

Resupinatus poriaeformis (Agaricomycetes), a new record from India

Suhaib Firdous Yattoo¹, Shoeib Mujeeb Sheikh^{2,*}

¹Mushroom Cultivation Centre, Department of Botany, Government Degree College, Sopore, Baramulla, Jammu & Kashmir 193201, India, ²Department of Botany, Rashtrasant Tukadoji Maharaj Nagpur University, Amravati Road, Nagpur, Maharashtra 440033, India, *Corresponding author, email: sheikhshoeib571@gmail.com

Abstract

The Himalayas are remarkably diverse and unique in terms of flora and fauna. Most of the Himalayan regions of India are either unexplored or poorly explored. *Resupinatus poriaeformis* is reported here as a new record from India. A morphological description is presented along with the taxonomic and ecological notes.

Keywords: cyphelloid fungi, Dendrohyphidia, mycoflora, nematophagous fungi, subiculum

Yattoo SF, Sheikh SM (2022) *Resupinatus poriaeformis* (Agaricomycetes), a new record from India. *MycoAsia* 2022/02.

Received: 24.09.2021 | Accepted: 31.01.2022 | Published: 31.01.2022

Handling Editor: Dr. Belle Damodara Shenoy

Reviewers: Dr. Samantha C. Karunarathna, Dr. Md. Iqbal Hosen

Introduction

The fungal genus *Resupinatus* was validated by Gray in 1821 to include dark-coloured (greyish), lamellate, small, resupinate or pendant, wood-inhabiting basidiomycetes (Nogueira-Melo et al. 2011). Traditionally the genus included only lamellate basidiomycetes (Singer 1989) but in recent years poroid and cyphelloid species have been included (Thorn et al. 2005). After the discovery of new species and rearrangement of the species within the genus and its related genera, Index Fungorum (2022) now lists 47 species names under this genus.

There has been a redistribution of species, for example, species such as *Resupinatus purpureo-olivaceus* G. Stev. is now in *Pleurotus* (Segedin et al. 1995), *R. crawfordii* G. Stev., in *Panellus* (Segedin et al. 1995), *R. tristis* G. Stev., first transferred to *Marasmiellus* Murrill, but now in *Campanella* Henn. (Horak 1971, Segedin 1993), *R. dorotheae* G. Stev. is now known as *Conchomyces bursiformis* (Berk.) E. Horak (Horak 1981) have been excluded from the genus. Genera like *Asterotus* Singer, *Calathinus* Qué!l, *Phyllotus* (Fr.) P. Krast and *Pleurotopsis* (Henn.) Earle which were earlier classified under separate genera have been considered as deprecated synonyms of *Resupinatus* (McDonald 2015). The genus is cosmopolitan and resembles *Hohenbuehelia* Schulzer and *Pleurotopsis* in its external morphology but can be differentiated from these two genera based on its non-nematophagous habit and gelatinized context, respectively.

Resupinatus poriaeformis (Pers.) Thorn et al. was first described by Persoon as *Peziza conspersa* (Persoon 1822) as he was the first person to recognize it as an aggregation of individual cups. Fries (1822) described a fungus in detail very similar to *R. poriaeformis*, however, he did not recognize it as such at that time and called it *Peziza poriaeformis*. *Resupinatus conspersus* was also described by Fuckel as *Solenia poroides*. Thorn et al. (2005) transferred *Solenia poroides* (Fuckel) to the genus *Resupinatus*.

Thorn et al. (2005) described *Resupinatus poriaeformis* as follows: Fruit bodies; annual, resupinate, cupulate, aggregated to form a resupinate polypore like structure. Cups 200–300 µm in diameter, subiculum tomentose-cottony-arachnoid and very thin grey, sometimes white at the margins. Hyphal system monomitic with thin-walled, clamped hyphae. The species is known to cause white decay in a variety of hardwoods like *Acer*, *Betula*, *Carpinus*, *Clematis*, *Corylus*, *Fagus*, *Fraxinus*, *Populus*, *Quercus*, *Salix*, *Tilia* (McDonald 2015, www.mycoquebec.org). A look-alike of *R. poriaeformis* has been reported from North America and was considered a different species named *R. urceolatus*.

