

Supplements to the monograph of tropical African species of *Marasmius* (Basidiomycota, *Marasmiaceae*)

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Abstract – This paper, a supplement to the monograph of *Marasmius* s. str. from tropical Africa published by the author in 2007, includes a total of 40 taxa. Five of these are here described as new species: *Marasmius portentosus* (sect. *Globulares*), *M. conicoparvus*, *M. brunneoniger*, *M. purpureotinctus* and *M. sepiopileatus* (sect. *Sicci*).

***Marasmius* sect. *Globulares* / *Marasmius* sect. *Sicci* / taxonomy / new species**

Résumé – Ce supplément à la monographie des *Marasmius* s. str. de l'Afrique tropicale, publiée par le même auteur en 2007, traite 40 espèces dont cinq sont décrites en tant qu'espèces nouvelles: *Marasmius portentosus* (sect. *Globulares*), *M. conicoparvus*, *M. brunneoniger*, *M. purpureotinctus* et *M. sepiopileatus* (sect. *Sicci*).

***Marasmius* sect. *Globulares* / *Marasmius* sect. *Sicci* / taxinomie / espèces nouvelles**

INTRODUCTION

In 2007, the author published a monograph of *Marasmius* and some other genera growing in tropical Africa (Antonín 2007). Since this time, only Douanla-Meli & Langer (2008) taxonomically contributed to the *Marasmius* flora of this region. This new paper deals with new tropical African collections of *Marasmius* s. str. studied since the submission deadline (ca 2004) of the above mentioned monograph. A total of 40 taxa are published in this paper, five of which are proposed as new species.

MATERIAL AND METHODS

For this paper, altogether 115 specimens from the herbaria BR and K labelled as *Marasmius* collected in tropical Africa were studied. They mostly represent either newly collected specimens since c. 2004, or collections newly added to the herbaria. In a few cases they were overlooked during the author's previous studies. One specimen was sent from the herbarium COFC for a revision. Macroscopic descriptions were made by the collectors, but sometimes

they have been compiled according to photos and/or dry basidiocarps. Microscopic features are described from dried material mounted in KOH, Melzer's reagent and Congo Red using an Olympus BX-50 light microscope with a magnification of 1000 \times . For basidiospores, the factors E (quotient of length and width in any one spore) and Q (mean of E-values) are used. For lamellae, L means the number of entire lamellae and l the number of lamellulae between each pair of entire lamellae. Herbarium abbreviations follow Thiers (2013). Authors of fungal names are cited according to the International Plant Names Index Authors website (<http://www.ipni.org/ipni/authorsearchpage.do>).

RESULTS

SECT. *MARASMIUS*

Basidiocarps small, marasmiod. Pileus hemispherical to convex, sulcate, usually centrally umbilicate. Lamellae collariate. Stipe filiform, insititious. Pileipellis and cheilocystidia in the form of broom cells of the Rotalis- or Siccus-type. Pleurocystidia absent. Hyphae at least in stipe apex dextrinoid.

Subsect. *Marasmius*

Pileipellis cells in the form of broom cells of the Rotalis-type.

Marasmius cf. cupressiformis Berk., J. Bot. 8: 140, 1856.

Revised specimen. – CAMEROON: East Prov., Dja Biosphere Reserve, Somalomo Distr., vicinity of Messamena, near camp site (Élou?), in marshy area (with dispersed young *Gilbertodendron*), with rhizomorphs hanging between the branches at eye-sight, 03° 19.50' N, 12° 42.87' E, 6 Apr. 2007 leg. D. Stubbe DS 07364 (BR 164420-05).

Remarks. – This collection agrees with *M. cupressiformis* in having very tiny basidiocarps with their stipe attached directly to rhizomorphs, cheilocystida and pileipellis composed of both Rotalis- and Siccus-type broom cells, but differs in slightly larger basidiospores (9.0-9.5 \times 5.25-5.75 μ m; *M. cupressiformis*: 6.2-8.9 \times 3.5-5.0 μ m, Antonín 2007) and a brown pileus (dry specimens) not being sulcate but possessing a prominent papilla. However, the specimen revised only consists of two rather young basidiocarps, a macroscopic description is missing, and therefore an exact identification is impossible.

Subsect. *Sicciformes* Antonín

Pileipellis cells in the form of broom cells of the Siccus-type.

Marasmius crinisequi F. Muell. in Kalchbr., Grevillea 8: 153, 1880.

Revised specimen. – CAMEROON: East Prov., Dja Biosphere Reserve, close to Somalomo, inundated *Uapaca* forest along the Dja river, 03° 23.65' N, 12° 43.37' E, alt. 650 m, 6 Apr. 2007 leg. A. Verbeken 07-17 (BR 164518-06).

Remarks. – A widely distributed species throughout tropical Africa.

Marasmius curreyi Berk. & Broome, Ann. Mag. Nat. Hist. 3: 209, 1879.

Revised specimen. – SIERRA LEONE: Kori, Njala, on the ground between roots of *Trichilia heudelotii*, 30 July 1949 leg. F.C. Deighton M 2915 (K 171071 ex herb. IMI 37525).

Remarks. – This collection undoubtedly belongs to *M. curreyi*. However, it is partly damaged by a mould, so that its variety cannot be identified. This species (var. *distantifolius* Antonín) has so far only been confirmed in Benin.

Marasmius guyanensis Mont., Ann. Sci. Nat. Bot., sér. 4, 1: 114, 1854.

Revised specimen. – TOGO: Plateau Prov., Béna-Ola, Néhou-Begnoi gallery, gallery forest with *Uapaca heudelotii* and *Berlinia grandiflora*, on fallen leaves, 07° 33.510' N, 0° 52.335' E, 7 Aug. 2007 leg. A. De Kesel 4195 (BR 158440-39, as *M. epiphyllus*).

Remarks. – This collection represents the first record for Togo.

Marasmius subruforotula Singer, Bull. Jard. Bot. Etat Brux. 34: 339, 1964.

Basidiocarps growing in close groups, arising from substrate. **Pileus** up to 9 mm broad, conical to convex, umbilicate, without central papilla, sulcate, slightly tomentose, (pale) brown. **Lamellae** rather distant, L = 13-16, l = 0(-1), collariate, brownish cream, with concolorous edge. **Stipe** up to 40 mm long, filiform, insititious, lustrous, entirely brown when young, then dark brown at base. (Macroscopic description according to dry specimens.)

Basidiospores (7.5-)8.0-9.5(-10) × 3.7-4.5 µm, av. 8.4 × 4.1 µm, E = 1.80-2.30, Q = 2.05, ellipsoid, ellipsoid-fusoid, thin-walled. **Basidioles** up to 29 × 4.0-8.0 µm, clavate, cylindrical, fusoid. **Cheilocystidia** 13-20 × 8.0-10.5 µm, in the form of broom cells of the Siccus-type similar to those in the pileipellis but thin-walled, mixed with scattered smooth cells. **Pleurocystidia** absent. **Trama hyphae** cylindrical, subinflated, ellipsoid, thin- to slightly thick-walled, smooth or minutely incrustated, clamped, non-dextrinoid, up to 15(-20) µm wide. **Pileipellis** a hymeniderm composed of two types of cells, 14-22 × 7.5-14 µm, (1) broom cells of the Siccus-type, clavate or subfusoid, thin-walled with slightly thick-walled apex or entirely (slightly) thick-walled (walls up to 1.0 µm), projections up to 10 × 1.5 µm, digitate, thick-walled, obtuse, up to 25 in number; thick-walled parts yellow-brown in KOH, (2) clavate, cylindrical, fusoid, regular, irregular, coralloid or almost broom-like cells, thick-walled cells (walls up to 2.0 µm). **Stipitipellis** a cutis of cylindrical, parallel, slightly thick-walled, clamped, dextrinoid, up to 5.0 µm wide hyphae. **Caulocystidia** absent.

Revised specimens. – BENIN: Niaouli, on decaying wood, 7 June 1999 leg. A. De Kesel 2559 (BR 112934-26). – Niaouli, Bas-Fond, on decaying wood, 29 June 2000 leg. A. De Kesel 2872 (BR 126425-34).

Remarks. – Both collections undoubtedly represent the same taxon. They differ from the original description of *M. subruforotula* by the absence of an orange tinge towards the pileus margin. The pileus colour agrees well with the collection by B. Buyck (Zaire, Tshopo Prov., Kisangani, 8 Apr. 1984 leg. B. Buyck 1361, BR 011767-30; for photo, see Antonín 2007, pl. 1) but its basidiospores are slightly larger (8.5-10.5 × 4.6-6.0 µm, Q = 1.8). However, the basidiospore size and shape of the Benin collection fall in the variability of *M. subruforotula* as published by Antonín (2007), varying in single collections between 7.0-9.0 × 3.5-4.4 µm, Q = 2.0 (Cameroon, Dja Biosphere Reserve, 8 Apr. 2001 leg. V. Antonín Cm 01.46, BRNM 666113) and 8.5-10.5 × 4.6-5.4(-6.0) µm, Q = 1.8 (Democratic Republic of Congo, Eala, July 1907 leg. L. Pynaert, BR 11515-69,

holotype) and the above-mentioned slightly aberrant collection by B. Buyck. Therefore, the variability of macro- and microscopic characters is either very large, or two taxa are hidden in *M. subruforotula* in the current sense. A final conclusion cannot be drawn because of the absence of macroscopic descriptions from most of the studied collections.

SECT. *NEOSESILES* SINGER

Basidiocarps pleurotoid. Pileus small. Lamellae not or indistinctly collariate. Stipe absent or rudimentary and then often eccentric to lateral. Pileipellis a (loose) hymeniderm composed of broom cells of the Siccus-type. Hyphae dextrinoid or non-dextrinoid.

Marasmius cyphella Dennis & D.A. Reid, Kew Bull. 1957/2: 288, 1957.

Revised specimen. – GHANA: Tafo, on leaves of *Theobroma cacao*, 18 Apr. 1963 leg. D.R. Glenn-dinning and D. Shaw (K 171076).

Remarks. – This species represents a less known taxon with only vein-like lamellae. It was already published from Ghana (Antonín 2007, Dennis & Reid 1957).

Marasmius neosessilis Singer, *Mycologia* 50: 103, 1958.

Revised specimens. – BENIN: Niaouli, Bas-Fond, 9 June 2000 leg. A. De Kesel 2766 (BR 126319-25). – Niaouli, Bas-Fond, 9 June 2000 leg. A. De Kesel 2765 (BR 126318-24). – CAMEROON: East Prov., Dja Biosphere Reserve, close to Somalomo, inundated *Uapaca* forest along the Dja river, 03° 22.15' N, 12° 44.89' E, alt. 610 m, 7 Apr. 2007 leg. A. Verbeken 07-25 (BR 164510-95).

Remarks. – *Marasmius neosessilis* has to date been reported from Ghana, Ivory Coast, Kenya, Nigeria, and Uganda. Therefore, localities published here represent new records for both countries. It seems to be a widely distributed species in tropical Africa.

