



Two Rough Spored Agarics from India

Munruchi Kaur*, Narinderjit Kaur and Harwinder Kaur

Department of Botany, Panjabi University Patiala-147002.

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ABSTRACT

A number of agarics were picked from the wild during the monsoon season from various localities of Punjab. In the present paper two very interesting rough spored taxa belonging to Family Tricholomataceae Vilgalys, Moncalvo & Redhead are described. Of these *Leucopaxillus brasiliensis* (Rick) Singer & A.H. Sm. was found growing in fairy rings, while the carpophores of *Leucopaxillus albissimus* (Peck) Singer were scattered. All the two taxa are described taxonomically along with their field photographs and constitute first time reports from India.

Key Words: Rough spore, germ pore, clamp connections, exannulate, fairy ring.

INTRODUCTION

Family Tricholomataceae Vilgalys, Moncalvo & Redhead represented by 78 genera and 1020 species the world over (Kirk *et al.* 2008). Out of which, 47 genera are known from India. Presently 02 rough spored species of genus *Leucopaxillus* are described. Genus *Leucopaxillus* represented by 15 species the world over (Kirk *et al.* 2008) and 06 species in India (Bilgrami *et al.* 1991). Genus *Leucopaxillus* is characterized by clitocyboid to tricholomatoid, fleshy, medium to very large basidiocarp. Pileus convex to infundibuliform. Lamellae sinuate to decurrent, pale to brightly colored. All hyphae with clamp connections. Spores small to medium, subglobose, ovoid or ellipsoid, hyaline, amyloid, verrucose.

MATERIALS AND METHODS

Fungal forays were undertaken during monsoon season to various localities of Punjab. The taxonomic details of the above examined collections with respect to their gross morphology and microscopic details were studied in accordance with the methodology given by (Atri *et al.* 2005). The color terminology used for describing the color tone of carpophore parts and spore print is as given by Kornerup & Wanscher (1978). The identified specimens have been deposited in the Herbarium, Department of Botany, Punjabi University, Patiala.

RESULTS AND DISCUSSION

Leucopaxillus brasiliensis (Rick) Singer & A.H. Sm. *Papers of the Michigan Academy of Sciences* 28: 124, 1943. (Figure 1, 2, 4)

Fructification 3.0-14 cm in height. Pileus 3.0-12 cm broad, flattened depressed to applanate, apex plane, pale yellow (3A₃) to vivid yellow (2A₆) when young, reddish brown (8D₇) to light yellow (3A₅) in mature; umbo absent; surface moist; margin irregular; uplifted in some fruiting bodies; scales absent; cuticle half peeling; flesh upto 1.0 cm thick, white to yellowish white, unchanging; pileal veil absent; taste sweet, odour mild. Lamellae decurrent, unequal in series of 4, close, reddish brown (8D₇) when young becoming yellow towards maturity and yellow like ladoos in mature carpophores, moderately broad, 0.4-0.5 cm broad; gill edges serrate, dark orange, normal. Stipe central to excentric, 2.6-8.5 cm long, 0.3-0.4 cm broad near pileus and 1.3-2.8 cm broad from the base, almost equal in diameter throughout, abruptly bulbous at the base with thick mycelial mat, powdery deposition near the cap attachment, solid, smooth; exannulate. Spore print thick white.

Spores 3.58-4.47 (5.37) × 2.68-3.58 μm, (excluding apiculus), (Q=1.35), ellipsoid, amyloid, double walled, warty, apical pore absent; apiculate, apiculus minute. Basidia 16.11-25 × 5.37-7.16 μm, clavate, granular to hyaline with thickenings at the apex, -2, -3, -4 spored; sterigmata 1.79-2.68 (3.58) μm long, pointed. Pleurocystidia absent; Cheilocystidia 18-30 (34) × 2.68 -5.37 μm, broad at the base, narrow at the apex, some with capitate tips, granular, abundant. Gill edges heteromorphous.

Corresponding author: munruchi@gmail.com



Fig. 1. Carpophores of *Leucopaxillus brasiliensis* growing in fairy ring under angiospermic tree.



Fig.2. Carpophores of *Leucopaxillus brasiliensis* Showing decurrent, crowded lamellae



Fig.3. Carpophores of *Leucopaxillus brasiliensis* (Peck) Singer showing infundibuliform pileus, decurrent gills and excentric stipe.

Carpophore context homoiomerous. Pileus cuticle an ixocutis, made up of 1.79 - 3.58 μm broad septate hyphae, giving rise to a regular turf of 1.79 - 2.68 μm broad, encrusted hyphae; context made upto 6.26 μm broad, loosely interwoven septate hyphae. Hymenophoral trama regular. Stipe cuticle hyphal, made up of longitudinally tangled, upto 13 μm broad septate hyphae; context made up of upto 18 μm broad, septate hyphae. Clamp connections present throughout.

