PERSOONIA
Published by the Rijksherbarium, Leiden
Volume 4, Part 4, pp. 355-377 (1967)

SOME AGARICALES FROM THE CONGO

R. SINGER
Facultad de Ciencias Exactas, Universidad de Buenos Aires
Carrera del Investigador, CNICT, Buenos Aires

& K. GRINLING
World Health Organization, Brazzaville

(With 44 Text-figures)

Clitocybe cystidiosa, *Neoclitocybe membranacea*, *N. lifotama*, *Hydropus xanthosarx*, *Xerocomus microsporus*, *Pulveroboletus paspali* and the genus *Hiatulopsis* are described as new; the new combinations *Clitocybe subtilis* (Berk.) Sing. & Grinl., *Hydropus funebris* (Speg.) Sing., *Hiatulopsis amara* (Beeli) Sing. & Grinl. are proposed. A key to the species of *Neoclitocybe* and another to the sections *Mycenoides* and *Irrorati* of *Hydropus* are given. *Chaetocalathus niduliformis*, *Gyrodon intermedius*, *Xerocomus alliaceus*, and *Boletellus obscurecoccineus* are redescribed. *Hiatulopsis* forms axially symmetric spores on autobasidia.

The following descriptions of new species and redescriptions of known species from the Congo region are mainly based on collections made by one of us (Grinling) in the vicinity of Brazzaville, République du Congo; a few are added from collections made by Belgian botanists and sent for determination since they were mixed in with the *Marasmius* material monographed by Singer (*1964a*, *1965*); they are from the "Bas-Congo" and the "District Forestier Central" of the ex-Belgian Congo, respectively.

Many collections from the Congo have been studied and published under various names by a number of mycologists; yet, the mycoflora of the combined Congo region is by no means exhausted and some of the descriptions available in the literature are either incomplete as far as the modern requirements of descriptive agaricology are concerned, or they are, because of the limited material available until now, not fully representative of the complete range or variability exhibited by each species.

We have therefore considered it useful to describe every specimen in detail.

In one case we have been forced to recognize a new genus of Agaricaceae, *Hiatulopsis*; in other cases (two boletes, four agarics) we believe our collections to represent species new to science. For *Neoclitocybe* we have considered it useful to add a key to the known species since no such key, even on a regional basis, has been published before. We have also added a key to all the species known in sections *Mycenoides* and *Irrorati* of the genus *Hydropus*. Both these sections as well as the genus *Neoclitocybe* are new to tropical Africa.

Persoonia, Vol. 4, Part 3 was issued 22 December, 1966.

As for *Hiatulopsis*, we are particularly surprised by the hitherto—as far as we are aware—undescribed type of spore attachment to the sterigma which differs from the classical type of half-sickle-shaped sterigma and asymmetric spore. It is at present too early to conclude that this new type of spore attachment is restricted to the genus *Hiatulopsis*.

The specimens are conserved at the Cryptogamic Herbarium of the Facultad de Ciencias Exactas y Naturales of the Universidad Nacional de Buenos Aires (BAFC) and in the private herbarium of K. Grinling.

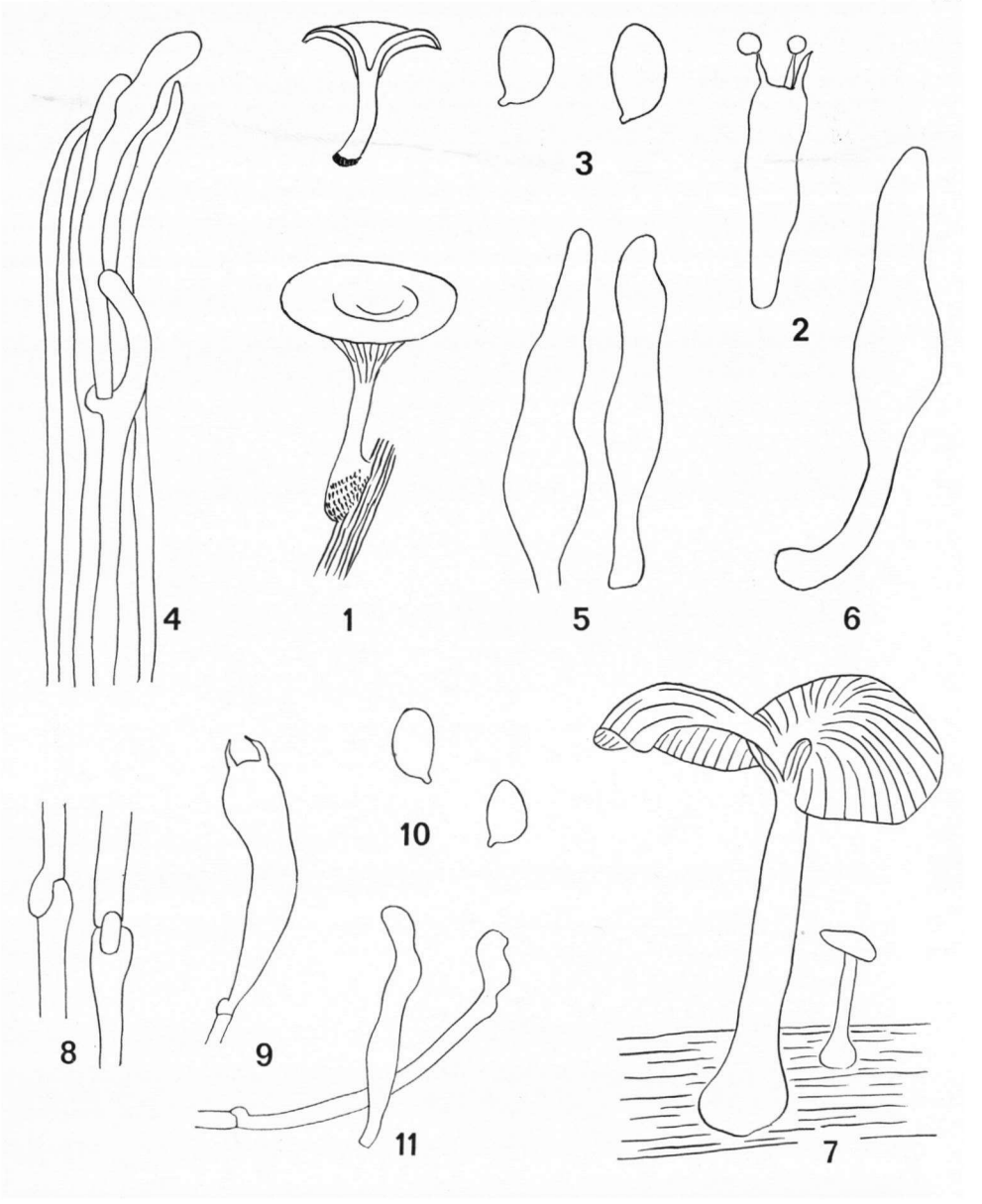
TRICHOLOMATACEAE

Clitocybe cystidiosa Sing., *spec. nov.*—Figs. 1–6

Pileo sordide cremeo-subargillaceo vel ochraceo-brunneo, centro atro-brunneo, concentrice rivuloso, praesertim in centro, margine primum involuto, ciliato, paullum striatulo, convexo, centro depresso et plerumque profunde infundibuliformi, 16–40 mm lato; lamellis clare cremeis acie integris, polydymis, sat confertis, decurrentibus; sporis in massa albis, s.m. 5–7 × 3.3–4 μ, ellipsoideis, levibus, hyalinis, inamyloideis; cystidiis opalescentibus sed haud metuloideis, haud metachromaticis in caeruleo cresylico nec pseudoamyloideis, 50–60 × 8–12 μ; hyphis inamyloideis fibulatis; hymenophore tramate irregulari, ex hyphis filamentosis sed interdum multiseptatis formato ex hymenopodio subregulari a subhymenio separato, haud gelatinisato; stipite ± concolori cum pileo, glabro, solido, albomycelioso ad basin 15–25 × 2.5–6 mm; carne tenui mollique in pileo, tenaci in stipite; sapore inamoeno dein amaro. — Ad culmos emortuos adustos graminum, Congo, Brazzaville, 'route de Lifoula', novembri 1965, *Grinling 51,110* (BAFC), typus.

Pileus dirty cream with an argillaceous tinge, varying to ocher brown, with deep brown center where the surface is concentrically rivulose, with at first involute margin which is finely ciliate-fimbriate, indistinctly striatulate over one quarter of the radius, convex, with depressed then deeply infundibuliform center in most caps, 16–40 mm broad. — Lamellae rather light cream, with entire edge, narrow, rather close, decurrent. Spore print white. — Stipe more or less concolorous with the pileus, strongly beset with sand particles, apparently glabrous, slightly thickened towards the base, solid, 15–25 × 2.5–6 mm, veil none; basal mycelium white, fibrillose. — Context thin and soft fleshy in the pileus, tough in the stipe; somewhat unpleasant grassy taste, later bitter.

Spores 5–7 × 3.3–4 μ, ellipsoid, smooth, hyaline, inamyloid. — Hymenium with basidioles, basidia and cystidia, the basidia 22.5–29 × 5–6 μ, clavate, hyaline, tetrasporous, with basal clamp, contents as well as that of the spores deep blue granulated in many cells when seen in cresyl blue mounts; cystidia deep rooted but not continuing into differentiated hyphae, on edges and sides of lamellae, 50–60 × 8–12 μ, rarely smaller, opalescent, thin-walled but the inner surface of the wall indefinitely delimited when seen in KOH, but appearing thin-walled when seen in cresyl blue mounts where the whole interior is clear and uniform, ventricose to fusoid or subampullaceous with rounded tip which may be somewhat mucronate or constricted-subcapitate, not pseudoamyloid; cheilocystidia not differentiated. — Hyphae with clamp connections (and some non-clamped secondary septa), inamyloid; hymenophoral trama consisting of mostly filamentous hyphae which are strongly interwoven and make the trama almost irregular, some elements of the hyphal chains very short and almost isodiametric (e.g. 9 × 5 μ), especially in the hymenopodium which is less interwoven, not gelatinized; context of pileus



Figs. 1–6. *Clitocybe cystidiosa.* — 1. Carpophores (× 1). — 2. Basidium (× 1000). — Spores (× 2000). — 4. Erect hyphae of the epicutis (× 1000). — 5. Cheilocystidia (× 1000). — 6. Pleurocystidium (× 1000).

