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Printing date: 18 Aug. 2021 ISBN 978-82-90724-61-5 ISSN 0802-8966

Aphyllophorales of Africa 46
Some polypores from Mont de Crystal National Park in Gabon

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Abstract
34 poroid species are reported from the Mont de Cristal National Park, in Northern Gabon out of which four are described as new species, viz. *Abundisporus resupinatus* Decock & Ryvarden, *Ceriporiopsis suballantoidea* Decock & Ryvarden *Theleporus labyrinticus* Decock & Ryvarden and *Tyromyces rabiensis.* Decock & Ryvarden.

Introduction
In April 2009, the senior author (C. Decock) had the opportunity to spend two weeks in Mont de Cristal National Park in Gabon for a survey of polypores. The park, ranging from 200 to 900 m in elevation, is covered by very humid Guineo-Congolian rainforest, also known as the Gabonese mountain forest.
The holotypes are deposited in the Fungarium of the Jardin Botanique de Meise (BR, Meise) with isotypes in the Fungarium of University of Oslo (O). The numbering is that of the senior authors register of collections in Gabon while the MUCL numbers refer to living strains preserved at the Mycothèque MUCL, Belgium.

Ganodermataceae

Amauroderma fasciculatum (Pat.) Torrend, 562.
Ganoderma chalceum (Cooke) Steyaert, 558 (MUCL 51981) and 574 (MUCL 51987).

Hymenochaetaceae

Inonotus pegleri Ryvarden, 555.
This is second known record of this rare species after it was described from Tanzania.
Fomitiporia gabonensis Decock & Yombiyeni 511 (MUCL 52010), 533 (MUCL

52063), 544, 554 (MUCL 52017), and 641.
Fomitiporia tenuis Decock, Bitew & Castillo, 524 (MUCL 51968).
Phellinus allardii (Bres.) Ryvarden, 557, 561 (MUCL 52002).
Phellinus cesatii (Bres.) Ryvarden, 579 (MUCL 52016).
Phellinus fastuosus (Lev.) Ryvarden, 531 (MUCL 51984), 532, 545, 547, 554 (MUCL 51998) and 618 (MUCL 52038).
Phellinus gabonensis Decock & Yombiyeni, 519 (MUCL 51975), 535 (MUCL 51987), 596 (MUCL 52026), 597 (MUCL 52027), 671 (MUCL 52816), 694 (MUCL 52825).
Phellinus sousae Ryvarden, Gomes-Silva & Gibertoni, 642 (MUCL 52070).
Phellinus nilgheriensis (Berk.) Cunningh., 538 (MUCL 51989) and 578.
Phellinus wahlbergii (Fr.) D.A. Reid, 658
Phylloporia pectinata (Kl.) Ryvarden, 543.

Polyporaceae

Abundisporus fuscopurpureus (Pers.) Ryvarden, 563 and 564 (MUCL 52003).

Abundisporus resupinatus Decock & Ryvarden nova species, Index Fung. F558313.
Holotype: Gabon, Prov. Estuaire, Parc National des Monts de Cristal, Kinguele site, on dead fallen trunk of Onzan, *Odyendyea gabonensis* (Simaroubaceae), 08 Apr. 2009, Coll. Decock and P. Yombiyeni, Ga/09-549, in BR, isotype in O. (living strain ex-type MUCL 51993)
Basidiocarps perennial, resupinate, 4 x 4 cm and up to 3 mm thick, tough, pore surface probably first pale pinkish to pinkish, bruising vinaceous, greyish to pinkish to buff with age, margin district, pinkish white when fresh, pale cocoa brown on drying, up to 2 mm wide, pores round, small, uniform 5-6 per mm, tubes pale pinkish brown, subiculum cottony compacted, pale brown up to 1 mm thick.
Hyphal system dimitic, generative hyphae with clamps, 2 4 µm wide, difficult to observe, skeletal hyphae thickwalled, 2-4 µm wide, pale yellow to fuscous brown.
Basidia not seen.
Basidiospores 4-5 x 2.2-3.2 µm, elliptic, slightly angular, often with one side flattened, pale yellowish, thickwalled and slightly dextrinoid. Abundantly present.
Substrate: Dead hard wood.
Distribution Known only from the type locality.
Remarks. This is the first resupinate representative in the genus and it shows no sign of forming a pileus, even if the margin is distinctly delimited towards the substrate.
Antrodiella cinerea Tsigang, Mossebo & Ryvarden, 616 (MUCL 52036).

Ceriporiopsis suballantoidus Decock & Ryvarden, nova species - Index Fung. 557435
Holotype: Gabon, Ogooué Maririme, Centre for Tropical Forest Science – Forest Global Earth observatory, Rabi forest monitoring Plot (about S 01°55'28.5" – E 009°52'48", elev. approx. 30-60 m), on a dead, rotten, hanging branch, unidentified angiosperm, 08 Apr. 2012, C. Decock, GA-12-821.

Basidiocarps annual: resupinate, effused, up to 5 cm long, 3 cm wide and up to 2 mm thick, soft when fresh, brittle when dry, margin 1-3 mm and white, pore surface white, black where touched in fresh condition, pores shallow, thin walled angular, 2-4 per mm, dissepiments incised to dentate, tubes white, up to 1 mm deep, subiculum, white, up to 400 µm thick.
Hyphal system monomitic; generative hyphae with clamps, 2-5 µm in diam.
Basidia not seen.
Basidiospores 3-3.3 x 0.8-1 µm allantoid, smooth and non-amyloid.
Distribution. Known only from the type locality in Gabon.
Remarks. The white pore surface becoming blackish when touched in fresh condition and the tiny allantoid spores, make this a distinct species.

Diplomitoporus irregularis Ryvarden, 612.
Haploporus nanosporus (A. David & Rajchenberg) Piątek, 505 (MUCL 51964), 514 (MUCL 51970), 516, 552 (MUCL 51996), 559 (MUCL 52001), 598 (MUCL 52028), 622 (MUCL 52062), and 651.
Microporus nigroglaber Decock & Ryvarden, 568 (MUCL 52007).
Microporus vernicipes (Berk.) Kunt., 550 (MUCL 51994).
Nigroporus stipitatus Douanla-Meli & Ryvarden, 630 (MUCL 52065).
Perenniporia decurrata Corner, 653.
Perenniporia inflexibilis (Berk. M. A. Curtis) Ryvarden, 546, 601 (MUCL 52029), 606 (MUCL 52031), 608, 609 (MUCL 52032) and 610 (MUCL 52033).
Perenniporia latissima (Bres.) Ryvarden, 556 (MUCL 51999) and 649 (MUCL 52075).
Perenniporia centrali-africana Decock & Mossebo, 611 (MUCL 52034).
Perenniporia miniochroleuca Ryvarden, 542 (MUCL 51992), 565 (MUCL 52004), 566 (MUCL 52005), 575 (MUCL 52013), 602 (MUCL 52030), 608, 609 (MUCL 52032), 610 (MUCL 52033), 613.
Perenniporia tephropora (Mont.) Ryvarden, 507, 529 (MUCL 51982).
Polyporus dictyopus Mont., 547.
Polyporus grammocephalus Mont., 572 (MUCL 52009) and 586.
Porogramme albocincta (Cooke & Massee) Lowe, 530 (MUCL 51983), 637.
Pycnoporus puniceus (Fries) Ryvarden, 506.
Rigidoporus dextrinoideus Johan. & Ryvarden, 518, 520 (MUCL 51976), and 594 (MUCL 52025).
Rigidoporus vinctus (Berk.) Ryvarden, 534 (MUCL 51986), 570 (MUCL 52008),and 583 (MUCL 52019), .

Theleporus labyrinticus Decock & Ryvarden, nova species Index Fung.558314.
Gabon, Province Estuaire, Parc National des Monts de Cristal, Tchimbele site, on a dead, fallen branch, 12 Apr. 2009, Coll. Decock & P. Yombiyeni, Ga/09-607, in BR, isotype in O.
Basidiocarps annual, resupinate, adnate, 5x 3 cm brittle when dry, pore surface pale creamy when fresh, pale ochraceous on drying, pores labyrinthine to occasionally angular, 7-8 pore walls per mm, 0.5 mm deep, subiculum white, very thin, almost invisible.

Hyphal system dimitic, generative hyphae hyaline, thinwalled and with clamps, 24 µm wide, skeletal hyphae thickwalled to solid, 25 µm wide, twisted and irregularly bent.
Basidiospores 2.5-3 x 1.5 mm, cylindrical, smooth, thin walled and IKI negative.
Substrate. Dead hard wood log.
Distribution. Known only from the type.
Remarks. The strongly labyrinthine pore surface with small openings and distances between individual walls make this a very distinct species.
Tyromyces kenyensis Ryvarden, 560.

Tyromyces rabiensis Decock & Ryvarden, nova species Index fung. IF558315.
Holotype: Gabon, Prov. Ogooue Maritime, Centre for Tropical Forest Science – Forest Global Earth observatory, Rabi forest monitoring Plot (about S 01°55'28.5" – E 009°52'48"), on dead fallen trunk, approx. 50 cm diam., 11 Apr. 2012, Coll. C. Decock & P. Yombiyeni, Ga/12-870, in BR, isotype in O.
Basidiocarps annual, pendant and attached to the substrate by a central conical part of the pileus, pileus up to 4 cm in diameter and about 3 mm thick at the point of attachment, semicircular with slightly irregular rounded lobes. Soft when fresh, hard and partly curled when dry, surface probably white, whitish with ochraceous and pale brownish tones when dry, adpressed velutinate, azonate margin thin and curled when dry, pore surface deep ochraceous, pores concolorous, thin-walled, wavy and irregular of outline, 1-4 per mm, fragile when dry, up to 2 mm deep, contrasting the whitish context being up 4 mm thick at the point of attachment.
Hyphal system monomitic, generative hyphae with large clamps, hyaline, thin-walled, 3-7 µm wide.
Basidia 8-10 x 4-5 µm tetrasterigmatic.
Basidiospores 3-3.5 x 1.5 µm, cylindrical, smooth, hyaline and non-dextrinoid.
Substrate: Dead hard wood log.
Distribution. Known only from the type locality.
Remarks. The large angular pores and it dorsal attachment to the substrate make this distinct species.
Macroscopically, by its pendant growth, this species reminds one of *Tyromyces pendens* Ipulet & Ryvarden, described from Uganda, which however, has smaller pores, i.e. 6-8 per mm, besides elliptic spores, i.e. 4-4.5 x 2.7-3 µm.

