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Gerronema hungo, a comb. nov. for a poorly known central African edible mushroom

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Abstract – The new combination *Gerronema hungo* (Henn.) Degreef & Eyi (Tricholomataceae) is proposed for an edible species collected in the central African rainforest and appreciated by the local populations.

Résumé – La combinaison nouvelle *Gerronema hungo* (Henn.) Degreef & Eyi (Tricholomataceae) est proposée pour une espèce comestible récoltée en forêt dense humide d'Afrique centrale et appréciée des populations locales.

***Gerronema hungo* / Tricholomataceae / central Africa / taxonomy / edible mushroom**

INTRODUCTION

During our recent field trips and surveys of edible mushrooms in the central African rainforest, we collected a species eaten by local people but with an unclear taxonomic status. A collection from D.R. Congo (Goossens-Fontana 4056) pertaining to the same taxon was found among the herbarium material kept in BR. This Congolese material was seen by Heinemann in 1978 and temporarily determined as "*Cantharellus* aff. *miniatescens*". When examining this specimen, we noted major macroscopic and microscopic differences compared with *C. miniatescens* Heinem. (*Bull. Jard. Bot. Etat Brux*. 28: 393, fig. 36 (1958)) and the relationship with the genus *Cantharellus* itself was seriously questioned (Eyssartier, pers. comm.).

Microscopic features were in favour of classifying our collections in the controversial lineages of omphalinoid mushrooms constituted namely by the genera *Gerronema* and *Chrysomphalina* (Tricholomataceae). A discussion on the taxonomical status of these genera was given quite recently (Lutzoni, 1997; Redhead *et al.*, 2002a, 2002b) in light of molecularly based phylogenetic data. The analysis of a 5.8S and nuLSU rDNA data set (Redhead *et al.*, 2002b; Palice *et al.*, 2005) confirmed that *Gerronema* forms a well-supported monophyletic group.

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MATERIAL AND METHODS

Field notes, colour-paintings by M. Goossens-Fontana and photographs were used for the macroscopic description. Colour codes (enclosed in brackets) and names used here follow the Methuen Handbook of Colour (Kornerup & Wanscher, 1983). Microscopic analysis and measurements of microstructures were made using 1% Congo-red solution. Mean values are obtained from twenty measurements of each microstructure (except for the basidiospores, 50 measurements) with analySIS® five imaging software (Soft Imaging System GmbH). Width and length measurements of basidiospores include minimal and maximal values (in parentheses), mean value (in italics) ± standard deviation. The same convention is used for length/width ratio. The studied herbarium material is deposited at BR and a double of the specimens collected in Gabon is also kept in LBV (abbreviations follow Holmgren *et al.*, 1990).

TAXONOMY

Gerronema hungo (Henn.) Degreef & Eyi, comb. nov. (Fig. 1)