Collection examined: Punjab: Pathankot, Dhar (309 m), growing scattered in fairy ring formation on humicolous soil under mixed angiospermic forest. Munruchi Kaur, Harwinder Kaur and Narinderjit Kaur, Accession no. PUN 4706, September 1, 2011.

Remarks: The above collection falls under genus *Leucopaxillus* (Rick) Singer, as it has amyloid, spiny spores, white spore print, clamps present, cheilocystidia present which are very small. This belongs to species *Leucopaxillus brasiliensis* (Rick) Singer & A.H. Sm. as all the macroscopic and microscopic details match well with the description given for this species by (Pegler 1983). This is a new fungus record for India.

Distribution and Ecology: It is reported to be growing in Pointe Rouge of Martinique in the Lesser Antilles in the eastern Caribbean Sea, at foot of *Xanthoxylon aromaticum* tree, on October 20, 1976 (Pegler 1983). Present Indian collection has been made from mixed angiospermic forest of Pathankot in the month of September.

Leucopaxillus albissimus (Peck) Singer, *Annales Mycologici* 41: 59, 1943. (Figure 3, 5)

Fructification 4-5.6.0 cm in height. Pileus 5.2-8.4 cm broad, infundibuliform, orange white (5A₂) centre, periphery creamish white and margin pure white; umbo absent; surface moist to hygrophanous, dull, not shining (unpolished); margin irregular, inrolled, splitting at maturity; cuticle fully peeling; flesh creamish white, unchanging, upto 0.5 cm thick; taste mild, odour reddish like (strong smelling). Lamellae decurrent, unequal, subdistant, with branching, offwhite to creamish white, light brown on bruising, moderately broad, upto 0.6 cm broad; gill edges smooth, fragile. Stipe excentric, 3.6-5.1 cm long, 1.0-1.8 cm broad, offwhite becoming light brown on handling, equal in diameter throughout with mycelial mat at the base, hollow, smooth, pruinose-fibrillose; exannulate. Spore print orange white (5A₂).

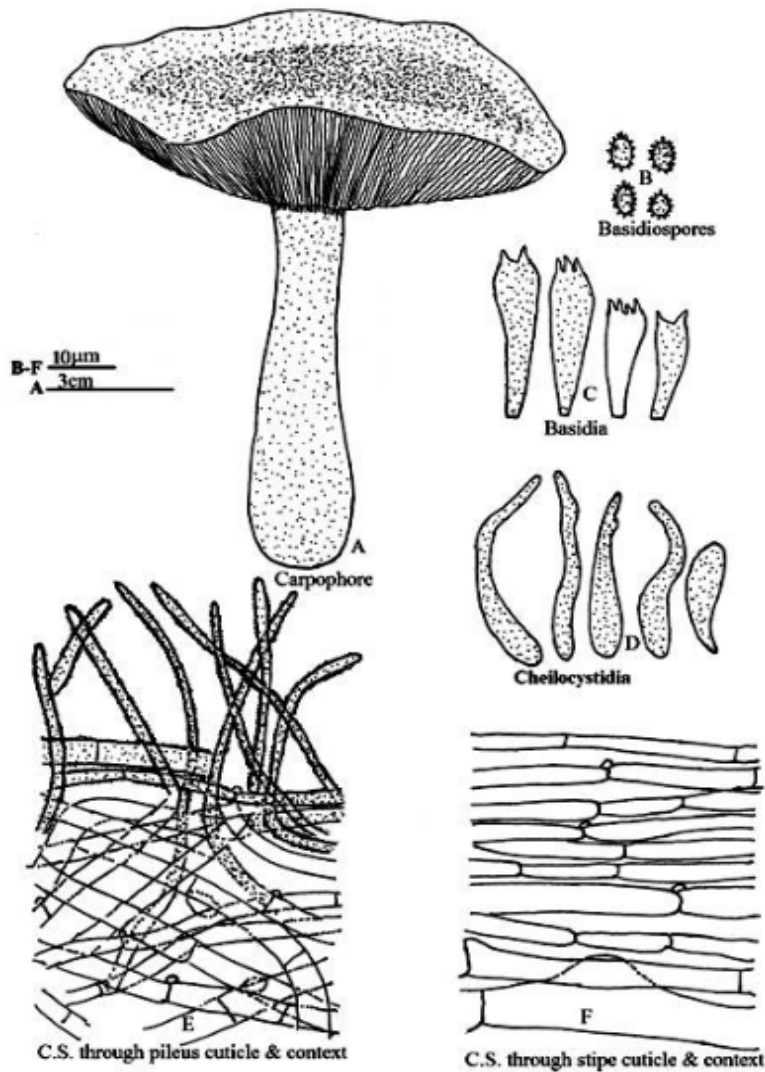


Fig.4. *Leucopaxillus brasiliensis* (Rick) Singer & A. H. Sm.

Spores $4.47-6.26 \times 3.58-4.47 \mu\text{m}$ (excluding apiculus), ($Q=1.32$), ellipsoid, double walled, spiny, warts isolated, amyloid, in tetrads; germ pore absent; apiculate, apiculus minute. Basidia $23.27-30 (34) \times 5.37- 8.0 \mu\text{m}$, clavate, granular, -2, -4 spored; sterigmata upto $3.58 \mu\text{m}$ long, pointed. Pleurocystidia and Cheilocystidia absent. Gill edges fertile.

