. Brit. Fung. Fl. III, 63, 1893—W. G. SM. Brit. Basid. 287, 1908—RICKEN, Blätterp. 44, pl. 16, f. 1, 1915—KAUFFM. Agar. Mich. 141, 1918—REA, Brit. Basid. 462, 1922—SING. Hedw. LXVI, 228, 1926; Beih. Bot. Cent. XLIX, 2 Abt. 323, 1932—LANGE, Agar. Denm. VI, 38, 1926—BRES. Icon. Myc. IX, pl. 423, 1929—CRAWS. Spore Ornam. Russulas, 90, 1930—KILLERM. Pilze Bayern. VI, 20, 1936.

*Agaricus cyanoxanthus* SCHAEFF. Fung. Bavar. IV, Ind. 40, pl. 93, 1774 (teste FR.).

Solitary or gregarious, edible. Pileus 5–10 cm. or more broad, convex, then plane, depressed at the center; surface viscid when wet, variable in color, usually at first lilac-pink, then becoming flushed with purple, pink, olive, blue or green and often with yellow, margin even, not striate; context white, purplish or reddish under pellicle, taste mild, odour none; lamellae attenuato-adnate, white, broad, equal, subcrowded, forked; stipe 4–8 cm. long, 1–2 cm. thick, equal or attenuated at the base, white, rarely tinged with pink or lilac color, spongy-stuffed; spores white in mass, subglobose or broadly ellipsoidal, minutely echinulate,  $8-10 \times 7-9 \mu$ .

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

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

Jap. name. *Kawari-hatsu* (n. n.).

#### Sect. *Rigidae* FR. emend. SING.

Beih. Bot. Cent. XLIX, 2 Abt. 241, 1932.

Pileus ordinarily intensely colored, not viscid, pruinose, velvety, asperulate, sometimes areolately cracked. Context white, unchanging color.

#### Subsect. *Virescentinae* SING.

Beih. Bot. Cent. XLIX, 2 Abt. 241, 1932.

Margin at length round. Pileus punctate-squamulose, ordinarily areolately-cracked, white, yellowish, gray, violet or green. Taste mild or slightly acrid. Spores white or cream in mass.

16. *Russula virescens* [SCHAEFF.] FR.

Epicr. Myc. 355, 1838; Hymen. Eur. 443, 1874—BERK. Outl. Brit. Fung. 212, pl. 13, f. 6, 1860—CKE. Handb. Brit. Fung. I, 220, 1871; Ill. Brit. Fung. pl. 1039, 1890—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 207, 1872; Ench. Fung. 133, 1836—GILL. Hymen. Fr. 234, cum icone, 1874—KARST. Hattsv. I, 204, 1879—SACC. Syll. Fung. V, 460, 1887; Fl. Ital. Crypt., Hymen. 412, 1915—MASS. Brit. Fung. Fl. III, 57, 1893—ATKINS. Mushrooms, ed. 2, 126, pl. 40, f. 1, 1903—W. G. SM. Brit. Basid. 285, 1908—ROLLAND, Atlas Champ. 41, f. 81, 1910—KAWAMURA, Ill. Jap. Fung. pl. 1, f. 14-16, 1912—BURLINGH. North Amer. Fl. IX, 209, 1915—RICKEN, Blätterp. 43, pl. 16, f. 3, 1915—KAUFFM. Agar. Mich. 131, 1918—REA, Brit. Basid. 460, 1922—SING. Hedw. LXVI, 248, 1926; Beih. Bot. Cent. XLIX, 2 Abt. 335, 1932—LANGE, Agar. Denm. VI, 37, 1926—BRES. Icon. Myc. IX, pl. 412, 1929—CRAWS. Spore Ornam. Russulas, 81, 1930—J. SCHAEFF. Ann. Myc. XXXI, 334, 1933—KILLERM. Pilze Bayern. VI, 13, 1936.

[P. HENN. Hedw. XXXIX, (156), 1900—MATSUM. Ind. Pl. Jap. I, 172, 1904—SHIRAI, List Jap. Fung. 89, 1905; ed. 2, 591, 1917; ed. 3, 347, 1927—KAWAMURA, Bot. Mag. (Tokyo), XXII, (379), 1908—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 114, 1931]

*Agaricus virescens* SCHAEFF. Fung. Bavar. IV, Ind. 40, pl. 94, excl. f. 1, 1774 (teste FR.).

*Agaricus (Russula) virescens* PERS. Syn. Fung. 447, 1801 (teste FR.).

*Agaricus (Russula) furcatus*  $\beta$  *heterophyllus* b. FR. Syst. Myc. I, 59, 1821.

Solitary or gregarious, edible. Pileus 5-10 cm. or more broad, globose, becoming convex, then nearly plane, finally depressed at the center; surface green or grayish-green, sometimes tinged with yellowish, pinkish or purplish color, dry, pellicle broken up into floccose patches or warts, center usually paler, not broken up and subvelvety, margin at first not striate and somewhat warted, finally shortly striate and rarely slightly tuberculated; context white, rather brittle, taste mild, odour none; lamellae nearly free or attenuated-adnate, pure white, then slightly tinged with yellowish color, somewhat mixed with short ones, some forking, narrow toward stipe, rather broad, somewhat crowded, rigid; stipe 4-8 cm. or more long, 1-2.5 cm. thick, nearly equal, white, rarely tinged with cream color, glabrous, pruinose, granulose or subflocculose, sometimes subrivulose, solid; spores white in mass, subglobose or broadly ellipsoidal,  $7-8 \times 6-7 \mu$ , echinulate.

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

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

Jap. name. *Aitake* (SHIRAI ex P. HENN.).

Subsect. *Lepidinae* M. et Zv. emend. SING.

Beih. Bot. Cent. XLIX, 2 Abt. 242, 1932.

Margin round. Pileus not cracked, white, yellow, brown, cinnamon or violet. Taste mild, often bitter. Spores white to cream in mass.

17. *Russula lactea* [PERS.] FR.

Epicr. Myc. 355, 1838; Hymen. Eur. 443, 1874—CKE. Handb. Brit. Fung. I, 220, 1871; Ill. Brit. Fung. pl. 1070, 1890—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 207, 1872; Ench. Fung. 133, 1886—GILL. Hymen. Fr. 234, cum icone, 1874—KARST. Hattsv. I, 203, 1879—SACC. Syll. Fung. V, 459, 1887; Fl. Ital. Crypt., Hymen. 412, 1915—MASS. Brit. Fung. Fl. III, 50, 1893—W. G. SM. Brit. Basid. 285, 1908—RICKEN, Blätterp. 41, 1915—BURLINGH. North Amer. Fl. IX, 209, 1915—REA, Brit. Basid. 459, 1922—BRES. Icon. Myc. IX, pl. 411, 1929—CRAWS. Spore Ornam. Russulas, 78, 1930—KILLERM. Pilze Bayern. VI, 12, 1936.

