



Wild Edible Plant Diversity and its Ethno-medicinal use by Indigenous Tribes of Koraput, Odisha, India

Padhan Bandana and Panda Debabrata*

Department of Biodiversity and Conservation of Natural Resources, Central University of Orissa, Koraput-764 021, Odisha, INDIA

Available online at: www.isca.in, www.isca.me

Received 9nd August 2015, revised 30th September 2015, accepted 5th October 2015

Abstract

The present study documented the ethnobotanical information about the wild edible plants and their importance towards food security of rural poor tribes of Koraput District, Odisha, India. Data are collected from 20 tribal villages belonging to seven tribal groups like Paroja, Bhumia, Gadaba, Bhatra, Saora, Gonda and Kondha of Koraput. A total of 122 plant species belonging to 94 genera and 56 families have been documented as wild edible plants, of which, the most utilized part is green leaves rank first 44 species, fruits, tubers or underground parts and flowers are 42, 29 and 7 species respectively. The plant part used for the medicinal purposes and the ailments related to the plant have also been recorded during the study.

Keywords: Biodiversity, ethno-medicines, traditional knowledge, wild edible plants.

Introduction

Wild edible plants are important parts of biodiversity and their exploitation has become a valuable livelihood strategy and fall back option for rural households during periods of nutritional stress¹. Food and nutritional security are key concerns the world over as low food intake and poor access to food in underdeveloped countries remain unresolved issues^{2,3}. Wild edible plants are available from natural habitat and used as sources of food which are neither cultivated nor domesticated⁴. Feeding in excess of 800 million undernourished people depends not only on increased productivity of the limited number of domesticated crops of the modern world but also the use of underutilized wild species⁵. The value of wild edible plants in food security has not been given sufficient attention⁶.

Odisha state is known as a genetic paradise for its diversity in plant genetic resources, notably the Koraput is one of the centres of diversity for many food crops and forest species⁷ and is also well known for its rich human cultural diversity⁸. Dietary habits of community in different regions of Koraput district are mainly determined by the local availability of foods and cultural practices. Utilization of locally available resources in their diet among the tribal community is distinctly reflected in their traditional food habits. The tribal people possess rich knowledge and wisdom regarding wild edible plants including their usage for treating common ailments such as diarrhea, dysentery, cold, malaria fever, vomiting, headache etc⁹. The Government of India has recently declared the Koraput region as an Agrobiodiversity Hotspot¹⁰. Historically, tribal and rural people identified and collected plants for food and medicine from forests and developed a range of processing methods in accordance with their needs. With modernization and settled

agriculture, this knowledge is becoming lost, a trend that may lead to decreased diversity of indigenous diets and poorer nutrition¹¹. The last five decades have witnessed a rapid decline in the genetic diversity of various crops and a depletion of forest species in the region¹². Site specific studies have recorded consumption of wild edibles by tribals and the rural poor in a few locations in India^{8,13}.

It is reported that very little work has been done in the ethnobotanical flora of the district and some sporadic reports^{7,3,14-16} from various sources are available. The rich tribal areas of South Odisha particularly Koraput have given less attention and wild edible plant species have not been systematically documented in the ethno medicinal aspect. The objective of the study is to make an ethno botanical inventory of wild edible plants and their uses by different tribal communities in the Koraput along with documenting the traditional knowledge regarding the ethno medicines. The study can provide a baseline data on the value of such locally produced food source, which may be helpful for prioritization of conservation through sustainable use and management of the resources.

Material and Methods

Study site, Observation and documentations: The study was conducted in Koraput district of Odisha state (18° 14' to 19° 14' N latitude and 82° 05' to 83° 25' E longitude) during 2013-15 (figure-1). Information on wild edible plants were collected from eighty respondents of diversified age groups of seven tribal communities viz. Paroja, Bhumia, Gadaba, Bhatra, Saora, Gonda and Kondha in twenty villages under five community development blocks (Boipariguda, Lakshmipur, Koraput, Jeypore and Kundra) of Koraput District. The data on

consumption of wild tubers, green leaves, fruits and flowers were collected through questionnaire, focus group discussions and personal interviews with traditional healers and knowledge holders. The plants were identified as per flora of Orissa and Botany of Bihar and Orissa¹⁷⁻¹⁸. The unidentified plants were

collected in polythene bags and taken into the laboratory for identification. Plant specimens were identified with the help from IMMT (RRL), Bhubaneswar Herbarium laboratory. The identified plants were arranged alphabetically with botanical name, local name and family and their medicinal importance.

