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RETIREMENT OF DR. R. A. MAAS GEESTERANUS

(With Plate 59)

On January 30th, 1976 Dr. Maas Geesteranus, Senior Mycologist, left the Mycological Department of the Rijksherbarium, Leiden, at the mandatory retirement age of sixty-five. This provides us with an occasion for outlining his career and commemorating his scientific achievements.

Rudolf Arnold Maas Geesteranus was born on January 20th, 1911, at the Hague. Before he was a year old the family went to the erstwhile Dutch East Indies and he remained there until 1929. As a growing boy he was deeply impressed by the richness and variety of nature in the tropics.

When he returned to the Netherlands he finished secondary school at the Hague in 1931, after which he enrolled at the University of Leiden for the study of Biology. As a student he had a wide interest in animals, especially birds and inects, and he became a skilled nature photographer.

In 1935–1936 and 1937–1938 he held at the Rijksherbarium the position of volunteer assistant, at that time the current stepping-stone to a scientific career. In July 1939 he was given a formal appointment at the Rijksherbarium as Assistant. Following the suggestion of a senior colleague, Dr. S. J. van Ooststroom, Maas Geesteranus turned his attention to lichens. In 1942 he was appointed Curator of the Herbarium of the Netherlands Mycological Society, and in 1946 Curator of the mycological and lichenological collections of the Rijksherbarium.

His lichenological studies led him to revise the taxonomy of the Parmeliaceae in the Netherlands and for this, on November 19th, 1947, he was granted the degree of Doctor of Science. After 1950, however, he concentrated principally on the taxonomy of fungi.

From March 12th, 1949 to January 14th, 1950, Maas Geesteranus made a one-man expedition to Kenya; he collected lichens and phanerogams in particular.

Through his continuous efforts the mycological herbarium was reorganized, many fungi were collected, described and depicted, and card indexes of mycological literature and Netherlands records were started. The primary aim was to establish a representative collection of the fungi of the Netherlands and surrounding countries, with special emphasis on the Agaricales and other groups of macromycetes.

From 1954–1958 Maas Geesteranus edited 'Fungus', a periodical for amateur mycologists in the Netherlands. Under his guidance it was transformed into a purely scientific publication.

After 1955 he became more and more interested in the stipitate hydnoïd fungi. He revised the stipitate 'Hydnums' of the Netherlands, publishing his work in sections and completing it in 1960. Subsequently he started type-studies and anatomical investigations of 'Hydnums' from all over the world.

In the fifties Maas Geesteranus and his then director Prof. H. J. Lam succeeded in establishing a taxonomic-mycological centre at the Rijksherbarium; the staff was joined successively by C. Bas, the late M. A. Donk and J. van Brummelen.

In 1959 Maas Geesteranus and Donk, again firmly supported by Prof. Lam, together founded the mycological journal 'Persoonia'. From the outset to 1974 Maas Geesteranus was on the editorial board.

Meanwhile he continued to collect fungi in the Netherlands and other European countries. Furthermore in 1964 Maas Geesteranus, accompanied by Bas, made a ten-week expedition to Northern India to collect mycological specimens.

Besides his work on hydnoïd fungi Maas Geesteranus also studied several groups of Ascomycetes, especially those with large fruit-bodies, such as the Helvellaceae, Geoglossaceae, Pezizaceae and the genus *Cordyceps*.

Many of his findings are compiled in his 'Hydnaceous fungi of the estern Old world' (1974) and 'Die terrestrischen Stachelpilze Europas' (1975).

His regional surveys of certain groups of macromycetes (e.g. Gasteromycetes, Pezizales, hydnoïd and clavaroïd fungi) are invaluable, not only for amateurs but also for professional mycologists.

At the mycological department of the Rijksherbarium Maas Geesteranus leaves a gap that will be hard to fill. Fortunately he plans to continue to spend part of his time on mycology, particularly on myco-floristic work in the Netherlands and on the taxonomy of the stipitate hydnoïd fungi of the whole world.

For his colleagues Maas Geesteranus has been an unfailingly helpful adviser and an exemplary and devoted fellow mycologist. For the Rijksherbarium he is a valued worker with a keen eye for system, detail and perfection in mycological work and taxonomic administration. We hope to have him amongst us for a long time.

J. van Brummelen, C. Bas

Publications of R. A. Maas Geesteranus on lichens and fungi

(Compiled by L. VOGELENZANG, Librarian)

This list is not confined to purely scientific publications, as their author probably would have wished. It also includes his popular mycological publications that have stimulated so many mycologists in the Netherlands and are therefore a characteristic part of Maas Geesteranus' activities.

1944

Nog een vindplaats van de Zadelhelvella. *In* Fungus **15**: 5 (with A. C. Perdeck).
Mycologisch werk uit het buitenland. *In* Fungus **15**: 22–23.
Maakt Uw vondsten productief. *In* Fungus **15**: 23–24.

1946

Review: Verdoorn, F. a.o. Plants and Plant Science in Latin America, Groningen 1945. *In* Vakbl. Biol. **26**: 70–71.

Over de berkenboleet en zijn verwanten. *In* Fungus **16**: 13–16, 27–30.

1947

Revision of the lichens of the Netherlands. I. Parmeliaceae. Thesis. *In* Blumea **6**: 1–199.

Mycologische aantekeningen. *In* Fungus **17**: 27.

Mycologische aantekeningen. *In* Fungus **17**: 37–38.

Mycologisch werk uit het Buitenland, II. *In* Fungus **17**: 66–68.

1949

Over IJsland's mos. In het voetspoor van Thijsse, 77–83. Wageningen, 1949.

Voorlopig verslag van het *Lycoperdon*-onderzoek. *In* Fungus **19**: 18–22 (with A. C. Perdeck).

1950

Een paar Fungi van de Kaloot. *In* Fungus **20**: 69–71.

Enkele herinneringen uit Kenya's bossen. *In* Vakbl. Biol. **30**: 117–129.

Enkele paddestoelenvondsten op en om de St. Pietersberg. *In* Natuurh. Maandbl. **39**: 115–118.

Verslag over een reis naar Afrika. Pp. 23. Mimeographed. Leiden.

1951

Beelden uit Kenya. *In* Verslag lezing gehouden Mij. Diligentia, 's-Gravenhage: 7–15.

Enkele paddestoelenvondsten op en om de St. Pietersberg. II. *In* Natuurh. Maandbl. **40**: 17–21.

Fomes pinicola, twee typen, één soort. *In* Fungus **21**: 15–17.

Mycologische aantekeningen 5–10. *In* Fungus **21**: 42–45.

Disciseda candida (Schw.) Lloyd. *In* Fungus **21**: 51–53.

Verzoek om toezending van Amanieten. *In* Fungus **21**: 59–60.

1952

Mycologische aantekeningen XI–XV. *In* Fungus **22**: 6–10.

Paxina dupainii (Boud.) Seaver, een nieuwe Discomyceet voor ons land. *In* Fungus **22**: 10–12.

Mycologische aantekeningen XVI–XVII. *In* Fungus **22**: 18–22.

Enkele Fungi uit Wageningen's omgeving en enige algemene opmerkingen vooraf. *In* Fungus **22**: 53–55.

Lijst van Fungi gevonden op de excursies der Ned. Myc. Ver. in de omgeving van Arnhem (27 en 28 September) en Maastricht (11 en 12 October). *In* Fungus **22**: 58–62.
Revision of the Lichens of the Netherlands. II. Physciaceae. *In* Blumea **7**: 206–287.
Itinerary in Kenya Colony and the Union of South Africa. *In* Blumea **7**: 297–302.

1953

Enkele paddestoelenvondsten op en om de St. Pietersberg, III. *In* Natuurh. Maandbl. **42**: 17–21.
Enkele paddestoelenvondsten op en om de St. Pietersberg, IV. *In* Natuurh. Maandbl. **42**: 75–80.
Index Fungus, vols. 1–20. Pp. 164. Amsterdam.
Lichenes in Agsteribbe, E. & Groenhuyzen, S., De bryologische voorjaarsexcursie naar Voorne. *In* Buxbaumia **7**: 39–41.
Over *Paxina acetabulum* (L. ex Fr.) O.K. *In* Fungus **23**: 17–21.
Over het conserveren van Fungi. *In* Fungus **23**: 47–48.

1954

Van levende boleet tot dood herbarium exemplaar. *In* Coolia **1**: 17–18.
Mycologisch nieuws 1–5. *In* Coolia **1**: 22–25.
„Waar moet ik op letten?" *In* Coolia **1**: 28.
Belangrijke kenmerken in het geslacht *Agaricus*. *In* Coolia **1**: 31–33.
Review: Haas, H. Pilze Mitteleuropas. Speisepilze I, Stuttgart 1951. *In* Coolia **1**: 34–35.
Hydnum onderzoek. *In* Coolia **1**: 36.
Notes on Dutch lichens. *In* Blumea **7**: 570–592.
Notes on Dutch fungi. *In* Fungus **24**: 13–27.

1955

Sclerotinia-soorten op Cyperaceae en Juncaceae. *In* Coolia **2**: 4–5.
Mycologisch nieuws 6–10. *In* Coolia **2**: 6–8.
Mycologisch nieuws 11–13. *In* Coolia **2**: 15–16.
Onze gesteelde Hydnums. *In* Coolia **2**: 27–31.
Some lichenological observations in Kenya. *In* Webbia **11**: 519–523.
Notes on Dutch fungi, II. *In* Fungus **25**: 44–52.

1956

Bij de 50e verjaardag van de Deense Mycologische Vereniging. *In* Coolia **3**: 6–7.
Op zoek naar Cyphella's. *In* Coolia **3**: 30–31.
Review: Romagnesi, H. Nouvel Atlas des Champignons, Paris 1956. *In* Coolia **3**: 39–40.
The stipitate Hydnums of the Netherlands. I. *Sarcodon* P. Karst. *In* Fungus **26**: 44–60.

1957

Nogmaals Hydnums gevraagd. *In* Coolia **4**: 24.
Mycologisch nieuws 14–15. *In* Coolia **4**: 35–36.
The stipitate Hydnums of the Netherlands. II. *Hydnellum* P. Karst. *In* Fungus **27**: 50–71.

1958

Mycologisch nieuws, 16. *In* Coolia **4**: 44.
Notes on Dutch lichens II. *In* Blumea suppl. **4**: 178–187.
The stipitate Hydnums of the Netherlands. III. *Phellodon* P. Karst. and *Bankera* Coker & Beers ex Pouz. *In* Fungus **28**: 48–61.

1959

Mycologisch nieuws, 17. *Pluteus leoninus* (Schaeff. ex Fr.) Quél. en zijn dubbelganger. *In* Coolia **6**: 3–4.
Note on *Lecidella carpathica* Körb. *In* Blumea **9**: 626–628.
Sur un *Hydnellum* méconnu. *In* Persoonia **1**: 111–114.
The stipitate Hydnums of the Netherlands-IV. *Auriscalpium* S. F. Gray, *Hericium* Pers. ex S.F. Gray, *Hydnum* L. ex Fr., and *Sistotrema* Fr. em. Donk. *In* Persoonia **1**: 115–147.
Review: Duncan, U. K., A guide to the study of lichens, Arbroath 1959. *In* Persoonia **1**: 169.
Review: Pilát, A. (Ed.), Flora CSR. B. I. Gasteromycetes, Praha 1958. *In* Persoonia **1**: 169–171.
Review: Pilát, A., Nase Houby II, Praha 1959. *In* Persoonia **1**: 171.

1960

Nog eens van Fungus naar Persoonia. *In* Coolia **6**: 54–55.
Een monstruositeit bij *Phallus impudicus*. *In* Coolia **7**: 27–28.
Notes on Hydnums. *In* Persoonia 1: 341–384.

1961

A *Hydnum* from Kashmir. *In* Persoonia **1**: 409–413.
Determinatietabel en beschrijving van soorten uit de genera *Aleuria* en *Galactinia*. Pp. 47. Mimeographed. Leiden
Het geslacht *Pustularia* Fuck. in ons land. *In* Coolia **8**: 4–7.
Review: Michael/Hennig, Handbuch für Pilzfreunde. Zweiter Band. Jena 1960. *In* Coolia **8**: 22–24.
Proposal to conserve the generic name *Phyllocharis* Diels (Lobeliaceae). *In* Taxon **10**: 246 (with R. C. Bakhuizen van den Brink and C. G. G. J. van Steenis).

1962

Een illusie minder. *In* Coolia **9**: 22–24.
Bijzondere vondsten, 1. *In* Coolia **9**: 38–40.
Nog eens *Melachroia xanthomela* (Pers.) Boud. *In* Coolia **9**: 46–47.
Kartering van Fungi. *In* Coolia **9**: 66–67.
Bijzondere vondsten, II. *In* Coolia **9**: 77–78.
Review: Lange, M., Svampe livet (Rhodos, København. 1961). *In* Coolia **9**: 79–80.
Literatuur voor beginners. *In* Natura **59**: 116–117.
Stilkete piggsopper. En oversikt over slekter og arter som forekommer i Norge. Stipitate Hydnums in Norway. A review of genera and species. *In* Blyttia **20**: 122–135 (with F.-E. Eckblad).
The identity of *Hydnum versipelle* Fr. *In* Persoonia **2**: 371–375.
Hyphal structures in Hydnums. *In* Persoonia **2**: 377–405.
Review: Scripta botanica II, Tartu 1962. *In* Persoonia **2**: 419.
Review: Ciferri, R., Mycoflora domingensis integrata, Pavia 1961. *In* Persoonia **2**: 420.

1963

A new species of *Sarcodon*. *In* Nytt Mag. Bot. **10**: 169–171.
A correction to: Hyphal structures in Hydnums, Persoonia **2**, 1962, 377–405. *In* Persoonia **2**: 476.
On '*Cordyceps capitata*'. *In* Persoonia **2**: 477–482.
Hyphal structures in Hydnums, II. *In* Proc. K. Ned. Akad. Wet. (C) **66**: 426–436.
Hyphal structures in Hydnums, III. *In* Proc. K. Ned. Akad. Wet. (C) **66**: 437–446.
Hyphal structures in Hydnums, IV. *In* Proc. K. Ned. Akad. Wet. (C) **66**: 447–457.

1964

On some white-spored Geoglossaceae. *In* Persoonia **3**: 81–96.
Index Fungus, vols. 21–28. Amsterdam: 1–28.
De Fungi van Nederland. I. Geoglossaceae — Aardtongen. *In* Wet. Meded. K. Ned. natuurh. Ver. **52**: 1–24.
The *Hydnellum aurantiacum* complex. *In* Proc. K. Ned. Akad. Wet. (C) **67**: 144–156.
Notes on Hydnums-II. *In* Persoonia **3**: 155–192.
Onderzoekingen over Hydnums. *In* Jaarb. Versl. Meded. K. Ned. bot. Ver. 1963 [publ. 1964]: 55.
Verslag van een botanische verzamelreis naar India in 1964. Pp. 11. Mimeographed. Leiden.

1965

Einiges über *Neogyromitra caroliana*. *In* Proc. K. Ned. Akad. Wet. (C) **68**: 128–134.
Geoglossaceae of India and adjacent countries. *In* Persoonia **4**: 19–46.
Paddestoelen en Kevers. *In* Coolia **12**: 20–22.

1966

Notes on Hydnums, III. *In* Proc. K. Ned. Akad. Wet. (C) **69**: 24–36.
On *Helvella platypus* DC. *In* Proc. K. Ned. Akad. Wet. (C) **69**: 191–203.
Notes on Hydnums, IV. *In* Proc. K. Ned. Akad. Wet. (C) **69**: 317–333.
Obituary. Pieter Groenhart (1894–1965). *In* Persoonia **4**: 69–71.
Sarcoleotia platypus (DC. ex Pers.) Maas G. *In* Coolia **12**: 44–47.
Review: Smith, A. H. & Zeller, S. M., A preliminary account of the North American species of *Rhizopogon*, Memoirs of the New York Botanical Garden 14, 1966. *In* Persoonia **4**: 352–353.

1967

Notes on Hydnums, V. *In* Proc. K. Ned. Akad. Wet. (C) **70**: 50–60.
Notes on Hydnums, VI. *In* Proc. K. Ned. Akad. Wet. (C) **70**: 61–72.
Quelques champignons hydnoïdes du Congo. *In* Bull. Jard. bot. nat. Belg. **27**: 77–107.
Studies in Cup-fungi-I. *In* Persoonia **4**: 417–425.
De Fungi van Nederland. II. Pezizales — deel 1 — Discinaceae, Helvellaceae, Morchellaceae, Pezizaceae, Rhizinaceae. *In* Wet. Meded. K. Ned. natuurh. Ver. **69**: 1–72.
Notes on Hydnums-VII. *In* Persoonia **5**: 1–14.

1968

Ein zweiter Fundort von *Thuemenella britannica*. *In* Westf. Pilzbr. **7**: 1–3.
Een zeldzame Pyrenomyceet. [*Camarops polysperma*] *In* Coolia **13**: 121–123.
Gestielte, oder doch wenigstens huttragende, europäische Stachelpilze. Pp. 20. Mimeographed. Leiden.
De lange weg. [*Peziza alpina* sensu Oudemans] *In* Gorteria **4**: 98–100.
Een nieuwe bewoner van de duinen. [*Bovista limosa* Rostr.] *In* Coolia **14**: 6–7.
Review: M. A. Rifai, The Australasian Pezizales in the Herbarium of the Royal Botanic Gardens Kew. 1968. *In* Taxon **17**: 725–726.
Review: Dennis, R. W. G., British Ascomycetes, Lehre 1968. *In* Persoonia **5**: 207–208
Review: Arx, J. A. von, Pilzkunde, Lehre 1967. *In* Persoonia **5**: 208.
Review: Mushroom Science VI, Wageningen 1967. *In* Persoonia **5**: 209.
Review: Fidalgo, O. & Fidalgo, M. E. P. K., Dicionário micológico, Rickia supl. 2, 1967. *In* Persoonia **5**: 209.

1969

Notes on Hydnums, VIII. *In* Proc. K. Ned. Akad. Wet. (C) **72**: 213–221.
Studies in Cup-fungi, II. *In* Proc. K. Ned. Akad. Wet. (C) **72**: 311–321.
De Fungi van Nederland. II. Pezizales — deel 2 – Ascobolaceae, Humariaceae, Pyronemataceae, Sarcoscyphaceae, Thelebolaceae. *In* Wet. Meded. K. Ned natuurh. Ver. **80**: 1–84.

The genus *Sarcodon* in Sweden in the light of recent investigations. *In* Svensk bot. Tidskr. **63**: 401–440 (with J. A. Nannfeldt).

1970

A short note on *Mycorrhaphium insulare* (Pat.) Maas G. *In* Biologia **15**: 11–12 (with S. Ahmad).

A propos d'un *Cristella* de la république Centrafricaine. *In* Cah. Maboké **8**: 27–31.

Hydnum s.l. *In* Flore icon. Champ. Congo **17**: 325–331.

Review: Corner, E. J. H., A monograph of *Thelephora* (Basidiomycetes), Beihefte Nova Hedwigia 27, 1968. *In* Persoonia **6**: 167.

Review: Mushroom Science VII, Wageningen 1968. *In* Persoonia **6**: 167–168.

Pezizale aanvullingen. *In* Coolia **14**: 121–122.

Helvella macropus met wrattige sporen. *In* Coolia **14**: 151–152.

Wat in het vat is.... *In* Coolia **14**: 152.

1971

De Nederlandse *Tulostoma*-soorten. *In* Gorteria **5**: 189–193.

Hydnaceous fungi of the eastern Old World. *In* Verh. K. Ned. Akad. Wet,. Afd. Natuurk. II, **60**: 1–176.

Review: Talbot, P. H. B., Principles of fungal taxonomy, 1971. *In* Persoonia **6**: 382.

Reviews: Henderson, D. M., Orton, P. D. & Watling, R., Introduction. In British Fungus Flora, Edinburgh 1969. — Watling, R. Boletaceae: Gomphidiaceae: Paxillaceae. In British Fungus Flora 1, Edinburgh 1970. *In* Persoonia **6**: 292–293.

Review: Webster, J., Introduction to fungi, Cambridge 1970. *In* Persoonia **6**: 293–294.

Gasteromyceten van Nederland. Een determinatietabel tot de soorten der Phallales, Lycoperdales, Tulostomatales, Sclerodermatales en Nidulariales. *In* Coolia **15**: 49–92.

1972

Een kaartindex op Coolia. *In* Coolia **15**: 100.

Een nieuwe stekelzwam voor ons land. *In* Coolia **15**: 144–145.

Spathularia and *Spathulariopsis*. In Proc. K. Ned. Akad. Wet. (C) **75**: 243–255.

1973

Eine neue *Discina* aus der Schweiz. *In* Proc. K. Ned. Akad. Wet. (C) **76**: 101–108 (with J. Breitenbach).

Dr. M. A. Donk, his life and work. *In* Persoonia **7**: 119–126.

Coolia onder de loep. *In* Coolia **16**: 21–27.

1974

Studies in the genera *Irpex* and *Steccherinum*. *In* Persoonia **7**: 443–591.

La typification de l'*Hydnellum concrescens*. *In* Bull. Soc. linn. Lyon **43** (Num. spéc., Trav. mycol. déd. R. Kühner): 241–243.

Notes on Hydnums, IX. *In* Proc. K. Ned. Akad. Wet. (C) **77**: 215–227.

A handful of South American Hydnums. *In* Proc. K. Ned. Akad. Wet. (C) **77**: 228–238.

Verzorging van paddestoelen. *In* Natura **71**: 125–126.

A response to Dr. K. A. Harrison. *In* Mycologia **66**: 868–876.

Hydnaceous fungi of the eastern Old World. Supplement. *In* Proc. K. Ned. Akad. Wet. (C) **77**: 477–495.

1975

Die terrestrischen Stachelpilze Europas (The terrestrial Hydnums of Europe). *In* Verh. K. Ned. Akad. Wet.. Afd. Natuurk. II, **65**: 1–127.

Observations sur quelques champignons hydnoïdes de l'Afrique. *In* Persoonia **8**: 145–165 (with P. Lanquetin).

Corrections. *In* Persoonia **8**: 166.

A new *Clavicorona*. *In* Persoonia **8**: 213–215.

Melastiza flavorubens found in the Netherlands. *In* Persoonia **8**: 215–217.

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NOTES ON THE GENUS PSATHYRELLA—IV

Description of and key to the European species of section Psathyrella

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(With 66 Text-figures and Plates 60—63)

The species of the genus *Psathyrella*, listed by Kühner & Romagnesi (1953: 357) in the groups *Graciles* and *Microrrhizae*, but excluding *P. ammophila*, are described and brought into one section, *Psathyrella* section *Psathyrella* emend. Kits van Wav. Four new species, belonging to this section are described, *P. connata*, *P. melanophylloides*, *P. ridicula*, and *P. melanophylla* [=*Drosophila caudata* sensu Kühn. & Romagn.]. *Drosophila stellata* var. *orbicularis* Romagn. is raised to specific level. Type material of *D. ochracea* Romagn., *D. opaca* Romagn., *D. stellata* Romagn., *D. stellata* var. *orbicularis* Romagn., and *Psathyrella longicauda* P. Karst. has been examined. It is argued that when it comes to a choice between spore size and shape of basidia on the one hand, and the degree of development of the veil on the other hand as leading characters in subdividing the genus *Psathyrella* into subgenera, spore size and shape of basidia are to be preferred because this directly leads to establishing the subgenus *Psathyrella* as a very natural group. The degree of development of the veil as key character leads to an undesirable spreading of closely related species over several subdivisions.

Apart from *P. gracilis* and *P. microrrhiza*, and to some extent *P. polycystis* and *P. pseudogracilis*, all other species of the section *Psathyrella* are very rare; three of our four new species are known only from the type locality. We fully realize that describing new species of *Psathyrella* is a hazardous undertaking as lack of material of these rare species has made it impossible to study and describe thoroughly the variability of their characters. In a previous paper (Kits van Waveren, 1971b) we listed seven considerations which in our opinion should guide us when it has to be decided whether a new species should be described or not. In the present paper we have endeavoured to let ourselves be guided by these considerations.

A. H. Smith, in his recently published (1972) monumental book on the North American species of *Psathyrella*, lists 412 species (398+another 16 in the appendix, making a total of 414, but in the text Nrs. 195 and 218 are missing). Out of these 412 species no less than 265 are described as new species, and 166 of these are based on only one collection; 24 on two. Further, Smith gives 53 new combinations of names and describes 17 new varieties of which many pertain to species also based on only one collection. Over the years he must, just as we, have found that apart from the well known and often common species almost every collection gathered in

the field differs in one or even more minor but also often major respects from any of the species previously collected. Our own herbarium now comprises over 60 still unidentified collections of *Psathyrella*, all of them with full descriptions of the macroscopic and microscopic characters. It would be tempting but scarcely rewarding to publish at random many of them as new species merely by giving the descriptions and finding a name. This is indeed what Smith did in several previous papers, and it is the great merit of his recent book that in it he has now attempted to classify all species, varieties, and forms known to him.

For our methods of examining the pleuro- and cheilocystidia, the shape, size and colour of the spores, the basidia and the pigmentation of the hymenophoral trama, the latter under both the binocular lens and the microscope, the reader is referred to our previous papers (Kits van Waveren, 1968: 132; 1971a: 249, and 1972: 24). Spore measurements are given both as a range and as a mean value added between brackets. For the description of the colours of the macroscopic structures and the spores (mounted in water, NH_4OH 10% or KOH 5% and studied with oil immersion with a rather strongly lit field of view) we used 'Munsell Soil Color Charts' edition 1954 (abbreviated in the text to M.) and the code designating its colours (a few of the colours in the 1971 edition differ very slightly from the corresponding ones in the 1954 edition, and the numbering of the code in the 1971 edition also is very slightly different from that used in the 1954 edition).

It is assumed that Romagnesi wrote the chapter on the genus *Drosophila* in the 'Flore analytique' (Kühner & Romagnesi, 1953), which explains why only his name is quoted when our text refers to this chapter.

In the descriptions of the species we have mentioned neither the cellular structures nor the pigmentation of the various layers of the flesh of the cap, since in our experience neither play any part in the delimitation of the species of section *Psathyrella*. The pigmentation of the trama of the cap is too variable, depending, as it does, largely on the age of the carpophores and on weather conditions (rain). This also goes for the pigmentation of the hymenophoral trama, but to a much lesser extent, so that this pigmentation is of some importance in characterizing species of *Psathyrella*, provided specimens are examined which are neither very young nor too old.

The caps of almost all species of section *Psathyrella* are dark reddish brown in their very early, and early stages. In many species the caps retain this colour for some length of time in the mature stages till the onset of the process of drying. At that stage the caps still look fresh but in fact they have already started drying out, the disappearance of the reddish hue being the first sign. The process sets in quickly so that some colour changes may have already taken place either in the field and/or before study of the specimens in the laboratory. The flesh of the caps is concolorous with the surface of the caps but by the time specimens have been bisected in order to produce habit sketches in the laboratory, the flesh usually has already lost its dark reddish colour. In descriptions therefore the colour of the flesh is often described as merely dark brown or dark greyish brown, whereas in fact it must have been dark reddish brown at onset. The same goes for quite a number of descriptions of the colour of the cap of species described in the literature.

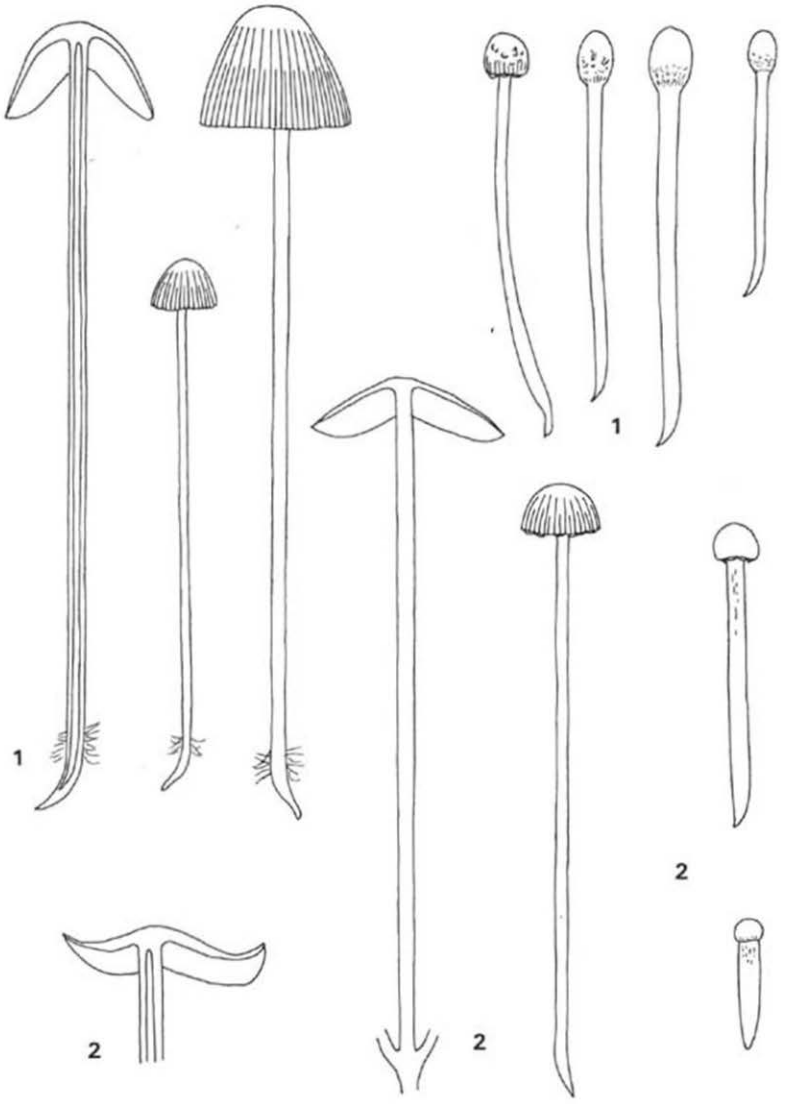


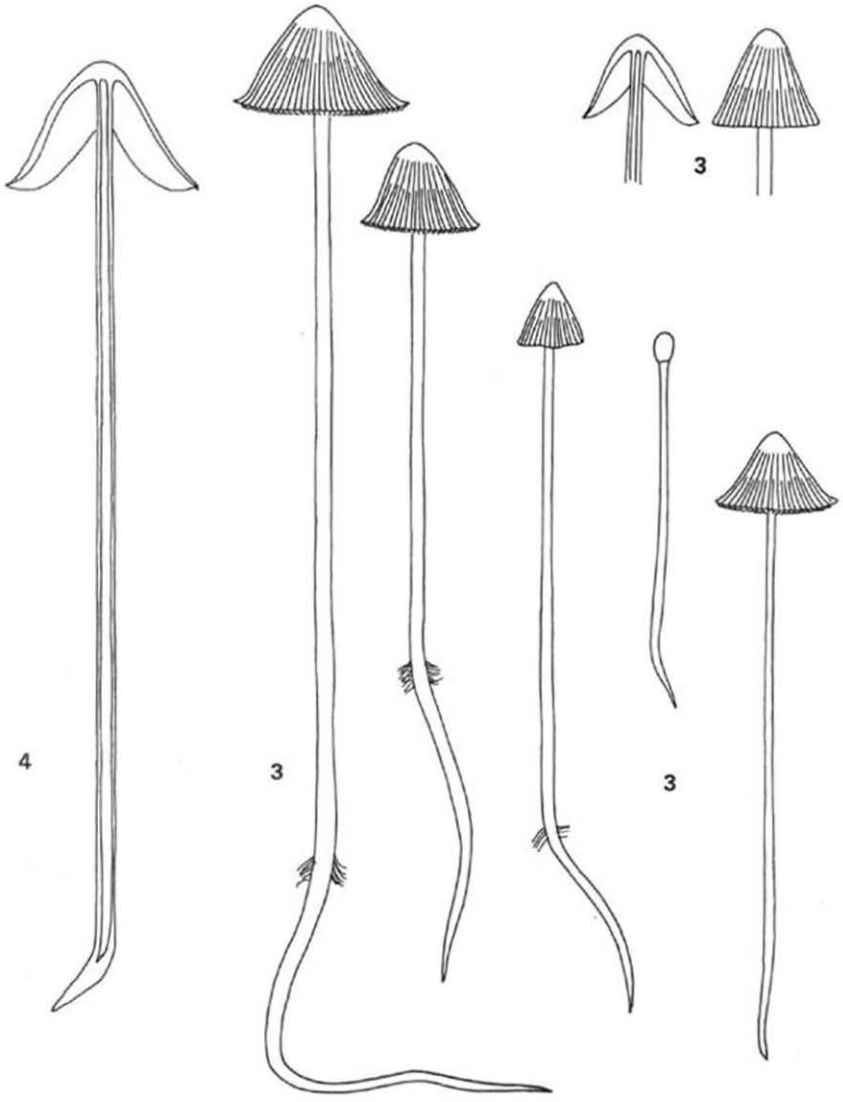
Fig. 1. *Psathyrella bifrons*, 7 Nov. 1961. — Habit sketch (× 1).
Fig. 2. *Psathyrella connata*, 13 Nov. 1962. — Habit sketch (× 1).

Since spore prints were often not available we always used spores from gills of mature carpophores, mounted in NH_4OH 10% for measuring spores sizes and producing sporograms. We were careful to use only the darkest coloured (=ripest) spores, also for assessing the colour of the spores in water, NH_4OH 10% and KOH 5% and the opacity in water.

In the literature descriptions of species of *Psathyrella* rarely give a detailed account of the pattern of the cellular lining of the sterile gill edge. This edge is almost always lined with two types of cells, pleurocystidium-like cells and spheropedunculate cells. In the terminology of the cystidia on the gill edge we follow Romagnesi in describing the pleurocystidioid cells as 'cheilocystidia', and describing the other type of sterile cells as spheropedunculate cells, although we are fully aware of the fact that the latter also are poper cheilocystidia. The proportion between the numbers of these two types of cells and/or the size of the spheropedunculate cells (sometimes also their shape) is characteristic for some species, e.g. *P. gracilis*, *P. microrrhiza*, and *P. prona* (see Kits van Waveren, 1971a, 1972). In our descriptions we have therefore made a point of describing the cheilocystidia and the spheropedunculate cells separately, and estimating the proportion between these two types of cells as accurately as possible. It is advisable to use the mid portion of the gills for this purpose as the spheropedunculate cells often increase in number and also in size towards the margin of the cap. For some species the proportion between the two types of cells varies from one collection to another or even from one specimen of the same collection to another, but for other species this proportion may be quite specific. In rare instances the cheilocystidia may even be absent near the margin of the cap, the spheropedunculate cells dominating the picture.

We therefore introduced the pattern of the cellular lining of the gill edge in the delimitation of species. The gill edge of *P. microrrhiza* (33 collections of different dates), *P. bifrons* (5 collections of different dates), and *P. orbicularis* (3 collections of different dates) are characterized by the very numerous and densely packed cheilocystidia, the spheropedunculate cells, although present, being barely noticeable. Our sole collection of *P. connata* also has densely packed cheilocystidia, and we can only hope that in the future more collections will teach us that this character is constant in this species too. In some of our collections of *P. polycystis* and *P. pseudogracilis* the cheilocystidia are rather densely packed, but in others they are not. Fortunately both species are characterized by the features of their pleurocystidia.

The sizes of the spores in the species of section *Psathyrella* scarcely differ from one species to the other so that no real significance can be attributed to slight differences in spore size. Exceptions are *P.ochracea* and *P.bifrons*. Romagnesi (1953: 357) describes the spores of *P. pseudogracilis* as rather large (11.5–16.5 × 5.7–7.5 μm) but in our material, consisting of nine fairly typical collections, we were unable to confirm this finding (but see observations on *P. pseudogracilis* on p. 396). Like Romagnesi, on examination of the type material we found the spores of *P. ochracea* slightly larger than in any other species of this section. The spores of *P. bifrons* are slightly but distinctly larger than those of *P. microrrhiza*, as already observed by Romagnesi.



Figs. 3, 4. *Psathyrella melanophylla*. — Habit sketches (× 1). — 3. 16 Oct. 1963. — 4. 18 Oct. 1974.

It is interesting that the caps of the species of the *P. melanophylla* group, although they are (cf. Romagnesi, 1953: 358) dark reddish brown in the fresh stage, show no pink shades on drying; but *P. melanophylloides* is an exception to this rule.

As the spores of all species of section *Psathyrella* have the same shape (ellipsoid-amygdaliform), owing to lack of space we have depicted spores of only a few species.

Most species of section *Psathyrella* are very closely related, and in some cases seemingly intermediate forms occur, as pointed out earlier for *P. gracilis* and *P. microrrhiza* (Kits van Waveren, 1971a: 279). *Psathyrella melanophylloides*, in the present paper described as a new species, is intermediate between *P. gracilis* and *P. melanophylla* (see observations on *P. melanophylloides*, p. 370); we also refer to our observations on *P. polycystis* (p. 393) with regard to P. *connata*.

In the chapter dealing with the descriptions of the taxa, the species are arranged in alphabetical order. The author's name is abbreviated to E. K. v. W.

ACKNOWLEDGEMENTS

We are very greatly indebted to Prof. Romagnesi for his very stimulating encouragement in the undertaking of our study of the genus *Psathyrella* and for taking so much interest in our work. We also wish to thank him very much indeed for sending us from his own herbarium material of the species he described in 1952, *P. ochracea*, *P. opaca*, *P. stellata*, and *P. orbicularis*. Furthermore we wish to thank the director of the Museum Botanicum at Helsinki for lending us the type material of *P. longicauda*.

By giving Persoonia a substantial donation, 'Winterthur Insurances Amsterdam' enabled us to give colour pictures of some of our species, for which we are very grateful.

THE SUBDIVISION OF THE GENUS PSATHYRELLA INTO SUBGENERA AND OF THE SUBGENUS PSATHYRELLA INTO SECTIONS

There is a fundamental difference between Romagnesi's (1953) and Smith's (1972) subdivision of the genus *Psathyrella* into subgenera; 4 with Romagnesi (who names the genus *Drosophila*), 11 with Smith. Romagnesi first separates the species of subgenera *Lacrymaria* and *Pluteopsis* from the remaining species of the genus and then uses spore size and shape of basidia as a basic character for separating the species of subgenus *Psathyrella* from those of subgenus *Psathyra*. This concept we fully endorse. Smith on the other hand does not use spore size at all in his key to the 11 subgenera he distinguishes. Having got rid of the species of 9 subgenera whose species are characterized by very special features (ornamented spores, granulose veil, absence of pleurocystidia in combination with the presence of an appendiculate veil, inocyboid thick-walled pleurocystidia, presence of an annulus etc.) he splits the remaining species of the genus into two subgenera, *Psathyrella* and *Pannucia*. This is done on the basis of the development of the veil, the veil being either 'thin to rudimentary or absent (check button stages)' in *Psathyrella*, or 'outer veil and/or partial veil more or

less well-developed, pileus margin appendiculate with remains of partial veil or a combination of both' in *Pannucia*. But what is 'more or less developed'? The limit is bound to be vague.

The result is that with Smith *P. gracilis* and *P. microrrhiza* (=*P. squamifera* with Smith), obviously two very closely related species with even intermediate forms (Kits van Waveren, 1971a: 279), find themselves in two different subgenera: *P. gracilis* in *Psathyrella* and *P. microrrhiza*, because of its veil, in *Pannucia*. Other species of Romagnesi's subgenus *Psathyrella* too are widely spread across Smith's classification: *P. prona* (non-rooting) is placed in section *Atomatae* (of subgenus *Psathyrella*) whose species are said to be 'either coprophilous or growing on very well fertilized soil', whereas the equally non-rooting species *P. atomata* (regarded by us as a form, f. *cana*, of *P. prona*, see Kits van Waveren, 1972: 37) finds itself in the series *Psathyrellae* of subsection *Psathyrellae* of section *Psathyrella* together with the rooting species *P. gracilis* and P. *trepida*. One finds the large-spored *P. bifrons* (spore size according to Smith 8–11×4.5–5.5 μm) in the same stirp (*Frustulenta*) as the small-spored *P. nolitangere* and *P. squamosa*, the latter two species, moreover, grossly differing from each other and each from *P. bifrons*.

Because of the variability of the development of the veil in the many species belonging to the genus *Psathyrella*, even within a single species, further because of the fugacity of the veil (manifestation strongly influenced by environmental conditions, such as rain, and age of the carpophores), and finally because of the frequent absence of primordia or young fresh stages in collections, we strongly feel that when classifying the species of the genus *Psathyrella*, the development of the veil should be brought in at the latest possible moment. Priority over the veil should be given—as it is by Romagnesi (1953: 353) and Singer (1975: 504)—to spore size and shape of basidia. This brings together into one, we believe natural, group a number of species as now find themselves spread throughout Smith's classification.

Singer (1975: 500) has subdivided the genus *Psathyrella* into seven subgenera (*Lacrymaria*, *Homophron*, *Drosophila*, *Heterocystis*, *Cystopsathyra*, *Psathyra*, and *Psathyrella*). We wholeheartedly endorse Singer's adoption of Romagnesi's concept of *Psathyrella* as distinguishable from *Psathyra* mainly by the large spores, which are mostly practically black in print or at least fuliginous-fuscous, and the characteristically ventricose to subvesiculose basidia with usually very narrow pedicel. Singer has not attempted a further subdivision of the subgenus *Psathyrella* into sections. In this paper we propose a subdivision into five sections.

In an earlier paper (Kits van Waveren, 1972: 23–54) we discussed at full length the European species of one section, viz. section *Atomatae*, which are characterized among other features by a non-rooting stem. Here we will deal with a second section, viz. section *Psathyrella* emend. Kits van Wav. It comprises all rooting species of the subgenus, therefore all species of Romagnesi's (1953: 357) groups *Graciles* and *Microrrhizae* of subgenus *Psathyrella* except *P. ammophila*. We feel that in several respects the latter species differs so much from the homogenous lot of species of our section *Psathyrella*, that a separate section should be introduced for it (habit and

habitat quite different, cap neither conical nor campanulate in any stage and very fleshy and accordingly not striate, stem firm and not really rooting, pleurocystidia very scarce, and cheilocystidia very sparsely and scattered.

Psathyrella conopilea (*subatrata*) and allied species of which the caps bear long thick-walled setae are again very different from the species of sections *Atomatae* and *Psathyrella*, and therefore demand a section of their own. For the purple-coloured *P. bipellis*, Malençon & Romagnesi (1953: 117) already founded section *Bipelles*. We intend dealing in full with these three sections and their species in a future paper. We have united the species of Romagnesi's groups *Graciles* and *Microrrhizae* into one section because our examinations taught that *P. gracilis* and *P. pseudogracilis* both have traces of a veil, whereas in some species of the *Microrrhizae* the development of the veil is similar; that in some species of the *Microrrhizae* the hymenophoral trama is just as colourless as in those of the *Graciles*; and that the red gill edge is a very unreliable character, occurring, moreover, in species of both groups. Finally seemingly intermediate forms occur between species of both groups (Kits van Waveren, 1971a: 279).

Our section *Psathyrella* does not correspond at all with section *Psathyrella* sensu Smith, which comprises the species of his subsection *Mesosporae*, none of them rooting (including the European species *P. orbitarum* = *P. prona*, see Kits van Waveren, 1972: 23–54, and also *P. clivensis*), nor does it correspond with the species of his subsection *Psathyrellae*, of which only a few are rooting and which includes *P. ammophila*. Moreover, the distinctly rooting *P. microrrhiza* is not included in Smith's section *Psathyrella*.

PSATHYRELLA (Fr.) Quél. section PSATHYRELLA *emend.* Kits van Wav.

Carpophores terrestrial, sometimes cespitose or subcespitose, often gregarious. Caps small to medium size, 15–40 mm in diam., coloured some shade of reddish brown, brown or greyish brown, striate when moist, hygrophanous and often showing pink on drying; veil varying from absent to rather strongly developed; gills broad and almost always broadly adnate, often with red edge; stems up to 150(–180) mm long, rooting; hymenophoral trama varying from practically colourless to usually distinctly brown from membranal pigment; spore print purple black or black; spores large, 10–14 × 6–7 μm, in water dark reddish brown; basidia 4-spored and ventricose (10–12 μm broad); pleurocystidia present; gill edge sterile with varying numbers of cheilocystidia and spheropedunculate cells. Type species: *P. gracilis* (Fr.) Quél.

For three reasons draughting a key to the species of section *Psathyrella*, in fact to the species of any section of the genus *Psathyrella*, is bound to be a hazardous undertaking: (i) Within a single species the variability of the majority of characters is great. Sizes of carpophores (diameter of cap, length of stem and root, the latter often very short and therefore both in the field and in the laboratory easily overlooked) for instance vary greatly, depending, as they no doubt do, on substrate, climatologic conditions, etc. Colour variations of the cap and to a lesser degree of the gills are considerable, and the development of the veil varies a good deal. Sizes and shape of pleurocystidia also vary considerably within a single species (see our pleuro-

cystidiograms of *P. polycystis* in the present paper, and of *P. microrrhiza* in our previous paper, 1971a: 249–280). (ii) This variability naturally also exists in those species which are rare, and of which as a result only a few collections (often even only one) are available, and in these cases the variability is inevitably almost unknown. (iii) Seemingly intermediate forms between species exist. For the species of the section *Psathyrella* we describe and discuss them in the observations on the species involved as we did for *P. gracilis* and *P. microrrhiza* in a previous paper (1971a: 274–279).

Like Romagnesi we believe the colour (pigmentation) of the hymenophoral trama to be important in the delimitation of many species. It is to be studied both macroscopically (binocular lens) and microscopically on 'washed' gills of neither too young nor too old but just mature specimens. But this pigmentation is also subject to some variation.

The key to the species is based on what are regarded as the essential and standard characters of the species. It does not comprise variations of species which are regarded as accidental, atypical, and therefore not warranting the introduction of new forms or varieties. An exception is made for the occasional collections of *P. gracilis* and *P. microrrhiza* with a white gill edge as the sole deviation from the standard characters.

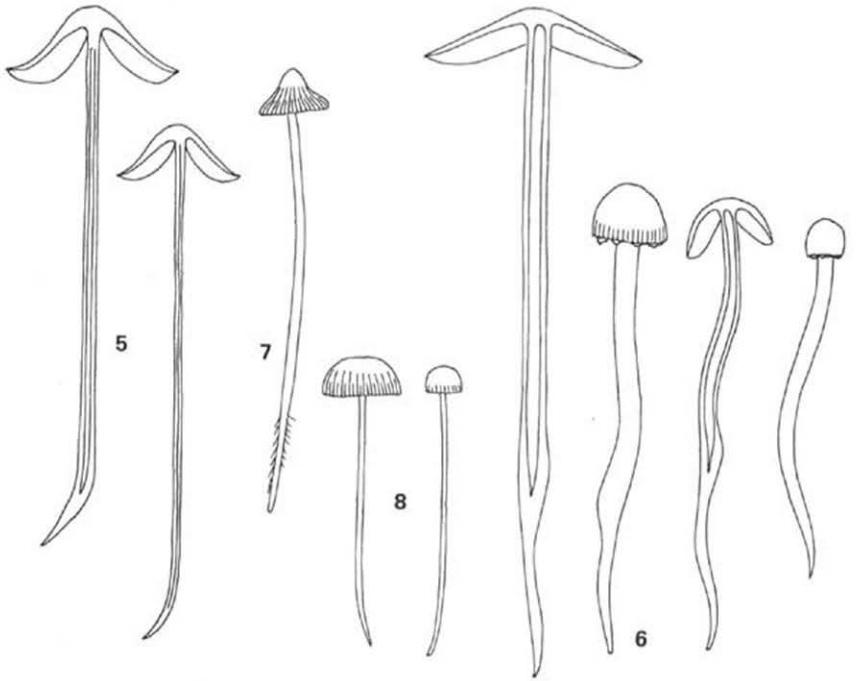


Fig. 5. *Psathyrella melanophylloides*, 21 Oct. 1973. — Habit sketch (× 1).
Fig. 6. *Psathyrella longicauda*, 11 Nov. 1969. — Habit sketch (× 1).
Figs. 7, 8. *Psathyrella orbicularis*. — Habit sketches (× 1). — 7. 23 Oct. 1959. — 8. 1 Oct. 1966.

KEY TO THE SPECIES OF *Psathyrella* SECTION *Psathyrella*

1. Hymenophoral trama colourless or almost so on both macroscopical (binocular lens) and microscopical examination.
   2. Gill edge red.
      3. Pleurocystidia obclavate, lageniform or fusiform, slender, often wavy, with subobtuse to acute apex, 8—15 μm wide.
         4. Caps 6–30 mm in diam., rugulose; stem 20–110 mm long.
            5. Caps dark brown, then brown, soon greying; gills dark grey to purple black *P. gracilis* f. *gracilis*, p. 366
            5. Caps pale yellowish brown or yellowish to white; gills white and carrying few spores . . . . . *P. gracilis* f. *substerilis*, p. 366
         4. Caps 15–50 mm in diam., predominantly grey, moderately to strongly rugose; stem 60–150 mm long. . . . . *P. gracilis* f. *corrugis*, p. 366
      3. Pleurocystidia at least partly clavate, cylindrical, subutriform, utriform or ventricose.
         6. Pleurocystidia partly clavate, cylindrical, subcylindrical (sometimes constricted or subutriform and partly obclavate, lageniform or fusiform, 9–15 μm wide *P. gracilis* f. *clavigera*, p. 366
         6. Pleurocystidia ventricose, subutriform or utriform, 10–20 μm wide *P. pseudogracilis*, p. 396
   2. Gill edge white.
      7. Germ pore distinct, ±2 μm wide; fruitbody solitary.
         8. Pleurocystidia obclavate, lageniform to fusiform, slender, often wavy, with subobtuse to acute apex, 50–70×8–15 μm *P. gracilis* f. *gracilis* with white gill edge, p. 366
         8. Pleurocystidia versiform, partly as in *P. gracilis* but many cylindrical, subcylindrical (sometimes constricted), mucronate, usually rather small, 30–50×8–12.5 μm, sometimes width up to 12.5–17.5 μm . . . . . *P. gracilis* f. *albolimbata*, p. 366
      7. Germ pore indistinct, ±1.5—1.8 μm wide; fruitbodies cespitose or subcespitose (rarely solitary); gills dark grey to black.
         9. Cap conical, with marginal area revolute; fruitbodies usually cespitose or subcespitose.
            10. Pink on dry cap; gills ventricose and narrowly adnate; stem 35–70 mm long; pleurocystidia rather numerous, slender, 50–70×7.5—10 μm *P. melanophylloides*, p. 378
            10. No pink on dry cap; gills straight and broadly adnate; stem 70–150 mm long; pleurocystidia scarce, 35–60×9–15 μm. . . . . *P. melanophylla*, p. 370
         9. Cap campanulate, with marginal area not revolute; fruitbodies solitary *P. pellucidipes*, p. 390
1. Hymenophoral trama coloured on both macroscopical (binocular lens) and microscopical examination.
   11. Gill edge red.
      12. Pleurocystidia exceedingly numerous, very slender; swollen apex 'spatula'-like *P. polycystis*, p. 393
      12. Not as above.
         13. Cheilocystidia exceedingly numerous, densely packed.
            14. Veil strongly developed (fibres, bundles of fibres, flocci, in young specimens appendiculate); carpophores large (cap 17–50 mm in diam., stem 25–190×1–4 mm) . . . . . *P. microrrhiza*, p. 381
            14. Veil forming finer network, not appendiculate; carpophores small (cap 10–17 mm in diam., stem 35–70×1 mm) . . . . *P. orbicularis*, p. 388
         13. Cheilocystidia scattered to moderately numerous.

