

Economically important wild 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 environment~~ for ~~the growth of~~ wild mushrooms. The locals collect them for food, medicine, and economic purposes. Addressing the economic value of wild mushrooms will provide a base 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 ~~that have~~ing 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 Products (NTFPs) provide a significant source of livelihood to millions of tribal people across the globe, particularly the communities inhabited inside the forests and 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*), Red Weaver Ant (Kurkuti), 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*, *Rauwolfia serpentina*, *Andrographis paniculata* etc, wild mushrooms, leafy vegetables etc [5]. Among these, mushrooms have long been used as a valuable food source, collected by the tribals during 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 incomes~~. 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 ~~and~~ in the process ~~improve the 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~~ were identified using the available literature [6-11].

Results

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*, *Russularosea*, *Termitomyces medius*, *Termitomyces microcarpus*, *Volvariella volvacea* etc. Details are listed in Table 1. Different types of *Russula* spp. are seen being sold in local market, commonly known as Patrachatu 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 higher 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 species 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.

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	Bhanuchatu	Rs. 20/-
<i>Amanita egregia</i>	Amanitaceae	Mandachatu	Rs.20/-
<i>Astraeus hygrometricus</i>	Diplocystaceae	Rugda	Rs. 30/- to Rs 40/- Rs.400 – 1800/-Per Kg.
<i>Boletus edulis</i>	Boletaceae	Jamuchatu	Rs.20/-
<i>Gomphus</i> Spp.	Gomphaceae	Gendaphul	Rs.20/-
<i>Macrolepiotaprocera</i>	Agaricaceae	Khadadachatu	Rs.10/-
<i>Russula brevipes</i>	Russulaceae	Patrachatu	Rs.10/-
<i>Russularosea</i>	Russulaceae	Patrachatu	Rs.10/-
<i>Russulavesca</i>	Russulaceae	Patrachatu	Rs.10/-
<i>Russula virescens</i>	Russulaceae	Patrachatu	Rs.10/-
<i>Russula xerampelina</i>	Russulaceae	Patrachatu	Rs.10/-
<i>Termitomyces heimii</i>	Lyophyllaceae	Benuachatu/ Srabanachatu	Rs.20/-

<i>Termitomycesmedius</i>	Lyophyllaceae	Bali chatu	Rs.20/-
<i>Termitomycesmicrocarpus</i>	Lyophyllaceae	Bali chatu	Rs.20/-
<i>Volvariellavolvacea</i>	Pluteaceae	Pala chatu	Rs.10/-

[Source](#)

Discussion

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*, *Volvariella 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 Polyporaceae 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 egergia*, *Russula rosea*, *Termitomyces microcarpus*, *Volvariella volvacea* 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 Chattishgarh 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 *Termitomycesheimii*, *Termitomycesclypeatus*, and *Termitomycesstriatus* 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~~ [found](#) in Bonai Forest Division, Odisha having economic value. These enumerated mushrooms should be taken for their value addition and further research works. They could provide a livelihood to the local communities in a sustainable manner. They might be helpful to improve 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.

References

1. Chamberlain J, Bush R and Hammett A (1998). Non-timber forest products: The other forest products. *Forest Products Journal*. 48(10):10-19.
2. Pandey AK, Tripathi YC and Kumar A. (2016). Non-Timber Forest Products (NTFPs) for sustained livelihood: challenges and strategies. *Research Journal of Forestry*. DOI: 10.3923/rjf.2016.
3. Vantomme P. (2003). Compiling statistics in Non- wood Forest Products as policy and decision-making tools at the national level. *International Forestry Reviews*. 5(2):156-160.
4. Saha D and Sundriyal RC. (2012). Extraction of non-timber forest products in humid tropics: consumption pattern, contribution to rural income and forest revenue. *Forest Policy and Economics* 14: 28-40.
5. Kumar SN, Mishra S, Marndi S, Kondaji P, Choudhury R and Kumar S. (2022). Tadi: a country liquor of Bonai Forest Division, Odisha, India. *Journal of Biodiversity and Conservation*. 6(1): 461- 463.
6. Kumar SN, Mishra S and Kumar S. (2021). Documentation of Indigenous Traditional Knowledge (ITK) on Commonly Available Plants in Koira Range, Bonai Forest Division, Sundargarh, Odisha, India. *Asian Plant Research Journal*. 8(4): 83-95.
7. Sachan SKS, Patra JK and Thatoi HN. (2013). Indigenous knowledge of ethnic tribes for utilization of wild mushrooms as food and medicine in Similipal biosphere reserve, Odisha, India. *International Journal of Agricultural Technology*. 9(2): 403-416.
8. Panda MK, Barik KL, Thatoi HN and Tayung K. (2018). Diversity of Wild Edible Mushrooms in Mayurbhanj District of Odisha, India. *Environment and Ecology*. 6(2). 219-225.