Figs. 7–11. *Neoclitocybe membranacea.* — 7. Carpophores (× 1). — 8. Hyphae of the epicutis (× 1000). — 9. Basidium (× 1000). — 10. Spores (× 1400). — 11. Cheilocystidia (× 1000).

consisting of filamentous hyphae which are, although interwoven more radially arranged. — Covering layer: Epicuticular layer consisting of erect hyphae rising from a cutis and sometimes many such hyphae (e.g. 45–55 × 3.3 μ) combined into a peg-like formation; the lower layer a cutis of filamentous hyphae 3.5–4 μ thick, the erect hyphae with acute or rounded tips; pigment brownish (KOH), dissolved in the cell sap; without incrustations, with smooth, hyaline wall.

On dead culms of Gramineae which were in part burned over. Congo, Brazzaville, savannah on the 'route de Lifoula', November 1965, *Grinling 51,110.*

This is a very puzzling species which obviously belongs in the neighborhood of the neotropical *Pleurotus subtilis* (Berk.) Sing. on one hand and the acystidiate *Clitocybe aprilis* Sing. on the other. *Clitocybe kabulensis* Sing. also appears to be close. Under these circumstances it follows that *Pleurotus subtilis* has been misplaced by Singer (*1961*: 136) who was misled by the more elongate spores of that species. Since all the affinities of this species are with *Clitocybe* we have no other choice but to transfer *Pleurotus subtilis* to *Clitocybe* as **Clitocybe subtilis** (Berk.) Sing. & Grinl., *comb. nov.* [basionym, *Lentinus subtilis* Berk. *in* J. Linn. Soc. (Bot.) **15**: 50. 1876].

All these species belong in or near section *Aberrantissimae* Sing.

Neoclitocybe membranacea Sing. & Grinl., *sp. nov.*—Figs 7–11

Pileo isabellino-griseo, uniformiter colorato sed lilacino-tincto, pellucido, striato usque ad centrum, margine ± lobato-crenulato et frequenter fisso, glabro, convexo, profunde infundibuliformi et perforato, usque ad 80 mm lato. — Lamellis pileo concoloribus, distantibus, interdum furcatis, angustissimis (1.5 mm), acie obtusiusculis, decurrentibus. — Stipite pileo concolori, glabro- sericello, fistuloso, subaequali sed bulbo subgloboso basali praedito, usque ad 40 × 6 mm; velo nullo; mycelio basali e disco radiato-fibrilloso albo angustissimo consistente, qui substrato applicatus permanet. — Contexto membranaceo-tenaci, in stipite tenaci-fibrilloso, latice destituto, in pileo tenuissimo; odore iucundo fructuum; sapore haud notabili. — Sporis in massa albis subcremaceis. — Sporis (6–)6.5–7.5 × 3.5–4.5 μ, hyalinis, levibus, tenui-tunicatis, ellipsoideis, inamyloideis. — Hymenio: Basidiis 28–35 × 6.2–7 μ, clavatis, hyalinis, tetrasporis. Cystidiis nullis, sed cheilocystidiis numerosis et differentiatis, ut membra terminalia hypharum tramalium nec non ad marginem zonae sterilis marginalis hymenium versus et ita hymenium basidiorum delimitantibus 22–31 × 3–6 μ, versiformibus, frequenter flexuoso-constrictis et in parte centrali vel inferiore inflatis, interdum excrescentiis brevibus munitis, frequenter hyphiformibus vel clavatis, tenui-tunicatis, hyalinis; acie lamellarum meteromorpha. — Hyphis inamyloideis, fibulatis; tramate hymenophorali hyphis axialiter dispositis sed fortiter intertextis, hyalinis efformato, haud gelatinoso; strato supralamellari ex hyphis radiatim dispositis subparallelis, tenuibus, sed densiore quam trama carnis suprajacentis quod stratum pro ratione tenue inter epicutem et stratum supralamellare format et laxius est quam epicutis et stratum supralamellare, ex hyphis pro parte latioribus magisque variabilibus (3–7 μ diam.), hyalinis, subparallelis, haud manifeste gelatinisantibus efformato, parietibus hypharum tenuibus. — Epicute pilei ex hyphis tenuibus (1–1.5 μ), interdum levibus, interdum leniter distanterque obtuse-diverticulatus (diverticulis subglobosis vel brevissime hyphosis), cutem formantibus, externis interdum pigmento pallide brunneolo incrustante granulari sparso ornatis, ceterum hyalinis. — Ad lignum putridum gregatim. Congo, Brazzaville, Februario 1966, *Grinling 60,209* (BAFC), typus.

Pileus uniformly isabelline grey tinged with lilac, transparent striate to the center, lobed and crenated at the margin, frequently split, glabrous, convex, deeply infundibuliform and perforated, up to 80 mm broad. — Lamellae concolorous,

distant, occasionally forked, narrow (1.5 mm), with rather obtuse edge, decurrent. Spore print white or slightly cream. — Stipe concolorous, glabrous, subsericeous, fistulate, subequal but swollen at the base, up to 40 × 6 mm, without veil; basal mycelium forming a white fibrous disc narrowly surrounding the point of attachment to the substratum. — Context tough, membranous, tough-fibrillose in stipe, without latex, very thin in pileus, smell somewhat fruitlike, taste negligible.

Spores (6–)6.5–7.5 × 3.5–4.5 μ, hyaline, smooth, thin-walled, ellipsoid, inamyloid. — Hymenium: Basidia 28–35 × 6.2–7 μ, clavate, hyaline, 4-spored. Cystidia none; but cheilocystidia numerous and differentiated as end members of the tramal hyphae and likewise at the borderline between the hymenium and the sterile edge zone and thus forming a row where the basidia end, 22–31 × 3–5 μ, versiform, frequently flexuous-constricted, in the central or lower part often inflated, often with very small, short excrescences, often also hyphoid or clavate, thin-walled, hyaline; edge of lamellae heteromorphous. — Hyphae inamyloid, clamped; hymenophoral trama of axially arranged hyphae which are strongly interwoven and hyaline, non-gelatinous; supralamellar layer of radially arranged hyphae which are subparallel with each other and thin, but are denser than those of the pileus trama which forms a relatively thin layer between the supralamellar layer and the cuticular layer, being differentiated from both by its less densely arranged hyphal elements, by the partly broader and more variable (3–7 μ diam.) hyphae, which are hyaline, subparallel with each other, not distinctly gelatinized; hyphal walls in trama thin. — Epicutis of thin (1–1.5 μ diam.) hyphae, sometimes smooth, sometimes slightly and distantly diverticulate with obtuse, subglobose to short-hyphous appendages, the outermost sometimes with pale brownish granular pigment incrusted which is sparse, otherwise all elements hyaline in KOH and NH_4OH; structure of epicutis—a cutis.

On rotten wood, gregarious. Congo, Brazzaville, hollow filled with primitive forest at the Djoumouna stream below the Linzolo road, February 1966, *Grinling 60,209*.

This species has somewhat the appearance of *Gerronema*, *Trogia*, or certain species of *Micromphale* but its anatomical structure is that of *Neoclitocybe*, a predominantly tropical genus. We have described this particular species as new because it does not agree with any described material published previously; nevertheless, we have some doubts as regards the specific and generic identity of *Cantharellus membranaceus* Seynes and *Trogia violaceogrisea* (Henn.) Pat. and *T. discopus* (Pat.) Pat. We do not know whether type material of *C. membranaceus* and *T. violaceogrisea* still exists. At any rate our Brazzaville material does not combine the anatomical characters of either *Cantharellus* or *Trogia*. This and the following species prove that *Neoclitocybe* is not a genus restricted to the Neotropics alone.

Neoclitocybe lifotama Sing., *spec. nov.*

Pileo albido, margine substriato, leniter subsulculato, glabro, convexo, leniter umbilicato, 11–24 mm lato. — Lamellis albis, moderatim latiusculis, confertis, vel subconfertis, in maturis intervenosis anastomosibus basalibus, interdum furcatis, adnato-decurrentibus. — Stipite albido, sordide griseolo ad basin quae in discum vel bulbum dilatatum est, subtomentoso ad basin, glabro vel subglabro supra basin, (10–)30 × 0.5–1.5 mm; velo nullo; mycelio basali e fibris radiantibus consistente, bulbum vel discum efformante. — Sporis 7.7–9 × 3.7–5 μ, hyalinis, levibus, inamyloideis, ellipsoideis. — Hymenio: Basidiis 23–24 × 8–8.5 μ, hyalinis, clavatis, tetrasporis. Cystidiis nullis visis; cheilocystidiis nodoso-ramuloso-

irregularibus. — Hyphis inamyloideis fibulatis. Epicute typi Ramealium, irregulariter fortiterque coralloideo-diverticulata. — Ad ramulos ligneos Dicotyledonum nec non ad folia dejecta arborum Dicotyledonum in silva inundabili, dense gregatim. Congo: Eala, Septembri 1923, *Goossens-Fontana 292* (BR), typus.

Pileus whitish with somewhat striate margin which is also slightly sulcate, glabrous, convex, slightly umbilicate, 11–24 mm broad. — Lamellae white, moderately broad, close or subclose, with low anastomoses, sometimes forked, adnate-decurrent. — Stipe whitish, sordid-grayish at base which is broadened into a disc or bulb, subtomentose at base, glabrous or subglabrous above, (10–)30 × 0.5–1.5 mm; veil none; basal mycelium consisting of radiant fibrils which form the bulb or disc.

Spores 7.7–9 × 3.7–5 μ, hyaline, smooth, ellipsoid, inamyloid. — Hymenium: Basidia 23–24 × 8–8.5 μ, hyaline, clavate, 4-spored. Cystidia none seen; cheilocystidia nodose-ramulose-irregular. — Hyphae inamyloid with clamp connections. — Epicutis of the Rameales type, hyphae irregularly and strongly coralloid-diverticulate.

On woody twigs of Dicotyledones and also on fallen leaves of trees in the low inundable tropical forest, densely gregarious. Congo, Central Forest district, Eala, September 1923, *Goossens-Fontana 292*.

