

## Studies on genus *Pluteus* of Korea

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### 한국산 난버섯속에 관한 연구

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**ABSTRACT:** Species of genus *Pluteus* were collected in Korea from 1984 to 1991. Eight species in *Pluteus* were identified, and six species were confirmed new to Korea and described here; *Pluteus atromarginatus*, *P. spinulosus*, *P. patricius*, *P. depauperatus*, *P. satur*, and *P. chrysophlebius* ssp. *sublaevigatus*.

**KEYWORDS:** *Pluteus atromarginatus*, *P. spinulosus*, *P. patricius*, *P. depauperatus*, *P. satur*, and *P. chrysophlebius* ssp. *sublaevigatus*.

Genus *Pluteus* in Korea was first published by Im (1957). During the period from 1957 to 1992 (Lee, 1973, 1985, 1988; Lee, Miller and Kim, 1987; Lee, 1990; Park, 1991; Park and Cho, 1992), eight articles were published and now total numbers of the reported species were six species : *P. atricapillus*, *P. aurantiorugosus*, *P. leoninus*, *P. umbrosus*, *P. podospileus*, and *P. nanus*.

Fruit-body without volva or ring, small to large; cap conico-convex or convex to plane, sometimes umbonate, dry, smooth to atomate-pruinose, rugulose, veined or scaly; gills free, often remote, closed to crowded, stem central, usually flesh-subfibrillose, veil reduced; spores pink in mass, usually ovoid or ellipsoid or rarely globose, moderately thin-walled; marginal cystidia usually present or more rarely absent, in some species thick-walled with a hooked apex. Gill-trama inverse; cap cuticle either filamentous or cellular, or more rarely mixed. Habitat lignicolous or less commonly terrestrial.

*Pluteus atromarginatus* (Singer) Kuhner 끝검은난버섯 (신칭)

Kuhner, Bulletin Mensuel de la Societe Linneenne de Lyon 4: 51, 1935. *P. cervinus* subsp. *atromarginatus* Konrad, Bull. Soc. Mycol. Fr. 43: 148, 1927. *P. cervinus* var. *atromarginatus* Singer, Zeits. f. Pilze. 4: 40, 1925.

Pileus 35-95 mm wide, convex, then expanded-plane, broadly umbonate, dark brown at centre, paler towards margin, at first blackish pilose scaly, then adpressed, radially fibrillose. Gills whitish, then brownish pink, with dark brown edge, crowded, free. Stem 35-150x6-15 mm, equal to clavate, sometimes bulbous at base, whitish to pale brown, white silky-fibrillose, striate, longitudinally brown fibrils or punctate-scaly in lower part, solid. Spores 5.7-7.6x4.7-5.7  $\mu$ m, broadly ellipsoid, pink brown in mass. Marginal cystidia 46-48x16-19  $\mu$ m, clavate to narrowly clavate, thin-walled, with bro-

wnish pigment, crowded. Facial cystidia 54-74x16-17  $\mu\text{m}$ , fusiform or lageniform with 2-4 hooks at apex, often with a yellowish band at apex appearing in KOH, abundant. Hyphae on cap filamentous, with brown pigment. Clamp-connections present.

**Habitat:** on coniferous wood.

**Specimens examined:** Suwon, 1989. 9. 7. (ASIK 3163).

**Discussion:** *P. atromarginatus* is recognized among generic species by its dark gill-edge, thick-walled hooked facial cystidia and coniferous habitat.

자실체는 소형 또는 중형에 속하며, 갓은 평반구형이다. 중앙은 흑갈색이고 가장자리로 가면서 엷어지고, 표면에는 검은색 인편이 성긴 모양으로 나 있다. 주름살은 떨어진 형으로 흰빛에서 분홍색으로 되며, 가장자리는 흑갈색이다. 대의 굵기는 같거나 곧봉형으로 가끔씩 근부는 구근을 이루며, 엷은 흰색이다. 활엽수의 고목, 썩은 나무등에 단생한다.

