

## Studies in the Agarics of Svalbard.

### 1. New species and combinations (Tricholomataceae)

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Abstract. – *Fayodia arctica* GULDEN spec. nov. and *Clitocybe paxillus* GULDEN spec. nov. are described from Svalbard and the new combinations *Arrhenia salina* (HOLLAND), *Phaeotellus acerosus* (FR.), *Phaeotellus acerosus* var. *latisporus* (FAVRE), and *Phaeotellus acerosus* var. *tenellus* (KÜHNER) are proposed.

### Introduction

Scattered records on agarics on Svalbard are found in various older reports. These were summarized by OHENOJA (1971), who also added several new species to the mycoflora of Svalbard, based on collections made by herself and other Finnish mycologists. The total number of species at that time amounted to about 50. Some later, fragmentary contributions to the agaric flora of Svalbard, were summarized by HUHTINEN (1987), who further added 10 new species to the Svalbard flora, and brought the number of known species up to about 75. The first monographic treatment of a group of agarics on Svalbard appeared in 1987, when the floristically important genus *Galerina* was revised by GULDEN (1987). Twelve species of *Galerina*, 6 of them new to the archipelago, were recorded and the number of recognised agarics was thereby brought to about 80 species.

Interest in arctic and alpine mycology has grown considerably during the last few years. A first international meeting, FISAM-I, was arranged in Alaska in 1980, a second 1984 in Switzerland, and a third will be held on Svalbard in 1988. For this occasion a field manual to the agarics of Svalbard is being made, based on literature accounts and my collections in the Isfjord and the Kongsfjord Districts from 1981 and 1986. Some new species and combinations in the family Tricholomataceae in this material are presented here. Colour pictures of the new species are published in the series Arctic and Alpine Fungi (GULDEN & al., 1988).

For the microscopic examination 5% KOH, lactic acid – Cotton blue solution, and Melzer's reagent have been used as mounting media. The colour codes refer to CAILLEUX (1981) and J. E. LANGE's colour plate published in LANGE (1926) and in LARSEN (1932).

I wish to thank Mr. O. RÖLLIN and curator O. MONTHOUX, both Geneva, for providing me with material and valuable suggestions.

### Enumeration of species

#### *Fayodia arctica* GULDEN, spec. nov. – Fig. 1, a–e

Colour plate: GULDEN & al., 1988.

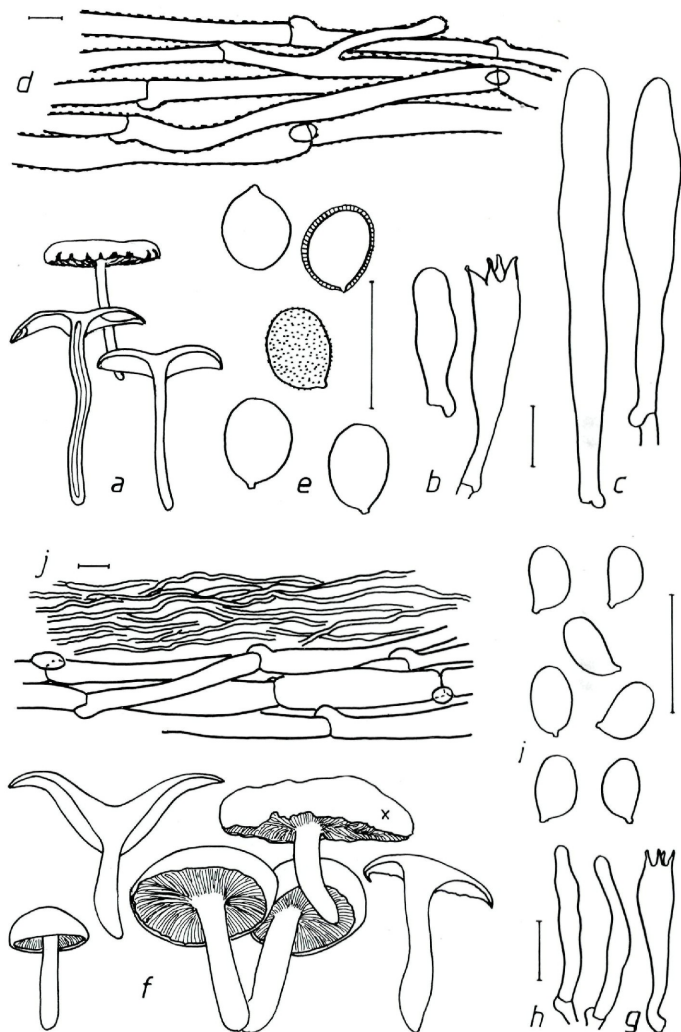
Pileus 13–35 mm, submembranaceus, dein depressus, margine plus minusve undulatus et crenulato-lobatus, opacus, non hygrophanus, glaber, leviter innato-fibrillosus, fuscus vel nigro-brunneus. Lamellae subdecurrentes, ex albis leviter griseo-brunneolae, ad aciem interdum fuscae. Stipes 14–50 × 2–3.5 mm, cylindricus, glaber, corticatus, fartus vel fistulatus, pileo concolor, dein leviter pallidior, ad basim albo-tomentosus. Carne alba. Odor saporque nulli. Sporae 5.5–7 × 4.3–5.3 (–5.8) µm, breviter ellipsoideae vel subgloboseae, spinulosae, hyalinae, leviter cyanophilae, inamyloideae. Basidia 18–34 × 6–8.5 µm, 4-sporigera. Cheilo- et pleurocystidia 30–70 × 7–12 µm, cylindræ, clavata vel lanceolata, hyalina. Pileipellis cutis hyphis cylindræ, 2–12 µm latis, pigmento incrustantibus. Hyphae fibulatae. Ad terram inter muscos, Dryades et Salices; in regione arctica; Svalbard. Holotypus in Herb. Osloensis: GG 262/86.