SECT. *GLOBULARES* KÜHNER

Basidiocarps marasmioid or collybioid. Pileus smooth or sulcate, mostly pigmented. Lamellae well-developed. Stipe central, non-insititious. Pileipellis a hymeniderm composed of smooth cells. Cheilocystidia always present. Pleuro- and caulocystidia present or absent. Hyphae dextrinoid.

Marasmius arborescens (Henn.) Beeli, Bull. Soc. Roy. Bot. Belg. 60: 156, 1928.

Revised specimen. – TOGO: Plateau Prov., Béna-Ola, Néhou-Begnoi gallery, gallery forest with *Uapaca heudelotii* and *Berlinia grandiflora*, on fallen leaves, 07° 33.510' N, 0° 52.335' E, alt. 690 m, 7 Aug. 2007 leg. et det. A. De Kesel 4199 (BR 163646-07).

Remarks. – *Marasmius arborescens* is one of the most widely distributed *Marasmius* species in tropical Africa. However, the collection published here represents the first one in Togo.

Marasmius bekolacongoli Beeli, Bull. Soc. Roy. Belg. 60: 157, 1928.

Revised specimens. – BENIN: Pahou, 27 June 1999 leg. A. De Kesel 2673 (BR 115763-42). – Plateau de Niaouli, 23 June 1999 leg. A. De Kesel 2646 (BR 115729-08). – CAMEROON: South West Prov., Korup National Park, trail

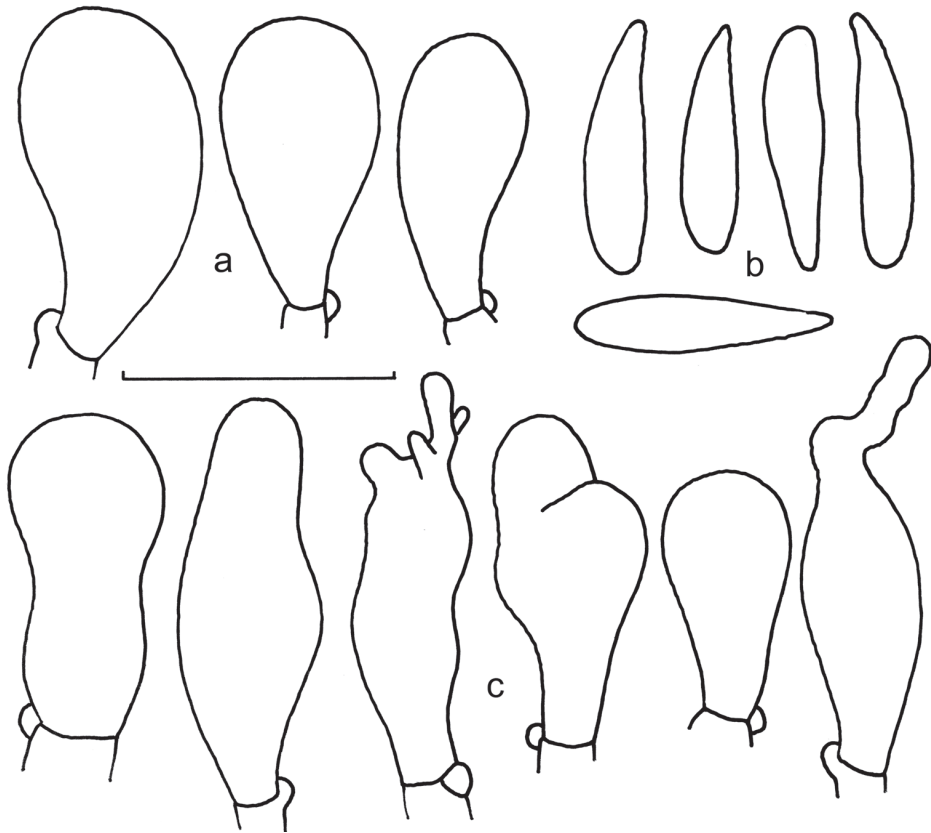


Fig. 1. *Marasmius portentosus* (holotype). **a.** pileipellis cells, **b.** basidiospores, **c.** cheilocystidia. Scale bar = 20 μ m.

to Rengo Rock, on rotten wood, alt. 100 m, 8 Apr. 1997 leg. P.J. Roberts K 958 K 147005, as *M. ferrugineoluteolus* Beeli). – Ibid., transect P, on litter, 50 m alt., 1 Apr. 1997 leg. M.E. Bechem (P.J. Roberts K 739, K 147007). – GABON: Ogoouè-Ivimbou Prov., Station D'Ipassa-Makokou, on dead wood on soil, alt. 470 m, 16 March 2005 leg. B. Toirambe 25 (BR 159806-47). – KENYA: Shimba Hills (Nature Reserve), South Coast, Kwalé District, 30 Nov. 2004 leg. A. De Kesel 3939bis (BR 162815-49).

Remarks. – *Marasmius bekolacongoli* is a very distinct taxon widely distributed in tropical Africa. Douanla-Meli recently described a new species, *Marasmius mbalmayoensis* (Douanla-Meli & Langer 2008), which should be very close to *M. bekolacongoli* and difficultly separable from it. It should especially differ by its spore shape, which is rather fusoid to sigmoid and often strongly curved, and its basal mycelium forming a broadening at stipe base. Some revised specimens (e.g. Roberts K 958, Toirambe 25) agree with this new species in having a typically broadened stipe base. However, *M. mbalmayoensis* is described as having well-developed pleurocystidia but *M. bekolacongoli* misses them (Antonín 2007, Singer 1964, 1965). Therefore, all above-mentioned collections belong to *M. bekolacongoli*.

“*Marasmius brunneoloides*” Antonín & De Kesel ad int.

Fig. 2

Pileus up to 18 mm broad, convex(-conical), slightly depressed at centre, sulcate to striped, brown without violaceous tinge. **Lamellae** distant, L = 14-16, l = 0-1, adnate, edge concolorous. **Stipe** up to 45 mm long and 1.5 mm wide, cylindrical, entirely puberulous, entirely pale brown, with whitish basal mycelium. (Macroscopic description according to dry specimens.)

Basidiospores $18 \times 5.0 \mu\text{m}$ (only one spore observed), clavate-fusoid, thin-walled. **Basidium** $35 \times 4 \mu\text{m}$ (only one seen). **Basidioles** $20-40 \times 5.0-15 \mu\text{m}$, clavate, fusoid, subcylindrical. **Cheilocystidia** $21-30 \times 13-17(-20) \mu\text{m}$, clavate, vesiculose, fusoid, thin-walled. **Pleurocystidia** absent. **Trama hyphae** cylindrical to subinflated, thin- to slightly thick-walled, smooth or minutely incrustated, clamped, dextrinoid, up to $12 \mu\text{m}$ wide. **Pileipellis** a hymeniderm composed of $15-36 \times 9.0-17 \mu\text{m}$, clavate, (sub)vesiculose, smooth, regular, irregular or lobate, thin- to slightly thick-walled cells with hyaline to brownish walls in KOH. **Stipitipellis** a cutis of cylindrical, parallel, slightly thick-walled, clamped, dextrinoid, up to $6.0 \mu\text{m}$ wide hyphae with subhyaline to pale brownish walls in KOH. **Caulocystidia** numerous, $27-41 \times 7.0-11 \mu\text{m}$, adpressed to erect, clavate, cylindrical, thin-walled, hyaline.

Revised specimen. – KENYA: North Coast, Malindi District, Arabuko-Sokoké National Park, on sandy soils in a *Brachystegia spiciformis* dominated coastal miombo forest, 25 Nov. 2004 leg. A. De Kesel 3896bis (BR 162703-34).

Remarks. – *Marasmius brunneoloides* is characterised in having rather small basidiocarps with a brown pileus without any violet tinge, and a puberulous stipe, rather large basidiospores, the absence of pleurocystidia and presence of caulocystidia. It undoubtedly represents a new species. However, because of the absence of a macroscopic description and a photo, and almost sterile basidiocarps, it is described *ad interim* here.

This species is macro- and microscopically similar to *M. brunneolus* (Beeli) Singer, except for its well-developed caulocystidia. Among species with well-developed caulocystidia and without pleurocystidia, all African species have either distinctly smaller basidiospores or a differently coloured pileus (Antonín 2007). *Marasmius albogriseus* (Peck) Singer, from North America, has a larger, 15-35 mm broad, centrally smooth, non-sulcate pileus with greyish brown centre becoming paler towards margin, a 2-6 mm broad stipe, and distinctly smaller basidiospores ($6.6-8.1(-9.0) \times 3.6-4.5 \mu\text{m}$) (Halling 1983, Halling *et al.* 1985). *M. decipiens* Halling *et al.*, described from the USA, has a light greyish yellowish brown pileus, larger basidiospores ($22.5-25.2 \times 4.5-6.3 \mu\text{m}$) and short ($(6.3-7.2-11.7(-22.5) \mu\text{m})$) and inconspicuous cheilocystidia (Halling *et al.* 1985). From East Asian taxa, *Marasmius aurantioferrugineus* Hongo has a large, orange-ferruginous pileus, a rather long and wide stipe ($50-120 \times 3-6 \text{ mm}$), and large, clavate, fusoid to sublacrimoid basidiospores ($11.5-15 \times (4.0-4.5-6.0) \mu\text{m}$), *M. maximus* Hongo has a 25-65 mm broad pileus, a $52-85 \times 2-6 \text{ mm}$ large stipe, smaller basidiospores ($7.0-10.25 \times 4.5-6.0 \mu\text{m}$), and numerous caulocystidia, forming a compact layer, and *M. nivicola* Har. Takah. has a 5-40 mm broad, non-sulcate, white-off, whitish to yellowish white or pale yellow pileus, smaller basidiospores ($6.5-8.0 \times 3.7-5.0 \mu\text{m}$), and a very rich, hairy or tomentose basal tomentum forming a \pm solid mycelial mat around stipe base (Antonín *et al.* 2010). *Marasmius pellucidus* Berk. & Broome, known from New Caledonia and South and South-East Asia, differs especially in having a milk-coloured, ivory, cream, pale orange-white or pale brownish pileus with a paler margin, and smaller, only $6-7.5(-8.5) \times 2.5-3.5(-4) \mu\text{m}$ large basidiospores (Desjardin & Horak 1997,

