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Journal of Threatened Taxa

Building evidence for conservation globally

www.threatenedtaxa.org

ISSN 0974-7907 (Online) | ISSN 0974-7893 (Print)

COMMUNICATION

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26 September 2020 | Vol. 12 | No. 13 | Pages: 16840–16853

DOI: 10.11609/jott.4896.12.13.16840-16853



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Contribution to the Macromycetes of West Bengal, India: 69–73

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Abstract: The varied topography, soil and climate of West Bengal makes conducive conditions of macrofungal habitats nurturing magnificent diversity. During exploration of macro-fungal diversity in Terai Duars region of the state during 2017–18, basidiocarps of different kinds of the genus *Lentinus* (Polyporaceae) were collected, photographed along with macro-morphological and ecological notes. The specimens were identified through macro and micro-morphological characters following standard literature. Five species of the genus *Lentinus* (*L. araucariae*, *L. fasciatus*, *L. polychrous*, *L. sajor-caju*, and *L. squarrosulus*) were identified which are presented in this paper along with amplified description, necessary figures and photographs. Literature survey revealed that out of five identified species, *L. araucariae* and *L. fasciatus* represent new distributional record for India. The outcome of the present study would enrich data related to the macro-fungal diversity from the state of West Bengal.

Keywords: Basidiomycota, *Lentinus*, Polyporaceae, polypore fungi, species, taxonomy.

সংক্ষেপিতসার: পশ্চিমবঙ্গে, মৃত্তিকা এবং জলবায়ুর বিভিন্নতা বৃহৎ ছত্রাক সমূহের বাসস্থানের উপযোগী পরিবেশ তৈরি করে তার বিপুল বৈচিত্র্যকে লালতি করে। এই রাজ্যের তরাই-দুয়ার্স অঞ্চলে ২০১৭-২০১৮ সালে বৃহৎ ছত্রাক অনুবন্ধেণে সময় লেন্টিনাস গণের (পলিপোরসে) বিভিন্ন প্রকার বসেডিওকার্প সংগ্রহ করা হয় এবং তাদের বৃহৎ অঙ্গসংস্থানিক চরিত্রাবলির পর্যবেক্ষণ সহ বস্তুতাত্ত্বিক তথ্য ও আলোকচিত্র সংগ্রহ করা হয়। বৃহৎ অঙ্গসংস্থানিক ও আণুবীক্ষণিক বৈশিষ্ট্য এবং প্রামাণ্য গবেষণামূলক গ্রহণে সাহায্যে সংগৃহীত নমুনা সমূহের সনাক্তকরণ করা হয়। লেন্টিনাস গণের পাঁচটি প্রজাতির (লেন্টিনাস আরাকারীয়ে, লেন্টিনাস ফাসিয়াটাস, লেন্টিনাস পলক্রোস, লেন্টিনাস সাজোর-কাজু ও লেন্টিনাস স্কয়ারসুলাস) সনাক্তকরণ করা হয়েছে এবং বর্তমানে গবেষণাপত্রে প্রয়োজনীয় রচোচিত্র ও আলোকচিত্রের সাহায্যে এদের বসিতারিত বর্ণনা পরিবেশিত হয়েছে। উপযোগী গবেষণাপত্র ও গ্রন্থাবলীর অধ্যয়নের মাধ্যমে বর্তমান আলোচ্য পাঁচটি প্রজাতির মধ্যে লেন্টিনাস আরাকারীয়ে এবং লেন্টিনাস ফাসিয়াটাস ভারতবর্ষ থেকে সর্বপ্রথম নথিভুক্ত হল। এই গবেষণাপত্রের ফলাফল পশ্চিমবঙ্গে বৃহৎ ছত্রাক বৈচিত্র্যের তথ্যভান্ডারকে সমৃদ্ধ করবে।

Editor: R.K. Verma, Tropical Forest Research Institute, Jabalpur, India.

Date of publication: 26 September 2020 (online & print)

Citation: Das, D., P. Pradhan, D. Ray, A. Roy & K. Acharya (2020). Contribution to the Macromycetes of West Bengal, India: 69–73. *Journal of Threatened Taxa* 12(13): 16840–16853. <https://doi.org/10.11609/jott.4896.12.13.16840-16853>

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Funding: West Bengal Biodiversity Board, Department of Environment, Government of West Bengal.

Competing interests: The authors declare no competing interests.

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Author contribution: Specimens collected by DD, PP, AR and KA. Field Photographs by Entaj Tarafder and AR. Microscopic photographs by DD. Macro and microscopic characteristics described by DD and PP. Data compiled and analysed by KA, AR and DR.

Acknowledgements: Authors are indebted to the Department of Environment, Government of West Bengal for financial assistance, West Bengal Biodiversity Board, and Department of Botany, University of Calcutta for providing necessary administrative and laboratory facilities. Directorate of forest, Government of West Bengal is duly acknowledged for extending guidance and facilities during the field visits.



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INTRODUCTION

West Bengal being a state with varied climate and topography includes Himalayan temperate-subtemperate region, foothills having moist-deciduous forests, vast gangetic plains, lateritic plateau and coastal plains which create diversified habitats for mosaic of life-forms, including macro-fungi (Pradhan et al. 2012, 2013, 2016; Dutta et al. 2013).

Among the polypore fungi, the genus *Lentinus* Fr. has subtropical distribution as lignicolous fungi and is represented globally by 40 species (Kirk et al. 2008), out of which 20 species are encountered in India (Sharma & Atri 2015).

From the evolutionary stand point *Lentinus* Fr. is an interesting taxon for its transitional nature between poroid and gilled fungi by gradual reduction of tubulate to lamellate hymenophore. Moreover, *Lentinus* Fr. represents agaricoid development with a lineage of polyporoid ancestry (Pegler 1983a; Hibbet & Vilgalys 1991). During the exploration of macro-fungal diversity of West Bengal, India, a good number of specimens were collected of which five species of *Lentinus* Fr. had been identified, two of which are new records for India (*L. fasciatus* and *L. araucariae*), and are represented in the present paper and it is in continuation of the series of publications on macro-fungal diversity of West Bengal (Bera et al. 2018; Saha et al. 2018).

Macro-fungal specimens were collected from June 2017 to October 2018 from Terai region of West Bengal, India. During fieldwork digital photographs of the samples were taken in their habitat and their macro-morphological and habitat features were noted.

During the tenure of work, by using standard identifying protocol, colour photographs and macro-morphological features of each specimen were taken in the field. Each collection was then wrapped with tissue paper and kept in separate boxes to avoid contamination/spore mixing. Finally, the collected specimens were carefully withered (separately) in a hot air drier until the moisture was minimal.

Microscopic features were observed with Carl Zeiss AX10 Imager A1 phase contrast microscope from thin handmade sections of the dried basidiocarps by staining with Congo Red and Melzer's reagent. Microscopic figures were photographed with microscope-mounted digital camera. Thirty measurements of basidiospores were taken from each sample for calculating dimensions of basidiospore. Length/breadth ratio denotes the Q value. Mean Q value (Q_m) was measured by dividing sum of Q value by total number of spores observed.

