

DR. E. KITS VAN WAVEREN
(1906-1995)

With the death on 3 September 1995 of Dr. E. Kits van Waveren, the Dutch mycologists lost one of their most prominent, internationally known amateurs, a specialist on the taxonomy of the genus *Psathyrella* and an ardent collector.

Dr. Kits van Waveren, honorary staff member of the Rijksherbarium at Leiden since 1970 and honorary member of the Dutch Mycological Society since 1983, will be most of all remembered as the author of the monograph 'The Dutch, French and British species of *Psathyrella*' published in 1985 as Supplement 2 of the mycological journal *Persoonia*. In this book of 300 pages about 100 species of *Psathyrella* are extensively described and illustrated, 10 of which were new to science. This publication, together with 7 later papers between 1986 and 1995, greatly stimulated the study of the genus in Europe and is still much in demand. On pp. 289-291 of his book a curriculum vitae of the author is given.

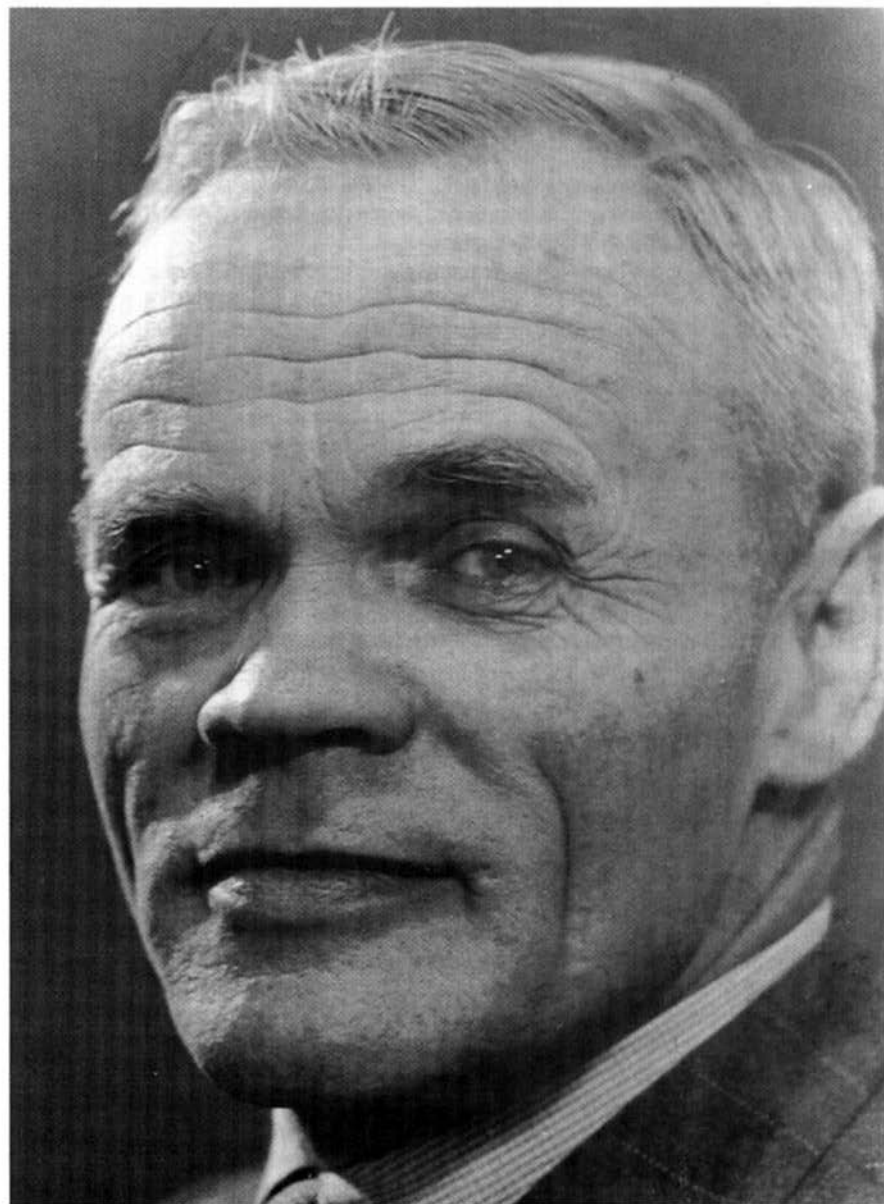
Because of the medical and other activities of Dr. Kits van Waveren, there is a large gap between his first mycological publication on the genera *Geastrum*, *Astraeus* and *Myriostoma* in the Netherlands (1926) and his series of publications on agarics starting in 1968. But already that first paper is remarkable for that time, because the author thoroughly studied Persoon's types and strictly followed the then current rules of botanical nomenclature.

Also in his later publications Dr. Kits van Waveren showed himself to be a very thorough observer and a meticulous recorder and he soon acquired a professional approach to mycological problems.

Because at first, particularly in the sixties and seventies, Dr. Kits van Waveren still was medically fully engaged, he kept a strict regime during his mycological season which ran from April to deep in November: collecting on Saturday, examination of the collected fungi on Sunday and checking the outcome of his studies on Monday at the Rijksherbarium. Collecting in the Netherlands was mainly restricted to a small number of well chosen rich areas (Amsterdams Bos, Duin en Kruidberg, Mook, Vorden, Delden and Denekamp), but later he rather frequently explored a number of areas in Scotland (Braemar), Wales (Lake Vyrnwy), England (New Forest), etc. Many of his collections are accompanied by cards with extensive descriptive notes and drawings of spores and cystidia. His herbarium, consisting of more than 5000 collections, has been donated to the Rijksherbarium at Leiden and is there now incorporated in the general mycological collection.

Dr. Kits van Waveren did not forget the other amateurs. His humorous and witty lectures at meetings of the Dutch Mycological Society were much appreciated and his clear and well-written more popular mycological papers in *Coolia* count up to 30.

Dr. Kits van Waveren discovered and described 31 new species, while four new species have been named after him (*Psathyrella waverenii* Arnolds 1982, *Entoloma kitsii* Noordeloos 1983, *Psathyrella kitsiana* Örstadius 1986, and *Psathyrella waveriana* Marchetti 1993). For his role in the resistance during World War II he was awarded the 'Verzetskruis', an official and highly esteemed decoration. The Prince Bernhard Foundation awarded him the 'Zilveren Anjer' for his scientific achievements as an amateur in mycology.



DR. E. KITS VAN WAVEREN

In 1981 Dr. Kits van Waveren founded the 'Rijksherbarium Foundation Dr. E. Kits van Waveren' which aims at promoting research on Agaricales s.l. at or under the wings of the Rijksherbarium. Although the capital of this foundation was rather modest at first, it nevertheless facilitated the publication of several mycological books. By a large legacy Dr. Kits van Waveren has made it now possible for this foundation to finance a series of fellowships at the Rijksherbarium for many years to come.

The Dutch mycologists have many reasons to remember Dr. Kits van Waveren with respect and gratitude.

Dr. C. Bas

PUBLICATIONS OF DR. E. KITS VAN WAVEREN ON FUNGI

- 1926: De Nederlandse soorten der genera *Geaster*, *Myriostoma* en *Astraeus*. Meded. Ned. mycol. Vereen. 15: 86–128.
- 1928: De Nederlandsche aardsterren. Levende Natuur 33: 144–148.
- 1961: Mycologisch dagboek. Mycologie in het voorjaar. Coolia 8: 8–12.
- 1968: The "Stercorarius group" of the genus *Coprinus*. Persoonia 5: 131–176.
- 1969: Determineer ellende I (*Cortinarius saturatus* Lange in Nederland). Coolia 14: 26–30.
- 1970: The genus *Conocybe* subgen. *Pholiotina* I. The European annulated species. Persoonia 6: 119–165.
- 1970: Determineer ellende II. Coolia 14: 98–102.
- 1970: *Galerina*-vreugde I. Coolia 14: 153–157.
- 1971: Notes on the genus *Psathyrella* I. *Psathyrella gracilis* and *P. microrrhiza*. Persoonia 6: 249–280.
- 1971: Notes on the genus *Psathyrella* II. Three new species of *Psathyrella*. Persoonia 6: 295–312.
- 1971: De "Stercorarius groep" van het geslacht *Coprinus*. Coolia 15: 4–8.
- 1972: Notes on the genus *Psathyrella* III. Unorthodox approach and key to section *Atomatae*. Persoonia 7: 23–54.
- 1972: *Russula cuprea* Kromb. ex Lange en de "Name game". Coolia 15: 135–137.
- 1973: *Galerina ampullaceocystis* P.D. Orton; *Galerina cinctula* P.D. Orton and *Galerina larigna* Singer. Proc. K. Ned. Akad. Wet. (Ser. C) 76: 392–405.
- 1973: De Florakommissie. Coolia 16: 3–4.
- 1973: *Psathyrella*-feuilleton I: *P. gracilis* versus *P. microrrhiza*. Coolia 16: 38–41.
- 1973: Van de Florakommissie. Coolia 16: 110–111.
- 1974: Een moeilijk determineerbare *Russula* (*Russula violeipes* f. *citrina*). Coolia 17: 5–8.
- 1974: *Psathyrella*-feuilleton II: Prepareertechniek. Coolia 17: 41–43.
- 1974: *Psathyrella*-feuilleton III: De rode lamelsnede bij sommige *Psathyrella* soorten. Coolia 17: 49–53.
- 1974: *Psathyrella*-feuilleton IV: *Psathyrella prona*, de type-soort van de sectie *Atomatae* van het genus *Psathyrella*. Coolia 17: 77–79.
- 1974: *Psathyrella*-feuilleton V: De hoedkleur in het genus *Psathyrella*. Coolia 17: 79–81.
- 1974: *Psathyrella*-feuilleton VI: Opmerkingen over de niet-koprofiele soorten, die Romagnesi in de groepen *Atomatae* en *Pronae* plaatst. Coolia 17: 96–98.
- 1975: *Psathyrella*-feuilleton VII: Sleutel en check list van de soorten van de sectie *Atomatae*. Coolia 18: 45–51.

- 1975: Over 7 voor Nederland nieuwe Gordijnzwammen. *Coolia* 18: 76–85.
- 1975: *Cortinarius casimiri*, to be or not to be. *Coolia* 18: 93–96.
- 1976: Notes on the genus *Psathyrella* IV. Description of and key to the European species of section *Psathyrella*. *Persoonia* 8: 345–406.
- 1976: Redescription of *Rhodophyllus scabiosus* (Fr.) Quél. *Persoonia* 8: 459–467.
- 1976: *Galerina*-vreugde II: *Galerina farinaceae* of *G. fallax* in Nederland? *Coolia* 19: 23–27.
- 1976: *Galerina*-vreugde III: *Galerina ampullaceocystis* versus *Galerina larigna*. *Coolia* 19: 125–128.
- 1977: Notes on the genus *Psathyrella* V. The sections *Ammophilae*, *Bipellis* and *Subatratae*. *Persoonia* 9: 199–231.
- 1977: Notes on the genus *Psathyrella* VI. Four controversial species of *Psathyrella*: *P. fibrillosa*, *P. frustulenta*, *P. clivensis* and *P. obtusata*. *Persoonia* 9: 281–304.
- 1977: *Rhodophyllus icterinus* versus *Rhodophyllus pleopodius*. *Coolia* 20: 54–59.
- 1978: Nogmaals de “*Stercorarius*-groep” van het geslacht *Coprinus*. *Coolia* 21: 78–81.
- 1979: *Melanotus proteus*, a species new to Europe. *Trans. Brit. mycol. Soc.* 73: 176–179.
- 1979: De soorten van het geslacht *Panaeolus* I. Inleiding. *Coolia* 22: 23–26.
- 1979: De soorten van het geslacht *Panaeolus* II. Sleutel tot de Europese soorten. *Coolia* 22: 48–51.
- 1979: De soorten van het geslacht *Panaeolus* III. *P. acuminatus* versus *P. fimicola*. *Coolia* 22: 76–82.
- 1979: De soorten van het geslacht *Panaeolus* IV. *Coolia* 22: 102–110.
- 1980: Checklist of synonyms, varieties and forms of *Psathyrella candolleana*. *Trans. Brit. mycol. Soc.* 75: 429–437.
- 1981: Notes on the genus *Psathyrella* VII. *Psathyrella longicauda* versus *Psathyrella atrolaminata* (= *P. melanophylla* pr. p. maj., excl. type). *Persoonia* 11: 359–368.
- 1982: Notes on the genus *Psathyrella* VIII. Description of and key to the European species of section *Hydrophilae*. *Persoonia* 11: 473–508.
- 1985: The Dutch, French and British species of the genus *Psathyrella*. *Persoonia Suppl.* 2: 1–300.
- 1986: *Psathyrella subumbrina*, a new species of *Psathyrella* section *Hydrophilae* from Sweden. *Persoonia* 13: 129–131. (With L. Örstadius.)
- 1987: Additions to our monograph. *Persoonia* 13: 327–368.
- 1987: Notes on some British species of *Psathyrella*. *Trans. Brit. mycol. Soc.* 89: 420–422.
- 1987: Een ‘name game’ in *Psathyrella*. *Coolia* 30: 60–62.
- 1988: A ‘name game’ and comedy of errors in *Psathyrella*. *Mycologist* 2: 162.
- 1988: Notes on the genus *Psathyrella* IX. *Psathyrella umbrina* Kits van Wav. and *P. galerooides* Romagn. *Persoonia* 13: 475–478.
- 1992: On five species of *Psathyrella* with lageniform pleurocystidia including variants with utriform pleurocystidia. *Persoonia* 14: 663–670.
- 1995: The Berkeley & Broome species of *Psathyrella* in the Kew herbarium. *Kew Bull.* 50: 307–325.

CONTRIBUTIONS TOWARDS A MONOGRAPH OF
PHOMA (COELOMYCETES) – III2. Misapplications of the type species name and the generic synonyms of
section *Plenodomus* (Excluded species)G. H. BOEREMA¹, W. M. LOERAKKER² & MARIA E. C. HAMERS³

Various old records of *Phoma lingam* (teleomorph *Leptosphaeria maculans*) on non-cruciferous plants proved to be based on misidentifications. In the past the fungus has also often been confused with other fungi occurring on crucifers. Forty-five species formerly classified under the generic synonyms *Plenodomus*, *Diploplenodomus*, *Leptophoma* and *Deuterophoma* were excluded from *Phoma* sect. *Plenodomus*, seventeen of them being non-scleroplectenchymatous species of *Phoma*. *Asteromella cocogena*, *Asteromella pomi* and *Phoma versabilis* are described as new species and twelve new combinations are proposed: *Ascochyta aggregata* (Höhnelt), *Cytospora cenanarium* (Corda), *Fusicoccum hoveniae* (Gucevics), *Phacidiella hiemalis* (Desm.), *Phoma cruenta* (Sydow), *Phoma filarszkyana* (Moesz), *Phoma haematites* (Petrač), *Phoma syriaca* (Petrač), *Phomopsis allescheriana* (P. Henn.), *Phomopsis destruens* (Harter), *Pleurophoma cava* (Schulzer) and *Pyrenochaeta corni* (Batista & Vital).

The species, subspecies and varieties at present classified in *Phoma* sect. *Plenodomus* (Preuss) Boerema et al. have been treated in Contribution III–1 of this series (Boerema et al., 1994)⁴. They are characterized by their ability to produce scleroplectenchyma in the peridium of the pycnidium, i.e. hyaline cells with thick walls and a relatively small lumen. Many of these anamorphs, especially those occurring on herbaceous plants, are meta-genetically related to scleroplectenchyma-producing species of the Ascomycete genus *Leptosphaeria* Ces. & de Not. (group *doliolum* Holm, 1957). Four genera have been successively assigned to the section, as *Plenodomus* Preuss, *Diploplenodomus* Died., *Leptophoma* Höhnelt and *Deuterophoma* Petri. However, not all species formerly placed in these genera appeared to belong to *Phoma* sect. *Plenodomus*. The type species of the section, *Phoma lingam* (Tode: Fr.) Desm., teleomorph *Leptosphaeria maculans* (Desm.) Ces. & de Not., is very variable. This may explain why the anamorph and teleomorph of this fungus have been confused with various other fungal morphs.

Firstly, this paper lists alphabetically all species now removed from the above four genera. Then, the taxonomic part deals with the misapplications of *P. lingam*/*L. maculans*, followed by the species which have been erroneously attributed in the past to the generic synonyms of the section *Plenodomus* ('Excluded species'; in alphabetical order of their epithets). An appendix deals with some additional collections within the section *Plenodomus*, treated in Contribution III–1.

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⁴) Contribution I deals with species of sect. *Phoma* (de Gruyter & Noordeloos, 1992; de Gruyter et al., 1993). Contribution II deals with the species classified in sect. *Peyronellaea* (Boerema, 1993).

MATERIAL AND METHODS

Original descriptions and, where possible, original herbarium material have been studied in the light of the present knowledge of coelomycetous genera, in particular the comparative type studies of Coelomycetes by Sutton (1980). Drawings were made with the help of a drawing tube (oil-immersion at $\times 1250$). The presence or absence of scleroplectenchyma was checked by staining thick sections with Lugol's iodine: cell-walls becoming red by adsorption of the iodine (JKJ+) or remaining white by non-adsorption (JKJ-). Herbaria and culture collections are coded according to, respectively, Holmgren & Keuken (1974) and Pridham (1974).

INDEX OF THE DEUTEROPHOMA, DIPLOPLENODOMUS, LEPTOPHOMA
AND PLENODOMUS NAMES FOUND IN LITERATURE AND HERBARIUM COLLECTIONS⁵

The annotated *Phoma*-synonyms belong to sect. *Plenodomus* and are discussed and documented in Contribution III-1. The numbers 1-45 refer to species excluded from sect. *Plenodomus* and are treated in the taxonomic part of this paper.

<i>Deuterophoma</i> 'Chrysanthemum spp.'	no. 9
[vascular pathogen]	
– <i>tracheiphila</i> Petri	≡ <i>Phoma tracheiphila</i> (Petri) Kant. & Gik.
– <i>ulmi</i> (Verrall & May) Goid. & Rugg.	no. 42
<i>Diploplenodomus aggregatus</i> Höhnelt	no. 1
– <i>malvae</i> Died. ex Died.	= <i>Phoma doliolum</i> P. Karsten (teleom. <i>Leptosphaeria conoidea</i> (de Not.) Sacc.)
– <i>microsporus</i> (Berl.) Höhnelt	= idem
– <i>piskorzii</i> Petrak	≡ <i>Phoma piskorzii</i> (Petrak) Boerema & Loerakker (teleom. <i>Leptosphaeria acuta</i> (Fuckel) P. Karsten)
– <i>rivini</i> (Allescher) Petrak	no. 37
<i>Leptophoma acuta</i> (Hoffm.: Fr.) Höhnelt [as '(Fuck.)']	≡ <i>Phoma acuta</i> (Hoffm.: Fr.) Fuckel subsp. <i>acuta</i> (teleom. <i>Leptosphaeria doliolum</i> (Pers.: Fr.) Ces. & de Not. subsp. <i>doliolum</i>)
– <i>doliolum</i> Höhnelt	= <i>Phoma acuta</i> subsp. <i>errabunda</i> (Desm.) Boerema et al. (teleom. <i>Leptosphaeria doliolum</i> subsp. <i>errabunda</i> Boerema et al.)
– <i>paeoniae</i> Höhnelt	no. 33
– <i>urticae</i> (Schulzer & Sacc.) Höhnelt	no. 43

⁵⁾ Knowingly omitted are four species of *Diploplenodomopsis* Petrak which have been erroneously listed under *Diploplenodomus* ('*D. bacillaris*', '*D. campanulae*', '*D. cylindrica*' and '*D. ragusina*') in the third volume of the Index to Petrak's papers by Samuels (1983).

- Plenodomus aconiti* Petrak = *Phoma doliolum* P. Karsten
(teleom. *Leptosphaeria conoidea* (de Not.)
Sacc.)
- *acutus* (Hoffm.: Fr.) Bubák = *Phoma acuta* (Hoffm.: Fr.) Fuckel
- *acutus* (Hoffm.: Fr.) Petrak subsp. *acuta*
[both as '(Fuck.)'] (teleom. *Leptosphaeria doliolum* (Pers.:
Fr.) Ces. & de Not. subsp. *doliolum*)
- *astragalinus* (Gonz.-Frag.) Petrak = *Phoma astragalina* (Gonz.-Frag.) Boerema
& v. Kest.
- *borgianus* Sacc. no. 2
- *brachysporus* Petrak no. 3
- *cannabis* (Allescher) Moesz & Smarods no. 4
- '*cannabis* Moesz & Smarods n. spec.'
in Petrak [an error of citation]
- '*cardaminis* Rupprecht' 'n. sp.' in no. 5
herb. B [manuscript name]
- *cenangium* (Corda) Oud. no. 6
- *chelidonii* Naumov no. 7
- *chenopodii* (P. Karsten & Hariot) v. Arx no. 8
- *chondrillae* Died. = *Phoma agnita* Gonz.-Frag.
(teleom. *Leptosphaeria agnita* (Desm.)
Ces. & de Not.)
- '*chondrillae*' sensu Batista & Vital = *Phoma enteroleuca* Sacc. var. *enteroleuca*
- *cocogenus* Saw. no. 10
[as '*cocogena*'; not validly published]
- '*complanatus* (Tode: Fr.) Rupprecht', no. 11
comb. nov. in herb. B [manuscript
name]
- *corni* Batista & Vital no. 12
- *cruentus* Sydow no. 13
- *destruens* Harter no. 14
- *dianthi* Bubák = *Phoma astragalina* (Gonz.-Frag.) Boerema
& v. Kest.
- *doliolum* (Höhnel) Höhnel = *Phoma acuta* subsp. *errabunda* (Desm.)
Boerema et al.
- *doliolum* (Höhnel) Petrak (teleom. *Leptosphaeria doliolum* subsp.
errabunda Boerema et al.)
- '*drobnjacensis* Bubák' in herb. BKL = *Phoma drobnjacensis* Bubák
[manuscript name]
- *erythrinae* Oud. no. 15
- *eucalypti* Alm. & Cam. no. 16
- *filarszkyanus* (Moesz) Petrak no. 17
- *fusco-maculans* (Sacc.) Coons no. 18

(Plenodomus contd)

- 'fusco-maculans' sensu Coons = *Phoma coonsii* Boerema & Loerakker
- 'galeopsidis Rupprecht' nov. sp. ['m.'] = *Phoma doliolum* P. Karsten
in herb. B (teleom. *Leptosphaeria conoidea* (de Not.)
[manuscript name]* Sacc.)
- gallarum (Lév.) Oud. no. 19
- gentianae (Moesz) Petrak = *Phoma pedicularis* Fuckel
- 'glechomae Rupprecht' 'n. sp.' in herb. B = *Phoma enteroleuca* Sacc. var. *enteroleuca*
[manuscript name]*
- haematites Petrak no. 20
- helicis Curzi & Barbaini = *Phoma pezizoides* (Ell. & Ev.) Boerema &
v. Kest.
- helveticus Petrak = *Phoma pedicularis* Fuckel
- herbarum Allescher no. 21
- hoveniae Gucevicz no. 22
- humuli Kusnetz. [as 'humulis'] no. 23
- inaequalis Sacc. & Trotter no. 24
- kariii Petrak = *Phoma pedicularis* Fuckel
- khorasanicus Petrak = *Phoma astragalina* (Gonz.-Frag.) Boerema
& v. Kest.
- labiatarum Petrak = *Phoma doliolum* P. Karsten
(teleom. *Leptosphaeria conoidea* (de Not.)
Sacc.)
- leonuri (Let.) Moesz & Smarods ≡ *Phoma leonuri* Let.
(teleom. *Leptosphaeria slovacica* Picb.)
- lingam (Tode: Fr.) Höhnel ≡ *Phoma lingam* (Tode: Fr.) Desm.
(teleom. *Leptosphaeria maculans* (Desm.)
Ces. & de Not.)
- lunariae Sydow ≡ *Phoma sublingam* Boerema
(teleom. *Leptosphaeria submaculans*
Holm)
- macrocapsa (Trail) Rupprecht ≡ *Phoma macrocapsa* Trail
- macropodii Petrak no. 25
- 'Malus punila' [spotted apples] no. 26
- meliloti Dearn. & Sanford = *Phoma sclerotoides* (Preuss) Sacc.
- meliloti Mark.-Let. = idem
- metasequoiae Gucevicz no. 27
- microsporus Berl. = *Phoma doliolum* P. Karsten
(teleom. *Leptosphaeria conoidea* (de Not.)
Sacc.)
- mollerianus Bres. no. 28
- mori (Mont.) Höhnel no. 29
- niesslii Petrak ≡ *Phoma petrakii* Boerema & v. Kest.
(?teleom. *Leptosphaeria suffulta* (Nees:
Fr.) Niessl)
- nigricans Negodi no. 30

(Plenodomus contd)

- *oleae* Cav. no. 31
- *origani* (Mark.-Let.) Petrak = *Phoma doliolum* P. Karsten
[see Errata on p. 190] (teleom. *Leptosphaeria conoidea* (de Not.) Sacc.)
- '*orthoceras* Höhnel' [as '(Fr.)'] no. 32
[in herb. W [manuscript name]]
- *prominens* (Bres.) Petrak ex v. Arx = *Phoma pedicularis* Fuckel
- '*pulcherrimus* Petrak' 'n. sp.' in herb. no. 34
Petrak, W [manuscript name]
- *pyracanthae* Gucevicz no. 35
- *rabenhorstii* Preuss = *Phoma lingam* (Tode: Fr.) Desm.
(teleom. *Leptosphaeria maculans* (Desm.) Ces. & de Not.)
- '*rabenhorstii*' sensu Riggenbach no. 12
- *ramealis* (Desm.) Höhnel no. 36
- *rostratus* Petrak = *Phoma sydownii* Boerema et al.
(?teleom. *Leptosphaeria senecionis* (Fuckel) Winter)
- *rutneri* Petrak ≡ *Phoma rutneri* (Petrak) Boerema &
v. Kest.
(?teleom. *Leptosphaeria affinis* P. Karsten)
- *salicum* (Sacc.) Died. = *Phoma pezizoides* (Ell. & Ev.) Boerema &
v. Kest.
- *sclerotioides* Preuss ≡ *Phoma sclerotioides* (Preuss) Sacc.
- '*scrophulariae* Rupprecht' 'n. sp.' = *Phoma acuta* subsp. *errabunda* (Desm.)
in herb. B [manuscript name]* Boerema et al.
(teleom. *Leptosphaeria doliolum* subsp. *errabunda* Boerema et al.)
- *senecionis* (Sydow) Bubák ≡ *Phoma sydownii* Boerema et al.
- *senecionis* (Sydow) Petrak (?teleom. *Leptosphaeria senecionis* (Fuckel) Winter)
- *sorgi* Morochkovskii = *Phoma sclerotioides* (Preuss) Sacc.
- *sphaerosporus* Petrak = *Phoma pedicularis* Fuckel
- *spurius* (Vestergren) Petrak no. 38
- *strobilinus* (Desm.) Höhnel no. 39
- *svalbardensis* Lind⁹ = *Phoma pedicularis* Fuckel
- *sylvaticus* (Sacc.) Rupprecht [as no. 40
'*silvatica*']
- '*sylvaticus*' sensu Rupprecht = *Phoma petrakii* Boerema & v. Kest.
(?teleom. *Leptosphaeria suffulta* (Nees:
Fr.) Niessl)
- *syriacus* Petrak no. 41
- *valentinus* Caballero no. 44
- *verbascicola* (Schw.) Moesz no. 45

(Plenodomus contd)

- ‘*verbascicola*’ sensu Moesz = *Phoma acuta* subsp. *errabunda* (Desm.) Boerema et al.
(teleom. *Leptosphaeria doliolum* subsp. *errabunda* Boerema et al.)
- *vincetoxici* Petrak = *Phoma doliolum* P. Karsten
(teleom. *Leptosphaeria conoidea* (de Not.) Sacc.)
- *wallneriana* (Allescher) Bubák = *Phoma pezizoides* (Ell. & Ev.) Boerema & v. Kest.

*) See documentation in the Appendix on p. 183–185.

TAXONOMIC PART

Phoma sect. *Plenodomus* (Preuss) Boerema et al., Trans. Br. mycol. Soc. 77 (1981) 61; generic synonyms *Plenodomus* Preuss (1851), *Diploplenodomus* Diedicke (1912a), *Leptophoma* Höhnel (1915a) and *Deuterophoma* Petri (1929). On herbaceous and woody plants; on herbaceous plants often associated with teleom. *Leptosphaeria* Cesati & de Notaris (1863; nom. cons.) gr. *doliolum* (Holm, 1957).

Type species: *Plenodomus rabenhorstii* Preuss = *Phoma lingam* (Tode: Fr.) Desm., Anns Sci. nat. (Bot.) 3, 11 (1849) 28; teleom. *Leptosphaeria maculans* (Desm.) Cesati & de Notaris (1863). Serious pathogen of *Brassica* spp.; also occurring on other cruciferous plants.

Selected literature. Boerema & van Kesteren (1981a), Boerema et al. (1981b), Boerema, Pieters & Hamers (1993; under *Leptosphaeria maculans*), Boerema, de Gruyter & van Kesteren (1994; = Contribution III–1).

Misapplications of the type species name in literature or exsiccata works (incl. teleomorph)

As noted in Contribution III–1, *Phoma lingam* (teleomorph *Leptosphaeria maculans*) is extremely variable in its morphology, cultural characteristics and pathogenicity, and so one needs to be aware of the earlier misapplications listed below. Muller & Tomašević (1957) remarked that *L. maculans* grows saprophytically on plants of quite different families. However, all records of the fungus on non-cruciferous plants that we have examined appeared to be based on misidentifications!

CRUCIFEROUS MATRICES

On *Berteroa incana* stem as ‘*Leptosphaeria maculans*’.

Coll. J. Smarods, distr. Riga, prov. Vidzeme, Latvia (Letland). Krypt. exs. Mus. Hist. Nat. Vind. No. 3608 [ed. Mus. Palatino, Vind.] (e.g. UPS), referred to by Smith & Sutton (1964; IMI 37207).

= *Leptosphaeria submaculans* Holm, a very close but distinct species of gr. *doliolum*. Det. Holm (1957: 38). The anamorph of this fungus has been differentiated as *Phoma sublingam* Boerema, see Contribution III–1 no. 16.

On *Brassica oleracea* stem as '*Phoma lingam* f. *sphaerulis bysso immersis*'.

Coll. J.B. Mougeot, Dep. l'Aude, France. Distributed by Roumeuguère as Fungi sel. gall. exs. [= Fungi gall. exs. Cent. 1/4] No. 364 (1879) [= duplicate of Mougeot & Nestler, Stirp. crypt. Vog.-Rhen. No. 1076 as *Sphaeria olerum* Fr. (Reliquiae Mougeotianae) (e.g. L)].

= *Arnium olerum* (Fr.: Fr.) Lundq. & Krug, common in Europe on cabbage stalks, but also recorded on other herbaceous plants and dung, see Lundqvist (1972). Roumeuguère's alteration of the original name *Sphaeria olerum* was based on a 'rectification' by Mougeot in Stirp. crypt. Vog.-Rhen. No. 1271, who suggested *S. olerum* was conspecific with the earlier described *S. lingam* Tode. This also explains why Tulasne & Tulasne (1863) and Von Höhnel (1911) have listed *Sphaeria olerum* 'Mougeot' as a synonym of *Sphaeria lingam* and *Plenodomus lingam*.

On *Brassica oleracea* stalk as '*Plenodomus lingam*'.

Coll. A. Ludwig, Forbach, Lotharingen (Lorraine), France. Distributed as Sydow, Mycoth. germ. No. 1123 (1912) (e.g. PAD, U).

On *Brassica oleracea* var. *capitata* stem and root as '*Plenodomus rabenhorstii*'.

Coll. O. Jaap, Triglitz, reg. Prignitz, Brandenburg, Germany, distributed as Jaap, Fungi sel. exs. No. 541 (e.g. L, U); discussed in Verh. bot. Ver. Prov. Brandenb. 56 (1914) 89 under '*Plenodomus lingam*'; earlier referred to by Diedicke (1912b). Jaap (l.c.) remarked that at the same location he found a similar fungus on another crucifer, *Hesperis matronalis*, and also on *Conium maculatum* (Umbelliferae; see below under non-cruciferous matrices).

= *Phoma doliolum* P. Karsten, a plurivorous member of sect. *Plenodomus* with relatively large conidia, see Contribution III-1 no. 19. Teleomorph *Leptosphaeria conoidea* (de Not.) Sacc.

Isol. stem *Brassica oleracea* var. *bullata* as '*Phoma lingam*'.

Isolate made by Moers, 17 Dec. 1957 and deposited at BBA (No. 8615). Detailed described by Kranz (1963: 'Isolierung 27') in comparison with various *Phoma*-isolates from potatoes; also studied by Breyer (1963) and Maas (1965) in comparison with the causal fungus of footrot of flax.

= *Phoma exigua* Desm. var. *exigua*, the plurivorous type species of *Phoma* sect. *Phyllostictoides* (van der Aa et al., 1990). Det. Maas, l.c. Some diagnostic data are given in this paper under Excluded species no. 4 (*Plenodomus cannabis*).

Isol. seed *Brassica* sp. as '*Phoma lingam*'.

Isolate PD-14 July 1958 deposited at CBS (C.J. Briejèr). Identification CBS cf. confusing data in Grove (1935), see discussion by Smith & Sutton (1964: 163).

= *Phoma herbarum* Westend. (syn. *P. oleracea* Sacc.), the saprophytic type species of *Phoma* sect. *Phoma* which commonly occurs on seed of brassicas, see Boerema (1964, fig. 3). Some diagnostic data are given in this paper under Excluded species no. 43 (*Leptophoma urticae*).

On *Descurainia (Sisymbrium) sophia* stem as '*Leptosphaeria maculans*'.

Coll. J.C. Fischer, Stralsund, Mecklenburg, Germany. Distributed as Rabenh., Fungi europ. exs./Klotzschii Herb. mycol. Cont. No. 2050 (1876) (e.g. B).

Coll. O. Jaap, Warnemünde near Rostock, Mecklenburg, Germany. Distributed as Jaap, Fungi sel. exs. No. 109 (e.g. B), listed in Verh. bot. Ver. Prov. Brandenb. 49 (1907) 15.

= *Leptosphaeria conferta* Niessl ex Sacc. (gr. *doliolum*). Det. Holm (1957). Often confused with *L. maculans* and *L. submaculans*. Anamorph *Phoma conferta* Sydow ex Died., see Contribution III-1 no. 9.

On *Hesperis matronalis* stem as '*Plenodomus lingam*'.

Coll. O. Jaap, Triglitz, reg. Prignitz, Brandenburg, Germany, cf. discussion of Jaap, Fungi sel. exs. No. 541 in Verh. bot. Ver. Prov. Brandenb. 56 (1914) 89.

= *Phoma doliolum* P. Karsten, teleomorph *Leptosphaeria conoidea* (de Not.) Sacc.; see the documentation under *Brassica oleracea*, second paragraph.

On *Sisymbrium loeselii* stem as '*Leptosphaeria maculans*'.

Coll. P. Sydow, Berlin, Germany. Distributed by O. Pazschke in Rabenh. & Winter, Fungi europ. extraeur. exs. No. 4158 (1898) (e.g. B, UPS).

= *Leptosphaeria submaculans* Holm (see also above under *Berteroa incana*). The specimen No. 4158 in UPS represents its holotype, see Holm (1957). This type specimen also contains some old pycnidia of the anamorph *Phoma sublingam* Boerema (type I), see Contribution III-1 no. 16.

NON-CRUCIFEROUS MATRICES

On *Ailanthus altissima* wood (Simaroubaceae; identification Dep. Silviculture, Agric. Univ. Wageningen, the Netherlands) as '*Plenodomus rabenhorstii*'.

Coll. G.T. Preuss, Hoyerswerda, Ober Lausitz, Germany. Distributed as Rabenh., Klotzschii Herb. mycol. No. 1282 (1849) ('ad ligna vetusta') (e.g. B, M).

= *Phoma pezizoides* (Ell. & Ev.) Boerema & v. Kest. A wood-inhabiting member of sect. *Plenodomus*. Det. Boerema & van Kesteren (1981). See also Contribution III-1 no. 26. This collection explains Preuss' annotation (1862) that *Plenodomus rabenhorstii* also occurs on wet old wood.

On *Artemisia campestris* stem (Compositae) as '*Leptosphaeria maculans* with *Phoma* and *Camarosporium* anamorphs'.

Coll. E. Müller, Jouques, Dep. Var, France, 19 June 1956. Culture studied by Müller & Tomašević (1957), referred to by Lucas (1963: 362) and Lacoste (1965: 28) (ETHZ-cult. M2651).

= *Leptosphaeria ogilvensis* (Berk. & Br.) Ces. & de Not., cf. rectification by Müller (1971). Mono-ascospore isolates of the plurivorous *L. ogilvensis* by Lucas (1959) did not produce conidial anamorphs (SHEFF dried cult. 2046, 2048, 2301). Within one month transfers of isolate ETHZ-M2651 on malt agar (1974) developed in *Camarosporium affine* Saccardo et al. (Bommer & Rousseau, 1887: 224-225; holotype PAD); the cultural characteristics were quite different from those of the SHEFF-isolates and CBS 233.58 of *L. ogilvensis*. Therefore the cultures are unlikely to represent a single fungus.

On *Conium maculatum* (Umbelliferae) and unidentified umbellifer stems as '*Phoma lingam*'.

Listed as hosts by Saccardo & Marchal (1885); the collections on which these records are based could not be traced.

= Probably *Phoma acuta* subsp. *errabunda* (Desm.) Boerema et al., which produces conidia similar to those of *P. lingam*, and frequently occurs in Europe on dead stems of Umbelliferae, see Contribution III-1 no. 15b (teleom. *Leptosphaeria doliolum* subsp. *errabunda* Boerema et al.). See also below under *Linaria genistifolia*.

On *Conium maculatum* stem (Umbelliferae) as '*Plenodomus lingam*'.

Coll. O. Jaap, Triglitz, reg. Prignitz, Brandenburg, Germany, cf. discussion of Jaap, Fungi sel. exs. No. 541 in Verh. bot. Ver. Prov. Brandenb. 56 (1914) 89; collection earlier referred to by Diedicke (1912b).

= *Phoma doliolum* P. Karsten, a large-spored plurivorous member of sect. *Plenodomus*, esp. common on umbellifers; teleomorph *Leptosphaeria conoidea* (de Not.) Sacc. This fungus is treated in Contribution III-1 no. 19.

On *Chamaenerion (Epilobium) angustifolium* stem (Onograceae) as '*Leptosphaeria maculans*'.

Coll. P. Morthier, Corçelles near Neuchâtel, Switzerland. Distributed as Thümen, Mycoth. univ. No. 459 (1876) (e.g. UPS), referred to by Müller (1950).

= *Leptosphaeria cylindrospora* Auersw. & Niessl ex Sacc. Det. Holm (1957: 41). A distinctive species on *Chamaenerion* and *Epilobium* spp. marked by four-spored asci. Curiously Müller l.c. united *L. cylindrospora* with *L. maculans*.

On *Hibiscus rosa-sinensis* (Malvaceae) as '*Phoma lingam*'.

Listed as host by Mathur (1979: 177) cf. Thesis U. Varma, Univ. Bhagalpur, 1976, Bihar, India.

= Probably *Phoma multirostrata* var. *microspora* (Allescher) Boerema. *Hibiscus* spp. are known to be very susceptible to the pathogenic varieties of *P. multirostrata* (Mathur et al.) Dorenb. & Boerema, a very common soil-borne fungus in India, see Boerema (1986). The pycnidia and conidia of var. *microspora* closely resemble those of *Phoma lingam* (type I). It is likely that isolates of '*P. lingam*' recorded from the rhizosphere of *Argemone mexicana* (Papaveraceae) in and around Bhagalpur (Verma, 1977) are also *P. multirostrata* var. *microspora*.

On *Linaria genistifolia* stem (Scrophulariaceae) as '*Phoma lingam*'.

Coll. Keissler, Szent-György near Pozsony, Hungary (now Svätý Jur near Bratislava, Slovakia). Distributed as Krypt. exs. Mus. Hist. Nat. Vind. No. 1171 [ed. Mus. Palatino, Vind.] (e.g. L.).

= *Phoma acuta* subsp. *errabunda* (Desm.) Boerema et al. The most common plurivorous member of sect. *Plenodomus*, see Contribution III-1 no. 15b. Teleomorph *Leptosphaeria doliolum* subsp. *errabunda* Boerema et al. [It should be noted that *Phoma lingam* f. *linariae* Sacc. & Paoli (Saccardo, 1889) refers to *P. pedicularis* Fuckel, another species of sect. *Plenodomus*, see Contribution III-1 no. 20.]

On *Lupinus albicaulis* var. *shastensis* stem (Leguminosae) as '*Leptosphaeria maculans*'.

Coll. Wm. B. Cooke, Mt Shasta, California, USA (DAOM: Wm. B. C. 20294).

= *Leptosphaeria ogilvensis* (Berk. & Br.) Ces. & de Not. Det. Shoemaker (1984: 2709).

This plurivorous fungus is often confused with *L. maculans*, see the identification note under *Artemisia campestris*.

On *Phaseolus* sp. stem (Leguminosae) as '*Pleospora maculans*' (nomenclatural synonym of *Leptosphaeria maculans*).

Ref. Tulasne & Tulasne (1863), France: "in winter time and in spring on dry stems of *Brassica campestris* and of a species of *Phaseolus* we have found it more than once on each host in the neighbourhood of Versailles" (translation W.B. Grove, 1931).

= Indeterminable from available data. It was certainly not *L. maculans*. [There are two other records of this fungus on beans, namely on *Phaseolus nanus*, see next paragraph (misapplied) and on *Phaseolus lunatus* (Sieva bean) in catalogue ATCC no. 18144 as *Phoma lingam*. In the latter case the host name was incorrect; the original culture PD 65/630 has been isolated from Brussels sprout, *Brassica oleracea* var. *gemmifera*.]

On *Phaseolus nanus* stem (Leguminosae) as '*Leptosphaeria maculans*'.

Coll. van der Trappen, Naaldwijk, the Netherlands, Febr. 1867, original labelled '*Pleospora maculans*', referred to by Oudemans (1897: 289-290) (preserved in herb. Oudemans, L.).

= *Pleospora tarda* E.G. Simmons [anamorph *Stemphylium botryosum* Wallr.; see Boerema, Pieters & Hamers, 1993], a plurivorous Ascomycete quite different from *L. maculans*. Identification apparently based on external appearance and the record of '*Pleospora maculans*' on *Phaseolus* sp. by the brothers Tulasne

(1863; see above). Oudemans's description is only a French translation of the Latin diagnosis of *L. maculans* by Saccardo (1883: 35).

On *Swertia perennis* stem (Gentianaceae) as '*Leptosphaeria maculans*'.

Coll. D. Cruchet, Tourbière de La Chaux (Ste. Croix), Cant. Vaud (Waadt), Switzerland. Referred to by Müller (1950) (preserved in herb. Cruchet, LAU).

= *Leptosphaeria agnita* (Desm.) Ces. & de Not. (gr. *doliolum*). A plurivorous species close to *L. ogilvensis*. Det. Dr. L. Holm (pers. inf. 1980). Anamorph *Phoma agnita* Gonz.-Frag., see Contribution III-1 no. 5.

Misapplications of the generic synonyms *Plenodomus*, *Diploplenodomus*, *Leptophoma* and *Deuterophoma*: Excluded species nos 1-45

The forty-five excluded species are treated in alphabetical order by epithet.

In the past, the above generic synonyms have been repeatedly misinterpreted, even by experienced mycologists. Von Höhnell (1909) treated *Plenodomus* Preuss initially as an older synonym of *Phomopsis* (Sacc.) Sacc. (background of the misapplications nos 7, 23, 29, 32, 36, 39 and 44). It explains the introduction of *Leptophoma* Höhnell (1915a), which was based on the typical *Plenodomus*-anamorph of *Leptosphaeria doliolum* (Pers.: Fr.) Ces. & de Not. on dead stems of stinging nettle, *Urtica dioica*. However, the scleroplectenchymatous wall structure was not noticed as an essential character (misappl. no. 33) and a proposed change in the description of *Leptophoma* by Von Höhnell (1917: 262-263) also erroneously includes the conidiogenous characteristics of a *Pyrenochaeta* species which occasionally occurs on dead stems of nettle (misappl. no. 43). In 1918 Von Höhnell finally accepted the synonymy of his *Leptophoma* with the earlier *Plenodomus*. Dedicke (1911, 1912a, b) usually interpreted *Plenodomus* correctly (except in case no. 21) and separated *Diploplenodomus* for species with some 1-septate conidia. The type species of *Deuterophoma* Petri (1929; referring to still closed scleroplectenchymatous pycnidia) additionally produces conidia on free conidiogenous cells on the mycelium: *Phialophora* synanamorph. This phenomenon, however, may also occur in non-scleroplectenchymatous vascular-inhabiting *Phoma*-like fungi (misappl. nos 9 and 42). Oudemans (1885, 1897) did not fully understand the generic characteristics of *Plenodomus* (misappl. nos 6, 15 and 19). The same holds for Saccardo (1903, 1913; misappl. nos 2 and 24) and various other authors of *Plenodomus*-binomials (misappl. nos 4, 5, 8, 10, 11, 13, 14, 16, 21, 22, 26, 27, 28, 30, 31 and 35). Various typical species of *Plenodomus* are described by Petrak (see Contribution III-1), but occasionally he did not give due consideration to the wall structure (misappl. nos 37 and 38). He emphasizes the meta-genetic relation with *Leptosphaeria* species (Petrak, 1947; misappl. nos 3, 17, 20 and 34), but also associated *Plenodomus* with species of *Didymella* (see Boerema & van Kesteren, 1981: 325 and misappl. nos 25 and 41).

In Coelomycetes the occurrence of scleroplectenchyma is admittedly not restricted to *Phoma* sect. *Plenodomus* [neither in Ascomycetes is it restricted to *Leptosphaeria* gr. *doliolum*] (misappl. nos 1 and 12).

Finally it appeared that some combinations in *Plenodomus* have been based on mis-identified specimens (misappl. nos 18, 40 and 45), i.e. confused with species truly belonging to sect. *Plenodomus*.

1. *Diploplenodomus aggregatus* Höhnelt

Diploplenodomus aggregatus Höhnelt, *Annls mycol.* 16 (1918) 70.

Material examined. Two collections, originally labelled *Scleroderris aggregata* (Lasch) Rehm, in the Fungi Islandiae: No. 194 on basal parts of stems of *Euphrasia* sp. (Scrophulariaceae), Breiddalsvik, distr. Sudur Múlasýsla, Iceland: coll. I. Jörstadi, 21 July 1939 and No. 332 on stem pieces of *Euphrasia* sp., Svinkolar í Lóni, distr. Austur Skaftafellssýsla, Iceland: coll. I. Jörstadi, 26 July 1939 (O).

