

Economically important wild edible mushrooms of Bonai Forest Division, Odisha, India

Abstract

Bonai Forest Division is rich in flora and faunal species. The fertile forest-dominated areas provide a good platform for growing wild mushrooms. The locals collect them for food, medicine, and economic purposes. Addressing the economic value of wild mushrooms will provide a platform for value addition and management of forest & wildlife in Bonai Forest Division, Odisha. Considering the importance of wild mushrooms in the day-to-day lives of tribal communities of the division, an attempt has been made to enumerate the mushrooms having economic values. A survey was carried out during 2021-2022 in 7 ranges. 15 wild mushrooms were identified as having economic value. Rugda mushrooms are the most popular of the 15, and can be sold for up to Rs. 1800 per kg. The present study brings attention to the urgent need for value additions to these mushrooms for the sustainable development of the local communities.

Keywords: Communities, Livelihood, Mushroom, Conservation, Sustainability

Introduction

Non-Timber Forest Produces (NTFPs) provide a significant source of income for millions of tribal people worldwide, particularly in communities isolated within forests and in peripheral areas. Hence, now the whole world is paying attention to the value addition and promotion of sustainable uses of NTFPs [1,2]. For the communities attached to the forest, it is one of the major sources of income, providing food, shelter, medicine, fibers etc [3,4]. Some major NTFPs found in the Bonai Forest Division include Mahula (*Madhuca longifolia*), Jhuna (Gum of *Shorea robusta*), Kurkuti (Red Weaver Ant), Tadi (country liquor made from the stem juice of *Phoenix sylvestris*), wild fruits like Kendu (*Diospyros melanoxylon*), Jamun (*Syzygium cumini*), Khajuri (*Phoenix sylvestris*), some medicinal plants like *Cissampelos pareira* (Mudika), *Rauwolfia serpentina* (Patalgaruda), *Andrographis paniculata* (Bhuin neem) etc, wild mushrooms, leafy vegetables etc [5]. Among these, mushrooms have long been used as a valuable food source, collected by the tribals during the monsoon (Plate 1-2). The edible mushrooms found in the forest of Bonai Forest Division have medicinal, economic, and ecological importance. These wild edible mushrooms are high in protein and play an important role in tribal dietary supplements. They are also used to sell these mushrooms and increase their economy. Diverse mushroom species were seen being sold in different local markets in Bonai Forest Division, contributing a significant aspect to improving their livelihood. Therefore, an attempt has been made to document the economically important wild edible mushrooms collected by different communities in Bonai Forest Division, Odisha, India for the purpose of promoting the sustainable use of these valuable food resources in the process of economic development of the nation.

Methodology

The survey work was carried out from 2021 to 2022 in Bonai Forest Division, Odisha, India. Bonai Forest Division is located between 21° 39' 8" N 85° 30' 23" E towards the North-Western

boundary of Sundargarh district of the state [6]. The authors visited different local markets, state highways, district roads, village roads, and tribal villages to collect information regarding wild edible mushrooms and their economic values from the sellers, villagers, and local communities. The mushrooms are identified using the available literature [6-11]. The local name(s) of enumerated wild mushrooms were noted and presented.

Results and discussion

A total of 15 mushrooms belonging to 8 families are tabulated as having economic importance in the Bonai Forest Division, Odisha (Plate 3). The most commonly found species are *Amanita caesarea*, *Amanita egregia*, *Russula rosea*, *Termitomyces medius*, *Termitomyces microcarpus*, *Volvariella volvacea* etc. Details are listed in Table 1. Different types of *Russula* spp. are seen being sold in the local market, commonly known as Patra chatu and sold at 10 rupees per leaf plate, followed by *Termitomyces species* and *Amanita* species. *Astraeus hygrometricus*, commonly known as Rugda mushrooms, are sold at a high price, ranging from 400 rupees to 1800 rupees per kg. It is the most common and highly valuable mushroom found in sal forests, with a higher protein content than other mushrooms. It is also rich in vitamins and minerals. It is very beneficial for heart patients, to reduce blood pressure and diabetes (Plate 4; Present study). It was also observed that sometimes in free time or on the day of the local nearby weekly market, locals enter the nearby forest and collect the mushrooms for selling purposes (Plate 6). Hence, wild mushrooms in study areas also give quick petty cash. During the survey, another interesting wild edible mushroom was Sarbana chatu (*Termitomyces heimii*) which emerges 4-5 times as per the regional festivals time from June to October. It was noticed that, the cost range is Rs. 50-400 per kg. It is very popular and tasty. It is also noticed that, it has demand during the festivals.

