THE KOREAN JOURNAL OF MYCOLOGY
Vol. 22, No 4, p421-426 December 1994
Printed in S. KOREA

Notes on Korean Agaricales (III)

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韓國產 주름버섯目에 대한 報告 (III)

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ABSTRACT: Some Agaric fungi were collected from the area of Suwon, Mt. Taewha and Mt. Yongmoon in Kyonggi-do and Chongpyong temple in Kangwon-do. Among them, one genus and five taxa of *Agaricales* were confirmed new to Korea. In this paper we registered five texa of Agricales in detailed description such as *Hygrocybe firma* (Berk. & Br.) Sing. var. *firma* Sing.; *Hohenbuehelia petalodes* (Bull.: Fr.) Schulzer; *Cystoagaricus strobilomyces* (Mull.) Sing.; *Coprinus domesticus* (Bolt.: Fr.) S.F.Gray and *Inocybe acutata* T. Koba.& E.Naga.. The one genus new to Korea is *Cystoagaricus* Sing.

KEYWORDS: *Hygrocybe firma* var. *firma*, *Hohenbuehelia petalodes*, *Cystoagaricus*, *Cystoagaricus strobilomyces*, *Coprinus domesticus*, *Inocybe acutata*, identification.

1. 이란성무명버섯(신칭) *Hygrocybe firma*(Berk, & Br.) Sing. var. *firma* Sing. in Sydowia 11: 355, 1957.

Pileus 15~30 mm wide, at first hemiglobose and then becoming flattened at times slightly depressed at center, margin somewhat undulate and more or less upturn at mature. Surface dry, smooth, innately fibrillose-squamulose with erect fibrils in the umbilicus, hygrophanous when dry, scarlet red (8B8) to dark red (10C7) or dark orange yellow (6A8). Context concolorous with cap surface, thin, fragile. Odor and taste indistinct. Lamellae adnate to decurrent, rather thick, subdistant, pale yellowish, edge smooth, flame scarlet to pale red or orange yellow, with lamellulae. Stipe 35~90×3~8 mm, equal to slightly enlarged downwards, at times compressed, surface smooth, dry, concolorous with the pileus upwards, shading to yellow downwards. Context orange yellow, becoming hollow.

Spores print white. Spores 11~18×7.5~10 um on the larger, basidia 5~7×3.5~5 um on the smaller basidia, ellipsoid, smooth. Basidia dimorphous, the large ones 60~80×14~15 um 4-spored, and the small ones 23~35×6.5~7.5 um, 2- and 4-spored (45~63×11~13 um in Hongo, 40×15 um in Hesler & A.H smith) without basal clamp connection. Pleurocystidia and cheilocystidia absent. Hymenophoral trama subparallel. Hyphae with clamp connection. Pileipellis of pileus 55~120×20~35 um, clavate to sphaeropedunculate, thin-walled, smooth.

Habit & Habitat: Solitary on the humus soil in mixed forests, summer to autumn.

Materials examined: Chongpyong Temple, Chunsong-gun, Kangwon Pro. Sep. 30. 1990. (ASIK: 3545), Coll. by S. J. Seok.

Observation: This texa is easily distinguished by its a small scarlet red pileus and the obvious dimorphous basidia.

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2. 꽃잎꼬막버섯(신칭) *Hohenbuehelia petalodes* (Bull.: Fr.) Schulzer in Mycotaxon 25: 321-453, 1986 fig. 24

Pileus 18~45 mm long, 15~35 mm wide, petaloid to semi-infundibuliform. Pure white (1A1) to yellowish white (4A2) or putty (4B2) to ivory (4B 3), smooth, to minutely pruinose near margin, usually somewhat white tomentose at base, margin more or less wavy or inrolled when young, lobed. Lamellae decurrent, narrow, crowded, whitish when fresh, putty (4B2) to ivory (4B3), stipe pseudostipe, rudimentary with white matted-tomentose at the base.

Spore sprint white. Spores 7.4~8.4×4.9~5.6 um, subglobose to elliptic, smooth, inamyloids. Basidia 23~37×5~7.8 um, normal, 4-spored with clamp connection at base.

