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ON THE CLAVARIACEÆ OF JAPAN

BY

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日本産箒茸科に就きて

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Our knowledge on the Japanese species of Clavariaceae is comparatively meager, and only about twenty species were recorded up to the present. From several localities in the Island of Hokkaido, especially in the vicinity of Sapporo, the writer has collected about twenty-five species belonging to this family. Among them, twelve species new to Japan or to science were selected and recorded in this short paper.

1. *Clavaria apiculata* FRIES, Syst. Myc. I, 470, 1821.

Syn. *Clavariella apiculata* HENN. Verh. Bot. Ver. Brandenburg, XXXVII, 30, 1895.

Clavaria Tsugina PECK, Bull. N. Y. St. Mus. LXVII, 27, 1903.

Hab. On the rotting branches of *Abies Mayriana* lying on the ground in woods. Hokkaido: Prov. Ishikari, Nopporo. September to October.

Jap. name. *Cha-hôkitake-modoki* (n. n.).

This fungus grows on rotting coniferous wood. By the habit and the smaller fruit bodies, the present species can be distinguished from very closely related *Cl. stricta* which grows on the decayed wood of various deciduous trees.

2. *Clavaria Broomei* COTTON et WAKEFIELD, Transact. Brit. Myc. Soc. VI, 170, 1919.

Hab. On the ground in woods. Hokkaido: Prov. Ishikari, Nopporo.

[Transact. Sapporo Nat. Hist. Soc., Vol. XI, Pt. 1, 1929]

July to October.

Jap. name. *Ko-arabôki-take* (n. n.).

The authors of this fungus have stated that "this species is closely allied to *Cl. formosa*, but it is distinguished from it and still more *Cl. flava* by its darker hue, and by the deeply coloured and distinctly aculeate spores. On drying it becomes nearly black in colour, whereas *Cl. formosa* and *Cl. flava* remain pale, and are somewhat more brittle. It is not possible to identify this species with FRIES' *Cl. aurea*, the spores being quite different from those of an authentic specimen of *Cl. aurea* in the Kew Herbarium: moreover among all the specimens so named from the Continent not one has been found agreeing with *Cl. Broomei*."

COKER* has stated that the present species is of the g r a n d i s group and is nearest to *Cl. longicaulis* PECK.

The present fungus belongs to the g r a n d i s group, and is characterized by the distinctly aculeate large spores; and there is no doubt of its being identical with *Cl. Broomei*.

3. *Clavaria crocea* PERS. Comm. Fung. Clav. 57 (189), 1797.

Syn. *Clavariella crocea* HERTER, Krypt. -Fl. Mark Brand. VI, (1), 164, 1910.

Hab. On the ground in woods. Hokkaido: Prov. Ishikari, Nopporo; Prov. Kushiro, Lake side of Akan; Prov. Kitami, Oketo Forest. September.

Jap. name. *Aka-hime-hôkitake* (n. n.).

This beautiful and tiny fungus seems to be rare in our district. The spores of the present fungus are subglobose with a central gutta and 2.5 to 3.5 μ in diameter.

4. *Clavaria flaccida* FRIES, Syst. Myc. I, 471, 1821.

Syn. *Clavariella flaccida* KARST. Hattsv. II, 186, 1882.

Clavaria abietina form. "*small, non-virescent*" COKER, Clav. Unit. Stat. Canada, 184, 1923.

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* COKER, W. C.: The Clavarias of the United States and Canada, p.p. 186–187, 1923

Clavaria abietina form. "*non-virescent of pine*" COKER, Ibid. 182, 1923.

Hab. On the needles of *Abies Mayriana*. Hokkaido: Prov. Ishikari, Nopporo. August to October.

Jap. name. *Hime-hôkitake* (n. n.).

FRIES and many other authors have treated *Cl. flaccida* as a distinct species from *Cl. abietina* by its fruit bodies being more flaccids and not showing stains in age or bruising, while QUÉLET included it into *Cl. abietina*. Our fungus does not turn green at all, showing it is not *Cl. abietina*.