*Agaricus (Russula) lacteus* PERS. Syn. Fung. 439, 1801 (teste FR.).

*Russula lepida* var. *alba* SING. Hedw. LXVI, 247, 1926; Beih. Bot. Cent. XLIX, 2 Abt. 341, 1933.

*Russula lepida* f. *lactea* J. SCHAEFF. Ann. Myc. XXXII, 225, 1934.

Gregarious or solitary, edible. Pileus 4–8 cm. broad, convex, then plane, depressed at the center; surface white, then tinged with alutaceous, dry, pruinose, margin even; context white, compact, taste mild, odour none; lamellae attenuato-adnexed or free, white, mixed with a few short ones, subdistant, forked, rather broad, thick, rigid; stipe 3–5 cm. long, 1–1.5 cm. thick, equal or ventricose, subconcolorous, pruinose, rugulose, spongy-stuffed; spores white in mass, subglobose or globose, echinulate,  $7.5\text{--}10 \times 7.5\text{--}8 \mu$ , or  $7.5\text{--}8 \mu$  in diam.

Hab. on the ground in woods. Summer to early autumn. Ishikari (Mt. Kurodake).

Distr. Japan (Hokkado), Europe, North America.

Jap. name. *Yuki-hatsu* (n. n.).

18. *Russula uncialis* PK.

2 Bull. N. Y. State Mus. 10, 1888—MURRILL, Mycologia, IV, 292, pl. 76, f. 6, 1912—BURLINGH. North Amer. Fl. IX, 232, 1915—KAUFFM. Agar. Mich. 160, 1918—J. SCHAEFF. Ann. Myc. XXXI, 354, 1933.

*Russula aurora* subsp. *uncialis* SING. Beih. Bot. Cent. XLIX, 2 Abt. 343, 1932.

Solitary or gregarious. Pileus 2–6 cm. broad, globose to convex, then plane and depressed at the center; surface viscid when wet, with a separable pellicle, subglabrous or pruinose, pink to blood-red or old blood color, paler on the margin, margin at first even, at length slightly tuberculato-striate; context white, reddish under the pellicle, thin, fragile, taste mild, odour almost none; lamellae free or freely adnate, white, then yellowish, equal but rarely mixed with short ones, some forking near the stipe, broader in front, crowded; stipe 4–6 cm. long, 7–10 mm. thick, equal or attenuated upward or downward, white, with pinkish flush in a part, glabrous, spongy-stuffed or slightly hollow; spores white in mass, subglobose,  $7.5 \times 6-7 \mu$ , echinulate.

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

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

Jap. name. *Ko-akebono-hatsu* (n. n.).

Sect. *Compactae* FR. emend. SING.

Beih. Bot. Cent. XLIX, 2 Abt. 243, 1932.

Pileus yellow to brown or white, viscid; margin glabrous or pubescent. Context white, at length becoming brown or black, more rarely remaining white, frequently becoming red on lamellae and context changing to red by exposure to air, rarely becoming blue or bay or black. Spores white or cream in mass.

Subsect. *Nigricantinae* M. et Zv. emend. SING.

Beih. Bot. Cent. XLIX, 2 Abt. 243, 1932.

Context ordinarily changing brown, blue, red or black when exposed to air. Lamellae often becoming red or black. Taste mild or very frequently slightly acid or rarely very acid. Pellicle not differentiated.

19. *Russula nigricans* [BULL.] FR.

Epicr. Myc. 350, 1838; Hymen. Eur. 439, 1874—BERK. Outl. Brit. Fung. 209, 1860—KICKX, Fl. Crypt. Flandr. II, 203, 1867—CKE. Handb. Brit. Fung. I, 218, 1871; Ill. Brit. Fung. pl. 1015, 1890—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 204, 1872; Ench. Fung. 132, 1886—GILL. Hymen. Fr. 231, cum icone, 1874—KARST. Hattsv. I, 199, 1879—SACC. Syll. Fung. V, 453, 1887; Fl. Ital. Crypt., Hymen. 408, 1915—MASS. Brit. Fung. Fl. III, 51, 1893—W. G. SM. Brit. Basid. 281, 1908—ROLLAND, Atlas Champ. 40, f. 78, 1910—BURLINGH. North Amer. Fl. IX, 206, 1915—RICKEN, Blätterp. 42, pl. 15, f. 2, 1915—KAUFFM. Agar. Mich. 126, 1918—REA, Brit. Basid. 458, 1922—SING. Hedw. LXVI, 256, 1926; Beih. Bot. Cent. XLIX, 2 Abt. 368, 1932—LANGE, Agar. Denm. VI, 26, 1926—BRES. Icon. Myc. VIII, pl. 397, 1928—CRAWS. Spore Orn. Russulas, 80, 1930—J. SCHAEFF. Ann. Myc. XXXI, 308, 1933—KILLERM. Pilze Bayern. VI, 6, 1936.

[YASUDA, Bot. Mag. (Tokyo), XXXVIII, (76), 1924]

*Agaricus nigricans* BULL. Champ. Fr. pl. 212 & 579, f. 2, 1791 (teste FR.).

*Agaricus (Russula) adustus* FR. Syst. Myc. I, 60, 1821, p. p.

Solitary or gregarious, edible. Pileus 4–15 cm. or more broad, convex and umbilicate, expanded and depressed at the center, finally subinfundibuliform; surface white or tinged with smoky-brown, becoming blackish or black, slightly viscid when wet, glabrous, margin incurved at first, even; context firm, white, slowly changing to reddish where wounded and becoming black, taste mild, odour none; lamellae adnate or adnexed, distant, broad, alternating short and longer ones, rigid, white, becoming reddish where bruised and then blackish; stipe 3–8 cm. long, 1–3 cm. thick, equal, white or pallid, then grayish, at length black, even or sometimes uneven in places, solid; spores white in mass, broadly ellipsoidal or nearly globose. asperulate,  $7.5-9 \times 6-7 \mu$ .

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

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

Jap. name. *Kurohatsu* (KAWAMURA), *Kuro-benitake* (YASUDA).

Subsect. *Delicinae* M. et Zv. emend. SING.

Beih. Bot. Cent. XLIX, 2 Abt. 243, 1932.

Context becoming brick-red or not changing color by exposure to air. Lamellae ordinarily becoming red, often becoming slightly

blue or glaucous-green. Pellicle not distinct or clearly breaking up into crusts. Taste mild or acrid.