This species is closely related to *Micromphale euomphalum* (Berk.) Sing. which, according to the conclusions which its affinity with the Congo material suggests, apparently should be transferred to *Neoclitocybe*. The spore print is said to be white. There is a colored picture at Brussels, with the type. This fungus is known under the vernacular name "lifotama", hence the specific epithet.

KEY TO THE KNOWN SPECIES OF NEOCLITOCYBE

1. Spores larger than 6 μ long.
   2. Sterigmata very large; spores very broad (5.5–9.3 μ). . . . . *N. latispora* Sing. ined.
   2. Sterigmata normal; spores less broad.
      3. Pileus white, whitish, cinereous-whitish.
         4. Spores 7.7–9 × 3.7–5 μ. African species . . . . . *N. lifotama* Sing.
         4. Spores slightly smaller. Tropical and subtropical American species.
            5. Cystidia none; spores rather short: 6–7.5(–10) × 4.2–5.7(–6.8) μ.
               6. Stipe eccentric, 4–6 × 0.5–1 mm. Pileus whitish to pale buff-yellow. *N. tropicalis* (Speg.) Sing.
               6. Stipe central, larger; pileus white and over 20 mm broad. *N. nivea* (Rick) Sing.
            5. Cystidia and/or hyphae breaking through the hymenium more or less differentiated; stipe mostly central; spores 6–7.5 × 3–4.5 μ.
               7. Lamellae subclose; base of stipe generally more or less socle-like with very fine radiating fibrils forming a basal mycelium. Amazonas. *N. euomphala* (Berk.) Sing.
               7. Lamellae distant; base of stipe with a white, fibrillose mycelial disc. Northern part of Neotropics. . . . . *N. substenophylla* (Murrill) Sing.
   3. Pileus not white nor whitish to grayish white.
      8. Pileus, stipe and lamellae with a lilac tinge when fresh. African species with narrow lamellae . . . . . *N. membranacea* Sing. & Grinl.
      8. Pileus, stipe and lamellae without a lilac tinge. American species, with rather broad to broad lamellae (with rather narrow to narrow lamellae, see "11" below).

9_1. Mostly on the ground in South Brazil and subtropical Argentina. Pileus generally more than 20 mm broad; lamellae white to melleous, stramineous; spores strikingly variable; base of stipe at first white and white myceloid.
N. subnimbata (Rick) Sing.

9_2. On sticks, trunks and living cortex of dictyledonous trees (often *Phoebe porphyria*) in the mountains of northwestern Argentina; pileus generally not more than 20 mm broad; lamellae white to dirty gray; stipe pigmented below and with very scanty basal mycelium; spores 7.5–9.6 × 4–4.8 μ.
N. omphalina (Sing.) Sing.

9_3. On wood, 20 or more mm broad; lamellae yellow or grayish (see "11" below).

1. Spores generally not larger than 6 μ long.

10. Pileus white to cinnamon; spores up to 3.3 μ broad.

11. Pileus convex, not umbilicate; spores 2.2–3 × 1.6–2 μ. Southern Chile.
N. microspora Sing. ined.

11. Pileus at least at maturity infundibuliform; spores somewhat larger: 4.2–6.2 × 2–3.3 μ. . . . . *N. byssiseda* (Bres.) Sing.

10. Pileus fresh not white to cinnamon in moist condition, or spores broader.

12. Spores relatively large: 5–7.5 × 3.5–4.2 μ; lamellae yellow; on wood in southern Brazil. . . . . *N. irregularis* (Rick) Sing.

12. Spores smaller or lamellae not yellow.

13. Pileus larger (up to 72 mm broad), blue-black; pigment of epicutis dark green in KOH or NH_4OH, amethyst in HCl, incrusting. Amazonas.
N. portentosa Sing.

13. Pigment either incrusting and rusty to chestnut brown in KOH and NH_4OH, or scanty to intracellular, or nil in epicutis.

14. Stipe generally eccentric; pileus cream-isabelline-whitish; small. Brazil.
N. sublateralis Sing.

14. Stipe generally central; pileus some other color.

15. Pileus umber-bister; spores 4.8–6.2 × 2.8–3.6 μ. On fallen and rotting leaves, ferns, etc. . . . . *N. nauseosa* (Rick) Sing.

15. Pileus "kis Kilim" to "burnt umber" (M & P) from a strong incrusting pigment; spores somewhat larger. On dead wood.
N. myceliosa Sing.

CHAETOCALATHUS NIDULIFORMIS (Murrill) Sing.

A specimen of this species, originally described from Bermuda, has been found among the *Marasmius* material from the Congo. The pilei were 1–5 mm broad, the lamellae subclose to medium close, the cystidia distributed fairly far up towards the lamellae-ground and predominantly pseudo-amyloid and thick-walled, the hairs of the pileus 2.5–5 μ in diameter with 0.7–1.7 μ thick wall. In this as in all other regards they agree satisfactorily well with the description given by Singer (*1942*: 521) from the type material. We mention the Congo material here because it is another example of a Central American–West African disjunctive area such as had previously been observed in *Marasmius conicopileatus* Henn. and *Crinipellis pseudostipitaria* subsp. *occidentalis* var. *mesites* Sing.

Congo, Bas-Congo, Kisanga, Kwango vicariate, April 11, 1910, *H. Vanderyst* (BR).

Hydropus xanthosarx Sing. & Grinl., *spec. nov.*—Figs. 12–17

Pileo stramineo-griseo nitido, glabro, subrugoso, longitudinaliter supralamellariter plicatulo, convexo, umbilicato, in umbilico acute papillato, 30 mm lato. — Lamellis aurantiacis ut in *Hygrophoropside aurantiaca*, distantibus, 16 lamellis percurrentibus, tridymis, subangustis (usque ad 3 mm latis), decurrentibus, venis perangustis intervenosis. — Stipite aurantio-brunneo, minus vivide quam lamellae colorato, flocculis albis in zona apicali ornato, ceterum glabro, levi, polito, fistuloso, cylindraceo, 40 × 3 mm, haud insiticio. — Contexto submembranaceo sed succoso (succo aurantiaco), aurantiaco, parte interna stipitis albida; odore nullo; sapore dulcidulo. — Sporis in massa tenui albis. — Sporis 7–9.5 × 3.5–4.8 μ. ellipsoideis vel cylindraceo-ellipsoideis, rarius suboblongis, levibus, hyalinis, inamyloideis. — Hymenio e basidiis, basidiolis, cystidiis, cheilocystidiis formato; basidiis 31–47 × 5.5–8(–9) μ, tetrasporis; cheilocystidiis 25–36 × 6.5–13 μ, clavatis, saepe longe pedicellatis, tenuitunicatis, hyalinis; cystidiis ad latera lamellarum cheilocystidiis simillimis, sparsis. — Hyphis tramatis hyalinis, inamyloideis, ita ut basi basidiorum fibulatis, haud gelatinisatis; hyphis laticiferis numerosis, flavis, 3.5–4.5 μ diam.; tramate hymenophorali regulari, ex hyphis ± intertextis efformato. — Strato corticali ex epicute hypodermioque consistente; epicute pallide fuscidula, ex hyphis levibus subparallelis, jacentibus, cutem efformantibus consistente et ex eis dermatocystidia 6–38 × 5.5–12 μ, integra vel usque ad 4 diverticula apicalia producentia, prostrata vel ascendentia, sparsa ecrescentia, hyphis 2.5–4 μ diam.; hypodermio pallide fuscidulo, simili sed hyphis latis (15–19 μ diam.) efforanto. — Ad truncum arboris in silva marginali fluminis. Congo, Brazzaville, Fl. Djoué, Martio 1965, *Grinling 50,313* (BAFC), typus.

Pileus greyish straw color, shining, glabrous, slightly rough, radially ridged along the lamellae, convex, umbilicate with small pointed papilla, 30 mm broad. — Lamellae bright orange as in *Hygrophoropsis aurantiaca*, narrow (< 3 mm), distant (16 lamellae reaching the stipe), of three lengths, interlamellar spaces with irregular, very small veins on the underside of the pileus, which in part run parallel with the lamellae. — Stipe brownish orange, duller than the lamellae, with white floccules on upper part, elsewhere glabrous, smooth, polished, fistulate, cylindrical, 40 × 3 mm, not insititious. — Context submembranous yet succulent (orange sap), white in upper part of stipe, odor none, taste sweetish. — Spores appearing white in very thin print.

Spores 7–9.5 × 3.5–4.8 μ, ellipsoid or cylindrical-ellipsoid, more rarely almost oblong, smooth, hyaline, inamyloid, — Hymenium: Basidia 31–47 × 5.5–8(–9) μ, 4-spored. Cheilocystidia 25–36 × 6.5–13 μ, clavate, often long-pedicellate, thin-walled, hyaline. Cystidia similar, sparsely scattered. — Hyphae in trama hyaline, inamyloid, clamped (as is the base of the basidia), not gelatinized; numerous laticiferous hyphae present, these yellow, 3.5–4.5 μ broad; hymenophoral trama regular, of more or less interwoven hyphae. — Cortical layer of pileus with a pale fuscous epicutis, consisting of smooth hyphae which are 2.5–4 μ broad, almost parallel with each other, repent, forming a cutis and from these dermatocystidia rising; dermatocystidia 6–38 × 5.5–12 μ, entire or with up to four apical diverticulate appendages, prostrate or ascendant, scattered, sparse; hyphodermium pale fuscous, similar to the epicutis, but of broader (15–19 μ) hyphae.

On tree trunk in marginal forest. Congo, Brazzaville, Djoué river, right bank, 1200 meters below dam, March 1965, *Grinling 50,313*, type, *50,328* (herb. Grinling), paratypus.

Collection 50,328 from the same station was similar but two fruit-bodies were thinner and showed a yellow (Séguy 215–227) surface of the pileus and stipe. A third collection which was otherwise like the type collection (50,313) showed

a very dirty yellow vestiment which becomes dissociated showing between radial fibrils the orange colored flesh and thus giving a general color value near Séguy 174 tinged with Séguy 134. The orange latex is contained in the laticiferous hyphae. The pigment of fresh material in the cortical layer of the pileus appeared incrusting on the narrow hyphae but the dried material, mounted in KOH showed no incrusting pigment.