IDENTIFICATION

= *Ascochyta aggregata* (Höhnelt), *comb. nov.*

The pycnidia of this anamorph (Fig. 1) are stromatic-scleroplectenchymatous, up to 500 μm diam., with 1–2 closed or poroid locules. They have a *Plenodomus*-like wall structure (JKJ+), comparable with that of *Phoma sclerotioides* Preuss ex Sacc. (Contribution III-1 no. 3). However, the conidia and conidiogenesis deviate. The relatively large cylindrical conidia, (14.5–)17–22(–24) \times 2–3 μm , arise as thin-walled outgrowths. At maturity they always become 1-septate as in true species of *Ascochyta* Lib. (Boerema & Bollen, 1975; Boerema, 1984: fig. 7, wall-thickening septation). The suggested obligate septation of the conidia could not be checked *in vitro* and the disposition is therefore provisional. However, the pycnidial wall structure, being typically *Plenodomus*-like, is quite

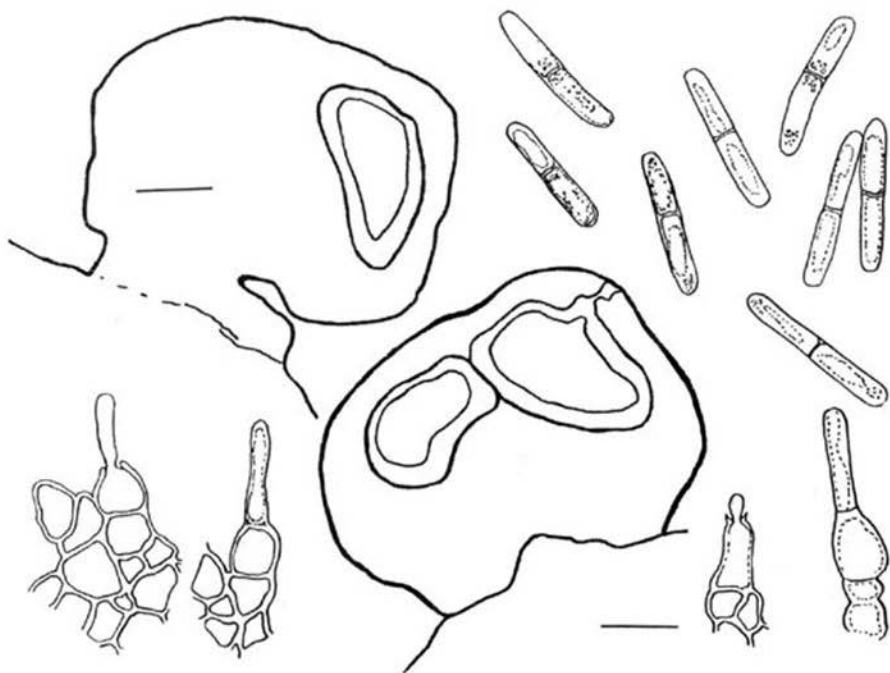


Fig. 1. *Ascochyta aggregata*. Conspicuous large scleroplectenchymatous pycnidia ('*Plenodomus*-like'). The conidia arise as thin-walled cylindrical outgrowths; at maturity they always become 1-septate. Drawings from Fungi Islandiae No. 194, labelled *Scleroderris aggregata* (O). Bar pycnidia 100 μm . Bar conidia 10 μm .

distinct from that of 'common' *Ascochyta* spp. and if species of *Ascochyta* with this type of wall are ever detected, they could then be classified with the above species in a separate section of *Ascochyta*.

Diploplendomus aggregata has been proposed as the anamorph of *Sclerodothis aggregata* (Lasch) Höhnelt, type species of the Ascomycete genus *Sclerodothis* Höhnelt. The latter genus is very close to *Leptosphaeria* Ces. & de Not., see Von Höhnelt l.c. and Holm (1957: 36). A single identity of both morphs is plausible but not yet proved in cultural experiments.

2. *Plenodomus borgianus* Sacc.

Plenodomus borgianus Saccardo, *Annl. mycol.* 11 (1913) 17–18.

Material examined. Type on skin of pumpkin fruit, *Cucurbita pepo* (Cucurbitaceae), S. Martin, Malta: coll. Caruana-Gatto, Oct. 1911 (Herb. Saccardo, PAD).

IDENTIFICATION

= *Phomopsis* sp.

The type collection of *Plenodomus borgianus* was examined by Dr. B.C. Sutton (IMI) who wrote to us: "I think there is no doubt about this being a species of *Phomopsis* producing α -conidia." The fungus is characterized by biguttulate fusiform conidia, (5–)5.5–6.5(–7) \times 2 μ m, formed from verticillately branched conidiophores with terminal phialides, and thick-walled, initially 'sclerotoid' pycnidia, separate or aggregate, up to 700 μ m diam. There are no other records of such a fungus on Cucurbitaceae. The species is quite different from *Phomopsis cucurbitae* McKeen (1957) [with α - and β -conidia], the causal organism of 'Fruit- and Stem rot' of cucurbits, and *Phomopsis sclerotoides* van Kesteren (1967) [with short, only occasionally septate conidiophores], causing 'Black Root Rot' in Cucurbitaceae. There is, however, a strong resemblance to *Phomopsis obscurans* (Ell. & Ev.) Sutton (1965), a cosmopolitan recorded foliicolous pathogen of *Fragaria* spp. ('Strawberry Leaf Blight'). The latter grows very well on various artificial media and then often produces large stromatic masses of aggregated pycnidia. An accidental occurrence of *Phomopsis obscurans* on pumpkin fruit is quite well possible. [Such casual findings are often associated with various pathogenic *Phoma* spp., see Boerema, 1975.]

3. *Plenodomus brachysporus* Petrak

Plenodomus brachysporus Petrak, *Annl. mycol.* 21 (1923) 197–199.

Material examined. Type on stem pieces of *Lavatera* sp. (Malvaceae), Gurein near Brunn, Mahren (now Křim near Brno, Jihomoravsky), Czechia (former Czechoslovakia): coll. J. Hruby, May 1922 (Herb. Petrak, W).

IDENTIFICATION

= *Phoma labilis* Sacc., *Michelia* 2 (2) (1881) 341, with reference to description in *Michelia* 1 (2) (1878) 258 [as '*Phoma malvacearum* West.' (misapplied; = *Phomopsis malvacearum* (Westend.) Grove)]; *Sylog. Fung.* 3 (1884) 122.

Petrak's (l.c.) classification of this obviously thin-walled pycnidial anamorph in *Plenodomus* rested on a casual association with a species of *Leptosphaeria* with *doliolum*-type wall structure. The characteristics of the type collection of *Plenodomus brachysporus* – subglobose papillate pycnidia, 150–250 μ m diam., conidia mostly 4–6 \times 2–3 μ m (Fig.

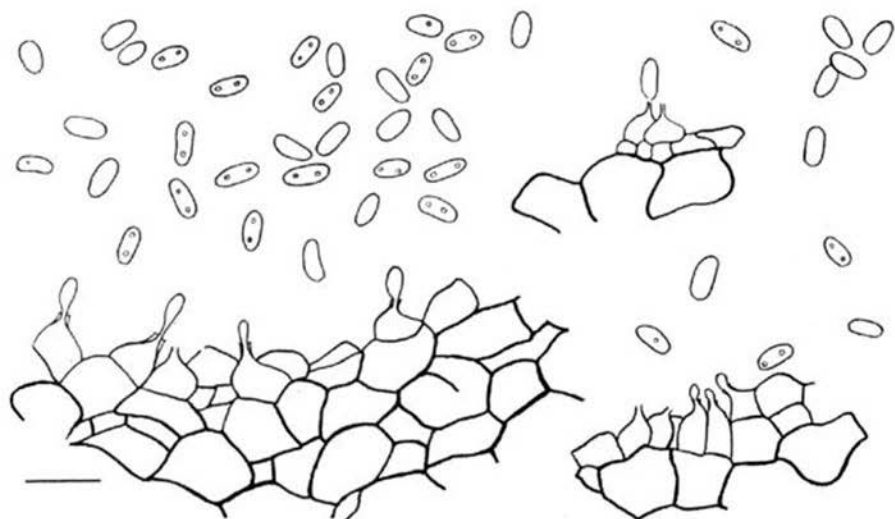


Fig. 2. *Phoma labilis*. Drawings of conidia and conidiogenous layer in vivo on *Lavatera* sp., from type of the synonym *Plenodomus brachysporus* (W). Bar 10 μ m.

2) – fully accord with those of *Phoma labilis*, a saprophytic species of the section *Phoma*, which has been previously recorded in southern Eurasia on dead stems of *Lavatera* spp. Diagnostic data on its characteristics in vitro can be found in Contribution I-2 no. 19 (de Gruyter, Noordeloos & Boerema, 1993).

4. *Plenodomus cannabis* (Allescher) Moesz & Smarods

[Also erroneously distributed as 'Moesz & Smarods n. spec.']

Plenodomus cannabis (Allescher) Moesz & Smarods in Moesz, Bot. Közl. 38 (1941) 70. — *Phoma herbarum* f. *cannabis* Allescher, Rabenh. KryptogFlora, Pilze 6 (1899 [vol. dated '1901']) 330.

Material examined. Type collection of *Phoma herbarum* f. *cannabis* on stem pieces of hemp, *Cannabis sativa* (Cannabaceae), near Altenmarkt, Oberbayern, Germany, 21 Aug. 1882 (Herb. Allescher, M); specimens labelled *Plenodomus cannabis*, on stems of *Cannabis sativa*, distr. Riga, prov. Vidzeme, Latvia (Letland); coll. J. Smarods, 23 March 1939 (Herb. Smarods, W) and coll. J. Smarods, May 1939, distributed as Smarods, Fungi latvici exs. No. 985 (W) and as Petrak, Mycoth. gen. No. 1870 (W; erroneously as 'Moesz & Smarods n. spec.').

IDENTIFICATION

= *Phoma exigua* Desm. var. *exigua*, Anns Sci. nat. (Bot.) III, 11 (1849) 282–283, type species of *Phoma* sect. *Phyllostictoides*.

Boerema (1970) established that the type collection of *P. herbarum* f. *cannabis* fully agreed with *Phoma exigua* on Dutch material of *Cannabis sativa* (proved by isolation of fungus in pure culture). This ubiquitous plurivorous species produces 'common' pseudo-parenchymatous pycnidia with very variable conidia, mostly 5.5–10 \times 2.5–3.5 μ m, the larger ones often becoming 1- or even 2-septate (characteristic for sect. *Phyllostictoides*,

see Van der Aa et al., 1990). For additional diagnostic data on characteristics in vitro see Boerema & Höweler (1967).

The specimens collected by Smarods near Riga in 1939 also contain a species of *Phoma* with pseudoparenchymatous pycnidia, but with notably smaller conidia, mostly 4–5.5 × 1.5–2(–2.5) µm, similar to those of *Phoma herbarum* Westend. (see no. 43, '*Leptophoma urticae*'). However, the conidial dimensions given by Moesz (l.c.) accord with those of *P. exigua* given by Allescher (l.c.).

5. '*Plenodomus cardaminis* Rupprecht'

'*Plenodomus cardaminis* n. sp. det. Rupprecht' in herb. B [manuscript name].

Material examined. Three samples of a collection on stem pieces of *Cardamine impatiens* (Cruciferae), near Oberdresselendorf, Westfalen, Germany: coll. A. Ludwig, 11 Oct. 1925 (Herb. Ludwig, B).

IDENTIFICATION

= *Phoma versabilis*, spec. nov. — Fig. 3

Pycnidia plerumque 240–320 µm diam., globosa, depressa, fusca, immersa, sero poro nec ostiolo aperientia, primum massam cellularum compactarum ('pyncosclerotia') continentia quae deinde in cavitatem cellulis conidiogenis phialidicis vestitam doliiformibus vel ampulliformibus, plerumque 5(–7) × 4–5 µm, dissolvitur. Conidia non-guttulata, ovoidea-ellipsoidea, magnitudine variabilia, in typo plerumque 5–7 × 2–2.5 µm. Cellulae periphericae et basales pycnidiorum fuscae, centrales hyalinae, iodio addito rubescentes. — Holotypus L 995.229-369, ex herbario Ludwig in B.

The characteristics of this species are typical of some species of *Phoma* sect. *Sclerophomella* (type *P. complanata*, see no. 11) with a *Didymella* teleomorph: stromatic pycnidial primordia ('pyncosclerotia', often indistinguishable from immature ascocarps), which lyse gradually into poroid pycnidia. The contents of the initial central cells (at first compact, later loose) stain red with JKJ. This also occurs with the hyaline wall cells of mature pycnidia (a common phenomenon in sect. *Sclerophomella*). The specimens on dead stems of *Cardamine impatiens* collected in Westfalen fully agree with specimens on

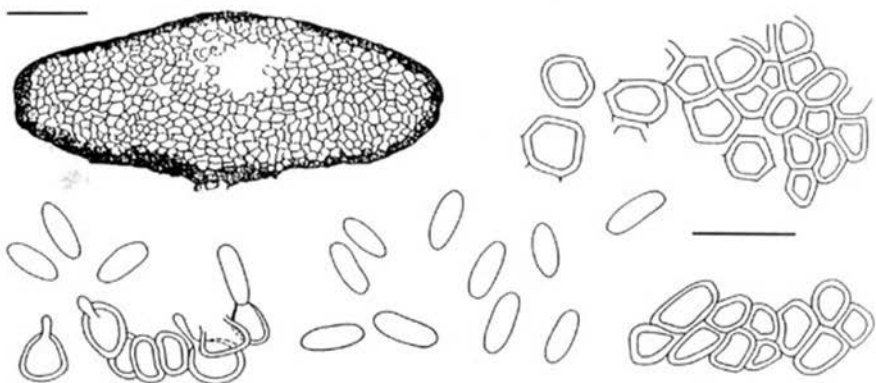


Fig. 3. *Phoma versabilis*. Pycnidia initially containing a compact mass of cells ('pyncosclerotia') which afterwards becomes loose and finally result in a pycnidial cavity lined with doliiform conidiogenous cells. Bar pycnidium 50 µm. Bar cells and conidia 10 µm.

a *Silene* species collected in Wageningen, the Netherlands. This is apparently a species occurring on different plants in Europe ('*versabilis*' = mobile). The immersed globose-depressed pycnidial primordia and pycnidia are mostly 240–320 μm diam., with a dark periphery. Conidiogenous cells doliiform or ampulliform, mostly 5(-7) \times 4–5 μm . Conidia eguttulate, ovoid-ellipsoidal, variable in size, in the type specimen mostly 5–7 \times 2–2.5 μm , in the specimens on *Silene* mostly 5.5–7 \times 2.5–3 μm . The species has much in common with *Phoma sylvatica* Sacc. on *Melampyrum* spp. (see no. 40), which, however, produces significantly smaller conidia.

6. *Plenodomus cenangium* (Corda) Oud.

Plenodomus cenangium (Corda) Oudemans, Enum. Syst. Fung. 4 (1923) 477. — *Sphaeria cenangium* Corda, Icon. Fung. 4 (1840) 43.

Material examined. Type of basionym on leaf of olive, *Olea europaea* (Oleaceae), Italy (Herb. Corda, PR-M 155638; permanent slide: CBS-v.d. Aa 11958). [The leaf with this type specimen has been figured by Corda, see Fig. 4.]

IDENTIFICATION

= *Cytospora cenangium* (Corda), *comb. nov.*



Fig. 4. *Cytospora cenangium*. Reproduction of original illustration of *Sphaeria cenangium* in Corda (1840: Tab. 9, fig. 126).

The characteristics of this fungus are clearly illustrated by Corda, l.c. (reproduced in Fig. 4). He noted that the fungus could be symptomless on petioles and young twigs, but on leaves conidiomata were hypophyllous within pallid spots. They fit well with those of the genus *Cytospora* Sacc. cf. the illustrated type study by Sutton (1980: fig. 339). Conidiomata stromatic, semi-globose with a broad base, 600–1000 μm diam., consisting of thin-walled pale brown cells, darker at the periphery; multiloculate, i.e. 15–20 locules at varying levels, ostioles absent, dehiscence by irregular fissures. Conidiophores arising from the inner cells of the locules, short cylindrical, occasionally septate, with acropoleurogenous conidia. Conidia cylindrical, often somewhat curved, mostly (4–)5(–5.5) \times 1.5 μm , eguttulate or with 1–2 small polar guttules.

Finally it should be noted that olive leaves can support some *Cytospora*-like anamorphs reminiscent of *Cytospora cenangium*, such as the well-known foliicolous Ascomycete *Propolis panizzei* (de Not.) Sherwood (1977; = *Stictis panizzei* de Not.), see Petri (1905).

7. *Plenodomus chelidonii* Naumov

Plenodomus chelidonii Naumov, Mater. Fitopat. Ross. 5 (1926) 12.

Material examined. Culture of type specimen from dead stems of *Chelidonium majus* (Papaveraceae), Detskoje (formerly Tsarskoje), Selo, Russia, 24 Sept. 1915; leg. N.A. Naumov (CBS 115.16).

IDENTIFICATION

= *Phomopsis* sp.

The description as well as the cultural characters of this fungus clearly point to a species of *Phomopsis* (Sacc.) Sacc. with only α -conidia. The placement in *Plenodomus* was probably based on the paper by Von Höhnell (1909) in which *Plenodomus* Preuss was treated as an older synonym of *Phomopsis* (recanted by Von Höhnell, 1918). The fungus was characterized by indistinct ostiolate conidiomata, 300–500 μm diam. and 300 μm high, with relatively long conidiophores, 22–30 μm ; dimensions of α -conidia 5.5–7.2 \times 2.7 μm . The characteristics of conidiophores and conidia are reminiscent of *Phomopsis morphaea* (Sacc.) Grove, Bull. misc. Inf. R. bot. Gdns Kew 2 (1917) 70, originally described on stems of *Papaveris orientale* in Italy. The latter, however, should produce very small conidiomata, c. 150 μm diam. For a discussion on the species concept in the genus *Phomopsis* see Sutton (1980) and Van der Aa, Noordeloos & de Gruyter (1990).

8. *Plenodomus chenopodii* (P. Karsten & Hariot) v. Arx

Plenodomus chenopodii (P. Karsten & Hariot) von Arx, Verh. Kon. ned. Akad. Wet. [Afd. Natuurk.] reeks 2, 51, 3 [= Revision Gloeosporium ed. 1] (1957) 73. — *Gloeosporium chenopodii* P. Karsten & Hariot, J. Bot., Paris 3 (1889) 209.

Material examined. Type of basionym on stem pieces of *Chenopodium album* (Chenopodiaceae), Clermont-Ferrand, Auvergne, France, Oct. 1888 (PC).

IDENTIFICATION

≡ *Phoma chenopodiicola* de Gruyter et al., Persoonia 15 (3) (1993) 395–396 [Contribution I–2 no. 23]; not *Phoma chenopodii* Ahmad, Sydowia 2 (1948) 79.

A common necrophyte on *Chenopodium album*. The thin-walled pycnidia, mostly 200–250 μm diam., are often deeply immersed, which may explain the original classification in *Gloeosporium*. Conidia in vivo usually broad-ellipsoidal, mostly 5.5–7 \times 2.5–3 μm ; in vitro their shape and size are more variable, common dimensions 4–7(–10) \times 1.5–2.5(–4.0) μm . In both cases the conidia always remain one-celled (sect. *Phoma*). The diagnostic data in Contribution I–2 no. 23 (de Gruyter, Noordeloos & Boerema, 1993) refer to the characteristics in vitro.

Von Arx's interpretation of this fungus as *Plenodomus* was recanted in the second edition of 'Revision Gloeosporium' (von Arx, 1970). There the species has been listed as conspecific with the plurivorous *Phoma exigua* Desm. var. *exigua*, which also frequently in Europe occurs on *Chenopodium album* (see e.g. Boerema & Howeler, 1967). The latter may produce similar continuous conidia, but usually also 1- or even 2-septate conidia occur (sect. *Phyllostictoides*); compare the note under *Plenodomus cannabis* (no. 4).

9. 'Deuterophoma vascular pathogen' of *Chrysanthemum* spp.

Deuterophoma isolates from stunted or wilting plants, reported by Baker, Davis & Kimball, Pl. Dis. Repr 33 (1949) 2–8, Taylor, Aust. J. exp. Agric. Anim. Husb. 2 (1962) 90–91 and Robertson, Pl. Path. 16 (1967) 31–36.

Material examined. Culture from dark coloured vascular bundles in flower stems of *Chrysanthemum coccineum* (Compositae), Chatteris, Cambridgeshire, England, 1962 (IMI 12871; isolate studied by Robertson, 1967).

IDENTIFICATION

= *Phoma vasinfecta* Boerema et al., *Persoonia* 15 (4) (1994) 485; synanamorph *Phialophora* sp.

The initial classification of this fungus as *Deuterophoma*, infecting the vascular system in *Chrysanthemum* spp. (Slow Wilt, Decline Disease), rested on the production of 'Cephalosporium-like' hyphal conidia (= *Phialophora* synanamorph), a feature of *Phoma tracheiphila* (Petri) Kant. & Gik. (Contribution III-1 no. 21), the type species of Petri's genus *Deuterophoma*. Both fungi have about the same dimensions of pycnidia, pycnidial conidia and hyphal conidia. *Phoma tracheiphila* is also a vascular pathogen, the causal organism of wilt and dieback of lemons and other *Citrus* spp. (Mal Secco Disease). Due to the similarities, Baker et al. (1985) proposed *P. tracheiphila* f. sp. *chrysanthemi* for the chrysanthemum pathogen. However, apart from the quite different hosts and improbability of common origin, there are essential morphological differences. The most important argument for differentiating the chrysanthemum pathogen at species level has been the absence of scleroplectenchyma (Boerema et al., 1994). Furthermore, the pseudoparenchymatous pycnidia of *Phoma vasinfecta*, (55-)75-100(-160) μm diam., have only slightly elongated necks (neck at the most 40 μm , whilst in *P. tracheiphila* it is up to 250 μm long); conidia mostly (2-)2.5-3(-4) \times 1-1.5 μm . The *Phialophora* synanamorph of *P. vasinfecta* is indistinguishable from *Phialophora chrysanthemi* (Zachos et al.) W. Gams, with variable conidia, mostly 2.5-5 \times 1-2(-2.5) μm .

10. *Plenodomus cocogenus* Saw.

Plenodomus cocogenus Sawada, *Spec. Publ. Coll. Agric. natn. Taiwan Univ.* 8 (1959) 145 [as '*cocogena*', nom. inval. Art. 36].

Material examined. Type on leaves of *Cocos nucifera* (Cocoineae), Hengchun, Pref. Pingtung, Taiwan: coll. T. Kusumoto, 15 March 1941 (TNS = NSM).

IDENTIFICATION

= *Asteromella cocogena*, *spec. nov.*

Diagnosis traducta e Sawada (1959: 145): Pycnidia hypophylla, gregaria, dispersa, subepidermalia, deinde erumpentia, conica, deinde globosa, 52-100 μm diam., plus minusve stromate circumdata, paries et stromata fusca, pseudoparenchymatosa; ostiola 11-13 μm diam.; conidia cylindrica, continua, hyalina, 4-4.5 \times 1 μm . In laesionibus ovalibus, flavo-brunneis ad griseo-albidis, modice depressis, margine brunneo et modice elevato circumdati, 1.5-13 \times 1.3-8 μm , ad folia *Cocoi nuciferae*. - Holotypus TNS-F 2207789.

A typical species of *Asteromella*: small, more or less stromatic pycnidia, 50-100 μm diam., hypophyllous in yellow-brown to greyish white lesions. Conidia small, usually 3-4(-4.5) \times 1 μm , arising from short septate conidiophores, apically and laterally just below the septa. The somewhat stromatic structure of the pycnidia was apparently the reason why Sawada has classified it in *Plenodomus*. It was published after 1 January 1935 without a Latin diagnosis (Art. 36.1). This is supplied above.

Asteromella cocogena resembles *A. cocoes* Batista & Bezerra (1965) described from similar lesions on leaves of *Cocos nucifera* in Brazil (holotype UFP = IMUR), but the

pycnidia of the latter are always epiphyllous. *Asteromella cocogena* and *A. cocoes* may represent the microconidial or spermogonial stages of two different species of *Mycosphaerella*.

11. *Plenodomus complanatus* (Tode: Fr.) Rupprecht'

'*Plenodomus complanatus* (Tode) Rupprecht', comb. nov. in herb. B [manuscript name]. — *Sphaeria complanata* Tode, Fungi mecklenb. Sel. 2 (1791) 22; Fries, Syst. mycol. 2 [Sect. 2] (1823) 508. — *Phoma complanata* (Tode: Fr.) Desmazières, Annl. Sci. nat. (Bot.) III, 16 (1851) 299–300. — *Sclerophomella complanata* (Tode: Fr.) Höhnelt, Hedwigia 59 (1918) 238.

Material examined. *Plenodomus complanatus* 'teste Rupprecht' on stem pieces of *Heracleum sphondylium* (Umbelliferae) near Rhode, Kreis Olpe, Westfalen, Germany: coll. A. Ludwig, 29 April 1921 (= Sydow, Mycoth. germ. No. 2179 sub *Sclerophomella complanata* (Desm.) Höhnelt) in Herb. Ludwig (B). Various other specimens on Umbelliferae in Herb. Ludwig (B) with the annotation 'Plenodomus teste Rupprecht', but originally labelled *Sclerophomella complanata*, e.g. collections by K. Starcs, Latvia (Letland) on *Angelica sylvestris*, distr. Riga, prov. Vidzeme, 27 June 1936 and 5 June 1938, collections by A. Ludwig, Flora von Hessen-Nassau, Germany, on *Conium maculatum*, Dillkreis, 10 May 1924, and Flora von Westfalen, Germany on *Aegopodium podagraria*, Kreis Siegen, 3 May 1947, on *Anthriscus sylvestris*, Kreis Siegen, 21 April 1934 and 30 Dec. 1947, and on *Chaerophyllum hirsutum*, Kreis Siegen, 15 July 1921.

IDENTIFICATION

≡ *Phoma complanata* (Tode: Fr.) Desm., l.c., type species of '*Phoma* sect. *Sclerophomella*'.

A very common fungus on old stems of wild Umbelliferae in temperate Eurasia and North America. Its thick-walled ('sclerotic') pycnidia, up to 400 µm diam., closely resemble pycnidial Type-II of sect. *Plenodomus*, but scleroplectenchyma is always wanting [cell-wall JKJ-; cell-contents may become red]. In vivo, the pycnidia usually contain only aseptate ellipsoidal conidia, 5–9 × 2–3.5 µm, but sometimes a high percentage of the conidia become larger and 1-septate, often 10–15(–16) × 2.5–3.5(–4) µm [see no. 37, '*Diploplenodomus rivini*']. For the characteristics in vitro see Boerema (1976). Old pycnidia on previous year's stems occasionally contain extremely large *ascochytoid* conidia, 20–34 × 6–10 µm. The conidial mass is initially buff to flesh coloured, but darkens with age to brown or black; the conidia then mostly appear septate, swollen and dark.

12. *Plenodomus corni* Batista & Vital

Plenodomus corni Batista & Vital, Anais Soc. Biol. Pernamb. 15 (1957) 420. — *Phoma riggenbachii* Boerema & Janse in Janse, Eur. J. For. Path. 11 (1981) 428–429 [as nom. nov. to avoid homonymy with *Phoma corni* Fückel ex Saccardo, Michelia 2 (1) (1880) 94 = *Phomopsis corni* (Fückel ex Sacc.) Traverso, Fl. ital. crypt. 2 (1906) 268].

['*Plenodomus rabenhorstii*' sensu Riggenbach, Phytopath. Z. 27 (1956) 1–40.]

Material examined. Type collection on branches of *Cornus sanguinea* (Cornaceae), Hungary (Magyarhon Virányaból = Hungarian Flora): coll. F. Hazslinszky, Oct. 1885 (S). Representative culture of *Phoma riggenbachii*, studied by Janse (1981) and obtained from bacterial knot of ash, *Fraxinus excelsior* (Oleaceae), Scheerwolde, Overijssel, the Netherlands, April 1978 (CBS 248.79). Another isolate from bacterial knot of ash, Wageningen, Gelderland, the Netherlands, 1980 (PD 80/212).

IDENTIFICATION

≡ *Pyrenochaeta corni* (Batista & Vital), comb. nov.

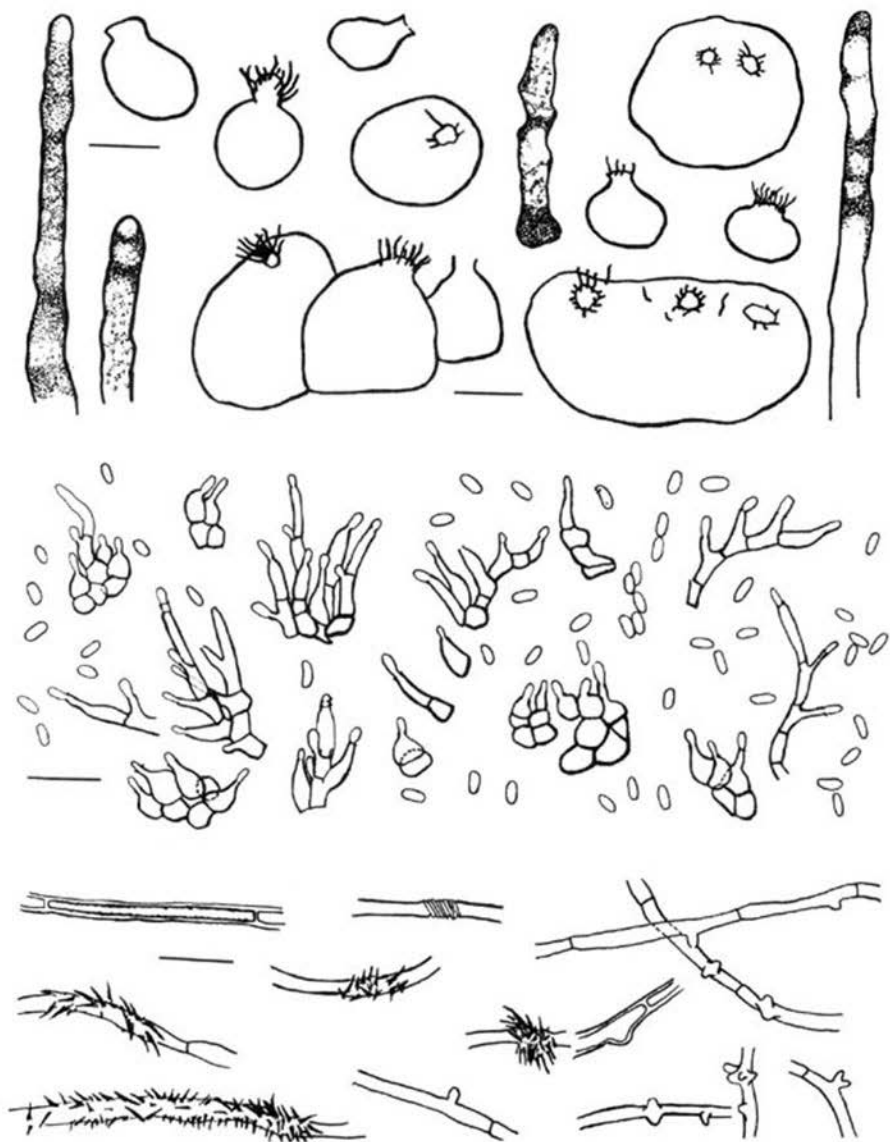


Fig. 5. *Pyrenochaeta corni*. Characteristics in vitro on OA; isolate from bacterial knot of ash, see Jansé, 1981: 428–429 sub *Phoma riggenbachii*. At maturity the initially closed and glabrous scleroplectenchymatous pycnidia (*Plenodomus*-like) become setose around the pore. The elongated ampulliform conidiogenous cells gradually develop into filiform septate conidiophores, producing small conidia apically and just below the transverse septa. Characteristic short tubercles and 'splinter'-crystals, emanate from the aerial hyphae. The crystals apparently start forming in bands beneath the cell wall. Bar pycnidia 100 μ m. Bar setae, hyphae, conidia and conidiogenous cells 10 μ m.

This appears to be a lignivorous necrophyte already distributed in 1884 by Roume-guère as '*Phoma enteroleuca* Sacc. f. *fraxini*', see Boerema & Loerakker (1985: 295–296). The fungus is often found in Europe in association with bacterial knot (canker) of ash (Riggenbach, l.c.; Janse, l.c.). On account of its scleroplectenchymatous wall structure it was reclassified in *Phoma* sect. *Plenodomus* (as *Phoma riggenbachii*). However, further studies on isolates from ash revealed typical characteristics of the genus *Pyrenochaeta* de Not. emend. Schneider (1979), see Fig. 5. At maturity, the initially closed and glabrous pycnidia become setose around the porus. The elongated ampulliform conidiogenous cells gradually develop into filiform and branched septate conidiophores, producing small conidia (mostly $2.5\text{--}3 \times 1\text{--}1.5 \mu\text{m}$) apically and just below the transverse septa. Production of short protuberances and 'splinter'-crystals are specific features of the aerial mycelium in vitro.

Within the genus *Pyrenochaeta* one species with an obviously scleroplectenchymatous wall structure is already known, viz. *Pyrenochaeta fallax* Bres., see the discussion under *Leptophoma urticae* (Schulzer & Sacc.) Höhnelt (no. 43). Thus within *Pyrenochaeta* one may also differentiate a separate section resembling sect. *Plenodomus* in *Phoma* ('*Plenodomopsis*').

13. *Plenodomus cruentus* Sydow

Plenodomus cruentus H. Sydow & P. Sydow, *Annis mycol.* 34 (1936) 395.

Material examined. Syntypes on stem pieces of *Thalictrum flavum* (Ranunculaceae), Tamsel, Brandenburg, Germany, distributed as Sydow, Mycoth. germ. No. 2935 (1936) sub '*Nebenfruchtform Leptosphæria cruenta* Sacc.': coll. P. Vogel, 6 July 1929, 29 May 1932, 17 May 1934 (Herb. Ludwig, B; UPS); specimens on stem pieces of *Thalictrum* sp., Mt Bisamberg near Vienna, Niederdonau, Austria, distributed as Petrak, Mycoth. gen. No. 1865: coll. F. Petrak, May 1940 (W); specimens on stem pieces of *Thalictrum* sp., Mt Hundsheimer Kogel near Hainburg, Niederdonau, Austria, distributed as Petrak, Mycoth. gen. No. 1939: coll. F. Petrak, May 1940 (W).

IDENTIFICATION

≡ *Phoma cruenta* (Sydow), *comb. nov.*

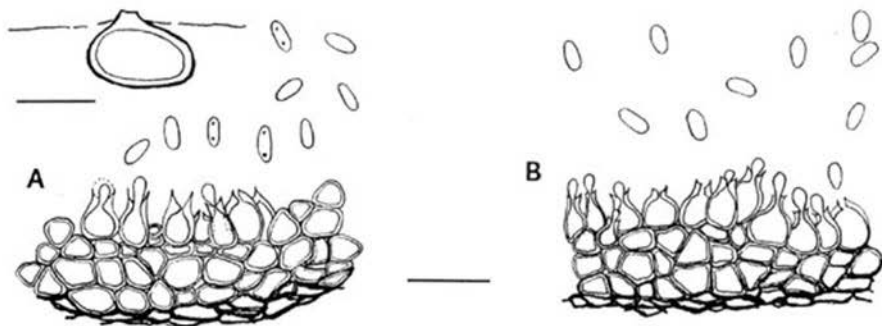


Fig. 6. *Phoma cruenta*. The wall of the small immersed pycnidia consists of several layers of small thin-walled cells. Conidiogenous cells relatively large, globose, with a conspicuous collarette. Drawings from A. syntype of the basionym *Plenodomus cruentus* on *Thalictrum flavum* (UPS), B. Mycoth. gen. No. 1865 (W) on *Thalictrum* spec. Bar pycnidium 100 μm . Bar cells and conidia 10 μm .

The small pycnidia of this species, mostly c. 200 µm diam., occur in reddened patches on the host; they have relatively thick walls, composed of rather small thin-walled cells (non-scleroplectenchymatous). The slightly papillate ostiole sometimes has a reddish pigment. The conidiogenous cells (Fig. 6) have conspicuous collarettes; conidia (3-)3.5-4.5 (-5) × 1-2 µm, often biguttulate. The pycnidia have been recorded in association with immature pseudothecia of *Leptosphaeria cruenta* Sacc., but a single identity is not yet proved by culture studies. *Leptosphaeria cruenta* is obviously close to *L. haematites* (Rob. ex Desm.) Niessl, frequently found in red coloured areas on stems of *Clematis vitalba*, see no. 20 under *Plenodomus haematites*. Another closely allied species, occurring in reddened patches on various hosts is *L. purpurea* Rehm, anamorph *Phoma sanguinolenta* Grove, treated in the 'Addendum' of Contribution III-1. The latter fungi show scleroplectenchymatous ascocarp wall structure but their pycnidia are always pseudoparenchymatous.

14. *Plenodomus destruens* Harter

Plenodomus destruens Harter, *Phytopathology* 3 (1913) 245.

Material examined. Type on stem pieces of sweet potato, *Ipomoea batatas* (Convolvulaceae), Portsmouth, Virginia, USA, 15 Aug. 1912 (BPI); an original culture of the fungus made by Harter (CBS 129.21); similar culture from decayed wood of *Ipomoea batatas*, 1966 (CBS 253.66).

IDENTIFICATION

≡ *Phomopsis destruens* (Harter), *comb. nov.*

The type collection, cultures and the original description of this well-known pathogen of sweet potatoes (Foot Rot) obviously refer to a species of *Phomopsis* characterized by biguttulate ellipsoidal α-conidia, mostly 7-10 × 3.5-4 µm, borne on filiform conidiophores, and often mixed with oblong-fusoid γ-conidia without guttules (compare Das Gupta, 1930, figs. 5-7). Harter (l.c.) already noted that the fungus "does not fit exactly the description of *Plenodomus*" and that it "has some characteristics of *Phomopsis*". But in his opinion it differed from *Phomopsis* by wall structure, "two instead of four walls", "dark outer wall which is conspicuous at the top and base of the pycnidia", and "in having no chambering of the pycnidium" and "in not being stromatic". In *Phomopsis*, however, the thickness and darkness of the wall and the presence of stromatic tissue is highly variable depending on factors such as the structure of the host tissue. Furthermore the pycnidia of *Phomopsis* are not always multilocular, the internal cavity usually being only partly divided by protrusions of the proliferous layer; this was also the case with the type specimen of *Plenodomus destruens* (see also Harter, l.c.: fig. 1b). The diversity and variation found amongst *Phomopsis* species is well defined by Sutton (1980).

15. *Plenodomus erythrinae* Oud.

Plenodomus erythrinae Oudemans, *Versl. gew. Verg. Afd. Natuurk. Kon. Ned. Akad. Wet.* 5 (1897) 229-231.

Material examined. Type on stems of dadap, *Erythrina javanica* (Leguminosae), Java, Indonesia, Nov. 1896 (Herb. Oudemans, L).

IDENTIFICATION

≡ *Lasiodiplodia theobromae* (Pat.) Griffon & Maubl., *Bull. trimest. Soc. mycol. Fr.* 25 (1909) 57.

The type collection contains large aggregates of stromatic ostiolate pycnidia, up to 3 mm diam., with relatively large, thick-walled subovoid hyaline conidia, $25-30 \times 15 \mu\text{m}$ [these dimensions are somewhat larger than those reported in the original account ($19-23 \times 10-11 \mu\text{m}$)], borne on cylindrical to somewhat obpyriform conidiogenous cells. The pycnidia are clearly a young (immature) stage of *Lasiodiplodia theobromae*, a common plurivorous fungus in tropical and subtropical regions, popularly known as *Botryodiplodia theobromae* Pat. Mature conidia of this anamorph are 1-septate, cinnamon to dark brown, and longitudinally striate. The teleomorph is known as *Phyalospora rhodina* Berk. (Sutton, 1980) or *Botryosphaeria rhodina* (Berk. & Curt.) von Arx (1970). The fungus causes, or is associated with, many diseases (see Punithalingam, 1976); in Java it is repeatedly found in association with a dieback of *Erythrina* (see e.g. Steinmann, 1928).

16. *Plenodomus eucalypti* Alm. & Com.

Plenodomus eucalypti d'Almeida & de Sousa da Camara, Revta agron., Lisb. 5 (1907) 339-340 [Contr. MycoFl. Lusit. 4, no. 96].

Original material "on branches of *Eucalyptus globulus* (Myrtaceae) near Caldas da Reinha, Portugal: coll. A. Moller, Aug. 1904" apparently not preserved cf. inf. Dr. M.E.P. Costa (1982), Lab. Pat. veg. 'Verissimo de Almeida' (LISVA). [The planned figures of the species 'Tab. 1 fig. 9-10' were also lost and not published; inf. Dr. M.T. Lucas (1982) (LISE).]

IDENTIFICATION

= *Phomopsis allescheriana* (P. Henn.), *comb. nov.*; basionym. *Phoma allescheriana* P. Hennings, Verh. bot. Ver. Prov. Brandenb. 40 (1898) 166; holotype on branches *Eucalyptus resinifera*, April 1894 (B).

The description of *Plenodomus eucalypti* matches very well with the characteristics of the above *Phoma allescheriana*, found on dead branches of various species of *Eucalyptus* in the Berlin botanical garden. This species is described in detail by Diedicke (1912b), who referred it to the genus *Sclerotiopsis* Speg. (synonym of *Pilidium* Kunze, cf. Sutton, 1980). In our opinion it concerns a typical host-restricted species of *Phomopsis* (Sacc.) Sacc., producing only α -conidia: Pycnidia initially immersed, then erumpent, subglobose with flattened base, $200-350 \mu\text{m}$ diam., thick-walled and stromatic ('sclerotoid tissue'), multilocular and without a distinct ostiole. Conidiophores filiform, but usually disappearing at maturity. Conidia fusiform, biguttulate, $5-6(-8) \times (2-2.5(-3) \mu\text{m}$ [α -conidia].

[*Phomopsis eucalypti* Zerova, Bot. Zh. 1 (1940) 307, in Kiev, Ukraine (former USSR), recorded on twigs of *Eucalyptus* sp. in a greenhouse, produces larger α -conidia, $7-9(-12) \times 2-2.5 \mu\text{m}$ and in addition β -conidia, $20-25 \times 1.5-2 \mu\text{m}$.]

17. *Plenodomus filarszkyanus* (Moesz) Petrak

Plenodomus filarszkyanus (Moesz) Petrak, Anns mycol. 23 (1925) [54-]55.—*Sphaeronaema filarszkyanus* Moesz, Bot. Közl. 14 (1915) 151[-152] [as '*Sphaeronaema filarszkyana*'].

Original material of the basionym "on dried stems of *Luzula spadicca* (Juncaceae), in the Kistarpatak valley in the mountain-range Vysoké Tatry, Slovakia (former Czechoslovakia): coll. F. Filarszky & G. Moesz, 15 June 1909" could not be traced and was probably destroyed in the Second World War cf. inf. Dr. J. Gönczöl, BP (1978); it was studied by Petrak (1925a).

IDENTIFICATION

≡ *Phoma filarszkyana* (Moesz), *comb. nov.*

The descriptions of this species by Moesz (l.c.) and Petrak (l.c.) clearly point to a species of *Phoma*, distinguished by nearly globular conidia, mostly 2.5–3 µm diam.; but the descriptions do not give any indication of the presence of scleropectenchyma. Petrak's concept of *Plenodomus* was mainly based on the general appearance of the pycnidia, 'pleurogenous' origin of the conidia and a connection with the ascomycetous genus *Leptosphaeria*. *Phoma filarszkyana* may indeed be connected with a species of *Leptosphaeria* sensu lato, because it agrees with the anamorph of *L. typhicola* P. Karsten, cf. the cultural study by Lucas & Webster (1967). That Ascomycete is known as a very variable plurivorous fungus [cf. Leuchtmann (1984) as *Massariosphaeria typhicola* (P. Karsten) Leuchtm. and Barr (1989) as *Chaetomastia typhicola* (P. Karsten) Barr], recorded on various monocotyledons, esp. marsh plants belonging to the Cyperaceae, Gramineae, Juncaceae and Typhaceae. However, some of the records probably refer to another species, because isolates made by Leuchtmann developed a different anamorph with much larger conidia. The pycnidia of *P. filarszkyana* in vivo were subglobose-ellipsoidal with flattened base and a gradually developing ostiolate neck, variable in size, 100–900 µm diam., wall 40–50 µm, neck mostly 130–150 µm long. The pycnidia obtained by Lucas & Webster in vitro were subglobose and non-ostiolate, 320–400 µm diam., wall 32–48 µm. Conidia 3–4 × 2.5–3 µm.

18. *Plenodomus fusco-maculans* (Sacc.) Coons

Plenodomus fusco-maculans (Sacc.) Coons, J. agric. Res. 5 (1916) 714; Rep. Mich. Acad. Sci. 17 (1916) 122. — *Phoma fusco-maculans* Saccardo, Michelia 2 (2) (1881) 275. — *Aposphaeria fusco-maculans* (Sacc.) Saccardo, Sylloge Fung. 3 (1884) 174.

Material examined. Type of basionym on decorticated wood of apple, *Malus pumila* (Rosaceae), Selva, North Italy, Oct. 1880 (PAD).

IDENTIFICATION

= *Aposphaeria pulviscula* (Sacc.) Saccardo, Michelia 1 (2) (1878) 259; type species of the genus *Aposphaeria* Sacc.

Coons (l.c.) erroneously adopted Saccardo's *Aposphaeria fusco-maculans* for a typical species of *Phoma* sect. *Plenodomus* found in Michigan, USA, in association with a superficial bark canker of apple: *Phoma coonsii* Boerema & Loerakker, see Contribution III-1 no. 22. The characteristics of Saccardo's *Aposphaeria fusco-maculans*, described from decorticated wood of apple in Italy, agree with those of the earlier described *Aposphaeria pulviscula* (compare Sutton, 1980). Superficial subglobose pycnidia with inconspicuous central ostiole; wall composed of an outer layer of brown thick-walled cells and an inner layer of smaller hyaline cells with undifferentiated conidiogenous cells together with cylindrical 1–3-septate conidiophores. Conidia 3–4.5 × 1.5 µm, arising apically or just below the septa. *Aposphaeria fusco-maculans* is also recorded on decorticated wood of mountain ash, *Sorbus aucuparia* (Bresadola & Saccardo, 1897). The original material of *A. pulviscula* (PAD) refers to bare wood of willow, *Salix* sp. and wood of an indeterminate species. Thus it may be a common lignivorous fungus in southern Europe. The pycnidial dimensions varied mostly between 80–200 µm on the various substrata. Some species of *Aposphaeria* are metagenetically related to members of the Ascomycete genus *Melanomma* (Nitschke) Fuckel; this is also suggested for *A. pulviscula*, but not confirmed in cultural experiments, see Sutton (1980).

