Journal of Threatened Taxa

Building evidence for conservation globally

www.threatenedtaxa.org

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

Short Communication

Contribution to the macromycetes of West Bengal, India: 63–68

Rituparna Saha, Debal Ray, Anirban Roy & Krishnendu Acharya

26 October 2020 | Vol. 12 | No. 14 | Pages: 17014–17023
DOI: 10.11609/jott.4964.12.14.17014-17023

Journal of Threatened Taxa | www.threatenedtaxa.org | 26 October 2020 | 12(14): 17014–17023
ISSN 0974-7907 (Online) | ISSN 0974-7893 (Print)
DOI: https://doi.org/10.11609/jott.4964.12.14.17014-17023
#4964 | Received 26 March 2019 | Final received 07 October 2020 | Finally accepted 12 October 2020
PLATINUM OPEN ACCESS

SHORT COMMUNICATION

Contribution to the macromycetes of West Bengal, India: 63–68

Rituparna Saha [1], Debal Ray [2], Anirban Roy [3] & Krishnendu Acharya [4]

[1,4]Molecular and Applied Mycology and Plant Pathology Laboratory, Department of Botany, University of Calcutta, Kolkata, West Bengal 700019, India.
[2]West Bengal Forest and Biodiversity Conservation Society, LB 2, Sector III, Salt Lake City, Kolkata, West Bengal 700106, India.
[3]West Bengal Biodiversity Board, Prani Sampad Bhawan, 5th Floor, LB - 2, Sector - III, Salt Lake City, Kolkata, West Bengal 700106, India.
[1]rituparnasaha2014@gmail.com, [2]raydebal@gmail.com, [3]dr.anirbanroy@yahoo.co.in, [4]krish_paper@yahoo.com (corresponding author)

Abstract: West Bengal, a significant landmass of eastern India with its varied topography, edaphic, and climatic conditions facilitates diversified forest types and conducive microhabitats for a wide array of macro-fungal wealth and the members of Aphyllophorales in particular. Detailed macro-microscopic characterizations and chemical reactions were performed to systematically identify the specimens using standard key and literatures. Six members of Aphyllophorales collected from different parts of West Bengal, India and four species belonging to the family Polyporaceae [*Hexagonia tenuis* (Fr.) Fr., *Polyporus arcularius* (Batsch) Fr., *P. tricholoma* Mont. and *Lenzites elegans* (Spreng.) Pat.] were identified, and a single species was identified under Meripiliaceae [*Physisporinus lineatus* (Pers.) F. Wu, Jia J. Chen & Y.C. Dai] and Meruliaceae [*Bjerkandera fumosa* (Pers.) P. Karst.]. The detailed description along with field and herbarium photographs, macro-morphology, and microscopic features of six species are provided in this article.

Keywords: Aphyllophorales, Basidiomycota, hymenophore, taxonomy, West Bengal.

During the macrofungal survey in different parts of West Bengal with various forest types (viz., mountain temperate forest, tropical mixed evergreen forests of the foothills, the deciduous forests of the plateau fringe, and the tidal forests of Sundarbans), edaphic and climatic conditions (average annual rainfall 175cm and humidity 71%), six species of the order Aphyllophorales (Basidiomycota) were identified. In continuation to our earlier publications (Acharya et al. 2017; Tarafder et al. 2017; Bera et al. 2018, Saha et al. 2018a, b, Das et al. 2020) the species are being contributed to the Macromycetes of West Bengal, with more detailed descriptions with necessary remarks.

Material and Methods

The macro-fungal specimens were collected during monsoon and post monsoon season from June to November (2000–2018) from different parts of West Bengal, India. Field study of the collected specimens like date and collection place, habit, habitat, types of fruiting body and their attachment to the substratum, pileus upper surface, presence or absence of hairs,

Editor: M. Krishnappa, Kuvempu University, Shimoga, India. **Date of publication:** 26 October 2020 (online & print)

Citation: Saha, R., D. Ray, A. Roy & K. Acharya (2020). Contribution to the macromycetes of West Bengal, India: 63–68. *Journal of Threatened Taxa* 12(14): 17014–17023. https://doi.org/10.11609/jott.4912.12.14.17014-17023

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

Competing interests: The authors declare no competing interests.

Acknowledgements: The authors would like to acknowledge Department of Environment, Government of West Bengal, India for providing financial assistance. The West Bengal Biodiversity Board and the Department of Botany (UGC-CAS Phase VI, VII), University of Calcutta and DST-FIST are duly acknowledged for providing necessary infrastructural and administrative supports. Authors are grateful to directorate of forest, Government of West Bengal for extending support during the field visit.

hymenophore surface, types of hymenophore, margin, presence or absence of stipe and stipe attachments were noted carefully in the field book. Colour photographs of the upper surface of the pileus, hymenophore region, context and tube layers were taken for future references. The fruiting bodies were carefully separated with the help of scalpel and chisel from the substratum. Then each collection was wrapped with tissue papers and isolated in a box to avoid contamination. The collected specimens were dried in a hot air drier prior to microscopic study. Microscopic characters were noted by crushing and making transverse sections of these dried materials by mounting and staining in 10% KOH, Congo red and Melzer's reagent and observing it under a microscope. Amyloidity/non-amyloidity/dextrinoidity of the microscopic features were observed using Melzer's reagent. Microscopic characters like hyphal system, presence or absence of clamp connections, basidia, basidiospores, cystidia, cystidioles were noticed under Carl Zeiss AX10 Imager A1 phase contrast microscope for systematically identifying the specimens. Standard keys and published literatures have been referred to in order to compare our specimens and identify them correctly (Roy et al. 1996; Sharma 2012). For colour terms and codes of specimens, the Methuen Handbook of Colour was used (Kornerup et al. 1978). To calculate the dimensions of basidiospores, 30 measurements were taken from each sample. The Q value is denoted by Length/breadth ratio. The measurement of mean Q value (Q_m) was done by dividing total sum of Q value by total number of spores observed. Outline of all identifying characters were drawn using camera lucida and 0.1mm rotring pen was used to trace the lines. Standard protocol was followed to preserve the specimens (Pradhan et al. 2015). The voucher specimens were systematically deposited at CUH (Calcutta University Herbarium) (Image 1a–f), Kolkata, India.

