

The psathyrelloid taxa described by P. A. KARSTEN

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Abstract: Original material of taxa described by P. A. KARSTEN supposed belonging to the present day concept of *Psathyrella* (*Agaricales*) was studied from Helsinki (H). Two new combinations are proposed: *Psathyrella solitaria* and *Psathyrella tenuicula*. The former offers an earlier name for *P. rannochii* and the latter for *P. minima* and *P. berolinense*. *Stropharia caput-medusae* var. *alba* is a synonym of *Psathyrella caput-medusae*. *Psilocybe gilletii* is *Hypholoma elongatum*. *Psathyra pallens* and *Psathyrella subatomata* are shown to be synonyms of *Psathyrella corrugis*. A study of the type of material of *P squamifera* confirmed the synonymy to *P. microrhiza*. The name *Psathyrella artemisiae* has erroneously been used for *P. squamosa*. The vague protologue and scanty type material offered no solid interpretation for *Psathyra staminoides*. *Hypholoma subpapillatum* is a synonym of *Psathyrella piluliformis*. *Psathyrella subrosea* is a synonym of *P. microrhiza*. The two syntypes of *Psathyra obtusata* var. *subumbrina* contain three taxa one of which is an unknown European species of *Psathyrella*. *Psilocybe tuberosa* is shown to be a synonym of *Psathyrella candolleana*. Original material was not found for *Psathyra cernua* var. *albicans*, *Psathyrella subatrata* subsp. *diminuta*, *Psathyra ombrophila*, *P subnuda* and *Hypholoma sublentum*. The typification of most of the taxa is clarified.

Zusammenfassung: Aus dem Herbarium in Helsinki (H) wurde Originalmaterial jener von P A. KARSTEN beschriebenen Taxa untersucht, die vermutlich in das heutige Gattungskonzept von *Psathyrella* (*Agaricales*) passen. Zwei Neukombinationen werden vorgeschlagen: *Psathyrella solitaria* und *Psathyrella tenuicula*. Erstere ist ein früherer Name für *P. rannochii* und letztere für *P. minima* und *P berolinense*. *Stropharia caput-medusae* var. *alba* ist ein Synonym von *Psathyrella caput-medusae*. *Psilocybe gilletii* ist *Hypholoma elongatum*. *Psathyra pallens* und *Psathyrella subatomata* sind Synonyme von *Psathyrella corrugis*. Die Untersuchung des Typusmaterials von *P. squamifera* bestätigte die Synonymie zu *P. microrhiza*. Der Name *Psathyrella artemisiae* wurde falsch angewandt für *P squamosa*. Der vage Protolog und das karge Typusmaterial boten keine sichere Interpretation für *Psathyra staminoides*. *Hypholoma subpapillatum* ist ein Synonym von *Psathyrella piluliformis*. *Psathyrella subrosea* ist ein Synonym von *P. microrhiza*. Die zwei Syntypen von *Psathyra obtusata* var. *subumbrina* enthalten drei Taxa, wovon eines eine unbekannte europäische *Psathyrella*-Art ist. *Psilocybe tuberosa* ist ein Synonym von *Psathyrella candolleana*. Von *Psathyra cernua* var. *albicans*, *Psathyrella subatrata* subsp. *diminuta*, *Psathyra ombrophila*, *P. subnuda* und *Hypholoma sublentum* wurde kein Typusmaterial gefunden. Die Typifizierung der meisten Arten wird geklärt.

P A. KARSTEN placed psathyrelloid agarics in the following genera: *Psathyra*, *Psathyrella*, *Hypholoma*, *Pannucia*, *Psilocybe* and *Stropharia*. Today, the taxa have been joined in the single genus *Psathyrella* (SINGER 1951). KARSTEN's psathyrelloid taxa have largely been neglected by later workers. This is partly due to the fact, that many of

the type specimens were "hidden" under aliases in his herbarium (in H).

Taxonomy, nomenclature and typification of the taxa is now clarified. In contrast to most treatments of KARSTEN's taxa, the reader will not find many holotype specimens cited. KARSTEN very seldom used definite words in his protologue such as "semel" or "unica vice lecta" Only when the protologue cites one element this can be taken as holotype. A great majority of KARSTEN's specimen citations are too vague to include only one element. Therefore, even if only one specimen with matching annotations exists in H, it is to be taken as syntype, not holotype. Such specimens are here selected as lectotypes.

Stropharia caput-medusae* var. *alba

Stropharia caput-medusae FR. var. *alba* P. KARST. Bidr. Känn. Finl. Nat. Folk **37**: 233. 1882. - *Stropharia alba* (P. KARST.) P. KARST. Hedwigia **32**: 59. 1883. - **Lectotype:** Finland: Etelä-Häme. Tammela, Saloistenjärvi, on decayed wood of *Betula*, 10. 1881 KARSTEN, P. A. (H 4494, examined) - selected here.

= *Psathyrella caput-medusae* (FR.) KONR. & MAUBL.

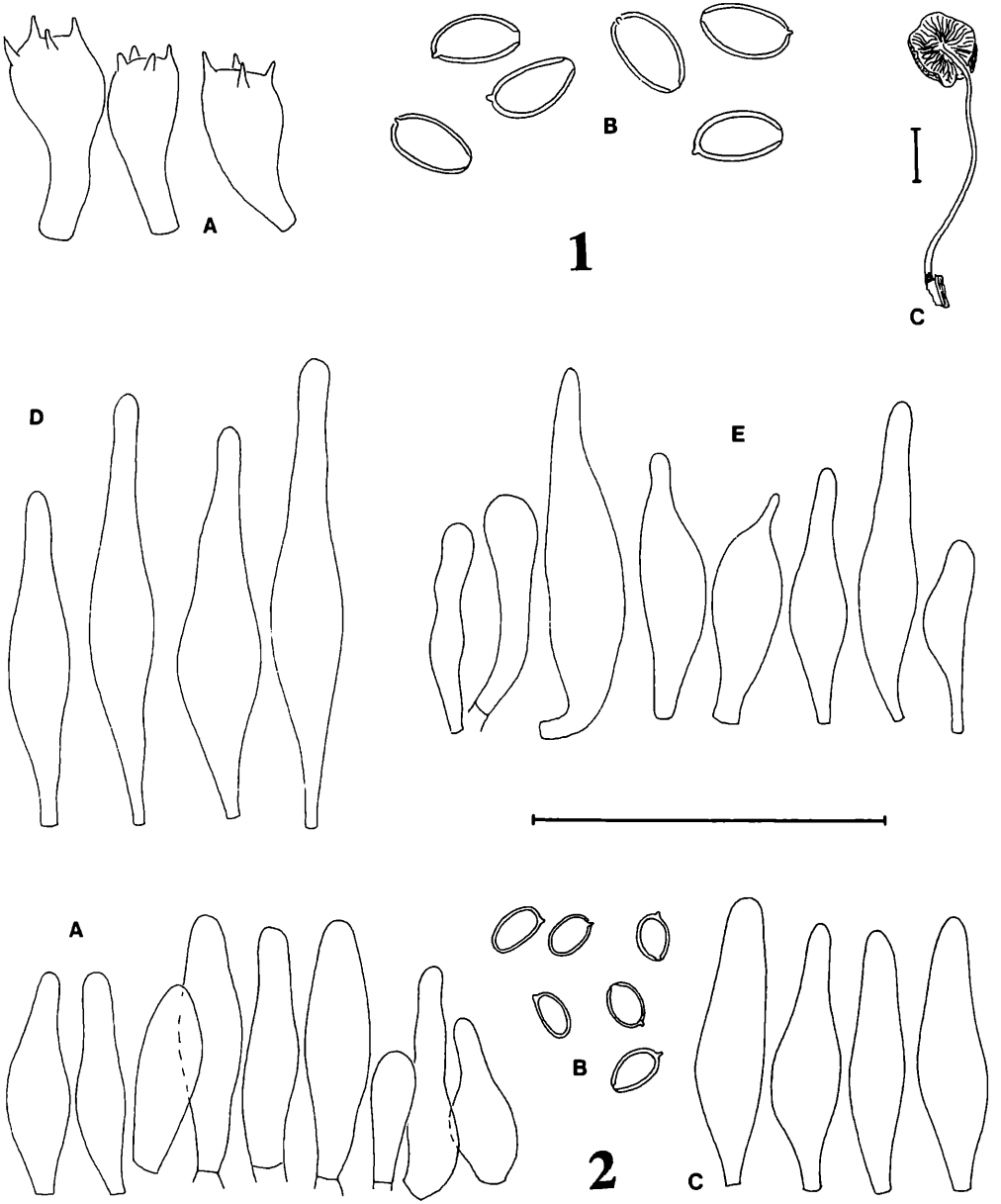
This variety was also published in "Symbolae" the same year (KARSTEN 1882 b). In this treatment KARSTEN refers to the other one with "Hattsv." His intention of the place of publication is thus obvious. As it is not known which of the two papers appeared first in 1882, KARSTEN's intention is followed here. The two diagnoses are almost identical, only the citation of material differs. In "Hattsvampar" (KARSTEN 1882 a) the material is cited from Mustiala and the ecology is given as "decayed wood of *Betula*" In "Symbolae" there is no reference to material. The ecology is given as "caespitose"

