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Cantharellus fistulosus sp. nov. from Tanzania

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Abstract – *Cantharellus fistulosus* sp. nov from Tanzania is described as a close relative to *C. schmitzii* from tropical miombo woodland dominated by tree species in *Brachystegia, Julbernardia* and *Isoberlinia*. The species is characterised by having a hollow, smooth stipe and a pink hymenium that contrasts with the yellowish brown stipe and cap surface.

***Cantharellus* / Taxonomy / Tanzania / Miombo woodland**

INTRODUCTION

The genus *Cantharellus* Fries was described in 1821 in Systema Mycologicum (Fries**,** 1821-1832). It has been recorded from all parts of the world with the exception of the Antarctic (Danell, 1994). In Tanzania, information on occurrence and diversity of *Cantharellus* is limited to Härkönen *et al*. (1995, 2003), who reported on six species, and Buyck *et al.* (2000) who reported on 11 species and introduced two new taxa: *Cantharellus tomentosus* Eyssart. & Buyck and *C. isabellinus* var. *parvisporus* Eyssart. & Buyck.

Cantharellus forms ectomycorrhiza and its distribution coincides with the distribution patterns of potential mycorrhizal partners. So far, all the partners for *Cantharellus* in Tanzania are dominant trees of the Miombo woodlands, which are divided into a South-eastern and a North-western zone in the country (Fig. 1). Miombo covers an estimated area of 2.7 million km^2 on nutrient-poor soils in sub-Saharan Africa that receives less than 700 mm of precipitation per year (Campbell *et al.,* 1996). It is distinguished from other African savannah woodland and forest formations by the high frequency of tree species with meso- and microphyllous compound leaves (Van der Meulen and Werger, 1984), the flush of new leaves before new rains and the dominance of ectomycorrhizal tree species (Högberg, 1982, 1992; Högberg and Piearce, 1986). 'Miombo' refers to a Bantu word for *Brachystegia,* the predominant tree genus in this type of vegetation. The woodland is further characterized by the local codominance of ectomycorrhizal trees in

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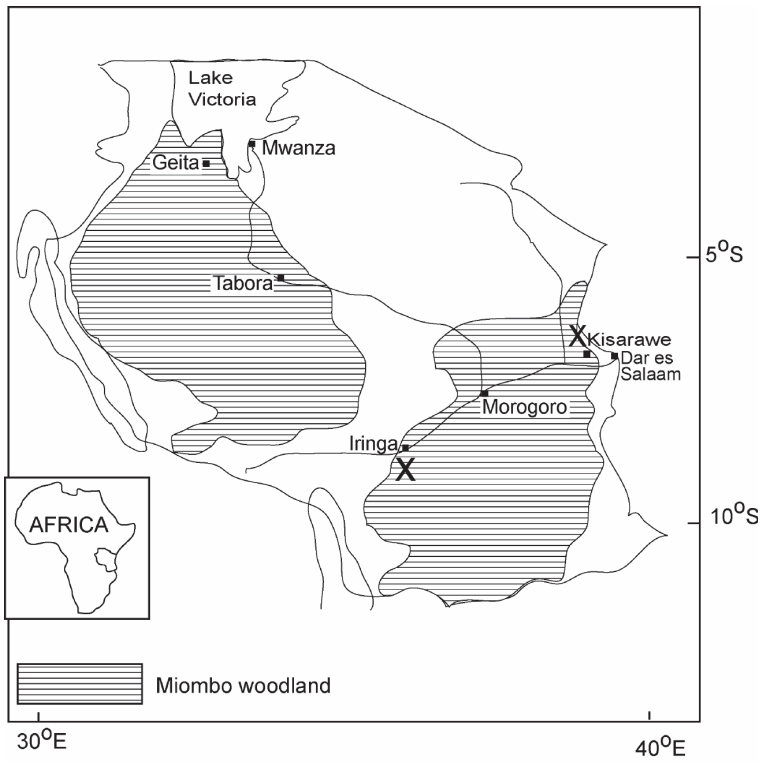


Fig. 1. Map showing the distribution of Miombo-woodland in Tanzania. Approximate positions of collecting sites are marked with 'X'.

