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Studies on the Agarics of North West India – New Species

Zusammenfassung: Neun Blätterpilzsippen werden nach Kollektionen aus Nordwestindien als neue Arten beschrieben. Sie gehören den Familien Hygrophoraceae, Tricholomataceae, Agaricaceae, Coprinaceae und Cortinariaceae an. Die Mehrzahl stammt aus den Bergen des Himalaya, ein geringerer Teil aus Flachländern. Die neuen Taxa werden ausführlich beschrieben und abgebildet sowie mit verwandten Arten aus Indien und Europa verglichen. Die Holotypen der neuen Sippen sind im Herbarium der Universität Chandigarh (PAN) hinterlegt.

Red.

Summary: Taxonomical, ecological and distributional studies on the following nine new taxa of agarics are provided from North West India: **Camarophyllus indicus* (Hygrophoraceae), *Mycena himalayana* (Tricholomataceae), **Lepiota sulphurea, L. nainitala* **Pseudobaeospora citrina* (Agaricaceae), *Psathyrella indica, P. pruinosa* (Coprinaceae), *Cortinarius indicus, and C. mussooriensis* (Cortinariaceae). The asterix marked species are collected from plains and others from various localities in N. W. Himalayas.

Introduction

The agarics in North India appear in rains. They are more common in monsoon (July–October) than in winter rains (December–February), and remain dormant during remaining calender months of the year. They grow in varied ecological situations. In plains they grow in open grassland, sandy soil, manure heaps, dead wood and termite mounds or in protection on tree trunks/bases or in soil under canopy of a shrub/tree (single or in grooves) in dry tropical riverine forest along banks of permanent or seasonal rivers or rivulets or canals. In hills, they occur in less dense to dense forests in cliffs and valleys, in special niches requiring differential light, moisture and temperature, invaried associations, consociations and under different communities and dominant tree vegetation of the forests of different types. They are luxurient in N. W. Himalayas in mixed conifer and oak forests up to 3000 meters and are rare above and in alpine region. Several interesting agarics were collected during repeated forays in North West India in the past and in this paper a taxonomic, ecological and distributional account of the following nine new taxa is given with suitable illustrations.

Materials and Methods

The materials were hot-air-dried after recording their field characteristics, and chemical tests. The exsiccatae were deposited in Panjab University Herbarium (PAN) in paper packets sealed in polyethylene bags along with naphthalene balls. The microscopic characteristics were studied from materials revived in water or aq. KOH 2% w/v. All microscopic illustrations are camera lucida drawn. Singer (1986) is mainly followed for identifications.

Descriptive account

1. *Camarophyllus indicus* Rawla sp. nov.

Etym: refers to the country

Pileus 1.5–3.5 cm latus, planoconvexus, viscidus, candidus portea pallide bubalinus, nitidus. Lamellae sinuato-subdecurrentes, albidae, glutinosae. Stipes 2.5–5 cm longus, 3–4 mm latus, albus, gelatinosus, nitidus. Sporae 5–8.5 × 3.5–4.5 μm, subglobosae, laeves, hyalinae, tenuitunicatae, inamyloideae. Pleuro- et Cheilocystidia nulla. Epicutis pilei ixocutis, gelatinose hyphis, hyalinis efformata. Hyphae omnes defibulatae.

In humo inter *Saccharum spontaneum* L. solitarium, Patiali Rao Cho, Chandigarh 280 m, Julius 1981. PAN 9606-**Holotypus.**

Pileus 1.5–3.5 cm diam, planoconvex, viscid, glistening white drying light buff. Margin thin, entire smooth. Lamellae sinnuato-subdecurrent, white, glutinous with lamellulae of 1 length; edge entire, concolorous. Stipe 2.5–5 cm long, 3–4 mm wide, white to witish on drying, glutinous, central, cylindric with subradicating base, fistulose. Context up to 2 mm thick at the centre, soft white consisting of inamyloid, thin-walled, hyaline hyphae 4–8 μm diam. Smell fruity. Taste like castor oil. Spores 5–8.5 × 3.5–4.5 (7 × 4.2) μm, subglobose, smooth, hyaline, thin-walled, inamyloid, without germ pore and uni-biguttulate. Spore print pure white. Basidia 25–35 × 6–7 μm, clavate, bi-sterigmatus; sterigmata 1.5–3.5 × 1 μm. Cheilo-and Pleurocystidia absent. Hymenophoral trama irregular with predominant axillary hyphae not differentiated into medio and lateral stratum; hyphal hyaline, thin-walled, inamyloid, 4–8 μm diam. Subhymenium intermixed, less developed. Pileipellis an ixocutis, hyphae repent in gelatinous matrix, 2–3 μm diam, without clamp connections.

HABIT, HABITAT AND DISTRIBUTION. Solitary, on soil underneath *Saccharum spontaneum* L. and *Lantana camara* L. shrubs in dry tropical riverine forest with *Dalbergia sissoo* Roxb. representing upper storey, along Patiali Rao Cho outside botanical gardens, P. U., Chandigarh (280 m), a monsoon species requiring shade and high temperature and moisture; locally common. (Fig. 1. 1–5)

MATERIAL EXAMINED: INDIA. CHANDIGARH: In forest outside botanical gardens, July 18, 1981 (PAN 9606-Holotype), leg. S. Arya.

The fungus comes in sect. *Virginei* because of pure white to whitish pileus with an ixocutis. It is somewhat close to *H. berkelyi* Orton, but differs from it and all other species included in the sect. by the following diagnostic characters:

a) Chalky white glistening basidiome, whitish on drying
b) Pileipellis – an ixocutis
c) Planoconvex, non umbonate, non striate, non scaly pileus
d) Sinnuato-subdecurrent, non intervenose, not forked lamellae
e) Small subglobose spores.