Hydropus xanthosarx seems to fade from orange to yellow whereby the cuticle proper develops a progressively more dirty yellow color. This is the first species known in this genus that has orange or yellow pigments. It belongs in section *Mycenoides* Sing.

The species of this section, characterized by an epicuticular structure as indicated above and by inamyloid spores can be determined by the following key.

KEY TO THE SPECIES OF HYDROPUS SECT. MYCENOIDES SING.

1. Cystidia thin-walled or very scattered or absent.
   2. European species with deep sepia pileus and long cheilocystidia [48–62 × 6–7(–9.5) μ, apex to 48 μ long and 3.4–4 μ broad, obtuse], evidently adventitious in greenhouse in The Netherlands . . . . . *Hydropus* spec. ined.
   2. American or African species with differentiated pleurocystidia or cystidioles (in the former case—broader than indicated above for the cheilocystidia), or without pleurocystidia.
      3. Spores 6 or more μ long, ellipsoid or short ellipsoid; pleurocystidia present.
         4. On dead *Lycopodium* or on the earth in subxerophytic vegetation; stipe white, tapering downwards; pileus grey, umbilicate. Northwestern Argentina. *H. xerophilus* Sing. ined.
      4. In moister forest, mostly on trunks or chips of scattered wood; not combining the characters indicated above.
         5. Pileus and stipe with orange or yellow tinges, or at least lamellae orange. Congo . . . . . *H. xanthosarx* Sing. & Grinl.
         5. Pileus, stipe and lamellae some other color, generally gray-black or deep gray or fuliginous in the cuticle of the pileus.
            6. Tropical species; cystidia numerous or, if scarce, cheilocystidia with thin appendage absent; never on needles of conifers; lamellae narrow to medium broad.
               7. Lamellae intervenose and sordid gray when dried. On wood in Panamá. *H. panamensis* (Sing.) Sing.
               7. Lamellae not intervenose, white when dried; cystidia with oily contents and very long (up to 125 μ). On wood in Belem, Pará. *H. paraensis* Sing. ined.
            6. Subtropical-montane and south-temperate species without pleurocystidia or, if pleurocystidia are present, with basidiomorphic or long-appendiculate cheilocystidia; on wood or on needles.
               8. On wood of *Aristotelia* on Juan Fernandez; pileus 5–7 mm, gray black or deep gray; stipe concolorous; cheilocystidia long-appendiculate, at least some of them; habit mycenoid . . . . . *H. aristoteliae* Sing.
               8. On other woods or conifer needles; pileus larger; habit omphalioid clitocyboid; cheilocystidia not long-appendiculate.
                  9. On wood in marginal forest; pileus finely blackish fibrillose on paler ground; lamellae white; stipe concolorous with pileus; spores 7·5–9·5 × 4·5–5·5 μ . . . . . *H. platensis* Sing. ined.

9. On needles of *Podocarpus* in the montane zone; pileus gray fading to white; lamellae and stipe white; spores 5.5–7 × 2.8–4.2 μ broad. *Marasmius podocarpi* Sing.[1]

3. Spores in their majority less than 6 μ long when mature. Pileus brown or ochraceous.

10. Clamp connections present; pleurocystidia present; among mosses (Polytrichaceae and others on rocky ground) in South Chile . . . . *H. pyxidatoides* Sing. ined.

10. Clamp connections absent; pleurocystidia absent or very inconspicuous; in tropical rain forest in Brazil . . . . . *Marasmius depauperatus* Sing. ined.

1. Cystidia thick-walled, metuloid.

11. Lateral stratum of hymenophoral trama very loosely arranged; spores 4–6.2 × 3–4 μ; cystidia pseudoamyloid (sect. *Irrorati* Sing.) . . . *H. irrorata* (Pat. apud Duss) Sing.

11. Not combining the above characters.

12. Lamellae white (but interlamellar spaces often concolorous with the pileus); spores up to 8.2 × 5 μ. Tropical species.

13. Epicutis consisting of a hymeniform layer of vesiculose cells interrupted by rather scattered dermatocystidia with more or less thickened wall and up to 330 μ long . . . . . *H. marasmioides* Sing. ined.

13. Epicutis with broad ascendant hyphae which do not form a continuous hymeniform layer; occasional dermatocystidia not thick-walled and relatively short . . . . . *H. mycenoides* (Dennis) Sing.

12. Lamellae partly or entirely gray; spores 6.5–10.2 × 5.5–9.5 μ. South-temperate species . . . . . *H. funebris* (Speg.) Sing.[2]

AGARICACEAE

Hiatulopsis Sing. & Grinl., *gen. nov.*

Genus novum familiae Agaricacearum; pileo squamoso pectinato epicute ex hyphis densis jacentibus subintertextis sed cutem efformantibus pigmento membranali praeditis consistente; lamellis remotis, lamellulis angustatis; cystidiis nullis; basidiis tetrasporis, sterigmatibus vix curvatis, sporis globosis vel subglobosis, symmetricis, inamyloideis, membrana firma complexa ornamentatione immersa praeditis sed extus levibus, poro germinativo destitutis; hyphis inamyloideis, fibulatis, haud gelatinisatis, in tramate hymenophorali subregulari hyphis haud divergentibus, plus minusve intertextis; ad quisquilias ligneas et truncos putridos in silva tropicali. — Species typica: *Lepiota amara* Beeli.

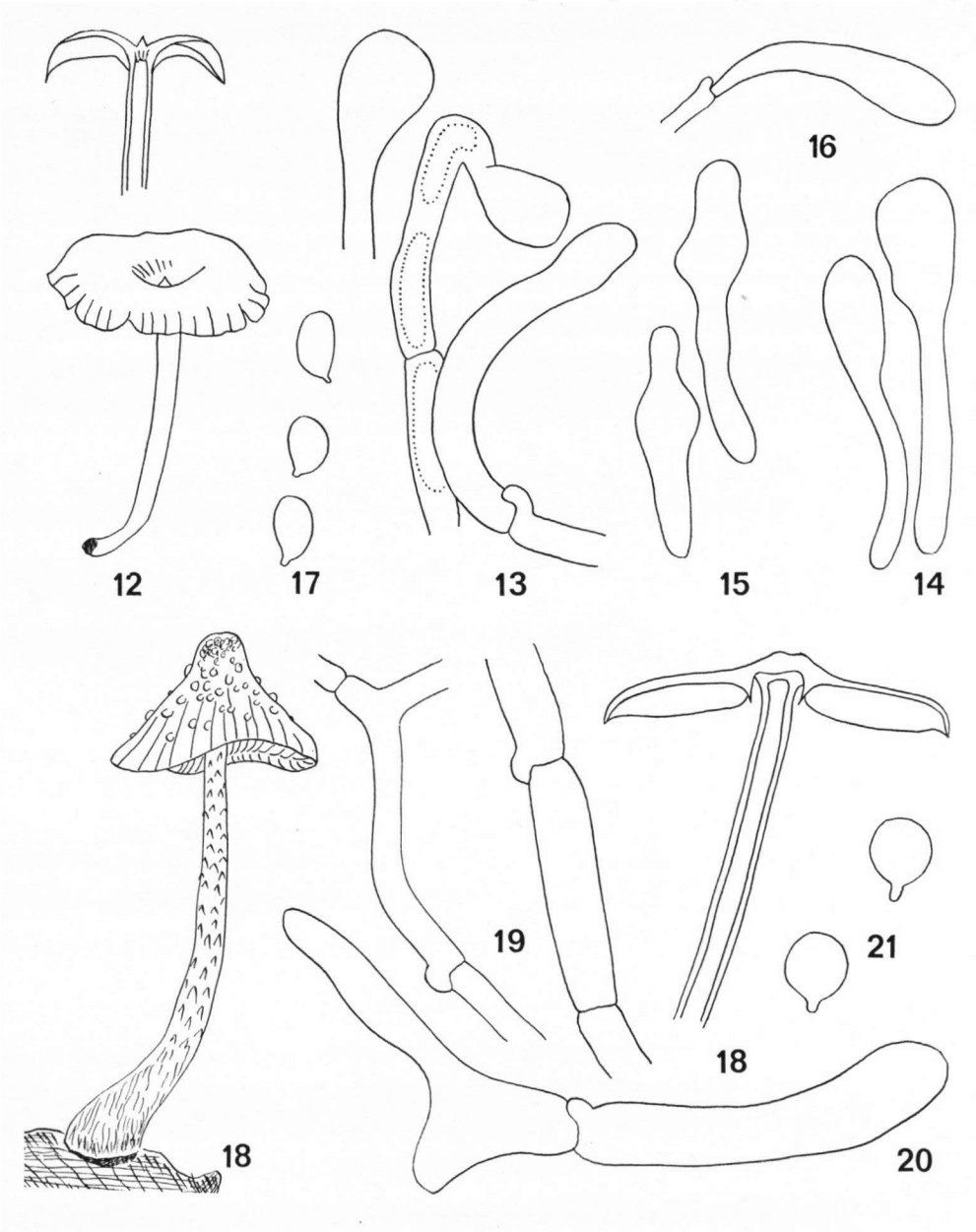
Hiatulopsis amara (Beeli) Sing. & Grinl., *comb.* nov.—Figs. 18–23

Lepiota amara Beeli *in* Flore iconogr. Champ. Congo Fasc. 2: 42 *pl. 8, fig. 9.* 1936.

Pileus with large brownish detersile scales on whitish ground, especially in the center, or when older with smaller verrucose scales and fine fibrils which are brown and numerous in the center, more scattered towards the margin, eventually distinctly yellowing, strongly radially pectinate in the manner of *Leucocoprinus* up to half or three quarters of the radius, conic to convex, eventually more flattened, with a distinct but obtuse umbo, 35–55 mm broad. — Lamellae whitish, later pale

[1] The separation line between *Hydropus* sect. *Mycenoides* and *Marasmius* sect. *Alliati* is now subject to revision. *Marasmius podocarpi* as well as *M. depauperatus* (see below) are somewhat intermediate. For the time being we insert in *Hydropus* only species with either fleshy or latex bearing stipes and in *Marasmius* species with tough, reviving stipes.

[2] **Hydropus funebris** (Speg.) Sing., *comb. nov.* (basionym, *Agaricus funebris* Speg. *in* Boln Acad. nac. Ci. Córdoba **11**: 9. 1887).