Based on the morphology of subiculum; thick and dense in *R. poriaeformis* versus thin and wispy in *R. urceolatus*, some researchers have synonymized the two species (e.g., Cooke 1957) while others separated them (e.g., Donk 1959, Thorn et al. 2005). Characteristics such as fruit body colour and size, and spore size, shape, ornamentation and colour, traditionally used to differentiate the two have not been supported by molecular analyses (McDonald 2015). Instead, subiculum density and thickness are likely to be environmental variations (McDonald 2015). Bijeesh et al. (2020) reported *R. odoratus* with merulioid hymenophore from Kerala, India. During a fungal foray, we found a fruit body of *Resupinatus* which matches with *R. poriaeformis* (Pers.) Thorn et al. based on microscopic characteristics and that represents the first record for India.

Materials and methods

Fresh fungal material was collected from a dead wood of *Salix caprea* and *Populus deltoides* from a forest dominated by cultivated trees of *Pyrus malus*, wild *Populus* spp. and *Salix* spp. in Kashmir, India. Mushroom fruitbodies were photographed in the field and morphologically described in the laboratory using field notes, and then air-dried. Macrophotographs were taken with 18–55 mm + 63 mm extension tubes mounted on a Canon 3000D SLR camera, while magnified pictures were taken with a 10× microscope objective lens mounted on the same camera. The dried material was rehydrated in 3–5 % KOH solution and free-hand sections were made for microscopic examination. Mounting agents 3–5 % Lugol's solution, distilled H₂O and 3 % KOH were used. Measurements were made of 20 basidiospores, basidia and cystidia. Colours were compared to the standard 'HSV plates for mycology'. The material was deposited in Herbarium of Government Degree College, Sopore, India.

Results

Taxonomy

Resupinatus poriaeformis (Pers.) Thorn, Moncalvo & Redhead, Mycologia 97(5):1148 (2006) (Fig. 1)

Index Fungorum Registration Identifier: 500914

Description: Fruiting body annual, fasciculate to gregarious, cup-shaped, up to 2–3 mm in diameter, 0.1 mm thick and 0.5 mm deep, subiculum tomentose to cottony, greyish (HSV 50:15:90), no reaction in KOH. Hymenial surface smooth, greyish (HSV 50:10:80). Hyphal system monomitic, generative hyphae hyaline, clamped, thin-walled. Basidia 25–30×5–7 µm clavate, guttulate, 4-sterigmata, hyaline. Cystidia absent. Dendrohyphidia present. Basidiospores 5.2–6.1 µm, Q = 1.0–1.2, Q_{av} = 1.12 (where Q is the length/width ratio and Q_{av} is the average length/width ratio), globose to subglobose, hyaline, thin-walled, smooth, inamyloid.

Specimen examined: India, Jammu & Kashmir, Baramulla, Nowpora, Sopore (34.2926° N, 74.4411° E, Altitude 1582 m above sea level), 15th May 2019, Suhaib Yattoo (BOT01200519), On dead wood of *Populus deltoides*.