2. *Mycena himalayana Rawla sp. nov.*

Etym: refers to region of occurence

Pileus 0.5–1.5 cm latus, umbilicatus, bubalinus vel vinaceo-bubalinus. Lamellae adnexae vel decurrentes, vinaceoluteae, forte intervenosae it ut videantur poroideas; poris radialiter dispositis. Stipes 1.5–2.5 cm longus, 1–2 mm latus, albidus, basi angustus. Sporae 5.5–8.5 × 2.5–4.5 μm, ovoideo sub-ellipsoideae, tenuitunicatae, hyalinae, inamyloideae, poro nullo. Cheilocystidia copiosa, 12–30 × 2–7 μm, versiformia, (cylindrica, clavata, mucronata, furcata), hyalina. Pleurocystidia nulla. Cuticula pilei ex hyphis repentibus, hyalinis fibulatis, 5 μm latis, composita.

In basi trunci *Bambusa bambos* Becker, solitaria et caespitosa, Jabli (H. P.) 450 m, September, 1977. PAN 9536-**Holotypus.**

Pileus 0.5–1.5 cm diam, umbilicate, buff to vinaceous buff, smooth. Margin thin, entire. Lamellae adnexed to decurrent, strongly anastomosing forming radial pores; anastomosing vein height unequal; edge entire, smooth, concolorous. Stipe 1.5–2.5 cm long, 1–2 mm wide, whitish, central, cylindric, with narrow base, fragile, smooth. Context up to 1 mm thick at the centre, brittle, whitish, amyloid consisting

of hyphae which are hyaline, thin-walled, 1–3 μm diam. Smell and taste none. Spores 5.5–8.5 × 2.5–4.5 (7.5 × 4.2) μm, ovoido subellipsoid, hyaline, inamyloid, thin-walled, smooth, granular contented, without germ pore. Spore print whitish. Basidia 15–22 × 2.5–4 μm, clavate with 2–4 sterigmata (4–5.5 × 0.5–1.5 μm). Cheilocystidia abundant 12–30 × 2–7 μm versiforme (cylindric, clavate, mucronate, furcate), hyaline, thin-walled. Pleurocystidia absent. Hymenophoral trama intermixed, hyaline, amyloid consisting of thin-walled hyphae which are 2–5 μm diam. Subhymenial layer less developed, up to 5 μm wide, subcellular to cellular. Pileipellis epicutis of thin-walled, hyaline, inamyloid repent hyphae, 1.5–5 μm diam. All hyphae clamped. (Fig. 1.6–11).

HABIT, HABITAT AND DISTRIBUTION. Solitary and caespitose on bases of *Bambusa bambos* BECKER, in slopes of Siwalik Chir Pine forest, railway track, near tunnel Jabli station (H. P.) 450 m, a post monsoon species requiring moderate shade, moisture and temperature; locally common.

MATERIAL EXAMINED: INDIA. HIMACHAL PRADESH: Jabli along railway track, near tunnel, September 18, 1977 (PAN 9536-Holotype), leg. S. ARYA.

The fungus comes in sect. *Purae* because of vinaceous buff pileus, amyloid trama and intervenose lamellae and in stirps *Violacella* because of anastomosing lamellae and inamyloid spores. It comes close to *M. decipiens* Van OVEREEM in its macroscopic features, but is distinguished from it and from four other species of the stirps in having unequal height of anastomosing veins, radial poroid lamellae and umbilical pileus.

3. *Lepiota sulphurea* RAWLA sp. nov.

Etym: refers to sulphur yellow basidiome

Pileus 1.5–3.5 cm latus, umbonatus, squamulosus, luteosulphureus, disco levi straminis, aliter, squamulis, ornatus. Lamellae liberae, luteo-sulphureae, ventricosae, cum duabus ordinibus lamellularum intermixtae. Stipes 2.5–4.5 cm longus, 2–4 mm latus, cylindricus, basi subbulbosus, pileo concolor. Annulus inferne, 2.5 cm ab apice, membranaceous, persistens, calciformis ad 4 mm latus, flavo-sulphureus. Sporae 4–5.6 × 2.5–3.5 μm, ovoideae vel subellipsoideae, hyalinae, pseudoamyloideae, guttulis. Pleurocystidia nulla. Cheilocystidia copiosa, 23–30 × 5–7 μm fusiformia, cylindrica, ventricoso-rostrata, hyalina, tenuitunicata. Pellicula cuticulae ex hyphis repentibus e vallo trichodermiali efformata. Crines pilei fasciculatae, parallelae vel erectae, septatae, ramulo-elementorae, 40–200 × 2–6 μm, succo pallide vacuolare praeditae; apicibus obtusis. Hyphae omnes defibulatae.

In humo solitario et caespitoso secundum, Patiali Rao Cho Chandigarh (280 m) Julius, 1981, PAN 9604-**Holotypus**.

Pileus 1.5–3.5 cm diam, umbonate; umbo broad, luteus to sulphur-yellow, fibrillose-scaly, naked and straw at umbo; scales concail, small scattered, fibrillose, sulphur-yellow. Lamellae free, sulphur-yellow, ventricose, thin with lamellulae of 2 lengths; edge entire concolorous. Stipe 2.5–4.5 cm longus, 2–4 mm wide, sulphur-yellow, central, cylindric, fistulose with sub-bulbous base, smooth. Annulus inferior, 2.5 cm from apex, membranaceous, persistent, cupulate up to 4 mm wide, sulphur-yellow. Context up to 2 mm at the centre, floccose, straw, inamyloid, consisting of hyphae which are hyaline thin-walled, 2–4 μm diam inflated to 10 μm diam. Smell faintly agaricoid. Tasteless. Spores 4–5.6 × 2.5–3.5 (5 × 2.8) μm, ovoid to short ellipsoid, hyaline, pseudoamyloid, thin-walled, uniguttulate. Spore print whitish. Basidia 18–24 × 4–6 μm, clavate, 2–4 sterigmatus; sterigmata 1–3 × 0.5–1 μm. Pleurocystidia absent. Cheilocystidia abundant, 23–30 × 5–7 μm, fusiform, cylindric, ventricose-rostrate, hyaline, thin-walled. Hymenophoral trama regular, hyaline, inamyloid of thin-walled hyphae 2–5 μm diam inflated up to 12 μm diam. Subhymenial layer less developed, subcellular. Pileipellis of disrupted trichodermial repent hyphae. Pileal hair in clusters of parallel, erect, septate, branched elements, 40–200 × 2–6 μm, slightly thick-walled and with paler vacuolar pigment; apex obtuse. All hyphae are clamped. (Fig. 1. 12–17).