Figs. 12–17. *Hydropus xanthosarx*. — 12. Carpophores (× 1). — 13. Pilocystidia (× 1000). — 14. Cheilocystidia (× 1000). — 15. Pleurocystidia (× 1000). — 16. Caulocystidium (× 1000). — 17. Spores (× 1100).

Figs. 18–21. *Hiatulopsis amara*. — 18. Carpophore (× 1). — 19. Elements of the scales of the pileus (× 1000). — 20. Element of the trama (× 1000). — 21. Spores (× 2000).

sordid cream color with a slight pinkish tinge, rather narrow (3–4 mm broad when mature), polydymous, subclose to close, with narrowed lamellulae, adnate to a collar at first adhering to the stipe then becoming remote, ascendant, later horizontal. Spore print white. — Stipe entirely covered by fine more or less fibrillose scales which are at first grayish or brownish gray, and in young carpophores often accompanied, towards the base by broader scales like those of the pileus, this covering becoming brownish, hollow to fistulose, tapering upwards (apex ± 3 mm across), 60–70 × 4–5 mm; veil restricted to the general scaly covering, no annulus ever formed nor even an annular zone; the frequently swollen base with abundant whitish basal mycelium. — Context thin, white and cottony in the umbo region, unchanging, fragile especially in the pileus; odor none or faint, pleasant; taste not noticeable.

Spores 4–5(–6.2) × 3.7–4.5(–4.8) μ, symmetric or occasionally subsymmetrical in continuation of a spiculum which is bent outwards with regard to the sterigma and becomes the hilar appendage, globose to subglobose, hyaline, the wall firm and consisting of a thin, often poorly developed endosporium, which is often metachromatically colorable (pink) in cresyl blue mounts, an episporium which is ornamented by faint (sometimes absent) very thin, rodlike or sheetlike ornamentations which perforate the exosporium (but in young spores exo- and episporium poorly differentiated from each other), leaving the circumference of the spore generally smooth, only exceptionally very slightly projecting and then lifting the perisporium (otherwise not demonstrable) which is extremely thin, neither of the strata either pseudoamyloid or amyloid. — Hymenium: Basidioles narrowly clavate to cylindric-subfilamentose; basidia 25–30 × 5–8 μ, tetrasporous, hyaline, with four almost or quite straight sterigmata which are apical and bend over outwards to form a spiculum which bears the spore. Cheilocystidia and pleurocystidia none. — Hyphae nowhere gelatinized, hyaline excepting the covering layers, with clamp connections, inamyloid; subhymenium subcellular, hyaline; hymenopodium rather easily demonstrable, of somewhat thinner subparallel hyphae which run towards the edge, the hymenophoral trama proper not showing any differentiation into mediostratum and lateral stratum, subregular but hyphae rather strongly interwoven, all hyaline and not gelatinized. — Cortical layers: Epicutis of pileus consisting of a rather dense cutis of elongated hyphae (only occasionally a short, small, generally apical element) which may be somewhat ascendant according to the position of the scales, hyphal elements with a brown membranal pigment and clamp connections; no epicutis differentiated in the ground tissue between the scales and fibrils; stipe covering with a similar structure.

On rotten wood and forest litter containing leaves and woody particles. In hollow containing remnants of primitive forest. Congo: Brazzaville, Djoumouna stream below Linzolo road, April 1966, *Grinling 60,420* (herb. Grinling and BACF), *60,409* (id.).

This species is extremely interesting, because, although obviously belonging in the Agaricaceae, it shows a number of very peculiar character combinations. As for its taxonomic position, it does not agree with any of the established genera in the group. While genera with inamyloid spores are known, these are not round and ornamented and, in the genera known, not correlated with the type of epicuticular structure described for *H. amara* above. While the particular ornamentation type (XI of the scale of Singer) exists in Agaricaceae, the respective genera showing it, are quite removed from *Hiatulopsis* by (a) a different epicuticular structure and (b) a better development of the annular veil. *Melanophyllum* which has a

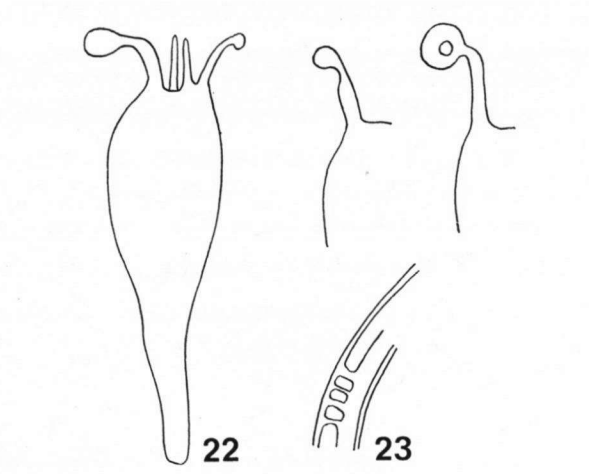


Fig. 22, 23. *Hiatulopsis amara.* — 22. Sporogenesis on the basidia (× 1500). — 23. Spore wall (× 10.000).

similar structure of the spore wall differs aside from that in colored spore print and less remote lamellae and the characteristic coprinoid pectination of the pileus is wanting. *Smithiomyces*, perhaps the most closely related genus among those known until now, does not show any degree of this pectination either, is devoid of pigmented scales and has a well developed partial veil. The roughness of the episporium, if present at all in *Smithiomyces*, is still fainter and the remnants of a general veil are thin-membranous, not squamulose. It is also remarkable that the habitat of our species is not on earth as usual in Agaricaceae but on rotten wood.

The same habitat and generally the same important characters are indicated for a species described by Beeli (*1936*: 42 *pl. 8 fig. 9*) under the name *Lepiota amara* Beeli. We identify our species with this latter in spite of the fact that *L. amara* is said to have an acrid odor and bitter taste and a squamulose not persistent annulus, inasmuch as Heinemann told one of us that the odor and taste indications by Madame Goossens-Fontana are frequently much exaggerated.

Another observation is of more general interest. It has been postulated in the past that the spores of Agaricales have asymmetrical spores which seemed to be an essential part of their capacity to be thrown off the sterigma which should be curved with the convex side at the outside. Although *Hiatulopsis*, when mature, throws a thick spore print, the discharge apparatus is different. Thus, we have here undoubtedly an autobasidium and not, in spite of the symmetry of the spores and the shape of the sterigmata, an apobasidium. The eccentric position of the spore is achieved by a spiculum which forms when the spore has reached a certain size and is directed outwards. Consequently, since the axis of the spore is not directed in the same direction as the axis of the sterigma, the spore is not typically orthotropic but the hilar appendage is consistently inserted at the proximal end of the spore

and the long axis of this latter so that, seen after discharge, the spores differ in nothing from a typical Gasteromycete spore. It is to be desired that detailed observations on other species of Agaricaceae, in the future, might show whether this new type of autobasidium is restricted to *Hiatulopsis*.

BOLETACEAE

GYRODON INTERMEDIUS (Pat.) Sing.—Figs. 24–28

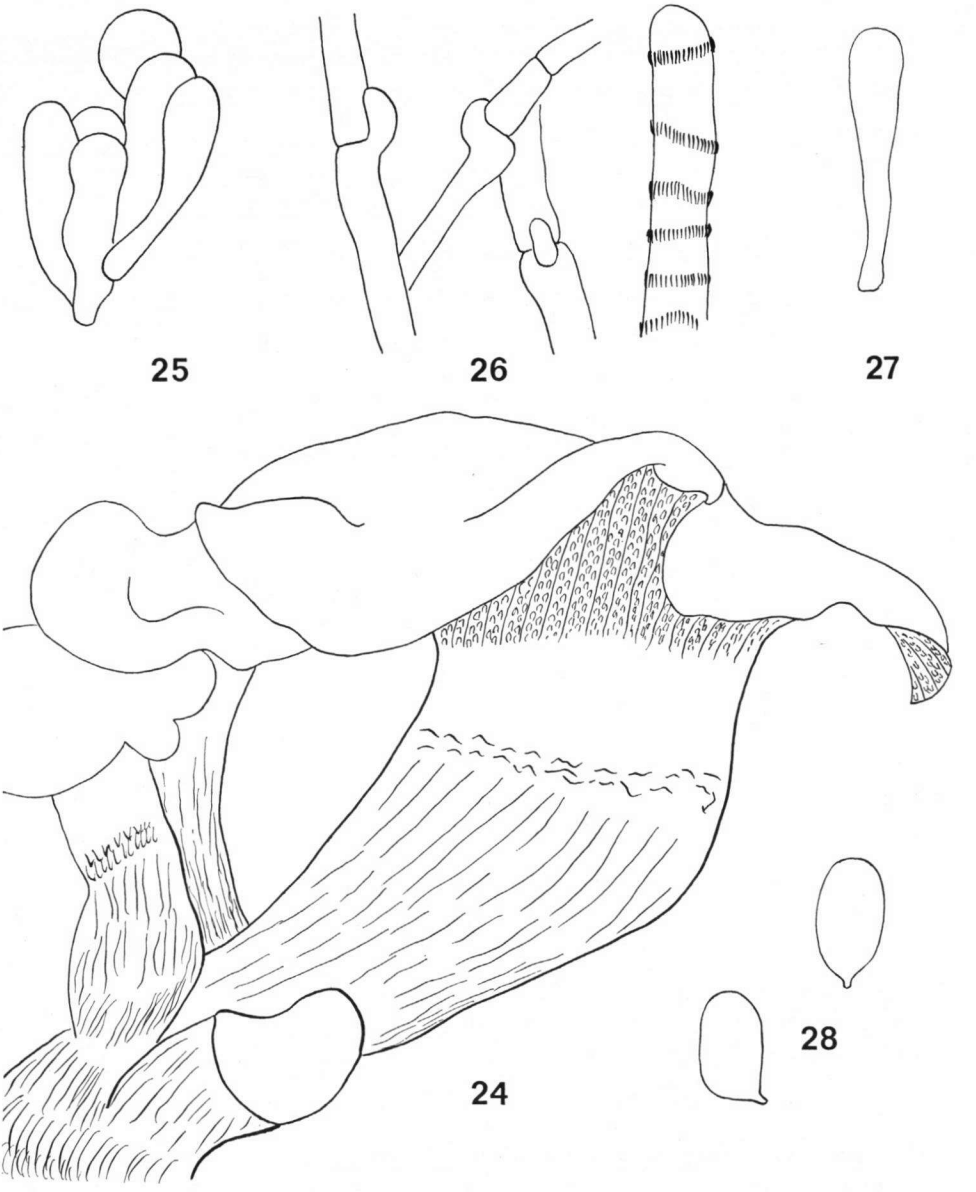
Phylloporus intermedius Pat. *in* Bull. Soc. mycol. Fr. **11**: 86. 1895. — *Gyrodon intermedius* (Pat.) Sing. *in* Revue Mycol. **3**: 172. 1938.

