

ON FIVE SPECIES OF PSATHYRELLA WITH LAGENIFORM PLEURO-  
CYSTIDIA INCLUDING VARIANTS WITH UTRIFORM PLEUROCYSTIDIA

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Attention is drawn to the fact that, although the shape of the pleurocystidia (utriform versus lageniform and/or fusiform) plays a part on sectional and specific level in *Psathyrella*, sometimes this pattern is broken by variants with utriform pleurocystidia within species normally with lageniform and/or fusiform pleurocystidia. Five examples are discussed, viz. *P. umbrina*, *P. bipellis*, *P. obtusata*, *P. prona*, and *P. ocellata*.

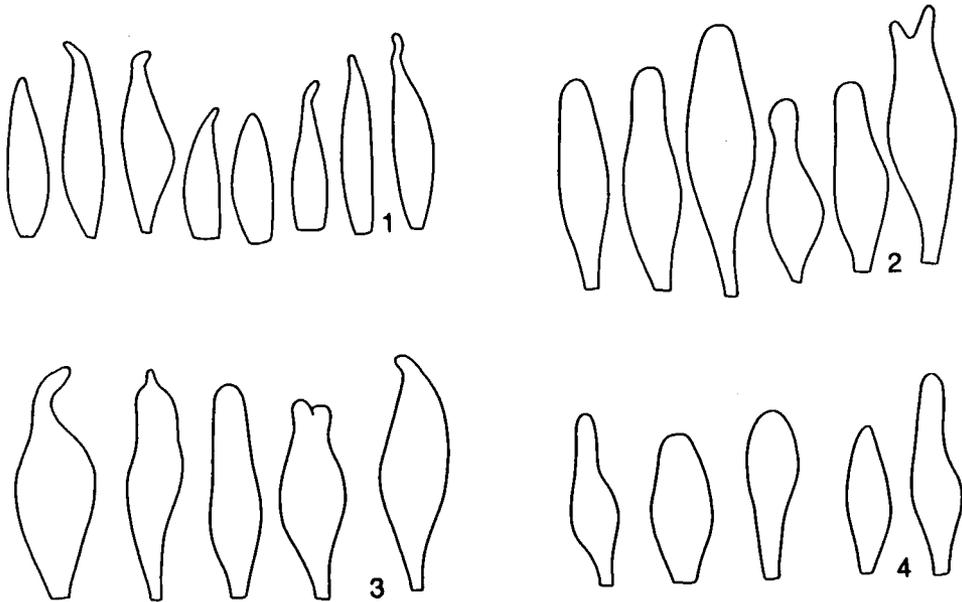
During a recent overhaul of our *Psathyrella* collection we discovered that of no less than five species of *Psathyrella*, all of them originally described with lageniform or fusoid-lageniform pleurocystidia, a variant with utriform pleurocystidia exists, while all other macro- and micro-characters of both taxa are fully identical.

We will abstain from giving full descriptions and pictures of these macro- and micro-characters and for these refer to our monograph on the genus *Psathyrella* (Kits van Waveren, 1985) and our other publications on this genus (see references).

1. *Psathyrella umbrina* Kits van Wav., its variety *utriformis* Kits van Wav. and intermediate forms — Figs. 1–4.

On September 5th 1968 we found one small specimen of a *Psathyrella*, growing under *Betula* in moss in the verge of a footpath near the hamlet Tomich (Invernessshire, Scotland) which due to its all-over brown colour, small spores (mean values  $7.3 \times 4.5$ – $4.8 \mu\text{m}$ ), absence of germ pore, distinctly pigmented hymenophoral trama, and mucronate pleurocystidia obviously belonged to section *Hydrophilae*. Because of its striking features it was described as a new species, *Psathyrella umbrina* (Kits van Waveren, 1982: 506), although only one specimen was available.