Results and Discussions

***Hexagonia tenuis* (Fr.) Fr.**

Epicr. syst. mycol. (Upsaliae): 498 (1838) [1836-1838]

(Image 2a, Figure 1)

Basidiocarp annual, pileate, sessile. Pileus semicircular 25–41 mm broad and wide 1–2 mm thick near the base, thin, flexible. Upper surface glabrous with concentric zones, brown (7E5, 7E7); greyish violet (17D6) in KOH when fresh and blackening in KOH when dry. Margin white (1A1), thin, entire, sometimes lobed. Pore surface light brown (7D4) in colour, pore hexagonal, 1 per mm. Tubes light brown (7D4), 1mm deep. Hyphal peg absent. Context 1mm thick, brown (7E5).

Hyphal system trimitic; generative hyphae clamped, 2.8–3.58 µm wide, hyaline, thin walled; skeletal hyphae 3.58–5.37 µm wide, hyaline, thick-walled, branched; binding hyphae 1.79–3.58 µm wide, hyaline. Cystidia absent. Basidia clavte, 29.52–35.8 × 7.1–10.74 µm in diameter, hyaline, thin walled, 4-sterigmate. Basidioles clavate, 20.41–28.64 × 7.16–8.59 µm in diameter, hyaline, thin walled. Basidiospores cylindrical, (13.60–)14.32–16.38–18.26(–22.19) × 3.58–3.77–4.29 µm in diameter, Q=3.42–5.63, Q_m=4.33, hyaline, thin walled, non-dextrinoid.

Habit and habitat: Solitary to gregarious, grown on dead wood of *Mangifera indica* L.

Specimen examined: CUH AM559, 27.vi.2017, 22.527°N & 88.362°E, elevation 13m, Ballygunge Science College, Kolkata, West Bengal, India, coll. R. Saha & K. Acharya.

Geographical distribution: India (Leelavathy et al. 2000; Sharma 2012), eastern Africa (Ryvarden & Johansen 1980), and Malawi (Morris et al. 1990).

Remarks: The present specimen is characterized by its sessile basidiocarp, semicircular, glabrous pelius with concentric zones; greyish violet (17D6) in KOH when fresh and blackening in KOH when dry; hexagonal shaped pores, 1 per mm; trimitic type of hyphal system; clamped generative hyphae; basidiospores measuring 13.60–22.19 × 3.58–4.29 µm in diameter with mean Q value of 4.33.

The description of our collection matches with the description reported from Uttarakhand (Sharma 2012) and East Africa. The specimen from Kerala (Leelavathy et al. 2000) differs from the present collection with regard to slightly smaller basidiospores (9–15.5 × 3–4.5 µm vs 13.60–22.19 × 3.58–4.29 µm).

Among morphologically closely related species, *Hexagonia hirta* (P. Beauv.) Fr. differs by the presence of long, dark stiff, erect or branched hairs; *Hexagonia papyracea* Berk. differs by the presence of smaller basidiospores (up to 13µm long) (Sharma 2012).

***Polyporus arcularius* (Batsch) Fr.**

Syst. mycol. (Lundae) 1: 342 (1821)

(Image 2b, Figure 2)

Basidiocarp pileate, centrally stipitate. Pileus round 13–14 mm in diameter, funnel shaped, depressed at disc. Upper surface light brown (6D4) when young and dark brown (9F4) at maturity. Margin thin, ciliated, inrolled when dry. Pore surface greyish-orange (5B3)

Image 1. Herbarium photographs of the specimens: a—*Hexagonia tenuis* | b—*Polyporus arcularius* | c—*Polyporus tricholoma* | d—*Lenzites elegans* | e—*Physisporinus lineatus* | f—*Bjerkandera fumosa*.

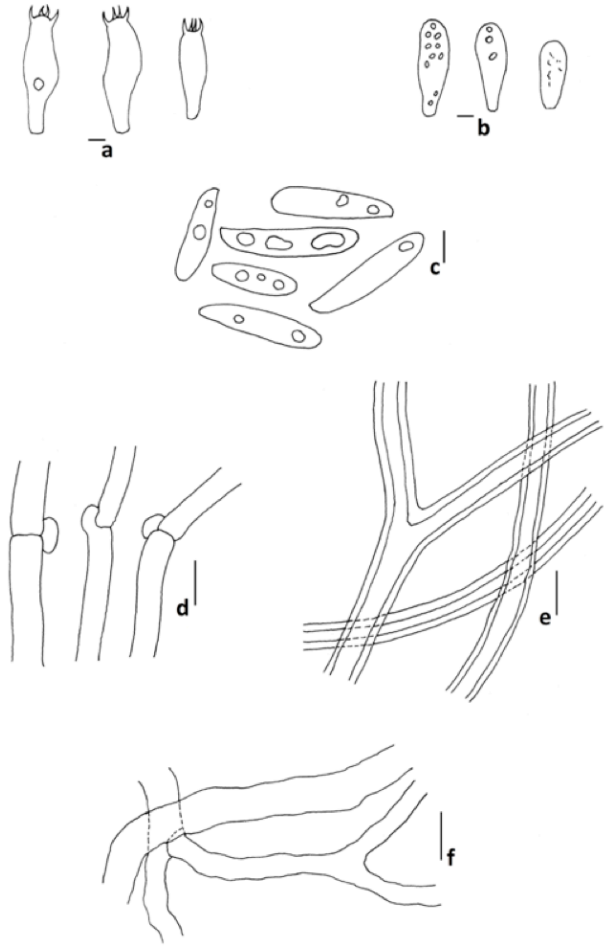

Figure 1. *Hexagonia tenuis*: a—basidia | b—basidioles | c—basidiospores | d—generative hyphae | e—skeletal hyphae | f—binding hyphae. Bars = 5µm. Drawing by Rituparna Saha.

