



An report of wood decaying polypore mushrooms *Irpex lacteus* and *Ganoderma lingzhi* on *Leucaena latisiliqua* (River tamarind)

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Abstract

The present article reports the analysis of *Irpex lacteus* and *Ganoderma lingzhi* polypore mushroom species were described morphologically, ecological characters, illustrated and discussed based on collections from Naldurg, Osmanabad district of Maharashtra.

Keywords: mushroom, polyporales, college campus, Naldurg

Introduction

The Polyporales are an order of about 1800 species of fungi in the division Basidiomycota. Mushrooms are highly valued for their utilization as foods. Many species are saprotrophs and grow exclusively on standing dead wood, logs, and other woody debris. Polyporales is one of the most intensively studied clades of Fungi. According to MycoBank, there have been 577 taxonomic proposals in Polyporales from 2010 to 2017, including 42 new genera and one new family. Polyporales account for only about 1.5% of all known species of Fungi (Kirk *et al.* 2008) [3]. Mushrooms are a good source of bioactive components, minerals and have been traditionally consumed across the globe for maintaining health. Mushrooms can be defined as macrofungi having hypogeous or epigeous distinctive fruiting bodies, which can be seen with the unaided eye and to be picked by hand (Chang and Miles, 1992). According to Hawksworth (1912) at present there are approximate 3 million fungi of which only 140,000 species produce fruiting bodies of sufficient size and suitable structure to be considered as mushrooms. Gilled mushrooms are a morphologically visible and not a taxonomically clear group and hence they belong to several orders of the Class Agaricomycetes of the Phylum Basidiomycota (Farook *et al.*, 2013). Mushroom offers to proteins, sugars, glycogen, lipid, vitamins, amino acids and crude fiber, mushrooms possess some essential mineral nutrients which are considered as key factors for the normal functioning of the body (Gbolagade, 2006; Kalac, 2011). Therefore in the present article two species *Irpex lacteus* and *Ganoderma lingzhi* are reported on *Leucaena latisiliqua* (River tamarind) from Deccan Plateau Zone of India i.e. Naldurg, Osmanabad district of Marathwada region in Maharashtra, India.

Materials and methods

Study site

Study sites college campus, Naldurg comes under the Deccan Plateau Zone of India in Osmanabad district of Marathwada region in Maharashtra state. It has an average elevation of 566 meters (1856 feet). The study site is located

at 17.49°N Latitude, 76.16°E Longitude, with an altitude of 509 m. This area lacks natural resources and is prone to drought, rocky and dry with low and uncertain rainfall, therefore the objectives of this study was to ascertain the status of macro fungi.

Collection and identification

Photographs were taken in their natural habitat using Sony Steady Shot DSC-W310 digital camera, geographical ranges were recorded using GPS system and describes its morphological characters and collected and brought to laboratory for further analysis. Morphological, physiological, and genetic characters for each family were compiled from the monographic treatments of Ryvarden & Melo (2014) [6]. The collected mushroom samples were identified by studying its habitat and various morphological characteristics prior to preservation as described by Roy & De (1996) [5] and with the help of standard manuals (Das & Sharma, 2005; Das, 2009; Philips, 2006) [2, 1]. Collected macro fungal specimens were systematically analyzed and identified previous literature and standard taxonomic methodology (Singer, 1986; Pegler *et al.*, 1998) and macro & microscopic morphological examination of tissues was made from free hand sections rejuvenated in 10% KOH and stained with 5% trypan blue and examination was made directly using the binocular research microscope 400X (Lawrence and Mayo LM-52-3521). Scientific names were authenticated and confirmed according to index fungorum database (www.indexfungorum.org), mycobank (www.mycobank.org). Preservation of the specimens of macro fungi (ASCNM-3 and ASCNM-4) were done in 4% formaldehyde solution (v/v) and deposited at department of Botany, Arts, Science and Commerce College Naldurg, district Osmanabad, Maharashtra.