19. *Plenodomus gallarum* (Oud.) Oud.

Plenodomus gallarum (Oud.) Oudemans, Ned. kruidk. Archf II, 4, 3 (1885) 229–230; Versl. gew. Verg. wis- en natuurk. Afd. Kon. ned. Akad. Wet. Amst. 5 (1897) 229–230. — *Dothiora gallarum* Oudemans, Versl. Meded. Kon. Akad. Wet. [Afd. Natuurk.] reeks 2, 18 (1883) 371–372.

Original material "on hypophyllous galls on fallen leaves of *Quercus robur* (Fagaceae), near Wageningen, the Netherlands; coll. M.W. Beyerinck" apparently not preserved (not in herb. Oudemans, L).

IDENTIFICATION

= *Cleistophoma dryina* (Berk. & Curt.) Petrak & H. Sydow, Beih. Repert. Spec. nov. Regni veg. 42 [Bogen 1/10; = Gatt. Pyrenomyz. Sphaerops. Melancon. I] (1926) 295–297.

The description of *Plenodomus gallarum* (Oudemans, 1885, 1897) matches well with the characteristics of *Cleistophoma dryina* as described by Petrak & Sydow (l.c.) from branches and branch-galls of *Quercus* spp., collected in the USA. Pycnidia subepidermal, numerous, mostly densely crowded, semi-globose, closed, with a flattened stromatic base, very variable in dimensions, often 200–400 µm diam., but also much larger and often coalescing. The pycnidial cavity has usually a multilocular appearance by the development of a central cellular column or irregular folded outgrowth from the basal stroma. At maturity the upper wall of the pycnidia apparently dehisces or breaks down. Conidia relatively large, broad ellipsoidal, but soon becoming shriveled; they are borne on short cylindrical conidiogenous cells lining the loculus. The two species differ only by conidial size; Oudemans noted 20 × 6–7 µm, whereas those of *C. dryina* should be shorter, mostly 11–14 × 6–8.5 µm. Petrak & Sydow (l.c.) remark that *C. dryina* is probably conspecific with *Cleistophoma suberis* (Prill. & Delacr.) Petrak & H. Sydow, originally described from leaves of *Quercus suber* in the Alpes-maritimes, France; conidia 12.5–18 × 7–10 µm. Thus they should be forms of one species (with *C. dryina* having priority). According to Oudemans (l.c.), *Plenodomus gallarum* fully agreed with the type material of *Tubercularia gallarum* Lévillé, Anns Sci. nat. (Bot.) III, 5 (1846) 273, described from leaf-galls of a *Quercus* species in Bois de Vincennes, Paris, France. However, the original material of *T. gallarum* now also seems to be lost (not in PC).

20. *Plenodomus haematites* Petrak

Plenodomus haematites Petrak, Sydowia 1 (1947) 135–136.

Material examined. Type on stems of *Clematis vitalba* (Ranunculaceae), Mt. Hundsheimer Kogel near Hainburg, Niederdonau, Austria, May 1940 (herb. Petrak, W); specimens studied by Lucas & Webster (1967) and labelled *Leptosphaeria haematites*: pycnidia associated with teleomorph on stems of *Clematis vitalba*, Sharnbrook, Bedfordshire, England, 6 March 1959, and pycnidia in dried oat meal agar culture produced by a single ascospore isolate of this collection (SHEFF 2367); pycnidia in dried oat meal agar culture produced by a single ascospore isolate of the teleomorph from stems of *Clematis vitalba*, Odell, Bedfordshire, England, 12 Feb. 1959 (SHEFF 2353).

IDENTIFICATION

= *Phoma haematites* (Petrak), *comb. nov.*

This species represents the anamorph of *Leptosphaeria haematites* (Rob. ex Desm.) Niessl, cf. the cultural studies by Lucas & Webster, l.c. The fungus is associated with red coloured areas on stems of *Clematis vitalba* throughout Europe. Closely allied to *L. haema-*

tites are *L. cruenta* Sacc. on *Thalictrum* spp., discussed under no. 13 as *Plenodomus cruentus*, and *L. purpurea* Rehm, anamorph *Phoma sanguinolenta* Grove, treated in the 'Addendum' of Contribution III-1. These fungi have the following features in common; they occur in reddened patches on the hosts and often have some red pigmentation around their ostioles; their ascocarp wall structure is scleropectenchymatous, but their pycnidia are pseudoparenchymatous. The pycnidia of *Phoma haematites* are relatively small, 150–250 µm diam., globose with a slightly papillate ostiole; wall consisting of several layers of small thin-walled cells (JKJ-). Conidiogenous cells are globose to bottle-shaped; conidia oblong to ellipsoidal with an inconspicuous guttule at each end, mostly (5–)5.5–7 (–7.5) × 2–2.5(–3) µm [clearly larger than those of *P. cruenta*; see no. 13].

21. *Plenodomus herbarum* Allescher

Plenodomus herbarum Allescher, Ber. bayer. bot. Ges. 5 (1897) 17.

Material examined. Type on decayed, overwintered leaves of lily of the valley, *Convallaria majalis* (Liliaceae). Langheim, near Lichtenfels, Oberfranken, Germany: coll. F. Rohnfelder, April 1896 [Herb. Allescher, M]; specimens on decayed leaves of *Convallaria majalis* distributed as '*Plenodomus herbarum*' in Petrak, Mycoth. gen. (1930) No. 295; coll. P. Vogel, Tamsel, Brandenburg, Germany, Feb. 1927 (W).

IDENTIFICATION

≡ *Phacidiella hiemalis* (Desm.), *comb. nov.*; basionym *Sporonema hiemalis* Desmazières, Anns Sci. nat. (Bot.) III, 16 (1851) 320; syntype on decayed leaves of *Quercus* sp. (PC, NY).

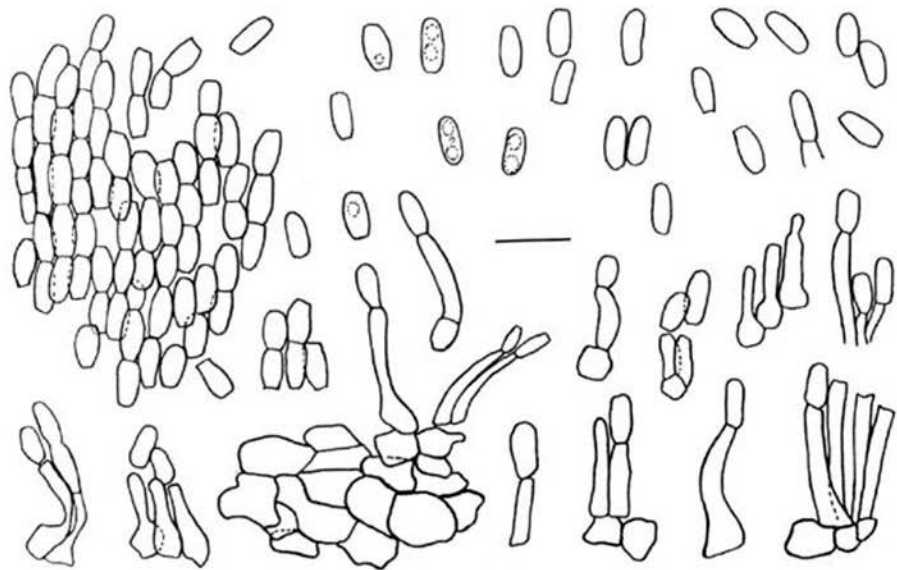


Fig. 7. *Phacidiella hiemalis*. Long chains of barrel-shaped conidia, produced on cylindrical conidiophores. Drawings from holotype of the synonym *Plenodomus herbarum* (herb. Allescher, M). Bar 10 µm.

Plenodomus herbarum appeared to be conspecific with *Sporonema hiemalis*, described from the previous year's semi-decayed leaves of a *Quercus* species in France [cf. Desmazières, Pl. cryptog. France II [ed. 3] No. 81; e.g. in PC and NY, the latter specimen studied and illustrated by Limber, 1955]. It may be significant that lily of the valley is often found under oak trees. The fungus has typical characteristics of the genus *Phacidiella* P. Karsten, compare Sutton (1980). Pycnidia at first globose and closed, later opening and splitting irregularly and becoming cupulate, mostly 150–200 µm diam.; wall rather thin, consisting of brown-black cells. Conidiophores inconspicuous, cylindrical, usually (4–)10(–15) × 1.5 µm, little different from the conidia. Conidia short-cylindrical with truncate ends, mostly (5–)6(–7) × 2–2.5 µm. The conidia adhere in long chains and separate with difficulty, see Fig. 7. It should be noted that this fungus also has been placed in the genera *Schizothyrella* Thumen (Von Höhnelt, 1910: 645) and *Sirexipula* Bubak (Limber, 1955).

22. *Plenodomus hoveniae* Gucevicz

Plenodomus hoveniae Gucevicz, Nov. Sist. niz. Rast. 14 (1977) 78.

Material examined. Type on dry branches of *Hovenia dulcis* (Rhamnaceae), Nikitzki Botanical Garden, Tauria, Russia, 1958 (LECB via IBFI).

IDENTIFICATION

≡ *Fusicoccum hoveniae* (Gucevicz), *comb. nov.*

Plenodomus hoveniae looks much like a species of *Phomopsis*, but the conidiogenous cells are not phialidic. It shows close agreement in conidiogenesis and conidial morphology with *Fusicoccum aesculi* Corda sensu Saccardo, the species on which *Fusicoccum* Corda (in Sturm, 1829) probably has been based. See the discussion of that genus and its type species by Sutton (1980). In this context *Fusicoccum* spp. are often anamorphs of *Botryosphaeria* spp.

The fungus (Fig. 8) produces conidiomata which are initially clypeoid-stromatic, but later become completely surrounded by stromatic tissue (JKJ–), mostly 250–600 µm diam., uni- or multilocular. Conidiogenous cells slender filiform, attenuated towards the apex, sparingly septate, usually unbranched, 9–18.5 × 1.5–2 µm, apparently producing only a single apical conidium. Conidia fusiform with truncate base and obtuse apex, with granular contents and often with one or more vacuoles, mostly 6–9 × 2–2.5 µm.

23. *Plenodomus humuli* Kusnetz.

Plenodomus humuli Kusnetzova in Dobrozrakova, Opredelit. bolezni rast. (1956) 323, cf. Negru (Romania) in Mycopath. Mycol. appl. 33 (1967) 368 [as 'humulis'].

Original description or material not seen (not recorded in Index of Fungi, not traced by IBFI and no information obtained from Romania). Negru (l.c.) refers to a sample on stems of hop, *Humulus lupulus* (Cannabaceae), collected near Sighisoara, distr. Brasov, Romania, 14 Aug. 1963.

IDENTIFICATION (based on Negru's description of Romanian collection)

= *Phomopsis sarmentella* (Sacc.) Traverso, Fl. ital. crypt. 2 (1906) 277.

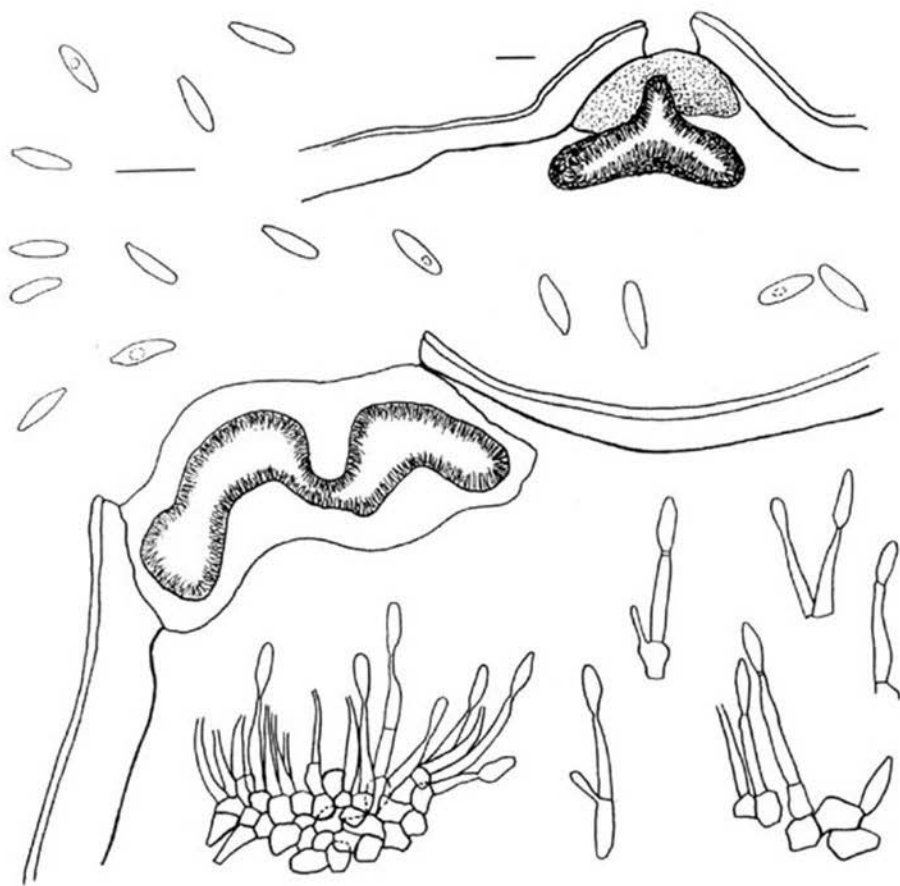


Fig. 8. *Fusicoccum hoveniae*. Stromatic subepidermal pycnidia, initially with only a clypeoid stroma, finally surrounded by stromatic tissue. Filiform conidiogenous cells, producing a single apical conidium. Conidia fusiform with truncate base and obtuse apex. Drawing from holotype of basionym *Plenodomus hoveniae* (LECB). Bar pycnidia 100 μ m. Bar conidia/conidiogenous cells 10 μ m.

Negru's (l.c.) description of *Plenodomus humuli* agrees with the characteristics of *Phomopsis sarmentella*, recorded many times on dead tendrils and runners of hop in Europe. Stromatic, separate, thick-walled pycnidia, erumpent at maturity, characterized by biguttulate fusiform α -conidia, 5–6(–7.5) \times 2–3 μ m, produced on short, rarely septate conidiophores [this may be why it has been classified in *Plenodomus*]. According to Wehmeyer (1933: 320) *Phomopsis sarmentella* should be the anamorph of *Diaporthe sarmenticia* Sacc., but experimental proof of this has not been documented.

24. *Plenodomus inaequalis* Sacc. & Trotter

Plenodomus inaequalis Saccardo & Trotter in Bresadola & Saccardo, Bull. Soc. r. Bot. Belg. 38 (1899) 167.

Material examined. Type on fronds of *Pandanus* sp., Congo: coll. A. Dewèvre, no date (Herb. Saccardo, PAD).

IDENTIFICATION

= *Stilbophoma inaequalis* (Sacc. & Trotter) B. C. Sutton, Coelomycetes (1980) 558.

The stromatic conidiomata of this fungus, 400–800 µm diam., only look superficially like *Plenodomus*. They have an extremely thick dark brown dome-shaped upper wall and an hyaline base with stilboid arranged filiform conidiophores with many septa. Ostioles were not observed. The conidia, 4.5–7 × 2–2.5 µm, arise immediately below septa. The fungus is probably commonly associated with *Pandanus* spp. (compare Saccardo, 1903 and Mathur, 1979: 226). The type species of *Stilbophoma* Petrak (1942) is found on palm fronds in India and produces very small conidia (2–3 × 1 µm: *S. microspora* Petrak); the genus had remained unispecific until the addition of *S. inaequalis*.

25. *Plenodomus macropodii* Petrak

Plenodomus macropodii Petrak, Hedwigia 68 (1929) 237.

Material examined. Type on stem pieces of *Macropodium nivale* (Cruciferae), Siberia, southern Altaj. Sarymsak, Russia: coll. K.E. Murashinsky (Sib. agric. Acad. Omsk), 30 July 1926 (Herb. Petrak, W).

IDENTIFICATION

= *Phoma nigrificans* (P. Karsten) Boerema et al., JI Phytopath. 115 (1986) 269–270 (teleom. *Didymella macropodii* Petrak).

The above synonymy is based on a comparison of type material with fresh isolates, see Boerema, Loerakker & Wittern (1986). The black massive pycnidia, mostly 175–375 µm diam., are *Plenodomus*-like, thick-walled and often with a conspicuous poroid neck. However, scleroplectenchyma is lacking [cell-wall JKJ-]: *Phoma* sect. '*Sclerophomella*' (see no. 11). The conidia are oblong-ellipsoidal to subcylindrical, mostly 6–8.5(–10) × 1.5–2.5(–3) µm, eguttulate or with a small guttule at each end. It appears to be a cold-tolerant fungus, found on various wild and cultivated crucifers in northern Europe. It is believed to be an opportunistic parasite. In northern Germany it has often been isolated from winter oilseed rape (*Brassica napus* var. *oleifera*) with Blackleg symptoms resembling those caused by *P. lingam*.

26. '*Plenodomus* on spotted apples', *Malus pumila*

Plenodomus species described in Japanese by Kanesuke Hara, 'Zikken-Sakumotu-byorigaku' (1930) 527.

Original material. Not known to be in existence cf. inf. Dr Hideo Ishii, Fruit Res. Stn Yatabe, Ibaraki, Japan (1984). The pycnidia occurred on round or irregular, dark brown spots on apple fruits (*Malus pumila*, Rosaceae), 7–13 mm diam. The name of the disease in Japanese is 'Ansyoka-hanten-byo'.

IDENTIFICATION

= *Asteromella pumi*, spec. nov.

Pycnidia ostiolata-papillata, 50–115 µm diam., 70–125 µm alta. Paries e duobus stratis parenchymaticis constat, cellulae strati exterioris magis crassitunicatae et intus obscuriores quam cellulae strati interioris. Conidiophora e strato interiore ad basim et peripheriam oriuntur, septata, 0.8–1 µm diam. Cellulae conidiogenae, semper discretiae, hyalinae, breves. Conidia numerosa capitulata, hyalinae, non-septatae, duabus vacuolis obscuris praeditae, 2–2.5(–3.5) × (0.8–)1 µm. Holotypus in fructibus mali, *Malus silvestris* (*M. pumila*) 'Granny Smith', Bilpin, New South Wales, Australia, Aprilis 1974, DAR 25767 (Penrose, 1984: 23).

[Species first recognized by Brooks & Black, 1912, but misidentified as '*Phoma pomi* Pass.' (Fig. 9), see discussion below; collection and culture (CBS) made by Brooks now shown to be quite effete; compare Westerdijk & van Luyk, 1920 and Penrose, l.c.]

Teleomorph: *Mycosphaerella* sp., Walton & Orton (1926) [Misidentified as '*Mycosphaerella pomi* (Pass.) Lindau', see below].

Hypohymycetous anamorph: *Pseudocercospora pomi* (Brooks) Noordeloos & Boerema (1988).

Hara's *Plenodomus* sp. from a fruit spotting disease of apple in Japan, clearly refers to the above thick-walled *Asteromella* species, first discovered in the United States on a similar apple fruit spot, popularly known as 'Brooks spot' (for history see Anderson, 1956). Hara's Japanese description of the anamorph may be translated as follows (cf. Dr. Ishii, l.c.): "Pycnidia initially subepidermal, subglobose, later crumpled, up to 200–300 µm diam. Wall made up of thick- and thin-walled polygonal cells, 3–6 µm diam. Sporophores tight-packed, filiform, 0.8–1 µm in diameter and up to 20–30 µm long. Spores ellipsoidal to cylindrical, obtuse at both ends, 2.5–3 × 0.8–1 µm, hyaline." The relatively large pycnidial dimensions given by Hara probably represent crowded pycnidia in which the walls may be wanting at the point of contact (compare Brooks & Black, l.c.). The 'pycnidiospores' arise from the apices of indistinct filiform columns of cells. They have never been observed to germinate and probably function as spermatia. The associated *Mycosphaerella* species, found on the surface of fallen apple leaves (Walton & Orton, 1926), was originally thought to be identical with *M. pomi* (Pass.) Lindau, but was later shown to be distinct (cf. holotype of *Sphaerella pomi* Pass., PAD: which has significantly broader ascospores and asci). In culture the fungus produces the hypohymycetous conidial anamorph *Pseudocercospora pomi*, commonly known as *Cylindrosporium pomi* Brooks (Noordeloos & Boerema, 1988). The latter is also found on spotted over-ripe apples. Brooks & Black erroneously identified the pycnidial anamorph with *Phoma pomi* Passerini (1888: 96; illegitimate as later homonym of *Phoma pomi* Schulzer & Saccardo), a common European species with larger spores = *Asteromella mali* (Briard) Boerema in Boerema & Dorenbosch (1965).

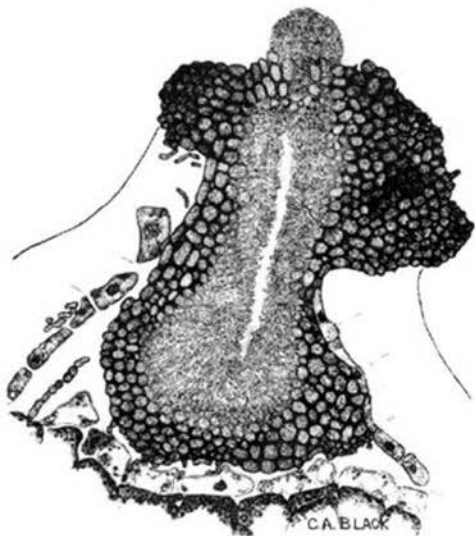


Fig. 9. *Asteromella pomi*. Reproduction of '*Phoma pomi*' by C.A. Black in Brooks & Black (1912: Pl. 5, fig. 8).

The 'Brooks spot' fungus of apples is known from North America (USA, Canada), Australia (New South Wales) and South and East Asia (India and Japan), see Penrose, l.c. It is probably a plurivorous opportunistic parasite, which also has been recorded in association with Blotching of quinces, *Cydonia vulgaris* (Brooks & Black, l.c.) and a Shoot Blight of *Ocimum sanctum* (Noordeloos & Boerema, l.c.).

27. *Plenodomus metasequoiae* Gucevicz

Plenodomus metasequoiae Gucevicz, Trudy gos. nikit. bot. Sada 32 (1960) 125.

Material examined. Type on short-shoots of *Metasequoia glyptostroboides* (Taxodiaceae), Nikitzki Botanical Garden, Tauria, Russia, 1957 (LECB via IBFI).

IDENTIFICATION

= *Gloeosporidina moravica* Petrak, Annls mycol. 19 (1921) 214; type species of the genus *Gloeosporidina* Petrak.

The characteristics of *Plenodomus metasequoiae* (Fig. 10) agree with those of *Gloeosporidina moravica* as figured by Sutton & Pollack (1973: figs. 10–12, syntype of *G. moravica*, BPI). Circular subepidermal acervular conidiomata, composed of a somewhat

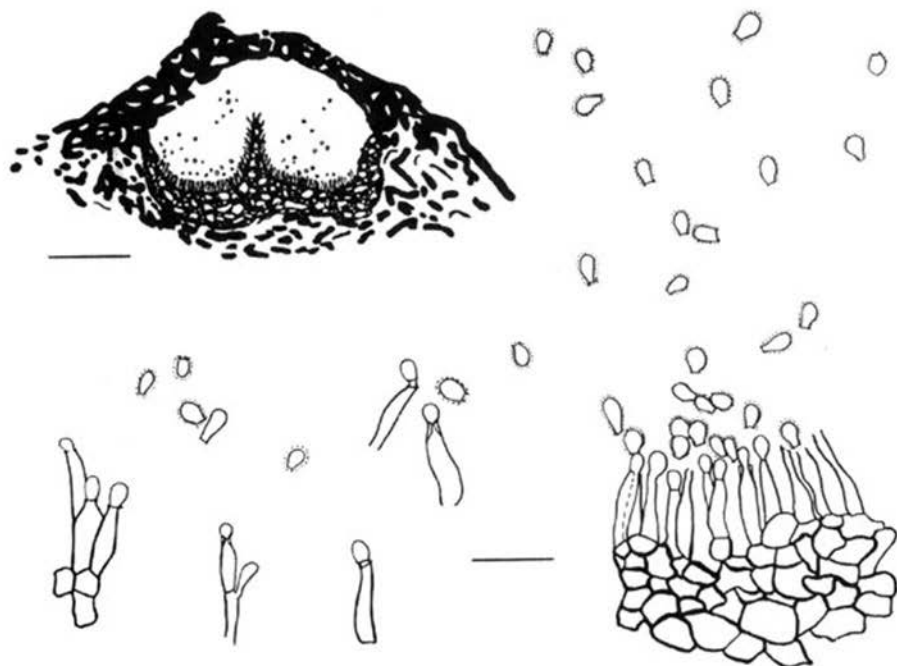


Fig. 10. *Gloeosporidina moravica*. Sketch of a subepidermal acervulus and drawings of conidia and cylindrical conidiogenous cells from the holotype of the synonym *Plenodomus metasequoiae* (LECB). Conidia with truncate base and slimy coating. Bar acervulus 100 μ m. Bar conidia/conidiogenous cells 10 μ m.

convex thick layer of polygonal pseudoparenchymatous cells of variable dimensions. Conidiophores cylindrical, vertically parallel, mostly $10 \times 2 \mu\text{m}$, formed from the upper pseudoparenchyma, and bearing a distinct apical collarete. Conidia pyriform, with truncate base and a somewhat slimy coating, eguttulate, $2.5-3.5 \times 2-2.5 \mu\text{m}$. Guzevicz's classification of the fungus in *Plenodomus* is possibly based on the 'closed' subepidermal position of the conidiomata ('non-ostiolate') and the relatively thick basal cell layer ('sclerotoid').

Gloeosporidina moravica is apparently a plurivorous necrophyte with a Eurasian distribution. The type specimen of the fungus is on leaves of *Quercus robur*, Mt. Svrčow near Mähr.-Weisskirchen (now Hranice), Czechia (former Czechoslovakia).

28. *Plenodomus mollerianus* Bres.

Plenodomus mollerianus Bresadola, Bolm Soc. Brot. 9 (1891) 6.

Material examined. Type on leaves of *Eucalyptus globulus* (Myrtaceae), S. Bento near Coimbra, Portugal: coll. Moller, Feb. 1890 (Herb. Bresadola, S).

IDENTIFICATION

= *Pilidium concavum* (Desm.) Höhnelt, Sber. Akad. Wiss. Wien [Math.-naturw. Kl., Abt. I] 124 (1915) 148 (teleom.: *Pezizella oenotherae* (Cooke & Ellis) Sacc.).

The type collection of *Plenodomus mollerianus* is typical of the plurivorous *Pilidium concavum* (Leptostromaceae). Shield-shaped eustromatic conidiomata, 80–150 μm diam., with septate branched cylindrical conidiophores, producing falcate-lunate conidia, mostly $4-7 \times 1.5-2 \mu\text{m}$, apically and just below the septa. The fungus has numerous synonyms in different genera, see Sutton (1980). It is also described as *Leptothyrium fixum* Sacc., Bolm Soc. Brot. 11 (1893) 20, from leaves of *Eucalyptus globulus* in Portugal collected at the same location as *Plenodomus mollerianus*. The plurivorous type species of the genus *Pilidium*, *P. acerinum* Kunze in Kunze & Schmidt, Mykol. Hefte 2 (1823) 92, is also frequently recorded on *Eucalyptus* spp. *Pilidium acerinum* is distinguished by much larger conidia (mostly $14-16 \times 2 \mu\text{m}$, see Sutton, 1980).

29. *Plenodomus mori* (Mont.) Höhnelt

Plenodomus mori (Mont.) Höhnelt, Sber. Akad. Wiss. Wien [Math.-naturw. Kl., Abt. I] 119, 1 (1910) 660. — *Phoma mori* Montagne, Anns Sci. nat. (Bot.) III, 12 (1849) 306. — *Aposphaeria mori* (Mont.) Saccardo, Sylloge Fung. 3 (1884) 174. — *Coniothyrium mori* (Mont.) O. Kuntze, Revisio Gen. Pl. 3, 2 (1898) 459.

Original material "on decorticated wood of *Morus alba* (Moraceae) near Perpignan, France, 1830" could not be traced (not in PC), but was examined by Von Höhnelt (1910: 66).

IDENTIFICATION

= *Phomopsis moricola* (Sacc.) Saccardo, Nuovo G. bot. ital. II, 22 (1915) 50 [= *Phomopsis moricola* (Sacc.) Grove, Bull. misc. Inf. 1917 (1917) 59].

According to Von Höhnelt (l.c.) the type specimen was characterized by convex stromatic conidiomata, 160–250 μm diam., densely crowded on the wood, initially closed, later irregular ruptured; conidiophores 10–12 μm long, conidia fusiform, $8-9.5 \times 2 \mu\text{m}$. Von Höhnelt's classification of this fungus as "a typical *Plenodomus* Preuss ..., perhaps



Fig. 11. *Pleurophoma cava*. Drawings of conidia, conidiophores and conidiogenous cells, from a specimen on *Morus albus* (PC; as '*Phoma mori*'). Bar 10 μ m.

the anamorph of *Diaporthe sociabilis* Nitschke" was in concurrence with his original view of the synonymy of *Plenodomus* Preuss with *Phomopsis* (Sacc.) Sacc. (Von Höhnelt, 1909; recanted by Von Höhnelt in 1918). It concerns a species of *Phomopsis* which has been described several times from dead branches and twigs of the white mulberry; see Uecker (1988). Transfer of *Phoma mori* Mont. to *Phomopsis* should result in a later homonym of the synonym *Phomopsis mori* Woronichin, Věst. tiflis. bot. Sada 35 (1914) 22. The oldest valid name in the genus *Phomopsis* appeared to be the *Phomopsis moricola* mentioned above, based on *Phoma moricola* Saccardo, *Michelia* 1 (5) (1879) 525. As well as Von Höhnelt, Wehmeyer (1933: 119) believed this anamorph should belong to *Diaporthe sociabilis* Nitschke [later synonym *Diaporthe mori* Berl., listed by Kendrick (1979: 301) and Uecker (1988)], but experimental proof is not documented.

Finally it should be noted that specimens labelled '*Phoma mori* Mont.', distributed as *Mycoth. univ.* [Ed. Thum.] Cent. 17 (1880) No. 1682 refer to a distinctly different lignivorous anamorph, popularly known as *Phoma cava* Schulzer (Boerema & Dorenbosch, 1973: 23–24). On account of its conidiogenesis (Fig. 11) this small-spored species is best placed in the genus *Pleurophoma* Höhnelt, type species *Pleurophoma pleurospora* (Sacc.) Höhnelt, see Sutton (1980) and the discussion under *Plenodomus pyracanthae*, no. 35.

Pleurophoma cava* (Schulzer), *comb. nov.

Basionym: *Phoma cava* Schulzer von Müggenburg, Verh. zool.-bot. Ges. Wien 21 (1871) 1248.

30. *Plenodomus nigricans* Negodi

Plenodomus nigricans Negodi, Atti Soc. Nat. Mat. 63 [VI, 11] (1932) 44.

Original material "on rotten and dried leaves of *Sansevieria stueckii* (Agavaceae), leaf cuttings from Somalia, Botanical Garden Univ. Modena, Italy, Feb. 1932" apparently not preserved.

IDENTIFICATION

= *Diplodia subsolitaria* (Schw.: Fr.) Currey, Trans. Linn. Soc. Lond. 22 (4) (1859) 284.

The description and figures of *P. nigricans* clearly point to an immature stage of a species of *Diplodia* Fr. [in Montagne, 1834: 302] conformity with Sutton's (1980) concept of the genus. The mature stage appears to have been described as *Diplodia sansevieriae* [H. & P.] Sydow, *Annls mycol.* 14 (1916) 200. The fungus produces conspicuous dark brown to black mycelium and black solitary pycnidia, mostly 200–500 µm diam. The pycnidia are unilocular, globose and thick-walled with a broad outer layer of dark brown cells and an inner layer of hyaline cells; initially closed, then later develop a central papillate pore. Conidiophores short cylindrical, septate, c. 10 µm long and 2–3 µm wide, each forming a single apical conidium. Conidia ellipsoidal to oblong-ovoid with a truncate base, at first hyaline and aseptate, later dark brown and medianly 1-septate, (18–)20–26(–28) × 10–12(–13) µm. In a comparative study of this didymosporous type of the Sphaerosporales Zambettakis (1954) has, however, referred them to the genus *Metadiplodia* Sydow [1937]. He concluded that *D. sansevieriae* belongs to a plurivorous cosmopolitan species, which had already been described in Fries's *Elenchus Fungorum* (1828) from material collected by Von Schweinitz in the USA (*Sphaeria subsolitaria* 'Schwein. in litt.'). Its teleomorph may be a species of *Botryosphaeria* [Von Schweinitz's collection is also believed to contain an Ascomycete: *Physalospora subsolitaria* (Schw.) Saccardo, *Sylloge Fung.* 13 (1898) 443].

31. *Plenodomus oleae* Cav.

Plenodomus oleae Cavara, *Atti Ist. bot. Univ. [Lab. crittogam.] Pavia II*, 1 (1888) 435 [Appunti Patol. veg. (1888) 13]; *Revue mycol.* 10 (1888) 206–207. — *Phoma oleae* (Cav.) Saccardo, *Sylloge Fung.* 10 (1892) 146.

Material examined. *Phoma olivarum* Thümen on mature fallen olives (*Olea europaea*, Oleaceae), Dalmatia, Croatia (former Yugoslavia); coll. L. Roesler, 'May', distributed as (part of) *Mycoth. univ.* No. 2885 (L) and as *Roum., Fungi. gall. exs.* No. 4748 (PC).

IDENTIFICATION

= *Phoma glomerata* (Corda) Wollenweber & Hochapfel, *Z. ParasitKde* 8 (1936) 592, the plurivorous type species of *Phoma* sect. *Peyronellaea*.

The original material of *Plenodomus oleae*, described from brown spots on olives in Italy, has been lost, but was studied by Berlese (1889). He concluded that it did not show any *Plenodomus*-like characteristics, but represented a typical ostiolate *Phoma* species resembling the previously described *Phoma olivarum* Thümen (1883). Boerema, Dorenbosch & van Kesteren (1977) provided evidence that the latter refers to the ubiquitous soil-borne *Phoma glomerata*, which frequently occurs on olives in southern Europe. The present species concept of *P. glomerata* (see Contribution II-2 no. 2, Boerema, 1993), is mainly based on the characteristics in vitro, especially those of the dictyochlamydospore *alternarioid* synanamorph. In vivo dictyochlamydospores are sometimes produced on the pycnidial wall near the ostiole. The conidia of *P. glomerata* are highly variable in shape and dimensions, mostly ovoid-ellipsoidal, 4–8.5 × 1.5–3 µm, usually smaller in vivo than in vitro. In old pycnidia the conidia become olive-brown and sometimes 1-septate.

32. '*Plenodomus orthoceras* Höhnelt'

'*Plenodomus orthoceras* (Fr.) v H (= *Phoma achillea* Sacc.) Spermog. v. *Diaporthe orthoceras*' in herb. W [manuscript name].

Material examined. Collection on stems of *Cirsium* sp. (Compositae), Sonntagsberg, Austria: coll. P.P. Strasser, June 1909 [originally labelled '?*Libertella*'] (W, no. 16952).

IDENTIFICATION

≡ *Phomopsis* sp. with only β -conidia.

In June 1909 Von Höhnelt published his subsequently recanted statement that *Plenodomus* Preuss must be considered an earlier synonym of *Phomopsis* (Sacc.) Sacc. The same month he received the above collection which he referred to *Plenodomus* even though it bore typically thick-walled unilocular *Phomopsis*-like pycnidia with filiform conidiophores and filiform-hamate β -conidia, $24\text{--}25 \times 1 \mu\text{m}$. The epithet of *Plenodomus orthoceras* refers to *Sphaeria orthoceras* Fr.: Fr., by Nitschke, (1870: 270) used as basionym of a *Diaporthe*-teleomorph found on *Achillea* species: *D. orthoceras* (Fr.: Fr.) Nitschke. The anamorph of the latter should produce α - and β -conidia (Nitschke, l.c.): 'spermatia' fusiform, $8\text{--}10 \times 2.5 \mu\text{m}$; 'stylospores' filiform-hamate, $26 \times 1 \mu\text{m}$. The α -conidia type is known as *Phoma achillea* Saccardo [Michelia 2 (3) (1882) 616; conidia $9\text{--}10 \times 2.5\text{--}3.5 \mu\text{m}$], transferred by Von Höhnelt to *Phomopsis*: *P. achillea* (Sacc.) Höhnelt, Sber. Akad. Wiss. Wien [Math.-naturw. Kl., Abt. I] 115 (1906) 680. Wehmeyer (1933) listed *D. orthoceras* as a synonym of *Diaporthe arctii* var. *achillea* (Auersw.) Wehm., which affects different hosts, including *Cirsium* spp. That teleomorph may therefore cover this *Phomopsis* sp. from *Cirsium*. However, different host-specific species are probably involved because recent studies on the *D. arctii*-complex have shown that Wehmeyer's broad species concept is untenable when the host-specific forms are compared in vitro and when biological (ecological) data are considered, see Van der Aa, Noordeloos & de Gruyter (1990).

33. *Leptophoma paeoniae* Höhnelt

Leptophoma paeoniae Höhnelt, Sber. Akad. Wiss. Wien [Math.-naturw. Kl., Abt. I] 124 (1915) 75. — *Sphaeronaema paeoniae* Höhnelt in Strasser, Verh. zool.-bot. Ges. Wien 60 (1910) 312 [as '*Sphaeronaema*': nomen nudum].

Material examined. Type on stems of *Paeonia* sp. (Ranunculaceae), Sonntagsberg, Austria: coll. P.P. Strasser, 1908 (Herb. Von Höhnelt No. 9394, FH).

IDENTIFICATION

≡ *Phoma nebulosa* (Pers.: Fr.) Berkeley, Outl. Br. Fungi (1860) 314 [as *P. nebulosa* 'Mont.'].

As noted by Von Höhnelt (1915b, l.c.) this fungus superficially resembles *Phoma acuta*, type species of *Leptophoma* = sect. *Plenodomus* (see Contribution III-1 no. 15a, b). However, the pycnidia are relatively thin-walled and not at all scleroplectenchymatous; they usually have dark hyphae at the base and a distinct neck. Conidiogenous cells ampulliform, often with a conspicuous neck, $8\text{--}10 \mu\text{m}$ long. Conidia oblong to ellipsoidal, mostly $3.5\text{--}6.5 \times 1.5\text{--}2 \mu\text{m}$ (i.e. wider than as noted by Von Höhnelt).

Phoma nebulosa is a saprophytic species which can be found on dead stems of various herbaceous plants in Europe, but the most common host is apparently stinging nettle, *Urtica dioica*. For the historical background of this fungus see Boerema (1976: 306–307). For diagnostic data on the characteristics in vitro see Contribution I-2 no. 22 (De Gruyter, Noordeloos & Boerema, 1993).

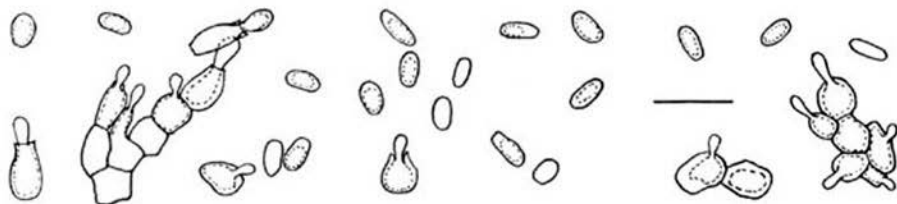


Fig. 12. *Phoma genistae*. Drawings of conidia and conidiogenous cells in vivo on *Genista tinctoria*, from '*Plenodomus pulcherrimus*' (herb. Petrak, W). Bar 10 μ m.

34. '*Plenodomus pulcherrimus* Petrak'

'*Plenodomus pulcherrimus* n. spec.' in herb. Petrak (W) [manuscript name for a 'Sclerophomee'-species mentioned by Petrak (1923b) in the discussion of his *Sclerophomella abnormis*].

Material examined. Original collection associated with the type of *Sclerophomella abnormis* Petrak, on dried branches of *Genista tinctoria* (Leguminosac), edge of a wood near Hrabuvka, Mähr.-Weisskirchen (now Hranice), Czechia (former Czechoslovakia); coll. F. Petrak, 18 March 1922 (Herb. Petrak, W).

IDENTIFICATION

≡ *Phoma genistae* Brunaud, Anns Soc. Sci. nat. Charente-Infér. 1889 (1890) 64 [Sphaerops. Char. ('1889') 14].

This 'Sclerophomee' is characterized by Petrak (1923b: 214) as truly 'dothideoid' with short cylindrical or elongate-ellipsoidal conidia c. 4–6 \times 2–2.5 μ m. Study of the above collection convinced us that a *Phoma* specific to *Genista tinctoria* is involved; it may produce small pycnidial as well as larger stromatic conidiomata (pseudoparenchymatous, JKJ-, just like *Phoma foveata* Foister, compare Kranz, 1963: 12–13). The correct name of the fungus is *Phoma genistae*, but the dothideoid phenotype has already been described as *Placosphaeria genistae* Brunaud, Act. Soc. linn. Bordeaux 52 (1888) 102 [Miscell. mycol. 1 (1889) 17]. The conidia usually have a large vacuole. Their variability in shape is associated with a gradual widening of the conidiogenous locus: conidia often with a truncate base, see Fig. 12.

Curiously Petrak's *Sclerophomella abnormis* did appear to be *Plenodomus*-like: thick scleroplectenchymatous pycnidial wall (JKJ+). The characteristics of *S. abnormis* agree with those of the plurivorous *Phoma astragalina* (Gonz.-Frag.) Boerema & v. Kest. (Contribution III-1 no. 4). Pycnidia mainly depressed globose to ellipsoidal, 150–300 μ m, but also up to 600 μ m and then more irregular in shape, unilocular but sometimes semi-multilocular due to wall-outgrowths. Conidia small ellipsoidal 2–3(–4) \times 0.5–1 μ m, with two minute guttules. So far *P. astragalina* is only known from mountainous regions in south-western Asia (Afghanistan, Iran, Turkey).

35. *Plenodomus pyracanthae* Gucevicz

Plenodomus pyracanthae Gucevicz, Nov. Sist. niz. Rast. 14 (1977) 79.

Original material "on dry branches of *Pyracantha angustifolia* (Rosaceae), Nikitzki Botanical Garden, Tauria, Russia; coll. L.V. Malzeva, 1960" apparently not preserved cf. inf. Dr V. Mel'nik (1982) (LECB).

IDENTIFICATION

= *Pleurophoma pleurospora* (Sacc.) Höhnel, Sber. Akad. Wiss. Wien [Math.-naturw. Kl., Abt. I] 123 (1914) 117, type species of the genus *Pleurophoma* Höhnel.

The description and illustration of *Plenodomus pyracanthae* are typical of the above *Pleurophoma pleurospora*, which we have studied in vivo and in vitro from branches and bare wood of *Acer*, *Cornus*, *Fraxinus*, *Pyracantha*, *Salix* and *Kerria* spp. The fungus is characterized by single, subglobose, dark brown, thick-walled pycnidia, up to 300 µm diam., with circular, central ostioles and straight, filiform, septate conidiophores, formed from the inner cells of the pycnidial wall. The small, cylindrical to ellipsoidal, eguttulate conidia arise from the apices and just below the septa of the conidiophores. The conidial dimensions of the various collections were within the range 3–4 × 1–1.5 µm; the septate conidiophores were mostly 30–50(–55) × 2 µm. For details of pycnidial wall and conidiophores see Sutton (1980: 397–399). The fungus may be identical to *Sphaeronaema subtile* Fr.: Fries (1823).

36. *Plenodomus ramealis* (Desm.) Höhnel

Plenodomus ramealis (Desm.) Höhnel, Sber. Akad. Wiss. Wien [Math.-naturw. Kl., Abt. I] 119 (1910) 647. — *Sporonema ramealis* Desmazières, Anns Sci. nat. (Bot.) III, 16 (1851) 320–321. — *Phomopsis ramealis* (Desm.) Höhnel, Öst. Bot. Z. 66 (1916) 100; not *Phomopsis ramealis* (Desm.) Diedicke, Anns mycol. 9 (1911) 28–29, see below.

Material examined. Syntype on dry branch of elder *Sambucus nigra* (Caprifoliaceae), 'autumn and spring', France, distributed as Desm., Pl. cryptog. France II [ed. 3] Fasc. 2, No. 82 (PC).

IDENTIFICATION

= *Phomopsis vicina* (Desm.) Grove, Bull. misc. Inf. R. bot. Gdns Kew (1917) 71; Br. Coelomycetes 1 (1935) 224.

The stromatic pycnidial anamorph, which Von Höhnel (1910) studied from an original sample of 'Pl. crypt. France, 1843, Nr 82' on elder, *Sambucus nigra*, were typical of a *Phomopsis* species: stromatic small-celled closed conidiomata, up to 520 µm long and 120 µm high, with a flattened loculus. Conidia fusiform, 8–10 × 2–2.5 µm, borne on punched conidiophores. Von Höhnel (1910, l.c.) identified the species as "certainly a *Diaporthe*-anamorph which therefore must be classified in *Plenodomus* Preuss = *Phomopsis* Sacc." The latter generic synonymy was suggested by Von Höhnel in 1909, but afterwards re-canted. The combination *Phomopsis ramealis* made by Von Höhnel, l.c. in 1916 must be rejected as a later homonym of a combination made by Diedicke, l.c. based on *Phoma ramealis* Desmazières, Anns Sci. nat. (Bot.) III, 3 (1850) 113, found on branches of *Euonymus* spp. As also noted by Von Höhnel (1916, l.c.) the next oldest known name of the elder fungus is *Phoma vicina* Desmazières, distributed as Pl. cryptog. N. France (1856) No. 353 (e.g. PC), basionym of the above *Phomopsis vicina*. The fungus is better known under the synonym *Phomopsis sambucina* (Sacc.) Trav., based on *Phoma sambucina* Saccardo, Michelia 2 (1) (1880) 97, see e.g. Petrak (1925b) and Grove (1935, l.c.). The acicular-filiform or subulate conidiophores are mostly 15–20(–25) × 1.5–2 µm. According to Von Höhnel (1916, l.c.) and Wehmeyer (1933) this anamorph belongs to *Diaporthe circumscripta* Oth, but this should be considered tentative since experimental proof is not documented. Finally it should be noted that not all samples of Desm., Pl.

cryptog. France No. 82 contain fertile *Phomopsis* pycnidia. The 'preparation' of 82 we received from PC had numerous small-celled stromata without any spores. A few deviating conidiomata looked very much like an effete *Colletotrichum*. That fungus was probably also present on the sample of 82 studied by Limber (1955: 'conidia $12-20 \times 4-6 \mu\text{m}$ ').