Specimens were properly identified using standard keys and published literature (Singer 1962; Pegler 1983a; Manimohan et al. 2004; Senthilarasu 2015). Kornerup & Wanscher (1978) was followed for colour terminology. The voucher specimens were preserved following Pradhan et al. (2015) and were deposited in the Calcutta University Herbarium (CUH), Kolkata, India.

1. *Lentinus araucariae* Har. & Pat.

Journal de Botanique (Morot) 17: 11 (1903)

(Image 1–2).

Basidiocarps pileate, lamellate and stipitate Pileus 34–89 mm in diam., white (1A1) to yellowish-white (1A2), deeply indented to infundibuliform, surface velutinate, with uplifted white (1A1) squamules, margin sulcate striate to rimose, white to yellowish-white (3A1 to 3A2) when young becoming pale yellow (3A3) on drying, concolorous. Context up to 3mm thick, yellowish-white (3A2). Lamellae decurrent with two–three tiers of lamellulae, lamellae width up to 3mm, margin serrate, moderately crowded, furcate with at least two dichotomies, light yellow (4A4) when young becoming (4B4) on drying, concolorous. Stipe 15–22 × 3–7 mm, slight eccentric, surface appressed white (1A1) squamulose, solid, fibrous, insititious base, yellowish–white to pale yellow (3A2 to 3A3) when young turning light yellow (4A4) on drying.

Basidiospores (5.1)–5.7–6.7–7.4–(8.1) × (2.7)–3–3.2–3.4–(3.7) μm, $Q_m=2$, cylindrical, hilar appendix bilaterally symmetric, thin walled. Basidia 20.4–27.8 × 5.8–6.8 μm, cylindrico-clavate, basally clamped, two to four spored, sterigma 2–3.7 μm in length, thin walled. Basidioles 21–30.2 × 5.8–7.1 μm, cylindrico-clavate, thin walled. Pileocystidia none. Cheilocystidia none. Hyphal system dimitic with skeleto-ligative hyphae. Generative hyphae 3–6.4 μm wide, clamped, clamp 2.7–3.7 μm wide, thin- to thick-walled, branched, interlocking projections present, content hyaline in 10% KOH. Skeleto-ligative hyphae 7.4–11.9 μm wide, with tapered branches, content not too narrow, thick walled, pale yellowish in 10% KOH. Hyphal pegs 40.8–57.8 μm wide, abundant, composed of 30 to 40 generative hyphae with rounded apical portion. Hymenophoral trama irregular, interwoven. Pileipellis trichodermal palisade, elements 8.5–13.6 μm wide.

Habit and habitat: Basidiocarps lignicolous, saprotrophic, growing gregarious, and caespitously upon fallen and decaying *Shorea robusta* Roth.

Specimen examined: CUH AM667, 04.x.2018, 26.5873N & 89.5327E, elevation 62m, Panijhora bit, Dooars, Alipurduar District, West Bengal, India, coll. K.



Image 1 (A–D). *Lentinus araucaria* | Scale= 10mm. © Entaj Tarafder.

Acharya & A. Roy.

Remarks: Presence of rigid, coriaceous basidiocarps with dichotomously furcated lamellae, pale yellowish pileus ranging from 34 to 89 mm, abundant hyphal pegs, devoid of cheilocystidia; central to excentric stipe; dimitic hyphal system with skeleton-ligative hyphae and 3–6.4 μm wide generative hyphae, and spore size of 5.1–5.7–6.7–7.4–8.1 \times 2.7–3.2–3.7 μm places the studied specimen under *Lentinus araucariae* (section Dicholamellatae of subgenus *Lentinus*). The studied specimen matches with the previously reported Australian specimen (Pegler 1983b) in terms of spore size [5.1–5.7–6.7–7.4–8.1 \times 2.7–3.2–3.7 μm , vs 5–7 \times 3–3.5 μm ; Q= 2 vs 1.87], width of generative hyphae [3.4–6.4 μm vs 2–5 μm] and width of skeleto-ligative hyphae [7.4–11.9 μm vs 2–12.5 μm], making it a new record for India. Morphologically, *Lentinus badius* (Berk.) Berk. is also closely related to the present taxon. Presence of sub-distant to moderately close lamellae, pale yellowish basidiocarp, trichodermal palisade pileipellis in *L. araucariae* distinguishes it from *L. badius*. *Lentinus*

araucariae differs from *L. dicholamellatus* Manim. by its spore size [5.4–6.1–6.9–8.1–8.5 \times 2.7–3–3.4 μm vs 6–10 \times 3–5], and absence of pseudo sclerotium.

2. *Lentinus fasciatus* Berk.

London Journal of Botany 2: 146 (1840)

(Image 3–4).

Basidiocarps pileate, lamellate and stipitate. Pileus 20–74 mm in diam., umbilicate to infundibuliform, surface white (1A1) to orange brown (5B2) to pale yellow (2A3), tomentose with numerous whitish (1A1) erect hairs, 1–3 mm long, becoming longer towards pileal margin, greyish-orange (6B4), appressed squamules present towards centre, Lamellae 2–4 mm wide, deeply decurrent with lamellulae of 1–3 tier, lamellae margin entire, smooth, distant to close, sometimes lamellae bifurcated in the region just above the stipe, yellowish grey (4B2). Stipe 10–55 mm \times 2.5–7 mm, short and stocky, central, cylindric, solid, tomentose, amount of hairs more in the base, without pseudo sclerotium, concolorous with the pileus. Context up to 2.5mm thick