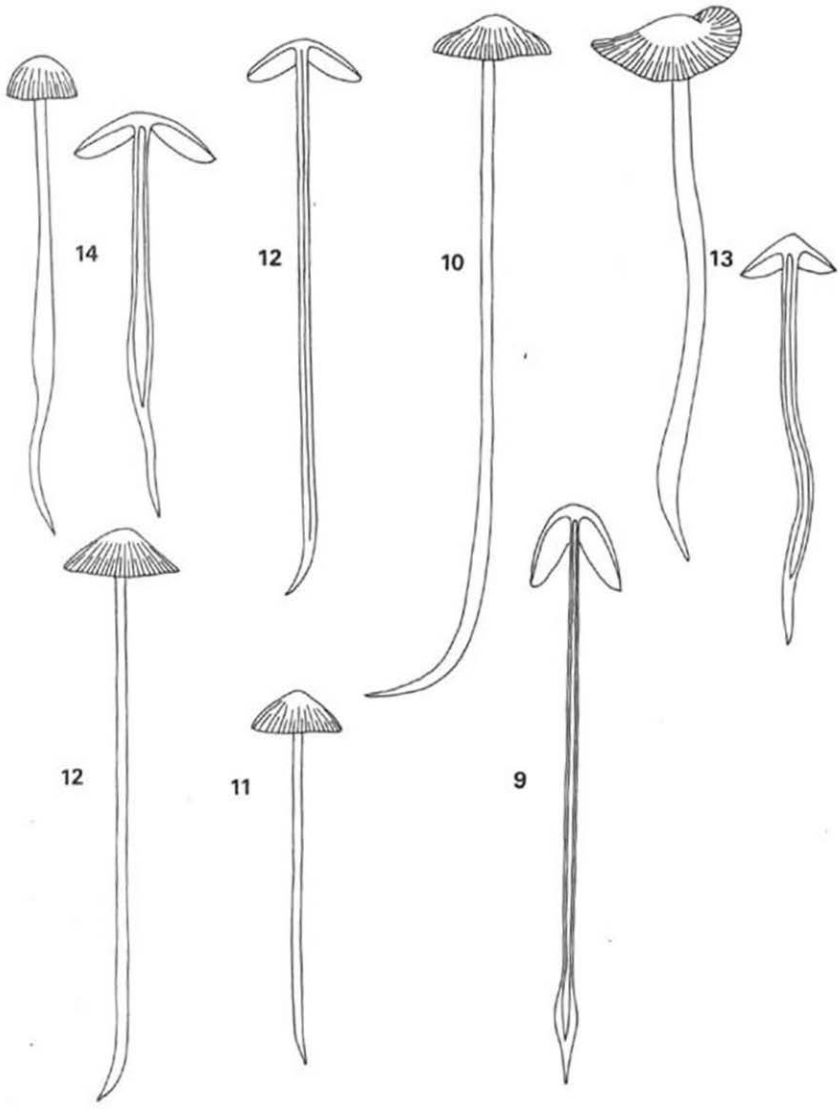


Fig. 9. *Psathyrella pellucidipes*, 19 Sept. 1967. — Habit sketch (×1).
Figs. 10–14. *Psathyrella polycystis*. — Habit sketches (×1). — 10. 22 Sept. 1962. — 11. 28 Sept. 1962. — 12. 13 Nov. 1962. — 13. 11 Nov. 1967. — 14. 28 Sept. 1968.

15. Cap 8—18 mm in diam., pale ochraceous with faint reddish hue; dry cap strongly rugose (cerebriform) . . . . . *P. ochracea*, p. 384
15. Cap 22–23 mm in diam., chestnut brown, brown, undulating, lobed and sulcate . . . . . *P. stellata*, p. 401

11. Gill edge white.
16. Cheilocystidia exceedingly numerous, densely packed.
17. Fruitbodies solitary but usually gregarious; veil strongly developed; stem up to 190 mm long; pleurocystidia 40–70 × 8–15 μm.
18. Cap very broadly obtuse campanulate, 15–45 mm in diam., ochre brown; gills tobacco brown (but sometimes bicoloured and then basidia 4–, 2– and 1–spored, vast majority sterile) . . . . . *P. bifrons*, p. 356
18. Cap conical, conico-campanulate, 17–50 mm in diam., dark brown, dull brown or greyish brown; gills dark purple grey to purple black; basidia always 4-spored . . . . . *P. microrrhiza* with white gill edge, p. 381
17. Fruitbodies cespitose; veil distinct; stem up to 80 mm long; pleurocystidia very long and slender, 65–80(–100) × 10–12 μm . . . . . *P. connata*, p. 363
16. Cheilocystidia neither numerous nor densely packed.
19. In marshes; cap fuligineous brown . . . . . *P. trepida*, p. 402
19. Not as above.
20. Cap pale brown or ochraceous, drying very rapidly; pleurocystidia 35–40 × 7.5–10 μm. . . . . *P. opaca*, p. 386
20. Cap dark brown or chestnut brown, drying slowly; pleurocystidia 40–80 × 7.5–14 μm.
21. Fruitbodies gregarious in humus or manured grass; veil fairly strongly developed (appendiculate in young specimens); stem 3–3.5 mm in diam., pseudorrhiza 10–30 mm long; germ pore indistinct; pleurocystidia slender, 50–80 × 9–12.5 μm. . . . . *P. longicauda*, p. 366
21. Fruitbodies subcespitose round tree trunk; veil rudimentary; stem 1–2 mm in diam., pseudorrhiza 5–15 mm long; germ pore distinct; pleurocystidia 40–60 × 7.5–14 μm . . . . . *P. ridicula*, p. 398

PSATHYRELLA BIFRONS (Berk.) A. H. Smith—Pls. 60, 61; Figs. 1, 19–22 (*sensu* W. G. Smith, Ricken, Kühner & Romagnesi; *non* Rea, A. H. Smith).

Agaricus bifrons Berk. *in* Hooker, English Flora J. E. Smith **5**(2): 114. 1836. — *Pannucia bifrons* (Berk.) P. Karst. *in* Bidr. Käpn. Finl. Nat. Folk **32**: 514. 1879. — *Psathyra bifrons* (Berk.) Quél. *in* Bull. Soc. bot. Fr. **26**: 52. '1879' [1880] (misappl.). — *Drosophila bifrons* (Berk.) Quél., Ench. Fung.: 117. 1886 (misappl.). — *Psilocybe bifrons* (Berk.) P. Hennings *in* Engler & Prantl, Natürl. PflFam. **1** (1**): 235. 1898. — *Hypholoma bifrons* (Berk.) Bigeard & Guillemin, Fl. Champ. sup. Fr.: 281. 1913 (misappl.). — *Psathyrella bifrons* (Berk.) A. H. Smith *in* Contr. Univ. Mich. Herb. **5**: 40. 1941 (misappl.); *sensu* Berk., W. G. Smith (Syn. Brit. Bas.: 192. 1908), Ricken (Blätterp.: 257, 1913), Kühn. & Romagn. (Fl. anal.: 358. 1953).

MISAPPLIED.—*Agaricus bifrons* sensu Fries, Hym. europ.: 307. 1874 (=*A. conopilea*?); Monogr. Hym. Suec. **2**: 347. 1857 (=*A. conopilea*?); Ic. sel. Hym. **2**: 38, pl. 138 fig. 2. 1879 (=*A. conopilea*?). — *Agaricus bifrons* sensu Cooke, Ill. Brit. Fungi **4**: pl. 616/594. 1884–1886 (=*A. conopilea*?); *Psathyra bifrons* sensu Rea, Brit. Basidiomyc.: 416. 1922 (=.....?).

SELECTED DESCRIPTIONS AND ILLUSTRATIONS. — Ricken, Blätterp.: 257. 1913. — Kühn. & Romagn., Fl. anal.: 358. 1953.

CHIEF CHARACTERISTICS.—Solitary to gregarious; cap 15–45 mm, strikingly broadly obtuse campanulate, ochraceous brown tinged with red, not showing pink on drying; veil strongly developed; gills 'brun tabac' according to Kühn. & Romagn. (1953:

358) but in our collections bicoloured because of abnormal sporogenesis, with edge white; stem rooting (pseudorrhiza 5–10 mm); spores 11.7–14.4×6.3–7.2 μm; pleurocystidia 45–70×10–15 μm, lageniform; cheilocystidia very densely packed; basidia 4-spored but in our collections also some 2- and 1-spored, giving rise to larger spores of 14.9–17×6.8–8.1 μm; hymenophoral trama coloured.

MACROSCOPIC CHARACTERS.—Cap at first (primordia: diam. of cap 3–5 mm, height 5–8 mm, margin appressed to stem) ellipsoid, not striate, dark reddish brown (M. 5 YR 3/4–4/4) or dark yellowish brown (M. 5 YR 4/6); when slightly older (diam. 8–10 mm, height 6–7 mm) hemispherical-campanulate, slightly striate at margin and reddish brown (M. 5 YR 4/4, 4/6) only at top, the remainder having lost the reddish hue, being dark brown (M. 7.5 YR 4/4), towards the edge paler, just brown (M. 7.5 YR 5/6), at margin ochraceous (M. 7.5 YR 7/8). Mature cap 15–45(–50) mm in diam., 11–30 mm high, conspicuously broadly obtuse, campanulate, sometimes even subhemispherical, in the final stages sometimes vaguely lobed, the surface sometimes grooved, the very thin, whitish extreme margin barely turning up; dark ochre brown with a faint reddish hue (M. 5 YR 5/6, 5/8, 6/6), paler towards margin (M. 7.5 YR 7/6, 8/6) and in later stages pale sordid ochre brown, oaknut colour (M. 10 YR 5/4, 6/4), again paler towards margin, only in final stages and sometimes only in local areas with a trace of grey or purplish because of the presence of spores (M. 10 YR 5/3, 4/2), finely striate almost to centre, hygrophanous, drying out to pale alutaceous, very pale yellowish brown or sordid white (M. 10 YR 8/4, 8/3), slightly darker at centre (M. 10 YR 7/3, 7/4), without pink shades, sometimes slightly micaceous, rugulose.

Veil rather strongly developed; in young stages white fibres and bundles of fibres or even flocci arranged at random on cap, reaching up to 1/2–2/3 from margin upwards and sometimes even at top, their number increasing towards margin, sometimes forming appendiculate flocci and denticles; easily detersible, in mature specimens usually absent.

Gills 4–6 mm broad, faintly ventricose near margin of cap, then straight, ascending, broadly adnate with a tooth. Colour when viewing the gills from underneath cap in very young specimens very pale brown (M. 10 YR 7/1, 7/2), later on (but still immature) slightly darker (M. 10 YR 7/3), next with a trace of grey (M. 10 YR 6/2, 5/2) and finally still greyer (M. 10 YR 5/1), particularly so towards the stem. Gills on viewing their face in very young specimens pale brown (M. 10 YR 7/2, 7/3) at base, whitish towards and white near edge; in mature specimens to a certain extent bicoloured: in basal part very pale brown (M. 10 YR 7/1, 7/2, 7/3), towards edge and particularly towards stem greyer (M. 10 YR 6/1). Gills throughout their entire surface fairly densely and minutely speckled by spore accumulations, almost always more densely towards and near edge, and particularly near stem. Spore accumulations in some areas often denser than in others, leaving brown colour of gill clearly visible between them. Edge of gills white and minutely fimbriate.

Stem 70–180×2–4 mm, straight, rather firm, cylindric or very slightly thickening towards base, whitish in upper part, isabelline to pale brown in lower ±2/3, sordid brown at base, hollow, at apex pruinose, rooting but with pseudorrhiza very short (4–10 mm) and easily overlooked, at base strongly strigose with white and often long hairs often reaching some 20–40 mm up, at extreme base sometimes thickened.

Flesh of cap very thin, 1.5 mm in centre, sordid ochre brown; flesh of stem pale brown, darker at base, white in upper part.

Spore print purplish black.

Trama of 'washed' gill under binocular lens hyaline, distinctly brown in a fairly narrow zone along base (M. 10 YR 6/3, 6/4, 5/6), the remainder up to edge pale brown (M. 10 YR 7/3, 7/4).

MICROSCOPIC CHARACTERS.—Spores 11.7–14.4 × 6.3–7.2 μm (averages 12.5–12.9 × 6.5–6.8 μm); excluded, however, all spores (37 out of a total of 250 spores measured, 50 out of each of our 5 collections) measuring 14.9 μm long or longer,[1] as these were taken to have come from 2- or even 1-spored basidia (size of these 37 spores: 14.9–17 × 6.8–8.1 μm); ellipsoid-amygdaliform, in water dark reddish brown (M. 2.5 YR 3/6, 3/4), in NH_4OH 10% scarcely darker (M. 2.5 YR 3/4, 3/6), in KOH 5% dark greyish brown (M. 10 YR 3/3, 3/2, 4/2), opaque, hilar appendix distinct, apical germ pore ± 2 μm wide and distinct. Mature basidia with well developed sterigmata usually rather scarce, sometimes even scarcely present, 17.6–33.6 × (10.4–)11.2–12.8 μm, 4-spored but in all specimens also some 2-spored and rarely even 1-spored basidia (sterigmata 4.8–8 μm long) present.

Pleurocystidia 45–70 × 10–15(–17.5) μm, fairly numerous, lageniform, sometimes with slightly swollen apex, colourless, thin-walled, without mucus or crystals.

Cheilocystidia 20–45(–50) × (5–)7.5–12.5 μm, exceedingly numerous, very densely packed, lageniform, colourless, thin-walled, without mucus or crystals. Clavate cells 10–20 × 2.5–7.5 μm, hardly noticeable, as in number and size very small. Gill edge sterile.

Pigmentation of hymenophoral trama under microscope ('washed' gill mounted in NH_4OH 10%): trama distinctly coloured from base to edge from pale brownish membranal pigment, strongest at and near the base, yellow hyphal septa and some encrustations in basal half of the gill.

Cuticle of cap cellular; cells 16–48 μm in diam., colourless.

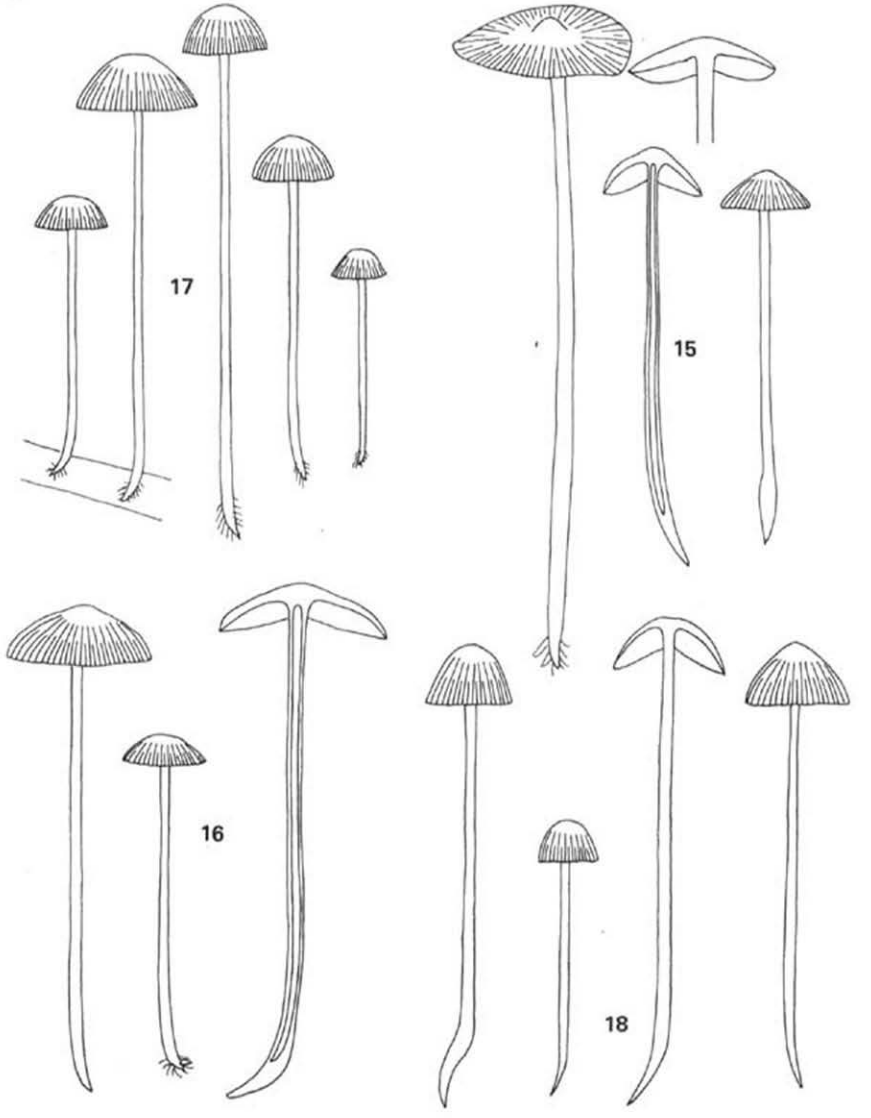
Clamps present on hyphae of stem.

HABITAT.—Gregarious in clayey soil, terrestrial against small pieces of wood, branches. October–November. Very rare.

COLLECTIONS EXAMINED.—THE NETHERLANDS, prov. Noord-Holland, Amsterdam, Amsterdamse Bos, 20 Nov. 1958, 6 Nov. 1959, 9 Oct. and 10 Nov. 1960, 7 Nov. 1961, *E. K. v. W.* (L).

Psathyrella bifrons we found in the years 1958–1961 always in the same area on the clayey soil of the Amsterdamse Bos, growing gregariously and producing tall and very striking carpophores. It has since disappeared from this area. Its characteristic features over the years were both very marked and very consistent: (i) the very broadly obtuse-campanulate and never conical, membranaceous, large cap; (ii) the rather striking ochraceous brown, oaknut brown colour of the cap, which in the early stages was reddish brown; (iii) the total absence of pink in the colour of the drying and dry cap; (iv) the rather strongly developed veil (bundles of fibres, even flocci; young specimens even appendiculate); (v) the white gill edge, and (vi) the irregular, incomplete and obviously abnormal sporogenesis, causing the gills to be somewhat bicoloured. Of these 6 items the first five are in full agreement with Berkeley's (1836: 114) original description in which he calls the cap 'campanulate obtuse' (the word 'conical' is not used), its colour when fresh 'ochraceous-brown tinged with red', and when dry 'pale tan' (no pink mentioned), the colour of the gill edge white. Of the veil Berkeley states that the cap is 'furnished at first with a minute fibrillose very evanescent veil', which might suggest a less strong development of the

[1] Two spores 14.9 μm long; 17 spores 15.3 μm; 4 spores 15.8 μm; 10 spores 16.2 μm; 4 spores 17 μm.



Figs. 15–17. *Psa hyrella pseudogracilis*. — Habit sketches (× 1). — 15. 27 July 1961. — 16. 24 July 1962. — 17. 16 Aug. 1963.
Fig. 18. *Psathyrella ridicula*, 11 Aug. 1962. — Habit sketch (× 1).

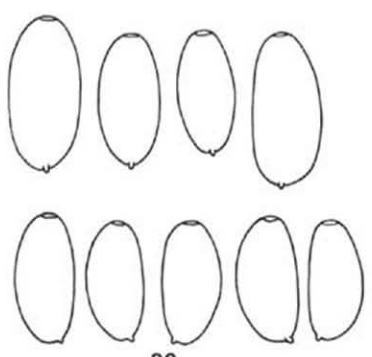
veil than observed in the species described by us above (but see W. G. Smith, 1908: 192). No bicolouration of the gills is mentioned. Microscopical data of course are missing, so that the interpretation of his species has to go entirely by the macroscopical characters.

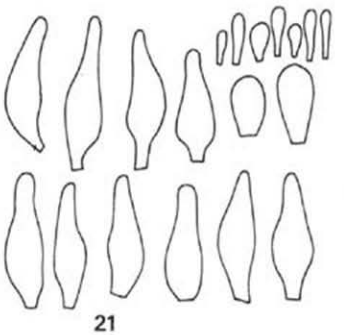
In Berkeley's description no indication or explanation at all is given why he chose the epithet '*bifrons*'. Ricken (1913: 257) probably interpreted this epithet as pertaining to the gills. Of the species he named *Psathyra bifrons* he described the gills (in italics) as 'öfter sogar zweifarbig, nach dem Hutrande hin sammetschwarz, um den Stiel herum weiss', and 'in seiner besten Entwicklung mit halbweissen und halbschwarzen Lamellen'. Buch (1952: 270), who adopted Ricken's interpretation of *P. bifrons*, also described the gills as bicoloured, be it that he found the gills 'grau, teilweise nach dem Hutrand zu weissgelblich und gleichzeitig nach dem Stiele zu schwarz'. Our collections on the whole showed the pattern of sporogenesis found by Buch; the spores had accumulated chiefly near the stem and in the area near the edges. Besides the whole surface of the gills of our mature specimens was minutely speckled with spore accumulations between which the true brownish colour of the gills clearly showed. The spreading of these areas was irregular; they were mostly located near the base of the gills and towards the margin of the cap.

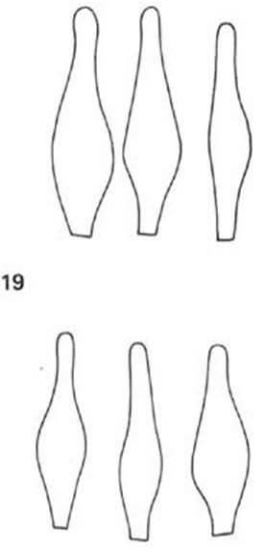
Other authors, on the other hand, indicate that the epithet '*bifrons*' pertains to the change of colour taking place while the cap is drying. Cooke (1871: 151) for instance added 'Changing *Psathyra*' to the epithet, and later (1887: 215) '*Bi-frons*=with two foreheads or faces, like Janus, from the changing colour'. W. G. Smith (1908: 192) wrote behind the epithet *bifrons* '(from the two-coloured pileus; *bifrons* with two faces)', and to him we owe a most valuable contribution to the interpretation of *P. bifrons* Berk. He gave a short but very adequate description of what he called *P. bifrons* Sacc. (but Saccardo, 1887: 1071, writes '*P. bifrons* Berk.') in which he stated: Cap obtuse, ochraceous brown tinged with red, whitish when dry, evanescent white-fibrillose, stem subrooting, gills pink-cinereous, edge white. He illustrated this description by depicting two specimens, which strikingly correspond with the specimens of our own collections: very broadly obtuse campanulate caps (diam. 30 mm, stem 100 mm long), slightly but distinctly rooting stems and moreover a rather strongly developed veil. All this fully agrees with Ricken's and Kühner & Romagnesi's interpretation of *P. bifrons* and the species described by us above. The large size of the carpophores of our collections (larger than described by Berkeley, but corresponding with W. G. Smith's description) is easily explained by the fact that the clayey soil of the Amsterdamse Bos not only produces many species of *Psathyrella* but also notably large carpophores of such species as *P. gracilis* and *P. microrrhiza*, both closely related to *P. bifrons*.

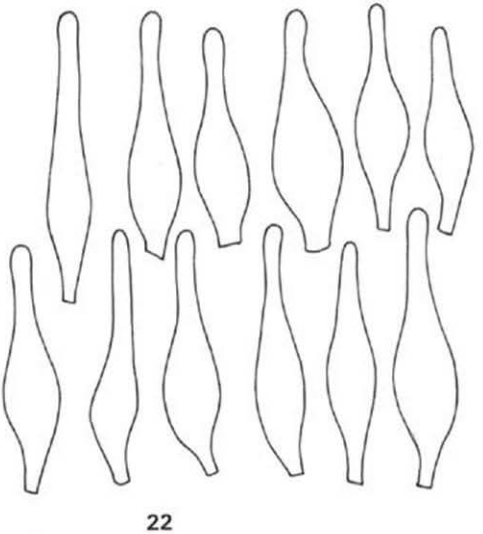
We learned from the mycologists of the Herbarium at Kew, London, and Edinburgh that they did not know nor had ever seen specimens named *P. bifrons*, and that these herbaria did not possess material labelled *P. bifrons*, let alone type material of this 'British' species. According to the New Check List (Dennis & al., 1960: 143, 175) two interpretations of the species exist: the one by Rea (1922: 416) and A. H. Smith

(1941: 40), and the one by Ricken (1913: 257) and Kühner & Romagnesi (1953: 358). Rea merely copied Berkeley's description and added figures for the spore size (9–10×4–5 μm), and Ricken's description of the cheilocystidia ('36–40×6–8 μm, blunt'). He claims that he has seen the species ('v.v.') and states that the species is 'not uncommon'. Rea quotes Cooke's plate 616/594 fig. A (1884–1886) which shows 6 specimens, all, however, with conical caps, the largest having a diameter of only









Figs. 19–22. *Psathyrella bifrons*. — 19–21. 7 Nov. 1961. — 19. Pleurocystidiogram (×575). — 20. Spores (×1212). — 21. Cheilocystidiogram (×575). — 22. 20 Nov. 1958. — Pleurocystidiogram (×575).

12 mm; the stems being non-rooting, measuring up to 50 mm long, and some of them wavy. One therefore wonders whether Rea's description pertains to another species.

A. H. Smith (1941: 40), while giving a more elaborate description, states that he based the determination of the single collection he found on Rea's description. His description says of the cap that it is 10–30 mm broad, obtusely conic and only sometimes campanulate, of its colour that it is pale buff, changing to sordid cinnamon brown, fading to sordid tan (no pink mentioned), of the veil that it is strongly developed, of the stem that it measures 60–100 × 3–5 mm (no pseudorrhiza mentioned). The spores are said to measure only 8–10 × 4–5 μm, and pleurocystidia are said to be absent. His description of 1972 (: 219) is practically the same, the diameter of the cap is given as 10–20 mm and the spores are said to be slightly larger, 8–11 × 4.5–5.5 μm. In our opinion therefore Smith's description deviates too much from Berkeley's original description and the supplementary description furnished by W. G. Smith.

Contrary to authors of the New Check List we therefore believe that W. G. Smith's, Ricken's, and Kühner & Romagnesi's interpretation of *P. bifrons* Berk. is to be preferred.

Neither Berkeley's original description of *P. bifrons* nor any of the later descriptions —except those of Ricken and Buch—mention the bicolouration of the gills. Kühner & Romagnesi (1953: 358), while merely mentioning the phenomenon, state not having noticed it in their collections. In all specimens of our collections this bicolouration was clearly present, be it not to the extent as described by Ricken and Buch, and as depicted by Ricken. In our specimens the bicolouration was obviously caused by some kind of disturbance in the sporogenesis, causing many basidia to be sterile, others to be 4-spored (their number varying between a great many and very few), 2-spored and (rarely) even 1-spored. Apparently this disturbance occasionally (be it very rarely) occurs in *P. bifrons*. Neither Ricken nor Buch mention the presence of 2- and 1-spored basidia (thus far unique in section *Psathyrella*), nor do they offer an explanation for the bicolouration (Ricken says of the phenomenon that it occurs 'öfter', therefore not always; he was the first author to make the observation). We therefore regard the bicolouration of the gills as abnormal. The normal colour of the gills should be rather brown judging by the colour of the 'washed' gill under the binocular lens. Indeed, Kühner & Romagnesi (1953: 358) call the gills 'brun tabac', Berkeley (1836: 114) 'pinkish-cinereous'.

Psathyrella bifrons, because of its rather strongly developed veil and very densely packed cheilocystidia, is close to *P. microrrhiza*, from which it is difficult to distinguish, but P. *bifrons* has larger spores. Excluding all spores longer than 14.4 μm and probably produced by 2- and 1-spored basidia, from our calculations, the average size of the spores of *P. bifrons* is still slightly but distinctly larger than the average size of the spores of *P. microrrhiza* (12.7 × 6.6 against 11.9 × 6.3 μm), as Romagnesi (1953: 358) already had discovered. Other differences with *P. microrrhiza*: the very broadly obtuse campanulate and more ochraceous brown cap, the consistently white gill edge, and the colour of the gills ('brun tabac' according to Kühner & Romagnesi).

Specimens of *P. microrrhiza* with a white gill edge (*P. microrrhiza* var. *pseudobifrons* Romagn., not validly published) may be difficult to distinguish from *P. bifrons*, but spore size will help.

Our specimens cannot be regarded as substerile specimens of *P. microrrhiza* since substerile forms of species of *Psathyrella* section *Psathyrella* in our experience are always barely pigmented and consequently whitish, looking like Mycenas (see *P. gracilis* f. *substerilis*, described in a previous paper, Kits van Waveren, 1971a: 267).

Psathyrella connata Kits van Wav., *sp. nov.*—Figs. 2, 23, 24

Pileus 10–35 mm latus, campanulatus deinde convexus postremo interdum margine repandus, castaneus deinde fuscus vel spadiceus, 1/2 striatus, hygrophanus, in sicco avellaneus, centro pallide ochraceus, leviter micaceus rugulosusque, haud roseus. Velum distincte formatum, album, primo exigue appendiculatum etiam pilei margine atque stipitis superficie affixum deinde in pileo stipiteque distincte fibrillosum. Lamellae marginem versus ventricosae, rectae, ascendentes, late adnatae, 3–5 mm latae, obscure purpureo-griseae basi nonnihil brunneae, acie alba. Stipes 50–80 × 1.5–3 mm, aequalis, rectus, firmus, albus, fistulosus, apice pruinosus, plures radice communi exorti. Caro cinereofusca in pileo, albida in stipite. Sporae in cumulo obscure castaneae.

Sporae (10.8–)11.3–12.6 × 6.3–6.8 μm, ellipsoideo-amygdaliformes, in aqua observatae rubiginosae, poro germinativo lato et distincto (±2 μm). Basidia 24–32 × 9.6–12 μm, 4-sporigera. Pleurocystidia (55–)65–80(–100) × 10–12 μm, numerosissima, procera, subcylindrica, sublageniformia, collo longo, tenui-tunicata. Cheilocystidia 27.5–45 × 6–12 μm, conferta, sublageniformia vel subfusiformia. Cellulae spheropedunculatae et clavatae paucae, 15–20 × 7.5–10 μm. Trama lamellarum colorata, basi distincte brunnea, aciem versus pallescens. Cuticula pilei cellularis. Hyphae stipitis fibuligerae.

Cespitosa ad trunci Fagi basin.

TYPUS: 'The Netherlands, prov. Overijssel, Ommen, "Ada's Hoeve", 13 Oct. 1962, *E. Kits van Waveren*' (L).

CHIEF CHARACTERISTICS.—Cespitose growth; cap hemispherical, campanulate-hemispherical, later spreading to convex, with marginal area sometimes revolute; dry cap pale brown, showing neither pink nor concentric zones; veil well developed and in young stages even appendiculate; gills dark purplish brown, edge white; stems rooting and springing from a common root; spore print very dark reddish brown; spores (10.8–)11.3–12.6 × 6.3–6.8 μm, predominantly brown; pleurocystidia (55–)65–80(–100) × 10–12 μm, very numerous, very long and slender; cheilocystidia abundant, intermixed with a small number of spheropedunculate to somewhat clavate cells.

MACROSCOPIC CHARACTERS.—Cap 10–35 mm in diam., 8–10 mm high, hemispherical, then campanulate-hemispherical, later expanding to convex and sometimes in the end with revolute marginal area and then sometimes seemingly umbonate, dark reddish brown (M. 5 YR 3/4, 4/2), then very dark (purplish) brown (M. 7.5 YR 3/2, 4/2), later just dark brown (M. 7.5 YR 4/4, 4/2), particularly at centre, or entirely dark reddish grey (M. 5 YR 4/2); in young stages very slightly striate at margin, later slightly or moderately striate up to half-way from margin to centre, hygrophanous, when dry still conspicuously though pallidly brown (M. 10 YR 6/3), with centre pale ochre, without pink shades, very slightly micaceous and rugulose, without concentric zones.

Veil on cap well developed, white, in young specimens both conspicuously appen-

diculate and forming radially arranged fibres and bundles of fibres up to 1/4 from margin upwards, in mature specimens still forming distinct fibres reaching even half-way up to centre.

Gills 3–5 mm broad, ventricose near margin of cap, then ascending and straight, broadly adnate, at first reddish grey, purplish (M. 5 YR 5/2), later dark reddish grey, dark purple and reddish brown (M. 5 YR 4/1, 3/2), only slightly but distinctly browner towards base, with white edge.

Stem 50–90 × 1.5–3 mm, cylindric, straight, firm, even in mature specimens covered with a white velar coating, white, hollow; apex pruinose; several stems springing from a common short root.

Flesh of cap 1–1.5 mm in centre, dark greyish brown; flesh of stem white.

Spore print very dark reddish brown.

Trama of 'washed' gill under binocular lens distinctly brown (M. 10 YR 6/3) in area near base, remainder of gill paler brown (M. 10 YR 7/3), palest (M. 10 YR 7/2) near the edge.

MICROSCOPIC CHARACTERS.—Spores (10.8–)11.3–12.6 × 6.3–6.8 μm (average 11.5 × 6.1 μm), ellipsoid-amygdaliform, in water yellowish red (M. 5 YR 4/8, 5/6), in NH_4OH 10% darker reddish brown (M. 5 YR 4/4), in KOH 5% dark sordid brown (M. 10 YR 4/3), opaque, with distinct, ±2 μm wide germ pore, and small but distinct hilar appendix.

Basidia 24–32 × 9.6–12 μm, 4-spored.

Pleurocystidia (55–)65–80(–100) × 10–12 μm, strikingly numerous, very slender, subcylindrical, sublageniform with very long subcylindrical neck gradually passing into very slightly ventricose lower part, rarely slightly swollen at apex, thin-walled, apex very thin-walled, colourless, without mucus or crystals.

Cheilocystidia 27.5–45 × 6–12 μm, densely packed (80–90% of total number of marginal cells), sublageniform to subfusiform, thin-walled, colourless, without mucus or crystals, intermixed with a small number (10–20% of total number of marginal cells) of spheropedunculate and somewhat clavate cells, 15–20 × 7.5–10 μm, thin-walled; gill edge sterile.

Pigmentation of hymenophoral trama under microscope ('washed' gill mounted in NH_4OH 10%) distinctly brown from membranal pigment at base of gills, colour gradually becoming fainter towards but still present at edge, with many yellowish hyphal septa and encrustations in basal part.

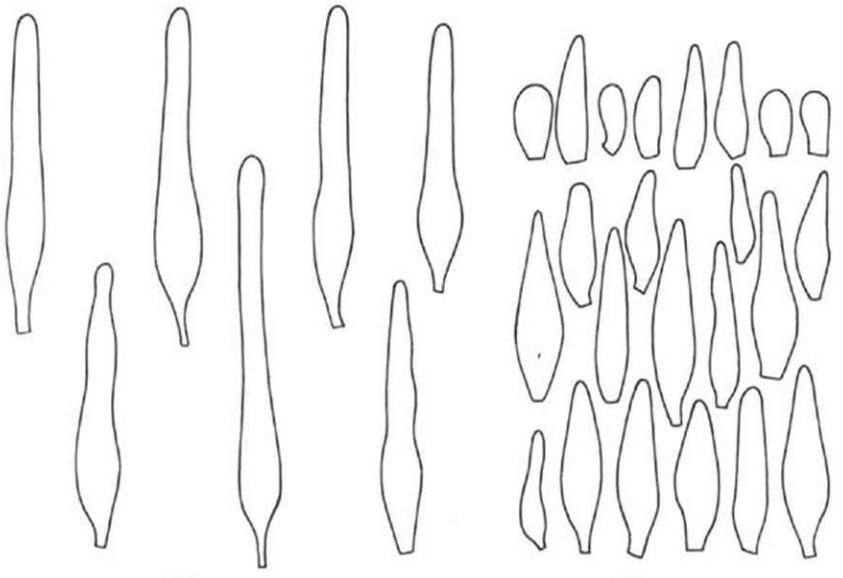
Cuticle of cap cellular; cells 24–48 μm in diam., colourless.

Clamps on hyphae of stem rather numerous.

HABITAT. — Cespitose against large beech stump in wood on sandy soil. October. Known only from type locality.

COLLECTON EXAMINED.—THE NETHERLANDS, Overijssel, Ommen, estate 'Ada's Hoeve', 13 Oct. 1962, *E. K. v. W.* (holotype: L).

At first we believed that this collection from Ommen might represent *P. polycystis* on account of its very numerous pleurocystidia. But in the end we decided that it could not be that species because of the lack of pink in the dry cap, the white gill edge, the rather strongly developed (in young specimens even appendiculate) veil, the remarkably firm stem, the cespitose growth from a common root, and the not swollen apex of the pleurocystidia. The species differs from *P. melanophylla* by its pigmented trama of the gills, its hemispherical-campanulate not conical cap, the by no means very dark spores with a distinct germ pore, and the very numerous pleuro-



Figs. 23, 24. *Psathyrella connata*, 13 Oct. 1962. — 23. Pleurocystidiogram (×575). — 24. Cheilocystidiogram (×575).

cystidia. *Psathyrella longicauda* differs in its non-cespitose growth, black spore print, very dark spores with an indistinct germ pore, different pattern of the lining of the gill edge, the spheropedunculate cells being very numerous, densely packed and fairly large (15–30×7.5–15 μm), whereas with *P. connata* it is the other way round, the cheilocystidia being densely packed and the spheropedunculate cells rather small, both in number and size (15–20×7.5–10 μm).

In A. H. Smith's classification, *P. connata* obviously belongs to subsection *Squamifera* of section *Pannucia*, subgenus *Pannucia*, in which it is closest to *P. longicystis*. Of the latter species the pleurocystidia are said to be abundant, ventricose near the base with a greatly elongated neck and to measure 50–80×10–15 μm. The caps of *P. longicystis*, however, are very small (8–12 mm in diam.), their colour is strikingly pale (pale cinnamon-brown when young, drab-grey to pale fuscous when mature), the veil is not appendiculate and much less developed (surface at first covered by delicate pallid flecks of fibrils), the stem measures only 40–60 mm, the apical germ pore is inconspicuous and the species does not grow cespitosely on wood but occurs on decaying leaves.

PSATHYRELLA GRACILIS (Fr. ex Fr.) Quél.

For a full description of *P. gracilis* and its forms f. *corrugis* (Pers. ex Fr.) Kits van Wav., f. *clavigera* Kits van Wav., f. *albolimbata* Kits van Wav., and f. *substerilis* Kits van Wav. we refer to our earlier paper (1971a: 249–280). In the same paper are given the means of distinguishing *P. gracilis* from *P. microrrhiza* and seemingly intermediate forms between these two species mentioned.

Our study of *P. melanophylla* (see p. 370) has shown that the following names have to be added to the synonymy of *P. gracilis*:

Agaricus (*Coprinus*) *caudatus* Fr., Obs. mycol.: 187. 1818. — *Agaricus gracilis* β *A. caudatus* (Fr.) ex Fr., Syst. mycol. **1**: 299. 1821. —*Agaricus caudatus* (Fr. ex Fr.) Fr., Epicr.: 239. 1838.— *Psathyrella caudata* (Fr. ex Fr.) Quél. *in* Mém. Soc. Emul. Montbéliard, sér. 2, **5**: 258. 1872. — *Coprinarius caudatus* (Fr. ex Fr.) Quél., Ench. Fung.: 120. 1886. — *Panaeolus caudatus* (Fr. ex Fr.) Quél., Fl. mycol. Fr.: 55. 1888. — *Psathyra caudata* (Fr. ex Fr.) J. E. Lange, Fl. agar. dan. **4**: 99, pl. 155A. 1939 (misappl.) .— *Drosophila caudata* (Fr. ex Fr.) Kühn. & Romagn., Fl. anal.: 359. 1953 (misappl.).

Under *Psathyrella gracilis* f. *corrugis* in the same publication should have been mentioned that *Psathyra corrugis* sensu Ricken is *Psathyrella bipellis* (Quél.) A. H. Smith.

In an earlier paper (1971a: 277) we discussed the not infrequently occurring difficulty in distinguishing between *P. gracilis* and *P. microrrhiza*, arising from the fact that with regard to quite a number of characters considerable overlapping exists between the two species. We ended our paper by stating that it cannot be denied that between these two closely related species seemingly intermediate forms occur. We were glad to read in Romagnesi's latest paper (1975) that like us he had come across specimens which he considered as being atypical for either *P. gracilis* or *P. microrrhiza*. His '*Drosophila* cf. *microrrhiza*?' (No 1014) is described as having only 'quelques traces de voile marginal à la loupe', whereas normally *P. microrrhiza* has quite a strongly developed veil. He also described a '*Drosophila* sp.' (No 909) of which even the young specimens did not show a trace of a veil, of which the numerous pleurocystidia were *gracilis*-like, but of which he considered the pigmentation 'un peu plus vive' so that he hesitated between *P. gracilis* and *P. microrrhiza*. We (1971a) described exactly the same combination of characters and hesitation with regard to the ultimate identification of a collection. We regret that Romagnesi in these descriptions did not use the density of the cheilocystidia at the gill edge as a means of distinguishing between the two species (see Kits van Waveren, 1971a: 278).

PSATHYRELLA LONGICAUDA P. Karst.—Pl. 62; Figs. 6, 25–28

Psathyrella longicauda P. Karst. *in* Hedwigia 30: 298. 1891; *in* Bidr. Känn. Finl. Nat. Folk 54: 175. 1893. — *Drosophila longicauda* (P. Karst.) Kühn. & Romagn., Fl. anal.: 359. 1953 (incomplete reference to basionym).

SELECTED DESCRIPTION.—Kühn. & Romagn., Fl. anal.: 359. 1953.

CHIEF CHARACTERISTICS.—Cap 13–30 mm, hemispherical, campanulate-hemispherical, spreading to convex, sometimes vaguely umbonate, showing neither pink nor concentric zones when dry; veil distinct; gills greyish brown, with white edge, stem rooting (pseudorrhiza 10–30 mm); spores (10.8–)11.3–13.5×6.3–7.2 μm, germ pore indistinct; pleurocystidia 50–80×9–12.5 μm, slender, sublageniform or subfusiform, with subcylindric neck; edge of gill chiefly covered by spheropedunculate cells; hymenophoral trama brownish.

MACROSCOPIC CHARACTERS.—Cap 13–30 mm in diam., 8–10 mm high, hemispherical to campanulate-hemispherical, spreading to convex, sometimes vaguely umbonate but without revolute margin, dark reddish brown (M. 5 YR 3/3), later less reddish, approaching dark brown colour of cap of *Agrocybe erebia* (M. 7.5 YR 3/2), moderately striate up to 1/2 from margin upwards, hygrophanous, when drying for a long time remaining remarkably brown (M. 7.5 YR 5/6, 5/8), finally fairly pale brown (M. 10 YR 7/4), with centre darker yellowish ochre (M. 7.5 YR 6/6), without pink shades, not micaceous, distinctly though not strongly rugulose.

Veil on cap well developed, white, in young specimens forming a conspicuously appendiculate collar, 1–2 mm broad, around entire margin with radially arranged fine fibres up to 1 mm from margin upwards, very fugacious.

Gills 2–3 mm broad, ventricose near margin of cap, then straight and ascending, broadly adnate, pale brownish grey near edge (M. 10 YR 6/2), browner (M. 10 YR 5/2) towards base, and darker greyish brown (M. 10 YR 6/3) at base itself, with white edge.

Stem 20–65×3–3.5 mm, straight or wavy, remarkably firm, cylindric but base thickened, glossy, white, hollow, with pruinose apex, without velar remnants, rooting, its pseudorrhiza 10–30 mm long and tapering towards its end.

Flesh of cap 1–1.5 mm thick in centre, dark brown (M. 10 YR 3/4), flesh of stem conspicuously brown (M. 7.5 YR 5/4; 10 YR 5/3) but with superficial layer pure white.

Spore print purplish black.

Trama of 'washed' gill under binocular lens distinctly brown (M. 10 YR 6/3) in a narrow zone along base; remainder of gill paler towards edge (M. 10 YR 7/2).

MICROSCOPIC CHARACTERS.—Spores (10.8–)11.3–13.5×6.3–7.2 μm (average 12.2×6.7 μm), ellipsoid-amygdaliform, in water very dark reddish brown, mahogany colour (M. 2.5 YR 2/2, 2/4), in NH_4OH 10% still darker (M. 2.5 YR 2/2, 2/4) and in KOH 5% strikingly dark, almost black (M. 10 YR 3/2), opaque, with ±1.8 μm wide but indistinct germ pore and small but distinct hilar appendix.

Basidia 25–30×9–11 μm, 4-spored.

Pleurocystidia 50–80×9–12.5 μm, scattered, slender, sublageniform or subfusiform, with subylindric neck and distinct stalk, thin-walled, colourless, without mucus or crystals.

Spheropedunculate cells densely packed (±80% of total number of marginal cells) and rather large, 15–30×7.5–15 μm; in between them a fair number (±20% of total number of marginal cells) of irregularly scattered (fewer in number near margin of cap) sublageniform cheilocystidia, their necks often subcylindrical, 27.5–35(–40)×7.5–10 μm, colourless, thin-walled, without mucus or crystals; gill edge sterile.

Pigmentation of hymenophoral trama under microscope ('washed' gill mounted in NH_4OH 10%) distinctly brown from membranal pigment at base, less brown in remainder of gill and very pale brown near edge, with few yellow hyphal septa and without encrustations.

Cuticle of cap cellular; cells 24–48 μm in diam., colourless.

Clamps on hyphae of stem fairly numerous.

HABITAT.—Gregarious in manured (cow dung) grass (meadow), or (Karsten) among rotting leaves. October–November. Very rare.

COLLECTIONS EXAMINED.—THE NETHERLANDS, Zuid-Holland, Goedereede, 'Middelduinen', 11 Nov. 1969, *E. K. v. W.* (L).

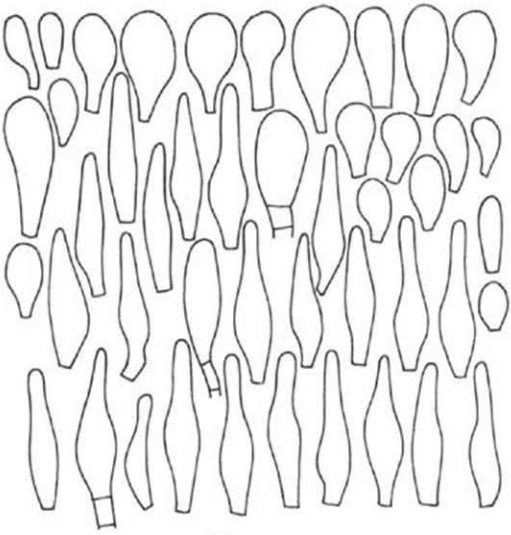
FINLAND, Tammela, Mustiala, Oct. 1891, *P. A. Karsten* (type: H).

The above description is based entirely on our rich collection from Goedereede, which corresponds very well with Karsten's type material received on loan by courtesy of the Director of the Museum Botanicum at Helsinki. Karsten's protologue of this species comprises a full description (1891: 298). The roots of the stems in our material went up to 30 mm long, those of Karsten's were even longer, up to 60 mm. The lengths of the pleurocystidia in Karsten's and our material are slightly different but in our opinion the difference falls within the range of variability to be expected, whereas the shape is the same in both collections. The 5 pleurocystidia we found in the type material measured 40–50 × 8–10 μm; Karsten himself described them as measuring 55–60 × 15 μm, in our material they are longer, 50–80 × 9–12.5 μm, and Romagnesi (1953: 359) states that they are 'souvent remarquablement sveltes, 45–82 × 10–12 μ,'. We regard the fact that in both the type material and our own collection the spores are of the same very dark colour and have an indistinct germ pore, as of decisive importance. It is interesting to note that Karsten found the spores of *P. longicauda* to be darker than those of *P. gracilis*—as indeed they are—and that according to him this is one of the characters by which this species is distinguished from *P. gracilis*.

Prof. Romagnesi very kindly sent us from his herbarium a very small specimen identified by him as *P. longicauda*. In this specimen we found slender sublageniform pleurocystidia, moderately numerous, and measuring 42.5–60 × 7.5–11 μm, but the spores were by no means as dark as those of the type material and our own collection, and the germ pore was ample, so that we believe that this material does not represent Karsten's *P. longicauda*. Romagnesi apparently, and in our opinion quite rightly, regards the distinctness of the pore as an important character (see his description of *Drosophila caudata*, 1953: 369, and his description of *P. pellucidipes*, 1967: 541).

Psathyrella longicauda differs from *P. melanophylla*, which like *P. longicauda* has dark spores and an indistinct germ pore, by the hemispherical-campanulate cap, the absence of concentric zones in the drying cap, the habit of the whole plant (remarkably firm stem), and the gills being not black but brownish grey. The differences with *P. ridicula* and *P. connata* are pointed out in the discussion on these species.

Psathyrella longicauda is hardly mentioned in the literature; the only descriptions we found were those in the descriptive keys of Kühn. & Romagn. (1953: 359) and Moser (1967: 215). Moser's description, however, is obviously a copy of the one given by Kühn. & Romagn., Dennis, Orton & Hora (1960: 146) refer only to the description of Kühn. & Romagn., while Konrad & Maublanc (1928: 77) range *P. longicauda* under 'espèces peu connues douteuses ou à exclure'. Ricken and Lange do not mention the species. A. H. Smith (1972: 334) states that *P. longicauda* is possibly the same as *P. caudata*, but this is certainly not so. With *P. caudata* sensu Kühn. & Romagn.



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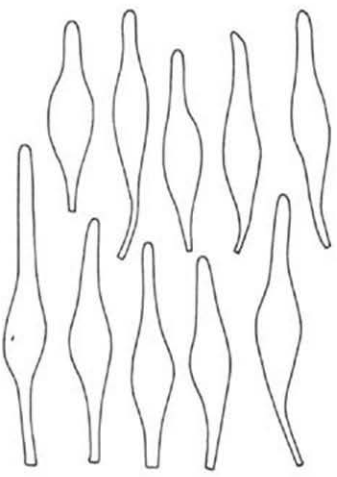

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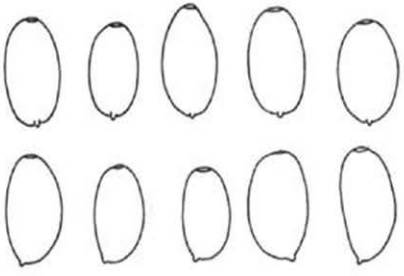

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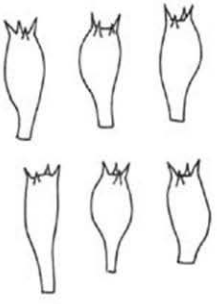

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Figs. 25–28. *Psathyrella longicauda*, 11 Nov. 1969. — 25. Cheilocystidiogram (×575). — 26. Pleurocystidiogram (×575). — 27. Spores (×1212). — 28. Basidia (×575).

the cap is largely conical and in the end its margin is revolute, the veil is rudimentary, the gills are conspicuously greyish black to black without a trace of brown. With *P. longicauda* the cap is largely hemispherical to campanulate and its margin is not revolute, the veil is distinct and the gills are dark greyish brown. The spores of both species have an indistinct germ pore, whereas Smith describes the germ pore in his *P. caudata* as broad and even somewhat truncate. A re-examination of the two collections cited by Smith seems desirable.

Psathyrella longicauda as described by Malençon & Bertault (1970: 186) does not

correspond with our description of this species. They describe the veil in young specimens as consisting of only 'des fibrilles très fugaces', the edge of the gills as 'non nettement discolore, ni blanche ni rose, mais jaune cannelle sale', the colour of the spores as 'brun foncé,' the apex of the spores as 'à sommet tronqué par un pore évident', and the cheilocystidia as utriform.