37. *Diploplendomus rivini* (Allescher) Petrak

Diploplendomus rivini (Allescher) Petrak, *Annl. mycol.* 42 (1944) 62. — *Pyrenochaeta rivini* Allescher in P. Sydow, *Hedwigia* 36 (1897) 161 [with discordant setae-bearing element]. — *Sclerochaetella rivini* (Allescher) Höhnelt, *Hedwigia* 59 (1918) 251.

Material examined. Type collection of the basionym on stem pieces of *Falcaria rivini* (Umbelliferae), Lichtenfelde near Berlin, Germany: coll. P. Sydow, Nov. 1895 (Herb. Allescher, M); duplicates distributed as Sydow, *Mycoth. March.* No. 4454 (Herb. Sydow, S; B).

IDENTIFICATION

= *Phoma complanata* (Tode: Fr.) Desmazières, *Annl. Sci. nat. (Bot.)* III, 16 (1851) 299–300; type species of *Phoma* sect. *Sclerophomella*.

The holotype of *Pyrenochaeta rivini* has been examined by Petrak (l.c.) and basically we agree with his conclusion that Allescher's description refers to a mixture of glabrous thick-walled pycnidia with mainly 1-septate hyaline conidia, $12-16 \times 3.5-4 \mu\text{m}$, and sterile *Vermicularia*-like setose structures (discordant element). Duplicates of the original material of *Pyrenochaeta rivini* distributed by Sydow as *Mycoth. March.* No. 4454, were mostly effete. Petrak (l.c.) examined two samples of 4454 and found no fertile fungus. A sample studied by Diedicke (1912a) was also sterile and contained only the setose *Vermicularia*-like structures. We made the same observation on 4454 from B; but the duplicate in S agrees in all respect with Allescher's type collection (Fig. 13A). Von

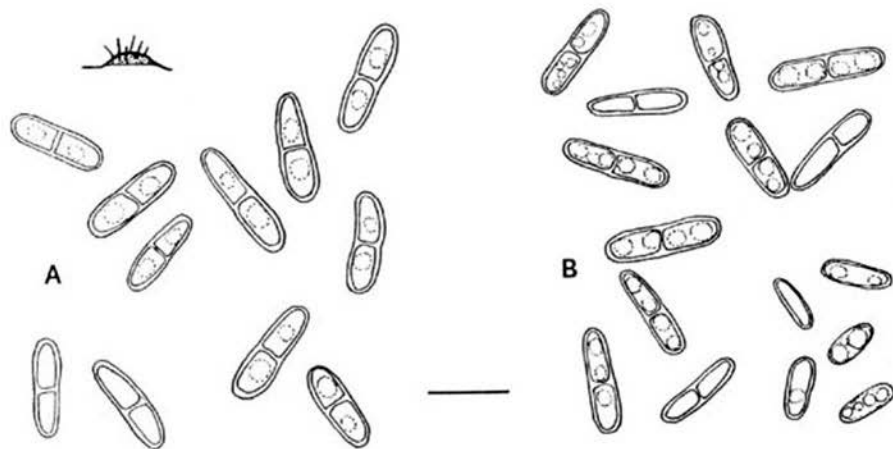


Fig. 13. *Phoma complanata*. Drawings of large 1-septate conidia from specimens on two different umbellifers. — A. Isotype of '*Diploplendomus rivini*' on stem of *Falcaria rivini* (S) [Original classification in *Pyrenochaeta* was based on the presence of a discordant element: sterile *Vermicularia*-like setose structures (see sketch)]. — B. Specimen on stem of *Pimpinella major* (PD) [Also pycnidia with mainly small aseptate conidia (right below) were present.] Identity checked by isolations in pure culture. Bar $10 \mu\text{m}$.

Höhnel (l.c.) based on a sample of Sydow's Mycoth. March. 4454 a separate genus: *Sclerochaetella*: papillate stromatic pycnidia 'somewhat setose above' and with finally 1-septate conidia. Von Höhnel found only two setae but referred to Diedicke's (1912a) observations.

The pycnidia of the fungus, 300–400 µm diam., are clearly thick-walled, but not scleroplectenchymatous as in *Phoma* sect. *Plenodomus* (cell-wall JKJ-; but cell contents become red). The structure of the pycnidial wall fully agrees with that of *Phoma complanata*, the type species of *Phoma* sect. *Sclerophomella*, see this paper under *Plenodomus complanatus*, no. 11. It is known that some strains of this common species on Umbelliferae may produce pycnidia in vivo which have mainly 1-septate conidia, similar to those of Allescher's fungus (see Fig. 13B). Therefore we consider both fungi to be conspecific, which also means that *Sclerochaetella* should be considered as a synonym of *Phoma* sect. *Sclerophomella*.

38. *Plenodomus spurius* (Vestergren) Petrak

Plenodomus spurius (Vestergren) Petrak, Fl. Boh. Morav. exs. II, 1 (1918) No. 2431 [compare *Annls mycol.* 39 (1941) 307]. — *Phoma spurius* Vestergren, JahresKat. Wien. Krypt. Tauschanst. (1897) 4. — *Paradiscula spuria* (Vestergren) Petrak, *Annls mycol.* 39 (1941) (307–)308.

Material examined. Collection on stem pieces of *Potentilla argentea* (Rosaceae), Mt. Svřčow near Mähr.-Weiskirchen (now Hranice), Czechia (former Czechoslovakia): coll. F. Petrak, May 1936, distributed as Petrak, *Myc. gen.* No. 195 (FH).

IDENTIFICATION

= *Paradiscula spuria* (Vestergren) Petrak (l.c.), type species of the genus *Paradiscula* Petrak.

This only known species of the genus *Paradiscula* is fully illustrated and described by Morgan-Jones (1975). Petrak's initial classification of the fungus in *Plenodomus* was based on over-ripe material. The fungus produces eustromatic conidiomata, 200–500 µm diam. Wall thicker at the base than the sides and above, made up of thin-walled pale brown cells. Dehiscence by a widely opening longitudinal wall fissure. Conidiogenous cells lageniform, 5–14 × 2–3.5 µm, formed from the basal and lateral walls. Conidia oblong-ellipsoidal, 4–6 × 1.5–2 µm. Petrak (1941) noted that this fungus is exceptional in its tendency to produce abnormal structures; deeply immersed conidiomata may become very irregular in shape, semi-multilocular and without the common thick basal stroma.

39. *Plenodomus strobilinus* (Desm.) Höhnel

Plenodomus strobilinus (Desm.) Höhnel, Sber. Akad. Wiss. Wien [Math.-naturw. Kl., Abt. I] 119, 1 (1910) 647. — *Sporonema strobilinum* Desmazières, *Annls Sci. nat. (Bot.)* III, 18 (1852) 368. — *Discella strobilina* (Desm.) Diedicke, *Krypt.-Fl. Mark Brandenb.* 9, Pilze 7 (1915) 752. — *Sirococcus strobilinus* (Desm.) Petrak, *Sydowia* 1 (1947) 155 [illegitimate; proposed as substitute for *Sirococcus strobilinus* Preuss, *Linnaea* 27 (1853) 716, the type of *Sirococcus* Preuss].

Material examined. Type of basionym on cones of '*Abies excelsa*' = *Picea abies*, the Vosges, France, 'winter' no date: coll. J.B. Mougeot (PC); duplicates distributed as Pl. cryptog. France No. 700 (PC).

IDENTIFICATION

= *Sirococcus conigenus* (DC.) P. Cannon & Minter, *Taxon* 32 (1983) 57, type species of the genus *Sirococcus* Preuss.

Examination of the above type specimens confirmed Petrak's (l.c.) inference that *Sporonema strobilinum* Desm. is conspecific with the type species of the genus *Sirococcus* Preuss (l.c.), presently known as *Sirococcus conigenus*. For the characteristics of this fungus see Sutton (1980: fig. 371). Thick-walled stromatic conidiomata, uni- or multi-locular, initially closed, then opened by breakdown of the upper wall. Conidiophores filiform, branched and septate, up to 50 µm long × 2.5 µm wide, tapering to 1.5 µm. Conidia (6-)12-15(-16) × (2.5-)3(-3.5) µm, arising from the apices of main and short lateral branches, fusiform, straight or curved, medianly 1-septate; smaller ones occasionally remaining aseptate. The fungus is found on cones and needles of various conifers in Eurasia and North America, where it causes Short Blight and Tip Dieback. In phytopathological literature it is commonly named either *Ascochyta piniperda* Lindau [in Engler & Prantl, Nat. Pfl. Fam. 1 (1) (1899) 368] or *Sirococcus strobilinus* Preuss. Von Höhnel's interpretation of the fungus as *Plenodomus* dates from the period when he regarded *Plenodomus* Preuss as an older synonym of *Phomopsis* (Sacc.) Sacc. (Von Höhnel, 1909, synonymy recanted in 1918). He noted that the 'cartilagenous-gelatinous-plectenchymatous' *Plenodomus strobilinus* probably belonged to *Diaporthe occulta* (Fuckel) Nitschke. This suggestion, initially adopted by Wehmeyer (1932: 251), was later questioned (Wehmeyer, 1933: 72).

40. *Plenodomus sylvaticus* (Sacc.) Rupprecht

Plenodomus sylvaticus (Sacc.) Rupprecht, Sydowia 13 (1959) 21 [as '*sylvatica*'].

Material examined. Type of basionym on stems of *Melampyrum sylvaticum* (Scrophulariaceae), near Rouen, Dep. de l'Eure, France: coll. A. Malbranche, no date (Herb. Saccardo, PAD); specimens on stems of *Melampyrum nemorosum*, Podluzie near Stanislau (now Ivano-Frankovsk), the Ukraine (former USSR): coll. Petrak, 9 June 1918, distributed as Petrak, Fungi Pol. exs. No. 481 (U); specimens on *Melampyrum nemorosum*, Hrabuvka, Mähr.-Weisskirchen (now Hranice), Czechia (former Czechoslovakia): coll. Petrak, 28 Sept. 1923, distributed as Petrak, Fl. Boh. Morav. exs. II, 1 No. 1870 (U).

IDENTIFICATION

= *Phoma sylvatica* Saccardo, Michelia 2 (2) (1881) 337; Sylloge Fung. 3 (1884) 128 [as '*sylvatica*'].

A very common fungus on *Melampyrum* spp. in Europe, characterized by small pycnidia, c. 150 µm diam., with a relatively thick wall made up of round polygonal cells. The contents of these cells stains red with addition of JKJ (typical for species of *Phoma* sect. *Sclerophomella*, type *P. complanata*, see no. 11). The conidia of this species, ellipsoidal to subcylindrical, (3.5-)4-5 × 1-1.5(-2) µm, are very similar to those of *Phoma petrakii* Boerema & v. Kest., a member of sect. *Plenodomus*, which also commonly occurs on stems of *Melampyrum* spp. (Contribution III-1 no. 10). The combination *Plenodomus sylvaticus* made by Rupprecht is partly based on misidentified collections of *P. petrakii* on *Melampyrum* spp. and partly on confusion with *P. ruttneri* (Petrak) Boerema & v. Kest., another species of sect. *Plenodomus* (Contribution III-1 no. 6), see Boerema & van Kesteren (1981). The pycnidia of *P. sylvatica* are often accompanied by pseudothecia of *Didymella winteriana* (Sacc.) Petrak, its telomorph according to Petrak (1922: 323). However, a single identity of these two morphs has not yet been proved with isolates in pure culture.

41. *Plenodomus syriacus* Petrak

Plenodomus syriacus Petrak, Sydowia 1 (1947) 42.

Material examined. Original collection on stem pieces of *Phlomis brevilibris* (Labiatae), subalpine region of Mt. Sanin (1700–1900 m), Lebanon (Flora Syriaca No. 1340): coll. J. Bornmüller, 21 July 1897, placed in two paper packets as type specimens of '*Plenodomus syriacus* n. sp.' and '*Didymella syriacus* n. sp.' (Herb. Petrak, W).

IDENTIFICATION

= *Phoma syriaca* (Petrak), *comb. nov.* (probable teleomorph: *Didymella syriaca* Petrak).

The relatively large pycnidia (200–350 µm diam.) of this 'alpine' collection resembled a *Plenodomus* type: thick-walled (35–50 µm thick) and initially closed (late development of a pore instead of a predetermined ostiole). However, typical scleroplektenchyma was lacking: JKJ did not stain the walls of cells but only their contents. These characteristics point to *Phoma* sect. *Sclerophomella* (type *P. complanata*, see this paper no. 11). The conidia are notably broad, ovate-ellipsoidal, occasionally with somewhat truncate ends, mostly 6–8 × 3.5–6 µm. The pycnidia, scattered or arranged in small groups, often occurred in association with pseudothecia of *Didymella syriaca* Petrak, the teleomorph according to Petrak (1947). Pycnidia and pseudothecia developed subepidermally on the stems, in both cases with at the sides dark, twisting, short-celled hyphae. The identity of the two morphs has not yet been proved with isolates in pure culture, but in this connection it should be noted that various species of *Phoma* sect. *Sclerophomella* belong to *Didymella* spp.

42. *Deuterophoma ulmi* (Verrall & May) Goid. & Rugg.

Deuterophoma ulmi (Verrall & May) Goidànich & Ruggieri, Ricerca scientifica 17 (1947) 1137 ['pro tempore']. — *Dothiorella ulmi* Verrall & May, Mycologia 29 (1937) 322. — *Plectophomella ulmi* (Verrall & May) Redfern & Sutton, Trans. Br. mycol. Soc. 77 (1981) 383.

Material examined. Type of basionym on *Ulmus* sp. (Ulmaceae), Britton, Oklahoma, USA: coll. J. M. Turner, 1 Oct. 1935 (BPI no. 70805).

IDENTIFICATION

= *Plectophomella ulmi* (Verrall & May) Redfern & Sutton, l.c.; synanamorph *Phialophora* sp.

Goidànich & Ruggieri, l.c., transferred this American wilt pathogen of *Ulmus* spp. (Verrall & May, 1937) to the genus *Deuterophoma* Petri, mainly because of the in vitro production of a *Phialophora* synanamorph, just like the type species of Petri's *Deuterophoma* (*Phoma tracheiphila* (Petri) Kant. & Gik., see Contribution III–1 no. 21). However, the stromatic pycnidia of the American pathogen, c. 100 µm diam., usually multiloculate or convoluted, are not scleroplektenchymatous and the conidia arise from distinct conidiophores (Redfern & Sutton, 1981, with figure). The latter are either short and 1-septate or long and up to 6-septate, with mostly short lateral branches produced below the septa, and branched irregularly at the base, 10–32.5 × 2–2.5 µm. Conidia ellipsoidal to cylindrical, 2.5–4 × 1–1.5 µm. These characteristics agree neither with '*Deuterophoma*' (*Phoma* sect. *Plenodomus*) nor *Dothiorella* Sacc. (cf. type study, Sutton, 1980), but fit well with *Plectophomella* Moesz. For cultural characteristics of the fungus and the *Phialo-*

phora synanamorph (conidia $4.5 \times 2 \mu\text{m}$), see Verrall & May, l.c. *Plectophomella concentrica* Redfern & Sutton (l.c.: 383–385), a related fungus lacking a *Phialophora* synanamorph, is known to cause canker and dieback of *Ulmus glabra* in Europe (Great Britain).

43. *Leptophoma urticae* (Schulzer & Sacc.) Höhnelt

Leptophoma urticae (Schulzer & Sacc.) Höhnelt, Hedwigia 59 (1917 [vol. dated 1917–1918]) 262. — *Phoma urticae* Schulzer & Saccardo, Hedwigia 23 (1884) 91; Sylloge Fung. 3 (1884) 140.

Material examined. Collection of *Phoma urticae* on dead stem pieces of stinging nettle, *Urtica dioica* (Urticaceae), distributed as D. Saccardo, Mycoth. ital. (1904) No. 1267 (Herb. Saccardo, PAD). Dried culture of *Phoma urticae* 'strain 25', obtained by Dennis (1946) from a previous season's stem of *Urtica dioica*, Corstorphine, near Edinburgh, Scotland, 20 March 1944 (K).

IDENTIFICATION

= *Phoma herbarum* Westend., Bull. Acad. r. Belg. Cl. Sci. 19 (1852) 118; type species of *Phoma* (sect. *Phoma*).

The original material of *Phoma urticae* on stems of *Urtica dioica*, collected in Vinkovce, Hungary, is not preserved, but Boerema (1964, 1970) provided evidence for its conspecificity with the cosmopolitan saprophyte *P. herbarum*. This interpretation is confirmed by the specimens listed above. The fungus usually produces non-papillate pseudoparenchymatous pycnidia with one ostiole; conidia measure $(3.5-4-5.5(-8) \times 1.5-2(-3) \mu\text{m}$. For additional data on cultural characteristics see Contribution I-2 no. 4 (de Gruyter, Noordeloos & Boerema, 1993).

Von Höhnelt's interpretation of *P. urticae* relates to the quite different fungus *Pyrenochaeta fallax* Bres. emend. Sutton & Pirozynski (1963), a specific necrophyte of *Urtica dioica*, with more or less setose scleroplectenchymatous pycnidia, branched septate conidiophores from which the relatively small conidia ($5-6 \times 1.5 \mu\text{m}$) arise apically or just below the septa. The scleroplectenchymatous wall structure of this species fully agrees with the anamorph of another specific nettle fungus on which Von Höhnelt had founded his genus *Leptophoma*: *Phoma acuta* (Hoffm.: Fr.) Fuckel subsp. *acuta* (sect. *Plenodomus*, Contribution III-1, teleom. *Leptosphaeria doliolum* Ces. & de Not. subsp. *doliolum*). Both anamorphs may occur on the same nettle stem [Schneider (1979) found only *P. acuta* on authentic collections of *Pyrenochaeta fallax*!]. Several species producing scleroplectenchyma probably occur within the genus *Pyrenochaeta* de Not. emend. Schneider, l.c. (see also no. 12, *Pyrenochaeta* 'sect. *Plenodomopsis*').

44. *Plenodomus valentinus* Caballero

Plenodomus valentinus Caballero, An. Jard. bot. Madr. 1 (1941) 195–196.

Material examined. Type on leaves of the wild date palm, *Phoenix silvestris* (Palmae), Botanical Garden Valencia, Spain: coll. A. Caballero, 10 April 1938 (MA).

IDENTIFICATION

= *Phomopsis phoenicis* (Cesati) Camara, Anais Inst. sup. Agron. Univ. t c. Lisb. 3 (1929) 102.

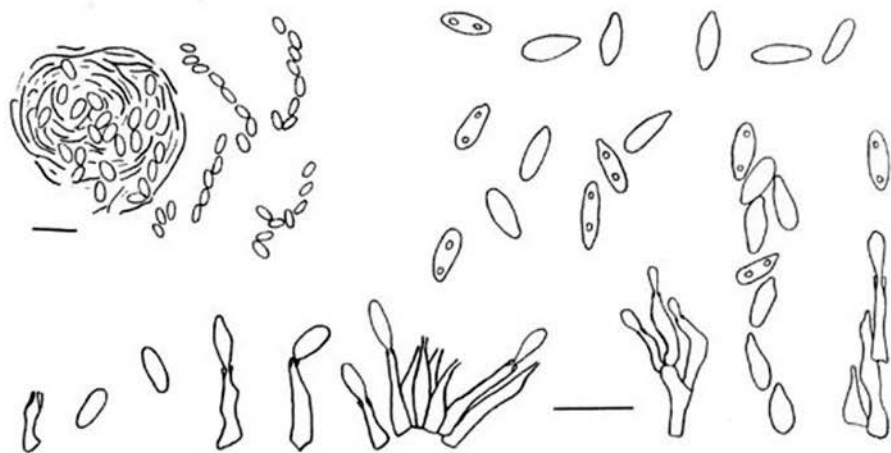


Fig. 14. *Phomopsis phoenicis*. Drawings of α -conidia and conidiophores from the holotype of the synonym *Plenodomus valentinus* (MA). Bar 10 μ m. The reproduction from Caballero (1941) clearly shows that the conidia are enveloped in mucilage and often produced in series of eight ('ascus'-like rows).

Plenodomus valentinus refers to a curious species of *Phomopsis* often producing 'ascus-like' rows of eight α -conidia (Fig. 14.). Pycnidia subepidermal, mostly globose and uniloculate, up to 130 μ m diam., sometimes aggregated and convoluted, initially closed, later with an erumpent papillate ostiole. Conidiophores short-filiform, sparingly branched, up to 13 μ m long, producing apically a series of α -conidia enveloped in mucilage. Conidia ellipsoidal-fusiform, 0–2 guttulate, mostly (5–)6.5–7.5(–8) \times 2–2.5(–3) μ m. This species fully agrees with *Sphaerella phoenicis* Cesati, described on spathes of a date palm from the Naples botanical garden, Italy and distributed as Rabenhorst, Fungi europ. exs./Klotzschii Herb. mycol. Cont. No. 2531 (1881) (e.g. in BR); it was then transferred to *Phoma* by Saccardo: *P. phoenicis* (Ces.) Sacc., Bull. Soc. r. Bot. Belg. 31 (1892) 232. The first classification in *Phomopsis* dates from the early twenties when Gonz ales Frago in Assoc. Esp. Progr. Ci. Congr. Oporto Ci. Nat. 6 (1921) 39 proposed replacing Saccardo's combination by *Phomopsis cesatii* Gonz.-Frag. (illegitimate nom. nov.). Another synonym is *Phoma magnusii* Bommer & Rousseau, Bull. Soc. r. Bot. Belg. 25 (1886) 177, reported on leaves of a date palm in the Gent botanical garden, Belgium (cf. holotype, BR).

45. *Plenodomus verbascicola* (Schw.) Moesz

Plenodomus verbascicola (Schw.) Moesz, Bot. Kozl. 28 (1931) 167–168. — *Sphaeria verbascicola* Schweinitz, Trans. Am. phil. Soc. II, 4 (1832 [‘1834’] = Synopsis Fung. Am. bor.) 221 [No. 1726.581]. — *Phoma verbascicola* (Schw.) Cooke “in Ravenel, Fungi Am. No. 141” (1878). — *Sclerophomella verbascicola* (Schw.) H hnel, Hedwigia 59 (1917 [vol. dated ‘1917–1918’]) 239. — *Mycosphaerella verbascicola* (Schw.) Fairman, Proc. Rochester Acad. Sci. 4 (1905) 176.

Material examined. Representative portion of type material of *Sphaeria verbascicola* on three stem pieces and a capsule of *Verbascum* sp. (Scrophulariaceae), Bethlehem, Pennsylvania, USA, mounted with

the reference '1726.581 - Syn Fung.' (written by Michener cf. Arthur & Bisby, 1918) and duplicates on stem pieces in three original paper packets: coll. L. D. von Schweinitz ['L.v.S.'] (Herb. von Schweinitz, PH). Duplicates of the original material in the 'National Fungus Collections' (BPI) and the 'Collins Collection' (PH), each consisting of one stem piece.

IDENTIFICATION

= Basionym refers to immature pseudothecia, probably belonging to a species of *Pleospora* Rabenh. ex Ces. & de Not.

The original material of *Sphaeria verbascicola* in Von Schweinitz's herbarium and the National Fungus Collections contains many immature pseudothecia. The duplicate in the Collins Collection bears also some mature pseudothecia with cylindrical clavate asci containing eight dark brown ascospores, $17.5-24 \times 5.5-7 \mu\text{m}$, with 4-6 transverse septa and 1-3 longitudinal septa in the central cells. These characteristics point to a species of *Pleospora* resembling *P. scrophulariae* (Desm.) Höhnelt recorded on various herbaceous plants in Europe, see Munk (1957). There are no indications that the immature ascomata refer to a species of *Mycosphaerella* as suggested by Fairman, l.c. The pycnidial interpretation of Von Schweinitz's *Sphaeria verbascicola*, especially the records under *Phoma* (Cooke, l.c. and Allescher, 1899), refers in many cases to *Phoma poolensis* var. *verbascicola* (Ell. & Ev.) van der Aa & Boerema (sect. *Phoma*, see Contribution I-2, de Gruyter, Noordeloos & Boerema, 1993). The records under *Sclerophomella* and *Plenodomus* (Von Höhnelt, l.c., Moesz, l.c. and Petrak, 1923a) relate to a typical representative of sect. *Plenodomus*, viz. *Phoma acuta* subsp. *errabunda* (Desm.) Boerema et al. (teleom. *Leptosphaeria doliolum* subsp. *errabunda* Boerema et al., see Contribution III-1 no. 15b).

APPENDIX

Documentation of herbarium specimens which refer to members of *Phoma* sect. *Plenodomus* (incorporated in the index).

'*Plenodomus galeopsidis* Rupprecht'

'*Plenodomus galeopsidis* m. det. Rupprecht' in herb. B [manuscript name].

Material examined. Collection, originally labelled '*Phoma* Berkeley Sacc.', on stem pieces of *Galeopsis ochroleuca* (Labiatae), Siegen, Westfalen, Germany: coll. A. Ludwig, 1 May 1947 (Herb. Ludwig, B).

IDENTIFICATION

= *Phoma doliolum* P. Karsten, Meddn Soc. Fauna Flora fenn. 16 (1888) 9-10 (teleomorph: *Leptosphaeria conoidea* (de Not.) Sacc.).

The morphological characteristics of the typical '*Plenodomus*'-like pycnidia in this collection on *Galeopsis* agree with the in vivo pycnidia of the plurivorous *Phoma doliolum* of sect. *Plenodomus* (cf. Contribution III-1 no. 19). Pycnidia depressed globose with a short sunken papillate neck, mostly 250-300 μm diam.; wall scleroplectenchymatous with basal more or less parallel cell-structure. Conidia oblong-ellipsoidal to subcylindrical, eguttulate, $6-9 \times 2-3 \mu\text{m}$ (av. $7 \times 2.5 \mu\text{m}$). The '*Phoma acuta*' recorded on *Galeopsis tetrahit* (Magnus, 1898: 85) may also refer to this plurivorous *Phoma* species. However, it should be noted that the host specific *Leptosphaeria galeopsidicola* Petrak (see Holm, 1957; Shoemaker, 1984) may produce a similar scleroplectenchymatous *Phoma* anamorph.

'Plenodomus glechomae Rupprecht'

'*Plenodomus glechomae* n. sp. det. Rupprecht' in herb. B [manuscript name].

Material examined. Collection, originally labelled '*Phoma herbarum?*', on old stolons of ground ivy, *Glechoma hederacea* (Labiatae), in 'Kleinwäldchen' near Forbach, Lotharingen (Lorraine), France: coll. A. Ludwig, 16 April 1914 (Herb. Ludwig, B).

IDENTIFICATION

= *Phoma enteroleuca* Sacc. var. *enteroleuca*.

This collection on ground ivy contains typical previous season's scleroplectenchymatous pycnidia of *Phoma enteroleuca*, commonly found on bark and wood of deciduous trees and shrubs in Europe (cf. Contribution III-1 no. 23a). Subglobose pycnidia becoming papillate; wall often with irregular invaginations and consisting of scleroplectenchyma cells of variable size. Conidia relatively small, 3-4(-4.5) × 1-2 µm, ellipsoidal or ovoid, mostly eguttulate. It is conceivable that in the vicinity of trees and shrubs this fungus could occasionally also spread to herbaceous plant remains. The non-fluorescing variety of *P. enteroleuca* has also been reported on a herbaceous plant (Boerema & Loerakker, 1985: table 1).

'Plenodomus scrophulariae Rupprecht'

'*Plenodomus scrophulariae* n. sp. det. Rupprecht' in herb. B [manuscript name].

Material examined. Collection originally labelled '*Phoma herbarum* det. Sydow', on stems of figwort, *Scrophularia nodosa* (Scrophulariaceae), in 'Kleinwäldchen' near Forbach, Lotharingen (Lorraine), France: coll. A. Ludwig, 17 Dec. 1911 (Herb. Ludwig, B).

IDENTIFICATION

= *Phoma acuta* subsp. *errabunda* (Desm.) Boerema et al. (teleomorph: *Leptosphaeria doliolum* subsp. *errabunda* Boerema et al.).

The scleroplectenchymatous pycnidia in this collection on dead figwort stems fully agree with those of the plurivorous *Phoma acuta* subsp. *errabunda* (compare Contribution III-1 no. 15b). Pycnidia subepidermal, depressed globose, with a short poroid papilla; wall scleroplectenchymatous with somewhat elongated basal cells. Conidia subcylindrical, eguttulate, 4-5 × 1.5-2 µm (av. 4 × 2 µm). This necrophyte has been previously recorded on *Scrophularia* spp.: Saccardo (1884: 133) and Lucas & Webster (1967).

Plenodomus svalbardensis Lind

Plenodomus svalbardensis Lind, Skr. Svalbard Ishavet 13 (1928) 35.

Material examined. Two small fragments of the type collection on basal leaves of *Draba alpina*, Magdalen Bay, Svalbard: coll. H. Resvoll-Holmsen, 17 August 1907 (O). Most material was sent to Prince Albert 1st of Monaco, who financed the expedition cf. inf. Dr I. Jörstad (1966), but apparently not preserved cf. inf. Dr. J. Alinat (1973), Inst. Océanographique, Monaco-Ville.

IDENTIFICATION

= *Phoma pedicularis* Fuckel.

The description of *Plenodomus svalbardensis* and detailed study of a single pycnidium found on the sparse original material, convinced us that it belonged to the plurivorous

arctic-alpine *Phoma pedicularis* of sect. *Plenodomus* (cf. Contribution III-1 no. 20): pycnidia subglobose, initially closed and relatively small, 200–300 µm diam., containing eguttulate cylindrical conidia, mostly 5–6 × 2 µm.

Phoma pedicularis was first found on dead leaves of a *Pedicularis* sp. near the Matochkin Shar (Straits) of Novaya Zemlya. The pycnidia usually become larger under snow cover and may develop conspicuous dark elongated beak-like necks. The conidia of *P. pedicularis* vary markedly in shape and size; they may be oblong-ellipsoidal to cylindrical, 4–6(–8.5) × 2(–3) µm, as recorded for *Plenodomus svalbardensis*, but also oval-ovoid to nearly spherical, 4–6 × 2.5–4.5 µm. For other characteristics of *P. pedicularis* in vivo and in vitro see Boerema, van Kesteren & Loerakker (1981: 65–71).

ACKNOWLEDGEMENTS

We wish to express our thanks to the staff of the Institutes and Herbaria at Baarn, Beltsville, Berlin, Brussels, Budapest, Kew, Lausanne, Leiden, Lisbon, Madrid, Monaco, Moscow, Munich, New York, Oeiras, Oslo, Ottawa, Padova, Paris, St. Petersburg (Leningrad), Philadelphia, Prague, Recife-PE, Rydalmere, Sheffield, Stockholm, Taiwan, Tokyo, Uppsala, Utrecht, Vienna, Washington-DC and Zürich. Sincere thanks are also due to Dr. R.T.A. Cook for revising the English text, to Dr. H.A. van der Aa and Dr. B.C. Sutton for expert advice and kind cooperation, and to Mrs. Frieda van Dreven for technical assistance. Dr. W. Gams kindly provided the Latin translations of descriptions.

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ERRATA

Boerema, G.H., J. de Gruyter & H.A. van Kesteren: Contributions towards a monograph of Phoma (Coelomycetes) III-1. Section Plenodomus: Taxa often with a Leptosphaeria teleomorph. Persoonia 15 (4) (1994) 431-487.

Page 440 heading: replace 'Fungus-host index' by *Host-fungus index*.

Page 447 text fig. 1: add *Vertical sections bar 100 µm, surface views bar 1000 µm*.

Page 449 line 21 from top: replace 'brown (fulvous, amber)' by brown (fulvous, *umber*).

Page 460 text fig. 5 the bottom line: replace 'In vitro (left)' by In vitro (*right*).

Page 469 line 18 from top: replace '12-seriate' by *1-2-seriate*.

Page 471 line 8 from top: replace 'comb. prov., not published' by *Ber. bayer. bot. Ges. 24 (1940) 8 (cf. reprint)*.

line 23 from top: replace '× 7-8 mm' by × 7-8 µm.

Page 472 line 3 from bottom (text) should be read: bordered by a narrow *yellow red and a narrow white zone*.

Page 482 fig. 10A-D: add  [bar = 10 µm].

Page 485 references: paper by Boerema & Gams is not published in 1994, but in 1995 [Mycotaxon 53: 355-360].

NOTES ON HYMENOSCYPHUS – II

On three non-fructicolous species of the 'fructigenus-group' with croziers

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Descriptions, illustrations, and keys are given of a small part of the 'fructigenus-group' of the ascomycete genus *Hymenoscyphus*. The species concerned are characterized by asci originating from croziers. *Hymenoscyphus scutuloides* and *H. fucatus* var. *badensis* are described as new, while the combination *H. fucatus* is validly published.

The taxonomic core of the genus *Hymenoscyphus* S.F. Gray is formed by a homogeneous group of species which have the same stipitate-cupulate habit, the same excipular structure, and almost the same shape of asci, ascospores, and paraphyses. This group, here called 'fructigenus-group'¹, comprises some dozens of lignicolous (incl. fructicolous), caulicolous, and foliicolous species, such as *H. albidus* (P. Karst.) W. Phill., *H. albopunctus* (Peck) Kuntze, *H. caudatus* (P. Karst.) Dennis, *H. fastidiosus* (Peck) Arendholz, the *H. fructigenus*-complex, *H. humuli* (Lasch) Dennis, *H. salicellus* (Fr.: Fr.) Dennis, *H. scutula* (Pers.: Fr.) W. Phill., and *H. serotinus* (Pers.: Fr.) W. Phill. Their exciple is composed of two layers: the inner layer (medulla) is a thin-walled textura porrecta, the outer layer (cortex) is a mostly thin-walled textura prismatica. The excipular hyphae are running parallel with or oriented at a low angle to the excipular surface and they are not embedded in a gelatinous matrix. Characteristic of the 'fructigenus-group' are the ellipsoid-fusiform to obovoid-fusiform ascospores. Such spores show the upper half of an ellipsoidal to obovoidal body and the lower half of a fusiform one. The spores are in general approximately bilaterally symmetrical, owing to an abaxially angulate or even hooked apex, occasionally combined with some slight curving or single-sided flattening of the spore. This particular shape is nowadays often indicated as 'scutuloid'², a term introduced by Baral (in Baral & Krieglsteiner, 1985: 120). As the torpedo shape is providing for an optimal discharge, some asymmetry causes the spores to rotate round their axis. This spinning can easily be seen under the microscope, at least in mounts of rehydrated material in ammonia 10%. Moreover, the spores of several species, e.g. *H. salicellus* and *H. scutula*, are provided at their ends with one or more hyaline, thread-like appendages, commonly indicated as 'cilia' but – because of their immovability and consistency – preferably called 'setulae' (bristles). Whether these appendages have a function in spinning, in attachment to substrata, or in any other process, is unknown (cf. Hawksworth, 1987: 186–187).

¹ Also called 'scutula-stirpe' (Dennis, 1956: 66, 82; cf. White, 1944: 609, 613) or 'caudatus-group' (Dumont, 1981: 60), but preferably named 'fructigenus-group' because *H. fructigenus* (Bull.: Fr.) S.F. Gray, the type species of the genus, forms part of it.

² From *H. scutula*, a member of the group.

As generally known, asci arise at the (provisional) end of ascogenous hyphae, from 2- or 3-celled structures called 'Dangeardian elements' (see e.g. Chadeffaud, 1943). Within the inoperculate ascomycetes two main types of such structures have been found, viz. the pleurorhynchous type and the aporhynchous type (Berthet, 1964: 98 et seq.). In the pleurorhynchous type the snout of the elements is laterally turned off over an angle of about 180°. Hence such elements are hook-shaped and called 'crozier' (French 'crochet (ascogène)', German 'Haken', Latin 'uncus'). In the aporhynchous or (secondarily) hookless type the forming of a lateral snout is thought to be suppressed, so that the asci seem to be 'simple-septate' (as called by Huhtinen, 1990: 66–67). When the foremost binucleate cell or 'crook' of a crozier develops into an ascus, the terminal (uninucleate) cell³ may remain visible as a small by-pass arching over the septum between the ascus and the preceding cell⁴. A separate term for this small arch seems not to be in common use, at least in English literature. For that reason several authors have resorted to a circumscriptio as 'Asci originating/produced/arising from croziers' (e.g. White, 1943; Dumont, 1976; Korf & Lizoñ, 1994) or 'Asci aus Haken entstehend' (e.g. Arendholz, 1979), without making clear whether the arch remains visible. Some other authors have misapplied the term 'crozier' to the arch solely (e.g. Dennis, 1956: 76, 79; Haines, 1989⁵). However, a similar process of forming arches is well known from many basidiomycetous fungi, viz. in the development of hyphae of the secondary mycelium (incl. basidia). In these fungi, the anastomosing arch has, for more than a century, been called 'clamp-connection' or, shortly, 'clamp' (Fr. 'boucle' or 'anse d'anastomose', Germ. 'Schnalle', Lat. 'fibula'). Since there is general agreement on the homology of early development of basidia and asci, and on the homology of clamp forming in basidiomycetes and arch forming in ascomycetes (see e.g. Martens, 1932: 261; Moreau, 1950; Moreau, 1954: 1563; Berthet, 1964: 98, 99, 118; Arx, 1967: 183, 184; Boidin, 1971: 143, 144; Dörfelt, 1989: 47; cf. Gäumann & Dodge, 1928: 421, 422), it seems justified and – for correct interpretation – advisable to apply the term 'clamp(-connection)' to relevant ascomycetes too. Yet, in several dictionaries the 'clamp' is considered as a character unique to basidiomycetes (e.g. Hawksworth et al., 1983; Dörfelt, 1989). I would, however, advocate a less exclusive application of this term. Accordingly Moreau & Moreau (1922) and Berthet (1964: 118) have already used the term 'boucle' and von Arx (1967: 69 et seq.) the term 'Schnalle' for the ascomycete clamp.

Most species of the '*fructigenus*-group' contain asci which originate from aporhynchous Dangeardian elements. Hence they lack an anastomosing arch at their base. In this article attention is paid to three species whose asci arise from pleurorhynchous Dangeardian elements, alias croziers, and generally do show a basal anastomosing arch. The presence of croziers and arches respectively is, indeed, not the only character by which these three species are distinguished from others. If so, I would not have regarded them as separate species but as taxa of an infraspecific rank. Such is the case in e.g. *Phaeohelotium*

³) Also called 'tip' (e.g. Gäumann & Dodge, 1928: 130) or 'downward protuberance' (Huhtinen, 1990: 66–67).

⁴) Also called 'stipe' (Gäumann & Dodge, 1928: 130), 'stalk cell' (Huhtinen, 1990: 67) or 'pédoncule' (Martens, 1932: 259).

⁵) Haines (1989: 315) simultaneously introduced 'crozier' [gen. 'crozieris', pl. 'crozieres'] as a Latin term ('cum crozieribus'), but there is no need for such an objectionable neologism.

(*Hymenoscyphus imberbe* (Bull.: Fr.) Svrček, wherein two otherwise identical forms can be distinguished: one with croziers and another with aporhynch elements.

Since there was no fresh material available, the presented full-descriptions have been based on dried specimens which were rehydrated in ammonia 10%. Microscopical observation and measuring were carried out on hand-made sections and squash preparations supplied with a solution of 0.2% cotton blue in lactic acid.

Measurements of asci, ascospores and paraphyses (length of end cells) are based on samples taken at random, with the exception of extremes (between round brackets) which are based on select elements outside the sample(s) referred to. The number of samples (k) and the number of elements per sample (n) are indicated between square brackets, just as the calculated taxon averages (length, width, and length/width-ratio respectively) and standard deviations.

KEY TO THE SPECIES TREATED

- 1a. Asci 72–90 μm long (average length < 87.0 μm). Ascospores 14–21 μm long (average length < 19.0 μm), with length/width-ratio of 3.4–5.9 (average ratio < 5.00), occasionally apiculate but not obviously setulose 3. *H. menthae*
- b. Asci 80–136 μm long (average length > 87.0 μm). Ascospores 18–36 μm long (average length > 19.0 μm), with length/width-ratio of 4.8–8.8 (average ratio > 5.00), mostly provided at the ends with obvious, up to 4.0 μm long setulae 2
- 2a. Ascospores 18–27 \times 3–4 μm (average length < 24.0 μm , average width < 4.0 μm), with length/width-ratio of 5.1–7.7 (average ratio > 5.50); setulae 1.0–4.0 μm long 2. *H. scutuloides*
- b. Ascospores 23–36 \times 4–6 μm (average length > 24.0 μm , average width > 4.0 μm); setulae 1.5–2.5 μm long 1. *H. fucatus*

1. *Hymenoscyphus fucatus* (W. Phill.) Baral & Hengstm., *comb. & stat. nov.*

Peziza fucata Cooke & W. Phill. in herb. [invalid: ined.]; in Cooke, Grevillea 4 (1876) 132, pl. 65, fig. 300 [invalid: nomen nudum; see also Carpenter, Mem. New York Bot. Garden 33 (1981) 214]. — *Hymenoscyphus fucatus* (Cooke & W. Phill.) Baral in Baral & Krieglsteiner, Beih. Z. Mykol. 6 (1985) 128 [as '(Phill.)'; invalid: nomen nudum].

Peziza scutula var. *fucata* W. Phill., Elv. brit. (3) (1877) n. 120 [invalid: nomen nudum]. — *Hymenoscypha scutula* var. *fucata* W. Phill., Man. Brit. Discomyc. (1887) 137 (basionym). — *Phialea scutula* var. *fucata* (W. Phill.) Sacc., Syll. Fung. 8 (1889) 266. — *Helotium scutula* var. *fucatum* (W. Phill.) Rehm in Rabenh. Krypt.-Fl. ed. 2, 1 (3) (1893) 793 [as var. '*fuscata*']. — *Helotium scutula* forma *fucatum* (W. Phill.) Massee, Brit. Fung.-fl. 4 (1895) 254 [as forma '*fucata*'].

Helotium superbum Velen. in herb. et ms. 1923 [invalid: ined.] fide Svrček (1985: 159, 188). — *Helotium macrosporum* Velen., Monogr. Discomyc. Bohem. 1 (1934) 194 [illegitimate: later homonym]; non *Helotium macrosporum* Peck, Ann. Rep. State Bot. 26 (1874) 82.

Hymenoscyphus fucatus has relatively long and wide spores. Two other non-lignicolous species of the '*fructigenus*-group', viz. *H. dearnessii* (Ellis & Everh.) Kuntze and *H. suspectus* (Nyl.) Hengstm., have ascospores which are similar in length, but narrower than those of *H. fucatus*, while their asci are narrower than those of *H. fucatus* and do not arise from croziers.

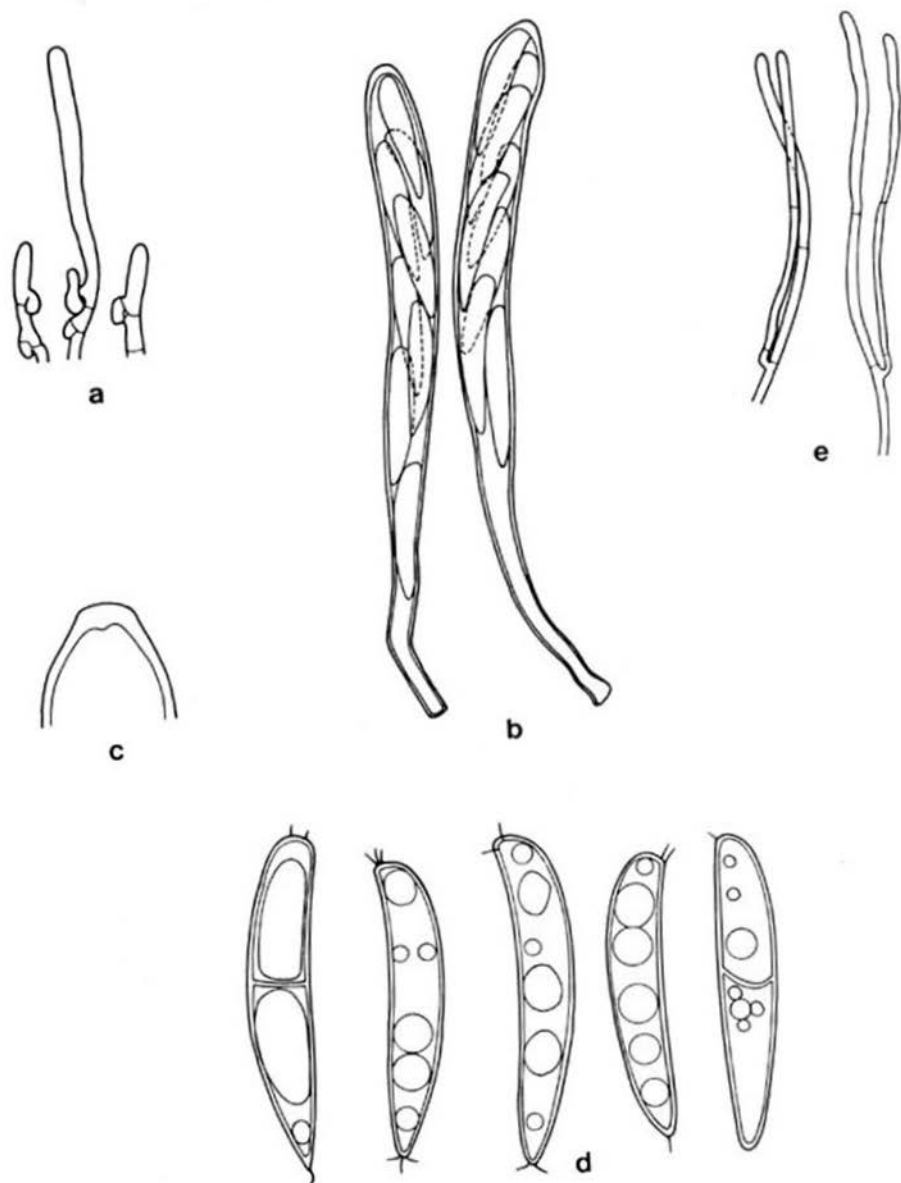


Fig. 1. *Hymenoscyphus fucatus* var. *fucatus* (from Krieglsteiner, 23 July 1986): a. young asci ($\times 750$), b. mature asci ($\times 750$), c. ascus apex ($\times 1500$), d. ascospores ($\times 1500$), e. paraphyses ($\times 750$).

For an extensive description, an enumeration of the examined collections and further comments, see under the distinguished varieties.

KEY TO THE VARIETIES

- a. Asci 83–101 × 9–11 µm. Ascospores 23–35 µm long (average length < 27.5 µm) and 4–5 µm wide b. *H. fucatus* var. *badensis*
 b. Asci 113–136 × 10–14 µm. Ascospores 24–36 µm long (average length > 27.4 µm) and 4–6 µm wide a. *H. fucatus* var. *fucatus*

1a. *Hymenoscyphus fucatus* var. *fucatus* — Fig. 1

Apothecial morphology — Apothecia stipitate-cupulate, up to about 1 mm high when rehydrated, loosely clustered, rarely mutually grown together at the base, erumpent through (locally blackened) epidermis or superficial on decorticated parts of the substratum; some dozens up to more than a hundred apothecia over a length of 10 cm of the substratal stem. Cupule saucer-shaped, up to 0.8 mm in diameter when rehydrated. Receptacle and stipe smooth to subpruinose. Stipe cylindrical to obconical, up to about 0.8 mm when rehydrated, about as long as the diameter of the cupule.