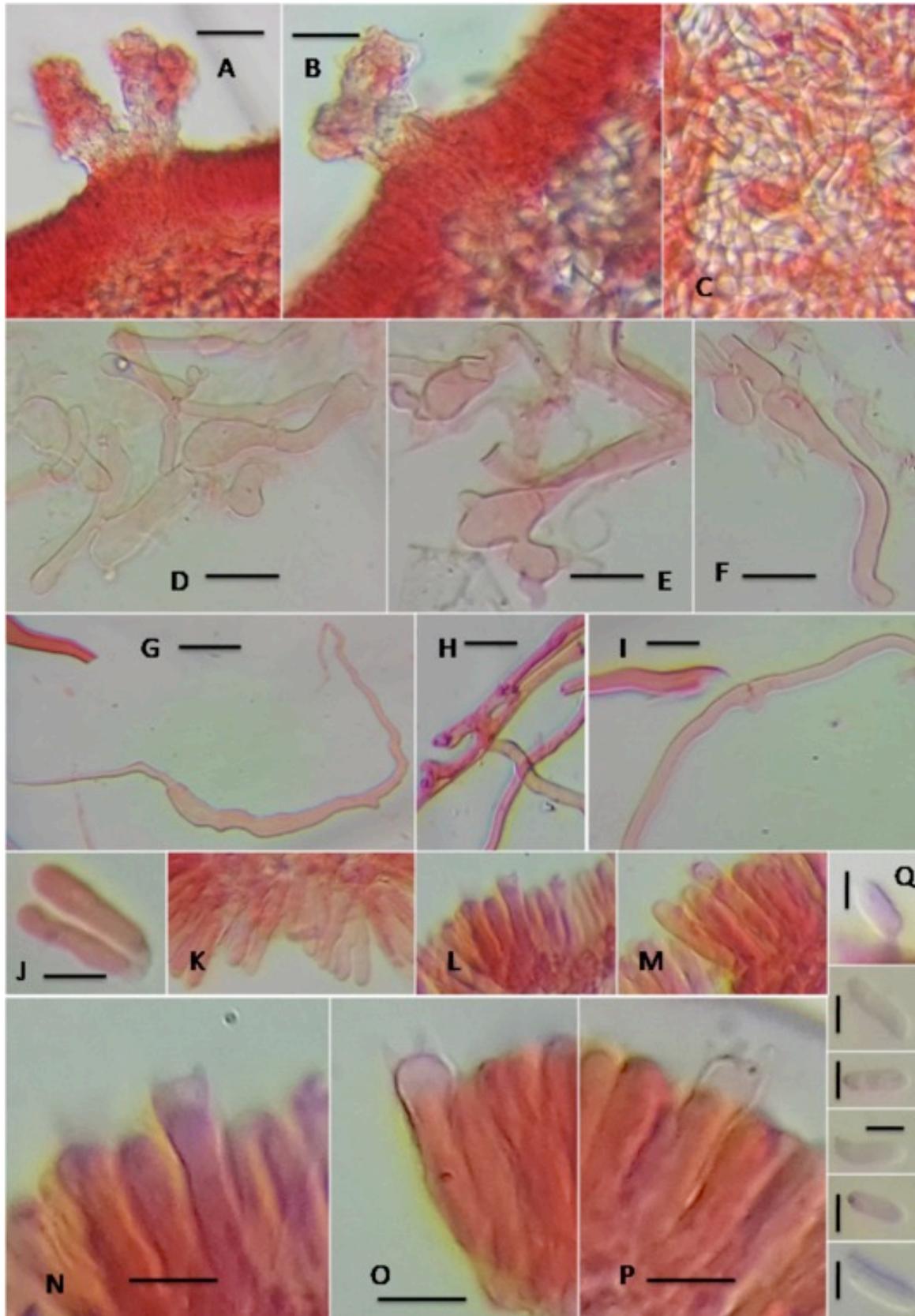


Image 2. *Lentinus araucaria*: (A–B)—hyphal peg | C—irregular lamellae trama | D–F—pileipilis elements | G—skeleto-ligative hyphae | H–I—generative hyphae of context | J—basidiolae | K–M—basidia and basidiolae in cluster | N–P—basidia | Q—basidiospores. Bars (A–B, D–G) = 25µm, (H–J) = 15µm, (N–Q) = 10µm. © Diptosh Das.

at the centre or disc, soft, yellowish-white (4A2).

Basidiospores (6)6.4–6.9–7.8–(8.2) × (2.1–)2.8–3.3–3.9(–4.2) μm [n=30; $X_M=6.9\pm0.49$ × 3.3±0.41 μm, $Q_M=2.07\pm0.24$], ellipso-cylindric, hilar appendix bilaterally symmetric, thin walled, hyaline with few contents. Basidia (21.8–28.6) × (4.2–7.1) μm, cylindrico-clavate, basally clamped, 2 to 4-spored; sterigma 2–4, 2.5–3.9 μm in length, cylindric. Basidioles (20–26) × (3.5–6) μm, clavate, basally clamped. Sclerocystidia abundant in both pleuro and cheilo position, 26–34 × 3.5–6.9 μm clavate, thick-walled, arise from hymenial base. Hyphal system dimitic with skeletal hyphae 2.1–4.2 μm wide, thick-walled with narrow lumen, unbranched; generative hyphae 2.1–3.5 μm wide, thin walled, hyaline, frequently branched, clamp-connexions present. Sterile lamellar edge consisting of numerous crowded sclerocystidia, clavate. Hymenophoral trama irregular. Pileipellis an epicutis of thin and thick-walled generative hyphae with prominent clamp connections, 3.6–5.8 μm wide, unbranched, producing loose, erect fascicles. Stipitipellis consists of thick-walled generative hyphae, up to 7 μm wide, forming erect tomentose, content hyaline in 10% KOH.

Habit and habitat: Basidiocarps lignicolous and saprotrophic, growing caespitously upon fallen and decaying trunk of *Schima wallichii* (DC.) Korth.

Specimen examined: CUH AM626, 19.ix.2017, 26.82N & 88.63E, elevation 137m, Targhera, Jalpaiguri District, West Bengal, India, coll. K. Acharya & A. Roy.

Remarks: Presence of rigid, coriaceous basidiocarps with hispid strigose pileus with short erect hairs, moderately crowded lamellae, presence of abundant sclerocystidia; central to excentric stipe; dimitic hyphal system with skeletal hyphae and 2.1–3.5 μm wide generative hyphae, and spore size of (6–)6.4–6.9–7.8–(8.2) × (2.1–)2.8–3.3–3.9(–4.2) μm places the studied specimen under *Lentinus fasciatus* (section Velutini of subgenus *Panus*). The present taxon was limited to Australia in its distribution (Pegler 1983a), is reported, hereby, from India for the first time. Current specimen shows maximum similarity with the description of *L. fasciatus* studied by Pegler (1983a) by forming a strongly hispid pileal and stipe surface, presence of abundant sclerocystidia rather than metuloids, well developed centrally placed stipe, spore size [(6–)6.4–6.9–7.8–(8.2) × (2.1–)2.8–3.3–3.9(–4.2) μm vs. 6.5–8.5 × 3–4] and Q_M value [2.07±0.24 vs. 2.20]. This taxon might be confused with widespread *L. strigosus* Fr. but presence of sclerocystidia rather than metuloids and cylindric basidiospores strongly differs the *L. strigosus* Fr. from the present taxon. It differs from *L. velutinus* Fr. by

lack of pseudosclerotium. This species differs from *L. hookerianus* Berk. by its spore size [(6–)6.4–6.9–7.8–(8.2) × (2.1–)2.8–3.3–3.9(–4.2) μm vs. 5–6.5 × 2.7–3.5 μm] and Q_M value [2.07±0.24 vs 1.87].

3. *Lentinus polychrous* Lév.

Annales des Sciences Naturelles Botanique 2: 175 (1844) (Image 5–6).

Basidiocarps pileate, lamellate, stipitate. Pileus 70–150 mm in diam., sub-infundibuliform, texture tough leathery flexible when young become rigid on drying, surface orange grey to greyish-orange (5B2–5B3) when young turn into yellowish-grey (2D2) on drying, covered with chestnut brown (6F7) coloured uplifted squamules, concolorous, margin entire. Context up to 6mm thick, white (1A1). Lamellae deeply decurrent with 1–3 tiers of lamellulae, width up to 5mm, spacing less than 1mm, crowded, tough and thick, honey yellow to golden brown (5D6 to 5D7) when young becoming brown to dark brown (7F4 to 7F5) on drying. Stipe 10–25 × 4–12 mm, slightly eccentric to central, solid, rigid, covered with minute appressed squamules, base tapered, white (1A1) at apex and slightly darker towards base.

