

## ***Rhacophyllus lilacinus* – a remarkable fungal morph from Western Ghats of Kerala, India**

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**Key words:** *Agaricales*. – Anamorph, teleomorph. – Mycobiota of India.

**Abstract:** *Rhacophyllus lilacinus* represents an unusual morphological form, demonstrating a unique form of spore production. No hymenial structures, basidia or basidiospores are produced, but the presence of clamp-connections confirms its basidiomycetous status. The fungus is described, illustrated and discussed based on collections from Western Ghats of Kerala (India).

**Zusammenfassung:** *Rhacophyllus lilacinus* ist eine ungewöhnliche morphologische Form, die eine einzigartige Sporenproduktion aufweist. Hymeniale Strukturen wie Basidien oder Basidiosporen fehlen, aber das Vorhandensein von Schnallen bestätigt ihren Basidiomyceten-Status. Der Pilz wird detailliert beschrieben, illustriert und diskutiert, basierend auf Kollektionen von Western Ghats aus Kerala (Indien).

As part of our continuing studies of the agarics of Western Ghats of Kerala, a remarkable fungus was collected and studied. Although the small fructifications had the overall appearance of a *Coprinus* species, the typical hymenial lamella found in normal agarics was modified to produce numerous, small, sclerotized patches. Neither basidiospores nor basidia were produced. Critical studies revealed that the fungus represented *Rhacophyllus lilacinus* BERK. & BROOME an anamorphic state of *Coprinopsis clastophylla* (MANIOTIS) REDHEAD, VILGALYS & MONCALVO, not recorded so far from India.

### **Materials and methods**

The description is based on fresh collections made by the authors. Microscopic observations were made on materials mounted in 3% aqueous KOH. Colour codes refer to KORNERUP & WANSCHER (1978). Collections examined are deposited in the Mycological Herbarium of TBGRI [TBGT] and at the Royal Botanic Gardens, Kew (K).

***Rhacophyllus lilacinus* BERK. & BROOME, J. Linn. Soc. Bot. 11: 560 (1871). (Fig.1)**

Pileus: 2-15 mm in diam., membranous, ovoid to conico-cylindrical, with an acute or obtuse apex; surface uniformly white in bud, with white floccose squamules, soon disappearing, 'greyish ruby' to 'greyish magenta' (12D4/13B7/13C7) when mature,

translucently striate, radially fissile especially towards the margin.

**Lamellae:** non-hymenial, free to adnate, radial, 'greyish ruby' to 'greyish magenta' (12D4/13B7/13C7), crowded, each lamella subdivided into numerous, thin, friable, irregular segments, variously shaped, polygonal or cylindrical with many sides, soon falling down leaving behind a papery pileus and stipe.

**Stipe:** 20-50 × 2-4 mm, central, cylindrical, arising from a white tomentose discoid base, hirsute, hollow; surface white, smooth and glabrous.

**Context:** papery, thin, 'reddish white' (13A2), composed of loosely arranged, inflated hyphae up to 20 µm in diam.

**Clamp-connections:** observed on context hyphae.

**Hymenium:** none, neither basidiospores nor basidia produced.

**Asexual unicellular propagules:** produced as polygonal elements, (6-)6.5-15 × (3.5-)5.5-8.5 µm, multisided, majority 5-6-sided, thin-walled with a dark stained area inside.

**Pileipellis:** a poorly differentiated epicutis of radially arranged repent, hyaline, 2.5-7.5 µm wide hyphae.

**Stipitipellis:** a cutis of longitudinally arranged, thin-walled, hyaline hyphae, 2.5-8.5 µm wide, with occasional clamp-connections.

**Habitat:** Scattered on bark of a dead *Bombax ceiba* L. (*Malvaceae*).

**Specimens examined:** **India:** Kerala State, Thiruvananthapuram District, TBGRI campus: 28. February 2011, TBGT13551; 24. April 2011, K (M) 170715; 4 May 2011, TBGT13590, leg. P. V. SHIBU.

## Discussion

*Rhacophyllus lilacinus* was first described from Sri Lanka by BERKELEY & BROOME (1871), as a monotypic genus in *Agaricaceae* CHEVALL. This *Coprinus*-like fungus was characterized by the presence of numerous sheets of small, irregular sclerotium like bodies (lysomeres) in place of lamellae. Neither basidia nor basidiospores were produced, but the presence of clamp-connections confirmed its basidiomycetous status. MANIOTIS (1964) discovered that a *Coprinus*-like teleomorph with normal, coprinoid fruiting bodies existed as an alternative state (morph). MANIOTIS (1964) claimed that *R. lilacinus* represented the abasidiosporic state of a new species and he named this "perfect state" *Coprinus clastophyllus* MANIOTIS. This view was shared by WATLING (1979). SINGER (1951, 1962, 1975, 1986) consistently treated the *Rhacophyllus*-form as an anamorph of *Coprinus clastophyllus*.



Fig. 1. *Rhacophyllus lilacinus*: a habit, b carpophore showing individual loculoments, c section through carpophore, d individual loculoment, e loculospores, f stipe context hyphae with clamp-connections. Bars: a, b 10 mm, c-f 10  $\mu$ m.

PEGLER (1986) noted that *Coprinus clastophyllum* was obtained only in culture and had never been found in the wild. He was of the opinion that *Rhacophyllum lilacinus* was unique in having the ability to form two teleomorphs. He recognized the genus *Rhacophyllum* as distinct from *Coprinus* keying both separately (PEGLER 1986).

REDHEAD & al. (2000) interpreted that there are two variations of fruiting bodies in *Coprinus clastophyllum*, one characterized by normal basidium development and one characterized by its absence. The second morph was an alternative means of dispersal and survival. They considered the *Rhacophyllum*-form as an anamorph because its type morph was not characterized by basidia and basidiospores, and the cellular structures pointed towards a known unequivocal teleomorph for the fungus. As there was an alternative morph (the *Coprinus*-like morph) producing basidia and basidiospores, they considered *Rhacophyllum* to be a nomen anamorphosis. DONK (1962) and WATLING (1979) had also labelled it a nomen anamorphosis earlier. In the case of *Rhacophyllum* it was not the missing lamellae but the missing hymenium and basidia that supported the interpretation of it as an anamorph despite its gross agaricoid appearance (REDHEAD & al. 2000). CLEMENÇON (2012) recently illustrated and discussed the pileus development.

Later, based on molecular studies, REDHEAD & al. (2001) subdivided the genus *Coprinus* PERS., into four genera – *Coprinus* sensu stricto in the family *Agaricaceae*, and *Coprinellus* P. KARST., *Coprinopsis* P. KARST and *Parasola* REDHEAD, VILGALYS & HOPPLE in the new family *Psathyrellaceae* (SINGER) VILGALYS, MONCALVO & REDHEAD, distinguished mainly on the basis of pileipellis and veil structure. *Coprinus clastophyllum* was subsequently named as *Coprinopsis clastophylla* (MANIOTIS) REDHEAD, VILGALYS & MONCALVO.

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