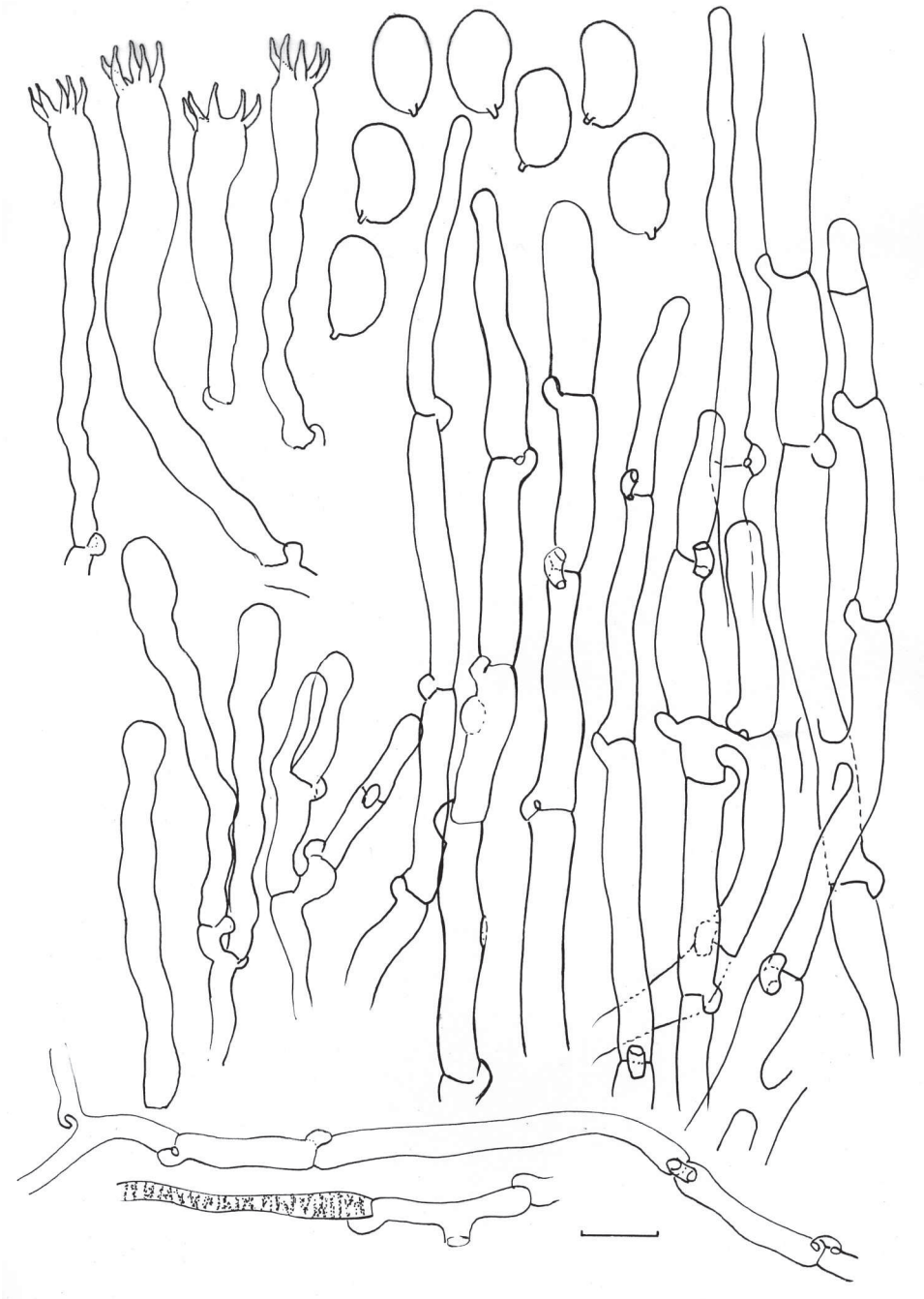
other genera of Caesalpinaceae, especially *Julbernardia* and *Isoberlinia*, as well as by host trees of the genus *Uapaca* (Phyllantaceae).

Cantharellus species not only are important for the ecology of this woodland by supplying mycorrhizal partners for trees (Munyanziza, 1994), but are also economically vital for the low income communities in the area. Various *Cantharellus* species are sold in local markets and along roadsides during the rainy season not only in Tanzania but also in the neighbouring countries (Morris, 1984; Buyck and Nzigidahera, 1995).

The objective of the present study is to describe and illustrate the small and rare *Cantharellus fistulosus* sp. nov. collected from the Miombo woodlands of Tanzania.

MATERIALS AND METHODS

The specimens were recently collected from Miombo woodlands located in the Kazimzumbwi forest reserve Kisarawe, in the Coast region, and in the Madibira-Iringa region (Fig.1). They are found growing in small troops emerging from the forest floor, on decayed woody humus deposits beneath living trees overall dominated by the ectomycorrhizal canopy of *Brachystegia, Combretum* and *Julbernardia.*



Figs 2-6. *Cantharellus fistulosus* (holotype). **2.** Basidia. **3.** Basidiola. **4.** Spores. **5.** Hyphal terminations of pileus surface. **6.** Fragments of hyphae just below the subhymenium with minute parietal incrustations indicated in part of one element as seen in Congo red. Scale bar = 5 µm for spores, 10 µm for the other elements. (all drawings B.Buyck)





Figs 7-8. *Cantharellus fistulosus*. Field aspect of fresh collections in situ. **7.** Holotype. **8.** Tibuhwa nr D.59 (all pictures D.Tibuhwa)

Microscopic characters were described from fresh specimens preserved in CTAB and observed in 10% ammonium solution in an aqueous solution of Congo red. Twenty measurements of basidiospores and basidia were analysed statistically to give (min) min-SD - AV -max-SD (max) Q; in which min = lowest value recorded for the measured specimen, max = highest value, AV = arithmetic average and SD standard deviation; Q the ratio length/width.