Anatomy — Asci [$k = 1, n = 10$] cylindrical-obconical to cylindrical-clavate, 113–136 µm long [average length ± standard deviation: 123.8 ± 8.2 µm], 10–12(–14) µm wide [average width ± standard deviation: 11.1 ± 0.7 µm], with length/width-ratio of 9.7–13.7 [average ratio ± standard deviation: 11.2 ± 1.2], 8-spored, originating from croziers; apex truncated conical; annulus turning medium blue in Melzer's reagent. Ascospores [$k = 2, n = 20$] obovoid-fusiform to ellipsoid-fusiform, sometimes almost cylindrical, straight to slightly curved, 24–36 µm long [29.1 ± 2.7 µm], 4–6 µm wide [5.0 ± 0.3 µm], with length/width-ratio of 4.8–7.2 [5.8 ± 0.6], 1-celled when mature, afterwards 2-celled, hyaline, thin-walled, smooth, provided with 1–2 large or about 4–6 medium-sized and occasionally some small guttules, obliquely biseriate, at apex and base mostly provided with 1–2 (–3) short, up to 1.5(–2.0) µm long, straight or slightly curved setulae; apex rounded to abaxially angulate, sometimes beaked; base (almost) acute, sometimes rather acute. Paraphyses [$k = 1, n = 10$] subcylindrical, 1.5–2.0 µm wide, at the top often slightly wider than at the bottom, hyaline, according to Baral (in litt.) provided with highly refractive guttules when fresh, with 3–5 septa in the uppermost 100 µm, forked about half-way (sometimes also in upper half); terminal cell 22–40 µm long [29.0 ± 6.0 µm], 0.9–1.5 times as long as the subterminal cell [1.3 ± 0.2], with rounded tip; subterminal cell 18–30 µm long [23.4 ± 4.6 µm]. Subhymenium up to about 60 µm thick, composed of branched and strongly winding hyphae, partly provided with anastomosing arches. Exciple 2-layered. Medulla a thin layer of textura porrecta with about 2–4 µm wide, thin-walled hyphae. Cortex consisting of textura prismatica; hyphae 4–10 µm wide but covering hyphae only 2–4 µm wide, thin-walled, running parallel with or oriented at a low angle to the excipular surface, not embedded in a gelatinous matrix; individual cells about 8–23 µm long.

Occurrence — Saprotrophic on stems of *Polygonum lapathifolium*, *P. robustius*, and possibly other herbs; July–September.

Collection examined. GERMANY: Baden-Württemberg, Schwäbisch-Hall, Teurershof, MTB 6824/3, in rush zone of a pond, on dead stem of *Polygonum lapathifolium*, 23 July 1986, L. Kriegelsteiner s.n. (herb. Baral 3057).

The typical variety of *H. fucatus* has been fully redescribed and illustrated by White (1944: 609–613, figs. 25–30). According to him its asci measure $118\text{--}135 \times 12\text{--}15 \mu\text{m}$ and its ascospores $24\text{--}34 \times 5\text{--}6.8 \mu\text{m}$, at each end beset with one to several small, inconspicuous 'cilium-like processes'. It is noteworthy that these setulae have not been mentioned or depicted by Dennis (1956: 79, fig. 69G), who also examined an isotype-collection.

Hymenoscyphus fucatus has originally been found and collected in Shropshire, England, on dead stems of *Polygonum* lying in water.

A probable record in 1923 in the Czech Republic can be deduced from Svrček (1985: 159, 188, pl. IX, fig. 4). For, in his revision of the taxa described by Velenovský in the genus *Helotium*, he states that the lectotype collection of *Helotium macrosporum* Velen., found on stems of *Cicerbita alpina* in Bohemia, is identical with *H. scutula* var. *fucatus*. White (1944: 610–613) collected it in both 1936 and 1938 in the same locality in New York State, USA, on old stems of *Polygonum robustius* lying in a swamp. Pallo collected the species in 1975 on a herbaceous dicotyledon stem in the Western Caucasus, Russia (Vaasma et al., 1986: 26). Baral (in Baral & Kriegelsteiner, 1985: 128) reported its occurrence in 1975 on stems of *Solidago* sp. in Baden-Württemberg, Germany (no herbarium material preserved). Blank has found *H. fucatus* sensu Baral in 1987 on a stem of *Solanum dulcamare* in Thayngen, Switzerland (not preserved; Baral in litt.). Weber (1992: 28, 122) has also examined a Swiss collection of it, found by Baral & Blank in 1990 on a dicotyledon stem in the canton Graubünden and determined by Baral (herb. Baral 4193). As to the last three records it has to be pointed out, however, that *H. fucatus* sensu Baral differs from the type in lacking arches at the ascus base (Baral in litt.; Weber, 1992: 121). Another alleged find was from Germany in 1989 on stems of *Aranunc silvester* in Bavaria, but the description and figures of this material show neither croziers or arches nor setulae (Engel, 1993: 5, 8; Engel & Hanff, 1993: 44).

A supposed record in the Netherlands (prov. Flevoland, Abbertbos, 10 Oct. 1981; herb. Swart-Velthuyzen 367) has turned out to represent typical *H. scutula*.

1b. *Hymenoscyphus fucatus* var. *badensis* Hengstm., var. nov. — Fig. 2

A varietate typica differt ascis minoribus, $83\text{--}101 \times 9\text{--}10 \mu\text{m}$, et ascosporis etiam paulo minoribus, $(23\text{--})25\text{--}31\text{--}(35) \mu\text{m}$ longis.

Apothecial morphology — Apothecia stipitate-cupulate, 0.4–1.5 mm high when rehydrated, scattered, erumpent through substratal epidermis; about 60 fruit-bodies on 6 cm long fragment of a leaf. Cupule cup- to saucer-shaped, 0.2–0.9 mm in diameter when rehydrated, with slightly raised to flat margin. Hymenium slightly concave to flat, light yellow when dried. Receptacle pale yellow when dried, subpruinose. Stipe cylindrical, up to 1.3 mm long when rehydrated, about as long as or longer than the diameter of the disc, 0.1–0.2 mm across, pale yellow when dried, subpruinose.

Anatomy — Asci [$k = 1$, $n = 10$] cylindric-clavate to obconical-clavate, $83\text{--}101 \mu\text{m}$ long [$91.0 \pm 5.9 \mu\text{m}$], $9\text{--}10 \mu\text{m}$ wide [$9.7 \pm 0.5 \mu\text{m}$], with length/width-ratio of 8.4–11.3 [9.5 ± 0.9], 8-spored, originating from croziers but anastomosing arches usually not

remaining visible at mature asci; apex more or less bullate and with thickened wall when immature, but slightly truncated conical and with hardly thickened wall when mature; annulus turning medium blue in Melzer's reagent. Ascospores [$k = 1$, $n = 20$] obovoid-fusiform to ellipsoid-fusiform, rarely subcylindrical, straight or slightly curved, bilaterally symmetrical, (23-)25-31(-35) μm long [$26.9 \pm 1.9 \mu\text{m}$], 4-5 μm wide [$4.6 \pm 0.2 \mu\text{m}$], with length/width-ratio of (5.1-)5.3-7.0(-8.8) [5.8 ± 0.5], 1-celled, hyaline, obliquely

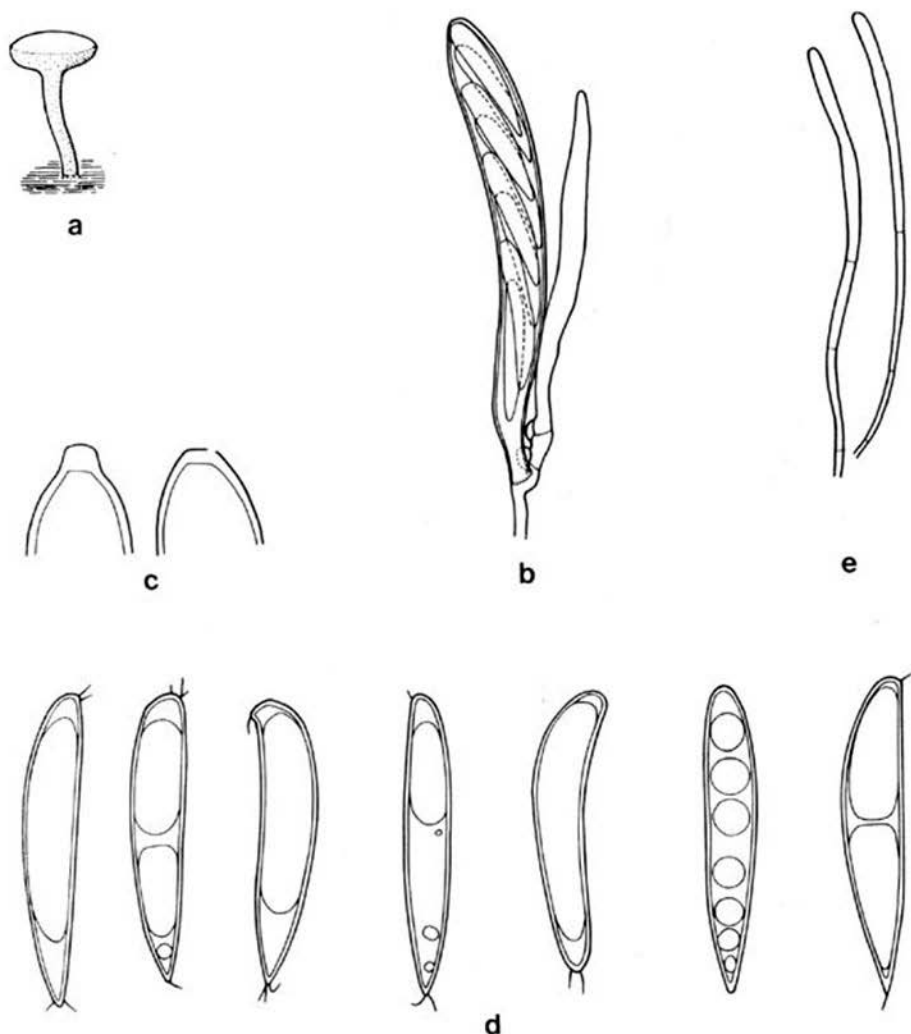


Fig. 2. *Hymenoscyphus fucatus* var. *badensis*, holotype: a. habit ($\times 20$), b. asci ($\times 750$), c. ascus apices in different stages ($\times 500$), d. ascospores ($\times 1500$), e. paraphyses ($\times 750$).

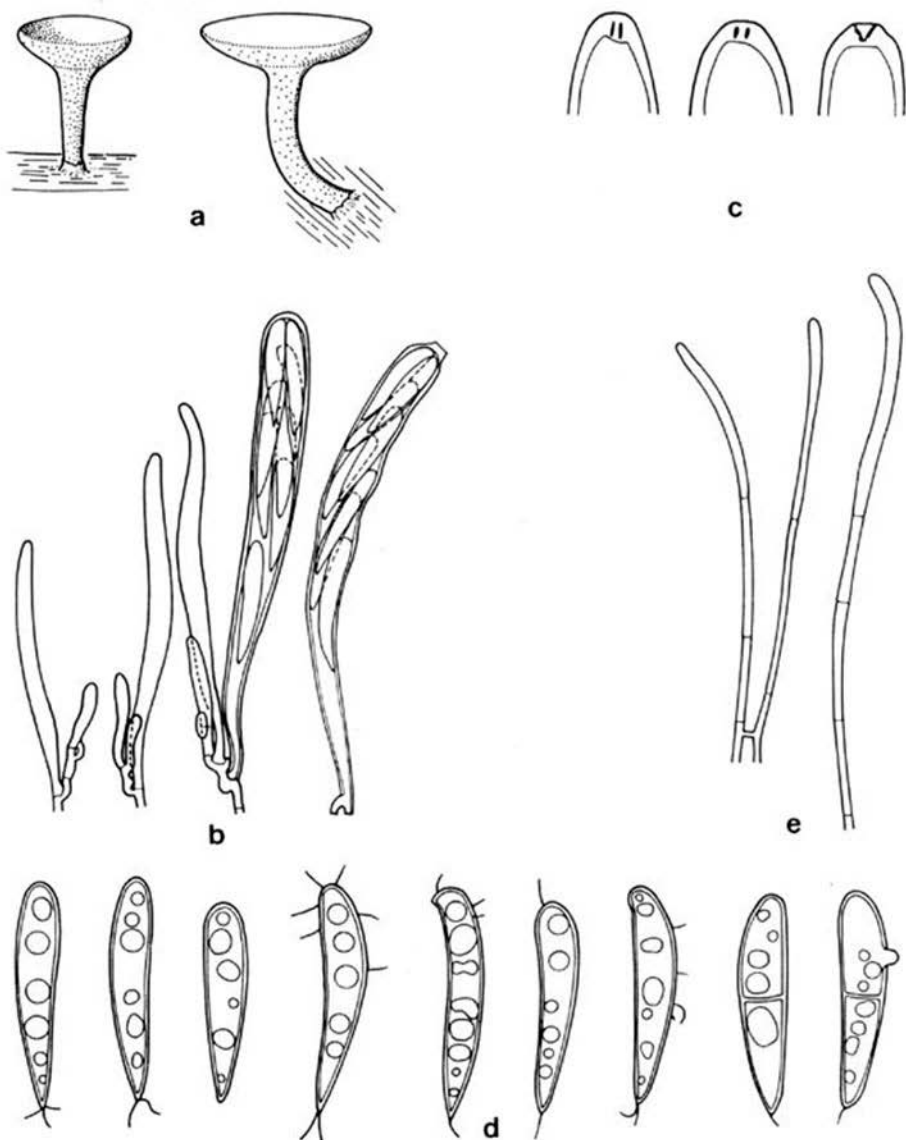


Fig. 3. *Hymenoscyphus scutuloides*, holotype: a. habit ($\times 20$), b. asci ($\times 750$), c. ascus apices (stained with iodine) in different stages ($\times 1500$), d. ascospores ($\times 1500$), e. paraphyses ($\times 750$).

biseriate, provided with 1-2 large and possibly one or a few small guttules when mature, afterwards with increasing number (up to about eight) of shrinking guttules and finally slightly granulose to optically empty, thin- and smooth-walled, at apex and base frequently (at least about 50% of the extremities) provided with 1-3 tiny setulae; apex blunt or rounded to abaxially angulate or sometimes laterally beaked (not hooked); base acute; setulae at most 2.5 μm long, extremely thin, mostly curved. Paraphyses [$k = 1$, $n = 10$] cylindrical-obconical, about 1.0 μm wide near the base and up to 1.5-2.0 μm wide at the tip, rather scarce, hyaline, according to Baral (in litt.) with highly refractive guttules (only when fresh), provided with 2-3(-4) septa in the uppermost 80 μm , sometimes forked or anastomosing in the lower half; terminal cell 24-50(-60) μm long [$39.6 \pm 9.1 \mu\text{m}$], 1.0-2.8 times as long as the subterminal cell [1.8 ± 0.5], with rounded tip; subterminal cell 14-31 μm long [$22.5 \pm 5.0 \mu\text{m}$]. Subhymenium above the stipe up to about 25 μm thick, consisting of 2-3 μm wide, strongly branched and winding hyphae, partly provided with arches. Exciple 2-layered. Medulla up to about 10 μm thick, a textura porrecta with 1-2 μm wide, thin-walled hyphae. Cortex up to about 30 μm thick, a textura prismatica; hyphae about 5-10 μm wide and near the edge about 2-3 μm wide but covering hyphae only about 1-2 μm wide, thin-walled, almost parallel with the excipular surface, not embedded in a gelatinous matrix; individual cells about 11-24 μm long.

Occurrence — Saprotrophic on sedge-like leaf; October.

Collection examined. GERMANY: Baden-Württemberg, Weingartener Moor (Oberrheinebene), MTB 6916-17, 113 m, reed-land, on leaf of '*Carex*' (according to finder), 1 Oct. 1986, W. Winterhoff 86570 (holotype; herb. Baral).

The asci of this variety are significantly smaller than those of the var. *fucatus*. Moreover, the ascospores tend to be smaller, and their average length is significantly smaller than that of the typical variety. The difference in spore size is even more convincing if we look at the dimensions of turgescient spores as found by Baral, viz. 23-30(-33) \times 4.5-5.5 μm in the latter collection versus (28-)30-38(-40) \times 5.5-7 μm in the collection of var. *fucatus* (Baral in litt.).

2. *Hymenoscyphus scutuloides* Hengstm., *spec. nov.* — Figs. 3, 4

?*Hymenoscyphus scutula* (Pers.: Fr.) W. Phill. sensu Breitenbach & Kränzlin, Pilze Schweiz 1 (1981) 170-171, pro parte.

Apothecia stipitato-cupulata, erumpentia, stipite longitudine diametrum cupulae circiter aequanti vel paulo superanti. Asci (80-)85-102(-105) \times 8-9(-10) μm , inoperculati, octospori, ex unciis orti; apex plus minusve truncate conicus, annulo iodo medie caerulescente. Ascospores irregulariter obovato-fusiformes ut in *Hymenoscypho scutula*, (18-)20-27 \times 3-4 μm , maturitate continuae, demum (uni-)septatae, hyalinae, guttulate, in asci parte inferiore uniseriatae, sursum oblique biseriatae, parietibus tenuibus laevibusque, ad apicem basemque vulgo 1-3(-4) setis filiformibus plerumque 1-3 μm longis instructae; apex obtusus vel rotundatus usque lateraliter angulatus vel paulo uncatas, interdum sat acutus; basis acuta vel subacuta. Paraphyses cylindraceae vel cylindraceo-obconicae, longitudine ascos aequantes, inferne 1.0-2.0 μm , superne 2.0-3.0 μm latae, septatae, in dimidio inferiore aliquando furcatae vel anastomosantes. Excipulum bistratum. Medulla e textura porrecta constans. Cortex e textura prismatica constans, hyphis parallelis vel sub angulo parvo ad paginam excipuli currentibus, in gelatina haud inclusis, parietibus tenuibus vel paulo incrassatis.

Occurrit ad caules emortuos herbarum et Rubi sp.; mensibus Augusti-Septembris.

Holotypus: 'Netherlands, Winterswijk, 20 Sept. 1953, R.A. Maas Geesteranus 9510' (L).

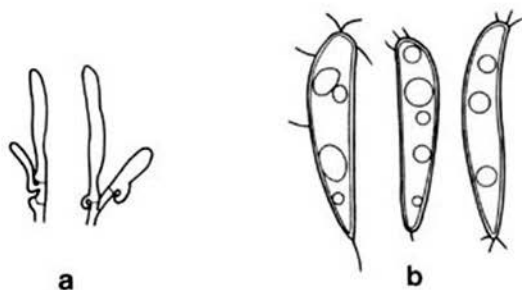


Fig. 4. *Hymenoscyphus scutuloides* (from Huijsman 55.H-99), a. young asci ($\times 750$), b. ascospores ($\times 1500$).

Apothecial morphology — Apothecia stipitate-cupulate, up to 2 mm high when rehydrated, concolorous light yellow when dry, scattered, erumpent through substratal epidermis; up to more than a hundred fruit-bodies over a length of 10 cm of the substratal stem. Cupule cup- to saucer-shaped, up to 1.5 mm in diameter when rehydrated, with slightly raised to entirely plane margin. Hymenium concave to flat. Receptacle smooth to subpruinose, occasionally slightly radially fibrous. Stipe cylindrical to obconical, up to 1.5 mm long, about as long as or slightly longer than the diameter of the cupule, up to 0.3 mm across, smooth to subpruinose, at the base sometimes surrounded by a small collaret of epidermal tissue.

Anatomy — Asci [$k = 1$, $n = 10$] obconical to cylindric-obconical, (80–)85–102 (–105) μm long [$96.0 \pm 4.9 \mu\text{m}$], 8–9(–10) μm wide [$8.6 \pm 0.5 \mu\text{m}$], with length/width-ratio of 9.6–12.9 [11.2 ± 1.0], 8-spored, originating from croziers and the resulting anastomosing arches at the base of the asci generally remaining visible; apex more or less truncated conical, thick-walled around the pore; annulus turning medium blue in Melzer's reagent, especially in the central part. Ascospores [$k = 1$, $n = 20$] bilaterally symmetrical (asymmetrical in side-view), obovoid-fusiform, flattened on one side or slightly curved, (18–)20–27 μm long [$21.7 \pm 1.5 \mu\text{m}$], 3–4 μm wide [$3.6 \pm 0.3 \mu\text{m}$], with length/width-ratio of 5.1–7.7 [6.1 ± 0.7], 1-celled, a few (older ones) 2-celled, hyaline, guttulate, in the lower part of the ascus uniseriate and upwards passing into obliquely biseriate, thin-walled, smooth, at apex and base mostly provided with 1–3(–4) setulae; apex blunt or rounded to oblique-angulate or slightly hooked, occasionally rather acute; base acute or subacute; setulae filiform, 1.0–3.0(–4.0) μm long, sometimes also adhering at the flanks of the spore; germination observed in 2-celled spores, laterally from the upper cell. Paraphyses [$k = 1$, $n = 10$] cylindrical or upwards slightly widening, equalling the asci, below 1.0–2.0 μm and above 2.0–3.0 μm wide, provided with 2–4 septa in the uppermost 100 μm , occasionally forked or anastomosing in the lower half, somewhat granulose, partly staining blue with cotton blue; terminal cell 20–58 μm long [$38.0 \pm 11.5 \mu\text{m}$], 0.7–4.9 times as long as the subterminal cell [2.3 ± 1.3], with rounded tip; subterminal cell 11–35 μm long [$20.0 \pm 7.8 \mu\text{m}$]. Subhymenium in the central part up to about 50 μm thick. Exciple 2-layered. Medulla near the stipe up to about 20 μm thick, composed of parallel, radially running, 2–4 μm wide, thin-walled hyphae (textura porrecta). Cortex

about 60 µm thick, inclusive of outer covering layer, a *textura prismatica*; hyphae parallel with or oriented at a low angle to the excipular surface, not embedded in a gelatinous matrix, with thin or slightly thickened walls (up to about 1.0 µm), 5–9 µm wide but covering hyphae thin-walled and only about 3 µm wide; separate cells about 5–30 µm long.

Occurrence — Saprotrophic on herbaceous stems and on canes of *Rubus* sp.; August–September.

Collections examined. NETHERLANDS: prov. Gelderland, Winterswijk, Bekendelle, on dead herbaceous stem, 20 Sept. 1953, R.A. Maas *Geesteranus* 9510 (holotype; L). — SWITZERLAND: canton Luzern, Schüpfheim, on dead cane of *Rubus* sp., 21 Aug. 1955, H.S.C. Huijsman 55.H-99 (L).

An indication of the shape and colour of the apothecia in fresh condition is given in notes accompanying the Swiss collection, which state: [apothecia] 'young deeply cup-shaped, later on more flat, but long time remaining cup-shaped, lastly flat; colour very light cream-lemon; disc slightly darker than rest.'

The type collection, originally identified as '*Helotium scutula* (Pers. ex Fr.) Karst.', has been examined by Dr. K.P. Dumont (New York Botanical Garden) in March 1981, but was not annotated by him.

As already expressed by its name, *H. scutuloides* shows a great resemblance to *H. scutula*. The latter species, however, has larger asci (120–142 × 9–11 µm) which do not originate from croziers, while its spores are slightly broader (4–5 µm) and usually possess only one setula at each end. In view of the forementioned resemblance it is quite possible that *H. scutula* in the sense of some authors includes *H. scutuloides* as well. This seems to be the case in Breitenbach & Kränzlin (1981: 170–171, No. 190). Their description and figures of *H. scutula* are mainly based on a collection, found on herbaceous stems in the Swiss canton Luzern (compare examined collection!) and probably representing *H. scutuloides*. The presence of anastomosing arches at the base of the asci is not mentioned, but suggested by their fig. 190B. Perhaps *H. scutuloides* also has been found by Berthet (1964: 40–41, 101) on dead stems of *Solidago canadensis* in France, for the relevant collection of '*H. scutula*' is described to be of the pleurorhynchous type.

A related species, also resembling *H. scutula* and with asci said to be produced from 'tiny' croziers, has been described by Dumont & Carpenter (1982: 582–587, figs. 5, 6) under the name *H. 'affin. scutululus'*. This species, however, found on various substrates in the neotropics, has obviously pigmented paraphyses and covering hyphae, while its spores are only 2–3(–4) µm wide, short-setulose at the base and shaped like those of *H. serotinus*.

3. *Hymenoscyphus menthae* (W. Phill.) Baral — Fig. 5

Helotium menthae W. Phill., *Elv. brit.* (4) (1881) n. 188 [invalid: nomen nudum]; W. Phill. in W. Phill. & Plowr., *Grevillea* 10 (1881) 69. (basionym). — *Hymenoscypha scutula* var. *menthae* (W. Phill.) W. Phill., *Man. Brit. Discomyc.* (1887) 137. — *Phialea scutula* var. *menthae* (W. Phill.) Sacc., *Syll. Fung.* 8 (1889) 266. — *Helotium scutula* var. *menthae* (W. Phill.) Rehm in Rabenh. *Krypt.-Fl. ed. 2*, 1 (3) (1893) 793. — *Helotium scutula* forma *menthae* (W. Phill.) Masee, *Brit. Fung.-fl.* 4 (1895) 254. — *Hymenoscyphus menthae* (W. Phill.) Baral in Baral & Kriegelsteiner, *Beih. Z. Mykol.* 6 (1985) 131 [bibliographic error of citation of basionym].

Misapplied? *Helotium scutula* var. *solani* (P. Karst.) P. Karst. sensu Dennis (1956: 78).

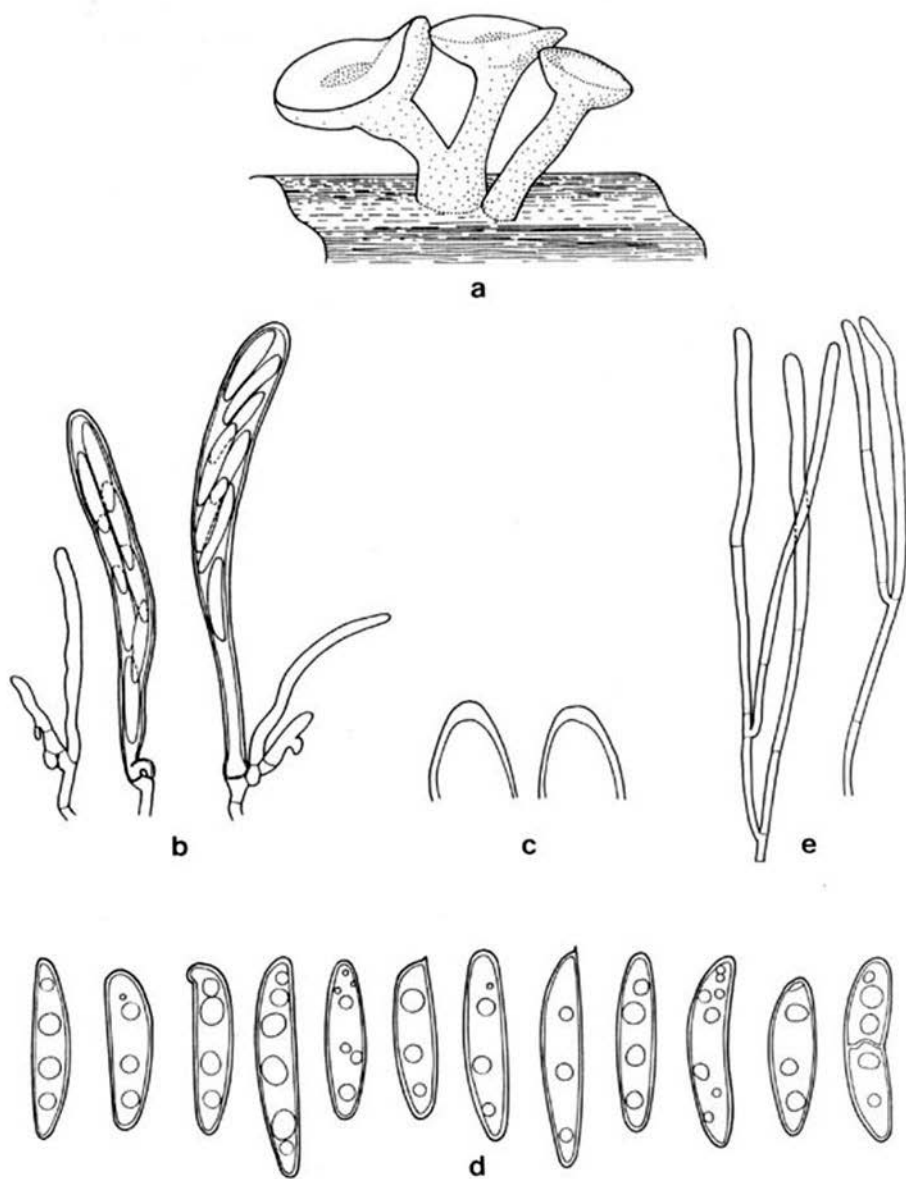


Fig. 5. *Hymenoscyphus menthae* (from Maas Geesteranus 9046), a. habit ($\times 20$), b. asci ($\times 750$), c. ascus apices ($\times 1500$), d. ascospores ($\times 1500$), e. paraphyses ($\times 750$).

Apothecial morphology — Apothecia stipitate-cupulate, variable in size, up to 6 mm high when rehydrated, concolorous light ochraceous yellow when dry, scattered, gregarious or clustered, rarely mutually grown together along whole length of the stipe, crumpled through substratal epidermis or superficial on decorticated parts, scanty to very numerous (up to more than a thousand specimens over a length of 10 cm of the substratal stem). Cupule cup- to saucer-shaped, up to more than 1.5 mm in diameter when rehydrated, when young with more or less raised margin. Hymenium concave to flat, young orange-yellow when fresh. Receptacle concolorous with hymenium, smooth to subpruinose. Stipe cylindrical to obconical, up to about 5×0.6 mm when rehydrated, about as long as or (much) longer than the diameter of the cupule, more or less pruinose, at the base occasionally surrounded by a small, often dark-coloured collaret of epidermal tissue.

Anatomy — Ascii [k = 1, n = 10] (cylindric-)obconical to cylindric-clavate, (72-)76–90 μm long [$82.8 \pm 5.1 \mu\text{m}$], 7–9 μm wide [$8.3 \pm 0.5 \mu\text{m}$], with length/width-ratio of (8.4-)9.1–11.1(-11.6) [10.0 ± 0.7], 8-spored, originating from croziers of which the arches remain visible at the base of the asci; apex more or less truncated conical, thick-walled around the pore; annulus turning blue in Melzer's reagent, especially in the middle part. Ascospores [k = 1, n = 20] axially to bilaterally symmetrical (in the latter case asymmetrical in side-view), fusiform-ellipsoidal, ellipsoidal, obovoidal or ellipsoid-fusiform to obovoid-fusiform, straight to slightly curved, 14–21 μm long [$16.5 \pm 1.7 \mu\text{m}$], 3–4(-5) μm wide [$3.7 \pm 0.2 \mu\text{m}$], with length/width-ratio of (3.4-)3.6–5.5(-5.9) [4.4 ± 0.5], 1-celled, only a few 2-celled, hyaline, guttulate, obliquely biseriate, thin-walled, smooth, without obvious setulae but occasionally apiculate at apex or base; apex blunt or rounded to oblique-angulate, occasionally rather acute; base blunt to subacute. Paraphyses [k = 1, n = 10] obconical, equalling the asci, below 1.0–2.0 μm and above 2.0–3.0 μm wide, provided with (1-)2–4 septa in the uppermost 80 μm , often with one or two furcations in the lower half; terminal cell (26-)31–50(-65) μm long [$41.3 \pm 6.2 \mu\text{m}$], 1.2–2.5 times as long as the subterminal cell [1.7 ± 0.4], with rounded tip; subterminal cell 18–31 μm long [$24.3 \pm 3.7 \mu\text{m}$]. Subhymenium in the central part up to about 65 μm thick. Exciple 2-layered. Medulla not sharply defined from subhymenium and cortex, near the stipe about 35–50 μm thick, consisting of textura porrecta with 2–4 μm wide, thin-walled hyphae. Cortex about 40–60 μm thick, a textura prismatica, without clearly differentiated covering layer; hyphae 4–13 μm wide, parallel with or oriented at a low angle (at most 45°) to the excipular surface, not embedded in a gelatinous matrix, with thin or slightly thickened walls; separate cells about 8–40 μm long.

Occurrence — Saprotrophic on stems of *Polygonum cuspidatum* and other herbs and on canes of *Rubus* sp.; September–October.

Collections examined. NETHERLANDS: prov. Drente, Ruinen, Wijken van Eleveld, on dead cane of *Rubus* sp., 2 Oct. 1983, L. Jalink & M.M. Nauta 229 (WBS); prov. Utrecht, Baarn, Lage-Vuursche, on dead herbaceous stems, 1 Sept. 1957, J. Daams 306 (L); prov. Zuid-Holland, Warmond, estate 'Huys te Warmont', on dead stems of *Polygonum cuspidatum*, 24 Sept. 1952, R.A. Maas Geesteranus 9046 (L).

With the understanding that in relevant literature nothing is said about the presence or absence of croziers, the above description agrees well with the original description by Phillips (in Phillips & Plowright, 1881: 69) and with the description and figures of an authentic collection of *Helotium menthae* in herb. Cooke, as given by Dennis (1956: 78, fig. 71E). According to Dennis (1956: 78) the latter material, at the time sent by Phillips to

Cooke, is 'evidently the type collection' but this seems inconsistent with the fact that *Helotium menthae* is formally based on *Elvellacei britannici* 188. At the same place Dennis has put *Helotium (Hymenoscypha) scutula* var. *menthae* '(Phill.) Boud.' into the synonymy of *Helotium scutula* 'var. *solani* Karst. ... 1870'.⁶ I doubt whether this is justified. Firstly, the asci of var. *menthae* are up to 90 µm long, whereas the ascus of var. *solani*, as depicted by Dennis (1956: fig. 71B) from material in herb. Karsten, is more than 110 µm long. Secondly, the annulus of var. *menthae* always turns blue in iodine, whereas var. *solani* has 'thecae ... apice iodo non tinctae' (Karsten, 1870: 234). Afterwards Dennis has possibly abandoned the forementioned synonymy, for, in his rearrangement of the genus *Hymenoscyphus* (Dennis, 1964: 73–78) he does mention *H. scutula* var. *menthae* whereas var. *solani*, whose varietal epithet has priority in case of synonymy, has been omitted. In my opinion var. *solani* sensu Karsten is quite similar to, if not identical with *H. consobrinus* (Boud.) Hengstm., also because of its 'fusoid-elongate' spores which are generally uniseptate according to Dennis (1956: fig. 71B).

Assuming that all of the British collections mentioned by Dennis (1956: 78) represent 'var. *menthae*' sensu stricto, then this taxon has been recorded in Great Britain on stems of *Mentha sativa* [= *M. × verticillata*], *Teucrium scorodonia*, *Solanum tuberosum*, *Campanula latifolia* and *Polygonum* sp. (cf. Dennis, 1978: 136). The record on *Solanum tuberosum* seems also to have been referred to in Ellis & Ellis (1985: 425–426, pl. 161, fig. 1672). Kirk & Spooner (1984: 532) have reported on two findings of *H. 'scutululus'* var. *solani* in 1980 on *Urtica dioica* and unidentified herbaceous stems on Arran, Scotland. Dr. B.M. Spooner (in litt.) has kindly informed me, that 'the interpretation followed in the Arran account is that of Dennis (1956), as figured (fig. 71B) from Karsten's material' [of var. *solani* s.str.!]. He added, that the Arran collection 'may differ from var. *solani* as described by Dennis [p. 78; i.e. var. *menthae* s.str.!] in having a rather white-tomentose stipe base [characteristic of *H. consobrinus*, as already mentioned by Dennis (1956: 79)] and in being on *Urtica*.' All in all, at least the Arran collection seems to show more resemblance to *H. consobrinus* than to *H. menthae* as described in this article.

Baral (in Baral & Krieglsteiner, 1985: 131–132) reported several findings of *H. menthae* in Baden-Württemberg, Germany, viz. on *Polygonum cuspidatum* and ?*piperatum*, *Scrophularia nodosa*, *Lysimachia vulgaris*, *Lycopus europaeus* and *Rubus idaeus*. Strangely enough, according to Baral (in litt.) *H. menthae* always has a white hymenium, whereas Phillips (1887: 137) speaks of a bright yellow disc. In 1914 and 1917 '*Helotium scutula* var. *menthae*' was found by P. Vogel in Mark Brandenburg, Germany, on stems of *Mentha piperita* and has been distributed within two German exsiccata series, viz. Sydow's Mycotheca germanica (as No. 1350) and Vogel's Flora der Mark (s.n.) respectively. However, the examined two copies of each of these exsiccata (L) all represent var. *scutula*. Exactly the same misapplication occurs in Petrak's Flora Bohemiae et Moraviae exsiccata, II. Serie, I. Abteilung, Lfg. 5, Nr. 243, collected by F. Petrak in 1911 on

⁶ *Helotium scutula* subsp. [!] *solani* P. Karst., Symb. Mycol. fenn. [1] (1870) 234 = *Helotium scutula* var. *solani* (P. Karst.) P. Karst., Mycol. fenn. 1 (1871) 111 = *Helotium scutula* forma *solani* (P. Karst.) Rehm in Rabenh., Krypt.-Fl. ed. 2, 1 (3) (1893) 793 [invalid: unintentional stat. nov.; only (erroneous) citation of Karsten's 'f. *Solani*' from 1871] = *Hymenoscyphus scutula* var. *solani* (P. Karst.) S. Ahmad, Ascomyc. Pakistan 1 (1978) 207 [neither by Thind & Sharma, Nova Hedwigia 32 (1980) 128, nor by Kirk & Spooner, Kew Bull. 38 (1984) 532, validly published as comb. nov. (both without basionym); superfluous combination by Korf & Zhuang, Mycotaxon 22 (1985) 500].

Mentha longifolia (examined specimen: L; cf. Samuels, 1985: 46). It is evident, that Vogel and Petrak wrongly used the substrate as an essential distinguishing feature. Likewise Oudemans (1890: 315) at first thought to deal with *H. scutula* var. *menthae* when he examined a *Hymenoscyphus* found in 1889 on stems of *Mentha aquatica* in the botanical garden of Amsterdam. Examination of authentic specimens of var. *menthae*, however, gave him certainty that the fungus of Phillips differed from his one, not only by the absence of cilium-like appendages, but also by the size and shape of the spores and the quantity of guttules.

From the Netherlands only the three indicated collections could be ascribed to *H. menthae*. Yet I examined several collections labelled as *Helotium/Hymenoscyphus scutula* var. *menthae* or var. *solani* (herb. Swart-Velthuyzen 210, 357; L. ex herb. Ernste 937/82, 949/82), but these all belong to *H. consobrinus*, just like two Belgian collections originally determined as *Helotium scutula* var. *menthae* (herb. Swart-Velthuyzen 272; herb. Batten 839) and a Belgian collection of '*Helotium scutula* f. *solani*' (BR coll. V. Mouton).

Outside (Western) Europe *H. menthae* probably only has been recorded under the name '*H. scutula* var. *solani*' in the sense of Dennis (1956: 78). Ahmad (1978: 207-208) has collected this taxon in 1953 and 1959 in Pakistan. Thind & Sharma (1980: 128-129, figs. 3, 4) found it 'growing luxuriantly on *Polygonum* stems [i.a. *P. amplexicaule*] in the North-Western Himalayas', India. Korf collected it in 1981 on unidentified stems and on *Polygonum cuspidatum* in Sichuan, China (Korf & Zhuang, 1985: 500). According to Lizoñ (1992: 45), however, the latter collection represents (the typical variety of) *H. scutula*. Furthermore, Thind & Sharma (1980: 129) mentioned the occurrence of *H. 'scutula* var. *solani*' in i.a. North America, but without giving any reference although this taxon has not been listed by Farr et al. (1989).

It need not be said that only a careful re-examination of relevant collections can give more certainty about the real occurrence and distribution of this little known species.

ACKNOWLEDGEMENTS

The author is indebted to Mr. H.O. Baral (Tübingen, Germany), Dr. E. Batten (Eefde, Netherlands), Mrs. C.M. Swart-Velthuyzen (Bennekom, Netherlands) and the curators of BR and WBS for the loan of relevant collections, and to Dr. B.M. Spooner (Kew, United Kingdom) for sending information on his interpretation of *H. scutula* var. *solani* and on Phillips' *Elvellacei britannici*, fasc. 3. He also wishes to thank Dr. R.A. Maas Geesteranus for checking the Latin diagnosis and description, and Mr. J.J.A.M. Wessendorp, who prepared the figures for printing.

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STUDIES IN TROPICAL AFRICAN LACTARIUS SPECIES. 3.
Lactarius melanogalus R. Heim and related species

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The type-specimens of the African blackening *Lactarius*-species, *L. melanogalus* R. Heim, *L. baliophaeus* Pegler and *L. griseogalus* R. Heim are examined and compared to recent collections from Zaire, Cameroon, Burundi, Zambia and Tanzania. *Lactarius denigrans* spec. nov. and *L. baliophaeus* var. *orientalis* var. nov. are proposed.

In tropical Africa, some of the *Lactarius*-species in the section *Plinthogali* (as defined by Bon, 1983 and Hesler & Smith, 1979) are characterized by a remarkable colour-change of the latex and a strong staining of the context. The latex is first watery and transparent, then turns to grey or even black. The context is cream-coloured and becomes first greyish pink or greyish red, finally black. In dried condition, those species are easily recognized by the black colour of the context.

Heim (1955b, 1966, 1967) described two blackening species in the section *Plinthogali*: *L. melanogalus* from Ivory Coast, Cameroon, Gabon and Zaire and *L. griseogalus* from Central African Republic. Another blackening *Lactarius* is described by Pegler (1969) from Ghana: *Lactarius baliophaeus*.

MATERIAL AND METHODS

This study is based on herbarium material from the National Botanic Garden of Belgium (BR), the Royal Botanic Garden of Edinburgh (E), the University of Gent (GENT), the University of Helsinki (H), the Royal Botanic Gardens of Kew (K), the National Museum of Natural History of Paris (PC) and the personal herbarium of Bart Buyck (BUYCK).

Microscopic features are studied in congo-red in ammonia or L4 (Clemençon, 1972) (eventually after a short passage in KOH 10% solution). Spore ornamentation is described and illustrated as observed in Melzer's reagent. Terminology of cystidial elements is according to Buyck (1991). Line-drawings are made with the aid of a drawing tube at magnifications 6700× for spores, 3200× for individual elements and 1100× for sections and surface views. Stippling indicates refractive contents in cystidia and lactifers, intracellular pigmentation in the elements of pilei- and stipitipellis. Basidia length excludes sterigmata length.

Spores are measured in side view in Melzer's reagent, excluding the ornamentation, and measurements are given as (MINa) [AVa-2*SD]-AVa-AVb-[AVb+2*SD] (MAXb) in which AVa = lowest mean value for the measured collections, AVb = greatest mean value and SD = standard deviation. Q stands for 'quotient length/width' and is given as (MINQa) Qa-Qb (MAXQb) in which Qa, resp. Qb, stand for the lowest, respectively the highest, mean quotient for the measured specimens.

Colour-codes are from Korerup & Wanscher (1978). Colour of spore-prints is according to Romagnesi (1967). L + l/cm means number of lamellae (L) and lamellulae (l) per cm at pileus mid-radius. Names of phytogeographical regions and vegetation types are according to White (1983).

RESULTS

In addition to the type-specimens, 40 more recent collections have been studied. Most of those collections could be identified as *L. baliophaeus*. Some represented *L. melanogalus*. When comparing all the collections of *L. baliophaeus*, it was striking that some of them had clearly longer spores than the type-specimen. I propose a new variety, *L. baliophaeus* var. *orientalis*.

Between the Tanzanian collections, gathered by Tiina Saarimäki et al., one blackening *Lactarius* that superficially resembles *L. baliophaeus*, was found. It shows exactly the same colour-changes, but has totally different microscopic features. The pileipellis consists of thick-walled cylindrical elements on a pseudoparenchymatous layer; there are thick-walled and emergent macropleurocystidia; the ornamentation of the spores is always lower than 0.5 μm and is composed of warts and fine connective lines. The species is described as *L. denigricans*.

Lactarius melanogalus, *L. griseogalus* and *L. baliophaeus* are typical members of the section *Plinthogali*, because of their winged spores and hymeniderm-like pileipellis without thick-walled elements. Though superficially related with those species by the similar colour-changes, *L. denigricans* belongs to a different section. The closest affinities with other African *Lactarii* are found with *Lactarius rubroviolascens* R. Heim. The latex of *L. rubroviolascens* is water-like, almost translucent with a greyish tinge, the context becomes blackish, then reddish. Most of the microscopical features are more or less similar to those of *L. denigricans*: rather thick-walled elements in pilei- and stiptipellis, macropleurocystidia thick-walled and emergent; spores low ornamented.

KEY TO THE BLACKENING LACTARIUS-SPECIES IN AFRICA

- 1a. Terminal elements of the pileipellis thick-walled; ornamentation of the spores never exceeding 0.5 μm height, composed of warts and fine connective lines . . . *L. denigricans*
- b. No thick-walled elements present in the pileipellis; ornamentation of the spores exceeding 1 μm height, composed of ridges forming a more or less complete reticulum . . . 2
- 2a. Spores ellipsoid; Q = 1.24–1.64 3
- b. Spores globose to subglobose, rarely ellipsoid; Q = 1.01–1.20 4
- 3a. Pileus and stipe greyish yellow to yellowish brown, without papilla; spores completely winged *L. baliophaeus* var. *orientalis*
- b. Pileus and stipe dark brown, with a distinct papilla; spores partially winged, with conical warts and lower ridges present *L. griseogalus*
- 4a. Ornamentation of the spores 1–2 μm high; spores 6.7–7.3–7.5–8.2 \times 6.0–6.5–6.7–7.2 μm ; latex finally bluish black *L. melanogalus*
- b. Ornamentation of the spores up to 1(–1.3) μm high; spores 7.0–7.9–8.3–9.0 \times 6.5–7.3–7.6–8.2 μm ; latex finally beige to cream-colour . . . *L. baliophaeus* var. *baliophaeus*

1. *Lactarius melanogalus* R. Heim — Figs. 1, 2

Lactarius melanogalus R. Heim, Bull. Jard. Bot. Etat 25 (1955) 46; Boissiera 7 (1943) 268 (nom. nud., without Latin diagnosis).

