

**Studies in *Perenniporia s.l.* (Polyporaceae):
African taxa VII. *Truncospora oboensis* sp. nov.,
an undescribed species from high elevation
cloud forest of São Tome**

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Abstract – In the frame of an ongoing survey of the genus *Perenniporia sensu* Ryvarden & Johansen (1980) (Basidiomycota) in sub-Saharan Africa, the status of some collections from high elevation, cloud forest of Obô National Park, São Tomé, and their relation to *Perenniporia sensu stricto* and *Truncospora* have been analyzed. The genus *Truncospora* is redefined and a new species, *Truncospora oboensis* is proposed. The new combination *Truncospora detrita* is also proposed. In sub-Saharan Africa, *Truncospora* is now represented by two species: *Truncospora ochroleuca sensu* Ryvarden & Johansen (1980) occurring mainly in open woodlands and *Truncospora oboensis*, known from high altitude cloud forest of São Tomé.

Basidiomycota / insular Africa / São Tomé / Polypores / *Truncospora*

INTRODUCTION

As a continuation of the revision of *Perenniporia s.l.* (mainly *sensu* Ryvarden & Johansen 1980) in sub-Saharan Africa¹, two specimens of a species morphologically similar to *P. ochroleuca* (Berk.) Ryvarden were collected in the cloud (mist) forest of Obô National Park, São Tomé, above 1800 m altitude.

These collections clearly deviate from *P. ochroleuca*, however, in having pure white, soft and spongy basidiomes when fresh, and distinctly smaller basidiospores. They differ also from two other related taxa, *P. ohiensis* (Gilbertson & Ryvarden 1987) and *P. detrita* (Decock & Ryvarden 1999), and are considered as belonging to an undescribed species.

The placement of these taxa in *Perenniporia s.s.* (Decock & Stalpers 2006) is not straightforward, however: they would be better accommodated in *Truncospora* Pilát ex Pilát (Decock & Ryvarden 1999, Decock 2001, Robledo *et al.* 2009).

Truncospora is re-described and *Truncospora oboensis* sp. nov. is described and illustrated. In addition, the new combination *Truncospora detrita* is proposed.

1. Decock (2001), Decock & Bitew (2011), Decock & Masuka (2003), Decock & Mossebo (2001, 2002), Decock *et al.* (2011).

MATERIAL AND METHODS

Material and collecting localities

Specimens were collected at Obô National Park, São Tomé, between Base and Mesa camps, approx. 00°15.8' N – 006°33.2' E, elev. approx. 1800–1900 m, in an afro-montane, cloud forest (White 1986). The type specimen of the new species is preserved at MUCL with an isotype deposited at NY (herbarium acronyms are from Thiers B. [continuously updated]). MUCL original strain was isolated from basidiome tissues during fieldwork, on malt extract agar supplemented with 2 ppm benomyl (benlate) and 50 ppm chloramphenicol, and later purified in the laboratory. Living cultures are preserved at MUCL, with a duplicate of the ex-type strain deposited at CBS.

Specimen's description

Colors are described according to Kornerup & Wanscher (1981). Sections of the basidiome were incubated for one hour at 40°C in NaOH 3% solution, then carefully dissected under a stereomicroscope and examined in NaOH 3% solution at room temperature (Decock *et al.* 2010). To study the staining reaction of the basidiospores and hyphae, sections of the basidiomes were examined in Melzer's reagent and lactic acid cotton blue. All microscopic measurements were done in Melzer's reagent. In presenting the size range of several microscopic elements, 5% of the measurements at each end of the range are given in parentheses when relevant. In the text, the following abbreviations are used: ave = arithmetic mean, R = the ratio of length/width of basidiospores, and ave_R = arithmetic mean of the ratio R.

TAXONOMY

Truncospora Pilát ex Pilát, Sb. Nár. Mus. v Praze, Rada B, Prír. Vedy 9(2): 108, 1953.