## 20. *Russula delica* FR.

Epicr. Myc. 350, 1838; Hymen. Eur. 440, 1874—BERK. Outl. Brit. Fung. 210, 1860—KICKX, Fl. Crypt. Flandr. II, 204, 1867—CKE. Handb. Brit. Fung. I, 218, 1871—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 204, 1872; Ench. Fung. 132, 1886—GILL. Hymen. Fr. 232, cum icone, 1874—KARST. Hattsv. I, 200, 1879—SACC. Syll. Fung. V, 455, 1887; Fl. Ital. Crypt., Hymen. 409, 1915—MASS. Brit. Fung. Fl. III, 53, 1893—W. G. SM. Brit. Basid. 282, 1908—BURLINGH. North Amer. Fl. IX, 207, 1915—RICKEN, Blätterp. 41, pl. 15, f. 1, 1915—KAUFFM. Agar. Mich. 125, 1918—REA, Brit. Basid. 457, 1922—SING. Hedw. LXVI, 253, 1926; Beih. Bot. Cent. XLIX, 2 Abt. 369, 1932—LANGE, Agar. Denm. VI, 28, 1926—BRES. Icon. Myc. IX, pl. 401, 1929—CRAWS. Spore Orn. Russulas, 79, 1930—J. SCHAEFF. Ann. Myc. XXXI, 314, 1933—KILLERM. Pilze Bayern. VI, 7, 1936.

[MATSUURA, Trans. Tottori Soc. Agr. Sci. IV, 99, 1932]

*Russula deliciosa* SCHROET. Pilze Schles. I, 549, 1889.

*Russula brevipes* PK. 54 Ann. Rep. N. Y. State Mus. 178, 1901 (teste BURLINGH.).

Solitary or gregarious, edible. Pileus 8–18 cm. broad, broadly convex-umbilicate, then expanded to subinfundibuliform; surface white, then pallid, yellowish or ochraceous, easily stained yellowish or ochraceous when dried, dry, glabrous, subglabrous or obscurely tomentose, areolately cracked in dry weather, pellicle not separable; context white, unchanging color, firm, brittle, taste not acrid; lamellae attenuated-adnate or subadnexed, broad, crowded, white, becoming pallid, yellowish or brownish, nearly alternating long and short ones, slightly forking near the stipe; stipe 2–5 cm. long, 1.5–3 cm. thick, equal or slightly attenuated at the base, white or concolorous, glabrous or slightly powdery, solid; spores white in mass, subglobose or globose, spinulate, 7.5–10  $\mu$ .

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

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

**Forma chloroides (KROMBH.) IMAI, comb. nov.**

*Agaricus chloroides* KROMBH. Abbild. Schwamm. VIII, 7, pl. 56, f. 8-9, 1843 (teste BRES.).

*Russula chloroides* BRES. Fung. Trid. II, 89, pl. 202, 1900; Icon. Myc. IX, pl. 402, 1929—SACC. Fl. Ital. Crypt., Hymen. 410, 1915—REA, Brit. Basid. 458, 1922.

*Russula delica* var. *glaucophylla* QUÉL. Champ. Jura Vosg. 22 Suppl., in Compt. Rend. Assoc. Fr. Avanc. XXX, 495, pl. 3, f. 7, 1902—SING. Hedw. LXVI, 254, 1926; Beih. Bot. Cent. XLIX, 2 Abt. 370, 1932.

*Russula delica* var. *chloroides* KILLERM. Pilze Bayern. VI, 7, 1936.

A specie typo differt lamellis et apice stipitis aeruginascentibus.

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

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

Jap. name. *Aiba-shirohatsu* (n. n.).

**Subfam. Cantharelloideae IMAI, nom. nov.**

*Cantharellaceae* REA, Brit. Basid. 540, 1922, p. p.

Fructificatio carnosa vel carnosocoriacea, floccosa, sine velis. Hymenium inseparabile, venosum vel plicatum angustum obtusumque, simplex vel furcatum.

**Key to the genera.**

- I. Spores white or pale ochraceous in mass, smooth.
  - A. Fructification fleshy or fleshy-coriaceous, stipitate.
    - 1. Lamellae forked..... *Cantharellus*.
- II. Spores ochraceous in mass, verruculose; fructification fleshy-coriaceous, stipitate; hymenium fold-like..... *Neurophyllum*.

***Cantharellus* [ADANS.] FR.**

Syst. Myc. I, 316, 1821.

*Chanterel* ADANS. Fam. Pl. II, 11, 1763 (sec. EARLE, ac MURRILL).

*Merulius* HALL. Hist. Stirp. Helv. III, 150, 1768, p. p.

*Turbinellus* EARLE, Bull. N. Y. Bot. Gard. V, 407, 1909.

*Alectorolophoides* EARLE, Ibid. 407, 1909.

Pileus fleshy, regular, excentric or lobed. Stipe central, confluent with the pileus. Lamellae decurrent, thick, branched. Spores white, rarely pale ochraceous in mass, smooth.

Type species: *Cantharellus cibarius* FR.

**Key to the sections and species in Hokkaido.**

- I. Pileus regular and entire; stipe central. . . . . Sect. Mesopus.
  - A. Pileus and stipe fleshy, solid.
    1. Pileus 3-8 cm. broad, ochraceous-orange. . . . . *C. cibarius*(1).
    2. Pileus 1.5-2 cm. broad, orange to ochraceous, glabrous. . . . .  
 . . . . . *C. minor*(2).
  - B. Pileus submembranous, stipe tubular, polished.
    1. Pileus umbilicate or infundibuliform.
      - a. Pileus yellowish-cinereous or fuliginous; lamellae and stipe yellowish. . . . . *C. infundibuliformis*(3).
      - b. Pileus fuscous-fuliginous; lamellae and stipe cinereous or fuscous-cinereous. . . . . *C. cinereus*(4).
    2. Pileus trumpet-shaped or deeply infundibuliform, bright yellow with tawny scales; lamellae yellowish to cream color. . . . *C. floccosus*(5).
- II. Pileus dimidiate, stipe lateral. . . . . Sect. Pleuropus.
  - A. Fructification white, then yellowish. . . . . *C. pallidus*(6).

**Sect. Mesopus FR.**

Epicr. Myc. 364, 1838.

Pileus regular and entire. Stipe central.

**1. *Cantharellus cibarius* FR.**

Syst. Myc. I, 318, 1821; Epicr. Myc. 365, 1838; Hymen. Eur. 455, 1874—BERK. in SMITH, Engl. Fl. V, (2), 125, 1836; Outl. Brit. Fung. 215, 1860—RABENH. Deut. Krypt. Fl. I, 446, 1844—BARLA, Champ. Nice, 55, pl. 28, f. 7-15, 1859—KICKX, Fl. Crypt. Flandr. II, 207, 1867—CORDA, Champ. Fr. II, 130, pl. 32, f. 1, 1870—CKE. Handb. Brit. Fung. I, 227, 1871; Ill. Brit. Fung. pl. 1103, 1889; Handb. Austr. Fung. 80, 1892—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 215, 1872; Ench. Fung. 138, 1886—GILL. Hymen. Fr. 352, cum icone, 1874—KARST. Hattsv. I, 238, 1879—WINT. Die Pilze, I, 523, 1884—SACC. Syll. Fung. V, 482, 1887—SCHROET. Pilze Schles. I, 510, 1888—MASS. Brit. Fung. Fl. II, 319, 1893—ATKINS. Mushrooms, ed. 2, 128, f. 126, 1903—W. G. SM. Brit. Basid. 294, 1908—KAWAMURA, Bot. Mag. (Tokyo), XXII, (412), 1 fig. 1908; Ill. Jap. Fung. pl. 3, f. 8-11, 1912—ROLLAND, Atlas Champ. 52, f. 115-116, 1910—RICKEN, Blätterp. 2, pl. 1, f. 2, 1915—KAUFFM. Agar. Mich.