Discussion

Resupinatus poriaeformis is morphologically similar to *R. conspersus* (Pers.) Thorn et al., *Porothelium cinereum* Pat. and *Tapesia daedalia* (Schwein.) Sacc. *Resupinatus poriaeformis* can be differentiated from *R. conspersus* based on habitat and morphology. *Resupinatus conspersus* occurs on softwoods like *Abies* spp. and has encrusted cups, indistinguishable from lichens, with a darker (brownish) hymenium while *R. poriaeformis* Pat. grows on hardwoods and has a lighter (brown) hymenium and dense subiculum. *Porothelium cinereum* and *Tapesia daedalia* can be differentiated from *R. poriaeformis* based on their distribution and type of decay. *Porothelium cinereum* is a tropical species, while *Tapesia daedalia* is a temperate species. Both of these are differentiated from *R. poriaeformis* by the morphology of their cups which are immersed within the substrate, whereas *R. poriaeformis* has cups on the surface of the substrate. *Resupinatus poriaeformis* also resembles *R. hyalinus* based on the cupsize and the smooth hymenial surface. However, the basidiospores of *R. hyalinus* are elliptical ($6-6.5 \times 3-3.4 \mu\text{m}$). The other species of *Resupinatus* have larger basidiomata (0.5–4 cm) and usually a lamellate or poroid hymenial surface. Furthermore, the basidiospores are ellipsoid ($5.8-7.8 \times 2.7-3.6 \mu\text{m}$) in *R. alboniger*, cylindrical ($5-8 \times 2.5-3 \mu\text{m}$) in *R. dealbatus*, and subglobose ($4.4-6 \times 4-4.8 \mu\text{m}$) in *R. applicatus* (Corner 1981, Ryvarden and Gilbertson 1993, Singer 1943, 1962, Thorn et al. 1986).

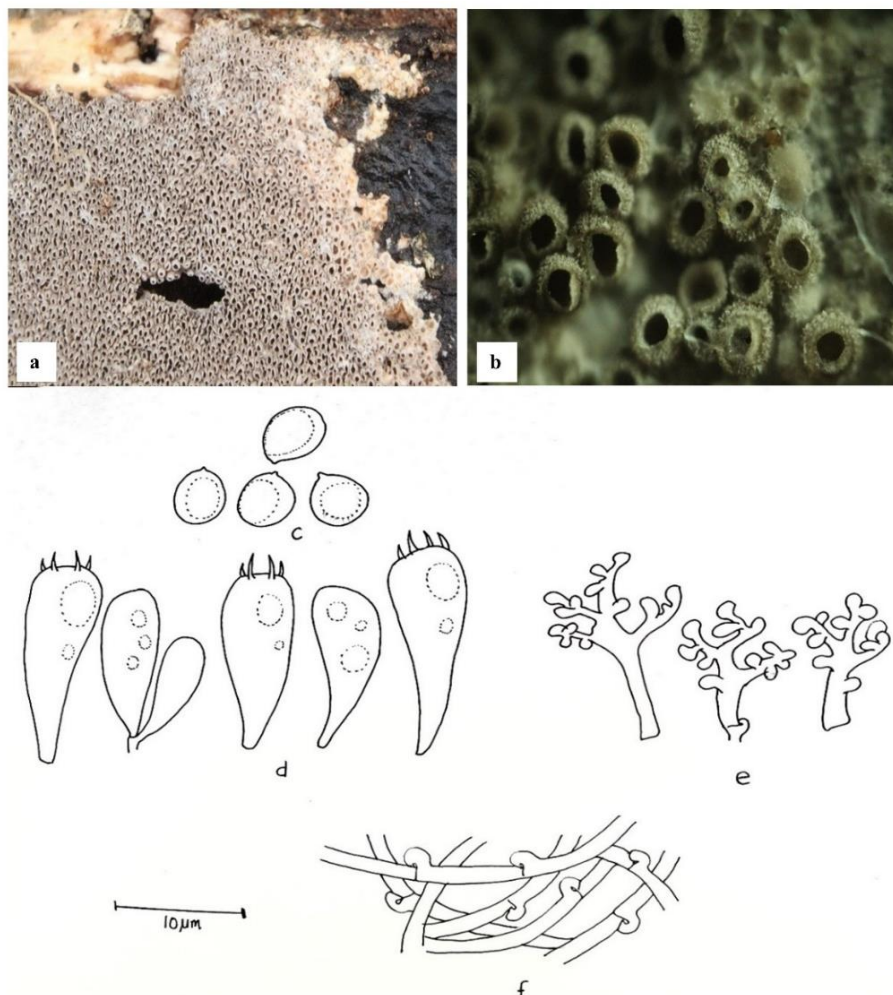


Fig. 1 *Resupinatus poriaeformis* (BOT01200519) (a) Habit (b) 10× magnified view of the fresh specimen (c) Basidiospores (d) Basidia (e) Dendrohyphidia (f) Subiculum. Scale bar: c–f = 10 μm

Acknowledgements

We are highly thankful to Björn Wergen and anonymous reviewers of this manuscript for their valuable comments and suggestions.