***Pluteus spinulosus* Murr. 가시난버섯 (신칭)**

Murr., North Amer. Fl. 10: 138, 1917.

Pileus 45-60 mm, convex, then plane, often broadly umbonate, often slightly depressed when old, greyish brown at centre, paler toward margin, pellucid-striate near the margin when moist, innately radially fibrillose, with erect squamules at centre. Gills pale orange (5A3), crowded, free, brown at edge. Stem 50-65x4-6 mm, subequal or clavate, whitish at apex to greyish brown in lower part, whitish pubescent at the base, fibrillose striate, sometimes twisted, stuffed-solid. Flesh whitish, compact. Spores 6.6-8.5x4.7-5.7  $\mu\text{m}$ , broadly ellipsoid, brownish pink in mass. Marginal cystidia 28-51x14-16  $\mu\text{m}$ , clavate or pyriform, vesiculose, rarely elongated, thin-walled, with brownish pigment. Facial cystidia 55-83x16-23  $\mu\text{m}$ , dimorphic, mostly with both apical and lateral spinules, or only with apico-lateral secondary spinules, with thick and hyaline walls, thinner-walled near the edge. Hyphae on cap filamentous, end cells cylindrical or fusiform, 12-14  $\mu\text{m}$  broad, with brownish

pigment. Clamp-connection present.

**Habitat:** on well-decayed wood.

**Specimens examined:** Jug-rung, 1987. 6. 14. (PWH 835).

**Discussion:** *P. spinulosus* is easily recognized by its dark gill-edge together with presence of dimorphic facial cystidia and clamp-connections.

자실체는 소형 또는 중형에 속하며, 갓은 평반구형으로 차츰 중앙이 약간 나오거나 편평한 모양을 이룬다. 평활한 표면은 회갈색으로 가장자리로 갈수록 엷어진다. 주름살은 떨어진 형으로 엷은 분홍색이며, 가장자리가 갈색이다. 대는 곧봉형으로 흰색이며 기부는 회갈색이다. 활엽수의 고목, 썩은 나무등에 단생한다.

***Pluteus patricius* (Schulzer) Boudier 털보난버섯 (신칭)**

Boudier, Icones Mycologicae I: 87, 1910. *Agaricus cervinus* var. *patricius* Schulzer & Kalchbrenner, Icones Selestae Hymenomycetum Hungaria, 20: 102, 1873.

Pileus 50-60 mm, convex, then expanded-plane, sometimes broadly umbonate, ivory to yellowish grey (4B2), smooth, pilose or scattered, minutely light-brown flocculose. Gills greyish orange (6B4), crowded, free. Stem 60-65x10-14 mm, clavate or thickened at base, robust, whitish fibrillose-scaly at first, becoming adpressed scaly, light-brown scaly at base, solid. Flesh cream (4A3), thick. Spores 6-9x4.7-6.6  $\mu\text{m}$ , subglobose or broadly ellipsoid, brownish pink in mass. Marginal cystidia 50-80x14-22  $\mu\text{m}$ , clavate or cylindrical-clavate, sometimes utriform, thin-walled, hyaline. Facial cystidia 42-72x14-19  $\mu\text{m}$ , fusiform or lageniform with 2-4 hooks at apex, often with a yellowish band at apex appearing in KOH, thick-walled. Hyphae on cap filamentous, 12-18  $\mu\text{m}$  broad, hyaline. Clamp-connections absent.