Pileus (2.5) 3–4 (5.5) cm diam., thin, applanate, then slightly depressed; margin irregular, undulate, not incurved; pellis not dehiscent, smooth, mat, dry, strongly radially wrinkled, olivaceous ochraceous brown to dark brown (5E4-6, 5F4-6, 6EF6-7) with black spots. Stipe (1.5) 2.5–4 (7) × 0.4–1.0 cm, cylindrical, curved near the base, smooth, longitudinally grooved, firm, dark cream-colour and greyish brown (4EF6-8, 6CD3-4), with black spots. Lamellae adnexed to adnate with decurrent tooth, unequal with lamellulae of different lengths, rather dense, 2–3 mm broad, thick, greasy, greyish, ochraceous, cream-colour, with black spots; edge slightly crenular, sometimes darker. Context thin, first transparent to cream-colour, then greyish pink, finally blackening; taste mild to acrid; smell not remarkable, sometimes sweet. Latex abundant, first watery, then cream to greyish, finally bluish black. Spore deposit not noticed.

Spores globose to subglobose, sometimes ellipsoid, 6.7–7.3–7.5–8.2 × 6.0–6.5–6.7–7.2 μm (Q = 1.04–1.11–1.13–1.20; n = 60); ornamentation amyloid, composed of high ridges (1–2 μm), forming a winged reticulum, without isolated warts, denser on adaxial side; plage not amyloid. Basidia 30–45 × 9–11 μm, cylindrical to narrowly utriform, 4-spored. Macroleurocystidia sparse, not emergent, 33–43 × 6–8 μm, cylindrical to fusiform, sometimes irregular, with slightly thickened wall. Pseudoleurocystidia sparse; content dark brown. Lamella-edge sterile; cheilocystidia 18–28 × 4–6 μm, cylindrical to fusiform and tapering upwards, wall slightly thickened; content brown. Lamella-trama irregular, composed of hyaline thin-walled hyphae; lactiferous hyphae abundant and with remarkable brown content. Pileipellis a hymeniderm; 40–70 μm thick, elements of the suprapellis 20–40 × 7–13 μm, thin-walled, subglobose to slightly clavate or clavate, with brown intracellular pigmentation; subpellis pseudoparenchymatous, thin. Stipitipellis a palissade; 40–90 μm thick; elements of the suprapellis (10) 15–30 (35) × 3–6 (10) μm, cylindrical, slender, sometimes fusiform or irregular, with brown intracellular pigment; subpellis pseudoparenchymatous. Clamp-connections lacking.

Chemical reaction — Gaiac: intense blue-green (both *Goossens-Fontana* 979 and *Buyck* 1356). Phormol: ± 7BC7, reddish orange, greyish red. NH₄OH: greyish yellow (4B4). Aniline: reddish, then 7E8 brown.

Examined material and distribution. CAMEROON: rain forest, South Western Prov., near Mundema, Korup National Park, transect P, 100–150 ft alt., 1984, *Alexander* '6' (E); *ibid.*, plot 10, March 1991, *Watling* 23140 (E); *ibid.*, plot 15–18, *Watling* 23141 (E); Amugebia, near Ebolowa, July 1946, *Heim* 'Q43' (PC: Heim, 1955b; lost?). — GABON: Drier Guineo-Congolian rain forest: road of Oyem, *Heim* (Heim, 1955b). — GHANA: West African dry coastal forest, Cape coast, Jukwa road, May 1973, *Rose* 7306 (K; Pegler & Young, 1982, not seen). — IVORY COAST: Drier Guineo-Congolian rainforest, near Gagnoa, April 1939, *Heim* A87 (PC: Heim, 1955b; lost?). — ZAIRE: Drier Guineo-Congolian rain forest with *Macrolobium dewevrei*, Equateur prov., Binga, 380 m alt., Dec. 1934, *Goossens-Fontana* 979 (lectotypus, BR). Guineo-Congolian lowland rain forest with *Gilbertiodendron* and *Scaphopetalum*, Tshopo prov., 5 km NNE of Batabongena, terrestrial amongst leaves, April 1984, *Buyck* 1356 (BR). — ZAMBIA: Wetter Zambezi miombo woodland, Luapala prov., Mansa, Kwanfumuwe, Jan. 1991, *Buyck* 3332 (BUYCK).

Observations:

1) Heim first used the name *Lactarius melanogalus* (1943) for a specimen from Ivory Coast, without Latin diagnosis. In 1955b he redescribed the species, Latin diagnosis in-

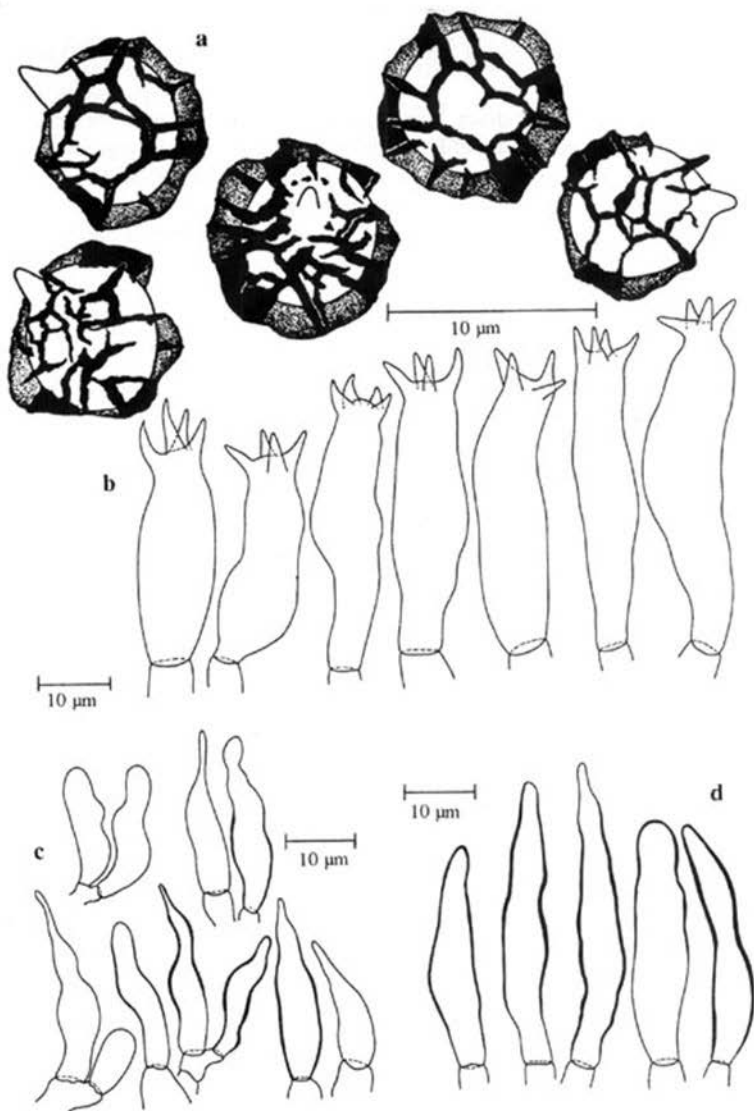


Fig. 1. *Lactarius melanogalus*. a. Spores; b. basidia; c. cheilocystidia; d. macropleurocystidia (a–d, *Goossens-Fontana* 979).

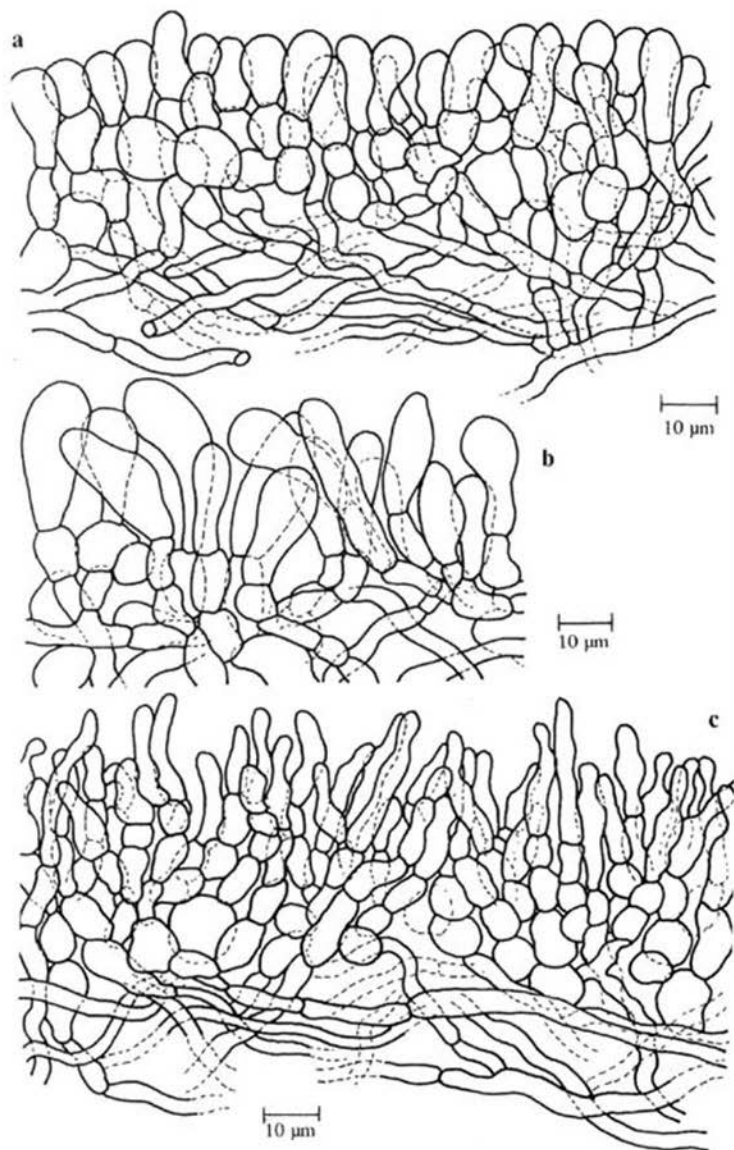


Fig. 2. *Lactarius melanogalus*. a. Section through the pileipellis near the margin; b. section through the pileipellis halfway the radius; c. longitudinal section through the stiptipellis near the top (a, c. *Goossens-Fontana* 979; b. *Buyck* 3332).

cluded, and cited specimens from Ivory Coast, Cameroon and Zaire. He did not indicate a type-specimen. *Heim A87* and *Heim Q43*¹ could not be traced at PC. Considering the water-colour of *Heim A87* and the drawings of the spores, they clearly represented the same species as *Goossens-Fontana 979*. I propose *Goossens-Fontana 979* as lectotypus. The type-specimen consists of two basidiomes in good condition.

2) The macroscopical description is based on the description of Heim (1955b) and completed with fieldnotes on *Buyck 3332* and *1356*. The microscopical description is based on *Goossens-Fontana 979*, including spore-measurements of *Buyck 1356* and *3332*.

3) Following the description of Heim, the colour of the pileus is ochraceous to olive-brown and the illustration of *Heim A87* shows indeed a rather pale mushroom. *Goossens-Fontana 979* is mentioned (Heim, 1955a) to be dark brown (bistre sombre), which is also the colour of the specimens of *Buyck* and *Watling*. The water-colour of *Heim A87*, which shows a very young specimen, proves that the pileus is ochraceous when young and becomes darker with age.

4) The taste of latex and context is very acrid in the specimens collected by Heim, very bitter in *Goossens-Fontana 979*, very acrid (but slow) in *Buyck 3332*, mild in *Buyck 1356*. There is a strong and sweetish smell in *Buyck 1356*, a fish-smell in *Heim Q43* and a smell of *Russula pectinata* (Foetentinae) in *Heim A87*.

5) The presence of aberrant spores is mentioned by Heim (1955b, fig. 15). Those spores can have the same size as the normal spores, but they have strongly amyloid droplet-like, globose warts, very irregular in size and number, and there is no sign of the normal reticulate ornamentation at all. I observed such spores in *Goossens-Fontana 979* and in the specimens of Cameroon, but they are certainly not characteristic for this species. Similar deviant spores were observed in collections of other African *Lactarius*- and *Russula*-species (*Buyck*, personal comment). An explication for their existence is unknown.

6) Coloured illustrations of *L. melanogalus* are provided by Heim (1955a: pl. 14.6; 1955b: pl. 5.1-2). *Pegler & Young* (1982) published a scanning electron microscopy-photograph of the spores of *L. melanogalus*.

7) *Lactarius melanogalus* is cited in *Nzigidahera* (1993), but those specimens represent *L. baliophaeus* var. *baliophaeus* (*Buyck 4062, 4063, 4338*) and *L. baliophaeus* var. *orientalis* (*Buyck 4375*).

2. *Lactarius griseogalus* R. Heim — Fig. 3a

Lactarius griseogalus R. Heim, Rev. Mycol. (Paris) 32 (1967) 204; Israel J. Bot. 15 (1966) 158, nom. nud., without Latin description.

Because the type-specimen (1 basidiome) is in very bad condition and no other specimens of this species are known yet, no complete description can be given here. Before he gave a Latin diagnosis in 1967, Heim described the species extensively in 1966. According to Heim, this species is very closely related to *L. melanogalus*, but differs from it by the very dark brown pileus and a very pronounced papilla. The latex becomes greyish, but

¹) There exists another specimen labeled *Heim Q43*, which represents *Lactarius gymnocarpus*. As there is no confusion possible between those species and as Heim cited *Heim Q43* also under *L. gymnocarpus*. I suppose that there were two specimens with the same number. Despite a long search, this *Heim Q43* could not be traced in the National Museum of Natural History of Paris.

never black and the taste is mild and sometimes a bit astringent. He also mentions that the spores are smaller. As in the present concept of *L. melanogalus* the pileus becomes darker with age and the taste of the context and latex appears rather variable, the noted differences are of low significance. Although the type is in very poor condition, it was possible to take a careful look at the spores. They proved to be very different indeed from those of *L. melanogalus*. The spores are ellipsoid and measure $7.0\text{--}8.2\text{--}9.3 \times 5.5\text{--}6.0\text{--}6.5 \mu\text{m}$ ($Q = 1.24\text{--}1.36\text{--}1.55$; $n = 20$). The winged aspect of the ornamentation of the spores is not as obvious as in *L. melanogalus*. The ornamentation is up to $1.5 \mu\text{m}$ high. Beside the normal 4-spored basidia, 2-spored basidia were frequently observed. For these reasons *L. griseogalus* is nevertheless considered as a good species.

Examined material and distribution. CENTRAL AFRICAN REPUBLIC: Sudanian woodland, Savanne de Bébé, close to Filifi river, associated with *Lophira alata* and *Uapaca guineensis* (the latter is likely to be the ectomycorrhizal host), Aug. 1966, Heim LM2189 (holotypus PC).

3. *Lactarius baliophaeus* var. *baliophaeus* Pegler — Figs. 3b, 4, 5a

Lactarius baliophaeus var. *baliophaeus* Pegler, Kew Bull. 23 (1969) 237.

Pileus 3–7 (9) cm diam., plano-concave, applanate to slightly depressed, infundibuliform when older; margin slightly incurved when young, then crenulate to undulate, striate when dry; pellis not dehiscent, smooth, dry, mat, quite thick, greyish yellow to brownish orange (4AB3–5–5C4) to dark blond and yellowish brown (5DE4–5), staining dark brown and black. Stipe central to excentric, (1.5) 2.5–5 × 0.5–1.0 cm, cylindrical, clavate towards the base, greyish yellow to brownish orange or dark blond, sometimes dark grey, staining black and dark brown, firm, smooth, dry. Lamellae broadly adnate to decurrent, very dense (4 + 12 to 3 + 6/cm), unequal with lamellulae (3–5 (7) between 2 lamellae, regular pattern), thin, paper-like, broad (3) 5–7 mm, cream, pale greyish, staining reddish then black; edge entire, sometimes black brown. Context firm, white to cream-colour, changing immediately to orange-red, greyish red and finally black; taste mild, sometimes slightly bitter (AV 94.283) or even first mild but then acrid (AV 94.438). Latex very abundant, water-like, transparent-brownish, changing to beige and cream-colour, taste mild (acrid in AV 94.438). Spore deposit cream-colour (IIa).

Spores globose to subglobose, $7.0\text{--}7.9\text{--}8.3\text{--}9.0 \times 6.5\text{--}7.3\text{--}7.6\text{--}8.2 \mu\text{m}$ ($Q = 1.01\text{--}1.07\text{--}1.09\text{--}1.15$, $n = 80$); ornamentation strongly amyloid, composed of ridges, up to 1.0 (1.3) μm high, forming a complete reticulum, isolated warts very scarce; plage distal amyloid. Basidia 38–48 × 10–12 μm , clavate to utriform, tapering downwards, 4-spored; sterigmata 3–6 × 1–2 μm ; content granular or guttate. Macropleurocystidia scarce to abundant, not emergent but often arising deep in the hymenium, 40–55 × 9–11, fusiform, wall slightly thickened and brown pigmented. Pseudopleurocystidia (2) 3–6 μm diam., cylindrical, rarely tortuous, top rounded, tapering or mucronate; content oleiferic, yellowish brown; sometimes emergent, quite abundant. Lamella-edge sterile; cheilocystidia 21–40 × (2) 3–6 μm , tortuous to cylindrical, fusiform, top rounded, mucronate or tapering, sometimes septate, sometimes slightly thick-walled, hyaline. Lamella-trama irregular, composed of thin-walled, hyaline hyphae and quite abundant lactifers with a brown content. Pileipellis a palissade; 30–80 μm thick; elements of the pileipellis 10–25 × 3–5 μm , cylindrical, slender, some fusiform, thin-walled, with brown intracellular pigment; subpellis pseudo-

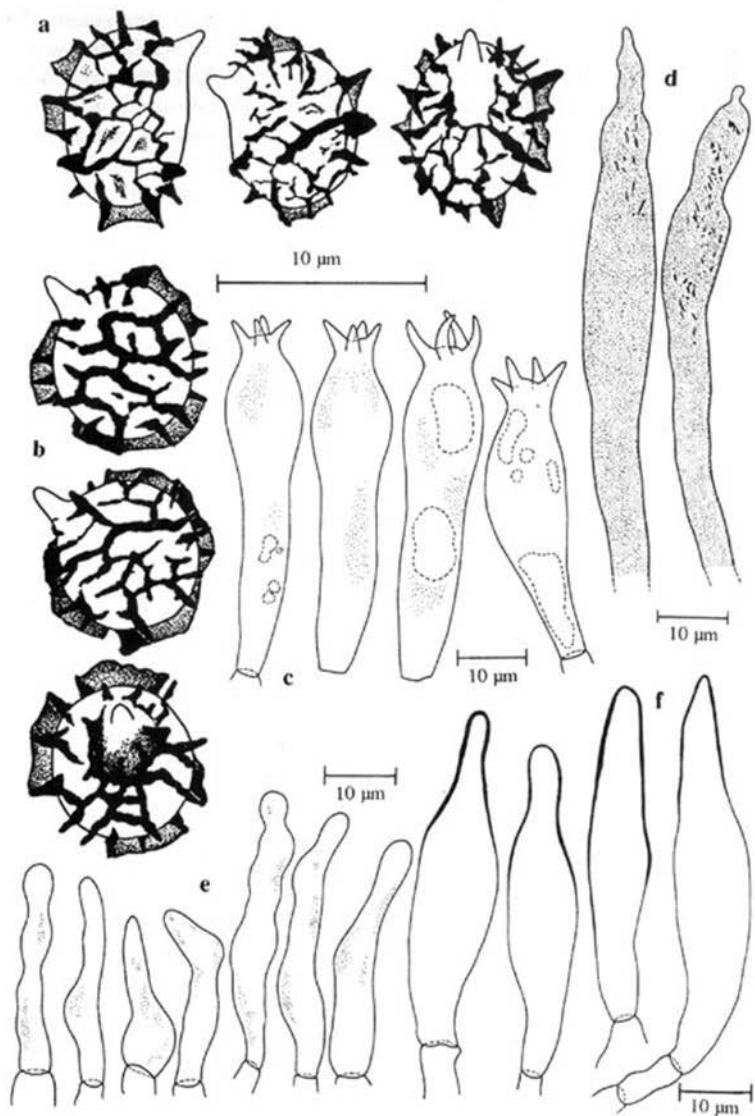


Fig. 3. *Lactarius griseogalus*. a. Spores (Heim LM 2189). — *Lactarius baliophaeus* var. *baliophaeus*. b. Spores; c. basidia; d. pseudopleurocystidia; e. cheilocystidia; f. macropleurocystidia (b, c. Holden GC 66; c–f. Verbeke 94.153).

parenchymatous. Stipitipellis trichoderm-like; hyphae interwoven and ascending in suprapellis, no spherical cells; terminal elements cylindrical to slightly tortuous, $20\text{--}30 \times 3\text{--}5$ μm , thin-walled, with brown intracellular pigment; lactifers in the underlayer abundant. Clamp-connections lacking.

Chemical reactions — FeSO_4 : nihil. HCl : nihil. NH_4OH : nihil. NaOH : pileipellis intense red.

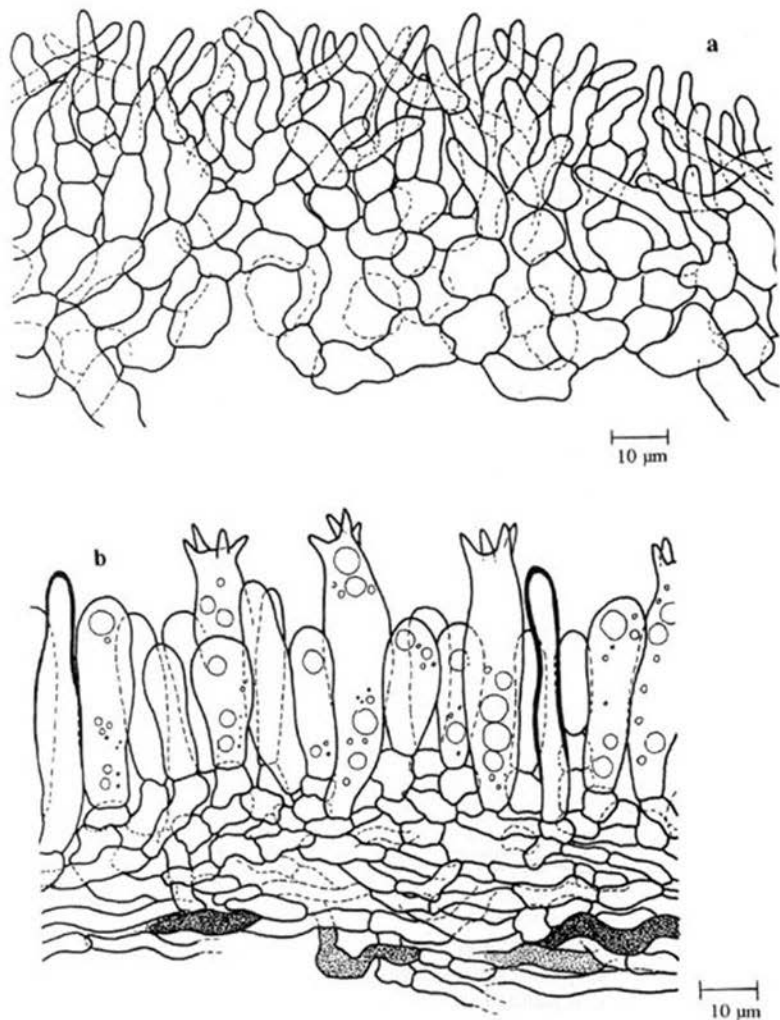


Fig. 4. *Lactarius baliophaeus* var. *baliophaeus*. a. Section through the pileipellis near the margin; b. part of the hymenium halfway a lamella (a. Holden GC 66; b. Verbeken 94.153).

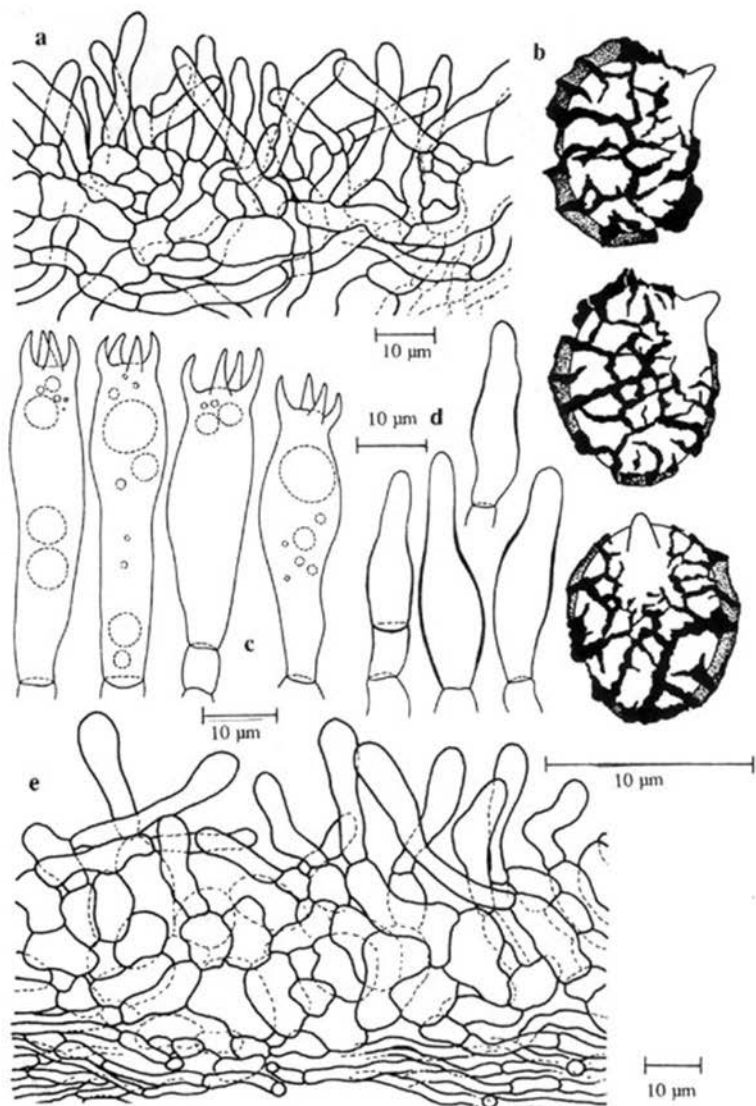


Fig. 5. *Lactarius baliophaeus* var. *baliophaeus*. a. Section through the pileipellis halfway the radius (*Verbeken* 94.153). – *Lactarius baliophaeus* var. *orientalis*. b. Spores; c. basidia; d. cheilocystidia; e. section through the pileipellis halfway the radius (b–e. *Verbeken* 94.472).

Examined material and distribution. BURUNDI: Miombo woodland dominated by *Brachystegia utilis*: Bururi prov., Nyamirambo, Rumonge Forest Reserve, 850–950 m alt., May 1993, *Buyck 5091* (et icon. phot.), 5092, 5137 (BUYCK); March 1994, *Verbeken 94.012, 94.028, 94.069, 94.283* (et icon. phot.), 94.386, 94.438, 94.472 (et icon. phot.) (BR); Nkayamba, just N of Rumonge, 850–950 m alt., Dec. 1991, under *B. microphylla*, *Buyck 4062, 4063* (BUYCK); April 1992, under *B. spiciformis*, *Buyck 4338* (BUYCK); Dec. 1992, under *B. microphylla*, *Buyck 4641, 4642* (BUYCK); March 1993, *Verbeken 94.153* (et icon. phot.), 94.165 (et icon. phot.) (BR). — GHANA: Guineo-Congolian rain forest: Tafo, under *Cassia*, July 1955, Holden GC66 (holotypus K). — ZAMBIA: Miombo woodland, Luapala prov., near Kawambwa, Jan. 1991, *Buyck 3446* (BUYCK).

Observations:

The macroscopical description is compiled from the description of Pegler (1969) and the fieldnotes of Verbeken. The microscopical description is based on *Holden GC66, Verbeken 94.153* and *Verbeken 94.283*.

4. *Lactarius baliophaeus* Pegler var. *orientalis* Verbeken, var. *nov.* — Fig. 5b–e

A varietate typica differt sporae forma atque sporae dimensionibus, sporis ellipsoideis, $7.4-8.7-9.4-10.3 \times 5.8-6.4-7.0-7.4$ (7.7) μm ($Q = 1.21-1.34-1.36-1.64$; $n = 60$).

Holotypus: *Verbeken 94.472*, Burundi, March 1994 (BR, isotypus GENT).

Lactarius baliophaeus var. *orientalis* differs from *L. baliophaeus* var. *baliophaeus* only by the spore shape and dimensions. The spores are ellipsoid, $7.4-8.7-9.4-10.3 \times 5.8-6.4-7.0-7.4$ (7.7) μm ($Q = 1.21-1.34-1.36-1.64$; $n = 60$).

Examined material and distribution. BURUNDI: Miombo woodland dominated by *Brachystegia utilis*: Bururi prov., Nyamirambo, Rumonge Forest Reserve, 850–950 m alt., Jan. 1993, *Buyck 5232* (BUYCK), Nov. 1993, *Buyck 5229* (BUYCK); March 1994, *Verbeken 94.215, 94.472* (holotypus BR, isotypus GENT), 94.523 (BR); Nkayamba, just N of Rumonge, 850–950 m alt., April 1992, associated with *B. microphylla*, *Buyck 4375* (BUYCK). — ZAMBIA: Miombo woodland with *Baphia bequartii*, *Isobertina angolensis*, *Uapaca kirkiana*, *Brachystegia spiciformis* and *Albizia antunesiana*: Copperbelt prov., Chatiforest, near Kitwe, alt. 1270 m, under *Brachystegia spiciformis*, Dec. 1990, *Buyck 3115, 3132, 3225, 3227* (et icon. phot.) (BUYCK), under *Anisophyllea boehmii*, *Buyck 3214* (BUYCK), under *Azelia quanzensis* and *Brachystegia spiciformis*. Miombo woodland with *Brachystegia boehmii*: Luapala prov., Mansa, Kwanfumuwe, Jan. 1991, *Buyck 3322* (BUYCK).

5. *Lactarius denigrans* Verbeken & Karhula, spec. *nov.* — Figs. 6–8

Pileus 6–8 cm diam., convexus ad leviter depressus; margine irregulari; pileipellis pallide ochracea, dein badio vel nigro maculata. Stipes 4.5–6 cm longus, 1.5–2 cm crassus, cylindricus, pileo concoloratus, dein badio vel nigro maculatus, in longitudine rugosus ad sulcatus. Lamellae decurrentes, modice confertae, albo-cremeae, denigrantes. Latex abundans, translucido-albus, rubescens, dein niger, gutu mitis. Contextus albus, rubescens, postremo lilacinus ad niger. Sporae $6.8-7.7-8.4$ (8.7) \times $5.6-6.3-7.1$ μm , subglobose ad ellipsoideae, irregulariter verrucosae ad incomplete reticulatae; macula suprahilaris centrale amyloidea. Macropleurocystidia absentia. Pileipellis bistrata; elementa suprapellis $15-55 \times 7-8$ (10) μm , cylindrica ad clavata, pariete incrassato (0–1) μm ; subpellis pseudoparenchymata.

Holotypus: *Saarimäki et al. 1467*, Tanzania, Jan. 1993 (H).

Pileus 6–8 cm diam., convex to slightly depressed; margin irregular; pellis mat, slightly wrinkled, pale beige, becoming brownish grey to black when bruised. Stipe 4.5–6 \times 1.5–2 cm, cylindric, round to applanate on section, mat, longitudinally wrinkled to groov-

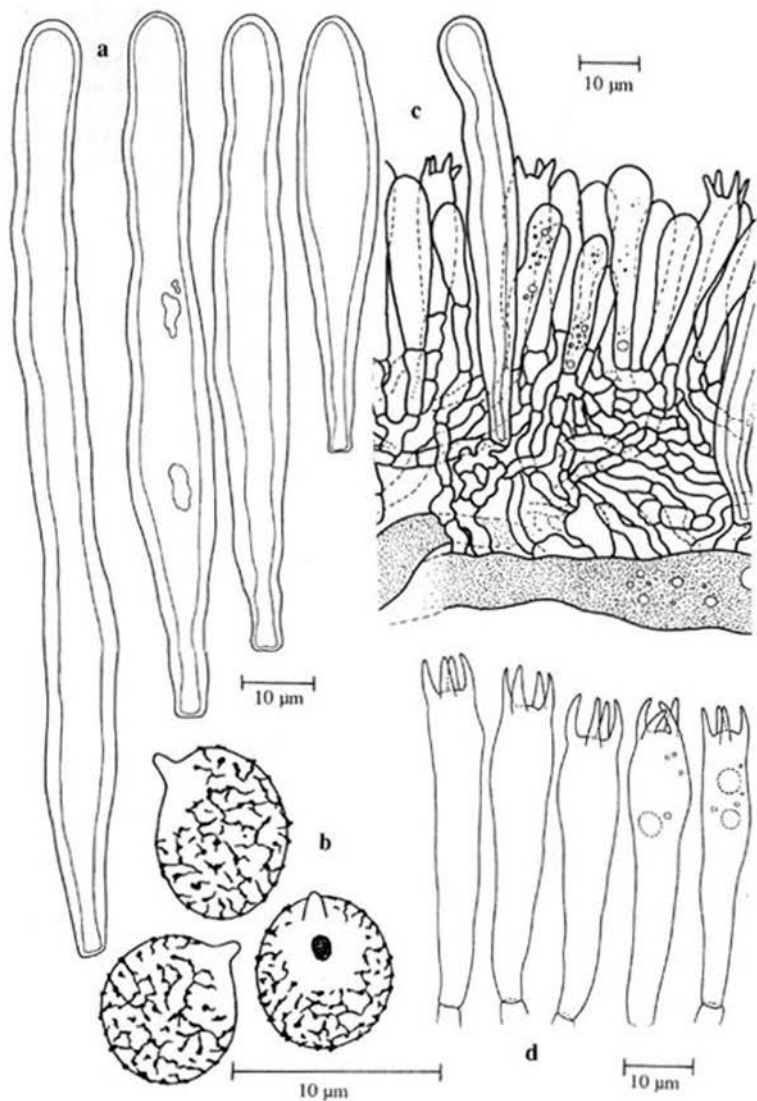


Fig. 6. *Lactarius denigricans*. a. Macropleurocystidia; b. spores; c. part of the hymenium halfway the lamella; d. basidia (a–d. Saarimäki et al. 1967).

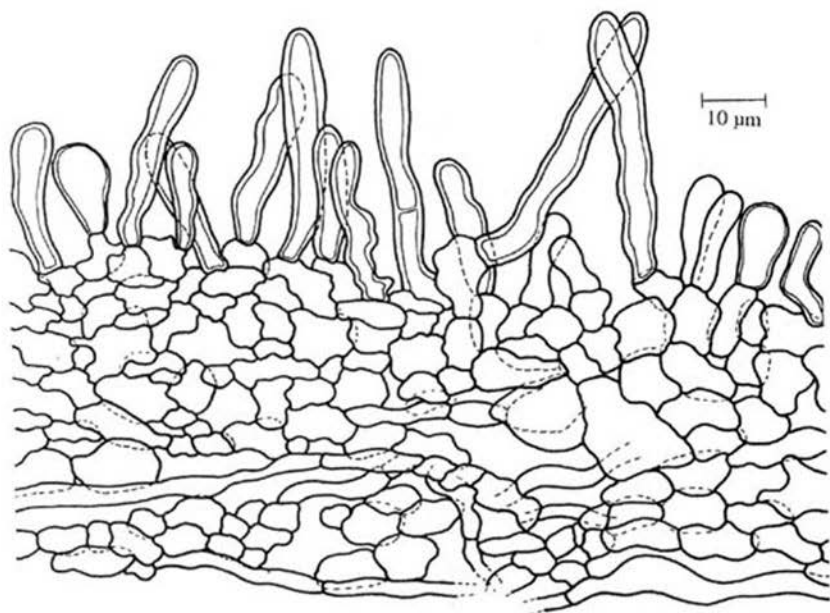


Fig. 7. *Lactarius denigricans*. Section through the pileipellis halfway the radius (Saarimäki et al. 1967).

ed. pale beige, becoming brownish grey when bruised. Lamellae decurrent, unequal with mostly short lamellulae, close, broad (8 mm), rather thick, ivory coloured, blackening when bruised; edge entire and concolorous. Context in the pileus white, becoming red, then lilac and finally black by the latex; in the stipe white, then yellow, red under the surface; taste mild, smell absent. Latex abundant, transparent-whitish, changing red on the air, finally black; taste mild. Spore deposit not noticed.

Spores subglobose to ellipsoid, $6.8-7.7-8.4$ (8.7) \times $5.6-6.3-7.1$ μm ($Q = 1.12-1.21-1.32$; $n = 50$); ornamentation amyloid, low, up to 0.5 μm high, composed of irregular knotty warts and fine connective lines, never forming a complete reticulum; plage distinct, with a central amyloid spot. Basidia (38) $40-45$ (47) \times $7-9$ (10) μm , cylindric to slightly clavate, 4-spored. Macropleurocystidia abundant, emergent, $60-135 \times 10-11$ μm , cylindric to narrowly fusiform, rounded with thickened wall ($1-2$ μm). Pseudopleurocystidia not abundant, cylindric, $7-8$ μm diam., content brownish oleiferic. Lamella-edge fertile, macrocystidia, basidioles and basidia present. Lamella-trama composed of sphaerocytes and abundant broad lactiferous hyphae. Pileipellis a palissade; $70-100$ μm thick; elements of suprapellis $15-55 \times 7-8$ (10) μm , cylindric, sometimes clavate, sometimes septate, thick-walled ($0-1$ μm); subpellis thin, pseudoparenchymatous, spherical cells $5-15$ μm . Stipitipellis a trichoderm, $90-140$ μm thick; terminal elements cylindric to slightly tortuous, (10) $25-60$ (80) \times $6-8$ (10) μm , thick-walled ($1-2$ μm). Clamp-connections absent.

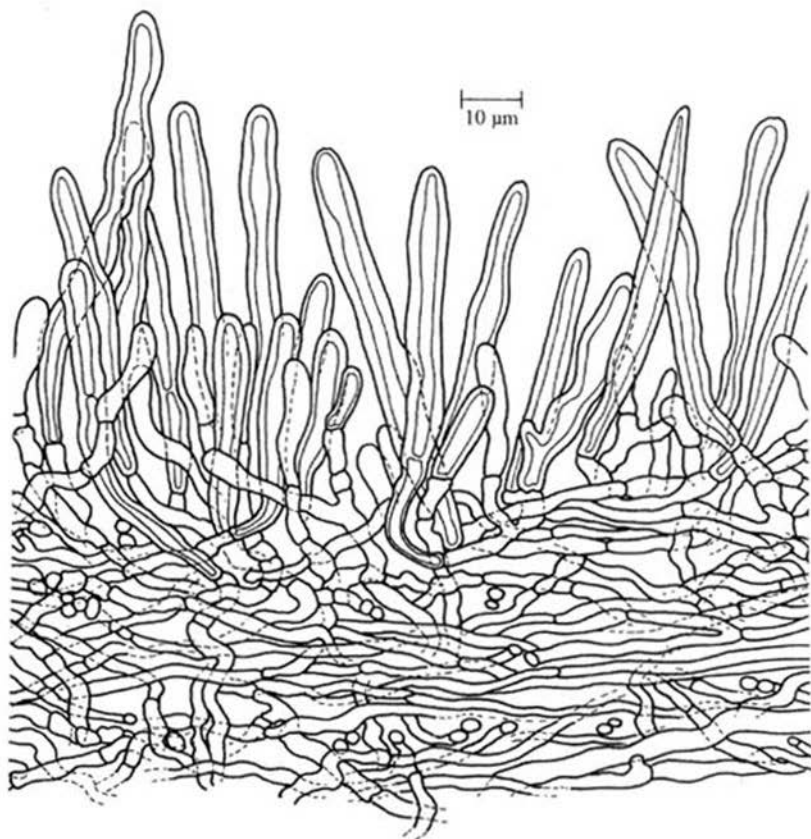


Fig. 8. *Lactarius denigrans*. Section through the stipeipellis near the top (Saarimäki et al. 1467).

Examined material and distribution. TANZANIA: Miombo woodland with mainly *Uapaca* and some *Brachystegia*, Southern prov., Songea distr., Lirondo, 1250 m, Jan. 1993, Saarimäki et al. 1467 (icon, phot.) (holotypus H).

ACKNOWLEDGEMENTS

I wish to express my gratitude to the directors and curators of the Herbaria referred to above, to Bart Buyck who kindly lent me his private collection, to Machiel Noordeloos for reviewing this paper, to Ruben Walley and Bart Buyck for the critical remarks and useful comments, to Paul Goetghebeur for checking and improving the Latin description and to Päivi Karhula for the pleasant cooperation during her stay in Belgium.

The National Foundation for Scientific Research (N.F.W.O., Belgium) is acknowledged for founding this research and for the financial support of my collecting-trip to Burundi.

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NOTULAE AD FLORAM AGARICINAM NEERLANDICAM XXIV–XXVIII

Some taxonomic and nomenclatural changes in the
Tricholomataceae, tribus ClitocybeaeTHOMAS W. KUYPER^{1, 2}

Three new taxa and three new combinations are introduced in Tricholomataceae, tribus Clitocybeae. Taxonomic and nomenclatural comments on some other taxa are added.

XXIV. A NOMENCLATRURAL NOTE ON *ARMILLARIA TABESCENS*

The name of this species is cited as *Armillaria tabescens* (Scop.: Fr.) Dennis et al. (Ter-morshuizen, 1995). However, this is double incorrect. First, the name *Agaricus tabescens* has never been sanctioned by Fries. Second, the combination in *Armillaria* has to be attributed to Emel (1921), as already noted by Dennis et al. (1960: 18) who were unable to confirm this combination.

Emel (1921: 50) in a dissertation that was probably not very widely distributed, introduced the combination *Armillaria tabescens*. The title of his dissertation (*Le genre Armillaria, Fr. sa suppression de la systématique botanique*), and remarks in the text (p. 75) that the genus *Armillaria* does not possess enough constant characters to be maintained, suggest that Emel did not accept the genus. Under Art. 34.1. (Greuter et al., 1994) the name would therefore be invalid. However, Emel's remarks are better interpreted that he just considered the Friesian taxon *Armillaria* as unnatural (a view universally accepted nowadays) and that he proposed the species of that genus to be placed in other genera. However, as Art. 34.1. only refers to anticipation of future acceptance of a taxon, and not to anticipation of future rejection of a taxon, and as Emel explicitly listed the combination *A. tabescens* (Scop.) Emel, I consider the name as validly published.

XXV. TAXONOMIC AND NOMENCLATRURAL NOTES ON CLITOCYBE

Clitocybe brumalis (Fr.: Fr.) Kumm.

It is a curious phenomenon in mycology that some fungal names persist for a long time even though the taxon, for which the name is used, might get very different interpretations. I would consider such names as names of ghost species. The genus *Clitocybe* is probably fairly rich in such ghost species and *C. brumalis* (Fr.: Fr.) Kumm. makes a good chance for being the most famous one.

Agaricus brumalis (Fries, 1818: 206–208) was described with a greyish pileus and lamellae, and long, concolorous stipe. Citation of the illustration of *A. cinerascens* Batsch

1) Biological Station, Centre for Soil Ecology, Kampsweeg 27, 9418 PD Wijster, The Netherlands.

2) Communication no. 572 of the Biological Station Wijster.

and Fries's comment that *A. brumalis* was very much related to *A. tardus* (= *Pseudoclitocybe cyathiformis* (Bull.: Fr.) Sing.) do not leave much doubt that the original *A. brumalis* belongs to the genus *Pseudoclitocybe*. The sanctioning description (Fries, 1821: 171) is essentially the same, except for the addition that it is odourless.

Fries (1838: 76) must be held responsible for the first different interpretation, by stating that the stipe is white and the lamellae pallid. The pileus colour was not mentioned in his vague description. It was said to be odourless (and by implication probably without taste). Such a vague description did form a good possibility for later confusion. Kühner & Romagnesi (1953) described *C. brumalis* as a species with a cream-coloured pileus with brown centre (although Fries described the pileus as unicolorous) and weak farinaceous smell (although odourless according to Fries). This description fits rather well for *C. marginella* Harm. (except for the weak farinaceous smell) and the large majority of collections filed under *C. brumalis* in Dutch herbaria did indeed represent *C. marginella*. Lange (1935) interpreted *C. brumalis* as a much darker species with small spores and a strigose stipe basis. It could represent *C. lohjaensis* Harm., a species unknown from the Netherlands. Bresadola (1927) noted a conspicuous smell and bitter taste for *C. brumalis* and his description very strongly suggest *C. phaeophthalma* (Pers.) Kuyp., a species otherwise lacking in Bresadola's work although it is not uncommon near Trento. Henry (1983) described *C. brumalis* as a large-spored species; his description would well fit *C. metachroa* (Fr.: Fr.) Kumm. With — at least — six different interpretations available and a protologue and sanctioning description that make it extremely likely that *C. brumalis* is not a *Clitocybe* at all, I cannot but reject this name as a *nomen dubium*.

***Clitocybe dealbata* (Sow.: Fr.) Kumm.**

Separation of *C. dealbata* and *C. rivulosa* (Pers.: Fr.) Kumm. has been considered as very difficult. The characters usually considered as sufficient for separating two taxa on species level, viz. general habit, pileus form, and colour of the pileus were found to show intergradations in Dutch collections. Herbarium collections in several Dutch herbaria filed under *C. dealbata* were found to consist of young specimens of *C. rivulosa*.

Harmaja (1969: 75) adopted only the name *C. dealbata* and nowhere discussed the name *C. rivulosa*, the latter name without arguments just being declared a *nomen dubium*. Harmaja did not provide a macroscopical description of *C. dealbata*, implying that he did not see fresh material of it himself, but as he included a collection from Lundell & Nannfeldt (1938) under the name *C. rivulosa*, I have no doubts about the identity of Harmaja's species. An earlier collection distributed as *C. dealbata* (Lundell & Nannfeldt, 1936), was identified as *C. candicans* (Pers.: Fr.) Kumm. by Harmaja. Lamoure (1983) concluded, on the basis of interfertility experiments that *C. dealbata* and *C. rivulosa* had to be considered conspecific. She also chose the name *C. dealbata* for it.

The application of the name *C. dealbata* is, however, beset with some difficulties. *Agaricus dealbatus*, as illustrated by Sowerby (1799), depicts a small hygrophanous white mushroom with a convex to infundibuliform pileus, growing under a canopy of firs. Although it cannot be excluded that Sowerby illustrated slender specimens of a *Clitocybe* (e.g. *C. candicans* (Pers.: Fr.) Kumm.), his figure is more strongly reminiscent of *Hemimycena lactea* (Pers.: Fr.) Sing. Fries (1821: 92) sanctioned the name *C. dealbatus*, but his listing of Sowerby's taxon as a separate variant, different from Fries's main interpre-

tation of *A. dealbatus* seems to suggest that Fries was in doubt whether his taxon was identical with Sowerby's.