Table 1: Enumerated mushrooms having economic values from the Bonai Forest Division, Odisha, India

Mushrooms	Family	Local name	Price (Per leaf plate)
<i>Amanita caesarea</i> (Plate 5)	Amanitaceae	Bhanu chatu	Rs. 20/-
<i>Amanita egregia</i>	Amanitaceae	Manda chatu	Rs.20/-
<i>Astraeus hygrometricus</i>	Diplocystaceae	Rugda	Rs. 30/- to Rs 40/- Rs.400 – 1800/-Per Kg.
<i>Boletus edulis</i>	Boletaceae	Jamu chatu	Rs.20/-
<i>Cantharellus cibarius</i>	Cantharellaceae	Genda phul	Rs.20/-
<i>Macrolepiota procera</i>	Agaricaceae	Khadada chatu	Rs.10/-
<i>Russula brevipes</i>	Russulaceae	Patra chatu	Rs.10/-
<i>Russula rosea</i>	Russulaceae	Patra chatu	Rs.10/-
<i>Russula vesca</i>	Russulaceae	Patra chatu	Rs.10/-
<i>Russula virescens</i>	Russulaceae	Patra chatu	Rs.10/-

<i>Russula xerampelina</i>	Russulaceae	Patra chatu	Rs.10/-
<i>Termitomyces heimii</i>	Lyophyllaceae	Benua chatu/ Srabana chatu	Rs. 50/- to Rs. 400/- Per Kg.
<i>Termitomyces medius</i>	Lyophyllaceae	Bada Bali chatu	Rs.20/-
<i>Termitomyces microcarpus</i>	Lyophyllaceae	Sana Bali chatu	Rs.20/-
<i>Volvariellavolvacea</i>	Pluteaceae	Pala chatu	Rs.10/-

Very fewer works have been worked on economically important mushrooms, but there are some reports available on wild edible mushrooms, their food and nutritional properties. Sachan et al. (2013) reported some Indigenous knowledge of ethnic tribes for utilization of wild mushrooms as food and medicine in Similipal Biosphere Reserve. A total of 14 species of fleshy mushrooms belonging to 8 genera and 6 families were reported. Some reported mushrooms are like *Russula emetic*, *Russula delica*, *Termitomyces eurhizus*, etc [7]. Panda et al. (2018) reported about 14 wild edible mushroom species belonging to 5 families from different locations and local markets of Mayurbhanj district, Odisha, like *Termitomyces eurhizus*, *Volvovella volvacea*, *Termitomyces heimi*, *Russula rosea*, *Russula albonigra*, *Russula brevipes*, *Amanita egergia* and *Astraeus hygrometricus*, regularly collected by the local people during the rainy season [8]. In 2019, Panda et al. reported a total of 20 wild edible mushroom species belonging under nine families from ten different places in three districts Mayurbhanj, Keonjhar and Balasore of Northern Odisha, India. Among them, the order Agaricales was dominant, showing maximum number of species and the genus *Russula* exhibited the maximum number of species followed by *Termitomyces* and *Amanita* [9]. Rout et al. (2020) studied the mushroom diversity in Dhenkanal district of Odisha and reported about 60 species of wild mushrooms belonging to 33 genera and 25 families among which 10 species are edible and consumed by local communities [10]. In 2021, Mishra et al. studied the wild mushroom diversity of Rairangpur Forest Division, Odisha, India and its medicinal uses and recorded 99 wild mushroom species belonging to 56 genera of 37 families. Among these 41 species were edible and 15 mushrooms were consumed by local and tribal communities in that study area. Family Agaricaceae and Polyphoraceae were reported the most dominant [11]. Kumar et al. (2022) reported 10 economically important mushrooms from the Mayurbhanj district, Odisha. The most common enumerated species were *Amanita caesarea*, *Amanita egregia*, *Russula rosea*, *Termitomyces microcarpus*, *Volvariellavolvacea* etc. These mushrooms are sold from Rs. 10 to Rs. 30 per leaf plate or bowl [12]. In 2013, Manna and Roy reported on the economic contribution of wild edible mushrooms to a forest fringe ethnic community in some eastern lateritic parts of India that the net value of revenue from wild edible mushrooms was estimated to be contributing 9.83 and 10.29 % of total annual income of a Santal family of the Choupahari and Gonpur forests [13]. Soni and Soni (2017) studied the diversity and economic value of medicinal mushrooms of Chhattisgarh and recorded medicinally important mushrooms, edible, non-edible and poisonous mushrooms [14]. In 2019, Verma reported some information on wild edible mushrooms collected from Sal forests of Dindori district, Madhya Pradesh by personal interviewing of rural folk or tribal people and