Acknowledgements
Cony Decock gratefully acknowledges the financial support from the Belgian-Belgian Federal Science Policy, the FNRS (Belgium) through a FRFC (Fonds de la Recherche Fondamentale Collective) project (FRFC No. 2.4515.06), and the Research Institute in Tropical Ecology (IRET), of the National Centre of the Scientific Research (CENAREST) of Gabon for the logistic and administrative formalities having allowed us to perform this field research. Cony Decock gratefully acknowledges the help of Mr Jean Yves Abagab Mekoulo during field trip.

Aphyllophorales of Africa 47
Some new and interesting polypores from Benin

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Abstract
26 poroid species are identified from certain collections of poroid fungi from Benin, out of which three species namely *Phellinus beninensis* Olou & Ryvarden, *Perenniporia beninensis* Olou & Ryvarden and *Tyromyces contractus* Olou & Ryvarden are described as new.

Introduction
Polypores are one of the most important groups of organisms as they contribute substantially to carbon and nutrient cycles by decomposing dead wood (Harley 1971, Olou et al. 2019b). Current knowledge of the diversity of polypores in tropical Africa is mainly based on the efforts of Ryvarden and collaborators over many years. Although this have greatly improved our knowledge of tropical African polypores, these efforts are most concentrated to Central and East African zones (Ryvarden 1972, 1988, 1998, Ryvarden and Johansen 1980, Masuka and Ryvarden 1993a, 1993b, 1999, Nunez and Ryvarden 1994, Ipulet and Ryvarden 2005, Roberts and Ryvarden 2006). In contrast, rather few investigations of polypores in West Africa have taken place (David and Rajchenberg 1992). To our knowledge, no mycological investigation with emphasis on polypores have previously been done in Benin (West Africa) until one of us (Boris Armel Olou) started collecting. Thus, from 2017 to 2020, polypores were collected and identified as new to Benin and new to science (Olou et al. 2019a, 2019b, 2020). The results of these investigations are reported in the following.

Material and methods
The specimens reported in this study were collected by Olou et al. (2019a) between July and August 2017 in southern and central Benin in the dense Lama forest, and the woodlands of Toui-Kilibo and Ouémé supérieur. For more details on specimens sampling and preservation see Olou et al. (2019a).

LIST OF SPECIES

Hymenochaetaceae

Phellinus carteri (Cooke) Ryvarden OAB0217, OAB0084 and OAB00125.
Phellinus fastuosus (Lev.) Ryvarden OAB00252 and OAB00518.
Phellinus gilvus (Schw.) Pat. OAB0108.
Phellinus pachyphloeus (Pat.) Pat OAB0120, OAB0246 and OAB0260.
Phellinus punctatus (Karsten) Pilat OAB0208.
Phellinus purpureogilvus (Petch) Ryvarden OAB0151.
Phylloporia spathulata (Hooker) Ryvarden OAB0294.

Phellinus beninensis Olou & Ryvarden nova species, Index Fung. 558316.

Holotype: Benin, Collines province, Toui-Kilibo Forest, 19. August 2017, on dead hard wood log, Coll. OAB0132, holotype in UNIPAR, isotype in O.
Etymology. *beninensis* (lat.): referring to the country of the type locality.
Basidiocarp annual, resupinate, 4 x 5 cm, up to 2 mm thick, and hard when dry, pore surface dark brown, pores irregular, angular, thin-walled, 2-5 per mm, tubes totally up to 2 mm long, subiculum light rusty brown, up to 2 mm thick.
Hyphal system dimitic, generative hyphae hyaline, thin walled 2-3 µm wide, skeletal hyphae totally dominating in the basidiocarp, 3-4 µm wide, rusty brown, thin to moderately thick-walled.
Hymenial setae 20-60 x 4-10 µm, subulate, dark ferruginous and thick-walled.
Basidiospores 4-4.5 x 2-2.5 µm, elliptic, hyaline, smooth, IKI negative.
Substrate. Dead hard wood log.
Distribution. Seen only at the type locality.
Remarks. The species is recognized by the irregular large pores, the long hymenial setae and the elliptic spores. It is undoubtedly related to *P. irregularis* Ryvarden, described from Zimbabwe, which however has wider spores. i. e. 3-3.5 µm and besides, as the name reflects, irregular to semi labyrinthine pores.

Polyporaceae

Datronia mollis (Sommerf.) Donk, OAB0180 and OAB0238.
Diplomitoporus hondurensis (Murrill) Ryvarden, OAB0183.
Echinochaete brachyporus (Mont.) Ryvarden, OAB0071.
Flavodon flavus (Kl.) Ryvarden OAB0227.
Grammothele lineata Berk. & Curtis, no spores seen OAB0515.
Hexagonia phellinoides Ryvarden, Second known coll. OAB0203.

Perenniporia beninensis Olou & Ryvarden nova species, Index Fung 558313.

Holotype: Benin, Zou province, Lama Forest, 28. July 2017, Coll. OAB0050, holotype in UNIPAR, isotype in O.
Etymology. *beninensis* (lat.): referring to the country of the type locality
Basidiocarp annual, pileate, 2.5 x 2 cm wide and 1 cm thick at the base, hard when dry, pileus glabrous, finely delicately laccate and reddish at the margin, otherwise

evenly dark brown, dull and slightly concentrically zoned, pore surface whitish to ochraceous, pores round, 5-6 per mm, tubes 1 mm deep, ochraceous, context concolours, dense and homogenous, up to 8 mm thick at the base, in section with a thin cuticle below the brown pileus surface.
Hyphal system trimitic, generative hyphae with clamps, hyaline, delicately thin walled 1.5-3 2-3 µm wide, skeletal hyphae totally dominating in the basidiocarp, 3-5 µm wide and dextrinoid in Melzers reagent, binding hyphae rare, twisted and with few obtuse side branches, non dextrinoid.
Basidia clavate, 25-30 x 4-6 µm, tetrasterigmatic.
Basidiospores 8-11 x 6-8, oblong to truncate, smooth, thick-walled IKI negative.
Substrate. Dead hard wood log.
Distribution. Seen only at the type locality.
Remarks. The species reminds one of *Perenniporia miniochroleuca* which has similar spores which, however, are distinctly dextrinoid, besides having non dextrinoid skeletal hyphae. Further, this species has a white to ochraceous pileus, thus distinctly different from the species described here.

Perenniporia centralafricana Decock & Mossebo OAB0190 and OAB0291.
Perenniporia cfr miniochroleuca Ryvarden OAB0072.
Perenniporia tephropora (Mont.) Ryvarden OAB008, OAB0036, OAB00519.
Phylloporia spathulata (Hooker) Ryvarden OAB0294.
Polyporus tricholoma Mont. OAB0504.
Serpula similis (Berk. & Curtis) Ginns OAB0266.
Theleporus calcicolor (Henn) Ryvarden OAB0258.
Coriolopsis floccosa (Jungh.) Ryvarden OAB0216.
Coriolopsis sanguinaria (Klotzsch) Teng OAB0081.
Coriolopsis strumosa (Fr.) Ryvarden OAB0158, OAB0197, and OAB0199.
Trametes lactinea (Berk.) Sacc. Sterile OAB0207.

Tyromyces contractus Olou & Ryvarden nova species, Index Fung 558318.
Holotype: Benin, Zou province, Lama forest, 30. July 2017, on dead hard wood log, Coll. OAB0073, holotype in UNIPAR, isotype in O.
Etymology. *contractus* (lat.): referring to the basidiocarp that curls up during drying.
Basidiocarp annual, pileate with widely effused pore surface, 3 x 5 cm wide, soft when fresh, curled with lifted margins when dry, apparently contracting under drying, pileus narrow, up to 5 mm wide, white and glabrous, up to 2 mm thick, pore surface white, pores round 7-9 per mm, hardly visible to the naked eye, tubes white, up to 1 mm deep, context cottony, white, up to 200 µm thick.
Basidia 12-15 x 4-6 µm,, tetrasterigmatic.
Basidiospores 4-5 x 2-2.5 µm, elliptic, hyaline, smooth, IKI negative.
Distribution. Seen only at the type locality.
Substrate: On dead hard wood log.
Remarks. The species may be recognized by the partly curled basidiocarp when dry, the tiny pores and the elliptic spores.

Discussion

Three new species namely *P. beninensis*, *P. beninensis*, and *T. contractus* are described from Benin based on morphometric and anatomical analyses. *Phellinus beninensis* resembles *P. irregularis* by sharing annual and resupinate basidiocarp, angular to irregular pores, and the presence of hymenial setae. However, *P. irregularis* differs from *P. beninensis* by having larger pores 1-3 per mm, longer hymenial setae (up to 75 µm), and wider spores (Ryvarden 2019a). *Phellinus beninensis* and *P. irregularis* could be two closely related species and future molecular studies will confirm or refute this assumption. *Perenniporia beninensis* resembles *P. miniochroleuca* but the latter differs from *P. beninensis* in having non-dextrinoid skeletal hyphae, smaller basidia (20-25 µm long), slightly longer and wider spores (Ryvarden 2019a). *Tyromyces contractus* differs from species within *Tyromyces* by its partially curled basidiocarp when dry and small pore size. The pore size of African *Tyromyces* species varies mostly between 1-8 per mm (Ryvarden 2019b) whereas the pores of *T. contractus* vary between 7-9 per mm. This character of small pore size combined with the curled basidiocarp when dry makes *T. contractus* a distinct species within *Tyromyces*.

Species of *P. irregularis*, *P. miniochroleuca* as well as the newly described species here do not have DNA sequences for the phylogenetic analysis. However, although this study did not use molecular data for the description of the new species, the three species described here fit well morphologically the genera *Phellinus*, *Perenniporia* and *Tyromyces*. Here in this study we consider the genera *Phellinus*, *Perenniporia*, and *Tyromyces* in the broadest sense. Several small genera have been segregated from *Phellinus* and *Perenniporia* sensu lato (Wagner and Fischer 2002, Decock and Ryvarden 2003, Zhao et al. 2012). Among these genera we have *Fuscoporia* Murrill and *Truncospora* Pilát for example which morphologically resemble to the new species *P. beninensis* and *P. beninensis* described here. Further molecular studies will allow us to know whether or not *P. beninensis* and *P. beninensis* belong to *Phellinus* and *Perenniporia* sensu stricto. Even if novel genera are not yet segregated from *Tyromyces*, this genus is considered polyphyletic (Binder et al. 2013). Therefore, it is still difficult to confirm that *T. contractus* belongs to *Tyromyces* sensu stricto. Further molecular studies will allow us to properly position this species within *Tyromyces*.