35, f. 3, 1918—REA, Brit. Basid. 542, 1922—BRES. Icon. Myc. X, pl. 471, 1929—LANGE, Agr. Denm. XI, 40, 1936.

[P. HENN. Hedw. XXXIX, (155), 1900—MATSUM. Ind. Pl. Jap. I, 133, 1904—SHIRAI, List Jap. Fung. 17, 1905; ed. 2, 107, 1917; ed. 3, 62, 1927—YASUDA, Bot. Mag. (Tokyo), XXXI, (171), 1917—UMEMURA, Pl. Fujiyama. 367, 1923]

*Agaricus Cantharellus* L. Sp. Pl. 1171, 1753—Sow. Engl. Fung. pl. 46, 1797 (teste FR.).

*Merulius Cantharellus* SCOP. Fl. Carn. ed. 2, II, 461, 1772 (teste FR.).

*Cantharellus edulis* PERS. Tent. Disp. Fung. 26, 1797 (teste SACC.).

*Merulius cantharellus* PERS. Syn. Fung. 488, 1801.

*Alectorolophoides cibarius* EARLE, Bull. N. Y. Bot. Gard. V, 407, 1909.

*Chanterel Cantharellus* MURRILL, North Amer. Fl. IX, 169, 1910.

*Cantharellus edulis* PERS. ex SACC. Fl. Ital. Crypt., Hymen. 456, 1915.

Gregarious or solitary, rarely cespitose, edible. Pileus 3–8 cm. broad, convex, turbinate, then nearly plane, or somewhat depressed, repand, margin involute and often lobed, then slightly revolute; surface almost glabrous, ochraceous-orange, whitish or pale-orange-yellow at the center; context yellowish, becoming whitish when drying, firm, taste and odour almost none; lamellae decurrent, fold-like, thick, distant, branched, often anastomosing, pale-orange-yellow to capusine-orange; stipe 2.5–9 cm. long, 5–20 mm. thick, equal or slightly attenuated upward or downward, concolorous or slightly paler, glabrous, or subtomentose at the base, solid; spores white or faintly ochraceous in mass, ellipsoidal,  $7.5-9 \times 6 \mu$ .

Hab. on the ground in woods. Summer to autumn. Ishikari (Mt. Teine, Nopporo), Iburi (Lake side of Shikotsu), Tokachi (Mt. Nupkaushinupri), Kushiro (Mt. Meakan).

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

Jap. name. *Komo-take* (SHIRAI ex P. HENN.), *Anzutake* (KAWAMURA).

## 2. *Cantharellus minor* PK.

23 Ann. Rep. N. Y. State Cab. 122, 1872—SACC. Syll. Fung. V, 483, 1887—KAWAMURA, Ill. Jap. Fung. pl. 1, f. 17–19, 1912.

[KAWAMURA, Bot. Mag. (Tokyo), XXIII, (465), 1909—SHIRAI, List Jap. Fung. ed. 2, 109, 1917; ed. 3, 62, 1927—LLOYD, Myc. Writ. V, Letter No. 65, p. 6, 1917—YASUDA, Bot. Mag. (Tokyo), XXXI, (330), 1917]

*Chanterel minor* MURRILL, North Amer. Fl. IX, 169, 1910.

Solitary or gregarious. Pileus 1.5–2 cm. broad, convex to expanded, irregular or depressed in the center; surface glabrous, orange to ochraceous, margin inrolled, then slightly revoluted, entire or repand; context thin, pallid, fleshy, taste mild; lamellae decurrent, subcrowded, very narrow, often forked, never anastomosed, concolorous; stipe 2–3 cm. long, 2–3 mm. thick, slender, cylindric, attenuated downward or sometimes equal, smooth, orange to yellow; spores yellowish in mass, ellipsoidal or subobovate, ventricose,  $7.0\text{--}7.5 \times 4.5 \mu$ .

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

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

Jap. name. *Ko-anzutake* (KAWAMURA), *Hime-anzutake* (YASUDA).

### 3. *Cantharellus infundibuliformis* [SCOP.] FR.

Epicr. Myc. 366, 1838; Monogr. Hymen. Suec. II, 208, 1863; Hymen. Eur. 458, 1874—RABENH. Deut. Krypt. Fl. I, 445, 1844—BERK. Outl. Brit. Fung. 216, 1860—CKE. Handb. Brit. Fung. I, 229, 1871; Ill. Brit. Fung. pl. 1109, 1890—QUÉL. Champ. Jura Vosg. in Mém. Soc. D'Emul. Montb. 2 sér. V, 216, 1872; Ench. Fung. 139, 1886—GILL. Hymen. Fr. 354, 1874—KARST. Hattsv. I, 240, 1879—WINT. Die Pilze, I, 521, 1884—SACC. Syll. Fung. V, 490, 1887; Fl. Ital. Crypt., Hymen. 450, 1915—SCHROET. Pilze Schles. I, 509, 1888—MASS. Brit. Fung. Fl. II, 324, 1893—PK. Mem. N. Y. State Mus. III, 158, pl. 56, f. 9–16, 1900—W. G. SM. Brit. Basid. 296, 1908—RICKEN, Blätterp. 3, pl. 1, f. 4, 1915—KAUFFM. Agar. Mich. 37, 1918—REA, Brit. Basid. 544, 1922—BRES. Icon. Myc. X, pl. 478, 1929.

[IMAZEKI, Journ. Jap. Bot. XI, 290, f. 1, 1935]

*Merulius infundibuliformis* SCOP. Fl. Carn. ed. 2, II, 462, 1772 (teste FR.).

*Agaricus cantharelloides* SOW. Engl. Fung. pl. 47, 1797 (teste FR.).

*Merulius lutescens* PERS. Syn. Fung. 489, 1801.

*Chanterel infundibuliformis* MURRILL, North Amer. Fl. IX, 168, 1910, p. p.

Gregarious or solitary, edible. Pileus 2–5 cm. broad, submembranous, umbilicate then infundibuliform; surface yellowish-cinereous or fuliginous when moist, becoming pale when dry, rugose, fibrillose; lamellae yellowish, then pruinose and gray, fold-like, decurrent, thick, distant, branched, anastomosing; stipe 4–8 cm. long, 4–6 mm. thick, light yellow, base somewhat thickened; spores white in mass, globose or subglobose,  $9\text{--}11 \times 7.5\text{--}9 \mu$ , smooth.

