

## Notes on *Rhodocybe* MAIRE

E. HORAK

Institut für Special Botany, ETHZ, CH-8092 Zürich, Switzerland

**Zusammenfassung:** Beschreibung und Abbildung von 11 neuen Arten der Gattung *Rhodocybe* MAIRE und taxonomische Notizen zu Taxa gesammelt in Australien, Papua New Guinea, Sabah, Indonesien (Java), Singapur, Schweiz, England, Norwegen, Grönland, Venezuela und Trinidad.

While studying type material of pink-spored agarics described as members of *Entoloma* (Fr.) or *Clitopilus* (Fr. ex RABENH.) KUMMER we came across a number of species which in fact represent typical taxa of *Rhodocybe*.

Furthermore several species of *Rhodocybe* were found among the *Entoloma* collections made by Prof. E. J. H. CORNER in some South East Asian countries. These fungi and new species found by the author in Europe and Papua New Guinea are also included in this informal enumeration of so far unknown taxonomic data. The results of our studies on New Zealand species of *Rhodocybe* (9 spp.) are published in a paper now in press (HORAK 1979).

I am grateful to Prof. CORNER (Cambridge, England) for the offer to work up his material. I have to thank also for the loan of exsiccata sent from the following herbaria: C, CHUR, E, K, WAITE. My thanks are expressed to the Dep. of Forests, Forest Research Centre, Bulolo (Papua New Guinea) for the opportunity to work in that country. The help and the comments of Dr. G. GULDEN (Oslo, Norway) are very much acknowledged.

Type material of the new species is kept in ZT or in the personal herbarium of Prof. CORNER. If not otherwise stated the magnifications of the figures are: carpophores (nat. size), spores ( $\times 2000$ ), basidia and cystidia ( $\times 1000$ ) and vertical section of cuticle ( $\times 500$ ).

### 1. Australia

#### 1. *Rhodocybe reticulata* (CLELAND) comb. nov. — Fig. 1, D

Bas. *Entoloma reticulata* CLELAND 1933: Trans. Roy. Soc. South Australia 57: 189.

„Pileus 25–50 mm, convexus, subumbilicatus, lineis concentricis et interdum rimosis reticulatis vel adversum marginem portionibus irregularibus elevatis et fissuris pallidioribus, cinereus. Lamellae dentibus subdecurrentibus subsinuatae, confertae, angustae, cinereo-carneo-luteae. Stipes 18 mm, subtenuis, infra striatus,

infarctus vel interdum cavus, particulis pallide-fumoso-cinereis, subter subniger. Caro tenuis, albida. Ad terram, South Australia, Mount Lofty“.

Spores  $4.5-6/4-4.5\ \mu\text{m}$ , subglobose or ovoid, subangular, rarely subrugulose, pale pink (KOH), thin-walled, inamyloid. Basidia  $27-32/6\ \mu\text{m}$ , 4-spored. Pseudocystidia absent. Cuticle a cutis of repent cylindric hyphae ( $3-6\ \mu\text{m}$  diam.), encrusted with brown pigment. Oleiferous hyphae in subcutis lacking. Clamp connections absent.

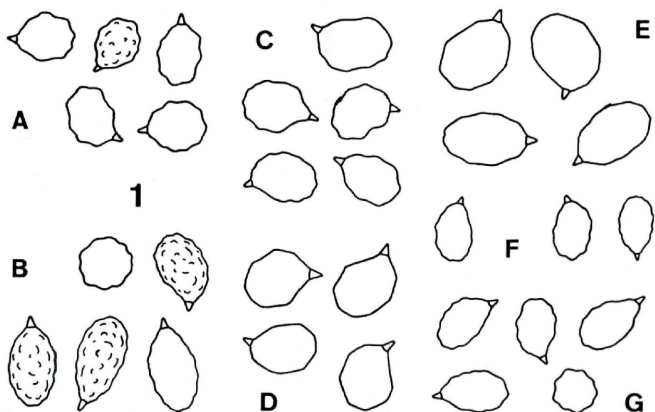


Fig. 1. A: *Rh. pseudonitellina* DENNIS (type): spores. — B: *Rh. griseospora* (PEARSON) ORTON (type): spores. — C: *Rh. testacea* DENNIS (type): spores. — D: *Rh. reticulata* (CLELAND) HORAK (type): spores. — E: *Rh. porcelanica* (DENNIS) HORAK (type): spores. — F: *Rh. cyathoidea* (COOKE & MASSEE) HORAK (type): spores. — G: *Rh. melleopallens* ORTON (type): spores

Habitat. — On soil. — South Australia.

Material. — Australia: South Australia, Adelaide, Mt. Lofty; 25. IV. 1924, leg. Cleland (WAITE 13938, holotype).

The shape of the spores reminds of those observed in *Rhodocybe gracilentia* (COOKE & MASSEE) PEGLER 1965. The two species, however, are distinctly separated by the size of the spores and the lack of pseudocystidia in *Rh. reticulata*.

## 2. *Rhodocybe radicata* (CLELAND) comb. nov. — Fig. 2, B

Bas. *Leptonia radicata* CLELAND 1933, Trans. Roy. Soc. South Australia 57: 189.

„Pileus —25 mm, irregulariter convexus, umbilicatus, subbrillosus, subfusco-cinereus. Lamellae subdecurrentes, marginibus

subcrassis, salmonaeo-cinereae. Stipes 18 mm, subtenuis, fibrillosus, supra farinaceus, solidus, pileo pallidior, radice longa attenuata. South Australia, Kinchina“.

Spores 5.5–7/4.5–5  $\mu$ m, ovoid, minutely rugulose, hyaline, membrane thin-walled. BASIDIA 25–30/8–9  $\mu$ m, 4-spored. Pseudocystidia 30–65/6–7  $\mu$ m, lanceolate-fusoid, yellow-brown, thin-walled, with coarse granular content. Structure of cuticle unknown (type material in fragmentary condition).

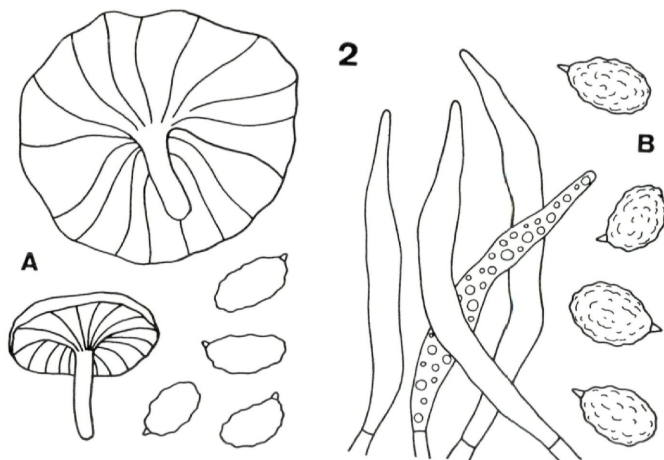


Fig. 2. A: *Rh. cyathoidea* (COOKE & MASSEE) HORAK (auth. mat. of *Ag. (Clitopilus) cancrinus* FR. ss. COOKE 1892): carpophores, spores. — B: *Rh. radicata* (CLELAND) HORAK (type): spores, pseudocystidia

Habitat. — On soil. — South Australia.

Material. — Australia: South Australia, Kinchina; 1. VIII. 1925, leg. Cleland (WAITE 13549, holotype).

Cleland (1933: 97) describes this grey-yellowish fungus as having a short but distinct pseudorhiza. In addition this fungus is characterized by ovoid rugulose spores and conspicuous fusoid pseudocystidia. All data found on the type material indicate that this fungus must be transferred to *Rhodocybe*.