COKER has described two forms of *Cl. abietina*, namely "non-virescent form of pine" (= ? *Cl. corrugata* KARST.) and "small non-virescent form" (= *Cl. flaccida* FRIES). According to his description, these forms differ in the size of fruit bodies as well as in the markings of the spore-wall. However, our specimens show that these points of distinction could not very well hold true in many cases, for there are many transitional forms between them, and the differences in the character of the warts on the spore-wall being not so constant and correlated with the size of the fruit body.

5. *Clavaria Kunzei* FRIES, Syst. Myc. I, 474, 1821.

Syn. *Clavaria chionea* PERS. Myc. Eur. I, 167, 1822.
Clavaria Krombholzii FRIES, Epicr. 572, 1838.
Clavurina Kunzei SCHROET. Pilze Schles. I, 442, 1889.
Clavaria asperula ATKINS. Ann. Myc. VI, 54, 1908.

Hab. On the humus soil in woods. Hokkaido: Prov. Ishikari, Nopporo. September to October.

Jap. name. *Shiro-hime-hôkitake* (n. n.).

The detailed accounts of this fungus have been discussed by COTTON* and COKER.** Its variability is also recognisable in our specimens as in the case of the foreign specimens.

This fungus is chracterized with its beautiful white to cream-white coloured and loosely branched fruit bodies.

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* COTTON, A. D.: Transact. Brit. Myc. Soc. III, p.p. 180–181, 1909; Ibid. VI, p.p. 177–178, 1919

** COKER, W. C.: The Clavarias of the United States and Canada, p.p. 95–101, 1923

6. *Clavaria ligula* SCHAEFF. Fung. Bavar. 116, 1763.

Syn. *Clavaria caespitosa* WULFEN, in JACQ. Misc. II, 98, 1781.
Clavaria pulvinata PERS. Comm. Fung. Clav. 65, 1797.
Clavaria luteola PERS. Ibid. 66, 1797.

Hab. On the humus soil in woods. Hokkaido: Prov. Kushiro, Lake side of Akan. September.

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

This clavate fungus somewhat resembles to *Cl. pistillaris*, but differs in the smaller size and paler colour.

The different spore-measurments of this species were given by various authors, for example, BOURDOT and GALZIN stated as 11–15 × 3–5 μ, BURT as 10–14 × 3–4 μ in European and 7–12 × 3–4 μ in American specimens, COKER 15-18.5 × 4.5–5 μ, COTTON 11–14 × 4 μ, REA 10 × 5–6 μ, and SACCARDO 14–16 × 3–4 or 10–11 × 4–5 μ. In our specimens, the spores are slightly smaller than those of the foreign specimens, namely 8–10 × 5 μ.

7. *Clavaria quercicola* S. IMAI, n. sp.

Plants 1–2 cm. high, gregarious or solitary. Club 8–16 × 1.5–2 mm., subcylindrical, mostly truncate at the apex, slightly attenuated downwards, white, becoming yellowish or brownish when dried, not distinctly marked off from the sterile base. Sterile base 2–5 mm. long, about 1 mm. thick, smooth, white. Basidia 4-spored. Spores ellipsoidal, 3–3.5 × 1.5–2.5 μ, with a central gutta.

Hab. On the bark of decaying wood of *Quercus* sp. lying on the ground in woods. Hokkaido: Prov. Ishikari, Nopporo. October.

Jap. name. *Shiro-hime-surikogitake* (n. n.).

From the allied species *Cl. Corbierei* BOURDOT et GALGIN and *Cl. Guillemini* BOURD. et GALZ. which grow on the ground, this fungus is easily distinguished by the habit of always growing on decayed wood, and also by its smaller spores.

8. *Clavaria Shimadai* S. IMAI, n. sp.