HABIT, HABITAT AND DISTRIBUTION. Solitary and caespitose among annual and perennial plants in dry tropical riverine forest with Dalbergia sissoo ROXB. representing upper storey along Patiali Rao Cho outside botanical gardens, P. U., Chandigarh (280 m), a premonsoon species requiring shade, high temperature and moisture; locally uncommon.

MATERIAL EXAMINED: INDIA. CHANDIGARH: In forest outside botanical gardens, Panjab University, Chandigarh July 16, 1981 (PAN 9604 Holotype), leg. S. ARYA.

The species is keyed out in sect. *Ovisporae* because of trichodermial cuticle, non spurred and not more than 10 μm long spores, well developed annulus and clamped hyphae. It differs from closely related *L. citrophylla* (BERK. & BR.) SACC. in having cheilocystidea, large pileus, persistent annulus, non spurred spores. Besides, it has a distinctive spore size and colour of basidiome and a disrupted trichodermial repent hyphal pileipellis.

4. *Lepiota nainitala* RAWLA sp. nov.

Etym: refers to the locality

Pileus 2.0–4.5 cm latus, planoconvexus, fibrilloso-squamulosus, bubalinus ad disco atro levi aliter squamulis contricis minutis fibrillosis, sepiaceis. Lamaellae liberae, sinuato-decurrentes, albescentes vel flavae, ventricosae, tribus ordinibus lamellularum intermixtae. Stipes 3–4.5 cm longus, 3–6 mm latus, basi subradicatus, albidoluteus, striatus. Annulus evanescens, albescens, floccosus. Sporae 4–6 × 2.5–3.5 μm, ellipsoideae, hyalinae, inamyloideae. Pleurocystidia nulla. Cheilocystidia copiosa, 10–21 × 3–5 μm, clavata, cylindrica, furcata, hyalina, tenuitunicata. Pellicula cuticulae ex hyphis repentibus e vallo trichodermiali efformata. Crines pilei 40–150 × 5–10 μm, erectae, simplicae, pallido-flavae, attenuatae; apicibus obtusis.

In humo inter stramenta, solitaria, Sat Tal (Nainital) U. P. (1980), September 1977, PAN-9621 **Holotypus** .

Pileus 2–4.5 cm diam, planoconvex, light buff to buff, fibrillose-scaly, scales small, almost concentric, buff to sepia, fibrillar; margin thin and entire. Lamellae free or sinnuato-decurrent, whitish to light buff, ventricose with lamellulae of 3 lengths; edge entire, concolorous, stipe 3–4.5 cm long, 3–6 mm wide, whitish to buff, longitudinally striate, central, cylindric, fistulose with subradicating base. Annulus fugaceous, whitish, floccose. Context up to 3 mm at the centre, whitish, brittle, inamyloid, consisting of thin-walled, hyaline hyphae (3–7 μm diam) inflated to 14 μm diam. Smell faint agaricoid. Tasteless. Spores 4.0–6 × 2.5–3.5 (5.6 × 2.8) μm, ellipsoid, hyaline, inamyloid, uniguttulate, whithout germ pore. Spore print whitish. Basidia 21–30 × 5–7 μm clavate, with 2–4 sterigmata (2–4 × 0.5–1 μm). Pleurocystidia absent. Cheilocystidia abundant, 10–21 × 3–5 μm, clavate, cylindric, furcate, hyaline, thin-walled. Hymenophoral trama subregular, hyaline, inamyloid consisting of thin-walled hyphae inflated to 14 μm diam. Subhymenial layer less developed up to 7 μm wide cellular. Pileipellis a trichodermial epicutis of repent hyphae. Pileal hair fasciculate, parallel, erect, unbranched, 40–150 × 5–10 μm,slightly thick-walled with pale luteus membranous pigment. All hyphae nonclamped. (Fig. 1.18–22; Fig. 2.1).

HABIT, HABITAT AND DISTRIBUTION. On humicolous soil in leaf litter in dark valley of Ban Oak and Chir Pine forest near bank of Sat Tal lake, Naini Tal U. P. (1980 m) among scanty growth of annual and perennial plants, a post monsoon species requiring excessive shade and moisture and moderate temperature; locally common.

MATERIAL EXAMINED: INDIA. UTTAR PRADESH HILLS: Naini Tal, around Sat Tal lake (1980 m), October, 1977, (PAN 9621-Holotype), leg. G. S. RAWLA.

The species cannot be keyed out in any of the sections of *Lepiota* (SINGER, 1986). Because of inamyloid spores and non clamped hyphae, it comes in section *Anomalae* and non truncate and less than 10 μm long spores, it comes in section *Ovisporae*. Besides overlapping the characters of two subsections *Anomalae and Ovisporae*, it has a disrupted trichodermial pileipellis with erect unbranched hairs.

5. *Pseudobaeospora citrina* RAWLA sp. nov.

Etym: Refers to citrine basidiome.

Carpophorum citrinum. Pileus 0.5–1cm latus, umbonatus, viridi citrinus, (flavus) atro disco serico-pruinosus ornatus. Lamallae liberae, citrinae; tribus ordinibus lamellarum intermixtae; acies integra. Stipes 1–1.5 cm longus, 1 mm latus, rectus, cylindricus, basiabruptus, citrinus, pruinosus. Sporae 4.5–5.6 × 3.5–4.2 μm, globosae, laeves, hyalinae, valde pseudoamyloideae, tenuitunicatae nec metachromatin in caeruleo cresyl. Cheilocystidia et pleurocystidia nulla. Epicutis pilei ex hyphis repentibus e vallo trichodermiali efformata. Crines pilei 28–140 × 3–5 μm, fasciculatae et attenuatae, hyalinae vel membrano-flavae; apicibus attenuato obtusis. Crines stipite pileo similis. Hyphae omnes defibulatae.

In humo solitar, P. U. campus Chandigarh, (280 m) Julius 1981, PAN 9605-**Holotypus**.