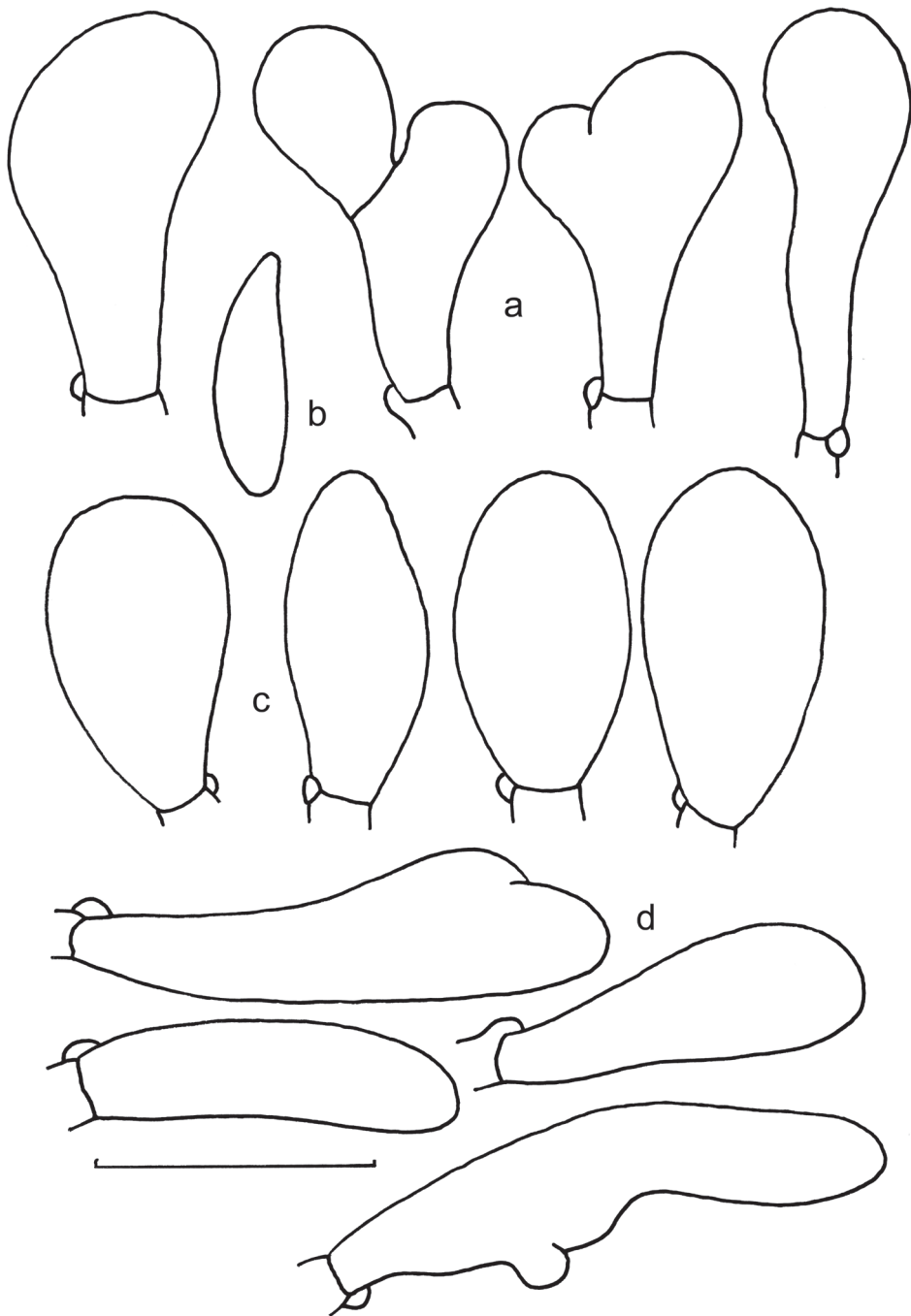


Fig. 2. *Marasmius brunneoloides*. **a.** pileipellis cells, **b.** basidiospore (only one observed), **c.** cheilocystidia, **d.** caulocystidia. Scale bar = 20 μ m.

Wannathes *et al.* 2004). *Marasmius amabilis* Hariot & Patouillard, also known from New Caledonia, also has a paler, white to cream-buff pileus, a longer stipe (40-100 × 1-2 µm), and larger (26.5 × 6.5 µm) basidiospores.

Marasmius brunneolus (Beeli) Singer, Bull. Jard. Bot. Etat Brux. 34: 344, 1964.

Revised specimens. – BENIN: Wari Maro (Soubak-O), 1 July 1998 leg. A. De Kesel 2231 (BR 112740-26). – Savalou, Ouèssè, 19 June 1999 leg. A. De Kesel 2622 (BR 115705-81).

Remarks. – *Marasmius brunneolus* has to date been published from the Democratic Republic of Congo, Nigeria, and Zimbabwe (Antonín 2007). The above collections studies represent the first ones in Benin.

Marasmius flavidulus Henn., Bot. Jahrb. Syst. 30: 49, 1901.

Revised specimen. – BENIN: Niaouli, 5 June 1999 leg. A. De Kesel 2553 (BR 112928-20).

Remarks. – *Marasmius flavidulus* seems to be a rare species known only from the type locality in Cameroon (Hennings 1901). The Benin collection represents the second African record.

Marasmius heinemannianus Antonín, Belg. Journ. Bot. 131(2): 127, 1998.

Revised specimen. – BENIN: Boukombé, 18 Sept. 2001 leg. A. De Kesel 3233 (BR 149754-83).

Remarks. – *Marasmius heinemannianus* is a very distinct and easily identifiable species only known from several localities in Benin.

Marasmius portentosus Antonín & De Kesel sp. nov.

Fig. 1

Mycobank MB 564928

Pileo usque 10 mm lato, hemisphaerico, posteo convexo vel plano-convexo, aurantiaco, deinde aurantiaco-luteo vel griseo-luteo. Lamellis pallide aurantiacis, acie concoloris. Stipite usque 45 × 1 mm, cylindraceo, tomentosus, aurantiaco, deinde griseo-brunneo. Basidiosporis 17-19.5 × (3.5-)4.0-5.0 µm, clavatis, fusiformibus, hyalinis. Cheilocystidiis 16-35 × 6.0-14(-18) µm, clavatis, utriformibus, fusiformibus, saepe irregularibus, lobatis vel subcoralloideis. Pleurocystidiis absentibus. Pileipellis hymeniformis, e cellulis clavatis, fusiformibus vel pyriformibus, 20-28 × 8.0-14 µm, laevibus. Caulocystidiis 30-95 × 5.0-8.0 µm, cylindraceis, clavatis vel subfusiformibus. Hyphis dextrinoideis, fibulatis.

Holotypus – Benin, Wari Maro, 18. VI. 1998 leg. A. De Kesel 2138 (holotypus in herbario BR 112649-32 asservatur).

Etymology. “portentosus” – having nice and distinct basidiocarps.

Pileus up to 10 mm broad, almost hemispherical when young, then convex, becoming plano-convex, centre obtuse slightly rugulose and slightly depressed when old, margin inflexed, then straight, crenulate, later uplifted, fragile, orange (5A6), then pale orangish yellow (4A2-4) or greyish yellow (4B4-5). **Lamellae** distant, L = 17-19, l = 1-2, free, ventricose, orange (5A6-8)), edge concolorous. **Stipe** up to 80 × 1 mm, cylindrical, entirely powdery-tomentose, non-insititious, fragile, yellowish orangish (4A4) when young, then becoming greenish yellow (4C4-4B4) from base towards apex, with rich basal white mycelium.

Basidiospores 17-19.5 × (3.5-)4.0-5.0 µm, av. 18.2 × 4.3 µm, E = 3.60-4.86, Q = 4.25, clavate, subfusoid, sometimes curved, thin-walled, non-dextrinoid.

Basidia 36-40 × 10.5-11.5 µm, 4-spored, clavate, clamped. **Basidioles** 15-45 × 3.0-11 µm, clavate, fusoid, cylindrical. **Cheilocystidia** 16-35 × 6.0-14(-18) µm, clavate, utriform, fusoid, mostly irregular, lobate or with projection(s), rarely subcoralloid, thin- to slightly thick-walled, clamped. **Pleurocystidia** absent. **Trama hyphae** cylindrical to subinflated, thin- to slightly thick-walled, smooth or minutely incrustated, clamped, dextrinoid, up to 12 µm wide. **Pileipellis** a hymeniderm composed of 20-28 × 8.0-14 µm, clavate, pyriform, subfusoid, smooth, thin- to slightly thick-walled, clamped cells. **Stipitipellis** a cutis of cylindrical, parallel, slightly thick-walled, dextrinoid, clamped, sometimes incrustated, up to 5.0 µm wide hyphae with hyaline to pale brownish walls in KOH; refractive hyphae in medulla present. **Caulocystidia** appressed to (sub)erect, interwoven, 30-95 × 5.0-8.0 µm, cylindrical, less frequently clavate or subfusoid, sometimes branched, thin- to slightly thick-walled.

Revised specimen. – BENIN: Wari Maro, on rotten twigs, under bushes in deep shade. 18 June 1998 leg. A. De Kesel 2138 (BR 112649-32, holotype).

Remarks. – *Marasmius portentosus* is characterised in having a small, orange, then pale orangish yellow or greyish yellow pileus, orange lamellae, an entirely tomentose, yellowish orangish, then greenish yellow stipe, rather large basidiospores, well-developed cheilo- and caulocystidia, and absent pleurocystidia.

Marasmius aurantioferrugineus Hongo, growing in East Asia, has a large, 30-70 mm broad, radially rugose pileus, a rather long and broad stipe (50-120 × 3-6 mm), and smaller basidiospores (11.5-15 × (4.0-)4.5-6.0 µm). *M. maximus* Hongo, also known from East Asia, has a larger, 25-65 mm broad, paler coloured pileus, a 52-85 × 2-6 mm large stipe, and smaller basidiospores (7.0-10.25 × 4.5-6.0 µm) (Antonín *et al.* 2010). *Marasmius pellucidus* Berk. & Broome, known from New Caledonia and South and South-East Asia, differs especially in having a milk-coloured, ivory, cream, pale orange-white or pale brownish pileus with a paler margin, and smaller, only 6-7.5(-8.5) × 2.5-3.5(-4) µm large basidiospores (Desjardin & Horak 1997, Wannathes *et al.* 2004). *Marasmius silvicola* Singer, known from Argentina and Indonesia, differs in having a larger, 50-90(-200) mm broad, dark reddish orangish brown to brownish orange or brownish yellow pileus, a 80-140 × 5-10 mm large stipe, smaller, only (5-)6-7 × 2-3.5 µm large basidiospores and well-developed pleurocystidia (Desjardin *et al.* 2000).

Marasmius violaceoides Antonín, Czech Mycol. 56: 249, 2004.

Revised specimens. – ANGOLA: Cazengo, on the ground in humid shady woods, 1911 leg. J. Gossweiler 4623 K 171074, as *M. caryotae*. – CAMEROON: South West Prov., Korup National Park, transect P, on litter, 50 m alt., 2 Apr. 1997 leg. M.E. Bechem (P.J. Roberts K 785, K 147008, as *Marasmius* sp.). – TANZANIA: Tanga Distr., Sawa, in closed bush, 10 May 1967 leg. H. Faulkner 3935 K 171075, as *M. caryotae*.