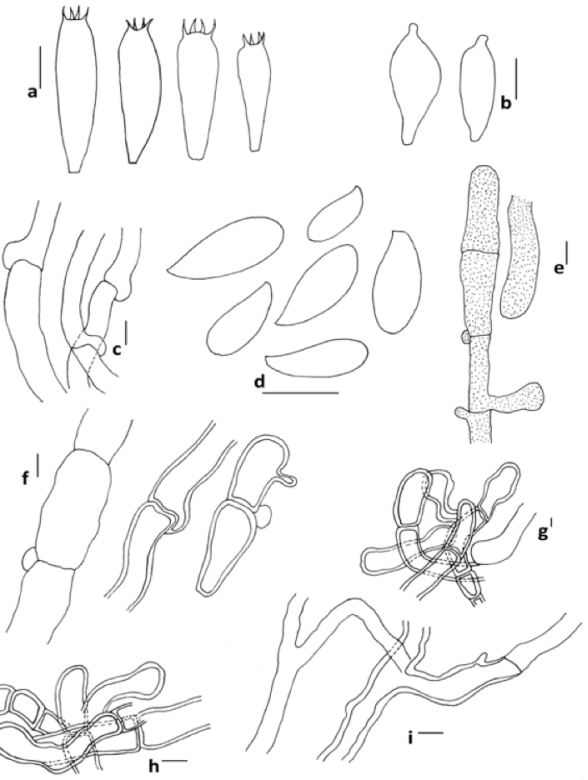

Figure 2. *Polyporus arcularius*: a—basidia | b—cystidioles | c—generative hyphae of context | d—basidiospores | e—gloeopherous hyphae | f—generative hyphae of pileus surface | g—interwined generative hyphae of pileus surface | h—interlocking generative hyphae of stipe | i—binding hyphae. Bars = 5µm. Drawing by Rituparna Saha.

when young, orange gray (5B2) at maturity, pores 1–2 per mm, angular to pentagonal. Pore tubes greyish-orange (5B3) to orange grey (5B2), tubes up to 1mm deep. Context 0.5–1 mm, thin, greyish-orange (5B3) to orange grey (5B2). Stipe straight, cylindrical, broad towards base, 24–44 × 14–20 mm in diameter, slightly pubescent towards base, brownish-orange (5C4) when young, greyish brown (8E3) at maturity, base strigose, solid.

Hyphal system dimitic; in context region generative hyphae clamped, branched, mostly thin-walled, some with thick-walled, 3.5–6.6 µm wide, hyaline; gloeopherous hyphae 3.58–7.16 µm wide with clamp connection. On the pileus upper surface generative hyphae much wider, swelled, 4.9–11.6 µm wide, thin to thick walled; some thin to thick walled, intertwined generative hyphae also present, usually 7.16–14.32 µm in diameter. Binding hyphae hyaline, thick-walled to solid, dendritic, branched, 3.5–6.5 µm wide. Some thin to thick-walled, interlocking generative hyphae present at brownish base of stipe, 4.99–8.33 µm wide. Cystidiole 12.53–14.32 × 3.58–5.37 µm in diameter, hyaline, thin-walled. Basidia 4-sterigmate, clavate, 12.5–17.9 × 3.5–4.29 µm in diameter, hyaline, thin walled. Basidiospores cylindrical with apiculate, guttulate, (5–)6.4–7–7.88 × (1.7–)2.5–2.9–3.58 µm in diameter, Q=1.67–4, Q_m=2.48, hyaline, thin walled.

Habit and habitat: Solitary to gregarious, grown on dead wood of angiosperm.

Specimen examined: CUH AM560, 5.vi.2017, 26.885°N & 88.182°E, elevation 1650.22m, Mirik, Darjeeling District, West Bengal, India, coll. S. Paloi & E. Tarafder. CUH AM555, 17.vii.2017, 26.192°N & 89.273°E, elevation 47m, Debhibari, New Coochbehar District, West Bengal, India, coll. R. Saha & K. Acharya.

Geographical distribution: India (Roy et al. 1996; Leelavathy et al. 2000), East Africa (Ryvarden & Johansen 1980), Malaya (Corner 1984), Austria (Krüger et al. 2004), USA (Krüger et al. 2004) and China (Krüger et al. 2004).

Remarks: *Polyporus arcularius* (Batsch) Fr. possesses characteristic features like centrally stipitate basidiocarp; thin, ciliated margin; pores 1–2 per mm, angular to pentagonal; slightly pubescent stipe towards the base; dimitic type of hyphal system; clamped generative hyphae; dendritic type of binding hyphae; hyaline, cylindrical, apiculate, guttulate basidiospores measuring 5–7.88 × 1.7–3.58 µm in diameter with mean Q value of 2.48.

The description of our collection agreeably matches with the previous report from Malaya and Bardwan (Roy et al. 1996). The specimen reported from eastern Africa and Uttarakhand (Sharma 2012) differs by having larger spores (7–11 × 2–3.5 µm, Ryvarden & Johansen (1980) and 7–9 × 2–3 µm, Sharma (2012)) that may be attributed to the reason of climatic and geographical variations. The specimen reported from Kerala (Leelavathy et al. 2000) varies a bit from the present collection with regard to the absence of cystidiole.