Psathyrella melanophylla Kits van Wav., *spec. nov.* —Figs. 3, 4, 29, 30

Pileus in primo aetate ellipsoideus, castaneus, apice margineque mox fuscescens, parte media semper castaneus, deinde 10–30 mm latus, typice conicus, postremo expansus, margine repandus, recens omnino castaneus, postea apice margineque fulvescens, zona lata media fusca, 2/3 striatus, hygrophanus, in sicco e avellaneo sordide alutaceus, variis zonis brunneis variegatus, haud tamen roseus, rugulosus, micaceus. Velum fugax e fibrillis nonnullis, albis. Lamellae marginem versus ventricosae, rectae, ascendentes, late adnatae, 2–5 mm latae, cinereae nigrescentes, acie alba. Stipes 70–150 × 1–3.5 mm, rectus, aequalis, albus, deorsum isabellinus, fistulosus, apice pruinosus, basi strigosus, radicans (radix 10–70 mm). Caro fusca in pileo, albida in stipite, apice tamen fusca. Sporae in cumulo atrae.

Sporae (11.7–)12.2–14.4 × 6.8–8.1 μm, ellipsoideo-amygdaliformes, in aqua observatae castaneae, opacae, poro germinativo tenui obscuroque instructae (±1.8 μm). Basidia 4-sporigera, 25–38.4 × 10–13.6 μm. Pleurocystidia 35–60 × 9–15 μm, pauca, ventricosa sublageniformia interdum collis cylindricis, longitudine pedicellorum et collorum variabili, tenuitunicata. Cellulae marginales: cellulae spheropedunculatae 10–27.5 × 4–12.5 μm, numerosae, confertae, pilei marginem versus majorae (20–30 × 8–17.5 μm); cheilocystidia (25–)30–45 × 6–15 μm, dispersa, haud numerosa, pleurocystidia similia. Trama lamellarum incolor vel fere incolor. Cuticula pilei cellularis. Hyphae stipitis fibuligerae.

Cespitosa vel subcespitosa vel interdum solitaria, terrestris.

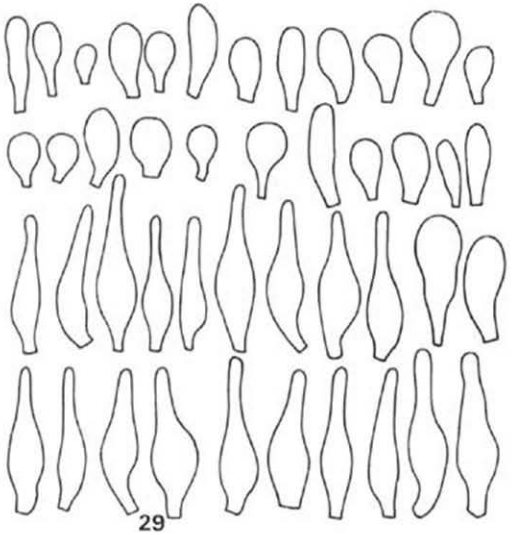
TYPUS: 'The Netherlands, prov. Overijssel, Oldenzaal, estate "Dijkhuis", 16 Oct. 1963, *E. Kits van Waveren*' (L).

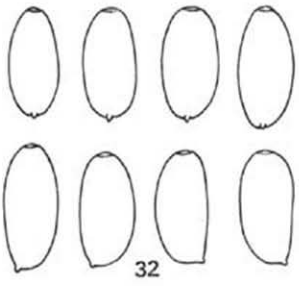
MISAPPLIED NAMES.—*Psathyra caudata* (Fr. ex Fr.) J. E. Lange *sensu* J. E. Lange, Fl. agar. dan. **4**: 99, pl. 155A. 1939. — *Drosophila caudata* (Fr. ex Fr.) Kühn. & Romagn. *sensu* Kühn. & Romagn., Fl. anal.: 359. 1953. — *Psathyrella caudata* (Fr. ex Fr.) Quél. *sensu* Hennig *in* Michael/Hennig, Handb. Pilzfr. **4**: 280, fig. 278. 1967; *sensu* Moser *in* Gams, Kl. KryptogFl. **2** (b2): 214. 1967 (spore size excluded); non *Agaricus caudatus* (Fr. ex Fr.) Fr., Epicr.: 239. 1838 (=form of *P. gracilis*).

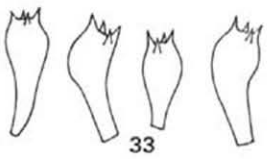
SELECTED DESCRIPTIONS AND ILLUSTRATIONS.—Ricken, Blätterp.: pl. 68 fig. 1. 1913 (as *P. caudata*); J. E. Lange, Fl. agar. dan. **4**: 99, pl. 155A (as *Psathyra caudata*); Kühn. & Romagn., Fl. anal.: 359. 1953 (as *Drosophila caudata*); Cooke, Ill. Brit. Fungi, pl. 622/596 (as *Agaricus microrrhizus*).

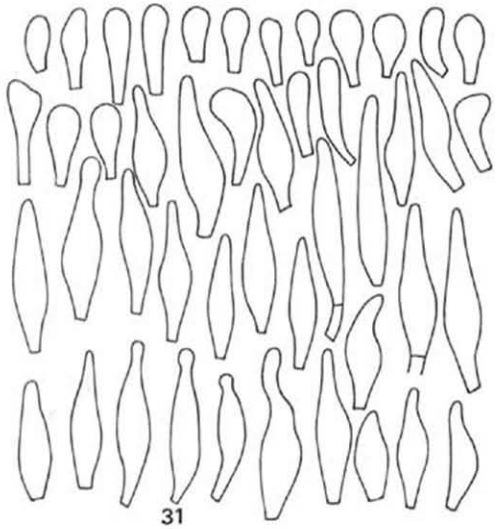
CHIEF CHARACTERISTICS.—Cespitose, subcespitose or sometimes solitary; cap 10–30 mm, conical but marginal area in mature specimens revolute, on drying showing concentric zones but no pink; veil rudimentary; gills conspicuously dark grey to greyish black, broadly adnate, with white edge; stem rooting (pseudorrhiza 10–70 mm); spores (11.7–)12.2–14.4 × 6.8–8.1 μm, with indistinct germ pore; pleurocystidia 35–60 × 9–15 μm, scarce, sublageniform; cheilocystidia scattered among abundant spheropedunculate cells; hymenophoral trama colourless or almost so.

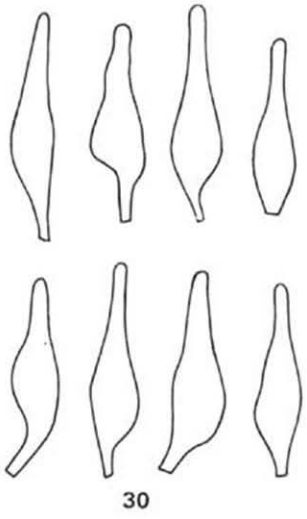
MACROSCOPIC CHARACTERS.—Cap at first (primordia, diam. of cap 3 mm, height 4 mm) ellipsoid, not or barely striate, dark reddish brown (M. 5 YR 3/3, 3/4) but











Figs. 29, 30. *Psathyrella melanophylla*, 16 Oct. 1963. — 29. Cheilocystidiogram (×575). — 30. Pleurocystidiogram (×575).

Figs. 31–33. *Psathyrella melanophylloides*, 21 Oct. 1973. — 31. Cheilocystidiogram (×575). — 32. Spores (×1212). — 33. Basidia (×575).

very soon both at top and in marginal zone dark yellowish brown (M. 10 YR 4/4), along margin itself paler yellowish brown (M. 10 YR 6/4), next, as cap gets larger (diam. 10 mm, height 9 mm) apex becoming glossy, remaining brown (M. 10 YR 4/4, 3/4), marginal area becoming paler brown (M. 10 YR 6/3) and zone in the middle either remaining dark reddish brown (M. 5 YR 3/3) for a while or (soon) becoming dark brown (M. 10 YR 3/3, 3/4). Mature caps 10–30 mm in diam., 10–18 mm high, characteristically conical to hardly campanulate-conical, in later stages marginal area or even peripheral 1/3 of cap usually characteristically spreading and becoming revolute, strongly striate almost to centre; when very fresh dark reddish brown all over (M. 5 YR 3/4), very soon both top and marginal area dark brown (M. 10 YR 3/3, 3/4), and then colour in between both areas either still distinctly reddish brown (M. 5 YR 3/4) or soon changing into very dark brown (M. 10 YR 3/4, 3/3, 4/3), following which both marginal area and top becoming paler brown (M. 10 YR 4/4, 5/4), and extreme margin whitish, hygrophanous, drying out via dark greyish brown (M. 10 YR 5/2, striae ±10 YR 3/3) to sordid pale brown (M. 10 YR 6/3, 7/4, 7/3, 7/2) or pale brownish grey (M. 10 YR 6/2) in peripheral half usually with one or two concentric broad zones of slightly different shades of pale brown, rugulose or even rugose, slightly to distinctly micaceous but without any pink shades.

Veil in primordia and very young stages consisting of a very thin but dense layer of fibres, running from apex of stem to margin of cap; in mature stages rarely present as minute remnants on surface of margin of cap, usually, however, absent from cap but present as scattered minute white fibres on stem.

Gills 2–5 mm broad, ventricose only near margin of cap (this part sometimes protruding below margin of cap), then straight, ascending, very broadly adnate (rarely with a tooth), conspicuously grey to dark grey (M. 10 YR 5/1), finally greyish black (M. 10 YR 4/1, 3/1, 3/2), with white, minutely fimbriate edge.

Stem 70–150 × 1–3.5 mm, straight and rather firm (especially when thick), cylindric, white but slightly isabelline in its lower 1/3–2/3, pruinose at apex, distinctly and often strongly rooting; pseudorrhiza 10–70 mm long, tapering towards its end and springing from an occasionally very slightly thickened base, which is strongly to sparsely strigose with white hairs.

Flesh of cap 1–2 mm thick in centre, dark brown (M. 10 YR 3/4, 4/3, 4/4); flesh of stem white but very pale brown in centre, and dark brown in extreme apex.

Spore print black.

Trama of 'washed' gill under binocular lens practically colourless to very pale greyish brown (M. 2.5 Y 7/2; '10 YR 7/2, hardly 7/3), near base sometimes only slightly darker and at base itself in a very narrow strip yellowish brown (M. 10 YR 6/4).

MICROSCOPIC CHARACTERS.—Spores (11.7–)12.2–14.4 × 6.8–8.1 μm (averages 13.1–13.5 × 7.2–7.6 μm), ellipsoid-amygdaliform, in water dark reddish brown, mahogany colour (M. 2.5 YR 3/4, 3/6), in NH_4OH 10% slightly darker (M. 2.5 YR 3/2, 2/4; 5 YR 3/3), in KOH 5% very dark greyish brown (M. 10 YR 3/2, 3/3), opaque, thin-walled, with small hilar appendix and rather wide (±1.5–1.8 μm) but indistinct apical germ pore.

Basidia 25–38.4 × 10–13.6 μm, 4-spored.

Pleurocystidia 35–60 × 9–15 μm, with 3–5 μm wide neck, rather scarce, scattered, ventricose-sublageniform, often with subcylindric neck, thin-walled, colourless, without mucus or crystals; length of both stalks and necks variable; neck sometimes elongate.

Gill edge sterile. Spheropedunculate cells (some clavate) densely packed (80–90% of total number of marginal cells, near margin of cap even up to 100%), 10–27.5 ×

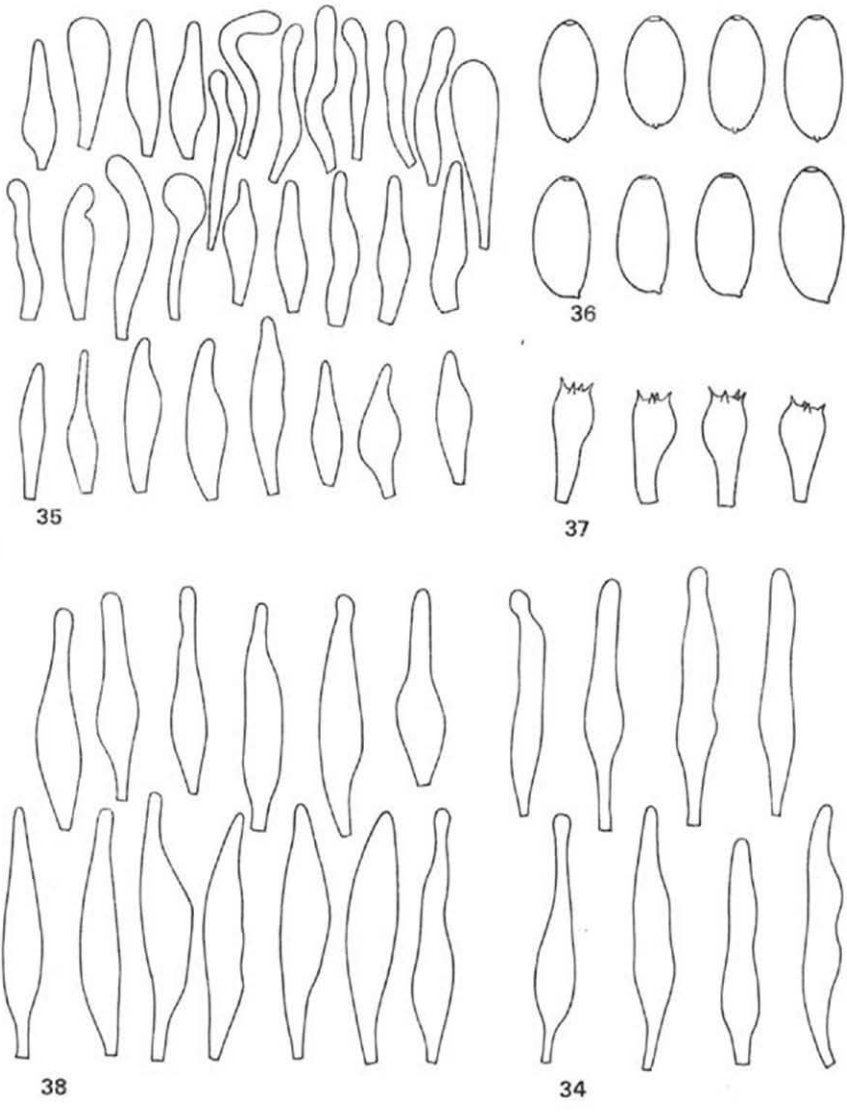


Fig. 34. *Psathyrella melanophylloides*, 21 Oct. 1973. — Pleurocystidiogram (×575).
Figs. 35–38. *Psathyrella ochracea*, 3 Oct. 1944. — 35. Cheilocystidiogram (×575). — 36. Spores (×1212). — 37. Basidia (×575). — 38. Pleurocystidiogram (×575).

4–12.5 μm, increasing in size towards margin of cap (20–30×8–17.5 μm), thin-walled, intermixed with a variable and usually small number (up to ±20% of total number of marginal cells) of scattered cheilocystidia (none or very few near margin of cap), often in local accumulations near middle of gill edge, similar to pleurocystidia, 27.5–45×6–15 μm, thin-walled, without mucus or crystals.

Pigmentation of hymenophoral trama under microscope ('washed' gill mounted in NH_4OH 10%): trama practically colourless to very pale brown from membranal pigment, very few encrustations, and yellow hyphal septa (slightly more at base).

Cuticle of cap cellular, 15–40 μm in diam., colourless.

Clamps present on hyphae of stem.

HABITAT.—Usually cespitose or subcespitose, sometimes isolated, terrestrial against small pieces of wood. September–October. Rare.

COLLECTIONS EXAMINED.—THE NETHERLANDS, prov. Overijssel: Oldenzaal, estate 'Dijkhuis', 16 Oct. 1963, *E. K. v. W.* (holotype; L); Delden, estate 'Twickel', 19 Sept. 1964, *E. K. v. W.* (L); Denekamp, estate 'Singraven', 18 Oct. 1974, *E. K. v. W.* (L).

FRANCE, dép. Oise, Coye-la-Forêt, 14 Sept. 1946, *H. Romagnesi* (Herb. Romagn.).

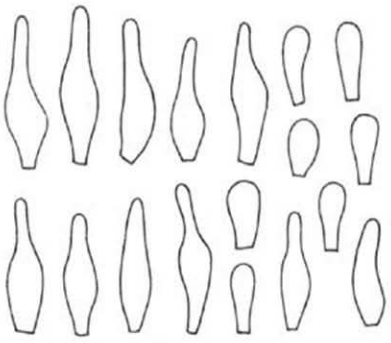
NOTE.—The above description is chiefly based on the type collection, which consists of some 10 fruit-bodies in very good condition.

Psathyrella melanophylla differs from *P. gracilis*, with which it may easily be confused, by its usually cespitose growth, the conspicuously greyish black gills, the white gill edge, the conical shape of the cap whose marginal area in later stages turns up, the absence of pink and usually the presence of concentric zones on the drying cap, and the presence, be it rudimentary, of a veil. On account of these characteristics *P. melanophylla* is easily discernible in the field from *P. gracilis* by those who are familiar with *P. gracilis* and the variability of that species. Romagnesi (1953: 359) moreover noted that the spores of *P. melanophylla* have an indistinct germ pore, whereas the spores of *P. gracilis* have a large and very distinct germ pore.

Psathyrella melanophylla differs from *P. melanophylloides* in several characters, outlined in the observations on the latter species, and from *P. polycystis* by the shape of its cap, the greyish black gills, the white gill edge, the usually cespitose growth, the pleurocystidia being neither very numerous nor swollen at their apex, and the indistinct germ pore. *Psathyrella longicauda* has not greyish black but browner gills (its hymenophoral trama is coloured), its cap is campanulate, with the margin not turning up in later stages, and on drying the cap does not show concentric zones, the veil is much more developed and accordingly clearly mentioned in Karsten's (1891: 298) original description.

Colours play a major part in characterizing *P. melanophylla*: the gills are conspicuously greyish black (Romagnesi, rightly puts this character in bold face letters in the 'Flore analytique'), the gill edge is white, and pink is lacking in the colour of the drying and the dry cap.

Romagnesi (1953: 371, note 4) states correctly that Fries' *Agaricus caudatus* differs from *Drosophila caudata* as described by Romagnesi (this description corresponds in every way with our description given above) in that Fries' plant turns pink on drying (in 'Epicr.' and 'Hym. europ.': 'in carneum vergens'; in 'Monogr. Hym. Suec.':



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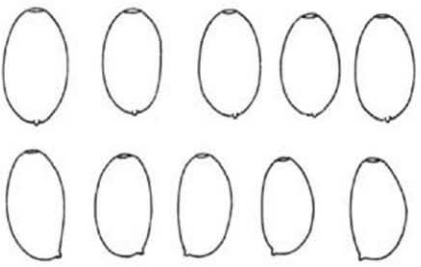

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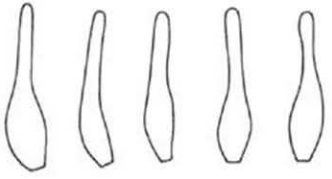

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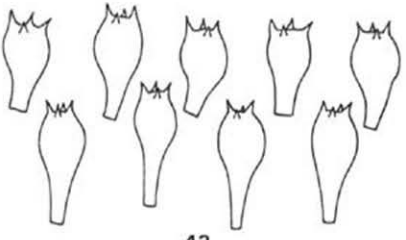

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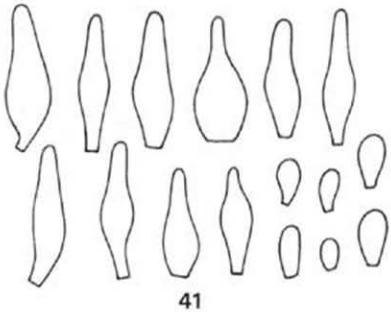

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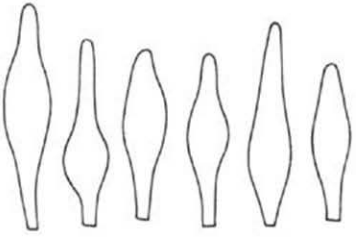

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Figs. 39, 40. *Psathyrella opaca*, 12 Sept. 1946. — 39. Cheilocystidiogram (×575). — 40. Pleurocystidiogram (×575).

Figs. 41–44. *Psathyrella orbicularis*, 1 Oct. 1966. — 41. Cheilocystidiogram (×575). — 42. Spores (×1212). — 43. Basidia (×575). — 44. Pleurocystidiogram (×575).

'in carneum obsolete vergens'), is very fragile, splits in rainy weather, and is deliquescent. Romagnesi might have added that Fries' plant is not said to be cespitose, that in all his publications the size of the cap is given as rather large ('2 unc.'=50 mm; with Romagn. 10–30 mm, like in our material) and, most important of all, that its gill edge is red. In 1821(: 299) Fries mentioned *A. caudatus* as a mere variety of *A. gracilis* ('*A. gracilis*, ...β *A. caudatus*, major, radicatus &c.'), referring for a full description to his elaborate description under the name *Agaricus* (*Coprinus*) *caudatus* in his 'Observationes' (1818: 187). In that description the gills are said to have a 'margine incarnato-roseis'. The gill edge is not mentioned in his later publications (Epicr., Hym. europ.) but in the 'Monographia' the edge is said to be 'concolore' (to the greyish black gills). In all these descriptions Fries, however, refers to his original description of 1818 in which the presence of a 'margine roseae' is clearly mentioned. Fries all through the years apparently was in doubt whether his *Agaricus caudatus* was a larger form of *Psathyrella gracilis*, equipped with a remarkably long pseudorrhiza, or a good species. Since Fries, mycologists have either merely copied Fries' descriptions of *A. caudatus* or else have given descriptions of *Agaricus* or *Psathyrella caudata* which are incomplete or in some respects slightly deviate from Fries' concept of *A. caudatus*. What later became known as *Psathyrella caudata* was almost always based on Fries' descriptions and, as pointed out above, these do not tally with the species described by Romagnesi under the name *Drosophila caudata* and by us under the name *P. melanophylla*.

Of the many descriptions under the name *Psathyrella caudata* in the literature only those given by J. E. Lange (1939: 99), Hennig (1967: 280), and Moser—except for spore size—(1967: 214) tally sufficiently with *Drosophila caudata* sensu Romagnesi and our *Psathyrella melanophylla*.

Romagnesi (1953: 359) rightly refers—even with an exclamation mark—to Lange's plate 155A (1939), which indeed (apart from the large size, the cap measuring 50 mm) depicts our species very well (the largest cap, however, does seem to show a trace of pink). Lange's description (1939: 99) also tallies with our species; the species is called subfasciculate, its cap conical with irregularly upturned marginal area, and without pink shades when dry, the gills dark grey and their edges whitish. Lange calls this species *Psathyra caudata*.

Romagnesi also refers to Ricken's plate 68 fig. 1, which depicts specimens of what Ricken calls *Psathyrella caudata* Fr., obviously in the mature and fresh stage. Again, the caps are rather large (diam. of cap 40 mm), and their marginal areas are not revolute, as is typical for *P. melanophylla*. In his description, however, Ricken (1913: 265) clearly mentions a pink colour of the dry cap ('trocken ledergelb oder scherbenrötlich'), and he does not mention the cespitose growth, neither the concentric zones on the drying cap nor the presence of a veil, and the gill edge is said to be concolorous. We therefore doubt the conspecifity of the species described by Ricken with *P. melanophylla*.

Dennis, Orton & Hora (1960: 143) refer to Lange's plate 155A and to Ricken's plate 68 fig. 1, but also to Cooke's plate 639/637 of *Agaricus* (*Psathyrella*) *caudatus*.

The latter plate depicts only dry specimens, whose caps measure no less than 60 mm in diam., and have a distinctly pink broad marginal zone (1/2 R). The gills moreover are narrow and practically free from the stem. We therefore do not consider that the plate depicts the species we describe above.

In our opinion Cooke's plate 622/596, according to Cooke himself depicting *Agaricus* (*Psathyra*) *microrrhizus*, shows the species we describe above. This figure shows fresh specimens of which the caps are small, conical and dark brown, and do not show traces of a veil (which they should if the plate depicted *P. microrrhiza*). The margin of the cap moreover is upturned, the gills are broad and grey and do not show a red edge, and no pink is shown in the colour of the cap. Pearson & Dennis (1948: 185) also interpreted Cooke's plate 622/596 as *Psathyrella caudata*.

Romagnesi (1953: 359) introduced an important character of the present species by stating that its spores have a 'tout petit pore'. Prof. Romagnesi very kindly sent us material of this species in which the germ pore turned out to be fairly large but strikingly indistinct (as compared with the germ pore of for instance *P. gracilis* and *P. microrrhiza*) obviously because of the thinness of the spore wall in combination with the opacity and dark colour of the spores. When we brought this to the attention of Prof. Romagnesi, he replied (in lit.) that by 'tout petit pore' he had really meant to say 'pore bas et peu tronquant', and 'quand j'ai écris "pore petit" il ne s'agissait pas de la largeur.'

In the material Prof. Romagnesi sent us we found that the pleurocystidia measured 30–37.5×8–12.5 μm, whereas in the 'Flore analytique' Romagnesi calls these cells '± longues (30–)45–75×8–12.5 μ.' In our own material we have never come across pleurocystidia of that length, our figures being (30–)35–55×8–12.5 μm. In all these cases, however, the shape of the cells was fairly uniform.

The description Moser (1967: 214) gives under *Psathyrella caudata* fully corresponds with *P. melanophylla* (the concentric zones on the drying cap and the indistinct germ pore, however, are not mentioned) except for the spore sizes, which are too large (12–16×8–9 μm). Nevertheless we consider the species as described by Moser to be conspecific with our species.

A. H. Smith's description (1972: 334) under *Psathyrella caudata*, however, does not fit in at all with our species (although his keys lead directly to this name), as Smith himself admits. Smith describes the cap as 'obtusely conic, becoming broadly conic and then with a flaring or turned up margin', and the gill edge as white; he also does not mention a pink shade in the dry cap but the colour of the gills is called 'pallid cinnamon-buff, soon dark greyish to purplish brown', the apical germ pore broad, the apex of the spore even somewhat truncate, and the species is not called cespitose. In his observations on the species he finally says that a veil is lacking. Accordingly Smith specifically states that *P. caudata* as described by him is not *P. caudata* sensu Moser. For the same reasons it cannot be *P. melanophylla* either, and we do not venture upon an interpretation.

In conclusion we believe that *Psathyrella caudata* (Fr. ex Fr.) Quél. is nothing but a large form of *P. gracilis*, equipped with a long pseudorrhiza, and that the species

described by Romagnesi in the 'Flora analytique' as *Drosophila caudata* (F. ex Fr.) Kühn. & Romagn, and by us above is a species in its own right, for which we propose the name *Psathyrella melanophylla*.

Psathyrella melanophylloides Kits van Wav., *spec. nov.*—Figs. 5, 31–34

Pileus 10–26 mm latus, typice conicus, postremo expansus et margine subrepandus, 2/3 striatus, haud umbonatus, centro spadiceus, marginem versus fuscus, margine extrema pertenuis, albidus, recens veri-similiter castaneus, hygrophanus, in sicco cremeus alutaceus, distincte roseus, rugulosus, leviter micaceus. Velum non visum. Lamellae ventricosae, anguste adnatae, 2.5–4 mm latae, ravidae, acie alba. Stipes 35–70 × 1–2 mm, rectus, aequalis, albus, fistulosus, apice leviter pruinosus, radicans (radix 8–10 mm), basi strigosus. Caro fusca in pileo, albida in stipite. Sporae in cumulo atropurpureae.

Sporae 10.8–13.5(–14.4) × (5.4–)5.9–6.8(–7.2) µm, ellipsoideo-amygdaliformes, in aqua observatae castaneae, poro germinativo obscuro instructae (± 1.8 µm). Basidia 22.5–40 × 10–12.5 µm, 4-sporigera. Pleurocystidia 55–70 × 7.5–10 µm, modice numerosa, tenuia, subcylindrica, sublageniformia vel subfusiformia, apice interdum subincrassata. Cellulae marginales: cellulae spheropedunculatae vel cellulae subclavatae, confertae, 15–20 × 5–8 µm vel leviter majorae, 25–30 × 10–20 µm; cheilocystidia 22.5–47.5 × 7.5–10 µm, dispersa, subfusiformia usque ad sublageniformia. Trama lamellarum incolor. Cuticula pilei cellularis. Hyphae stipites fibuligerae.

Cespitosa, terrestris.

TYPUS: 'The Netherlands, prov. Overijssel, Delden, Zaagmolenweg, 21 Oct. 1973, *E. Kits van Waveren*' (L).

CHIEF CHARACTERISTICS.—Cespitose growth; cap 10–26 mm, conical with peripheral half tending to become revolute, on drying without concentric zones but distinctly pink; veil (probably) absent; gills very dark grey, ventricose and narrowly adnate, with white edge; stem rooting (pseudorrhiza 8–10 mm); spore print dark purple; spores 10.8–13.5(–14.4) × (5.4–)5.9–6.8(–7.2) µm, germ pore indistinct; pleurocystidia 55–65 × 7–10 µm, subcylindrical, very slender, rather numerous; hymenophoral trama colourless.

MACROSCOPIC CHARACTERS.—Cap 10–26 mm in diam., 8–10 mm high, conical with a distinct tendency of its peripheral half to turn up, without umbo, deep brown to very dark yellowish brown (M. 5 YR 4/4; 10 YR 4/4) in central 1/3, and greyish brown (M. 10 YR 4/2) in peripheral 2/3, at extreme margin very thin and whitish,[2] striate up to 2/3 from margin upwards, hygrophanous, drying out to pale yellow (M. 10 YR 8/4) at centre, distinctly pink (M. 5 YR 7/4) in a broad zone in the middle, and very pale brown (M. 5 YR 7/4) in peripheral 1/4, conspicuously rugulose, slightly micaceous, without concentric zones.

Veil not seen on either cap or stem (primordia not available).

Gills 2.5–4 mm broad, distinctly but not strongly ventricose, ascending and narrowly adnate without tooth, very dark grey (M. 10 YR 4/1), pale grey (M. 10 YR 5/1) only near margin of cap, no traces of brown or even purple, with white edge.

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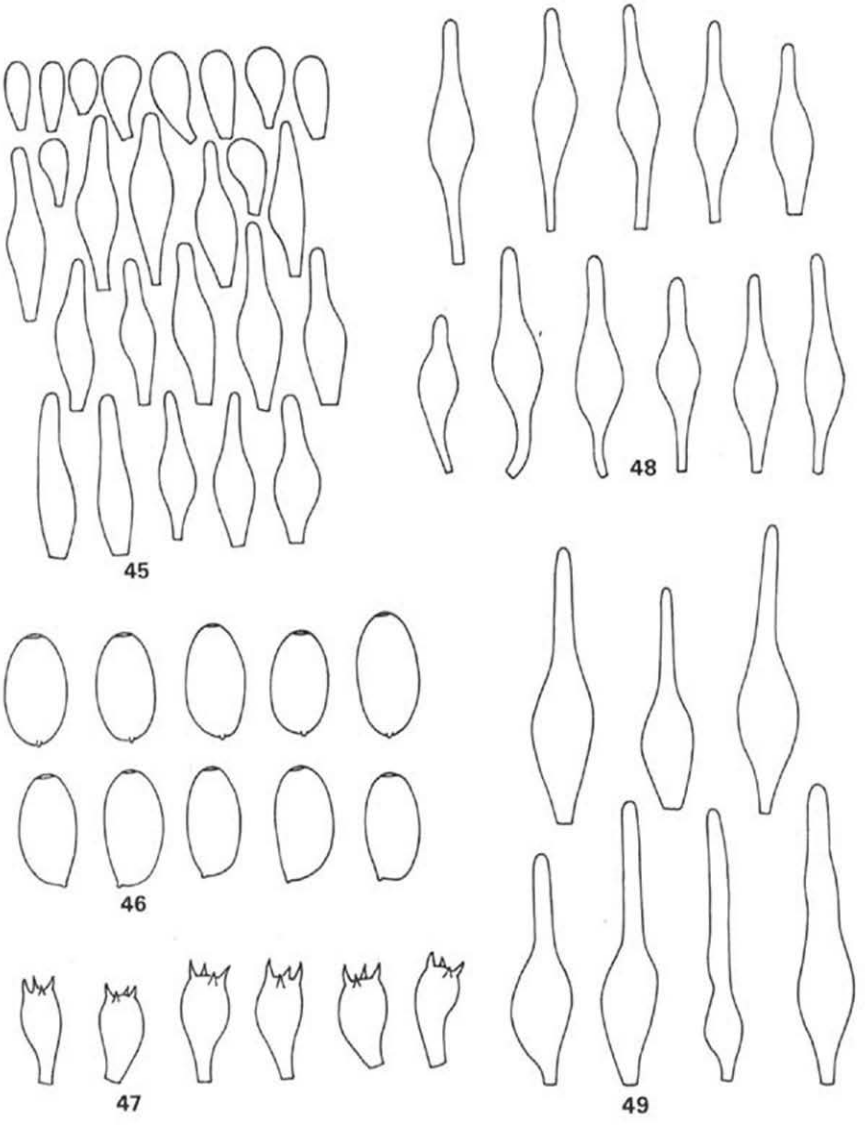
[2] Our description of the colours of the cap is based on caps which—although seemingly fresh when the specimens were collected—may well have been at the onset of the process of drying out. In earlier still fresher stages the colour of the cap is most likely to have been some shade of dark reddish brown like in all other species of this group.



Figs. 45–49. *Psathyrella pellucidipes*. — 45–48. 19 Sept. 1967. — 45. Cheilocystidiogram (×575). — 46. Spores (×1212). — 47. Basidia (×575). — 48. Pleurocystidiogram (×575). — 49. 29 May 1966. — Pleurocystidiogram (×575).

Stem 35–70 × 1–2 mm, straight, cylindric but sometimes slightly thickening towards base, rooting with 8–10 mm long, white, hollow pseudorrhiza, only slightly pruinose at apex, strigose at base.

Flesh of cap 2–3 mm thick in centre, dark brown (M. 10 YR 4/4); flesh of stem white but greyish brown in extreme apex and here with conspicuous narrow reddish zone alongside attachment of gills (like usually in P. gracilis).

Spore print very dark purple.

Trama of 'washed' gill under binocular lens hyaline, practically colourless (M. 2.5 Y 7/2) from base to edge with only just a trace of brown at the very base.

MICROSCOPIC CHARACTERS.—Spores 10.8–13.5(–14.4) × (5.4–)5.9–6.8(–7.2) μm (average 12.4 × 6.3 μm), ellipsoid-amygdaliform, in water dark reddish brown (M. 2.5 YR 3/6; 5 YR 4/4), in NH_4OH 10% scarcely darker (M. 5 YR 4/4), in KOH 5% very dark greyish brown (M. 10 YR 4/3, 3/3), opaque, thin-walled, with ±1.8 μm wide but indistinct germ pore and small hilar appendix.

Basidia 22.5–40 × 10–12.5 μm, 4-spored.

Pleurocystidia 55–70 × 7.5–10 μm, rather numerous, strikingly slender, subcylindrical, sublageniform or subfusiform with elongate neck, often slightly wavy, with subacute or sometimes slightly swollen apex, colourless, thin-walled, without crystals or mucus.

Spheropedunculate and slightly clavate cells small, 15–20 × 5–8 μm, but occasionally some or a number of these cells somewhat larger, 25–30 × 10–20 μm, densely packed (±80% of total number of marginal cells), shape and size fairly uniform, hyaline, thin-walled, intermixed with a fair number (±20% of total number of marginal cells) of cheilocystidia, irregularly scattered along gill edge (sometimes grouped together in small groups), subfusiform to sublageniform and quite a few subcapitate, shaped differently from the pleurocystidia and smaller, 22.5–47.5 × 7.5–10 μm, thin-walled, colourless, without crystals or mucus; gill edge sterile.

Pigmentation of hymenophoral trama under microscope ('washed' gill mounted in NH_4OH 10%): trama practically colourless, without encrustations and without yellow hyphal septa.

Cuticle of cap cellular; cells 16–48 μm in diam., colourless.

Clamps present on hyphae of stem but scarce.

HABITAT.—Terrestrial and cespitose against a small branch lying in clayey soil. October. Known only from type locality.

COLLECTION EXAMINED.—THE NETHERLANDS, Overijssel, Delden, Zaagmolenweg, 21 Oct. 1973, *E. K. v. W.* (holotype; L).

No primordia were found, but as in none of the specimens traces of a veil were detected either on the cap or the stem, it is assumed that the velar development corresponds with that in *P. gracilis*, in which the scarcely developed veil inserts at the margin of the cap.

The species is close to *P. gracilis*, with which it has in common the colourless trama of the gills, the absence of a veil, the pink colour of the drying cap, and the slender pleurocystidia. But it differs from that species by the shape of the cap, the cespitose growth, the white gill edge, the spheropedunculate cells of the gill edge being non-elongate, irregularly shaped and often thick-walled as in *P. gracilis*, and the indistinct germ pore. *Psathyrella melanophylloides* closely resembles *P. melanophylla*, especially older specimens of that species, when they have lost their velar remnants. It has in

common with *P. melanophylla* the conical chape of the cap, the distinct tendency of the marginal area of the cap to turn up, the cespitose growth, the conspicuously grey to greyish black gills, the white gill edge, the indistinct germ pore, and the colourless hymenophoral trama. The differences with *P. melanophylla* are the distinctly ventricose and narrowly adnate gills, the drying cap showing a very marked pink colour and no concentric zones, the pleurocystidia being numerous, not scarce like in *P. melanophylla*, and moreover strikingly slender, the dark purple and not purplish black spore print and accordingly the spores being browner under the microscope. *Psathyrella melanophylloides* is to be regarded as intermediate between *P. gracilis* and *P. melanophylla*, with both of which, however, it shows so many differences that we have decided to regard it as being a species in its own right.

Psathyrella melanophylloides differs from *P. polycystis* in the shape of the cap, the greyish black gills, the white gill edge, the absence of a veil, the cespitose growth, the indistinct germ pore, and its pleurocystidia being not, as in *P. polycystis*, strikingly numerous and not having a swollen apex. In *P. stellata* and *P. orbicularis* the gills are not grey but show a distinct brown or purple tinge and the gill edge is red, the pleurocystidia are lageniform, and the germ pore is distinct. *Psathyrella melanophylloides* differs from P. *longicauda* in the shape of the cap, which in the latter species is hemispherical to campanulate without revolute marginal area and without pink shades in the dry stage, the lack of a brown colour in the gills and accordingly its colourless hymenophoral trama, the lack of a veil, and finally its cespitose growth.

In A. H. Smith's keys (1972) *P. melanophylloides* finds its place in series *Psathyrella* of subsection, section and subgenus *Psathyrella* on account of the distinct pink colour of the drying cap, the decisive character by which subsection *Psathyrella* is split by Smith into series *Psathyrella* and *Tenerae*. In series *Psathyrella P. melanophylloides* would adjoin *P. gracilis*. If it had not been for the presence of this pink colour *P. melanophylloides* would have found its way into series *Tenerae* where it would have adjoined *P. melanophylla* (=*P. caudata* with Smith).

PSATHYRELLA MICRORRHIZA (Lasch) Konr. & Maubl.

For a full description of this species, its synonymy, its distinguishing characters, and a discussion on seemingly intermediate forms between this species and *P. gracilis*, see our earlier paper (1971a: 249–280). Continued studies in *Psathyrella* have shown us that the following additions to and corrections of the earlier cited synonyms, descriptions, and illustrations are necessary.

SYNONYM—*Psathyrella badiovestita* P. D. Orton *in* Trans. Br. mycol. Soc. **43**: 368. 1960.

MISAPPLIED NAME.—*Psathyra semivestita* (Berk. & Br.) Ricken sensu Ricken, Blätterp.: 258. 1913.

SELECTED DESCRIPTIONS AND ILLUSTRATIONS.—Ricken, Blätterp.: 257 (as *Psathyra microrrhiza*) and 258 (as *Psathyra semivestita*) 1913. — Not Cooke, Ill. Br. Fungi, pl. 622/596, as mentioned in our previous paper (1971a: 269; =*P. melanophylla*).

An additional annotation on the epithet '*microrrhiza*' is needed since Smith (1972: 198) disagreed with this epithet, which he replaced by '*squamifera* Karst.'. Smith wrote that '...The original concept of *P. microrrhiza* Lasch as copied by Saccardo (1887: 1073) states of the pileus "Pileo ... primitus luteo-piloso..." which to me indicates clearly that the species has a yellow veil. It also had close narrow gills. On the basis of these characters I do not accept the current concepts of *P. microrrhiza*.'

The full text of Lasch's description (1828: 426) is 'Initio totus, praesertim ad stipitem, pilis brevibus, erectis, luteis, deciduis, ad marginem pilei vero, cortina tenui, floccoso-annulata, fugacissima vestitus', in other words: 'in the beginning entirely, particularly near the stem, clothed with erect yellow but falling short hairs, at the margin with a thin floccose annulate very fugacious cortina.' This description, particularly its last part, portrays the characteristics of the veil in *P. microrrhiza* rather accurately except for the words 'short, erect, yellow hairs', which we would consider to be an error.

Smith's second objection to the epithet '*microrrhiza*' is that Lasch's species 'also had close narrow gills'. Smith himself, however, calls the gills of his *P. squamifera* close and narrow, but does not give a figure for their width. It is interesting to observe that Karsten describes the gills of his *P. squamifera* as being 2 mm wide, which also means that they are narrow, this width however still lying within the normal limits we (1971a: 269) found in 33 collections of *P. microrrhiza*.

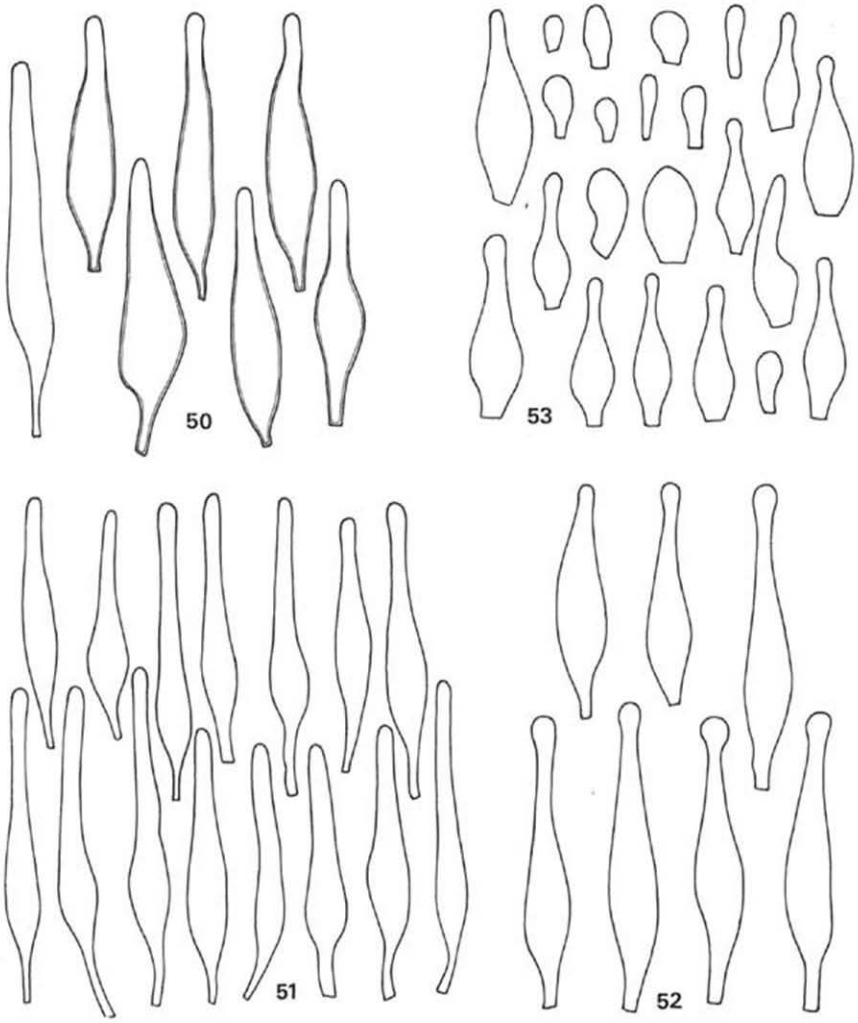
In conclusion, we stick to choosing the epithet '*microrrhiza*' as the correct name for this species as it is the oldest. In doing so we are in line with all authors (except J. E. Lange, who calls it *Psathyra squamifera*) who have given descriptions of the species. Romagnesi (1953: 358) added '*sensu* Ricken' as Ricken was the first to interpret Lasch's species as the species we described under that name in our previous paper (1971a: 269), and the first to give a full and correct description.

Romagnesi (1953: 358) quotes Cooke's plate 622/596 (according to Cooke himself, *P. microrrhiza*) but in our observations on *P. melanophylla* we pointed out that in our opinion it is that species that is represented on this plate.

As for the correct spelling of the epithet '*microrrhiza*' with double r, Romagnesi (in lit.) who is a Latin scholar, very kindly explained to us that from the point of grammar 'c' est un barbarisme d'en mettre un seul r'. The Code of Nomenclature provides for such orthographic corrections in the original spelling of names.

From the very clear description given by Orton (1960: 368) of his *Psathyrella badiovestita* it is evident that this species is conspecific with *P. microrrhiza*. All its characters (cap 10–37 mm, at first with scattered white fibrils or fibrillose scales in outer part, persisting at margin, drying cap sometimes with pinkish tinge round margin, gill edge sometimes pinkish flocculose, veil remnants present in lower part of stem, spores 11–14×6–7 μm, shape and size of pleurocystidia, etc.) are identical with those given in our description of *P. microrrhiza* (1971a: 269). Orton's figures 185–188, 357, and 484 are also in complete agreement with our figures for this species. Two important features are missing in Orton's description, i.e. the width and shape of the basidia and the rooting of the stem. But Orton states that his species

is *Psathyra semivestita* sensu Ricken, and this species is described and depicted by Ricken with a distinct pseudorrhiza. *Psathyrella semivestita* sensu Ricken, however, is considered by us conspecific with *P. microrrhiza* (Ricken's pl. 67 fig. 4 is typical for *P. microrrhiza*). Accordingly Romagnesi (1953: 371) in a note states about *P. semi-*



Figs. 50–53. *Psathyrella polycystis*. — 50–52. Pleurocystidiograms (×575). — 50. 22 Sept. 1962. — 51. 28 Sept. 1962. — 52. 13 Nov. 1962. — 53. Cheilocystidiogram, 13 Nov. 1962 (×575).

vestita sensu Ricken '. . .Nous comprenons mal comment il la distinguait de *microrrhiza*.' Indeed Ricken's description corresponds in every way except for the absence of a red gill edge (an inconsistent character, as we pointed out in an earlier paper) with our own description of *P. microrrhiza* (1971a: 269).

Orton argues that his *Psathyrella badiovestita* is not *Agaricus semivestitus* Berk. & Br. because the latter has smaller and narrower spores, viz. 10–12×5.5–6.5 μm (examination of type material by Orton). These figures, however, lie within the range of variability for *P. microrrhiza*, which we found to be 9.9–13.5×5.9–7.2 μm (examination of 33 collections). A. H. Smith (1972) does not mention *P. badiovestita* in his recent monograph. This is not the proper place to attempt to arrive, if at all possible, at the true interpretation of *Agaricus semivestitus* Berk. & Br. It may be a species in its own right. Romagnesi has not included the species in his key to the species of the genus *Drosophila*.

For seemingly intermediate forms between *Psathyrella microrrhiza* and *P. gracilis* see p. 366.

PSATHYRELLA OCHRACEA (Romagn.) Moser—Figs. 35–38

Drosophila ochracea Romagn. *in* Bull. Soc. linn. Lyon **21**: 152. 1952. — *Psathyrella ochracea* (Romagn.) Moser *in* Gams, Kl. KryptogFl. **2** (b/2): 213. 1967.

SELECTED DESCRIPTION.—Kühn. & Romagn., Fl. anal.: 357. 1953.

CHIEF CHARACTERISTICS.—Cap 8–18 mm in diam., campanulate, when young already pale ochraceous, drying out to very pale cream colour, without pink, strongly reticulate, with often very dark wrinkles, even cerebroid; veil absent (even in primordia); gills dark brown, with edge seemingly pale or red (see observations); stem rooting; spores large, (11.7–)12.6–15.3×6.3–7.2 μm; pleurocystidia 50–67.5×10–13 μm, numerous, subfusiform often with elongate neck, hymenophoral trama brownish.

MACROSCOPIC CHARACTERS[3].—Cap small, 8–18 mm in diam., campanulate, obtuse, usually not or barely umbonate, in young specimens, when wet, ochraceous and already pale, slightly hygrophanous, subsequently very pale cream or first cream then subochraceous (not pink), strongly reticulate from often very dark wrinkles, at apex even ± rugose-cerebroid.

Veil none (absent even in primordia).

Stem 40–75×1–2.2 mm, flexuous, with long pseudorrhiza, villose, white, then straw yellow or ochraceous, glossy.

Gills distant, adnate, slightly uncinate-decurrent, ventricose, brown, fairly dark, with pale edge, without red (but see observations).

Trama of 'washed' gill under binocular lens distinctly yellowish brown (M. 10 YR 6/4) only slightly paler near edge, and with very distinct dark greenish brown subhymenial zone under marginal cells, in many places interrupted over very short distance, and no doubt signifying the presence of a red gill edge.

MICROSCOPIC CHARACTERS[3].—Spores (11.7–)12.6–15.3×6.3–7.2 μm (average 13.5×6.5 μm), ellipsoid-amygdaliform, in water reddish brown (M. 2.5 YR 3/6),

[3] The macroscopic characters of the fruit body have been taken from Romagnesi's Latin diagnosis. The description of the characters of the trama of the gills and of the microscopic characters is based on our own examination of the type material.

in NH_4OH 10% dark reddish brown (M. 5 YR 3/3, 3/4), in KOH 5% greyish brown (M. 10 YR 3/2, 4/2), opaque, with ±2 μm wide, very distinct germ pore and small hilar appendix.

Basidia 25–30 × 11–12.5 μm, 4-spored.

Pleurocystidia 50–67.5 × 10–13 μm, numerous, subfusiform and often with elongate neck, slender, with subacute apices, thin-walled, colourless, without mucus or crystals.

Marginal cells predominantly (±90%) vermiform, often flexuous, subcylindric and at apex slightly swollen, intermixed with rather small number (±10%) of small fusiform to sublageniform cheilocystidia, 30–45 × 7–10 μm, and scattered fairly large clavate cells with broad apex, 32.5–47.5 × 10–12 μm; all these cells colourless, thin-walled, and without mucus or crystals; gill edge sterile.

Pigmentation of hymenophoral trama under microscope ('washed' gill mounted in NH_4OH 10%) pale yellowish brown from membranal pigment but without yellow septa or encrustations, with distinct, narrow, yellowish brown strip with some short interruptions running directly under marginal cells, and indicating the presence of a red gill edge.

Cuticle of cap cellular; cells 20–40 μm wide, colourless.

Clamps present on hyphae of stem, but scarce.

HABITAT.—In humus, gregarious, rare.

COLLECTION EXAMINED.—FRANCE, dép. Yvelines, St-Germain-en-Laye, 3 Oct. 1944, *H. Romagnesi* (lectotype: Herb. Romagnesi D 425; fragments in L).