Remarks. – *Marasmius violaceoides* was described to replace a taxon identified as *M. violaceus* s. Singer (1964, 1965), because its type specimen represents a collybioid fungus (for details, see Antonín 2004, 2007). It is widely distributed in tropical Africa (Cameroon, Democratic Republic of Congo, Nigeria, Zambia; Antonín 2007). A specimen made by the same collector at the same locality and on the same day was already published from Cameroon (see Antonín 2007). For Angola and Tanzania, they represent the first records, but the Angolan material is partly mouldy and difficult to identify.

The collection from Benin (Wari Maro, 23 July 1999 leg. Soulemame Nouru Y. 34, BR 130033-53) is similar to *M. violaceoides* in having similar macro-

(dry specimens) as well as microscopic characters. However, its cheilocystidia are a mixture of smooth and broom cells. Unfortunately, neither a macroscopic description nor a photo is available, hence an exact identification is impossible.

SECT. *SICCUS* SINGER

Basidiocarps marasmioid or collybioid. Pileus mostly sulcate, less frequently smooth, white or pigmented. Lamellae well-developed. Stipe central, non-insititious. Pileipellis a hymeniderm composed of broom cells of the *Siccus*-type. Cheilocystidia always present, mostly in the form of broom cells of the *Siccus*-type. Pleuro- and caulocystidia present or absent. Hyphae dextrinoid.

Ser. *Atrorubentes* Desjardin & E. Horak

Stipe pruinose to pubescent. Caulocystidia present. Pileo-, caulosetae and hymenial setae absent.

Marasmius atrorubens (Berk.) Mont., Ann. Sci. Nat., Bot., sér. 4, 1: 118, 1854.

Revised specimen. – CAMEROON: South West Prov., Korup National Park, trail from Rengo Camp to Ekunde-Kunde, on fallen leaves, 9 Apr. 1997 leg. P.J. Roberts K 996 (K 92734). – NIGER: Tillabery, Say, W National Park, Mekrou, 6 Aug. 2010 leg. O. Hama 340, P.P. Daniëls, M. Barage, D. Ibrahim and M. Rosas (COFC).

Remarks. – This species is widely distributed throughout tropical Africa. Collections from Korup National Park were already published (Antonín 2007). Specimen found in Niger probably represents the first record for this country.

Marasmius buzungulo Singer, Bull. Jard. Bot. Etat. Brux. 34: 371, 1964.

Revised specimens. – BENIN: Niaouli, Bas-Fond, 29 June 2000 leg. A. De Kesel 2869 (BR 126422-31). – CAMEROON: Campo Ma'an National Park, Nvini, 23 Febr. 2009 leg. J. Degreef 650 (BR 166540-88). – GABON: Station de recherche d'Ipassa – Makokou, bord de l'Ivindo, 21 March 2005 leg. J. Degreef 302 (BR 164223-02).

Remarks. – This distinct species has so far been reported from the type locality in the Democratic Republic of Congo (Kinshasa) only.

Marasmius corrugatififormis Singer, Bull. Jard. Bot. Etat. Brux. 34: 374, 1964.

Revised specimens. – BENIN: Niaouli, 11 Oct. 2000 leg. Soulemane Nouru Y. 352 (BR 130351-80). – Wari Maro (Soubak-N), 24 Sept. 1998 leg. A. De Kesel 2330 (BR 112823-12). – CAMEROON: South West Prov., Korup National Park, transect P, alt. 50 m, on fallen stick, 26 Apr. 1996 leg. M.E. Bechem (P.J. Roberts K 155, K 147012). – GABON: Ogooué-Ivindo Prov., Ipassa-Makokou, lignicolous, 24 March 2005 leg. A. Murhula Cizungu 35 (BR 159742-80).

Remarks. – This species is rather widely distributed in tropical Africa (Antonín 2007: Cameroon, Democratic Republic of Congo, Ghana, Ivory Coast, Uganda). The collections represent the first records for Benin and Gabon.

Ser. *Spinulosi* (Cléménçon) Desjardin

Stipe pruinose or pubescent. Pileo-, caulosetae and hymenial setae present.

Marasmius castaneovelutinus Henn., Bot. Jahrb. Syst. 38: 124, 1905.

Revised specimen. – CAMEROON: East Prov., Dja Biosphere Reserve, Somalomo Distr., vicinity of Messamena, village of Shouam, trail towards Rochers de Shouam, on decaying wood and leaves on the forest floor, 03° 26.64' N, 12° 43.41' E, 12 Apr. 2007 leg. D. Stubbe DS 07371 (BR 164416-95).

Remarks. – *Marasmius castaneovelutinus* was already published from Cameroon (Antonín 2007). This collection showed slightly smaller basidiospores (12.5-15 × 3.5-6.0 µm), but other microscopic characters agree well.

Marasmius fulvovelutinus Beeli, Bull. Soc. Roy. Bot. Belg. 60: 155, 1928.

Revised specimen. – BENIN: Niaouli, 10 June 1999 leg. A. De Kesel 2590 (BR 112965-57).

Remarks. – *Marasmius fulvovelutinus* has been published only from two localities in the Democratic Republic of Congo to date (Antonín 2007).

Marasmius aff. mengoënsis Pegler, Kew Bull. Addit. Ser. 6: 194, 1977.

Pileus up to 20 mm broad, broadly conical with a small papilla, then applanate, margin inflexed then straight, slightly striate, otherwise smooth, chestnut brown at centre, brown towards margin. **Lamellae** moderately close, L = 29-33, l = 3, almost free, brownish tinged, with concolorous edge. **Stipe** up to 50 × 2 mm, cylindrical, entirely puberulous to furfuraceous, non-insititious, brown to greyish brown, basal tomentum white. (Macroscopic description according to dry specimens.)

Basidiospores 6.0-7.5 × 3.0-3.5 µm, av. 6.9 × 3.2 µm, E = 1.71-2.34, Q = 2.15, cylindrical, ellipsoid or ellipsoid-fusoid, thin-walled. **Basidioles** up to 25 × 3.0-7.0 µm, clavate, fusoid, (sub)cylindrical, clamped. **Cheilocystidia** 12-24 × 4.0-11 µm, clavate, subcylindrical, (sub)fusoid, sometimes rostrate, sometimes irregular, thin-walled. **Pleurocystidia** 30-75 × 10-16 µm, fusoid, cylindrical-fusoid, sometimes pimpled, thin-walled, refractive, clamped. **Trama hyphae** of cylindrical, fusoid, ellipsoid cells, thin- to slightly thick-walled, clamped, smooth or minutely incrustated, dextrinoid, up to 25 µm wide. **Pileipellis** a hymeniderm composed of clavate, sometimes irregular, smooth, thin- to slightly thick-walled cells. **Pileosetae** 48-61 × 9.0-11 µm, fusoid, sometimes septate, ± thin- to thick-walled (walls up to 1.0 µm). **Stipitipellis** a cutis of parallel, cylindrical, thick-walled, clamped, dextrinoid, up to 6.0 µm wide hyphae with hyaline to brownish walls in KOH. **Caulocystidia** and caulosetae 27-75 × 6.0-17 µm, lageniform, fusoid, subcylindrical, often with up to 40 µm long rostrum, ± thin- to thick-walled (walls up to 1.0 µm).

Revised specimen. – BENIN: Niaouli, 29 June 2000 leg. Soulemane Nouru Y. 272 (BR 130271-00).

Remarks. – This collection agrees with *Marasmius mengoënsis* in having a smooth and glabrous pileus, smooth pileipellis cells, similar cheilocystidia and similar, well-developed pileo- and caulosetae. However the latter fungus differs by a smaller pileus, larger (7.5-10 × 4.0-5.0 µm) and slightly differently shaped basidiospores (Pegler 1977).

Although the Benin collection high probably represents a new taxon, unfortunately neither a macroscopic description nor a photo is available. Moreover, neither the type specimen nor other specimens of *M. mengoënsis* are preserved to enable comparison of both fungi (Antonín 2007). Therefore, exact identification is impossible.

Ser. *Leonini* Singer

Stipe smooth and glabrous. Pleuro- and caulocystidia absent.

Marasmius cf. carcharus Singer, Bull. Jard. Bot. Etat Brux. 34: 361, 1964.

Revised specimen. – BENIN: Niaouli, Bas-Fond, 12 June 2000 leg. A. De Kesel 2782 (BR 126335-41).

Remarks. – This collection agrees well with *M. carcharus* in all macro- and microscopic characters except for the stipe colour of young basidiocarps (according to a slide) which is yellow, although the yellow colour is totally absent in older specimens. The yellow stipe is described for *M. luteostipitatus* Mossebo & Antonín. However, it has a paler, cream pileus with ochraceous yellowish centre, and smaller basidiospores ($16-18(-20) \times 4.0-5.0 \mu\text{m}$) (Antonín 2007, Mossebo & Antonín 2004).

Marasmius conicoparvus Antonín, C. Sharp & Stubbe sp. nov.

Fig. 3

Mycobank MB 564929

Pileo 6-12 mm lato, campanulato, conico, vel plano-convexo, rubro vel aurantiaco-rubro. Lamellis albis, acie concolore. Stipite 36-60 \times 0.5 mm, cylindraceo, glabro, aurantiaco-luteo usque nigro-brunneo. Basidiosporis 13-16 \times 3.5-5.0 μm , subclavatis, fusiformibus. Cheilocystidiis e cellulis similibus cellulis typo Marasmii sicci, 11-22 \times 6.0-10 μm , clavatis, subcylindraceis, tenuitunicatis. Pleurocystidiis absentis. Pileipellis hymeniformis, e cellulis similibus cellulis hymenodermatis Marasmii sicci, 9.0-26 \times 6.0-10 μm , clavatis, ad basin tenuitunicatis, apicem leviter crassitunicatis. Caulocystidiis absentis. Hyphis fibulatis, dextrinoideis.

Holotypus: Cameroon, De l'Est Prov., Dja Biosphere Reserve, Somalomo Distr., Messamena, 4. IV. 2007 leg. D. Stubbe DS 07320 (BR 164456-41).

Etymology. “conicoparvus” – having a small and conical pileus.

Pileus 6-12 mm broad, conical or convex when young, becoming plano-convex when mature, papillate in centre (but not distinctly), surface irregular, somewhat smoother when mature, dry and slightly pruinose, cap margin mostly smooth to faintly irregularly crenate, the outer rim translucently striate, cap colour deep (crimson?) red when young, more orange-red when maturing (mature specimens paler than young ones). **Lamellae** distant, L = 16-20, emarginate, moderately crowded, white, edge concolorous, smooth. **Stipe** 36-60 \times 0.5 mm, very thin, filiform, smooth and glabrous, upper part pale orange-yellowish, but most of the stipe blackish-brown.

