

Lactifluus kanadii



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Lactifluus kanadii I. Bera, A. Ghosh, Nuytinck & Verbeken, *sp. nov.*

Etymology. In honour of Dr Kanad Das for his invaluable contribution to the systematics of *Russulaceae* in the Indian Himalayan Region.

Classification — *Russulaceae*, *Russulales*, *Agaricomycetes*.

Pileus 30–85 mm diam, hemispheric to convex when young, gradually becoming planoconvex with a broad shallow depressed centre; surface moist, smooth, velvety, faintly rugulose towards the margin, yellowish white (1A2) and paler, with some irregular darker spots, but turning orange white to pale orange (5A2–4) to ochraceous and darker on bruising and even brownish on maturity; cracked at several places towards the margin in mature basidiomata; margin entire, incurved when young, remaining incurved through maturity. **Lamellae** adnate to sub-decurrent, close to rather crowded (20 L+I /cm at pileus margin), dichotomously forked; lamellulae present in 3–4 series; yellowish white (2–3A2); edge entire, smooth, concolorous. **Stipe** 25–95 × 15–30 mm, central, cylindrical but sometimes twisted near the base; surface velvety, strongly rugulose locally; concolorous to the pileus, when bruised turning pale orange to light orange (5A3–4) to ochraceous and darker. **Context** thick in pileus and stipe, yellowish white (1–2A2), almost immediately turning pale orange on bruising, greyish green (1D4) in guaiac, orange (5A6–7) in FeSO₄ and immediately yellowish in KOH. **Latex** yellowish white, copious, unchanging on cut lamellae. **Taste** very acrid. **Odour** fruity. **Spore print** not recorded.

Basidiospores 5.8–6.7–8.2(–9.1) × 4.7–5.6–6.7 μm, n = 30, Q = 1.04–1.19–1.32(–1.44), usually globose to ellipsoid; ornamentation amyloid, up to 0.6 μm high, composed of isolated irregular warts which are sometimes aligned or connected by lower lines but never forms any reticulation; suprahilar spot inamyloid. **Basidia** 39–56.8 × 9.0–11.8 μm, clavate to subclavate, 4-spored; sterigmata 2–3 × 1.4–2 μm. **Pleuromacrocytidia** abundant, 47–69 × 5.4–9 μm, emergent up to 32 μm, cylindrical to subcylindrical with rounded, subfusoid to subcapitate apices, thin-walled; content dense, granular to crystalline. **Pleuropseudocystidia** abundant, 2.5–3 μm wide, emergent up to 12 μm, cylindrical, with rounded apex. **Lamellae edge** fertile with basidia, basidioles and cystidia. **Cheilomacrocytidia** abundant, 45–61 × 4.6–6.6 μm, emergent up to 40 μm, subcylindrical with rounded, subfusoid to subcapitate apices, thin-walled; content dense, granular to crystalline. **Subhymenium** up to 20 μm thick, cellular. **Hymenophoral trama** composed of lactifers and few nests of sphaerocytes connected with hyphae. **Pileipellis** a trichoeipithelium, up to 136 μm thick; suprapellis composed of ascending elements, 15.4–22.1 × 2.7–3.8 μm, cylindrical to subfusiform, septate; subpellis multicellular composed of isodiametric cells of 8.6–12.8 × 4.0–11.1 μm; pileocystidia present, 22–26.5 × 5–10 μm, cylindrical to subcylindrical, content dense, crystalline. **Stipitipellis** a trichoeipithelium, up to 52.2 μm thick; suprapellis composed of septate ascending elements arising from distinct multicellular subpellis of mostly

isodiametric cells; caulocystidia present, 16–26 × 5.5–6.6 μm, mostly cylindrical, content dense, crystalline. **Clamp connections** absent in all tissues.