In some respects the description of this species given by Romagnesi in the 'Flore analytique' differs slightly from the Latin one: the cap is called 'conique-obtus à campanulé', and the colour of very young specimens is described as being 'd'un ocracé légèrement fauvâtre, mais remarquablement clair', meaning that there is a slight reddish hue in the colour. It is furthermore stated that the caps dry very quickly 'devenant d'un ocracé pâle avec le sommet concolore ou plus ocre', and the gills are called 'brun-tabac à brun-bistre obscur'. This colour of the gills, as described by Romagnesi, does not correspond at all with his definition (1953: 355) of his group *Graciles*, in which he says 'Trame sensiblement incolore (...), totalement hyaline dans les lam., ...'.

We have never come across this characteristic species of which Romagnesi gives a full length Latin description (1952: 152) and the chief characteristics (1953: 357). Moser (1967: 213) also pays attention to the species. On examination of the type material we were particularly struck by the peculiar shape of the vast majority of the marginal cells, unique in section *Psathyrella*. While studying the colour of the hymenophoral trama of a 'washed' gill under a binocular lens we immediately noticed a very conspicuous greenish brown, in several places over a short distance interrupted zone under the marginal cells. This pigmentation was confirmed on microscopical examination, and in our experience signifies the presence of a red gill edge. Having brought this to the attention of Prof. Romagnesi we received (in lit.) his reply that in his Latin description with regard to the gill edge, in writing '*non visa*' he had merely meant to express that he had not been sure about either the absence or presence of a red zone at the gill edge (his description in the 'Flore ana-

lytique' does not mention the colour of the gill edge). He added that he had noticed that this colour, at times hardly visible and doubtful in fresh material, often becomes more distinct with age, and above all during the process of drying, and that one should mistrust examinations of exsiccata. We are inclined to draw a somewhat different conclusion. At least in this case it is probable that the pigment is already present in fresh material but becomes more manifest in dried fruit bodies. If there is doubt about the presence of a red gill edge in the fresh stage therefore we again strongly recommend washing the gill, as we described earlier (1971a: 249).

Psathyrella ochracea differs from all other species of this group in the pale ochraceous colour of the fresh cap, the very strongly veined, rugose (cerebroid) surface of the dry cap, the absence of a veil, the large spores, and the abundant vermiform cells on the gill edge.

PSATHYRELLA OPACA (Romagn.) Moser—Figs. 39, 40

Drosophila opaca Romagn. *in* Bull. Soc. linn. Lyon **21**: 152. 1952. — *Psathyrella opaca* (Romagn.) Moser *in* Gams, Kl. KryptogFl. **2** (b/2): 214. 1967.

SELECTED DESCRIPTION.—Kühn. & Romagn., Flore anal.: 357. 1953 (as *Drosophila opaca*).

CHIEF CHARACTERISTICS.—Cap 6–20 mm in diam., campanulate or hemispherical, drying out remarkably rapidly, and then opaque, pale alutaceous-ochraceous without pink; veil absent; gills brown, with white edge; stem rooting; spores 11.7–12.6 (–13.5) × (5.4–)6.3–6.8 μm; pleurocystidia 35–40 × 7.5–10 μm; hymenophoral trama coloured.

MACROSCOPIC CHARACTERS[4].—Cap 6–20 mm in diam., campanulate or hemispherical, then convex, barely hygrophanous, only in primordia translucent, from pale ochraceous becoming brownish, soon opaque, when dry pale argillaceous, ochraceous or whitish, not distinctly tinged with pink, slightly micaceous and wrinkled.

Veil none, or scarcely any (?).

Gills fairly close to fairly distant, adnate, ascending, ± ventricose, whitish, then brown, with pruinose, white edge.

Stem 35–65 × 0.7–1.5 mm, straight, rooting, white, finally smooth and glossy.

Trama of 'washed' gill under binocular lens distinctly brown, be it pale (M. 10 YR 6/3), from base to edge, no sign of a red gill edge.

MICROSCOPIC CHARACTERS[4].—Spores 11.7–12.6(–13.5) × (5.4–)6.3–6.8 μm (average 12 × 6.4 μm), ellipsoid-amygdaliform, in water dark reddish brown (M. 2.5 YR 3/4), in NH_4OH 10% slightly darker (M. 2.5 YR 3/2, 2/4), in KOH 5% dark greyish brown (M. 10 YR 4/2), opaque, with small hilar appendix, and distinct, ±2 μm wide apical germ pore.

Basidia 22.5–27.5 × 10–12 μm, 4-spored.

Pleurocystidia 35–40 × 7.5–10 μm (neck 3–5 μm thick), scattered and rather scarce, lageniform with cylindric neck, thin-walled, colourless, without mucus or crystals.

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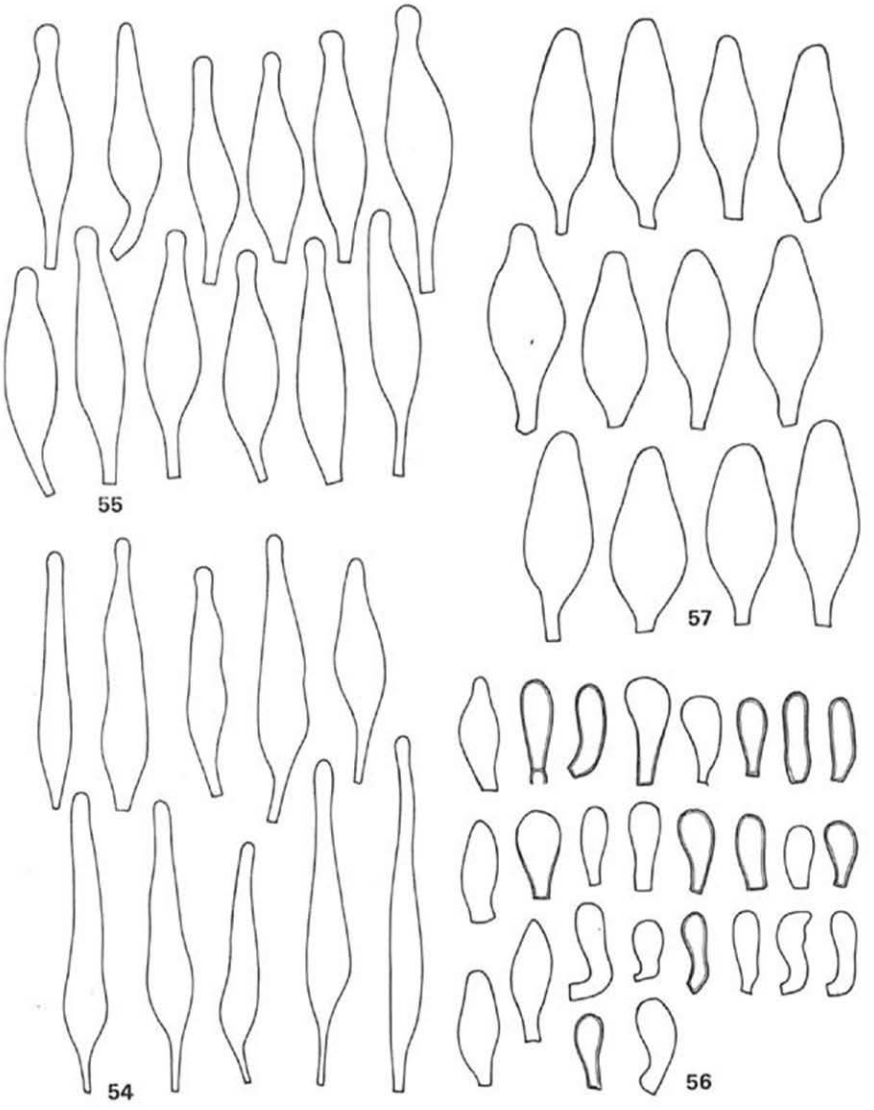
[4] The macroscopic characters of the fruit body have been taken from Romagnesi's Latin diagnosis. The description of the characters of the trama of the gills and of the microscopic characters is based on our own examination of the type material.



Figs. 54, 55. *Psathyrella polycystis*. — Pleurocystidiograms (×575). — 54. 11 Nov. 1967. — 55. 7 Nov. 1959.

Figs. 56, 57. *Psathyrella pseudogracilis*, 16 Aug. 1963. — 56. Cheilocystidiogram (×575). — 57. Pleurocystidiogram (×575).

Cheilocystidia 27.5–37.5 × 7.5–10 μm wide, scattered and not numerous (±20% of total number of marginal cells), lageniform, colourless, thin-walled, without mucus or crystals, with at their base, not easily detectable, a large number (±80% of total number of marginal cells) of narrow, small, spheropedunculate and clavate cells, 15–22.5 × 6–8 μm; gill edge sterile.

Pigmentation of hymenophoral trama under microscope ('washed' gill mounted in NH_4OH 10%): trama distinctly pale yellowish brown from membranal pigment, particularly in basal 1/3, and in this area with a number of yellow hyphal septa and a few encrustations.

Cuticle of cap cellular; cells 16–32 μm in diam., colourless.

Clamps present on hyphae of stem, but very few.

HABITAT.—In humus, among grass or moss.

COLLECTION EXAMINED.—FRANCE, 'Asnière-Oix', 12 Sept. 1946, *H. Romagnesi* (lectotype: Herb. Romagnesi No. 523; fragments in L).

This species has never been found in the Netherlands, and we have never seen fresh material. Romagnesi's original Latin description, the one in the descriptive key in the 'Flore analytique', and Moser's (1967: 214) very short description, which is an abstract of the one in the 'Flore analytique', are the only ones available in the literature. We have accepted the species on the strength of Romagnesi's description, and are grateful that we could study material he made available to us.

In the description of this species in the 'Flore analytique' (1953: 357) Romagnesi states (in bold face letters) that the cap dries remarkably rapidly, and that as a result the fresh stage can be studied only in very young specimens, in which the colour then turns out to be pale, brown or ochre, vaguely lilac near the margin; the gills are called tobacco brown, and the pleurocystidia are said to measure 32–63 × 9.5–14.5 μm.

Psathyrella orbicularis (Romagn.) Kits van Wav., *comb. nov.*

Figs. 7, 8, 41–44

BASIONYM: *Drosophila stellata* var. *orbicularis* Romagn. *in* Bull. Soc. linn. Lyon **21**: 153. 1952; Kühn. & Romagn., Flore analytique: 357. 1953.

CHIEF CHARACTERISTICS.—Cap 10–17 mm in diam., conical or hemispherical-campanulate, showing neither pink nor concentric zones when dry; veil distinct; gills dark purple or tobacco colour, with red edge; stem rooting (pseudorrhiza 5–15 mm); spores 11.3–13.5(–14.4) × 6.3–7.2 μm; pleurocystidia (35–)40–65(–75) × 10–15 μm, sublageniform, ventricose-lageniform or subfusiform; cheilocystidia densely packed; hymenophoral trama brownish.

MACROSCOPIC CHARACTERS.—Cap 10–17 mm in diam., 4–6 mm high, conical or hemispherical-campanulate, finally spreading to convex, sometimes with fairly distinct umbo, dark reddish brown, chestnut brown when very fresh (M. 10 R 3/4; 2.5 YR 3/4), very soon with only a trace of red at centre, the remainder just dark brown (M. 7.5 YR 3/2, 4/2) with marginal area somewhat paler and margin itself even whitish, striate up to 1/2–2/3 from margin upwards, hygrophanous, drying out via pale brown (M. 10 YR 6/3), and in centre darker brown (M. 7.5 YR 5/4; 10 YR

7/4) to ultimately very pale brown, alutaceous or greyish (M. 10 YR 7/1, 7/2) but without pink, as a rule distinctly micaceous but not or only just rugulose.

Veil forming a very distinct network of white fibres, isolated or bundled into small groups, reaching almost up to centre of cap; not appendiculate.

Gills 2–4 mm broad, ventricose near margin of cap, then straight and ascending, broadly adnate and sometimes with distinct tooth, in which case edge even slightly concave towards stem, very dark purple or reddish brown, tobacco colour (M. 5 YR 3/2; 7.5 YR 3/2, 4/2) or dark greyish brown (M. 10 YR 4/2), with red but sometimes seemingly white edge (red on microscopical examination of 'washed' gill).

Stem 35–70 × 1 mm, cylindric but base sometimes slightly thickened, straight, distinctly rooting, pseudorrhiza 5–15 mm long, strigose at base with white hairs, white in upper part, isabelline lower down, glossy, at apex conspicuously pruinose, hollow.

Flesh of cap 1 mm thick in centre, dark reddish brown; flesh of stem whitish and pale brown in basal part.

Spore print purplish black.

Trama of 'washed' gill under binocular lens in basal half of gill distinctly brown (M. 10 YR 6/3), towards edge paler (M. 10 YR 7/3, 7/2), practically colourless near edge.

MICROSCOPIC CHARACTERS.—Spores 11.3–13.5(–14.4) × 6.3–7.2 μm (averages 12–12.5 × 6.4–6.8 μm), ellipsoid-amygdaliform, in water dark reddish brown (M. 2.5 YR 3/6, 4/6; 5 YR 3/4), in NH_4OH 10% darker (M. 2 5 YR 3/4, 3/6), in KOH 5% dark greyish brown (M. 10 YR 3/3), opaque, with distinct, ± 2 μm wide germ pore and small hilar appendix.

Basidia 17.6–35 × 9–12 μm, 4-spored.

Pleurocystidia (35–)40–65(–75) × 10–15 μm, fairly scarce to moderately numerous, sublageniform, ventricose-lageniform or subfusiform, with neck sometimes subcylindrical and then sharply delimited from the ventricose cell body, with obtuse to subacute apex, thin-walled, colourless, without mucus or crystals.

Cheilocystidia 25–40(–45) × 7.5–14 μm, densely packed, of same shape as pleurocystidia but smaller, colourless, without mucus or crystals, at their base intermixed with a small number (±30% of total number of marginal cells) of small and unobtrusive spheropedunculate cells, 10–17.5(–20) × 5–8(–10) μm; gill edge sterile.

Pigmentation of hymenophoral trama under microscope ('washed' gill mounted in NH_4OH 10%) distinctly pale brown from membranal pigment, darkest at and near base of gills, paler towards edge, colourless or faintly coloured at edge, with a fair number of yellowish hyphal septa and few encrustations, both in somewhat larger number at and near base, and absent in peripheral 1/3 of gills.

Cuticle of cap cellular; cells 16–32 μm in diam., colourless.

Clamps on hyphae of stem fairly numerous.

HABITAT.—Solitary, terrestrial against small pieces of wood in deciduous woods. October. Very rare.

COLLECTIONS EXAMINED.—THE NETHERLANDS, prov. Noord-Holland, Overveen, estate 'Elswout', 23 Oct. 1959 and 1 Oct. 1966 (2 collections in two widely separated places), *E. K. v. W.* (L).

FRANCE, dép. Yvelines, Grignon, 29 Sept. 1951, *H. Romagnesi* (lectotype: Herb. Romagnesi D 642; fragments in L).

This is a small and rooting species of *Psathyrella* whose gills have a red edge (microscopical verification perhaps needed) so that it easily might be taken for

P. gracilis. But the mature cap is dark reddish brown, the veil is well developed, the hymenophoral trama is brownish, and the pleurocystidia differ from those of *P. gracilis*. The species is a good deal smaller than *P. stellata*, the margin is not undulating, lobed or sulcate as in *P. stellata*, and the veil is very distinct. On account of these characters we believe the species deserves specific rank, although Romagnesi described it as a mere variety of *P. stellata*.

PSATHYRELLA PELLUCIDIPES (Romagn.) Galland—Figs. 9, 45–49

Drosophila pellucidipes Romagn. *in* Bull. Soc. mycol. Fr. **82**: 541. '1966' [1967]. — *Psathyrella pellucidipes* (Romagn.) Galland *in* Rev. Mycol. **36**: 151. 1972.

CHIEF CHARACTERISTICS.—Solitary. Cap 13 mm in diam., campanulate, marginal area not revolute, on drying showing neither concentric zones nor pink; veil rudimentary; gills dark grey, broadly adnate, with white edge; stem rooting (pseudorrhiza 8 mm); spores 11.7–13.5 × 6.3–7.2 μm, with indistinct germ pore; pleurocystidia 40–55 × 10–12.5 μm; marginal cells chiefly consisting of spheropedunculate cells; hymenophoral trama practically colourless.

MACROSCOPIC CHARACTERS.—Cap 13 mm in diam., 12 mm high, campanulate, with marginal area not revolute, extreme margin not extending beyond end of gills, strikingly very dark reddish brown (M. 5 YR 3/2; 2.5 YR 3/2), hygrophanous, rapidly becoming paler when drying, becoming brown or yellowish brown (M. 10 YR 6/4), distinctly micaceous, rugulose but without pink, and without concentric colour zones, striate half-way up from margin.

Veil not seen on cap, but stem with scattered white velar fibres.

Gills 3 mm broad, straight, ascending, broadly adnate, strikingly grey (M. 10 YR 5/1) with only a trace of purple, with white edge contrasting conspicuously with grey face of gill.

Stem 70 × 1.75 mm, cylindric, straight, at extreme base slightly thickened, covered with very thin coating of greyish tissue and scattered with velar fibres, ending in a distinct but short (8 mm) tapering pseudorrhiza, whitish to pale brown (M. 7.5 YR 6/4), hollow, minutely pruinose at apex, its cavity loosely filled with white spongy tissue.

Flesh of cap in centre 1 mm thick, very dark brown (M. ±10 YR 3/4); flesh of stem pale brown (M. 7.5 YR 6/4) but dark brown (M. 10 YR 3/4) at extreme apex along insertion of gills.

Spore print black

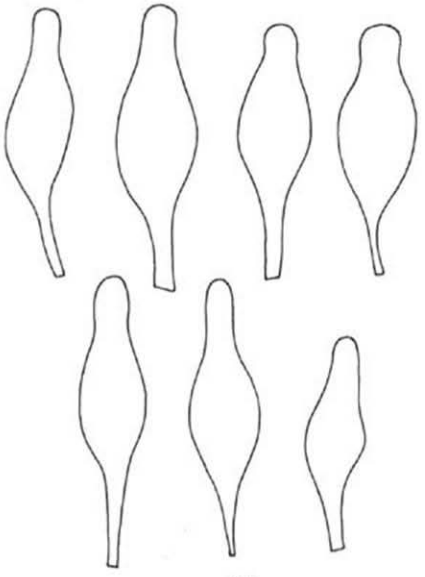
Trama of 'washed' gill under binocular lens practically colourless (M. 10 YR 7/2) with very narrow yellowish brown (paler than M. 10 YR 5/6) strip at base.

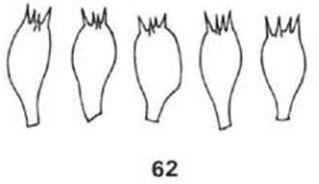
MICROSCOPIC CHARACTERS.—Spores 11.7–13.5 × 6.3–7.2 μm (average 12.7 × 6.7 μm), ellipsoid-amygdaliform, in water dark reddish brown (M. 2.5 YR 3/2, 3/4), in NH_4OH 10% slightly darker (M. 2.5 YR 3/4, 2/4), in KOH 5% dark greyish brown (M. 10 YR 3/2), opaque, with ±1.8 μm wide but indistinct germ pore.

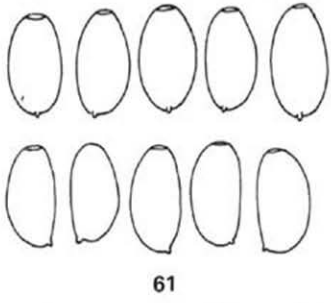
Basidia 22.5–27.5 × 10–12 μm, 4-spored.

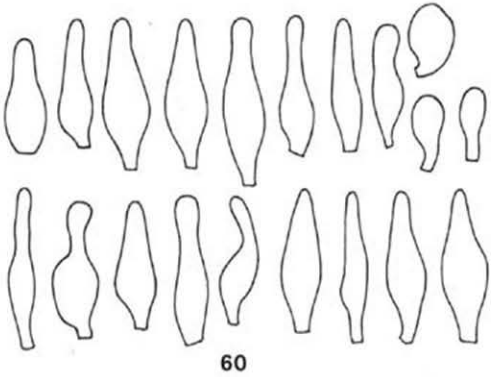
Pleurocystidia 40–55 × 10–12.5 μm, neck 4–5 μm wide, scattered and rather scarce, slightly ventricose-sublageniform with fairly long stalk and long subcylindrical neck, colourless, without mucus or crystals.

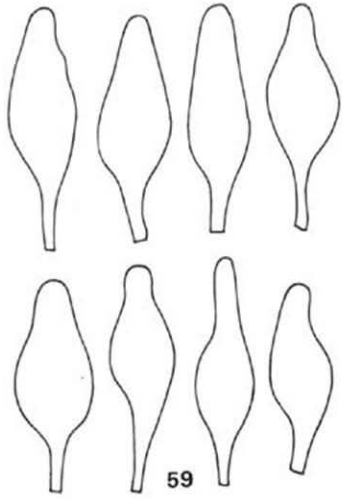
Spheropedunculate cells 15–22.5 × 7.5–12.5 μm, abundant (±80% of total number of marginal cells), fairly small but increasing in number and size towards











Figs. 58, 59. *Psathyrella pseudogracilis*. — Pleurocystidiograms (×575). — 58. 24 July 1962. — 59. 27 July 1961.

Figs. 60–62. *Psathyrella ridicula*, 11 Aug. 1962. — 60. Cheilocystidiogram (×575). — 61. Spores (×1212). — 62. Basidia (×575).

margin of cap (near margin some measuring up to 32.5 × 17.5 μm), intermixed with scattered cheilocystidia ±20% of total number of marginal cells but in some places more numerous, similar to pleurocystidia but smaller, 35–47.5 × 8–12.5 μm, with stalks shorter than those of pleurocystidia but necks fairly long and subcylindric, colourless, without mucus or crystals.

Pigmentation of hymenophoral trama under microscope ('washed' gill mounted in NH_4OH 10%): trama practically colourless, very pale brown near and at base from membranal pigment, with in basal region a small number of yellow hyphal septa and a few encrustations.

Cuticle of cap cellular; cells 24–48 μm in diam., colourless.

Clamps present on hyphae of stem.

HABITAT.—Solitary. In grass field.

COLLECTIONS EXAMINED.—GREAT BRITAIN, Shropshire, Oswestry, estate 'Llangedwyn', 19 Sept. 1967, *E. K. v. W.* (L).

FRANCE, dép. Oise, Comelle à Orry-la-Ville, 29 May 1966, *Mesplède* & *Soleillant* (holotype: fragments in L).

The above description is based exclusively on the only specimen of this species we ever found. It answers Romagnesi's description (1966: 541) very well. Prof. Romagnesi, to whom we sent a drawing of our specimen, answered that it 's'adapte bien à mon *pellucidipes*.' With him it is also a small species (cap 7.5–14 mm, stem 50–80 × 0.7–2 mm), with very rapidly disappearing remnants of a rudimentary veil, neither pink nor concentric colour zones on the dry cap, which is rather brown, a very short pseudorrhiza, grey gills with a white gill edge, a black spore print, and an indistinct germ pore ('à pore large mais très aplati, très bas'). Prof. Romagnesi stated (in lit.) that he believed that *P. pellucidipes*, although 'la microscopie est à peu près la même' as in *P. caudata* (sensu Romagn. = *P. melanophylla*), distinguishes itself from the latter species by its 'physionomie', the species being 'très fragile, à pied presque transparent, de port tout à fait différent'. The shape of both cap and gills of Romagnesi's figure (1967: fig. 2 g) are in every respect identical with those of our Fig. 9.

Obviously, and Romagnesi says so in his observations, the species is very close to *Psathyrella melanophylla*. It differs from that species mainly in its much smaller size and its campanulate cap, neither conical nor with revolute marginal area. According to Romagnesi, other differences are that in *P. melanophylla* the pseudorrhiza is longer, the cap 'plus coloré et bien plus hygrophane', and the pleurocystidia 'constamment plus petites et à col plus court.' The latter statement must be an error since in the 'Flore analytique' the pleurocystidia of *P. caudata* (sensu Romagnesi = *P. melanophylla*) are said to be '±longues (30–)45–75 × 8–12.5 μ.'; Romagnesi's figures for *P. pellucidipes* being practically the same, 60–75 × (8–)10–18 μm.

Prof. Romagnesi very kindly sent us fragments of the holotype of *Psathyrella pellucidipes* for study. We found exactly the same pleurocystidia (Fig. 49) as those depicted by Romagnesi (1967: 543, fig. 2a, b). As is clear from comparison of the figures of the pleurocystidia of the holotype with those of our Welsh collection (Fig. 48) the cells of the two collections differ somewhat. This, we believe, is just

another example where the pleurocystidia within a single species differ from one collection to another; in his figure 2c Romagnesi depicts a cystidium with a rather long neck, far more slender and subfusiform than those of his figures 2a and 2b; the cystidium in figure 2c bears more resemblance to the cells of our Welsh collection.

As for the length of the pseudorrhiza and the colour of the cap, 'brun-bistre ochracé un peu fauvâtre' according to Romagnesi, the variability of characters like these is too great to rely on them in the delimitation of species in this part of the section *Psathyrella*. Also, according to Romagnesi *P. melanophylla* is supposed to be 'plus hygrophane', and *P. pellucidipes* 'peu hygrophane'. If this should be so it is difficult to understand why in spite of this Romagnesi states that the cap of *P. pellucidipes* is 'très vite déshydraté et récolté généralement pâle'. This statement makes it very likely that really fresh caps of *P. pellucidipes* are a good deal darker than 'brun-bistre ochracé un peu fauvâtre', but, instead, dark reddish brown, as indeed the colour of the cap of our specimen was.

PSATHYRELLA POLYCYSTIS (Romagn.) Moser—Figs. 10–14, 50–55

Drosophila polycystis Romagn. *in* Bull. Soc. linn. Lyon **21**: 152. 1952. — *Psathyrella polycystis* (Romagn.) Moser *in* Gams, Kl. Kryptog Fl. **2** (b/2): 214. 1967.

SELECTED DESCRIPTION. — Kühn. & Romagn., Fl. anal.: 358. 1953 (as *Drosophila polycystis*).

CHIEF CHARACTERISTICS.—Cap 13–30 mm in diam., conico-campanulate to convex, dark reddish brown, showing pink when dry; veil present; gills purplish grey, browner towards base, with red edge; stem rooting (pseudorrhiza 3–30 mm); spores 10.8–14.4 × 5.9–7.2 μm; pleurocystidia (40–)55–85(–90) × 7.5–15 μm, very numerous, slender, subfusiform with long necks and swollen apex; hymenophoral trama brownish.

MACROSCOPIC CHARACTERS.—Cap 6–25(–30) mm in diam., 4–12 mm high, conico-campanulate, later spreading to conico-convex; in young but also older stages conspicuously dark reddish brown (M. 2.5 YR 3/4; 5 YR 3/3, 3/4), when starting to dry out soon losing reddish colour, becoming pale brown (M. 10 YR 5/2, 5/3, 5/4, 6/3, 7/4) in marginal area, just brown (M. 7.5 YR 4/3, 5/4; 10 YR 4/3) towards centre, and dark brown (M. 7.5 YR 3/2) in and around centre, with extreme edge often whitish; striate up to 2/3 from margin upwards, hygrophanous, drying out to pale brown (M. 10 YR 8/4, 7/3) or greyish brown, alutaceous (M. 10 YR 7/2), at centre remaining slightly darker or yellowish brown (M. 7.5 YR 6/6; 10 YR 7/4, 8/4), at periphery these colours usually distinctly mixed with pink (M. 5 YR 8/4; 7.5 YR 7/4), slightly but sometimes more distinctly micaceous and rugulose.

Veil sometimes very conspicuous, sometimes hardly developed, usually leaving quite a number of velar fibres or even small networks of fibres on young caps, sometimes even up to the apex, but fibres few on mature caps.

Gills 2–4 mm broad, ventricose near margin of cap, then straight, ascending and broadly adnate, rarely slightly ventricose and narrowly adnate, when young pale brown (M. 7.5 YR 6/4) or with trace of purple (M. 7.5 YR 5/2), when old grey to fairly dark purplish grey (M. 10 YR 5/1; 5 YR 5/1, 4/1) near edge, and browner towards base (M. 10 YR 5/2), with distinctly red edge.

Stem 35–80(–95) × 1–3 mm, straight, cylindric or gradually thickening (2–4 mm) towards base, slightly to distinctly rooting (with 3–30 mm long pseudorrhiza),

practically smooth or minutely longitudinally striate and usually covered with a small to fairly large number of white fibrillose velar remnants, white in upper part, lower down isabelline or even pale brown (M. 10 YR 7/3, 6/3) towards base, strigose with white hairs at base, pruinose at apex, hollow.

Flesh of cap in centre 1–2 mm thick, dark brown (M. 7.5 YR 3/2; 10 YR 3/4, 4/3); flesh of stem white or whitish in upper part, isabelline or pale brown (M. 10 YR 6/4) lower down.

Spore print purplish black.

Trama of 'washed' gill under binocular lens usually distinctly but not strongly brown in basal 1/3–1/2 of gill (M. 10 YR 6/4), gradually paler towards edge (M. 10 YR 7/4, 7/3), colour in older specimens paler, pale brown (M. 10 YR 7/4, 7/3) in basal part, elsewhere very pale brown (M. 10 YR 7/2, 7/3) or even pale yellowish brown (M. 5 Y 7/2).

MICROSCOPIC CHARACTERS.—Spores 10.8–14.4 × 5.9–7.2 μm (averages 11.4–13.1 × 6.3–6.7 μm), in water brown (M. 7.5 YR 4/4) to faintly reddish brown (M. 5 YR 3/4, 4/4), in NH_4OH 10% reddish brown (M. 5 YR 3/3, 3/4, 4/4), in KOH 5% dark greyish brown (M. 10 YR 3/3, 4/3), with distinct, ±2 μm wide germ pore and small hilar appendix.

Basidia 17.6–38.4 × 9.6–12.8 μm, 4-spored.

Pleurocystidia (40–)55–85(–90) × 7.5–15(–17.5) μm, very to exceedingly numerous, slender, subfusiform to sublageniform with long and narrow necks and practically always distinctly swollen apex ('en spathule au sommet'), thin-walled, colourless, without mucus or crystals; apex very thin-walled and unlike rest of cell not or scarcely staining red when gill is mounted in Congo red.

Cheilocystidia 25–57.5(–70) × 7.5–15 μm, usually densely (70–90% of total number of marginal cells) but sometimes less densely (±20–70%) packed or locally even scattered, subfusiform to sublageniform, with sometimes slightly swollen apex, thin-walled, colourless, and without mucus or crystals. Spheropedunculate cells 10–20 × 5–12.5 μm, usually very few (10–30% of total number of marginal cells) but sometimes in larger numbers (30–80% of total number of marginal cells), particularly near margin of cap and then also larger (20–35 × 10–17.5 μm); sometimes quite a few spheropedunculate cells and a few cheilocystidia with slightly thickened walls.

Pigmentation of hymenophoral trama under microscope ('washed' gill mounted in NH_4OH 10%) quite distinct but varying a good deal and strongest in young, rather faint in old specimens; trama usually very brown from membranal pigment along base of gills, distinctly brown in basal 1/3 of gill, colour gradually fainter towards edge, where trama almost colourless; yellow hyphal septa and some encrustations present in basal part of gills but disappearing towards edge.

Cuticle of cap cellular; cells 16–40 μm in diam., colourless.

Clamps numerous on hyphae of stem.

HABITAT.—Solitary, terrestrial, often against small pieces of wood in rich soil, humus or decaying leaves, in woods. September–November. Not uncommon.

COLLECTIONS EXAMINED.—THE NETHERLANDS: prov. Utrecht, Zeist, estate 'Nienhof', 22 Sept. 1962, *A. F. M. Reijnders* (L); prov. Noord-Holland: Amsterdam, Amsterdamse Bos, 7 Nov. 1959 and 13 Oct. 1960, *E. K. v. W.* (L); Santpoort, estate 'Duin en Kruidberg', 28 Sept. 1962, 3 Nov. 1962, and 13 Nov. 1962, *E. K. v. W.* (L); Heilo, Heilose Bos, 11 Nov. 1967, *E. K. v. W.* (L); Castricum, Dunes of County Water Reservoir 28 Sept. 1968, *E. K. v. W.* (L); prov. Zuid-Holland, Bodegraven, alongside Utrecht-The Hague motorway, 19 Oct. 1967, *A. F. M. Reijnders* (L).

The delimitation of this species from all other species of this section is based exclusively on the three characteristics presented by its pleurocystidia. These are (i) very numerous (hence the name), (ii) very slender (in the 'Flore analytique' Romagnesi rightly calls them, in bold face, 'très sveltes'), and (iii) almost always swollen at the extreme apex, which is very thin-walled and 'spatula'-like. Occasionally one comes across some pleurocystidia with a swollen apex in other species of section *Psathyrella*.

In the field *Psathyrella polycystis* can hardly be distinguished from *P. gracilis* as both species have about the same habit and a red gill edge, and as the veil in *P. polycystis* is very often rudimentary or has disappeared. The mature fresh caps of *P. polycystis*, however, are dark reddish brown, unlike those of *P. gracilis*, which very soon turn greyish brown to mud-grey.

Unlike *Psathyrella gracilis*, which can almost for certain be identified by a mere glance at the pattern of the cellular lining of the gill edge, this is not so in *P. ploycystis*, in which this pattern is much more variable, and in some specimens may even greatly resemble the pattern in *P. gracilis*. The cellular lining of the gill edge in our collection from Santpoort, 28 Sept. 1962, for instance was identical with that in *P. gracilis*. The pleurocystidia, however, were numerous (though not exceedingly so), they were very slender and their apices were slightly swollen; moreover the hymenophoral trama was coloured, so that after some hesitation we ranked this collection with the other collections of *P. polycystis* (seemingly a transitional from between *P. polycystis* and *P. gracilis*).

Another difficulty was presented by the specimens from Bodegraven, 19 Oct. 1967, which grew in a cespitose bunch, springing from a common pseudorrhiza. Their dry caps did not show a pink colour, the gills were slightly ventricose and narrowly adnate, and the cellular lining of the gill edge was identical with that of *P. gracilis*. We decided against describing this collection as a new species because the pleurocystidia possessed the three characteristics typical of *P. polycystis*; they are exceedingly numerous, very slender, and their apices are swollen. Here the absence of pink in the dry cap and the cespitose growth are characters in common with *P. melanophylla*, the red gill edge and the absence (through rain?) of velar remnants with *P. gracilis*, which makes this collection somewhat intermediate between *P. melanophylla* and *P. gracilis*, and also *P. polycystis* itself.

The gills of three out of our nine collections of *P. polycystis* were narrowly adnate. This mode of attachment is very rare in the species of this section; we encountered it only in *P. melanophylloides*.

In the collection from Zeist, 22 Sept. 1962, the walls of almost all pleurocystidia and many cheilocystidia were very slightly thickened but the apices of the former were swollen and very thin-walled as they should be in *P. polycystis*.

Of *Psathyrella subdebilis*—a new species described by A. H. Smith (1972: 327)—Smith states that in the field it is likely to be confused with *P. conopilea*. If this is so, we cannot think how Smith can be right in stating: '*Drosophila polycystis* Romagnesi appears to be close to this species.' *Psathyrella conopilea* and *P. polycystis* have nothing

in common, either macro- or microscopically. The colour of the cap of *P. subdebilis* is not given as being reddish brown but as pale cinnamon, it is not stated that the stem is rooting, the spores in KOH are said to be of a chocolate colour, the pleurocystidia are not described as numerous, and they measure 36–57 × 10–17 μm so that they cannot be called slender; and the apex is merely called obtuse. The true *Psathyrella polycystis* Romagn. must have been unknown to Smith.

PSATHYRELLA PSEUDOGRACILIS (Romagn.) Nathorst-Windahl

Figs. 15–17, 56–59

Drosophila pseudogracilis Romagn. *in* Bull. mens. Soc. linn. Lyon **21**: 152. 1952. — *Psathyrella pseudogracilis* (Romagn.) Nathorst-Windahl *in* Friesia 6: 300. 1961.

SELECTED DESCRIPTIONS.—Kühn. & Romagn., Flore analytique: 357. 1953 (as *Drosophila pseudogracilis*); Romagn. *in* Bull. trimest. Soc. mycol. Fr. **91**: 218. 1975 (as *Drosophila pseudogracilis* forma *minor*); Malençon & Bertault, Flore champ. sup. Maroc: 190. 1970 (as *Drosophila pseudogracilis*).

CHIEF CHARACTERISTICS.—Isolated growth, cap 9–25 mm in diam., campanulate-convex, pale yellowish brown to grey, showing pink when dry; veil rudimentary; gills dark purple, with red edge; stem rooting (pseudorrhiza 3–10 mm); spores 11.3–13.1 × 6.3–7.2 μm, with distinct germ pore; pleurocystidia 40–70 × 10–20 μm, fairly numerous and ventricose-utriform; hymenophoral trama colourless.

MACROSCOPIC CHARACTERS.—Cap 9–25 mm in diam., campanulate-convex, spreading to convex, sometimes with umbo; at first fairly dark brown (M. 10 YR 3/3, 4/3) but very soon yellowish brown (M. 10 YR 4/4, 5/4, 5/6), at centre even yellowish olive brown (M. 2.5 Y 5/4), later greyish brown or brownish grey (M. 10 YR 4/2, 5/2) with yellowish brown centre (M. 10 YR 5/4), finally predominantly and rather pallidly grey (M. 10 YR 6/2), at extreme margin very thin and whitish, strongly striate up to 2/3–3/4 from margin, hygrophanous, drying out to very pale brown or alutaceous (M. 10 YR 7/3, 7/4, 8/4) or almost whitish (M. 10 YR 8/2, 8/3; 2.5 Y 8/2) with yellowish centre (M. 10 YR 6/6, 7/6), outside centre distinctly and sometimes even strongly mixed with pink, somewhat micaceous and rugulose.

Veil usually forming some minute, scattered and fugacious white fibres along margin of cap and on stem.

Gills 2–4 mm broad, slightly ventricose from margin of cap towards midway (this part sometimes protruding below margin of cap), then ascending and straight or straight all the way up, broadly adnate, often with small tooth, grey (M. 10 YR 6/1, 5/1), then dark grey (M. 10 YR 4/1, 3/1), finally dark purple (M. 2.5 YR 3/2), with distinctly red edge.

Stem 30–75(–95) × 1–2.5 mm, cylindrical or very slightly thickening towards base, straight, white, hollow, pruinose at apex, rooting with 3–10 mm long pseudorrhiza, at base more or less strongly strigose with white hairs.

Flesh of cap 1–2 mm thick in centre, greyish brown; flesh of stem white but very pale brown around cavity.

Spore print purplish black.

Trama of 'washed' gill under binocular lens more or less colourless or very pale grey to yellowish (M. 5 Y 7/2, 7/3; 2.5 Y 7/2) or very pale brown (M. 10 YR 7/2, 7/3, 8/3).

MICROSCOPIC CHARACTERS.—Spores 11.3–13.1 × 6.3–7.2 μm (averages 11.8–12.6 × 6.4–6.9 μm), ellipsoid-amygdaliform, in water dark reddish brown (M. 2.5 YR 3/6, 3/4), in NH_4OH 10% slightly darker (M. 2.5 YR 3/4), in KOH 5% dark greyish brown (M. 10 YR 3/2, 4/2), opaque to subopaque, with small hilar appendix and ±2 μm wide, distinct germ pore.

Basidia 19.2–33.6 × 10.4–12.8 μm, 4-spored.

Pleurocystidia 40–70(–77.5) × 10–20 μm, fairly numerous, ventricose, utriform or subutriform, often with rather long stalk, thin-walled, colourless, without mucus or crystals.

Cheilocystidia 25–50 × 7.5–17.5(–20) μm, in very variable numbers, sometimes densely packed, sometimes scattered, of very variable shape, mostly subutriform but also utriform, sublageniform or subfusiform, thin-walled, colourless, rarely with droplets of mucus at apex, without crystals, intermixed with a very variable number of spheropedunculate and clavate (sometimes subcylindric) cells, (12.5–)15–25 (–30) × 5–12.5 μm, sometimes with slightly thickened walls (as in *P. gracilis*).

Pigmentation of hymenophoral trama under microscope ('washed' gill mounted in NH_4OH 10%): trama practically colourless, or very pale yellowish to yellowish brown in basal part from membranal pigment, without yellow hyphal septa, and without encrustations.

Cuticle of cap cellular; cells 16–40 μm in diam., colourless.

Clamps present on hyphae of stem.

HABITAT.—Solitary, in grass along roadsides, in clayey soil. July–September. Uncommon.

COLLECTONS EXAMINED.—THE NETHERLANDS: prov. Gelderland, Zoelen, castle 'Zoelen', 9 Aug. 1974, *G. J. Tjallingii-Beukers* (L); prov. Utrecht, Breukelen, estate 'Over Holland', 28 July 1962, *E. K. v. W.* (L); prov. Noord-Holland, Amsterdam, Amsterdamse Bos, 27 July 1961, 24 July and 7 Aug. 1962, 16 Aug. 1963, *E. K. v. W.* (L).

GREAT BRITAIN, Oxfordshire, Bladon, Blenheim Park, 16 Sept. 1969, Foray British Mycological Society, *M. P. English* (L).

In the field this species can hardly be distinguished from *P. gracilis*, but the colour of its cap is slightly paler (trama less pigmented) and contains no reddish shades when fresh, not even in the early stages; it usually grows in grass. Microscopically its outstanding feature is its utriform pleurocystidia. A. H. Smith (1972: 332) states that his *P. gracilis* var. *fulva* 'may deserve rank as an autonomous species, but should be carefully compared with *P. pseudogracilis* Romagn'. the latter species being not further mentioned in his monograph. *Psathyrella gracilis* var. *fulva*, however, is described as having a deep colouration of the pileus, an undulating and in later stages all over brownish stem, large spores (13.5–16 × 6.5–7.5 μm), and fusoid-ventricose pleurocystidia whose apex is acute to subacute, and which therefore are by no means utriform.

Like Romagnesi we found the spores of *Psathyrella pseudogracilis* to be very slightly larger than those of *P. gracilis*, but Romagnesi's figures even go up to 16.5 μm for the length. In his latest publication (1975: 218) Romagnesi, however, gives smaller figures for a small form of *P. pseudogracilis* : 11.5–14.7 × 6–6.5 μm.

On 22 September 1964 we found on the estate 'Leyduin' near Vogelenzang (prov. Noord-Holland) two specimens a good distance apart, whose cap and gills were

strikingly white, 'ivory white'. The caps contained scarcely any pigment, the gills, of which the edges showed no red, none. The two specimens were substerile. Their gills were speckled with numerous purplish minute points. These contained a majority of normal and a minority of very large spores (up to 12.6–17.1 × 7.2–8.1 μm). Quite a number of basidia were—as expected—2 spored. The vast majority of the basidia had no sterigmata at all.

Psathyrella ridicula Kits van Wav., *spec. nov.*—Pl. 63; Figs. 18, 60–63

Pileus 8–20 mm latus, campanulatus, haud vel vix dilatatus, interdum exigue umbonatus, castaneus deinde fuscus, 2/3 striatus, hygrophanus, in sicco canus vel fumosus alutaceus, centro ochraceo-brunneus, exigue micaceus rugulosusque, haud roseus. Velum fugax in pileo, conspique albo-fibrillosum in stipitis parte inferiori, etiam disperse albo-flocculosum. Lamellae exigue marginem versus ventricosae, rectae, ascendentes, late adnatae, 2–3 mm latae, obscure purpureae, brunnei basi, acie alba. Stipes 30–60 × 1–2 mm, aequalis, rectus, superne albus, basin versus isabellinus, inferne pallide ochraceo-brunneus, fistulosus, apice pruinosus, radicans (radix 5–15 mm). Caro cinereofusca in pileo, albida in stipite. Sporae in cumulo purpureo-atratae.

Sporae (11.3–)11.7–13.5 × 6.3–6.8 μm, ellipsoideo-amygdaliformes, in aqua observatae castaneae, poro germinativo lato et distincto (± 2 μm). Basidia 20–32 × 9.6–12.5 μm, 4-sporigera. Pleurocystidia 40–60 × 7.5–14(–17.5) μm, modice numerosa, lageniformia, in pluribus apice subincrassato. Cheilocystidia 30–45 × 6–10 μm, modice numerosa, tum subconferta tum dispersa, interdum pilei margine absentia, lageniformia. Cellulae spheropedunculatae tum dispersae tum confertae, interdum pilei margine confertissimae, 15–20 × 7–12.5 μm. Trama lamellarum distincte colorata. Cuticula pilei cellularis. Hyphae stipitis fibuligerae.

Subcespitosa, terrestris circa Fagi truncum.

TYPUS: 'The Netherlands, prov. Noord-Holland, Santpoort, "Duin en Kruidberg", 11 aug. 1962, *E. Kits van Waveren*' (L).

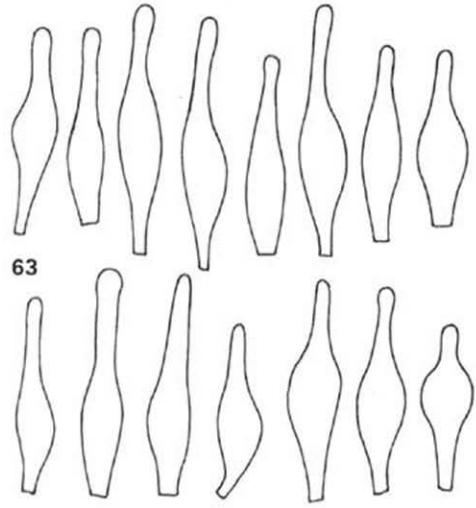
CHIEF CHARACTERISTICS.—Subcespitose growth; cap 8–20 mm in diam., campanulate, showing neither pink nor concentric zones when dry; gills dark purplish brown, with white edge; stem rooting with 5–15 mm long pseudorrhiza; spores (11.3–)11.7–13.5 × 6.3–6.8 μm, with distinct germ pore; pleurocystidia 40–60 × 7.5–14(–17.5) μm, lageniform, often with slightly swollen apex; hymenophoral trama brownish.

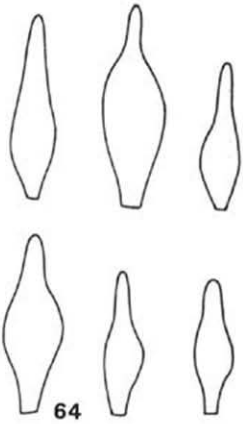
MACROSCOPIC CHARACTERS.—Cap 8–20 mm in diam., 6–11 mm high, campanulate, not or scarcely expanding, sometimes very slightly umbonate, dark reddish brown (M. 5 YR 3/3) or dark brown with just a trace of red (M. 7.5 YR 3/2), then dark brown (M. 7.5 YR 4/2), strongly striate up to 1/2–2/3 from margin upwards, hygrophanous, drying out via greyish brown (M. 10 YR 5/2) to pale grey or greyish brown, alutaceous (M. 10 YR 6/2, 7/2), at centre remaining browner or more yellowish brown (M. 10 YR 7/4, 8/6), without pink shades, very slightly micaceous and rugulose.

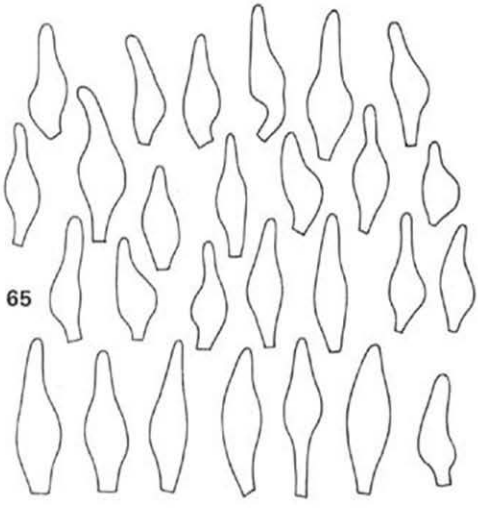
Veil very fugacious on cap but stem in its lower 1/2–2/3 conspicuously covered with white velar fibres, bundles of fibres and even some appressed white flocci.

Gills 2–3 mm broad, slightly ventricose near margin of cap, then straight, ascending, broadly adnate, in young specimens greyish (M. 10 YR 4/1) but with just a trace of purple or brown, in old specimens dark purple (M. 5 YR 3/2) with greyish brown tinge, brownish (M. 10 YR 3/2, 3/3) near base, with white edge.

Stem 30–60 × 1–2 mm, straight, cylindric, rooting with 5–15 mm long pseudorrhiza,







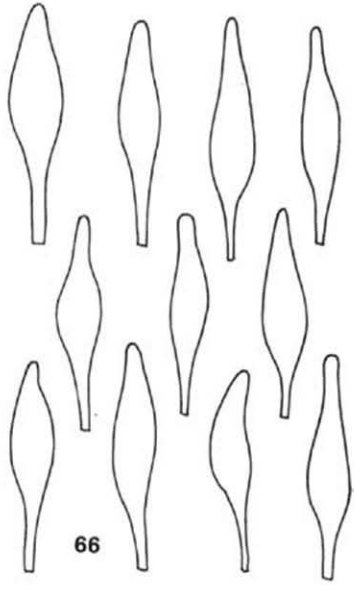


Fig. 63. *Psathyrella ridicula*, 11 Aug. 1962. — Pleurocystidiogram (×575).
Fig. 64. *Psathyrella trepida*, 20 Aug. 1945. — Pleurocystidiogram (×575).
Figs. 65, 66. *Psathyrella stellata*, Oct. 1940. — 65. Cheilocystidiogram (×575). — 66. Pleurocystidiogram (×575).

in upper part white, lower down isabelline and at base pale brown, with on lower part white velar remnants contrasting with isabelline colour.

Flesh of cap 1.5–2.5 mm in centre, dark greyish brown; flesh of stem white.

Spore print purplish black.

Trama of 'washed' gill under binocular lens distinctly brown (M. 10 YR 6/3, 7/3) in basal 1/2–2/3, and still pale brown (M. 10 YR 7/3) in area near edge.

MICROSCOPIC CHARACTERS.—Spores (11.3–)11.7–13.5 × 6.3–6.8 μm (average 12.2 × 6.5 μm), ellipsoid-amygdaliform, in water reddish brown (M. 5 YR 4/4), in NH_4OH 10% darker (M. 2.5 YR 3/6; 5 YR 3/4), in KOH 5% greyish brown (M. 10 YR 4/3), opaque, with distinct ±2 μm wide germ pore and small hilar appendix.

Basidia 20–32 × 9.6–12.5 μm, 4-spored.

Pleurocystidia 40–60 × 7.5–14(–17.5) μm, moderately numerous, sublageniform, the majority with slightly swollen apex, thin-walled, colourless, without mucus or crystals.

Cheilocystidia 30–45 × 6–10 μm, in some places fairly, elsewhere less crowded and scattered (70–30% of total number of marginal cells), sometimes even absent in area near margin of cap, sublageniform, thin-walled, colourless, without mucus or crystals; intermixed with spheropedunculate and slightly clavate cells, 15–20 × 7–12.5 μm, locally in variable numbers (30–70% of total number of marginal cells, near margin of cap sometimes 100%), small, thin-walled, colourless; gill edge sterile.

Pigmentation of hymenophoral trama under microscope ('washed' gill mounted in NH_4OH 10%); trama distinctly brownish from membranal pigment at base of gill, gradually paler towards but still present at edge, with many yellowish hyphal septa and encrustations in basal part but very few near edge.

Cuticle of cap cellular; cells 16–32 μm in diam., colourless.

Clamps present on hyphae of stem, not numerous.

HABITAT.—Subcespitose against and around large beech stump in sandy ground of dunes. Known only from type locality.

COLLECTION EXAMINED.—THE NETHERLANDS, prov. Noord-Holland, Santpoort, estate 'Duin en Kruidberg', 11 Aug. 1962. *E. K. v. W.* (holotype; L).