Acknowledgements

We are grateful to Ewald Langer for the facilities provided to send specimens from Germany to Oslo in Norway and to Basile Hounwanou for his assistance during the field work.

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Aphyllophorales of Africa 48
Some poroid species from São Tomé

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Abstract
34 poroid species are reported from the Ôbo de São Tomé National Park, in São Tomé, out of which *Ganoderma thomensis* Decock & Ryvarden, *Fomitopsis deviata* Decock & Ryvarden, *Physisporinus africanus* Decock & Ryvarden and *Wrightoporia deviata* Decock & Ryvarden are described as new species.

Introduction
The Island of São Tomé is located in the Gulf of Guinea, 255 km off the African west coast. The island is of volcanic origin; it forms part of the oceanic segment of the Cameroon Volcanic Line (CVL), an alignment extending from Cameroon to the north down southerly to Annobón and St Helene. The local orography is contrasted, especially in the central south, with steep mountains culminating at 2024 masl at "Pico de São Tomé ", in what is now the Parque Natural Ôbo de São Tomé. In 2011, one of us (CD) collected for a few days polypores in the Ôbo de São Tomé National Park, between Bom Sucesso Botanical Garden and Mesa camps, at an elevation approx. 1200-1900 masl, and which vegitation is the afromontane Equatorial rainforest up to approx. 1400 masl, then the afromontane, cloud forest (White 1986, Carvalho et al. 2004). Since the late 2000s, the Mycota of São Tomé, especially in the Parque Natural Ôbo de São Tomé, have been the object of renewed interest (Copper et al. 2018, Desjardin and Perry 2009, 2015a, b, 2016, 2017, 2020, Degreef et al. 2013). Decock (2011, 2013) described two new species, viz. *Truncospora oboensis* (Decock 2011) and the small-sized *Coltricia oboensis* (Decock 2013).
In the following, 34 species are reported, including the new species *Ganoderma thomensis* Decock & Ryvarden, *Fomitopsis deviata* Decock & Ryvarden, *Physisporinus africanus* Decock & Ryvarden, and *Wrightoporia deviata* Decock & Ryvarden.
As a rule, type specimens are deposited at O (Oslo), BR (Meise Botanical Garden), and MUCL. MUCL numbers refer also to living strains held at the MUCL culture collection.

LIST OF SPECIES

Ganodemataceae

Ganoderma australe (Fr.) Ryvarden, 2 and 18 (MUCL 53554).
G. chalceum (Cooke) Steyaert, 1.
G. resinaceum Boudier, 9 (MUCL53521), 13 (MUCL53523), 14 (MUCL 53524), and 73 (MUCL53543).

Ganoderma thomensis Decock & Ryvarden nova species, Index Fung. 558319.

Holotype: São Tomé, Ôbo de São Tomé National Park, Carvalho camp, approx. N 00°17,719 – E 006°33.228', elev. 1600 masl, at the base of a living tree, 17 April 2011, Coll. Cony Decock, ST-11-69, in BR, isotype in O (living strain ex type MUCL 53581).
Basidiocarps annual, semicircular to dimidiate, about 14 cm long, 7 cm wide and up to 1.5 cm wide, dense and hard when dry, pileus applanate, dark brown, glabrous with a white , up to 1 cm wide, white and rounded margin, cuticle about 0.5 mm thick, dense, dark brown and without distinct structure, pore surface pale brownish becoming dark when touched in fresh condition, pores hardly visible with the naked eye, round, 4-5 per mm with thick walls, tubes pale brown, up to 7 mm deep, context triplex lower parts homogenous pale brown about 2 mm thick, central part with dense, black and partly broken bands 4-6 mm, while upper part is ochraceous and homogenous up to 2 mm thick.
Hyphal system dimitic, generative hyphae with clamps septa, hyaline, wavy and sinuous, variable from thin walled and partly collapsed to distinctly thick walled, up to 7 µm wide, negative in Melzers reagent, skeletal hyphae pale brown, 3-6 µm wide.
Basidia not seen.
Basidiospores 5-7 x 9-10 µm, oblong to drop shaped, very finely ornamented, dextrinoid in Melzers reagent.
Substrate. Dead hard wood log.
Distribution. Known from only the type locality in Sao Thome.
Remarks. This is remarkable species with its dextrinoid, fairly small spores and its variable context with three distinct, differently coloured strata.

Hymenochaetaceae

Phellinus extensus (Lev.) Pat., 36 (MUCL53529).
P. gilvus (Schw.) Pat., 15 (MUCL 53525).
P. pachyphloeus (Pat.) Pat., 54 (MUCL 53580).
P. wahlbergii (Fr.) Reid, 17 and 74 (MUCL 53667).

Polyporaceae s. lato

Bjerkandera adusta (Fr.) Karsten 36 (MUCL 53662).
Diplomitoporus ethiopicus Ryvarden, 29 (MUCL 53513).

Fomitopsis deviata Decock & Ryvarden nova species Index Fung. 558320.

Holotype: São Tomé, Ôbo de São Tomé National Park, camino Fugido, N 00°17.475' – E 006°36.357', elev. 1250 masl, on dead standing trunk, approx. 20 cm diam, 15 April 2011, Coll. Cony Decock ST-11-48, in BR, isotype in O (living strain ex type

MUCL 53579). Paratypes ST-11-39, ST-11-65.
Basidiocarps perennial, pileate, semicircular up to 10 cm wide, 15 cm long and 3 cm thick, tough when fresh, very hard when dry, pileus glabrous, azonate, slightly undulating, white becoming covered with by a black thin cuticle spreading from the base, in the type covering over half of the pileus, margin sharp, pore surface whitish to ochraceous, pores round, regular 4-5 (6) per mm with thick walls, tubes evenly pale ochraceous, dense, up to 1 cm thick, context pure white, azonate, dense, up to 1 cm thick at the base.
Hyphal system dimitic, generative hyphae with clamps, hyaline, thin- to thick walled, wavy and sinuous, 3-5 µm wide, skeletal hyphae almost solid both in 5 KOH and in Meltzer's reagent, hyaline, 2-4 µm wide in the trama, up to 7 µm wide in the context, occasionally with swellings, up to 10 µm in diameter, probably representing old clamps.
Basidia clavate, 15-22 x 4-6 µm tetrasterigmatic.
Basidiospores 4-5 µm in diameter, globose, smooth, hyaline, thin walled and negative in Melzers reagent.
Substrate. Dead hard wood log.
Distribution. Known from only the type locality in Sao Tome.
Remarks. The position of this species is uncertain, but seemingly *Fomitopsis* with its perennial basidiocarps is the best alternative instead of *Trametes* with its trimitic hyphal system and more ephemeral basidiocarps.

Hexagonia glaber (Beauv.) Ryvarden, 8, 23 and 32 (MUCL 53528).
Junghuhnia nitida (Fr.) Ryvarden, 19 (MUCL 53555).
Lignosus sacer (Fr.) Ryvarden, 64 (MUCL 53541).
Nigroporus stipitatus Dounala-Meli & Ryvarden, 11.
N. vinosus (Berk.) Ryvarden, 50 (MUCL 53538).
Perenniporia cfr latissima (Bres.) Ryvarden, no spores seen, 67.
P. ochroleuca (Berk.) Ryvarden, 10 (MUCL 53522) and 30.
P. subacida (Peck) Donk, 28 (MUCL 53563), 51 (MUCL 53564).

Physisporinus africanus Decock & Ryvarden nova sp. Index Fung. 558323.
Holotype: São Tomé, Ôbo de São Tomé National Park, on the way to Lago Amelia, approx. N 00°16.95' – E 006°35.48', elev. 1300 masl, on buttress of a living tree, *Olea capensis* (Oleaceae), 12 April 2011, Coll. Cony Decock ST-11-3 in BR, isotype in O (living strain ex type MUCL 53518).
Basidiocarps annual, semi resupinate to pileate with decurrent pore surface, probably soft when fresh, drying dense and resinous hard, partly bent and irregular as a part of the drying, pileus up to 4 cm wide, sloping, black, glabrous, younger parts along the margin cream to pale ochraceous, margin round and irregular, pore surface whitish to ochraceous, pores slightly irregular and split in front on decurrent parts, 5-9 per mm, up to 1 cm long in decurrent parts of the pore surface, tubes dense, resinous pale brown, subiculum 1-2 mm, in parts apparently lacking, whitish and dense.
Hyphal system monomitic, generative hyphae with simple septa, hyaline, wavy and sinuous, variable from thin walled and partly collapsed to distinctly thick walled, up to 7 µm wide, negative in Melzers reagent.

Basidia not seen
Basidiospores 3-3.5 x 2.5-3 µm, subglobose, smooth, thin walled, and occasionally with a large oil drop.
Substrate. Dead hard wood log.
Distribution. Known from only the type locality in São Tomé.
Remarks. This is a conspicuous species by its dense and contracted basidiocarps with an irregular outline when dry. The hyphae are variable from very thin walled ones, in parts more or less collapsed, to large and conspicuous thick walled one with rare branching. The latter could easily be taken as skeletal hyphae, but there is a continuous variation from these distinct thick walled ones to the thin-walled ones with irregular outline and in many cases with collapsed walls.

P. resinaceus Ipulet & Ryvarden, 3.
Polyporus austroafricanus Nunez & Ryvarden, 34.
Rigidoporus crocatus (Pat.) Ryvarden, 38.
R. lineatus (Pers.) Ryvarden, 37 (MUCL 53530).
R. microporus (Fr.) Overeem, 47 (MUCL 53536).
R. subvinctus Ryvarden, 22 (MUCL 53527).
R. ulmarius (Fr.) Imazeki, 45.
R. vinctus (Berk.) Ryvarden, 20 (MUCL 53526).
Schizopora trichilae (Van der Byl) Ryvarden, 40.
Tinctoporellus epimiltinus (Berk.) Ryvarden, 21.
Trametes elegans (Fr.) Fr. 44 (MUCL 53534) and 49 (MUCL 53537). These specimens are deviating by having a completely lamellate hymenophore with large and wavy lamella. Usually in this common species, the lamellae, if they occur, are mixed with round and semi daedaleoid pores. Unfortunately, the specimens are sterile, thus, their taxonomic disposition has to be decided either by DNA screening or collection of fertile specimens.
T. versicolor (Fr.) Pilat 75A (MUCL 53544).
Wrightoporia africana Ryvarden 72.