3. *Rhodocybe cyathoidea* (COOKE & MASSEE) comb. nov. — Fig. 1 F; 2, A.

Bas. *Agaricus* (*Clitopilus*) *cyathoideus* COOKE & MASSEE ap. COOKE 1892b: Grevillea 21: 36.

Syn. *Clitopilus cyathoides* (COOKE & MASSEE) SACCARDO 1895: Syll. Fung. 11: 45.

*Agaricus (Clitopilus) cancrinus* FR. ss. COOKE 1892a: Handbook of Australian fungi, 40.

Illustrations: COOKE 1892a: tab. 3, 15.

Habitat. — On soil under burnt logs. — Australia.

Material. — Australia: Victoria; 1892, leg. MARTIN 1054 (K, holotype). — Victoria, Garra Falls; 27. IV. 1889 (sub *Ag. cancrinus* FR., K). — Queensland, Brisbane, 663 (sub *Ag. cancrinus* FR., K).

Two additional collections have been compared with the type material from Victoria. Despite poor information about the macroscopic characters there is little doubt about the fact that all three are conspecific. The elliptical spores ( $4.5-6.5/3-4\ \mu\text{m}$ ) are minutely rugulose and pseudocystidia are absent. The new combination to *Rhodocybe* is proposed.

## 2. Papua New Guinea

### 4. *Rhodocybe ammophila* HORAK sp. n. — Fig. 3

Pileo — 20 mm, convexo vel umbonato-plano, argillaceo-griseo, sericeo. Lamellis late adnatis vel subdecurrentibus, obscure argillaceo-griseis. Stipite — 20/—1,5 mm, cylindrico, pileo concolori, minute fibrilloso. Odore rancido. Sporis 5—6,5/4,5—5  $\mu\text{m}$ , subglobosis, rugulosis. Pseudocystidiis nullis. Hyphis defibulatis. Ad terram arenosam. Nova Guinea. Typus ZT 72/494.

Pileus 10—20 mm diam., convex when young, becoming broadly campanulate or umbonate-expanded, margin inrolled; argillaceous with distinct grey tint, not hygrophanous, margin estriate; silky to minutely radially fibrillose, dry, veil remnants absent. Lamellae broadly adnate or subdecurrent with short tooth, crowded (L 10—16,

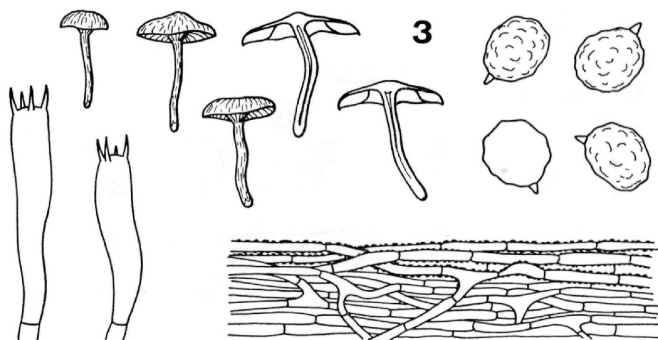


Fig. 3. *Rh. ammophila* HORAK (type): carpophores, spores, basidia, cuticle

—5), not ventricose; conspicuously grey-argillaceous, edge concolorous, even. Stipe 10—20mm, 1—1.5 cylindric, rarely attenuated towards base; concolorous with pileus, white basal tomentum present or absent; minutely fibrillose, fistulose, dry, single in groups. Context pale grey-brown. Odour and taste rancid or like raw cucumber. Chemical reactions unknown. Spores 5—6.5/4.5—5  $\mu$ m, subglobose, rugulose or subangular, pale grey-brown in KOH, membranes thin-walled. Basidia 28—35/5—7  $\mu$ m, 4-spored. Pseudocystidia absent. Cuticle a cutis of repent, cylindric, short-celled hyphae (2—5  $\mu$ m diam.), encrusted with brown pigment, oleiferous hyphae in subcutis absent. Clamp connections lacking.

Habitat. — On soil in dunes (near coast), amongst herbs and shrubs. — Papua New Guinea.

Material. — Papua New Guinea: Morobe district, Buso; 21. VI. 1972, leg. HORAK (ZT 72/494, holotype).

This rather inconspicuous fungus grows among grasses and shrubs in the coastal dunes on the NE-coast of Papua New Guinea. The most distinctive characters are the pale grey-brown colour of the carpophores, the strong rancid smell and the subglobose spores with rugulose to subangular profile. Pseudocystidia are lacking.

5. *Rhodocybe lateralipes* HORAK sp. n. — Fig. 4

Pileo —25 mm, circulari, dimidiato vel conchato, convexo vel plano, pallide brunneo, innate fibrilloso, substriato. Lamellis adnexas, pallide argillaceis. Stipite —10—1 mm, excentrico vel laterali, cylindrico, pileo concolori. Odore rancido. Sporis 5—7/4—4.5  $\mu$ m, subangulatis, ovoideis. Pseudocystidiis nullis. Hyphis defibulatis. Ad terram nudam. Nova Guinea. Typus ZT 73/187.

Pileus 5—25 mm diam., plano-convex becoming expanded, occasionally subdepressed at eccentric centre, margin incurved,

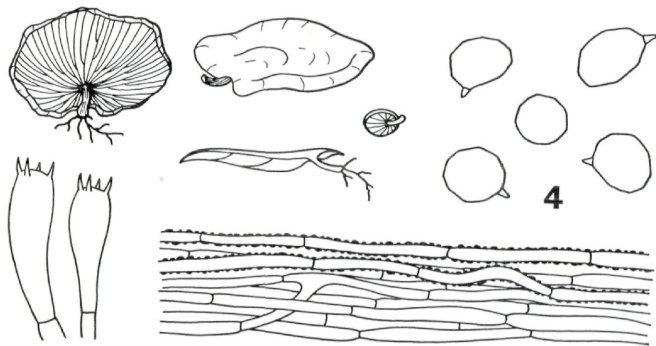


Fig. 4. *Rh. lateralipes* HORAK (type): carpophores, spores, basidia, cuticle

circular, often dimidiate or conchate; dark argillaceous to grey-brown, strongly hygrophanous, margin striate when moist; minutely innate-fibrillose, dry, veil remnants absent. Lamellae subfree to adnexed, densely crowded; argillaceous or pale brown, without pink tint, edge concolorous, even. Stipe 5–10/–1 mm, cylindric, eccentric or lateral, occasionally swollen at base, curved; concolorous with pileus, with conspicuous white rhizoids; silky, fibrillose, dry, solid, single in groups. Context thin, pale brown. Odour and taste unpleasant, rancid or like raw cucumber. Chemical reactions unknown.

Spores 5–7/4–4.5  $\mu\text{m}$ , ovoid to subglobose, subangular, occasionally subrugulose, pink in KOH, membrane thin-walled. Basidia 20–26/7–9  $\mu\text{m}$ , 4-spored. Pseudocystidia absent. Cuticle a cutis of repent cylindric hyphae (4–6  $\mu\text{m}$  diam.), encrusted with yellow-brown (KOH) pigment, oleiferous hyphae absent. Clamp connections lacking.

Habitat. — On bare soil in forests. — Papua New Guinea.

Material. — Papua New Guinea: Morobe district, Bulolo, Susu; 26. IV. 1973, leg. HORÁK (ZT 73/187, holotype).

*Rh. lateralipes* is another representative of *Rhodocybe* with eccentric to lateral stipe, and, therefore, appears related to taxa which are put into sect. *Claudopodes* and sect. *Crepidotoides* (SINGER 1975: 672; PEGLER 1977: 527).