Characteristic. – A thin-fleshed, clitocyboid agaric with evenly blackish brown, neither hygrophanous nor striate pileus and with whitish gills contrasting the dark pileus and stipe, reminding somewhat of a *Leptonia*. Spores minutely spiny, inamyloid. Cystidia conspicuous.

Pileus 1.3–3.5 cm, thin-fleshed, depressed with downbent margin, margin somewhat undulate and crenulate to lobed, opaque or very faintly translucently striate at outermost margin, innately fibrillose, smooth, somewhat fatty-shiny when moist, dark brown or blackish brown (darker than T 30), not (or faintly?) hygrophanous. – Lamellae slightly decurrent, moderately close, with many lamellulae inserted from margin and becoming interveined, thin, up to 4 mm high, whitish, becoming pale brownish or greyish (M 50, M 70, N 70, N 71), with age ± dark veined on the sides and brown-edged. – Stipe 1.4–5 × 0.2–0.35 cm, cylindric, pitted then fistulose, smooth, at first concolorous with pileus, fading to paler brown (P 50) often intermediate between pileus and lamellae and paler at apex and in lower part, base white tomentous. – Flesh white in pileus and stipe, cortical layers brown. – Smell indistinct or faintly farinaceous. – Taste mild.

Spores 5.5–7 × 4.3–5.3 (–5.8) µm (exclusive of spines), shortly ellipsoid to subglobose, minutely spiny (oil immersion), apparently

Fig. 1: *Fayodia arctica* GULDEN (Typus GG 262/86): a. fruitbodies. – b. basidium and basidiole. – c. cystidia. – d. pileipellis. – e. spores. – Below: *Clitocybe paxillus* GULDEN (Typus GG 445/86): f. fruitbodies (× from collection GG 283/81). – g. basidium. – h. cystidioid marginal cells. – i. spores. – j. pileipellis. – Fruitbodies ca. 3/4×, spores 2000×, basidia and cystidia 1000×, pileipellis 500×. Bars=10 µm.



double-walled with embedded spines, spines up to 0.7  $\mu\text{m}$ , not amyloid, faintly cyanophilic, sticky: many adhering in tetrads or aggregates or glued to cystidia and cortical hyphae. – Basidia 18–34  $\times$  6–8.5  $\mu\text{m}$ , 4-spored. – Cheilo- and pleurocystidia scattered and protruding up to 25  $\mu\text{m}$  beyond the basidia, 30–70  $\times$  7–12  $\mu\text{m}$ , cylindric, clavate or lanceolate,  $\pm$  repeatedly constricted, occasionally irregularly attenuated at apex, thin-walled, hyaline. – Hymenophoral trama regular, of cylindric to somewhat inflated, long to medium celled, 3.5–12  $\mu\text{m}$  wide, hyaline to evenly brown hyphae. Subhymenium of narrow, cylindric hyphae, 2–3  $\mu\text{m}$ . – Pileipellis a cutis of radially repent, cylindric to somewhat inflated, medium to rather long-celled, 2–12  $\mu\text{m}$  wide hyphae, brown zebra-like incrusting; no gelatinized hyphae. – Stipitepellis of cylindric, long-celled, evenly pale brown to transversely striate hyphae, 2–6  $\mu\text{m}$  wide. – Clamps present all septa. Pigment membranous and incrusting.