Hab. on the ground in woods. Autumn. Kushiro (Lake side of Akan), Southern Saghalien (Mt. Kashipo).

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

Jap. name. *Mikiirousutake* (IMAZEKI).

#### 4. *Cantharellus cinereus* [PERS.] FR.

Syst. Myc. I, 320, 1821; Epicr. Myc. 366, 1838; Monogr. Hymen. Suec. II, 206, 1863; Hymen. Eur. 458, 1874—BERK. in SMITH, Engl. Fl. V, (2), 126, 1836; Outl. Brit. Fung. 216, 1860—RABENH. Deut. Krypt. Fl. I, 445, 1844—KICKX, Fl. Crypt. Flandr. II, 208, 1867—CKE. Handb. Brit. Fung. I, 229, 1871; Ill. Brit. Fung. pl. 1110, f. A, 1888; Handb. Austr. Fung. 81, 1892—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 216, 1872; Ench. Fung. 138, 1886—GILL. Hymen. Fr. 353, cum icone, 1874—KARST. Hattsv. I, 240, 1879—WINT. Die Pilze, I, 521, 1884—SACC. Syll. Fung. V, 490, 1887—MASS. Brit. Fung. Fl. II, 324, 1893—W. G. SM. Brit. Basid. 297, 1908—RICKEN, Blätterp. 4, pl. 1, f. 6, 1915—REA, Brit. Basid. 544, 1922—BRES. Icon. Myc. X, pl. 480, 1929—LANGE, Agar. Denm. XI, 41, 1936.

*Helvella hydrolips* BULL. Champ. Fr. pl. 465, f. 2, 1791 (teste FR.).

*Merulius cinereus* PERS. Icon. Descr. Fung. I, 10, pl. 3, f. 3, 1798; Syn. Fung. 490, 1801 (teste FR.).

*Cantharellus hydrolips* SCHROET. Pilze Schles. I, 509, 1888—SACC. Fl. Ital. Crypt., Hymen. 449, 1915.

*Chanterel infundibuliformis* MURRILL, North Amer. Fl. IX, 168, 1910, p. p.

Gregarious or somewhat caespitose. Pileus 2–5 cm. broad, submembranous, convex-infundibuliform, often pervious to the base of the stipe; surface villose-squamulose, fuscous-fuliginous, becoming whitish; context concolorous, odour and taste mild; lamellae thick, fold-like, often reticulate, at first cinereous, then whitish, pruinose, decurrent, distant; stipe 3–8 cm. long, 4–8 mm. thick, attenuated downward, curved, glabrous, lacunose, fuscous-cinereous, nearly blackish, hollow; spores white in mass, ellipsoidal,  $8-10 \times 5-6 \mu$ .

Hab. on the ground in woods. Autumn. Ishikari (Jôzankei), Kushiro (Lake side of Akan).

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

Jap. name. *Akuiro-usutake* (n. n.).

#### 5. *Cantharellus floccosus* SCHW.

Trans. Amer. Phil. Soc. 2, IV, 153, 1832—SACC. Syll. Fung. V, 491, 1887—PK. Mem. N. Y. State Mus. III, 156, pl. 55, f. 9-13, 1900—KAWAMURA, Ill. Jap. Fung. pl. 3, f. 23-25, 1912—KAUFFM. Agar. Mich. 34, 1918—BRES. Icon. Myc. X, pl. 475, 1929.

[LLOYD, Myc. Writ. IV, Letter, No. 47, p. 9, 1913; Myc. Notes, No. 72, p. 1296, 1924; Ibid. 75, p. 1357, f. 3202, 1925—YASUDA, Bot. Mag. (Tokyo), XXIX, (169), 1915—SHIRAI, List Jap. Fung. ed. 2, 109, 1917; ed. 3, 62, 1927—UMEMURA, Pl. Fujiyama. 367, 1923—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 113, 1931]

*Turbinellus floccosus* EARLE, Bull. N. Y. Bot. Gard. V, 407, 1909.

*Chanterel floccosus* MURRILL, North Amer. Fl. IX, 168, 1910.

Solitary or gregarious, rarely somewhat caespitose, edible. Pileus 4–12 cm. broad, 7–16 cm. high, subcylindrical or horn shaped in younger stage, then elongated, trumpet-shaped to funnel-shaped, at length becoming deep infundibuliform; surface floccose when young, bright yellow with ocher to tawny spots, becoming darker in age, margin inrolled at first, undulate, often lobed; context white, rather thin, fleshy, rather soft, taste mild, odour none; lamellae decurrent, irregularly distant, 2–4-branched and anastomosing, thick, narrow, fold-like, yellowish to cream color with pruinescence; stipe short, red, pinkish, ochraceous, white or grayish with pruinescence; spores yellow in mass, ellipsoidal, 12–15 × 6.5–8  $\mu$ , smooth.

Hab. on the ground in woods, especially of *Abies*. Summer to autumn. Ishikari (Nopporo, Mt. Kurodake), Iburi (Lake side of Shikotsu), Kushiro (Akan).

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

Jap. name. *Usu-take* (KAWAMURA).

### Sect. *Pleuropus* FR.

Epicr. Myc. 368, 1838.

Pileus dimidiate. Stipe exactly lateral.

### 6. *Cantharellus pallidus* LLOYD

Myc. Notes, No. 47, 661, f. 949, 1917—YASUDA, Bot. Mag. (Tokyo), XXXII, (49), 1918—SACC. Syll. Fung. XXIII, 142, 1925—IMAZEKI, Journ. Jap. Bot. XI, 292, f. 2–3, 1935.

[LLOYD, Myc. Writ. V, Letter No. 65, p. 6, 1917—SHIRAI, List Jap. Fung. ed. 3, 62, 1927]

Gregarious or caespitose, edible. Pileus 4–9 cm. high, turbinate, funnel-shaped with reflexed sides, subinfundibuliform, irregular, pleuropodial, spathulate, lobate or branched; surface white or

whitish when fresh, when dried becoming brownish, hymenium white when fresh and young, then becoming yellow, with obtuse, narrow folds or lamellae; stipe irregular in length, usually radicate, white or whitish, discolored when dry; spores yellow or pale ochraceous in mass, ellipsoidal,  $8-12 \times 4-5.5 \mu$ , smooth.

Hab. on the ground among fallen leaves, mostly in frondose woods. Autumn. Oshima (Ônomura).

Distr. Japan (Honshu, Hokkaido).

Jap. name. *Shiro-anzutake* (YASUDA).

### *Neurophyllum* PAT.

Hymen. Eur. 129, 1887.

Pileus fleshy-coriaceous, turbinate, clavate or excentric. Stipe central or excentric, rarely lateral, confluent with the pileus. Hymenium fold-like, thick, decurrent, reticulate or anastomosing. Spores ochraceous in mass, verrucose.