This species might easily be confused with *Psathyrella gracilis* although on finding it we immediately realized that it was not that species. It differs from *P. gracilis* by the presence of a veil, coloured hymenophoral trama, the dark reddish brown colour of the cap not turning mud-grey on drying, the white gill edge, the absence of pink in the drying cap, and the shape of the pleurocystidia. It differs from *P. longicauda* in the absence of a long pseudorrhiza, its general habit (see Plates 62 and 63), its thinner stem, the spores having a very distinct germ pore and not being very dark, and the different shape of the pleurocystidia. It differs from *P. connata* in the much smaller sublageniform pleurocystidia, in the smaller and not expanding cap, and in the darker spores, which in *P. connata* are predominantly brown. *Psathyrella connata*, moreover, has densely packed cheilocystidia. *Psathyrella melanophylla* and *P. melanophylloides* are quite different species (conical cap, colourless hymenophoral trama, black gills, dark spores with indistinct germ pore). Because of the subcespitose growth, the dry cap not showing any trace of pink, the gill edge being white, the pleurocystidia not very numerous *P. ridicula* cannot be *P. polycystis*, although most

pleurocystidia have a slightly swollen apex. But the species must be considered as being very close to *P. polycystis*.

In A. H. Smith's classification (1972) this species should be placed in series *Tenerae* of subsection, section, and subgenus *Psathyrella*. In this series *P. ridicula* would be closest to *P. melanophylla* (=*P. caudata* with Smith), because of its rooting stem, all other species of the series being non-rooting.

While drafting the above description, and not yet having named the species, it suddenly dawned upon us how ridiculous it might be to describe yet another new species of *Psathyrella* based on only one collection, whereas so many hundreds of species of this genus have already been described. Hence the name.

PSATHYRELLA STELLATA (Romagn.) Moser—Figs. 65, 66

Drosophila stellata Romagn. *in* Bull. Soc. linn. Lyon **21**: 152. 1952. — *Psathyrella stellata* (Romagn.) Moser *in* Gams, Kl. KryptogFl. **2** (b/2): 215. 1967.

SELECTED DESCRIPTION.—Kühn. & Romagn., Flore analytique: 359. 1953 (as *Drosophila stellata*).

CHIEF CHARACTERISTICS.—Cap 22–38 mm in diam., at first obtusely conical, soon expanding and with typically undulating, lobed, sulcate margin, chestnut brown, drying out to argillaceous without pink; veil scarcely developed; gills greyish brown or brown; stem rooting; spores 10.8–11.7(–12.6) × 6.3–7.2 μm; pleurocystidia 50–60 × 9–12 μm, fusiform with conspicuous stalk; hymenophoral trama distinctly brown.

MACROSCOPIC CHARACTERS[5].—Cap 22–38 mm in diam., at first obtusely conical, soon expanding to convex or almost flat, often also more or less recurved, sometimes obtuse, sometimes umbonate, with margin typically undulating, lobed, sulcate and uneven, striate when moist, from chestnut brown turning dark brown, hygrophanous, when dry argillaceous or from rufous becoming argillaceous, at centre fulvous or deeper ochraceous; fragile.

Veil scarcely manifest.

Gills 3.5–6 mm broad, not crowded, thin, adnate, not uncinate, ventricose, from watery grey turning greyish brown or brown, with pruinose, pinkish edge.

Stem 60–90 × 2.5–4 mm, ± flexuous, rooting, at first pale reddish and shiny, pallescent.

Trama of 'washed' gill under binocular lens very distinctly brown throughout the entire gill, strongest at base and in basal 1/4 of gill (M. 10 YR 5/4), in remaining 3/4 paler (M. 10 YR 6/4).

MICROSCOPIC CHARACTERS[5].—Spores 10.8–11.7(–12.6) × 6.3–7.2 μm (average 11.5 × 6.5 μm), ellipsoid-amygdaliform, in water dark reddish brown (M. 2.5 YR 3/6; 5 YR 3/4), in NH_4OH 10% barely darker (M. 2.5 YR 3/6, 3/4), in KOH 5% dark greyish brown (M. 10 YR 4/2, 3/2), opaque, with distinct, ± 2 μm wide, apical germ pore and small hilar appendix.

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[5] The macroscopic characters of the fruit body have been taken from Romagnesi's Latin diagnosis. The description of the characters of the trama of the gills and of the microscopic characters is based on our own examination of the type material.

Basidia 25–43 × 11.5–13 μm, 4-spored (Romagnesi).

Pleurocystidia 50–60 × 9–12 μm, fairly numerous, sublageniform, subfusiform with a rather conspicuous stalk, with subacute, rarely subcapitate apex, thin-walled, colourless, without mucus or crystals.

Cheilocystidia 20–40 × 8–10 μm, numerous and fairly closely packed, sublageniform to subfusiform, thin-walled, colourless, without mucus or crystals, intermixed with quite a number of small sphæropedunculate and clavate cells (condition of material inadequate for measuring and drawing these cells); gill edge sterile.

Pigmentation of hymenophoral trama under microscope ('washed' gill mounted in NH_4OH 10%): trama distinctly yellowish brown from base to edge from membranal pigment, strongest at and near base of gills, with a great many yellow hyphal septa and some encrustations at base, encrustations soon disappearing towards middle of gill at which a small number of yellow septa, however, still present.

Cuticle of cap cellular; cells 24–32 μm in diam., colourless.

Clamps present on hyphae of stem, but very few.

HABITAT.—Typical form on large rotting stems thrown out of a garden. Rare.

COLLECTION EXAMINED.—FRANCE, dép. Yonne, Sens, Oct. 1940, *H. Romagnesi* (lectotype: Herb. Romagnesi D 245; fragments in L).

We have never come across this species. Romagnesi's original Latin description, the one in the descriptive key in the 'Flore analytique', and Moser's short description are the only ones available in the literature. We have accepted the species on the strength of Romagnesi's description. Unfortunately the condition of the material Prof. Romagnesi very kindly let us have for study did not enable us to observe intact basidia and spheropedunculate cells.

PSATHYRELLA TREPIDA (Fr.) Gill.—Fig. 64

Agaricus trepidus Fr., Epicr.: 238. 1838; Monogr. Hym. Suec. **1**: 449. 1857; Hym. europ.: 314. 1874; Ic. sel. Hym. **2**: 38, pl. 139 fig. 2. 1879. — *Psathyrella trepida* (Fr.) Gill. Hymen. Fr.: 615. 1878. — *Coprinarius trepidus* (Fr.) Quél., Ench. Fung.: 120. 1886. — *Drosophila trepida* (Fr.) Quél., Fl. mycol. Fr.: 57. 1888. — *Psathyra trepida* (Fr.) J. E. Lange *in* Dansk bot. Ark. **9**(1): 16. 1936.

SELECTED DESCRIPTIONS AND ILLUSTRATIONS.—Fries, Ic. sel. Hym. **2**: 38, pl. 139 fig. 2. 1879. — Ricken, Blätterp.: 265, pl. 68 fig. 4. 1913. — J. E. Lange, Fl. agar. dan. **4**: 101, pl. 155B. 1939 (as *P. trepida* forma *minor*). — Kühn. & Romagn., Flore analytique: 358. 1953. — Michael/Hennig, Handb. Pilzfr. **4**: 280, fig. 279. 1967.

CHIEF CHARACTERISTICS.—Solitary in marshes, boggy and muddy areas; cap 12–30 mm, campanulate-convex, without pink shades when dry; veil rudimentary; gills blackish brown, with white edge; stem rooting with up to 5 mm long pseudorrhiza; spores 9.9–11.7 × 5.4–6.3 μm (but larger with other authors, giving figures 11–14 × 6–7 μm), with distinct germ pore; pleurocystidia 35–50 × 10–16 μm, ventricose-sublageniform; hymenophoral trama coloured.

MACROSCOPIC CHARACTERS[6].—Cap 12–30 mm in diam., campanulate, obtuse, spreading to convex, fuligineous brown, date brown, fuscous (M. 7.5 YR 3/2; 10 YR

[6] The macroscopic characters of the fruit body have been compiled from Fries' descriptions and his plate 139 fig. 2 in the Ic. sel. Hym. The description of the colour of the trama of the gill and of the microscopic characters is based on our own examination of material received from Prof. Romagnesi.

3/2, 3/3), at sometimes slightly umbonate centre dark yellowish brown (M. 5 YR 4/6; on Fries' plate already drying?), densely striate 3/4 from margin upwards, membranaceous, hygrophanous (neither pink colour nor rugulosity mentioned).

Veil not mentioned by Fries but according to Gulden & M. Lange (1971: 16) remnants of veil present.

Gills 2–3 mm broad, faintly ventricose, ascending, broadly adnate, crowded, thin, fuligineous black (but on Fries' plate dark greyish brown, M. 10 YR 4/2, in basal half; pale brown, M. 10 YR 7/3, towards edge).

Stem 45–80 × 1–2 mm, straight, rarely slightly flexuose, cylindric but at extreme base slightly clavate (2–2.5 mm), extreme end again narrower ('pseudorrhiza'), pellucid, bare, hollow, whitish to slightly isabelline.

Spore print black.

Trama of 'washed' gill under binocular lens: entire gill distinctly but not strongly brownish (M. 10 YR 7/3, 6/3).

MICROSCOPIC CHARACTERS[6].—Spores (9.9–)10.8–11.7 × 5.4–6.3 μm (average 10.8 × 6.0 μm), ellipsoid-amygdaliform, in water reddish brown (M. 5 YR 4/4), in NH_4OH 10% scarcely darker (M. 5 YR 4/3, 4/4), in KOH 5% dark greyish brown (M. 10 YR 4/2), opaque, with small hilar appendix and distinct, ±2 μm wide apical germ pore.

Basidia 4-spored (material inadequate for measurements).

Pleurocystidia (only 6 seen) 35–50 × 10–16 μm, ventricose-sublageniform, thin-walled, colourless, without mucus or crystals.

Cheilocystidia not seen (material inadequate).

Pigmentation of hymenophoral trama under microscope ('washed' gill mounted in NH_4OH 10%): trama pale yellowish brown from base to edge, no yellow hyphal septa or encrustations seen.

Cuticle of cap cellular, cells 16–24 μm in diam., colourless.

Clamps present on hyphae of stem.

HABITAT.—Solitary in marshes and boggy and muddy areas, in moss.

COLLECTON EXAMINED.—FRANCE, dép. Val-d'Oise, Chaumontel, 20 Aug. 1945, *H. Romagnesi* (Herb. Romagnesi D. 509).

This species is universally considered to be very rare. It must be looked for in its special habitat (marshes). The cited coloured pictures by Fries, Ricken, J. E. Lange, and B. Hennig all have a striking mutual resemblance, the outstanding features of the species being the campanulate-convex, rather small and fuligineous, sooty brown, striate cap, and the long, whitish stem, about which J. E. Lange (1939: 101) is the only author to mention that it is slightly rooting. Gulden & M. Lange (1971: 16) state that the stem is 'not distinctly rooting, attached to moss', and Kühn. & Romagn. (1953: 358) rank the species with the rooting species.

Some authors who mention spore sizes, give larger figures than the ones we found: 12–14 × 6–7 μm (Rea, 1922: 420; Hennig, 1967: 280); 11–12 × 6.5–7.5 μm (Bresinsky, 1966: 15); 12–14 × 6–7.5 μm (Favre, 1960: 552); 12–14 × 5.5–6 μm (J. E. Lange, 1939: 101); 10–12(–13.2) × 6–6.5 μm (Kühn. & Romagn., 1953: 358).

A. H. Smith's description of *P. trepida* (1972: 325) leaves some doubt as to whether it pertains to *P. trepida* in the sense of Fries and subsequent authors. His description states that faded parts of the drying cap become 'dingy pinkish', whereas in none of

the descriptions in the literature is pink mentioned at any stage of development of the cap. Romagnesi (1953: 358) even specifically states about the species of his 'Groupe de *D. caudata*' to which *P. trepida* belongs, that their caps show 'pas de nuances roses par le sec'. Furthermore the colour of the gills is said to be 'pale fuscous-brown', the habitat is said to be 'organic debris', and not marshes.

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EXPLANATION OF PLATES 60–63

PLATES 60, 61

Psathyrella bifrons, 6 Nov. 1959. — Fruit-bodies (× 1).

PLATE 62

Psathyrella longicauda, 11 Nov. 1969. — Fruit-bodies (× 1).

PLATE 63

Psathyrella ridicula, 11 Aug. 1962. — Fruit-bodies (× 1).

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THE GENUS PHAEOISARIA

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(With three Text-figures)

The type species of *Phaeoisaria*, *P. clematidis* (Fuckel) Hughes is described from pure culture. The conidiogenous cells occur on both the synnemata and undifferentiated hyphae. The latter condition is compared with that of the fertile cells of some non-synnematous genera of the Hyphomycetes. *Chloridium glaucum* Ellis & Everh. is placed in *Phaeoisaria* and a new species, *P. curvata*, is described. A key to the species of *Phaeoisaria* is provided.

On the natural substrate the genus *Phaeoisaria* is easily recognized by its erect synnemata bearing numerous denticulate conidiogenous cells in the apical region, as described by von Höhnel (1909). Further species have been added by Mason & Hughes (in Mason & Ellis, 1953), Sutton (1973) and Deighton (1974). A generic description conforming to von Höhnel's concept has been provided by Morris (1963b) and by Ellis (1971).

In 1973 a pure culture of the type species, *P. clematidis* (Fuckel) Hughes, became available for study. In cultures on oatmeal agar two types of fertile hyphae can be observed. In young subcultures some of the subhyaline aerial hyphae form lateral conidiogenous cells, which usually are not sealed off from the supporting hyphal cells. In cases of abundant sporulation, practically the whole aerial mycelium is converted into conidiogenous cells. After about two weeks clusters of thick-walled cells are formed in the hyphae, each giving rise to an erect bundle of stiff, closely coherent hyphae. Directly below many of the hyphal septa new branches which adhere to the shaft of the synnema, are formed. Terminally the hyphal elements of the synnema bend outwards and give rise to a number of conidia by sympodial growth.

When a strain of *Phaeoisaria clematidis* is transferred frequently at an early stage, the synnematal type of fertile hyphae may not be formed, and the colony remains flat, showing a powdery appearance owing to the abundance of undifferentiated fertile hyphae. In the strain CBS 307.73 synnemata were present on the natural substrate, but have not been observed in pure culture.

Consequently the presence of synnemata can not be used as a diagnostic feature of *Phaeoisaria*, and the genus diagnosis has to be altered as follows:

PHAEOISARIA Höhn.

Phaeoisaria Höhn. *in* Sber. Akad. Wiss. Wien, Abt. I, **118**: 329. 1909. — *Graphiopsis* Bain. *in* Bull. trimest. Soc. mycol. Fr. **23**: 19. 1907. — *Hansfordiula* Morris *in* Am. Midl. Nat. **69**: 103. 1963.

Colonies restricted or effused, powdery to velvety, pale brown to blackish brown. Synnemata, if present, composed of parallel hyphae, bearing conidiogenous cells over entire length or in upper part only; sometimes synnemata short, brush-like. Conidiogenous cells brown, acicular or cylindrical with tapering apical part, forming conidia by sympodial growth, with spine- or blotch-shaped, 0.5–1.5 μm long denticles scattered in the apical region. Conidia subglobose to fusiform, hyaline or nearly so, smooth, thin-walled, without any remains of ruptured cell-walls at base, one- or rarely two-celled. Sometimes brown, thick-walled, ellipsoidal, continuous chlamydospores present.

Spiculostilbella Morris may be a further synonym of *Phaeoisaria*. According to Morris (1963a) the type material of *S. dentritica* Morris was deposited in Herb. IA, but as no such fungus is maintained there (M. A. Rosinski, pers. commun.) it could not be examined. Consequently *Spiculostilbella* is of doubtful identity.

A number of species hitherto assigned to *Acrotheca* Fuckel, *Chloridium* Link and similar genera are related to *Phaeoisaria*. They differ in the conidiogenous cells which are usually integrated in the stalks of short conidiophores sealed off from the supporting hypha, and in the conidium-bearing denticles, which mostly are short and flat, resulting in clearly discernable scars on the conidial bases. If denticles are cylindrical, the conidiogenous cells are not acicular. The colonies of such strains are spreading, lanose, and have olivaceous or reddish pigments. *Rhinocladiella* sensu Schol-Schwarz is also reminiscent of *Phaeoisaria*, but differs in having crowded conidium-bearing denticles, and in the presence of conidiogenous cells with annellated zones and budding cells. Some species of *Sporothrix* also resemble the above genera, but differ in their cottony colonies and the absence of pigmentation from the fertile hyphae.

Acrodontium de Hoog is distinguished by the regularly acicular conidiogenous cells of definite shape and size; either with crowded, or with minute denticles. *Tharoopama* Subram. and *Nodulisporium* Preuss differ in the short and flat denticles, and the presence of remains of ruptured cell-walls at the bases of detached conidia. Other genera with cylindrical denticles, such as *Scolecobasidium* Abbott, *Ochroconis* de Hoog & v. Arx and *Dactylaria* Sacc., can easily be distinguished by their septate, often warty and pigmented conidia.

KEY TO THE SPECIES OF *Phaeoisaria*

1a. Conidia usually over 4 μm long 2
b. Conidia usually less than 4 μm long 4
2a. Conidia 4–10 μm long, continuous 3
b. Conidia over 10 μm long, continuous or rarely two-celled . . . . . *P. sparsa*
3a. Conidia fusiform, 1.5–3(–4) μm wide; cultures evenly velvety; synnemata, if present, without flaring hyphae at the tip . . . . . *P. clematidis*

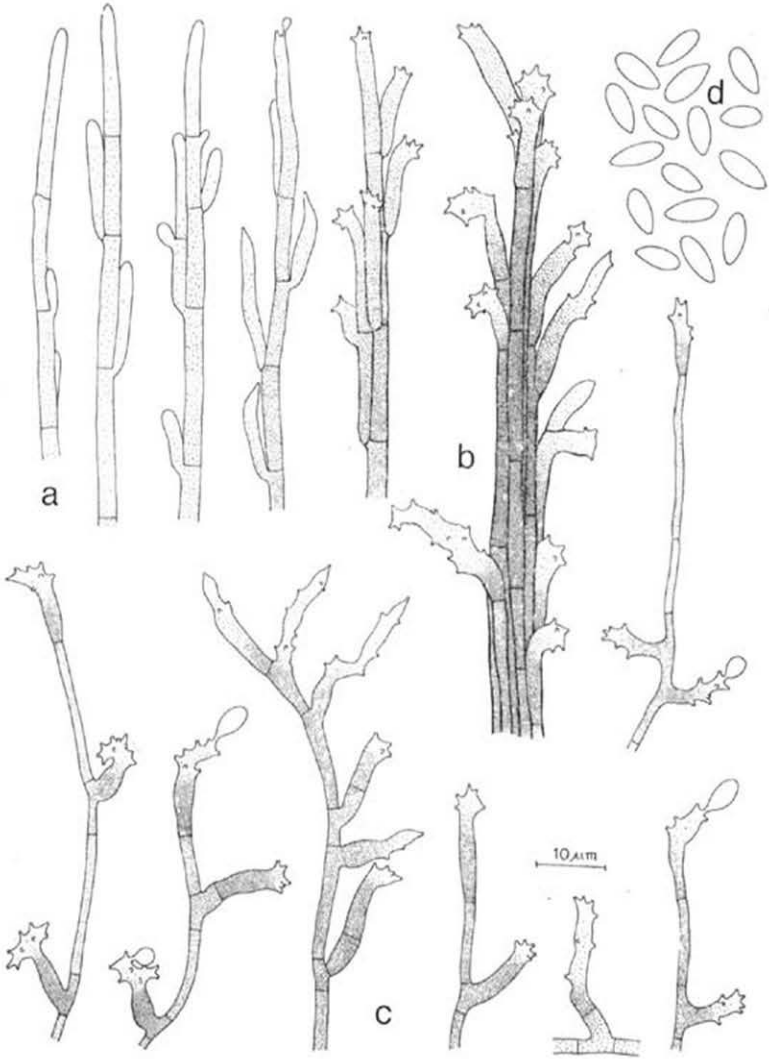

Fig. 1. *Phaeoisaria clematidis* on oatmeal agar. — a. CBS 504.73, developing synnemata. — b. CBS 429.73, mature synnema. — c. Diverse cultures, conidiogenous cells on undifferentiated hyphae. — d. Conidia.

b. Conidia wider, 3–4.5 μm; cultures radially feathered; synnemata with flaring hyphae at the tip . . . . . *P. magnifica*
4a. Conidium-bearing denticles occurring on a thin rachis which is markedly differentiated from the basal part of the conidiogenous cell . . . . . *P. clavulata*
b. Conidium-bearing denticles occurring scattered in the apical region of the conidiogenous cell. 5
5a. Conidia curved, clavate to sickle-shaped . . . . . *P. curvata*
b. Conidia straight, guttuliform to clavate; occasionally sickle-shaped conidia present also *P. glauca*

1. PHAEOISARIA SPARSA Sutton

Phaeoisaria sparsa Sutton *in* Mycol. Pap. **132**: 87. 1973.

The type specimen (IMI 144, 569) is well distinct from all other *Phaeoisaria* species owing to the penicillate conidiogenous cells and to the comparatively large, occasionally septate conidia.

2. PHAEOISARIA CLEMATIDIS (Fuckel) HUGHES—Fig. 1

Stysanus clematidis Fuckel *in* Jb. nassau. Ver. Naturk. **23–24** (Symb. mycol.): 365. 1870. — *Phaeoisaria clematidis* (Fuckel) Hughes *in* Can. J. Bot. **36**: 795. 1958.

Colonies on oatmeal agar at 20 °C attaining a diameter of 7–10 mm in 14 days, at first smooth, soon becoming powdery, usually remaining smooth near edge, occasionally slightly zonate, buff to brown, later on often with numerous synnemata; reverse greyish brown at centre, olivaceous near margin, finally almost entirely dark olivaceous; exudate and odour absent. Hyphae smooth, thin-walled, hyaline, pale brownish in mass, 1.5–2.5 μm wide. Synnemata, when present, arising from dark brown, thick-walled cells, erect, cylindrical to narrowly clavate, pointed at tip, up to 3000 μm high and 125 μm wide, consisting of very regular, parallel, moderately thick-walled, brown hyphae. Conidiogenous cells arising from synnemata, inserted terminally, or laterally just below septa of peripheral hypha and appressed to column of synnemata, with apical fertile portion bent outwards, or on lateral fertile branches, and also arising from undifferentiated hyphae, often without septum at base; conidiogenous cells smooth, slightly thick-walled, pale brown near base, subhyaline towards apex, more or less cylindrical, usually about 10–15 μm long, but in age often considerably longer, 2–3 μm wide, forming conidia by sympodial growth on conspicuous denticles about 1–1.5 μm long occurring scattered or clustered in apical region of cell. Conidia smooth, thin-walled, hyaline or nearly so, fusiform to obovoidal, (4.5–)6–8(–10) × 1.5–4 μm, with a pointed base.

MATERIAL EXAMINED.—Herbarium specimens: *Stysanus clematidis*, type in herb. L. Fuckel (G) under no. 2611, on *Clematis vitalba* L., Gottesthal, Nassau, Germany (two envelopes). — *Stysanus clematidis* in herb. G. Winter (B) under no. 1922, on branch of *Clematis vitalba*. — *Stysanus clematidis* in herb. A. Ludwig (B), on *Clematis vitalba*, Erdbach, Germany, April 1943. — *Graphium ceratostomoides* Speg., type, LPS 33.133, on *Salix* sp., Boca, Buenos Aires, Argentina, January 1880, leg. C. Spegazzini. — *Graphium fissum* Preuss in herb. P. A. Saccardo (PAD), on wood, May 1870. — *Graphium sacchari* Speg., type, LPS 33.137, on *Saccharum officinarum* L., Tucumán, Argentina, April 1894, leg. C. Spegazzini. — *Phaeoisaria bambusae*

Höhn., type, in herb. F. von Höhnel (FH) under no. 3001, on *Bambusa* sp., Buitenzorg, Java, Indonesia, 1907–8. — *Phaeoisaria clavulata*, on rotten wood of *Machilus thunbergii* Sieb. & Zucc., Kagashima Pref., Japan, 1971, leg. K. Tubaki (=IFO 9591 =CBS 307.73).

Living strains: CBS 307.73=IFO 9591, sent by K. Tubaki as *Phaeoisaria clavulata*. — CBS 429.73=IMI 171,447. — CBS 504.73, isolated by W. Gams from wood of *Dendrocalamus giganteus*, Hortus Peradenyia, Ceylon, January 1973.

In old cultures short chains or groups of brown, thick-walled chlamydospores are present. In CBS 307.73 they occur singly at the tips of undifferentiated hyphae and are dark brown, fitting the diagnosis of *Humicola* Traaen.

Descriptions of *Phaeoisaria clematidis* on the natural substrate have been provided by Udagawa & Takada (1971, as *P. bambusae*) and Deighton (1974). The latter author also compiled a list of synonyms. Additional data on synonymy are discussed below.

The type material of *Graphium fissum* Preuss has recently been rediscovered in Herb. B. It comprises some synnemata with percurrent conidiogenous cells, producing mucous heads of small conidia. The possible synonyms of *P. clematidis* as mentioned by von Höhnel (1909), viz. *Isaria sphecophila* Ditm., *I. gracilis* Vossler and *I. surinamensis* Vossler are all of doubtful identity (R. A. Samson, Baarn; pers. commun.). The type material of *Graphium verticillatum* Speg. (LPS), a species accommodated in *Graphiopsis* by Goidànich (1935), is too scanty for examination. The types of two other species described by Spegazzini, viz. *Graphium ceratostomoides* and *G. sacchari*, are in good condition; they can be identified with *Phaeoisaria clematidis*.

A number of CBS strains deviate slightly from CBS 504.73 in several respects. The colonies are rather pale, without any synnemata. The conidiogenous cells are cylindrical, provided with denticles which arise sympodially or at random, and the conidia are subcylindrical, with a more or less rounded base. Possibly they are identical to the *Phaeoisaria* state of *Peroneutypella echidna* (Cooke) Deighton, as tentatively described by Deighton (1974) from a poor collection. Further collections are needed for confirmation.

3. PHAEOISARIA MAGNIFICA Deighton

Phaeoisaria magnifica Deighton *in* Trans. Br. mycol. Soc. **62**: 247. 1974.

The species is closely related to *P. clematidis*, from which it merely differs by the weakly discriminating key-features mentioned before.

4. PHAEOISARIA CLAVULATA (Grove) Mason & Hughes *apud* Mason & Ellis

Pachnocybe clavulata Grove *in* J. Bot., London **30**: 168. 1885. — *Graphium grovei* Sacc. *in* Syll. Fung. **4**: 613. 1886 (name change). — *Phaeoisaria clavulata* (Grove) Mason & Hughes *apud* Mason & Ellis *in* Mycol. Pap. **56**: 42. 1953.

This species can be recognized by stiff synnemata, composed of parallel hyphae, packed with slender, curved conidiogenous cells with very thin, fragile conidiogenous rachides. Descriptions and illustrations have been provided by Ellis (1971) and Sutton (1973). A strain described as *P. clavulata* by Tubaki (1973) could be identified as *P. clematidis*.

5. **Phaeoisaria curvata** de Hoog & Papendorf, *spec. nov.*—Fig. 2

Coloniae in agaro farina avenacea addita post 14 dies 10–14 mm diametro, cito pulverulentae in medio, margine levi indistincta circumdatae, zonatae, pallide vinoso-bubalinae in medio, cremeae in marginae; exsudatum et odor absunt. Hyphae leves, tenuitunicatae, hyalinae, 1–2 μm latae. Cellulae conidiogenae ex hyphis indistinctis oriuntur, leves, pariete paulum inspissato ad basim dilute bubalinae, sursum hyalinae, forma et magnitudine variabiles, plerumque 10–15 μm longae et ad basim 1.5–3 μm crassae, sursum modice attenuatae; conidia polyblastice elongatione sympodiali in denticulis conspicuis circa 1 μm longis, dense aggregatis formant. Conidia levia tenuitunicata, hyalina, clavata vel obovoidea, curvata, nonnumquam falciformia, basi acutata, (4–)6–8(–11) × (1–)2–3 μm.

Typus CBS 153.72, isolatus a M. C. Papendorf e foliis putrescentibus *Parinaris capensis* in Africa austro-occidentali.

Colonies on oatmeal agar at 20 °C attaining a diameter of 10–14 mm in 14 days, at first smooth, soon becoming powdery but usually remaining smooth near indistinct margin, zonate, pale vinaceous buff; reverse pale vinaceous buff at centre, cream coloured near margin; exudate and odour absent. Hyphae smooth, thin-walled, hyaline, 1–2 μm wide. Conidiogenous cells arising from undifferentiated hyphae, often without septum at base, smooth, slightly thick-walled, pale buff near base, hyaline towards apex, variable in shape and size, cylindrical, slightly tapering towards tip, 10–15 μm long, about 1.5–3 μm wide at base, forming conidia by

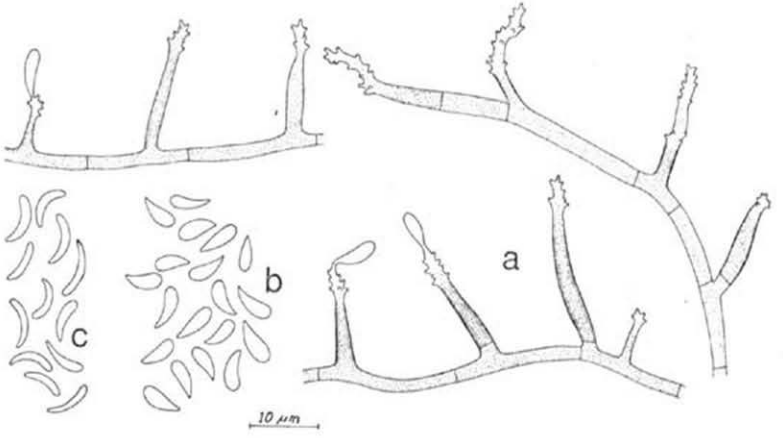

Fig. 2. *Phaeoisaria curvata*, CBS 153.72 on oatmeal agar. — a. Conidiogenous structures. — b. Conidia. — c. Sickle-shaped conidia.

sympodial growth on conspicuous denticles of about 1 μm long occurring in dense groups at apex of cell. Conidia smooth, thin-walled, hyaline, clavate to bovoid and pointed at base, curved, occasionally sickle-shaped, (4–)6–8(–11) × (1–)2–3 μm.

MATERIAL EXAMINED.—CBS 153.72, type culture, and CBS 532.72, isolated by M. C. Papendorf from leaves of *Parinari capense* Harv., South West Africa, under no. 1169 and 1176 respectively.

Young cultures of *Phaeoisaria curvata* are only faintly pigmented and may resemble some species of *Sporothrix*. In older colonies the pigmentation becomes more pronounced, especially in the conidiogenous cells, whereas in all species of *Sporothrix* the fertile cells remain hyaline and thin-walled. *Sporothrix curviconia* de Hoog differs in its slender conidiogenous cells with basal septa, dense apical clusters of short denticles, smaller conidia and in the presence of guttuliform lateral blastoconidia. In *S. inflata* de Hoog the conidia are occasionally allantoid (de Hoog, 1974) but this species is readily distinguished by the morphology of the conidiogenous cells and the sympodial conidia. Some species of *Idriella* Nelson & Wilhelm, e.g. *I. desertorum* Mouchacca, are reminiscent of *Phaeoisaria curvata*, but differ in cultural characteristics, in the shape of the conidiogenous cells, and in the presence of dark brown, thick-walled chlamydospores. *Microdochium* Syd. is distinct because of its inflated conidiogenous cells.

6. **Phaeoisaria glauca** (Ellis & Everh.) de Hoog & Papendorf, *comb. nov.*
Fig. 3

Chloridium glaucum Ellis & Everh. *in* J. Mycol. **4**: 113. 1888 (basionym).

Colonies on oatmeal agar at 20 °C attaining a diameter of 2–3 mm in 14 days, at first smooth, soon becoming powdery, pale buff to brown; reverse pale brown; exudate and odour absent. Vegetative hyphae smooth, thin-walled, hyaline or nearly so, 1.5–2.5 μm wide. Fertile hyphae usually slightly wider, often ascending, profusely branched in apical region, thus occasionally becoming synnema-like. Conidiogenous cells arising from undifferentiated or slightly thick-walled hyphae, pale brown near base, hyaline towards apex, variable in shape and size, usually about 2–2.5 μm wide at base and 10–20 μm long, cylindrical, tapering towards tip, forming conidia by sympodial growth on conspicuous denticles about 1 μm long, occurring scattered in apical region of cell. Conidia smooth, thin-walled, hyaline, guttuliform to ellipsoidal, 2.5–3.5 × 1.6–2.2 μm, with pointed base, occasionally becoming inflated and giving rise to some globose to ellipsoidal secondary conidia or a short secondary conidiophore.

MATERIAL EXAMINED.—Herbarium specimen: *Chloridium glaucum*, type, in herb. NY, on rotten wood of *Quercus* sp., Gloucester County, Newfield, U.S.A., July 1888.

Living strains: CBS 319.74 and 320.74, isolated by W. Gams from *Acer* twigs, 'eendenkooi Buren', Isle of Ameland, Netherlands, October 1973. — CBS 479.75 A and B, isolated by G. S. de Hoog from rotten wood, Leningrad, USSR, July 1975. — CBS 481.75, isolated by W. Gams from *Buxus sempervirens*, Petit Lubéron, France, October 1974.

Phaeoisaria glauca is distinct from *P. clavulata* because of the absence of a well differentiated rachis on the conidiogenous cell. Usually the conidiophores occur

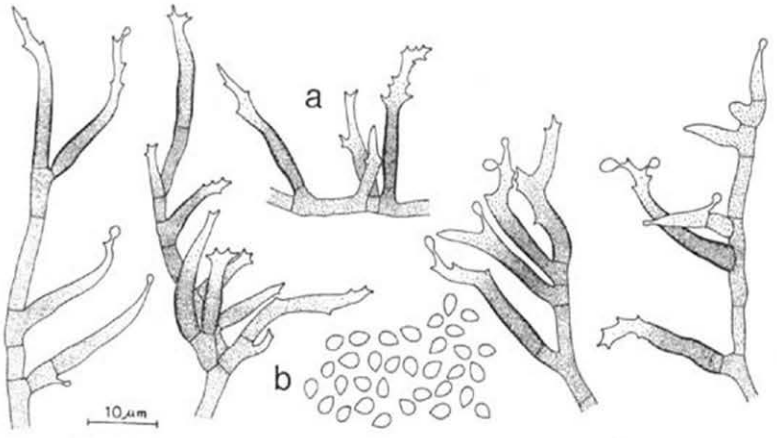

Fig. 3. *Phaeoisaria glauca*, CBS 319.74 and CBS 320.74 on oatmeal agar. — a. Conidiogenous structures. — b. Conidia.

singly or in loose brushes, in culture as well as on the natural substrate, whereas *P. clavulata* has well defined synnemata. In some of the strains, especially in CBS 319.74 and 320.74, secondary conidia are formed; occasionally some conidia become inflated, each producing a short fertile rachis. The species is closely related to *Rhinocladiella* Nannf.; in the latter genus, however, the conidium-bearing denticles are crowded on distinct fertile rachides.

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ULTRASTRUCTURE DES PAROIS SPORIQUES DES APHYLLOPHORALES—I

Les Bankéracées

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(Avec Planches 64–69)

Les observations faites au microscope électronique permettent d'affirmer que la famille des Bankéracées est bien distincte de la famille des Théléphoracées et que sa suppression comme le proposent certains auteurs serait une erreur. Les parois sporiques montrent en effet des différences si nettes en ce qui concerne la composition des strates, la structure de la coriotunica, l'architecture des ornementations et la pigmentation que les opinions de Donk (créateur de la famille, 1961) et de Maas Geesteranus (défenseur de la famille, 1974) sont pleinement confirmées.

La famille des Bankéracées (Donk, 1961) comprend les genres *Bankera* et *Phellodon*. Ces deux genres ont été séparés des genres voisins *Sarcodon*, *Hydnellum* et *Hydnodon* (famille des Théléphoracées) pour être réunis sur la base de différences observées au niveau des spores surtout; elles sont en effet, contrairement aux Théléphoracées, blanches, non sinueuses et jamais fortement échinulées ou tuberculeuses.

Dès la parution de la publication de Donk (1961), de nouvelles recherches ont montré que certains critères utilisés pour définir la famille des Bankéracées ne sont pas aussi convaincants comme on l'aurait souhaité; certains auteurs en sont même venus à se demander si cette nouvelle famille a sa raison d'être et si elle doit subsister. Bresinsky & Rennschmid (1971) par exemple mirent en évidence la présence d'acide théléphorique dans quelques espèces des deux familles, supprimant ainsi l'un des critères utilisés par Donk; de plus, à l'opposé de ce dernier, les deux auteurs pensent que l'on ne peut expliquer les ressemblances très étroites des carpophores, des spores et de la pigmentation par une simple convergence, même si elle est extrême. Grand & Moore (1970) pour leur part publièrent des photographies réalisées au microscope électronique à balayage; les documents obtenus ne leur permirent pas de constater une différence notable entre les spores des deux familles et ils soulignèrent même la similitude de structure des ornementations qui sont arrondies aux extrémités dans

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les deux cas. Harrison (1972) enfin, découvrit, contrairement à la définition des Bankéracées de Donk, la présence de boucles chez *Phellodon fibulatus* Harrison.

Ces quelques exemples que nous venons de citer semblent assez clairement démontrer la fragilité de la position de la famille des Bankéracées; Maas Geesteranus (1974) cependant, estima qu'il était trop tôt pour envisager sa suppression et suggéra au contraire la poursuite des recherches et la prudence car:

1. Bresinsky & Rennschmid (1971) ont trouvé dans le chromatogramme des Théléphoracées une zone fluorescente aux rayons ultraviolets que l'on ne retrouve pas chez les Bankéracées.
2. Les spores, très peu différentes au premier abord, mériteraient une étude approfondie car « only electron microscope photographs of sectioned spores can give the answer».
3. Les spores des Bankéracées sont blanches et non brunes.
4. L'odeur du fenugrec n'est perceptible chez les Bankéracées qu'après une première phase de dessication et n'existe pas chez les espèces des genres *Hydnellum* et *Sarcodon* à l'état sec.

Toutes ces considérations nous conduisent donc à penser que les spores jouent un rôle prépondérant dans la caractérisation de la famille des Bankéracées. Comme nous en avions déjà observées quelques-unes (Keller, 1974) ainsi que plusieurs spores de Théléphoracées (Keller, 1973 et 1974), il nous a paru intéressant de poursuivre et compléter ces premiers résultats.

Nous tenons à exprimer ici nos très vifs remerciements à M. le Dr. R. A. Maas Geesteranus pour son aide précieuse, ses conseils, ses déterminations ainsi que pour le matériel mis à notre disposition. Grâce à cette collaboration, nous avons été en mesure de passer en revue les Bankéracées d'Europe, c'est-à-dire *Bankera fuligineo-alba* (Schmidt ex Fr.) Pouz., *B. violascens* (Alb. & Schw. ex Fr.) Pouz., *Phellodon confluens* (Pers.) Pouz., *P. melaleucus* (Sw. apud Fr. ex Fr.) P. Karst., *P. niger* (Fr. ex Fr.) P. Karst. et *P. tomentosus* (L. ex Fr.) Banker.

MATERIEL ET METHODE

Nous avons fixé les spores fraîches de *P. niger* et *P. tomentosus* alors que dans les quatre autres cas nous les avons prélevées sur des exsiccata.

Des aiguillons entiers ont été fixés au $KMnO_4$ à 1,5% dans un tampon cacodylate, puis deshydratés, inclus, coupés et contrastés par l'acétate d'uranyle et le citrate de plomb (Reynolds, 1963).

RESULTATS ET DISCUSSION

L'examen des parois sporiques des six Bankéracées montre une remarquable identité de structure. Toutes les spores possèdent une paroi formée de deux strates, toutes sont échinulées et toutes enfin, présentent la même architecture au niveau des ornements ce qui est sans nul doute leur principale caractéristique.

La jeune ébauche de spore qui naît à l'extrémité du stérigmate présente déjà très tôt deux strates (*P. niger*, Pl. 64 fig. 1). La strate externe qui semble limitée à la spore est le *sporothecium* (terminologie de Clémençon 1970, modifiée dans Keller 1974). Encore floconneux à ce stade précoce, il devient plus dense par la suite à tel point même qu'il constitute la strate la plus opaque de la paroi (particulièrement bien visible chez *P. confluens* et *P. tomentosus*, Pl. 65 fig. 1 et 2). Dans cet exemple, le *sporothecium* n'est pas, à l'opposé de ce qui se passe dans la majorité des cas, une pellicule continue qui se déchire à maturité pour se résoudre en fins flocons, mais il prend au contraire de la consistance avec l'âge; une observation analogue a été faite par Hugueney (1972) chez *Coprinus cineratus* Quél. var. *nudisporus* Kühn.

La strate interne qui se poursuit légèrement dans le stérigmate est la *coriotunica* (*P. niger*, Pl. 64 fig. 1); encore très dense à ce stade, elle perd de son opacité par la suite et devient grise, homogène, épaisse (toujours plus épaisse que le *sporothecium*) et floue (typique chez *P. confluens*, Pl. 65 fig. 1). Cette *coriotunica* se caractérise d'autre part par le fait qu'elle conflue avec le *sporothecium* au sommet des ornementations alors qu'à sa base se détache un feuillet très mince qui s'épaissit au centre de manière à lui donner une forme lenticulaire (*P. niger*, Pl. 64 fig. 2 et 3 et *P. melaleucus*, Pl. 66 fig. 1). Il s'agit du feuillet basal de la *coriotunica* que l'on observe parfois chez les Aphyllophorales (*Amphinema byssoides* (Pers. ex Fr.) J. Erikss., *Coniophora betulae* (Schum.) P. Karst., *C. puteana* (Schum. ex Fr.) P. Karst. et *Pachykytospora tuberculosa* (DC: ex Fr.) Kotl. & Pouz., Keller 1974) et chez les Agaricales. Dans ce dernier cas, le feuillet basal a été nommé *endocorium* par Kühner (1973) chez *Hebeloma radicosum* (Bull. ex Fr.) Rick. et *subendospore* par Hugueney (1975) chez *Coprinus congregatus* Bull. ex Fr.

A remarquer encore qu'entre ce feuillet basal et le reste de la *coriotunica* subsiste une grande zone blanche qui occupe un volume important de l'ornement; cette zone n'est pas vide comme on pourrait le croire au premier abord car, en bien des endroits, elle est parcourue par des éléments noirs qui prouvent que l'ornement est bien un ensemble solide (*P. melaleucus*, Pl. 66 fig. 1).

Un dernier caractère commun à toutes les spores est qu'elles sont pourvues d'une ornementation au sommet de chaque protubérance protoplasmique.

Connaissant maintenant la structure des parois sporiques des Bankéracées, il devient indispensable de les comparer à celles observées chez les Théléphoracées puisque certains auteurs n'hésitent pas à dire qu'il n'y a pas de différence fondamentale entre les deux familles en question.

La paroi sporique des Théléphoracées est le plus souvent constituée de deux strates, la *coriotunica* et la *tunica*; certaines espèces cependant (*H. suaveolens* (Scop. ex Fr.) P. Karst., Pl. 68 fig. 2) possèdent une strate supplémentaire, *l'épicorium* (Keller, 1974).

La *coriotunica* est la strate interne et épaisse comme chez les Bankéracées mais s'en distingue par sa structure et sa formation; en effet, contrairement à la spore de *P. niger* mentionnée ci-dessus, la *coriotunica* se compose d'abord de masses grises isolées (futures verrues) réunies seulement par la suite, après la mise en place du feuillet

basal (*H. concrescens* (Pers. ex Schw.) Banker, Pl. 67 fig. 2 et 3) ; il est toutefois possible que cette formation de *coriotunica* soit l'apanage de quelques espèces seulement et qu'il ne faille pas, pour l'instant, considérer ce caractère comme typique avant d'avoir compléter les observations.

A maturité, la *coriotunica* se caractérise parfois par la présence d'un feuillet interne opaque entouré d'un feuillet clair d'inégale épaisseur (*Sarcodon imbricatus* (L. ex Fr.) P. Karst. et *H. suaveolens*, Pl. 68 fig. 1 et 2), mais le plus souvent, par l'épaississement considérable au niveau des tubercules; ceux-ci sont effectivement occupés par une masse grise plus ou moins structurée et non, comme chez les Bankéracées, par une masse claire. Par contre, les ornements sont solides dans les deux familles.

La strate externe est la *tunica* à cause de sa consistance, de son opacité et de son épaisseur. Cette prise de position est également étayée par le fait que le passage de la *coriotunica* à la *tunica* est progressif, preuve de l'appartenance des deux strates au même tégument, c'est-à-dire à l'*eusporium*. La *tunica* offre aussi une curieuse particularité observée jusqu'ici chez les Théléphoracées uniquement; elle éclate au sommet des tubercules que nous avons appelés, pour cette raison « verrues ouvertes » (Keller, 1973). Il est possible qu'il ne s'agisse là que d'un artéfact car les images obtenues au microscope électronique à balayage montre des verrues lisses et arrondies régulièrement à leur sommet (*H. concrescens* et *S. imbricatus*, Pl. 69 fig. 3, 4 et 5, ainsi que chez Grand & Moore, 1970). Il n'empêche que ce caractère est très fréquent chez de nombreuses espèces (*H. concrescens*, pl. 67 fig. 3, *H. peckii* Banker apud Peck, Pl. 68 fig. 3, *S. imbricatus*, Pl. 68 fig. 1, *H. suaveolens*, Pl. 68 fig. 2 et *Boletopsis leucomelaena* (Pers. ex Pers.) Fayod, Pl. 69 fig. 2) et démontre, puisque toutes les spores ont été traitées de la même façon, que la consistance ou la structure de cette *tunica* est particulière à la famille des Théléphoracées.

En résumé, cette brève analyse aura permis de constater que les familles des Bankéracées et des Théléphoracées sont très différentes l'une de l'autre si l'on prend en considération les caractéristiques de leurs parois sporiques. Elles se différencient par les strates qui les composent, par la structure et la formation de la *coriotunica* ainsi que par l'architecture des ornements.

TABLEAU DES DIFFERENCES

BANKERACEES	THELEPHORACEES
Strates	
coriotunica	coriotunica
sporothecium	tunica
	épicorium (parfois)

Coriotunica

homogène	parfois hétérogène (feuillet basal opaque et feuillet externe clair)
séparé du sporothecium par une strate blanche	passage progressif vers la tunica

Ornements

forme régulière (spore échinulée)	verrues assez souvent irrégulières (spores verruqueuses ou tuberculeuses)
confluence coriotunica-sporothecium (sommet)	fréquent éclatement de la tunica (sommet)
principalement occupé par une masse claire (coriotunica)	principalement occupé par une masse grise plus ou moins structurée (coriotunica)
présence (parfois) d'un feuillet basal, mais toujours localisé au niveau de l'ornement seulement.	s'il existe un feuillet basal, il est continu et non limité à l'ornement.

Pigmentation

spores blanches	spores brunes

SUMMARY

Electron microscope observations allow the conclusion to be drawn that the family Bankeraceae is clearly distinct from the family Thelephoraceae. The spore walls show such obvious differences as to the composition of layers, the structure of the *coriotunica*, the construction of the ornament and the pigmentation, that the opinions of Donk (author of the family, 1961) and Maas Geesteranus (defender of the family, 1974) are strongly confirmed.

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SOME NEW SPECIES OF SACCOBOLUS

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(With five Text-figures)

Five new species of *Saccobolus* are described: *Saccobolus sphaerosporus* from Germany, *S. purpureus* and *S. parvisporus* from Libya, *S. eleutherosporus* from Belgium, and *S. diaphanus* from Thailand.

Since the publication of my monograph of *Ascobolus* and *Saccobolus* (van Brummelen, 1967) many new data have come available for both genera. Especially in the genus *Saccobolus* several new species have been found, some of which have shown to be constant in cultures during long periods.

In *Saccobolus* the arrangement of the ascospores in a cluster proved to be a valuable character, not only for the distinction of species but also as a character to recognize natural sections within the genus.

Apart from the patterns of arrangement, which can be distinguished after the disposition of the ascospores in the cluster (van Brummelen, l.c.: 40) it is important to notice eventual changes in the disposition during ripening. In species with a changing arrangement of the ascospores or in species with loose ascospores the typical pattern of arrangement can usually be established just before or shortly after the violet pigment becomes visible on the surface of the epispore.

The coherence between the ascospores in different species of *Saccobolus* shows a wide range of possibilities. The spores in the spore-cluster may be completely loose to very firmly united. More or less independently from this the longitudinal contraction of the mature spore-cluster proves to be constant in most species.

Thanks are due to Mr. St. Aubyn Glynn and the late Mr. A. Vervliet for sending living material and to Dr. H. O. Sleumer and Dr. C. F. van Beusekom for providing samples of dung from tropical countries.

Saccobolus sphaerosporus Brumm., *spec. nov.*—Fig. 1

Apothecia angustata parva sessilia, 0,2–0,5 mm diam. Receptaculum initio globulare usque ovoideum et album, denique applanatum usque pulvinatum et dilute brunneum, laeve. Excipulum ad basim strato superficiali e textura globulosa praeditum. Asci initio late obovati, denique late clavati, apice tholiformes, 72–100 × 25–36 μm, 8-spori, pariete iodo caerulescente. Sporarum fasciculi saepe elongati (44–85 × 11–22 μm), interdum compactissimi (29 × 22 μm). Ascosporae saepe in series irregulariter dispositae, sphaericae, violascentes, 9,8–11,2(–12,9) μm diam., fissuris brevibus foveolisque minutis ornatae. Paraphyses sparsim ramosae, cylindrico-clavatae, 1,8–2,2 μm latae, apice leviter inflatae, cellulis terminalibus materia lutea repletis. In fimo ovino crescens.

TYPUS: *St. Aubyn Glynn*, Wirceburgum, Germania, 14.VI.1973 (L).

