Occurrence of fossil-wood rotters (polyporales) from the Lameta Formation (Maastrichtian), India

Fossil-wood rotters (polyporales) ranging in size from 10 to 19 cm long, 8–15 cm wide and 3–6 cm thick are reported from the red, ferrugenous sandstone overlying the marine Bagh beds of Turonian age (?) exposed at Zeerabad (22°41′ lat. and 75°12′ long.), Dhar District, Madhya Pradesh, India in association with dicotyledonous fossil-woods. Comparable fossil forms, viz. *Fomes idahoensis* Brown were reported from the late Tertiary of southwestern Idaho, USA[1]. It is distinguished from the present specimen by the presence of many pores which could be seen with naked eyes. The fossil fungi belong to the extant family Polyporaceae of the order Aphyllophorales and named as *Lithopolyporales zeerabadensis gen. et sp. nov.* The fossil specimens closely resemble the living genus *Fomes* with regard to its shelf-like, hard, woody, perennial fruiting bodies. The presence of fossil-woods nearby indicates that the fossil fungi were thriving on them in a warm, humid, tropical climate.

Fungi are either friends or foes to the plants; they grow around and into plant roots symbiotically to help them in absorbing minerals and water, and they also cause decay and death by attacking the cells as parasites and saprophytes. Fossil fungi are by no means rare in rocks. The oldest record of fungi comes from marine bryozoans of Ordovician age[2]. The first report of terrestrial filamentous fungi is from the Late Silurian of Sweden[3]. During Devonian, fungi exhibited diversity and various fungi are observed in the Rhynie chert along with the plant fossils[4,5]. Many types of fungi are witnessed in the Carboniferous peat matrix and coal balls[6,7]. In the Permian and Triassic they steadily increase in numbers and from Jurassic onwards, the fungi closely resemble the living ones indicating their utmost stability through ages (Figure 1).

The fungi described here were collected by R.K.K. from Zeerabad (22°41′ lat. and 75°12′ long.), Dhar District, Madhya Pradesh. Several specimens ranging in size from 10–19 cm long, 8–15 cm wide and 3–6 cm thick were observed. The biggest one presented here is 19 cm × 15 cm × 6 cm. They are found in association with angiospermic fossil-woods, most of which are preserved in the form of cast presumably in the Lameta Sandstone. Most of the fossil-woods do not exhibit any internal structure; but some could be provisionally identified as dicotyledonous woods resembling *Barringtonia* of the family Lecythidaceae, on the basis of diffuse-porous wood, indistinct growth rings, vessels of various sizes generally arranged in radial rows, paratracheal–apotracheal parenchyma and occasionally, crystalliferous, multiseriate xylem rays (Figure 2).

At Zeerabad area, the coarse-grained, ferrugenous sandstone lies above the Bagh beds. Some geologists recognize this unit as Lameta Formation, while others consider it as supra Bagh beds[8,9]. The Lameta Sandstone is overlain by volcano–sedimentary rocks[10]. This formation is well known for dinosaurian remains, molluscs, ostracodes, charophytes, palynofossils, etc. and all these fossils indicate a Maastrichtian age[11–13].

The specimens were studied both macroscopically and microscopically. Several sections were cut to study the internal structure. After careful and thorough examination, the specimen was identified as the fruiting body of the family Polyporaceae, belonging to the class Basidiomycetes. The specimen was named *Lithopolyporales zeerabadensis gen. et sp. nov.* with the following characters. The fruiting body is macroscopic, conspicuous, shelf-like and effused reflexed. The texture appears to be tough and leathery. The fruiting basidiocarp or 'conks' as they are occasionally called are perennial as evidenced by the presence of zonation in the section. They were sessile. In the section, minute