Basidiomata seasonal (occasionally pluri-seasonal), pulvinate, attached by a dorsal vertex (button shape), to pileate, then amplexens or broadly attached, semi-circular to circular in outline, applanate to unglulate in section; *pileus* surface white, cork-colored, light brown to brown or reddish brown, to black from the base, smooth to concentrically or/and radially sulcate; *pores* surface white; *pores* very regular, with a honey-comb pattern; *context* reduced to a thin layer; *trama of the tubes* forming most of the basidiomata, the all white to pale corky when fresh. *Hyphal system* dimitic in the context, di- to trimitic in the trama of the tubes; *generative hyphae* hyaline, thin-walled, clamped; *vegetative hyphae* hyaline, variably dextrinoid, cyanophilous; *in the context* mainly of the skeletal hyphae type, parallel to the pileus surface, unbranched, thick-walled; *in the hymenophoral trama*, variably branched with a branching gradient, forming *in fine* a continuum from binding-like, few to moderately branched hyphae and with short, lateral or terminal processes, tortuous, often aborted, and thick-walled to unbranched skeletal hyphae, arising from clamped septa or from slightly branched, mediate hyphae, usually of limited growth (especially in the hymenophoral trama), thick-walled to almost solid.

Basidia broadly clavate to pedunculate (pear-shaped), clamped at the basal septum, with four sterigmata; *basidiospores* ellipsoid, broadly ellipsoid, elongated ovoid, distinctly thick-walled, with a truncate apex bearing a large apical germ pore developing through local disintegration, outside-inside, of the *coriatunica*, hyaline, slightly to strongly dextrinoid, cyanophilous; *cystidioles* variably present; chlamydospores absent.

Type species: Truncospora ochroleuca (Berk.) Pilát, Sb. Nár. Mus. v Praze, Rada B, Prír. Vedy 9(2): 108, 1953 (basionym: *Polyporus ochroleucus* Berk.², Hooker's J. Bot. Kew Gard. Misc. 4: 53, 1845).

***Truncospora oboensis* Decock sp. nov.**

Figs 1-2

Mycobank: MB 563793

Etymology: “*oboensis*”, named after the type locality, Obô National Park

Basidiomata annua, pulvinata vel pileada, alba, spongiosa; pororum facies albida; pori rotundi 3-4/mm, (185-)220-350(-375) µm latis; systema hypharum di-trimiticum; hyphae generatoriae fibulatae, hyalinae; contextus hyphis skeletalibus, crassitunicatis, hyalinis, leviter dextrinoideis, cyanophilis, 3.0-5.0 µm latis; trama hyphis skeletalibus, non- ad paucis ramosis, hyalinis, leviter dextrinoideis, cyanophilis 3.5-4.5 µm latis; trama hyphis ligativibus ramosis, crassitunicatis, hyalinis, adextrinoideis, 1.8-2.5 µm latis; basidia clavata vel pedunculata, tetrasterigmatica; basidiosporae ellipsoideae vel ovoidae, cum apice truncatae, crassitunicatae, dextrinoideae, (10.0-)11.0-14.0(-15.0) × (6.5-)6.5-8.5(-9.5) µm.

Basidioma annual, pileate, sessile; *pileus* solitary or laterally fused, circular when pending (button-shaped), attached by a small apical vertex, up to 10 mm diam., semicircular when broadly attached, then projecting 5-10 mm, 5-15 mm wide, appanate to subtriquetrous in section, 1.5 mm thick at the margin to 8(-12) mm thick at the base (or center), the surface smooth to faintly, gently concentrically sulcate (broad concentric ridges), glabrous, dull, pure white when fresh, pale grayish orange on aging or bruising (drying whitish, pale to grayish orange, 5B[3-5], apricot); *margin* acute, radially slightly folded, pure white when fresh (enrolled downward, plicate, and whitish to grayish orange on drying); *pore surface* plane to slightly convex, white when fresh (drying white to very pale grayish orange [5B3]); *pores* regular, in a honey-comb pattern, 3-4/mm, (185-)220-350(-375) mm wide (ave 305 µm); *dissepiments* thin, entire to dentate when fresh (lacerate on drying), 30-80 mm thick (ave 46 µm); *context* homogenous, reduced to thin layer above the tubes, 1-1.5(-2) mm thick at the base, white, soft, spongy when fresh (drying whitish to grayish orange [5B3] to pale orange [5B7], hard and horny); *tube layer* single, up to 6 mm long, concolourous with the context, white, soft spongy when fresh (drying hard, horny).