Apothecia solitary or closely crowded, superficial, sessile on a rather narrow base, 0.2–0.5 mm across, 0.2–0.4 mm high, watery-fleshy. Receptacle at first globular to ovoid and white, then flattened to pulvinate and pale brownish, smooth, without margin. Disk at first convex and yellow to amber-coloured, then more flattened and becoming brownish, dotted with the dark-brown protruding tips of asci. Hymenium 50–80 μm thick. Hypothecium very thin, of only a few layers of subglobular or ellipsoid cells 3–10 × 3–4.5 μm. Flesh not clearly differentiated. Excipulum consisting of a group of closely compacted subglobular cells 3–6 × 3–4 μm (textura globulosa) near the base of the fruit-body and a palisade of thin-walled hyaline hyphae up to 4 μm wide more upwards. Asci at first broadly obovate, then broadly clavate, gradually tapering downwards into a rather thick base, with broad dome-shaped apex, 72–100 × 25–36 μm, 8-spored, the wall blue in Melzer's reagent. Spore-clusters usually elongated, 44–85 × 11–22 μm, but sometimes also very compacted down to 29 × 22 μm. Ascospores irregularly disposed in a cluster, often in one row of eight

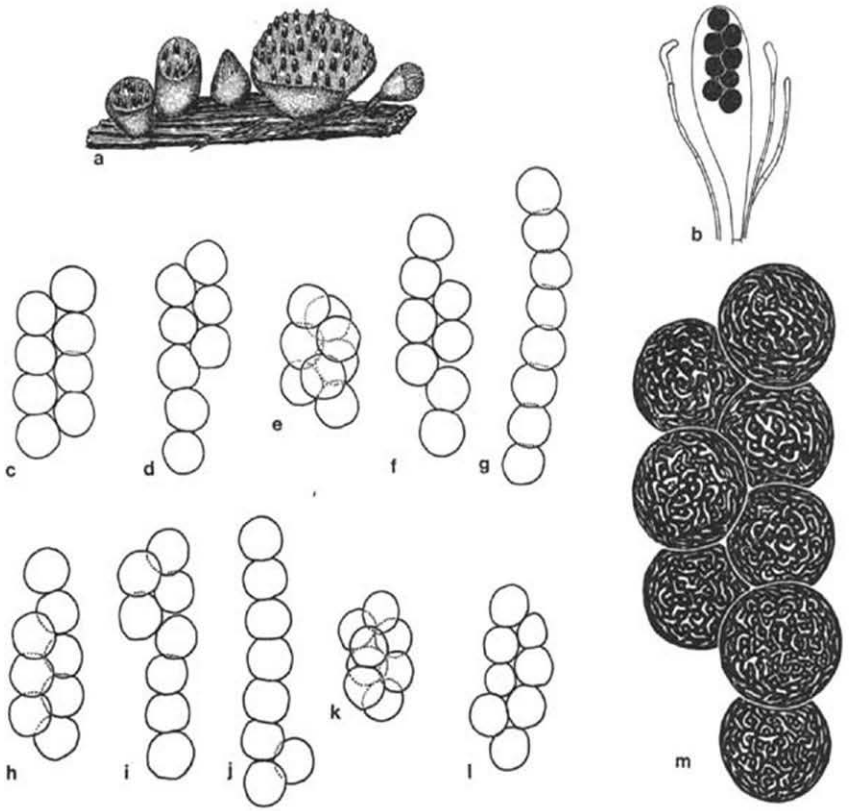

Fig. 1. *Saccobolus sphaerosporus*. — a. Habit of fruit-bodies × 50. — b. Ascus and paraphyses × 320. — c–l. Diagrams of spore-clusters × 630. — m. Spore-cluster × 1600. (From type.)

spores or two rows of one to seven spores, more rarely densely united in an ellipsoid mass, spherical, at first hyaline, then pinkish-violet, finally violet to purplish-brown, 9.8–11.2(–12.9) μm in diameter, ornamented with a very fine pattern of small pits and short more or less branching curved fissures; pigment 0.4–0.8(–1.2) μm thick. Paraphyses cylindric-clavate, sparsely branched, septate, 1.8–2.2 μm thick, enlarged up to 3.5 μm thick at the tip, especially the upper part with yellow contents.

HABITAT.—Only known from dung of sheep.

ETYMOLOGY.—From Greek, σφαιρα, a ball, a globe and σπορα, a seed: with spherical spores.

SPECIMENS EXAMINED.—GERMANY: *St. Aubyn Glynn*, on sheep dung and blotting paper, Würzburg, 14.VI.1973. A pure culture, isolated from this material, has also been examined (L, type).

Mainly on the ground of the presence of yellowish pigment in the paraphyses and the absence of any violet or brownish intercellular pigment, this species is placed in *Saccobolus* sect. *Saccobolus*.

The spherical shape of the ascospores does not lead to a constant or characteristic arrangement of the spores in a cluster.

Judging by the occasionally very compact spore-clusters, the ornamentation and the volume of the ascospores, *S. sphaerosporus* is related to *S. truncatus* Vel.

Another species which seems to be related is *Saccobolus platensis* Gam. & Ran. But here the spores are subfusoid with truncate ends, while longitudinal shortening of the spore-cluster is not reported by Gamundi & Ranalli (1969).

Saccobolus purpureus Brumm., *spec. nov.*—Fig. 2

Apothecia sessilia, 0,15–0,50 mm diam. Receptaculum initio hemisphaericum et dilute purpureo-roseum, denique obconicum et magis fusco-purpureum, postremo pulvinatum vel raro subcylindricum, laeve. Excipulum strato superficiali e textura globulosa praeditum, pigmento roseo-purpureo incrustatum. Asci clavati, apice truncati, 110–120×22–26 μm, 8-spori, pariete iodo caerulescente. Sporarum fasciculi elongati, arcte adpressi, 34–36×14–15 μm. Ascosporae secundum typum II dispositae, initio fusiformi-ellipsoideae et hyalinae, denique asymmetricae, trigonae vel ventricosae et intense purpureo-violascentes, 13,8–15,6×7,3–8,3 μm, laeves, saepe lineis irregularibus tenuissimis ornatae. Paraphyses ramosae, cylindricae, 2,5–3,7 μm latae, apice leviter inflatae, interdum pigmento purpureo-roseo obtectae. In fimo asinorum et animalis insectivori ignoti invenitur.

TYPUS: *van Brummelen 3290*, prope Jabo in Djebel Nefusa, Libya (L).

Apothecia solitary or in small groups, superficial, sessile on a broad base, 0.15–0.50 mm across, 0.25–0.35 mm high, watery-fleshy. Receptacle at first hemispherical and pale purple-red, then obconical and more brownish purple, finally pulvinate or rarely subcylindrical; surface smooth; margin not differentiated. Disk convex, at first colourless, then dark violet from ripe ascospores, roughened by the protruding tips of ripe asci. Hymenium 80–100 μm thick. Hypothecium very thin, of only a very few layers of isodiametric cells 2.5–7×2.5–6 μm. Flesh not clearly differentiated. Excipulum 6–10 μm thick, of one or two layers of isodiametric or slightly oblong cells 5–9×3–7 μm (textura globulosa), with maturity restricted to the base of the fruit-body, with purple-red, amorphous, intercellular, water-soluble pigment. Asci clavate, with truncate apex, 110–120×22–26 μm, 8-spored, the wall blue in Melzer's

reagent. Spore-clusters very compact, elongated, 34–36 × 14–15 μm, with unilateral mucilaginous substance. Ascospores arranged according to a very compact form of pattern II, at first fusiform-ellipsoid and hyaline, then asymmetrical, subtrigonal, or ventricose and dark purple-violet, finally brownish-purple, 13.8–15.6 × 7.3–8.3 μm, smooth with a few irregular secundary cracks taking the shape of delicate lines over the whole of the spore-cluster; pigment in a rather thick layer (0.5–1.3 μm thick). Paraphyses branched, septate, cylindrical, 2.5–3.7 μm thick, not or very slightly enlarged up to 5 μm at the tip, with colourless contents; the apex sometimes covered with small purple-red crystals.

HABITAT.—On dung of donkey and of unknown insectivorous animal.

ETYMOLOGY.—From Latin, *purpureus*, purple or purple-red colour.

SPECIMENS EXAMINED.—LIBYA: *van Brummelen 3290*, on dung of donkey (comm. Dr. H. O. Sleumer), near Jabo in the Djebel Nefusa, c. 170 km S. W. of Tripoli,

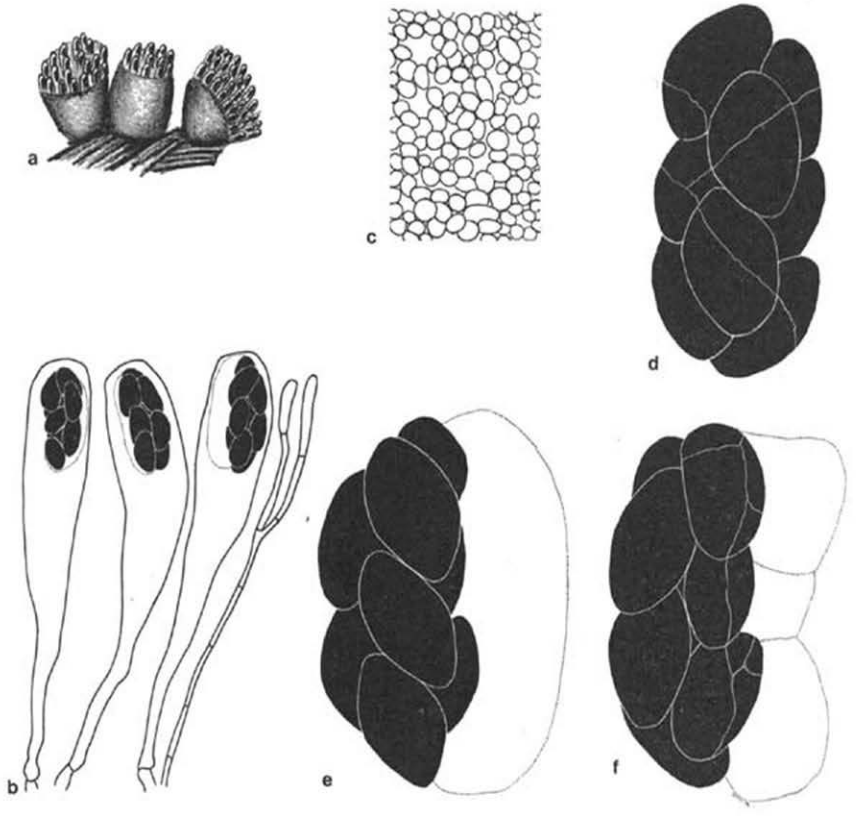

Fig. 2. *Saccobolus purpureus*. — a. Habit of fruit-bodies × 50. — b. Asci and paraphysis × 500. — c. Texture of excipulum seen from outside × 1000. — d–f. Spore-clusters × 1600. (From type.)

14.V.1971 (L, type); *van Brummelen 3295*, on dung of unknown insertivorous animal (comm. Dr. H. O. Sleumer), near Bir Ghanam, c. 70 km S. of Tripoli, 9.VIII.1971 (L).

This is a representative of *Saccobolus* sect. *Eriobolus* Sacc. Obviously *Saccobolus purpureus* is close to *S. versicolor* (P. Karst.) P. Karst., from which it can be distinguished by the conspicuous purple-red colour and the very compact spore-clusters. In *S. versicolor* the pigment of the receptacle is bluish-violet and does not tend to purple-red. The spore-clusters in *S. versicolor* may sometimes be rather compact. They measure 40–62 × 14–19(–23) μm (van Brummelen, 1967), which is considerably longer than in *S. purpureus*.

In *Saccobolus verrucisporus* Brumm. ascospores and spore-clusters of the same shape and size occur, but in this species the ascospores are ornamented with coarse, isolated warts, while the receptacle is whitish with a shade of violet.

Saccobolus parvisporus Brumm., *spec. nov.*—Fig. 3

Apothecia sessilia, solitaria, interdum confluentia, 0,3–0,6 mm diam. Receptaculum initio subglobulare et dilute roseum usque dilute violaceum, denique pulvinatum et sordide roseum usque dilute carneum, laeve. Excipulum strato superficiali textura globulosa praeditum, hyalinum. Asci clavati, apice truncati, 122–132 × 15–18 μm, 8-spori, pariete iodo intense caerulescente. Sporarum fasciculi elongati, valde laxi, raro compacti, (23–)27–29 × 10–11 μm. Ascosporae secundum typum II vel interdum secundum typum IIIa dispositae, ellipsoideae, violascentes, 9,5–10,3 × 5,1–6,3 μm. Episporium pigmenti disposito verrucis admodum grossis granulisque irregularibus obtectum, basi saepe strato tenui. Paraphyses simplices vel ramosae, cylindraceae, 1,8–2,3 μm latae, apice leviter inflatae, hyalinae. In fimo asinorum invenitur.

TYPUS: *van Brummelen 3288*, prope Jabo in Djebel Nefusa, Libya (L).

Apothecia solitary or in small coherent groups, sometimes apparently confluent, superficial, sessile on a broad base, 0.3–0.6 mm across, 0.3–0.4 mm high, watery-fleshy. Receptacle at first subglobular and pale pinkish to pale violet, then pulvinate and dingy pinkish to pale flesh-coloured, smooth, without margin. Disk convex, translucent pale pinkish, roughened by protruding asci. Hymenium 90–110 μm thick. Hypothecium thin, of closely compacted isodiametric cells 3–7.5 μm in diameter. Flesh not differentiated. Excipulum very thin, consisting of subglobular cells (textura globulosa), hyaline, scarcely pigmented, with maturity restricted to base of fruit-body. Asci clavate, with a long stalk, with truncate apex, 122–132 × 15–18 μm, 8-spored; the wall deep blue in Melzer's reagent. Spore-clusters elongated, 27–29 × 10–11 μm, sometimes becoming more compact 23–26 × 11 μm. Ascospores rather loosely united in a cluster, arranged according to pattern II, sometimes changing into pattern IIIa, ellipsoid, at first hyaline, then pale violet, becoming darker in concentrations of pigment, 9.5–10.3 × 5.1–6.3 μm; ornamented with irregular large warts and granules, often with thin uniform layer at base; mucilaginous substance very fugacious or absent. Paraphyses simple or branched, septate, cylindrical, 1.8–2.3 μm thick, slightly enlarged up to 4 μm at the tip, colourless.

HABITAT.—Known only from dung of donkey.

ETYMOLOGY.—From Latin, *parvus*, little, small and *sporus*, a seed: with small spores.

SPECIMEN EXAMINED.—LIBYA: *van Brummelen 3288*, on dung of donkey (comm. Dr. H. O. Sleumer), near Jabo in the Djebel Nefusa, c. 170 km S. W. of Tripoli, 11.V.1971 (L, type).

Judging by the arrangement of the ascospores in the cluster and the absence of yellowish pigment in the paraphyses this is a typical representative of *Saccobolus* sect. *Eriobolus*. The ascospores are longitudinally disposed with two rows of three and one row of two spores. In rare cases the cluster becomes longitudinally contracted with rather irregular arrangement of the spores.

As a result of the irregular distribution of the pigment the ascospores are only loosely united in the cluster. In squash-preparations the spores will easily break apart.

This species resembles *Saccobolus thaxteri* Brumm. in many respects. However, the

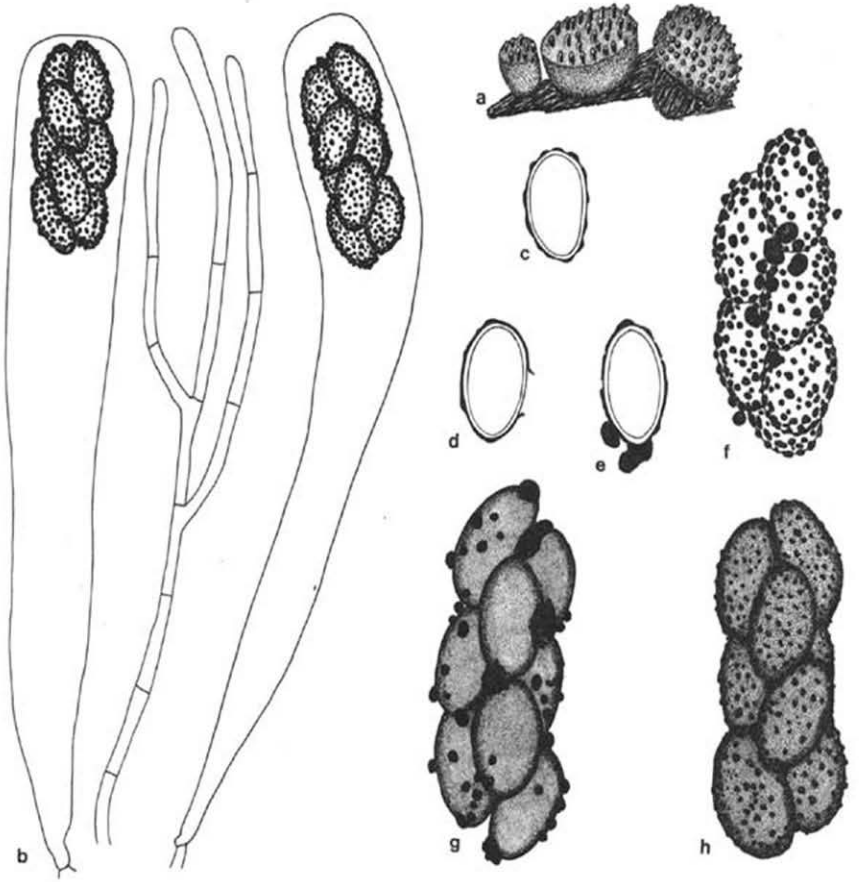

Fig. 3. *Saccobolus parvisporus*. — a. Habit of fruit-bodies ×50. — b. Asci and paraphysis ×1000. — c–e. Ascospores in optical section ×1600. — f–h. Spore-clusters ×1600. (From type.)

differences are evident. In *Saccobolus parvisporus* the ascospores are considerably smaller, the length-breadth ratio is higher, the spore-clusters are more slender, and the asci are much longer.

In *Saccobolus infestans* (Batista & Pontual) Brumm. ascospores of about the same size (9–11 × 5–6.5 μm) occur, but the arrangement of the spores in the cluster is quite different (c.f. van Brummelen, 1967).

Saccobolus eleutherosporus Brumm., *spec. nov.*—Fig. 4

Apothecia sessilia, basi angustata, 0,10–0,25 mm diam. Receptaculum initio subglobulare et dilute roseum, denique applanatum usque pulvinatum et malvinum, leviter asperum. Excipulum strato superficiali e textura globulosa praeditum. Asci cylindrico-clavati, apice truncati, 95–120 × 22–27 μm, 8-spori, pariete iodo caerulescente. Sporarum fasciculi elongati, valde laxi, facile soluti. Ascosporae non congregatae, secundum typum II dispositae, elongato-ellipsoideae, initio hyalinae, denique violascentes, 16,5–17,5 × 6,4–7,6 μm. Episporium pigmenti verrucis vel molibus irregulariter obtectum, ascosporis ipsis pro parte majore pigmento

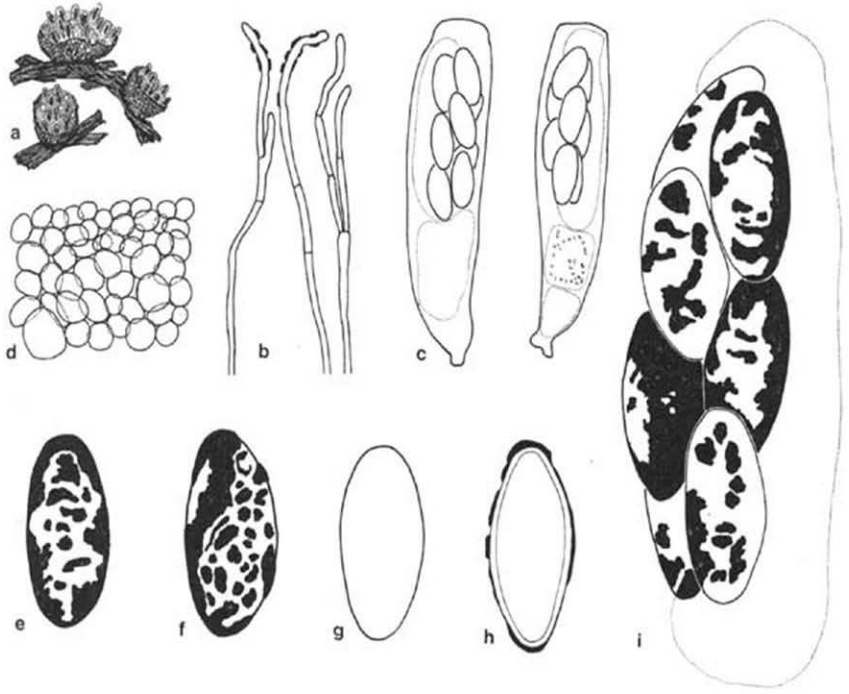

Fig. 4. *Saccobolus eleutherosporus*. — a. Habit of fruit-bodies × 50. — b. Paraphyses × 500. — c. Asci × 500. — d. Texture of excipulum seen from outside × 500. — e–g. Ascospores × 1600. — h. Ascospore in optical section × 1600. — i. Spore-cluster × 1600. (From type).

destitutis. Paraphyses valde ramosae, irregulariter filiformes, 2–3 μm latae, apice leviter inflatae, pigmento dilute roseo obtectae. In fimo Phasiani colchici invenitur.

TYPUS: *A. Vervliet*, Ekeren prope Antverpiam, Belgia, 28.II.1971 (L).

Apothecia solitary or in small groups, not confluent, superficial, sessile on a narrow base, 0.10–0.25 mm across, 0.10–0.15 mm high, soft fleshy. Receptacle at first subglobular and pale pinkish, then flattened to pulvinate and pale purplish pink, in a few cases slightly yellowish; surface finely roughened by subglobular cells; margin not differentiated. Disk convex, at first pink, then pale purplish pink, roughened by the pale violet protruding tips of ripe asci. Hymenium 90–100 μm thick. Hypothecium very thin, of subglobular cells 5–15 μm in diameter (textura globulosa). Asci cylindric-clavate, with a short stalk, truncate at the apex, 95–120 × 22–27 μm, 8-spored; the wall blue in Melzer's reagent. Spore-clusters elongated, very loose. Ascospores not cemented together by their pigment, at first free, then clinging together according to pattern II, finally often more or less free, ellipsoid or elongated-ellipsoid (length-breadth ratio 2.2–2.7), often somewhat ventricose; hyaline, then pale violet, finally pale purplish brown; 16.5–17.5 × 6.4–7.6 μm; ornamented with very irregular coarse warts and thick lumps of pigment, leaving large parts of the wall uncovered; with common unilateral mucilaginous substance. Paraphyses rather frequently branched, septate, irregularly filiform, 2–3 μm thick, not or only slightly enlarged up to 4 μm at the tip; covered near the ends with pale pinkish, amorphous pigment; pigment staining brownish red with iodine.

HABITAT.—Known only from dung of pheasant.

ETYMOLOGY.—From Greek, ελευθερος, free and σπορα, a seed: with free spores.

SPECIMEN EXAMINED.—BELGIUM: *A. Vervliet*, on dung of pheasant, Ekeren near Antwerp, 28.II.1971 (L, type).

This material was sent to me as *Saccobolus saccoboloides* (Seaver apud Dodge & Seaver) Brumm., which it resembles because of the free ascospores. In *Saccobolus saccoboloides*, however, the ascospores are arranged in a cluster according to pattern I (van Brummelen, 1967), the ornamentation of the ascospores consists of a uniform, thin layer, and the terminal elements of the paraphyses are filled with yellowish contents. This makes *S. saccoboloides* a typical representative of *Saccobolus* sect. *Saccobolus*.

Saccobolus eleutherosporus is also characterized by free ascospores, but the ascospores are arranged in a cluster according to pattern II and the pigment is irregularly distributed over the surface of the ascospores. The contents of the paraphyses are colourless, while their terminal elements are covered with amorphous pinkish pigment. These characters together with the unilateral attachment of the mucilaginous substance to the spore-cluster make the new species a typical representative of *Saccobolus* sect. *Eriobolus* Sacc.

Saccobolus eleutherosporus is closely related to *Saccobolus versicolor* (P. Karst.) P. Karst., which is a very variable species. But it can be distinguished from this by the free ascospores and the very pale, irregularly distributed sporal pigment.

At maturity the spores of *S. eleutherosporus* are loosely united in the upper part of the ascus by the mucilaginous substance. Soon after ascospore discharge this substance dissolves and the spores are set completely free.

Saccobolus diaphanus Brumm., *spec. nov.*—Fig. 5

Apothecia sessilia, 0,20–0,25 mm diam. Receptaculum initio obconicum, basi leviter constrictum, deinde applanatum, albidum, laeve. Excipulum strato superficiali e textura globulosa usque angularis praeditum. Asci late clavati, apice truncati, 73–86 × 21–23 μm, (7–)8-spori, pariete iodo caerulescente. Sporarum fasciculi satis laxi, facile soluti, 27–32 × 10–12 μm. Ascosporae secundum typum II, vel saepius irregulariter dispositae, late ellipsoideae usque ellipsoideae, 9,5–10,7 × 5,3–6,5 μm, saepe omnino laeves, tantum raro subtiliter punctatae. Paraphyses simplices, irregulariter cylindricae, 1,7–2,2 μm latae, hyalinae. In fimo equorum invenitur.

TYPUS: *van Brummelen 2800*, Chiengmai, Doi Pui, Thailandia (L).

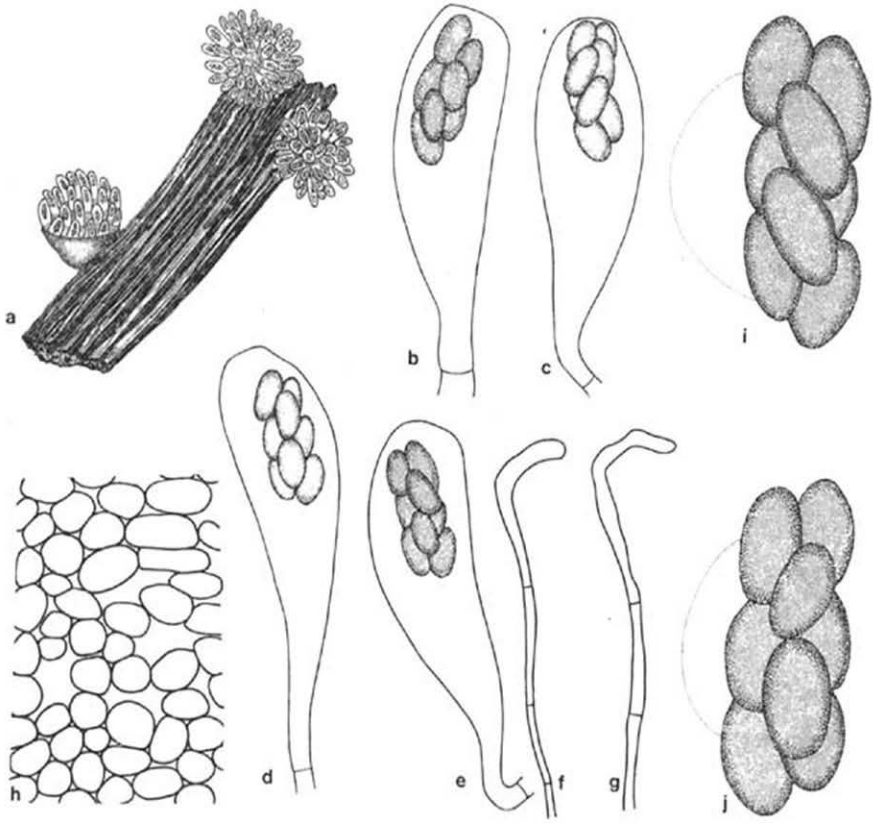

Fig. 5. *Saccobolus diaphanus*. — a. Habit of fruit-bodies × 50. — b–e. Asci × 630. — f, g. Upper parts of paraphyses × 1000. — h. Texture of excipulum seen from outside × 630. — i, j. Spore-clusters. (From type.)

Apothecia solitary, superficial, sessile, 0.20–0.25 mm across, about 0.20 mm high. Receptacle at first obconical with a narrow base, then more expanded, white, smooth; margin retracted towards the base at maturity. Disk convex, translucent white, then pale violet, dotted with the brown protruding tips of ripe asci. Hymenium up to about 65 μm thick. Hypothecium very thin, of isodiametric cells 4–8 μm wide. Flesh not or scarcely differentiated. Excipulum of only one layer of isodiametric or slightly elongated (sometimes angular) cells 8–14×8–10 μm (textura globulosa to angularis), hyaline. Asci broadly clavate, gradually tapering downwards into a rather thick base, with truncate apex, 73–86×21–23 μm, (7–)8-spored; the wall blue in Melzer's reagent. Spore-clusters rather loose, 27–32×10–12 μm. Ascospores loosely arranged according to pattern II or more often irregularly disposed, broadly ellipsoid to ellipsoid (length-breadth ratio 1.5–1.9), at first hyaline, then very pale violet, finally pale brownish violet, 9.5–10.7×5.3–6.5 μm, usually wholly smooth, more rarely finely punctate; pigment in a very thin layer 0.2–0.4 μm thick. Paraphyses simple, septate, irregularly cylindrical, 1.7–2.2 μm thick, frequently hooked at the slightly enlarged tips (up to 3 μm), hyaline.

HABITAT.—Known only from dung of horse.

ETYMOLOGY.—From Greek, διαφανης: transparent, translucent.

SPECIMEN EXAMINED.—THAILAND: *van Brummelen 2800*, on dung of horse (comm. Dr. C. F. van Beusekom), Chiengmai, Doi Pui (alt. c. 1500 m), 14.IV.1970 (L, type).

In this species the layer of pigment covering the ascospores is very thin, which gives them the pale, translucent colour. At maturity the ascospores are scarcely or not cemented together by their pigment. This leaves them often rather loose in the spore-cluster. At a certain stage of maturity a typical arrangement of the spores, according to pattern II (i.e. with two longitudinal rows of three and one of two spores), is attained. But this disposition is not sufficiently fixed by the scanty pigment, so that more or less aberrant arrangements are found.

In rare cases asci with only seven spores were found. In such asci usually one spore was found to be bigger than the others, measuring 11.9–13.4×6.5–7.0 μm.

Saccobolus diaphanus is a representative of *Saccobolus* sect. *Eriobolus* Sacc. that should be placed close to *Saccobolus depauperatus* (Berk. & Broome) E. C. Hansen. From this it can be distinguished by the pale, somewhat smaller (especially shorter) ascospores, that are only loosely united.

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STUDIES IN RESUPINATE BASIDIOMYCETES—IV*

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(With six Text-figures)

A new genus (Mycostigma) is established for Corticium aegeritoides Bourd. & Galz. Trechispora spinulifera and Tulasnella pallidocremea are described as new species. Two new combinations are made.

On Corticium aegeritoides Bourd. & Galz.

In a recent publication (Jülich, 1975) I placed *Corticium aegeritoides* Bourd. & Galz. in synonymy with *Trechispora farinacea* (Pers. ex Fr.) Liberta. The reason for this was that the type material studied by me consisted of a young state of *T. farinacea* which roughly matched the description given by Bourdot & Galzin (1911, 1928) of their species. I assumed that their description of the spores was not entirely correct, as *T. farinacea* has not smooth but minutely warted spores. During my visit to the Botanical Museum in Stockholm I found an authentic specimen of *C. aegeritoides* from which I got the impression that this species of Bourdot & Galzin is different from *T. farinacea*. A careful search under a binocular lens of high magnification (50×) revealed small cream-coloured globules, less than 0.1 mm in diam., which seemed to be either pollen grains or the small imperfect state of a fungus. Contrary to this first impression, microscopic study showed the globules to be the perfect state of a basidiomycete. This was a great surprise, since these minute globules represent the smallest type of basidiocarp in the Corticiaceae.

Similar structures are known as imperfect states of Ascomycetes and of some Basidiomycetes too. Examples of the latter within the Corticiaceae are: *Aegerita candida* Pers. ex Fr. —perfect state: *Bulbillomyces farinosus* (Bres.) Jülich—, *Aegerita tortuosa* Bourd. & Galz. —perfect state: *Subulicystidium longisporum* (Pat.) Parm.—, and *Necator decretus* Mass. —perfect state: *Phanerochaete salmonicolor* (Berk. & Br.) Jülich. But *Corticium aegeritoides* is the only perfect state of a basidiomycete known to form minute *Aegerita*-like bodies.

Since these globules are invisible to the naked eye, it is not surprising that except for Bourdot & Galzin nobody ever recorded this species. It is only by chance that one can find it. Judging from the material in Bourdot's herbarium it seems likely that the samples were collected as *Trechispora farinacea* but were subsequently found to

* This study was supported by the Netherlands Organization for the Advancement of Pure Research (Z.W.O.).

contain a second, far more interesting species. This *Aegerita*-like species they consequently named *Corticium aegeritoides*, and they established a new section for it within the genus *Corticium*, viz. sect. *Aegeritoides*.

The genus *Corticium* was an accumulation of often unrelated species for which in the past decades many small and more natural genera have been erected. One of the remaining species in need for re-allocation is *C. aegeritoides*. Its key characters are the minute globular basidiocarps, the hyaline, thin-walled and probably clamped hyphae, the rather small basidia, and the hyaline, thin-walled and inamyloid spores. It is beyond any doubt that this species belongs to the Corticiaceae, but it certainly is not related to the imperfect *Aegerita*-states, which never develop basidia on their surface and whose perfect states belong to such unrelated genera as *Subulicystidium* and *Bulbillomyces*. Moreover the other characters of *C. aegeritoides* do not match very well the definitions of the known genera of the Corticiaceae. A new genus is therefore proposed to accommodate this unique species.

Mycostigma Jülich, *gen. nov.*

Carposomata globulis minutis constant, separata vel saepe aggregata sed haud confluentia, hyphis hyalinis mutuo conjuncta. Systema hypharum monomiticum. Hyphae hyalinae, cylindraceae vel paulo torulosae, tenui-tunicatae, circa 2–3 μm in diam., probabiliter fibulatae. Cystidia vel gloeocystidia desunt. Basidia hyalina, clavata, tenui-tunicata, parva, tetraspora. Sporae hyalinae, ellipsoideae, tenui-tunicatae, laeves, inamyloideae.

TYPUS: *Corticium aegeritoides* Bourd. & Galz. 1911.

Basidiocarps consisting of minute globules, separated or aggregated but never confluent, connected by a few hyaline hyphae. Hyphal system monomitic. Hyphae hyaline, cylindrical or somewhat torulose, thin-walled, c. 2–3 μm in diam., probably with clamps. Cystidia or gloeocystidia lacking. Basidia hyaline, clavate, thin-walled, rather small, probably clamped, 4-spored. Spores hyaline, ellipsoid, thin-walled, smooth, inamyloid.

Mycostigma aegeritoides (Bourd. & Galz.) Jülich, *comb. nov.*—Fig. 1

Corticium aegeritoides Bourd. & Galz. *in* Bull. trimest. Soc. mycol. Fr. **27**: 249. 1911 (basionym).

Basidiocarp annual, whitish to cream-coloured, globose to subglobose, more or less smooth, 0.02–0.1 mm in diam., dispersed or somewhat aggregated, never confluent, separate or connected by very few delicate hyaline hyphae; consistency membranaceous. Hyphal system monomitic. Hyphae hyaline, rather indistinct and easily collapsing, thin-walled, flexuous-cylindrical, probably with clamps, 2–3 μm in diam.; crystals lacking. Cystidia and glococystidia absent. Basidia hyaline, thin-walled, clavate, 11–18×4.5–6 μm, probably with clamp at base; 4-spored; sterigmata subulate and slightly curved, c. 3–3.7×0.8–1 μm. Spores hyaline, smooth, thin-walled, globose to subglobose or broadly ellipsoidal, 4–4.5 μm in diam., with large, conspicuous apiculus, c. 1–1.2×0.8–1 μm; non-amyloid. Conidial state absent.

REACTIONS.—No part of basidiocarp amyloid, dextrinoid, or cyanophilous.

SUBSTRATE.—On petioles of ferns.

DISTRIBUTION.—Known only from France.

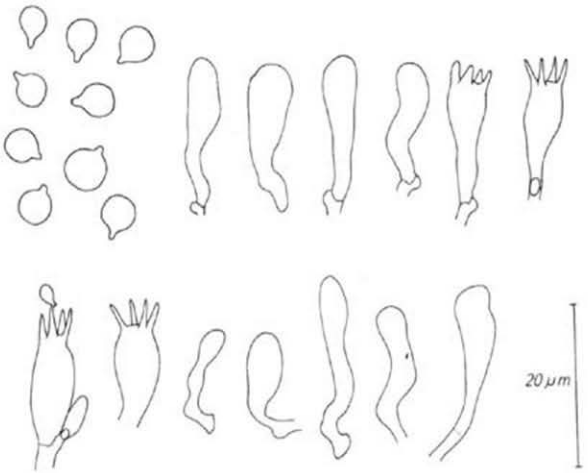

Fig. 1. *Mycostigma aegeritoides*, France, type.

MATERIAL STUDIED.—FRANCE: Allier, St. Priest, 2 Nov. 1909, *H. Bourdot 6837* (lectotype; PC). — Aveyron, près St. Sernin, *A. Galzin 5163* (herb. Bourdot 6950; PC). — Allier, ad filices, March 1910, *H. Bourdot 6950* (S).

On Corticium fuciforme (Berk.) Wakef.

A curious fungus has several times been collected in the Netherlands; a species described more than hundred years ago from Australia. It was first collected in 1854 on Mt. Gambier, South Australia by Baron von Mueller and sent to Berkeley for identification. The latter described it in 1873 under the name *Isaria fuciformis* Berk. The specific name refers to the alga-like appearance of the fungus when dry, and the species was placed in the genus *Isaria* because of its isarioid fruitbody, from the apical part of which Berkeley described minute conidia. Berkeley's short description runs as follows: 'Pallid, slender, filiform, sparingly branched, branches acute; spores very minute, globular.' This species was reported in 1883 from Dublin and in 1884 from the southern counties of England, in both cases as a parasite of grass, especially of *Festuca ovina*. With regard to the reproduction of the fungus, the presence of globular conidia was generally accepted; Massee (1893) gave the size of the conidia as 2 µm.

It was not until 1906, that the true affinities of the species were recognized. In this year McAlpine described the basidiocarp of the fungus and placed it in the genus *Hypochnus*. He correctly described the isarioid structures as peripheral hyphal fascicles of a resupinate basidiomycete and gave the first description of the basidia and spores,

based on Australian material, at the same time stating that conidia were not present. When no basidiocarp with hymenial layer is developed, the fungus consists of an effused glutinous layer of hyphae with gelatinized walls, closely attached to the cuticle of the grass. From this almost invisible layer the thin, clavarioid or isarioid tufts emerge, which have a bright coral pink colour when fresh and are easily discernible from a distance of several meters. These tufts are sterile. The perfect state is (in Europe) not formed until late in autumn (in Australia in June–July). This explains why most of the specimens from the Netherlands are sterile, being collected too early in the year.

Propagation of the species possibly occurs by means of basidiospores, but the fungus is probably more effectively spread in a vegetative manner by means of its projecting hyphal tufts. It is possible (as suggested already by McAlpine in 1906) that the apical part of the tuft may expand when it comes in contact with grass and there starts a fresh growth. It has also been observed that the tufts when dry are easily detached and broken into smaller pieces, which when moist are able to affix themselves to grasses and to start growing again.

The fungus has been reported from several species of grass. According to McAlpine it has been found in Australia on *Agropyron scabrum*, *Agrostis alba* var. *stolonifera*, *Bromus mollis*, *B. sterilis*, *Danthonia pilosa*, *Festuca bromoides*, and *Lolium perenne*. Cunningham (1963) adds three more species to this list: *Danthonia caespitosa*, *Lolium multiflorum*, and *Poa bulbosa*. In a wet season it also may grow over herbs. In Europe (i.e. England and the Netherlands) it is known from several grass species; the best material I saw was found on *Festuca ovina* and *Nardus stricta*. The effect on grass land is mostly not severe, but sometimes large areas are covered; McAlpine mentions an infected area of 25 km^2 in Victoria, Australia.

The geographical distribution of the species is very disjunct. For many years it was known only from Australia and England. At the turn of the century the question arose whether Australia got this parasite from England or vice versa. The question may remain unsolved since according to McAlpine the fungus is easily carried on seeds, and it is by no means uncommon (at least in Australia) to find the hymenium on seeds of *Lolium perenne*.

The species has been placed in *Isaria*, *Hypochnus*, *Epithele*, and *Corticium*, but it belongs to none of these genera. The systematic position among the genera of the Corticiaceae is rather difficult to establish. However, the firm membranaceous to ceraceous basidiocarp with clampless hyphae, the rather large and thin-walled spores as well as the multinucleate basal hyphal cells indicate a close relationship with *Phanerochaete*.

Phanerochaete fuciformis (Berk.) Jülich, *comb. nov.*—Fig. 2

Isaria fuciformis Berk. *in* J. Linn. Soc. **13**: 175. 1873 (basionym). — *Hypochnus fuciformis* (Berk.) McAlp. *in* Ann. mycol. **4**: 549. 1906. — *Epithele fuciformis* (Berk.) Höhn. & Syd. *apud* H. & P. Syd. *in* Ann. mycol. **4**: 551. 1906. — *Corticium fuciforme* (Berk.) Wakef. in Trans. Br. mycol. Soc. **5**: 481. 1917.

Basidiocarp annual, resupinate, effused; the perfect stage 1–2 cm large, forming small patches on leaves and culms or seeds of grasses, rarely on basal part of hyphal tufts, adnate; consistency firm-membranaceous to ceraceous; context homogeneous, composed of closely compacted hyphae; hymenial surface pinkish when fresh, tan to cream-coloured when dry, even, not or only slightly cracked when dry; margin indistinct, thinning out; rhizomorphs or hyphal strands lacking but isarioid or

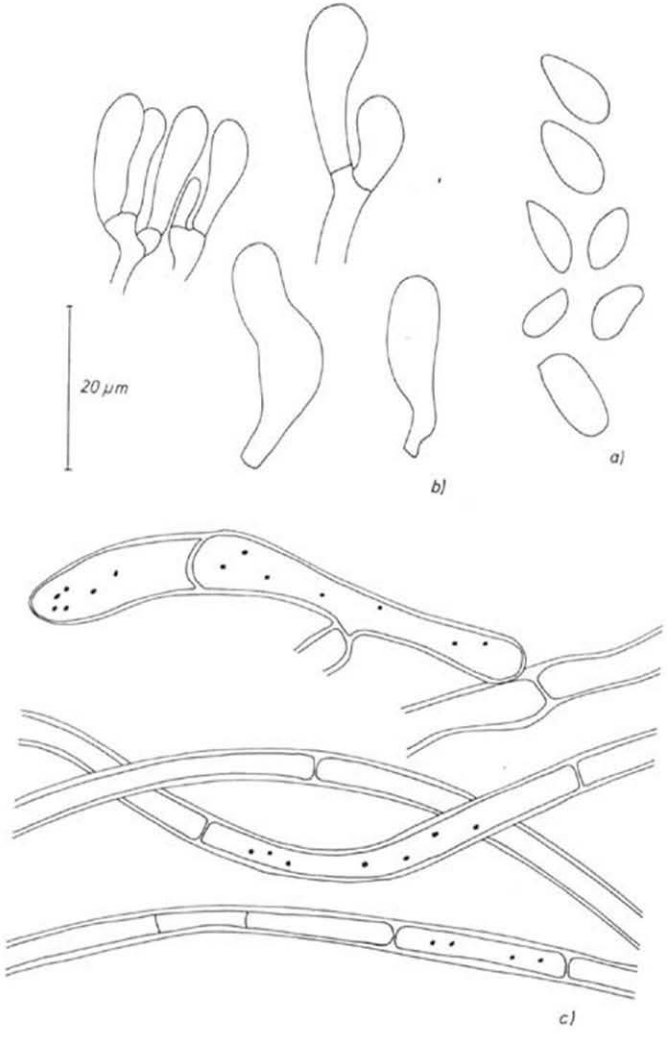

Fig. 2. *Phanerochaete fuciformis*, Netherlands. — a. L 965.299–050. — b., c. L 968.241–655.

clavarioid hyphal fascicles present. Sterile outgrowths single or branched, each long-acute or subulate, up to 3 cm long, ceraceous, bright coral pink when fresh, pale when dry, consisting of a compact mass of hyaline, slightly thick-walled, clampless hyphae. Effused mucous base of tufts sometimes spreading out, forming a hyaline, almost invisible sheath around culms and leaves of grasses and sometimes glueing different parts of grass together. At irregular intervals new hyphal tufts forming. Hyphal system monomitic. Hyphae hyaline, cylindrical, compactly arranged in trama and sterile tufts, branching often close to septa (initial stages then suggesting clamps), in subhymenium 2.5–4 μm wide and thin-walled (c. 0.2 μm), in trama and tufts 4–8 μm wide and somewhat thick-walled (c. 0.5 μm), with smooth surface or encrusted with some orange mucilage granules; clamps lacking from all septa; contents homogeneous. Cystidia or gloeocystidia lacking. Basidia hyaline, clavate, 16–20–26 × 5–8–10 μm, thin-walled, with smooth surface, clampless, with homogeneous contents, with four, stout sterigmata (c. 6 × 2 μm). Spores hyaline, ellipsoid to fusiform, with small apiculus, 9–12 × 5–6.5 μm, not glued together, thin-walled, with smooth surface, not amyloid; contents homogeneous.

REACTIONS.—No part of basidiocarp amyloid, dextrinoid, or cyanophilous.

SUBSTRATE.—Parasitic on culms and leaves of grasses; rarely on herbs.

DISTRIBUTION.—Australia (type locality), Tasmania, New Zealand, Great Britain, Netherlands, North America (East Coast).

MATERIAL STUDIED.—THE NETHERLANDS: prov. Gelderland, National Park Veluwezoom, 'Postbank', 5 Oct. 1968. *Ch. Matthijsse* (L 965.299–050); prov. Noord-Holland, Vogelenzangse bos, 19 Oct. 1959, *Anonym.* (L 959.41–018); prov. Zuid-Holland, Wassenaar, Meyendel, near parking lot, 25 Nov. 1957, *C. Bas 1392* (L 957.255–719); prov. Noord-Brabant, Strabrechtse Heide, 15 Oct. 1968, *W. Iven and G. Verver* (L 968.241–655).

NOTES.—According to Wakefield (1916) there are clamps at the hyphal septa; this could not be confirmed (also fide Cunn. 1963 hyphal septa without clamps). The 'paraphyses' described by Cunningham are probably young basidial stages.

On a new species of Trechispora from South-East Asia

An unknown resupinate hydnoid fungus collected on a termite nest on the Solomon Islands was received from the Kew Herbarium for identification. The monomitic hyphal system as well as the mainly hyaline hyphae and hyaline to pale yellowish spores show that the specimen belongs to the Corticiaceae. The systematic position is with *Trechispora* since the basidia are rather short and the spores rather small, warted, and inamyloid. Most species of the genus *Trechispora* have a smooth hymenial surface, but three species are known which sometimes or always develop a hydnoid hymenial surface, viz. *T. farinacea* (Pers. ex Fr.) Liberta, *T. gillesii* (Maas G.) Liberta, and *T. mutabilis* (Pers.) Liberta. Of these species, *T. mutabilis* has smooth spores and *T. farinacea* a soft-membranaceous basidiocarp. The remaining *T. gillesii*, up to now known only from Central Africa, shows a stipitate-pileate basidiocarp and larger spores. This indicates that the specimen from the Solomon Islands, having different characters, belongs to an as yet undescribed species.

While looking through the collections of unidentified hydnoid fungi in the Rijksherbarium, Leiden, two more samples of this species were found, also from termite nests. The two additional findings are from Sumatra and the island Krakatau.

Trechispora spinulifera Jülich, *spec. nov.*—Fig. 3

Carposoma late effusum, membranaceum, cremeum ad ochraceum. Hymenium hydnoideum, aculeis circa 2 mm longis, cylindraceis vel subulatis. Systema hypharum monomiticum. Hyphae distinctae, hyalinae vel basales brunnescentes, tenui- vel crassate-tunicatae, fibulatae, interdum inflatae, 1.5–4(–6) μm wide. Cystidia vel glococystidia desunt. Basidia hyalina, suburniformia, 10–13(–16) × 4.8–5.5 μm, fibulata. Sporae hyalinae vel leviter flavidae, subglobosae, verrucosae, 3–4 × 2.8–3.3 μm, inamyloideae.

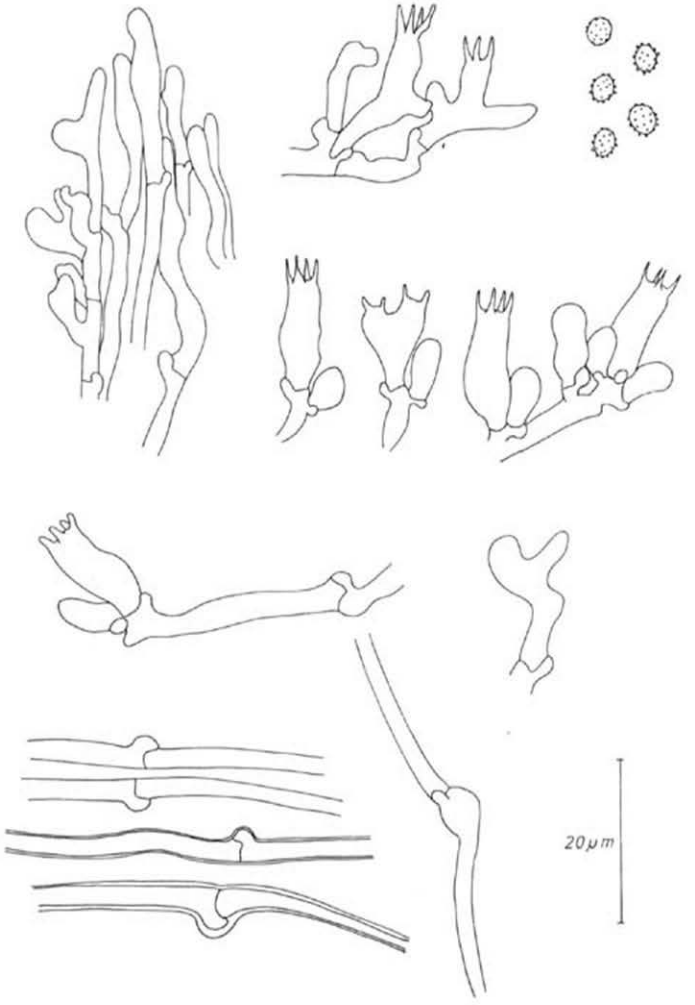

Fig. 3. *Trechispora spinulifera*, Solomon Islands, type.

TYPUS: 'British Solomon Islands Protectorate, Malaita Island, Dala Cocoa Research Station, .12.1975, *G.V.H. Jackson* (no. D 5)' (holotypus, L 974.106–264; isotypus, K).

Basidiocarp annual, resupinate, effused, several cm long, 150–350 μm thick, firm-membranaceous, with hymenial layer somewhat ceraceous, more or less adnate; context homogeneous; hymenial surface distinctly hydnoid, not cracked, cream coloured between teeth, the teeth proper dark greyish brown (in dried condition), crowded, not or only occasionally glued together, up to 2 × 0.2 mm; margin whitish, narrow; rhizomorphs and hyphal strands lacking. Hyphal system monomitic. Hyphae hyaline in subhymenium and trama but brown near substrate, mostly cylindrical, seldom some parts ampulliform, more or less loosely arranged in subhymenium, compactly arranged in trama, branching often from clamps or at places opposite to these, 1.5–3 μm in diam. in subhymenium, 2–4(–6) μm in diam. in trama, with smooth surface, the basal hyphae slightly to distinctly thick-walled (0.3–0.8 μm); clamps always present; contents homogeneous. Cystidia and gloeocystidia absent. Basidia hyaline, suburniform when mature, rather short, sometimes pleurobasidioid, broadly ellipsoidal when young, 10–13(–16) × 4.8–5.5 μm, thin-walled, with smooth surface, with clamp at base; contents homogeneous; with four subulate, slightly curved sterigmata (c. 3 × 1 μm). Spores hyaline to slightly yellowish when mature, subglobose, with minute apiculus, 3–4 × 2.8–3.3 μm, not glued together, rather thin-walled (c. 0.3 μm), with warted surface; warts short (c. 0.4 × 0.3 μm), regularly distributed over surface; contents homogeneous; wall not amyloid nor dextrinoid, not or only weakly cyanophilous.

SUBSTRATE.—Saprophytic on termite nests.