The placement at the species level was proposed by KARSTEN first in Hedwigia (KARSTEN 1893 a, as "species est propria"). This rank change was cited in anew the same year (KARSTEN 1893 b) with the correct page reference to Hedwigia.

The protologue cites collection locality as "Mustiala", whereas specimen no. 4494 was collected from Saloistenjärvi. This locality is often cited by KARSTEN as "Salois" in various protologues. The specimen is, however, cited type material. It has spore annotations by KARSTEN matching exactly those in the original diagnosis. Furthermore, KARSTEN published the variety in a treatment of Fennoscandian fungi where localities around Mustiala were all cited only as "Mustiala" The more accurate locality citations are used in KARSTEN's smaller papers.

The microscopical examination of no. 4494 gave the following result: Spores 9-10.5 x 4.5-5.5 µm, mean-value 9.8 x 5.0 µm, elliptical, fusiform, in profile flattened on one side, amygdaliform, germ-pore absent, wall thick, apiculus prominent, in water red (MUNSELL 2,5 YR 5/8). Basidia 18-28 x 8-9 µm, 4-spored seen. Pleurocystidia 40-65 x 14-18 µm, utriform, clavate, few, walls yellow pigmented. Cheilocystidia 45-60 x 10-18 µm, similar in shape to pleurocystidia or sometimes mucronate extended at apex. Pileipellis of subglobose to elliptical cells, 15-40 µm wide. Veil cells 40-130 x 6-22 µm, cylindrical-inflated. Clamps numerous.

The description in the protologue and the result of the microscopical examination agree with the modern concept of *Psathyrella caput-medusae* (e.g., KITS VAN WAVEREN 1985). There is no reason to distinguish the taxon "*alba*"



Figs. 1-2. Type specimens of *Psathyrella*. - Fig. 1. *Psathyra pallens*, Herb. KARSTEN 4230. *A* basidia, *B* spores, *C* dry fruitbody, *D* pleurocystidia, *E* cheilocystidia. - Fig. 2. *Psathyra solitaria*, Herb. KARSTEN 4229. *A* cheilocystidia, *B* spores, *C* pleurocystidia. - Bar: 50 µm, for fruitbody 1 cm.

Psathyra cernua* var. *albicans

Psathyra cernua (VAHL) FR. var. *albicans* P. KARST., Bidr. Känn. Finl. Nat. Folk **32**: 507. 1879. - **Type:** not existent.

The original description is too short to give an interpretation: "Cap sulcate and rugose, when young white, at maturity argillaceous, hardly hygrophanous. Soil, wood, rare. Scandinavia (Upsala)"

Psathyrella subatrata* subsp. *diminuta

Psathyrella subatrata FR. subsp. *diminuta* P. KARST. Bidr. Känn. Finl. Nat. Folk **32**: 521. 1879. - **Type:** not existent.

The protologue is too vague to give an interpretation: "Cap slightly umbonate, when moist fuliginous with a tinge of olive green; stem about 3 cm long; lamellae ventricose, 4 mm broad. Manured, grassed places, Scandinavia (Småland)"

Psilocybe gilletii

Psilocybe gilletii P. KARST., Medd. Soc. Fauna Flora Fenn. **5**: 32. 1879 - **Lectotype:** Finland: Etelä-Häme. Tammela, Haarankorpi, in a moist site along a path, 28. 09. 1878, KARSTEN, P. A. (H 1522, examined) - selected here.

= *Hypholoma elongatum* (PERS., FR.) RICKEN

KARSTEN published the species on two occasions in 1879. In the treatment in "Symbolae" (KARSTEN 1879 a), however, the species is introduced with a "n. sp." added, whereas in "Hattsvampar" (KARSTEN 1879 b) this expression is lacking. Hence, the obvious place of publication is "Symbolae". The date in no. 1522 differs with one day from the date mentioned in the protologue. The annotations on spore characteristics on the convolute are a perfect match to those in the diagnosis. Judging from other specimens in H, KARSTEN seems to have collected at Haarankorpi only during 28th of September, not on the 29th. Specimen no. 1522 is thus not to be considered as neotype, but is here selected as lectotype burdened by a one day slip of the pen in the protologue.

STIG JACOBSSON in Göteborg very kindly examined collection no. 1521 and found it to be identical with *Hypholoma elongatum* (PERS., FR.) RICKEN. This collection is, however, not cited type material. Both specimens were studied by GUZMAN (1983). They were determined as "*Naematoloma* sp." and no typification was provided. Our study of specimen no. 1522 revealed that it is conspecific with no. 1521. *Psilocybe gilletii* is therefore considered to be a synonym of that species.

Spores 9.5-11 x 5.5-6.5 µm, elliptical, ovoid, amygdaliform, germ-pore present but small, in water yellowish (MUNSELL 10 YR 8/4). Pleurocystidia rather few, 35-60 x 8-15 µm, lageniform, fusiform, subutriform, sometimes mucronate, with a strong yellow, intracellular pigment (= chrysocystidia). Cheilocystidia smaller, about 24-40 x 5-12 µm.

Additional collection examined: Finland: Etelä-Häme. Tammela, Saloistenjärvi, 09. 1876 KARSTEN, P A. (H 1521).

Psathyrella longicauda

Psathyrella longicauda P KARST., Hedwigia **30**: 298. 1891. - *Drosophila longicauda* (P KARST.) KÜHN. & ROMAGN. 1953: 359, comb. inval. (Art. 33.2). **Lectotype:** Finland: Etelä-Häme. Tammela, Mustiala, on a pile of decaying leaves, 10. 1891 KARSTEN, P A. (H 1239, examined) - selected by KITS VAN WAVEREN (1976: 368; Art. 7 11).