RESULTS

Cantharellus fistulosus Tibuhwa & Buyck sp nov.

Cantharello schmitzii differt hymenophoro roseo tincto sporis haud subglobosis pileipellis hyphis valde angustioribus. Holotypus: Tanzania. Kazimzumbwi forest reserve, Kisarawe, Coast region, S 06°04'324'' E 039°15'567'', April 2007 on decayed woody humus in miombo woodland, Tibuhwa D 43.2007 (holotypus UPS; isotypi PC and UDSM).

Vernacular names: Zaramo dialect: KIZOGORO MDOGO, Hehe dialect: WISOGORO MDOGO (Literally means small *Cantharellu*s)

Cap 1.5-2.5 cm diam., bell-shaped with strongly incurved margin when young, then expanding with age to plano-convex, becoming irregularly and slightly fissured; cap center slightly depressed and brown matted, contrasting with the bright yellow colour of the more marginal part of the cap. **Context** yellow, soft, watery and unchanging. **Hymenophore** of well-developed gills, these thick, decurrent, widely spaced, forked, pink-coloured and strongly contrasting against the yellow stipe and cap margin. **Stipe** 1.5-2.8 ¥ 0.2-0.5 cm, smooth, cylindrical, sometimes laterally compressed, with the base slightly enlarged, hollow. **Taste** slightly bitter when raw, but good when cooked. **Odour** not particular. **Spore deposit** pale pink.

Basidiospores ellipsoid or slightly reniform, 5-6.3-7 ¥ 3.5-3.75-4 µm, Q=1.43-1.69-2.0, smooth. **Basidia** (38)45-60(70) ¥ 5-7 µm, pedicellate-clavate, irregularly sinuous, mostly 5-6-spored. **Hymenial cystidia** not observed. **Pileipellis** composed of septate hypha measuring 4-6(7) µm diam., the terminal cells (13)25-50(65) µm long, mostly 3-5 µm diam., often narrowing slightly upward and somewhat sinuous or with a slight subapical constriction, in lower layers most hyphae up to 7 µm diam., with frequent anastomosing 'bridges' between adjacent cells of different hyphae; cell walls not exactly 'thin' but all more or less slightly thickened and therefore clearly refringent under the microscope; carotene pigment distinctly present. Near the subhymenium most hyphae again narrower, 2-4 µm diam., some with weak, yet distinct, zebroid transverse incrustations **Clamps** present everywhere.

Habitat: Gregarious to imbricate in small troops emerging from the *Brachystegia-Combretum-Julbernadia* woodland soil, on decayed woody humus deposits beneath the trunks of living trees, April-May.

Specimens examined: Tanzania, Iringa region, Madibira forest S 08°15'086'' E 35°17'219'' at an altitude of 1847m, in Uapaca woodland, May 2007, Tibuhwa D 59.2007 (UPS, UDSM).; Coast region, Kazimzumbwi forest reserve, Kisarawe, S 06°04'324'' E 039°15'567''. April 2007, miombo dominated by *Brachystegia*, *Combretum* and *Julbernardia*, Tibuhwa D 43.2007 UPS (holotype, isotypes: PC,UDSM).

DISCUSSION

The species is easily recognized in the field by its small size, yellow color with clearly brown matted center, pink hymenophore composed of widely spaced gills, and by the smooth hollow stipe, which is slightly twisted or compressed.

Although too small and too rare to represent some culinary interest, the bitter taste disappears when the mushrooms are prepared.

The hollow stipe and marked 'fibrils' on the cap are reminiscent of the genus *Craterellus Pers.,* but occur also in some of the smaller chanterelles of subgenus *Parvocantharellus* Eyssartier & Buyck.

Our species is morphologically very close to *C. schmitzii* Heinem. described from a very similar habitat (humus-rich trunk base) from neighboring miombo in the south of the Democratic Republic of Congo (Heinemann, 1966). The latter species – only known from the type collection – differs in particular by the more subglobose spores and the much more voluminous cells in the pileipellis, additional field differences (and therefore possibly of lesser importance) are the initial brown pigmentation of the cap and stipe fading only later to yellow and the more orange instead of pink color of the hymenophore. Both possess the often laterally compressed, hollow stipe and matted-fibrillose cap surface and are of the same size.

The recently described *Cantharellus conspicuus* Eyssart., Buyck & Verbeken from Zimbabwe (Eyssartier *et al*., 2002) was also reported as having a general "*Craterellus*" aspect and resembles our species in most of its microscopic features. However, *C. conspicuus* differs markedly in the darker and more purple-lilac colors of its cap and stipe, its squamulose-fribrillose cap and stipe surface. and whitish to pale orange hymenophore.

Other yellow *Cantharellus* species of a similar small size, e.g. *C. microcibarius* Heinem. or *C. isabellinus* var. *parvisporus*, differ by the rarity or absence of clamp connections and their not hollow stipe.

Our species morphologically fits best in subgenus *Parvocantharellus* as defined by Eyssartier & Buyck (2001), being characterized by small basidiomata, abundant clamp connections and absence of thickened cell walls in the hyphal endings of the cap.

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