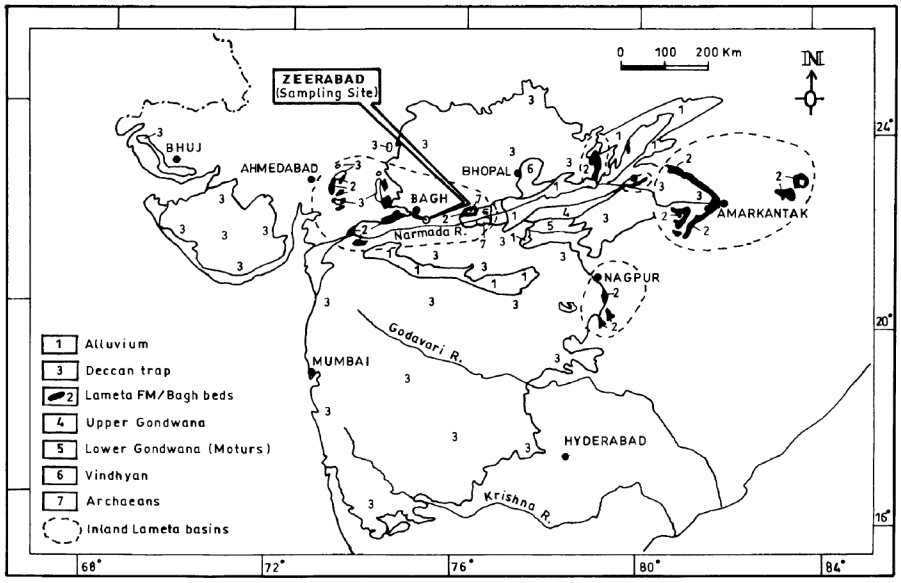

Figure 1. Map of the locality from where the specimens were collected (after Mohabey[10]).

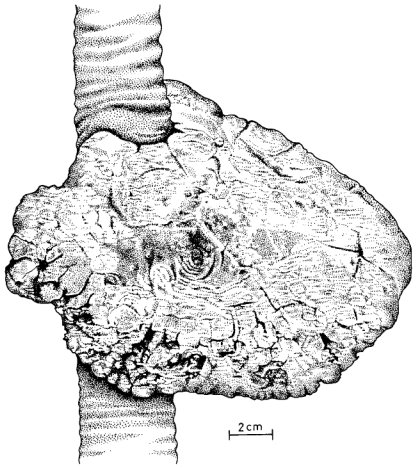

Figure 2. Probable mode of attachment of the basidiocarp to a tree trunk.