Basidiospores 13-16 \times 3.5-5.0 μm , av. 14.4 \times 4.4 μm , E = 2.9-3.7(–4.3), Q = 3.2-3.4, fusoid, subclavate, thin-walled, non-dextrinoid. **Basidia** e.g. 25 \times 9.0 μm , 4-spored, clavate. **Basidioles** 12-27(–33) \times 4.0-12 μm , clavate, fusoid, clamped. **Cheilocystidia** in the form of broom cells of the Siccus-type, 11-22 \times 6.0-10 μm , clavate, subcylindrical, \pm thin-walled, hyaline, projections up to 30 in number, nodulose, digitate, up to 8.0 \times 1.0 μm . **Pleurocystidia** absent. **Trama hyphae** cylindrical or subinflated, thin- to slightly thick-walled, dextrinoid, up to 20 μm wide. **Pileipellis** a hymeniderm composed of broom cells of the Siccus-type, 9.0-26 \times 6.0-10 μm , clavate, subcylindrical, mostly thin-walled with slightly thick-walled apex; projections digitate, nodulose, obtuse to subacute, up to c. 25(–30) in number, up to 8.0 \times 1.0 μm ; thick-walled parts with subhyaline to pale yellowish brown- reddish walls in KOH. **Stipitipellis** a cutis of parallel, cylindrical, slightly

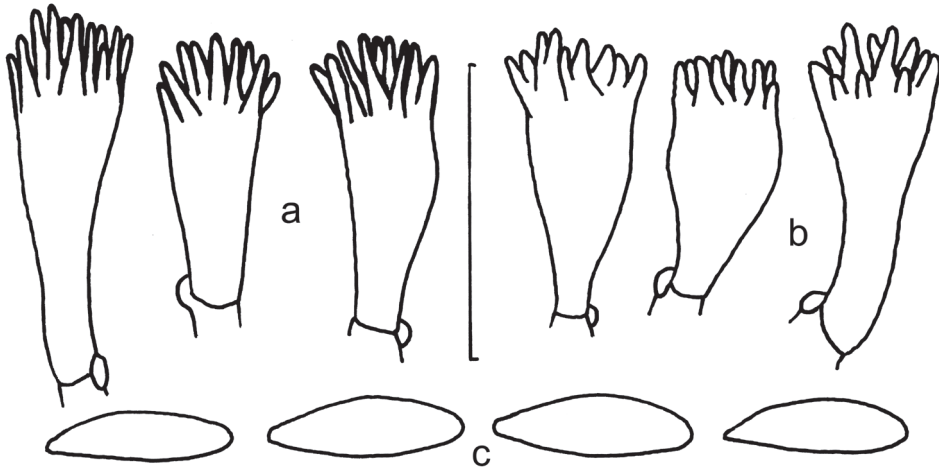


Fig. 3. *Marasmius conicoparvus*. **a.** pileipellis cells, **b.** cheilocystidia, **c.** basidiospores. Scale bar = 20 μ m.

thick-walled, clamped, dextrinoid, up to 5.0 μ m wide hyphae, with pale ochraceous yellowish walls in KOH. **Caulocystidia** absent.

Revised specimens. – CAMEROON: East Prov., Dja Biosphere Reserve, Somalomo Distr., vicinity of Messamena, farthest *Gilbertodendron* stand, on decaying leaves, 03° 22.24' N, 12° 44.01' E, 4 Apr. 2007 leg. D. Stubbe DS 07320 (BR 164456-41, holotype, and GENT). – DEMOCRATIC REPUBLIC OF CONGO: ? Kimuingu, 29 Nov. 1907, *H. Vanderyst* s. n. (BR 13865-91). – Katanga Province, Luiswishi, 19 March 1986, *J. Schreurs* 1428 (BR 8210-62). – ZIMBABWE: Mashonaland Prov., Bromley, Liemba Farm, leaf litter in miombo woodland, 1. Febr. 1999, *C. Sharp* 1585/01 (BR 152507-23). – Manicaland Prov., Penhalonga, in *Brachystegia spiciformis* litter, 9 Febr. 1999, *C. Sharp* 1586/01 (BR 152503-19). – Mwuma, Beacon Hill Homestead, leaf litter in miombo woodland, 29 Jan. 1994, *C. Sharp* 809/97 (BR).

Remarks. – *Marasmius conicoparvus* is characterised in having a rather small, deep red then more orange-red pileus, distant lamellae, rather large basidiospores, and by the absence of pleuro- and caulocystidia. For a detailed discussion, see Antonín (2007).

This species has been invalidly (*ad int.*) described by Antonín & Sharp (Antonín 2007) because of the absence of a macroscopic description. Now it is described validly with a macroscopic description based on material from Cameroon.

Marasmius haediniformis Singer, Bull. Jard. Bot. Etat. Brux. 34: 363, 1964.

Revised specimens. – BENIN: Niaouli, 5 June 1999 leg. A. De Kesel 2523 (BR 112898-87). – Niaouli, 5 June 1999 leg. A. De Kesel 2551 (BR 112926-18). – GABON: Ogoové Ivondo Prov., Impassa Makokou, lignicolous, 15 March 2005 leg. M. Nguele 14 (BR 159804-45).

Remarks. – *Marasmius haediniformis* is a widely distributed species in tropical Africa. The collections published here, however, represent the first records from Benin and Gabon.

Marasmius lilacinoalbus Beeli, Bull. Soc. Roy. Bot. Belg. 60: 158, 1928.

Revised specimens. – BENIN: Bassila, 4 Oct. 2000 leg. A. De Kesel 2995 (BR 129207-03). – Bassila, northern part of the Forêt Classée de Bassila, 17 June 2004 leg. A. De Kesel 3667 (BR 157072-29). – Pahou, 27 June 1999 leg. A. De Kesel 2671 (BR 115756-35). – Niaouli, 25 June 1999 leg. A. De Kesel 2663 (BR 115748-27). – Niaouli, 12 June 2000 leg. Soulemane Norou Y. 221 (BR 130220-46). – CAMEROON: East Prov., Dja Biosphere Reserve, close to Somalomo, inundated *Uapaca* forest along the Dja river, 03° 22.15' N, 12° 44.89' E, alt. 610 m, 7 Apr. 2007 leg. A. Verbeken 07-32 (BR 164504-89). – Ibid., village of Shouam, trail to Inselberg, primary rainforest with abundant *Uapaca* trees, 03° 20.64' N, 12° 43.41' E, alt. 670 m, 12 Apr. 2007 leg. A. Verbeken 07-77 (BR 164459-44). – GABON: Ogooué-Ivindo Prov., Station d'Ipassa-Makokou, on detritus, 16 March 2005 leg. Benjamin Toirambe 24 (BR 159807-48). – KENYA: Shimba Hills (Kayatelezia plots), South Coast, Kwalé District, 6 Dec. 2004 leg. A. De Kesel 4028bis (BR 162801-35). – TOGO: Bassila (border), west of Forêt Classée de Bassila, 11 June 2002 leg. A. De Kesel 3352 (BR 152146-50). – ? ZIMBABWE: Vumba 1932B2, under mature *Berlinia spiciformis* amongst litter and grass tufts, 25 Jan. 2006 leg. E. Sharp 1748 and L.C. Morrison (BR 160901-75).

Remarks. – *Marasmius lilacinoalbus* is a widely distributed species throughout tropical Africa, being known from Burundi, Cameroon, Democratic Republic of Congo, Ghana, Nigeria, Tanzania, Uganda, and Zambia (Antonín 2007). For Benin, Gabon, Kenya, Togo, and Zimbabwe, the published collections represent the first record.

Marasmius cf. luteostipitatus Mossebo & Antonín, Czech Mycol. 56: 106, 2004.

Revised specimen. – BENIN: Plateau de Niaouli, 23 June 1999 leg. A. De Kesel 2645 (BR 115728-07).

Remarks. – This collection from Benin consists of young basidiocarps which macroscopically (according to a slide) and microscopically agrees with *M. luteostipitatus*. However, no spores have been found, and, therefore it is published with a question mark here.

Marasmius nodulocystis Pegler, Kew Bull. Addit. Ser. 6: 200, 1977.

Revised specimen. – GABON: Ogooué-Ivindo Prov., Station d'Ipassa-Makokou, on soil, 16 March 2005 leg. C. Ntoutoume 22 (BR 159776-17).

Remarks. – The published collection slightly differs by the presence of both broom cells (with typically broadly obtuse projections) and smooth cells in the pileipellis and the same character of cheilocystidia, and slightly broader basidiospores (8.5-10(-11) × 4.5-5.0 µm). Other macro- and microscopic characters agree well. I suppose that these differences belong to the species variability.

Marasmius cf. ochropus Singer, Bull. Jard. Bot. Etat. Brux. 34: 369, 1964.

Revised specimen. – GABON: Ogooué-Ivombo Prov., Station d'Ipassa, Makokou, on dead wood, 10 March 2005 leg. B. Toirambe 9 (BR 159809-50).

Remarks. – So far, this species is known from the Democratic Republic of Congo, Uganda, and probably Nigeria (Antonín 2007). The collection from Gabon differs from the original description (Antonín 2007, Singer 1964, 1965) in having darker, reddish brown stipe.

Marasmius purpureotinctus Antonín & P. Roberts sp. nov.**Fig. 4**

MycoBank MB 564930

Pileo usque 15 mm lato, campanulato, centro depresso, sulcato, roseo-purpureo. Lamellis ochraceis, acie concolore. Stipite usque 30 mm longo, cylindraceo, glabro, purpureo. Basidiosporis 17.5-20 × 4.5-5.7 μm, clavatis, fusiformibus. Cheilocystidiis e cellulis similibus cellulis typo Marasmii sicci, 12-22 × 7.0-12 μm, clavatis, subcylindraceutis, tenuitunicatis. Pleurocystidiis absentibus. Pileipellis hymeniformis, e cellulis similibus cellulis hymenodermatis Marasmii sicci, (9.0-)12-22 × 6.0-9.0 μm, clavatis, ad basin tenuitunicatis, apicem leviter crassitunicatis vel crassitunicatis. Hyphis fibulatis, dextrinoideis.

Holotypus: Cameroon, South West Prov., Korup National Park, trail from Rengo Camp to Ekunde-Kunde, 9. IV. 1997 leg. P.J. Roberts K1035 (holotypus in herbario K 92733 asservatur).

Etymology. “purpureotinctus” – having a pileus with a purple tinge.

Pileus c. 15 mm broad, membranaceous, ± campanulate with slightly depressed centre, sulcate, slightly rugulose in central umbilicus, dull pinkish purple, uniform, not striped. **Lamellae** distant, L = 12-15, l = 0(1), (shortly) adnate, buff, with concolorous edge. **Stipe** up to 30 mm long, cylindrical, thin, ± polished, non-insititious, purple, with well-developed white basal mycelium. (Description according to the collector’s notes and dry specimens.)