Carpophore context homoiomerous. Pileus cuticle hyphal, made up of projecting, granular upto $3.58 \mu\text{m}$ broad septate hyphae; context made up of loosely interwoven gelatinised, upto $6.26 \mu\text{m}$ broad septate hyphae. Hymenophoral trama regular. Stipe cuticle hyphal, made up of projecting, less granular upto $2.68 \mu\text{m}$ broad septate hyphae; context made up of upto $5.37 \mu\text{m}$ broad hyphae. Clamp connections present.

Collection examined: Punjab: Patiala, Bahadurgarh (251 m), growing under broad leaved

bushes on wet leaf litter, along road side. Narinderjit Kaur and Harwinder Kaur, Accession no. PUN 4707, September 17, 2011.

Remarks: The presently worked out collection is similar to *Leucopaxillus albissimus* (Peck) Singer as given by (Arora 1986), in all its external and internal details except for the spore size. In our specimen spore size is $4.47-6.26 \times 3.58-4.47 \mu\text{m}$, but spore size is $5-7 \times 3.5-5 \mu\text{m}$ (Arora 1986). It is a new fungus record for India.

Distribution and Ecology: It is reported to be growing in California, in cool winter months, particularly under redwood, but also with other trees, including *Eucalyptus* given by (Arora 1986). Present Indian collection has been made from Patiala, growing under broad leaved bushes on wet leaf litter, along road side in the month of September.

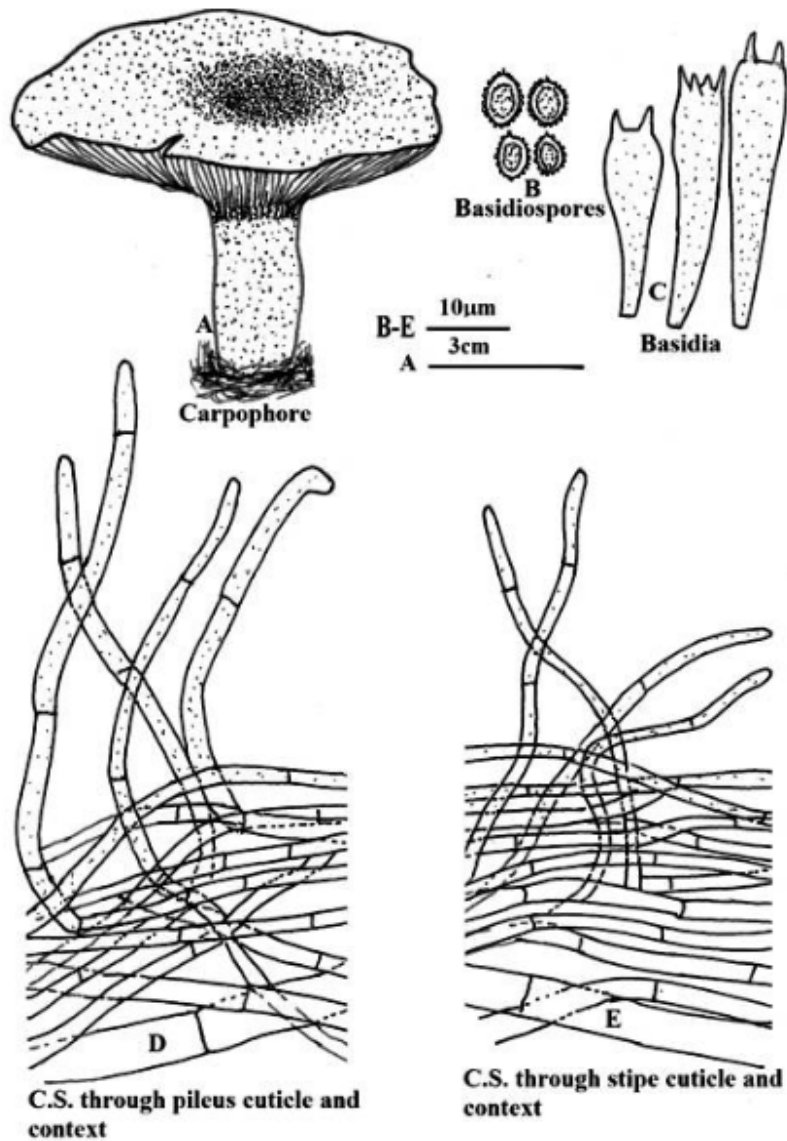


Fig.5. *Leucopaxillus brasiliensis* (Peck) Singer

CONCLUSION

Leucopaxillus brasiliensis is earlier known from Martinique in France (Pegler, 1983), whereas *Leucopaxillus albissimus* is known from California (Arora 1986). As these two rough spored genera are not earlier known from India, they are new records for the country.

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