

North Indian Agaricales. II.

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Summary. — A new species of *Macrocystidia* HEIM ex JOSSERAND (*M. indica*) and a new variety of *Russula minutula* VELEN. (*R. minutula* var. *robusta*) are illustrated and described.

Introduction

This paper records additional taxa of Agaricales from North India as a part of the study of the fungus flora of that region undertaken by the senior author and his students.

The first contribution (SAINI & ATRI, 1981) deals with four known species. The second contribution deals with one new species of *Macrocystidia* HEIM ex JOSSERAND (*M. indica*) and one new variety of *Russula minutula* VELEN., namely *R. minutula* var. *robusta*. These are described based upon their morphological, anatomical and micro-chemical details. The type collections have been deposited at the Herbarium of the Botany Department, Punjabi University, Patiala (PUN) and a part of it at the Field Museum of Natural History, Chigago, Illinois, U.S.A. (F). The colors are given according to the Methuen Handbook terms (KORNERUP & WANSCHER, 1978) and the type of spore ornamentation according to SINGER (1975).

Descriptions

Macrocystidia indica SAINI, ATRI & SINGER, sp. nov. — Fig. 1.

Pileo usque ad 2 cm lato, convexo, umbonato, brunneo (6E8) in immaturis, atro-brunneo (6F8) in maturis carpophoris. Lamellis adnexis vel adnatis, subdistantibus, moderatim latis vel latis, e brunneolo-griseis (6C2) in immaturis carpophoris, dilute brunneis (6D4) in maturis carpophoris, fimbriatis. Stipite usque ad 7.2×0.2 cm, cylindraceo, aequali, cavescente, brunneo superne atque atro-brunneo basin versus. Sporis $6-8.5(9.5) \times 3-4.5$ μm , ellipsoideo-oblongis, inamyloideis, sporis in cumulo brunneolo-aurantiis (6C3). Basidiis $15-23 \times 6-7.5$ μm , clavatis, (2-)4- sporis, sterigmatibus usque 3 μm longis. Cystidiis et gloeocystidioideis $24.3-63 \times 6.8-20$ μm . Tramate hymenophorali regulari, hyalino, Epicute pilei hyphosa. Dermatoecystidiis $24-95 \times 8-26.6$ μm , numerosis. India. Typus: PUN 275, ATRI, Aug. 21, 1979.