Cheilocystidia 13.9~27.9×5~11.2 um, ventricose, subventriose, fusoid-ventricose, lecythiform or subcapitate, rarely branched, hour-glass cells 4~4.6 um long, sometimes with mucoid ball. Pleurocystidia metuloid type, 44.6~58×12~16.7 um, lanceolate, hyaline, or brownish-yellow, encrusted with crystals. Cuticle of cap, pale to pale brown in KOH, Pileipellis on upper the gelatinous layer 32.5~74×4.6~7 um, ventricose, subventricose, fusoid-ventricose, lecythiform or subcapitate, rarely branched, sometimes with hour-glass cells 5.6~6.5 um, but usually without mucoid ball, metuloid 55.8~78×6~9.3 um, lanceolate typically without crystals, gelatinous zone 150~270 um deep, terminal cells within gelatinous layer, 4.5~5 ×26~28 um, cylindric, thin walled, with clamp connection. Anamorphs fertile hyphae 4~5 um, with clamp connection, predatory adhesive knobs 5.5~6×13~15 um, at times with mucoid ball, conidia 9.7~13×2.0~2.6 um, cylindric, elliptic or broadly fusoid often slightly curved.

Habit & Habitat: on the branch to trunks of dead broad leaves trees, often associated with woody debris.

Materials examined: Mt. Taewha, Kwangju-gun, Kyonggi Prov. Sep. 15. 1994. (GBDS:1470), Coll. by S. J. Seok

Observation: This texa is easily recognized by its petaloid, pileus and its short-elliptic spores.

3. 고슴도치버섯속(신칭) *Cystoagaricus* Sing. Mycologia 39: 85. 1947

Pileus convex or applanate, squarrose-spinose to subglabrous, minutely verruculose-floccose or subfibrillose to granular, epiderm of the pileus consisting of chains of subisodiametrical or ellipsoid, short-fusoid, cylindric cells. Lamellae free to very narrowly adnexed. Spore print brownish fuscous, fuscous grey of purplish fuscous, at times olive brown in KOH, without a germ pore, with curved-nodose or subangular, elongate to subisodiametric, inamyloid. Basidia normal, four-spored, cystidia and cheilocystidia pluricellular, hymenophoral trama regular to subregular. Stipe central. Annulus none. Context thin. Hyphae inamyloid, with clamp connection. On woods or on the ground, solitary, gregarious.

Type species: *Cystoagaricus strobilomyces* (Murr.) Sing.

4. 고슴도치버섯(신칭) *Cystoagaricus strobilomyces* (Murr.) Singer [=Syn. *Nolanea strobilomyces* Murr.]

Pileus 8~3.3 mm wide, at first semiglobose, then becoming convex to sometimes conico-convex, binally somewhat plane, covered with greyish brown (7-8F3), dark brown (7-8F4) to (9F3) or violet brown (9F4), subsquarrosoid to squarrose-spinose or mixed with minutely verruculose-floccose on the dark brown to greyish brown ground colour, at first margin appendiculated with remnants of inner veil but easily disappeared. Lamellae 2. 5~5 mm broad, adnate, adnexed to subfree or ascendant, greyish brown (7-8F3) later discolouring pale reddish, edge fimbriate lamellulae 1-or 2-tiers. Stipe 2.5~6.5×2~3.5 mm, subequal, whitish to pale cream, pruinose at apex, covered with greyish brown (7-8F3), squarrose spinose to verruculose-floccose, central, cartilaginous.