Pileus beautifully russet brown ("russet" Ridgway, or ground color Séguy 342 tinged with 174, whereby a color between Séguy 202 and 192 results), covered, generally, by a silvery lustre or by small appressed squamules in the center which are somewhat darker than the ground color, otherwise glabrous, with non-separable cuticle, with the margin somewhat involute and wavy, convex becoming applanate, 50–170 mm broad. Lower surface of pileus at times not covered by tubes, but merely by a narrow zone of reticulated hymenial surface at the margin. — Hymenophore at first strongly boletinoid with sublamellar, often forked radial walls and continuing on the apex of the stipe as a reticulum, decurrent; tubes relatively short (4–8 mm long), at first clearly arcuate; pores radially elongated, large, irregular and compound by irregular anastomoses, dirty yellow to bright yellow (Séguy 226, Ridgway "lemon chrome") like the tubes but sometimes becoming pink along a zone 5—15 mm wide around the stipe, bluing when bruised. Spore print rather dark olive brown to sordid olive gray. — Stipe reddish or paler than the rest of the stipe surface in a zone bordering the hymenophore at the apex, with blackish or blackening base, otherwise concolorous with the pileus and fibrillose or subfibrillose, solid to stuffed-hollow, cylindric but short or difform and sometimes compressed-flattened, 50–80 × 14–30 mm; sometimes conglobated at the base with neighboring carpophores; veil none. — Context pallid, then cream, bluing when bruised, then yellowing after a few minutes of exposure, soft in the pileus, very firm in the stipe; odor strong, disagreeable to weak, at the same time spirituous and raphanaceous; taste not remarkable.

Spores (6–)6.5–9(–9.3) × (3.5–)4–5.3(–5.5) μ, mostly around 6.8–8 × 4.2–5 μ, ovoid to ellipsoid or short cylindric, melleous to brownish, smooth. — Hymenium: Basidia 14–28 × 6.7–8 μ, 4-spored. Pleurocystidia rare and scattered, about 19 × 9 μ or like the cheilocystidia; cheilocystidia 9.2–33 × 2.4–9 μ, versiform, generally varying between cylindrical, small and lobed to medium sized ampullaceous or ampullaceous-subcapitate to ventricose or ventricose-subvesiculose, mixed in with basidioles and basidia (pores not heteromorphous), hyaline, sometimes with a secondary (clampless) septum or two, the nodose-lobed cells merely slightly differentiated hyphal ends protruding on the pore edges. — Hyphae inamyloid, with clamp connections (base of cystidia and basidia also clamped), some clamps of the medallion type; hymenophoral trama hyaline, bilateral of the *Boletus*-type, slightly gelatinized, hyphae of the lateral stratum 5.5–7.5 μ in diameter. — Cortical layers: Epicutis of pileus—a trichodermium which is ochraceous yellow and consists of interwoven hyphae, the terminal members often subclavate and hyaline and hyaline-incrusted cells forming bunches of semi-erect to plastered down cells.

Chemical characters: surfaces with NH_4OH dark greenish blue.

On the ground in secondary or partly cleared forest, once found in a big cespitose group, fruiting in October-November. Congo, Brazzaville, Mikatu, *Grinling 41,105, 51,004*. Also Liberia, Firestone no. 3, July 25, 1926, *Linder* (FH).



Figs. 24–28. *Gyrodon intermedius*. — 24. Carpophore of conglobate specimen (× 1). — 25. Cheilocystidia (× 1000). — 26. Elements of the epicutis (× 1000). — 27. Pleurocystidium (× 1000). — 28. Spores (× 2000).

This may be an example of cicatrizer mycorrhiza in tropical Africa; *Saepium cornetum* was present at every station where this fungus has been collected by Grinling but root anatomy has not been studied. There were no conifers or Fagales present at these stations.

As for the identity of this fungus we believe it to be conspecific or at least strictly affined with *G. intermedius* from Madagascar. The West African race differs from the type specimen studied by Singer in slightly smaller, especially slightly narrower spores (in *G. intermedius* they are 7.8–9.2 × 5–6.8 μ, mostly 8.5–9 × 5.3–5.7 μ). The bluing is not indicated by Patouillard who had not seen this species in living condition. The hymenophore is perhaps even more strongly boletinoid than in Liberia and the Congo, and the carpophores are not conglobated and somewhat smaller than described. All together, for the time being, these differences do not warrant the description of a new species for our material and we have to wait for more observations on the fresh material in Madagascar in order to decide on the validity and constancy of the aberrant characters in the Madagascarian form. If it were not for the large cystidia described by Heinemann for his *Gyrodon cupreus*, we would consider this latter species a synonym of ours. These large cystidia would be entirely aberrant and uncharacteristic for the genus *Gyrodon*.

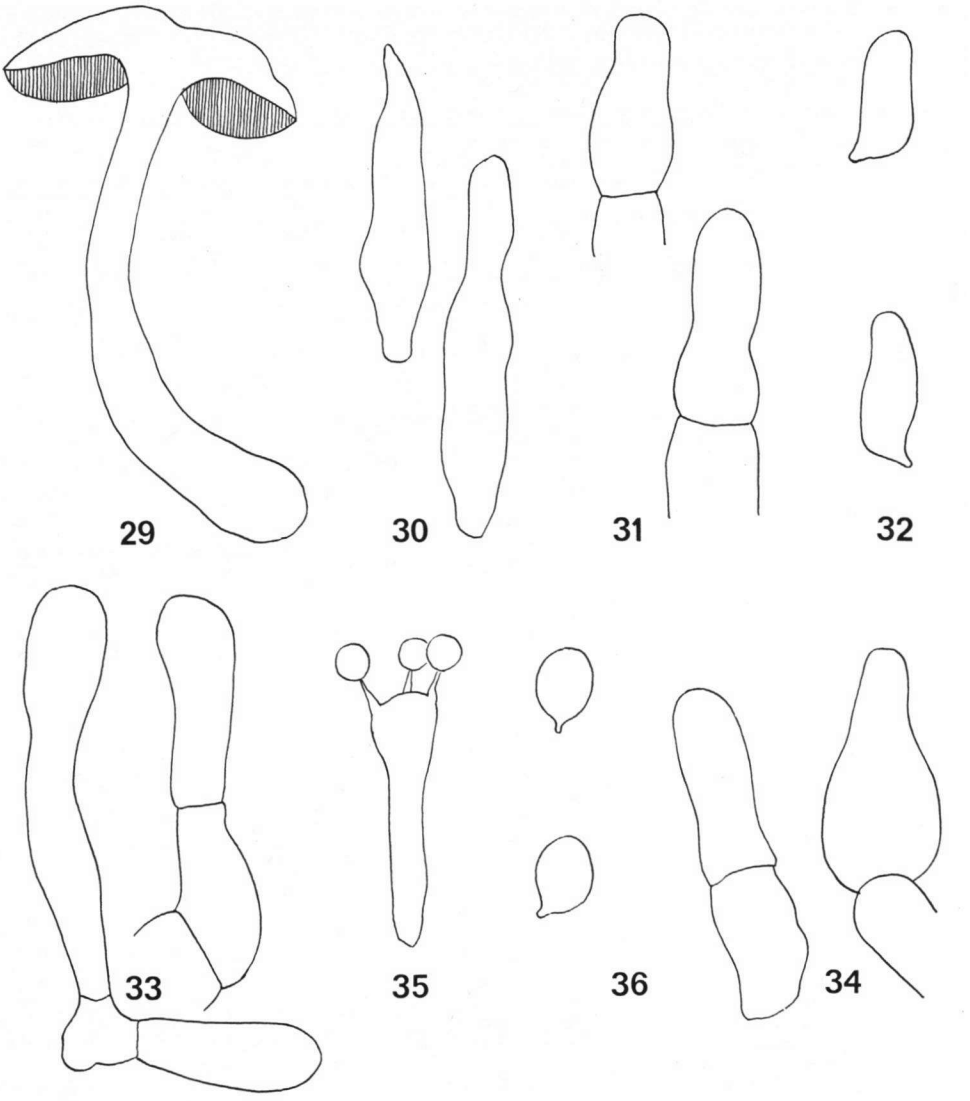
The pinkish zone observed in the fasciculate specimen of our Congo material is comparable with that seen in *G. rompellii*, an American tropical species which differs in the color of the pileus and has the spores over 5.5 μ broad and different to absent odor (cf. description by Singer, *1964b:* 118–120) where the material from Liberia is critically compared with *G. rompellii* as well as with some other African Gyrodons mentioned by Heinemann). The specimens showing the pink zone were also the ones that showed the silvery lustre on the pileus and a paler zone on the apex of the stipe; these are the specimens that were found to grow in a conglobated group *(Grinling 51,004)*.

The other specimens we refer to here did not show these characters even when young and fresh. Since they are identical in all other regards we have given a single description for all collections but we wish to point out that only further observation will show whether the form with pink zone and fasciculate growth habit has the silvery lustre and the paler apical zone on the stipe as constant correlated characters. If this were the case, we might be dealing with at least two closely related forms, perhaps species.

XEROCOMUS ALLIACEUS (Beeli) Heinemann—Figs. 29–32

Boletus alliaceus Beeli *in* Bull. Soc. r. Bot. Belg. **58**: 210. 1926. — *Xerocomus alliaceus* (Beeli) Heinemann *in* Bull. Jard. bot. Brux. **21**: 266. 1951.