Basidiospores (6.1–)6.4–8.1–9.5(–10.2) × 3–3.4–3.4–3.7–4 μm, $Q_M=2.3$ (n=30), cylindric, hilar appendix bilaterally symmetric or asymmetric, thin-walled, hyaline, negative in Melzer's reagent. Basidia 20–25.5 × 5.7–7.1 μm, cylindrico-clavate, basal clamp not found, hyaline in 10% KOH, 4-spored; sterigma four, 2–3.4 μm high. Basidioles 17–27.2 × 4.7–7.1 μm, cylindrico-clavate, basal clamp not found. Pleurocystidia none. Cheilocystidia none. Hyphal system dimitic with skeleto-ligative hyphae. Generative hyphae 2.7–6.8 μm wide, thin to thick-walled, branched, clamped, clamp connection 2.3–3.4 μm wide, hyaline in 10% KOH. Skeleto-ligative hyphae 3.4–8.5 μm wide, thick-walled, narrow lumen, highly branched, tapered apex, pale yellow in 10% KOH. Hyphal pegs 34–45.2 μm wide, consists of 25–35 generative hyphae. Lamellae trama interwoven irregular. Subhymenial layer too narrow to observe. Squamules of pileus formed by agglutinated thick-walled generative hyphae. Pileipellis a trichodermal palisade.

Habit and habitat: Basidiocarps lignicolous and saprotrophic, growing solitary to slightly gregarious upon fallen and decaying logs of *Shorea robusta* Roth.

Specimen examined: CUH AM668, 30.vii.2018, 26.8746N & 88.8551E, elevation 176m, near Chapramari forest, Jalpaiguri District, West Bengal, India, coll. K. Acharya & A. Roy.

Remarks: Presence of rigid, coriaceous basidiocarps



Image 3. (A–C). *Lentinus fasciatus*. Scale= 10mm. © Entaj Tarafder.

with brown coloured uplifted pileal squamules, amber coloured thick rigid hymenophore, irregular lamellae trama, central to excentric dark coloured tapered base; complicated dimittic hyphal system with skeleto-ligative hyphae and 2.7–6.8 μm wide generative hyphae, hyphal pegs and spore size of (6.1–)6.4–8.1–9.5(–10.2) \times 3–3.4–3.4–3.7–4 μm places the studied specimen under *Lentinus polychrous* (section Rigidi of subgenus *Lentinus*). The present taxon is one of the most widely distributed species in India and it has been reported several times from several localities including Bihar, West Bengal, Andhra Pradesh, Kerala (Pegler 1983a; Sharma & Atri 2015). The present specimen matches nicely with the description illustrated by Pegler (1983a) in spore size [(6.1–)6.4–8.1–9.5(–10) \times (3–)3.4–3.4–3.7(–4) μm vs. 6–9 \times 2.7–3.3 μm], width of generative hyphae [2.7–6.8 μm vs. 1.4–4.5 μm], length of basidia [20–25.5 \times 5.7–7.1 μm vs. 20–27 \times 5–6 μm] and with the description of Corner (1981) in spore size [(6.1–)6.4–8.1–9.5(–10.2) \times (3–)3.4–3.4–3.7(–4) μm vs. 6–9.5 \times 3–3.7 μm], width of

generative hyphae [2.7–6.8 μm vs. 2–5 μm] and length of basidia [20–25.5 \times 5.7–7.1 μm vs. 15–35 \times 5–6 μm]. The present taxon is distinguished from closely resembling *L. squarrosulus* Mont. by having fine tomentum, short stipe, fuliginous to umbrinous amber coloured lamellae, (6.1–)6.4–8.1–9.5(–10.2) \times (3–)3.4–3.4–3.7(–4) μm sized basidiospores instead of appressed soft squamules, deeply decurrent white lamellae, 5.5–7.5 \times 1.7–2.5 μm sized basidiospores in *L. squarrosulus*.

4. *Lentinus sajour-caju* (Fr.) Fr.

Epicrisis Systematis Mycologici: 393 (1838)

(Image 7–8).

Basidiocarps pileate, lamellate, stipitate. Pileus 25–75 mm in diam., convex to broadly convex when young, becoming infundibuliform at maturity, disc dark brown (6F7), margin golden brown (5D7) to brown (6E7), turning brown (6E5) to dark brown (6F5) on drying, margin incurved, entire to undulating. Context up to 3mm thick, off white. Lamellae ca. 1mm broad, deeply

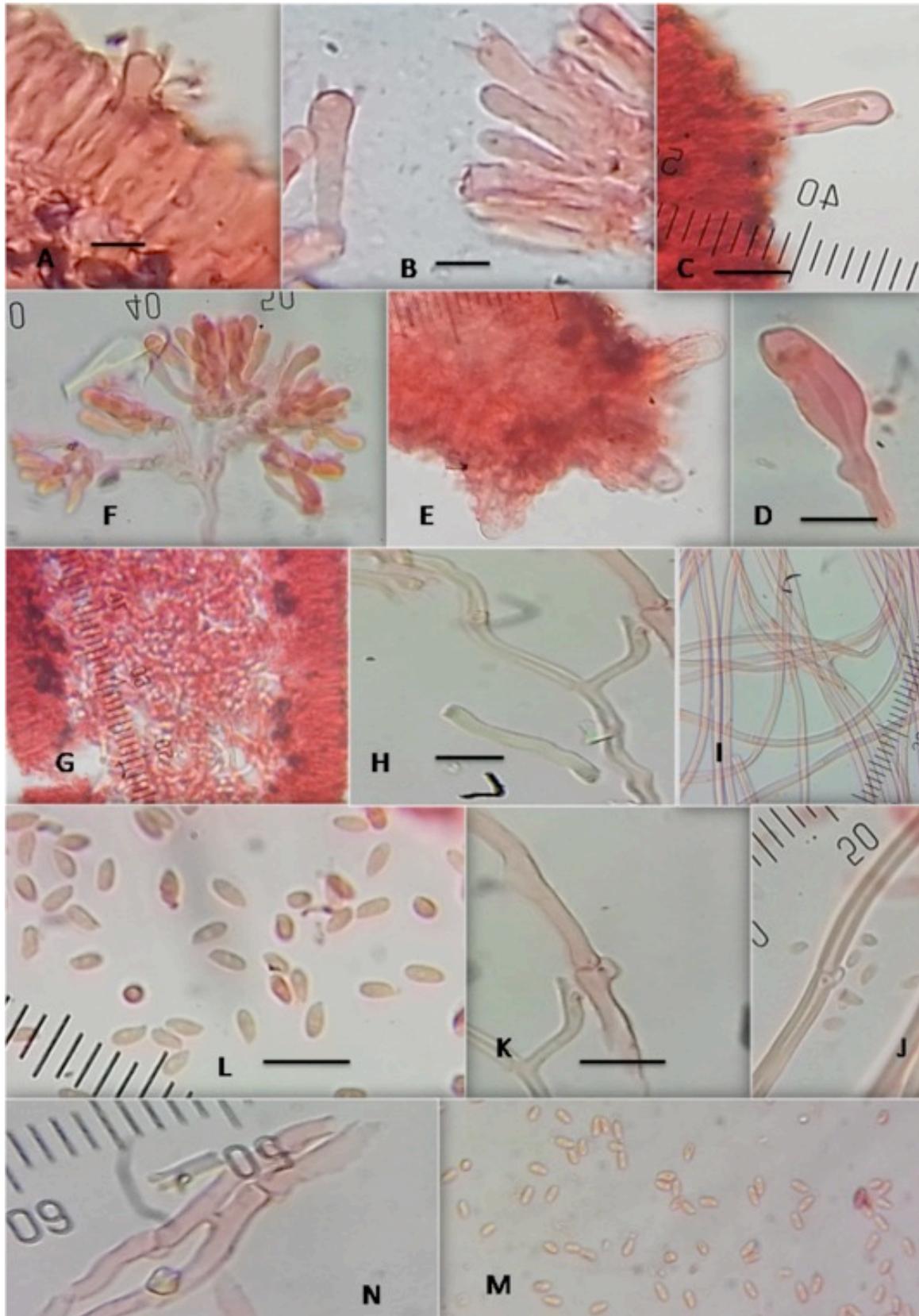


Image 4. *Lentinus fasciatus*: A–B—basidia | C–D—sclerocystidia | E—cheilocystidia | F—basidioloes | G—irregular lamellae trama | H—skeletal hyphae | I–J—thick-walled generative hyphae | K—generative hyphae of context | L—basidiospores. Bars (A–D, K) = 10µm | H = 15µm | L = 20µm. © Diptosh Das.