Basidiome citrine. Pileus 0.5–1 cm diam broadly umbonate, greenish yellow (citrine) darker at umbo , silky-hairy. Margin thin entire, broken, non striate. Lamellae free, citrine, ventricose, thin with lamellulae of 3 lenghts; edge entire, concolorous. Stipe 1–1.5 cm long, 1 mm wide, central, cylindric hollow with abrupt base. Context up to 1 mm thick at the centre, soft, whitish, amyloid consisting of hyphae which are hyaline, thin-walled up to 5 μm diam. Smell feebly agaricoid. Tasteless. Spores 4.5–5.6 × 3.5–4.2 (5.6 × 4.2) μm, globose, smooth, hyaline, strongly pseudoamyloid, thin-walled, not metachromatic in cresyl blue. Spore print whitish. Basidia 14–16 × 5–7 μm, clavate, cylindric with 4 sterigmata (1.5–5.5 × 0.5–1.5 μm). Cheilo- and pleurocystidia absent. Basidioles 10–12 × 5–6 μm, clavate, hyaline. Hymenophoral trama regular, hyaline, amyloid, consisting of hyphae, which are 3–7 μm diam. Subhymenial layer less developed up to 5 μm wide, subcellular. Pileipellis trichodermial epicutis of repent hyphae upto 7 μm diam. Pileal hair 28–140 × 3–5 μm, fasciculate, attenuated towards an obtuse apex, slightly thick-walled, hyaline to pale brown membranous pigment. Hair on stipe similar to those on pileus. All hyphae non clamped.

HABIT, HABITAT AND DISTRIBUTION. Solitary, on soil in grassy lawns, in shade of roadside trees, P. U. Campus Chandigarh (280 m), a premonsoon species requiring moderate light, moisture and high temperature; locally uncommon (Fig. 2. 2–7).

MATERIAL EXAMINED: INDIA. CHANDIGARH: In road side grass under tree shade, University campus, July 18, 1981 (PAN 9605-Holotype), leg. S. ARYA.

This species is morphologically somewhat close to *P. defibulata* SING., but differs from it as well as from *P. oligophylla* (SING.) SING. and *P. pillodii* (QUÉL.) HORAK in greenish yellow to citrine pileus, subglobose spores and pruinose stipe and pileus. It, however, is unmatched among all known clampless species of *Pseudobaeospora.*

6. *Psathyrella indica* RAWLA sp. nov.

Etym: refers to the country

Pileus 1–3 cm latus, conicus vel planoconvexus, ochraceus croceus, flavo-rufobrunneus, tenuis, floccosus, substriatus. Lamellae adnatae, corylae vel umbrinae, distantes cum unius ordinibus lamellularum intermixtae; acies denticulata et pallida. Stipes 2.5–4 cm longus, 3–4 mm latus, albido-ochreus, cylindricus, basibulbopruinosa. Sporae 5.5–6.5 × 3.5–4 μm, ellipsoideae, fusconigrae, mutabilis in concentrato sulphurico acido, inamyloideae, laeves, crassitunicatae, poro germinativo distincto destituto, uni-biguttulis, Basidia 10–17 × 5–7 μm, subvesiculosa, angusto pediculo portante. Pleurocystidia nulla. Cheilocystidia copiosa, 18–37 × 6.5–8 μm, cylindrica, ampulacea, hyalina, tenuitunicata, cum apicalis portio est minus ampla quam dimidium ventriculosae partis inferioris. Cuticula pilei cellularis. Cellulae monostratae, vesiculosae vel ovatae, hyalinae, 8–27 μm latae. Hyphae omnes fibulatae.

In humo solitario et caespitosa, Sat Tal (Nainital) U. P. 1980 m, September 1977, PAN 9536-**Holotypus**.

Pileus 1–3 cm diam, conical to planoconvex, buff to saffron, sienna on drying,

thin, floccose, feebly striate. Margin thin, broken at maturity. Lamellae adnate, hazel to umber, ventricose, distant with lamellulae of one lenght; edge minutely denticulate and pallid. Stipe 2.5–4 cm long, 3–4 mm wide, whitish to ochreus, central, cylindrical, hollow with slightly bulbous pruinose base. Context up to 2 mm thick at the centre, brittle, whitish, inamyloid, consisting of thin-walled hyphae up to 3.5 μm diam. Odourless and tasteless. Spores 5.5–6.5 × 3.5–4 (6 × 4) μm, ellipsoid, fuscous black, discolouring in conc. H_2SO_4, inamyloid, smooth, thick-walled with distinct germ pore, uni-biguttulate. Spore print fuscous black. Basidia 10–17 × 5–7 μm, subvesiculose with narrow pedicel bearing 2–4 sterigmata (2–3 × 1.0 μm). Pleurocystidia absent. Cheilocystidia abundant, 18–37 × 6.5–8 μm, cylindric,. ampullaceous, hyaline, thin-walled having apical portion less than half broad than the ventricose part below. Hymenophoral trama regular, hyaline, consisting of hyphae which are thin-walled, inamyloid, up to 3.5 μm diam. Subhymenial layer less developed, subcellular. Hypodermium thin, of filamentous, light ochreus hyphae. Pileipellis cellular. Cells 8–27 μm diam, vesiculose to oval, hyaline, thin-walled. All hyphae clamped.

HABIT, HABITAT AND DISTRIBUTION. Solitary or caespitose, on humicolous soil in leaf litter in dark valley of Ban Oak and Chir Pine forests along bank of Sat Tal lake Nainital, U. P. (1980 m) among scanty growth of annual and perennial plants, a post monsoon species requiring excessive shade and moisture and moderate temperature; locally uncommon. (Fig. 2. 8 – 13).

MATERIAL EXAMINED: INDIA. UTTAR PRADESH HILLS: Nainital, around Sat Tal lake, September 29, 1977 (PAN 9536-Holotype), leg. G. S. RAWLA.

According to the spores being less than 10 μm long the fungus comes in subgenus *Psathyra* and because of fuscous black spores and pedicellate and subventricose basidia, it comes in subgenus *Psathyrella*. In addition to overlapping characteristics of the two subgenera, the fungus has buff ochreus to saffron sienna and up to 3 cm diam pileus whitish top ochreus stipe, no veil and no pleurocystidia, cheilocystidia hyaline, 18–37 × 6.5–8 μm and spores 5.5–6.5 × 3.5–4.0 μm.

7. *Psathyrella pruinosa* RAWLA sp. nov.