Spore print bownish fuscous. Spores 6~6.5× 5~5.6×4.5~4.6 um, smooth, subangular or with eccentric projection, with curved-nodose, to subisodiametric, with a distinct germ pore. Basidia 17.6~18.4×6.0~7.4 um, clavate, four-spored, rarely two-spored, Pleurocystidia 14.6~22.5×37~ 43.8 um, utriform, narrowly utriform, or subpyri-

form or suboblong, thin-walled, small vacuole within apex, numerous. Cheilocystidia 15.7~24.8×25~49.5 um, clavate to broadly clavate or spheropedunculate, incrusted with brownish grey to greyish brown pigments, thin-walled, bundles. Pileipellis consisting of the regular, epithelium of subisodiametric of ellipsoid to short fusoid cells, 15.8~38.3×11.3~24.7 um, thin-walled, incrusted with greyish brown pigments hymenophoral trama regular but later subregular. Veil consisting of cylindric to clavate cells. Terminal cells at base of stipe, 67.5~96.7×9~38.3 um, subclavate cylindric, subfuciform, incrusted with pigments hyphae with clamp connection.

Habit & Habitat: Solitary on the naked soil under.

Materials examined: Mt. Taehwa, Kwangju-gun, Kyounggi Pro. Aug. 14. 1994 (GBDS: 1468), Coll. by S. J. Seok

Observation: This texa is easily recognized by the shaggy to squarrose-spinose pileus and stipe and its habitat.

5. 받침대먹물버섯(신칭) *Coprinus domesticus* (Bolt.: Fr.) S. F. Gray in A. Natural Arrangement of British Plants. 1: 635, 1821.

Pileus 10~30×6~20 mm when young, ellipsoid-ovoid to cylindrical ovoid, or parabolic, then becoming campanulate to finally nearly expanded 30~60 mm broad, margin upturn or split in age. Surface dry, whitish, pale ochraceus to cinnamon or rusty tawny center, at first covered with whitish fulvous or rust fibrillose-floccose nearly scales with often pointed at tips, usually smooth in age sulcate-striates. Context thin. Odor and taste indistinct. Lamellae adnate in young, nearly free when old subcrowded white when young, then umber finally violaceous black, edge fimbriate. Stipe 40~140×1.5~6 mm, tapering upwards, thickened downward, or subbulbous (1.5~10 mm) at the base, whitish, silky shiny or tinged cream or buff colour downwards, at times minutely white floccose above base being of white floccose scaly and ridged, at times with sienna to rust ozonium at the base.

Spore print dark date brown. Spores 7.5~10×4~5 um, cylindric ellipsoid or cylindric phaseoliform to ellipsoid, with apical germ pore. Basidia 27~39×6~7 um, 4-spored, without basal clamp connection. Pleurocystidia 65~150×30~60 um, cylindric or vesiculose to cylindric ovoid thin walled. Cheilocytidia 25~80×12~40 um, subglobose to clavate, thin walled, hymenophoral trama subregular. Veil on pileus mixed globose to ellipsoid hyaline cells 12~45 um broad, and chains of cylindric or somewhat inflated thin-and thick-walled and sometimes pigmented and encrusted cells, end-cells often broadly clavate or fusiform. Hyphae without clamp connection.

Habit & Habitat: solitary or in small grouped on logs, branches stumps, common early summer.

Materiels examined: RDA, Suwon, Kyounggi Pro. Jun. 14. 1990. (ASIK: 3210), Coll. by S. B. Park

Observation: This present species can easily be distinguished among the members of stirps Domesticus, by only spore shape and size. *C. domesticus* can be separated from *C. ellisii* in having longer and broader spores and clampless.

6. 흰꼭지땀버섯(신칭) *Inocybe acutata* T. Kobayshi & E. Nagasawa in Mycotaxon Vol. XL VIII. 459-469, 1993.

Pileus 7~25 mm wide, 4~8 mm high, at first conic to conico-campanulate, later convex to planoconvex with prominantly acute papilla, margin incurved when young, then expanded in age. Surface mustard brown, linoleum brown to yellowish brown (5E6-8) or oak brown to golden brown (5D 6-7), in old snuff brown (5F6) to raw umber (5F8) or sepia brown (5F4), at papila yellowish white in hygrophanous but usually greyish orange (5B3) or paler than surface in wet, glabrous or slightly fibrillose, subrimulose, hygrophanous, slightly transluscent-striate when wet, margin with whitish to buffish fimbriate-like appendiculate, however slightly crenulate in age. Context thin, buffish. Oder indistinct, taste mild. Lamellae 2~3 mm broad, adnexed to subfree, rather close, orange grey (5B 2) to paler than brownish orange (5C3), in age yellowish brown (5D5) to bronze brown (5F5), edge whitish, fimbriate, lamellulae 1-to 2-tiers.