Found in small groups, in deep carpet of *Tomenthypnum nitens*, also among *Dryas* and *Salix polaris* in bird cliff vegetation, and in heath vegetation among *Salix polaris*, mosses and lichens; on calcareous soils.

Material examined. – SVALBARD: Isfjord District: Hotelneset, 15 Juli 1981, GG 84/81. – Kongsfjord District: Ossian Sars-fjella, 7. August 1986, GG 262/68 (holotypus) and GG 263/86. – *Fayodia xerophila*, Switzerland: Geneva, Moulin de Vert, 8. December 1984 (no. 4128) and 17 November 1987, leg. RÖLLIN.

Notes. – This is a fairly large *Fayodia*, more clitocyboid than omphalinoid. The downbent, somewhat undulate and crenulate to lobed margin is fairly characteristic. The essentially non-hygrophamous and non-striate pileus is remarkable for such a thin-fleshed species.

Microscopically *F. arctica* is similar to *F. leucophylla* (GILL.) M. LANGE & SILVERTSEN [= *F. striatula* (KÜHN.) SING.], but the spores are slightly shorter and broader and tend more towards the subglobose form. The pileipellis hyphae are more densely incrusting. Macroscopically it is rather different from *F. leucophylla*. The pileus and stipe are considerably darker. The pileus is evenly coloured, not paler towards margin, and hardly striate and hygrophamous. The edge of the lamellae tend to become brown, a feature not known in *F. leucophylla*.

M. LANGE & SILVERTSEN (1965), with reference to northern material, state that *F. leucophylla* in open areas develops darker colours. But I do not believe the Svalbard material is only a dark form of *F. leucophylla*, but rather a distinct species.

Two other dark *Fayodia* species with similar anatomy are known. viz. *Omphalia fusco-alba* MÖLL. described from the Faeroes (MÖLLER, 1945), and *F. xerophila* LÜTHI & RÖLLIN described from



Switzerland (LÜTHI & RÖLLIN, 1972). *Omphalia fusco-alba* is described and illustrated with a "sooty-brown" pileus like in our fungus, but is "pellucido-striate" and hygrophanous. It seems to be a smaller, more omphalinoid fungus, with a rather pale stipe. The type is in poor condition and other collections are not known. According to M. LANGE & SILVERTSEN (1965: 204) it is conspecific with *F. leucophylla*.

*Fayodia xerophila* occurs regularly associated with *Peltigera polydactyla* in xerophilic vegetation during late autumn and winter near Geneva. Apparently it kills the lichen. Thanks to Mr. RÖLLIN, I have been able to study fresh and herbarium material, and colour slides from several different years. Mr. RÖLLIN states (in litt.) that the original colour plate (LÜTHI & RÖLLIN, 1972: T. 88) is much too dark (especially the two upper right specimens). We have compared material, descriptions and slides, and have come to the conclusion that the Swiss and the Svalbard material represent different species. *F. xerophila* is more omphalinoid, more yellow brown, distinctly striate and distinctly hygrophanous, has not been observed with brown edged lamellae, and has a somewhat particular smell [although not so strong as stated in the original description (RÖLLIN, in litt.)]. It has slightly more ellipsoid spores, more in accordance with those of *F. leucophylla*, according to my measurements:  $6.3-7.3 \times 4.3-5 \mu\text{m}$ .

LA MOURE & al. (1982) records a *Fayodia*, *F. striatula* forma, growing on *Peltigera* from Greenland. Also in North America *Fayodia leucophylla* (as *F. striatula*) is recorded with *Peltigera* (BIGELOW, 1979). No *Peltigera* was noticed with *F. arctica* in the field. On closer examination of the dried material, however, small pieces of  $\pm$  moribund *Peltigera* (cf. *leucophlebia*) were found on and at the base of two specimens in two of the three collections (84/81 and 263/86). Apparently the fungus attacks and ingests the phycobiont, since much of the algal cells were disintegrated. Perhaps it is significant that the *Fayodia* species often occur associated with *Peltigera* species.

### ***Clitocybe paxillus* GULDEN, spec. nov. — Fig. 1, f-j**

Colour plate: GULDEN & al., 1988.