#### 6. *Rhodocybe nitellinoides* HORÁK sp. n. — Fig. 5

Pileo — 20 mm, conico-convexo dein umbonato, aurantio-brunneo, subglabro. Lamellis emarginato-adnatis, pallidis postea pallide aurantiis. Stipite — 50/–3 mm, cylindrico, pileo concolori, subcaniculato, glabro. Odore ingrato. Sporis 6–7.5/4.5–5  $\mu\text{m}$ , rugulosis vel subangulatis. Pseudocystidiis — 90/–10  $\mu\text{m}$ , lanceolato-fusoideis. Hyphis defibulatis. Ad terram in silvis. Nova Guinea. Typus ZT 73/131.

Pileus 5–20 mm diam., conico-convex, campanulate finally umbonate-plane, margin not inrolled; orange-brown (like *Rh. nitellina*), not hygrophanous, margin estriate; smooth to subtomentose, dry, veil remnants absent. Lamellae (L 14–18, –5), crowded, emarginate, with short decurrent tooth; whitish at first turning pale orange in aged carpophores; edge even, concolorous. Stipe 20–50/1–3 mm, cylindrical, occasionally attenuated or subfusoid towards base, with white rhizoids; concolorous with pileus, with white basal tomentum; smooth when young, frequently becoming canaliculate with shallow longitudinal grooves (like *Lentinellus* sp.), glabrous, fistulose, single in groups. Context pale orange to pale brown. Odour unpleasant. Chemical reactions unknown.

Spores 6–7.5/4.5–5  $\mu\text{m}$ , ovoid, rugulose to subangulate, pale pink, often collapsed. Basidia 28–36/5–6  $\mu\text{m}$ , 4-spored. Pseudocystidia 40–90/4–10  $\mu\text{m}$ , lanceolate to fusoid, base rooting in

subhymenium, hyaline, with coarse granular content. Cuticle a cutis of repent, cylindric hyphae (2–4  $\mu\text{m}$  diam.), encrusted with yellow (KOH) pigment, membranes not gelatinized. Clamp connections absent.

Habitat. — On soil in forest. — Papua New Guinea.

Material. — Papua New Guinea: Morobe district, Bulolo, Watut; 30. III. 1973, leg. HORAK (ZT 73/131, holotype).

In the field this species recalls the European *Rh. nitellina* (Fr.). The smaller spores and the lanceolate pseudocystidia, however, are distinct characters to distinguish the two fungi readily.

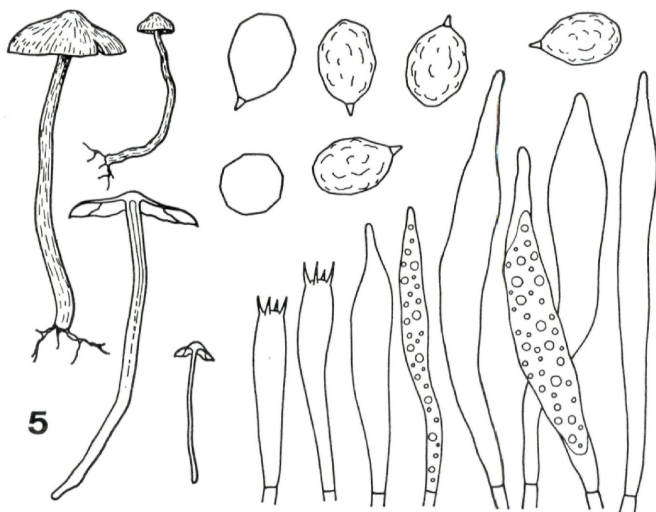


Fig. 5. *Rh. nitellinoides* HORAK (type): carpophores, spores, basidia, pseudocystidia

7. *Rhodocybe gibbosa* HORAK sp. n. — Fig. 6

Pileo —15 mm, conico-convexo vel campanulato, argillaceo, glabro, striato. Lamellis adnato-adnexis, pileo concoloribus. Stipite —50/—2 mm, cylindrico, pileo concolori, glabro. Odore nullo. Sporis 7.5–10.5/6–8  $\mu\text{m}$ , ellipsoideis, ruguloso-gibbosis. Pseudocystidiis conspicuis, —10  $\mu\text{m}$  latis, cylindraceo-fusoideis. Hyphis fibulatis. Ad terram in silvis *Araucariae*. Nova Guinea. Typus ZT 73/148.

Pileus 10–15 mm diam., conico-convex, campanulate or umbonate-expanded, margin incurved; argillaceous to pale (coffee) brown, hygrophanous, margin striate; glabrous, dry, veil remnants

absent. Lamellae subfree to adnexed, occasionally adnate, ventricose, crowded (L 8–12, –3); argillaceous to pale brown, edge even, concolorous. Stipe 30–50/1–2 mm, cylindric, equal; concolorous with pileus, with white tomentum at base; glabrous, fistulose, single in groups. Odour not distinctive. Chemical reactions absent.

Spores 7.5–10.5/6–8  $\mu\text{m}$ , ellipsoid, conspicuously rugulose or gibbous, hyaline to pale pink, membrane thin-walled, often collapsed.

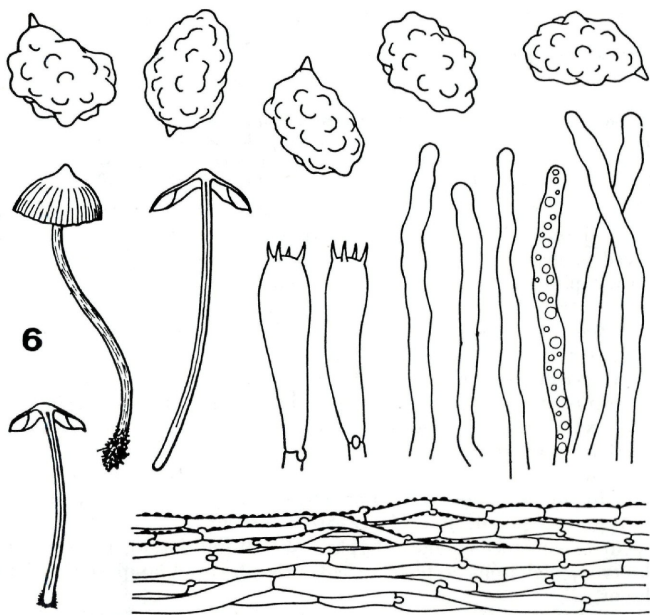


Fig. 6. *Rh. gibbosa* HORAK (type): carpophores, spores, basidia, pseudocystidia, cuticle

Basidia 30–36/6–9  $\mu\text{m}$ , 4-spored. Pseudocystidia cylindric with conic or fusoid apex, deeply rooting in subhymenium and connected with oleiferous hyphae, 5–10  $\mu\text{m}$  diam., membranes thin-walled, with coarse granular content. Cuticle a cutis of repent cylindric hyphae (4–10  $\mu\text{m}$  diam.), encrusted with brownish pigment. Clamp connections numerous.

Habitat. — On soil in forests, dominated by *Araucaria* sp. — Papua New Guinea.

**Material.** — Papua New Guinea: Morobe district, Taun Creek, Bulolo; 4. IV. 1973, leg. HORAK (ZT 73/148, holotype). — Bulolo, between Watut and Manki; 28. IV. 1972, leg. HORAK (ZT 72/420).

To our knowledge the spores of *Rh. gibbosa* are the largest reported for any species of *Rhodocybe*. In addition this fungus is recognized by its conical pileus, subfree to adnate lamellae, cylindric to almost filiform pseudocystidia and the presence of clamp connections on the septae of the cuticular hyphae.