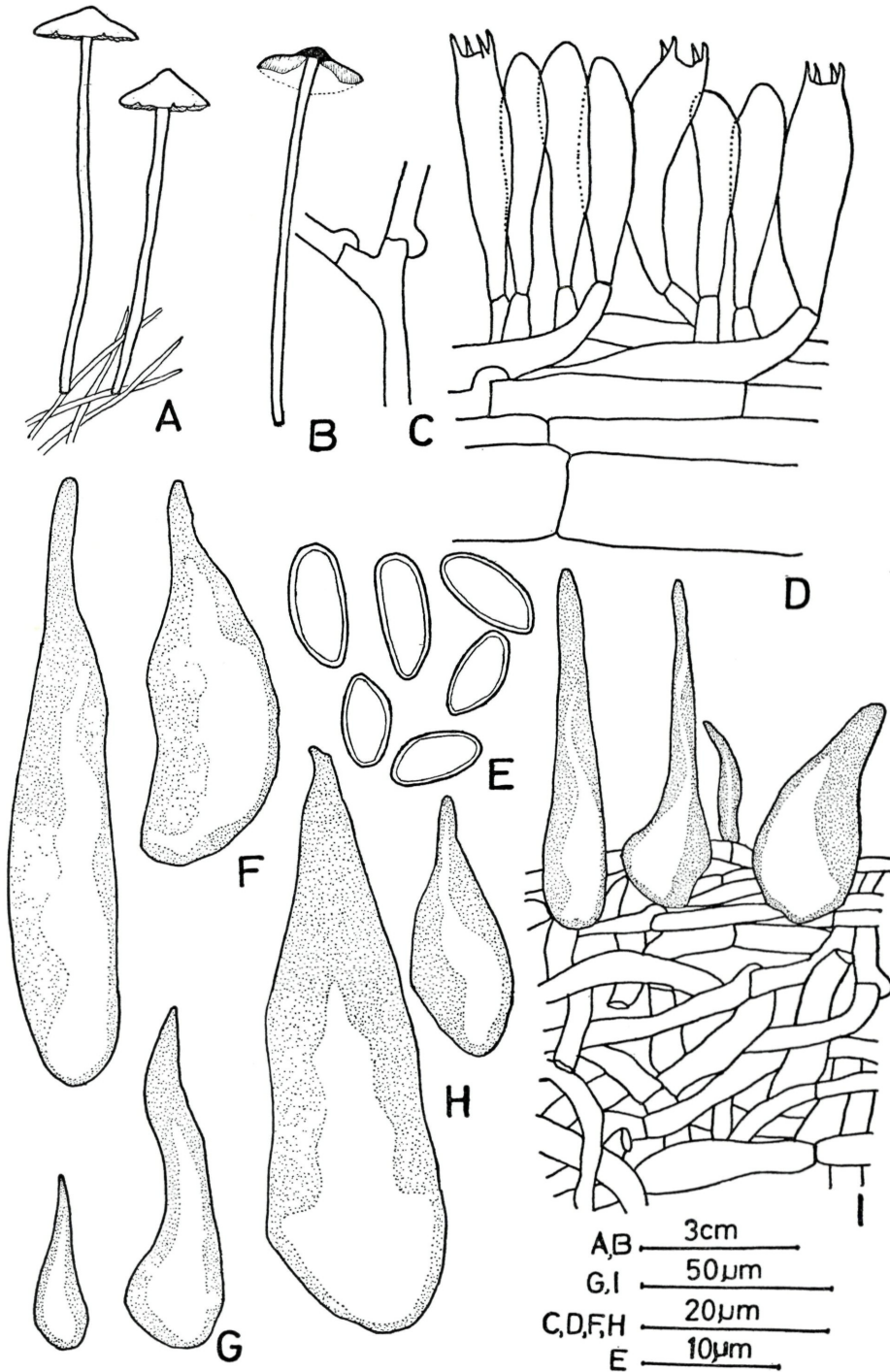


Fig. 1. *Macrocyttidia indica* SAINI, ATRI & SINGER. — A. Carpophores. — B. Cross section through carpophore showing gill attachment. — C. Clamped mycelial hypha. — D. Cross section through hymenophore showing basidia and hymenophoral trama. — E. Basidiospores. — F. Gloeocystidia of gill edge. — G. Dermatocystidia of stipe. — H. Gloeocystidia of gill sides. — I. Cross section through pileus showing dermatocystidia and pileus context

Pileus up to 2 cm broad, convex, broadly umbonate, margin irregular, splitting at maturity, slightly pectinate, surface moist, pubescent, brown (6E8) when young and dark brown (6F8) when mature. Lamellae adnexed to adnate, moderately broad to broad, subdistant, unequal, lamellulae not arranged in series, brownish grey (6C2) when young, light brown (6D4) at maturity, no change when bruised, edges fimbriate. Spore print brownish orange (slightly lighter than 6C3). Stipe up to 7.2×0.2 cm, central, cylindrical, equal in diameter throughout, pubescent, hollow, brown above and dark brown below. Basal mycelium present. Context yellowish brown (5D5), unchanging when bruised. Odour farinaceous, taste mild.

Spores $6-8.5(9.5) \times 3-4.5$ μm , ellipsoid-oblong, attenuate, even cylindrical, double walled, epispodium thin, fuscidulous-melleous, cyanophilic, endosporium rather broad hayline or subhyaline, the entire wall reaching 0.5 μm in diameter, without germ pore, inamyloid. Basidia $15-23 \times 6-7.5$ μm , (2-)4-spored, short, clavate, hyaline, sterigmata up to 3 μm long. Cystidia gloeocystidioid (bluemetachromatic in cresyl blue mounts), $24.3-63 \times 6.8-20$ μm , both on sides and edges of the lamellae, pedicel often very short or almost absent, thin walled, obclavate, sometimes ventricose mucronate or appendiculate, often merely subacute or obtuse, cloudy inside from an optically visible internal mass which fills the whole cell or only part of it, yellowish in NH_4OH , pallid in KOH , crowded on edge but not making the edge heteromorphous, numerous to moderately numerous on sides. Hyphae inamyloid, with clamp connections, not gelatinized, parallel in the trama of the stipe, strongly branched in the basal mycelium. Hymenophoral trama hyaline, regular. Epicutis a cutis of hyaline hyphae $1.5-5$ μm broad, multiseptate. Dermato-cystidia similar to the gloeocystidia and present both on pileus and stipe, $24-95 \times 8-26.6$ μm , numerous but not crowded. Hypodermium fuscidulous or reddish fuscidulous from an intraparietal pigment, size and shape of cells similar to epicutis, with hyaline (KOH) firm walls about 0.5 μm thick.