found commonly collected mushrooms from Sal forests like *Astraeus hygrometricus*, *Russula congoana*, *Termitomyces clypeatus*, *T. eurhizus*, *T. microcarpus* and *Termitomyces* sp. [15]. Kakraliya (2020) reports the economic importance, medicinal, pharmacological, nutritional and ecological values of some mushrooms [16]. In 2022, Sharma et al. studied the ethnomycology of wild edible and medicinal mushrooms in district Jammu, J&K (UT), India and reported 14 edible fleshy mushrooms with medicinal values. Some culturally important and frequently consumed species are *Termitomyces heimii*, *Termitomyces clypeatus*, and *Termitomyces striatus* var. *annulatus* [17]. Imtiaj and Rahman (2008) documented a note on the economic viability of mushrooms cultivation to poverty reduction in Bangladesh [18]. In 2021, Qwarse et al. reported some wild mushroom species used by the local communities in the Selous-Niassa corridor in Namtumbo district, Ruvuma region, Tanzania, and documented a total of 32 edible and inedible wild mushroom species belonging to thirteen genera and eleven families. Among these wild mushrooms, 34.38% were edible, 25% were medicinal and edible, 31.25% did not have known uses, 6.25% were medicinal only and 3.12% were poisonous [19].

Conclusion

The present study concludes that about 15 wild mushrooms are available in Bonai Forest Division, Odisha having economic value. These enumerated mushrooms should be taken for their value addition and further research work. They could provide a livelihood to the local communities in a sustainable manner. They might be helpful in improving their lifestyle and health. Therefore, a long-term plan is needed to achieve the balanced activities of NTFP collection and biodiversity conservation in Bonai Forest Division, Odisha, India.

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Plate 1: Some common mushroom of Bonai Forest Division, A) *Amanita egregia*, B) *Amanita caesarea*, C) *Termitomyces microcarpus*, D) *Astraeus hygrometricus*, E) *Russula rosea*