Wrightoporia deviata Decock & Ryvarden nova species Index Fung. 558335.
Holotype: São Tomé, Ôbo de São Tomé National Park, approx. N 0°16.833' – E 006°35.30', elev. 1400 m a s l, on dead fallen tree, 15 April 2011, Coll. Cony Decock, ST-11-39 in BR, isotype in O (living strain ex type MUCL 53531).
Basidiocarps annual, semi resupinate to pileate, probably soft when fresh, drying dense and resinous hard, partly bent and irregular as a part of the drying, pileus up to 1 cm wide, wavy, brown, azonate and dull, younger parts along the margin whitish to pale ochraceous, margin wide, white, dull, glabrous almost looking like a corticoid species, pore surface whitish, pores round, invisible to the naked eye, 7-9 per mm, in vertical parts of the basidiocarps slightly irregular and larger, tubes dense, white, up to 3 mm long, subiculum or context whitish, apparently absent in parts.
Hyphal system monomitic, generative hyphae with simple septa, hyaline, wavy and sinuous, thin- to thick-walled, 2-10 µm wide, slightly dextrinoid in Melzers reagent.
Basidia not seen.

Basidiospores 3-3.5 µm in diameter, globose, very finely ornamented, thin-walled and amyloid in Melzers reagent.
Substrate. Dead hard wood log.
Distribution. Known from only the type locality in São Tomé.
Remarks. The brown, dull to finely velutinate pileus and simple septate hyphae make this a distinct species in the genus,

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Aphyllophorales of Africa 49
The genus *Climacodon* - a synopsis

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Abstract
6 species of *Climacodon* are described, partly based on type studies. The combination *Climacodon javanicum* (Pat.) Decock & Ryvarden, is proposed.

CLIMACODON P. Karsten,
Rev. Mycol. (Toulouse) 3: 20 1881.
Basidiocarps annual, pileate, often imbricate in dense clusters, white to cream, pilear surface smooth to scrupose; hymenial surface densely covered with slender spines; hyphal system monomitic, generative hyphae with clamps or simple septa; cystidia absent or present; basidia clavate, tetrasterigmatic; basidiospores globose to elliptic, smooth, thin-walled, negative in Melzer's reagent. Causing a white rot in hardwood.
Type species: *Hydnum septentrionale* Fr.
Remarks. The genus is usually easily recognized by the often large, imbricate clusters of pileate and densely hydnoid basidiocarps with a smooth pilear surface. Superficially it may remind one of species of *Hericium*, which have the same type of basidiocarps, but where the spores are ornamented and amyloid.

Key to species

1. Basidiocarps reddish **2**
1. Basidiocarps whitish **3**

2. West African species ..... **C. sanguineus**
2. South Asian species ..... **C. javanicus**

3. Spores globose, no cystidia present ..... **C. africanus**
3. Spores elliptic to subcylindrical, cystidia present **6**
4. Only gloeocystidia present ..... **Donkia pulcherrima** (not described here)
4. Gloeocystidia and apically encrusted cystidia present **5**

5. Predominantly boreal to temperate species ..... **C. septentrionalis**
5. Predominantly tropical Asian species **6**

6. Cystidia smooth or finely encrusted, contextual hyphae with clamps, spores elliptic, 4.5-6 mm long ..... **C. dubitativus**
6. Cystidia covered with an oily sheath, all hyphae simple septate, spores cylindrical, 3.6-4.3 µm long ..... **C. chlamydocystis**

Climacodon javanicum (Pat.) Decock & Ryvarden comb nov. Index. Fung. 558337.
Basionym: *Hydnum javanicum* Pat., Ann. Jard. Bot. Buitenzorg suppl. 1:114, 1897.
- *Mycoleptodon annamensis* Hariot & Pat. Bull. Mus. Nat. Hist. nat. 20:154, 1914. - *Hydum roseo-maculatum* Henn. & E. Nyman, Monsunia 1:10, 1899.
Basidiocarps pileate, effused reflexed to flabelliform with narrow base, up to 4.5 wide and 6 cm long, radiately fibrillose, with partly raised veins, villose to hirsute especially towards the base, rosy pink when fresh, drying with age more ochraceous to pale brown, margin entire to slightly split, stipe when occurring up to 2 cm long, villose and concolorous with the pileus, spines moderately crowded, up 1 cm long and 5 mm wide, reddish when fresh, fading to pale pink ochraceous when dry, context up to 8 mm thick, firm, fibrillose, whitish to ochraceous when fresh, yellowish brown when dry.
Hyphal system monomitic, generative hyphae on the pileus with scattered clamps, those of the spines simple septate, 3-6 µm wide.
Gloeocystidia up to 80 µm long and 20 µm wide, projecting in parts above the hymenium, smooth or finely encrusted.
Basidia 18-21 x 4-6 mm, tetrasterigmatic and simple septate.
Basidiospores 4.3-6 x 2-3 µm, elliptic to subcylindrical.
Habitat. On the ground.
Distribution. South Asian species known from Viet Nam, Indonesia and Borneo.
Remarks. The reddish colours and the sessile, occasionally dimidiate basidiocarps, beside the distribution make it a distinct species. It is undoubtedly related to *C. sanguineus* of Western Africa which however, is a centrally stipitate species with a deep red and even colour both as dry and fresh.

Climacodon chlamydocystis Maas-Geest.,
Verhand. Naturk. Kon. Nederl. Akade, Wetens. ser 2.part 60, no 3:133, 1971.
Basidiocarps pileate, sessile, effused reflexed, imbricate, pilei up to 2.5 cm wide and long, pilear surface finely pubescent to glabrous, slightly zoned, white to pale ochraceous with scattered reddish brown lines or streak, hymenial surface densely hydnoid, individual spines up to 2.5 mm long, white when fresh, pinkish to pale brown when dry, context 1-2 mm thick, white when fresh with some horizontal darker lines.
Hyphal system monomitic, hyphae predominantly simple-septate in the trama, in the context with scattered clamps, 3-7 µm wide.
Cystidia of two types:
Gloeocystidia as terminal ends of generative hyphae, projecting, about 4 µm wide, and encrusted cystidia as terminal ends of generative hyphae 4 µm wide, up to 300 µm

covered with crystals over which there is a cover of oily matter.
Basidia not seen,
Basidiospores 3.5-4.5 x 1.8-2 µm, narrowly elliptic to subcylindrical.
Habitat. At the base of a living tree.
Distribution. Known only from the type locality in Singapore.
Remarks. The small spores characterize this species.
Specimen examined: Singapore, Mandai road, July 1929, at base of a tree, leg. E. J. Corner, holotype (K).

Climacodon dubitativus (Lloyd) Ryvarden,

Mycotaxon 44:129, 1992. – *Polystictus dubitativus* Lloyd, Lloyd Mycol Writ. 7:1111, 1922. - *Climacodon efflorescens* Maas-Geest., Verhand. Naturk. Kon. Nederl. Akade, Wetensk. ser 2.part 60, no 3:136, 1971.
Basidiocarps pileate, sessile, forming large clusters, up to 30 cm tall and wide, becoming coralloid with numerous pile form a common base, pileus up to 12 cm wide and long, spatulate, first tomentose to velutinate, becoming strigose and centrally furrowed, finally glabrous, white, becoming ochraceus when dry, in older parts darker and pale orange brown with some darker lines, spines up to 1.5 mm long, white when

fresh, brittle and paler brown when dry, context white, up to 7 mm thick.
Hyphal system monomitic, generative hyphae simple-septate, 3-5 µm wide.
Cystidia of two types:
Gloeocystidia 5-7 µm wide, immersed in the hymenium, projecting up to 40 µm.as terminal ends of generative hyphae, projecting, about4 µm wide.
Encrusted cystidia as terminal ends of generative hyphae, 4 µm wide, slightly covered with fine crystals.
Basidia 22-35 x 6-7 µm, tetrasterigmatic.
Basidiospores 4.5-6 x 3.7-4.5 µm, elliptic.
Habitat. On dead wood, but also seen at the base of a living tree.
Distribution. Singapore, Malaysia and Solomon Islands.
Remarks. The large basidiocarps and fairly large spores characterize this conspicuous species.
Specimen examined: Malyasia, Negri Sembilan, Leg. E. J. Corner 30 Sept. 1966, holotype (K).

Climacodon sanguineus (Beeli) Maas-Geest.,
Verhand. Naturk. Kon. Nederl. Akade, Wetensk. ser 2. part 60, no 3:131, 1971. – *Hydnum sanguineum* Beeli, Bull. Soc. Bot. Belg. 58:210, 1928.
Basidiocarps centrally stpitate, dark red, pileate, often in clusters, pileus individual branched, often densely imbricate, up to 4 cm in diameter, 5 mm thick, soft when fresh, denser and tough when dry, adpressed fibrillose to tomentose, stipe centrally to slightly lateral, up to 5 cm tall, deep reddish and finely pubescent, hymenophore densely hydnoid, individual spines up to 3 mm long, concolours with the pileus.
Hyphal system monomitic, those on the pileus with clamps, in context and spines also with simple septa, 3-6 µm wide.
Cystidia 25–60 × 8–18 µm, abundantly present in the hymenium, broadly fusiform to conical with a pointed apex, thick-walled, smooth or with a small apical crystal crown.
Basidia 18-24 x 4-6 µm, tetrasterigmatic.
Basidiospores narrowly elliptic to subcylindrical, 4.5–5 × 2–2.5 µm.
Habitat. On the ground.
Distribution. Known only from Western tropical Africa.
Identification. The deep reddish, stipitate basidiocarps characterise this beautiful species.
Specimens examined: Ivory Coast: Cavally, region Sakre, 20 December 1992, Leg. L. Ake Assi (K), - Cameroon: Dja Biosphere reserve, NW Daj Sector, 15/9 2019, on the ground, leg L. Ryvarden (O).

Climacodon septentrionalis (Fr.:Fr.) P. Karsten,
Rev. Mycol. (Toulouse) 3: 20 1881. — *Hydnum septentrionale* Fr., Syst. Mycol. 1: 41, 1821.
Basidiocarps pileate, often densely imbricate, individual pilei with a radius of up to 20 cm, 1–2 cm thick, fleshy and soft when fresh, hard and brittle when dry, pilear surface scrupose to slightly strigose, the whole fungus at first white, later cream to chamois yellow, discoloured in patches and brownish when dried, hymenial surface densely hydnoid, individual spines up to 2 cm long, context white and dense, up to 1.5 cm thick, tough and fibrous.
Hyphal system monomitic, hyphae predominantly simple-septate in the trama, in the context with scattered clamps, also some multi-clamped septa, hyphae hyaline, thin- to slightly thick-walled, in the trama 3–5 µm wide, in the context up to 10 µm wide.
Cystidia abundantly present in the hymenium, broadly fusiform to conical with a pointed apex, thick-walled, smooth or with a small apical crown of crystals, 25–60 × 8–18 µm.
Basidia 5–20 × 5–9 µm, tetrasterigmatic with a basal clamp.
Basidiospores 4.5–5 × 2–2.5 µm, narrowly elliptic to subcylindrical.
Habitat. On living hardwoods such as *Acer*, often high above the ground along vertical cracks in the trunks.
Distribution. A typical eastern continental species in Europe, known throughout southern Fennoscandia and central parts of Europe to eastern France. Widespread further through Siberia and in North America.
Identification. Superficially this species reminds one about the hydnoid representatives of Hericiaceae with its white, soft, hydnoid basidiocarps. However, the smooth, non-

amyloid basidiospores and the thick-walled conical cystidia immediately rule out this family, where the basidiospores are ornamented and amyloid and the cystidia are of the gloeocystidia type.