Much later, while studying unidentified specimens of *Psathyrella* from our herbarium, we discovered that already on October 10th 1965 we had found four specimens of the very same species, growing separately at a mutual distance of some two meters from each other under oak, also in moss in the verge of a footpath (Eindhoven, estate 'De Wielewaal'). Their macroscopical characters, spores and pigmentation were fully identical with those of *P. umbrina*, but the pleurocystidia varied from one specimen to another: of one (specimen a) all pleurocystidia and pleurocystidioid cheilocystidia were fusoid-lageniform (as in *P. umbrina*), half of them being mucronate. In the specimens b and c all pleurocystidia and pleurocystidioid cheilocystidia were utriform and non-mucronate. Based on these two specimens a new taxon was published: *P. umbrina* var. *utriformis* (Kits van Waveren, 1985: 189); the cells were depict-



Figs. 1–4. *Psathyrella umbrina* var. *umbrina* and 'var. *utriformis*'. Pleurocystidiograms ( $\times 575$ ). — 1. Var. *umbrina*, Tomich (Scotland), 5 Sept. 1968. — 2. 'Var. *utriformis*', Eindhoven, specimen d, 10 Oct. 1965. — 3. Intermediate form, Örup (Sweden), 17. Oct. 1985. — 4. Intermediate form, Eindhoven, specimen d, 10 Oct. 1965.

ed later (Kits van Waveren, 1988: 477, figs. 8–11). Out of 71 pleurocystidia taken at random from two gills of specimen **d** and drawn on cards, 43 were fusoid-lageniform with subobtuse to subacute apex, but none mucronate, 28 distinctly utriform, the pleurocystidioid cheilocystidia following suit except for only one fusoid-lageniform cell, which was mucronate. Obviously specimen **d** is intermediate between specimens **a** and **b** + **c**.

December 1985 we received from Mr. Örstadius (Sweden) an exsiccatum of another intermediate form of *P. umbrina* (found in October 1985 in Sweden). Its utriform and non-mucronate (many with a forked apex) pleurocystidia were intermixed with quite a number of fusoid-lageniform cells, some of them mucronate (Kits van Waveren, 1988: 477, fig. 12).

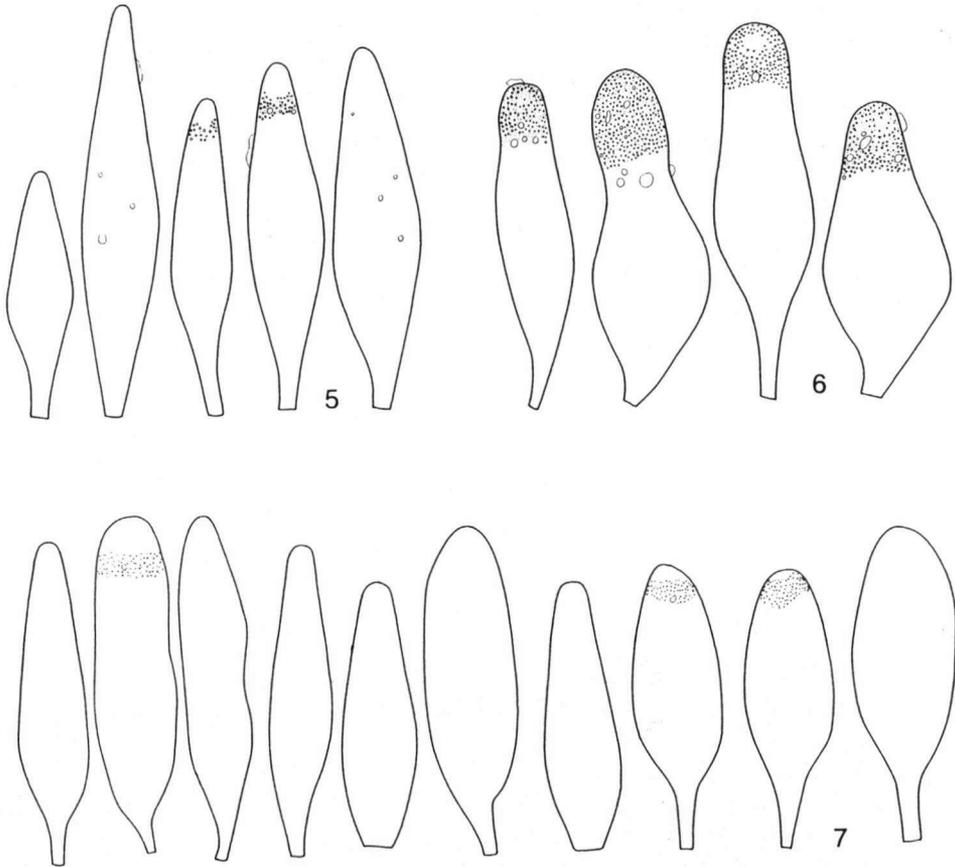
Later Romagnesi (1986: 189–191) published the very same observations. He recorded four collections (found in 1946, 1968 and 1982, all of them in moss in the verge of a foot-path), which he described as a new species: *P. galeroides*. On reading his description and seeing his pictures we immediately realized its full conspecificity with *P. umbrina*. In the description he called the pleurocystidia lageniform, not mentioning that a number of them were mucronate, but all 15 pleurocystidia he depicted (figs. 1 and 2) are fusoid-lageniform (two of them mucronate) except four which are utriform (non-mucronate), one even with forked apex (as so often seen in *P. spadiceogrisea*). From the holotype (Ardèche, 15 September 1982, Romagnesi 1260) Romagnesi very kindly sent us an exsiccatum of which we depicted 20