Image 5 (A–B). *Lentinus polychrous*. A—Scale = 15mm | B—scale = 10mm. © Entaj Tarafder.

decurrent, densely crowded without lamellulae, narrow, white (1A1) to pale orange (5A3) or light orange (5A4), concolorous. Stipe 15–25 × 10–15 mm, central to slightly eccentric, fleshy-fibrous, white (1A1) to pastel grey (1C1) turning yellowish-grey (3B2) on bruising. Annulus single, white (1A1), inferior, removable.

Basidiospores (4.2–)5.3–6.9–7.5(–9.6) × (2.1–)4.6–2.6–2.8(–3.5) μm, $X_M = 6.9 \pm 1.11 \times 2.6 \pm 0.33$; Q = 1.4–3.4, $Q_M = 2.6$ (n = 30), narrow cylindrical, hyaline with KOH, inamyloid. Basidia 14–23.5 × 3.5–4.5 μm, cylindrico-clavate, 2- to 4-spored; sterigmata 2–4, 0.7–1.4 μm high, cylindrical, basally clamped. Basidioles 10.5–24 × 3.5–4.5 μm, cylindrico-clavate, basally clamped. Pleurocystidia absent. Cheilocystidia 22.8–25.5 × 3.7–6.8 μm, narrow cylindrico-clavate, basally clamped. Lamellae trama interwoven, hyphae 3–7 μm wide, cylindrical, hyaline, thin to thick-walled. Hyphal system dimitic; generative hyphae of the context 3.5–7.5 μm wide, clamp connections prominent, 0.7–2.8 μm wide, thin walled, content hyaline, sometimes branched; skeleto-ligative

hyphae 3.9–7.8 μm wide, thick walled, well branched, tapered towards the apex. Annulus hyphae 3.2–4.6 μm broad, hyaline, thin-walled, clamp-connections present. Hyphal pegs abundant, 47.6–91.8 μm wide. Pileipellis made up with repent generative hyphae.

Habit and habitat: Basidiocarps lignicolous and saprotrophic, growing solitary to gregariously in an imbricate fashion on a fallen and decaying log of *Shorea robusta* Roth. Hymenophoral surface of this species also provided shelter and food to members of the insect order Coleoptera L.

Specimen examined: CUH AM623, 16.vii.2017, 26.32N & 89.32E, elevation 115m, Damanpur, Alipurduar District, West Bengal, India, coll. K. Acharya & A. Roy.

Remarks: Presence of tough, coriaceous, central to eccentrically stipitate basidiocarps with deeply infundibuliform pileus, stipe short with distinct annulus, dimitic hyphae with skeleto-ligative hyphae and 3.5–7.5 μm wide generative hyphae, presence of hyphal pegs and spore size of (4.2–)5.3–6.9–7.5(–9.6) × (2.1–)4.6–2.6–2.8(–3.5) μm places the studied specimen under *Lentinus sajor-caju* (section Rigidi of subgenus *Lentinus*). From India this species has been reported from West Bengal, Kerala, Andaman Island (Pegler 1983a; Sharma & Atri 2015). The currently studied specimen matches with the description of specimen studied by Pegler (1983a). *L. sajor-caju* differs from its closely related species *L. umbrinus* Reichardt by having pure white pileus, a distinct annulus, densely crowded lamellae and cylindric basidiospores [(4.2–)5.3–6.9–7.5(–9.6) × (2.1–) 4.6–2.6–2.8(–3.5) μm vs. 5–8.5 × 2.3–3.5].

5. *Lentinus squarrosulus* Mont.

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(Image 9–10).

Basidiocarps pileate, lamellate, stipitate. Pileus 40–68 mm in diam., fleshy, covered with soot brown (5F5) appressed squamules forming a circular lining on the grey (14C1) coloured pileus, margin lacerate to undulated, slightly inrolled. Context up to 3mm thick, grey (14C1) in colour. Lamellae up to 4mm in width, strongly decurrent with 1–3 tiers of lamellulae, moderately crowded to crowded, light orange (5A4) in colour, gill edge denticulate. Stipe 15–25 × 6–15 mm in size, eccentrically placed, covered with grey (11C1) coloured squamules, base slightly bulbous, solid. Odor pleasant mushroomy.

Basidiospores (4.2–)5.3–6.19–6.8(–7.16) × (2.1–)2.5–2.63–2.8(–3.5) μm, $X_M = 6.19 \pm 0.71 \times 2.63 \pm 0.36$, Q-Value = 1.33–2.85, $Q_M = 2.37 \pm 0.33$, n = 30