#### 8. *Rhodocybe pallens* HORAK sp. n. — Fig. 7

Pileo —70 mm, convexo-plano dein umbilicato, marginem incurvatam versus undulato, argillaceo-roseo, subtomentoso. Lamellis emarginatis vel subdecurrentibus, densis, argillaceo-roseis. Stipite —50/—7 mm, cylindrico, pileo concolori vel pallidiori, fibrilloso, fasciculato. Odore farinaceo. Sporis 5—6/3.5—4  $\mu$ m, ovoideis, subrugulosis vel subangulatis. Pseudocystidiis nullis. Hyphis defibulatis. Ad terram in silvis. Nova Guinea. Typus ZT 73/118.

Pileus 20—70 mm diam., convex when young becoming plane, centre depressed to umbilicate, margin inrolled at first, irregularly waved in mature carpophores; pale argillaceous or argillaceous with distinct pink tint, hygrophanous, estriate; minutely velutinous, dry, veil remnants absent. Lamellae emarginate or subdecurrent with short tooth, densely crowded; pale argillaceous with pink tint, edges even, concolorous. Stipe 35—50/3—7 mm, cylindric, equal or attenuated towards base; concolorous with pileus or paler, with white tomentum at base; minutely fibrillose, hollow, dry, single or in clusters. Context firm, cartilaginous. Odour and taste farinaceous. Chemical reactions unknown.

Spores 5—6/3.5—4  $\mu$ m, ovoid, subrugulose, occasionally subangular in profile, membrane thin-walled, pale pink. Basidia 25—30/6—7  $\mu$ m, 4-spored. Pseudocystidia absent. Cuticle a cutis of repent or suberect cylindric hyphae (4—10  $\mu$ m diam.), pigment not observed, oleiferous hyphae in subcutis absent. Clamp connections absent.

**Habitat.** — On soil in forests (under *Araucaria* and *Castanopsis*). — Papua New Guinea.

**Material.** — Papua New Guinea: Morobe district, Bulolo, Manki; 29. III. 1973, leg. HORAK (ZT 73/118, holotype).

The characters observed on *Rh. pallens* indicate that this species is closely related to the European *Rh. mundula*. It differs, however, by the pale pink-brown colour of the carpophores which do not change colour after bruising.

#### 9. *Rhodocybe mustellina* HORAK sp. n. — Fig. 8

Pileo —20 mm, convexo, dein subdepresso-applanato, pallide brunneo aurantio tinctu, glabro. Lamellis adnatis vel subdecurrentibus, argillaceis.

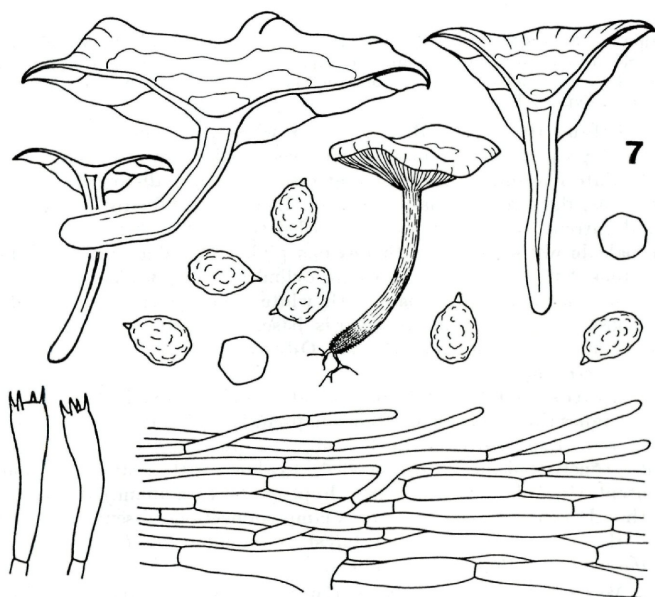


Fig. 7. *Rh. pallens* HORAK (type): carpophores, spores, basidia, cuticle

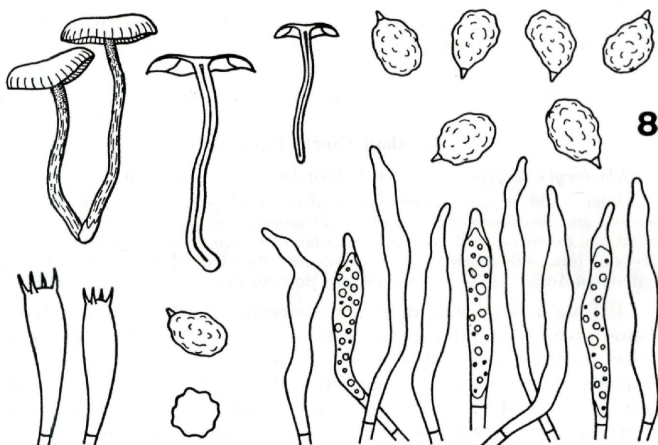


Fig. 8. *Rh. mustellina* HORAK (type): carpophores, spores, basidia, pseudo-cystidia

Stipite —35/—2.5 mm, cylindrico, pileo concolori, glabro. Odore acidulo. Sporis 5—6/3.5—4.5  $\mu$ m, ovatis, rugulosis. Pseudocystidiis —40/—5  $\mu$ m, fusoides, granulato-impletis. Hyphis defibulatis. Ad terram in silvis. Nova Guinea. Typus ZT 72/443.

Pileus 10—20 mm diam., convex when young becoming plane with depressed centre, margin incurved; pale brown towards the substrate margin, brown-orange at disc; smooth, indistinctly hygrophanous, dry, veil remnants lacking. Lamellae broadly adnate or subdecurrent, with short tooth, crowded (L 8—12, —3); argillaceous or pale brownish, often with obvious pink tint, edge smooth, concolorous. Stipe 20—35/2—2.5 mm, cylindric, base swollen at times; concolorous with pileus, base with white tomentum; conspicuously pruinose at apex, fibrillose towards base, dry, fistulose, single and fasciculate, veil remnants absent. Odour strongly acidulous, like *Lepiota cristata*.

Spores 5—6/3.5—4.5  $\mu$ m, ovoid, rugulose, hyaline in KOH, membranes thin-walled and often collapsed. Basidia 18—25/5—7  $\mu$ m, 4-spored. Pseudocystidia 30—40/2—5  $\mu$ m, fusoid, occasionally with constricted neck, thin-walled, hyaline, with coarse granular content. Cuticle a cutis of repent hyphae (2—4  $\mu$ m diam.), encrusted with pale yellow-brown pigment. Clamp connections absent.

Habitat. — On soil in forests dominated by *Castanopsis*—*Lithocarpus*. — Papua New Guinea.

Material. — Papua New Guinea: Morobe district, Gurakor (between Lae and Bulolo); 4. V. 1972, leg. A. KAIRO (ZT 72/443, holotype).

The microscopical characters (structure of cuticle, shape and size of spores, and pseudocystidia) closely resemble those found in the New Zealand *Rh. dingleyi* Hk. (1979). The two species are readily distinguished by the shape of the pileus and the insertion of the lamellae.

### 3. Sabah (North Borneo)

#### 10. *Rhodocybe tergipes* CORNER & HORAK sp. n. — Fig. 9

Pileo —30 mm, reniformi vel conchato, plano-convexo, subochraceo, glabro. Lamellis decurrentibus, pallidis vel subochraceis. Stipite —40/—1.5 mm, cylindrico, excentrico vel laterali, albo, glabro. Odore farinaceo. Sporis 5—6.5/3.5—4.5  $\mu$ m, subgloboso-ovatis, rugulosis. Pseudocystidiis nullis. Hyphis defibulatis. Ad lignum putridum in silvis. Borneo. Typus RSNB 5675, ZT 78/68.