Type species: *Craterellus clavatus* FR.

### *Neurophyllum clavatum* (PERS. ex FR.) PAT.

Hymen. Eur. 129, 1887—REA, Brit. Basid. 548, 1922.

*Elvela carnea* SCHAEFF. Fung. Bavar. IV, Ind. 106, pl. 164, 1774 (teste FR.).

*Clavaria truncata* SCHMID. Icon. Pl. ed. 2, pl. 60, 1793-97 (teste FR.).

*Merulius clavatus* PERS. Obs. Myc. I, 22, 1796; Syn. Fung. 498, 1801 (teste FR.).

*Cantharellus clavatus* FR. Syst. Myc. I, 322, 1821—HARPER, Mycologia, V, 261, pl. 93-94, 1913—RICKEN, Blätterp. 1, pl. 1, f. 1, 1915—KAUFFM. Agar. Mich. 34, pl. 2, 1918—BRES. Icon. Myc. X, pl. 482, 1929.

*Gomphus truncatus* PERS. Myc. Eur. II, 9, 1825.

*Craterellus clavatus* FR. Epicr. Myc. 533, 1838; Hymen. Eur. 632, 1874—RABENH. Deut. Krypt. Fl. I, 399, 1844—CORDA, Champ. Fr. II, 173, pl. 45, f. 2, 1870—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 299, 1872; Ench. Fung. 201, 1886—GILL. Hymen. Fr. 741, 1874—KARST. Hattsv. II, 120, 1882—WINT. Die Pilze, I, 351, 1884—SACC. Syll. Fung. VI, 519, 1888—SCHROET. Pilze Schles. I, 437, 1888—MASS. Brit. Fung. Fl. I, 137, 1892—W. G. SM. Brit. Basid. 398, 1908—ROLLAND, Atlas Champ. 54, f. 114, 1910.

[YASUDA, Bot. Mag. (Tokyo), XXII, (372), 1908—SHIRAI, List Jap. Fung. ed. 2, 177, 1917; ed. 3, 105, 1927]

*Craterellus carneus* SACC. Fl. Ital. Crypt., Hymen. 1135, 1916.

Solitary or gregarious, edible. Pileus 3–10 cm. broad, turbinate, truncate or depressed, flexuose, attenuated into the solid stipe; surface fawn-color or army-brown, lilac or rose color, then flesh color, finally ochraceous; lamellae fold-like, thick, reticulated, anastomosing, decurrent. cinnamon-drab or brownish-drab; stipe 1–5 cm. long, 1–3 cm. thick, obconic, whitish, lilac or amethyst, then pale, occasionally branched; spores ochraceous in mass, ellipsoidal or fusiform,  $10\text{--}12.5 \times 4\text{--}5 \mu$ , verruculose.

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

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

Jap. name. *Rappa-take* (YASUDA).

### Conclusion

1. The present paper was intended to report the results of the writer's fifteen years study on the taxonomy of the agarics in Hokkaido.

2. Three hundred and forty eight species including seven forms of Agaricaceae have been enumerated in this paper among which forty species and three forms are new to science. They have been classified into six subfamilies, twenty one tribes and fifty one genera.

3. The new species and forms described in the present study are as follows:—

<i>Agaricus comptulellus</i> IMAI	<i>Hebeloma fimicolum</i> IMAI
<i>Agaricus jezoensis</i> IMAI	<i>Hebeloma helvolescens</i> IMAI
<i>Agaricus semotellus</i> IMAI	<i>Hebeloma humosum</i> IMAI
<i>Amanita flavipes</i> IMAI	<i>Hebeloma Tomocae</i> IMAI
<i>Amanita longistriata</i> IMAI	<i>Hygrophorus carnescens</i> IMAI
<i>Amanita pulchella</i> IMAI	<i>Hygrophorus subniveus</i> IMAI
<i>Amanita sepicea</i> IMAI	<i>Laccaria laccata</i> f. <i>minuta</i> IMAI
<i>Amanita spissacea</i> IMAI	<i>Laccaria murina</i> IMAI
<i>Amanita subjunquillea</i> IMAI	<i>Lactarius akanensis</i> IMAI
<i>Amanitopsis avellaneosquamosa</i> IMAI	<i>Lactarius avellaneus</i> IMAI
<i>Amanitopsis clarisquamosa</i> IMAI	<i>Lactarius deliciosus</i> f. <i>laeticolorus</i> IMAI
<i>Armillaria Matsutake</i> S. ITO et IMAI	<i>Lactarius deliciosus</i> f. <i>virescens</i> IMAI
<i>Clitocybe fallax</i> IMAI	<i>Lactarius flavidulus</i> IMAI
<i>Crepidotus longistriata</i> IMAI	<i>Lactarius Sakamotoi</i> IMAI
<i>Crepidotus terrestris</i> IMAI	<i>Lepiota ossaeiformispora</i> IMAI
<i>Crepidotus viticolus</i> IMAI	<i>Lepiota subamanitiformis</i> IMAI
<i>Entoloma subnitidum</i> IMAI	<i>Lepiota subglischra</i> IMAI

<i>Leptonia umbrinella</i> IMAI	<i>Russula senecis</i> IMAI
<i>Pluteus bulbosus</i> IMAI	<i>Stropharia bulbosa</i> IMAI
<i>Pluteus marcosporus</i> IMAI	<i>Stropharia venenata</i> IMAI
<i>Psathyra microspora</i> IMAI	<i>Tricholoma porphyrophyllum</i> IMAI
<i>Psathyra multissima</i> IMAI	

4. Among these three hundred and forty eight kinds of agarics, two hundred and thirty three species are distributed over both Europe and North America, forty nine species over Europe only and twenty three species over North America only, white forty three species are endemic or eastern Asiatic.

5. A considerable number of fungi in our district are intermediate forms between the European and North American species. This may be of interest from the plant geographical point of view.

6. The species new to Japan are one hundred and ninety six with one form. The plants having newly combined scientific names are eighteen species and three forms, and one species was given a new scientific name.

7. The species having the scientific names of new combination are as follows:—

<i>Agaricus hortensis</i> (CKE.) IMAI	<i>Hebeloma fastibile</i> (PERS. ex FR.) IMAI
<i>Amanitopsis albida</i> (FR.) IMAI	<i>Hypholoma stipatum</i> (FR.) IMAI
<i>Armillaria japonica</i> (KAWAM.) IMAI	<i>Lactarius piperatus</i> [SCOP.] FR. f.
<i>Clitocybe extenuata</i> (FR.) IMAI	<i>pergamenus</i> (SWARTZ ex FR.) IMAI
<i>Clitocybe nebularis</i> (BATSCH ex FR.)	<i>Pholiota Arrhenii</i> (FR.) IMAI
QUÉL. f. <i>alba</i> (LANGE) IMAI	<i>Pholiota Nameko</i> (T. ITO) S. ITO et
<i>Cortinellus edodes</i> (BERK.) S. ITO et	IMAI
IMAI	<i>Pholiota togularis</i> (FR.) IMAI
<i>Cortinellus squarulosus</i> (BRES.) IMAI	<i>Rhodotus subpalmatus</i> (FR.) IMAI
<i>Galerula campanulata</i> (FR.) IMAI	<i>Russula delica</i> FR. f.
<i>Gomphidius rutilus</i> (FR.) IMAI	<i>chloroides</i> (KROMBH.) IMAI
<i>Gymnopilus astragalinus</i> (FR.) IMAI	<i>Stropharia aurantiaca</i> (CKE.) IMAI
<i>Gymnopilus lubricus</i> (FR.) IMAI	<i>Tricholoma humosum</i> (FR.) IMAI

The new name *Panaeolus Linnaeanus* IMAI was proposed instead of *P. campanulatus* (L. ex FR.) QUÉL.