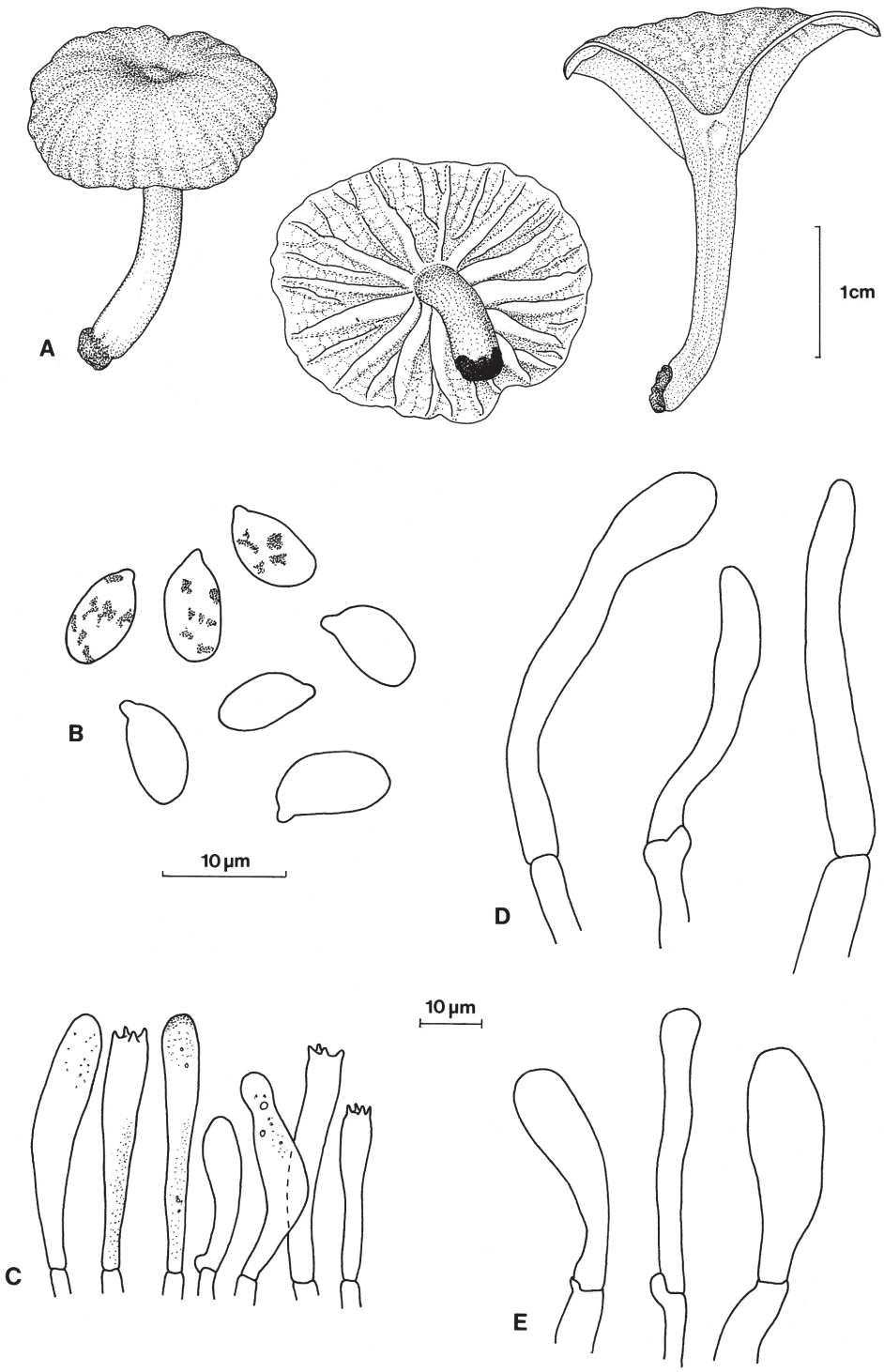
= *Marasmius hungo* Henn., Bot. Jahrb. Syst. 22: 98 (1895); Antonín, Fung. Fl. Trop. Afr. 1: 152 (2007) (under "Excluded and doubtful taxa").

The following description is based on the specimen gathered by Goossens-Fontana in D.R. Congo and those collected by us in Cameroon and Gabon. A detailed revision of the type is given by Antonín (2007).

Pileus 22-50 mm in diameter, campanulate to convexo-umbilicate, then strongly depressed in the center; yellowish orange [4A6] to brownish-orange [5C4] with greyish-brown [5F3] radiant grooves; surface dry, glabrous, deeply sulcate; margin acute, slightly incurved; context very thin (up to 0.5 mm), pale orange [5A3]. *Gill-folds* decurrent, distant (5-6 per cm), thick (0.5 mm), up to 4 mm broad, simple, little interveined, not anastomosing, deep orange [6A8]. *Stipe* 19-40 × 2-5 mm, central, cylindrical or slightly thickened downwards; glabrous; melon orange [5A6] turning olive brown [4D4] when aging; hollow. *Smell* agreeable, weak. *Taste* somewhat peppery. *Spore print* white to pale yellowish white [2A2].

Basidiospores (6.6-) 7.2-*7.8*-8.4 (-9.7) × (3.9-) 4.1-*4.4*-4.7 (-5.1) µm, ellipsoid (l/w = (1.56-) 1.65-*1.77*-1.89 (-2.16)), white, smooth; non amyloid; generally containing small granules. *Basidia* 30-46 × 6-10 µm, cylindrical to narrowly clavate, hyaline or containing small granules while immature, (2-) 4-spored. *Cystidia* absent. *Trama* bi-directional, hyphae cylindrical, up to 35 µm wide. *Pileipellis* cutis with hyaline, thin-walled hyphae 2-15 µm wide; end-cells lanceolate to subclavate, up to 12 µm wide. *Stipitipellis* cutis with hyaline, thin-walled hyphae 2-12 µm wide; end-cells lanceolate to clavate, up to 15 µm wide. *Clamp connections* present.

Fig. 1. *Gerronema hungo* (Henn.) Degreef & Eyi comb. nov. (Degreef 370). A. Macroscopic feature; B. Basidiospores; C. Hymenophore; D. Pileipellis; E. Stipitipellis. (Ink-drawing by O. Van de Kerckhove).