Pileus 15—30 mm diam., semicircular, reniform or conchate, plano-convex to subumbonate-expanded; whitish to pale ochraceous, opque, hygrophanous, margin striate when moist; smooth or indistinctly villous, dry, veil remnants absent. Lamellae decurrent, scarcely crowded (L 6—9, —5); white when young turning pale ochraceous-pink in mature specimens, edge concolorous, even. Stipe 10—40/1—1.5 mm, cylindric, eccentric or lateral, curved; white;

smooth, with villous tomentum and rhizoids at base, dry, solid, single in groups. Context soft, white. Odour farinaceous. Chemical reactions unknown.

Spores  $5-6.5/3.5-4.5\ \mu\text{m}$ , ovoid to subglobose, distinctly rugulose, hyaline to pale pink (KOH), membranes thin-walled. Basidia  $22-26/6-8\ \mu\text{m}$ , 4-spored. Pseudocystidia absent. Cuticle a cutis of repent cylindric hyphae ( $3-6\ \mu\text{m}$  diam.), encrusted with pale brown pigment, oleiferous hyphae lacking. Clamp connections absent.

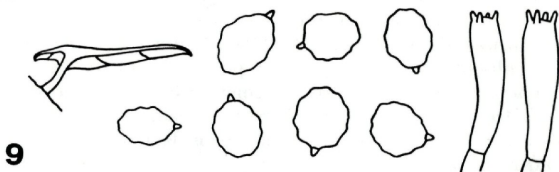


Fig. 9. *Rh. tergipes* CORNER & HORAK (type): carpophores, spores, basidia

Habitat. — On rotten wood in forests. — North Borneo.

Material. — Sabah: Mt. Kinabalu, Mesilau, 1700 m; 7. III. 1964, leg. CORNER (RSNB 5675, ZT 78/68, holotype).

Like *Rh. lateralipes* HK. (5) this species is also characterized by the eccentric to lateral stipe. Contrary to the Papua New Guinean fungus *Rh. tergipes* grows on rotten wood, carries no rhizomorphs at the base of the stipe, and the spores are distinctly rugulose.

#### 4. Indonesia—Java

##### 11. *Rhodocybe cyathiformis* CORNER & HORAK sp. n. — Fig. 10

Pileo — 30 mm, umbonato-infundibuliformi, marginem versus conspicue incurvato, pallide fusco. Lamellis arcuato-decurrentibus, pileo concoloribus. Stipite — 40/—6 mm, cylindrico, pileo concolori, sericeo, cavo. Olore nullo. Sporis  $5-6.5/3.5-4.5\ \mu\text{m}$ , subrugulosis. Pseudocystidiis nullis. Ad terram in silvis. Indonesia (Java). Typus J-30, ZT 78/69.

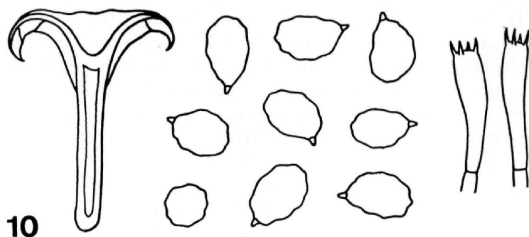


Fig. 10. *Rh. cyathiformis* CORNER & HORAK (type): carpophore, spores, basidia

Pileus —30 mm diam., convex with depressed or umbilicate centre, finally infundibuliform, margin strongly inrolled; pale fuscous or bistre, opaque, hygrophanous, margin estriate; smooth, not viscid, veil remnants absent. Lamellae arcuate to deeply decurrent, crowded, narrow; concolorous with pileus, with pink tint in mature carpophores, edge even, concolorous. Stipe 20—40/4—6 mm, cylindric, equal; concolorous with pileus, with white villous base from tomentum; smooth to minutely silky, hollow, dry, single in groups. Context pale brown, thin beneath cuticle, firm. Odour slight, fragrant.

Spores 5—6.5/3.5—4.5  $\mu$ m, ovoid, subrugulose, hyaline to pale pink, thin-walled. Basidia 20—25/4—5  $\mu$ m, 4-spored. Pseudocystidia absent. Cuticle a cutis of repent cylindric hyphae (3—6  $\mu$ m diam.), encrusted with pale brown pigment. Clamp connections absent.

Habitat. — On soil among ferns in forests. — Indonesia (Java).

Material. — Indonesia: Java, Bogor, Kebun Raya; 2. V. 1972, leg. CORNER (J-30, ZT 78/69, holotype).

The infundibuliform and strongly inrolled pileus, the long decurrent lamellae, the indistinctly rugulose spores and the absence of pseudocystidia renders *R. cyathiformis* easy to recognize.

## 5. Singapore

### 12. *Rhodocybe perstriata* CORNER & HORAK sp. n. — Fig. 11

Pileo —40 mm, plano-convexo dein concavo vel depresso, fuligineo, glabro. Lamellis adnato-decurrentibus, griseis dein roseo-ochraceis. Stipite —25/—3 mm, cylindrico vel attenuato basim versus, pileo concolori vel pallidiori, subfibrilloso. Olore ingrato. Sporis 6—8.5/5—5.5  $\mu$ m, rugulosis. Pseudocystidiis praesentibus. Hyphis defibulatis. Ad terram vel lignum putridum. Singapore. Typus ZT 78/70.

Pileus 10—40 mm diam., convex when young becoming soon planoconvex and finally depressed and shallowly umbilicate in the centre, margin conspicuously striate when young, upturned in mature specimens; dark fuliginous to sepia brown, drying pale ochraceous bistre, hygrophanous; smooth, dry, veil remnants absent. Lamellae adnate to subdecurrent, scarcely crowded (L 6—10, —7); pale grey turning ochraceous with pink tint, edge concolorous, even. Stipe 15—25/1—3 mm, cylindric or attenuated towards base, cartilaginous; fuliginous or pale brown, paler at the white pruinose apex, base with white rhizoids; dry, smooth to subfibrillose, hollow, single in groups. Context tough, brown. Odour like fish or cucumber.

Spores 6—8.5/5—5.5  $\mu$ m, ovate, conspicuously rugulose to almost gibbous, hyaline to pink (KOH), thin-walled. Basidia 20—26/6—7  $\mu$ m, 4-spored. Pseudocystidia 30—45/4—6  $\mu$ m, fusoid with long neck, scattered and inconspicuous on gill edge, hyaline, with granular oleaginous content. Cuticle a cutis of repent cylindric hyphae (2—5  $\mu$ m diam.), encrusted with pale brown (KOH) pigment. Clamp connections absent.

**Habitat.** — On soil or on rotting wood. — Singapore.

**Material.** — Singapore: Botanical Garden (Aroid rockery); 4. XII. 1940, leg. CORNER (ZT 78/70, holotype).

*Rh. perstriata* is remarkable for the strongly striate pileus, the tough consistency, the conspicuously rugulose to verrucose spores and the white rhizoids at the base of the stipe. Scattered rather inconspicuous pseudocystidia project among the basidia along the fertile edge of the lamellae.

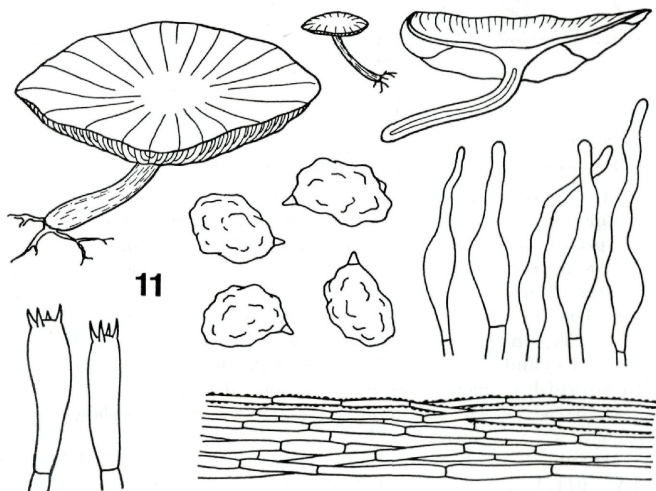


Fig. 11. *Rh. perstriata* CORNER & HORAK (type): carpophores, spores, basidia, pseudocystidia, cuticle

## 6. Sri Lanka (Ceylon)

### 13. *Rhodocybe subgilva* (BERK. & BR.) PEGLER 1977 — Fig. 12

Kew Bull. 32: 215.