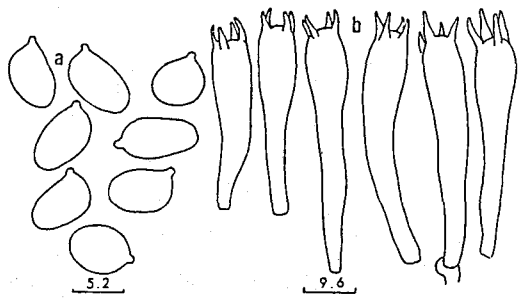

Fig. 1. *Hygrocybe firma* var. *firma*
a. spores, b. basidia

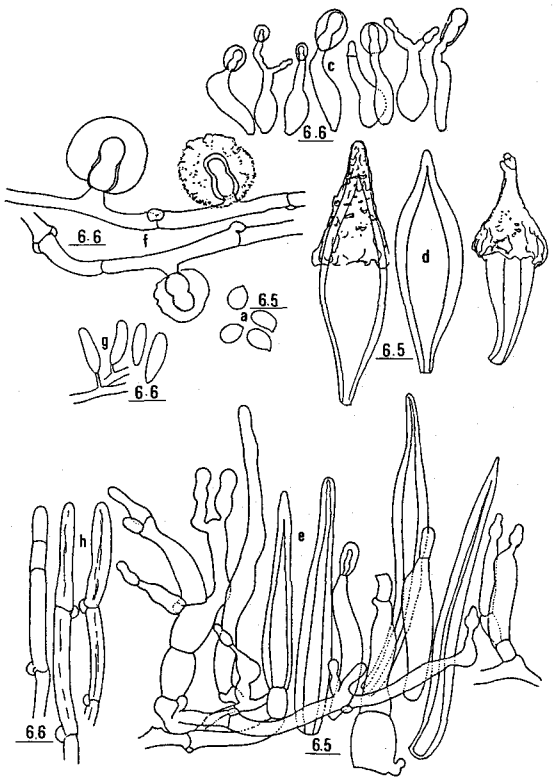

Fig. 2. *Hehenbuehelia petalodes*
a. spores, b. basidia, c. cheilocystidia, d. pleurocystidia, e. pileipellis, f. fertile hyphae & predatory adhesive knop, g. conidia, h. terminal cells within gelatinous layer of pileus

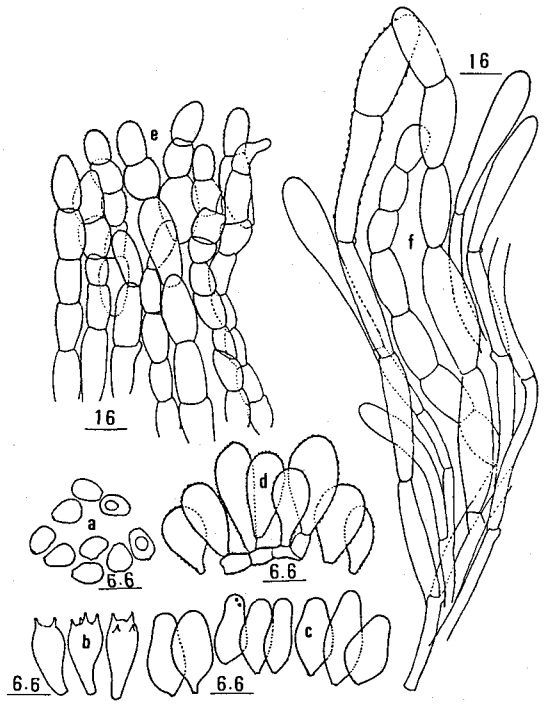

Fig. 3. *Cystoagaricus strobilomyces*
a. spores, b. basidia, c. pleurocystidia, d. cheilocystidia, e. pileipellis, f. stipitipellis at the base of stipe