Hyphal system dimitic in the context, di- to trimitic in the hymenophoral trama; *generative hyphae* sparsely branched, hyaline, thin-walled, clamped, 2.0-2.5 µm wide; *vegetative hyphae* hyaline, faintly dextrinoid (better seen in mass), cyanophilous, slightly swelling in KOH; *context* mainly composed of skeletal hyphae, in a periclinal disposition, almost parallel to the pileus surface, arising from clamps, of indeterminate growth, unbranched, thick-walled to almost solid, gradually enlarging from 2.5-3.0 µm wide at the septum to 3.0-5.5 µm wide (ave 4.0 µm), with local swelling to 6.0 µm; *hymenophoral trama* composed of skeletal hyphae, arising from a clamped septum, or from slightly branched, tortuous

2. Holotype examined: Australia, Swan River, 1879, n° 248, K !

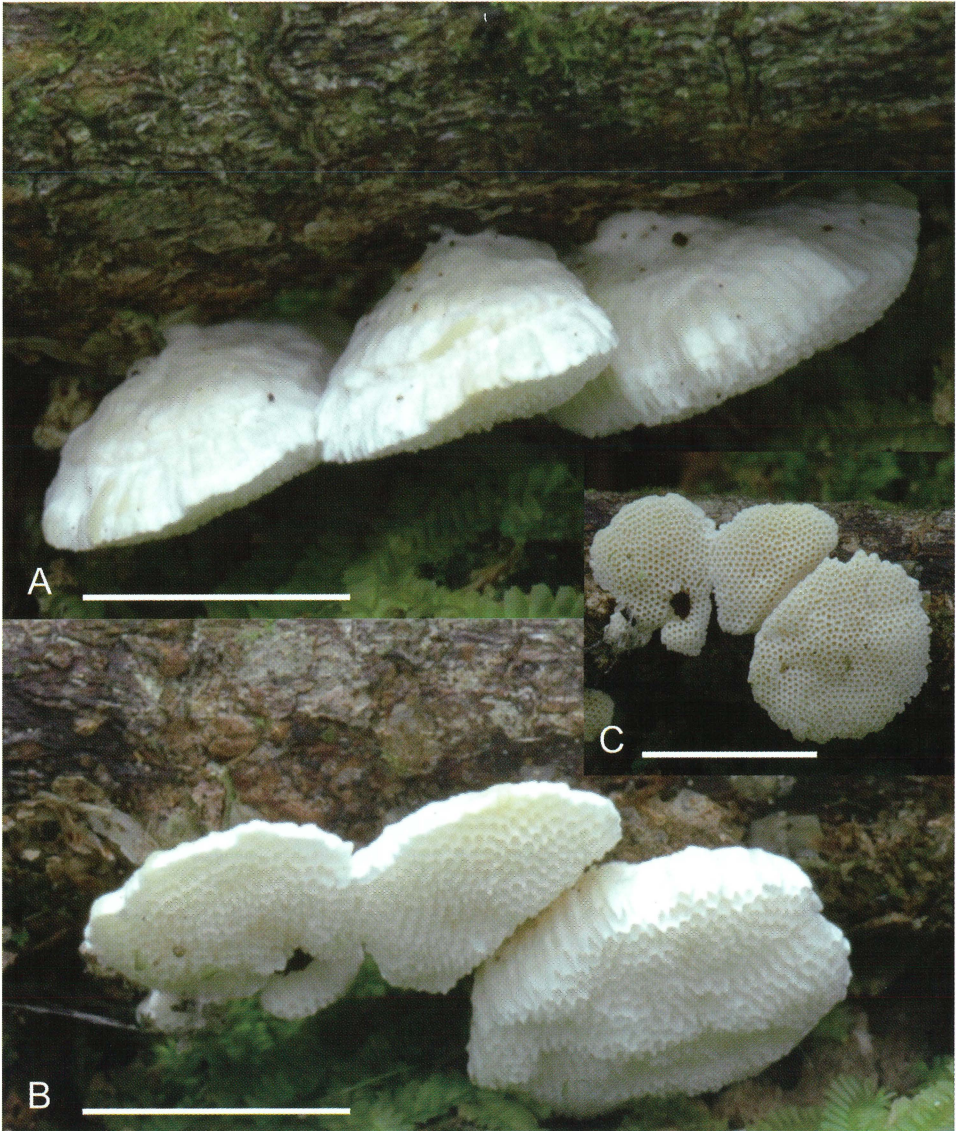


Fig. 1. *Truncospora oboensis*, from the type. A, B. Basidiome *in situ*, scale bar = 10 mm; C. detail of the pore surface, scale bar = 10 mm.

mediate hyphae, unbranched, of limited growth, reaching 600 μm long, thick-walled to almost solid, widening from 1.8-2.3 μm wide at the basal septum to (3.5-)3.5-4.5(-5.0) μm wide (ave 4.1 μm), ending in thin-walled rounded tips, occasionally with secondary septa; some *mediate hyphae* turn into *binding-like hyphae*, with few, short lateral or terminal branches (often aborted), tortuous, thick-walled, 1.8-2.5 μm wide. *Basidia* pedunculate, with four sterigmata (mostly collapsed); *basidiospores* ellipsoid to broadly ellipsoid, occasionally elongated ovoid, with a large, distinctly truncate apex, thick-walled but with a large apical