Bas. *Agaricus subgilvus* BERK. & BR. 1871, Journ. Linn. Soc. Bot. 11: 538.

Syn. *Clitopilus subgilvus* (BERK. & BR.) SACC. 1887, Syll. Fung. 5: 702.

Illustrations. — PEGLER (1977: l. c.).

**Habitat.** — On the ground. — Sri Lanka (Ceylon).

**Material.** — Sri Lanka (Ceylon); 29. VI. 1968, No. 1184 (K, holotype).

The revision of the type material confirmed the observations made by PEGLER (1977: 215). For detailed description see there.

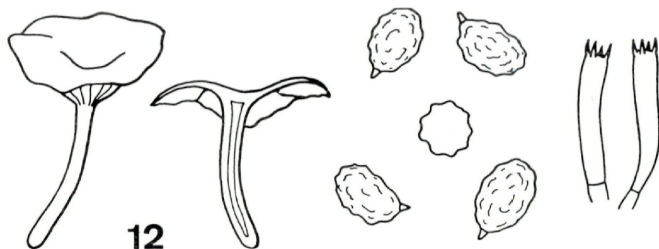


Fig. 12. *Rh. subgilva* (BERKELEY & BROOME) PEGLER (type): carpophores, spores, basidia

## 7. Switzerland

### 14. *Rhodocybe dubia* FAVRE 1960 — Fig. 13

Erg. wiss. Unters. schweiz. Nationalpark 42: 451.

Illustrations. — FAVRE (1960: l. c.).

For the macroscopic description consult FAVRE (1960: l. c.).

Spores 6.5–9/3.5–4.5  $\mu\text{m}$ , elliptical,  $\pm$  hyaline, minutely rugulose or minutely verrucose-spiny, rough, inamyloid. Basidia 25–30/6–7  $\mu\text{m}$ , 4-spored. Pseudocystidia scattered, projecting among basidia on or near edge of lamellae, terminal portion conic, occasionally constricted, with pale brown plasmatic pigment. Cuticle a cutis of cylindric, short-celled hyphae (2–6  $\mu\text{m}$  diam.), encrusted with brownish pigment. Clamp connections absent.

Habitat. — On soil under *Alnus viridis* or in grassland (up to 1900 m a. s. l.). — Switzerland.

Material. — Switzerland: Kt. Grisons, Scharl, Val Tavrü; 2. IX. 1944, leg. FAVRE (CHUR 498 d, holotype).

This grey-brown species with depressed or umbilicate pileus (20–30 mm diam.) is characterized by the elliptical rough spores and

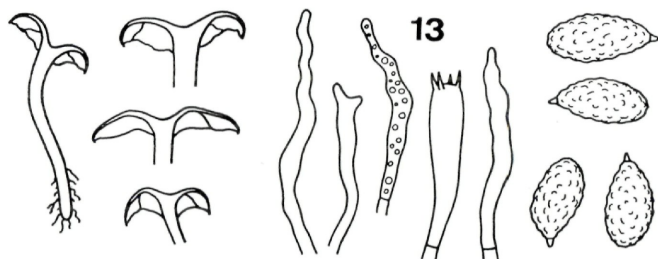


Fig. 13. *Rh. dubia* FAVRE (type): carpophores, spores, basidium, pseudocystidia

the inconspicuous pseudocystidia. The ornamentation of the spores can be seen only under oil immersion, and as the name says FAVRE hesitated for a while to transfer this fungus to *Rhodocybe*.

15. *Rhodocybe cuprea* (FAVRE) comb. nov. — Fig. 14

Bas. *Collybia cuprea* FAVRE 1960, Erg. wiss. Unters. schweiz. Nationalpark 42: 401.

Illustrations. — FAVRE (1960: l. c.).

For macroscopic description compare FAVRE (1960: 401).

Spores 6.5–8/4–5  $\mu\text{m}$ , ovoid to elliptical, rugulose or verrucose, especially towards the apical end,  $\pm$  hyaline, inamyloid. Basidia

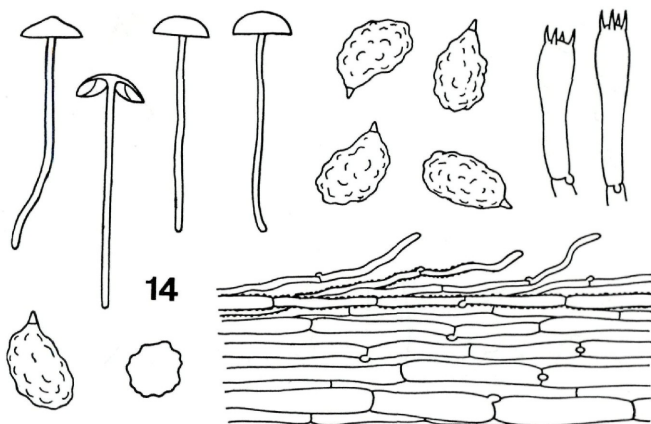


Fig. 14. *Rh. cuprea* (FAVRE) HORAK (type): carpophores, spores, basidia, cuticle

22–34/6–7  $\mu\text{m}$ , 4-spored. Pseudocystidia absent. Cuticle a cutis of cylindric hyphae (2–10  $\mu\text{m}$  diam.), encrusted with pale brown pigment. Clamp connections present.

Habitat. — On soil under *Alnus viridis* (type) or on swampy soil in mixed forest, from lowlands to subalpine region, — 1900 m a. s. l. — Switzerland.

Material. — Switzerland: Kt. Grisons, Scarl, Val Sesvenna; 9. IX. 1944, leg. FAVRE (CHUR 373, holotype).

The revision of the type material of *Collybia cuprea* FAVRE revealed that this fungus belongs to *Rhodocybe*. If mounted in KOH the verrucose surface of the spores is very difficult to make out and we assume therefore that this character escaped FAVRE's attentive observation.

Additionally this small fungus is remarkable for the lack of pseudocystidia and the presence of clamp connections. The new combination to *Rhodocybe* is proposed.

16. *Rhodocybe obtusatula* HORAK sp. n. — Fig. 15

Pileo — 8 mm, conico-convexo vel campanulato, argillaceo, glabro. Lamellis adnato-decurrentibus, albido-argillaceis roseis tinctu. Stipite — 30/— 1.5 mm, cylindrico, pileo concolori, at apicem pruinoso. Odore ingrato. Sporis 7.5—10/4.5—5.5  $\mu$ m, conspicue rugulosis. Pseudocystidiis — 90/— 8  $\mu$ m, subfusioideoclavatis, pigmento luteo impletis. Hyphis defibulatis. Ad terram in silvis. Helvetia. Typus ZT 66/84.