pleurocystidia at random. All of these were fusoid-lageniform (so were the pleurocystidioid cheilocystidia) and 16 of them were mucronate (Kits van Waveren, 1988: 477, figs. 6 and 7).

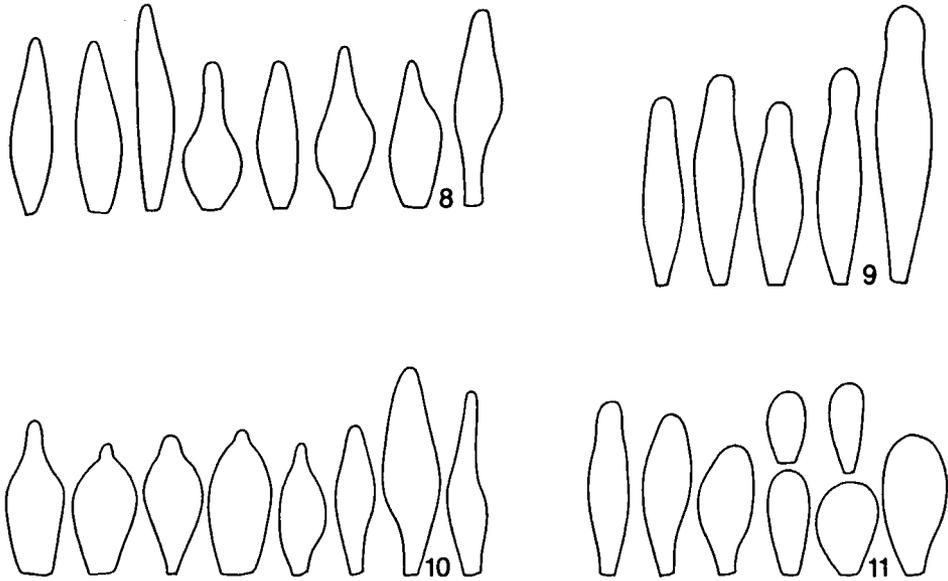
From Romagnesi's publication it is clear that he too observed and depicted pleurocystidia from material intermediate between *P. umbrina* var. *umbrina* (= *P. galerooides*), and *P. umbrina* var. *utriformis*. The relatively frequent occurrence of these intermediate forms implies that the maintenance of var. *utriformis* is no longer taxonomically justified.