9. Panda MK, Thotai HN, Sahu SC and Tayung K. (2019). Wild edible mushrooms of Northern Odisha, India: data on distribution and utilization by ethnic communities. *Research Journal of Life Sciences, Bioinformatics, Pharmaceutical and Chemical Sciences*. 5(2): 248-268.
10. Rout Y, Behera F, Kumar S, Sahoo MP and Devi RS. (2020). Mushroom Diversity of Dhenkanal District, Odisha, India: Source of Alternative Foods and Medicines. *European Journal of Medicinal Plants*. 31(7): 33-41.
11. Mishra AK, Mishra S, Rathore S, Naik V, Patil S and Kumar S. (2021). Wild Mushroom Diversity of Rairangpur Forest Division, Odisha, India & Its Medicinal Uses. *European Journal of Medicinal Plants*. 32(9): 19-27.
12. Kumar S, Mishra S, Mishra AK and Marndi S. (2022). Economic Importance of Wild Mushrooms in Mayurbhanj District, Odisha, India. *Asian Journal of Biology*. 15(4): 20-25.
13. Manna S and Roy A. (2013). Economic contribution of wild edible mushrooms to a forest fringe ethnic community in some eastern lateritic parts of India. *Journal of Forestry Research*. DOI 10.1007/s10310-013-0411-4.
14. Soni I and Soni MY. (2017). Diversity and economic value of medicinal mushroom of Chhattisgarh. *Indian Journal of Scientific Research*. 13(2): 152-157.
15. Verma RK, Pandro V, Mishra SN, Raj D and Asaiya AJK. (2019). Sal Forest: A Source of Wild Edible Mushrooms for Livelihood Support to Tribal People of Dindori District, Madhya Pradesh, India. *International Journal of Current Microbiology and Applied Sciences*. 8(1): 563-575.
16. Kakraliya SS. (2020). Economic Importance of Mushroom and Their Uses. *Just Agriculture*. 1(3).
17. Sharma R, Sharma YP, Hashmi SAJ, Kumar S, Manhas RK. (2022). Ethnomycological study of wild edible and medicinal mushrooms in district Jammu, J&K (UT), India. *Journal of Ethnobiology and Ethnomedicine*. 18(1):23. doi: 10.1186/s13002-022-00521-z.
18. Intiaj A and Rahman SA. (2008). Economic viability of mushrooms cultivation to poverty reduction in Bangladesh. *Tropical and Subtropical Agroecosystems*. 8: 93-99.
19. Qwarse M, Moshi M, Mihale MJ, Marealle AI, Sempombe J and Mugoyela V. (2021). Knowledge on utilization of wild mushrooms by the local communities in the Selous-Niassa Corridor in Ruvuma Region, Tanzania. *Journal of Yeast and Fungal Research*. 12(1): 8-19.



Plate 1: Some common mushroom of Bonai Forest Division, A) *Amanita egregia*, B) *Amanita caesarea*, C) *Termitomycesmicrocarpus*, D) *Astraeushygrometricus*, E) *Russularosea*