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Aphyllophorales of Africa 50
The genus *Donkia* - a synopsis

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Abstract
Donkia africana Decock & Ryvarden is described as new and a synopsis of the genus is provided.

Introduction
In connection with exploration of wood inhabiting fungi in Central Africa, an unknown hydnoid species were found in Gabon. It belongs in *Donkia* and is described below as *Donkia africana*, together with a synopsis of the genus.

DONKIA Pilat,
Bull. Soc. Mycol. Fr. 52:328, 1936.
Basidiocarp annual, pileate, white to reddish orange, pilear surface smooth to scrupose, hymenial surface densely covered with slender spines, hyphal system monomitic, generative hyphae with clamps, cystidia present, smooth to apically encrusted, basidiospores ellipsoid, smooth, thin-walled and negative in Melzer's reagent, causing a white rot in hardwoods.
Type species: *Hydnum pulcherrimum* Berk. & W. A. Curtis.
Remarks. The genus is recognized by the pileate, densely hydnoid basidiocarps with a smooth pilear surface. Superficially it may remind of species of Hericiaceae which have the same type of basidiocarps, but all pileate hydnoid species in this family have ornamented amyloid basidiospores. Tropical genus.

Key to species

1. Spores elliptic, 3.5-4.5 x 1.5-2 µm ..... **D. pulcherrima**
1. Spores globose, 4-5 µm in diameter..... **D. africana**

Donkia africana Decock & Ryvarden, nova species: Index Fung. 557842
Holotype: Gabon, Ogooue Ivindo province, Ipassa Makokou Biosphere Reserve, ~ 0°17'60" N, 12°35'58" E, elev. ~ 400 m a s l, near the Kongou falls, on a dead fallen trunk, 80 cm diam., unidentified angiosperm, 08-09 April 2006, Coll. C. Decock, GA-

06-119, in BE, isotype in O (culture ex type MUCL 47641).
Basidiocarps pileate, sessile, broadly attached, 8 cm long and 2 cm wide and 2 cm thick at the base, dense; pileus white, glabrous, azonate, dull and smooth; hymenial surface white, densely hydnoid, individual spines up to 1 cm long, round to slightly flattened, about 1-2 mm wide, white to pale, context white, dense, azonate up to 1 cm thick at the base.
Hyphal system monomitic, all generative hyphae with camps, thin walled, 3-7 µm wide.
Cystidia not observed.
Basidia 15-24 x 4-6 µm tetrasterigmatic with a basal clamp.
Basidiospores 4-5 µm in diameter, globose, smooth, thin walled and negative in Melzers reagent.
Substrata. on a dead fallen trunk, 80 cm diam., unidentified angiosperm
Habitat. Primary Guineo-Congolian rain forest
Distribution. Known only from the type locality, Ipassa Makokou Biosphere Reserve, Gabon.
Remarks. The lack of cystidial organs and the globose spores characterize this species.

Fig. 1. *Donkia africana*, the holotype.

Donkia pulcherrima (Berk. & W. A. Curtis) Pilat,

Op. cit. - *Hydnum pulcherrimum* Berk. & W. A. Curtis, Hook., J. Bot. 1:235, 1849. – *Hydnum gilvum* Berk., Hook., J. Bot. 3:168, 1851. – *Hydnum uleanum* Henn., Hedwigia 36:198, 1897. – *Hydnum kauffmannii* Peck, Bull. Torrey Bot. Cl. 34:348, 1907. – *Hydnum australe* Lloyd, Mycol. Writ. 5 (Letter 69):11, 1919. – *Hydnum duriusculum* Lloyd, Mycol. Writ. 7:1107, 1922.

Basidiocarp pileate, often imbricate, individual pilei up to 7.5 cm wide and long, 1-2 cm thick, fleshy and soft when fresh, dense and brittle when dry; pilear surface first white, fibrillose, scrupose to slightly strigose, later discoloured in brown colours and becoming warted, tuberculate, radially veined to almost smooth; hymenial surface densely hydnoid, white becoming cartilaginous brown when dry, individual spines up to 4 mm long; subiculum white fleshy, becoming brown, shrunken and dense, up to 10 mm thick when fresh.

Hyphal system monomitic, generative predominantly simple-septate with some scattered clamps, thin- to slightly thick-walled, 3-5 µm wide in the spines, up to 8 µm wide in the subiculum, in the core of the spines oleiferous hyphae present, yellowish and up to 8 um wide.

Gloeocystidia present in the hymenial surface, embedded and often difficult to observe properly, up to 50 um long, 2-5 um wide, negative in Melzer`s reagent.

Basidia 17-22 x 3-5 µm, clavate with four sterigmata and with a basal simple septum.

Basidiospores 3.5-4.5 x 1.5-2 µm, elliptic, adaxially flattened.

Substrata. On dead hardwoods.

Distribution. A rare species in Europe, widespread in tropical zone.

Remarks. The macroscopically similar *Climacodon septentrionalis* is usually a larger, fleshier species besides having thick-walled smooth to slightly encrusted cystidia, thus easily separated from *D. pulcherrimum*.

The gloeocystidia in *D. pulcherrima* may sometimes be difficult to observe properly, especially in dried specimen, making determination more difficult. DNA sequencing has showed no relationship to *C. septentrionalis*, even if their basidiocarps are strikingly similar.

Aphyllophorales of Africa 51
Some new species from Ethiopia

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Abstract
40 poroid species are reported from the Kafa biosphere reserve, in Southern Nations, Nationalities and People Republic (SNNPR) in Ethiopia, out of which *Ceriporiopsis allantoideus* Ryvarden and *Melanoporella carbonaceous* (Berk. & M. A. Curtis) Murrill, are new to Ethiopia while *Antrodiella cylindrospora* Gminder & Ryvarden, *Perenniporia ethiopica* Gminder & Ryvarden and *Polyporus minitenuiculus* Gminder & Ryvarden are described as new species.

Introduction
In 2014 a general first investigationof the Kafa Biosphere Reserve (Ethiopia) was organized by The Nature and Biodiversity Conservation Union (NABU) (NABU 2017). One of the aims was to investigate the unique flora, fauna and funga of the Kafa region, a designated UNESCO biosphere reserve since 2010 (UNESCO 2020) and belonging to the Eastern Afromontain Biodiversity Hotspot (Mittermayer et al. 2005). For the fungi the wet mountain cloud forests, home of *Coffea arabica* L., as well as the high elevation bamboo forests with *Yushania alpina* (K. Schum.) W. C. Lin were of special interest. In this assessment the first author had the chance to collect fungi in the mountain cloud forests and bamboo forests around Bonga. A similar assessment was organized again by NABU during the rain season in 2019 (NABU 2020) where the same locations were visited again. Altogether 17 excursions in 7 different locations have been carried out. A characterization of these 7 locations is presented in NABU (2017: 91, tab. 2) where also the abbreviations used in the following list can be found.

Hymenochaetaceae

Cyclomyces tabacinus (Mont.) Pat. - KO 2014
Phellinus gilvus (Schw.) Pat. - AW, Bonga city 2014
Phylloporia pectinata (Kl.) Ryvarden - BK, BO, SHO 2014
Phylloporia spatulata (Hooker) Ryvarden - MA 2014

Polyporaceae

Amylonotus africanus Ryvarden - BK 2014
Antrodiella cylindrospora Gminder & Ryvarden spec. nov.
Registration no.: IF 558397
Holotype: Ethiopia, SNNPR, Wushwush, Komba,forest, 30. July 2019, on dead hard wood log, coll. A. Gminder, no. ETH-565 in private herbarium A. Gminder. Iostype in fungarium O (Oslo).
Diagnosis: Differing from other species of *Antrodiella* by basidiocarps with short, lateral stipe with black base, tiny pores and cylindrical spores.
Basidiocarps annual, pileate, semistipitate, flabellate to fan shaped, slightly bent when dry, up to 3 cm wide and long, about 3 mm thick, dense and hard when dry, pileus pale ochraceous with a small blackish cuticle close to the contracted based , glabrous and smooth and slightly radially veined, probably smooth when fresh, margin thin and deflexed in dry condition, pore surface pale ochraceous, pores angular (5) 6-7 (8) per mm, hardly visible to the naked eye, tubes concolorous, 2 mm deep, context 1 mm thick, homogenous, white.
Hyphal system dimitic; generative hyphae with clamps which are rather difficult to observe, skeletal hyphae hyaline, 3-5 µm wide.
Basidia 10-16 x 4-6 µm tetrasterigmatic.
Basidiospores 5-6 x 1.8-2 µm, cylindrical, smooth, negative in Melzers reagent.
Substrata. Dead hardwood.
Distribution. Known only from the type locality.
Remarks. The tiny pores, cylindrical basidiospores and laterally semistipitate basidiocarps with a black base make this a distinct species.

