



Economically Important Wild Edible Mushrooms of Bonai Forest Division, Odisha, India

Sanjeet Kumar ^{a*}, Arun Kumar Mishra ^b, Sanath Kumar N. ^c and Sweta Mishra ^d

^a *Ambika Prasad Research Foundation, Odisha, India.*

^b *Office of the Regional Chief Conservator of Forest (RCCF), Rourkela Circle, Rourkela, Odisha, India.*

^c *Office of the Divisional Forest Officer (DFO), Bonaigarh, Odisha, India.*

^d *Department of Life Sciences, Rama Devi Women's University, Bhubaneswar, Odisha, India.*

Authors' contributions

Each author contributed to the completion of this book. The final manuscript was examined and approved by all authors.

Article Information

DOI: 10.9734/AJOB/2022/v16i1294

Open Peer Review History:

This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: <https://www.sdiarticle5.com/review-history/92526>

Original Research Article

Received 13 August 2022
Accepted 04 October 2022
Published 10 October 2022

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.

1. 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), *Rauvolfia 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 forests 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. Additionally, they help boost the local economy by selling these mushrooms. In Bonai Forest Division, a variety of mushroom species were observed being sold in several local marketplaces, significantly enhancing their standard of living. Therefore, an attempt has been made to document the economically important wild edible mushrooms being 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.

2. 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]. To learn more about wild edible mushrooms and their economic worth from vendors, villagers, and local communities, the authors travelled to several local markets, state highways, district roads, village roads, and tribal settlements. Utilizing the available literature, mushrooms are

identified [6–11]. The local name(s) of enumerated wild mushrooms were noted and presented.

3. 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 markets, 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. 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 noted that sometimes, at free time or on the day of the weekly market, locals would explore the neighbouring forest and gather mushrooms to sell. (Plate 6). Wild mushrooms therefore also provide quick petty cash in study locations. Another noteworthy wild edible mushroom observed during the survey was Sarbana chatu (*Termitomyces heimii*), which blooms 4-5 times depending on the timing of local festivals from June to October. It was noted that the price per kg ranges from Rs. 50 to Rs. 400. It is delicious and very well-liked. It has been observed that there is a demand for it during the festivals. Additionally, it was shown that there is a greater diversity of wild mushrooms in areas without forest fires. Forest fire should be controlled in order to achieve the diversity of wild mushrooms. The leaf litters provide a platform for the development of wild mushrooms, which are also a source of food for many insects and maintain the balance of associations on the forest floor. Economically significant mushrooms have received very little scientific attention, but there are some reports available on the food and nutritional value of wild mushrooms. In the Similipal Biosphere Reserve, Sachan et al. (2013) described some indigenous knowledge of ethnic communities regarding the use of wild mushrooms as food and medicine. A total of 14 species of fleshy mushrooms belonging to 8 genera and 6 families were reported. Some reported mushrooms are

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 to 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*, *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 Chhattisgarh and recorded medicinally important mushrooms, edible, nonedible 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].

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>Volvariella volvacea</i>	Pluteaceae	Pala chatu	Rs.10/-



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

Intiaj 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].

4. CONCLUSION

According to the results of the present study, there are roughly 15 wild mushrooms of

economic viability in the Bonai Forest Division of Odisha. These listed mushrooms should be well taken for their added value and future research. They might sustainably offer local communities a means of subsistence. They could be useful in enhancing their way of life and health. Therefore, a long-term plan is needed to achieve the balanced situation of sustainable collection of these NTFPs and biodiversity conservation in Bonai Forest Division, Odisha, India.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Chamberlain J, Bush R, Hammett A. Non-timber forest products: The other forest products. *Forest Products Journal*. 1998;48(10):10-19.
2. Pandey AK, Tripathi YC, Kumar A. Non-Timber Forest Products (NTFPs) for sustained livelihood: challenges and strategies. *Research Journal of Forestry*; 2016. DOI: 10.3923/rjf.2016.
3. Vantomme P. Compiling statistics in non-wood forest products as policy and decision-making tools at the national level. *International Forestry Reviews*. 2003;5(2):156-160.
4. Saha D, Sundriyal RC. Extraction of non-timber forest products in humid tropics: consumption pattern, contribution to rural income and forest revenue. *Forest Policy and Economics*. 2012;14:28-40.
5. Kumar SN, Mishra S, Marndi S, Kondaji P, Choudhury R, Kumar S. Tadi: a country liquor of Bonai Forest Division, Odisha, India. *Journal of Biodiversity and Conservation*. 2022;6(1):461- 463.
6. Kumar SN, Mishra S, Kumar S. Documentation of Indigenous Traditional Knowledge (ITK) on commonly available plants in Koira Range, Bonai Forest Division, Sundargarh, Odisha, India. *Asian Plant Research Journal*. 2021;8(4):83-95.
7. Sachan SKS, Patra JK, Thatoi HN. 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*. 2013;9(2):403-416.
8. Panda MK, Barik KL, Thatoi HN, Tayung K. Diversity of wild edible mushrooms in Mayurbhanj District of Odisha, India. *Environment and Ecology*. 2018;6(2):219-225.
9. Panda MK, Thotai HN, Sahu SC and Tayung K. 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*. 2019;5(2):248-268.
10. Rout Y, Behera F, Kumar S, Sahoo MP, Devi RS. Mushroom diversity of Dhenkanal District, Odisha, India: source of alternative foods and medicines. *European Journal of Medicinal Plants*. 2020;31(7):33-41.
11. Mishra AK, Mishra S, Rathore S, Naik V, Patil S, Kumar S. Wild mushroom diversity of Rairangpur Forest Division, Odisha, India and its medicinal uses. *European Journal of Medicinal Plants*. 2021;32(9):19-27.
12. Kumar S, Mishra S, Mishra AK, Marndi S. Economic importance of wild mushrooms in Mayurbhanj District, Odisha, India. *Asian Journal of Biology*. 2022;15(4):20-25.
13. Manna S, Roy A. Economic contribution of wild edible mushrooms to a forest fringe ethnic community in some eastern lateritic parts of India. *Journal of Forestry Research*; 2013. DOI: 10.1007/s10310-013-0411-4.
14. Soni I, Soni MY. Diversity and economic value of medicinal mushroom of Chhattisgarh. *Indian Journal of Scientific Research*. 2017;13(2):152-157.
15. Verma RK, Pandro V, Mishra SN, Raj D, Asaiya AJK. 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*. 2019;8(1):563-575.
16. Kakraliya SS. Economic importance of mushroom and their uses. *Just Agriculture*. 2020;1(3).
17. Sharma R, Sharma YP, Hashmi SAJ, Kumar S, Manhas RK. Ethnomycological study of wild edible and medicinal mushrooms in district Jammu, J&K (UT), India. *Journal of Ethnobiology and Ethnomedicine*. 2022;18(1):23. DOI: 10.1186/s13002-022-00521-z.
18. Imtiaj A, Rahman SA. Economic viability of mushrooms cultivation to poverty reduction

- in Bangladesh. Tropical and Subtropical Agroecosystems. 2008;8:93-99.
19. Qwarse M, Moshi M, Mihale MJ, Marealle AI, Sempombe J, Mugoyela V. 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. 2021;12(1):8-19.

© 2022 Kumar et al.; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:

The peer review history for this paper can be accessed here:
<https://www.sdiarticle5.com/review-history/92526>