Among macro-microscopically alike species of *Polyporus arcularius* (Batsch) Fr., *P. umbellatus* (Pers.) Fr. differs by having basidiocarp with several pilei from a common base; *Polyporus grammocephalus* Berk. differs by having laterally stipitate basidiocarp; and *Polyporus tricholoma* Mont. differs by having 6–8 pores per mm (Sharma 2012).

***Polyporus tricholoma* Mont.**

Ann. Sci. Nat., Bot., sér. 2 8: 365 (1837)

(Image 2c, Figure 3)

Basidiocarp annual, centrally stipitate. Pileus 5–11 mm in diameter, upper surface reddish brown (9D4), smooth, glabrous, centrally depressed. Margin thin, ciliated. Pore surface whitish (1A1), pores round to angular, 5–7 per mm. Context thin, 1 mm thick, whitish (1A1). Tubes whitish (1A1), 1mm thick. Stipe 4–10 mm long and 1–2 mm thick, pale reddish brown (8D4), glabrous, solid and cylindrical.

Hyphal system dimitic; in the context generative hyphae clamped, thin walled, 3.58–5.73 µm wide hyaline, branched, sometimes thick walled, 6.44–7.88 µm wide. On the pileus surface generative hyphae thin to thick walled, 6.44–7.88 µm wide, hyaline, branched. Some strongly interwoven to skin like appearance; gloeopherous hyphae 3.58–5.37 µm wide, hyaline; binding hyphae dendritic, thick walled, 3.58–5.37 µm wide, branched, solid, hyaline, septate, some are gradually swelled, 7.16–9.67 µm wide. Basidia not observed. Basidiospores cylindrical, 5.01–6.57–7.16 × 1.79–2.98–3.58 µm in diameter, Q=1.5–3, Q_m=2.29, hyaline, thin walled.

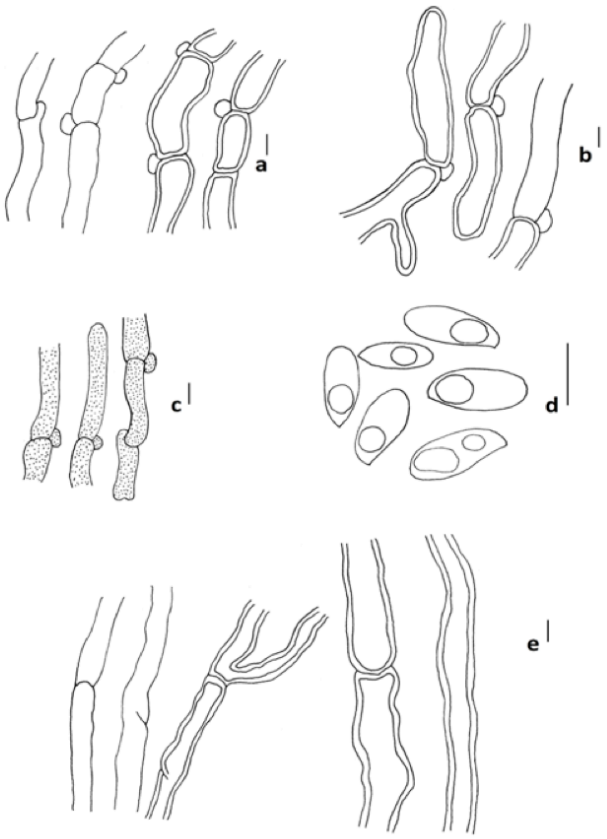

Figure 3. ***Polyporus tricholoma*****: a—generative hyphae of context | b—generative hyphae of pileus surface | c—gloeopherous hyphae | d—basidiospores | e—binding hyphae. Bars = 5µm. Drawing by Rituparna Saha.**

Habit and habitat: Solitary to gregarious, grown on dead wood of angiosperm.

Specimen examined: CUH AM591, 15.x.2017, 26.684°N & 88.350°E, 124.57m, Sukna, Siliguri District, West Bengal, India, coll. K. Acharya, R. Saha & A. Roy.

Geographical distribution: India (Roy et al. 1996; Leelavathy et al. 2000), Brazil (Núñez et al. 1995), eastern Africa (Ryvarden & Johansen 1980), Costa Rica (Krüger et al. 2004), Mexico (Krüger et al. 2004), and USA (Krüger et al. 2004).

Remarks: The present specimen is characterized by its centrally stipitate basidiocarp; ciliated margin; 5–7 per mm pores; dimitic hyphal system, clamped generative hyphae and dendritic type of binding hyphae; basidiospores measuring 5.01–7.16 × 1.79–3.58 µm diam. with mean Q value of 2.29. Our present specimen satisfactorily matches with the earlier report of Burdwan (Roy et al. 1996), Uttarakhand (Sharma 2012), Brazil and East Africa. The species reported from Kerala (Leelavathy et al. 2000), as described, slightly differs from our collection by having a bit larger basidiospores