Ceriporia leptoderma (Berk. & Broome) Ryvarden - AW 2014
Ceriporia xylostromatioides (Berk.) Ryvarden. - KO 2019
Ceriporiopsis allantoideus Ryvarden AW 2014, new to Ethiopia.
Ceriporiopsis mucida (Pers.) Gilb. & Ryvarden - BK, KO 2014
Datronia caperata (Berk.) Ryvarden - KO 2014
Dichomitus cavernulosus (Berk.) Ryvarden (no spores seen) - BO 2014
Echinochaete brachypora (Mont.) Ryvarden - MA 2014; BO, KO 2019
Fomitopsis carnea (Blume et Nees) Imazeki - BA, BK, KO 2014; BK, KO 2019
Gloeoporus dichrous (Fr.) Bres. - KO 2014
Hexagonia glaber (Beauv.) Ryvarden - BA, BK, BO, MA, Bonga town 2014; KO 2019
Hexagonia velutina Pat. & Hariot - MA 2019
Junghuhnia autumnale Spirin, Zmitr. and Malysheva, new to Africa.
Junghuhnia carneoloa (Bres.) Rachjenb. - BA 2014
Junghuhnia nitida (Fr.) Ryvarden - BK 2014
Melanoporella cfr.carbonaceous (Berk. & M. A. Curtis) Murrill. This collections was returned to you and I do not have any part here in Oslo! -
New to Ethiopia. The pores are slightly smaller than seen in the other African collections seen by us. Unfortunately, the collection is sterile, thus, the identification has to be treated with caution.
Microporus vernicipes (Berk.) Kunt. - KO 2014
Microporus xanthopus (Fr.) Kunt. - AW, BO, KO, MA 2014

Perenniporia ethiopica Gminder & Ryvarden spec.nov. Registration no.:558433.
Holotype: Ethiopia Wushwush, Komba forest, 10. December 2014, coll. A. Gminder, ETH-286 in private herbarium A. Gminder, isotype in Fungarium O (Oslo).
Basidiocarps annual, dense, pileate to effused reflexed, pileus up to 3 mm wide, glabrous, wrinkled, resinous dense, dark brown with white margin apparently representing new growth, pore surface light buff, the pores round to slightly angular due to oblique pores surface, 5- 7 per mm hardly visible to the naked eye, tubes ochraceous up to 3 mm deep, context resinous, dense and brown about 200 µm thick.
Hyphal system dimitic; generative hyphae with clamps, hyaline, 2-5 µm wide, skeletal hyphae dextrinoid thin-to thick walled, 2-4 µm wide in a dense structure,
Basidia, 18-25 x 4-8 club shaped tetrasterigmatic
Basidiospores globose, 5-6 µm in diameter, smooth, thin walled slightly dextrinoid.
Substrata. Dead hardwood log.
Distribution. Known only from the type locality.
Remarks. The resinous pileus, small pores and globose dextrinoid spores are distinctive characters.
Perenniporia dendrohyphidia is a resupinate species without a trace of a pileus, thus quite different from our species!

Polyporus dictyopus Mont. - KO 2014

Polyporus minitenuiculus Gminder & Ryvarden spec. nov.
Registration no.: IF558396
Holotype: Ethiopia, Boginda forest, Saja, 9. December 2014, coll. A. Gminder, ETH-308 in private herbarium A. Gminder.
Diagnosis: Differing from the otherwise similar *P. tenuiculus* by smaller spores, narrower pores and molecular differences in the ITS-region.
Basidiocarps annual, flabellate to fan shaped, up to 3 cm wide and long and 2 mm thick with a small white stipe, up to 5 mm long and 5 mm wide, basidiocarp probably soft when fresh, fragile when dry, pileus glabrous, white to pale ochraceous, finely radially veined, margin thin and sharp, pore surface ochraceous, pores angular, 3-4 (5) 6-9 per mm, angular, thin walled, slightly elongated towards the base, pore walled papery and dentate in lower part of the basidiocarp, tubes ochraceous, up to 2 mm deep tube walls dense and fragile, context pure white, homogenous and 2 mm thick.
Hyphal system dimitic; generative hyphae with clamps, hyaline, 3-5 µm wide, arboriform, sparingly dichotomously branched, thick walled, up to 8 µm wide at the base, tapering to whip like distal tips, negative in Melzers reagent.
Basidia club shaped, 14-20 x 4-6 µm, tetrasterigmatic, difficult to observe.
Basidiospores 6-7 x 2-2.5 µm, cylindrical, smooth, thin walled, negative in Melzers reagent.
Substrate Dead hardwood log.
Distribution Known only from the type locality.
Remarks Superficially the basidiocarps of this species may remind one of small specimens of the wide spread and common *P. tenuiculus* (Beauvois) Fr., which however has wider pores and above all larger spores, i.e. 9 -12 x 2-3.5 µm.

Polyporus tenuiculus (Beauv.) Fr. - KO 2014 also KO 2019 (= coll. 596) or is this minitenuiculus? To me they seems to represent the typical species P. tenuiculus
Rigidoporus ulmarius (Sowerby: Fr.) Imazeki - MA 2019
Rigidoporus vinctus (Berk.) Ryvarden (no spores seen) - MA, SHO 2014
Skeletocutis nivea (Jungh.) Keller - BK, KO 2014
Trametes elegans (Fr.) Fr. - SHO 2019
Trametes polyzona (Pers.) Corner - AW 2014
Trametes sanguinaria (Kl.) Ryvarden - BO 2014
Trametes sanguinea (L.) Lloyd - AW, KO 2014; KO, MA, SHO 2019
Trametes versicolor (L.: Fr.) Pilat - BK 2014
Trametes villosa (Fr.) Kreisel - AW, BO, MA, SHO 2014

Heterobasidiomycetes
Protomerulius africanus (Ryvarden) Ryvarden - BO, KO 2019

Acknowledgements
The first author thanks NABU for the opportunity to investigate the fungi in the Kafa BR. We thank the people responsible for the project at NABU Germany, in particular Svane Bender, Steffanie Brandes, Marie Schoroth and Anteneh Tamirat Bogale, and also to the organization by the NABU employees on site, in particular Mesfin Tekle and employees, as well as the rangers Abebe Belachew and Wodajo Kebede. We would like to thank the Ethiopian Institute for Biodiversity (EBI) for issuing a Material Transport Agreement. The financing of the entire project was kindly approved by the Federal Ministry for Economic Cooperation and Development (BMZ), in particular Ludwig Schindler (Berlin). We would also like to thank the NABU International Nature Conservation Foundation for ensuring that the inventory was carried out by international experts. The inventory in the Kafa BR was financed by the Federal Ministry for Economic Cooperation and Development (BMZ) as part of the project "Community Action for Biodiversity and Forest Conservation and Adaptation to Climate Change in the Wild Coffee Forests (CAFA)". For the collection in the Kafa biosphere reserve, a permit for the entire project had been applied for by NABU. The export and molecular processing of the samples was approved by a MTA of the EBI (Ethiopian Biodiversity Institute).

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Aphyllophorales of Africa 52
Some poroid species from Kakamega Forest National Reserve in Kenya

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Abstract
46 poroid species are reported from Kakamega forest National Reserve in Kenya out of which *Antrodiella duplexa* Decock & Ryvarden and *Ceriporia kenyensis* Decock & Ryvarden are described as new species.

Introduction
During two shorts excursions at Kakamega Forest National Reserve (2015, 2018), in the western part of Kenya, wood-inhabiting basidiomycetes were collected, out of which two species are described as new, *Antrodiella duplexa* and *Ceriporia kenyensis*. The Kakamega Forest National Reserve is the easternmost remnant of the Guineo-Congolian lowland rain forest, also classified as the Lake Victoria transitional rain forest (Kindt et al. 2011), and that once stretched all along the Equator.

LIST OF SPECIES

Hymenochaetaceae
Fomitiporia tenuis Decock, Bitew & Castillo, 03, 58, 84.
Inonotus pachyphloeus (Pat.) T. Wagner & M. Fischer, 57.
Phellinus allardii (Bres.) Ryvarden, 13, 95.
P. callimorphus (Lev.) Fr. 85.
P. carteri (Bres.) Ryvarden. 68.
P. cesatii (Bres.) Ryvarden. 14 (MUCL 55531).
P. gilvus (Schw.) Pat. 65.
P. nilgheriensis (Mont.) Cunningh. 71.
P. purpureogilvus /Petch) Ryvarden. 03.
P. senex (Blume & Nees) Imazeki. 99.

Polyporaceae
Abortiporus roseus (D.A. Reid) Masuka & Ryvarden, 17, 78
Abundisporus fuscopurpureus (Pers.) Ryvarden, 29, 38, 40, 61, 84.

Antrodiella duplexa Decock & Ryvarden, sp. nov., Index Fung. 558349.
Holotype: Kenya, Kakamega Forest National Reserve, dead fallen branch, 16 Feb 2015, Coll Cony Decock KE-15-18 in in MUCL, isotype in O and EA.
Basidiocarps annual, flabelliform to spatulate to substipitate, up to 3 cm wide and long, and 4 mm thick, flexible when fresh, light of weight when dry; margin thin and sharp, deflexed in dry specimens; pileus evenly pale ochraceous, azonate, soft and velvety to adpressed tomentose, dull; pore surface ochre to buff; pores irregular, angular, 1-3 per mm; tubes concolorous with pore surface up to 2 mm deep; context up to 2 mm thick, distinctly duplex, lower part 1 mm thick at base and pure white, the upper part about 1 mm thick at base, soft and pale ochraceous.
Hyphal system dimitic; generative hyphae with clamps, hyaline, thin-walled, branched, 2-8 µm wide; the tomentum consists almost entirely of such hyphae; the context and trama generative hyphae and with densely agglutinated skeletal hyphae, difficult to separate, 2-4 µm wide.
Basidiospores 5-6 x 4-5 µm, subglobose, smooth, thin-walled, negative in Melzers reagent.
Substrate. Dead hard wood branch.
Distribution. Known only from the type locality in Kakamega Forest National reserve, western Kenya.
Remarks. The small, flabelliform to spatulate to substipitate, ochraceous basidiocarps with an adpressed, and soft tomentum, a duplex context, and slightly irregular angular pores, characterize this species.

Ceriporia kenyensis Decock & Ryvarden, nova species Index Fung.558350.
Holotype: Kenya, Kakamega Forest National Reserve, rotten wood on the ground, 17 Feb 2015, Coll Cony Decock KE-15-24 in MUCL, isotype in O and EA.
Basidiocarps annual, effused, up to 20 x 15 cm, adnate, consistency soft when fresh, drying brittle to fragile; margin wide and white; pore surface white; pores angular, 3-5 slightly irregular on sloping parts of the substrate; tubes concolorous with pore surface, 1-2 mm deep; subiculum thin and white.
Hyphal system monomitic; generative hyphae with simple septa, moderately branched, often at right angles, slightly thick-walled, 2-5 µm wide.
Basidia 10-15 x 3-5 µm tetrasterigmatic, few seen.
Basidiospores 3-4 x 1-1.2 µm, cylindrical.
Substrate. On dead hard wood log.
Distribution. Known only from the type locality in Kakamega Forest National Reserve, western Kenya.
Remarks. The species is characterized by a pure white basidiocarp, angular pores and cylindrical spores.