Etym: refers to pruinose stipe

Pileus 1–3 cm latus, conico-campanulatus, bubalinus vel griseus (murinus), ambio sub striatus, glaber. Lamellae adnexae, luteae vel griseae cum unibus-tribus ordinibus lamellularum intermixtae; acies lenes, pileo concolor. Stipes 2–6 cm longus, 1–3 mm latus, ochraceous, cylindricus, basibulbosus, pruinosus. Sporae 12–15 × 5–7 μm, ellipticae, atro vinoso-fusco brunneae, inamylodeae, crassitunicatae, poro germinativo distincto destituto, polyguttulis. Basidia 15–23 × 10–12 μm, ventricosa vel subventricosa. Pleurocystidia nulla. Cheilocystidia copiosa, 21–28 × 8–20 μm, ampullacea, subvesiculosa vel amplo-capitata vel utriformia. Cuticula pilei cellularis. Cellulae 6–15 μm latus, hyalinae ad pallide luteae, ovatae, vesiculosae, pyriformes. Crines stipite 20–55 × 2–4 μm latus, copiosae, fasciculatae, parallelo-erectae, simplicae, aseptatae, hyalinae, tenuitunicatae; apicibus obtusis. Hyphae omnes fibulatae.

In mortuo ligno, solitario et caespitoso, Solan (H. P.) 1 400 m, Julius 1980, PAN 9573-**Holotypus.**

Pileus 1–3 cm diam, conico-campanulate, buff to mouse grey, thin, glabrous, striate at the periphery. Margin thin splitting. Lamellae adnexed, subdistant, with lamellulae of 1–3 lengths; edge smooth, concolorous, Stipe 2–6 cm × 1–3 mm wide, buff to ochreus, pruinose, central, straight, cylindric with bulbous base. Annulus none. Context up to 2 mm thick at the centre, floccose, whitish, inamyloid, consisting of hyphae which are hyaline, thin-walled up to 7 μm diam inflated up to 14 μm diam. Odourless and tasteless. Spores 12–15 × 5–7 (14 × 6.5) μm, discoloured in conc. H_2SO_4, elliptic, deep vinaceous fuscous brown, inamyloid, thick-walled with distinct germ pore and many guttulate. Spore print cinnamon fuscous. Basidia 15–23 × 10–12 μm, ventricose to subvesiculose with 2–4 sterigmata (1–3 × 0.5–1.5 μm). Pleurocystidia absent. Cheilocystidia abundant, 21–28 × 8–20 μm, broadly am-

pullaceous to subvesiculose or broadly capitate or utriform; neck broader than half the diam of ventricose part below, hyaline, thick-walled, not exuding green substance with ammonia. Hymenophoral trama subregular to regular, hyaline, inamyloid of thin-walled hyphae, 5–9 μm diam. Subhymenial layer well developed up to 28 μm wide, cellular. Pileipellis cellular. Cells 6–15 μm diam, oval, vesiculose, pyriform, pale luteus, thick-walled. Hair on stipe abundant, 20–55 × 2–4 μm tufted, parallel, erect, unbranched, aseptate, hyaline, thin-walled, apex obtuse. All hyphae clamped.

HABIT, HABITAT AND DISTRIBUTION. Solitary or caespitose, on dead wood, road side cliff of Siwalik Chir Pine forest, Solan (1400 m), a premonsoon species requiring moderate light low temperature and moderate moisture; locally common. (Fig. 2. 14–20).

MATERIAL EXAMINED: INDIA. HIMACHAL PRADESH: Solan, along road side, July 8, 1980 (PAN 9573-Holotype) leg. S. ARYA.

The species is characterized by the lack of pleurocystidia and annulus and having versiform cheilocystidia (ampullaceous, subvesiculose, capitate to utriform) with neck not narrower than half the diameter of ventricose part below, pruinose stipe, hyaline trama and spores longer than 10 μm (10–12 μm). The fungus comes in sect. *Fragilissimae* (subgenus *Mycophila*) in which it is close to *P. marcescibilis* (BRITZ.) SING. It, however, differs from it in lignicolous habit and pruinose stipe besides having cheilocystidia 21–28 × 8–20 μm.

8. Cortinarius indicus RAWLA sp. nov.

Etym: refers to the country

Pileus 1.5–4 cm latus, planoconvexus vel demisse umbonatus, luteo-fulvus, squamulosus; squamae, sordido-adpressae densiores circa medium, minus circa marginum. Lamellae sinnuato-adnatae, fulvo-umbrinae; acies concolor. Stipes 3–5 cm longus, 0.2–1 cm latus, albido-ochreus, cylindricus, basi subradicatus, longitudinaliter costatus. Annuli veli reliquiae in forma innate fibrillose affixae, tenues albescentes. Sporae 7–10 × 4–5.6 μm, ellipsoideae vel amygdaliformes, ochreo-luteae, inamyloideae, crassitunicatae, sublaevae, medio uniguttulis. Pleurocystidia nulla. Cheilocystidia copiosa, 15–24 × 7–10 μm, pyriformia, amploclavata, hyalina, tenuitunicata. Hyphae epicuticulae pilei filamentosae radialiter dispositorae, hyalinae vel pallido-luteo incrustatae, inamyloideae 5–8 μm latae. Hyphae omnes fibulatae.

In solo humicolo, solitario, Woodstock Road, Mussoorie (2100 m), September 1980, PAN 9598-**Holotypus**.