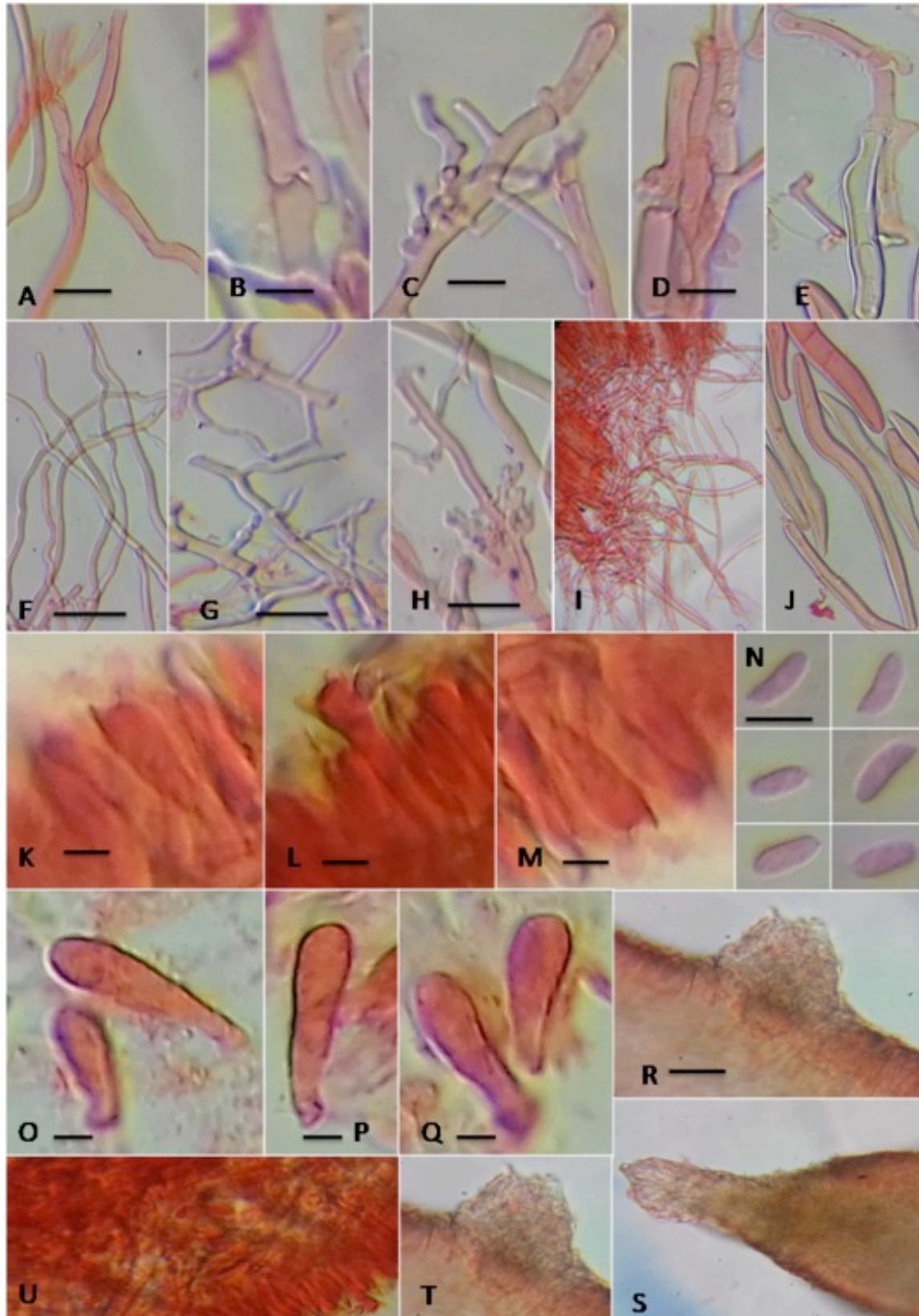


Image 6. *Lentinus polychrous*: A–B—thin-walled generative hyphae with clamp connection | C—thick-walled generative hyphae | D—agglutinated hyphae | E—generative hyphae with skeletal element | F–G—skeleto-ligative hyphae | H—coralloid skeletal element | I—squamule elements with septation | K–M—basidia | N—basidiospores | O–Q—basidioles | R–T—hyphal pegs | U—irregular interwoven lamellae trama. Bars A–E = 10µm | F–H = 30µm | O = 10µm | K–M = 10µm | R–T = 20µm. © Diptosh Das.



Image 7. A–C. *Lentinus sajor-caju*. (A–B) Scale = 5mm | C = basidiocarp with insects. © Anirban Roy.

spores, narrow cylindrical, hilar appendix asymmetric, thin-walled, hyaline, negative in Iodine test. Basidia $14.32\text{--}24.34 \times 3.9\text{--}4.6 \mu\text{m}$, 2–4 sterigmata, cylindrico-clavate; sterigmata $0.3\text{--}0.7 \mu\text{m}$ in length. Basidioles $17.5\text{--}21.4 \times 5.01\text{--}7.1 \mu\text{m}$, cylindrico-clavate, basal clamp present. Cheilocystidia $11.8\text{--}21.4 \times 6.4\text{--}7.8 \mu\text{m}$, narrow clavate with emergent skeletal hyphae, content hyaline with no oil guttule. Pleurocystidia none. Lamellar edge sterile. Hyphal peg abundant, $32.2\text{--}64.4 \mu\text{m}$ wide, consisting of 25–30 generative hyphae, extruded from the lamellae trama. Hyphal system dimitic. Generative hyphae of context $3.5\text{--}5.3 \mu\text{m}$ in width, clamped, thin walled, branched, content hyaline. Skeleto-ligative hyphae of context $5.7\text{--}10.74 \mu\text{m}$ in width, become tapered towards apex, highly branched, thick-walled, wall $1\text{--}2 \mu\text{m}$ thick. Generative hyphae of stipe $3.5\text{--}7.1 \mu\text{m}$ in width, clamped, thin to thick-walled, content hyaline. Skeletal hyphae of stipe $6.8\text{--}11 \mu\text{m}$ in width, thick walled, wall $1.2\text{--}2 \mu\text{m}$ thick. Hymenophoral trama irregular interwoven, devoid of sub-hymenium layer. Pileipellis consists of inflated generative hyphae. Squamules of pileus emerging from the disrupt epicutis.

Habit and habitat: Basidiocarps lignicolous and

saprotrophic, grows in troops or clusters of 1–4 caespitose basidiocarps upon fallen and decaying logs of *Shorea robusta* Roth.

Specimen examined: CUH AM622, 15.vii.2017, 26.64N & 89.54E, elevation 116m, near Buxa forest, Alipurduar District, West Bengal, India, coll. K. Acharya & A. Roy.

Remarks: Presence of tough, coriaceous, excentrically stipitate basidiocarps with soot brown coloured appressed squamules which forms a ring-like pattern on pileus surface; dimitic hyphae with skeleto-ligative hyphae and $3.5\text{--}5.3 \mu\text{m}$ wide generative hyphae, presence of hyphal pegs and spore size of $(4.2\text{--})5.3\text{--}6.19\text{--}6.8\text{--}(7.16) \times (2.1\text{--})2.5\text{--}2.63\text{--}2.8\text{--}(3.5) \mu\text{m}$ places the studied specimen under *Lentinus squarrosulus* (section Rigidi of subgenus *Lentinus*).

Spore dimensions of the collected specimen is similar with the previously reported taxon from Kerala (Manimohan et al. 2004) $[(4.2\text{--})5.3\text{--}6.19\text{--}6.8\text{--}(7.16) \times (2.1\text{--})2.5\text{--}2.63\text{--}2.8\text{--}(3.5) \mu\text{m}]$ vs $5.7\text{--}5 \times 1.75\text{--}3 \mu\text{m}$, but the length of the spore of the material studied by Pegler (1983a) slightly larger $[(4.2\text{--})5.3\text{--}6.19\text{--}6.8\text{--}(7.16) \times (2.1\text{--})2.5\text{--}2.63\text{--}2.8\text{--}(3.5) \mu\text{m}]$ vs $5.5\text{--}9 \times 1.8\text{--}2.7 \mu\text{m}$.