Statement on conflict of interest

The authors declare that there is no conflict of interest.

References

- Bijeesh C, Kumar AM, Pradeep CK (2020) A new species of *Resupinatus* (Agaricomycetes) with merulioid hymenophore from India. *Phytotaxa* 464:167-174. <https://doi.org/10.11646/phytotaxa.464.2.3>
- Cooke WB (1957) The *Porotheleaceae*: *Porotheleum*. *Mycologia* 49:680-693.
- Corner EJH (1981) The agaric genera *Lentinus*, *Panus* and *Pleurotus* with particular reference to Malaysian species. J. Cramer, Germany. p169.
- Donk MA (1959) Notes on the *Cyphellaceae* I. *Persoonia* 1:25-110.
- Fries EM (1822) *Systema mycologicum* Vol II, Lundae, Officina Berlingiana.
- Horak E (1971) A contribution towards the revision of the Agaricales (Fungi) from New Zealand. *New Zealand Journal of Botany* 9:403-462.
- Horak E (1981) *Conchomyces* v. *Overeem* - an independent genus within the Agaricales. *Sydowia* 34:109-114.
- Index Fungorum (2022) Index Fungorum. <http://www.indexfungorum.org/names/names.asp> (accessed on 30/01/2022).
- McDonald J (2015) *Molecular and Morphological Studies of Resupinatus* (Basidiomycota). Western Graduate and Postdoctoral Studies. pp. 88-125
- Nogueira-Melo GS, Ryvar den L, Gibertoni TP (2011) First record of *Resupinatus poriaeformis* (Agaricomycetes) from South America. *Mycotaxon* 117:423-427. <http://dx.doi.org/10.5248/117.423>
- Persoon CH (1822) *Mycologia Europaea* 1: i-[ii], 1-356, [iii-iv], plates 1-12. Erlangen; J.J. Palmius
- Ryvar den L, Gilbertson RL (1993) *European polypores*, Vol. 2. *Fungi flora*, Oslo. pp. 394-743.
- Segedin BP (1993) Studies in Agaricales of New Zealand: Some new and revised species of *Campanella* (Tricholomataceae: Collybieae) *New Zealand Journal of Botany*, 31375-384, DOI: [10.1080/0028825X.1993.10419515](https://doi.org/10.1080/0028825X.1993.10419515)
- Segedin BP, Buchanan PK, and Wilkie JP (1995) Studies in the Agaricales of New Zealand: new species, new records and renamed species of *Pleurotus* (Pleurotaceae). *Australian Journal of Systematic Botany* 8:453-482.
- Singer R (1943) Type studies on Basidiomycetes II. *Mycologia* 32:142-163.
- Singer R (1962) *The Agaricales in modern taxonomy*. 2nd ed. Germany J. Cramer. pp. 915.
- Singer R (1989) New taxa and new combinations of *Agaricales* (*Diagnoses Fungorum novorum agaricalium* IV). *Fieldiana Botany* 21:1-133.
- Thorn RG, Moncalvo JM, Redhead SA, Lodge DJ, Martín MP (2005) A new poroid species of *Resupinatus* from Puerto Rico, with a reassessment of the cyphelloid genus *Stigmatolemma*. *Mycologia* 97:1140-151. <http://dx.doi.org/10.3852/mycologia.97.5.1140>
- Thorn RG, Barron GL (1986) *Nematoctonus* and the tribe *Resupinateae* in Ontario, Canada. *Mycotaxon* 25:321-453.



Published by Managing Editor, MycoAsia, Email: mycoasiajournal@gmail.com

Editor-in-Chief: Dr. Nalin N. Wijayawardene | Managing Editor: Dr. Belle Damodara Shenoy | Production Editor: Dr. Gunjan Sharma