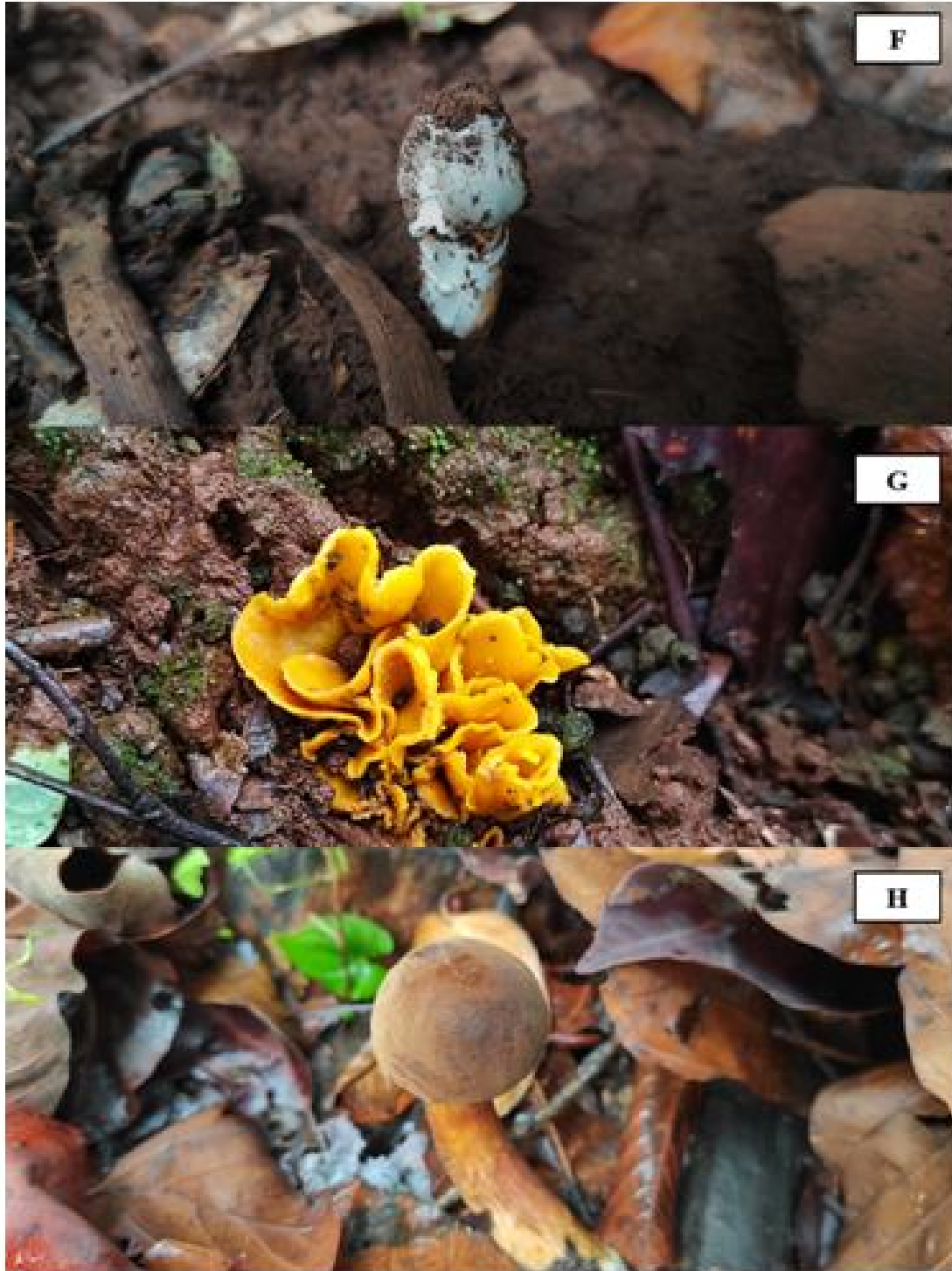


Plate 2: Some common mushrooms of Bonai Forest Division, F) *Termitomycesheimii*, G) *Gomphus*Spp., H) *Boletus edulis*



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

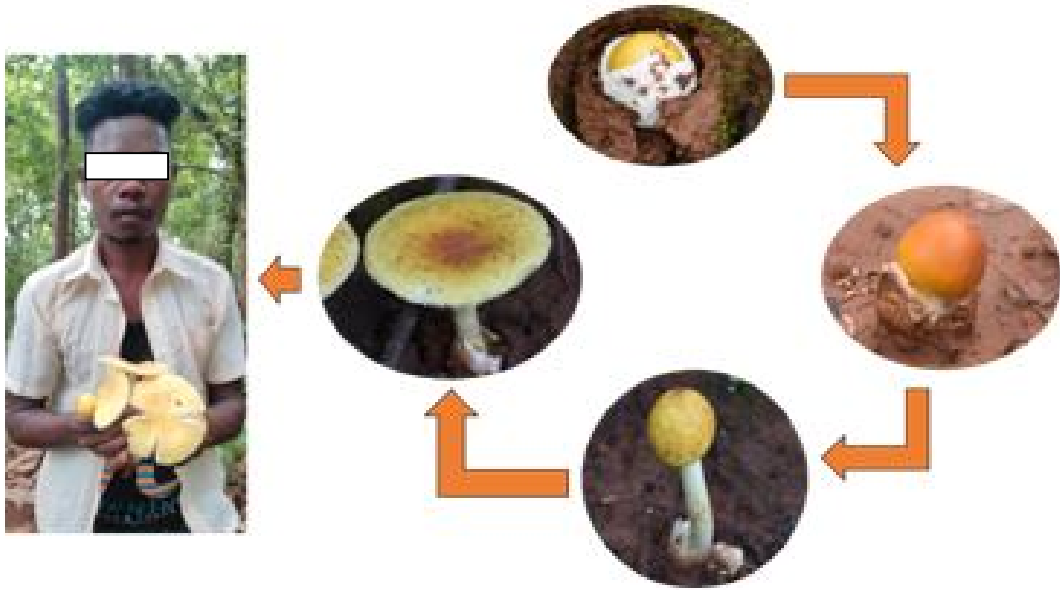


Plate 5: Life cycle of *Amanita caesarea* and collected by forest watchers



Plate 6: Collected wild mushrooms by local for selling purposes