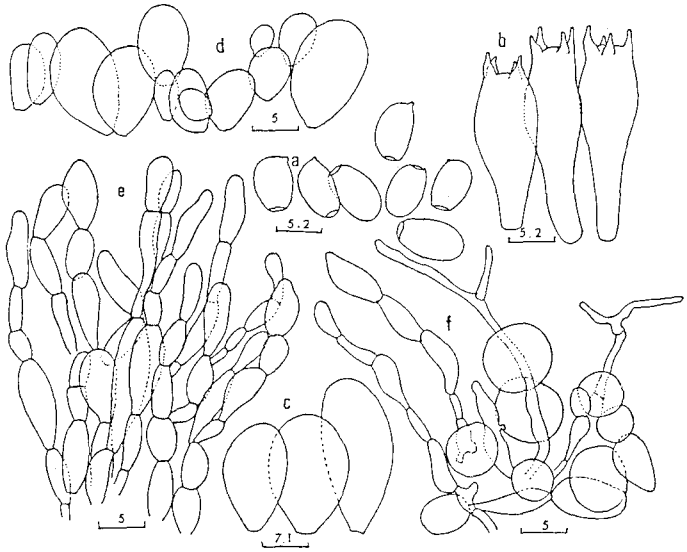

Fig. 4. *Coprinus domesticus*
a. spores, b. basidia, c. pleurocystidia, d. cheilocystidia, e. veil, f. pileipellis

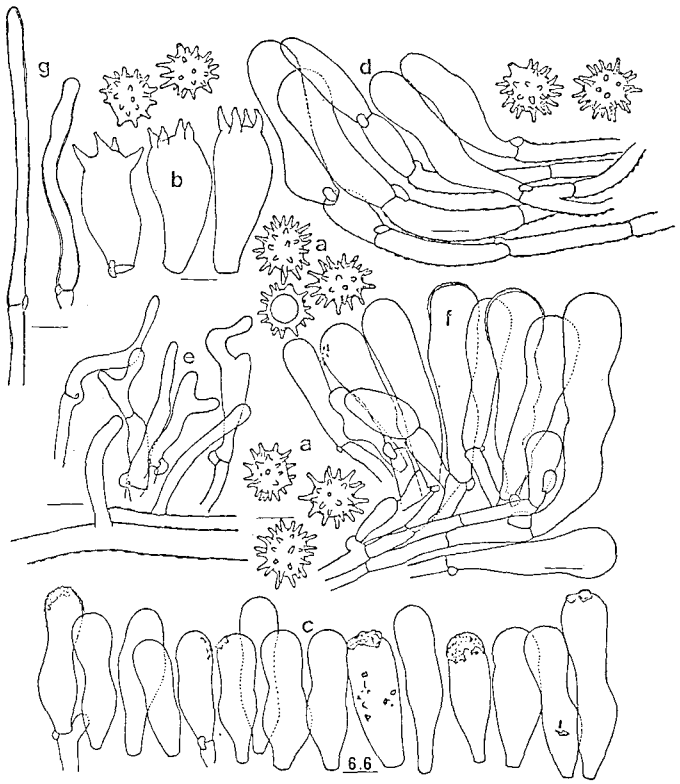

Fig. 5. *Inocybe acutata*
a. spores, b. basidia, c. cheilocystidia, d. terminal cells on margin of pileus, e. pileipellis, f. caulocystidia at apex, g. caulocystidia

Veil cortinoid, whitish, disappearing in young stage. Stipe 45~110×1~2.2 mm, cylindric, equal to subequal, at times twisted, subbulbous to slightly enlarged at base (up to 4 mm). Surface with whitish appressed fibrillose, but subflocculose at apex, dull greyish orange (5B4) to champagne (4B 4) in young. Cartilaginous. Context pale brown.

