

New records of *Crepidotus* (*Crepidotaceae*) from Kerala, India

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ABSTRACT

During an ongoing inventory study on the crepidotoid agarics of Kerala State, two interesting *Crepidotus* were encountered and identified by morphotaxonomic procedure. Of the two, *Crepidotus latifolius* forms a new record to India while *C. mollis* is reporting for the first time from Kerala. Complete descriptions, photographs and comparisons with related taxa are provided.

Keywords: Cosmopolitan, Crepidotoid, Diversity, Taxonomy

INTRODUCTION

Crepidotus (Fr.) Staude is a well-defined genus with nearly 200 taxa described world-over (Aime *et al.*, 2005; Kirk *et al.*, 2008). Species of *Crepidotus* are characterized typically by a pleurotoid, astipitate habit, pale brown to yellowish spore print, basidiospores either smooth or ornamented, but always lacking a germ pore, and the presence of cheilocystidia but without pleurocystidia (Singer, 1986). Knowledge of Indian *Crepidotus* is fragmentary and only 30 taxa have so far been reported from this vast country (Kumar *et al.*, 2020). In an ongoing effort to understand the diversity of *Crepidotus* in the State of Kerala, we came across two interesting species viz., *Crepidotus latifolius* Peck and *C. mollis* (Schaeff.) Staude, which were not reported earlier from the region. This paper discusses details of these species with description, macro- and microphotographs.

MATERIALS AND METHODS

Conventional morphology based taxonomic techniques were employed. Microscopic characters were studied on dried material stained with 1% Congo red and mounted in 3% aqueous KOH. For evaluation of the range of spore size, 20 basidiospores of each collection were measured for length and width. Basidiospore measurements include both the mean and the standard deviation, together with the range of spore quotient (Q, length: width ratio). Colour codes follow Kornerup and Wanscher (1978). All material examined are deposited at the Mycological Herbarium of Jawaharlal Nehru Tropical Botanic Garden and Research Institute, Thiruvananthapuram [TBGT (M)].

RESULTS

Taxonomy

Crepidotus latifolius Peck, *Bull. Torrey bot. Club* **26**: 66, 1899. (Figs. 1-6)

Basidiomata small, fragile, thin, dorsally attached. Pileus up to 3 mm diam., plano-convex to applanate, flabelliform to almost resupinate; surface brownish orange (7C6), bearing white pubescent hairs throughout, becoming denser and tomentose-villose towards the base, dry, nonstriate, hygrophanous; margin straight, exceeding the lamellae,

entire. Lamellae arising from a lateral point, brownish orange to titan red (7C6/7D6), up to 2 mm wide, ventricose, distant with lamellulae of 1-2 lengths; edge concolourous to the sides, entire. Stipe absent. Context thin, pale. White villose hairs present at the base. Odour not distinctive.

Basidiospores 5.6 (6.4) × (4.8) 5.6 μm, [avL= 5.98 μm, avW= 5.2 μm], Q= 1 (1.15), mostly globose, rarely subglobose, brownish in aqueous KOH, thick-walled, coarsely verrucose. Basidia 20-26.5 × 6.5-8 μm, clavate, 2 or 4-spored, thin-walled, hyaline, guttulate. Lamella edge sterile with scattered to crowded cheilocystidia. Cheilocystidia 29-60 × 8-14 μm, versiform, narrowly lageniform to lageniform with a long narrow flexuous neck, thin-walled, hyaline. Pleurocystidia absent. Hymenophoral trama regular, hyphae 3-4 μm, thin-walled, hyaline. Subhymenium pseudoparenchymatous. Pileal trama composed of thin-walled, hyaline, hyphae 9.6 μm wide. Pileipellis composed of parallel hyphae, 3-4 μm wide, thin-walled, hyaline. Pileipellis a cutis, interrupted at places with ascending, suberect to erect, cylindrical, cystidioid elements, 32-52 × 3-5 μm, clavate to cylindro-clavate often with irregular apices. Clamp connections present in all tissues.

Habitat and ecology: Saprotrophic; gregarious on bark of dead decaying twig of an angiosperm tree in tropical evergreen forest.