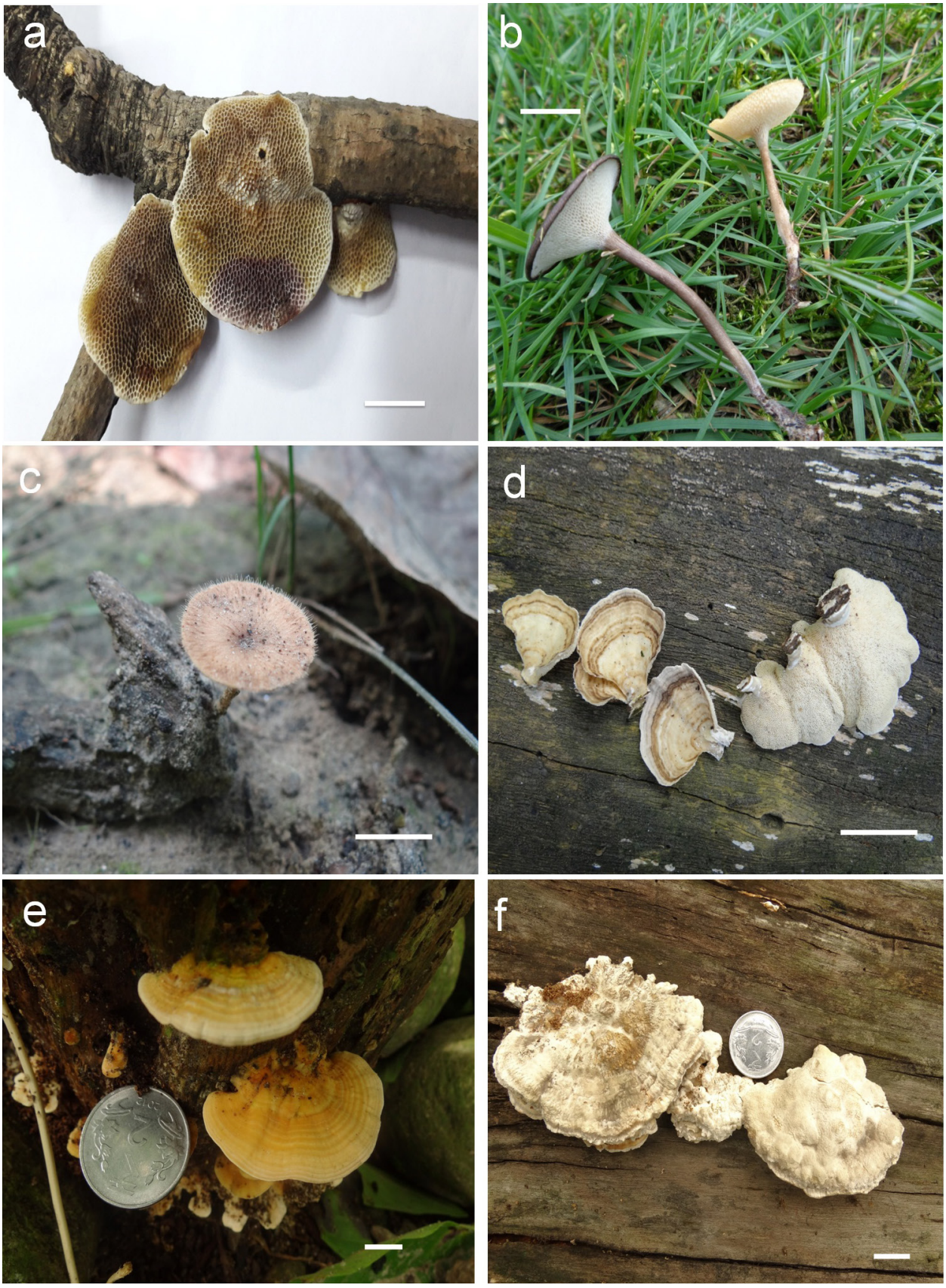

Image 2. Field photographs of the basidiocarp: a—*Hexagonia tenuis* | b—*Polyporus arcularius* | c—*Polyporus tricholoma* | d—*Lenzites elegans* | e—*Physisporinus lineatus* | f—*Bjerkandera fumosa*. Bars = 10mm. © Rituparna Saha.

(7.5–8.7 × 3–3.7 µm vs 5.01–7.16 × 1.79–3.58 µm).

Among macro-microscopically closely related species, *Polyporus umbellatus* (Pers.) Fr. differs by having basidiocarp with several pilei from a common base; *Polyporus grammocephalus* Berk. differs by having laterally stipitate basidiocarp; and *Polyporus arcularius* (Batsch) Fr. differs by having 1–2 pores per mm (Sharma 2012).

***Lenzites elegans* (Spreng.) Pat.**

Essai Tax. Hyménomyc. (Lons-le-Saunier): 89 (1900)

(Image 2d, Figure 4)

Fruit body annual, sub-stipitate, laterally attached, 20–50 × 21–25 mm in diameter, 2–6 mm thick towards base, hard, glabrous. Upper surface of pileus orange white (6A2) with dark coloured violet brown (10E4, 10F4) concentric zonations. Margin grey (1D1), sulcate, thin. Hymenophore orange white (6A2), hymenophore irpicoid to daedaloid, partly lamellate, lamellae 3–4 per mm, 1–2 mm thick, orange white (6A2). Context single layered, white (1A1), 1–5 mm thick towards base.

Hyphal system trimitic; generative hyphae clamped at septa, 2.51–3.58 µm wide, thin, hyaline walled; skeletal hyphae solid, thick-walled, 3.58–7.16 µm wide, hyaline; binding hyphae branched, hyaline, solid, septate, 1.43–3.58 µm wide. Cystidia absent. Basidia not observed. Basidiospores cylindrical, smooth, (4.65–)5.73–6.66–7.52 × 1.79–2.97–3.58 µm, Q=1.6–3.49, Q_m=2.23, hyaline.

Habit and habitat: Solitary to grerarious, grown on dead wood of *Shorea robusta* C.F. Gaertn.

Specimen examined: CUH AM593, 15.vii.2017, 26.32°N & 89.32°E, 115m, Damanpur kathgola, Alipurduar District, West Bengal, India, coll. K. Acharya, R. Saha & A. Roy.

Geographical distribution: India (Sharma 2012), eastern Africa (Ryvarden & Johansen 1980), and North Carolina (Grand 2011).

Remarks: *Lenzites elegans* (Spreng.) Pat. is characterized by its lateral stipe; daedaloid to lamellate hymenophore; single layered white context, trimitic type of hyphal system; basidiospores measuring 4.65–7.52 × 1.79–3.58 µm diam. with mean Q value of 2.23.