Basidiospores 17.5-20 × 4.5-5.7 μm, av. 18.9 × 5.1 μm, E = 3.45-4.44, Q = 3.75, clavate, fusoid, thin-walled, non-dextrinoid. **Basidioles** 18-35 × 5.0-11 μm, clavate, fusoid, subcylindrical. **Cheilocystidia** in the form of broom cells of the Siccus-type, 12-22 × 7.0-12 μm, clavate, subcylindrical, thin-walled, clamped; projections up to 11 × 1.5 μm, nodulose, digitate, obtuse to subacute, thin-to slightly thick-walled. **Pleurocystidia** absent. **Trama hyphae** ± cylindrical, dextrinoid, clamped. **Pileipellis** a hymeniderm composed of two types of broom cells of the Siccus-type, (9.0-)12-22 × 6.0-9.0 μm, (1) clavate, thin-walled with

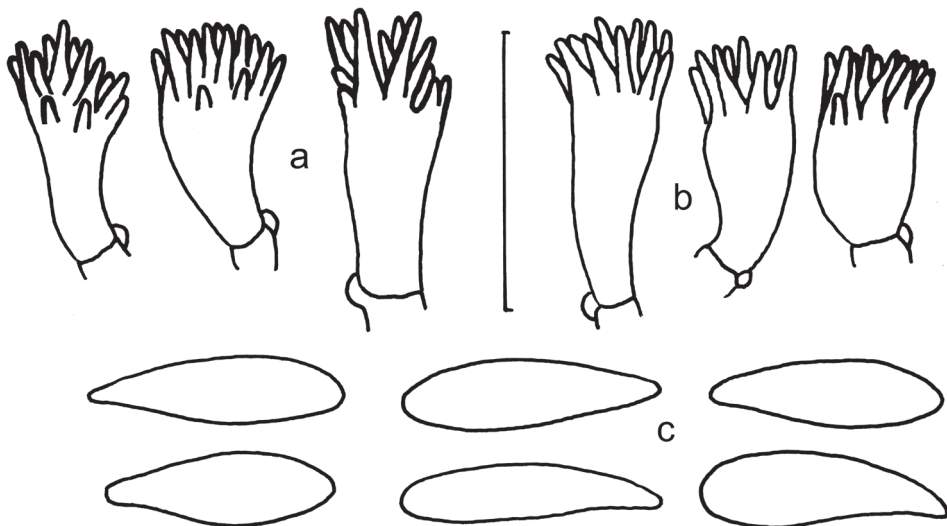


Fig. 4. *Marasmius purpureotinctus* (holotype). **a.** pileipellis cells, **b.** cheilocystidia, **c.** basidiospores. Scale bar = 20 μm.

slightly thick-walled, and 8-25 nodulose, digitate, obtuse to subacute, up to $8.0 \times 1.0 \mu\text{m}$ large projections, and (2) distinctly thick-walled at apex with 8-25, up to $12 \times 2.0 \mu\text{m}$ large, thick-walled, nodulose, digitate, obtuse projections. **Stipitipellis** a cutis of cylindrical, parallel, slightly thick-walled, dextrinoid, clamped, up to $5.0 \mu\text{m}$ wide hyphae with ochraceous walls in KOH. **Caulocystidia** absent.

Revised specimen. – CAMEROON: South West Prov., Korup National Park, trail from Rengo Camp to Ekunde-Kunde, on twig, 9 Apr. 1997 leg. P.J. Roberts K 1035 (K 92733).

Remarks. – *Marasmius purpureotinctus* is characterised by a dull pinkish purple pileus, buff coloured lamellae, a purple stipe, rather large basidiospores, and the absence of pleurocystidia and caulocystidia.

Among species with a purple tinge on pileus or stipe, *Marasmius carcharus* Singer, known from Central Africa, differs by a pinkish brown and pallescent pileus, the presence of lamellulae, a brown stipe, slightly different size and shape of basidiospores ($17.5\text{-}24 \times 3.8\text{-}5.0\text{(-}5.5) \mu\text{m}$, $E = 3.6\text{-}5.6$, $Q = 4.2\text{-}4.5$), and smaller cheilocystidia ($11.5\text{-}16.5 \times 6.2\text{-}9.2 \mu\text{m}$) (Antonín 2007). *Marasmius amazonicus* Henn., described from Bolivia and also known from Brazil, has a broader (Singer 1976: 42-72 mm, Oliveira *et al.* 2008: 16-58 mm), deep purple to deep lilac-violet pileus with a blackish purple centre, covered with buff coloured dots, a longer stipe (Singer 1976: $80\text{-}145 \times 2.5\text{-}3.5 \text{ mm}$, Oliveira *et al.* 2008: $50\text{-}70 \times 1\text{-}2 \text{ mm}$), and different basidiospores (Singer 1976: $12\text{-}21 \times 3.5\text{-}4.8 \mu\text{m}$, Oliveira *et al.* 2008: $13.75\text{-}16.25\text{(-}17.5) \times 2.5\text{-}3.75 \mu\text{m}$) (Singer 1976, Oliveira *et al.* 2008). *Marasmius tucumanus* Singer, known from Argentina, differs by an intensely pink pileus with a dark purple centre, pink lamellae, smaller basidiospores ($10.3\text{-}15 \times 3.3\text{-}4.8 \mu\text{m}$) (Singer 1976). *Marasmius tageticolor* Berk., known from South America and Java, Indonesia, has a smaller, 5-12 mm broad, dark purplish red, ruby or violet-brown pileus, greyish red lamellae, a dark brown stipe, and narrower, $19\text{-}21.5 \times 3\text{-}4 \mu\text{m}$ large basidiospores (Desjardin *et al.* 2000, Singer 1976).

Marasmius sierraleonis Beeli, Bull. Jard. Bot. Etat Brix. 15: 36, 1938.

Revised specimen. – CAMEROON: South West Prov., Korup National Park, transect P, on dead twig, 50 m alt., 26 Apr. 1996 leg. M.E. Bechem (Roberts K 160, (K 147018).

Remarks. – *Marasmius sierraleonis* seems to be widely distributed through tropical Africa (Cameroon, Democratic Republic of Congo, Kenya, Sierra Leone, Zimbabwe). The collection from Korup National Park by the same group of mycologists was already published before (Antonín 2007).

Marasmius cf. tanougouensis Antonín, Mycotaxon 89(2): 417, 2004.

Revised specimen. – CAMEROON: East Prov., Dja Biosphere Reserve, close to Somalomo, inundated *Uapaca* forest along the Dja river, $03^{\circ} 23.65' \text{ N}$, $12^{\circ} 43.37' \text{ E}$, alt. 650 m, 6 Apr. 2007 leg. A. Verbeken 07-18 (BR 164517-05).

Remarks. – According to the dry specimen (a macroscopic description is not available, the specimen consists of only one small basidiocarp), this collection agrees well with *Marasmius tanougouensis*, but the basidiospores are slightly broader, $12.5\text{-}15 \times 4.75\text{-}5.5 \mu\text{m}$ (Antonín 2007: $(11.5\text{-})12.5\text{-}15.5 \times 3.5\text{-}5.0\text{(-}5.5) \mu\text{m}$).

Marasmius sp.

Fig. 5

Pileus up to 15 mm broad, convex, centrally umbilicate, sulcate, crenulate at margin, finely tomentose, violaceous brown. **Lamellae** distant, $L = 12\text{-}13$, $I = 0$, ochraceous cream coloured, edge concolorous or violaceous brown. **Stipe** up to

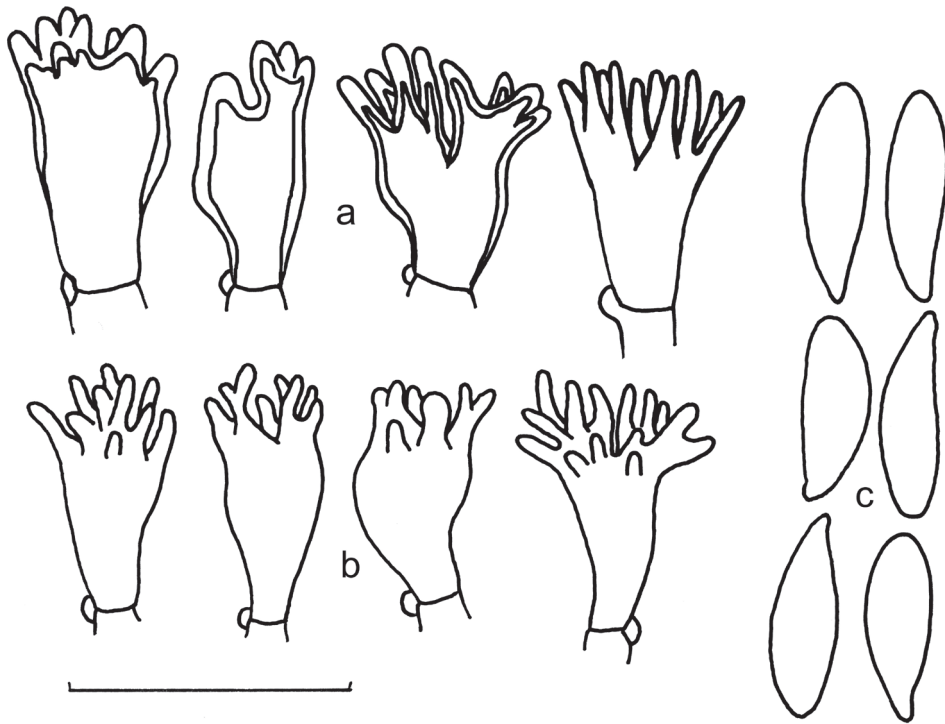


Fig. 5. *Marasmius* sp. **a.** pileipellis cells, **b.** cheilocystidia, **c.** basidiospores. Scale bar = 20 μ m.

45 \times 1.5 mm, cylindrical, lustrous, stramineous brown. (Description according to dry specimens.)

Basidiospores (10–)11–16(–17) \times (4.0–)4.5–6.0 μ m, av. 13.9 \times 4.9 μ m, E = (2.2–)2.5–3.4, Q = 2.70–3.04, fusoid, clavate, sublacrimoid, thin-walled, non-dextrinoid. **Basidia** 25–38 \times 9.0–10.5 μ m, 4-spored, clavate, clamped. **Basidioles** 20–45 \times 5.0–9.0 μ m, clavate, fusoid, cylindrical, clamped. **Cheilocystidia** in the form of broom cells, 13–23 \times (6.5–)7.5–10 μ m, clavate, subcylindrical, sometimes irregular or branched at apex, \pm thin-walled, clamped; projections up to 10 \times 1.5–2.0 μ m, digitate, obtuse, often branched, nodulose, \pm slightly thick-walled. **Pleurocystidia** absent. **Trama hyphae** cylindrical or subinflated, thin- to slightly thick-walled, smooth or minutely incrustated, clamped, dextrinoid, up to 15 μ m wide. **Pileipellis** a hymeniderm composed of broom cells of the *Siccus*-type, (10–)13–28 \times 6.0–12 μ m, clavate, subcylindrical, subfusoid, sometimes branched, thin-walled with slightly thick-walled apex or entirely thick-walled; projections up to 10 \times 2.0 μ m, digitate, obtuse, thick-walled, c. 10–25(–30) in number; thick-walled parts grey-brown to dark brown in KOH. **Stipitipellis** a cutis of cylindrical, parallel, slightly thick-walled, dextrinoid, clamped, up to 5.0 μ m wide hyphae with brown-green walls in KOH. **Caulocystidia** absent.