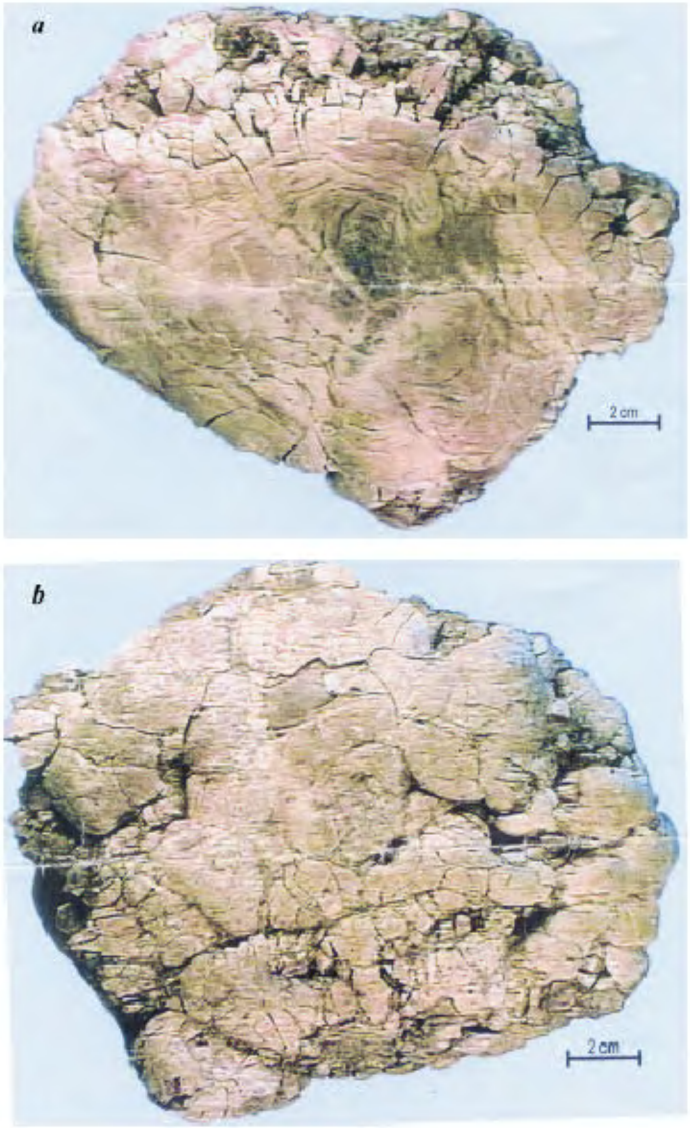

Figure 3. *Lithopolyporales zeerabadensis gen. et sp. nov.* in ***a***, proximal view and ***b***, distal view.

hyphal strands forming the network could be seen; scattered between were found tiny dot-like spores – presumably the basidiospores (Figures 3–5).

The family Polyporaceae is the largest of the order Aphyllophorales, and some of the easily recognized genera are *Fomes*, *Polyporus*, *Poria*, *Irpex*, *Daedalea* and *Lenzites*. *Fomes* and *Polyporus* resemble the fossil specimens by their hard, leathery fruiting bodies. In *Poria*, the fruiting bodies are crust-like and resupinate. *Lenzites* and *Daedalea* are easily distinguished from the fossil specimens by their elongated gill-like pores. *Polyporus* is annual and thus separated from the present specimens. So the genus *Fomes* comes close to *Lithopolyporales* proposed here because of its hard shelf-like, leathery, perennial fruiting bodies.

Many species of the genus *Fomes* live saprobiotically on the dead wood of various trees. Some species like *Fomes*

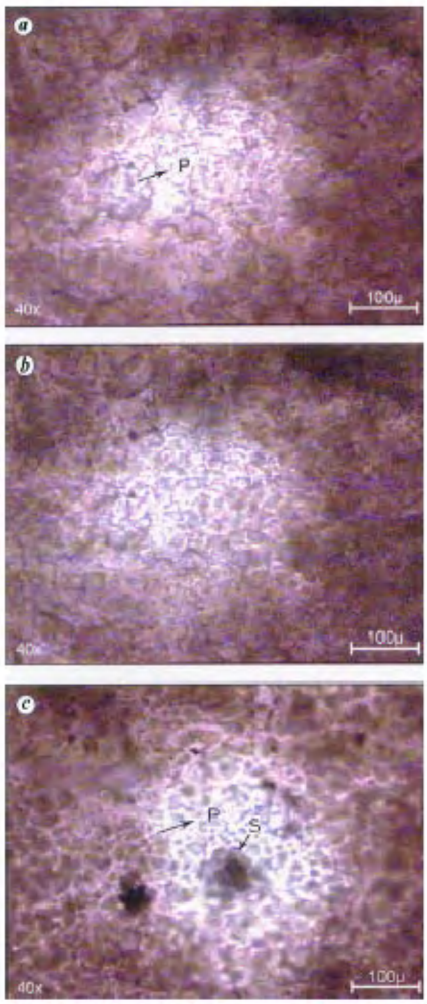

Figure 4. Hyphal strands forming a network in transverse section. P, pore, and S, spore.