Later interpretations (Kühner & Romagnesi, 1953) of the name *C. dealbata* included not only *C. rivulosa* but also a closely related species with a farinaceous smell (a character not mentioned by Sowerby; Fries explicitly stated that the species was inodorous). This latter taxon is better known as *C. augeana* (Mont.) Sacc. (syn. *C. ruderalis* Harm.).

As the name *C. rivulosa* is of unambiguous application, it has been accepted by me (Kuyper, 1995: 48). The name *C. dealbata* is best rejected as a nomen dubium, as none of the interpretations that have been in use correspond to Sowerby's taxon.

Although *C. rivulosa* is generally regarded as a grassland species, it can grow in forests as well. Records of muscarine poisoning by *C. phyllophila* (Pers.: Fr.) Kumm. or *C. candicans* refer to *C. rivulosa* as the two other species do not contain muscarine (Stijve & Kuyper, unpublished).

Clitocybe frysica Kuyp., *spec. nov.*

Pileus usque 20 mm latus, infundibuliformis, haud hygrophanus, haud striatus, subtomentoso-sub-squamulosus, pallide roseo-bubalinus, *Lactario pallido* concolor. Lamellae furcatae, decurrentes, pileo concolor. Stipes usque 40 × 6 mm, versus apicem incrassatus, pileo concolor. Odor debilis, subaniseus. Sporae 4.5–6.0(–6.5) × 2.5–3.5 µm, laeves, haud cyanophilae. Basidia tetrasporigera. Cheilocystidia desunt. Pileipellis cutis cum pigmento intracellulari. Fibulae frequentes. Sub arboribus frondosis.

Holotype: *J. Wisman*, 12-VIII-1977, 'Vijverzathe, Jelsum, prov. Friesland, the Netherlands' (L).

I consider this taxon as *Clitocybe subalutacea* sensu J. Lange (1930, 1935). The application of the epithet subalutaceus is discussed under *C. odora* var. *fallax*.

Clitocybe infundibuliformis (Schaeff. →) Quél.

It has been customary to treat this name as a younger synonym for *C. gibba* (Pers.: Fr.) Kumm. However, this is certainly incorrect. *Agaricus infundibuliformis*, as described and illustrated by Schaeffer (1774) has a red-brown pileus with paler and darker spots, and yellowish lamellae. It is *Lepista flaccida* (Sow.: Fr.) Pat. The epithet *infundibuliformis* is apparently quite obvious for a funnel-shaped agaric, and at least 7 different homonymous *A. infundibuliformis* have been described, viz. *A. infundibuliformis* Scop. 1772 (= *Cantharellus tubaeformis* Fr.: Fr.), *A. infundibuliformis* Schaeff. 1774 (= *Lepista flaccida*), *A. infundibuliformis* Bolt. 1788 (= *Cantharellus cinereus* (Pers.: Fr.) Fr.), *A. infundibuliformis* Hoffm. 1789 (= *Leucopaxillus giganteus* (Leyss.: Fr.) Sing.), *A. infundibuliformis* Bull. 1786 (= *Clitocybe gibba* (Pers.: Fr.) Kumm.), *A. infundibuliformis* Schum. 1803 (probably *Pseudoclitocybe cyathiformis* (Bull.: Fr.) Sing.), and *A. infundibuliformis* Liljebl. 1806 (listed as a synonym of *Agaricus fimbriatus* Bolt.: Fr., a pleurotoid taxon coming close to *Ossicaulis lignatilis* (Pers.: Fr.) Redh. & Ginns).

Clitocybe langei Hora

The application of this name has also been beset with many difficulties, already arising from the fact that Fries in his first mycological publications might not have had a clear con-

ception of *C. vibecina* (Fr.) Quél. and *C. metachroa* (Fr.: Fr.) Kumm., as nowadays understood, and therefore might have confused them (Harmaja 1969: 97). He might even have considered them as synonyms (Fries 1821: 172). *Clitocybe vibecina* nowadays is understood as a species with a farinaceous smell, but this was not mentioned by Fries (1818). Only later (Fries, 1838) did Fries remark that an (unnamed) subspecies of it possessed a weak farinaceous smell.

It is therefore not surprising that later authors used the name *C. vibecina* for what is now called *C. metachroa* (Bresadola, 1928: pl. 179; Konrad & Maublanc, 1925: pl. 295). The concept of *C. vibecina* by Lange (1930), who separated it from *C. metachroa* because of farinaceous smell, smaller spores, darker lamellae and unicolorous stipe, was therefore deviating from several of the important mycological publications at that time. It is also not very surprising that Singer (1943) proposed a new name for *C. vibecina* sensu J. Lange, viz. *C. langei* [nomen invalidum, Latin diagnosis lacking]. Unfortunately, Singer remained silent on the identity of *C. vibecina*.

The subsequent fate of the name *C. langei* has been like that of a ghost species. Favre (1948) described both *C. vibecina* and *C. langei* (still invalid) and separated the latter species on account of more brownish pileus and smaller lacrymoid spores ($5.0\text{--}6.5 \times 2.7\text{--}3.2 \mu\text{m}$; *C. vibecina* was said to have ellipsoid spores, measuring $5.5\text{--}7.0 \times 3.5\text{--}4.0 \mu\text{m}$). No recent collections of Favre's taxon are known. However, as Lange (1930) described elliptical spores for *C. vibecina*, we must conclude that *C. langei* Singer and *C. langei* sensu Favre refer to different species.

Hora (1960: 441) validly described *C. langei*. His description notes lacrymoid spores measuring $5.0\text{--}6.0 \times 2.7\text{--}3.2 \mu\text{m}$. Hora also remarked that *C. langei* in Britain is more common than *C. vibecina*. Unfortunately, Hora's type collections have been lost and the identity of the type can therefore never be established. However, his remark that *C. langei* is in Britain even more common than *C. vibecina*, leads to the conjecture that *C. langei* Hora is merely a brownish variant of *C. vibecina* without formal taxonomic status (despite differences in spore size and form), as all collections in K and E named *C. langei* did indeed belong to *C. vibecina*. *Clitocybe langei* sensu Harmaja (1969: 104–105) is enigmatic; one cannot escape the feeling that he felt unable to really separate both species and therefore even suggested hybridisation between *C. langei* and *C. vibecina* as intermediaries were also found. This also leads to the conjecture that it too is merely a variant of *C. vibecina*.

For these reasons, *C. langei* is treated as a synonym of *C. vibecina* (Kuyper 1995: 56).

Clitocybe maxima (Fr.) Kumm.

In conjunction with the name *C. geotropa* (DC. & Lam.) Quél., the name *C. maxima* has repeatedly been used by mycologists to denote a closely related taxon. That taxon was said to differ from *C. geotropa* in being larger, lacking an umbo, having a shorter stipe, and in possessing more ellipsoid spores. However, two different interpretations of the name *C. maxima* have been in use, none of which corresponds to *Agaricus maximus* Gärtner, Meyer & Scherbius. One interpretation of *C. maxima* refers to a variant of *C. geotropa*, where the supposed differences (size, pileus form, ratio of pileus diameter and stipe length) between both taxa are without a genetic basis (Nüesch, 1926: 122). The other interpretation refers to an autonomous species, which is closely related to *C. geotropa*,

but differs in having ellipsoid spores $(6.5-9.5(-11.0) \times 4.5-6.0(-7.0) \mu\text{m})$; *C. geotropa* has subglobose to broadly ellipsoid spores measuring $(7.0-7.5-9.5(-10.0) \times 6.0-7.0 \mu\text{m})$. The correct name for this taxon is *C. gigas* Harm.

Both interpretations of *C. maxima* contradict the protologue. *Agaricus maximus* Gärtner et al. was a superfluous name for *A. giganteus* Leyss. and *A. infundibuliformis* Hoffm. (itself also superfluous for *A. giganteus* Leyss.). Their description is also in agreement with *Leucopaxillus giganteus*. Fries (1821: 80) clearly recognized this fact, by listing *A. maximus* as a synonym of *A. giganteus*, keeping it clearly separate from *A. geotropus*, considered as a large form of *A. gibbus*. However, Fries (1825: 10-13) came to doubt his earlier taxonomic judgements and referred part of *A. giganteus* and *A. maximus* to infraspecific status under *A. gibbus*. The 'true' *A. giganteus* as a separate species remained unknown to Fries at that time. By excluding the obligatory type of *A. maximus* when Fries redescribed *A. gibbus* var. *maximus*, he is considered to have created a new taxon that must be attributed to Fries solely.

As the name *Agaricus maximus* has been used for at least three different species, it is best rejected as a nomen dubium.

Clitocybe metachroa (Fr.: Fr.) Kumm.

As discussed by me (Kuyper, 1985) yellow to yellow-brown variants of this taxon should be recognized as **Clitocybe metachroa** var. **aquosoumbrina** (Raithelhuber) Kuyp., *comb. nov.* — *Clitocybe bicolor* var. *aquosoumbrina* Raithelhuber in Schweiz. Z. Pilzk. 47: 138. 1969 (basonym).

Many authors have tried to separate *C. metachroa* and a closely related taxon called *C. bicolor* (Pers.) Murrill. From a nomenclatural point of view such a separation seems unfounded, as *Agaricus metachrous* Fr.: Fr. (1821: 172) was proposed as a renaming for *A. bicolor*. This was stated explicitly by Fries (1830) as "*Agaricus bicolor* = *A. metachrous* S.M.; nomen bicolor, et radice hybridum et per se minus aptum est."

Several authors might, however, have had a broad concept of *C. metachroa* including the closely related *C. amarescens* Harm. and *C. metachroides* Harm. The latter species comes very close to *C. metachroa* but differs in having somewhat darker colours, slightly smaller spores and distinctly incrusting pigments in pileipellis and upper pileitrama. Dutch collections of this species are also somewhat more tough than *C. metachroa* and hardly translucent striate, although Finnish material is striate (Harmaja, 1969). *Clitocybe metachroides* has only recently been recognized in the Netherlands and it is probably not uncommon.

Clitocybe odora var. **fallax** Kuyp., *var. nov.*

Ab varietate odora differt colore bubalino-brunneo vel brunneo. Colores virides totaliter absunt. Ad folia et acua in silvis mixtis.

Holotypus: Th. W. Kuyper 2659, 25-X-1984, 'Ravenswoud, Appelscha, prov. Friesland, the Netherlands' (L).

The taxon looks identical to *Clitocybe odora* (Bull.: Fr.) Kumm. var. *odora* in all macroscopical and microscopical characters, except for the complete absence of green tinges in pileus, stipe and lamellae, even in young, very well developed specimens.

There seem to have been no earlier reports of such a non blue-green variety of *C. odora*, except for some remarks that in old specimens of that species the blue-green tinges may have almost completely faded (Nüesch, 1926). Another possibility is that var. *fallax*, when found, would be referred to the enigmatic *C. subalutacea* (Batsch: Fr.) Kumm.

The identity of *Agaricus subalutaceus* has remained doubtful. The original description by Batsch (1789) refers to a whitish species for which no smell was indicated. In my opinion Batsch's illustration depicts *C. phyllophila* (Pers.: Fr.) Kumm. Fries (1818: 138) in his first description did also not mention a smell of aniseed. In the sanctioning description Fries (1821: 90) noted that some variants have a smell of aniseed. However, Fries did not compare this species to *A. odoratus*, although he in the same publication pointed out the very close relationship between *A. odoratus* and *A. suaveolens* as interpreted by him (actually *C. odora* var. *alba* J. Lange). It seems possible that Fries's sanctioning description refers to either *C. albofragrans* (Harm.) Kuyp. or to *C. phyllophila* var. *tenuis* Harm.

Later authors have provided different interpretations of the name *C. subalutacea*, thereby augmenting uncertainty about the application of the name. Ricken (1914: 370) described *C. subalutacea* as a pale species with a weak smell of aniseed and with small spores ($3-4 \times 3 \mu\text{m}$). Nüesch (1926: 148-151) described *C. subalutacea* on the basis of one collection and indicated somewhat larger spores ($3-6 \times 3-4 \mu\text{m}$). Both descriptions seem to refer to *C. albofragrans*. Nüesch also made clear that pale variants of *C. odora* could be confused with *C. subalutacea*, but that *C. odora* has decidedly larger spores. *Clitocybe subalutacea* sensu Bigelow (1982: 116) is also small-spored and with a weak smell of aniseed. It too might come close to *C. albofragrans*, a species unknown to Bigelow.

Lange (1930: 45-46) described a species which he called *C. subalutacea* Batsch? (thereby indicating doubts about the application of the specific epithet), which was characterized by a smell of *Marasmius oreades* (cyanidic smell). As noted by him, his taxon might well be in need of another name.

Kühner & Romagnesi (1953: 137) accepted *C. subalutacea* in Ricken's interpretation, but noted that they never saw this species themselves. They also introduced a new species, viz. *Clitocybe sericella* [nomen invalidum, as a Latin diagnosis was lacking] for which *C. subalutacea* sensu J. Lange was given as a synonym. This species was said to have a distinct cyanidic smell. In a later publication Romagnesi (in Kühner & Romagnesi, 1956: 119-120) proposed the name *C. subsericella* [nomen invalidum, because alternative names were proposed] and indicated large cylindrical spores ($7.2-9.0 \times 3.7-4.0$); earlier they were given as $6 \times 4 \mu\text{m}$) and the absence of clamp-connections, making it rather unlikely that his species is identical with Lange's. Interestingly, Métrod (1946) introduced the new name *C. rufuloalutacea* [nomen invalidum, as a Latin diagnosis was lacking] which was suggested to be the same as *C. subalutacea* sensu Ricken and *C. subalutacea* sensu J. Lange; but spores were indicated as $4-5 \times 3.2-3.7 \mu\text{m}$!

A taxon very similar to Lange's species was reported from the Netherlands by me (Kuyper, 1995: 51) as *C. subalutacea* sensu J. Lange; it is here formally described as *C. frysica*.

As the name *C. subalutacea* has been applied for at least five different taxa (viz. *C. phyllophila*, *C. albofragrans*, *C. odora* var. *fallax*, *C. subsericella*, *C. frysica*), it seems best to reject this name as a nomen dubium.

XXVI. A NEW COMBINATION IN HYGROPHOROPSIS

The following new combination is introduced: **Hygrophoropsis macrospora** (D. Reid) Kuyp., *comb. & stat. nov.* — *Hygrophoropsis aurantiaca* var. *macrospora* D. Reid, *Fung. rar. Ic. col.* 6: 6. 1972 (basionym).

This large-spored taxon of the genus *Hygrophoropsis* has been known as *H. pallida* (Peck) Kreisel, although the combination has never been formally validly published. *Cantharellus aurantiacus* var. *pallidus* Peck 1896, described with a pale pileus and lamellae, is a later homonym of *C. aurantiacus* var. *pallidus* Cooke 1888–1890, illustrated with pale lamellae but with a hardly paler pileus. Peck made clear that his specimens were just pale variants of the typical variant, and did not suggest that they were larger-spored.

XXVII. A NEW SPECIES AND A NEW COMBINATION IN OMPHALINA

Omphalina cyathella (J. Favre & Schweers) ex Kuyp., *nov. spec.*

Pileus usque 15 mm latus, infundibuliformis, involutus, hygrophanus, striatus, glaber, griseo-brunneus. Lamellae decurrentes, griseae. Stipes usque 50 × 1 mm, glaber, politus, griseo-brunneus. Inodorus. Sporae 5.5–6.5(–7.0) × 5.0–6.0(–6.5) µm, (sub)globoseae, cum apiculo conspicuo. Basidia tetrasporigera. Cheilocystidia desunt. Pileipellis cutis cum pigmento parietali, sine incrustationibus. Fibulae frequentes. In paludosis.

Holotypus: A. C. S. Schweers, VIII-1939, 'Geldermalsen, prov. Gelderland, the Netherlands' (L 942-133.20).

In describing this 'new' species I do not wish to make any claim for original taxonomic work. I just validate *Omphalina cyathella* Favre & Schweers (1943) which was not validly published as it lacked a Latin diagnosis.

The present wording of Art. 46.4 (Greuter et al., 1994) would in my opinion not allow to cite this as *O. cyathella* J. Favre & Schweers in Kuyp., because the Latin diagnosis can not be ascribed to them. This leaves only the 'ex' citation according to Art. 46, Note 2.

The species is somewhat enigmatic in *Omphalina* because of its spore form (subglobose with very prominent apiculus instead of lacrymoid with confluent apiculus) and absence of incrusting pigment. The species is probably very rare in Europe, having been reported from Switzerland, Germany, and the Netherlands (where it is extinct now).

Omphalina galericolor var. **lilacinicolor** (M. Bon) Kuyp., *comb. & stat. nov.* — *Omphalina lilacinicolor* M. Bon, *Doc. mycol.* 10 (37–38): 91. 1979 (basionym).

As the only difference between var. *galericolor* and var. *lilacinicolor* is found in the pinkish or flesh-coloured tinges in the pileus of the former, Bon's taxon is formally reduced to the status of variety of *O. galericolor*. Ecologically, both species have very similar requirements, occurring mainly in moss-rich dune grasslands on calcareous or locally calcium-enriched sandy soil.

XXVIII. A NOMENCLATORIAL NOTE ON PSEUDOOMPHALINA

The combination *Pseudoomphalina pachyphylla* has been formally made by Knudsen, *Nord. J. Bot.* 12: 76. 1992.

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THE IDENTITY OF AGARICUS CYATHIFORMIS SCHAEFF.

F. KOTLABA¹ & Z. POUZAR²

The problem of the correct interpretation of the original concept of *Lentinus cyathiformis* (Schaeff.) Bres. = *Agaricus cyathiformis* Schaeff. is analysed. The authors demonstrate, on the basis of the original protologue, that this species is identical with *Pleurotus pulmonarius* (Fr.) Quél. The modern interpretation of *Lentinus cyathiformis*, originating from Bresadola and followed by a number of contemporary authors, is erroneous: this fungus should be called *Lentinus degener* Kalchbr. in Fr.

A conspicuous wood-inhabiting gill fungus, sporadically distributed in riverside forests of the southern part of Central Europe and evidently also in Southern and Western Europe, is known in the contemporary mycological literature under three different names. One of them is *Lentinus degener* Kalchbr. in Fr., the second, just recently applied, is *L. schaefferi* (Weinm.) Rausch., but the most frequent is the third name, *L. cyathiformis* (Schaeff.) Bres. The interpretation of the last two names is quite erroneous in modern mycological literature.

About 27 years ago (Kotlaba & Pouzar, 1967) we attempted to elucidate the identity of the name *Agaricus cyathiformis* Schaeffer (1774) because, in our opinion, it represents a fungus quite different from *Lentinus degener*. On the basis of Schaeffer's picture only (Tab. CCLII in *Icones fungorum*, 1771), without taking into account the description, we reached the conclusion that it most likely represents *Panus torulosus* (Pers.: Fr.) Fr. = *Pleurotus conchatus* (Bull.: Fr.) Pilát, since the lamellae of the fungus on Schaeffer's plate are very broad and as such in contrast to the context of the pileus, which is relatively thin.

We recently restudied Schaeffer's picture (Tab. CCLII), together with the description (p. 66-67), and reached the new conclusion that Schaeffer's fungus is almost certainly identical with *Pleurotus pulmonarius* (Fr.) Quél. The reasons for this new interpretation are as follows: the description asserts that the pileus is yellow ('pileo luteo'), the surface is punctate-striate ('punctato-striatus') and the stipe is also pale yellow ('pallide luteo'). However, in the copy of Schaeffer's book in the National Museum, Prague, it is darker and rather brown.

It is worth to explain why Schaeffer's fungus could be in no way identical with the fungus with which it is still continually identified (see e.g. Bockhout, 1990; Moser, 1983; Pegler, 1983; Rauschert, 1988; Kreisel, 1987, 1992). This interpretation originates from Bresadola (1900), who misinterpreted Schaeffer's fungus. The reasons why Schaeffer's fungus cannot be identified with *Lentinus degener* = *L. cyathiformis* sensu Bresadola are as follows.

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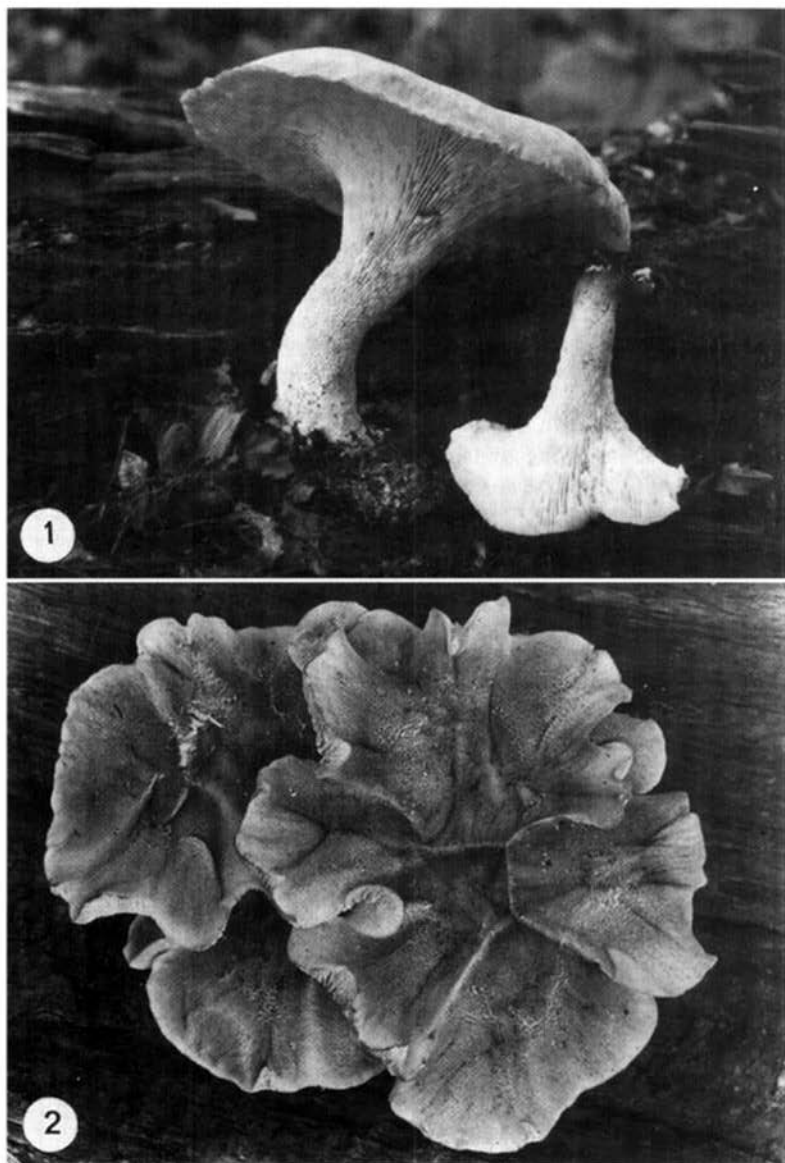


Fig. 1. *Lentinus degener*, general view. Riverside virgin forest Ranšpurk near Lanžhot, S. Moravia, Czech Republic; on laying trunk of *Populus alba* (?), 4.VI.1971. — Fig. 2. *Lentinus degener*, view from above. Riverside forest Cahnov near Lanžhot, S. Moravia, Czech Republic; on laying trunk of *Aesculus hippocastanum* (?), 17.V.1966. (Photos by F. Kotlaba.)

– The edge of the lamellae of *Agaricus cyathiformis* in the work of Schaeffer is depicted as being entire, and fits therefore well with *Pleurotus pulmonarius*, whereas the edge clearly is denticulate (serrate) in *L. degener*. It should also be compared with the plate of *Agaricus tubaeformis* Schaeff. (= *Lentinus lepideus*) on plate CCLIX of Schaeffer's book, where the lamella edge is depicted as clearly denticulate. Both pictures were made by the same painter (Loibl), and this proves that Schaeffer paid attention to the precise drawing of the lamella edge.

– The lamellae of *Lentinus cyathiformis* sensu Bresadola are thinner in the middle part of the pileus than the context of the pileus in Bresadola (*Fungi tridentini*, plate 206) (the margin of the pileus cannot be taken into consideration). This is quite different in Schaeffer's *Agaricus cyathiformis* where the lamellae are at least two times broader than the context of the pileus, and so this character also fits well with *Pleurotus pulmonarius*.

– The fungus of Schaeffer's plate CCLII is evidently of a rather thin nature, which fits also well with *Pleurotus pulmonarius* (*Panus torulosus* is also similar). Fruit-bodies of *Lentinus degener* have usually much thicker context, especially young specimens, and therefore they have quite another appearance. The ratio of the breadth of the lamellae to the thickness of the context of the pileus is in fact opposite in *Lentinus degener* compared with *Pleurotus pulmonarius*.

– We interpret the dark colour of the stipe in the picture of *Agaricus cyathiformis* by Schaeffer as a shadow, made by the painter, since Schaeffer described the stipe as 'pallide luteo' ('von mittlerer Farbe'), which in no way is brown. In *Lentinus degener* the stipe becomes more or less brown rather early (see the picture of the younger specimens in Bresadola's plate 206), while in *Pleurotus pulmonarius* the stipe is white and becomes yellowish to ochraceous in old specimens only.

– According to our experience and photographs young specimens of *Lentinus degener* and *Pleurotus pulmonarius* are quite different, however, in older specimens the surface of the pileus is rather similar in both species, with a somewhat fibrillose to shortly striate margin. The striate appearance of the whole pileus of *Agaricus cyathiformis* on Schaeffer's plate CCLII, however, is in no doubt the result of the painter's stylization or better to say his artistic utterance which he (Loibl) used in the same book also in pictures of other fungi with a more or less smooth pileus. Good examples are e. g. Tab. XLIX, fig. 1, VI of *Agaricus lateritius* (= *Hypholoma lateritium*), Tab. CIX of *Boletus aurantius* (= *Albatrellus confluens*) or Tab. CCXIV, fig. II, III of *Agaricus xerampelinus* (= *Russula xerampelina*).

– *Lentinus degener* and *Pleurotus pulmonarius* occur not only on wood of broad-leaved trees, but rarely also on coniferous wood. *Lentinus degener* grows in Mediterranean regions sometimes on conifers. Schaeffer's *Agaricus cyathiformis*, a species described from Central Europe (Bavaria) originally was indicated as collected "In silvis abiegnis ... ad radices et truncos ..." or "In Tannenwäldern ..." However, in the territory of the former Czechoslovakia and elsewhere in Central Europe we found *Lentinus degener* never on coniferous wood. On the other hand we have several records of *Pleurotus pulmonarius* on conifers, including *Abies alba*.

– Bresadola was unsuccessful also in the interpretation of some other older names of fungi, as e. g. *Agaricus fuliginosus* Fr., which in fact is *Lactarius picinus* Fr., but not *L. fuliginosus* (Fr.) Fr., or *Russula sardonica* Fr., which in Bresadola's interpretation represents *R. luteotacta* Rea. Later mycologists evidently did not pay attention to the original concept of *Agaricus cyathiformis* Schaeff., and simply followed Bresadola.

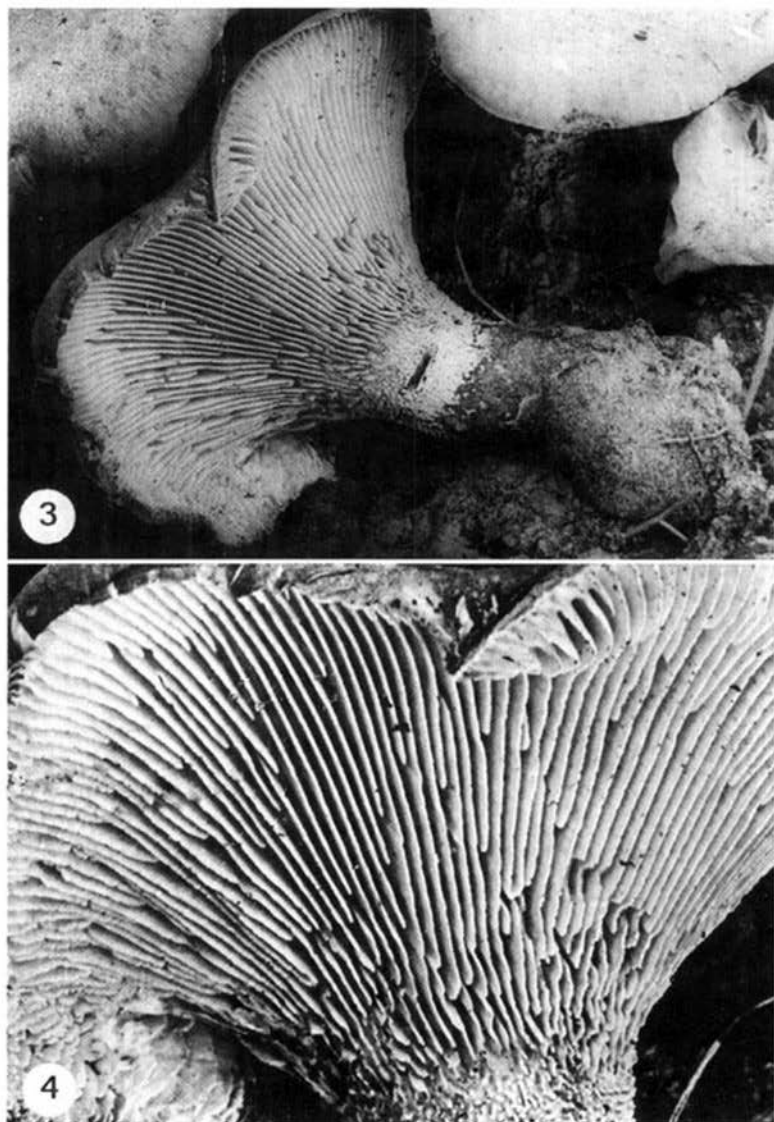


Fig. 3. *Lentinus degener*, laying carpophore. Chl'aba near Štúrovo (Parkan), S. Slovakia, Slovak Republic; on stump of *Populus alba*, 13.VI.1966. — Fig. 4. *Lentinus degener*, detail of gills. Chl'aba near Štúrovo (Parkan), S. Slovakia, Slovak Republic; on stump of *Populus alba*, 13.VI.1966. (Photos by F. Kotlaba.)

From all these reasons, it is impossible to accept the conspecificity of *Agaricus cyathiformis* Schaeff. with *Lentinus degener* Kalchbr. in Fr. In our experience of some forty years we came across numerous fruit-bodies of *Lentinus degener* in Czechoslovak riverside forests, we know the fungus rather well and can therefore judge this problem on the basis of a well founded knowledge of this fungus.

The name *Lentinus schaefferi* (Weinm.) Rauschert, which nowadays is sometimes used for *L. cyathiformis*, is based on *Agaricus schaefferi* Weinm. (1836). This is merely a new name for *Agaricus cyathiformis* Schaeff. non *Agaricus cyathiformis* Bull.: Fr. (= *Pseudoclitocybe cyathiformis* (Bull.: Fr.) Sing.) and therefore must be typified with the same iconotype as *A. cyathiformis* Schaeff. Weinmann correctly interpreted Schaeffer's fungus, because his description relates to *Pleurotus pulmonarius*: beside similar morphological features he also refers to *Betula alba* (= *B. pendula*) as host, one of the many host trees of *P. pulmonarius*, but never for *L. degener*. So, nomenclaturally speaking, the name *Lentinus schaefferi* (Weinm.) Rauschert relates to *Pleurotus pulmonarius*, and in no way to *Lentinus degener* Kalchbr. in Fr.

Pegler (1983) cites, as another synonym of our fungus, *Panus urnula* Fr. '1851' (the last pages with the description of this fungus in Monographia Hymenomycetum Sueciae were, however, published in 1863) which is seemingly older than *Lentinus degener* Kalchbr. in Fr. 1874. However, when analysing the description of *Panus urnula* Fr., we reached the conclusion that it could in no way be *Lentinus degener*: The fruit-body is described as 'imbricato-multiplex et concrescens', a character which does not apply in *L. degener*. Also the gills are described as 'integerrimae, griseae', whereas in *L. degener*, the gills are denticulate (at least in some places) and never grey. *Panus urnula* Fr. may therefore represent *Pleurotus pulmonarius* (Fr.) Quél. as well. Pegler (1983) cited a further apparently older synonym of *L. degener*, i.e. *Panus schurii* Schulzer 1844, but this is a misprint: the date should be correctly cited as 1884. Judging from the description of that species, it is most likely not identical with *Lentinus degener*.

We conclude that the correct name for the species of the gill fungus which is often called *Lentinus cyathiformis* (Schaeff.) Bres. or *L. schaefferi* (Weinm.) Rausch. must be, without questioning, *Lentinus degener* Kalchbr. in Fries 1874 as there is no doubt as regard the interpretation of its original concept.

The Italian authors Tomei & Monti (1979) presented quite a new taxonomic concept of *Lentinus degener*, stating that there are, in fact, two different species which they call *L. cyathiformis* and *L. degener* respectively. The differences are to be found in the shape of the carpophore, the configuration of the hymenophore and the size of spores. This problem should be thoroughly studied – we are unable to confirm the existence of two species – but, nomenclaturally, the name *L. cyathiformis* can in no way be applied to any of the taxa involved.

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NOTULAE AD FLORAM AGARICINAM NEERLANDICAM XXIX
Two new species of *Psilocybe*

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Two new species of *Psilocybe* (Basidiomycetes, Agaricales) are described from the Netherlands, viz. *P. puberula*, a bluing species similar to *P. semilanceata* and *P. cyanescens*, but clearly different by its dry cutis-like pileipellis with well-differentiated pileocystidia, and *P. flocculosa*, a member of section *Psilocybe* characterized by a floccose stipe and the presence of pleurocystidia.

During the revision of *Psilocybe* for the Flora agaricina neerlandica (Noordeloos, 1996, in prep.) two species of *Psilocybe* have been discovered that appear to be new to science. They are described in the present paper, which is dedicated to Marcel Bon because of his contribution to the knowledge of European agarics.

1. *Psilocybe puberula* Bas & Noordel., *spec. nov.* — Fig. 1, 2

Pileus 40–50 mm latus, conicus margine inflexus demum expansus, hygrophanus, margine translucido-striatus, obscure griseo-brunneus vel ater, in sicco sordide ochraceo centro obscuriore. Lamellae moderate confertae, liberae vel adnatae, ventricosae, stramineae demum fuliginosae vel griseo-brunneae violaceo tinctae. Stipes 20–70 × 1.2–3.5 mm, cylindraceus, apice pallide brunneus, basi obscure brunneus, apice pruinosis, versus basim ochraceo-fibrillosus. Odore saporeque rancido-farinaceo. Sporae 10.0–11.5(–12.0) × 6.0–7.0 × 7.0–8.0 μm, ellipsoideae vel oblongae, antice lentiformes, crassitunicatae, poro germinativo praeditus. Basidia tetrasporigera, fibulata. Cheilocystidia 10–35 × 4.5–11 × 1.0–3.0 μm, lageniformia. Pleurocystidia 15–30 × 7.0–12.5 × 1.5–3.5 μm, lageniformia. Pileipellis cutis hyphis cylindraceis, 2.0–7.0 μm latis constitutis. Pileocystidia abundantia, clavata, lageniformia, 15–55 × 3.0–12 μm. Stipitipellis cutis hyphis ad 20 μm latis. Caulocystidia abundantia, 16–80 × 7–20 μm, versiformia. Fibulae abundantes. Ad terram, gregarius.

Holotypus: The Netherlands, prov. Utrecht, Amersfoort, Leuserheide, 29 Oct. 1990, J. Wisman (L).

Pileus 40–50 mm broad, conical at first with involute to deflexed margin, expanding with age to (plano-)convex with weak, but distinct umbo and deflexed to straight margin, hygrophanous, very dark grey-brown when moist, with age becoming blackish (Mu. 10 YR 4–3/4 or even darker), translucently striate at margin, pallescent on drying to ochraceous buff (10 YR 7–8/6) with small, darker, grey-brown to dark ochraceous brown central spot, in two young specimens with slight bluish tinge when bruised, but no trace of blue seen in other specimens, lubricous when moist but not viscid, pellicle not easily peeling, smooth, under strong lens innately radially fibrillose, mat. Lamellae, L = 22–28, l = 1–3, moderately crowded, free, narrowly adnate or ascending, rather broadly ventricose, up to 6 mm broad, dull straw-coloured buff to pale chocolate-brown at first, soon

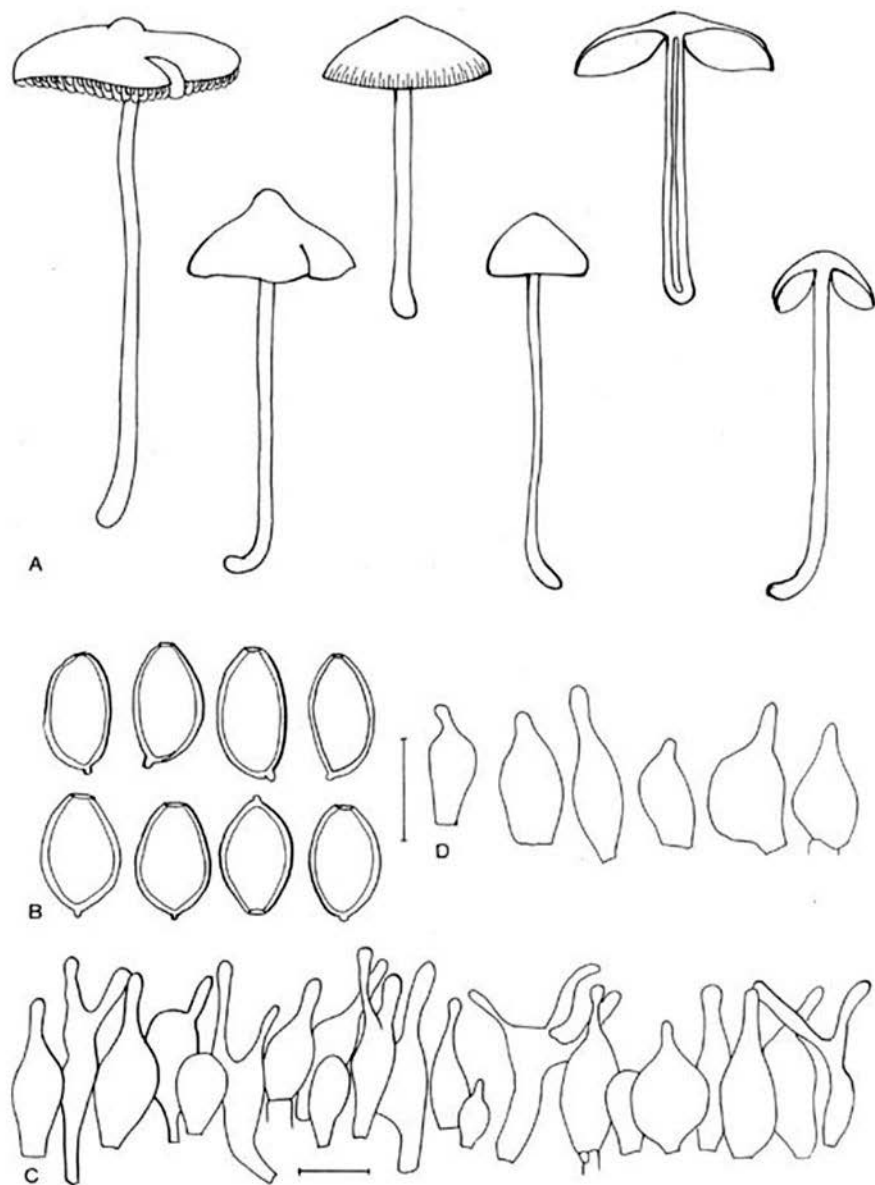


Fig. 1. *Psilocybe puberula*. A. Basidiocarps; B. spores; C. cheilocystidia; D. pleurocystidia. — Scale bars = 10 μ m.

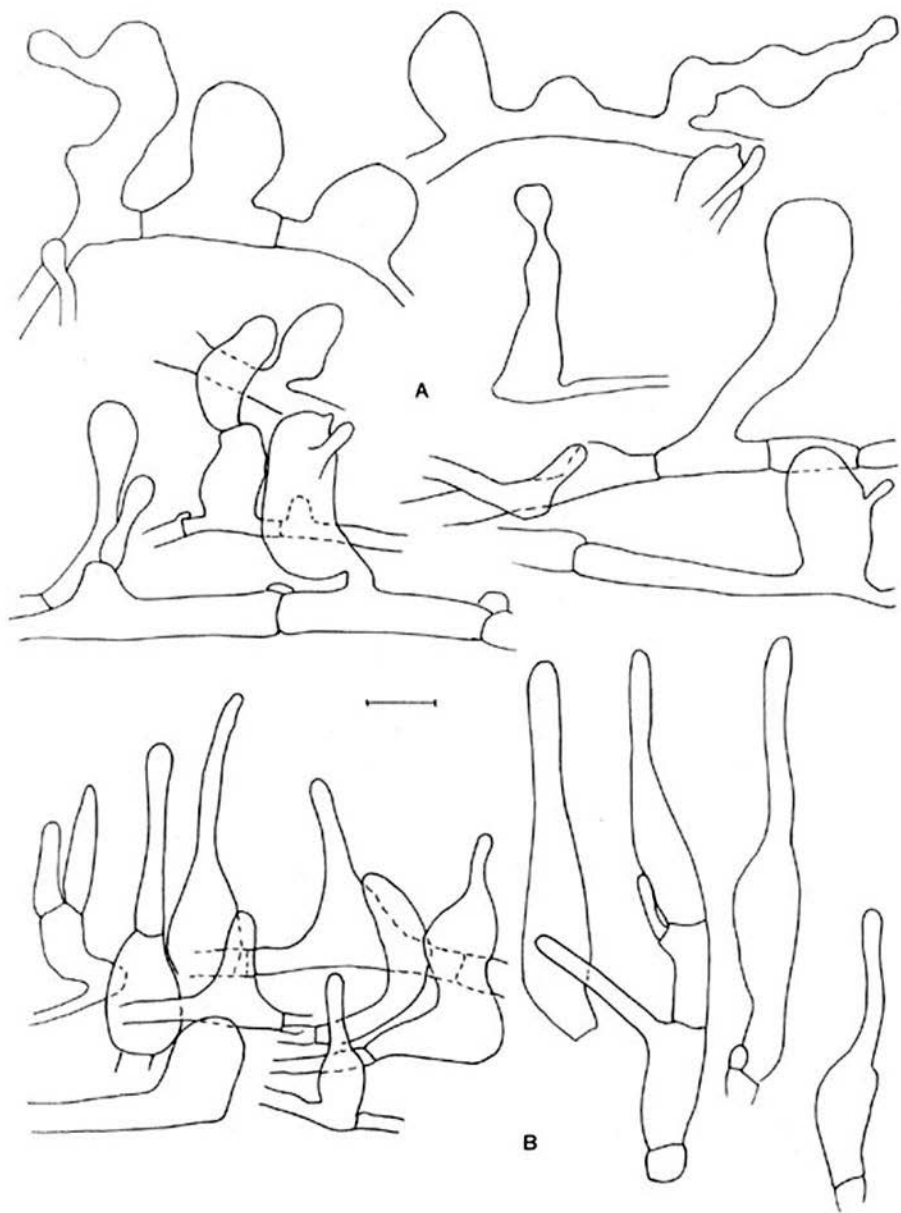


Fig. 2. *Psilocybe puberula*. A. Elements of pileipellis; B. caulocystidia. - Scale bar = 10 μ m.

darker from ripening spores, finally dark grey-brown with violaceous tinge (first about 7.5 YR 3/2–4, then 10 YR 2–4/2–4), with conspicuous white edge. Stipe 20–70 × 1.2–3.5 mm, cylindrical, sometimes slightly enlarged at base, tough, stuffed to narrowly fistulous, very pale buff at apex, ochraceous buff in middle part, dark brown at base, darkening with age to dark red-brown or blackish brown, with pale pruinose covering at apex, downwards appressed fibrillose to strongly fibrillose at base with paler, isabella or ochre fibrils. Veil absent. Context thin and pale to dark brown in pileus, pallescent on drying to pale buff, in stipe pale yellow-brown in apical part, darker grey-orange to yellow-brown in middle part to blackish brown in base. Smell faint when fresh, somewhat sweetish-fungoid, strongly rancid-farinaceous when cut. Taste strongly rancid-farinaceous becoming somewhat bitter-astringent.

Spores 10.0–11.5(–12.0) × 6.0–7.0 × 7.0–8.0 μm, ellipsoid to oblong in side-view, Q = 1.4–1.7(–2.0), av. Q = 1.5–1.6, oblong to ovoid or sublentiform in frontal view, Q = 1.3–1.6, av. Q = 1.4–1.5, with up to 1.5 μm thick wall and large central germ-pore, moderately dark brownish violaceous in water, olivaceous brown in ammonia. Basidia 15–20 × 6.0–9.0 μm, 4-spored, clamped. Lamella edge sterile. Cheilocystidia 10–35 × 4.5–11 × 1.0–3.0 μm, irregularly lageniform with narrow to rather broad basal part, neck sometimes forked, thin-walled, clamped. Pleurocystidia 15–30 × 7.0–12.5 × 1.5–3.5 μm, lageniform with broad basal part and relatively short neck, thin-walled, colourless, clamped, rather numerous. Hymenophoral trama regular to subregular, made up of slightly inflated, 6.0–30 μm wide elements. Pileipellis a cutis of 2.0–7.0 μm wide, cylindrical hyphae, sometimes with lateral projections, bearing numerous clavate, lageniform or irregularly shaped pileocystidia or cystidioid terminal elements, 15–55 × 3.0–12 μm; subpellis more or less distinct from underlying trama, made up of up to 35 μm wide, inflated elements. Pigment predominantly membranous, sometimes also faintly incrusting in pileipellis and upper pileitrama. Stipitipellis a cutis of up to 20 μm wide, cylindrical hyphae with slightly thickened, yellow walls. Caulocystidia abundant, 16–80 × 7–20 μm, very variably shaped from cylindrical to clavate, capitate to lageniform, with thin, colourless walls. Clamp-connections abundant.

Habitat & distribution – Saprotrophic, in groups at grassy road-side on poor, rather dry, sandy soil. Only known from type-locality.

Collections examined. The Netherlands, prov. Utrecht, Amersfoort, Leusderheide, 18 Oct. 1990 and 29 Oct. 1990 (holotype), J. Wisman (L).

Psilocybe puberula is a very distinct species because of the dry, not gelatinized pileipellis with pileocystidioid elements, the rather thick-walled spores, which are sometimes almost lentiform in frontal view, and the slight, but distinct bluing of the stipe and rarely also the pileus. *Psilocybe turficola* differs among other things by having larger spores, and sphagnicolous habitat. *Psilocybe sabulosa* Peck has a well-developed veil, larger spores (12–18.5 μm long), and differently shaped cheilocystidia. Both species lack pileocystidia. If one takes into consideration the slight bluing of the pileus in some specimens, sections *Semilanceatae* and *Cyanescens* also must be checked on similar taxa. *Psilocybe puberula* has some resemblance indeed with *P. strictipes* and *P. semilanceata*, which differ, however, by their distinctly gelatinized pileipellis without pileocystidia or pileocystidioid elements. *Psilocybe puberula* is not related to *P. cyanescens*, which always shows a very strong bluing, and has a very different, gelatinized pileipellis.