2. *Psathyrella bipellis* (Quél.) A.H. Smith and '*P. barlae*' (Bres.) A.H. Smith — Figs. 5–7.

For a full description see Kits van Waveren 1985: 107, figs. 123–128, also 1977a: 210, figs. 30–46.



Figs. 5–7. *Psathyrella bipellis* and '*P. barlae*'. Pleurocystidiograms ( $\times 575$ ). — 5. Var. *bipellis*, Overveen, 25 Oct. 1974. — 6. '*P. barlae*', Epse, 25 Oct. 1974. — 7. Intermediate form, Vogelenzang, 24 July 1966.



Figs. 8–11. *Psathyrella obtusata* var. *obtusata* and var. *aberrans*. — 8, 9. Pleurocystidiograms ( $\times 575$ ). — 8. Var. *obtusata*, Overveen, 21 Oct. 1976. — 9. Var. *aberrans*, Denekamp, 15 Oct. 1967. — 10, 11. Cheilocystidiograms ( $\times 575$ ). — 10. Var. *obtusata* (6 spheropedunculate cells with apical bulge and 3 pleurocystidioid cheilocystidia), Overveen, 21 Oct. 1976. — 11. Var. *aberrans* (4 spheropedunculate cells without apical bulge and 3 pleurocystidioid cheilocystidia), Denekamp, 15 Oct. 1967.

In the literature the consensus is that there are two variants of *P. bipellis*, which macroscopically are indistinguishable: *P. bipellis* having lanceolate fusiform pleurocystidia with subacute apex and '*P. barlae*' with utriform pleurocystidia. It has been suggested and debated that *P. bipellis* is an autumnal, *P. barlae* a vernal species. On having studied the literature on this issue we (1985: 110) concluded that the evidence in support of this assumption is conflicting and insufficient for the existence of a hard and fast rule in this respect. Our own findings also seem to indicate that a relation between seasonal appearance and shape of cystidia is very questionable.

**a**— A lamella from each of the two collections found in Overveen (Elswout, 25 Oct. 1974, four specimens; Koningshof, 2 Nov. 1974, five specimens) showed exclusively slender fusoid pleurocystidia with subacute apex,  $57.5\text{--}95 \times 12.5\text{--}20 \mu\text{m}$ ; none of the 22 resp. 23 pleurocystidia taken at random and drawn were subapically constricted: *P. bipellis*.

**b**— The examined lamella from the solitary growing specimen found in Kortenhoef (14 Nov. 1970) showed exclusively very ventricose-utriform pleurocystidia ( $50\text{--}60\text{--}85 \times 17.5\text{--}27.5 \mu\text{m}$ ; out of the 16 cells taken at random and drawn, 14 were moreover distinctly subapically constricted: '*P. barlae*'.

c—The examined lamella from our Epse collection (16 June 1974, five specimens) also had exclusively very ventricose utriform pleurocystidia,  $55-85 \times 15-30 \mu\text{m}$  and out of the 13 cells taken at random and drawn six were subapically constricted: '*P. barlae*'.

d—A lamella from one of the ten specimens found on the very same day as the Epse collection, at Bathmen, only a few miles from Epse, had both fusiform ( $\times 12.5-15 \mu\text{m}$ ) and utriform ( $\times 15-20 \mu\text{m}$ ) pleurocystidia, of which only nine out of the total number of the 25 cells, taken at random and drawn were subapically constricted, 16 were fusoid, be it with obtuse to very obtuse apex so that a few of them could be called utriform: intermediate form between *P. bipellis* and '*P. barlae*'.

e—From a lamella taken from one of the two specimens of our Vogelenzang collection (20 July 1966) 29 pleurocystidia,  $62.5-85 \times 15-25 \mu\text{m}$  were drawn, of which eight were undoubtedly utriform, be it that only one was distinctly constricted not subapically but in the middle, all other cells being ventricose fusoid or ellipsoid. All cells were equipped with a rather long pedicel: intermediate form between *P. bipellis* and '*P. barlae*'.

f—From our one and only specimen from Castricum (21 Oct. 1977) we took at random 12 pleurocystidia,  $55-75 \times 15-17.5 \mu\text{m}$ , seven of them were distinctly but not very ventricose utriform with subapical constriction, the other five fusoid: intermediate form between *P. bipellis* and '*P. barlae*'.