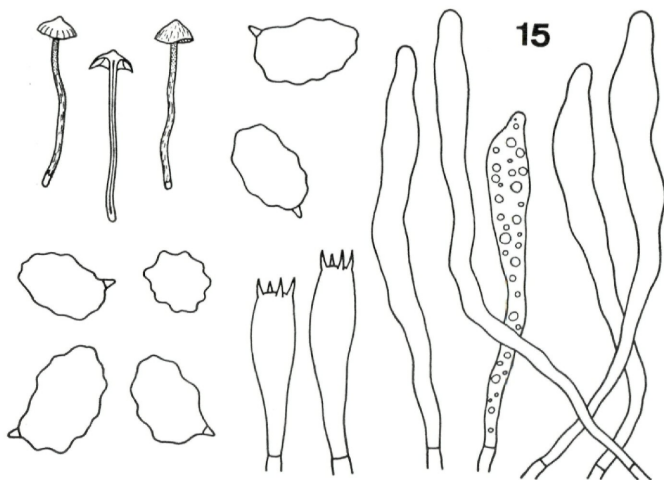


Fig. 15. *Rh. obtusatula* HORAK (type): carpophores, spores, basidia, pseudo-cystidia

Pileo 5—8 mm diam., conico-convex when young becoming campanulate or umbonate-convex, margin estriate, incurved; argillaceous to pale brown, hygrophanous; smooth, dry, veil remnants absent. Lamellae broadly adnate to subdecurrent, arcuate, crowded (L 10—16, —3); pallid to pale argillaceous with distinct pink tint, edge concolorous, even. Stipe 15—30/1—1.5 mm, cylindric, equal; dark brown at apex, paler towards base; innately fibrillose, pruinose upwards, dry, fistulose, single in groups. Context pale brown. Odour and taste unpleasant, farinaceous or like rotten fish. Chemical reactions unknown.

Spores 7.5–10/4.5–5.5  $\mu\text{m}$ , ellipsoid, distinctly rugulose, hyaline, membranes thin-walled often collapsed. Basidia 24–35/6–8  $\mu\text{m}$ , 4-spored. Pseudocystidia 50–90/5–8  $\mu\text{m}$ , slender fusoid to subclavate, thin-walled, with grey-yellow (KOH) granular coarse content, numerous, connected to oleiferous hyphae in subcutis. Cuticle a cutis of cylindric, repent hyphae (5–12  $\mu\text{m}$  diam.), encrusted with brown pigment. Clamp connections absent.

Habitat. — On soil in forest (under *Fraxinus*, *Tilia* and *Sambucus*). — Switzerland.

Material. — Switzerland: Kt. Bern, Guttannen, Innere Urweid; 21. VII. 1966, leg. HORÁK (ZT 66/84, holotype).

Among the three small (pileus less 10 mm diam.) European species of *Rhodocybe* (compare Nr. 17 and 18), *Rh. obtusatula* has not only the largest spores but also the most conspicuous pseudocystidia. As in *Rh. melleopallens* ORTON clamp connections are found on the septae of hyphae.

## 8. England

17. *Rhodocybe melleopallens* ORTON 1960 — Fig. 1, G

Trans. Brit. myc. Soc. 43: 380.

Illustrations. — ORTON (1960: l. c.).

For detailed description consult ORTON (1960: l. c.).

Habitat. — On soil under *Fagus* and *Taxus*. — England.

Material. — England: Surrey, Mickleham, Norberry Park;

13. X. 1958, leg. ORTON 1710 (K, holotype).

*Rh. melleopallens* is a very distinctive species which is easily recognized by the small size of the carpophores, the broadly adnate lamellae, the small spores (5–6/3–3.5  $\mu\text{m}$ ), the lacking pseudocystidia and the presence of clamp connections on the encrusted hyphae of the cuticle.

18. *Rhodocybe griseospora* (PEARSON) ORTON 1960 — Fig. 1, B

Trans. Brit. Myc. Soc. 43: 181.

Bas. *Collybia griseospora* PEARSON 1952: Trans. Brit. Myc. Soc. 35: 102.

Illustrations. — PEARSON (1952: l. c.).

Habitat. — On the ground in mixed wood. — England.

Material. — England; North Wales, Bangor, Vaynol Park;

11. IX. 1950, leg. PEARSON (K, holotype).

With one exception our observations made on the type material agree in all details with the original diagnosis. Despite efforts the reported pseudocystidia (cylindric, 60/3  $\mu\text{m}$ ) were not recovered. The spores measure about 6–8/3–4  $\mu\text{m}$ , elliptic, rough to rugulose. Cuticle a cutis of cylindric hyphae (2–10  $\mu\text{m}$  diam.), encrusted with brownish pigment. Clamp connections absent.

## 9. Norway

### 19. *Rhodocybe nauseodulcis* HORAK sp. n. — Fig. 16

Pileo — 55 mm, plano dein depresso-umbilicato, pallide brunneo vel argillaceo, tomentoso-subzonato, sicco. Lamellis decurrentibus, densis, argillaceo-griseis. Stipite — 50/—4 mm, cylindrico, pileo concolori vel pallidiori, subfibrilloso. Caro pallide griseo-brunnea, intense nauseodulci. Sporis 5.5—8  $\mu$ m, globosis, verrucis conicis — 2  $\mu$ m altis instructis, subhyalinis. Ad truncos vetustos Matteuciaae struthiopteridis. Norvegia. Typus ZT 76/70.

Pileus 15—55 mm diam., subumbonate or plane when young, soon depressed to umbilicate, margin inrolled at first becoming straight and undulated, often corrugated; argillaceous to pale brown;

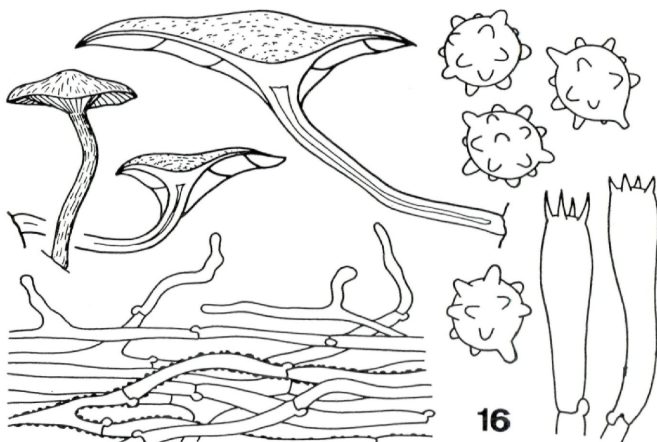


Fig. 16. *Rh. nauseodulcis* HORAK (type): carpophores, spores, basidia, cuticle

fibrillose, margin not ciliate, zonate around centre, occasionally guttate, dry, estriate. Lamellae arcuate to decurrent, crowded; pale brown with distinct grey tint; gill edge concolorous, even. Stipe 25—50/2—4 mm, cylindric, often curved towards base; concolorous with pileus; minutely fibrillose, at times with white basal web, becoming fistulose, dry, single in groups. Context pale grey-brown. Odour and taste unpleasant, mixture of sweet and stinky components, also reminiscent of burnt horn. Chemical reactions on pileus: KOH — negative.

Sporis 5.5—8  $\mu$ m, globose, with conspicuous conical or hemispherical warts or projections (up to 2  $\mu$ m high), subhyaline, thin-walled, inamyloid. Basidia 30—40/7—9  $\mu$ m, 4-spored, occasionally

with thick-walled membrane. Cystidia absent. Cuticle a cutis of subregular cylindric hyphae (2–10  $\mu\text{m}$  diam.), with encrusting brownish pigment, oleiferous hyphae absent. Clamp connections numerous.

Habitat. — On rotting stumps of *Matteucia struthiopteris* Tod. (fern). — Norway (type), Austria.

Material. — Norway: N of Mo i Rana, Ramanga, Ravna, 8. IX. 1976, leg. HORAK (ZT 76/70, holotype; isotype in 0). — Austria: Kärnten, Alnetum N of Ferlach, 6. X. 1978, leg. HORAK (ZT 78/267).