**Habitat:** on beach logs or stumps.

**Specimens examined:** Tae-rung, 1989. 6. 25. (PWH 1639).

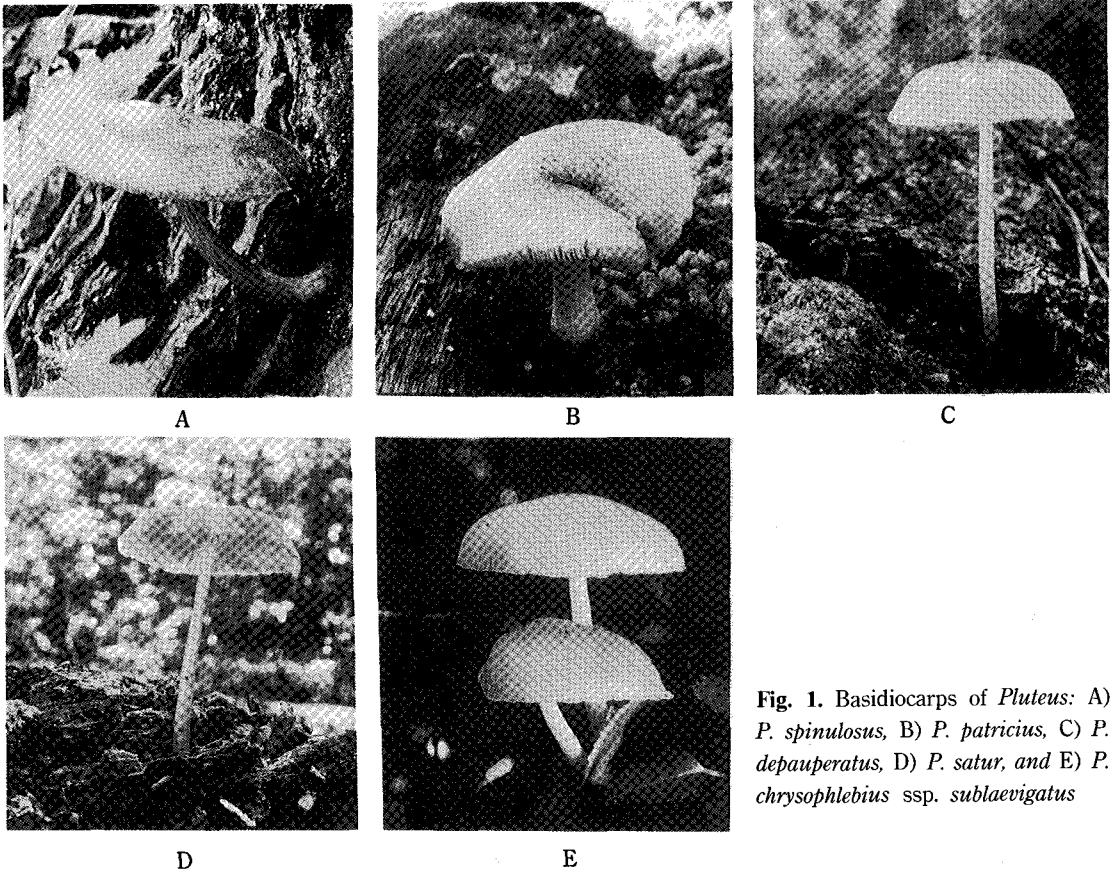


Fig. 1. Basidiocarps of *Pluteus*: A) *P. spinulosus*, B) *P. patricius*, C) *P. depauperatus*, D) *P. satur*, and E) *P. chrysophlebius* ssp. *sublaevigatus*

**Discussions:** *P. patricius* is recognized by its cap with finely scattered brown pilose scales on a pale brown background.

자실체는 중형으로, 갓은 평반구형으로 차츰 중앙이 약간 나오거나 편평한 모양을 이룬다. 얇은 백색이거나 얇은 회갈색이며, 평활한 표면위에 갈색 인편이 산재해 있다. 주름살은 떨어진 형으로 담홍색이다. 대는 곤봉형으로, 흰색의 막질로 덮여 있으며, 기부에는 얇은 갈색 인편이 덮여 있다. 활엽수의 고목, 썩은 나무등에 단생한다.

***Puteus depauperatus* Romagnesi 살갓난버섯 (신칭)**

Romagnesi, Bulletin trimestriel de la Societe Mycologique de France 72: 181; 221, 1956.