Pileus 1.5–4 cm diam, planoconvex, low obtusely umbonate, luteus to fulvous vous, thin, squamulose; scales innately floccose, denser in the centre. Margin thin, entire, concolorous. Lamellae sinuato-adnate, luteus, fulvous to umber with lamellulae of 3 lengths; edge entire, concolorous. Stipe 3–5 cm long, 0.2–1 cm wide, whitish to ochreus, straight, cylindric, hollow, longitudinally costate, terete. Annulus innately fibrillose, whitish, 1–1.5 cm from stipe end, thin. Context up to 2 mm at the centre whitish, brittle unchanging on bruising and with KOH and not greening with sulfoformol, inamyloid, consisting of hyphae, which are hyaline, thin-walled up to 5 μm diam. Smell feebly agaricoid. Taste mild. Spores 7–10 × 4–5.6 (8.5 × 4.0) μm, ellipsoid to amygdaloid, ochreus to luteus, inamyloid, thick-walled, sub smooth lakking coarse ornamentation with 1 central guttule; guttule occupying 1/3 spore cavity. Spore print fulvous. Basidia 20–30 × 6–9 μm, clavate with 2–4 sterigmata (2–3.5 0.5–1.5 μm). Pleurocystidia absent. Cheilocystidia abundant, 15–24 × 7–10 μm, pyriform to broadly clavate, hyaline, thin walled. Hymenophoral trama regular, hyaline, inamyloid consisting of thin-walled hyphae up to 7 μm diam. Subhymenial layer well developed up to 12 wide, cellular. Pileipellis an epicutis of radially repent, inamyloid, thin-walled hyphae up to 8 μm diam, pale luteus above and hyaline below. Scale hyphae similar to pileipellis. Hyphae lack clamp connections. (Fig. 3. 1–6).

HABIT, HABITAT AND DISTRIBUTION. Solitary, on humicolous soil, in moist deodar forest cliff along roadside, Woodstock school, Mussoorie (2100 m), a post monsoon species requiring low light, moderate temperature and moisture; locally common.

MATERIAL EXAMINED: INDIA. UTTAR PRADESH HILLS: Mussoorie, Woodstock school Road, Sept. 22, 1980 (PAN 9589-Holotype) leg. G. S. RAWLA.

It comes in subgenus *Cortinarius* because of medium sized fleshy carpophore, dry scaly pileus, cuticular hyphae 8 μm diam, spores ellipsoidal-amygdaliform. Cheilocystidia present, pleurocystidia absent. Pigment pale luteus vacuolar, flesh unchanging with KOH. The distinctive characters of the species are luteus to fulvous innately fibrillose scaly pileus, white annulus, luteus-umber lamellae, spores less than 10 μm long (7–10 × 4–5.6 μm), subsmooth, hyphae non clamped, context unchanging with KOH and with sulfoformol.

9. *Cortinarius mussooriensis* RAWLA sp. nov.

Etym: refers to place of occurrence

Pileus 4–6 cm latus, planoreflexus, bubalinus ad discum salmoneus, glutinosus. Lamellae sinuato-subdecurrentes, citrinae vel atro-umbrinae. Stipes 4–7 cm longus, 5–7 mm latus, albidus vel citrinus, longitudinaliter costatus. Annulus cortina glutinosa, citrina. Sporae 7–9 × 4–6 μm, brevi-ellipsoideae vel amygdaliformes, atro-ochreae, inamyloideae, crassitunicatae, asperae, verrucosae vel echinatae, poro nullo, medio guttulis. Cheilo- et pleurocystidia nulla. Hyphae epicuticulae pilei filamentosae, hyalinae, brunneo epimembranae, valde inamyloideae. Hyphae omnes fibulatae.
In humo briogeno, gregario. Woodstock Road Mussoorie (2100 m), October, 1978, PAN 9552-**Holotypus**.

Pileus 4–6 cm diam, planoreflexed, buff, salmon at the disc, thin, glutinous, smooth. Margin entire concolorous. Lamellae sinnuato-subdecurrent, citrine or light sienna to umber, thick with lamellulae of 3 lengths; edge entire, concolorous. Stipe 4–7 cm long, 5–7 mm wide, shining white to citrine, hollow, straight, cylindric, longitudinally costate. Annulus glutinous cortina, deciduous. Context up to 5 mm thick at the centre, firm, light buff, unchanging on bruising and with KOH, inamyloid consisting of hyaline, thin-walled hyphae up to 10 μm diam inflated to 18 μm diam. Smell feebly agaricoid. Taste mild. Spores 7–9 × 4–6 (8 × 5.5) μm, short ellipsoid to amygdaloid, dark ochreus, inamyloid, thick-walled, rough, warty, without germ pore, centrally uniguttulate. Spore print sienna. Basidia 25–36 × 5–7 μm, clavate, with 2 sterigmata (3–3.5 × 0.5–2 μm). Cheilo- and pleurocystidia absent. Hymenophoral trama regular, hyaline, inamyloid, of thin-walled hyphae 2–5 μm diam. Subhymenial layer less developed, intermixed. Pileipellis an epicutis of repent hyphae, which are brown membrane pigmented, thin-walled up to 4 μm diam. Hyphae of universal veil gelatinous, hyaline, narrow. All hyphae lacking clamps. (Fig. 3. 7–11).

HABIT, HABITAT AND DISTRIBUTION. Solitary, gregarious, on soil in moist deodar forest cliff, Woodstock school road, Mussoorie (2100 m), a post monsoon species requiring low light, temperature and moisture; locally common.

MATERIAL EXAMINED: INDIA. UTTAR PRADESH HILLS: Mussoorie, Woodstock school road, October, 4, 1978 (PAN 9552-Holotype), leg. G. S. RAWLA.

This species is identified by gelatinous cortinate annulus, narrow cuticular hyphae (less than 5 μm diam), short verrucose, ellipsoid to amygdaliform spores (7–9 × 4.2–6 μm), lacking cheilocystidia. It comes in stirps *Pallidifolius*, sect. *Delibuti*, subgenus *Myxacium*. It is distinct from all species included in the sect. by narrow cuticular hyphae (2–4 diam and not 7–20 μm diam). It differs from other yellow shaded species like *C. citrinifolius* SMITH, in size, shape and colour of pileus, stipe, spores and pleurocystidia.