Plants 1–2 cm. high, gregarious or solitary, simple, clavate, blunt at the

apex, cylindrical or rarely flattened, straight or crooked, 1–2 mm. thick, without a distinct stem, deep orange-red (salmon-orange to orange-chrome), then becoming dingy in colour, context subconcolorous, brittle, not hollowed. Basidia 4- or 2- spored. Spores subglobose, smooth, about 5 μ.

Hab. On the fire brand wood in woods. Hokkaido: Prov. Ishikari, Jôzankei. September.

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

This species is closely related to *Cl. aurantio-cinnabarina* SCHW. and *Cl. fusiformis* Sow., but is easily distinguished by its smaller size and habitat on the fire brand wood. It is named from Mr. S. SHIMADA, the collector of the fungus.

9. *Clavaria truncata* QUÉL. Enchir. Fung. 221, 1886.

Syn. *Craterellus pistillaris* FRIES. Epicr. 534, 1838.
Clavaria truncata LOVEJOY, Bot. Gaz. L, 385, 1910.
Clavaria pistillaris COKER, Clav. Unit. Stat. Canada, 83. 1923 (p. p.).

Hab. On the ground in coniferous or mixed Woods. Hokkaido: Prov. Kitami, Notoro Forest. September.

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

The present fungus is so closely related to *Cl. pistillaris* as COKER has considered them as an indentical. BURT* has already discussed that *Clavaria truncata* (= *Craterellus pistillaris* FRIES) ought to be better treated as a distinct species from *Clavaria pistillaris*.

I have collected twenty or more plants at the same place in Kitami. Among them, there were no specimens which coincide with the character of *Cl. pistillaris*. Their morphological characters show that it is better to classify this fungus as a species of *Clavaria* not of *Craterellus*, although many authors have discussed on this point.

10. *Typhula Itoana* S. IMAI, n. sp.

Syn. *Typhula graminum* TASUGI, Journ. Imp. Agr. Exp. St. Nishigahara, I, 55 (49), 1929 (not KARST.).

* BURT, E. A.: Ann. Mo. Bot. Gard. I, p.p. 341-342, 1914; Ibid. IX, p. 69, 1922

Plants 3.5–30.0 mm. high, solitary or gregarious, springing from sclerotium. Club 1.0–11.0 mm, long, 0.4–1.2 mm. thick, cylindrical or long-ellipsoidal, rarely conical; surface smooth, rose-coloured, rarely lighter below. Stem 1.5–20 mm. long, slender, distinctly marked off from the club, white or grayish coloured, often slightly powdery above, villose below. Basidia subclavata or subcylindrical, about 30×6.0 μ, 4-spored, rarely 2-spored. Spores ellipsoidal, ventricose, 6.0–12×3–5 μ. Paraphyses clavate. Sclerotia 0.5–4.5 mm., mostly 1.5–2 mm. in diam., globose, oblong or irregular in shape, smooth, reddish brown, becoming dark brown when dried.

Hab. Parasitic on graminaceous plants. Honshu: Prov. Mutsu, Kuroishi; Prov. Shinano, Nagano. Hokkaido: Prov. Ishikari, Sapporo. October to November.

Jap. name. *Fuyugare-gamanoho-take* (n. n.).

This is closely allied to *T. elegantula* KARST. but easily distinguished from it by the sporophore springing from the sclerotium, and still more from *T. graminum* KARST. by its rosy coloured club. After a careful review on the hitherto described species of *Typhula*, the writer came to the conclusion that the present fungus is undoubtedly new to science and is named in honour of Prof. Dr. SEIYA ITO.

In the northern parts of our country where the ground is heavily covered with snow during winter, the cereal crops and the forage grasses often suffer from a disease called *Fuyugare* (Winter-rot), *Yukigusare* (Snow-rot), *Tôgai* (Frost-injury), etc. Just after the thawing of snow, the young culms and leaves turn to brownish or grayish-white colour and gradually dry up and die away. At this time, many reddish brown small sclerotia of the causal fungus are found on the diseased culms and leaves. At first, we thought the causal fungus to be *Typhula graminum* KARST. or *T. elegantula* KARST.