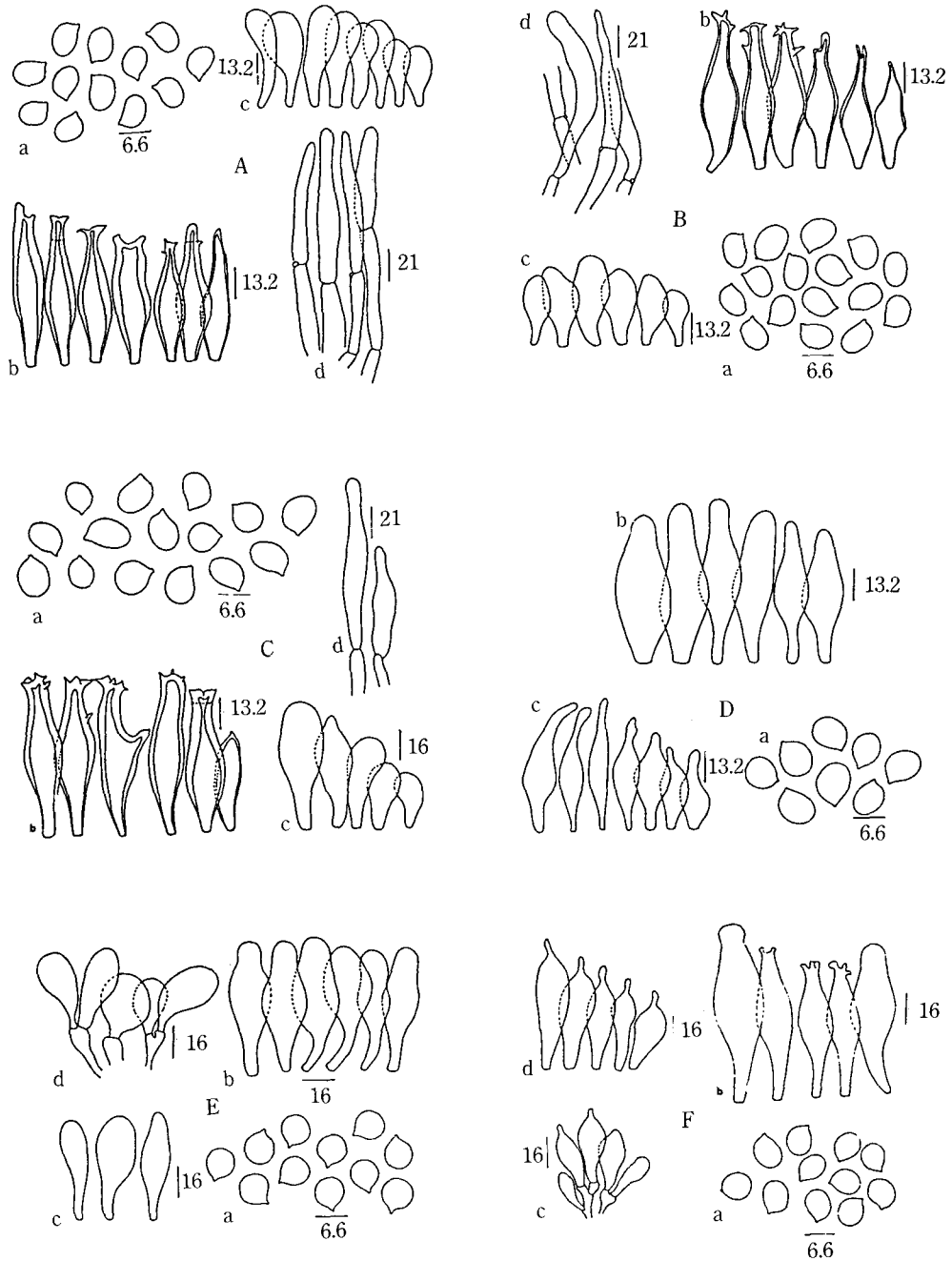
Pileus 10-44 mm, convex or obtusely conical, then expanded-convex, brownish grey (6F8) at centre, with a white or whitish margin (4B2),