Pileus rather light gray to deeper grayish brown (so when quite young), subvelutinous, not shining, convex, about 45 mm broad when mature. — Hymenophore tubulose; tubes about 5 mm long, when mature, at first adnate, slightly depressed-sinuate around the stipe when mature and the tube walls connecting sublamellarly and continuing as veins on the apex of the stipe, where there is a



Figs. 29–32. *Xerocomus alliaceus*. — 29. Carpophore (× 1). — 30. Pleurocystidia (× 1000). — 31. Erect cells of the epicutis (× 1000). — 32. Spores (× 2000).

Figs. 33–36. *Xerocomus microsporus*. — 33. Caulocystidia (× 1000). — 34. Erect cells of the epicutis (× 1000). — 35. Basidium (× 1000). — 36. Spores (× 2000).

shallow reticulation, sordid yellowish, at first a very light yellow, almost pallid-whitish; pores concolorous with tubes, about 0.5 mm wide, i.e. neither very narrow nor wide, unchanging when bruised or touched. — Spore print light brown in thin layer. — Stipe concolorous with the pileus or a little lighter, striate-sulcate below, reticulate at apex, dry, solid, tapering upwards, about 60 × 9 mm when mature. Basal mycelium white. — Context cream colored, unchanging, soft-fleshy, rather thick; odor strong, of garlic even in dried material upon moistening.

Spores 8.5–9.5 × 3–3.5 μ, cylindric-fusiform, or cylindrical, smooth, pale melleous. — Hymenium: Basidia 21–32 × 7.5–9 μ, clavate, tetrasporous. Cystidia rather numerous in tubes and on pores, 27.5–45 × 6–8.5 μ, hyaline, thin-walled, projecting beyond the basidia, fusoid to ampullaceous with obtuse tip. Base of basidia and cystidia without clamp. — Hyphae of the context and hymenophoral trama without clamp connections, hyaline, 4.5–15 μ broad. — Subhymenium well developed, of short, small elements; hymenophoral trama bilateral of the *Phylloporus* type; hyphae of the lateral stratum 5–10 μ broad. — Covering layers: Epicutis of the pileus well developed as a trichodermial palisade and brown (in KOH) on top of a trichodermial hypodermium; terminal members of epicuticular layer brownish-tawny, some with subhyaline granular incrustation, mostly broadly rounded at the tips, few acute, either short ventricose and 20–53 × 8–18(–19) μ (also sometimes constricted in the middle or above and then 30–53 × 9–10 μ), or cylindrical and 35–42 × 11–12 μ, more rarely fusoid-obtuse or subulate and then 19–36 × 9–15 μ.

Chemical characters: NH_4OH slightly rusty-tawny on the surface of the pileus, otherwise negative.

On forest litter in remnant of forest gallery, Congo, Brazzaville, right shore of Djoué river 1200 meters below dam, March 1965, *Grinling 50,316* (BAFC, herb. Grinling).

We are quite certain that our material corresponds to the species as described by Beeli and Heinemann (ll. cc.) but consider it useful to give a redescription of the Djoué river material since it differs slightly in some aspects, especially the smaller size of the carpophores, the presence of the reticulation at the apex of the stipe and the absence there of a purplish tinge. Since there are only few collections on hand, it does not seem justified to describe a new infraspecific taxon for our material before the full variability of the species is known. For the time being, the three characters indicated do not appear to be very weighty.

The tramal structure makes it necessary to consider this species as belonging in *Xerocomus*. Within this genus, due to the unchanging context and hymenophore, the absence of a deep blue ammonia reaction in young fresh pilei, and the concolorous apical reticulum of the stipe, we believe that the species belongs in section *Moravici*, as does the following species.

Xerocomus microsporus Sing. & Grinl., *sp. nov.*—Figs. 33–36

Pileo castaneo, convexo, 35 mm lato; hymenophoro tubuloso, pallide flavido; tubis brevibus; poris subangustis; tramate hymenophorali bilaterali typum phyllopori approximante; sporis minutis 5.5–6.5 × (3–)3.7–4 μ, ellipsoideis, pallide ochraceis, levibus; stipite pileo concolori, pustuloso, farcto, demum cavernoso; carne alba, immutabili; odore fructuum amoeno; hyphis defibulatis. — Ad terram in silva marginali tropicali. Congo, prope Brazzaville, *Grinling 51,204* (BAFC), typus.

Pileus chestnut brown, velvety-opaque, smooth, convex, then convex-applanate, and occasionally with uplifted margin, 35 mm broad. — Hymenophore tubulose, tubes short (2 mm long), sinuate-emarginate at the stipe, pale yellowish as are the small pores. Spore print not obtained. — Stipe concolorous with the pileus, velutinous-cracked so that it appears pustulose on the surface because of small bunches of raised fibrils, at first stuffed, eventually with cavities; cylindrical-difform, 40 × 8 mm; veil none; basal mycelium of dried material pale brownish, woolly, not abundant. — Context white, unchanging, soft-fleshy, spongy in pileus; odor fruitlike, pleasant.

Spores 5.5–6.5 × (3–)3.7–4 μ, ellipsoid, with one rounded oil droplet, smooth, with moderately thin wall, pale ocher. — Hymenium: Basidia (16–)27–32 × 5.7–7.5 μ, clavate, hyaline, tetrasporous. Pleurocystidia very few, like cheilocystidia; cheilocystidia numerous, extremely versiform, varying from cylindrical to club-shaped, with or without a narrow apical mucro, also sometimes constricted in the middle, hyaline, 18–24 × 3.8–7 μ. — Hyphae without clamp connections; hymenophoral trama all hyaline, with an axial mediostratum which is thin, slightly gelatinized but rather dense, with the hyphae filamentous, parallel with each other to slightly interwoven and 1.5–4.5 μ broad, with a lateral stratum of divergent hyphae but these not strongly curved excepting in the pore region, not strongly separated from each other and not more gelatinized than those of the mediostratum, 2.8–8 μ broad. — Covering layers: Epicutis of the pileus and stipe consisting of fascicles of brownish ascendant to erect elements which are elongated and form fragments of trichodermium or trichodermial palisade, the terminal members of the hyphae clavate to broadly cylindric or slightly narrowed in the upper part, with broadly rounded tip, 26–58 × (4.5–)9–15(–18) μ, wall 0.4–0.8 μ thick; pigment intracellular, dissolved, partly vacuolar, fulvous in KOH mount, soluble in NH_4OH, mounts from fresh material.

On earth in remnant of gallery forest. Congo, Brazzaville, 400 metres below dam on right shore of Djoué river, December 1965, *Grinling 51,204.*

This species has macroscopically the appearance of a *Gyroporus*. It may very well be the same as *Gyroporus castaneus* var. *microsporus* Heinemann (*1951*: 232) but our species is by no means conspecific with any known *Gyroporus* and the lack of clamp connections and the configuration of the hymenophoral trama place it in *Xerocomus*. It would be interesting to obtain a fresh spore print of this species in order to have a further indication as to whether we are dealing with a truly intermediate form or a case of external convergence.

Pulveroboletus paspali Sing. & Grinl., *sp. nov.*—Figs. 37–40

Pileo citrino vel vitellino, rubescente, humido, pulvinato dein applanato 20–50 mm lato, cute obtecto; hymenophoro tubuloso, tubis brevibus vel longiusculis, poris dein compositis, pallidissime griseolo-flavidis, dein flavidis, demum sordide olivaceo-brunneis, sporis in cumulo olivaceo-brunneis, s.m. 5.5–8.5 × 3–3.5 μ, versiformibus, cystidiis 20–30 × 4.5–4.8 μ, fusoideo-subventricosis; tramate hymenophorali adulto bilaterali typi phyllopori; stipite flavido, e velo subannulato et fibrillis brunneis ornato, 20–45 × 4–8 mm; carne flava, ex hyphis defibulatis efformata; odore saporeque haud notabilibus. — Ad *Paspala* frequenter obvius in Congo: Brazzaville, in urbe Djoué, *Grinling 41,104* (BAFC), typus.

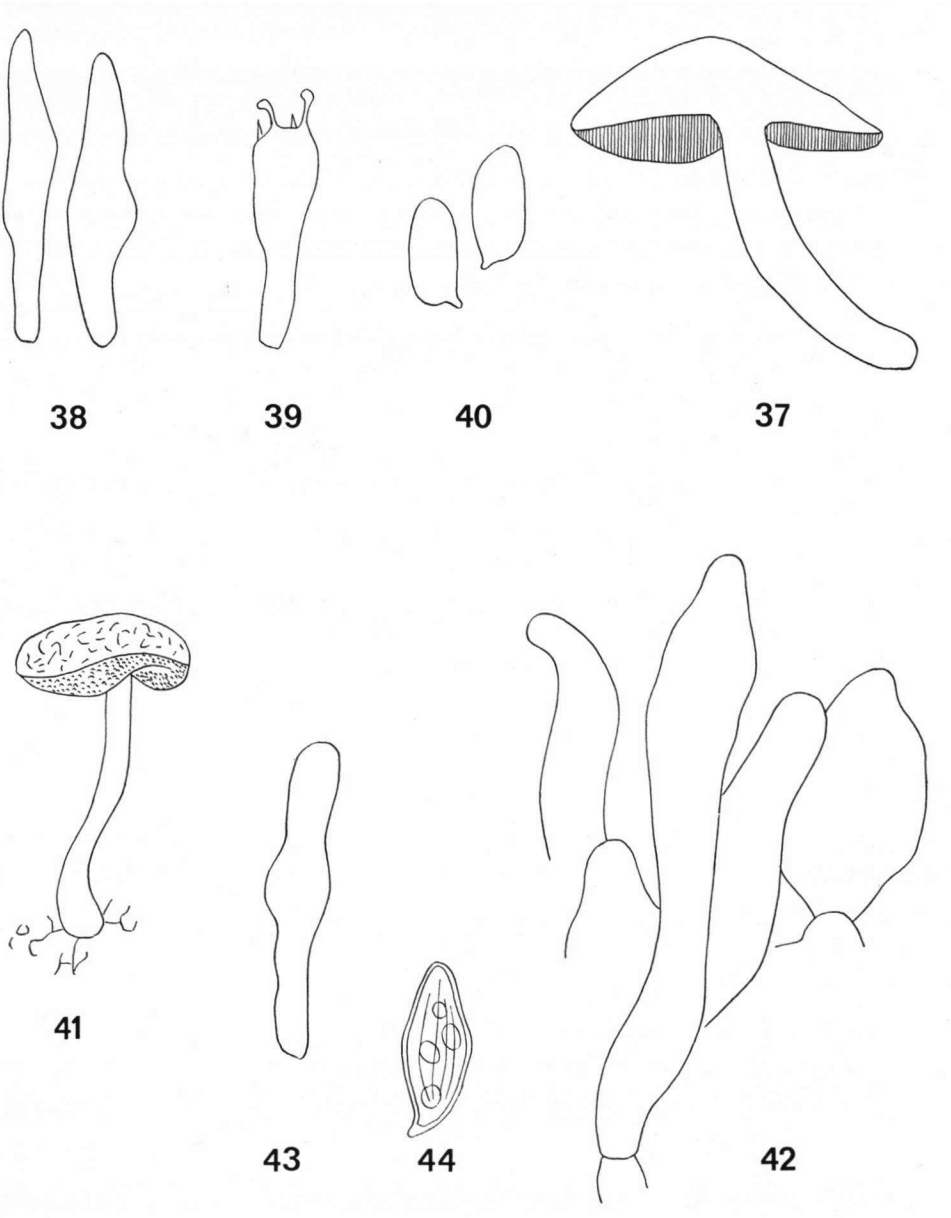
Pileus lemon yellow to egg yellow, paler on the margin, young specimens reddening when bruised, humid to subviscid in wet weather but never clearly glutinous,