Results and discussion

Taxonomic description (Fig.1)

Irpex lacteus (Fr.) Fr. = *Polyporus tulipiferae* (Schw.) Overh.

Irpex lacteus, a wood-decaying basidiomycete, was observed from decaying wood of *Leucaena latisiliqua*. It is

a crust fungus distributed throughout temperate areas of the world. It is the type of the genus *Irpex*. It is considered a polypore White-rot fungi that are efficient lignin degraders responsible for its turnover in nature. Occurrence on wood substrate: Saprobic; on deadbranches of deciduous trees; year-round. Dimensions: Caps (when present) 1-4 cm wide. Upper surface: Growth entirely resupinate to effused-reflexed; caps (when present) whitish, drying yellowish; velvety hairy. Pore surface: White to cream, dingy yellow in age; tubes

Location

The study site is located at 17.49°N Latitude, 76.16°E Longitude, with an altitude of 477 m, temperature- 21.1 °C, college Campus and found in first week of September, 2022.

Ganoderma lingzhi Karst = *Boletus lucidus* (Curtis)

The fruiting body almost always has a stipe present, which is yellowish-brown to russet colored and 1.5 times the diameter of the cap. Context tissue (sterile tissue inside the fruiting body between the pileus crust and the initiation of the tubes) is pink-buff to cinnamon-buff and corky, showing concentric growth zones and no resinous or melanoid deposits. [citation needed] The hymenium displays 4–5 pores per millimetre. Chlamydospores are absent. Basidiospores are 8.2–12.1 µm (average 10.7 µm) long and 4.8–8.9 µm (average 7.1 µm) wide, with a spore shape index of 66.2.

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Fig 1: Wood decaying polypore mushrooms *Irpex lacteus* and *Ganoderma lingzhi* on *Leucaena latisiliqua*

In Chinese, the name lingzhi represents a combination of spiritual potency and essence of immortality, and is regarded as the “herb of spiritual potency,” symbolizing success, well-being, divine power, and longevity. Among cultivated mushrooms, *G. lucidum* is unique in that its pharmaceutical rather than nutritional value is paramount. A variety of commercial *G. lucidum* products are available in various forms, such as powders, dietary supplements, and tea. These are produced from different parts of the

mushroom, including mycelia, spores, and fruit body. The specific applications and attributed health benefits of lingzhi include control of blood. The book, which has been continually updated and extended, describes the beneficial effects of several mushrooms with a reference to the medicinal mushroom *G. lucidum* (Zhu, 1998; Upton 2000; Sanodiya *et al.* 2009) [13, 9, 7]. Nevertheless, the *Ganoderma* species continue to be a popular traditional medicine in Asia and their use is growing throughout the world (Wachtel-

Galor, Buswell *et al.* 2004; Lindequist, Niedermeyer, and Jülich 2005)^[10,4]. *Ganoderma* species are found all over the world, and different characteristics, such as shape and color (red, black, blue/green, white, yellow, and purple) of the fruit body, host specificity, and geographical origin, are used to identify individual members of the species (Zhao and Zhang 1994; Woo *et al.* 1999)^[12, 11]. In a study of the nonvolatile components of *G. lucidum*, it was found that the mushroom contains 1.8% ash, 26–28% carbohydrate, 3–5% crude fat, 59% crude fiber, and 7–8% crude protein (Mau, Lin, and Chen 2001). Tomasi *et al.* (2004)^[8] tested 58 basidiomycetes mushrooms, of which *G. lucidum* was shown to be the most effective in killing cancer cells. *G. lucidum* induced cell-cycle arrest and apoptosis in various human and rodent tumor cells.

Conclusion

Study concluded that the wild species mushrooms are edible and poisonous. Polyporales, large order of pore fungi within the phylum Basidiomycota. The order includes some polypores as well as many corticoid fungi and a few agarics. Many species within the order are saprotrophic and most of them are wood-rotters. Therefore accurate identification is needful. Thus these edible mushrooms produced natural bioactive compounds. Hence cultivation is essential of these polypore mushroom by using agro waste materials in further studies.

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