Revised specimens. – CAMEROON: East Prov., Dja Biosphere Reserve, close to Somalomo, inundated *Uapaca* forest along the Dja river, 03° 22.15' N, 12° 44.89' E, alt. 610 m, 7 Apr. 2007 leg. A. Verbeke 07-34 (BR 164502-87). – *Ibid.*, leg. A. Verbeke 07-30 (BR 164505-90).

Remarks. – These collections are characterised by distinctly sulcate, violaceous brown pilei, distant lamellae, lustrous, stramineous or stramineous brown stipes, moderately large basidiospores, and the absence of pleuro- and caulocystidia. Unfortunately, neither macroscopic descriptions nor photos are available. Without them, it is impossible to identify it exactly or describe it as a new taxon. Its microscopic characters do not even allow to describe it as *ad interim* here (in contrast to *Marasmius brunneoloides*, which certainly represents a new species; see above).

In comparison with other tropical African species with a glabrous, stramineous or yellow-brown coloured stipe and without pleurocystidia, *Marasmius episemus* Singer has a larger, up to 50 mm broad pileus, a large stipe (90-100 × 5-6 mm), and smaller and broader basidiospores (9.6-12(-13) × 5.2-6.9(-7.7) µm), whereas *Marasmius ochropus* Singer has a slightly sulcate, ochraceous brown pileus, and smaller, only 9.5-12.5 × 3.0-4.2 µm large basidiospores (Antonín 2007, Singer 1964, 1965).

Ser. *Haematocephali* Singer

Stipe smooth and glabrous. Pleurocystidia present. Caulocystidia absent.

Marasmius cf. bingaensis Singer, Bull. Jard. Bot. Etat Brux. 34: 382, 1964.

Revised specimen. – BENIN: Niaouli, Bas-Fond, 30 June 2000 leg. A. De Kesel 2874 (BR 126427-36).

Remarks. – This collection agrees rather well with *M. bingaensis*. However, the pileus is more distinctly papillate, lamellae are closer (L = 16-18) and basidiospores slightly smaller (14-18(-19) × (4.0-)4.5-5.0(-5.5) µm). Unfortunately, neither a macroscopic description nor a photo is available. On the other hand, the variability of basidiospore size and pleurocystidia shape is rather great, and this collection may fit in it.

Marasmius brunneoniger Antonín & De Kesel sp. nov.

Fig. 6

Mycobank MB 564931

Pileo 10-35 mm lato, convexo, deinde campanulato vel plano, centro late umbonato vel papillato, striato, obscure brunneo vel brunneo-nigro. Lamellis cremeis, acie concolore vel colore nigro. Stipite 35-60 × 0.5-2 mm, cylindraceo, glabro, apicem cremeo vel brunneo, ad basin obscure brunneo. Basidiosporis 12-14(-15) × 4.0-4.5 µm, clavatis, fusiformibus vel sublacrimiformibus. Cheilocystidiis e cellulis similibus cellulis typo Marasmii sicci, 10-16 × 5.0-9.0 µm, clavatis, tenuitunicatis. Pleurocystidiis 26-52 × 6.0-9.0 µm, fusiformibus, subcylindraceutis, rostratis, tenuitunicatis. Pileipellis hymeniformis, e cellulis similibus cellulis hymenodermatis Marasmii sicci, (8.0-)12-29 × 6.0-10 µm, clavatis vel subcylindraceutis, crassitunicatis vel ad basin tenuitunicatis, apicem leviter crassitunicatis. Caulocystidiis absentis.

Holotypus: Benin, Niaouli, Bas-Fond, 29. VI. 2000 leg. A. De Kesel 2866 (holotypus in herbario BR 126419-28 asservatur).

Etymology. “brunneoniger” – having a brown-black pileus.

Pileus 10-35 mm broad, convex, then campanulate, soon applanate, obtuse or with small central papilla, shortly inflexed to straight at margin, slightly tomentose, mat, striate, not sulcate, sometimes slightly rugulose at centre, dark brown to blackish brown, finely striped-grooved up to 1/3. **Lamellae** rather distant, L = 16-18, l = 4-5, only few reaching the stipe, not intervenose or slightly intervenose when old, 3-4 mm broad, with powdery surface, cream-coloured, with

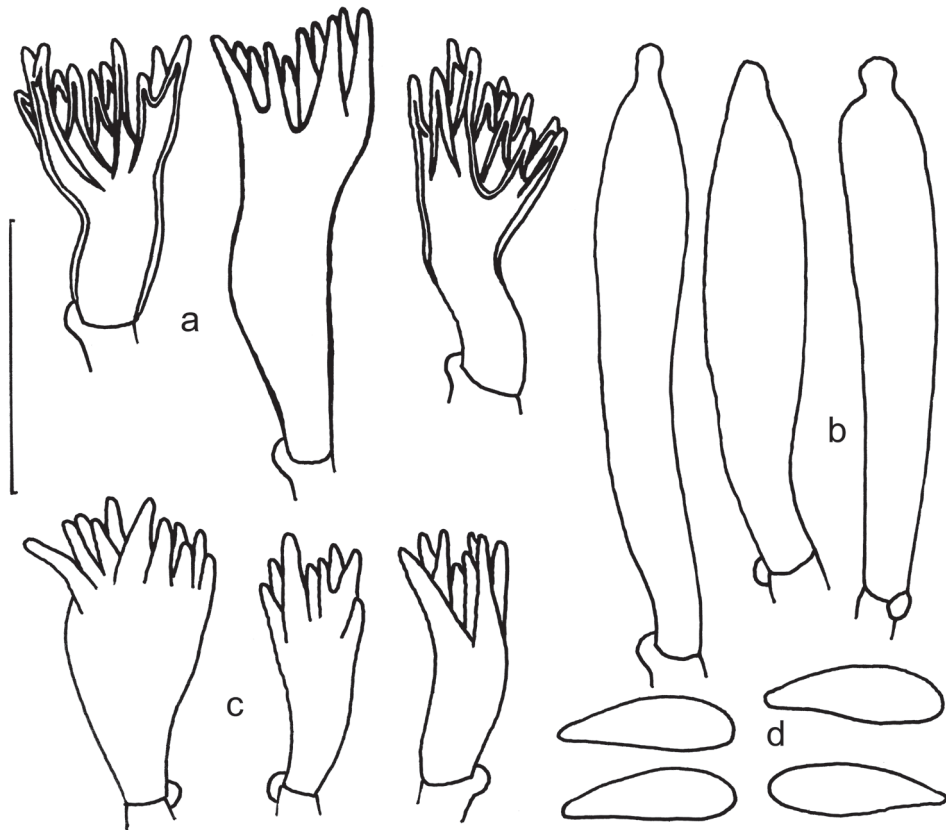


Fig. 6. *Marasmius brunneoniger*. **a.** pileipellis cells, **b.** pleurocystidia, **c.** cheilocystidia, **d.** basidiospores. Scale bar = 20 μ m.

concolorous or black-coloured edge. **Stipe** 35-60 \times 0.5-2 mm, slender, cylindrical, slightly broadened at apex, hard and a bit tough, hollow, non-insititious, smooth, glabrous, mat or slightly lustrous, dark brown to black brown except for the uppermost pale brown part; basal mycelium rich, cream-coloured or beige. Context in cap very thin, in the stipe dark brown, with a humus-like smell and weakly fungoid taste. Spore print white.

Basidiospores 12-14(-15) \times 4.0-4.5 μ m, av. 13.5 \times 4.3 μ m, E = 2.8-3.6, Q = 3.1, clavate, fusoid, sublacrimoid, thin-walled, non-dextrinoid. **Basidia** (only one found) 29 \times 8.5 μ m, 4-spored clavate, clamped. **Basidioles** 16-30 \times 4.0-7.0(-10) μ m, clavate, fusoid, subcylindrical. **Cheilocystidia** in the form of broom cells of the Siccus-type, 10-16 \times 5.0-9.0 μ m, clavate, thin-walled, with slightly thick-walled projections. **Pleurocystidia** 26-52 \times 6.0-9.0 μ m, often originating in the subhymenium, fusoid, subcylindrical, mostly pimpled, thin-walled, refractive, clamped. **Trama hyphae** cylindrical, fusoid, thin- to slightly thick-walled, smooth or minutely incrustated, clamped, up to 30 μ m wide. **Pileipellis** a hymeniderm composed of broom cells of the Siccus-type, (8.0-)12-29 \times 6.0-10 μ m, clavate, subcylindrical, sometimes irregular, entirely thick-walled or with thin-walled base and thick-walled apex (walls up to 1.0 μ m), clamped; projections up to 12 \times

1.5(–2.0) μm , digitate or conical, thick-walled, 6–25 in number, obtuse to subacute. **Stipitipellis** a cutis of cylindrical, parallel, slightly thick-walled, clamped, up to 5.0 μm wide hyphae with olivaceous brown walls in KOH. **Caulocystidia** absent.

Revised specimens. – BENIN: Niaouli, Bas-Fond, in groups on dead wood, 29 June 2000 leg. A. De Kesel 2866 (BR 126419-28, holotype). – CAMEROON: Sud Prov., Somalomo, Dja Biosphere Reserve, 9 Apr. 2001 leg. V. Antonín Cm 01.62 (BRNM 666129).

Remarks. – *Marasmius brunneoniger* is characterised in having a brown-black to black pileus, moderately large basidiospores, well-developed, narrow pleurocystidia, pileipellis cells and cheilocystidia in the form of broom-cells of the Siccus-type and by the absence of caulocystidia.

The closest species is *Marasmius strigipes* Beeli, known from the Democratic Republic of Congo. It also has a dark brown to chestnut black pileus, close lamellae, and well-developed pleurocystidia. However it differs by larger basidiospores (14–16(–17.5) \times 3.8–4.5(–5.0) μm) and larger, especially broader, more distinctly fusoid pleurocystidia (25–72 \times 9.0–16 μm) (Antonín 2007). *Marasmius brunneolus* (Berk. & Broome) Pegler var. *fuliginosus* Desjardin & E. Horak, from Papua New Guinea, with a dark fuscous brown to soot-brown pileus, has distant to remote lamellae (L = 10–14), a shorter stipe (25–30 \times 0.5(–1) mm), and distinctly longer basidiospores (23–26 \times 2.5–4 μm) (Desjardin & Horak 1997). Also *M. nocturnus* Har. Takah., described from Japan, may have a very dark brown pileus when old. However, its pileus is light yellow, reddish yellow, light orange to orange in primordial stages, and basidiospores distinctly smaller (9–10.5 \times 4–4.5 μm) (Takahashi 2000).

The collection from Cameroon (Antonín Cm 01.62), included with a question mark in *M. strigipes*, and additional comments to *M. strigipes* by Antonín (2007) also belong to *M. brunneoniger*.

Marasmius confertus Berk. & Broome, J. Linn. Soc., Bot. 14: 34, 1873.

Revised specimen. – CAMEROON: South West Prov., Korup National Park, trail from Rengo Camp to Erat, on fallen leaf, alt. 100 m, 2 May 1996 leg. P.J. Roberts K 359 (K 147003).