Spore print dark yellowish brown (5F3 to 5F4) when fresh, umber when dry. Spores 14.9~15.8× 13.5~14.9 um (including spiny up to 4 um), subglobose, prominantly spin with obtuse apex, yellowish brown under the microscope. Basidia 38.1× 12.1~13 um, 4-spored. Pleurocystidia absent. Cheilocystidia 26~40×9.3~11.2 um, clavate to subclavate, constricted in middle, thin-walled, with basal clamp connection at times with light yellow content and at times encrusted with crystals, but easily melted in KOH, bundles terminal cells on the margin of pileus 26~44.6×6.5~20 um, clavate to subclavate at times constricted in middle or flexuous, with basal clamp connection, thin walled, hyphae under the terminal cells mostly encrusted, abundant. Pileipellis cutis sparsely repented branching hyphae simple or continuously dichotomous branched or prolonged, thin walled. brownish pigment. Caulocystidia at apex of stipe 51.1~62.3× 13~15.8 um, narrowly clavate, thin-walled, rarely with yellowish brown content in KOH, abundant. Hyphae with clamp connecting.

Habit & Habitat: Scattered or grouped on rawn ground under Quercus in summer.

Materials examined: Yong moon Temple, Yangpyong-gun, Kyonggi Pro. Sep. 4. 1994. (GBDS: 511), Coll. by S. J. Seok.

Observation: *Inocybe acutata* is very similar to *Inocybe calospora* Quelet in having spiny spores, but differ from it in the absence of metuloid cystidia.

摘 要

한국산 주름버섯목에 대한 종 분포상 및 종 다양성을 파악하기 위하여 강원도 춘성군 청평사(1990. 9.), 경기도 수원 진흥청구내(1990. 6.), 경기도 광주군 태화산(1994. 8~9), 경기도 양평군 용문산(1994. 9.) 등 4개 지역에서 주름버섯류를 조사한 결과 그중 고슴도치버섯속 *Cystoagaricus* Sing. 1속과 한국미기록 이란성무명버섯 *Hygrocybe firma*(Berk, & Br.) Sing. var. *firma* Sing.; 꽃잎꼬막버섯 *Hohenbuehelia petalodes* (Bull.: Fr.) Schulzer; 고슴도치버섯 *Cystoagaricus strobilomyces* (Murr.) Singer; 받침대먹물버섯 *Coprinus domesticus* (Bolt.: Fr.) S. F. Gray; 흰꼭지땀버섯 *Inocybe acutata* T. Kobayshi & E. Nagasawa 5종이 확인되어 이들에 대한 자실체의 특징을 기술하고 현미경 그림을 작성하여 보고하는 바이다. 인용된 색명은 Kornerup과 Wascher(1978)의 Methuen Handbook of colour을 참조하여 기술하였다. 종 분류에 이용된 버섯표본은 농업기술연구소와 농업유전공학연구소 표본실에 보관중이다.

References

Hongo, T. 1975. Notulae Mycologicae (14), 56-63 (Fig. 51, 5-8), Mem, Shiga Univ. No 25.

Hongo, T. 1966. Notes on Japanese larger Fungi (18), Journ. of Japanese Botany.

Korean Society of Mycology. 1978. Suggestion on "Standard Korean Names of Mushrooms in Korea" *Kor. J. Mycol.* **6**: 45-55.

Kornerup, A. & J. H. Wanscher. 1983. Methuen Handbook of Colour. 3rds, Eds Fletcher & Son Ltd. Norwich, Great Britain.

R. G. Thorn and G. L. Barron. 1986. Nematoctonus and the Tribe Resupin ateae in Ontario, Canada, *Mycotaxon.* **25**: 321-453.

Singer, R. 1986. The Agaricales in Modern Taxonomy. 4th edition, 1-981, 88 pls. K. Scientific Books, Koenigstein.

T. Kobayshi & E. Nagasawa. 1993. *Mycotaxon* Vol. XL VIII. 459-469.

Orton, P. D. & Watling, R. 1979. British Fungus Flora Agarics & Boleti (Coprinaceae Part 1: Coprinus) PP. 1-149, Royal Botanic Garden, Edinburgh.

S. F. Gray. 1821. A. Natural Arrangement of British Plants. **1**: 635.