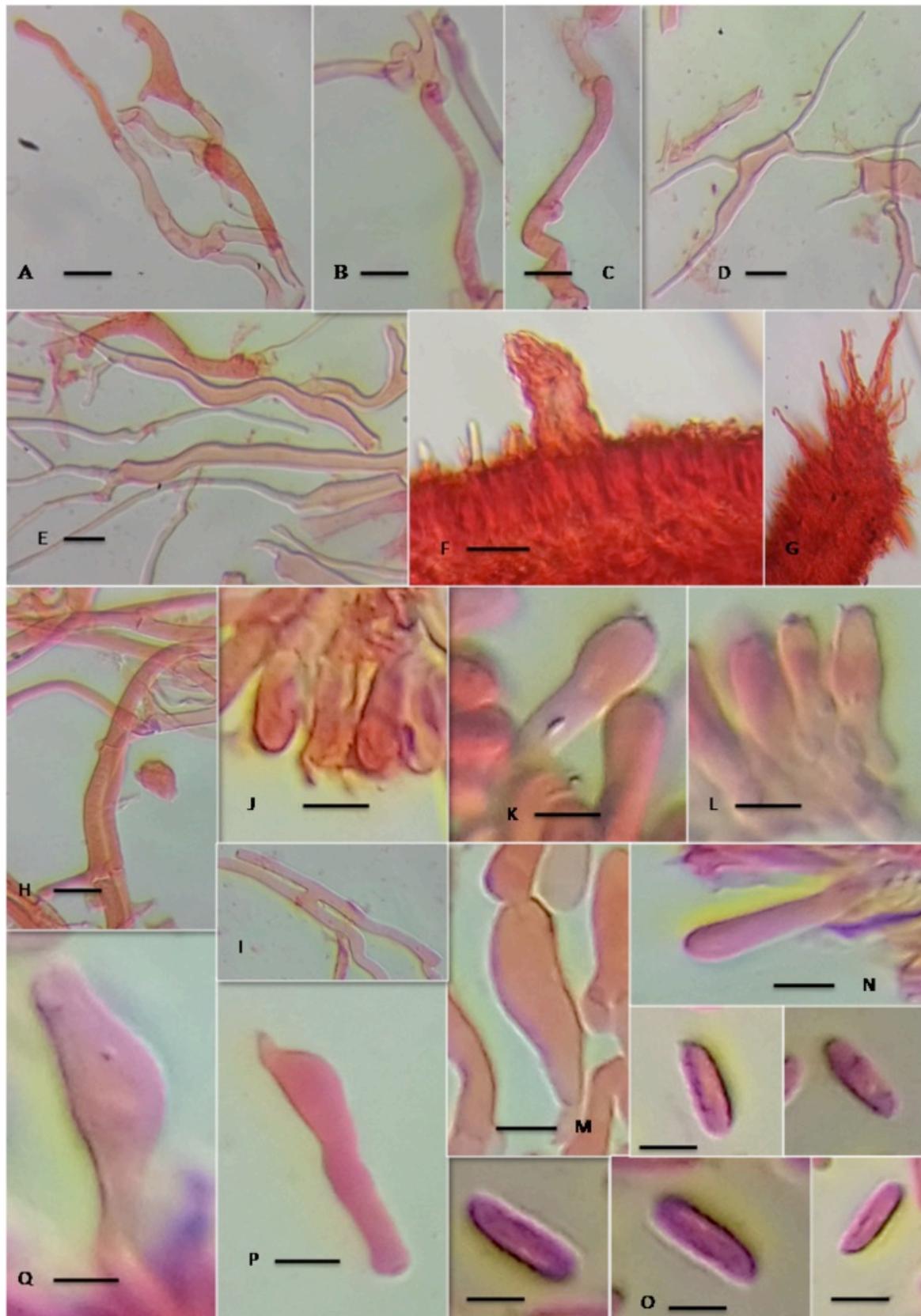


Image 8. *Lentinus sajor-caju*: A–C—generative hyphae of context | D–E—skeleto-ligative hyphae | F—hyphal peg | G—lamellae edge and trama | H—generative hyphae of annulus | I—H-connection | J–L—basidia | M–N—basidioles | O—basidiospores | P–Q—cheilocystidia. Bars A–C = 15µm | D,E,H=10µm | F=70µm | J–Q = 5µm. © Diptosh Das.



Image 9 A–C. *Lentinus squarrosulus*. A–B—Scale = 15mm. © Anirban Roy.

A provisional key to the species of *Lentinus* reported in the study

1. Lamellae bifurcation absent 2
- 1a. Lamellae bifurcation prominent. Cheilocystidia absent. Basidiospores $5.1\text{--}8.1 \times 2.7\text{--}3.7 \mu\text{m}$ *L. araucariae*
2. Hyphal pegs present. Cystidia occasionally found. Pileus surface appressed or uplifted squamules or glabrescent 3
- 2a. Hyphal pegs absent. Sclerocystidia abundant. Pileus covered with erect hairs. Basidiospores $6\text{--}8.2 \times 2.1\text{--}4.2 \mu\text{m}$ *L. fasciatus*
3. Basidiocarps soft flexible, infragile. Hymenophore some shade of white or paler. Hyphal system dimitic with skeleto-ligative hyphae 4
- 3a. Basidiocarps comparatively rigid. Hymenophore honey-coloured when young, becoming dark brownish during maturity. Hyphal system dimitic complex. Cheilocystidia absent. Basidiospores $6.1\text{--}10.2 \times 3\text{--}4 \mu\text{m}$ *L. polychrous*
4. Annulus absent. Soot brown squamules forming a circular lining on the pileus surface. Imbricate caespitose in habit. Basidiospores $4.2\text{--}7.2 \times 2.1\text{--}3.5 \mu\text{m}$ *L. squarrosulus*
- 4a. Annulus present on the stipe. Pileus surface glabrescent. Solitary to gregarious in habit. $4.2\text{--}9.6 \times 2.1\text{--}3.5 \mu\text{m}$ *L. sajor-caju*

The present taxon is one of the most widely distributed species in India and it was reported previously from Chennai, Kerala, Maharashtra, West Bengal (Manimohan et al. 2004; Sharma & Atri 2015). Among other members of the section Rigidii, the studied specimen differs from *L. cladopus* in having absence of branched stipe, *L. sajor-caju* and *L. umbrinus* in the absence of annulus or annular ridge, *L. polychrous* in the absence of complex hyphal system tending towards trimitic amber coloured

tough hymenophore.

REFERENCES

- Bera, M., S. Paloi, A.K. Duta, P. Pradhan, A. Roy & K. Acharya (2018). Contribution to the Macromycetes of West Bengal, India: 23–27. *Journal of Threatened Taxa* 10(9): 12270–12276. <https://doi.org/10.11609/jott.3875.10.9.12270-12276>
- Corner, E.J.H. (1981). The agaric genera *Lentinus*, *Panus* and *Pleurotus*. *Beihefte zur Nova Hedwigia* 69: 1–169.