Pileus 20–60 mm latus, primo carnosus et convexus, dein subinfundibuliformis et flexuosus, margine incurvatus et pubescens, dein crenulatus-lobatus, initio leviter pruinoso-zonatus (1–3 mm), opacus, glaber, hygrophanus, udus carneo-brunneus dein incarnato-alutaceus. Lamellae adnatae vel emarginato-decurrentes, confertae, angustae, facile discernibiles, pallide bubalinae vel incarnatae, dein brunneolae, interdum rubro-maculatae. Stipes curtus,  $15-30 \times 2.5-12$  mm, cylindricus vel basis versus attenuatus, solidus, farctus, dein cavus, corticatus, glaber vel fibrillosus, incarnato-brunneolus et pileo  $\pm$  concolor. Caro primo firma, dein fragilis. Odor saporque grati. Sporae  $4.5-5.8 \times 2.8-3.5 \mu\text{m}$ , ellipsoideae, leves, cyanophileae, max-

ima pars earum in tetradibus, in cumulo bubalinae. Basidia  $17-24 \times 4.5-5 \mu\text{m}$ , 4-sporigera. Pileipellis cutis hyphis cylindraceis, gracilibus,  $- 3 \mu\text{m}$  latis, leviter pigmentatis. Hyphae fibulatae. Subcaespitosus et in circulum, callicolus, in regione arctica. Svalbard. Holotypus in Herb. Osloensis: GG 445/86.

**Characteristic.** – A pinkish, hygrophanous *Clitocybe* growing  $\pm$  caespitosely and in rings; with narrow lamellae tending to loosen and with a relatively short, often tapering stipe. The cyanophilic spores tend to adhere in tetrads and the pinkish spore deposit further distinguish the species.

Pileus 2–6 cm, young thick-fleshed, convex to plano-convex with persistently white pubescent, incurved margin, becoming thin-fleshed and depressed to almost infundibuliform with  $\pm$  flexuous, crenulated to lobed margin, smooth, somewhat fatty, without any radial structure, young with a narrow (1–3 mm) pruinose marginal zone; old becoming  $\pm$  cracked, not translucently striate, hygrophanous, moist evenly flesh brown, pinkish brown to pinkish beige (R 47, R 53, h 2, j 1), drying from centre to pinkish alutaceous (N 55, M 20, M 49, M 50). – Lamellae adnate to shortly emarginate-decurrent, close to crowded, narrow, up to 5 mm high, with many lamellulae inserted from margin,  $\pm$  wavy, easily removable from pileus trama, initially pale buff, pinkish, becoming beige (L 71, M 70, M 71, N 67, N 69, b 8), and sometimes red brown spotted. – Stipe rather short,  $1.5-3 \times 0.25-1.2$  cm, cylindric or often tapering downwards, solid to hollow, corticated, smooth to fibrillose, apex not pubescent, young somewhat paler than pileus, pale pinkish beige (g 4, h 4), discolouring  $\pm$  brownish and becoming  $\pm$  concolorous with pileus. – Flesh rather thick in young pileus and firm, becoming brittle, moist beige or pinkish, drying to whitish, somewhat darker above lamellae and in cortex. – Smell and taste pleasant. – Spore deposit pinkish.

Spores  $4.5-5.8 \times 2.8-3.5 \mu\text{m}$ , ellipsoid with distinct apiculus, smooth, inamyloid, cyanophilic,  $\pm$  adhering in tetrads in preparations of lamellae. – Basidia  $17-24 \times 4.5-5 \mu\text{m}$ , 4-spored. – Cystidia absent or indistinct. – Hymenophoral trama regular, of somewhat inflated, medium-celled, hyaline,  $3-10 \mu\text{m}$  wide hyphae; subhymenium of narrower, cylindric-flexuous,  $1-3 \mu\text{m}$  wide hyphae. – Pileipellis composed of narrow, radially repent, rather long-celled, almost hyaline, somewhat gelatinized hyphae,  $- 3.5 \mu\text{m}$  wide; underneath are rather loosely arranged, considerably broader ( $5-13 \mu\text{m}$ ), rather short-celled and slightly thick-walled, hyaline hyphae of the pileus trama. – Clamps at all septa. Pigment pale and difficult to trace.

Found among *Salix polaris* in a fairy ring partly in a tractor track (holotypus), also in open heath vegetation with *Luzula*, *Dryas*, *Salix*, and *Agaricus arcticus* GULDEN, growing subcaespitosely.