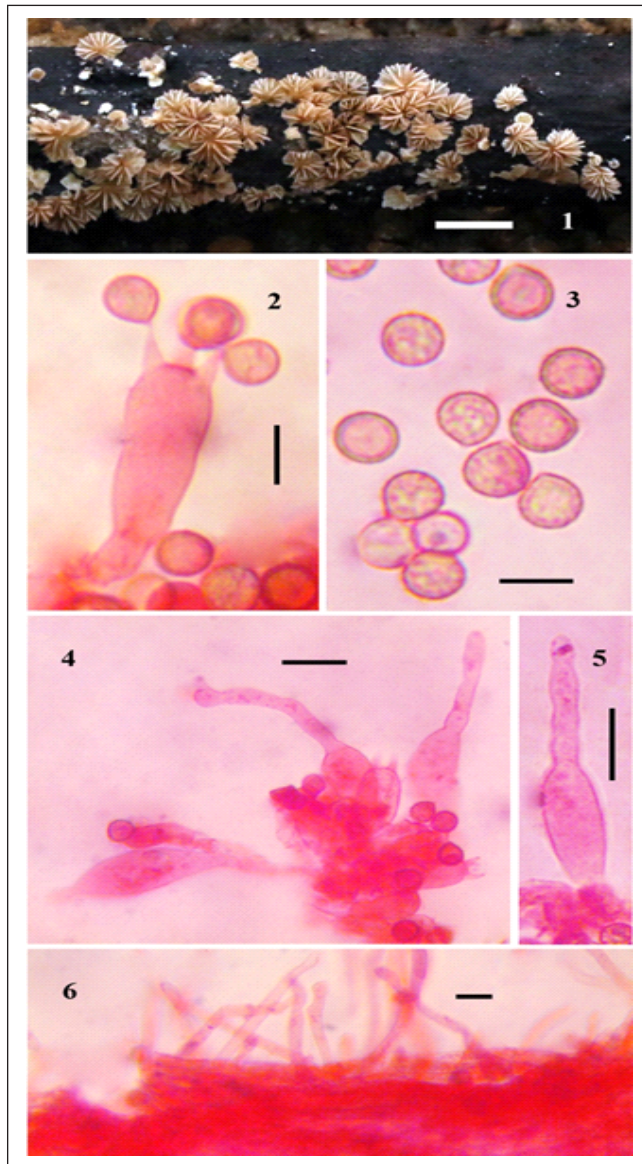
Specimen examined: Kerala State, Kollam district, Sanghili, Cheenikala: 23 August 2016, Manoj TBGT (M)16551.

DISCUSSION

Crepidotus latifolius Peck is characterized by a very small, thin, fragile, dorsally attached basidiomata, globose coarsely verrucose basidiospores, versiform cheilocystidia with long flexuous neck, pileipellis with cystidioid elements and presence of clamp connections. The Kerala collection is in complete agreement with the description of *C. latifolius* from USA (Hesler and Smith, 1965). *Crepidotus latifolius* was also reported from Mexico, Bolivia, and South Korea (Singer, 1973; Bandala and Montoya, 2004; Han *et al.*, 2004) and several varieties were also proposed by these workers.

Some of the related small species of *Crepidotus* include *C. praelatifolius* Murrill, *C. quitensis* Pat., and *C. conchatus* Hesler & A.H. Sm. Small, globose to ovoid basidiospores (4.56 μm) and cylindric obclavate to flask-shaped cheilocystidia distinguishes *C. praelatifolius* (Hesler and Smith, 1965). White pileus and nodulose cheilocystidia (Pegler, 1977) distinguishes *C. quitensis*. *Crepidotus conchatus* originally described from Michigan (USA) differs by its small globose basidiospores (4.5-5.5 μm) and cylindric-clavate or ventricose cheilocystidia.

Crepidotus latifolius was so far not reported from India and hence forms a new record to India.



Figs. 1-6: *Crepidotus latifolius* 1. Habit in situ; 2. Basidium; 3. Basidiospores; 4. Cheilocystidia 5. Cheilocystidium; 6. Pileipellis. Scale bars: 1= 5 mm; 2, 3= 5 μm ; 4-6= 10 μm