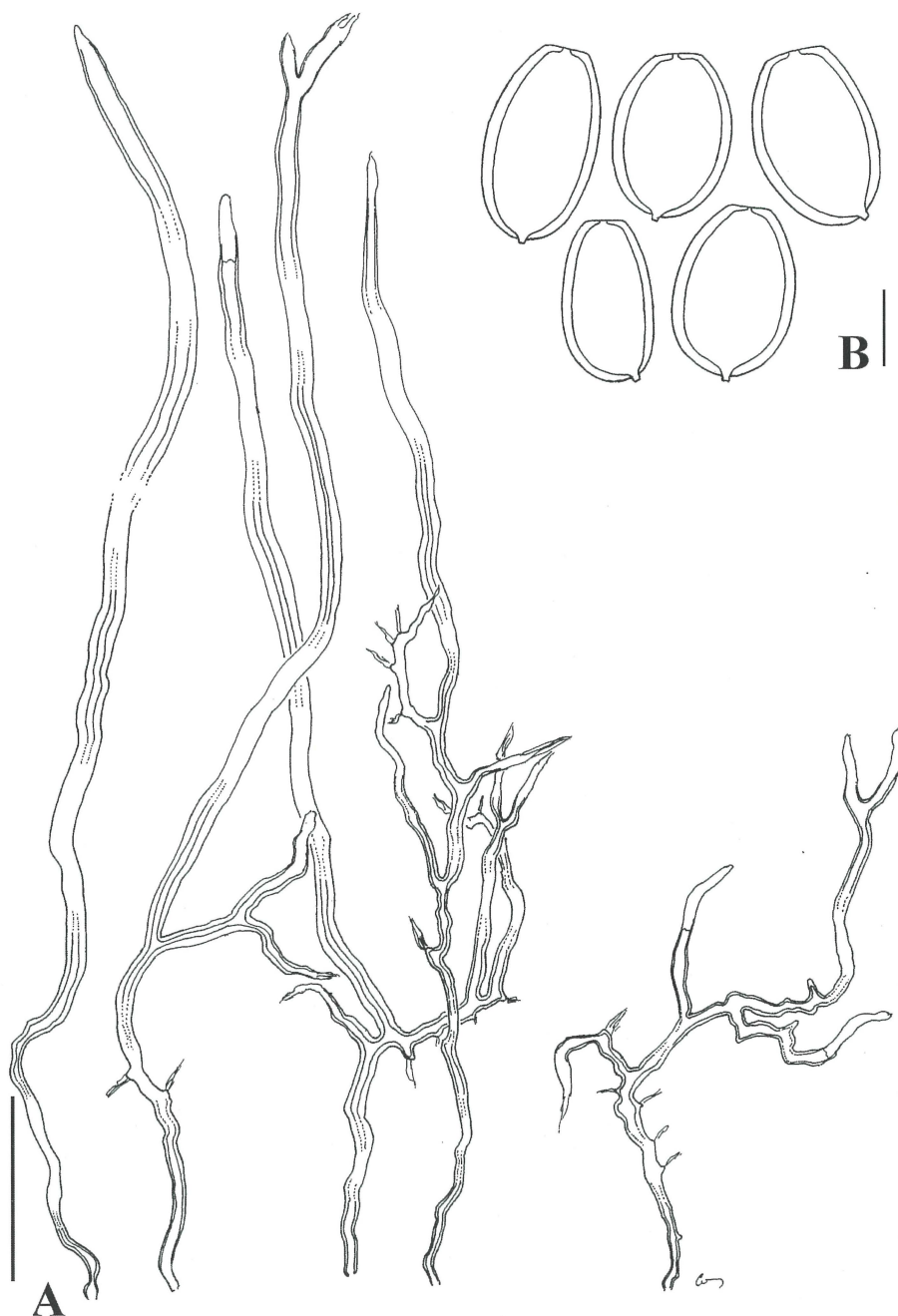


Fig. 2. *Truncospora oboensis*, from the type. A. Vegetative hyphae from the hymenophoral trama, scale bar = 50 µm; B. Basidiospores, scale bar = 5 µm.

germ pore, apiculate, 0(-1) guttulate, hyaline, slightly to mostly quickly, strongly dextrinoid, cyanophilous, (10.0-)11.0-14.0(-15.0) × (6.5-)6.5-8.5(-9.5) μm, (ave 12.7 × 7.7 μm), R = (1.38-)1.45-1.85(-2.0), ave_R = 1.65; chlamydospore absent.

Type of rot: white rot (presence of laccases positive when tested with syringaldazine on MUCL 53565 [Harkin & Obst 1974]);

Substrate: dead twigs of unidentified angiosperm;

Distribution: known from the cloud forest of São Tomé.

Holotype: SÃO TOMÉ, Obô National Park, on the way from Base camp down to Mesa camp, approx. 00°15.72' N – 006°33.23' E, elev. approx. 1800 m, on a dead twig, unidentified angiosperm, 17 Apr. 2011, C. Decock, ST-11-57, in herbarium MUCL 53879 (Isotype at NY).

Other specimen examined: SÃO TOMÉ, Obô National Park, on the way from Base camp down to Mesa camp, approx. 00°15.72' N – 006°33.23' E, elev. approx. 1850 m, on a dead twig, unidentified angiosperm, 17 Apr. 2011, C. Decock, ST-11-55, in herbarium MUCL 53565 (culture ex-: MUCL 53565, CBS).

DISCUSSION

Truncospora was [validly³] published by Pilát in 1953 but subsequently variably considered (e.g. Corner 1989, 1993; Domański 1973), and nowadays mostly reduced to a synonym of *Perenniporia* (Gilbertson & Ryvarden 1994; Ryvarden 1972, 1991; Ryvarden & Johansen 1980, Ryvarden & Gilbertson 1987). Ryvarden (1991) emphasized the similar basidiospores, hyphal system, and dextrinoid reactions in the vegetative hyphae and basidiospores in the type species of both genera to justify their synonymy, *Perenniporia* (1942) having priority over *Truncospora* (1953).

Corner (1993) was not convinced by the merging of *Truncospora* and *Perenniporia*, arguing, *a contrario*, that their hyphal construction was sufficiently different to support their recognition as two distinct genera.