MATERIAL STUDIED.—BRITISH SOLOMON ISLANDS PROTECTORATE, Malaita Island, Dala Cocoa Research Station, Dec. 1975, *G. V. H. Jackson* (*no. D 5*) (K; L 974.106–264). — INDONESIA: Sumatra, Onderneming Bergen, July 1930, *v. Balen* (L 974.106–267); Mt. Krakatau, 18 Oct. 1933, *K. B. Boedijn 2758* (L 974.106–413).

KEY TO THE HYDNOID SPECIES OF TRECHISPORA

1a. Spores smooth, subglobose, 3.5–4.5(–5) × 3–4(–4.5) μm; Europe, U.S.S.R., North America *T. mutabilis* (Pers.) Liberta
b. Spores with warts 2
2a. Basidiocarp conchate-pileate to stipitate-pileate; spores broadly ellipsoid, 4.5–5.5 × 3.5–4 μm; Africa . . . . . *T. gillesii* (Maas G.) Liberta
b. Basidiocarp resupinate 3
3a. Basidiocarp soft-membranaceous, fragile; hymenial surface grandinioid to hydnoid, soft; spores ellipsoid, 3–4(–4.5) × 2.5–3(–3.5) μm; Europe, U.S.S.R., North, Middle, and South America. . . . . *T. farinacea* (Pers. ex Fr.) Liberta
b. Basidiocarp firm-membranaceous; hymenial layer somewhat ceraceous; hymenial surface hydnoid; spores subglobose, 3–4 × 2.8–3.3 μm; South-East Asia . . *T. spinulifera* Jülich

On a new species of Tulasnella

While preparing a revision of the genus *Tulasnella* my attention was drawn by *T. fuso-violacea* Bres. This is a rarely collected species, characterized by simple-septate hyphae and rather wide, cylindrical, slightly curved spores. Among the collections studied, two different types of spores are recognizable. Some specimens

(including the type collection) show rather wide spores, 10–13×4.3–6.2 μm; in other collections the spores are narrower, 10–13×3–3.3 μm. For specimens with the latter type of spores no name is available; hence a new species has to be described.

Tulasnella pallidocremea Jülich, *spec. nov.*—Fig. 4

Carposoma resupinatum, adnatum, membranaceum vel crustaceum, tenue. Hymenium laeve, in vegeto dilute violaceum, sicco cremeum. Systema hypharum monomiticum. Hyphae hyalinae, efibulatae, subhymeniales tenui-tunicatae, basales tunicis incrassatis (0.3–1.0 μm), 3–5 μm diam. Cystidia et gloeocystidia desunt. Basidia clavata, circa 10–12×7–8 μm, tetraspora; epibasidiis abrupte constrictis. Sporae hyalinae, tenui-tunicatae, leaves, cylindraceae vel suballantoideae, 10–13×3–3.3 μm, apiculis distinctis, inamyloideae.

TYPUS: 'Sweden, Upland, Danmark parish, the wood W. of Sävja (near Upsala)', 6 Aug. 1936, *S. Lundell and K. G. Ridelius* (K) (=Lundell & Nannfeldt, Fung. exs. suec. 472, sub *Tulasnella fusco-violacea* Bres.).

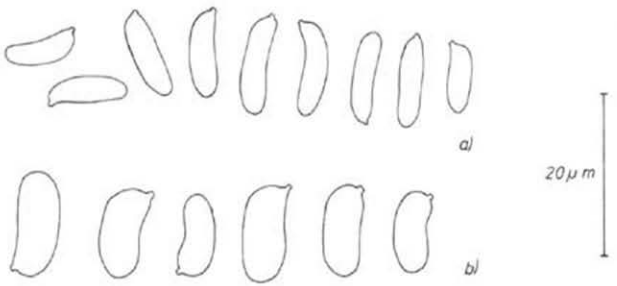

Fig. 4. a. *Tulasnella pallidocremea*, type. — b. *Tulasnella fusco-violacea* Bres., type.

Basidiocarp resupinate, adnate, membranaceous or crustaceous, thin. Hymenial surface even, light violaceous when fresh, pale cream when dry. Hyphal system monomitic. Hyphae hyaline, clampless, 3–5 μm in diam., the subhymenial ones thin-walled, the basal ones thin- to thick-walled (0.3–1.0 μm). Cystidia and gloeocystidia lacking. Basidia clavate, c. 10–12×7–8 μm, 4-spored, the epibasidia abruptly constricted. Spores hyaline, thin-walled, smooth, cylindrical or slightly allantoid, 10–13×3–3.3 μm, with distinct apiculus, inamyloid.

MATERIAL STUDIED.—SWEDEN: Upland, Danmark par., the wood W. of Sävja (near Upsala), 6 Aug. 1936, *S. Lundell and K. G. Ridelius* (C, S, K) (=Lundell & Nannfeldt, Fung. exs. suec. 472); Småland, Femsjö, autumn 1911, *L. Romell* (S). — AUSTRIA: Nieder-Österreich, Grosse Klause bei Aspang, without date, *v. Höhnel and Litschauer* (S).

HYPHODERMA COMPTUM (H. S. Jackson) Jülich—Figs. 5, 6

Peniophora compta H. S. Jackson *in* Canad. J. Res. **26**: 138. 1948 — *Hyphoderma compactum* (H. S. Jackson) Jülich *in* Persoonia **8:** 80. 1974 ('compacta').

Basidiocarp annual, resupinate, effused, up to 10 cm large, 80–150 μm thick, soft-membranaceous, separable in small pieces; context homogeneous; hymenial

surface cream-coloured, even, under lens minutely reticulate-poroid, not cracked when dry; margin pale cream-coloured, indistinct, thinning out; rhizomorphs and hyphal strands lacking. Hyphal system monomitic. Hyphae hyaline, cylindrical, somewhat compactly arranged in subhymenium, loosely arranged in trama, branching from or opposite clamps, 2.5–3.5 μm in diam, and thin-walled (c. 0.2 μm) in subhymenium, 3.5–5 μm in diam. and thick-walled (0.5–1.0 μm) in trama, mostly with smooth surface, rarely somewhat granular, clamps present at all septa, contents guttulate. Cystidia (leptocystidia) present, rather abundant, of hymenial to subhymenial origin, hyaline, subulate, 30–45×3–4.5 μm, thin- to slightly thick-walled (0.2–0.5 μm), with smooth surface, projecting up to 20 μm, with basal clamp; contents somewhat guttulate. Echinocysts present, abundant, laterally produced on basal hyphae, hyaline, globose, 4–5 μm in diam., thin-walled (c. 0.3 μm), with c. ten spines (about 1.5–2.5×0.5 μm) regularly arranged over the whole surface, always with basal clamp; contents homogeneous or slightly guttulate. Basidia hyaline, ellipsoid when young, clavate to suburniform when mature, 14–26×5.5–8 μm, thin-walled, smooth, with basal clamp, with somewhat guttulate contents, with (2–)4 subulate, slightly curved sterigmata (5–10×1.5–3 μm). Spores hyaline, broadly ellipsoid, 6–8×4–5 μm, with rather large (c. 1.5×1.2 μm) and distinct apiculus, not glued together, thin-walled, smooth, with guttulate contents, non-amyloid.

REACTIONS.—No part of basidiocarp amyloid, dextrinoid, or cyanophilous.

SUBSTRATE.—Saprophytic on very rotten wood of gymnosperms (e.g. Pinus strobus, 'white pine').

DISTRIBUTION.—Canada.

MATERIAL STUDIED.—CANADA: Ontario, Paradis Bay, Lake Timagami, T.F.R., 22 Aug. 1935, *R. Biggs 404* (TRTC 8746) & 26 Aug. 1936, *R. Biggs 732* (TRTC 16675); Bear Island, Lake Timagami, 18 Aug. 1944, *H. S. Jackson* (TRTC 19742, 19977, 20028, 20030); Partage to Spawm. Lake, Lake Timagami, 11 Aug. 1939, *H. S. Jackson* (TRTC 22442); Woods S. of Aurora, 16 Oct. 1938, *H. S. Jackson* (TRTC 13717, 13718).

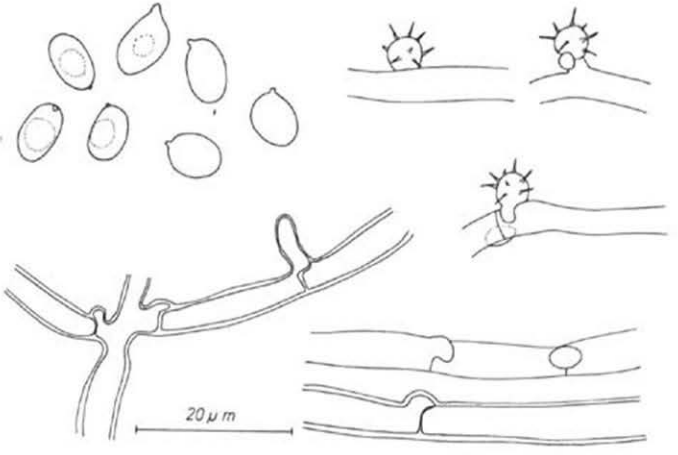

Fig. 5. *Hyphoderma comptum*, Canada, type.

The echinocysts on the basal hyphae in combination with the broadly ellipsoid spores are characteristic for this species. Larger echinocysts with somewhat different shapes are known from *Hyphoderma echinocystis* J. Erikss. & Strid, and *H. pallidum* (Bres.) Donk, but both species differ in having allantoid spores.

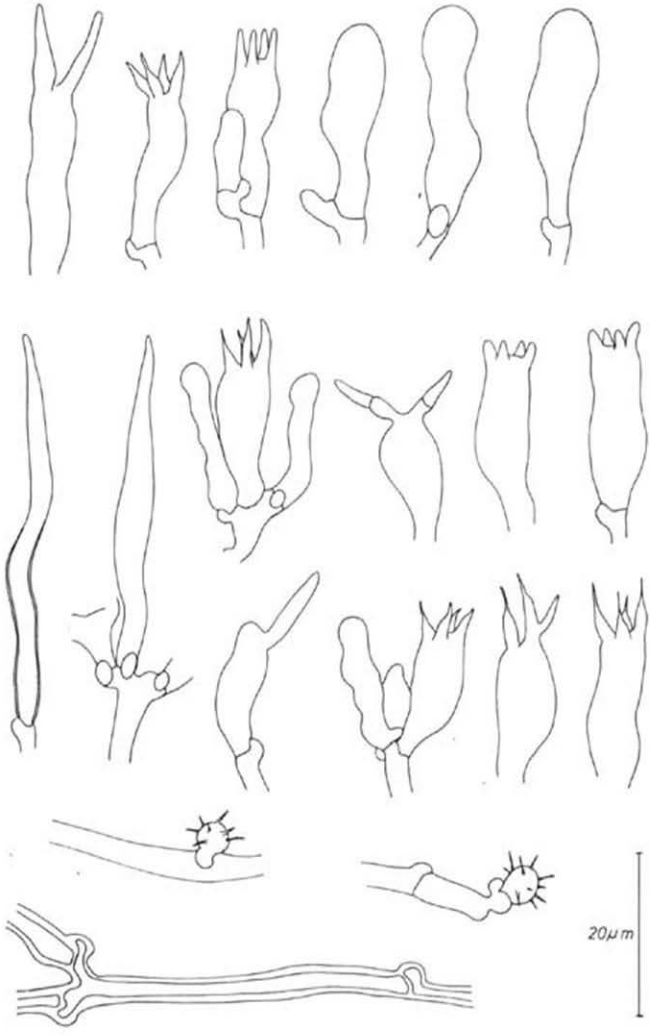

Fig. 6. *Hyphoderma comptum*, Canada, TRTC 20028.

Conohypha terricola (Burt) Jülich, *comb. nov.*

Peniophora terricola Burt in Ann. Mo. bot. Gdn **12**: 237. 1926 (basionym).

This species is very similar to *C. albocremea* (Höhn. & Litsch.) Jülich, but differs in having thin-walled, subulate, 60–80 μm long cystidia.

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CORTINARIUS CONTRARIUS, A NEW SPECIES IDENTICAL WITH C. SERTIPES KÜHN. SENSU SVRČEK

J. GEESINK
Den Helder

(With two Text-figures)

It is argued that the taxon described under the names *Cortinarius sertipes* by Svrcek and *C. flexipes* f. *sertipes* by Kühner is not conspecific with the true *C. sertipes* Kühn.; hence its description as a new species.

In the middle of November 1972 I collected at a roadside in the Wieringermeer (prov. Noord-Holland, Netherlands) a small *Cortinarius*, growing under *Populus* on calcareous clay, with a very striking characteristic: in young fruit-bodies the pale brown gills contrasted strongly with the lilac apices of the stems. I described this collection as follows:

Pileus 30–45 mm across, deep brown, with white, fibrillose, inflexed margin when young, later convex, obtusely umbonate, purple-brown, at margin with white velar remnants, fleshy, hygrophanous, non-striate, smooth but surface cracking into scales when very old. Gills slightly distant, subdecurrent when young, later adnate, broad, pale clay, then pale milky coffee, finally cinnamon brown, with concolorous edge. Stem 40–60 × 5–8 mm, brownish with white, fugacious zones and lilac apex when young, later pallid brown with silky sheen and hardly visible velar remnants. Smell indistinct. Guaiac- and KOH-reactions positive.

Spores 9–10 × 5,5–6 μm, pale brown, minutely warty. Cystidia lacking.

It is evident that this *Cortinarius* belongs to the group *Pulchelli* (Kühner & Romagnesi, 1953: 304–305; Moser, 1967: 331–332). The fact that the gills and the apex of the stem have different colours, however, makes the identification difficult. The species around *C. erythrinus* (see Kühner & Romagnesi, 1953: 305) show this phenomenon, but their colours of stem and cap differ from those in the present species. *Cortinarius subsertipes* Romagnesi has the same contrasting colours of the gills and the apex of the stem, but has larger spores (10–12,5 × 6.5–7 μm). The only description in the 'Flore' of Kühner & Romagnesi (1953: 305) fitting my species reasonably is that of *C. sertipes* Kühn. of which the gills are described as 'devenant brun-canelle'. The name *C. sertipes*, however, had not yet been validly published then.

Kühner validated the name *C. sertipes* two years later (1955: 40), describing both the young gills and the apex of the stem as 'lilacin'. In *Cortinarius* the colour of the young gills is generally considered of such importance that *C. sertipes* Kühn. 1955 probably is not identical with the unvalid *C. sertipes* of 1953, nor with the species from the Wieringermeer either.

In 1961(: 60) Kühner described another fungus that distinguishes itself from *C. sertipes* Kühn. 1955 in having brown young gills, a lilac apex of the stem and that, just like my fungus, occurs among grasses under *Populus* outside woods. He named it *Cortinarius flexipes* forma *sertipes* and, surprisingly, declared this name synonymous to *Cortinarius sertipes* Kühn. 1955, ignoring the difference in the colouration of young gills.

There are several interpretations of *Cortinarius flexipes* (Pers. ex Fr.) Fr. In the present case, however, it is only important to know that Persoon (1802: 275) originally described *Agaricus flexipes* as a fungus with a cinnamon cap, concolorous gills and a subconcolorous stem, growing in coniferous forest in the Harz[1] (no purple, violaceous or lilaceous tinges mentioned) and that Fries (1821: 212) described under the name *A. flexipes* Pers. another fungus with a strong smell ('olidus') and gills changing from purple to cinnamon, growing in moist coniferous forest in Sweden. In view of the characters mentioned it is very unlikely that the fungus described here is identical with *A. flexipes* Pers. or *A. flexipes* sensu Fries.

Svrček (1968: 274) described a species of *Cortinarius* with in young stages pale brown gills and a lilac apex of the stem, collected in a habitat similar to that described by Kühner in 1961 for his *C. flexipes* f. *sertipes*. Svrček called this species (incorrectly I believe because of the colour of the young lamellae) *Cortinarius sertipes* Kühn. 1955, considering the name *C. flexipes* f. *sertipes* (Kühn.) Kühn. a synonym. He placed this species in his paper next to *C. flexipes* sensu Kühn. with pale violet young gills and growing in coniferous woods.

In my opinion the fungi described by Svrček as *C. sertipes*, by Kühner in 1961 as *C. flexipes* f. *sertipes*, and by me in the present paper are identical. The concerning taxon does not have a validly published name and seems to deserve specific rank. Therefore it is here formally described under the name:

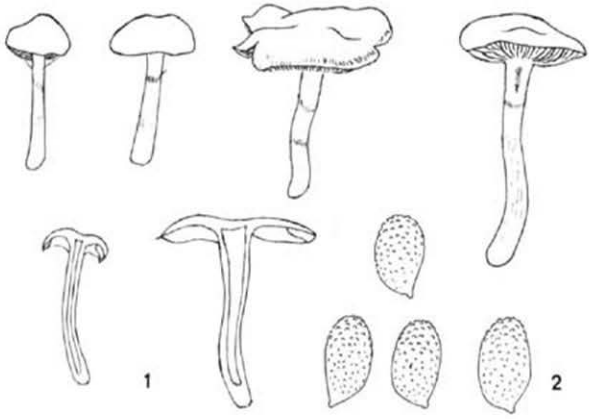
Cortinarius contrarius J. Geesink, *spec. nov.*—Figs. 1, 2

MISAPPLIED NAMES.—*Cortinarius sertipes* Kühn. sensu Svrček *in* Česká Mykol. **22**: 274. 1968. — *Cortinarius flexipes* forma *sertipes* (Kühn.) Kühn. sensu Kühn. *in* Bull. mens. Soc. linn. Lyon **30**: 60. 1961.

Pileus 30–45 mm, primo margine incurvo, fuscus, margine albo fibrose, tum convexus, obtuse umbonatus, levis, circa marginem fragmentis veli albi ornatus, carnosus, hygrophanus, purpureo-brunneus, postremo ruptus. Lamellae pallidae, tum albido-suffuscae, postremo cinnameo-brunneae, primo paulum decurrentes, mox adnatae, latae, subconfertae, acie concolore. Stipes 40–60 × 5–8 mm, primo brunneus, tenuibus zonis albis fugacibus circumdatus et apice lilacino, dein pallido-brunneus sericeo-nitidus, fragmentis veli vix conspicuis. Nullus odor. Sporae 9–10 × 5,5–6 mm, suffuscae, tenuiter verrucosae. Basidia 4-sporigera. Cystidia desunt.

HOLOTYPUS: 'Netherlands, prov. Noord-Holland, Wieringermeer, 18 Nov. 1972, J. Geesink' (L).

[1] The type of *Agaricus flexipes* is lacking from Persoon's herbarium at L.



Figs. 1–2. *Cortinarius contrarius*. — 1. Fruit-bodies (× 1/2). — 2. Spores (× 1250).

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STUDIES IN HYDNOID FUNGI—I

On some genera with hyphal pegs*

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(With six Text-figures)

Mycobonia flava and *Epithele typhae* are described. Two new genera are introduced, viz. *Mycothele* (for *Mycobonia disciformis* Cunn.) and *Epithelopsis* (for *Epithele fulva* Cunn.).

On Mycobonia

When Patouillard (1892) established the genus *Bonia*, he based it on a resupinate species, *B. papyrina*, from Tonkin. In the same publication (p. 49) he remarked that '*Hydnum flavum* Berk. doit être rapporté au genre *Bonia*'. Later he found this generic name to be preoccupied by *Bonia* Balansa (1890, Gramineae) and placed (1894) his *B. papyrina* in the synonymy of *Heterochaete tenuicola* (Lév.) Pat. which according to Bodman (1952) is a synonym of *Heterochaete delicata* (Klotzsch ex Berk.) Pat. In the same year (1894), Patouillard established a new genus, *Mycobonia*, based on *Hydnum flavum*. Some years later, Banker (1906) created the genus *Grandinioides* for the same species, whereas the generic name *Bonia* Pat. was maintained by Hennings (1898: 123) in the first edition of Engler/Prantl, Natürl. PflFamilien, as well as by Killermann (1928: 140) in the second edition of the same work.

Another genus, also typified by *Hydnum flavum*, is *Hirneola* Fr. 1825, introduced as a monotypic genus. In 1848, Fries once more used the generic name *Hirneola*, this time for species belonging to the Auriculariales. To avoid confusion and to save the genus *Hirneola* Fr. 1848, Donk (1941) proposed conservation of *Mycobonia* against *Hirneola* Fr. 1825. This proposal was adopted in 1953, leaving *Mycobonia* the correct generic name for *Hydnum flavum*.

The type species of the genus *Mycobonia* was originally published as a *Peziza* by Swartz in 1788, based on a collection from Jamaica. Later Berkeley (1842) transferred it to *Hydnum* and in 1859 described a very similar species, *H. brunneoleucum* Berk. & Curt. from Venezuela. The latter species is closely related to if not identical with *Mycobonia flava*. *Mycobonia* has remained a rather small genus; only four species names could be found:

* This study was supported by the Netherlands Organization for the Advancement of Pure Research (Z.W.O.).

Mycobonia brunneoleuca (Berk. & Curt.) Pat. 1900,
disciformis Cunn. 1956,
flava (Sw. ex Fr.) Pat. 1894,
winkleri Bres. 1911.

Of *M. brunneoleuca* and *M. winkleri* no material was available, therefore this preliminary study is restricted to the two remaining species.

As defined by its type species, *Mycobonia* is a stereoid fungus with effuso-reflexed or somewhat stipitate and rather thick basidiocarps, hyphal pegs, a dimitic hyphal system, medium-sized basidia, and rather large, ellipsoid and inamyloid spores. The hyphal pegs, i.e. sterile hyphal fascicles projecting beyond the hymenial surface, constitute a curious character. Only a few genera are known to possess this feature: *Epithele*, *Gloiothele*, *Heterochaete*, *Mycobonia* and *Veluticeps*. For some species of *Coriolus* and other genera of polypores hyphal pegs are reported, but these never are such a conspicuous character there. True hyphal pegs are always sterile, also at their base adjacent to the hymenial layer. Contrary to this the teeth of odontioid or hydnoid fungi are always fertile, although in fast growing species the apical part of the teeth may be sterile. As far as I know there has never been described an intermediate form between sterile hyphal pegs and fertile teeth. Up to now the species with hyphal pegs have always been kept apart from other hydnoid species and placed in genera of their own. This generic delimitation is often supported by the presence of other differential characters. Nevertheless the genera with hyphal pegs are more or less closely related to other genera with hydnoid or smooth hymenial surface, and a separation in a family of their own is not justified.

There is an outspoken disagreement among mycologists as to the question to which family the genus *Mycobonia* belongs. According to Donk (1964: 294) this genus belongs to the Stereaceae although he mentioned it to be closely related to *Pseudofavolus* Pat., Polyporaceae. Singer (1962, 1975) placed it in the Polyporaceae: 'The absence of a hymenophore differentiates the genus clearly from other Polyporaceae. However, this genus is not, as may otherwise be expected, related to any "hydnaceous" or "stereaceous" genus.' (1975: 179). His conception was criticized by Smith (1963: 696): 'I think by including *Mycobonia* he has de-emphasized the taxonomic value of the configuration of the hymenophore to an almost ridiculous degree. There can be parallelisms in anatomical structure and hyphal arrangement just as there are for spore ornamentation and pigmentation of the basidiocarp.'

After having studied the microscopical structure of the genus I prefer to leave it in the Stereaceae where it fits very well the characters of the other genera. At least for the moment I cannot decide whether the similarities in hyphal structure really indicate such a close relationship with genera of the Polyporaceae *sensu stricto* as Singer suggested. In my opinion there are more connections with the Stereaceae.

Mycobonia is probably a monotypic genus. The species *M. disciformis* Cunn. has been studied by me and appeared to represent a genus of its own for which I propose the name *Mycothele*.

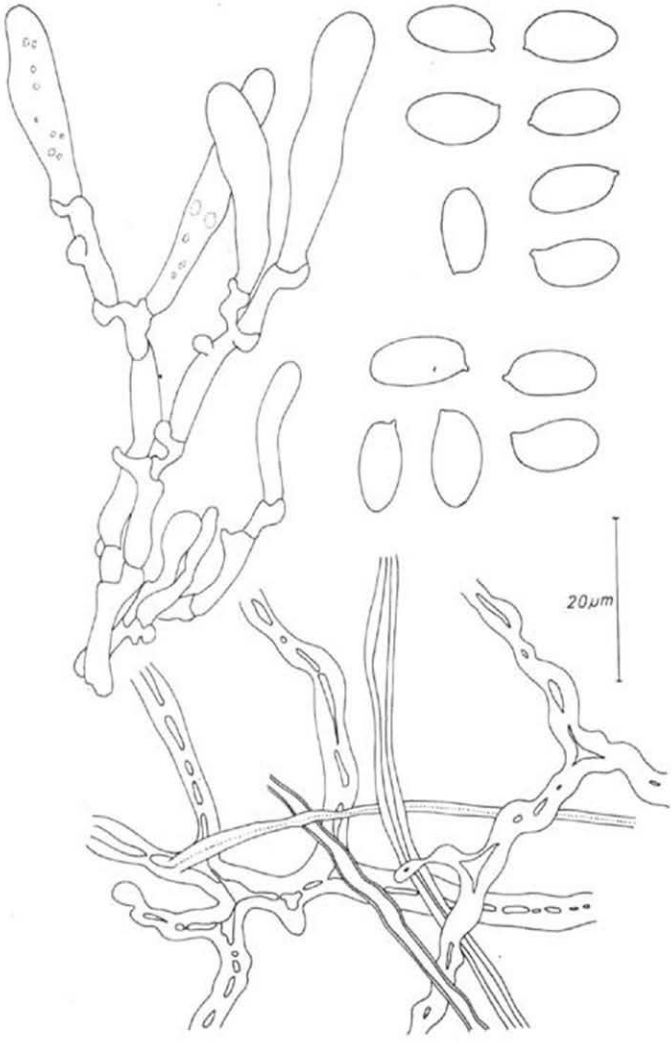

Fig. 1. *Mycobonia flava*, Argentine, *Bettuci-Gómez*. — Basidia. — Spores. — Tramal hyphae.

MYCOBONIA Pat., nom. cons.

Mycobonia Pat. *in* Bull. trimest. Soc. mycol. Fr. **10**: 76. 1894. — Type species: *Peziza flava* Sw. ex Fr. 1822.

Hirneola Fr., Syst. Orb. Veg. 93. 1825 (nom. rejic.); not Fr. 1848; not ∽ Velen. 1939. — *Grandinioides* Banker *in* Mem. Torrey bot. Cl. **12**: 179. 1906.

Basidiocarp pileate, subsessile to short-stipitate, several cm large, about 1–2 mm thick; consistency firm and brittle when dry. Hymenial surface 'hydnoid', with sterile hyphal pegs consisting of thick-walled to almost solid hyphae lacking clamps. Hyphal system dimitic. Generative hyphae hyaline, thin-walled, with clamps. Binding hyphae hyaline to somewhat yellowish, thick-walled to solid. Basidia hyaline, clavate, c. 30–40 μm long, with a basal clamp. Spores hyaline, thin-walled, ellipsoid, c. 10–20 μm long, smooth, inamyloid.

MYCOBONIA FLAVA (Sw. ex Fr.) Pat.—Figs. 1, 2

Peziza flava Sw., Nova Gen. Sp. Prodr.: 150. 1788 (devalidated name). — *Peziza flava* Sw. *ex* Fr., Syst. mycol. **2**: 161. 1822. — *Hirneola flava* (Sw. ex Fr.) Fr., Syst. Orb. Veg.: 93. 1825 (indirect reference). — *Hydnum flavum* (Sw. ex Fr.) Berk. *in* Ann. Mag. nat. Hist. **10**: 380. 1842. — *Bonia flava* (Sw. ex Fr.) Pat. *in* Bull. trimest. Soc. mycol. Fr. **8**: 49. 1892. — *Mycobonia flava* (Sw. ex Fr.) Pat. *in* Bull. trimest. Soc. mycol. Fr. **10**: 77. 1894. — *Auricularia flava* (Sw. ex Fr.) Farlow, Bibl. Index North Am. Fungi **1**: 307. 1905; not ∽ Lloyd 1922. — *Grandinioides flava* (Sw. ex Fr.) Banker *in* Bull. Torrey bot. Cl. **12**: 179. 1906.

Basidiocarp pileate, concavo-convex, subsessile, up to 10×10 cm, c. 0.5–1.8 mm thick (excl. of hyphal pegs), with yellowish brown, reddish brown or dark brown upper surface, with basal part attenuate or short-stipitate; stipe mostly dark, if well developed c. 3 mm wide, broadened to an about 6 mm wide disc-shaped foot on substrate; consistency said to be fleshy to subgelatinous when fresh, firm and brittle when dry. Hymenial surface ochraceous, hydnoid, with densely crowded 50–85 μm wide hyphal pegs projecting 120–180 μm and originating 80–150 μm beneath the hymenial surface; pegs consisting of more or less interwoven hyphae of same kind as in trama (skeletal-like, not or rarely branched) but slightly more pigmented with age; in young basidiocarps hyphal pegs conical or almost cylindrical, but in older basidiocarps apical parts becoming fimbriate. Hyphal system dimitic, with binding hyphae. Hyphae of hymenial layer and trama hyaline to slightly yellow, in hyphal pegs more distinctly yellow. Generative hyphae cylindrical, thin-walled. loosely arranged, 2.5–3.5 μm in diam., with smooth surface; clamps present (but not always easily visible); contents homogeneous or with some small guttules. Binding hyphae sometimes scarcely but more often extensively branched, with hyphal ends thinning out, irregularly cylindrical or torulose, thick-walled to almost solid, loosely arranged, 1.5–5 μm in diam., at some places inflated and up to 20 μm wide, with non-gelatinized walls. In some (young) specimens a layer of thick-walled cylindrical to ellipsoid cystidia-like bodies present c. 80–120 μm under hymenial layer; cystidioid bodies sometimes nearly solid, 25–40×10–15 μm with, one or several apical appendages reaching into hymenial layer and sometimes even slightly projecting. Hymenial cystidia and gloeocystidia lacking. Basidia hyaline, thin-walled, cylindrical when young, irregularly clavate when mature, 26–36×5.5–9 μm, with basal clamp, contents homogeneous, 4-spored. Spores hyaline, thin-walled, ellipsoid, 10–15–20×5–7.5 μm, with distinct apiculus (c. 1 μm long), smooth; contents homogeneous or somewhat guttulate.

REACTIONS.—No part of the basidiocarp is amyloid, dextrinoid, or cyanophilous.

DISTRIBUTION.—From the southern states of North America to Argentine.

MATERIAL STUDIED.—U. S. A., Louisiana, St. Martinsville, 20 Aug. 1898, *A. B. Langlois 2817* (S). — CUBA: Fungi Cub., *Wright 343* (S); Monte Verde, on logs in dense woods, *C. Wright 237* (S). — BRAZIL: Caldas, Regnell (S); S. Leopoldo, 1904, *Rick* (S). — COLOMBIA, distr. Cauca, ad pag. El Tambo, 1700 m, 1 Nov. 1937, *Kjell von Sneidern* (S). — ARGENTINE, Tucumán, Tafí Viejo, 5 Feb. 1965, *Bettuci-Gómez* (ex LPS 32 700) (L).

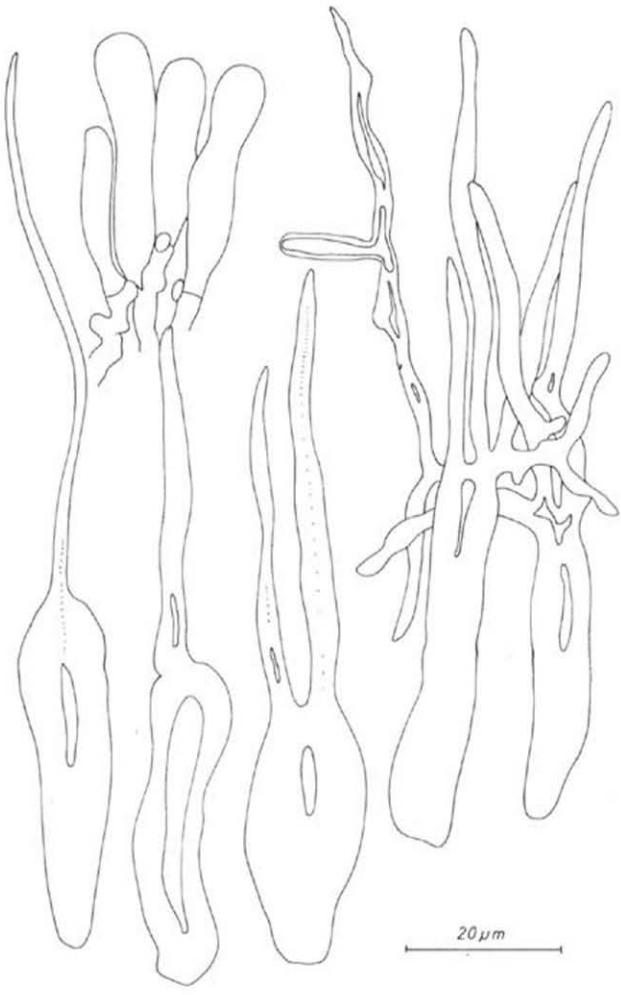

Fig. 2. *Mycobonia flava*, Argentine, *Bettuci-Gómez*. — Tramal 'cystidia'.

According to Martin (1939: 248) the spores are noticeably thick-walled; this could not be confirmed with the present study.

Also according to Martin (1939: 249): 'The presence or absence of a stipe seems to be determined by the accident of position, and especially by the size of the substratum, forms growing on small twigs, as was the specimen first studied by Berkeley, showing a greater tendency to be sessile than applanate sporophores growing laterally on large trunks.'

I do not know whether the cystidia-like bodies are formed by generative hyphae or not, but it seems not impossible since I never could find a connection with the thick-walled binding hyphae.

Mycothele Jülich, *gen. nov.*

Carposoma resupinatum, membranaceum vel ceraceum, hydnoideum, aculeis sterilibus ex trama proventis. Systema hypharum monomiticum. Hyphae hyalinae, fibulatae. Basidia hyalina, clavata, circa 40–50 μm longa. Sporae hyalinae, tenui-tunicatae, satis magnae (circa 8–12 μm), inamyloideae.

TYPUS: *Mycobonia disciformis* Cunn. 1956.

Basidiocarp resupinate, effused, membranaceous to ceraceous. Hymenial surface hydnoid; teeth sterile, of tramal origin. Hyphal system monomitic. Hyphae hyaline, with clamps. Basidia hyaline, clavate, about 40–50 μm long. Spores hyaline, thin-walled, rather large (about 8–12 μm), inamyloid.

Mycothele disciformis (Cunn.) Jülich, *comb. nov.*—Fig. 3

Mycobonia disciformis Cunn. *in* Trans. R. Soc. N.Z. **83**: 635. 1956 (basionym).

Basidiocarp annual, resupinate, disciform, only the central part attached to the substrate, up to 10 mm in diam., about 0.5 mm thick, adnate; consistency firm-membranaceous to ceraceous; margin determinate, free from the substrate but not involute; exterior part brownish; rhizomorphs or hyphal strand lacking. Hymenial surface hydnoid, with acute, sterile, up to 1 mm long, cream-coloured teeth of tramal origin. Hyphal system monomitic. Hyphae hyaline, thin-walled, cylindrical or slightly torulose, with clamps at all septa; contents homogeneous or granular; large masses of crystals present especially in teeth. Cystidia and gloeocystidia lacking. Basidia hyaline, stalked-clavate, 37–45–55 × 7–9–11 μm, thin-walled, with clamp at base, with granular contents, with four subulate, slightly curved sterigmata 7–10 × 1.5–2 μm. Spores hyaline, broadly ellipsoid to subglobose, thin-walled, smooth, 8–12 × 6.5–9 μm, with rather large apiculus and homogeneous or granular contents, not amyloid, dextrinoid, nor cyanophilous.

HABITAT & DISTRIBUTION.—Only found on *Rhopalostylis sapida*, an endemic species of Palmae in New Zealand. Cunningham cites eight specimens.

NOTE.—Contrary to Cunningham's description I found the large masses of crystals mostly inside the tissue of the teeth.

On Epithele

The genus *Epithele* was established by Patouillard in 1900 for resupinate species with flocculent to hypochnoid basidiocarps and an even hymenial surface with scattered, short, sterile spines originating in the trama. He mentioned two species: in the first place '*Epithele typhae* (Fuckel) Pat.'; the second one was *E. dussii* Pat. In the treatment of Bourdot & Galzin (1928) three species are mentioned (*E. galzini Bres.*, *E. typhae* (Pers.) Pat., *E. ochracea* Bres.).

The genus remained small, until Boquiren (1971) published a revision, recognizing 13 species. As the principal character she considered the presence of hyphal pegs on

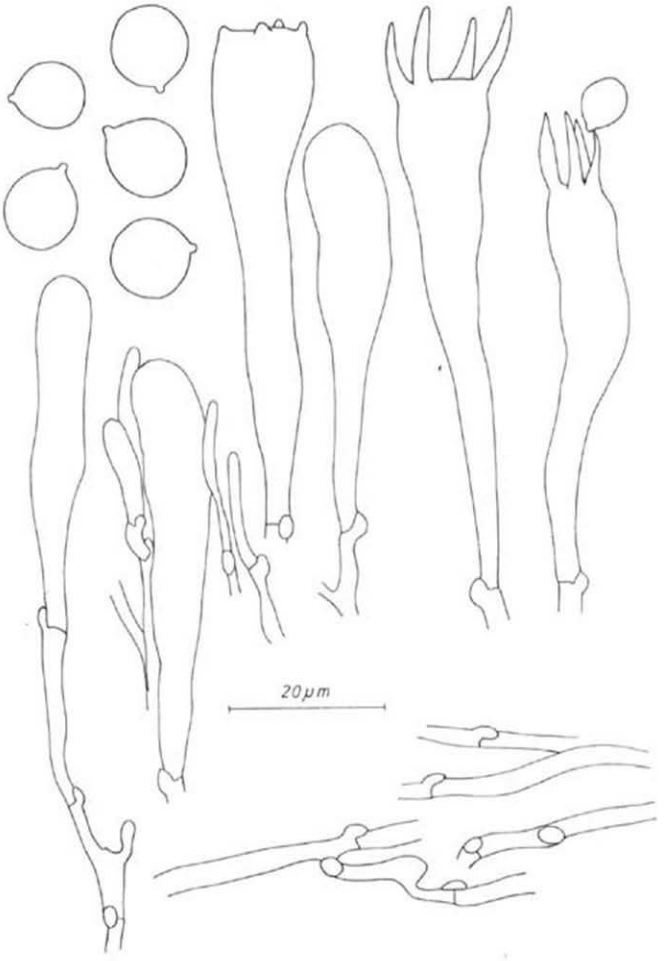

Fig. 3. *Mycothele disciformis*, New Zealand, type.

the hymenial surface, although she claimed (1971: 938) that other characters are also significant in delimitating the genus: 'texture and manner of growth of the fructification, nature of the subicular hyphae, and morphology of the basidia, sterigmata, and basidiospores.' Boquiren combined with *Epithele* two species for which both Oberwinkler (as *Tubulicium*; 1965: 53) and Parmasto (as *Tubulixenasma*; 1965: 231) had created a special genus, characterized by rather short basidia and multirooted lyocystidia.

A careful study of the type species, *E. typhae* showed me that this species is quite different from most other species of *Epithele*. It has much more in common with the typical species of *Radulomyces* (like *R. confluens*, *R. molaris*, *R. rickii*), but differs from these in its hyphal pegs and the large and ultimately thick-walled spores.

A revision of the genus *Epithele* is in preparation, but one species (*E. fulva* Cunn.) is so aberrant that it can already be removed from *Epithele* and placed in a genus of its own.

EPITHELE (Pat.) Pat.

Hypochnus sect. *Epithele* Pat. *in* Bull. trimest. Soc. mycol. Fr. **15**: 202. 1899. — *Epithele* (Pat.) Pat., Essai tax. Hymén. 59. 1900. — Type species: *Epithele typhae* (Pers.) Pat.

Basidiocarp annual, resupinate, effused, several cm large, soft-membranaceous; context homogeneous; hymenial surface whitish to cream-coloured, even, penetrated by sterile hyphal fascicles (hyphal pegs) originating in trama; margin pale, indeterminate, thinning out; rhizomorphs and hyphal strands lacking. Hyphal system monomitic. Hyphae hyaline, cylindrical to torulose, often rather indistinct, more or less thin-walled; clamps present. Cystidia lacking. Basidia (podobasidia) hyaline, stalked-clavate, rather large, thin-walled, with smooth surface, with basal clamp, and with four subulate, large sterigmata. Spores hyaline to slightly yellowish, ellipsoid to fusiform, rather large, thick-walled when mature (up to 1.0 μm), with smooth surface, non-amyloid.

SUBSTRATE.—Saprophytic on plant debris.

The systematic position of the genus is uncertain. It somewhat resembles the genus *Jaapia* with regard to the spores, but seems related to *Radulomyces* with regard to the basidia.

EPITHELE TYPHAE (Pers.) Pat.—Figs. 4, 5

Athelia typhae Pers., Mycol. europ. **2**: 84. 1822. — *Thelephora typhae* (Pers.) Fr., Elench. Fung. **1**: 226. 1828. — *Corticium typhae* (Pers.) Desm., Plantes crypt., Ed. I, No. 2161. 1851. — *Hypochnus typhae* (Pers.) Pat., Tab. anal. fung. **2**: 31. 1887. — *Kneiffia typhae* (Pers.) Pat. apud Pat. & Lag. *in* Bull. trimest. Soc. mycol. Fr. **9**: 132. 1893. — *Epithele typhae* (Pers.) Pat. ("Fuck."), Essai tax. Hymén.: 59. 1900.

Basidiocarp resupinate, membranaceous, 100–150 μm thick, adnate; hymenial surface cream-coloured, odontioid, with sterile hyphal pegs (100–200 μm long), slightly cracked when dry; margin white, distinct, slightly fimbriate, narrow. Hyphae hyaline, torulose, rather indistinct, 1–2 μm in diam., thin-walled, with smooth surface, with clamps at all septa; contents homogeneous or somewhat guttulate. Cystidia lacking. Paraphysoid hyphae between basidia present, of hymenial to subhymenial origin, hyaline, flexuous-cylindrical, 1.5–2.5 μm in diam., thin-walled, smooth, clamped, with homogeneous or slightly guttulate contents, not projecting; apical part easily detaching and perhaps acting as conidium. Basidia (podobasidia) hyaline, flexuous-cylindrical to stalked clavate, 55–70 × 8–11 μm, with smooth surface, with basal clamp, with homogeneous or guttulate contents, and with four large, subulate, slightly curved sterigmata (8–13 × 2–3 μm). Spores hyaline, but slightly yellowish when fully mature, narrowly ellipsoidal to fusiform,

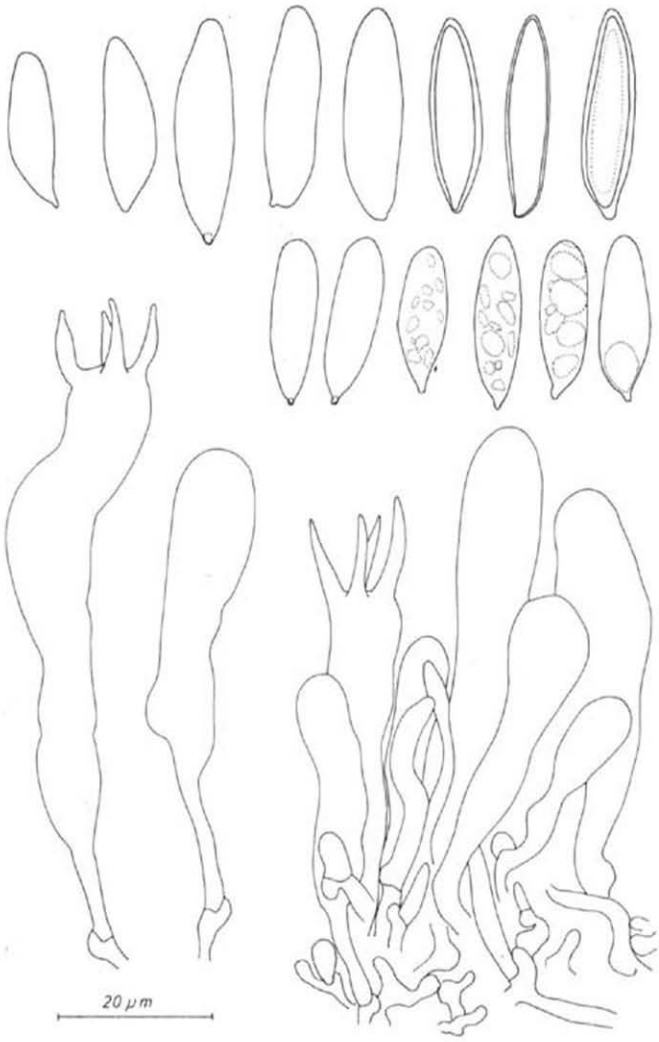

Fig. 4. *Epithele typhae*, Germany, *Jülich 1534*.

with distinct, often refractive apiculus, 16–28×5.5–8 µm, not glued together, thin-walled, only late in development (perhaps after detachment) thick-walled (up to 1.0 µm), with smooth surface, contents often guttulate, especially when young, not seldom with homogeneous contents when mature, non-amyloid.

REACTIONS.—No part of basidiocarp amyloid, dextrinoid, or cyanophilous.

SUBSTRATE.—Saprophytic on old leaves and stems of Cyperaceae (*Scirpus*, *Carex*, *Typha*).

DISTRIBUTION.—In Europe only known from Middle- and South-Europe.

MATERIAL STUDIED.—GERMANY: Hessen, Weissenborn, Graburg, 24 Sept. 1968, *W. Jülich 1534* (herb. Jülich).

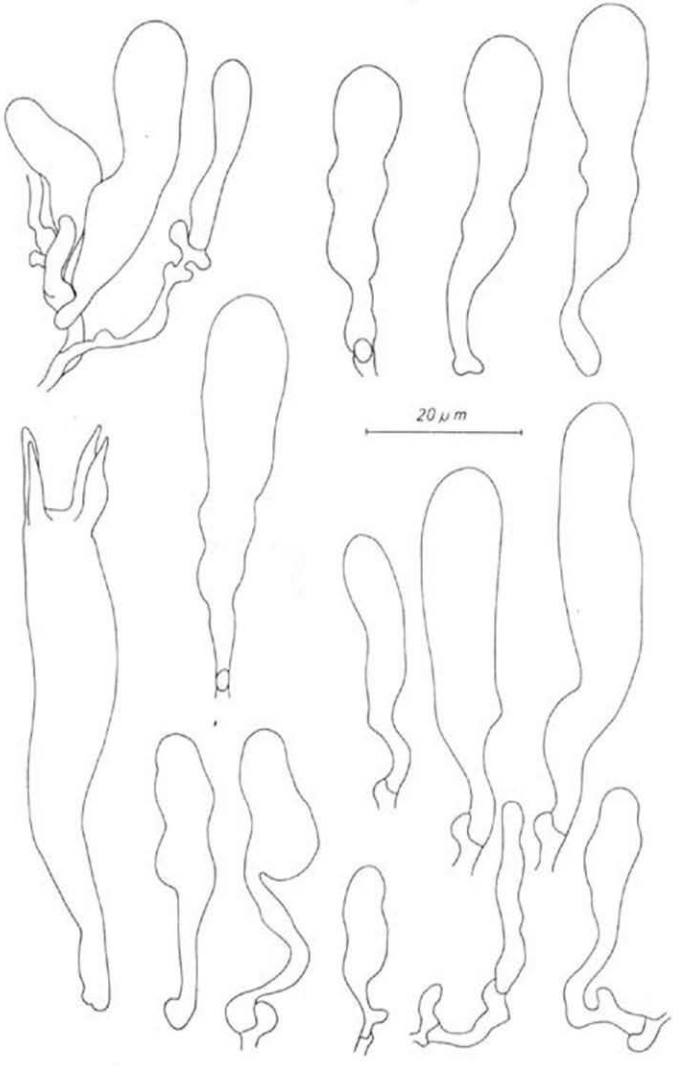

Fig. 5. *Epithele typhae*, Germany, *Jülich 1534*. — Basidial ontogeny.

Epithelopsis Jülich, *gen. nov.*—Fig. 6

Carposoma resupinatum, effusum, adnatum, membranaceum, hydnoideum, fasciculis sterilibus ex trama proventis. Systema hypharum dimiticum. Hyphae generativae hyalinae, distinctae, incrassate tunicatae, fibulatae; hyphae skeleticae hyalinae, crasse-tunicatae. Gloeocystidia nonnumquam adsunt. Basidia hyalina, clavata, tetraspora, fibulata. Sporae magnae, hyalinae, late ellipsoideae, incrassate tunicatae, valde cyanophilae.

TYPUS: *Epithele fulva* Cunn. 1956.

Basidiocarp annual, resupinate, effused, several cm large, adnate; consistency membranaceous; context homogeneous; hymenial surface pale coloured, odontioid, with sterile hyphal pegs composed of hyaline skeletal hyphae. Hyphal system dimitic. Generative hyphae hyaline, cylindrical, loosely arranged, distinct, thick-walled (at least the basal ones), with clamps. Skeletal hyphae hyaline, thick-walled. Gloeocystidia may be present. Basidia hyaline, clavate, 4-spored, with basal clamp. Spores large, hyaline, somewhat thick-walled, strongly cyanophilous.

Epithelopsis fulva (Cunn.) Jülich, *comb. nov.*

Epithele fulva Cunn. *in* Trans. R. Soc. N.Z., **83**: 631. 1956 (basionym).

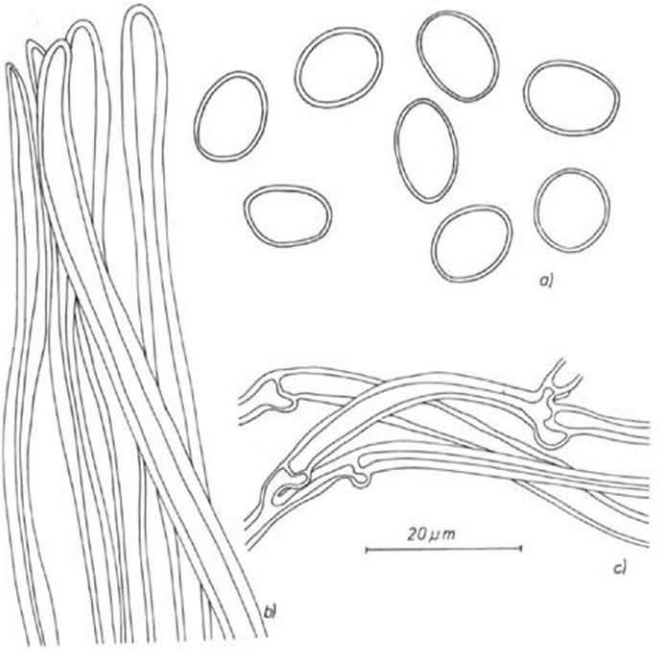

Fig. 6. *Epithelopsis fulva*, New Zealand, type.

Basidiocarp resupinate, up to 15 cm large, up to 250 μm thick, membranaceous, adnate, separable in small pieces; context homogeneous, cream-coloured; hymenial surface at first white, later cream-coloured to ochraceous, odontioid, with sterile hyphal pegs (200–500×30–100 μm); margin concolorous, indistinct, thinning out, arachnoid; rhizomorphs and hyphal strands lacking. Hyphal system dimitic. Generative hyphae hyaline, cylindrical, distinct, loosely arranged in subhymenium and trama, branching near septa, 2.5–6 μm in diam., thin-walled in subhymenium, thick-walled in trama (0.8–1.5 μm), smooth; clamps always present; contents homogeneous. Skeletal hyphae hyaline, cylindrical, loosely arranged, 3–5.5 μm in diam., thick-walled (0.8–2.0 μm), smooth, often with secondary septa. Gloeocystidia scanty, of subhymenial to tramal origin, cylindrical to moniliform, 60–110×5–6 μm. Basidia hyaline, clavate, 25–35×6–8 μm, thin-walled, smooth, with basal clamp, with four sterigmata. Spores hyaline, broadly ellipsoidal, with small apiculus, 10–12×5–8 μm, not glued together. thick-walled (c. 0.5 μm), smooth, not amyloid but strongly cyanophilous.