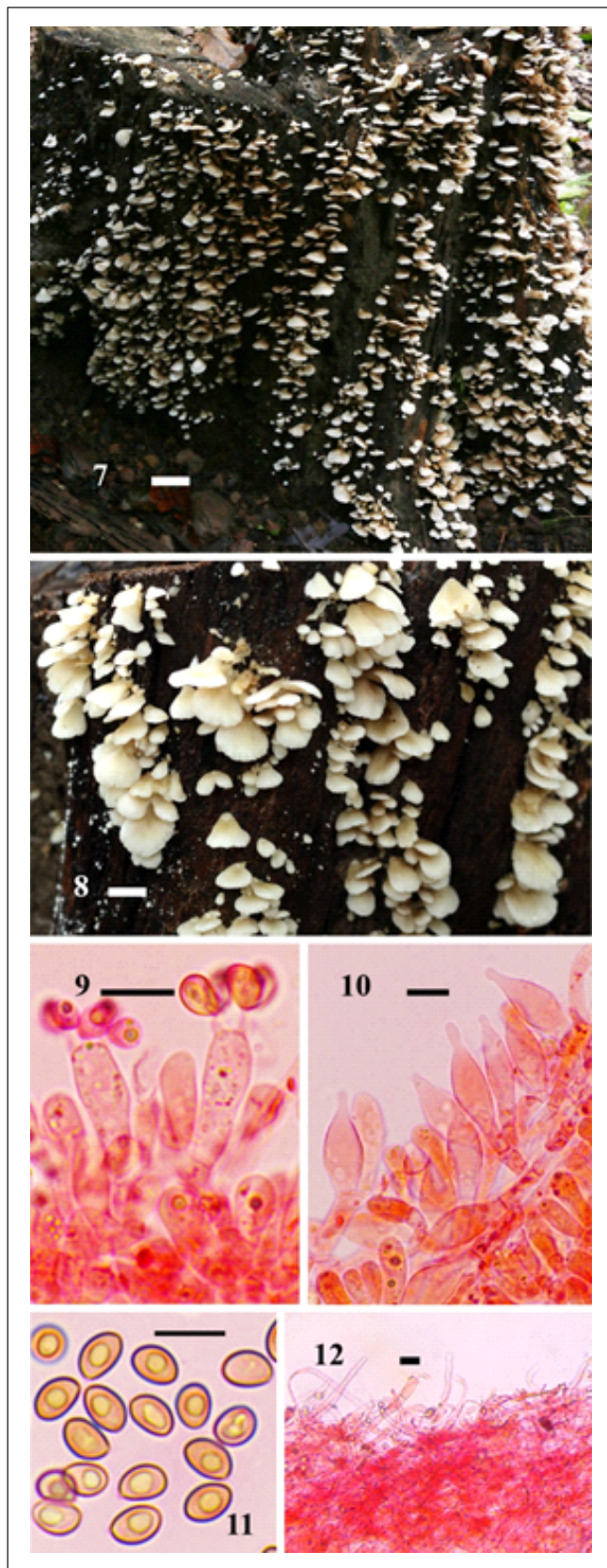
Crepidotus mollis (Schaeff.) Staude, *Schwämme Mitteleutschl.* 25: 71, 1857. (Figs. 7-12)

Basidiomata crepidotoid to pleurotoid, fleshy. Pileus 8-60 mm, convex, applanate, orbicular, spatuliform, flabelliform, sessile; surface white, dull white to yellowish white (4A1/4A2/5A2/4B3/5B2) in young basidiomes, later nougat to dark blonde (5D3/5D4/5D5) when mature, sunburn (6D5) in old basidiomes, smooth and glabrous to naked eye, but 3/4th of the pileus is with white pubescent hairs towards margin, slimy to glutinous when wet, becoming less sticky on drying, strongly hygrophorous, pellucid striate up to 3/4th from the margin; margin straight to slightly uplifted, entire, uneven or variously incised, at times lobed. Lamellae arising from a lateral point, white, off white or cream when young, later yellowish white to birch bark (4A2-4B4/5A2-5D5/6B2-6D4) to camel (6D4) in old basidiomes, up to 5 mm wide, close to crowded with lamellulae of 3-4 lengths; edge concolourous to sides, entire. Stipe absent. Context thin, pale to white, up to 2 mm thick at the pileus disc. Odour not characteristic. White pubescent hairs present at the base. Spore print clay (5D5).