Ceriporiopsis costaricensis Ryvarden. 97.
Daedalea stereoides Fr. 90.
Datronia caperata (Berk.) Ryvarden. 37, 73.
Dichomitus cameronensis Ryvarden. 27.
Diplomitoporus ethiopicus Ryvarden, 01, 15, 20, 27 and 68.
Earliella scabrosa (Pers.) Gilb. & Ryvarden, 80.
Fomitopsis carnea (Blume & Nees) Imazeki, 06, 07, 08, 09, 54, 83.
Ganoderma australe (Fr.) Pat, 16.
Hexagonia glaber (Beauv.) Ryvarden. 46.
Hexagonia velutina Pat. & Hariot. 59.
Kusaghiporia usambarensis J. Hussein, S. Tibell & Tibuhwa 361, 362
Laetiporus discolor (Kl.) Corner, 22, 32, 33.
Lentinus brunneofloccosus Pegler. 26, 52.
L. courtetianus Hariot & Pat. 3, 91.
L. sajor-caju (Fr.) Fr. 91.
L. similis Berk. & Broome. 47.
L. velutinus Fr. 46.
Lignosus sacer (Fr.) Ryvarden, 30, 45, 75.
Microporus vernicipes (Berk.) Kunt, 79 (MUCL 55585), 94 (MUCL 55605).
Nigrofomes melanoporus (Mont.) Murrill. 04.
Perenniporia centrali-africana Decock & Mossebo, 36.
Perenniporia tephropora (Mont.) Ryvarden. 04 (MUCL 55553).
Polyporus austroafricanus Nuñez & Ryvarden. 42.
P. tenuiculus (Beauv.) Fr. 72.
Rigidoporus crocatus (Pat.) Ryvarden. 10.
Rigidoporus ulmarius Schw.) Imazeki. 85.
Rigidoporus vinctus (Berk.) Ryvarden, 41.
Schizopora trichilae (Van der Byl) Ryvarden, 48.
Trametes africana Ryvarden. 83.
T. elegans (Fr.) Fr. 70.
T. hirsuta (Fr.) Pilat. H5.
Trichaptum durum (Jungh.) Corner. 50.
T. sprucei (Berk.) Rachjenb. & Bianco. WP.
Vanderbylia vicina (Lloyd) D.A. Reid, 98, 363.
Wrightoporia avellanea (Bres.) Pouzar. 66.
Wrightoporia gloeocystidiata Johan. & Ryvarden. 11.

Stereaceae
Podoscypha nitidula (Berk.) Pat, 81, 86.

Acknowledgments
Cony Decock gratefully acknowledges the financial support received from the Belgian State – Belgian Federal Science Policy (BELSPO), through the BCCM program, and the FNRS through an ERAFRICA (project ASAFEM). The authors also extend their gratitude to the Kenyan Wildlife Service for granting permission to collect at Kakamega Forest National Reserve.

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Aphyllophorales of Africa 53
Some new combinations in Polyporaceae

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Introduction
Recent research has made it necessary to make some name changes. To avoid to do this in a forthcoming book on poroid fungi of Africa, some new combinations are proposed as follows.

LIST OF NEW COMBINATIONS

Protomerulius camerooniensis (Metsebing, Mossebo & Ryvarden) Ryvarden, comb. nov. Index Fung no 558461
– Basionym: *Aporpium camerooniensis* Metsebing, Mossebo & Ryvarden, Synopsis Fung. 39:74, 2019.

Trametes anthleroides (Douanla-Meli & Ryvarden) Ryvarden, comb. Nov Index Fung. no 558462
Basionym: *Coriolopsis anthleroides* Douanla-Meli & Ryvarden, Hedwigia 84:410, 2007.

Trametes subtuberculata Ryvarden, nomen nov. Index Fung. no 557239
= *Coriolopsis tuberculata* Ryvarden Micologia (Trento) p. 480, 2000, non *Trametes tuberculata* Bres. 2012.

Aphyllophorales of Africa 54
New species of Amanita, Armillaria and Termitomyces from East Africa

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Abstract
Amanita aurora Härkönen & Niemelä, *Amanita flavogala* Niemelä & Härkönen, *Amanita uapacae* Niemelä & Härkönen, *Armillaria verrucispora* Niemelä & Härkönen and *Termitomyces mbuzi* Härkönen & Niemelä are described as new, based on the authors' project collections from East Africa.

Introduction
This paper was prepared to describe five agaric species in order to make the names available for a forthcoming book (Niemelä *et al.* 2021). The specimens were collected in Tanzania, Zambia and Mozambique in the course of studies on edible mushrooms (Härkönen *et al.* 1995, 2003, 2015), Tiina Saarimäki being a team member and one of the collectors in Tanzania. Only brief technical descriptions are provided here. The species will be illustrated in the forthcoming book with photographs taken *in situ*. The collections are preserved at the Herbarium of the Finnish Museum of Natural History (H), University of Helsinki, Finland.

Basidiospore dimensions are given as follows. At least 30 spores were measured in Cotton Blue and Melzer's reagent with phase contrast and ×1250 magnification. Extreme values are given in parentheses; non-parenthesized ranges cover 90% of all the spores measured. Mean values include all the spores measured; Q is their length/width ratio; *n* tells the number of spores measured.

Amanita aurora Härkönen & Niemelä species nova, MycoBank MB840838.
Holotype: Tanzania, Mtwara Reg., Masasi Dist., Rukohe village near Ndanda, miombo woodland, alt. 1450 m, 23 Jan 1993, coll. Saarimäki *et al.* 1353 (H).
Basidiocarp 2.5 cm diam., 4 cm tall, thin, fragile, with a flat cap and slender stipe. Cap surface light orange-yellow, glabrous; the disc at centre depressed, smooth and darker orange, further out strongly plicate for about 2/3 of the radius, edge sharp, serrate. Gills yellowish white, free, medium-spaced, with few forkings, rather thin and *ca* 0.5 cm broad, edge smooth. Stipe 3.5 × 0.4 cm, equal, yellowish white, smooth, hollow; ring thin, white, fugacious; volva saccate, white. Context white but in cap near the surface

yellowish, in stipe fibrous. No special smell; not tasted.
Hyphal system monomitic, hyphae in all parts thin-walled, negative in Melzer's reagent, faintly cyanophilous, with clamp connections; in pileipellis 2.5–4 µm, agglutinated, running along the surface; in context 3–7(–10) µm, in a loose network; in gill trama 3–6 µm, longitudinally oriented but strongly twisted; in stipe 5–10 µm, parallel.
Basidia 19.5–27 × 10–11.2 µm, 4-sterigmate, with a basal clamp.
Basidiospores (11–)11.9–16.1(–17) × (6.4–)6.9–8.8(–9.4) µm, mean 13.89 × 7.76 µm, Q = 1.80, *n* = 60, narrowly ellipsoid, often tapered at both ends, non-amyloid, faintly cyanophilous, with one large guttule seen in Cotton Blue but not in Melzer's reagent.
Habitat and distribution On the ground in miombo woodland. Known only from the type locality in southeastern Tanzania.
Remarks The species resembles some other, small, yellow-capped amanitas (Beeli 1935). *Amanita aurea* is taller, it has an umbo instead of depression on its cap, and its hyphae lack clamp connections. Another look-alike, *Amanita luteoflava*, resembles our species in having a small, yellow cap with striate margin and a more saturated orange-coloured, depressed centre. Under the microscope these two differ, *e.g.* in having much smaller, globose spores, 4 µm diam. and 7–8 µm diam., respectively. Spores of *Amanita goossensiae* and *A. bingensis* are ellipsoid to ovoid, but they are smaller (8–10 × 5.5–6 µm

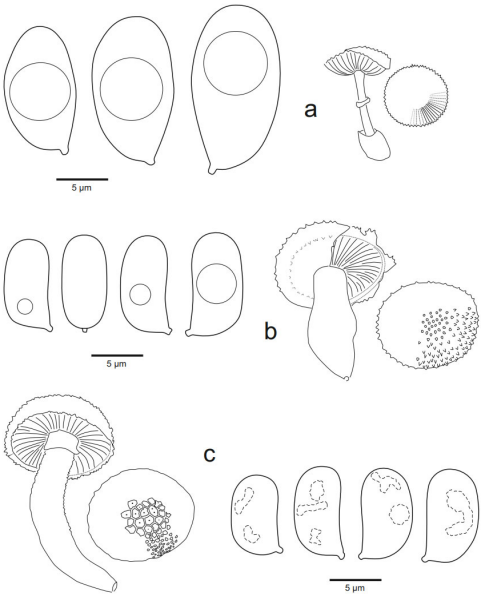

Fig. 1. Spores and habit pictures, a) *Amanita aurora*, b) *Amanita flavogala*, c) *Amanita uapacae*. All from holotype specimens.

and 5–6 × 3–4.5 µm, respectively) than in our new species.

Amanita flavogala Niemelä & Härkönen species nova, MycoBank MB840839.
Holotype: Zambia, Central Prov., Mkushi Dist., North Swaka For. Res., miombo woodland, 12 Feb 2013, coll. Härkönen 2013177 (H).
Basidiocarp compact, robust, with a subglobose cap 5–12 cm diam. and thick stipe. Cap cream-coloured with a rosy tint, densely covered with pointed but fairly short warts which fall off easily, leaving behind circular scars. Gills free, white to pale buff, with lamellulae of two lengths, exuding yellow droplets. Stipe 6.5–11 × 1.5–3 cm, but with a bulbous base 4 cm diam., solid, rooting; ring white, most of it torn apart and hanging along the cap edge; no separate volva, but nodulous zones seen on the bulbous base. Context white, solid, firm, when broken exuding copious yellow latex in particular from the cap above the gills. Smell and taste pleasant, groundnut-like.
Hyphal system monomitic, hyphae in all parts thin-walled, negative in Melzer's reagent, faintly cyanophilous, with clamp connections; pileipellis with pyriform to vesicular hyphal apices 18–25(–40) µm diam., arising from a layer of evenly thick, 5–7 diam. hyphae parallel along the surface; context with inflated, tightly intermixed stipe.
Basidia 31–45 × 8–8.9 µm, narrowly clavate, 4-sterigmate, with an inconspicuous basal clamp.
Basidiospores (8–)8.3–10(–10.7) × (4–)4.2–4.9(–5.1) µm, mean 9.20 × 4.54 µm, Q = 2.03, *n* = 100, cylindrical, smooth, amyloid, acyanophilous.
hyphae 5–20 µm diam.; gill medulla with short vesicular cells, but hyphae narrower and non-inflated in subhymenium; stipe with tightly parallel, moderately inflated hyphae, 3–7(–29) µm diam. Oleiferous hyphae common in cap context and to lesser extent in
Habitat and distribution On the ground in well-preserved miombo woodland. Known only from the type locality in Zambia.
Remarks Our species resembles *Amanita afrospinosa* (Pegler & Shah-Smith 1997), but that species does not produce latex; its hyphae are clampless. Latex-producing amanitas do occur at least in the Old World Tropics. We noted milky-white latex in *Amanita loosei, A. miomboensis* and *A. uapacae*. Mostly it oozes forth from cap context above the gills, but in the present species also from the gills themselves. Pegler & Shah-Smith (1997) report *Amanita praeclara* to 'exude clear yellow fluid when cut'; its spores are subglobose, 8–10.5 × 6.5–8.5 µm, and hyphae lack clamps. *Amanita xanthogala*, described from Borneo (Bas 1969), is another species that exudes yellow latex. It may be the closest kin to our species, but its spores are 8.5–10(–10.5) × 5.5–7 µm, *i.e.* equally long but much broader.