Chemical color reaction: Surface with KOH greenish olive; with NH_4OH greyish brown.

Specimen examined. — INDIA: Himachal Pradesh, Simla, Summer Hill (1,983 m), foliicolous, on the rotten needles of *Pinus roxburghii* SARGENT, among mosses, N. S. ATRI, August 21, 1979, PUN 275 (holotype; isotype in F).

The present collection belongs to the genus *Macrocystidia* HEIM ex JOSSERAND of which 5 species namely, *M. cucumis* (PERS. ex FR.) HEIM, *M. occidentalis* SING., *M. africana* SING., *M. incarnata* SING. and *M. carneipes* (SPEG.) SING. [is rather a species of *Lactocollybia* (CAPELLANO, 1976)] were described (SINGER, 1975). The present

collection comes close to *M. cucumis* (PERS. ex FR.) HEIM but differs mainly in having smaller and relatively broader spores (measuring $(7)-7.5-10 \times (3)-3.3-4.5-(5.7) \mu\text{m}$ in *M. cucumis* as compared to $6-8.5(9.5) \times 3-4.5 \mu\text{m}$ in *M. indica*); also the elongated stipe and perhaps the colors may be diagnostic.

M. indica is possibly a geographic race of *M. cucumis*. The degree of interfertility (if any) between these species and their respective areas of distribution should be studied before *M. indica* can be given infraspecific status under *M. cucumis*.

Russula minutula var. *robusta* SAINI, ATRI & SINGER, var. nov. —

Fig. 2.

Pileus usque ad 7 cm lato, convexoapplanato dein infundibuliformi, alto rubro (10C8). Stipite usque ad 8×1.7 cm, albido, vel incarnato-tincto. In silvis montanis (*Pinus wallichiana*, *Rhododendron arboreum*). India. Typus: PUN 274, ATRI, Jul. 30, 1979.

Pileus up to 7 cm broad, convex when young, applanate with a depression in the centre when partially mature, infundibuliform at maturity, margin obtuse, not rounded, irregular, slightly splitting at maturity, surface dry, deep red (10C8). Lamellae adnexed, crowded, forked, lamellulae absent, broad, white, no change when bruised, edges red, fimbriate. Spore print white. Stipe 8×1.7 cm, stout, slightly tapering towards the pileus, veined, fleshy, solid, white, rarely with pinkish tinge which also develops when bruised. Sulfovanillin on stipe distinctly red and remaining so, only after about half an hour becoming brown. Context white, unchanging. Taste mild, odour nil.

Spores $6.5-7.5-(7.8) \times 5.5-6.5-(6.8) \mu\text{m}$, subglobose, ornamentation type IV, IV-II, few IIIb, IIIb-IV, projecting up to more or less $0.3 \mu\text{m}$, amyloid, apiculus up to $1.5 \mu\text{m}$ long. Basidia $20-41 \times 6-9.5 \mu\text{m}$, 4-spored, clavate, sterigmata up to $3 \mu\text{m}$ long. Cystidia present both on sides and edges, $40-62 \times 5-11.5 \mu\text{m}$, occasionally with some scattered thin granular contents, occasionally appendiculate with appendage up to $8 \mu\text{m}$ long, clavate-cylindrical, fusoid, obtuse or subacute, many with a distinct cothurnate amorphous-subgranular incrustation, moderately numerous, not bluing in sulfovanillin. Epicutis a pigmented cutis, not gelatinized, with few superficial dermatocystidia, some of them also incrustated, few primordial hyphae and few incrustated hyphae with long subobtuse or acute straight hyphal ends, no reaction with sulfovanillin. Cap context, gill trama and stipe context heteromerous.

Specimen examined. — INDIA: Himachal Pradesh, Simla, Summer Hill (1,983 m), on humicolous soil, under *Rhododendron arboreum* SM. and *Pinus wallichiana* JACKSON, N. S. ATRI, July 30, 1979, PUN 274 (holotype; isotype in F).