A
1cm
B
10 µm
D
10 µm
C
E

Syntype: CAMEROON, station of Yaoundé, on old stem in a shady virgin forest, 5 Jan. 1894, Zenker & Staudt 161 (S F-16275).

Additional specimens examined: CAMEROON, South Province, Shouam, Dja Reserve, 12 April 2007, Degreef 546 (BR); D.R. CONGO, Equateur Province, Binga, June 1947, Goossens-Fontana 4056 (BR); GABON, Ogooué-Ivindo Province, Ipassa-Makokou Research Station, 7 April 2006, Degreef 370 (BR, LBV); Ibid., Kongou Waterfalls, 8 April 2006, Eyi 53 (BR, LBV).

Ecology: scattered on the ground in the rainforest.

DISCUSSION

In his recent monograph of *Marasmius*, *Gloiocephala*, *Palaeocephala* and *Setulipes* in Tropical Africa, Antonín (2007) rejected *Marasmius hungo* Henn. suspecting this species to pertain to "*Gerronema* or similar genera". By examining this work, our attention was namely caught by the fact that this species was mentioned in the diagnosis (Hennings, 1895) as eaten by the local people. This is at our knowledge a unique case for a representative of the genus *Gerronema* in Africa.

Gerronema pertains to the omphalinoid Tricholomataceae, a group whose European species were revised by Clémençon (1982). Clémençon reinvestigated the structure of the hymenophoral trama and gave it a heavy taxonomic weight instead of using the pigmentation as the primary distinction character (Singer, 1986). He notably put in evidence that the gill trama is irregular and "bi-directional" in *Gerronema* and used this character for discriminating the genus. Redhead (1986) also restricted the genus *Gerronema* to species with sarcodimitic tissues defining in such a way a more natural group. It was confirmed later on (Moncalvo *et al.*, 2000, 2002) that the taxa with sarcodimitic tissues form a well-supported lineage and are distantly related to other omphalinas, namely *Chrysomphalina* that accommodates taxa with pachypodial subhymenium and monomitic tissues (Norvell *et al.*, 1994).

The species studied here clearly shows a bi-directional gill trama with descending and transversal hyphae (fig. 2). This rare feature is also observed in *Clitocybula* (Sing.) Métrod from which our species differs clearly by its non-amyloid spores and in *Hydropus* (Kühner) Singer where large pleurocystidia are observed (cystidia absent in our case).

The species was described and first (and last) mentioned as edible by Hennings in 1895 in Cameroon, close to Yaoundé. The origin of the vernacular name cited by Hennings ("hungo", chosen as species epithet) is questionable but the affinity with the Spanish word "hongo" (= mushroom) could be due to the proximity with Equatorial Guinea.

The pygmy populations of the Bakoya ethnic group we surveyed in Gabon quoted this edible species as "appreciated".

The delimitation of omphalinoid taxa has been controversial for decades and remains unclear. The new combination proposed here is supported by recent phylogenetic results but a redefinition of the genus *Gerronema* is still possible in the near future based on additional molecular data. Notwithstanding this debatable taxonomy, it is worth bringing this unknown species to light now for contributing to the knowledge of the edible mushrooms in central Africa.