8. The newly proposed names are six in subfamilies, fifteen in tribes, fifteen in subgenera, nine in sections and four in subsections.

Subfamilies are Amanitoideae, Volvarioideae, Pholitoideae, Agaricoideae, Lactarioideae and Cantharelloideae. Tribes are Armillarieae, Tricholomateae, Pleuroteae, Collybieae, Lentineae, Volvarieae, Entolomateae, Claudopeae, Leptonieae, Pholiotaeae, Cortinarieae,

Rhodoteae, Crepidoteae, Naucorieae, and Agariceae. Subgenera are Cystoderma and Limacella in *Lepiota*, Verarmillaria and Mucidula in *Armillaria*, Melaleuca, Rhodopaxillus and Micromphale in *Tricholoma*, Euclitocybe and Lepista in *Clitocybe*, Concharia and Phyllotus in *Pleurotus*, Euinocybe and Astrosporina in *Inocybe*, Veripaxillus and Tapinia in *Paxillus*. Sections are Limacina, Rigida and Guttata in *Tricholoma*, Fibrillosi, Pruinosi, and Nudi in *Pluteus*, Viscigomphus and Floccigomphus in *Gomphidius*, Pruinatipedes in *Psathyrella*. Subsections are Squamosae in *Pholiota*, Viscidi, Impoliti and Glabrati in *Lactarius*.

9. So far as the writer is aware, the edible agarics in Hokkaido comprise one hundred and eighty one species and four forms. Among them, the fungi suitable for market are seventy four species and two forms.

Edible fungi suitable for market are as follows:—

<i>Agaricus arvensis</i> SCHAEFF. ex FR.	<i>Cortinellus edodes</i> (BERK.) S. ITO et IMAI
<i>Agaricus campestris</i> L. ex FR.	<i>Cortinellus sculpturatus</i> (FR.) KARST.
<i>Agaricus hortensis</i> (CKE.) IMAI	<i>Cortinellus vaccinus</i> (SCHAEFF. ex FR.) ROZE
<i>Agaricus placomyces</i> PK.	<i>Entoloma clypeatum</i> (L. ex FR.) QUÉL.
<i>Agaricus silvaticus</i> SCHAEFF. ex FR.	<i>Gomphidius rutilus</i> (SCHAEFF. ex FR.) IMAI
<i>Agaricus silvicola</i> (VITT.) SACC.	<i>Gymnopilus lentus</i> (PERS. ex FR.) MUR- RILL
<i>Agaricus subrufescens</i> PK.	<i>Gymnopilus lubricus</i> (FR.) IMAI
<i>Armillaria caligata</i> (VIV.) GILL.	<i>Hebeloma mesophaeum</i> (PERS. ex FR.) QUÉL.
<i>Armillaria Matsutake</i> S. ITO et IMAI	<i>Hygrophorus chrysodon</i> [BATSCH] FR.
<i>Armillaria mellea</i> (VAHL ex FR.) QUÉL.	<i>Hygrophorus erubescens</i> FR.
<i>Armillaria ventricosa</i> PK.	<i>Hygrophorus pudorinus</i> FR.
<i>Cantharellus cibarius</i> FR.	<i>Hypholoma lateritium</i> (SCHAEFF. ex FR.) SCHROET.
<i>Cantharellus floccosus</i> SCHW.	<i>Lactarius deliciosus</i> [L.] FR. f.
<i>Clitocybe extenuata</i> (FR.) IMAI	<i>laeticolorus</i> IMAI
<i>Clitocybe nebularis</i> (BATSCH ex FR.) QUÉL.	<i>Lactarius deliciosus</i> [L.] FR. f.
<i>Clitopilus caespitosus</i> PK.	<i>virescens</i> IMAI
<i>Collybia butyracea</i> (BULL. ex FR.) QUÉL.	<i>Lactarius flavidulus</i> IMAI
<i>Collybia velutipes</i> (CURT. ex FR.) QUÉL.	<i>Lactarius luteolus</i> PK.
<i>Cortinarius elatus</i> (PERS. ex FR.) SACC.	<i>Lactarius piperatus</i> [SCOP.] FR.
<i>Cortinarius fulgens</i> [ALB. et SCHW.] FR.	<i>Lactarius piperatus</i> [SCOP.] FR. f.
<i>Cortinarius latus</i> [PERS.] FR.	<i>pergamenus</i> (SWARTZ ex FR.) IMAI
<i>Cortinarius multiformis</i> FR.	

- Lactarius sanguifluus* [PAUL.] FR.  
*Lactarius torminosus* [SCHAEFF.] FR.  
*Lactarius vellereus* FR.  
*Lactarius volemus* FR.  
*Lepiota naucina* (FR.) QUÉL.  
*Marasmius oreades* [BOLT.] FR.  
*Pholiota adiposa* (FR.) QUÉL.  
*Pholiota erebia* (FR.) GILL.  
*Pholiota Nameko* (T. ITO) S. ITO et  
 IMAI  
*Pholiota praecox* (PERS. ex FR.) QUÉL.  
*Pholiota squarrosa* (MUELL. ex FR.)  
 QUÉL.  
*Pholiota squarrosoides* (PK.) SACC.  
*Pholiota terrestris* OVERH.  
*Pholiota togularis* (FR.) IMAI  
*Pholiota VahlII* (SCHUM. ex FR.)  
 LANGE  
*Pleurotus cornucopiae* (PAUL. ex PERS.)  
 ROLLAND  
*Pleurotus ostreatus* (JACQ. ex FR.)  
 QUÉL.  
*Pleurotus porrigens* (PERS. ex FR.)  
 GILL.
- Pleurotus serotinus* (PERS. ex FR.)  
 GILL.  
*Russula aurata* [WITH.] FR.  
*Russula cyanoxantha* [SCHAEFF.] FR.  
*Russula delicata* FR.  
*Russula delicata* FR. f.  
*chloroides* (KROMBH.) IMAI  
*Russula integra* [L.] FR.  
*Russula lactea* [PERS.] FR.  
*Russula virescens* [SCHAEFF.] FR.  
*Tricholoma albobrunneum* (PERS. ex  
 FR.) QUÉL.  
*Tricholoma cartilagineum* (FR.) QUÉL.  
*Tricholoma conglobatum* (VITT.) SACC.  
*Tricholoma equestre* (L. ex FR.) QUÉL.  
*Tricholoma gambosum* (FR.) GILL.  
*Tricholoma humosum* (FR.) IMAI  
*Tricholoma nudum* (BULL. ex FR.)  
 QUÉL.  
*Tricholoma personatum* (FR.) QUÉL.  
*Tricholoma pessundatum* (FR.) QUÉL.  
*Tricholoma sejunctum* (SOW. ex FR.)  
 QUÉL.