The annotations on the convolute of no. 1239 are an excellent match to the protologue. Although no locality or ecological data was indicated by KARSTEN, the specimen can safely be taken as a syntypic due to the matching epithet, annotations and collection date. A later treatment by KARSTEN (1893 b) described the same material.

The microscopical examination of the type-collection gave the following result: Spores 12.5-14.5 x 7-8 µm, mean-value 13.4 x 7.3 µm, regularly elliptical, amygdaliform but suprahilar depression less pronounced, germ-pore distinct, opaque, in H_2O dark red (Munsell 10 R 3/6). Pleurocystidia partly collapsed, few seen, small, 40-50 x 10-14 µm, fusiform with a rostrate upper part. Cheilocystidia rather numerous, 26-38 x 6-12 µm, fusiform and often rostrate. Cells of pileipellis subglobose, 20-50 µm, hyphae of pileitrama coarsely incrusted.

In our experience, however, we must keep in mind that the length of pseudorhiza varies from one collection to another due to substrate in ground. Consequently, apart from the somewhat unreliable length of the pseudorhiza, *P. longicauda* can be recognized by the scanty veil, dark coloured cap, large, opaque spores and relatively small, pointed cystidia. It is a distinct but rarely recorded species. Material has also been investigated from Sweden. KITS VAN WAVEREN (1985) reported the species from the Netherlands.

Psathyra ombrophila

Psathyra ombrophila P KARST., Hedwigia **32**: 119. 1893. - **Type:** not existent.

The species was treated as new by KARSTEN in the same year (KARSTEN 1893 b). But as this treatment included a direct citation even to the correct page in Hedwigia, we take it as a proof that the actual place of publication is in Hedwigia. That volume of Hedwigia appeared in May-June 1893.

There is no original material preserved in H. Apparently the species was based on a single collection from flower pots in Mustiala. KARSTEN described the spores to be 4-6 x 2-3.5 µm. Since no further microscopic characters are known, no interpretation is possible. *Psathyrella lacuum* HUIJSMAN (1955) was found in similar habitat but it has larger spores.

Psathyra pallens (Fig. 1)

Psathyra pallens P KARST., Medd. Soc. Fauna Flora Fenn. **16**: 102. 1890. **Lectotype:** Finland: Etelä-Häme. Mustiala, Runkomäki, on unvegetated sandy soil in pine

forest, 12. 09. 1889 KARSTEN, P. A. (H 4230, examined) - selected here.

= *Psathyrella corrugis* (PERS., FR.) KONR. & MAUBL.

The microscopic examination revealed the following characters: Spores 12-13 (-15.5) x 6-6.5(-8) µm, elliptical, amygdaliform, germ-pore very distinct, wall thick, in water red (MUNSELL 2,5 YR 4/8). Basidia 4-spored, 22-28 x 10-11 µm. Pleurocystidia 50-85 x 9-14 µm, narrowly conical, fusiform, lageniform, at apex sometimes rostrate or slightly headlike ending, rather few. Cheilocystidia 35-50 x 7-11 µm, similar in shape and frequency to pleurocystidia, intermixed with many smaller clavate to cylindrical cells, gill edge yellow-brown pigmented, not continuously pigmented but broken by short pigmentless areas. Pileipellis of subglobose to elliptical cells, 20-50 µm wide. Pileitrama of rather pale pigmented hyphae. Clamps seen on cells of the stem.

Also the detailed description in the protologue confirms the synonymy with *P. corrugis*.

Psathyra solitaria (Fig. 2)

Psathyra solitaria P. KARST., Medd. Soc. Fauna Flora Fenn. **16**: 102. 1889 - **Lectotype:** Finland: Etelä-Häme. Tammela, Saloistenjärvi, (Pusunsuo), on *Sphagnum*, 19. 09. 1889 KARSTEN, P. A. (H 4229, examined) - selected here.

= *Psathyrella rannochii* KITS VAN WAVEREN

The type convolute bears no mention of "Pusunsuo", which was given in the protologue. Pusunsuo is a *Sphagnum* bog just close to lake Saloistenjärvi. Hence, the material is cited type material.

The microscopic examination showed the following characters: Spores 6.5-7.5(-8) x 4-4.5 µm, average 6.9 x 4.2 µm, elliptical, ovoid, in profile flattened on one side, neither amygdaliform nor phaseoliform, germ-pore indistinct, wall thick, in water red (MUNSELL 2,5 YR 4/8). Basidia 14-18 x 7-8 µm, sterigmata not seen. Pleurocystidia 30-45 x 8-12 µm, narrowly conical or fusiform, sublageniform, few. Cheilocystidia 25-40 x 7-11 µm, similar in shape to pleurocystidia, numerous, mixed with some smaller clavate cells which never dominate. Pileipellis made up of subglobose to elliptical cells, 15-50 µm wide. Pileitrama of rather strongly pigmented hyphae. Clamps seen frequently on cells of the stem.

The original material consists of two specimens in two halves. Judging from the black lamellae they were obviously mature or old when collected. In the protologue the cap was said to be "glaber, umbrinus, siccitate alutaceo-pallens, 3-4 cm. latus stipes fibrillosus" KARSTEN found the fungus "in paludosis sphagnosis"

Psathyrella rannochii KITS VAN WAVEREN (1982) is considered to be a synonym of *Psathyra solitaria*. Certainly, the Dutch author described the veil as strongly developed but the veil is an unreliable character often disappearing in mature or old specimens.

The following new combination is necessary: ***Psathyrella solitaria* (P. KARST.) ÖRSTADIUS & HUHTINEN, comb. nova.** Basionym: *Psathyra solitaria* P. KARST. Medd. Soc. Fauna Flora Fenn. **16**: 102. 1889.

The species can be recognized by its small, rather dark, ovoid spores, numerous

true cheilocystidia, sometimes acute pointed pleurocystidia and in young stages well-developed veil. The habitat is not restricted to *Sphagnum*. It also grows on sawdust, on wood or directly on soil. *P ocellata* is closely related but differs in having slightly larger spores which in addition are provided with a distinct germ-pore. More material must be studied, however, to separate the two species satisfactory.

Additional collections examined: Norway: 30. 05. 1984, Ö. WEHOLT (L). Sweden: Västergötland, Upphärad, SV Kroken, on the ground in mixed forest, 28. 08. 1981, L. STRIDVALL (Herb. STRIDVALL 81: 172). - Skåne, Örkened, Ubbaboda, in *Sphagnum*, 02. 09. 1982, L. ÖRSTADIUS (Herb. LÖ 249-82). - Medelpad, Torp, Åsetjärn, in *Sphagnum*, 02. 09. 1991, L. ÖRSTADIUS (Herb. LÖ 200-91). UK, Scotland: Perthshire, Kinloch Rannoch, 31. 08. 1970, E. KITS VAN WAVEREN (L). - Wester Ross, Loch Maree, on sawdust, 12. 09. 1963, E. KITS VAN WAVEREN (L).

Psathyrella squamifera

Psathyrella ("*Psatyrella*") *squamifera* P KARST., Medd. Soc. Fauna Flora Fenn. **5**: 60. 1882. - **Lectotype:** Finland. Etelä-Häme. Tammela, Mustiala, Haarankorpi, on decaying branches, 21 09. 1882 KARSTEN, P A. (H 2453, examined) - selected here.

= *P microrhiza* (LASCH: FR.) KONR. & MAUBL.