Decock & Ryvarden (1999), Decock (2001), and Robledo *et al.* (2009) discussed the generic placement of *P. ochroleuca* and related species, and their relation to *Perenniporia*. Decock & Ryvarden (1999) concluded that *P. ochroleuca* together with *P. detrita* and *P. ohiensis* form a morphologically homogeneous alliance, which could be recognized at genus level, and for which the name *Truncospora* would be available. Later, Decock (2001) and Robledo *et al.* (2009), using phylogenetic inferences based on DNA sequences data (5' end of the LSU and the complete ITS (including 5.8S) of the nuclear ribosomal repeats) showed that these three taxa formed a monophyletic clade, distinct from *Perenniporia* s.s. as then defined (Decock 2001, Decock and Stalpers 2006), and worth of being recognized at genus level.

Truncospora is morphologically well characterized by small basidiomata, pores with a very regular, honey-comb pattern, a di- to trimitic hyphal system with variably branched vegetative hyphae, unbranched in the context and central part of the hymenophoral trama to binding-like hyphae near the hymenium and dissepiments, ellipsoid to broadly ellipsoid basidiospores with a largely truncate apex, where is located a germ pore. The germ pore results from the local disintegration of the *coriatunica*.

3. The name first appeared in 1941, but invalidly (*Truncospora* Pilát, Atlas Champ. Europe, III, Polyporaceae (Praha) 1: 365, 1941).

Perenniporia s.s. is closely related; it has similar basidiospores with a homologous germ pore (Decock 2001, Decock & Stalpers 2006). Its vegetative hyphae differ, however; they are variably branched skeleto-binding hyphae, commonly with an arboriform pattern (Corner 1989, Decock & Stalpers 2006, Ryvarden 1972).

Truncospora oboensis shares the typical features of *Truncospora*, viz. small pilei, very regularly disposed, honey-comb like pores, a di-trimitic hyphal system, and ellipsoid to broadly ellipsoid, distinctly apically truncate and dextrinoid basidiospores. It is characterized specifically by soft, spongy (drying horny) and completely white pilei when fresh, 3-4 pores/mm, and basidiospores in the range of $11.0-14.0 \times 6.5-8.5 \mu\text{m}$, ave $12.7 \times 7.7 \mu\text{m}$.

In tropical Africa, *T. oboensis* could be compared to *T. ochroleuca* (*sensu* Ryvarden & Johansen 1980). The latter has a distinctly darker pileus, creamy to commonly ochraceous to reddish brown, and larger basidiospores (ranging (12-) 14-17(-18) \times 7.0-9.5 μm , average $15.4 \times 8.3 \mu\text{m}$, in the type). In Africa, *T. ochroleuca* (*sensu* Ryvarden & Johansen 1980) occurs mainly in open woodland.

Truncospora ohienensis shares with *T. oboensis* basidiospores of the same size range but is distinguished by harder, corky basidiomata, pilei white to grey, discoloring to black from the base. Furthermore, the species is found essentially in the eastern – northeastern areas of the USA and Canada (with possible occurrence in northeast temperate East Asia, Zhao & Cui 2011).

Truncospora detrita* (Berk.) Decock *comb. nov.

Mycobank: MB 563794

Basionym: *Polyporus detritus* Berk.⁴ (MB 196779), Hooker's J. Bot. Kew Gard. Misc. 8: 197. 1856).

Commentary: *Perenniporia detrita* is phylogenetically (and morphologically) closely related to *T. ochroleuca* (Decock & Ryvarden 1999, Robledo *et al.* 2009) and is congeneric; hence the new combination. See Decock and Ryvarden (1999) for a description.

This species shares with *T. oboensis* basidiospores of the same size range ($10.5-12.5(-13.0) \times (5.5-)6.0-8.0 \mu\text{m}$, average $11.3 \times 7.0 \mu\text{m}$), but differs in having a much harder, corky consistency and pilei turning brown from the base (Decock & Ryvarden 1999). Furthermore, *T. detrita* is, in all probability, endemic to the Neotropical (rainforest) areas (pers. obs.); it is rather common in French Guiana, often growing on left timbers, fences, or poles.

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4. Holotype examined: Brazil, Panuré, on wood, *Spruce* # 49, K (K(M): 33758) !

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