Material examined. – SVALBARD: Isfjord District: Adventda-  
len 28 July 1981, GG 283/81, GG 284/81, GG 285/81, GG 286/81;  
Hotelineset 27 July 1981, GG 248/81, 14 August 1986, GG 402/86, GG  
404/86, GG 409/86, GG 416/86, GG 445/86 (holotypus), GG 450/86. –  
*Clitocybe martiorum*, holotypus (G).

Notes. – The colours of fruitbody and spore deposit suggest a  
position of this species in sect. *Rhodospora* HARMAJA (1969), close to  
*C. diatreta*. It differs from *C. diatreta* i.a. by having a broader pileus  
without translucent striation, and a relatively short stipe.

*Clitocybe paxillus* reminds of a *Lepista*, i.a. in the way the  
lamellae loosen from the pileus trama, in colours, and in growth  
habit. Cyanophilic spores adhering in tetrads are further charac-  
teristic of *Lepista* species, but the *Lepista* spores are  $\pm$  verruculose.  
At this point the limit between *Clitocybe* and *Lepista* is very ques-  
tionable. HARMAJA (1976) removed sect. *Rhodospora* to *Lepista*, in  
spite of the smooth spores found in this section (in light microscope).  
At present I prefer to relate the smooth spored species to *Clitocybe*.

Using LAMOURE's key to the alpine *Clitocybe* species (LAMOURE,  
1972) one arrives at *C. marginella* HARMAJA. This appears, however,  
to be closer related to *C. diatreta* than to our fungus, since it is small  
and slender and has a translucently striate pileus margin. As origi-  
nally described it has typically a dark disc and a stipe that is  
attenuated upwards.

*Clitocybe paxillus* has more in common with a *Clitocybe* species  
described from spruce forest in Switzerland, *C. martiorum* FAVRE,  
appearing late in the season and growing caespitosely and in fairy  
rings (FAVRE, 1956). This is known also from France and from some  
places in North America, growing in forests with oak, beech, pine  
etc., among needles and litter (cp. ROMAGNESI & MARGAINE, 1964;  
BIGELOW, 1985). *Clitocybe martiorum* is, however, larger with a more  
convex, only rarely somewhat depressed pileus, and a stipe that is  
pubescent-flocculose at apex and soon becomes hollow and inflated-  
disformed. Its smell is said to be somewhat farinaceous, but also  
reminding of *Lepista nuda*, and the taste somewhat rancid or bitter.  
The descriptions refer to resemblance with *Lepista* (*Rhodopaxillus*)  
in habitus and growth habit. *Clitocybe martiorum* has thicker and  
more extensive pruina than *C. paxillus*, where the pruina on the  
pileus margin is very thin and soon disappears. Typical of *C. paxil-  
lus* is also a white pubescent pileus margin which is not recorded for  
*C. martiorum*.

On examination of the type of *C. martiorum* I found that the  
spores were cyanophilic and adhering in tetrads, features that  
further suggest relationships with *Lepista* and with *C. paxillus*. The  
most clearcut microscopic difference between the two was found to

be in the pileipellis, where there are  $\pm$  ascending hyphae in *C. martiorum* and a thin covering layer of slightly thick-walled and strongly yellow refringent hyphae. The spores were found to be slightly narrower than in *C. paxillus*,  $4.8\text{--}5.3 \times 2.8\text{--}3 \mu\text{m}$ , ( $5\text{--}6 \times 2.5\text{--}3(-3.3) \mu\text{m}$  according to FAVRE). Fairly large marginal cells have been described in *C. martiorum*. These have also been interpreted as germinating basidioles and appear to be present to various degrees. Also in *C. paxillus* I have occasionally found cystidioid bodies on the edge (cp. Fig. 1, h). These are smaller than those in *C. martiorum*.

***Arrhenia salina* (HØILAND) GULDEN comb. nov.**

Bas.: *Leptoglossum littorale* HØILAND in Norw. J. Bot. 23: 203. 1976, non *L. littorale* ROSTR. (1892) in Bot. Tidsskr. 18: 65–78. Holotypus: TUR.

Syn.: *Leptoglossum salinum* HØILAND in Trans. Br. mycol. Soc. 79: 343 (1982).

The generic distinction between *Arrhenia* and *Leptoglossum*, both with veined hymenophore, have long been questioned, and KÜHNER & LAMOURE (1972) lumped the two under the generic name *Arrhenia* Fr. which has priority. *Leptoglossum salinum* HØILAND, common in North-European costal sites in brackish marshes, belongs in *Arrhenia* s. l., but was not considered by these authors.

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