In the last decades most authors have considered *P. squamifera* to be a synonym of *P microrhiza* (e.g., KÜHNER & ROMAGNESI 1953). The synonymy has been drawn without studying type material (cf., e.g., KITS VAN WAVEREN 1971 274). The type has now been studied and we agree with the proposed synonymy. SMITH (1972) pointed out that the original diagnosis of *P. microrhiza* refers to a taxon with yellowish veil, and consequently used KARSTEN's name. Apparently type material was illustrated by KARSTEN (1888) in his "Icones"

Spores 10.5-12 x 6-6.5 µm, regularly elliptical, amygdaliform, germ-pore very distinct, wall thick, in H_2O red (MUNSELL 2,5 YR 4/8). Pleurocystidia ± collapsed, but the fusoid shape possible to discern. Cheilocystidia easier to verify, numerous, 30-40 x 10-12 µm, fusoid.

Psathyra pennata var. *squamosa* (Fig. 3)

Psathyra pennata FR. var. *squamosa* P KARST., Medd. Soc. Fauna Flora Fenn. **5**: 33. 1879. - *Psathyra squamosa* (P KARST.) P KARST., Hedwigia **32**: 59. 1893. - **Holotype:** Finland: Etelä-Häme. Tammela, Mustiala, on the ground amongst wooden chips, 30. 09. 1878, KARSTEN, P A. (H 2455, examined).

= *Psathyrella squamosa* (P KARST.) MOSER ex A. H. SMITH.

KARSTEN clearly cited one collection in the protologue ("semel die 30 m. Sept. copiose lecta"). Hence, collection no. 2455 is clearly the holotype. The original diagnosis was short, stressing the characters of the stipe as differentiating from the main variety The stipe was described as undulating and being covered by white squamules. Spore size was given as 5-6 x 3 µm.

The type-collection consists of well-preserved specimens, partly caespitose. The microscopical characters are as follows: Spores 6.8-7.4 x 3.8-4.0 µm, mean value 7 1 x 4.0 µm, rather regularly elliptical, in profile flattened on one side, subamygdaliform,

hardly phaseoliform, germ-pore distinct, wall rather thin, in water yellowish red (MUNSELL 5 YR 5/8). Basidia 16-24 x 7-8 µm, 4-spored. Pleurocystidia rather numerous, 36-46 x 9-13 µm, narrowly lageniform to fusiform. Cheilocystidia abundant, 30-40 x 7-12 µm, similar in shape to pleurocystidia, mixed with few clavate cells. Gill edge not pigmented. Pileipellis consists of mainly subglobose cells, 20-40 µm, pileitrama of moderately incrusted hyphae. Veil cells at cap margin 60-130 x 10-28 µm, inflated, clamped.

In the two later diagnosis of *Psathyra squamosa* KARSTEN (1893 a, 1893 b) pointed out the strongly developed veil of cap and stem ("Pileus primitus squamis superficialibus, facillime secedentibus squarrosis vel plumosis albis dense vestitus. Stipes squamis squarrosis, albis totus obtectus"). Other characters mentioned were the moderate cap size ("2-4 cm latus"), and the cap colour ("fulvescens, mox fusco-spadiceus, dein fuscescente lividus"). KARSTEN found the fungus "ad terram inter ramenta lignea. Valde caespitosa"

After having examined the type material of *P. squamosa* STIG JACOBSSON (Göteborg) discovered that the name *Psathyrella squamosa* had been incorrectly used for a species nowadays called *Psathyrella artemisiae* (PASS.) KONR. & MAUBL. (KITS VAN WAVEREN 1985).

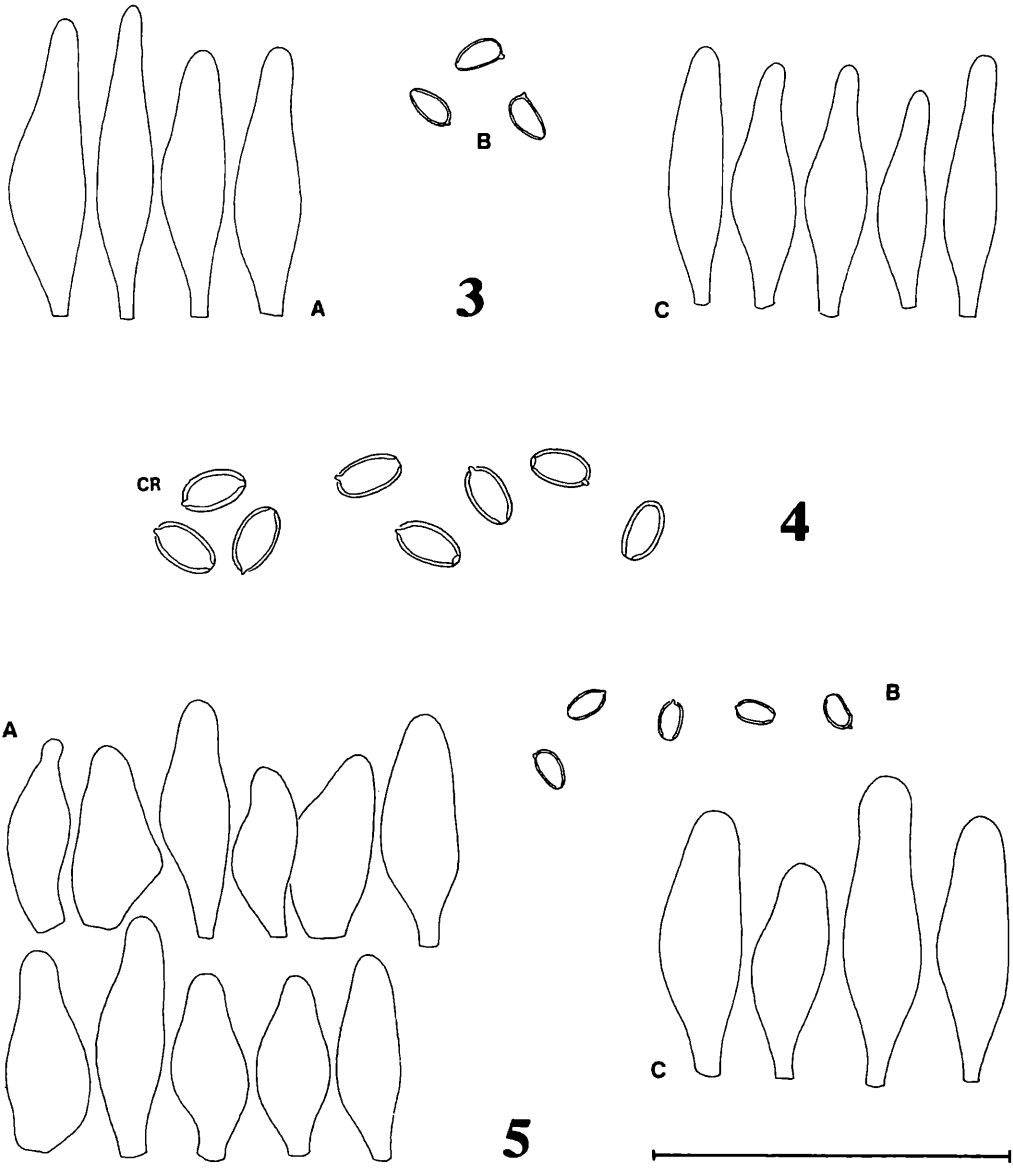
Psathyrella squamosa has been rediscovered in Sweden. The material deviates from KARSTEN's description in a non-caespitose growth. Other important characters, such as veil, spores and cystidia agree well.