2. *Psilocybe flocculosa* Bas & Noordel., *spec. nov.* — Fig. 3

Pileus 5–9 mm latus, hygrophanus, rufo-brunneus, margine translucido-striatus, siccus, omnino subgranulosus. Lamellae confertae, subdecurrentae, pallide argillaceae. Stipes rufo-brunneus, omnino flocculososquamulosus, glabrescens. Sporae 6.0–7.0 × 3.5–4.0 × 4.5–6.0 μm, distincte lentiformae vel rhomboidae. Basidia 16–24 × 4–7 μm, 2- vel 4-sporigera, fibulata. Cheilocystidia 20–30 × 6–8 × 2–3 μm, lageniformia. Pleurocystidia abundantes, 20–30 × 8–11 × 3–4 μm, ventricosos-rostrata vel lageniformia. Pileipellis cutis vel trichoderma hyphae cylindraceae, 3.0–7.0 μm latae. Fibulae abundantes. Ad terram humosam in horto.

Holotypus: *J. Daams* s.n., 9 Sept. 1968, 'The Netherlands, prov. Noord Holland, 's-Gravenland, 'Boekensteyn' (L).

Pileus 5–9 mm, obtusely conical with involute margin, sometimes slightly umbonate, expanding to plano-convex or applanate, usually with slight depression around low, rounded umbo, hygrophanous, when moist dark red-brown at centre (Mu. 5 YR 3/2–4), with rather narrow, much paler ochraceous red to dark isabella marginal zone (5 YR 4/6, 7.5 YR 5/4, 10 YR 5/3), translucently striate at margin, dry, not viscid, entirely subgranulose, pallescent on drying, becoming minutely fibrillose-flocculose. Lamellae crowded, broadly adnate to subdecurrent, often secedent in expanded pilei, rather broad, triangular, up to 1.5 mm wide, pale clay-coloured when young (10 YR 6/3), then darker grey-brown with slight violaceous tinge (10 YR 5/3–7.5 YR 5/4), with white, granular edge. Stipe 9–17 × 0.3–1.5 mm, tapering towards base, reddish-ochraceous brown with dark red-brown base, finally almost black in basal part, at first entirely covered with pale reddish-ochraceous flocculose-squamulose covering, later on fibrillose, glabrescent. Context rather dark brown in pileus, concolorous with surface in stipe. Smell spontaneously weak, strongly subaromatic when crushed. Taste unpleasant, slightly bitter. Spore print dark purplish grey-brown (5 YR 3/3).

Spores 6.0–7.0 × 3.5–4.0 × 4.5–6.0 μm, Q = 1.4–1.8, av. Q = 1.6, ellipsoid to oblong in side-view, Q = 1.05–1.3, av. Q = 1.3, lentiform to rhomboid in frontal view, relatively thin-walled, with prominent germ-pore, brown in water. Basidia 16–24 × 4–7 μm, 2- and 4-spored, clamped. Lamella edge sterile. Cheilocystidia 20–30 × 6–8 × 2–3 μm, slenderly lageniform. Pleurocystidia abundant, 20–30 × 8–11 × 3–4 μm, ventricose-rostrate to lageniform, thin-walled, colourless. Hymenophoral trama subregular, made up of strongly inflated elements, 23–60(–80) × 4.0–12 μm, with finely incrustated walls. Pilei-

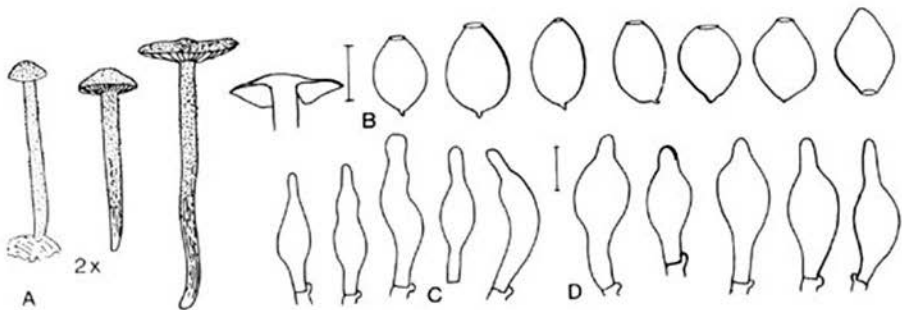


Fig. 3. *Psilocybe flocculosa*. A. Basidiocarps; B. spores; C. cheilocystidia; D. pleurocystidia. — Scale bars = 10 μm.

pellis a dry cutis with transitions to a trichoderm of cylindrical, often branched, 3–7 μm wide hyphae. Pigment minutely incrusting and membranous in upper layer of pileus. Stipitipellis a cutis with trichodermal tufts of cylindrical, often strongly branched, up to 5.0 μm wide hyphae with incrustated walls. Clamp-connections abundant.

Habitat & distribution – Saprotrophic, in large group on sandy soil mixed with compost and wood debris in orchard. Known only from type-locality.

Collections examined. The Netherlands, prov. Noord-Holland, 's-Gravenland, 'Boekensteyn', 9 Sept. 1968, J. Daams s.n., 15 Sept. 1968, J. Daams s.n. (holotype) & 15 Sept. 1968, E. Kits van Waveren (all in L).

Psilocybe flocculosa is well characterized by its flocculose pileus and stipe, presence and abundance of pleurocystidia, and strongly flattened spores with rhomboid frontal view. There exists no European species with this set of characters. Pleurocystidia only rarely occur in subgenus *Psilocybe*. Guzman (1983) accommodates species with pleurocystidia mainly in sect. *Singerianae* and sect. *Atrobrunneae*. *Psilocybe pallidispota* (Murrill) A.H. Smith has similar pleurocystidia, but clearly differs by paler basidiocarps and not distinctly rhomboid spores; *P. laticystis* (Peck) A.H. Smith has much broader cheilocystidia, larger pleurocystidia, and less distinctly rhomboid spores.

ACKNOWLEDGEMENTS

We are very grateful to Mr. J. Wisman and Mr. J. Daams (†) for bringing these two species to our attention.

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ON A NEW SPECIES OF MYCENA FROM SPAIN

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Mycena calceata Robich, collected at L'Estartit in Spain in November 1993, during the Mycological Days of the European Confederation of Mediterranean Mycology, is described as new to science. It belongs to section *Insignis*, characterized by the radiating hairs at the base of the stipe, large spores and growing on thin rotting branches of *Quercus suber* (Cork oak) in mediterranean forest.

Viene descritta *Mycena calceata* spec. nov. raccolta nel mese di novembre 1993, in occasione delle Giornate Micologiche della Confederazione Europea Micologia Mediterranea svoltesi in L'Estartit, Spagna.

***Mycena calceata* Robich, spec. nov. — Fig. 1**

Pileus 8 mm latus campanulato expansus, glabrescens, pruina alba conspersus, pellucido-striatus, fusco-cremeus, disco obscuriori, circa marginem dilute cremeo pallescentem. Lamellae subconfertae, leviter ventricosae, venis connexae, adscendentes, arcuatae, adnatae, albae. Caro alba. Stipes 5 cm longus, 1.5 mm crassus, subaequalis, cavus, fragilis, laevis, nitens, superne aquoso-cremeus, deorsum aquoso-cinereus, albo-pruinatus, basi insiticius densis pilis radiantibus praeditus. Solitaria supra ramulos *Quercus suberis* putrescentibus in terra.

Sporae 5.5–8 × 11–13.5 µm, ellipsoideae, amyloideae. Basidia 12–13 × 37–45 µm, 4-spora, clavata. Cheilocystidia 6–20 × 20–50 µm, versiformia, abnormia, vel clavata, apice inflata, surculisque crassis instructa, ramosa, fusiformia, laevia, base pedunculata. Pleurocystidia nulla. Pileipellis hyphae cylindricae, in materia gelatinosa immersae, 1.5–3 µm latae, diverticulis simplicibus vel ramosis munitae. Hyphae stipitis corticales laeves, 1–3 µm latae, gelatinosae. Caulocystidia cylindrica, 2–5 × 50–130 µm, sparsis surculis obtectae. Fibulae nullae.

Holotypus: MCVE n. 397. Leg. G. Robich, 17.XI.1993, St. Pol de la Bisbal, Gerona, Spain.

Etymology: calceatusi, furnished with a shoe, in reference to the basal disc.

Pileus 8 mm across, campanulate-applanate, with broad low umbo, glabrescent, pruinose, translucent-striate for half the radius, cream-brown, light grey-brown, dark brown at disc, margin light cream, pallescent. Lamellae, L = 19, l = 1, not crowded, slightly ventricose, somewhat intervenose, ascending-arcuate, adnate, whitish, with white edge. Flesh thin, white, grey under pileal cortical layers, smell and taste unrecorded. Stipe 1–2 × 50 mm, almost cylindrical, slightly tapering from base to apex, hollow, fragile, smooth, shining, watery, watery-cream above, then watery-grey, white pruinose below, base insititious with thick radiating hairs.

Spores 5.5–8 × 11–13.5 µm, elongated-cylindrical, ellipsoid, with opaque content, a few with large guttae, amyloid. Basidia 12–13 × 37–45 µm, 4-spored, clavate, sterigmata, 9–10 µm long (a few basidia 5-spored, 13.5 × 46 µm). Cheilocystidia 6–20 × 20–50 µm, versiform, irregularly-shaped or clavate with thickened tip or coarse apical bumps



Fig. 1. *Mycena calceata*. A. Spores; B. cheilocystidia; C. hyphae of pileipellis; D. hyphae of stipitipellis.

with two or three elongated excrescences, forked, fusiform, smooth, with pedicellate base, mixed with basidia and basidioles on the gill edge. Pleurocystidia none.

Pileipellis an ixocutis of smooth, cylindrical hyphae, yellow in Melzer's reagent, embedded in a gelatinous layer, branched, clamped, 3–10 µm wide, suprapellis made up of thinner, 1.5–3 µm wide hyphae with simple or branched diverticulae, 1–1.5 × 5–15 µm, thickly tangled into coralloid masses, tramal hyphae cylindrical to inflated, 11–27 µm wide. Subhymenial layer made up of subglobose, elongated-globose and cylindrical hyphae 3–5 × 3–16 µm. Hyphae of trama of stipe cylindrical, pseudoamyloid, vinaceous reddish-brown and metachromatic, 6–24 µm wide. Stipitipellis an ixocutis of smooth, 1–3 µm wide cylindrical hyphae, yellow in Melzer's reagent, not metachromatic, embedded in a gelatinous layer, with slightly enlarged tips, 2–5 × 50–130 µm, with sparse diverticula in the form of bumps and excrescences. Hyphae of pilei- and hymenophoral trama pseudoamyloid, reddish-brown in Melzer's reagent. Clamps none.

Habitat & distribution – Solitary on thin rotting branches of *Quercus suber* (Cork oak) in mediterranean forest. Only known from the type-locality in Spain.

Collection examined. Spain, St. Pol de la Bisbal (Carretera de Calonge), La Bisbal, Gerona, 17.XI. 1993, G. Robich (MCVE 397).

A misjudgment of the significance of the thick, radiating hairs at the base of the stipe coupled with the fragility of the latter, and some other characters, first induced me to place this taxon in section *Fragilipedes* (Fr.) Quél., among the clampless species (Maas Geesteranus, 1988: 46, Key 3). After reading a draft of the present work, Dr. R. A. Maas Geesteranus, whom I thank wholeheartedly both for confirming that the species was as yet undescribed and for his valuable suggestions, informed me that the new taxon fitted in perfectly with section *Insignes* Maas G. which at the moment included five American and two European species.

Section *Insignes* Maas G. includes species having, among other characters, 4-spored basidia (only one is 2-spored), pileus and stipe hyphae embedded in a gelatinous layer and clamps, generally growing on pine needles on the ground. On the contrary, the possible presence of plentiful and noticeable fibrils, either radiatingly disposed or forming more or less thick mats at stipe base appears to have uncertain diagnostic value: "generally covered with fibrils at the base" (Maas Geesteranus, 1989: 343–344). The spore size of *Mycena calceata*, much larger than those of the other 4-spored species of the section, is a major character. As a matter of fact, it is well known that spore size in a 2-spored form is always larger than that of a 4-spored form. Only the spore size of *Mycena corrugans* Maas G. is much larger than that of *Mycena calceata*, but only because the former is 2-spored (or rarely 3-spored). Also the thick radiating hairs at the base of the not radiating stipe is an uncommon character for the species now included in the section, being this character described only for *Mycena roriduliformis* (Murrill) Dennis "unite to form comparatively few, coarse, stiff, radiating strands" and for *Mycena mitis* Maas G. "basi fibrillis radiantibus albis substrato affixus" (Maas Geesteranus, 1992: 469). In addition *Mycena mitis* and *Mycena corrugans* grow on *Quercus* leaves on the ground and at the base or on roots of *Calamagrostis epigeios* respectively, while *Mycena calceata* grows on thin branches or twigs of *Quercus suber* on the ground. All these species grow under broad-leaf trees, by contrast all the American species of section *Insignes* were collected under conifers. Finally *Mycena calceata* is the first clampless species of the section.

ACKNOWLEDGEMENTS

I wish to thank E. Grilli for the English translation of this work, and for the Latin diagnosis, and Dr. R. A. Maas Geesteranus for valuable help and discussions in earlier stages of the manuscript.

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**TYPIIFICATION OF
VOLVARIELLA GLOIOCEPHALA (DC.: FR.) BOEKHOUT & ENDERLE**TEUN BOEKHOUT¹ & MANFRED ENDERLE²

A neotype is designated for *Volvariella gloiocephala* (DC.: Fr.) Boekhout & Enderle, to serve as an representative collection for the current concept of this species, that generally is considered conspecific with *V. speciosa* (Fr.: Fr.) Kummer.

Authentic material of many species of agarics described in the nineteenth century or before is not preserved. This has led to many controversies about the interpretation of species names in agaricology. Designation of a lectotype, paratype, neotype or epitype contributes to taxonomic and nomenclatural stability (Greuter et al., 1994, Art. 9.2, 9.5, 9.6, 9.7). However, the selection of lecto-, para-, neo- or epitypes may be complicated (see e.g. Fell et al., 1989; Kuyper & Vesterholt, 1990; Guého et al., 1992; Rodrigues de Miranda & Batenburg-van der Vegte, 1981).

Many early descriptions of agarics are short, e.g. that of *Amanita speciosa* Fr. (Fries, 1818), and lack information on taxonomically important characters. Therefore, unambiguous interpretations may not always be possible. In principle, careful comparison of descriptions of the same species given by subsequent authors may help to understand the (changes in) historical concepts of the species concerned, which are the basis of currently used taxonomic concepts. When a species description can only be interpreted equivocally, and no authentic material fitting the protologue is present, most taxonomists tend to reject these names (see e.g. Kosonen, 1993). Every now and then, mycologists try to interpret old and hardly interpretable names, e.g. *Agaricus phaepodius* Bull.: Fr. (Singer & Cléménçon, 1972), *Agaricus humilis* Persoon (Métrod, 1948), *Agaricus fastibilis* Pers.: Fr. (Kuyper & Vesterholt, 1990). As a result, conflicting interpretations of these species exist, or a name is used for different species as in the case of *Agaricus melaleucus* Pers. (Kühner, 1978; Maire, 1916).

The recently adopted 'Tokyo Code' provides for epitypes, or interpretative types in cases where the holotype, lectotype, neotype or all original material is demonstrable ambiguous and cannot be critically identified for purposes of the precise application of the name of a taxon. It is the authors' opinion that nomenclatural and taxonomic stability can only be achieved if the interpretation of old species names is accompanied by the designation of lecto-, para-, neo- or epitypes. If possible pure cultures, made from recently collected neo- or epitype specimens, should be deposited in public culture collections. Once such a typification is settled, future workers must stick to it, unless the typification seriously conflicts with the protologue (ICBN, Art. 9.13). However, in cases of great

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confusion it is useful to regard the original diagnosis non-interpretable, reject the name, and describe a new species. Undesired nomenclatural changes can now be circumvented by the widely expanded possibility for conservation of names (ICBN, Art. 14).

Current progress in the study of ancient DNA, which also includes herbarium specimens, and making use of the polymerase chain reaction (PCR) are promising (Bruns et al., 1990; Wingfield & Wingfield, 1993; K. O'Donnell, pers. communication). It can be foreseen that in the near future these methods will become optimized and standardized, and will benefit the elucidation of taxonomic confusion between early and currently used species concepts.

Volvariella gloiocephala (DC.: Fr.) Boekhout & Enderle and *V. speciosa* (Fr.: Fr.) Kummer are currently considered conspecific (Orton, 1974; Boekhout & Enderle, 1986; Boekhout, 1990), as formerly used differentiating characters were found to overlap strongly. *Volvariella gloiocephala* was thought to differ from *V. speciosa* mainly by its greyish brown pileus, whereas that of *V. speciosa* is whitish (Shaffer, 1957; Courtecuisse, 1984). However, the original descriptions do not provide arguments for this distinction as De Candolle (1815) described the pileus of *Agaricus gloiocephalus* DC. as "d'un blanc gris de souris", whereas Fries (1818) described the colour of *Amanita speciosa* Fr. as "glabro alba, disco griseo." Moreover, both colours have been found to occur in, supposedly, one and the same mycelium (e.g. *Daams 945*, L), and they have been experimentally obtained from one mycelium (Herrmann, 1973). The species grows saprotrophically and can be commonly found in gardens, lawns, deciduous forests, agricultural fields, compost, wood chips, saw dust, etc.

Unfortunately, no material of *A. gloiocephalus* studied by De Candolle is known to be preserved, nor is an illustration cited in the protologue. Fries (1821) did not refer to any illustration for *Agaricus gloiocephalus* or *A. speciosus*, nor is material known to be preserved in UPS. Therefore, a neotype is selected for *Volvariella gloiocephala* (DC.: Fr.) Boekhout & Enderle. Generally, it may be preferred to select a neotype from an area mentioned in the protologue (viz. Montpellier). However, in this case we prefer material from Germany, which has been studied for many years by one of the authors (M.E.). There seems no risk for misinterpretation, as considerable consensus on the species concept of *V. gloiocephala* exists (see synonymy given by Shaffer, 1957; Boekhout & Enderle, 1987; Boekhout, 1990).

The neotype of *V. gloiocephala* (DC.: Fr.) Boekhout & Enderle was collected in Germany, Bavaria, northeast of Riedheim, near Leipzig, MTB 7527/1, growing singly or in small groups on an arable field owned by G. Kreiss (acre no. 258), collected and identified by Manfred Enderle, 18 Oct. 1990. It has been deposited in L (988.032-099), and isoneotypes are placed at M and CBS. Unfortunately, attempts to isolate a culture of the neotype failed thus far.

No specimens nor illustrations of the species made by Fries are preserved at UPS (O. Constantinescu, pers. comm.). In the Persoon herbarium (L) a specimen of *Agaricus gloiocephalus* DC. is present (L, 910.255-459). It concerns a medium-sized agaric, with a clear volva. The spores are broadly ellipsoidal, with a clear apiculus, and measure $11.6-16.6 \times 8.2-9.1 \mu\text{m}$. Therefore, Persoon's specimen is considered to agree with the current interpretation of the species.

ACKNOWLEDGEMENTS

Drs W. Gams, J. van Brummelen and Th.W. Kuyper are kindly acknowledged for critically reading an earlier version of this paper. Their comments are highly appreciated. Dr. J. van Brummelen made it possible to study material from the Persoon herbarium (L) and Dr. O. Constantinescu informed me that no specimens or illustration left by Fries are preserved at UPS.

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NOTULAE AD FLORAM AGARICINAM NEERLANDICAM XXX
MELANOLEUCA POLIOLEUCA
FORMA PUSILLA BOEKHOUT & KUYPER

A new name for *Melanoleuca polioleuca* forma *oreina* (Fr.: Fr.) Boekhout

TEUN BOEKHOUT¹ & THOMAS W. KUYPER²

A new name is introduced for the small-sized variant of *Melanoleuca polioleuca*, formerly also recognized as f. *oreina*. The authors demonstrate that the use of this epithet is undesirable because it is not likely that *Agaricus oreinus* Fr.: Fr. represents the same taxon.

Melanoleuca polioleuca (Fr.: Fr.) Kühn. & Maire is a rather variable species (Boekhout, 1988). In this complex many infraspecific taxa have been described (see discussion in Boekhout, 1988: 426). During investigations of the genus in the Netherlands, three more or less distinct morphological variants have been recognized within this species, which were given taxonomic status as forma. Unfortunately no information is available on the evolutionary relationships between those forms, and therefore the hierarchical structure presented was based on intuition. Forma *polioleuca* is considered the 'central' taxon as it is most common, whereas the short-stiped (forma *langei* Boekhout) and small (forma *oreina* (Fr.: Fr.) Boekhout) variants have been interpreted as modifications. However, it turned out that *Agaricus oreinus* Fr. (1815: 98) was sanctioned by Fries (1821: 52), while the epitheton *polioleucus* was treated as an infraspecific taxon (probably a variety) of *Agaricus melaleucus* Pers.: Fr. in the same work (Fries, 1821: 115). Therefore, the name *M. oreina* would have priority over *M. polioleuca* at the species rank, necessitating further nomenclatural changes. We do not favour such a 'nomenclatural' solution as it conflicts with the existing infraspecific hierarchy of the morphological forms within this species.

One may question whether *Agaricus oreinus* Fr.: Fr. is closely related to *A. melaleucus* γ *polioleucus* Fr.: Fr. as both taxa have been placed in different groups by their author. *Agaricus oreinus* Fr.: Fr. was placed in the *Tricholomata Personata* (pileus semper siccus, lamellae subrotundatae) (Fries, 1821: 52), whereas *A. melaleucus* Pers.: Fr. was placed in the tribe *Clitocybe* subtribe *Thrausti* (Fries, 1821: 115). Other differences can be found in the species descriptions. *Agaricus oreinus* seems to differ from *A. melaleucus* γ *polioleucus* by the presence of free lamellae ('lamellis liberis') and a pale stipe ('stipite solido pallido') (Fries, 1821: 52). In the *Epicrisis* (Fries, 1838: 46) the pileus was described as non-hygrophanous ('nec hygrophano'), whereas the pileus of *M. polioleuca* is somewhat hygrophanous. Moreover, as stated earlier, *A. oreinus* was reported from a rather specialized habitat ('Ericetis montosis'). Fries (1838, l.c.) referred to a plate of *Agaricus testudineus* Pers., which is an obese fungus with a short stipe, clearly different from the small-

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sized variant of *M. polioleuca*. Contrary to our earlier interpretation (Boekhout, 1988) we presently think it unlikely that *A. oreinus* is conspecific with *A. melaleucus* γ *polioleucus*. *Agaricus oreinus* Fr.: Fr. seems best interpreted as a nomen dubium.

A second name used for this small variant is *Melanoleuca* (*Agaricus*, *Tricholoma*) *humilis* var. *fragillima* (Fr.) Bon. The small-sized variant of *M. polioleuca* differs in some aspects from the description of *Agaricus humilis* var. *fragillima* Fr. The most striking difference is the hollow stipe of *A. humilis* var. *fragillima* (Fries, 1838: 52, 'stipite longiori cavo fibrilloso'), although this was not reported in this author's earlier description (Fries, 1821: 51). The original description of *A. humilis* var. *fragillima* was very short ("Var. tota fragillima, pileo flavescens, stipite fibrilloso notabilis. In arvis, areis hortorum, pratis & collibus. Sept.–Nov. v. v."). No information was provided on the microscopic morphology, which is very important in the taxonomy of the genus. Therefore, we are unable to link *A. humilis* var. *fragillima* with any of the currently recognized taxa in *Melanoleuca*. *Agaricus humilis* Pers. has been considered doubtful (Boekhout, 1988), and the same holds for its variety. Consequently, we prefer to introduce a new name for the small-sized variant of *Melanoleuca polioleuca* (Fr.: Fr.) Kühn. & Maire, for which we propose *Melanoleuca polioleuca* forma *pusilla* Boekhout & Kuyper.

***Melanoleuca polioleuca* forma *pusilla* Boekhout & Kuyper, forma nov.**

A varietate *polioleuca* differt basidiocarpiis minoribus. Pileus 17–35(–45) mm diam., carne tenui, dilute griseo-brunneus, in medio paulo obscurior, siccus pallescens. Lamellae densae vel fere distantes, emarginatae vel sinuatae vel nonnumquam subdecurrentes, albiae. Stipes 25–75 \times 2–4 mm, albidus, deinde dilute brunneus vel griseo-brunneus, sursum flocculosus. Contextus pilei albidus vel dilute bubalinus, in parte superiore stipitis dilute bubalinus vel griseo-brunneus, ad basim obscure brunneus. Structurae microscopicae sicut in varietate *polioleuca*. Habitat ad terram, praecipue in pratis, sed etiam in silvis latifoliis solo fertili insidentibus. In Neerlandia fere communis ad dunas litorales, sed etiam ad loca a mari remota. — Holotypus: *C. Bas* s.n., 25 Nov. 1953, in Horto botanico (L).

Differs from the typical variety by smaller basidiocarps. Pileus 17–35(–45) mm, thin-fleshed, pale greyish brown (Munsell 10 YR 5/3–4), with somewhat darker centre, becoming paler on drying. Lamellae crowded to rather distant, emarginate to sinuate or occasionally even subdecurrent, whitish. Stipe 25–75 \times 2–4 mm, whitish, becoming pale brown to grey-brown (Munsell 10 YR 5/4, 3/3), at apex flocculose. Context of pileus whitish to pale yellowish brown, in the upper part of the stipe pale yellowish brown to greyish brown, towards the base dark brown. Microscopical characteristics as in typical variety. Grows terrestrially, mainly in grasslands, but also in broad-leaved forests on rich soils. In the Netherlands rather common in coastal dunes, but also occurring inland.

Holotype: *C. Bas* s.n., 25 Nov. 1953, Leiden, Hortus Botanicus (L).

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NOTULAE AD FLORAM AGARICINAM NEERLANDICAM XXXI
Latin diagnoses of two new species in *Pseudobaeospora*

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Two new species of *Pseudobaeospora* have been fully described and illustrated in the third volume of *Flora agaricina neerlandica* (Bas et al., 1995: 133–134), but without Latin diagnoses. In order to validate their names, diagnoses are provided here.

A monograph on *Pseudobaeospora* in Europe is in preparation.

***Pseudobaeospora argentea* Bas, spec. nov.**

Pseudobaeospora argentea Bas in Bas et al., Fl. agar. neerl. 3 (1995) 133, fig. 134 (inval.).

Pileus 4.5–8 mm latus, conicus vel conico-convexus, vix hygrophanus, purpureo-brunneus vel obscure brunneus, fibrillis argenteis obtectus. Lamellae distantes, valde emarginatae vel fere liberae, sordide brunneo-purpureae sed margine multo pallidiores. Stipes 18–22 × 0.7–0.9 mm, parum radicans, apice sordide brunneo-purpureus, basi obscure brunneo-purpureus, apice albo-flocculosus. Sporae 4.0–5.0 × 3.5–4.5 µm, Q = 1.0–1.2(–1.3), globosae vel late ellipsoideae, dextrinoideae. Cystidia nulla. Pileipellis ex hyphis 5.5–12.5 µm latis constans; subpellis non-differens. Fibulae praesentes. Inter muscos prope *Salicem repentem*.

Typus: 'R.A. Maas Geesteranus, 9.XI.1963, Netherlands, Santpoort, estate Duin en Kruidberg' (L).

***Pseudobaeospora frieslandica* Bas, spec. nov.**

Pseudobaeospora frieslandica Bas in Bas et al., Fl. agar. neerl. 3 (1995) 134, fig. 135 (inval.).

Pileus 9–16 mm latus, paraboloides vel convexus, vix hygrophanus, obscure violaceo-griseus vel atro-violaceus, initio omnino incanus sed centro glabrescens. Lamellae paulo confertae, liberae, obscure griseo-violaceae. Stipes 31–43 × 1.5–2 mm, obscure violaceo-griseus vel atro-violaceus, apice minute albo-flocculosus. Spores 3.5–4.0 × 2.5–3.0 µm, Q = 1.2–1.4, late ellipsoideae vel ellipsoideae, vix dextrinoideae. Cystidia nulla. Pileipellis suprapellis tenuissimus, ex hyphis 2–4.5 µm latis constans; subpellis ex cellulis amplis, 20–38 × 8–28 µm, constans. Fibulae nullae sed in subhyemnio et ad basim basidiorum praesentes. Humicola, inter folia delapsa.

Typus: *J. Wisman*, 18.X.1984, Netherlands, Oudehornstercompagnie.

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**MYCENA JUNIPERINA, A NEW MEMBER OF SECTION SUPINAE
FROM NORWAY**

A. ARONSEN

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Mycena juniperina, collected on bark of *Juniperus* in southern Norway, is proposed as a new species belonging to section *Supinae*. It is compared with the other species of the section, from which it is separated on account of the habitat, the pale brown colours of the pileus and the stipe, and some details in the microscopic features.

On the west coast of the Oslo fjord in southern Norway *Juniperus communis* is widely distributed, and in some places it actually dominates the landscape. Searching for *Mycenas* in these areas has proved to be rewarding, and several new or poorly known species have been found during the recent years (Aronsen & Maas Geesteranus, 1989; Maas Geesteranus, 1993; Aronsen, 1994a, and 1994b). *Mycena juniperina* is another new species, recently discovered on bark of *Juniper*.

Sincere thanks are due to Dr. R. A. Maas Geesteranus, Leiden for preparing the Latin diagnosis, and for valuable advice.

***Mycena juniperina* Aronsen, *spec. nov.* — Fig. 1**

Basidiomata dispersa. Pileus 2.5–8 mm latus, hemisphaericus vel convexus, sulcatus, pruinosis vel albo-puberulus vel subfloccosus, pallide brunneus vel flavidobrunneus, centro vulgo obscurior, margine pallidior vel albus. Caro tenuis, albidus, odore indistincta vel acidula. Lamellae (7–)10–12 stipitem attingentes, latiusculae, subadscendentes vel arcuatae vel subhorizontales, late adnatae, dente decurrentes, pallide flavido-cinereae, margine albo. Stipes 3–5 × c. 0.5 mm, aequalis vel supra et infra subincrassatus, cylindraceus, cartilagineus, fistulosus, pruinosis vel puberulus, subflavidus vel pallide brunneus, e disco basali fibrilloso natus.

Basidia 33–40 × 11–13.5 μm, clavata, 4-spora, fibulata, sterigmatibus usque ad 8 μm longis instructa. Sporae 8.8–11.2 × 8.1–10.5 μm, subgloboosae vel globoosae, leves, amyloideae. Cheilocystidia 22–40 × 7–11.5 μm, clavata, surculis simplicibus vel ramosis, curvatis, 2–23 × 0.7–1.5 μm munita, fibulata. Pleurocystidia nulla. Trama lamellarum iodi ope vivescens. Hyphae pileipellis 1.8–11.5 μm latae, fibulatae, varie diverticulatae. Hyphae stiptipellis 1.5–3.8 μm latae, fibulatae, diverticulatae, cellulae terminales copiosae, 23–43 μm longae, clavatae, varie diverticulatae.

Ad corticem *Juniperi communis*.

Holotypus: Norway, Vestfold, Tjøme, Hvasser, Sønstegård, 27 Oct. 1994. Leg. A. Aronsen A 61/94 (O); (Isotypus, L).

Basidiomata scattered or in small groups. Pileus 2.5–8 mm across, hemispherical to parabolical, finally convex, occasionally somewhat depressed in the centre or with a small papilla, conspicuously sulcate, pruinose to white-puberulous or even somewhat flocculose, pale brown or yellowish brown, often darker in the centre, with the margin paler to white. Flesh very thin, whitish. Odour not distinct or somewhat acidulous. Taste mild, not distinct. Lamellae (7–)10–12 reaching the stipe, fairly broad, somewhat ascending or

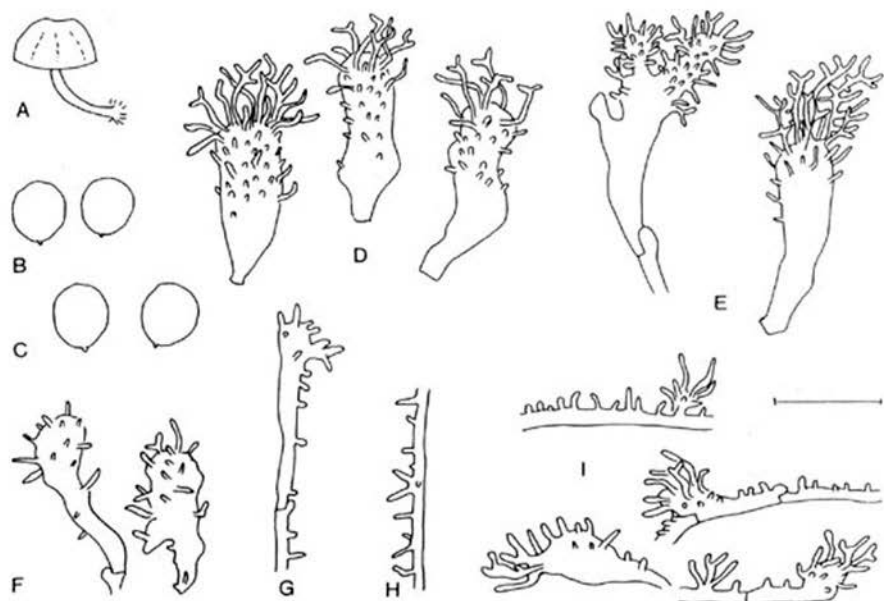


Fig. 1. *Mycena juniperina*. A. Basidiome; B, C. spores; D, E. cheilocystidia; F, G. terminal elements of stipe cortex; H. hypha of stipe cortex; I. hyphae of the pileipellis with terminal elements. — A, B, D, G, H, I from holotype, C, E from A 68/93, F from A 75/94. — Scale bar = 10 μ m.

arcuate to subhorizontal, the edge concave to convex, broadly adnate with a decurrent tooth, sometimes decurrent far down the stipe, pale yellowish grey or beige with the edge white-pruinose. Stipe 3–5 \times c. 0.5 mm, equal or somewhat widened below the lamellae, and sometimes also towards the base, terete, curved, cartilaginous, fistulose, pruinose to puberulous, beige to pale brown, the base attached to the substratum with a patch of radiating, fine, whitish fibrils.

Basidia 33–40 \times 11–13.5 μ m, clavate, 4-spored, clamped, with sterigmata up to 8 μ m long. Spores 8.8–11.2 \times 8.1–10.5 μ m, subglobose to globose, smooth, amyloid. Cheilocystidia 22–40 \times 7–11.5 μ m, forming a sterile band (lamellar edge homogeneous), clavate, covered with unevenly spaced, simple to branched, curved to tortuous, often irregularly shaped excrescences, 2–23 \times 0.7–1.5 μ m, clamped. Pleurocystidia absent. Lamellar trama brownish vinescent in Melzer's reagent. Hyphae of the pileipellis 1.8–11.5 μ m wide, clamped, with cylindrical, often curved, simple to branched excrescences which may grow out to coralloid masses. Hyphae of the cortical layer of the stipe 1.5–3.8 μ m wide, with cylindrical excrescences 1–6 \times 1–1.5 μ m, clamped, the terminal cells abundant, 23–43 μ m long, clavate, variously diverticulate.

On bark of living *Juniperus communis*.

Collections examined. NORWAY: Vestfold, Tjøme, Hvasser, Sønstegård, 22 Aug. 1992, A. Aronsen A 91/92; 27 Oct. 1994, A. Aronsen A 61/94 (holotype; O; isotype; L); 20 Nov. 1994, A. Aronsen A 69/94; 11 Dec. 1994, A. Aronsen A 75/94; Vestfold, Tjøme, Moutmarka: 9 Oct. 1993, A. Aronsen A 68/93. (All collections, except type, in herb. Aronsen.)

Mycena juniperina belongs to section *Supinae* Konr. & Maubl. It differs from all the previously known species of the section (see Maas Geesteranus, 1984). *Mycena corticalis* A.H. Smith is the only member of the section that has been reported from conifer, but it has quite different cheilocystidia which are slender-clavate to almost cylindrical, only 2.5–5.5 µm wide, and have excrescences up to 40 µm long. In *Mycena venustula* Quél. the pileus is pinkish brown to flesh-coloured on a white back-ground, and the lamellar edge is also pinkish brown to flesh-coloured. *Mycena supina* (Fr.) Kummer differs in having cheilocystidia covered with unbranched, fairly short excrescences and smaller spores. The microscopic characters of *M. juniperina* show similarities to *Mycena meliigena* (Berk. & Cooke apud Cooke) Sacc. and *Mycena pseudocorticola* Kühn., but those species grow exclusively on bark of deciduous trees, they have a different colour of both the pileus and the stipe, the cheilocystidia occur mixed with the basidia, and the hyphae of the pileipellis have rather shorter excrescences.

Another species that frequently occurs in the same habitat as *Mycena juniperina* is *Marasmiellus ramealis* (Bull.: Fr.) Sing. to which it macroscopically bears a superficial resemblance. A closer examination, however, will clearly distinguish the two species.

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E. Arnolds, Th.W. Kuyper & M.E. Noordeloos (Eds.). *Overzicht van de paddestoelen in Nederland*. (Netherlands Mycological Society. 1995.) ISBN 90-802818-1-6. Pp. 876, 16 col. pls. Price for members of the Netherlands Mycological Society: Dfl 35.-, for non-members Dfl. 55.-, exclusive postage and packing (\pm Dfl 12.50-20.-, depending on the country). Written orders should be addressed to: H. Lammers, Hoofdstraat 92, 5706 AM Helmond, the Netherlands. The book will be delivered only after correct payment of the invoice has been received.

As a follow-up of the well-known 'Standaardlijst van Nederlandse paddestoelen' (Arnolds, 1984), a new book has been edited by Arnolds, Kuyper & Noordeloos, entitled 'Overzicht van de paddestoelen in Nederland' (Survey of the Macromycetes of the Netherlands). It is written in Dutch language with an extensive English summary. The book contains, after six introductory chapters, a taxonomic survey of 3,488 species recorded from the Netherlands. The genera were treated by a total of 24 professional and amateur mycologists. For each species the following data are given: accepted scientific name with numerical code; vernacular name; selected literature; data on distribution and ecology in the Netherlands; position on preliminary Red List of endangered macrofungi; notes on variation and taxonomic position. The data are also summarized in a tabellaric list with frequency and ecological data in numerical codes. This list is completely accessible without knowledge of Dutch language. Surveys of changes in nomenclature compared to the former list complete the book. The book is illustrated with line drawings and 16 colour plates after water colour paintings.

D. Boertmann. *The Genus Hygrocybe*. (Danish Mycological Society. 1996.) Pp. 184, 59 col. pls. Price: Dkr. 198.- excl. shipping charges. Orders to The Danish Mycological Society, P.O. Box 168, DK 2670, Greve, Denmark.

The genus *Hygrocybe* is the first in a new series 'Fungi of Northern Europe', published by the Danish Mycological Society. Each volume will be published simultaneously in a Danish and English version. The present volume, written by a leading expert on the subject, treats 59 species of *Hygrocybe* occurring in the Nordic Countries. Each species is provided with a full description, excellent coloured photograph, and line-drawings of the spores. The introductory chapters give a rather extensive account of the taxonomy, characters used and a nicely written chapter on the value of *Hygrocybe* species as indicators of habitat quality. Good analytical keys make the identification of the species possible. This book must be recommended to all interested in this group of brightly coloured mushrooms, and it has a modest price. We look forward to the following issues of this new series.

U. Braun. *The powdery mildews (Erysiphales) of Europe*. (Gustav Fischer Verlag, Jena, 1995.) Pp. 337, 112 black and white pls. Price: DM 148.-.

The present work represents an updated treatment of the European powdery mildews of the author's world-wide monograph of the same group in 1987. The chapters in the general part and the taxonomic descriptions have been taken partly from this monograph. In the technical part new keys are provided to the genera and species. Full descriptions and illustrations are given of all European species, while some SEM and TEM micrographs are added. A list of excluded and doubtful taxa is appended.

J. Breitenbach & F. Kränzlin. *Pilze der Schweiz (Champignons de Suisse; Fungi of Switzerland)*. vol. 4. *Blätterpilze 2 (Agarics 2)*. (Verlag Mykologia, P.O. Box 165, CH-6000 Luzern, Switzerland). Pp. 371, 465 col. pls. Price: Sfr. 158.- excl. shipping charges.

The fourth volume of this comprehensive flora covers the families of Entolomataceae, Pluteaceae, Amanitaceae, Agaricaceae, Coprinaceae, Bolbitiaceae, and Strophariaceae. Many rare taxa are included, as well as small and neglected taxa that hardly, if ever, are depicted in popular mushroom guides. The authors have set a trend with this series, particularly with vol. 1 and 2, dedicated to the Ascomycetes and Aphyllophorales respectively. The formula of this series is fairly practical with full macroscopic and microscopic descriptions based on the coloured picture of the mushroom, with schematic, but fairly sufficient microscopic line-drawings. Unfortunately in volume four the authors obviously did not consult specialists in various groups, resulting in a fairly large number of mistakes and misidentifications. Some of the most striking are the false identifications of *Entoloma chalybaeum* var. *chalybaeum* (= ? *E. mougeotii*), *E. juncinum*, *E. papillatum* (doubtful), *E. pseudocoelestinum* (false colours), *E. saundersii*, *E. sericeum* var. *cinereopacum*, poor photo of the poisonous *E. sinuatum*, *Pluteus ephebeus*, *P. petasatus*, *Amanita battarae* (= *A. submembranacea*), poor pictures of *Amanita franchetii* and *A. porphyrea*, same photo used for both *Lepiota echinacea* and *L. perplexa*, poor photo of *Leucocoprinus lanzonii*, untypical or false *Macrolepiota excoriata*. A fairly large number of *Coprinus* species is poorly depicted or wrongly named: *Coprinus laanii* (in reality a mouse-grey species), *C. patouillardii*, *C. tigrinellus* (wrong colour of squamules). Also the microscopic drawings of spores are in some cases inaccurate (*C. leiocephalus*, *C. angulatus*), too old material in the photos of *C. cinereus* and *C. xanthothrix* where the veil is washed off. *Coprinus leiocephalus* is wrongly named and may represent *C. auricomus*; *C. heptemerus* is more like *C. cordisporus*, the photo of *C. cortinatus* does not resemble that species, and that of *C. hemerobius* probably represents a species from subsect. *Setulosi*. Within the Strophariaceae there are also some mistakes: in the picture of *Hypholoma elongatum* the lamellae are far too dark for that species, *Pholiota jahnii* represents *P. squarrosa*, *Psilocybe merdaria* is in reality *P. inquilina* and under the name *Psilocybe subcoprophila* we find a rather good picture of *Panaeolus olivaceus*. The photos of *Stropharia albonitens* and *S. semiglobata* are of very poor quality.

In this volume the authors present an, at first sight, elaborate system of presenting the spore-print colour, which they recorded with a combination of video and computer-scanning methods. They give with each species a rectangular recording of the exact spore-print colour. Unfortunately in some cases this is not the true colour. In many Strophariaceae the

typical violaceous tinge of the spore-print is lacking, and also the dark blackish tinges in many *Agaricus* and *Coprinus* species is not fully matched. The identification key in the book is also based on these spore-print colours, but does not seem to be a great success.

Despite all criticism, the book offers a lot of valuable information on the taxonomy and ecology of many rare and interesting taxa, but the price is fairly high.

J.H. Ginns & G.W. Freeman. *The Gloeocystidiellaceae (Basidiomycota, Hericiales) of North America*. (Bibliotheca Mycologica 157, J. Cramer in der Gebr. Borntraeger Verlagsbuchhandlung, Stuttgart. 1994.) Pp. 118, 24 text-figs. Price: DM 70.-.

Most species formerly placed under *Gloeocystidiellum* sensu lato are now arranged in one of the eight genera of the family Gloeocystidiellaceae. These corticioid fungi are easily recognized by the presence of large gloeocystidia and amyloid basidiospores. Their subdivision is mainly based on basidiospore morphology. This paper is a first survey of the representatives of this group of fungi in Canada and the United States. After a short introduction keys and descriptions of genera and species are presented.

M. Moser & W. Jülich. *Farbatlas der Basidiomyceten. Colour Atlas of Basidiomycetes, Lief. 13*. (Gustav Fischer Verlag, Stuttgart & New York. 1995.) Pp. 200, 60 pls. Price: DM 98.-.

The thirteenth issue of this loose-leaf atlas contains figures in colour of genera from the Boletales and Agaricales: *Boletus*, *Gomphidius*, *Leccinum*, *Agaricus*, *Armillaria*, *Arrhenia*, *Canarophyllopsis*, *Coprinus*, *Cortinarius*, *Echinoderma*, *Flammulaster*, *Flammulina*, *Hygrocybe*, *Inocybe*, *Laccaria*, *Lyophyllum*, *Mycena*, *Omphalina*, *Ossicaulis*, *Pholiota*, *Pholiotina*, *Psathyrella*, *Psilocybe*, *Rhodocybe*, *Stropharia*, including many taxa that rarely or never have been illustrated in colour before. The quality of the photos in this issue is generally good, especially the excellent studio photos of Mr. A. Hausknecht.

O. Petrini & E. Horak (Eds.). *Taxonomic monographs of Agaricales*. (Bibliotheca Mycologica 159, J. Cramer in der Gebr. Borntraeger Verlagsbuchhandlung, Stuttgart. 1995.) Pp. 236, 230 text-figs. Price: DM 110.-.

This volume presents three most valuable, critical, taxonomic revisions of taxa of Agaricales. D.E. Desjardin gives an account of the world-wide members of *Mycena* sect. *Sacchariferae*. Thirty species and one variety are fully described and illustrated. A list of excluded taxa and doubtful names is appended. The genus *Amparoina* is reduced to the synonymy of *Mycena*. A key to the species facilitates their identification.

G. Guzmán gives a supplement to his monograph of the genus *Psilocybe*. Since the publication of his monograph (1983), 28 new taxa have been added to the genus. New updated keys to 17 sections and 144 species are included.

R.A. Maas Geesteranus & E. Horak give an account of the species of *Mycena* and some related genera collected by the second author in Papua New Guinea and New Caledonia. All species found proved to be new: 22 in *Mycena*, four in *Filoboletus*, and one each in *Hydropus*, *Xeromphalina*, *Baeospora*, and the new genus *Cynema*. Four new sections of *Mycena* are proposed. Of all taxa full descriptions and clear illustrations are presented.