Basidiospores 7.5-9 \times 5-5.5 μm , [avL= 8.2 μm , avW= 5.4 μm] Q= 1.38-1.61 (1.69) μm , mostly ellipsoid, rarely oblong, yellowish brown in KOH, thick-walled, smooth. Basidia 20-22.5 \times 5.5-7 μm , cylindric, clavate, 4spored, thin-walled, hyaline. Lamella edge sterile with crowded cheilocystidia. Cheilocystidia tramal in origin, embedded in a gelatinous matrix, 12-23 \times 5.5-11 μm , mostly ampullaceous, fusiform or ventricose with round or with a beak, thin-walled, hyaline. Pleurocystidia absent. Hymenophoral trama composed of interwoven hyphae, 4-12 μm wide, thin-walled, hyaline, gelatinized. Subhymenium pseudoparenchymatous. Pileal trama composed of thin-walled, hyaline hyphae, 6.5-16 μm wide. Pileipellis an ixocutis interrupted by a turf of elongated, slender, cylindrical hyphae, 1.5-2.5 μm wide, with obtuse ends. Distinct cystidioid elements present, 20-49.5 \times 5-13 μm , cylindro-clavate, narrowly ventricose, thin-walled, encrusted with pale brown contents. Oleiferous hyphae present. Clamp connections absent in all tissues.

Habitat and ecology: Saprotrophic; scattered, gregarious, crowded or in imbricate clusters on dead angiosperm wood and bark and on dead Coconut palm rachis.

Specimens examined: India, Kerala State, Thiruvananthapuram district, Palode, Plavara: 13 May 2015, Manoj TBGT (M)15637; JNTBGRI campus: 11 May 2017, Manoj TBGT (M)16702; *ibid.*, 18 May 2017, Manoj TBGT (M)16758; *ibid.*, 30 May 2017, Manoj TBGT (M)16783; *ibid.*, 27 Jun. 2017, Manoj TBGT (M)16852; *ibid.*, 28 Jun. 2017, Manoj TBGT (M)16852; *ibid.*, 3 Jul. 2017, Manoj TBGT (M)16886; *ibid.*, 6 Jul. 2017, Manoj TBGT (M)16923; *ibid.*, 7 Aug. 2017, Manoj TBGT (M)17017; *ibid.*, 25 Aug. 2017, Manoj TBGT (M)17052; *ibid.*, 7 May 2018, Manoj TBGT (M) 17397.



Figs. 7-12: *Crepidotus mollis* 7-8. Habit in situ; 9. Basidia; 10. Cheilocystidia; 11. Basidiospores; 12. Pileipellis. Scale bars: 7-8= 5 mm; 9-12 = 10 µm

DISCUSSION

Crepidotus mollis (Schaeff.) Staude is a well-known and widely distributed species, reported from almost all regions of the world (Hesler and Smith, 1965; Singer, 1973; Pegler, 1983; Levin *et al.*, 1985; Watling and Gregory, 1989; Senn-Irlet, 1995; Senn-Irlet and De Meijer, 1998; Breitenbach and Kränzlin, 2000; Gonou-Zagou and Delivorias, 2005). It is characterized by small to medium, soft, fleshy basidiomata; sticky to glutinous pileus; gelatinized gill edge and trama; smooth basidiospores; ampullaceous to ventricose cheilocystidia; pileipellis an ixocutis with pileocystidia; lack of clamp connections and gregarious habit.

The Kerala material matches remarkably with the description of *C. mollis* from USA (Singer, 1973) except for the smaller size of the cheilocystidia and lack of stratified gelatinization in the context tissue of the present collection. However, according to Senn-Irlet and De Meijer (1998) the thickness of the gelatinous layer varies considerably between collections from different regions and has no taxonomic significance except for its presence or absence.

In gross morphology, *C. mollis* is similar to *C. alabamensis* Murrill, *C. calolepis* (Fr.) P. Karst, *C. uber* (Berk. & M.A. Curtis) Sacc. and *C. fraxinicola* Murrill. *Crepidotus alabamensis* (Hesler and Smith, 1965) differs by its slightly broader basidiospores, shorter cheilocystidia, unbranched and non-forked trichodermial elements and presence of encrustations in the pileipellis. *Crepidotus calolepis* is distinguished by the brownish squamulose pileus, larger, broadly ellipsoid to ovoid basidiospores, filamentous cheilocystidia and pileipellis a cutis. *Crepidotus uber* is distinct by its smaller basidiomata, sulcate-striate, pinkish brown pileus, undifferentiated pileipellis and hyphae without encrustation. Smaller pileus, white to isabelline lamellae, slightly smaller basidiospores and habitat makes *C. fraxinicola* distinct.

Crepidotus mollis was earlier reported from Maharashtra (Sathe and Deshpande, 1980) and West Bengal (Acharya *et al.*, 2010), but was not reported from Kerala prior to this study.

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