From these data emerges the following conclusion: in *P. bipellis* two variants can roughly be distinguished, viz. one with fusoid pleurocystidia (typical *P. bipellis*) and one with utriform pleurocystidia (formally called *P. barlae*). Several collections of *P. bipellis* with both fusiform and utriform pleurocystidia, however, demonstrate that formal recognition of a '*var. barlae*' is not taxonomically justified.

### 3. *Psathyrella obtusata* (Pers.: Fr.) A.H. Smith and its var. *aberrans* Kits van Wav. — Figs. 8–11.

For a full description see Kits van Waveren 1987: 336, figs. 21–28, also 1985: 197, figs. 279–283 and 284.

It took us quite a number of years before we really got to know *P. obtusata* (Kits van Waveren 1977b: 299; 1982: 499; 1985: 197). Only in our final description (1987: 336, figs. 21–28) the presence of spheropedunculate cells, equipped with a short relatively thick protuberance (bulge),  $2.5-5 \times 3-5 \mu\text{m}$ , or with a subcylindrical neck,  $5-6 \times 2.5-4 \mu\text{m}$ , either passing gradually into the cell-body or more or less sharply delimited from it, was put forward as a character of great taxonomical importance. These cells proved to be diagnostic for the species in combination with the other characters, which necessitate placing it in section *Hydrophilae*. Neither Lange (1939: 90, pl. 152A), who depicted these cells very clearly, nor we (1977b: 302; 1985: 198, fig. 283) at the time attached any taxonomical importance to these cells of which the diagnostic value was only and suddenly realized in 1986 while restudying all our collections of *P. obtusata*, by then numbering 14.

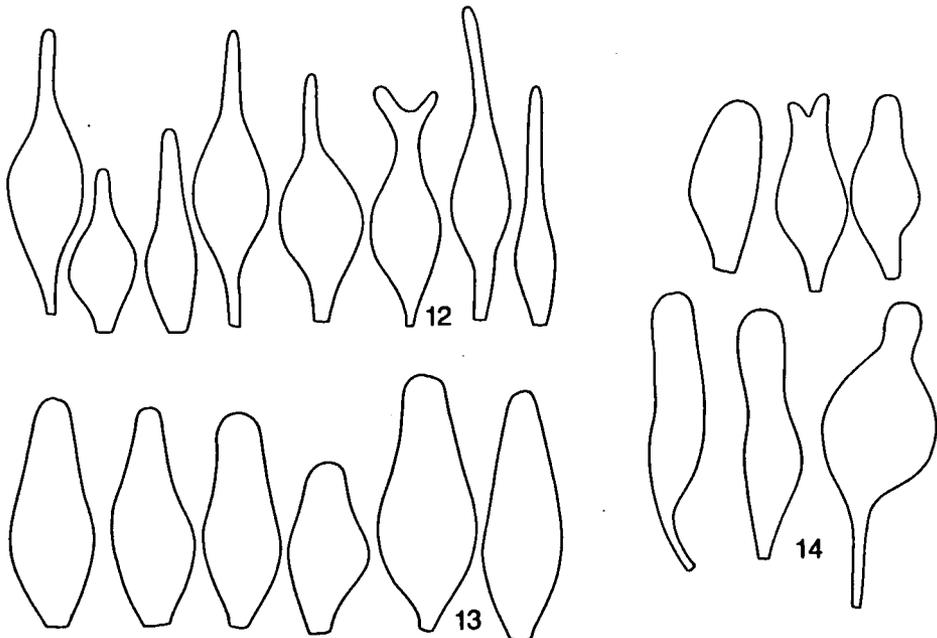
Earlier we (1982: 499) published, without depicting the cells, *P. obtusata* var. *utriformis*, differing from *P. obtusata* var. *obtusata* with ventricose-fusoid to sublageniform pleurocystidia with subobtuse to subacute apex, by its utriform pleurocystidia and pleurocystidioid