An emended description based on the Swedish collections: Cap 10-30 mm broad, at first conico-convex, then expanded convex, sometimes umbonate or papillate, strong brown (MUNSELL 5-7,5 YR 5/6), when moist striate at margin, hygrophanous, drying to pale yellow brown and alutaceous, veil white or cream, copious as floccules to centre, margin appendiculate. Gills adnate to adnexed, rather distant to close, when young pale brown, at maturity brown with pale fimbriate edge. Stem 25-70 x 2-4 mm, pale, flocculose except the pruinose apex, a fugacious ring-zone sometimes present, rather stiff to fragile. Smell and taste indistinctive.

Spores 6-8 x 3.5-5 µm, averages 6.4-7.6 x 3.9-4.5 µm, in front view elliptical-ovoid, sometimes elongate, in profile flattened on one side, amygdaliform, subphaseoliform, germ-pore distinct or indistinct, in water yellowish red (MUNSELL 5 YR 5/8-6/8), not opaque. Basidia 4-spored, 14-22 x 7-8 µm. Pleurocystidia 30-60 x 8-16 µm, narrowly conical, fusiform or lageniform, sometimes flexuous, rarely bent, forked or headlike at apex, numerous, walls pale. Cheilocystidia 25-60 x 6-14 µm, similar in shape to pleurocystidia, numerous, mixed with a few small clavate cells, gill edge not pigmented. Caulocystidia seen only at apex of stem. Pileipellis a layer of mainly subglobose cells, 20-60 µm wide, 2-3 cells deep. Pileitrama with moderately pigmented hyphae, incrusted or not. Hyphae of hymenophoral trama less pigmented. Veil cells large, 30-300 x 6-30 µm, inflated, clamped. Clamps also present at hyphae of stem tissues.

The species grows singly or in small groups, in deciduous forests, on paths, on stumps, in leaves, probably with preference for rich soil, dry or moist places.

The examination of the veil needs a particular comment. In *Psathyrella* the veil is often said to be either copious or scanty. When copious, veil features as size and shape of the cells and presence or absence of clamps as a rule are easy to demonstrate. During last years work the veil-characteristics were checked from many species. Besides *P. squamosa* only a few European species turned out to have large cells, e.g., *P. hirta* PECK, *P. caput-medusae* (FR.) KONR. & MAUBL. and *P. suavissima* AYER. *P. hirta* and



Figs. 3-5. Type specimens of *Psathyrella*. - Fig. 3. *Psathyra pennata* var. *squamosa*, Herb. KARSTEN 2455. *A* pleurocystidia, *B* spores, *C* cheilocystidia. - Fig. 4. *Psathyra staminoides*, Herb. KARSTEN 4181, spores. - Fig. 5. *Hypholoma subpapillatum*, Herb. KARSTEN 3766. *A* cheilocystidia, *B* spores, *C* pleurocystidia. - Bar: 50 µm.

P. caput-medusae differ from *P. squamosa* in having larger spores. *P hirta*, moreover, grows on dung and the stem of *P caput-medusae* is usually provided with a ring. *P suavissima* has a fragrant smell and utriform cystidia.

Drosophila fibrillosa (PERS. ex FR.) sensu LANGE (ROMAGNESI 1976) can be distinguished from *P squamosa* by the smaller veil cells, i.e. 20-90 x 5-20 µm, and larger spores, i.e. 7.5-10 x 4.5-5.5 µm. Moreover, in *D. fibrillosa* the veil is typically distributed as larger patches at the cap margin and the cap seems to be more red brown.

As indicated above, *P. artemisiae* has been confused with *P squamosa*, but it differs in having smaller veil cells and larger spores, i.e. 15-100 x 4-20 µm and 8-10 x 4-5.5 µm, respectively.

Collections examined: Sweden. Medelpad. Timrå, Indalsälvens delta, 31. 08. 1989, leg. D. OLOFSSON & H-G. TORESSON (Herb. LÖ 267-89). - Medelpad. Liden, Sillre, 03. 09. 1991, leg. B. JANSSON (Herb. LÖ 203-91). - Medelpad. Torp, Getterån, 15. 09. 1995, leg. H. LINDSTRÖM (Herb. LÖ 104-95). - Västergötland. Brunn, Kråkeboberget, 12. 09. 1990, leg. L. ÖRSTADIUS & H-G. TORESSON (Herb. LÖ 234-95). - Skåne. Fjälkestad, Perstorp, 17 09. 1990, leg. L. ÖRSTADIUS (Herb. LÖ 306-90).

Psathyra staminoides (Fig. 4)

Psathyra staminoides P KARST., Bidr. Känn. Finl. Nat. Folk **48**: 250. 1889. **Lectotype:** Finland: Etelä-Häme. Tammela, Mustiala, 26. 05. 1881 KARSTEN, P.A. (H 4181, examined) - selected here.

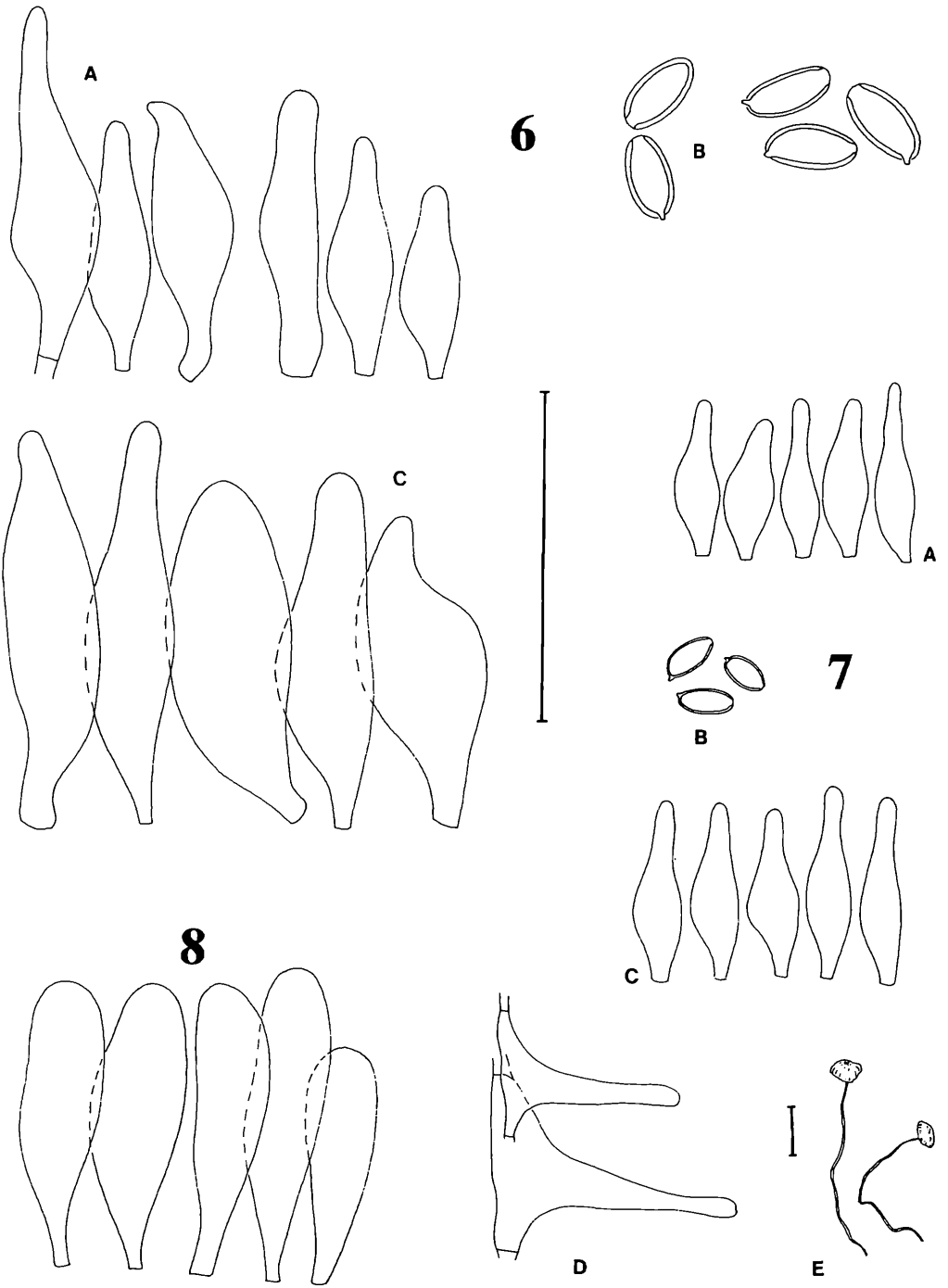
Psathyra urticaecola BERK. & BR. sensu KARSTEN, Medd. Soc. Fauna Flora Fenn. **9**: 48. 1882. - Non sensu orig.