In the Indian context, the present taxon was previously reported from Uttarakhand (Dehra Dun). Our collection mostly matches with the specimens reported from Dehra Dun (Sharma 2012) except having slight variations in basidiocarp size. The present specimen is smaller in size with respect to the specimen of Dehra Dun i.e., 100–200 mm wide and 10–30 mm thick (Sharma 2012) that may be attributed due to the reason

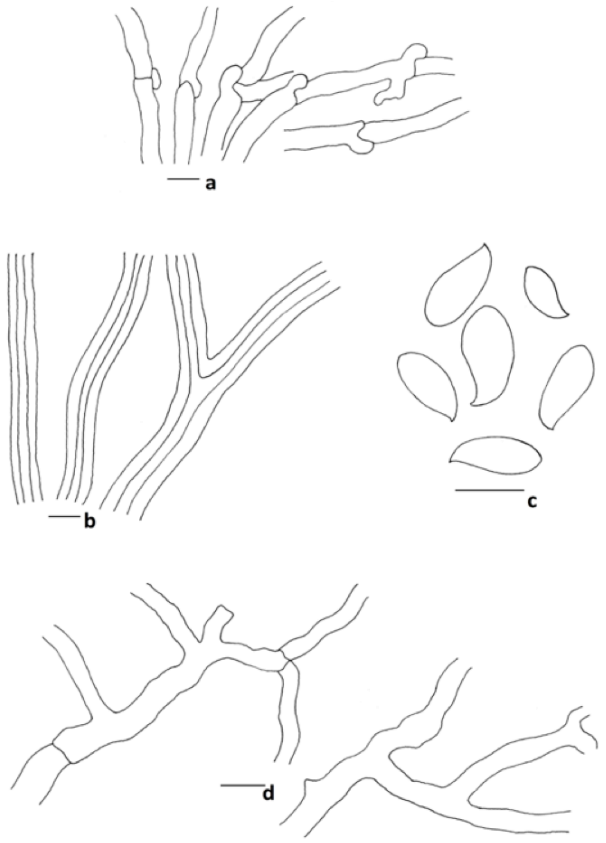

Figure 4. ***Lenzites elegans*****: a—generative hyphae | b—skeletal hyphae | c—basidiospores | d—binding hyphae. Bars = 5µm. Drawing by Rituparna Saha.**

of climatic and geographical variations. The collection, however, reported from eastern Africa (Ryvarden & Johansen 1980) and North Carolina (Grand 2011) matches with the description of our collected specimen.

Among macro-microscopically similar taxa, *Lenzites betulinus* (L.) Fr. differs by the presence of finely hirsute and concentrically zonate pileus surface; and *Lenzites stereoides* (Fr.) Ryvarden differs by the presence of whitish to wood coloured with pinkish tint basidiocarp and spiny to toothed hymenophore; and *Lenzites acutus* Berk. differs by having 3–6 lamellae per cm (Sharma 2012).

***Physisporinus lineatus* (Pers.) F. Wu, Jia J. Chen & Y.C. Dai**

Mycologia 109(5): 760 (2017)

(Image 2e, Figure 5)

Basidiocarp annual, pileate, sessile. Pileus dimidiate, 23–31 × 15–20 mm in diam., 1–6 mm thick at base. Pileus upper surface glabrous, greyish orange (5B6) to brownish-orange (7C7) towards base and with brownish-orange (6C7) concentric zones. Margin entire, thin,

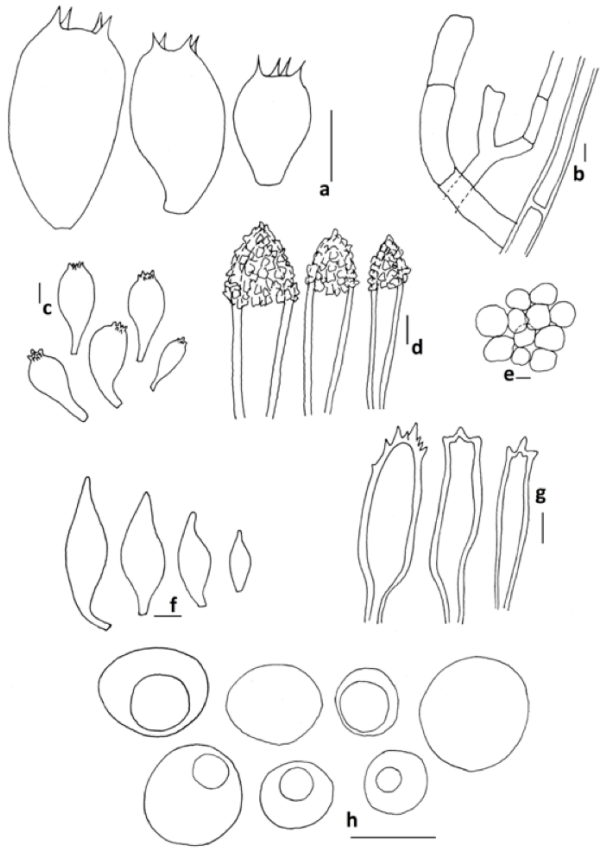

Figure 5. ***Physisporinus lineatus***: a—basidia | b—generative hyphae | c—apically encrusted cystidia | d—strongly encrusted cystidia | e—pseudo-parenchymatous cells | f—cystidioles | g—acanthophyces | h—basidiospores. Bars = 5µm. Drawing by Rituparna Saha.

decurved on drying, greyish-orange (6B3). Pore surface greyish-orange (6B3), pores circular to angular, 7–10 per mm. Context up to 1mm thick, greyish-orange (6B3) in colour. Tubes 1–2 mm deep, not stratified, concolorous with the context.