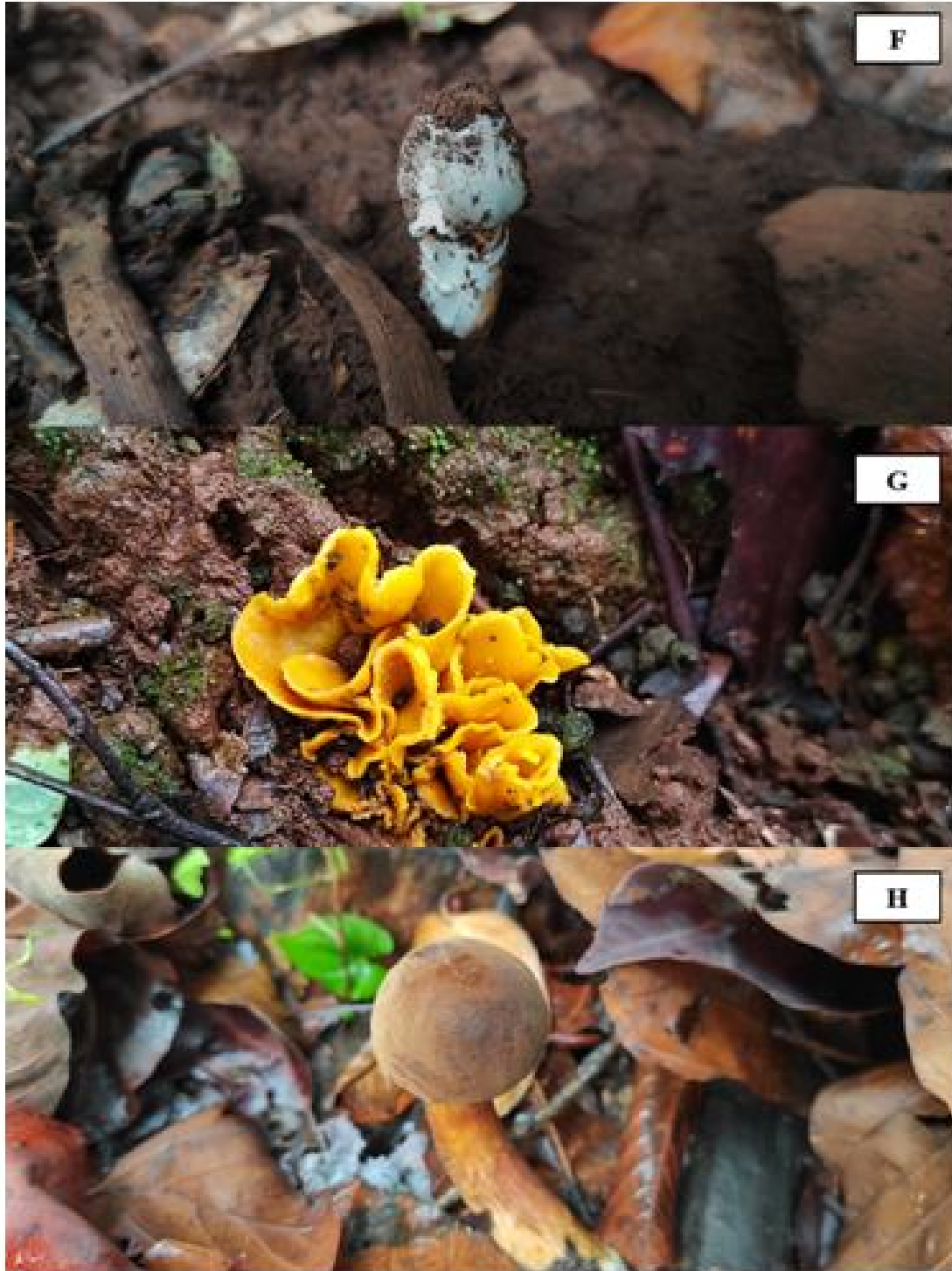


Plate 2: Some common mushrooms of Bonai Forest Division, F) *Termitomyces heimii*, G) *Cantharellus cibarius*, H) *Boletus edulis*



Plate 3: Wild mushrooms as a source of livelihood in Bonai Forest Division, Odisha, India



Plate 4: Survey works and collection of information on food, medicinal and economic values in Bonai Forest Division, Odisha, India

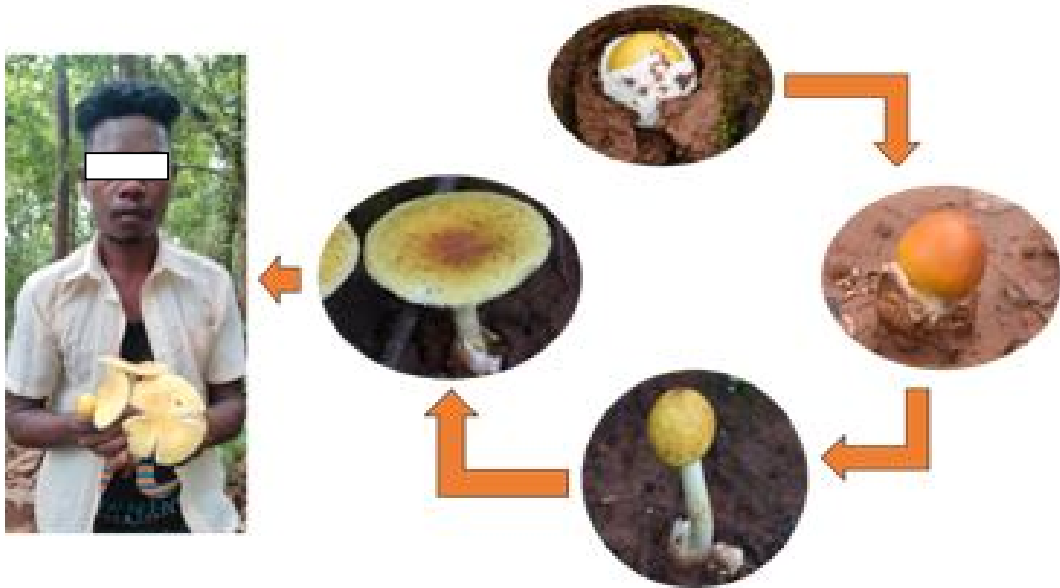


Plate 5: Life cycle of *Amanita caesarea* and collected by forest watchers



Plate 6: Collected wild mushrooms by local for selling purposes