When KARSTEN (1889) described *Psathyra staminoides* as new, he cited *P urticaecola* as synonym. This citation was, however, intended as a reference citation to the earlier treatment in "Symbolae", not a true synonymization. This is evident from the fact that, in the protologue, KARSTEN excluded the original concept of *P urticaecola* from the his concept of *P. staminoides* with the wording "Vix BERK. et BR. COOK. Illustr. t. 596, f. 2."

Both treatments by KARSTEN refer to the same collection. There is no definite reference to one collection only. In "Symbolae" the material is referred to as "scanty specimens" and in "Kritisk öfversigt" as "very rare" Hence, specimen no. 4181 cannot be the holotype and is here selected as lectotype. KARSTEN also treated the same material in the additions and corrections -section, listed after "Hattsvampar 2" (KARSTEN 1882 a), which was not cited in the protologue. Here the material is cited "in a flower pot", the amount of collections, yet, not specificially mentioned.

The material was fragmentary and scanty. The following microscopical characters were noted: Spores 9-9.5 x 5-5.5 µm, mean-value 9.1 x 5.0 µm, regularly elliptical, in profile flattened on one side, subphaseoliform, not amygdaliform, germ-pore very distinct, wall thick, in water red (MUNSELL 2,5 YR 4/8). We failed to find pleuro- and cheilocystidia.

The original diagnosis of *P staminoides* is too vague to allow an interpretation. *Psathyrella lacuum* HUIJSMAN (1955), the only species of *Psathyrella* growing in flower pots, has smaller spores. We are not even convinced *Psathyra staminoides* belongs to the present day concept of *Psathyrella*. It could also be a member of *Coprinus*.



Figs. 6-8. Type specimens of *Psathyrella*. - Fig. 6. *Psathyrella subrosea*, Herb. KARSTEN 3767 *A* cheilocystidia, *B* spores, *C* pleurocystidia. Fig. 7. *Psathyra tenuicula*, Herb. KARSTEN 3791. *A* pleurocystidia, *B* spores, *C* cheilocystidia, *D* caulocystidia, *E* dried fruitbodies. Fig. 8. *Psilocybe tuberosa*, KUO 7728, cheilocystidia. - Bar: 50 µm, for fruitbodies 1 cm.

Psathyrella subatomata

Psathyrella subatomata P KARST., Hedwigia **24**: 72. 1885. **Lectotype:** Finland: Etelä-Häme. Tammela, Mustiala, Runkomäki, amongst pine needles, 13. 10. 1884 KARSTEN, P A. (H 3287, examined) - selected here.

= *Psathyrella corrugis* (BATSCH: FR.) KONR. & MAUBL.

The protologue cited material from October 1884, from Mustiala. The amount of specimens was not given. Hence, specimen no. 3287 is here selected as lectotype.

KITS VAN WAVEREN (1972) supposed *P. subatomata* to be a synonym of *P. gracilis* (FR.) QUÉL. [= *P. corrugis* (BATSCH: FR.) KONR. & MAUBL.]. Reading the original description of *P. subatomata* nothing is contradictory to that statement. Our investigation of the type confirmed KITS VAN WAVEREN's suspicion.

Spores 11.5-13 x 5.5-6.5 µm, elliptical, amygdaliform, germ-pore very distinct, wall thick, in H_2O red (MUNSELL 2,5 YR 4/8). Pleurocystidia partly collapsed, 50-70 x 10-13 µm, fusoid with an often rostrate apex typical for *P corrugis*. Cheilocystidia seem to be few, about 35-50 x 8-10 µm, fusoid with rostrate apex. Gill edge strongly pigmented.

Hypholoma sublentum

Hypholoma sublentum P KARST., Bidr. Känn. Finl. Nat. Folk **37**: 233 1882. - **Type:** not existent. - Nomen dubium.

In the original description of *H. sublentum* nothing is said about the spore colour. An almost identical diagnosis was given later in "Symbolae", where also spore colour was indicated (KARSTEN 1882 b). The spores of *H. sublentum* were said to be 8-10 x 4-5 µm and "flavae diaphanaeque" KARSTEN later (1889) considered *H. sublentum* to be conspecific with *H. chondroderma* (BERK. & BR.) P KARST. KITS VAN WAVEREN (1985: 191) accepted *H. sublentum* as a synonym of *Psathyrella chondroderma*.

The spore characteristics given by KARSTEN (1882 b) should, however, exclude *H. chondroderma*. On the other hand, both KARSTEN's diagnoses indicate that the lamellae showed purplish colour with a clear contrast to the whitish, flocculose (cystidiate?) edge. The diagnosis of *Agaricus chondrodermus* by BERK. & BR. (1876) states the spores to be purple-black. Such spores could hardly be seen as "translucent yellowish" under the microscope, so KARSTEN's observation remains obsolete. Whatever the case may be, no interpretation is possible at the species level, and *H. sublentum* should be rejected as a nomen dubium.

Psathyra subnuda

Psathyra subnuda P KARST., Bidr. Känn. Finl. Nat. Folk **37**: 234. 1882. *Psathyra torpens* FR. subsp. *subnuda* (P KARST.) P KARST Bidr. Känn. Finl. Nat. Folk **48**: 248. 1889. - **Type:** not existent. - Nomen dubium.

It is always difficult to interpret descriptions of *Psathyrella* from older literature. *Psathyra subnuda* makes no exception. According to KARSTEN (1882 b) that species

had a scanty veil ("fibrillis tantum paucis"), a pale cap colour ("subargillaceo-pallidus lividus"), a large cap ("4-6 cm") and spores of medium size ("longit. 8-9 mmm. crassit. 4 mmm"). *P subnuda* is a name of uncertain application and because the name has not been much used, there is no need for neotypification.

Hypholoma subpapillatum (Fig. 5)

Hypholoma subpapillatum P KARST., Medd. Soc. Fauna Flora Fenn. **5**: 31. 1879.
Psathyrella subpapillata (P KARST.) ROMAGN., Bull. Soc. mycol. Fr. **98**: 46. 1982.
Lectotype: Finland: Etelä-Häme. Tammela, Mustiala, Haarankorpi, on *Betula* wood, 25. 09. 1878 KARSTEN, P A. (H 3766, sub nom. *H. subgranulosum*; examined) - selected here.