cheilocystidia. Under that name it was included in our monograph (1985: 200, fig. 284). It was based on only one specimen, growing on a large, mossy coniferous tree-stump at a distance of only some 50 cm from a typical specimen of *P. obtusata* (Denekamp, estate 'Singraven', 15 Oct. 1967). Later a second and important difference with var. *obtusata* was discovered: none of the numerous (as in var. *obtusata*) spheropedunculate cheilocystidia were provided with the protuberance, that is diagnostic for a var. *obtusata*. A second find of var. *utriformis* was sent to us by Mrs. Vellinga, who found it in Denmark on 24 Oct. 1986. Finally it was discovered that by mistake the wrong type material had been mentioned in the publication of *P. obtusata* var. *utriformis* (Kits van Waveren, 1985: 200, fig. 28), so that on correcting this (1987: 338, 340, figs. 26–28) renaming was necessary: *P. obtusata* var. *aberrans*.

Intermediates between *P. obtusata* var. *obtusata* and *P. obtusata* var. *aberrans* are not known to us. These two varieties differ not only by the shape of the pleurocystidia, but also by the shape of the spheropedunculate cheilocystidia, which taxonomically justifies the maintenance of var. *aberrans*.

**4. *Psathyrella prona* (Fr.) Gillet var. *prona* and *P. prona* var. *utriformis* Kits van Wav. — Figs. 12–14.**

For a full description see Kits van Waveren 1985: 81, figs. 75–79 and 80, 81.



Figs. 12–14. *Psathyrella prona* var. *prona* and var. *utriformis*. Pleurocystidiograms ( $\times 575$ ). — 12. Var. *prona*, Haarzuilen, 31 Oct. 1969. — 13, 14. Var. *utriformis*. — 13. Amerongen, 31 Oct. 1969. — 14. Echt, 16 Oct. 1962.

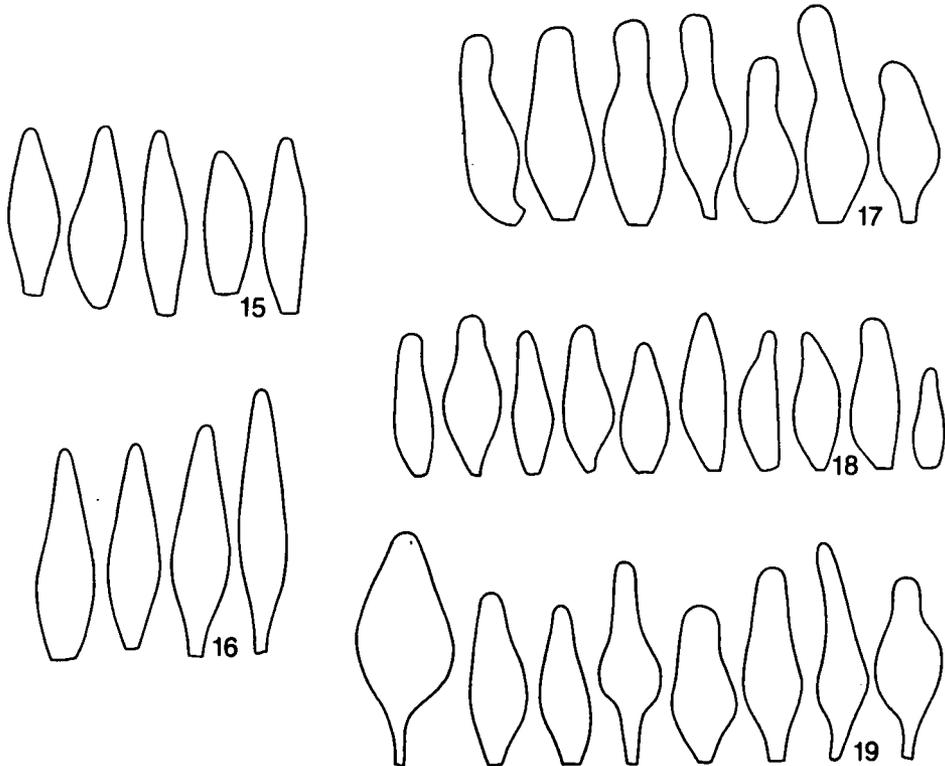
In our monograph (1985: 19) we expounded and stressed the very great variability of colours of pilei and red underlining of lamella edges in the species of sect. *Atomatae*, in particular its *prona*-group, rendering these colours quite unsuitable to go by in trying to distinguish species. In the past, unfortunately, most species were mainly based on these colours. We (1985: 81–88) reduced several of them to colour-forms of *P. prona*, all five of them characterized by lageniform pleurocystidia usually with a fairly long and sometimes even conspicuous neck.