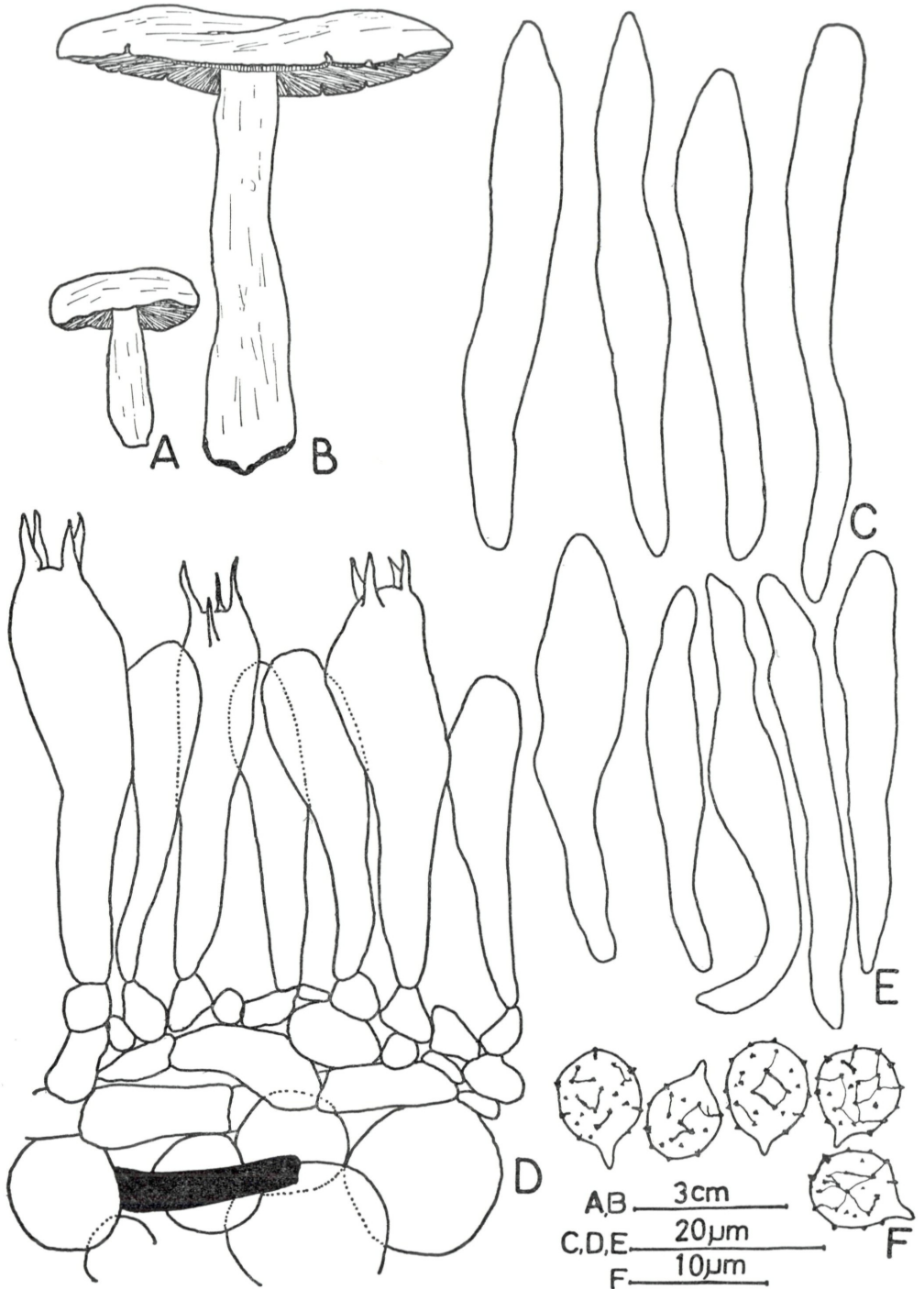


Fig. 2. *Russula minutula* var. *robusta* SAINI, ATRI & SINGER. — A. Immature carpophore. — B. Mature carpophore. — C. Cystidia of gill sides. — D. Cross section of gill showing basidia, heteromerous trama and a conducting hypha. — E. Cystidia of gill edges. — F. Basidiospores

The above collection is in complete agreement with *Russula minutula* Velen. (ROMAGNESI, 1967) except for its habitat and larger size. The present collection is characterized by its carpophores measuring up to 9 cm in height, pileus up to 7 cm broad and stipe up to 8×1.7 cm in size. The corresponding measurements for *R. minutula* are: carpophores up to 3 cm in height, pileus up to 2–3 cm broad and stipe up to $1.5-3 \times 0.5-0.75$ cm in size. In addition the habitat of the present collection is under broad leaved and pine trees instead of deciduous trees, as is reported for the European type variety.

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