= *Psathyrella piluliformis* (BULL. FR.) ORTON.

Although this specimen was filed under a different herbarium name, the collection data clearly links it to the protologue of *H. subpapillatum*. The spore annotations on the convolute are identical to those in the diagnosis. The collection time indicated ("end of September") fits to the specimen as well as the year given as "h.a." (= hujus anni), referring to year 1878 (cf. *Armillaria bulbigera* in the same paper). Also the ecology is a match. The cases where KARSTEN changed the epithets are not rare. Actually his herbarium specimens are characterized by names stroken over In hundreds of cases the name has been changed to match the one published, but in few tens of cases KARSTEN has forgotten to make the change to the specimen. Again the protologue cites the material too vaguely for specimen no. 3766 to be a holotype.

The prevailing concept of *P subpapillata* is not based on a study of original material, which was just recently found during a survey of KARSTEN's types. The interpretation presented by KITS VAN WAVEREN (1985) and earlier workers (KÜHNER & ROMAGNESI 1953), is erroneous, being based on the coloured plate published by KARSTEN (1888) and modern collections.

The present day conception of *Psathyrella piluliformis* (e.g., KITS VAN WAVEREN 1985) agrees for the greater part with KARSTEN's original description of *Hypholoma subpapillatum* ("Caespitosum. Pileus badius, vel rufo-cinnamomeus 5-6 cm Sporae fuscidulae longit. 5-6 mmm., crassit. 2,5-3 mmm Cortina appendiculata cito evanida"). The densely granulate cap surface stressed by KARSTEN, is a character difficult to interpret. He considered *H. appendiculatum* (BULL.) FR. [= *Psathyrella candolleana* (FR.. FR.) MAIRE] to be closely related to *H. subpapillatum*.

The microscopical examination of the lectotype specimen confirmed the conspecifity between *H. subpapillatum* and *P piluliformis*. The latter name is the oldest one.

Spores 5-6 x 3-3.5 µm, mean-value 5.6 x 3.4 µm, in front view ellipsoid, in side view flattened on one side and sometimes phaseoliform, not amygdaliform, germ-pore distinct, wall thin, in water reddish yellow (MUNSELL 5 YR 6/8). Basidia 12-16 x 5-6 µm, 4-spored. Pleurocystidia few, 26-44 x 10-15 µm, utriform. Cheilocystidia rather numerous, 18-34 x 8-12 µm, utriform, mixed with few clavate cells. Gill edge not pigmented. Pileipellis polystratic, made up of subglobose or elliptical cells, 20-50 µm wide, pileitrama of incrusted pigmented hyphae. Veil hyphae at cap margin 1-5 µm wide, clamped.

We refrain from describing a new species to replace the misapplied name *P sub-*

papillata as *P subpapillata* sensu ROMAGN. and *P laevissima* (ROMAGN.) SINGER seem to be synonyms. The differences drawn up by ROMAGNESI (1982) and KITS VAN WAVEREN (1985) are too small and not convincing.

Psathyrella subrosea (Fig. 6)

Psathyrella subrosea P KARST Medd. Soc. Fauna Flora Fenn. **5**: 33. 1879. - *P. atomata* (FR.) QUÉL. subsp. *subrosea* P KARST., Bidr. Känn. Finl. Nat. Folk **32**: 524. 1879. - **Lectotype:** Finland: Etelä-Häme. Tammela, Mustiala, on a small twig, 31 10. 1878 KARSTEN, P A. (H 3767, sub nom. *Psathyrella*; examined) - selected here.

= *P microrhiza* (LASCH: FR.) KONR. & MAUBL.

The protologue refers to material collected on 31. 10. and the year is indicated as "h.a.", standing for year 1878 (cf. the previous taxon). Although the specific epithet is lacking from the convolute, this is clearly the collection cited in protologue. The annotations match the protologue very well. As no single specimen was cited by the protologue, the present one is here selected as the lectotype.

The taxon was published in two separate journals which both appeared in 1879. In "Symbolae" (KARSTEN 1879 a) it was published at the species level with a "n. sp." after the name. In "Hattsvampar" (KARSTEN 1879 b) it appeared at subspecific level, cited as "*Ps. subrosea* KARST " As the exact dates of publication are not known, KARSTEN's intention is followed here and "Symbolae" cited as the place of publication. In "Hattsvampar" KARSTEN cited the collection month as "10, 11" This does not necessarily, however, refer to collections made in both months, as the collection day was the last of October. For a larger treatise of Fennoscandian fungi, KARSTEN might have indicated both months when the material was collected at the turn of a month.

"Pileus totus striatus, nudus, fusco-lividus, coelo sereno rosellus, circiter 1,5 cm. latus. Stipes 2-3 cm. longus, 2 mm. crassus. Lamellae acie roseae. Sporae longit. 10-13 mmm., crassit. 5-6 mmm." These features from the original description of *P subrosea* could fit at least some species in the present day conception of subgenus *Psathyrella*.

The microscopical examination gave the following result: Spores 12-13.5 x 6-7 µm, mean-value 12.6 x 6.4 µm, in front view elliptical, in side view flattened on one side, amygdaliform, germ-pore very distinct, wall thick, in water red (MUNSELL 2,5 YR 4/8). 4-spored basidia seen, about 20-28 x 11-12 µm. Pleurocystidia often collapsed, 50-65 x 12-16 µm, rather few, lageniform to obtusely conical. Cheilocystidia 25-45 x 8-12 µm, numerous, similar in shape to the pleurocystidia. Gill edge continuously yellow brown pigmented.

The often collapsed cystidia rendered the examination difficult. The numerous cheilocystidia and the continuously pigmented gill edge indicate that *P. subrosea* is a synonym of *P microrhiza* (LASCH: FR.) KONR. & MAUBL.

Psathyra obtusata* var. *subumbrina

Psathyra obtusata (PERS.) P KARST var. *subumbrina* P KARST Bidr Känn. Finl. Nat. Folk **42**: 9. 1898. - **Typification:** open.

The protologue refers material only with "Mustiala. On *Betula* cortex." The diagnosis is short, stating only "smaller than main form" Two collections of the taxon were deposited in H., namely no. 4495 and no. 4496. The text on the convolute of no. 4495 informed that the five fruitbodies were collected in "Mustiala 18 Aug. 1881" On the convolute of no. 4496 the text shortly stated "umbrinus, siccus alutaceus" No locality or date were mentioned for the two fruitbodies collected.

The microscopic examination of no. 4495 revealed that it consisted of two species. One of the five fruitbodies is *P ocellata* (ROMAGN.) MOSER while the other four represent a species of *Psathyrella* not previously reported in Europe.

The microscopic features of *P ocellata* were as follows: Spores: 7-8 x 4.5-5 µm, elliptical, ovoid, in profile subamygdaliform, not phaseoliform, germ-pore distinct, wall thick, in water red (MUNSELL 2,5 YR 5/8). Basidia 4-spored, 14-18 x 8-9 µm. Pleurocystidia 30-50 x 10-14 µm, obtusely fusiform, subutriform, rather few. Cheilocystidia 25-40 x 9-13 µm, similar in shape to pleurocystidia, rather numerous, smaller clavate cells also seen.