REACTIONS.—Spores strongly cyanophilous; no other part of basidiocarp is amyloid, dextrinoid, or cyanophilous.

SUBSTRATE.—On decorticated rotting wood, rarely on bark (Cunningham, 1956).

DISTRIBUTION.—New Zealand.

MATERIAL STUDIED.—NEW ZEALAND: Taranaki, Dawson Falls, Mt. Egmont, 850 m, Jan. 1953, *J. M. Dingley*, on *Schefflera digitata* (PDD 14245) (K; type).

NOTE.—Contrary to Cunningham (1963) I found the hyphal system to be dimitic.

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REDESCRIPTION OF RHODOPHYLLUS SCABIOSUS (FR.) QUÉL.

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(With 10 Text-figures)

On September 21st 1975 Mr. J. Geesink, Den Helder, found a few carpophores of a species of *Rhodophyllus* in the Wieringermeer and mailed them to the Rijksherbarium at Leiden for identification. Although the carpophores arrived in fragments Dr. C. Bas was able to identify them as *Rhodophyllus jubatus* (Fr.) Quél. He noticed, however, that the spore sizes are smaller (6.6–7.4 × 5.6–5.9 μm) than those mentioned for this species in the literature.

In January 1976 we showed Dr. Bas the dried and intact material of five well-developed specimens, obviously of the same species, that we had found on September 25th 1975 under oak shrubs at Overveen. Although the spore sizes of these specimens are also smaller (7.2–8.1 × 5.4–6.3 μm) than those given in the literature for *R. jubatus* and although the lecythiform cheilocystidia differ from those depicted by Kühner & Romagnesi (1953: 198, fig. 277) for the 'Jubati typiques', we also had identified the specimens as *R. jubatus*.

While comparing the dried material of the two collections mentioned above with the dried material of a collection found by Dr. Bas on October 20th 1963 in the dunes of Oostvoorne and marked *R. jubatus* in the Rijksherbarium, we noticed further that the caps of the above two collections are coarser fibrillous than the caps of the Oostvoorne collection, the white underlayer showing distinctly between the bundles of fibres. We then decided to carry out a close examination of all the available material marked *R. jubatus* present in both the Rijksherbarium (3 collections) and our own herbarium (7 collections, among which three from Scotland and one from Wales). All 10 collections are accompanied by elaborate descriptions of the macroscopical characters.

As it turned out, the specimens of the four most recent collections (Voorschoten, 12 Sept. 1974; Santpoort, 20 Sept. 1974; Wieringermeer, 21 Sept. 1975; Overveen, 25 Sept. 1975) differ in four respects from those of the other six collections, which sufficiently answer the identification of *R. jubatus*.

The four recent collections have the following distinctive characters:

1. The network of dark brown fibres and bundles of fibres on the caps is distinctly coarser, conspicuously showing the white underlayer; this is mentioned especially in the descriptions of the fresh material of three of the four collections and it is still visible on the dry material of the fourth. The fibrous network, moreover, is more squamulose, especially at the centre.

2. The stems distinctly broaden towards their base, either very gradually or only at

the, consequently subbulbous, base. (In the other six collections the stems are cylindric.)

3. The spores are smaller and more isodiametric (Fig. 4; mean sizes 7.4–7.6 × 6.1–6.2 μm) than those of the other six collections (Fig. 5; mean sizes 8.6–9.1 × 6.3–6.7 μm)[1]. It should be mentioned that with regard to the length of the spores the latter figures are somewhat lower than those given in the literature for *R. jubatus* by J. E. Lange (1936: 93), Favre (1948: 47), and Moser (1967: 154), viz. 9–10.5 × 5–6.5 μm; whereas Ricken (1913: 283), Bresadola (1929: pl. 551[I]) and Kühner & Romagnesi (1953: 199) give still somewhat larger spores (up to 9–12 × 6–7 μm).

4. The cheilocystidia are tibiform to lecythiform and the capitula often somewhat elongate or even rhomboid, frequently carrying a very short (1/2–1 μm) to long (up to 7.5 μm) appendix. Those in the other six collections consist of both clavate and lecythiform cells often with up to 17 μm large globose capitula (Figs. 9, 10).

These four very distinct differences between the carpophores of the four recent collections and those of the six earlier ones led us to conclude that the former belong to a species different from *R. jubatus* (Fr.) Quél. A search of the literature disclosed that the four collections represent *R. scabiosus* (Fr.) Quél., a species that has more or less disappeared from recent literature.

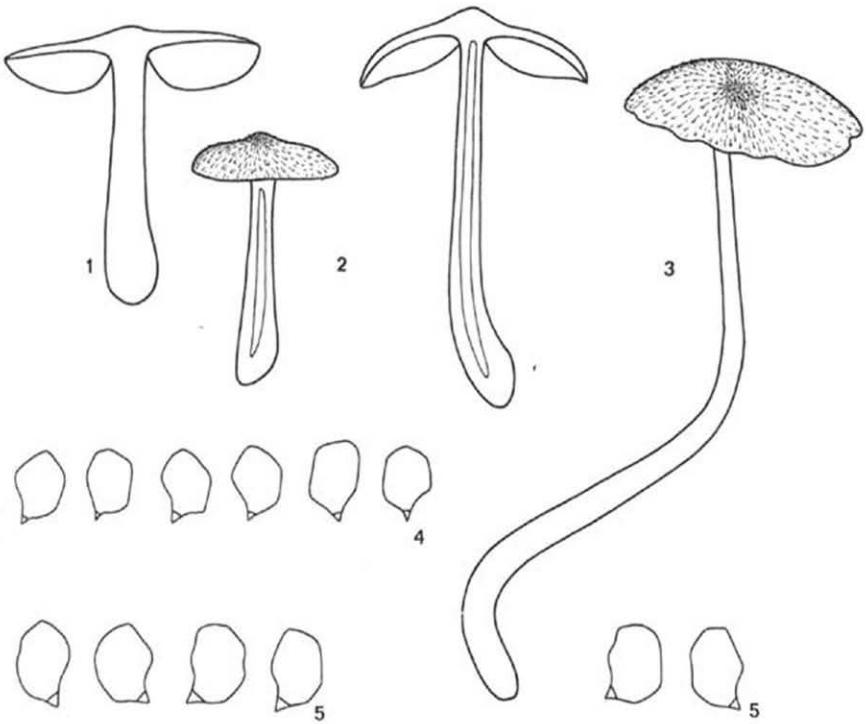
RHODOPHYLLUS SCABIOSUS (Fr.) Quél.—Figs. 1–4, 6–8

Agaricus scabiosus Fr., Spicil. Plant. neglect.: 3. 1836 (Epicr.: 145, 1838; Monogr.: 272, 1863; Hym. europ.: 193, 1874). — *Entoloma scabiosum* (Fr.) Quél. *in* C. r. Ass. franç. Av. Sci. (Grenoble, 1885) **14**(2): 445. 1886. — *Rhodophyllus scabiosus* (Fr.) Quél., Ench. Fung.: 58. 1886.

Cap 22–65 mm in diam., in early stages plano-conical, soon convex to plano-convex, with very distinct but sometimes only small umbo, entirely coarsely fibrillose-squamulose, with blackish brown to very dark brown (Munsell 10 YR 2/2, 3/2; 7.5 YR 4/2) bundles of fibres and appressed to erect squamules strongly contrasting with the whitish flesh showing in between, tomentose-scaly at umbo, neither striate nor hygrophanous. Veil absent. Gills rather crowded, ventricose, emarginate to very narrowly adnate, 4–6 mm broad, broadest part close to stem, at basal half (as well as interlamellar surface of cap) distinctly veined, in early stages pinkish grey (M. 7.5 YR 6/2), at maturity brownish pink (M. 5 YR 5/3; 2.5 YR 4/4, 5/4); edge white to sometimes concolorous. Trama of 'washed' gills under binocular lens pale brown (M. 10 YR 7/4), paler (M. 10 YR 7/3) towards edge. Stem 30–65(–100) × 2.5–6 mm, either gradually thickening towards base or subbulbous (base 3–10 mm wide), sometimes flattened because of longitudinal groove on either side, brownish but paler than cap (M. 7.5 YR 4/2), whitish at base, longitudinally fibrillose-striate, hollow, not pruinose at apex. Flesh of cap in centre 1–3.5 mm thick, whitish to very pale greyish brown; flesh of stem whitish. Smell and taste indistinct, not farinaceous.

Spores angular, almost isodiametric, 7.2–8.1(–8.6) × 5.4–6.8(–7.2) μm (mean values 7.4–7.6 × 6.1–6.2 μm), with large hilar appendix, practically colourless under microscope. Basidia 30–56 × 9–10 μm, 4-spored, clampless. Pleurocystidia absent. Cheilocystidia fairly scarce to locally numerous, intermixed with basidia, tibiform to lecythiform, 27.5–55(–67.5) × 2.5–17.5 μm, with 2.5–7.5(–10) μm wide capitulum

[1] Of each collection 20 spores have been measured.



Figs. 1–4. *Rhodophyllus scabiosus*. — 1–3. Habit sketches (×1). — 1. 12 Sept. 1974. — 2. 20 Sept. 1974. — 3. 25 Sept. 1975. — 4. Spores (×1212), 25 Sept. 1975.
Fig. 5. *Rhodophyllus jubatus*, 20 Oct. 1963. — Spores (×1212).

either globose with or without a minute apical protuberance (1/2–1 μm), or globose to rhomboid with small to long (1–7.5 μm) apical appendix, intermixed with a very small number of sublageniform, subfusoid or subcylindric, small and hardly noticeable non-capitate cheilocystidia often with thin and pointed neck and very acute apex (30–45×5–10 μm, at apex –2 μm); all cheilocystidia colourless and thin-walled, but some capitula slightly thick-walled and rarely covered with a thin film of mucus. Hymenophoral trama regular, composed of colourless, 3.2–14.4 μm wide hyphae and scattered, broad, ellipsoid cells, 11–24×8–16 μm, without incrustations. Cap cuticle consisting of long hyphae usually constricted at septa, made up of cells measuring 35–150(–300)×10–25 μm, usually colourless but terminal 1–3 ellipsoid to obovoid cells very often brown owing to vacular, diffuse or coagulated pigment. Clamps absent.

HABITAT.—On rich (sandy) humus in deciduous woods (*Quercus*, *Fraxinus* or mixed) especially at inland side of dunes. Rare.

COLLECTIONS EXAMINED.—NETHERLANDS, prov. Noord-Holland: Wieringermeer, Robbenoord, 21 Sept. 1975, *J. Geesink* (L); Santpoort, estate 'Duin en

Kruidberg', 20 Sept. 1974, *E. Kits van Waveren* (herb. E.K.v.W.); Overveen, estate 'Elswout', 25 Sept. 1975, *E. Kits van Waveren* (herb. E.K.v.W.); prov. Zuid-Holland: Voorschoten, estate 'ter Horst', 12 Sept. 1974, *M. E. Noordeloos* (L).

Fries first described *Agaricus (Entoloma) jubatus* (1821: 196) and later *A. (Entoloma) scabiosus* (1836: 3; 1838: 145), both species belonging to the group *Leptonidei* ('pileus absolute siccus, sed flocculosus, subsquamosus nec hygrophanus') of the subgenus *Entoloma*. He obviously regarded them as two different but closely related species, as in his publications (1838: 145; 1863: 272; 1874: 193) *A. scabiosus* is always followed immediately by *A. jubatus*. Fries regarded *A. jubatus* as quite a common species, but *A. scabiosus* he found only once (be it excellently developed) so that he regretted not knowing about its variability.

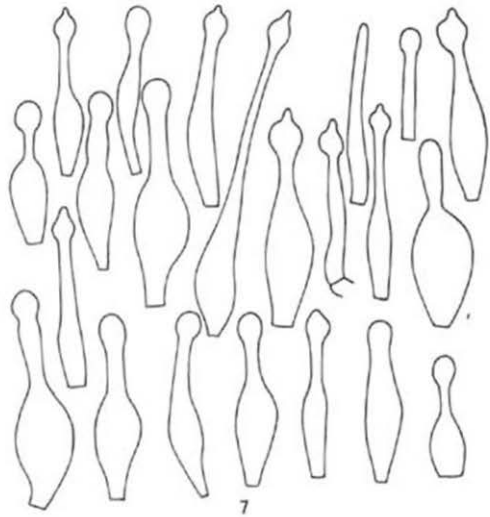
Since Fries, *Rhodophyllus (Entoloma) scabiosus* has virtually disappeared from the literature, possibly because of its rarity. The species is mentioned only by Quélet (1886a: 445, 1886b: 58, and 1888: 183), Ricken (1913: 284) and Bresadola (1929: pl. 550). Kühner & Romagnesi (1953: 200, note 11), giving a short description obviously based on Fries, state that they have never come across this species.

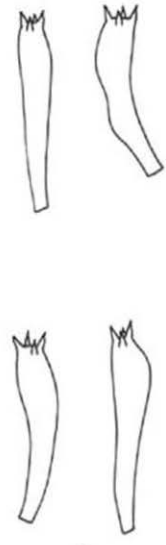
Adopting the rather elaborate descriptions of both *A. scabiosus* and *A. jubatus* in Fries' Monografia (1863: 272) as a basis for comparison, the two species differ as follows:

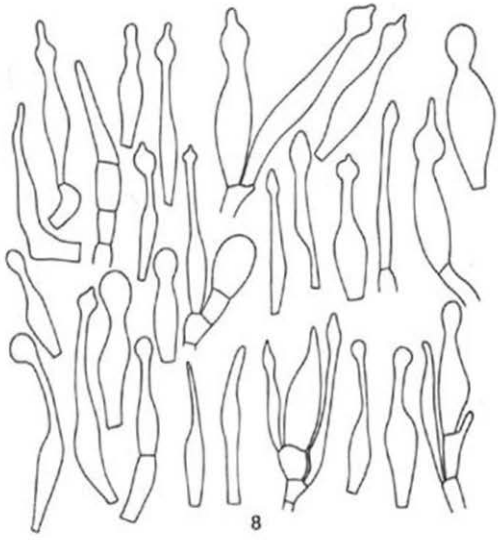
1. Fries describes *A. scabiosus* as a much larger species than *A. jubatus* but his figures are not very convincing: for *A. scabiosus* stem 75×4.5–7 mm and cap 50 mm in diam., for *A. jubatus* stem 50–75 ×4.5–7 mm and cap 25–50 mm 'et ultra latus.' In our four collections of *R. scabiosus* the sizes for the cap were 22–65 mm, those for the stem 30–100×2.5–6 mm, whereas in our six collections of *R. jubatus* these figures were 14–40 mm for the cap and 30–80×3.5 mm for the stem.

2. The shape of the cap is the same for both species but the structure of their surfaces is distinctly different. For *A. scabiosus* Fries describes the cap as having its entire surface rough from floccose acute, erect, crowded papillae. In Epicrisis (1838: 145) and Hym. europ. (1874: 193) the papillae are called 'squamis papillosis'. For *A. jubatus* the surface is described as floccose-squamose and/or fibrillose. With this in mind it is significant that we described the cap of our 1974 collection as 'densely minutely scaly by black-brown erect scales, entire surface covered with dense network of black-brown fibres, bundling into small scales on a white background' and the cap of our 1975 collection as 'adpressed minutely scaly by very dark brown minutely warty fibres on a white underlayer'. On the other hand we described the surface of the caps of our six collections of *R. jubatus* as finely woolly and only the umbo in four out of the six collections as minutely tomentose-scaly.

3. In Monografia Fries describes the colour of the cap of *A. scabiosus* as 'murino-fuligineus', in Hym. europ. as 'fuligineus', whereas in all his descriptions of *A. jubatus* the cap is simply called 'murino' (mouse-grey). In three out of our four collections of *R. scabiosus* the colour of the fresh cap is described as very dark greyish brown or even black-brown (particularly at the umbo), whereas in the six collections







Figs. 6–8. *Rhodophyllus scabiosus*. — 6. Basidia (×575), 25 Sept. 1975. — 7, 8. Cheilocystidia (×575). — 7. 25 Sept. 1975. — 8. 20 Sept. 1974.

of *R. jubatus* the colour was merely called greyish brown or dark greyish brown. On examination of the dried material the difference was even more pronounced. The colour of the finely radially fibrillose top layer of the cap in *R. jubatus* is bronze-brown, whereas the colour of the coarser fibrillose network in *R. scabiosus* is distinctly darker.

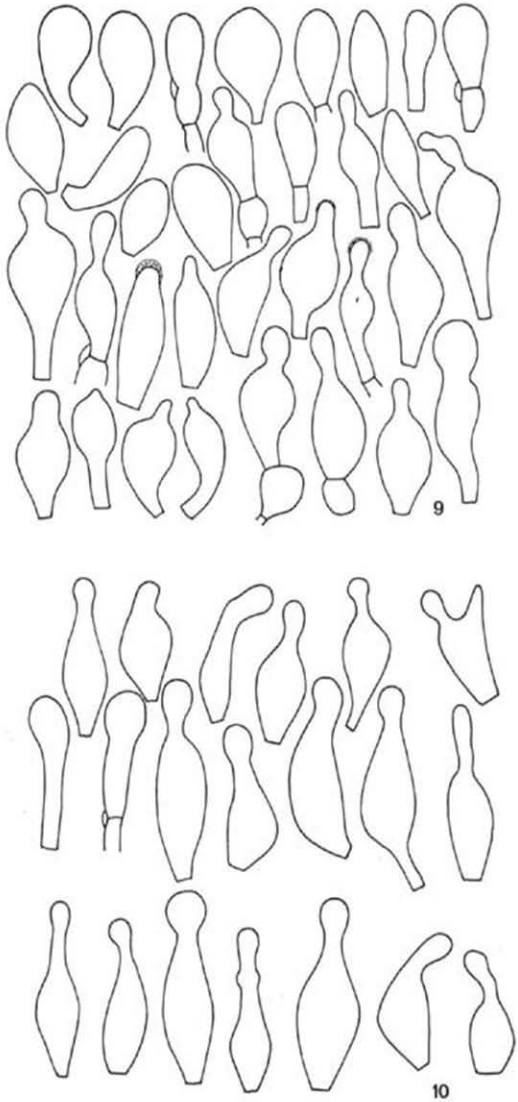
4. Fries describes the colour of the gills of *A. scabiosus* as whitish, then grey flesh-coloured, but those of *A. jubatus* as at first dark smoke-coloured, not greyish brown, later dark smoke-coloured, becoming purplish. This tallies closely with our observations on both species. The colour of the gills in our four collections of *R. scabiosus* varied from pale pinkish grey (M. 7.5 YR 6/2) to reddish brown (M. 2.5 YR 4/4, 5/4; 5 YR 5/3), whereas in all six collections of *R. jubatus* the colour was described as fairly to strikingly greyish brown with hardly a trace of pink (only for the collection of 10 Sept. 1963 were the Munsell charts used in describing the colour of the gills: 10 YR 4/3, 4/2=dark brown).

5. With Fries the characters of the stem do not differ significantly for the two species (hollow, surface fibrose and brown). In Hym. europ. the stem of *A. scabiosus*, however, is called 'subaequali', which must indicate that it becomes thicker towards its base, as in none of the species of this group do the stems become thicker towards the apex. This is a most interesting point as in all four of our collections of *R. scabiosus* the stems either gradually became thicker towards their base or were even subbulbous. The stems of the specimens of our six collections of *R. jubatus* were always cylindric.

6. For *A. jubatus* Fries never mentioned fragility of the carpophores, but for *A. scabiosus* he stated that the whole carpophore is extremely fragile ('totus fungus admodum fragilis', the latter word even in italics). This again tallies very well with our four collections of *R. scabiosus*. The specimens mailed by Mr. Geesink to the Rijksherbarium, although carefully packed, arrived in fragments, while most of the specimens from our rich collection of Sept. 25th 1975 had been partly or even considerably damaged in the field.

Quélet (1886a: 445; 1886b: 58, and 1888: 183) gives descriptions of what he first calls *Entoloma*, later *Rhodophyllus scabiosus*, which tally sufficiently with those given by Fries. However, he adds spore sizes (10–12 μm) which are larger than those we found in our material. Ricken (1913: 284) gives an excellent description of *Entoloma scabiosus* which fully corresponds with the description given above, adding as a new feature that the spores can be more or less isodiametric: 'eiförmig-viereckig, 8–10×6–8 μ auch rundlich 7–8 μ (Herpell)'.

Bresadola (1929) gives descriptions and coloured plates of both *Entoloma scabiosum* (pl. 550) and *E. jubatum* (pl. 551). The fruit-bodies of his *E. scabiosum* are described and depicted with a strongly sulcate-striate, cylindrical to subcylindrical stem and its spores are said to measure 10–13×6–8 μm, the plate indeed showing strongly elongate spores. On account of these three characters, but especially the size and shape of the spores, we believe that *E. scabiosum* sensu Bresadola does not represent the species we described above, although the scaliness, the colour of the cap and the



Figs. 9, 10. *Rhodophyllus jubatus*. — Cheilocystidia (×575). — 9. 20 Oct. 1963. — 10. 22 Sept. 1967.

colour of the gills tally well with Fries' concept of *Agaricus scabiosus* and with our four collections of this species. Bresadola himself states that *Entoloma scabiosum* as he described and depicted it is close and similar to *E. jubatum* but distinguishable by its grooved stem and much more angular spores, and that it should be regarded as a variety of *E. jubatum*.

In literature there is, however, some doubt about the identity of *E. jubatum* sensu Bresadola (e.g. Favre, 1948: 49), probably on account of the rather strongly squamulose cap. Because of the relatively pale colour of the cap ('griseus vel griseo-murinus') and the fairly large spores (9–11 × 6.–7 μm), however, it is certainly not conspecific with *Rhodophyllus scabiosus* as described above.

We have not studied material of Möller's *Entoloma fusco-tomentosum* from the Faeröes, a species certainly closely related to both *Rhodophyllus jubatus* and *R. scabiosus*. From Möller's description (1945: 251) and particularly his plate 3c we gather that the surface of the cap is chiefly tomentose, not outstandingly scaly, and that no white underlayer is showing between bundles of fibres. On account of these characters of the cuticle and the habitat (in grass on slopes) we suppose that *R. fusco-tomentosus* is not conspecific with *R. scabiosus*, although it has in common with this species the size and shape of the spores (8–9 × 6–7 μm), the clavate base of the stem, and the very dark brown cap. If, however, Möller's species would turn out to be conspecific with *R. scabiosus* its name would fall into the synonymy of the latter species.

In conclusion we believe we have rediscovered Fries' *Agaricus scabiosus*, renamed *Rhodophyllus scabiosus* by Quélet (1886: 85). As a new characteristic of this species Ricken (1913: 284) added its small and almost isodiametric spores, and we were able to add as another new characteristic the peculiar shape of the tibiform and lecythiform cheilocystidia, of which the globose, ellipsoid or rhomboid capitula often carry a subcylindric appendix at the top.

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E. B. G. Jones (Ed.), *Recent advances in aquatic mycology*. (Elek Science, London, 1975). Pp. 749, illustr. Price: £ 21.00.

In 27 chapters by as many authors a review and evaluation is given of the work on aquatic fungi, freshwater as well as marine, over the past 15 years. Many aspects like morphology (including fine structures), taxonomy, ecology, physiology, economic importance, etc., are given due attention.

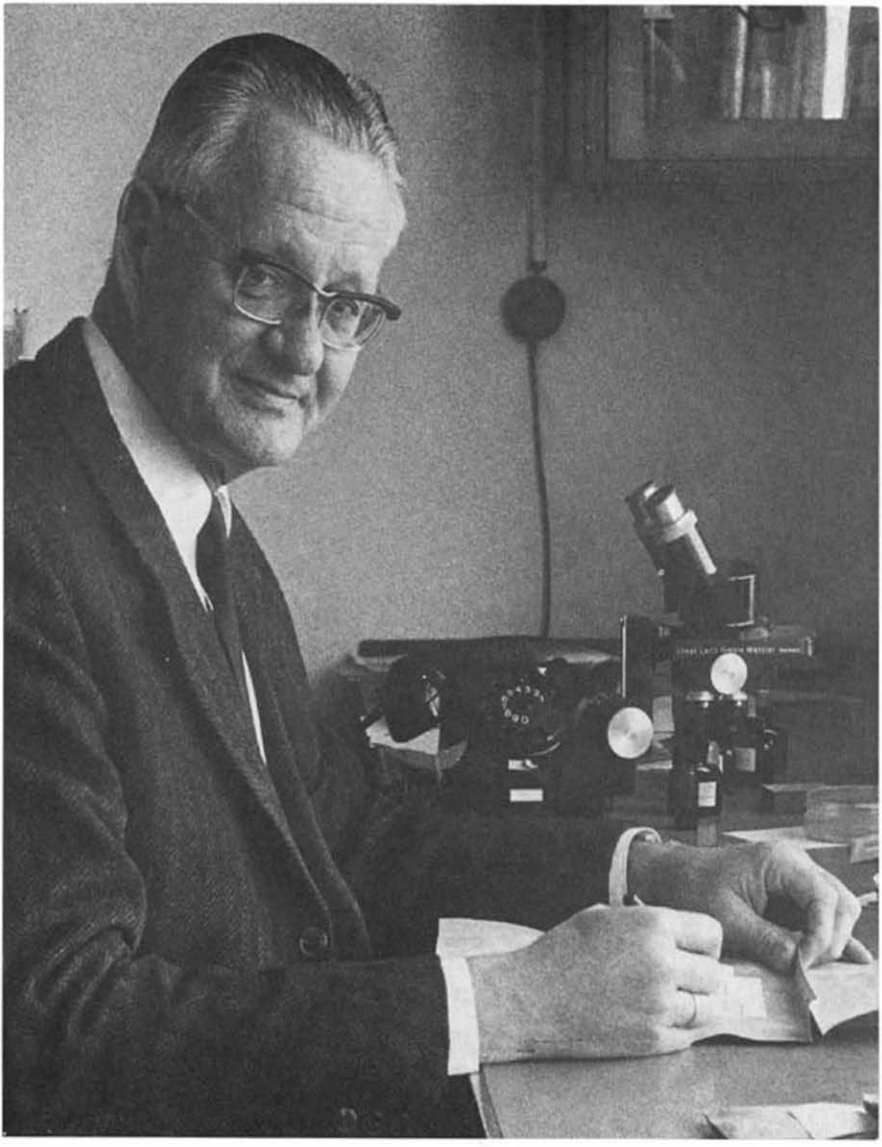
T. R. Nag Raj & B. Kendrick, *A monograph of Chalara and allied genera*. (Wilfrid Laurier University Press, Waterloo, Ontario, 1975). Pp. 200, 61 text-figs. Price:?

The hyphomycete genera *Chalara*, *Fusichalara*, *Chaetochalara*, *Sporoschisma*, *Sporencladia*, *Ascoconidium* and *Bloxamium* with together 86 species are monographically treated and thoroughly illustrated. About one third of the included species are new to science.

M. J. Larsen, *A contribution to the taxonomy of the genus Tomentella*. (Mycologia Memoir **4**, 1974). Pp. 145, 173 text-figs. Price: $ 10.— ($ 9.— in U.S.A.).

This monograph of *Tomentella*, comprising 72 species distributed among 14 sections, is based on a study of about 12 000 specimens from all over the world. Two new species are described and 16 new combinations proposed. Spore characters are illustrated on photomicrographs.

New names are in **bold-face** type. Subdivisions of genera are indicated by the sign §, illustrations by an asterisk (*).



(Photo Ruth van Crevel, 1972)

DR. R. A. MAAS GEESTERANUS

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PSATHYRELLA BIFRONS

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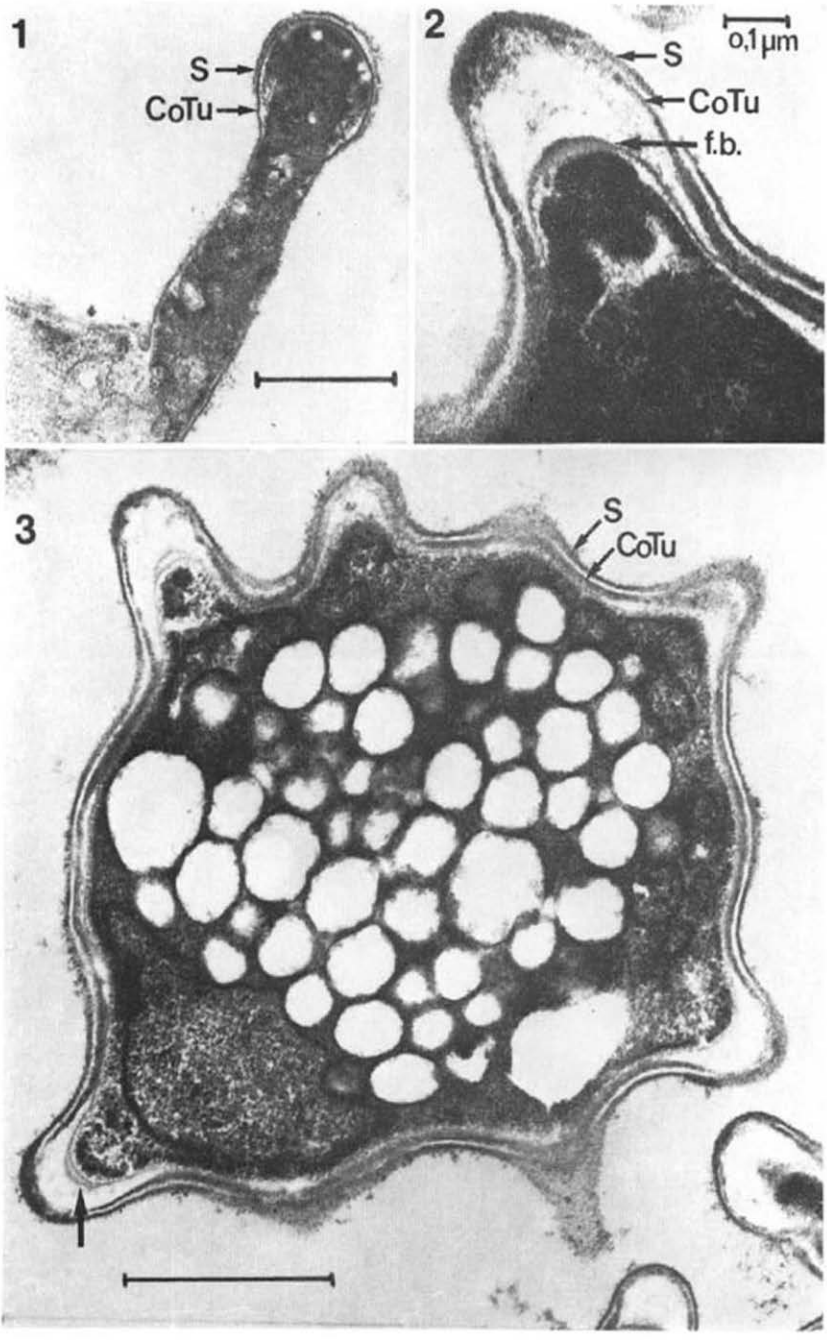
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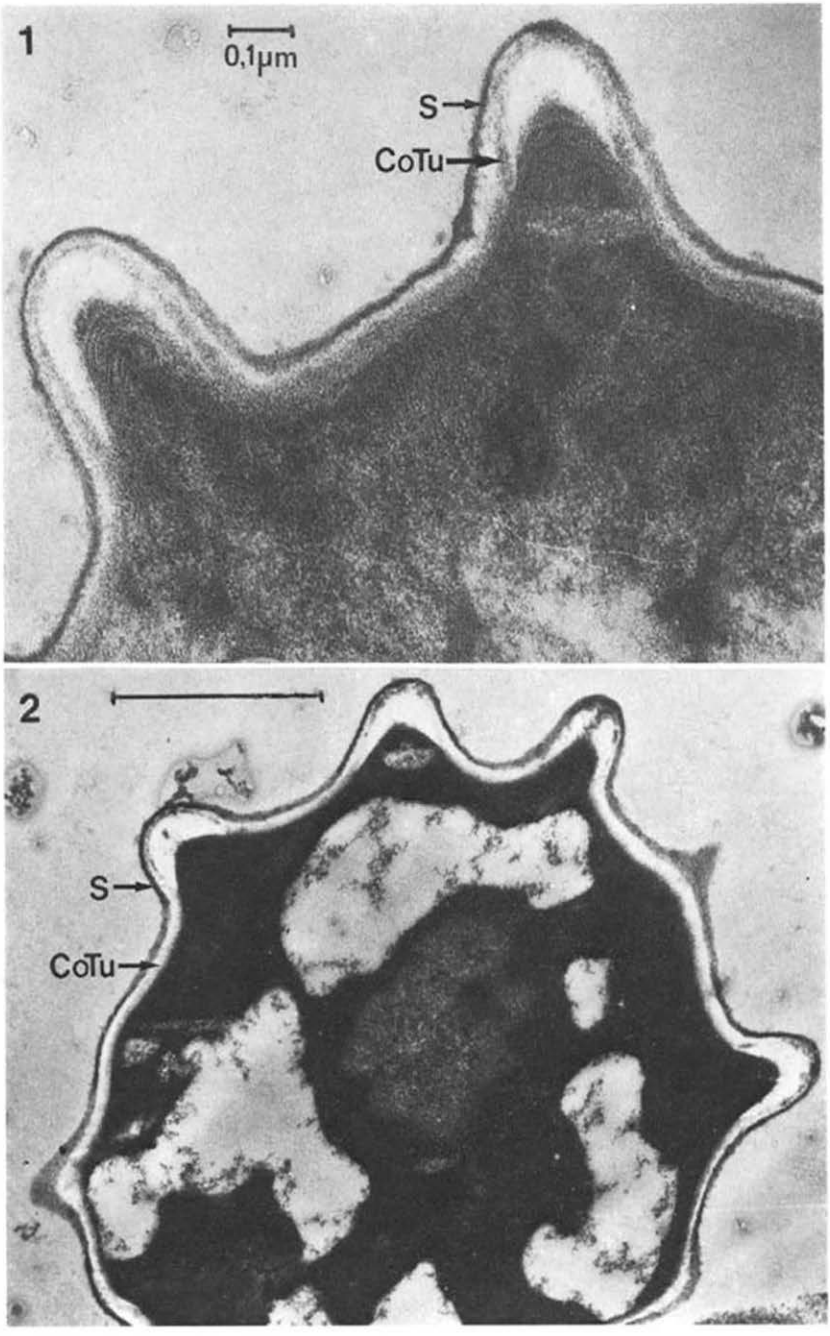
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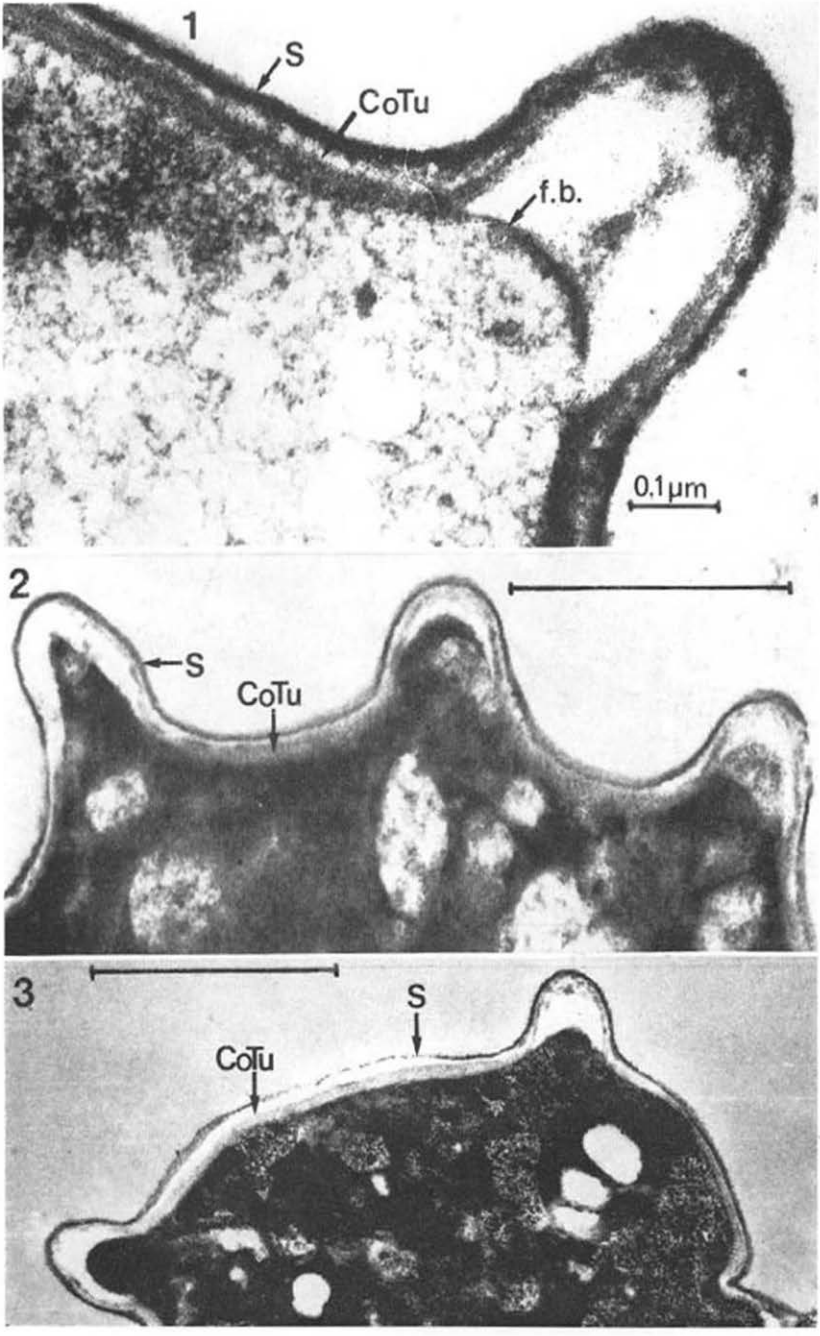
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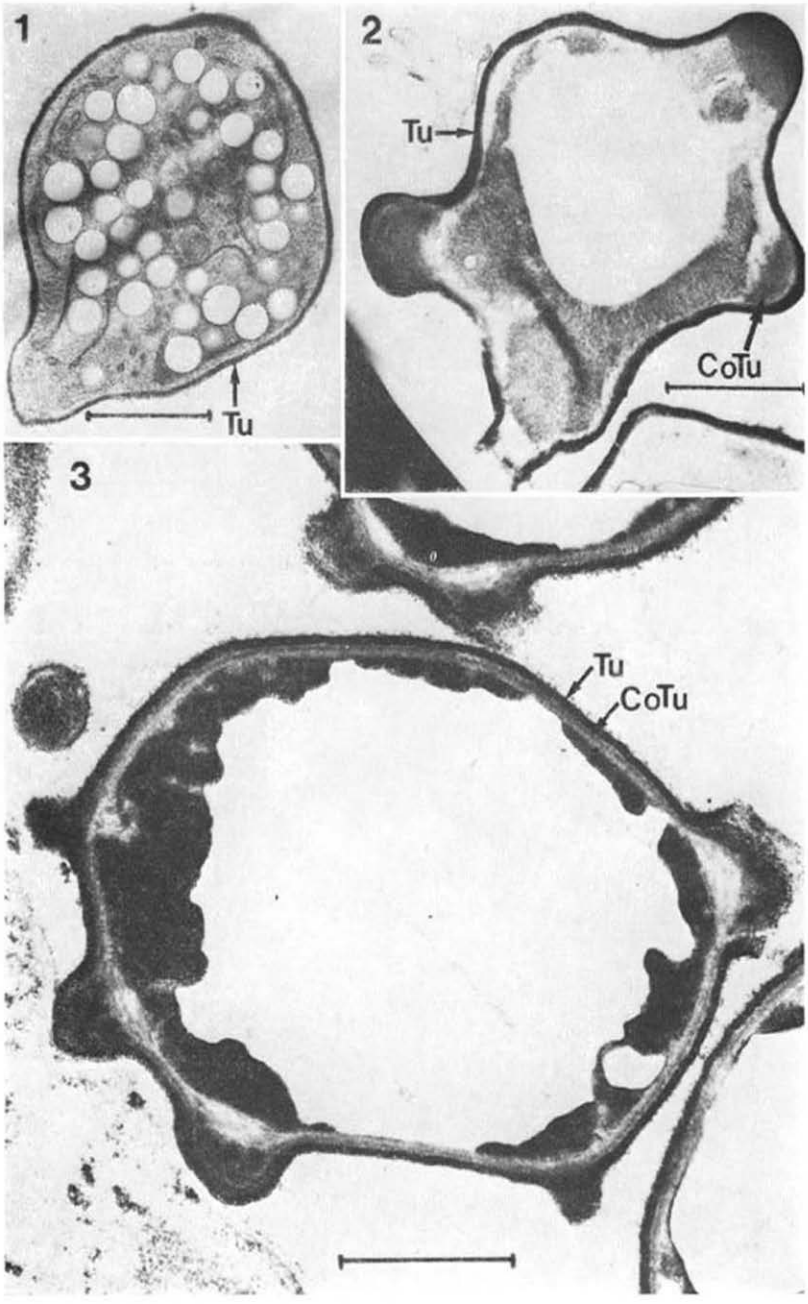
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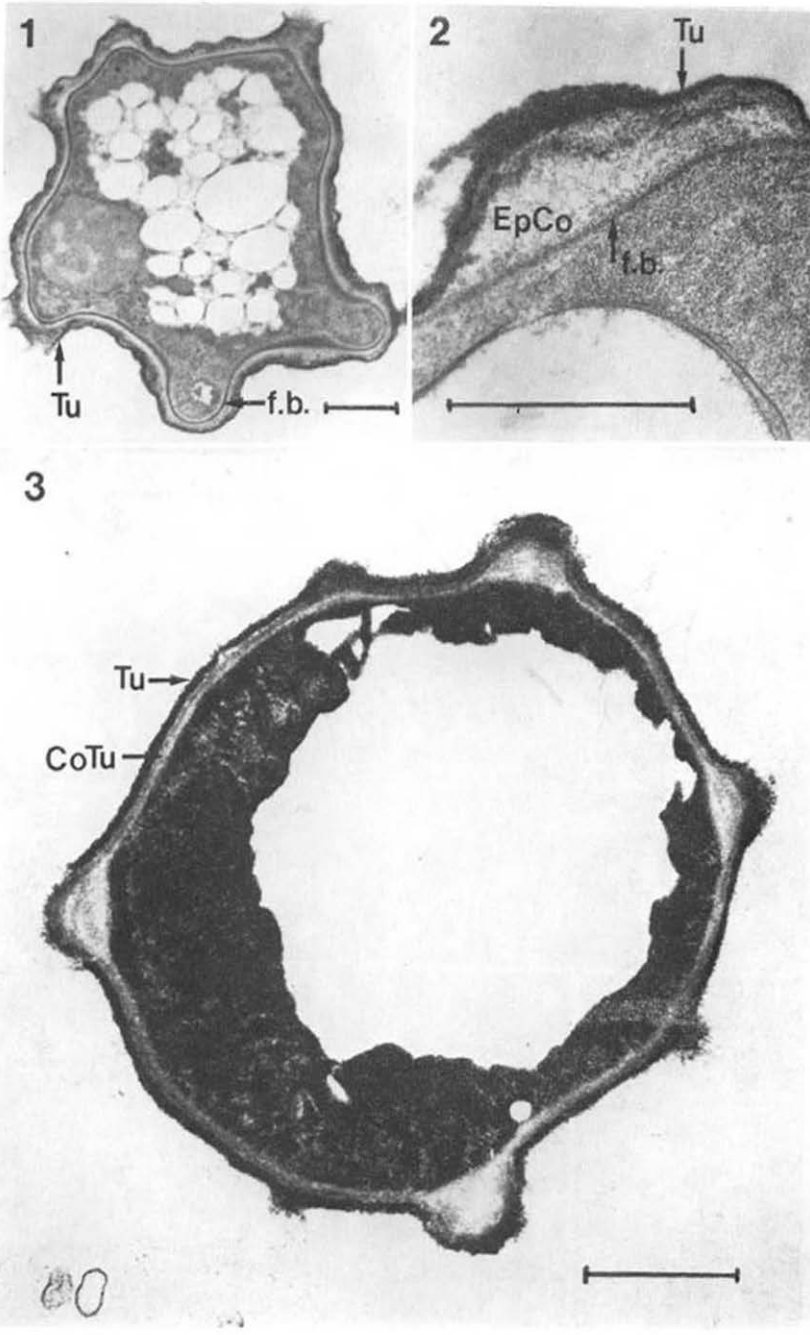
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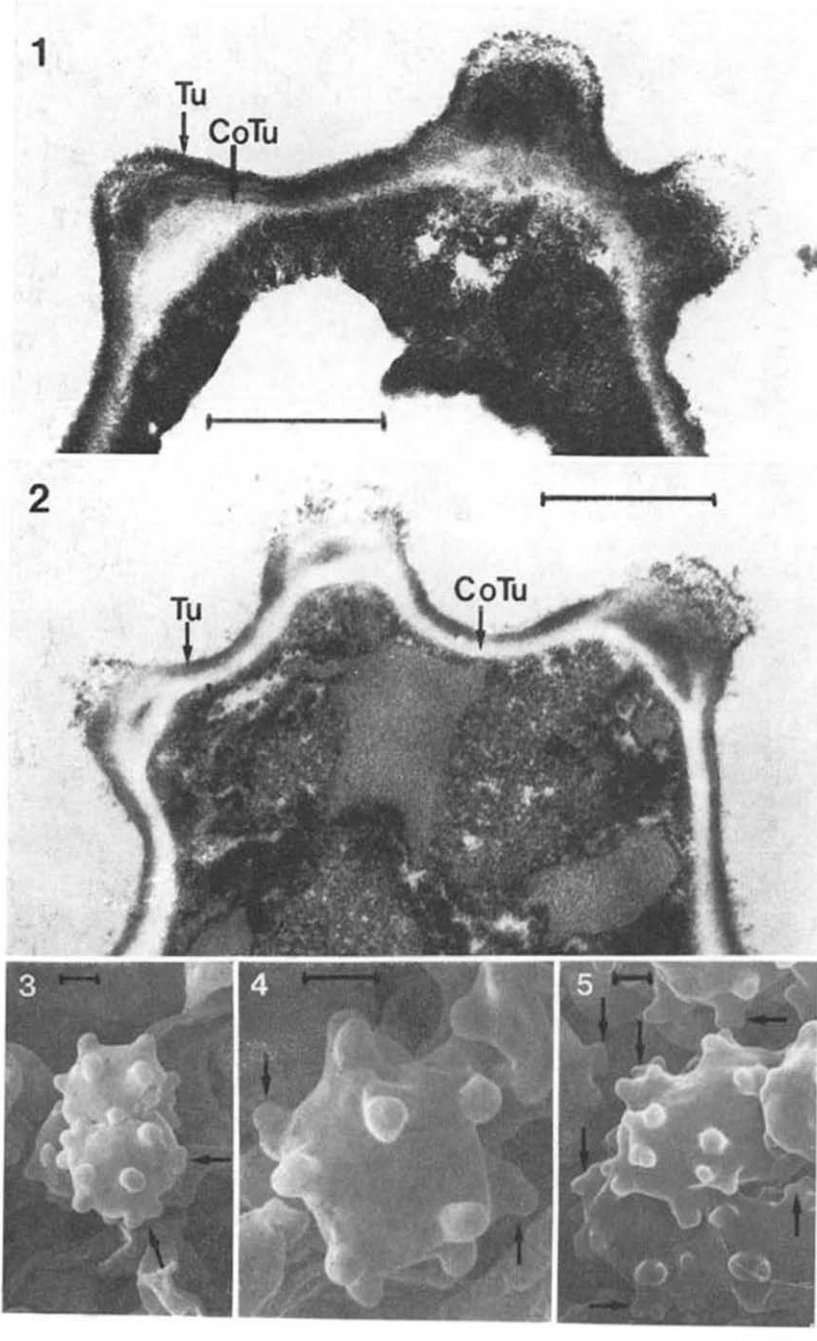
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Explication des abréviations. — CoTu, *coriotunica*. — EpCo, *épicorium*. — Tu, *tunica*. — S, *sporothecium*. — f.b., feuillet basal de la *coriotunica*.

Le trait porté sur chaque Figure équivaut à 1 µm (trois exceptions).

Planche 64

Fig. 1–3. *Phellodon niger*. — 1. Ebauche d'une jeune spore montrant un *sporothecium* floconneux à l'extérieur et une *coriotunica* continue à l'intérieur. — 2. Détail d'une ornementation. La *coriotunica* conflue avec le *sporothecium* au sommet de la protubérance alors qu'à sa base se détache le feuillet basal. — 3. Les ornementations régulières sont situées au sommet des protubérances protoplasmiques. La forme lenticulaire du feuillet basal est bien visible à gauche en bas (flèche).

Planche 65

Fig. 1. *Phellodon confluens*. La *coriotunica* est la strate grise, épaisse et floue, le *sporothecium* la strate opaque et mince.

Fig. 2. *Phellodon tomentosus*. La forme des ornements est très régulière et le *sporothecium* d'une grande opacité.

Planche 66

Fig. 1. *Phellodon melaleucus*. Le détail de l'ornement montre le feuillet basal de la *coriotunica* et l'importance de la grande masse blanche chargée d'éléments noirs.

Fig. 2, 3. *Bankera violascens* et *B. fuligineo-alba*. Les ornements sont réguliers, la *coriotunica* est floue, le *sporothecium* mince, opaque et bien délimité.

Planche 67

Fig. 1–3. *Hydnellum concrescens*. — 1. La très jeune spore n'est pourvue que d'une seule strate, la *tunica*. — 2. En murissant, la spore acquiert des ornements qui sont occupés intérieurement par une substance grise (*coriotunica*). — 3. A maturité, la spore comprend distinctement deux strates, une *coriotunica* grise à l'intérieur et une *tunica* foncée à l'extérieur.

Planche 68

Fig. 1. *Sarcodon imbricatus*. La *coriotunica* comprend un feuillet basal opaque surmonté d'un feuillet clair. Tout à l'extérieur est la *tunica* qui a éclaté au sommet de l'ornement.

Fig. 2. *Hydnellum suaveolens*. La *coriotunica* se compose, comme dans le cas précédent, de deux feuillets englobant par place une strate réticulée appelée *épicorium*.

Fig. 3. *Hydnellum peckii*. La paroi est caractérisée par la *coriotunica* (interne) et la *tunica* (externe); cette dernière éclate au sommet des verrues qui sont alors « ouvertes ».

Planche 69

Fig. 1, 2. *Sarcodon versipellis* et *Boletopsis leucomelaena*. Ces deux exemples montrent une *coriotunica* à feuillet basal clair (les spores ne sont peut-être pas totalement mûres) et à masses grises (dans les ornements); tout à l'extérieur est la *tunica*.

Fig. 3, 4, *Hydnellum concrescens*, et 5, *Sarcodon imbricatus*. Les verrues sont irrégulières (flèches) de forme et de disposition (irrégulièrement distribuées), mais leurs extrémités sont arrondies ce qui tendrait à prouver que l'éclatement des verrues « ouvertes » est un artéfact.