Sporocarp characteristics — *Lactifluus kanadii* differs from the other members of *L.* sect. *Piperati* due to the clear change of basidiomata colour from yellowish white when young to pale orange to ochraceous and darker to even brownish on maturity and when bruising, the trichoeipithelium nature of pileipellis and stipitipellis and in sequence data of the nrITS, LSU and *rpb2* markers.

Typus. INDIA, Arunachal Pradesh, Bebar Thanka, Dirang, West Kameng, under *Castanopsis* sp. (*Fagaceae*) in temperate broadleaf forest, 4 Aug. 2019, I. Bera, IB 19-020 (holotype CAL 1826, ITS, LSU and *rpb2* sequences GenBank MW295837, MW295839 and MW354672, MycoBank MB 838371).

Additional material examined. INDIA, Arunachal Pradesh, Namchu, Dirang, West Kameng, under *Castanopsis* sp. (*Fagaceae*) in temperate broadleaf forest, 6 Aug. 2019, I. Bera, IB 19-025, CAL 1827, ITS, LSU and *rpb2* sequences GenBank MW295838, MW295840 and MW354673.

Notes — The combination of macro- and micromorphological characters like the smooth, yellowish white, firm sporocarp, crowded lamellae, yellowish white, copious, latex, acrid tasting context and two-layered pileipellis with the hyphal suprapellis and the cellular subpellis with pileocystidia undoubtedly place *L. kanadii* in *L.* subg. *Lactifluus* sect. *Piperati* (Hesler & Smith 1979, Heilmann-Clausen et al. 1998, De Crop et al. 2014). In the field, it can be misidentified as *L. piperatus* (as the name has been misapplied several times to many lookalike specimens worldwide), but *L. kanadii* easily distinguishes itself due to its much smaller pileus (30–85 mm diam), striking colour change of the basidiomata from the yellowish white in young sporocarps to light orange to ochraceous and darker and even brownish on maturity, its context that immediately turns yellowish in KOH, much thicker pileipellis (up to 137 μm thick) and the trichoeipithelial nature of both the pilei- and stipitipellis. Morphologically, *L. glaucescens* can also be confused with *L. kanadii*. But *L. glaucescens* can be distinguished on account of its latex turning greenish on drying, subglobose to ellipsoid basidiospores (Q = 1.05–1.26–1.33–1.45) with much shorter ornamentation (up to 0.2 μm high), longer pleuromacrocytidia (60–90 × 7–10 μm) and cheilomacrocytidia (55–70 × 7–9 μm) (Heilmann-Clausen et al. 1998).

The Indian species *Lactifluus dwaliensis* (originally described as *Lactarius dwaliensis*) can easily be distinguished from *L. kanadii* due to its much more robust and larger sporocarps (pileus 84–130 mm diam, stipe 50–145 × 17–30 mm), rather distant lamellae and latex turning greenish yellow on exposure (Das et al. 2003, Verbeken et al. 2012).

(text continues on Supplementary material page FP1257)

Supplementary material

FP1257 Maximum Likelihood (ML) phylogram inferred from raxmlGUI v. 2.0 (Edler et al. 2021) based on concatenated three-locus (nuc rDNA ITS, nrLSU and *rpb2*) sequences of *Lactifluus*. Bootstrap support values (> 70 %) obtained from the Maximum Likelihood (ML) analysis are shown above or below the branches at nodes. Sequences derived from the novel Indian species *Lactifluus kanadii* (vouchers IB 19-020 and IB 19-025) are presented in blue and bold font.

Colour illustrations. India, Arunachal Pradesh, Bebar Thanka, West Kameng, temperate broadleaf forest. *Lactifluus kanadii* (IB 19-020, holotype); macrochemical test with FeSO₄, Guaiac and KOH on stipe context; latex on the cut lamellae; transverse section through pileipellis; pleuromacrocytidia; cheilomacrocytidia; SEM of basidiospore. Scale bars = 10 μm (all others), 2 μm (basidiospore).

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