We resorted to morphological characters in distinguishing from *P. prona* var. *prona* a var. *utriformis* because of its utriform pleurocystidia (as in *P. calcarea* Romagnesi and *P. vinosofulva* P.D. Orton, both synonymized with var. *utriformis*).

Intermediates between var. *prona* and var. *utriformis* have not been found, which taxonomically would seem to justify the maintenance of var. *utriformis*.

##### 5. *Psathyrella ocellata* (Romagn.) Mos. — Figs. 15–19.

For a full description see Kits van Waveren 1985: 268, figs. 439–443.



Figs. 15–19. *Psathyrella ocellata*. Pleurocystidiograms ( $\times 575$ ). — 15. Amerongen, 16 Oct. 1960. — 16. Tomich (Scotland), 11 Sept. 1968. — 17. Goudbergven, 27 Aug. 1961. — 18. Kortenhoeft, 3 April 1971. — 19. Denekamp, 22 Sept. 1962.

This small, inconspicuous, seemingly uninteresting species was originally described with subutriform to obtusely sublageniform pleurocystidia and is characterized by its narrow, ellipsoid to oblong spores,  $7\text{--}10 \times 3.5\text{--}5.5 \mu\text{m}$  (mean values  $7.7\text{--}9.5 \times 3.9\text{--}4.7 \mu\text{m}$ ). In his recent description Romagnesi (1982: 37) called the pleurocystidia 'tantôt assez nettement utriformes, tantôt lagéniformes à cause du col plus étroit.' We (1985: 268, fig. 442) confirmed this observation.

Running through the descriptions and cell-drawings of our seven collections of this species we found in two the pleurocystidia strictly sublageniform-fusoid (Figs. 15, 16), in one strictly utriform (Fig. 17) but in the others intermediately shaped (Figs. 18, 19). Therefore it is not taxonomically justified to distinguish the variant with utriform cystidia as a formal variety.

It is remarkable that in *Psathyrella* the character-pair utriform pleurocystidia versus lageniform and/or fusiform pleurocystidia plays a role at very different taxonomical levels. It is this character-pair that helps to distinguish between sect. *Spadiceogriseae* and sect. *Pennatae*, but also between relatively closely related species as *P. gracilis* and *P. pseudogracilis*.

In the five cases discussed above a variant with utriform pleurocystidia and a variant with lageniform and/or fusiform pleurocystidia occur within one species.

In two cases, viz. *P. obtusata* var. *obtusata* and its var. *aberrans* and *P. prona* and its var. *utriformis*, no intermediates are known. In the other three cases, viz. *P. umbrina*, *P. bipellis*, and *P. ocellata*, relatively frequent intermediates between variants with utriform pleurocystidia and variants with lageniform and/or fusiform pleurocystidia make the distinction of varieties based on these characters unjustifiable.

It is obvious that in *Psathyrella* the shape of the pleurocystidia is a character to be handled with great care when delimitating taxa as well as when constructing keys.

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