10. The poisonous agarics in Hokkaido are the following seventeen species.

- Amanita aspera* (FR.?) QUÉL.  
*Amanita mappa* (BATSCH ex FR.)  
 QUÉL.  
*Amanita muscaria* (L. ex FR.) QUÉL.  
*Amanita pantherina* (DC. ex FR.)  
 QUÉL.  
*Amanita phalloides* (FR.) QUÉL.  
*Amanita porphyria* (ALB. et SCHW. ex  
 FR.) GILL.  
*Amanita verna* (BULL. ex FR.) QUÉL.  
*Amanita virosa* (FR.) QUÉL.  
*Amanitopsis agglutinata* (BERK. et  
 CURT.) SACC.
- Armillaria japonica* (KAWAMURA)  
 IMAI  
*Entoloma lividum* (BULL. ex FR.)  
 QUÉL.  
*Inocybe rimosa* (BULL. ex FR.) QUÉL.  
*Lepiota helveola* BRES.  
*Panaeolus papilionaceus* (BULL. ex FR.)  
 QUÉL.  
*Panus stipticus* [BULL.] FR.  
*Pholiota spectabilis* (FR.) GILL.  
*Stropharia venenata* IMAI

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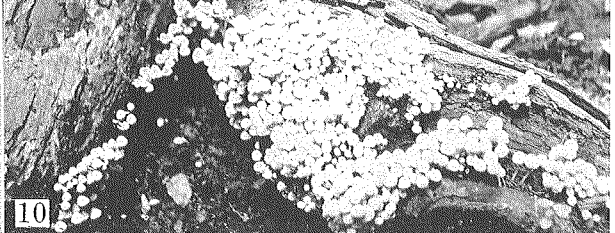
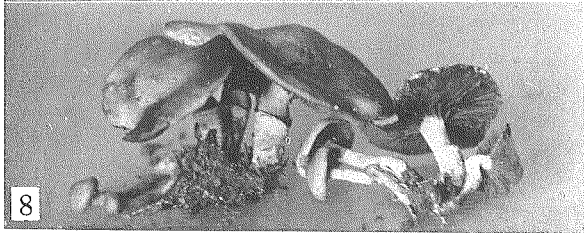
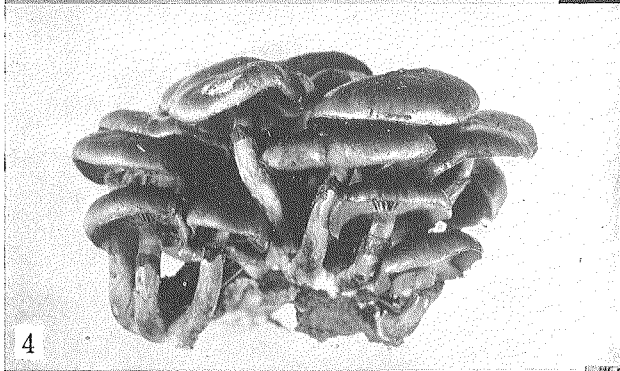
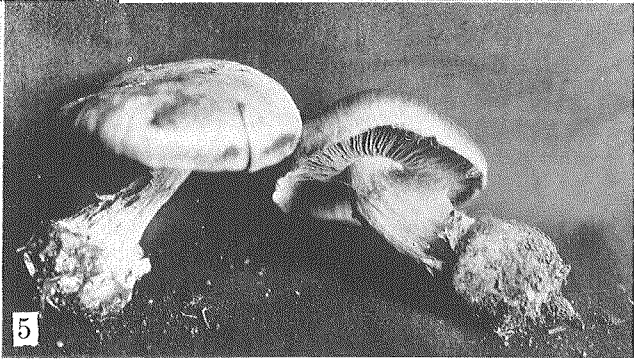
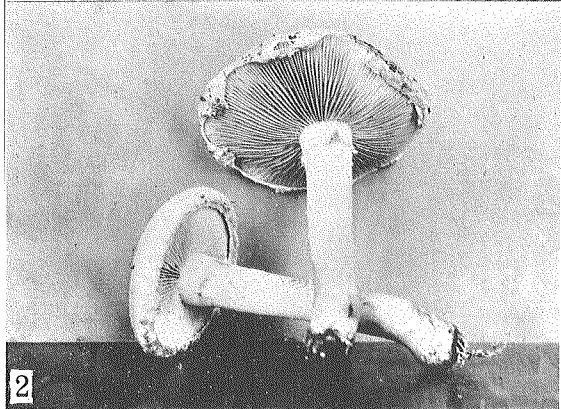
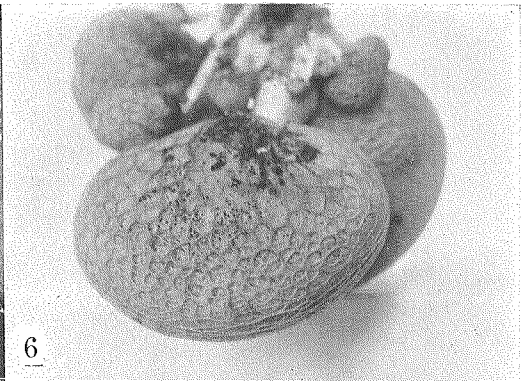
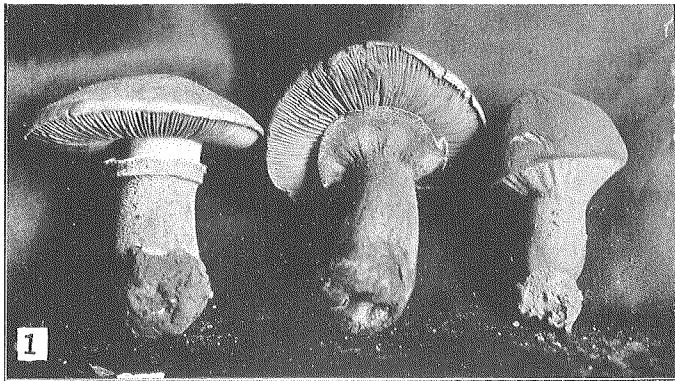
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### Explanation of Plate IV

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**PLATE V**

### Explanation of Plate V

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