Hyphal system monomitic; generative hyphae 3.58–7.88 µm wide, simple septate, hyaline, solid, thin to thick-walled. Cystidia are of two types– one is apically encrusted club shaped cystidia with hyaline, thick- walled, 14.68–21.48 × 4.29–8.95 µm in diameter, apical part wide and basal part tube-like, and the other is strongly encrusted cystidia with highly thick-walled, solid, 6.04–11.09 µm wide, embedded in the trama and sometimes partly projecting into the hymenial region. Cystidioles mucronate, tips pointed, 10.74–26.85 × 3.58–7.16 µm in diameter, hyaline. Acanthophyces thick walled, 5.37–8.95 µm wide, hyaline, solid. Pseudo-parenchymatous cell present just below the context region; cells globose to subglobose, thin-walled, 7.16–11.09 × 6.44–7.52 µm in diameter, hyaline. Basidia short, barrel shape, 7.88–14.32 × 5.37–7.88 µm in diameter, hyaline, 4-sterigmate, sterigmata short. Basidiospores thin-walled, globose to subglobose, often with one oil droplet, 3.94–4.58–5.37(–6.44) × 3.58–4.03–5.01 µm in diameter, Q=1–1.27, Q_m=1.13, hyaline, (–) ve in Melzer's reagent.

Habit and habitat: Solitary to gregarious, grown on dead wood of angiosperm.

Specimen examined: CUH AM604, 19.ix.2017, 26.28°N & 88.63°E, 137m, Targhera, Jalpaiguri District, West Bengal, India, coll. R. Saha, K. Acharya & A. Roy.

Geographical distribution: India (Leelavathy et al. 2000; Sharma 2012), eastern Africa (Ryvarden & Johansen 1980) and Europe (Ryvarden & Gilbertson 1994).

Remarks: *Physisporinus lineatus* (Pers.) F. Wu, Jia J. Chen & Y.C. Dai possesses characteristic features of an annual habit; sessile basidiocarp coloured greyish-orange (5B6) to brownish-orange (7C7) towards base and with brownish-orange (6C7) concentric zonations; pores 7–10 per mm; monomitic type of hyphal system; simple septate generative hyphae; two types of cystidia- one being apically encrusted club shaped, apical part wide and basal part tube like, 14.68–21.48 × 4.29–8.95 µm in diameter and the other being strongly encrusted, highly thick-walled; mucronate cystidioles; thick-walled acanthophyces; and thin-walled, globose to sub-globose basidiospores measuring 3.94–6.44 × 3.58–5.01 µm diam. with mean Q value of 1.13.

Our collection appropriately matches with the previous reports of Uttarakhand (Sharma 2012), Kerala (Leelavathy et al. 2000) and eastern Africa (Ryvarden & Johansen 1980). The specimen reported from Europe bears most resemblances with our collection except for having a larger basidiocarp.

Among the macro and micro-morphologically closely related species, *Physisporinus vitreus* (Pers.) P. Karst. differs from *P. lineatus* (Pers.) F. Wu, Jia J. Chen & Y.C. Dai due to absence of cystidia (Sharma 2012).

***Bjerkandera fumosa* (Pers.) P. Karst.**

Meddn Soc. Fauna Flora Fenn. 5: 38 (1879)

(Image 2f, Figure 6)

Basidiocarp annual, effused reflexed, sessile, broadly attached to the substratum. Pileus dimidiate, 46–55 × 29–46 mm in diameter and 2–17 mm thick towards base. Upper surface white (1A1) to purplish grey (13D2), glabrous, azonate, irregular. Margin concolourous, 1–2 mm thick. Pore surface grey (7B1) to greyish red (7B3); pores 2–6 per mm, circular to angular towards margin and radially elongate from centre to base. Context

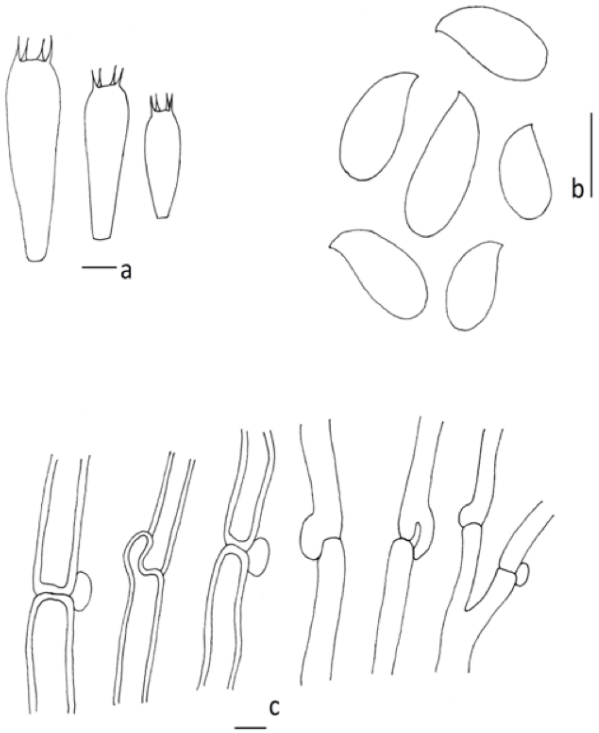

Figure 6. ***Bjerkandera fumosa*****: a—basidia | b—basidiospores | c—generative hyphae. Bars = 5µm. Drawing by Rituparna Saha.**

double layered, upper layer whitish and lower layer greyish orange (6B3) near the base, 3–14 mm thick towards base. Tubes 1–3 mm deep, grey (7B1).

Hyphal system monomitic; generative hyphae 3.22–7.16 µm wide, hyaline in water and KOH, thin to thick walled, branched, clamped at septa. Cystidia absent. Basidia clavate, 4-sterigmate, 14.32–25.06 × 5.37–7.16 µm in diameter, hyaline, thin walled. Basidiospores thin-walled, cylindrical, (5.37–)6.44–6.89–7.16(–8.59) × 3.22–3.48–3.58 µm in diameter, Q=1.5–2.39, Q_m=1.98, hyaline, smooth.

Habit and habitat: Solitary to gregarious, dead wood of *Shorea robusta* C.F. Gaertn.