In the spring of 1926, the writer collected many sclerotia on the diseased wheat and oat in the vicinity of Sapporo and placed them on sand in flower pots. In the autumn of the same year, these sclerotia produced the rosy coloured fruit bodies. Also the sclerotia sent to the writer from the Provinces of Mutsu and Shinano in the Northern Honshu, at the writer's request produced similar fruit bodies.

It is a noteworthy fact that these sclerotia produce the white branched strands in darkness. In the case of such an abnormal condition, the fungus may be mistaken as *Typhuia graminum.*

11. ***Typhula phacorrhiza*** (REICH.) FRIES, Epicr. 585, 1838.

Syn. *Clavaria phacorrhiza* REICHARD, Schrift. Naturf. Treunde, Berlin, I, 315, 1775.

Sclerotium scutellatum A. et S. Consp. Fl. Lusat. 74, 1805.

Hab. On the rotting fallen leaves. Hokkaido: Prov. Ishikari, Sapporo. November.

Jap. name. *Akae-gamanohotake* (n. n.).

The sclerotia of this fungus are light brown when wet, dark brown when dry, and 2–5 mm. in diameter, compressed globose or disc shape.

12. ***Pterula multifida*** FRIES, Monogr. Hym. Suec. II, 282, 1863.

Hab. On the fallen dead branches or leaves in woods. Hokkaido: Prov. Ishikari, Nopporo; Prov. Kushiro, Lake side of Akan. September to October.

Jap. name. *Fusa-take.*

YASUDA* has reported the occurrence of *P. penicillata* in our country by the identification of LLOYD. From the YASUDA's description, we could not recognize any difference from *P. multifida.* His *P. penicillata* may be the same as our fungus.

In conclusion, the writer wishes to express his sincere thanks to Profs. K. MIYABE and S. ITO for their kind suggestions.

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* YASUDA, A.: Bot. Mag. Tokyo, XXXVIII, (47), 1924

摘　　要

北海道、殊に札幌附近に於て採集せる箒茸科の菌類中、日本或は學會に新たに發表せらるべきもの十二種を選びて報告せり。

1. 茶　箒　茸　*Clavaria apiculata* FRIES
2. 小粗箒茸　*Cl.* *Broomei* COTTON et WAKEF.
3. 赤姫箒茸　*Cl.* *crocea* PERS.
4. 姫　箒　茸　*Cl.* *flaccida* FRIES
5. 白姫箒茸　*Cl.* *Kunzei* FRIES
6. 小櫧木茸　*Cl.* *ligula* SCHAEFF.
7. 白姫櫧木茸　*Cl.* *quercicola* S. IMAI (新種)

四五分内外の白色なる小形菌にして截頭棍棒形をなし、ミヅナラ等の落葉濶葉樹の腐朽しつゝある樹皮上に生ず。

8. 擬長刀茸　*Cl.* *Shimadai* S. IMAI (新種)

一見長刀茸に類すれ共、それより小形なると燒木上に生ずる點に於て肉眼的に區別得べし。

9. 擬櫧木茸　*Cl.* *truncata* QUÉL.
10. 冬枯萠穂茸　*Typhula Itoana* S. IMAI (新種)

本菌は麥類其他禾本科牧草類の冬枯又は雪腐病等と稱せられつゝある菌核病菌の子實体時代にして、恐らく從來本邦に於て、*Typhula graminum* KARST. と稱せられつゝあるものゝ大部分は本種ならんと思考さる。著者は 1927年 本州北部の各地より該菌核の送附を受け、子實体の形成を試みたるに、その内青森縣下及長野縣下より送られたる菌核に於て本種の發生をみたり（他の縣下の菌核は不幸にして子實体の形成をみざりき）。

11. 赤柄萠穂茸　*Typhula phacorrhiza* (REICH.) FRIES
12. 總　　茸　*Pterula multifida* FRIES