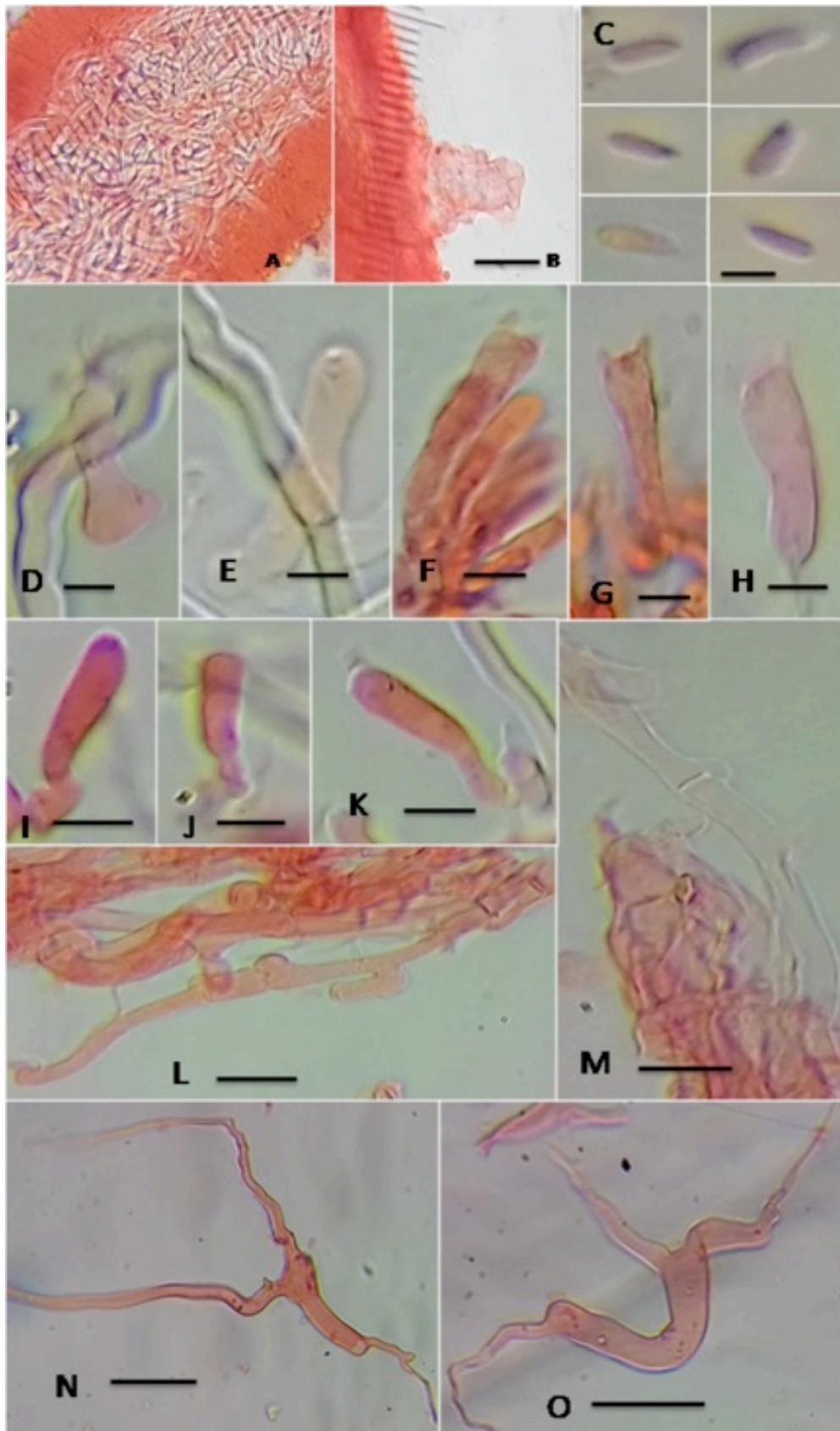


Image 10. *Lentinus squarrosulus*. A—interwoven lamellae trama | B—hyphal peg | C—basidiospores | D—E—cheilocystidia | F—H—basidia | I—K—basidioles | L—M—generative hyphae | N—O—skeleto-ligative hyphae. Bars B = 30µm | D—H = 5µm | I—M = 10µm | N—O = 20µm. © Diptosh Das.

- Dutta, A.K., P. Pradhan, S.K. Basu & K. Acharya (2013). Macrofungal diversity and ecology of the mangrove ecosystem in the Indian part of Sundarbans. *Biodiversity* 14(4): 196–206. <https://doi.org/10.1080/14888386.2013.848824>
- Hibbett, D.S. & R. Vilgalys (1991). Evolutionary Relationships of *Lentinus* to the Polyporaceae: Evidence from Restriction Analysis of Enzymatically Amplified Ribosomal DNA. *Mycologia* 83(4): 425–439. <https://doi.org/10.2307/3760353>
- Kirk, P.M., P.F. Cannon, P.F. Minter & J.A. Stalpers (2008). *Ainsworth Bisby's Dictionary of Fungi* (10th edition). CAB International Wallingford, Oxon, UK, 771pp.
- Kornerup, A. & J.H. Wanscher (1978). *Methuen Handbook of Colour*. Methuen Publishing Ltd, London, 256pp.
- Manimohan, P., N. Divya, T.K.A. Kumar, K.B. Vrinda & C.K. Pradeep (2004). The Genus *Lentinus* in Kerala State, India. *Mycotaxon* 90(2): 311–318.
- Pegler, D.N. (1983a). *The Genus Lentinus A World Monograph*. Kew Bulletin Additional Series. 10. HMSO, London, 281pp.
- Pegler, D.N. (1983b). *Lentinus araucariae*, an Australasian member of the *Lentinus badius*-complex. *Cryptogamie Mycologie* 4: 123–128.
- Pradhan, P., A.K. Dutta, A. Roy, S.K. Basu & K. Acharya (2012). Inventory and spatial ecology of macrofungi in the *Shorea robusta* Roth. forest ecosystem of lateritic region of West Bengal. *Biodiversity* 13(2): 88–99. <https://doi.org/10.1080/14888386.2012.690560>
- Pradhan, P., A.K. Dutta, S.K. Basu, A. Roy & K. Acharya (2013). Macrofungal diversity and habitat specificity: A case study. *Biodiversity* 14(3): 147–161. <https://doi.org/10.1080/14888386.2013.805660>
- Pradhan, P., A.K. Dutta & K. Acharya (2015). A low cost long term preservation of macromycetes for fungarium. Protocol Exchange. Accessed online on 17 March 2015. <https://doi.org/10.1038/protex.2015.026>
- Pradhan, P., A.K. Dutta, S. Paloi, A. Roy & K. Acharya (2016). Diversity and distribution of macrofungi in the Eastern Himalayan ecosystem. *Eurasian Journal of Biosciences* 10: 1–12. <https://doi.org/10.5053/ejobios.2016.10.0.1>
- Saha, R., A.K. Dutta, S. Paloi, A. Roy & K. Acharya (2018). Contribution to the Macromycetes of West Bengal, India: 28–33. *Journal of Threatened Taxa* 10(15): 13006–13013. <https://doi.org/10.11609/jott.4188.10.15.13006-13013>
- Senthilarasu, G. (2015). The Lentinoid fungi (*Lentinus* and *Panus*) from Western Ghats, India. *IMA Fungus* 6(1): 119–128. <https://doi.org/10.5598/imafungus.2015.06.01.06>
- Sharma, S.K. & N.S. Atri (2015). The genus *Lentinus* (Basidiomycetes) from India - an annotated checklist. *Journal of Threatened Taxa* 7(11): 7843–7848. <https://doi.org/10.11609/JoTT.o3864.7843-8>
- Singer, R. (1962). Diagnoses fungorum novorum Agaricalium II. *Sydowia* 15(1–6): 45–83.





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ISSN 0974-7907 (Online) | ISSN 0974-7893 (Print)

September 2020 | Vol. 12 | No. 13 | Pages: 16715–16926

Date of Publication: 26 September 2020 (Online & Print)

DOI: 10.11609/jott.2020.12.13.16715-16926

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