Amanita uapacae Niemelä & Härkönen species nova, MycoBank MB840840.
Holotype: Tanzania, Njombe Reg., Wanging'ombe Dist., Mbalali village 11 km S of Kidugala, degraded *Uapaca* woodland on riverside, alt. 1650 m, 1 Feb 1993, coll. Saarimäki *et al.* 1507 (H).
Basidiocarp stout, with 7 cm diam. cap and sturdy stipe. Cap surface pale beige-coloured, covered all over with somewhat darker, mosaic-like pyramidal warts; edge floccose, non-striate. Gills adnexed, white with a faint salmon tint, fairly distant and thick, 1.2 cm wide, edge serrulate. Stipe 9–10 × 2 cm, slightly clavate, rooting, upper

part whitish with a faint pink tint, further down concolorous with cap, striate above the ring, compactly cottony below; ring fugacious, superior, hanging, slightly plicate; volva inconspicuous, scaly. Context white, in cap tough, in stipe solid and softly fibrous; white milky latex exuding from broken cap context and to a lesser extent from the stipe. No special smell; taste mild.
Hyphal system monomitic, hyphae in all parts thin-walled, negative in Melzer's reagent, faintly cyanophilous, with clamp connections; pileipellis with 3–10 µm diam., interwoven hyphae, most of them oleiferous; context hyphae 3–5(–15) µm, moderately inflated, in a loose network; gill trama with 3–7 µm diam., longitudinally oriented and non-inflated hyphae; in stipe 4–8 µm, parallel. Lower context at the cap/gill transition with abundant oleiferous hyphae.
Basidia 30–38 × 8.3–9 µm, clavate, with a basal clamp.
Basidiospores (7.4–)7.6–9.3(–10.2) × (4–)4.5–5.7(–6.2) µm, mean 8.39 × 5.13 µm, Q = 1.65, *n* = 80, broadly cylindrical to ellipsoid, amyloid, acyanophilous, smooth.
Habitat and distribution The specimen was growing in a degraded woodland under *Uapaca* trees along a riverside, at the altitude of 1650 m. The three Mbena women we interviewed said it is edible and grows under *Uapaca*. Another collection: Tanzania, Njombe Reg., Wanging'ombe Dist., Masaulwa village N of Kidugala, alt. 1500 m, 2 Feb 1993, coll. Saarimäki *et al.* 1540 (H).
Remarks This species resembles *Amanita pleropus* (Pegler & Shah-Smith 1997, Westhuizen & Eicker 1994) which has a little shorter but broader spores (mean 8.2 × 5.2 µm); warts on its cap are outward-pointing scales rather than polygonal-symmetrical low pyramids like in our species. *Amanita pleropus* makes fairy rings on lawns and among grass, so the two species differ in their ecology. The most striking feature in our new species is the copious white latex that exudes from a broken fresh cap.

Armillaria verrucispora Niemelä & Härkönen species nova, MycoBank MB840841

Holotype: Tanzania, Arusha Reg., Arusha Dist., Mt Meru western slope, NE of Olmotonyi, Laikinoi, stump of *Cupressus lusitanica* in a plantation, alt. 1770–1900 m, 17 Dec 1989, coll. Saarimäki *et al.* 516 (H).
Basidiocarp with convex, slightly umbonate cap 2–2.7 cm diam., and long stipe, growing in confluent groups. Cap surface deep tan to rusty brown, densely squarrose; edge downcurved, with flake-like white velar remnants. Gills slightly decurrent, pale brownish cream, fairly close. Stipe 3.5–4 × 0.5 cm, equal or tapering downwards, cream-coloured above, more brownish towards the base, with white cottony squamules; ring evanescent, floccose, white. Context white, soft fleshy, in stipe fibrous. No smell; taste mild with an acrid aftertaste. Spore print white.
Hyphal system monomitic, hyphae negative in Melzer's reagent, faintly cyanophilous, mostly hyaline and thin-walled, with clamp connections; in pileipellis 3–10 µm, short-celled, with slightly thickened brown walls covered with resinous granules; in context 2.8–4(–7) µm, radially parallel, only moderately inflated; gill trama with 4–6.5 µm diam., parallel and moderately inflated hyphae; stipe surface hyphae as in cap surface, 5–9 µm diam., stipe medulla with parallel and moderately inflated hyphae 4–7(–10)

µm diam.
Pleurocystidia 35–48 × 5–7 µm, thin-walled, lageniform, with a long neck and a few apical crystals.
Basidia 18–23.5 × 5.5–6.3 µm, clavate, with a basal clamp.
Basidiospores (4–)4.1–4.9(–5) × (3–)3.1–3.7(–3.9) µm, mean 4.44 × 3.40 µm, Q = 1.32, *n* = 40, slightly thick-walled, verrucose, ellipsoid with a tapering proximal end, negative in Melzer's reagent, cyanophilous.
Habitat and distribution The type was growing in confluent groups on a stump of *Cupressus lusitanica* in a forest plantation. Known only from the type collection.
Remarks The shape of the basidiocarp, colours, mode of growth, and hyaline spores are typical for *Armillaria*, but all the other species in the genus that we have seen have smooth spores. However, Pegler & Young (1971) showed localised thickenings in the spore wall of *Armillaria mellea*, if seen with electron microscopy. In *A. camerunensis* longitudinal ridges are seen even under the light microscope (Singer 1986), but verrucose spore ornamentation is a unique feature of the present species.

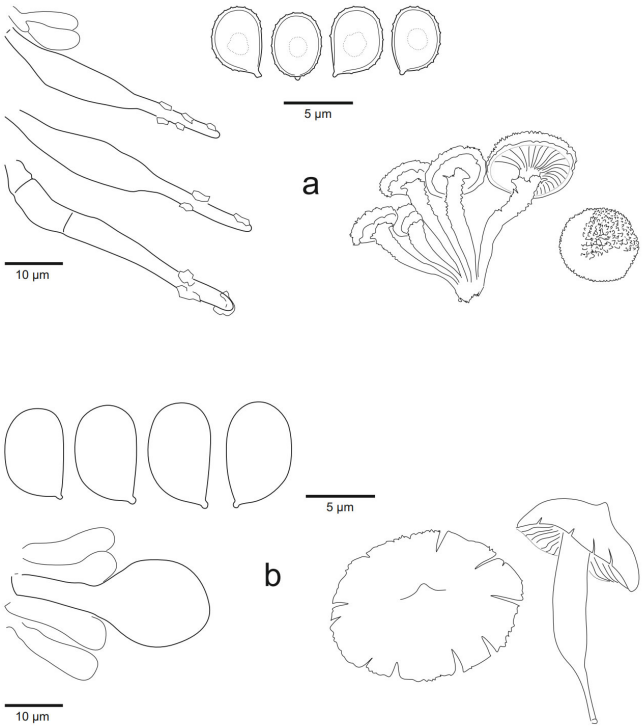

Fig. 2. Spores, pleurocystidia and habit, a) *Armillaria verrucispora*, b) *Termitomyces mbuzi*. Both from holotype specimens.

Termitomyces mbuzi Härkönen & Niemelä species nova, MycoBank MB840842

Holotype: Tanzania, Geita Reg., Geita Dist., SW of Mwanza along the Sengerema–Geita road, Buharahara, alt. 1200 m, 5 Dec 1991, coll. Saarimäki *et al.* 994 (H).

Basidiocarp with a cap 4–6.5 cm diam., first conical, then campanulate to flattened with a low but sharp perforatorium. Surface mostly white but faintly brownish cream or beige-coloured towards the perforatorium, smooth, matt; edge incised. Gills white or with a pinkish hue, free, thin, crowded, ca 0.8 cm broad, edge crenulate. Stipe 3–5.5 × 0.8–1 cm, cylindrical, smooth but minutely fluffy, white, without a ring; underground part tapering into a thin white pseudorrhiza. Context white, firm in both cap and stipe. Smell fungoid or reminiscent of rubber; taste mild.

Hyphal system monomitic, hyphae in all parts thin-walled, negative in Melzer's reagent, faintly cyanophilous, without clamp connections; pileipellis amorphous layer of agglutinated hyphae 5–9 µm diam.; in context 5–8(–17) µm, moderately inflated, radially oriented; in gill trama 3.5–7 µm, parallel and only slightly inflated; in stipe 6–12 µm, strictly parallel.

Pleurocystidia 35–38 × 13–15 µm, pyriform, thin-walled, few.

Basidia 20–25 × 6.8–7.7 µm, 4-sterigmate, clavate, with no basal clamp.

Basidiospores (6.1–)6.4–7.8(–8.6) × (3.9–)4.1–5.1(–5.5) µm, mean 6.95 × 4.45 µm, Q = 1.56, *n* = 90, ellipsoid, thin-walled, dextrinoid, cyanophilous.

Habitat and distribution Known from the type locality south of Lake Victoria in northern Tanzania, growing in large gregarious troops in miombo woodland. Another collection: Same as in type, coll. Saarimäki *et al.* 995 (H).

Remarks Pleurocystidia seem to be very rare in this species. Together with the minute-sized *Termitomyces microcarpus* and robust *Termitomyces schimperi*, this is the whitest termite mushroom we came across in Africa, characterized by a sharp-pointed umbo and fairly thick stipe if compared to the overall size. Like all *Termitomyces* species, also this is edible. The collection 994 was so abundant that part of it was forwarded to the Technical Research Centre of Finland (VTT) for nutrient content analysis. Species of *Termitomyces* – this one among the others – had the highest protein contents of the studied edible species (Härkönen *et al.* 2003: 52).studied edible species (Härkönen *et al.* 2003: 52).

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