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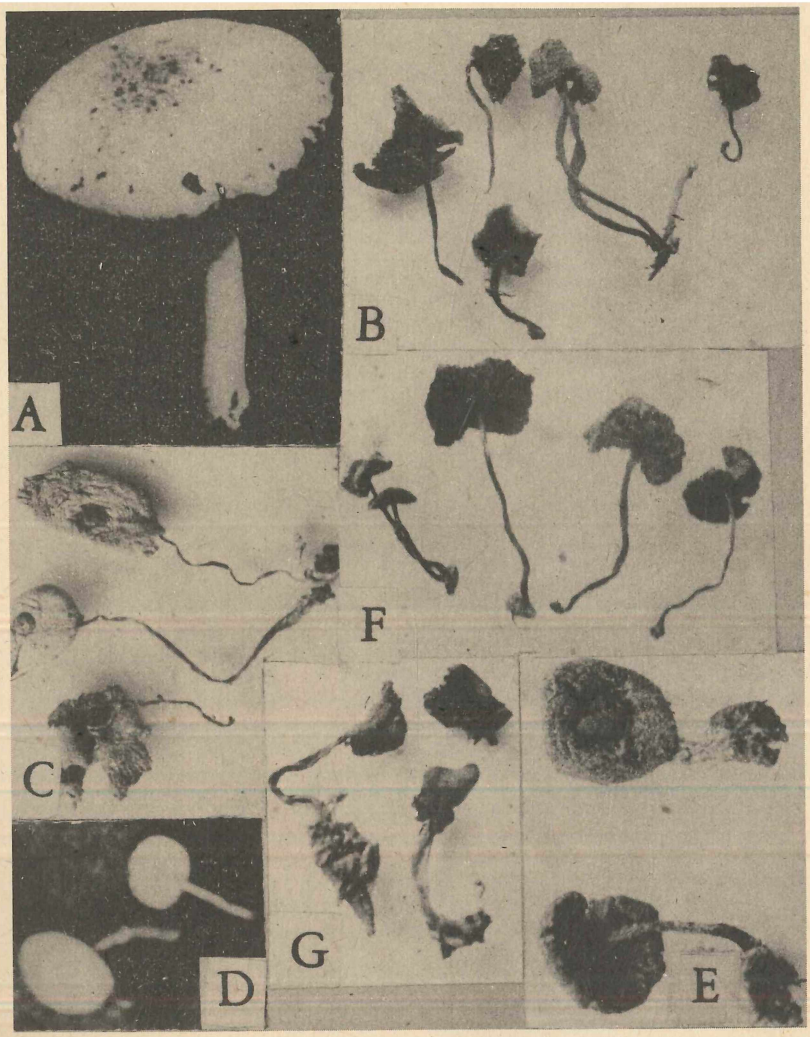
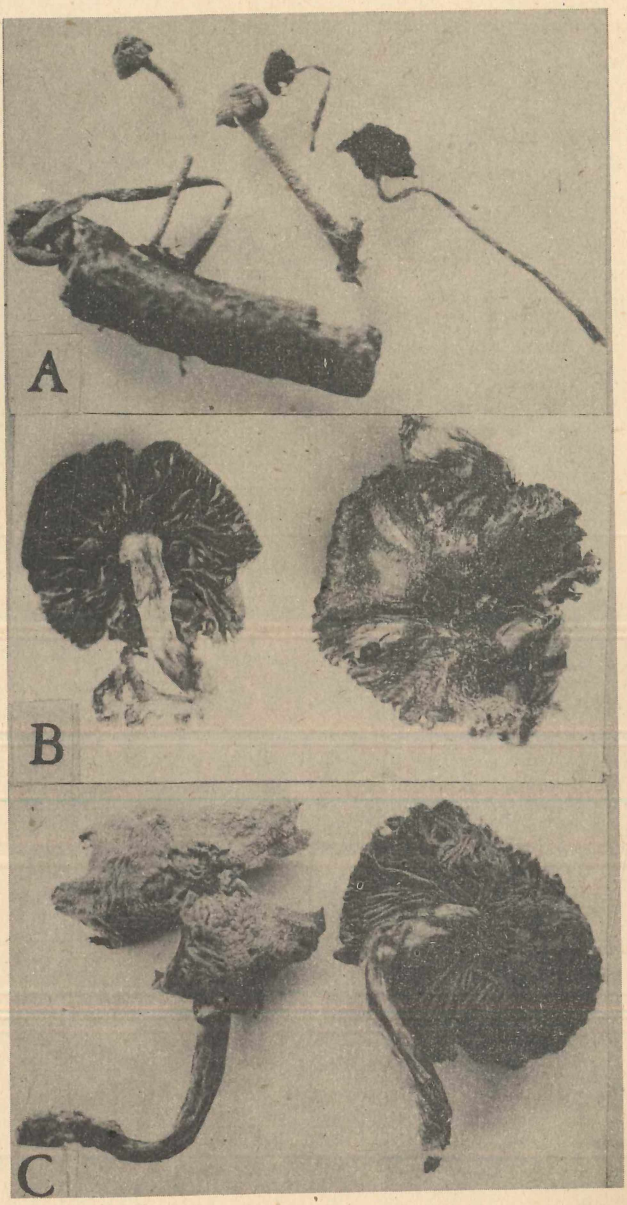
Texte zu Fig. 1 und 2 (S. 122, 123)

Fig. 1. *Camarophyllus indicus* (1–5). 1. Habit. 2. L. S. Pileus. 3. Spores. 4. Basidium. 5. Pileipellis. *Mycena himalayana.* (6–11). 6. Habit. 7. L. S. Pileus. 8. Spores. 9. Basidium. 10. Cheilocystidia. 11. Pileipellis. *Lepiota sulphurea* (12–17). 12. Habit. 13. L. S. Pileus. 14. Spores. 15. Basidium. 16. Cheilocystidia. 17. Pileal hair. *L. nainitala* (18–22). 18. Habit. 19. L. S. Pileus. 20. Spores. 21. Basidia. 22. Cheilocystidia.

Fig. 2. *Lepiota nainitala* (1) Pileal hair. *Pseudobaeospora citrina* (2–7). 2. Habit. 3. L. S. Pileus. 4. Spores. 5. Basidium. 6. Basidioles. 7. Pileal hair. *Psathyrella indica* (8–13). 8. Habit. 9. L. S. Pileus. 10. Spores. 11. Basidia. 12. Cheilocystidia. 13. Pileipellis. *P. pruinosa* (14–20). 14. Habit. 15. L. S. Pileus. 16. Spores. 17. Basidium. 18. Cheilocystidium. 19. Stipe hair. 20. Pileipellis.



Pl. I. A. *Camarophyllus indicus* x 2. B. *Mycena himalayana* x 1. C. *Lepiota sulphurea* x 1. D. *L. sulphurea* x 1/2. E. *L. nainitala* x 1/2. F. *Pseudobaeospora citrina* x 2. G. *Psathyrella indica* x 1.