smooth, outer part striate when moist. Gills pale orange (6A3), closed, free. Stem 25-60x1-3 mm, equal or slightly thickened downward, twisted, yellowish white (4A2), light brownish white flocculose, then discolouring into cream to saffron cinnamon colour in lower part, fibrillose, hollow. Flesh cream (4A3), thin. Spores 6.6-8x5-6.5  $\mu$ m, broadly ovoid or subglobose. Marginal cystidia 36-76x13-25  $\mu$ m, clavate, fusiform or slightly lageniform, hyaline. Facial cystidia 51-69x14-16  $\mu$ m, elongate lageniform or fusiform, without coloured contents. Hyphae on cap filamentous with clavate.

**Habitat:** on deciduous wood.

**Specimens examined:** Suwon, 1989. 9. 3. (PWH 2260); Gwang-rung, 1991. 9. 16. (JN214).

**Discussions:** *P. depauperatus* is distinguished by its discolouring cream buff to saffron cinnamon



**Fig. 2.** Microscopic observations of basidiocarps of *Pluteus* species; A) *P. atromarginatus*, (a. spores, b. facial cystidia, c. marginal cystidia, and d. pileipellis), B) *P. spinulosus* (a. spores, b. facial cystidia, c. marginal cystidia, and d. pileipellis), C) *P. patricius* (a. spores, b. facial cystidia, c. marginal cystidia, and d. pileipellis), D) *P. depauperatus* (a. spores, b. facial cystidia, and c. marginal cystidia), E) *P. satur* (a. spores, b. facial cystidia, c. marginal cystidia, and d. pileipellis), and F) *P. chrysophlebius* ssp. *sublaevigatus* (a. spores, b. facial cystidia, c. marginal cystidia, and d. pileipellis). A number indicated in the above was a length of  $\mu\text{m}$  under microscopic observations for each bar.

cap and stem, and facial cystidia without coloured content.

자실체는 소형에서 중형으로, 갓은 평반구형 또는 원추형과 비슷하다. 평활한 표면은 암회색으로 가장자리는 옅은 백색이다. 주름살은 떨어진 형으로 담홍색이다. 대는 거의 굵기가 같고, 옅은 흰색으로 후에 기부는 옅은 갈색으로 변하며, 막질이다. 활엽수의 고목, 썩은 나무등에 단생한다.

***Pluteus satur* Kuhner & Romagnesi** 우산난버섯 (신칭)

Romagnesi, Bulletin trimestriel de la Societe Mycologique de France 72: 182; 227, 1956. *P. pallescens* P. D. Orton, Trans. Brit. mycol. Soc. 43: 360, 1960.

Pileus 11-16 mm wide, convex, then expanded plane, often slightly umbonate, at times with whitish flesh appearing between cracks, dark brown (6F5) at centre, clay (5D5) in outer part, punctate scales, clearly hygrophanous, drying light brown (5D8), margin striate-sulcate. Gills 9x5 mm, free, crowded, white then orange white (6A2). Stem 16-21x0.5-2 mm, white, cylindric, slightly tapered upward, surface longitudinally fibrillose-striate, hollow. Flesh whitish, thin. Spores 5-6x5.5-7  $\mu$ m, globose or subglobose, brownish pink. Marginal cystidia 35-53x14-19  $\mu$ m, clavate to vesiculose-fusiform, thin-walled, hyaline. Facial cystidia 49-68x23-29  $\mu$ m, clavate to broadly lageniform with broad apex (13-21  $\mu$ m), thin-walled, hyaline. Cells of cap spheropedunculate or pyriform 19-26  $\mu$ m broad, with brown pigment.