eventually reddish-brown to dark brown where a covering leaf has been attached, with slightly projecting margin so that it appears somewhat appendiculate, mat, convex-pulvinate, then gradually becoming more applanate, 20–50 mm broad. — Hymenophore tubular; tubes of variable length but generally shorter than the thickness of the context, adnate to free and often sinuate at the stipe, rarely subdecurrent, but usually free or at least deeply depressed when mature; yellow or yellowish, finally becoming dirty olive brown; pores at first small (less than 0.5 mm in diameter) and daedaleoid-gyrose, very pale grayish-yellow, then light yellow and eventually dirty olive and compound, a large superficial pore (to 1 mm diameter) with smaller component pores at a lower level, unchanging. — Spore print deep olive brown. — Stipe light yellow, fibrillose and finely excoriated at apex, in the lower portion covered by veil fibrils, solid, sometimes becoming somewhat hollowed, often curved or flexuous, or else broad-cylindrical especially when young, 20–45 × 4–8(–20) mm; veil present, forming traces of a lacerate annulus and a brown fibrillosity which covers the surface of the lower portion of the stipe of the adult specimens, fibrillose; basal mycelium often directly attached to the roots of *Paspalum*. — Context yellow, unchanging, soft-fleshy; odor none; taste not noticeable.

Spores 5.5–8.5 × 3–3.5 μ, cylindrical and attenuated below, or cylindrical-subovate or clavate, the smaller ones ellipsoid to short-cylindrical or sometimes clavate to reniform, smooth, golden brown to golden ochraceous, with firm wall without germ pore, young spores likewise dimorphic but hyaline. — Hymenium: Basidia 19–24.5 × 6–8.5 μ, clavate, hyaline, tetrasporous. Cystidia moderately numerous in tubes, numerous on pores, 20–30 × 4.5–4.8 μ, fusoid-subventricose, with obtuse apex, thin-walled, hyaline to yellowish. — Hyphae inclusive the septa between subhymenial cell and basidium and cystidium without clamps, hymenophoral trama in fully adult specimens of the *Phylloporus* type (bilateral) with a very thin mediostratum of axial slightly interwoven thin ($\pm$ 3 μ) hyphae, the lateral stratum moderately divergent but not strongly curved, the hyphae touching each other, hyaline in KOH, up to 7.5 μ thick. — Covering layers: Epicutis of pileus now (fully adult specimens) appearing as a cutis of elongate hyphal elements, hyaline to pale yellowish in KOH excepting the brown spots where a brown pigment is visible; the surface hyphae show a yellow granular incrustation in water mounts.

On turf, composed principally of *Paspalum*, Congo, Brazzaville, in residential area of Djoué, fruiting at the beginning of the rains in October, November, *Grinling 41,104*, type, *50,109* paratypus (herb. Grinling).

This species is remarkable by its veil remnants which would tend to put it in either *Suillus* or *Pulveroboletus*. Since no conifers have been found nearby and no yellow basal mycelium has been observed, *Suillus* seems to be excluded. The cystidia are likewise not of the type found in that genus. On the other hand, the *Phylloporus* type of hymenophoral trama is likewise encountered in adult specimens of *Pulveroboletus hemichrysus*. In *Pulveroboletus*, this species seems to be somewhat intermediate between the sections *Pulveroboletus* and *Sulphurei* (Sing.) Sing. Among the African species this species appears to be similar to **Pulveroboletus kivuensis** (Heinemann & Goossens) Sing., *comb. nov.* (basionym, *Gyrodon kivuensis* Heinemann & Goossens *in* Bull. Jard. bot. Brux. **25**: 37. 1955), which differs from our new species in larger carpophores, bluing context, less evident veil, consistently arcuate-decurrent tubes; it is thus clearly referable to section *Lignicolae*.



Figs. 37–40. *Pulveroboletus paspali.* — 37. Carpophore (× 1). — 38. Cheilocystidia (× 1000). — 39. Basidium (× 1000). — 40. Spores (× 2000).

Figs. 41–44. *Boletellus obscurecoccineus.* — 41. Carpophore (× 1). — 42. Elements of the epicutis (× 1000). — 43. Cystidium (× 1000). — 44. Spore (× 1400).

STROBILOMYCETACEAE

BOLETELLUS OBSCURECOCCINEUS (Höhn.) Sing.—Figs. 41–44

Strobilomyces obscurecoccineus Höhn. *in* Sber. Akad. Wiss. Wien (Math.-nat. Kl., Abt. I) **123**: 88. 1914. — *Boletellus obscurecoccineus* (Höhn.) Sing. *in* Farlowia **2**: 127. 1945.
Boletus versicolor var., Patouillard *in* Mém. Acad. Malgache **6**: 20. 1927.

Pileus deep red (approximately Séguy 66) with somewhat cracked covering which occasionally lets appear the whitish context, convex, 25 mm broad. — Hymenophore tubulose, yellow, 6 mm long, the tube walls close to the stipe sublamellarly attached and somewhat decurrent on the apex of the latter, sinuate; pores to 1 mm broad, concolorous, irregularly shaped, unchanging. Spore print not obtained. — Stipe concolorous with the pileus but with whitish apex, with white base, with innate carmin red longitudinal stripes, with the whitish context showing between the fibers where these are separating, cylindric and somewhat flexuous, 45 × 3 mm; veil none; basal mycelium white and cottony. — Context in thickness about equal to the tube length in the pileus, white, unchanging, taste acidulous, at length peppery.

Spores 17–19(–21.5) × (4.5–)5.7–7 μ, fusiform, rarely with constriction, appearing subsmooth but distinctly longitudinally striate (striae elevated to 0.3 μ in mature spores), with the wall melleous and 0.5–0.7 μ thick, with suprahilar depression, without a germ pore, the striae concurrent but touching each other at the poles. — Hymenium: Basida 31–37 × 10.5–12 μ, mostly tetrasporous, fewer bisporous, hyaline. Cystidia in tubes and on pores moderately numerous but very distinct, 38–50 × 13–15 μ, tapering upwards or slightly ampullaceous, with thin hyaline walls, often hyaline or melleous incrusted. — Hyphae without clamp connections, all inamyloid, mediostratum of the hymenophoral trama pale melleous, more hyaline in lateral stratum, clearly bilaterally arranged. Covering layers: Epicutis of the pileus subhymeniform, terminal members erect, attenuated-obtuse to broadly rounded at the tips, 26–57 × 10–15 μ.

Chemical characters: NH_4OH negative.

On the earth at the base of a shrub, in narrow marginal forest. Congo: Brazzaville, right bank of the Djoué river, 1200 meters below dam, April 1965, *Grinling 50,402* (BAFC).

This species reminds one of the European "*Xerocomus versicolor*" (or what some European mycologists determine as such) which is a form of *Xerocomus chrysenteron* and forms mycorrhiza with *Eucalyptus* and *Salix* in South America and with other forest trees in Europe and North America.

Our African material has been compared with the type; fragments of Heinemann's material from the Congo as well as Patouillard's from Madagascar were compared by J. Perreau-Bertrand (*1961*: 421–422) with that of the type communicated by Singer (ex FH), so that there cannot be much doubt about the identity of all four collections now known. Nevertheless a redescription of this species seemed in order.

BIBLIOGRAPHY

BEELI, M. (1936). Genre *Lepiota* (Pers.) Fr. *In* Flore icon. Champ. Congo. Fasc. 2: 29–45 & (i) *pls. 5–8.*

HEINEMANN, P. (1951). Champignons récoltés au Congo belge par Madame M. Goossens-Fontana. I. Boletineae. *In* Bull. Jard. bot. Brux. **21**: 223–346.

—— (1955). Champignons récoltés au Congo belge par Madame M. Goossens-Fontana I. Boletineae, note complémentaire 2. *In* Bull. Jard. bot. Brux. **25**: 169–181.

PERREAU-BERTRAND, J. (1961). Recherches sur les ornementations sporales et la sporogénèse chez quelques espèces des genres *Boletellus* et *Strobilomyces* (Basidiomycetes). *In* Annls Sci. nat. (Bot.) XII **27**: 399—489.

SINGER, R. (1942). A monographic study of the genera *Crinipellis* and *Chaetocalathus*. *In* Lilloa **8**: 441–534.

—— (1961). Type studies on agarics IV. *In* Sydowia **15**: 133–151.

—— (1964a). *Marasmius* congolais receuillis par Mme Goossens-Fontana et d'autres collecteurs belges. *In* Bull. Jard. bot. Brux. **34**: 317–388.

—— (1964b). Boletes and related groups in South America. *In* Nova Hedwigia **7**: 93–132.

—— (1965). Monographic studies of South American Basidiomycetes .... 2.) The genus *Marasmius* in South America. *In* Sydowia **18**: 106–358.