Pl. II. A. *Psathyrella pruinosa* x 1/2. B. *Cortinarius indicus* x 1. C. *C. mussooriensis* x 2/3.

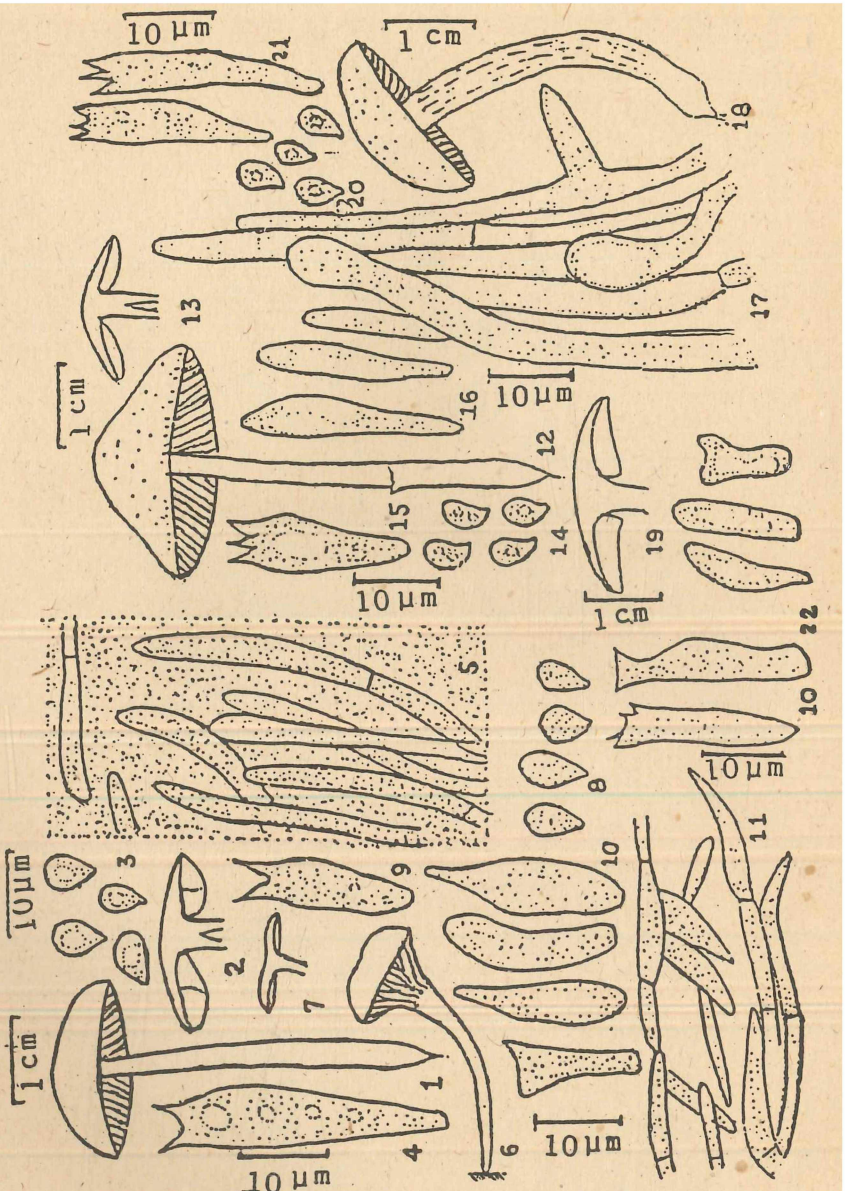


Fig. 1: s. S. 119

Fig. 2: s. S. 119

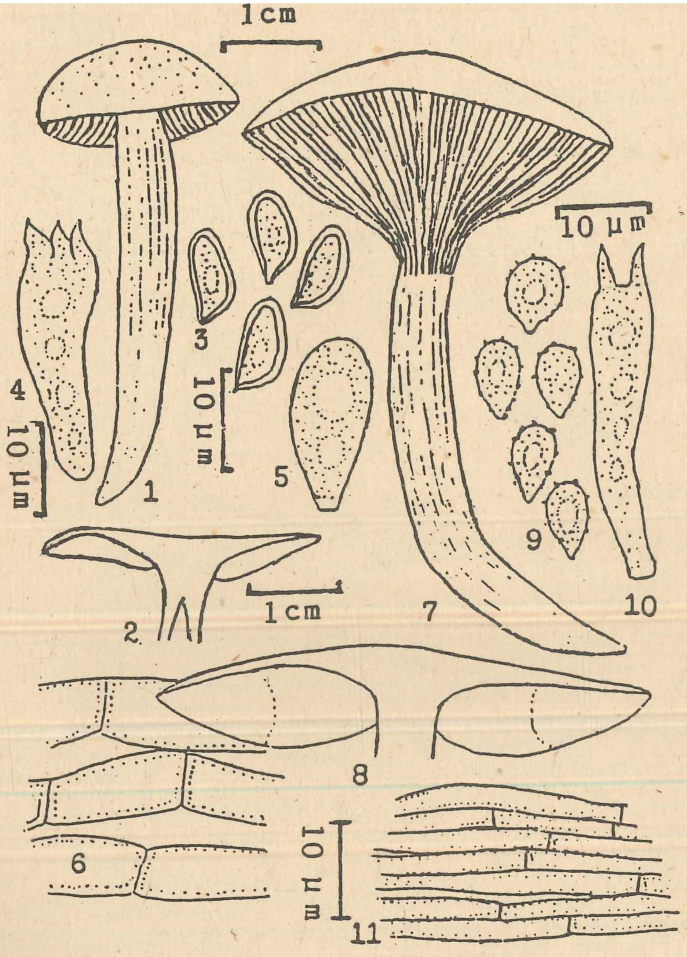


Fig. 3. *Cortinarius indicus* (1–6). 1. Habit 2. L. S. Pileus. 3. Spores. 4. Basidium. 5. Cheilocystidium. 6. Pileipellis. *C. mussooriensis* (7–11). 7. Habit. 8. L. S. Pileus. 9. Spores. 10. Basidium. 11. Pileipellis.