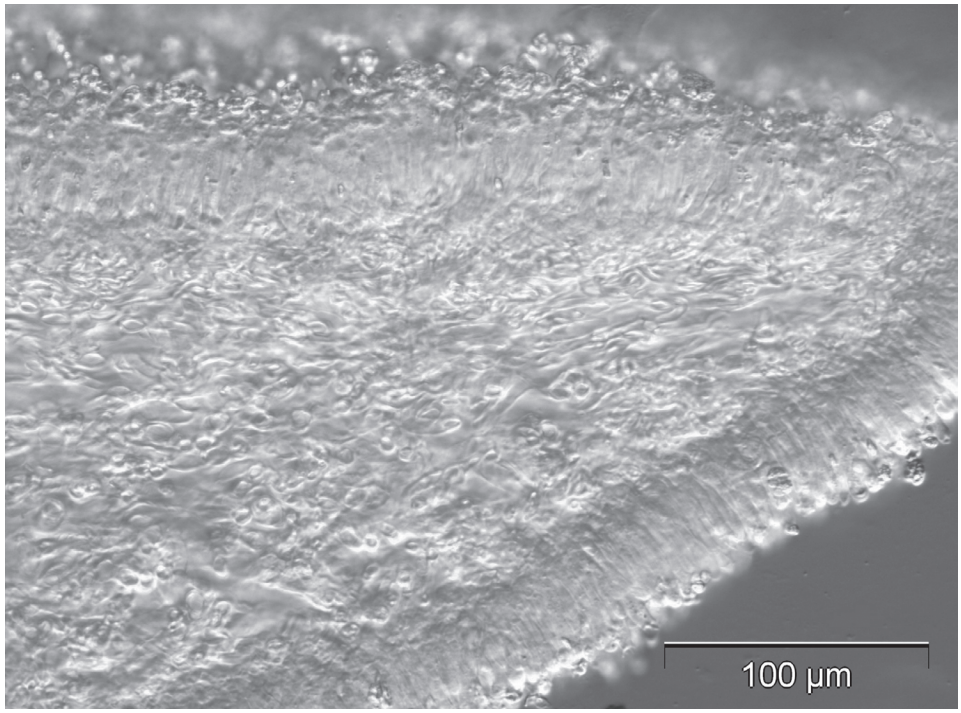


Fig. 2. Bi-directional trama at the edge of a gill with longitudinal and grouped transversally cut hyphae (Degreef 370).

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REFERENCES

ANTONÍN V., 2007 — *Monograph of* Marasmius*,* Gloiocephala*,* Palaeocephala *and* Setulipes *in Tropical Africa.* Fungus Flora of Tropical Africa 1. Meise, National Botanic Garden of Belgium, 164 p.

CLÉMENÇON H., 1982 — Kompendium der Blätterpilze. Europäische omphalinoide Tricholomataceae. *Zeitschrift für Mycologie* 48(2): 195-237.

HEINEMANN P., 1958 — Champignons récoltés au Congo belge par Madame M. Goossens-Fontana. 3. Cantharellineae. *Bulletin du Jardin botanique de l'Etat, Bruxelles* 28: 385-437.

HENNINGS P., 1895 — Fungi camerunenses. I. *Botanische Jahrbucher für Systematik* 22: 72-111.

HOLMGREN P.K., HOLMGREN N.H. & BARNETT L.C., 1990 — *Index herbariorum. Part I: Herbaria of the World*. 8th ed. Bronx, New York Botanical Garden.

KORNERUP A. & WANSCHER J.H., 1983. — *Methuen Handbook of Colour*. 3rd ed. London, Eyre Methuen.

LUTZONI F.M., 1997 — Phylogeny of lichen- and non-lichen-forming omphalinoid mushrooms and the utility of testing for compatibility among multiple data sets. *Systematic Biology* 46: 373-406.

MONCALVO J.-M., LUTZONI F.M., REHNER S.A., JOHNSON J. & VILGALYS R., 2000 — Phylogenetic relationships of agaric fungi based on nuclear large subunit ribosomal DNA sequences. *Systematic Biology* 49: 278-305.

MONCALVO J.-M., VILGALYS R., REDHEAD S.A., JOHNSON J.E., JAMES T.Y., AIME M.C., HOFSTETTER V., VERDUIN S.J.W., LARSSON E., BARONI T.J., THORN R.G., JACOBSSON S., CLÉMENÇON H. & MILLER Jr. O.K., 2002 — One hundred and seventeen clades of euagarics. *Molecular Phylogenetics and Evolution* 23: 357-400.

NORVELL L.L., REDHEAD S.A. & AMMIRATI J.F., 1994 — *Omphalina* sensu lato in North America. 1-2. 1: *Omphalina wynniae* and the genus *Chrysomphalina*. 2: *Omphalina* sensu Bigelow. *Mycotaxon* 50: 379-407.

PALICE Z., SCHMITT I. & LUMBSCH H.T., 2005 — Molecular data confirm that *Omphalina foliacea* is a lichen-forming basidiomycete. *Mycological Research* 109(4): 447-451.

REDHEAD S.A., 1986 — Mycological observations: 17-20, nomenclatural notes on some omphalioid genera in Canada: *Chrysomphalina*, *Rickenella*, *Gerronema*, *Omphalina*. *Acta Mycologica Sinica*, suppl. 1: 297-304.

REDHEAD S.A., MONCALVO J.-M., VILGALYS R. & LUTZONI F., 2002a — Phylogeny of agarics: partial systematics solutions for bryophilous omphalinoid agarics outside the Agaricales (euagarics). *Mycotaxon* 82: 151-168.

REDHEAD S.A., LUTZONI F., MONCALVO J.-M. & VILGALYS R., 2002b — Phylogeny of agarics: partial systematics solutions for core omphalinoid genera in the Agaricales (Euagarics). *Mycotaxon* 83: 19-57.

SINGER R., 1986 — *The Agaricales in Modern Taxonomy*. 4th ed. Koenigstein-Taunus, Koeltz, 981 p.