**Habitat:** on well-decayed wood.

**Specimens examined:** Dongku-rung, 1991. 9. 1. (JN 195).

**Discussion:** *P. satur* is recognized by its clearly hygrophanous cap and broadly lageniform facial cystidia with a broad apex. *P. nanus* has lageniform with a narrow apex.

자실체는 소형으로, 갓은 평반구형으로 차츰 중앙이 약간 나오거나 편평한 모양을 이룬다. 중앙은 흑갈색으로 가장자리로 갈수록 옅어지며, 건변색

현상이 나타난다. 주름살은 떨어진 형으로 흰색에서 분홍색으로 된다. 대는 굵기가 같으며, 표면은 막질이다. 활엽수의 고목, 썩은 나무등에 단생한다.

***Pluteus chrysophlebius*, ssp. *sublaevigatus* Singer** 노란줄난버섯 (신칭)

Singer, Syll. Fung. 5: 678, 1887. *Agaricus chrysophlebius* Berk. et al., Ann. Mag. Nat. Hist. III. 4: 289, 1859. *Pluteus chrysophlebius* ssp. *bruchii* (Speg.) Sing., Trans. Brit. Mycol. Soc. 39: 196, 1956.

Pileus 30-55 mm wide, convex to plane, slightly umbonate, yellow (3A6), with a concolorous or slightly darker centre (deep yellow 4A8), not rugulose, striate at margin, silky smooth sometimes except at centre or punctate. Gills orange white (6A2), moderately crowded, free. Stem 40-65x3-9 mm, equal or slightly thickened downwards or at base, whitish to pale yellow (2A3), base sometimes brownish orange (5C4), finely silvery silky striate, stuffed to hollow. Flesh whitish, thin. Spores 6-7x4.5-6  $\mu$ m, subglobose or ovoid, reddish brown to yellowish brown in mass. Marginal cystidia 23-40x7-11  $\mu$ m, clavate (sometimes with an apical point) to fusiform or slightly lageniform. Facial cystidia 83-91x25.5-26  $\mu$ m, fusiform with 2-3 points or lageniform with an obtuse apex. Cells on cap clavate with an apical point to fusiform, 9-16  $\mu$ m broad, hyaline.

**Habitat:** on well-decayed wood or on rich soil.

**Specimens examined:** 1986. 7. 7. (ASIK1716); Cheju-do, 1991. 7. 22. (PWH2521).

**Discussion:** *P. chrysophlebius* ssp. *sublaevigatus* is easily recognized by its smooth yellow cap together with exactly cellular pileipellis. This species has been mistaken for *P. leoninus* in Korea for a long time but, as far as this study is concerned, the latter species was not discovered in Korea yet.

자실체는 중형으로, 갓은 평반구형으로 차츰 중앙이 약간 나오거나 편평한 모양을 이룬다. 평활한 표면은 노란색이며 가끔 중심부는 갈색이기도 하다. 주름살은 떨어진 형으로 흰색에서 분홍색으로 된다.

대는 거의 굵기가 같거나 곧봉형으로, 흰색이나 옅은 노란색을 띄며 가끔 기부는 옅은 갈색을 띤다. 활엽수의 고목, 짙은 나무, 기름진 토양 등에 단생 또는 군생한다.

## 적 요

전국 각지 15 등지에서 1984년 부터 1991년 까지 채집된 난버섯속은 8종 으로 분류되었다. 이 8종은 *P. atromarginatus*(끝검은난버섯), *P. spinulosus*(가시난버섯), *P. atricapillus*(난버섯), *P. patricius*(털보난버섯), *P. depauperatus*(살갓난버섯), *P. satur*(우산난버섯), *P. chrysophlebius* ssp. *sublaevigatus*(노란줄난버섯), *P. podospileus*(툽밥난버섯)이며, 이 중 미기록종은 *P. atromarginatus*, *P. spinulosus*, *P. patricius*, *P. depauperatus*, *P. satur*, *P. chrysophlebius* ssp. *sublaevigatus* 6종 이었다.

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