Specimen examined: CUH AM606, 19.ix.2017, 26.28°N & 88.63°E, 137m, Targhera, Jalpaiguri District, West Bengal, India, coll. R. Saha, K. Acharya & A. Roy.

Geographical distribution: India (Roy et al. 1996; Sharma 2012), Russia (Ryvarden & Gilbertson 1993), Korea (Jung et al. 2014), America (Jung et al. 2014), and Europe (Zmitrovich et al. 2016).

Remarks: *Bjerkendera fumosa* (Pers.) P. Karst. is well characterized by its white (1A1) to purplish-grey (13D2) pileus upper surface; grey (7B1) to greyish-red (7B3) hymenophore; double layered context, upper whitish and lower greyish-orange (6B3) near the base; thin to thick-walled clamped generative hyphae; hyaline, cylindrical, smooth basidiospores measuring 5.37–8.59 × 3.22–3.58 µm diam. with mean Q value of 1.98.

Considering morphological features, the description of our collected specimen matches with the earlier report of Uttarakhand (Sharma 2012) and the collection reported from Bardwan (Roy et al. 1996) and America (Jung et al. 2014) varies a bit from the present collection with regards to the longer size of the basidiospores (4–6.5 × 2–3.5 µm and 5–5.5 × 2–3.5 µm respectively). The description reported from Russia and Europe, however, matches well with the description of our collected specimen.

Among macro-microscopically closely related taxa, *Bjerkandera adusta* (Willd.) P. Karst. differs by having thinner context (up to 6mm) and a greyish-black zone between the context and tube layer which is concolorous with the tube layer (Sharma 2012).

References

Acharya, K., E. Tarafder, P. Pradhan, A.K. Dutta, S. Paloi, M. Datta & A. Roy (2017). Contribution to the Macromycetes of West Bengal, India: 18–22. *Research Journal of Pharmacy and Technology* 10(9): 3061–3068.

Bera, M., S. Paloi, A.K. Dutta, 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. (1984). *Ad Polyporaceas II & III*. Beiheftezur Nova Hedwigia 78: 1–222.

Das, D., E. Tarafder, M. Bera, A. Roy & K. Acharya (2020). Contribution to the macromycetes of West Bengal, India: 51–56. *Journal of Threatened Taxa* 12(9): 16110–16122. https://doi.org/10.11609/jott.5115.12.9.16110-16122

Grand, L.F. (2011). *Lenzites elegans* profile. Mycological Herbarium NCSU. 1–3 pp; https://ncslg.cals.ncsu.edu/files/2014/05/Lenzites-elegans.pdf

Jung, P.E., J.J. Fong, M.S. Park, S.Y. Oh, C. Kim & Y.W. Lim (2014). Sequence Validation for the Identification of the White-Rot Fungi *Bjerkandera* in Public Sequence Databases. *Journal of Microbiology and Biotechnology* 24(10): 1301–1307.

Kornerup, A. & J.H. Wanscher (1978). *Methuen Handbook of Colour*. Methuen Publishing Ltd, London, 256pp.

Krüger, D., K.W. Hughes & R.H. Petersen (2004). The tropical *Polyporus tricholoma* (Polyporaceae) – taxonomy, phylogeny, and the development of methods to detect cryptic species. *Mycological Progress* 3(1): 65–79.

Leelavathy, K.M. & P.N. Ganesh (2000). *Polypores of Kerala*. Daya Publishing House, Delhi, 166pp.

Morris, B. (1990). An annotated check-list of the macrofungi of Malawi. *Kirkia* 13(2): 323–364.

Núñez, M. & L. Ryvarden (1995). *Polyporus* (Basidiomycotina) and related genera. *Synopsis Fungorum* 10:1–85.

Pradhan, P., A.K. Dutta & K. Acharya (2015). A low-cost long term preservation of macromycetes for fungarium. *Protocol Exchange*. Available on 17th March 2015. https://doi.org/10.1038/protex.2015.026.

Roy, A. & A.B. De (1996). *Polyporaceae of India*. International Book distributors, Dehra Dun, 287pp.

Ryvarden, L. & I. Johansen (1980). *A preliminary polypore flora of East Africa*. Fungiflora, Oslo, 636pp.

Ryvarden, L. & R.L. Gilbertson (1993). *Eu*ropean polypores. Part 1. *Synopsis Fungorum* 6: 1–387.

Ryvarden, L. & R.L. Gilbertson (1994). European polypores. Part 2. *Synopsis Fungorum* 7: 394–743.

Saha, R., A.K. Dutta, S.Paloi, A. Roy & K. Acharya (2018b). 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

Saha, R., D. Das, E. Tarafder, A. Roy & K. Acharya (2018a). Contribution to the Macromycetes of West Bengal, India: 34–39. *Research Journal of Pharmacy and Technology* 11(11): 5123–5129.

Sharma, J.R. (2012). *Aphylloporales of Himalaya*. Botanical Survey of India, Kolkata, 590pp.

Tarafder, E., A.K. Dutta, P. Pradhan, B. Mondal, N. Chakraborty, S. Paloi, A. Roy & K. Acharya (2017). Contribution to the Macromycetes of West Bengal, India: 13–17. *Research Journal of Pharmacy and Technology* 10(4): 1123–1130.

Zmitrovich, I.V., M.A. Bondartseva & N.P. Vasilyev (2016). The Meruliaceae of Russia. I. *Bjerkandera*. *Turczaninowia* 19(1): 5–18.

Journal of Threatened Taxa

www.threatenedtaxa.org

PLATINUM OPEN ACCESS

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

October 2020 | Vol. 12 | No. 14 | Pages: 16927–17062
Date of Publication: 26 October 2020 (Online & Print)
DOI: 10.11609/jott.2020.12.14.16927-17062

Member

FJN

Publisher & Host

WILD ZOOREACH

Threatened Taxa