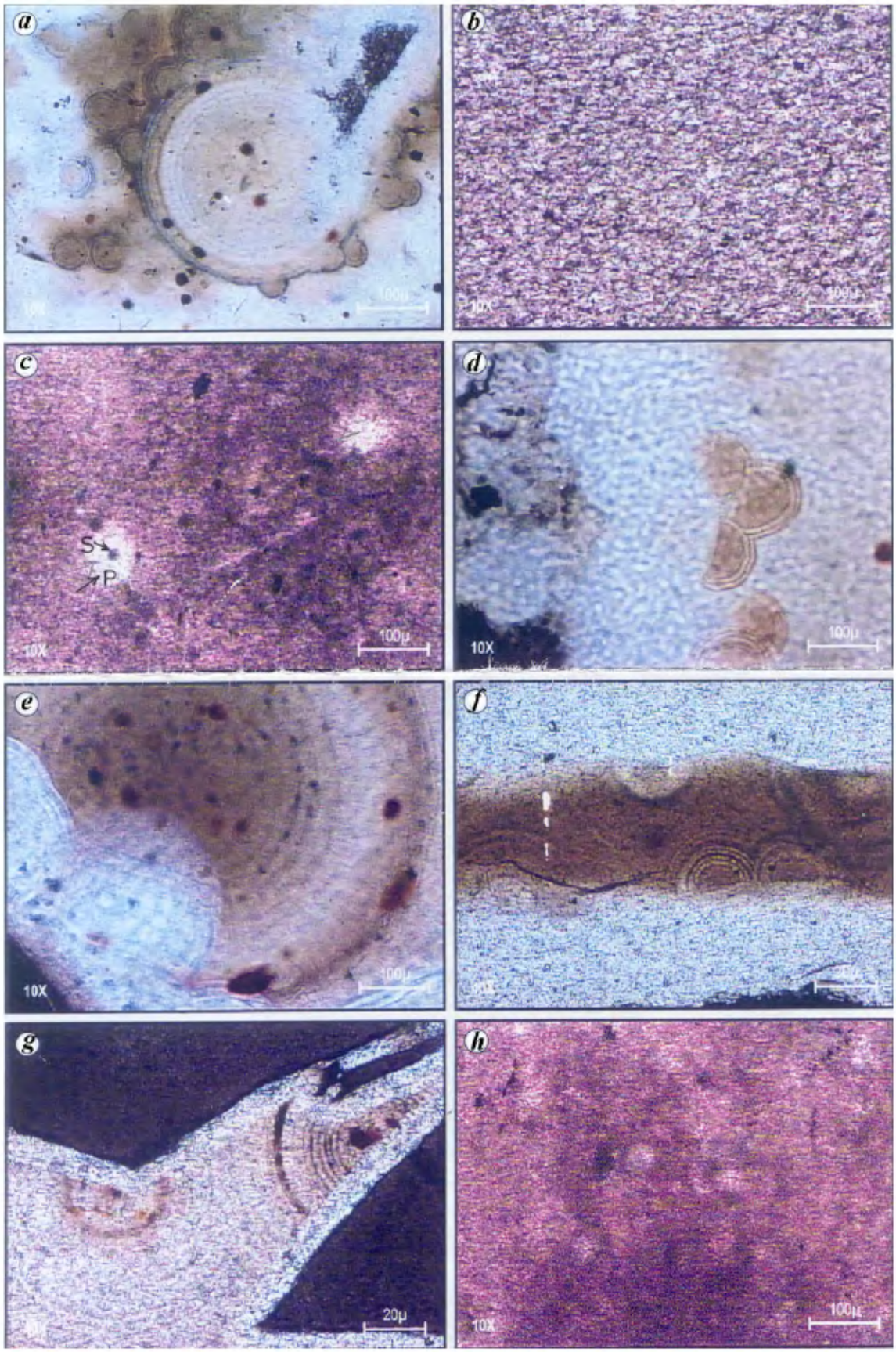

Figure 5. ***a***, Colony in transverse section. Note many juvenile forms; ***b***, Proximal surface of *L. zeerabadensis* in transverse section; ***c***, ***h***, Pores (P) and some spores (S); ***d***, ***f***, Juvenile colonies in transverse section; ***e***, ***g***, Individuals in transverse section showing deposition.

annosus also live as a parasites causing root rot in many trees and damaging them considerably[14]. The fossil species could have behaved in a similar way causing decay and death of the trees on which they thrived.

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MEETINGS/SYMPOSIA/SEMINARS

Symposium on Early Warning of Natural Hazards Using Space Technology

Date: 18–25 July 2004
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Using space technology various parameters related to land, ocean, vegetation, atmosphere and meteorology are being deduced on routine basis. These parameters have helped the scientific community to understand the physical processes related to earthquakes, volcanoes, landslides, subsidences, forest fire, cyclones, droughts, floods, snow avalanches and El Nino. Contributed papers related to use of space technology and multi sensors data for early Warning of Natural Hazards are invited for oral and poster presentation.

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Date: 14–21 October 2003
Place: Dehradun and New Delhi, India

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