Remarks. – The specimen studied consists only of one basidiocarp with half a pileus and partly damaged lamellae. All its macro- and microscopic characters agree well with *Marasmius confertus* except for the stipe colour, which is described as dark red by the collector, which is not really typical. However, in some stages of the development of *M. confertus*, the stipe can be \pm red-coloured (cf. Antonín 2007, pl. 17, fig. 99.1c.).

Marasmius ferrugineoides Antonín, Mycotaxon 89(2): 403, 2004.

Revised specimen. – BENIN: Niaouli, 4 June 1999 leg. A. De Kesel 2541 (BR 112916-08).

Remarks. – A widely distributed species in tropical Africa. This collection represents the first record from Benin. A similar taxon, *M. confertus* var. *tenuicystidiatus* Antonín, especially differs in having a darker, brown, orange or brownish orange pileus.

Marasmius grandisetulosus Singer, Bull. Jard. Bot. Etat. Brux. 34: 379, 1964.

Revised specimen. – CAMEROON: East Prov., Dja Biosphere Reserve, village of Shouam, trail to Inselberg, primary rainforest with abundant *Uapaca* trees, 03° 20.64' N, 12° 43.41' E, alt. 670 m, 12 Apr. 2007 leg. A. Verbeke 07-72 (BR 164464-49).

Remarks. – *Marasmius grandisetulosus* is a widely distributed species in the whole of tropical Africa (Cameroon, Democratic Republic of Congo, Ghana, Ivory Coast, Nigeria, Tanzania, and Zambia; Antonín 2007).

Marasmius haedinus Berk., in Hooker, J. Bot. 8: 135, 1856.

Revised specimen. – BENIN: Niaouli, 4 June 1999 leg. A. De Kesel 2544 (BR 112919-11).

Remarks. – In tropical Africa, this species has only been found in Cameroon (Antonín 2007). The published collection represents the first record from Benin.

Marasmius haematocephalus (Mont.) Fr., Epicr.: 382, 1838.

Revised specimens. – BENIN: Niaouli, 4 June 1999 leg. A. De Kesel 2539 (BR 112914-06). – Wari Maro, 22 Sept. 1998 leg. A. De Kesel 2302 (BR 112795-81). – CAMEROON: East Prov., Dja Biosphere Reserve, village of Shouam, trail to Inselberg, primary rainforest with abundant *Uapaca* trees, 03° 20.64' N, 12° 43.41' E, alt. 670 m, 12 Apr. 2007 leg. A. Verbeken 07-78 (BR 164458-43).

Remarks. – A pantropic species also common throughout tropical Africa.

Marasmius sepiopileatus Antonín & P. Roberts sp. nov.

Fig. 7

Mycobank MB 564932

Pileo usque 10 mm lato, campanulato, cum centro depresso, sepio-brunneo. Lamellis obscure ochraceis. Stipite usque 35 mm longo, apicem ochraceo, ad basin aurantiaco-luteo-brunneo. Basidiosporis 16-18(19) × 4.2-5.0(6.0), fusiformibus vel sublacrimiformibus. Cheilocystidiis e cellulis similibus cellulis typo Marasmii sicci, 14-20 × 8.0-10 µm, clavatis, subcylindraceis tenuitunicatis. Pleurocystidiis 37-48 × 10-11 µm, fusiformibus, fusiformibus-cylindraceis, rostratis, tenuitunicatis. Pileipellis hymeniformis, e cellulis similibus cellulis hymenodermatis Marasmii sicci, 10-21 × 6.0-10 µm, clavatis, ad basin tenuitunicatis, apicem leviter crassitunicatis. Caulocystidiis absentibus.

Holotypus: Cameroon, South West Prov., Korup National Park, trail to Rengo Rock, 8. IX. 1997 leg. P.J. Roberts K 979 (holotypus in herbario K 147004 asservatur).

Etymology. “sepiopileatus” – having a sepia-coloured pileus.

Pileus up to c. 10 mm broad, campanulate with small central depression, matt, velvety smooth, sepia. **Lamellae** distant, L = c. 16, light buff. **Stipe** up to 35 mm long, thin, polished, buff above, deep orange-tawny below. (Description according to the collector's notes and dry specimens.)

Basidiospores 16-18(–19) × 4.2-5.0(–6.0) µm, av. 16.9 × 4.6 µm, E = 3.30-4.05, Q = 3.68, fusoid, sublacrimoid, sublacrimoid, sometimes curved, thin-walled, non-dextrinoid. **Basidioles** c. 33 × 10 µm, clavate, subfusoid. **Cheilocystidia** in the form of broom cells of the Siccus-type, 14-20 × 8.0-10 µm, clavate, subcylindrical, thin-walled, clamped; projections up to 7.0 × 1.0 µm, up to 25(–30) in number, nodulose, digitate, slightly thick-walled, subacute to acute, pale brownish yellowish. **Pleurocystidia** 37-48 × 10-11 µm, fusoid, fusoid-cylindrical, pimpled, thin-walled, refractive. **Trama hyphae** cylindrical to subinflated, thin- to slightly thick-walled, hyaline, clamped, up to 15 µm wide. **Pileipellis** a hymeniderm composed of broom cells of the Siccus-type, 10-21 × 6.0-10 µm, clavate, sometimes branched, thin-walled with slightly thick-walled apex, clamped; projections up to 30(–35) in number, up to 8.0 × 1.0 µm, digitate, nodulose, obtuse to subacute, with yellow-brown walls in KOH. **Stipitipellis** a cutis of cylindrical, parallel, slightly

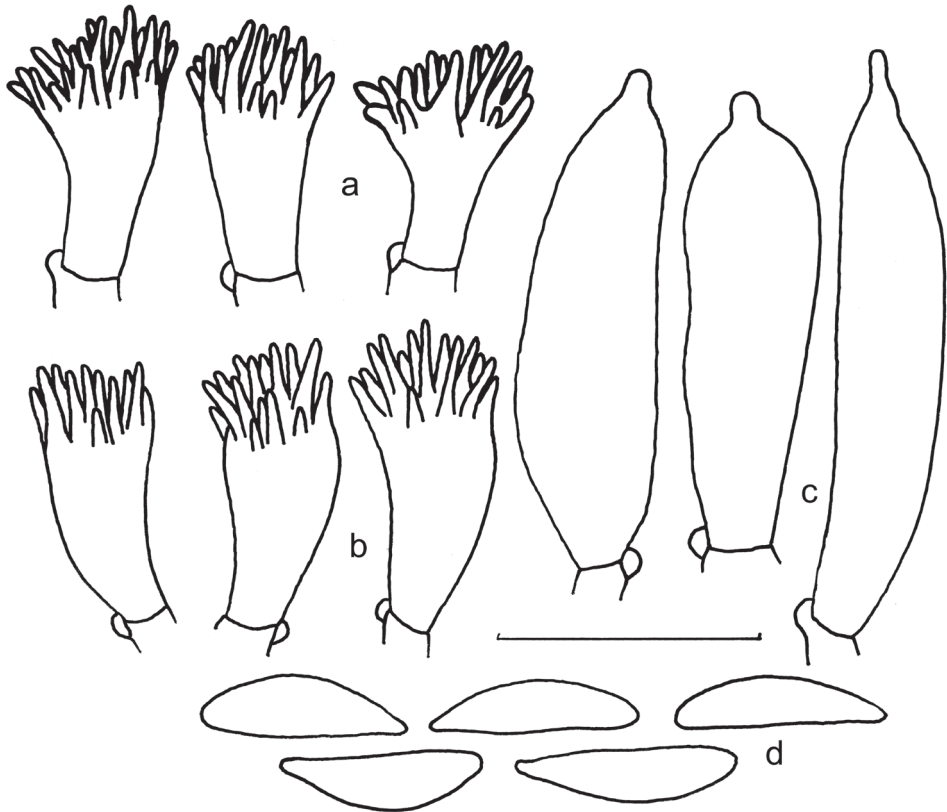


Fig. 7. *Marasmius sepiopileatus* (holotype). **a.** pileipellis cells, **b.** cheilocystidia, **c.** pleurocystidia, **d.** basidiospores. Scale bar = 20 μ m.

thick-walled, clamped, dextrinoid, up to 5.0 μ m wide cells with yellow-brown walls in KOH. **Caulocystidia** absent.

Revised specimen. – CAMEROON: South West Prov., Korup National Park, trail to Rengo Rock, on leaf litter, alt. 100 m, 8 Apr. 1997 leg. P.J. Roberts K 979 (K 147004, holotypus).

Remarks. – *Marasmius sepiopileatus* is characterised by a sepia-coloured pileus, a deep orange-tawny stipe, rather large basidiospores, well-developed, pimpled pleurocystidia, and the absence of caulocystidia.

The only African species having an olivaceous tinge, *Marasmius elaeocephalus* Singer, has smaller basidiospores (10.8-13.8(-14.5) \times 3.8-5.4 μ m; Antonín 2007). *Marasmius olivinus* Y.S. Tan & Desjardin, described from Malaysia, has smaller basidiospores (11-14(-15) \times 4-5.5(-6) μ m), and no pleurocystidia. Also *M. adhesus* Corner, known from Malaysia and Singapore, may have a brownish olive pileus, but has distinctly larger basidiospores ((21-)25-30(-31) \times 3-5 μ m) and no pleurocystidia either (Tan *et al.* 2009). *Marasmius trinitatis* Dennis, known from the USA and South and Central Americas, has an olive fuscous or deep olive pileus with a tawny to rusty centre, a 27-50 \times 1-2 mm large stipe, and smaller basidiospores (8.3-12.5 \times 2.7-4 μ m). *M. epelaeus* Singer,

described from Bolivia, has a smooth or slightly sulcate pileus and smaller basidiospores ($7.5\text{--}8.2 \times 3.5 \mu\text{m}$). *M. digiloi* Singer, from South America, has smaller basidiospores ($6\text{--}9 \times (3\text{--})3.5\text{--}4.5\text{--}(5) \mu\text{m}$), moreover none of the above species has developed pleurocystidia (Singer 1976). *Marasmius pseudocorrugatus* Singer may have a dull cinnamonaceous pileus with or without an olivaceous tinge, however it differs by smaller basidiospores ($(7.5\text{--})8\text{--}11.7 \times 2\text{--}3.5 \mu\text{m}$, Singer 1976).

Acknowledgements. The author wishes to thank the curators of the herbaria BR, COFC, and K for the loan of herbarium specimens, Zdeněk Pouzar (Prague, Czech Republic) for corrections of Latin diagnoses, Jan W. Jongepier (Veselý nad Morávou, Czech Republic) for linguistic improvement of this manuscript, and Miroslav Beran (České Budějovice, Czech Republic) for a translation of the French abstract. This paper appears through financial support provided to the Moravian Museum by the Ministry of Culture of the Czech Republic as part of its long-term conceptual development programme for research institutions (ref. MK000094862).

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