Macroscopically this peculiar species (compare fig. 16). reminds of *Ripartites*. However, the nodose spores exclude a relationship to that genus. To our opinion *Rh. nauseodulcis* represents a rather atypical taxon of *Rhodocybe*. Morphologically the spores resemble those of *Hygrophorus nodulisporus* DENNIS (1953b) (= *Hygroaster nodulisporus* (DENNIS) SINGER 1955) from Trinidad. Unfortunately the fragmentary condition of the type collection (HORAK 1968: 286) does not allow a thorough examination so that the question whether or not *Hygroaster* could be considered a synonym of *Rhodocybe* remains open.

## 10. Greenland

### 20. *Rhodocybe cancrinella* (M. LANGE) comb. nov. — Fig. 17

Bas. *Rhodophyllus cancrinellus* M. LANGE 1957: Medd. om Grønland 148: 43 (Macromycetes. III).

Illustrations. — LANGE (1957: l. c.).

For macroscopic description see LANGE (1957: 43).

Habitat. — On needles of *Juniperus*. — Greenland.

Material. — Greenland: West Greenland, Nordlandet, Ivigtut; 27. IX. 1946, leg. M. LANGE, 652 (C, holotype).

The original description is based upon 1 record. After examining the type material there is a strong indication that this fungus represents a member of *Rhodocybe* rather than *Entoloma*. The microscopic data are as follows: spores 5.5–7/4.5–6  $\mu\text{m}$ , subglobose to

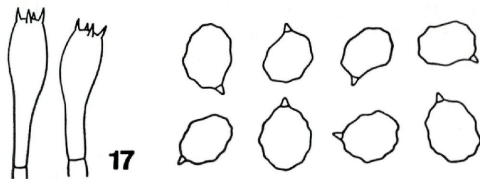


Fig. 17. *Rh. cancrinella* (M. LANGE) HORAK (type): spores, basidia

ovoid, subangular or rugulose in profile, membrane thin-walled and often collapsed, hyaline, inamyloid. Basidia 25–33/7–9  $\mu\text{m}$ , 4-spored (basidia with 2 sterigma not observed). Pseudocystidia absent. Cuticle a cutis of cylindric hyphae (2–7  $\mu\text{m}$  diam.), encrusted with pale brown pigment. Clamp connections absent. Based upon these data the new combination to *Rhodocybe* is proposed.

## 11. Venezuela and Trinidad

### 21. *Rhodocybe caelatoidea* DENNIS — 1961 Fig. 18

Kew Bull. 15: 154.

Illustrations. — DENNIS (1961: l. c.; 1970: tab. 15,8.).

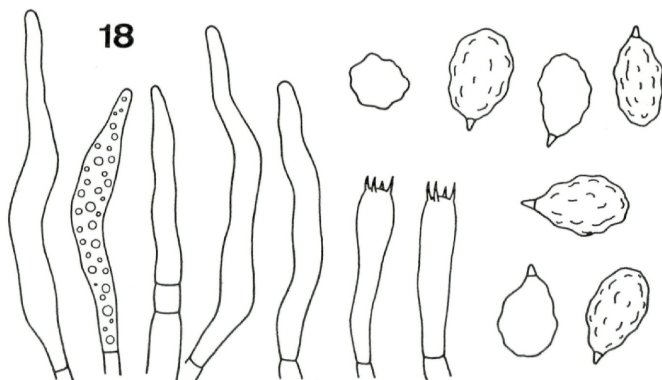


Fig. 18. *Rh. caelatoidea* DENNIS (type): spores, basidia, pseudocystidia

For macroscopic description see DENNIS (1961: l. c.).

Spores 6–7/4–5  $\mu\text{m}$ , ovoid to elliptical, rugulose,  $\pm$  hyaline, inamyloid. Basidia 22–30/4–7  $\mu\text{m}$ , 4-spored. Pseudocystidia 35–60/4–7  $\mu\text{m}$ , cylindric to subfusoid, with yellow-brown (KOH) plasmatic pigment, membrane thin-walled. Cuticle a cutis of interwoven cylindric hyphae (2–5  $\mu\text{m}$  diam.), encrusted with brownish pigment. Clamp connections absent.

Habitat. — On bare soil and among debris under trees. — Venezuela.

Material. — Venezuela: Caracas, Botanic Garden, 900 m; 30. VI. 1958, leg. DENNIS 1125 A (K, holotype).

This fungus represents a typical member of *Rhodocybe* and there is no reason to transfer *Rh. caelatoidea* to *Entoloma* or *Eccilia* respectively (DENNIS 1970: 80).

22. *Rhodocybe porcelanica* (DENNIS) HORAK 1978 — Fig. 1, E

Sydowia 30: 108.

Bas. *Eccilia porcelanica* DENNIS 1961: Kew Bull. 15: 145.

Illustrations. — DENNIS (1961: l. c.).

For macroscopic description see DENNIS (1961: l. c.).

Spores 6—6.5/4.5—5.5  $\mu$ m, subglobose, subangular to indistinctly rugulose, hyaline, membrane thin-walled, inamyloid. Basidia 28—30/6—7  $\mu$ m, 4-spored. Pseudocystidia absent. Cuticle a cutis of densely packed cylindric hyphae (2—8  $\mu$ m diam.), encrusted with brown pigment. Clamp connections absent.

Habitat. — On mossy soil under tress. — Venezuela.

Material. — Venezuela: Sierra de Santo Domingo, Mérida, Laguna Negra, 3440 m; 27. VII. 1958, leg. DENNIS & BUZA, 1733 (K, holotype).

The peculiar structure of the cuticle (compare drawing in DENNIS 1961!) is indicative that this Venezuelan fungus belongs to *Rhodocybe*. The examination of the type collection supported our suspicion and therefore the new combination is proposed.

23. *Rhodocybe pseudonitellina* DENNIS 1953a — Fig. 1, A

Bull. Soc. Myc. Fr. 69: 156.

Habitat. — On soil in forest. — Trinidad.

Material. — Trinidad: Arena forest; 30. X. 1949, leg. DENNIS 254 (K, holotype).

Based upon the results of our re-examination of the type material the taxonomic position of this fungus is confirmed. The small subglobose spores are rugulose and measure about 4—5/3.5—4.5  $\mu$ m. Pseudocystidia absent. Cuticle a cutis of shortcelled cylindric hyphae (2—8  $\mu$ m diam.) encrusted with brownish pigment. Clamp connections none.

24. *Rhodocybe testacea* DENNIS 1961 — Fig. 1, C.

Key Bull. 15: 155.

Illustrations. — DENNIS (1961: l. c.; 1970: tab. 15,9.).

Habitat. — On bare soil of a bank, in broad-leaved forests. — Venezuela.

Material. — Venezuela: Caracas, Botanic Garden, 900 m; 11. VII. 1958, leg. DENNIS 1612 (K, holotype).

From the microscopic point of view *Rh. testacea* recalls *Rh. pseudonitellina* DENNIS (Nr. 23) described from Trinidad. According to the characters observed this species belongs to sect. Decurrentes SINGER (1975: 671).

## Excluded species

*Rhodocybe munduliformis* (DENNIS) DENNIS 1970

Kew Bull., Add. Ser. III: 80.

Bas. *Rhodopaxillus munduliformis* DENNIS 1952, Kew Bull., 489.

Material. — Trinidad: Nr. 165; 11. X. 1949, leg. DENNIS (K, holotype).

To our opinion the type material of this fungus represents neither a species of *Rhodocybe* nor *Rhodopaxillus*. The ovoid spores bear cylindrical or verrucose projections and therefore may indicate a relationship towards *Ripartites*.

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