The remaining four fruitbodies of no. 4495 have the following characters: Spores 8-9 x 5-5.5 µm, elliptical, in profile flattened on one side, phaseoliform, not amygdaliform, germ-pore almost absent, wall thin, in water reddish yellow (MUNSELL 5 YR 6/8). Basidia 4-spored, 18-28 x 8-10 µm. Pleurocystidia 50-80 x 12-22 µm, utriform, sublageniform, subcylindrical, obtusely fusiform, numerous. Cheilocystidia 30-55 x 10-18 µm, often utriform or obtusely fusiform, numerous, smaller clavate cells not seen. Pileipellis of subglobose cells, 25-70 µm wide. Pileitrama of moderately pigmented hyphae with few incrustations. Clamps numerous.

There is no description of this species in the European literature. In the extensive work of SMITH (1972), however, species like *Psathyrella larga* (KAUFFMAN) A. H. SMITH and *P subagraria* (ATKINSON) A. H. SMITH could very well represent the four fruitbodies.

The microscopic examination of collection no. 4496 showed the following characters: Spores 7-9 x 4.5-5.5 µm, mean-value 7 9 x 5.1 µm, elliptical, in profile phaseoliform, germ-pore absent, smooth, wall thin, in water pale yellow, almost colourless. Basidia 4-spored, 20-28 x 6-7 µm. Pleurocystidia not seen. Part of gill edge examined and cheilocystidia there abundant, 32-60 x 3-8 (lower portion) x 3-6 (middle portion) x 5-10 µm (upper portion), tibiiform, subclavate, sublageniform, often headlike and flexuous. Upper layer of pileus without cellular structures, cystidia-like elements present, about 40-80 x 5-10 µm, tibiiform, cylindrical, clavate, flexuous.

This is not a species of *Psathyrella*. It most certainly represents *Pholiota tuberculosa* (SCHAEFF FR.) KUMM.

As the material in the two syntypes is mixed and could not yet be wholly identified, typification is best left open.

Psathyra tenuicula (Fig. 7)

Psathyra tenuicula P KARST., Bidr Känn. Finl. Nat. Folk **32**: 511. 1879. - **Lectotype:** Finland: Etelä-Häme. Tammela, Heinämaa, amongst decaying plant remains, 05. 10. 1879 KARSTEN, P A. (H 3791, sub nom. *P tenella* P KARST. examined) - selected here.

This is very probably type material for *P tenuicula*. KARSTEN changed the name

from "*tenella*", appearing on the convolute, to "*tenuicula*" The ecology given in the protologue is a match to the present collection, as well as the collection month. Spore size taken from these annotations to the protologue. The caespitose habit could still be observed from the dried specimens. The protologue does not mention one specific collection so this is not a holotype. The statue of the fungi matches well those depicted in "Icones" (KARSTEN 1888).

The microscopical examination gave the following result: Spores 6-7.5 x 3-4 µm, mean-value 6.8 x 3.5 µm, cllipsoid to subcylindrical, in side view flattened on one side, sometimes phaseoliform or amygdaliform but never pronounced, germ-pore distinct, wall thin, in water yellowish red (MUNSELL 5 YR 5/8). Basidia 10-14 x 5-6 µm, 4-spored, of one form. Pleurocystidia few, 18-28 x 7-9 µm, lageniform. Cheilocystidia rather few, 16-28 x 5-8 µm, lageniform, without clavate or similar shaped cells. Caulocystidia about 30-50 x 6-7 µm, found at lower half of stem, often collapsed. Pileipellis made up of subglobose to elliptical cells, 15-40 µm wide, pileocystidia not seen but the material didn't allow a closer examination. Pilei- and hymenophoral trama of pale pigmented hyphae. Clamps not seen at hyphae of stem.

Psathyra tenuicula is recognized by the small fruit-bodies, pruinose stem, small cystidia and the apparently lacking clamps. It is closely related to *Psathyrella pygmaea* (BULL., FR.) SINGER which differs in having utriform cystidia with crystals.

In the protologue the stem was said to be "m. fint luddig" (pruinose). The presence of caulocystidia at the lower half of the stem confirmed a ± entirely pruinose stem, a character only known for a few species in Europe, e.g., *P. pygmaea*, *P. tephrophylla* (ROMAGN.) BON and *P. berolinense* GERHARDT *P. tephrophylla* differs among other things in having larger spores and utriform cystidia.

Judging from the protologue of *P. berolinense* (GERHARDT 1978), it differs only in growing on dung of wild boar. All other characters agree for the two species, e.g., the small fruit-bodies, the spores, the mentioned caulocystidia, the apparently lacking clamps and above all the very small lageniform cystidia. At the time KARSTEN collected *P. tenuicula*, there was no population of wild boar in that area. The deviating substrates, however, are no reason to maintain two species. *P. berolinense* is therefore considered to be a synonym of *Psathyra tenuicula*.

The following new combination is necessary: ***Psathyrella tenuicula* (P. KARST.) ÖRSTADIUS & HUHTINEN, comb. nova**. Basionym: *Psathyra tenuicula* P. KARST., Bidr. Känn. Finl. Nat. Folk **32**: 511. 1879

A. H. SMITH (1972: 262) described *Psathyrella minima* Peck growing on deer dung. In spite of the tiny fruit-bodies, "pileus 1-4 mm broad", the species looks like a later synonym of *P. tenuicula*.

Additional collections examined: Germany: Berlin-Grunewald, Langen Luch (type locality of *P. berolinense*), on dung of wild boar, 03. 1989 E. LUDWIG, (Herb. LUDWIG 839). Sweden: Skåne. Brösarp, Bertilstorp, on dung of wild boar, 23. 06. 1991, E. LUDWIG & L. ÖRSTADIUS (Herb. LÖ 148-91).

Psilocybe tuberosa (Fig. 8)

Psilocybe tuberosa P. KARST., Öfversigt Finska Vetenskaps-Soc. Förh. **46**: 2. 1903.
Lectotype: Russia: Bashkir Republic. Ufa, in forests, 06. 1902 OKSANEN, J. G. (H 1531, examined) - selected here.

= *Psathyrella candolleana* (FR. FR.) MAIRE

This specimen was studied and cited by GUZMAN (1983); the name, however, with erroneous author citation. GUZMAN referred the material belonging to *Psathyrella*.

The material was rather well preserved. The microscopic examination revealed that *Psilocybe tuberosa* is synonymous with *Psathyrella candolleana*. In the protologue the cap was said to be "glaber" Its not unusual, however, that the veil disappears in mature specimens.

Spores 7.5-8 x 4.5-5.5 µm, mean-value 7.9 x 5.0 µm, elliptical, ovoid, in profile flattened on one side, neither amygdaliform nor phaseoliform, germ-pore distinct, in water yellowish red (MUNSELL 5 YR 5/8). Pleurocystidia not seen. Cheilocystidia 35-50 x 10-18 µm, clavate to utriform, numerous. Pileipellis of subglobose to elliptical cells, 20-45 µm wide. Pileitrama made up of pale pigmented hyphae.

The two syntypi in KUO bear identical collection data. Both have been determined by KARSTEN as "*Psilocybe tuberosa* n. sp." but no detailed annotations are present. KUO 7727 is a mixed collection with at least three agaric genera present. KUO 7728 contains only *Psathyrella candolleana*.

Many thanks to Prof. NILS LUNDQVIST for his help with the nomenclatural issues concerning *P. squamosa*. The authors are also grateful to the director of the herbarium at the Botanical Museum of Helsinki (H) for the loan of material.

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