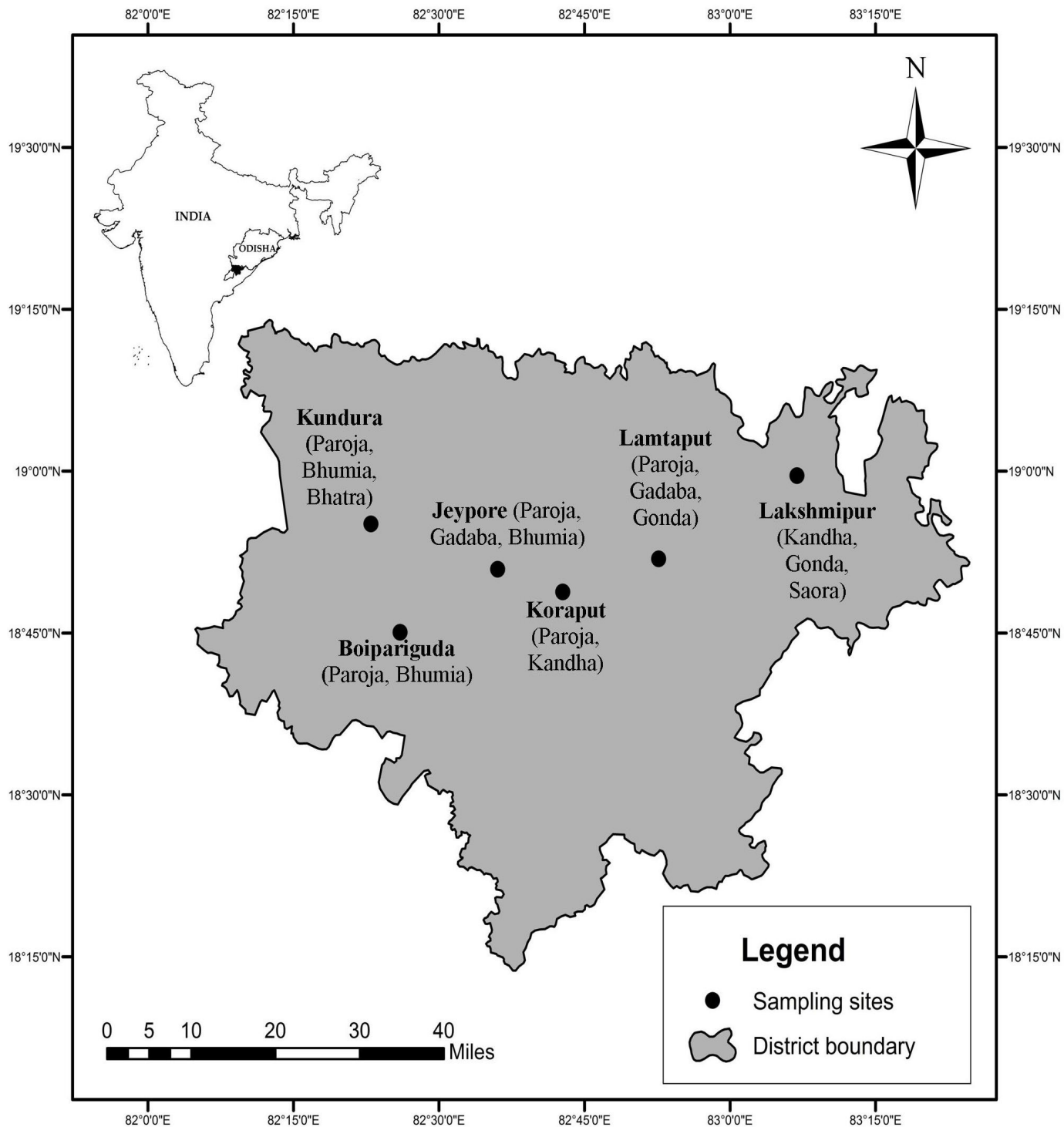


Figure-1
 Map of study site Koraput showing location of blocks surveyed

Results and Discussion

The present study showed that the tribal people of Koraput district have very good knowledge and wisdom on wild edible plants and their medicinal importance. A total of 122 plant species belonging to 94 genera and 56 families have been documented as wild edible plants in the study area. The data collected were grouped under three divisions, each having several sub divisions viz. Leafy vegetables, tuber or underground parts, fruits and flowers for explicit use. Of which green leaves rank first with 44 species and fruits, tubers or underground parts and flowers are 42, 29 and 7 species respectively. Most of the wild edibles are collected by the tribal people from nearby forest and most of the leafy vegetables are weeds in the agricultural fields. Wild edible tubers are mainly collected in winter season where as green leaves are mainly collected in rainy season and fruits and flowers are collected in winter and summer season. Consumption pattern of wild edible plants by the tribals of this district are presented in figure-2. Wild leafy vegetable species are most consumed by the tribals (36 %) compared to fruits (34 %), tuber (24 %) and flower (6 %). Among the 56 family the mostly utilizes species belongs to Amaranthaceae (8), and Dioscoreaceae (7).

corn, tuber, bulb and bulbils. The edible plant parts are mostly collected from the underground, washed properly, boiled, sliced, cooked and then eaten¹⁶. Some tubers are eaten raw just after collection and peeling the outer skin owing to its good taste. During the food scarcity or mainly in winter season the tribal people (male) collected the tubers from the nearest forest patches. The tender tuber of *Phoenix aculis* is eaten as raw and all the tubers are boiled and cooked as curry (table-1). The tuber of *Dioscorea pentaphylla* and *Dioscorea oppositifolia* are excellent yams and very popular for the taste among the tribal peoples. *Dioscorea alata*, *Manihot esculenta*, *Ipomoea batatas* are also cultivated by the tribals. The leafy vegetables are found as weed and are collected mainly in rainy season from the agricultural field or the open fields are presented in table-2. Most of the wild fruits are available during summer seasons (table-3). Seeds of *Schleichera oleosa*, *Azadirachta indica* and *Madhuca indica* are used for oil extraction and commercialized. Seven species of flowers are used by different tribal groups and are mainly used by cooking except *Woodfordia fruticosa* (table-4). The flowers of *Indigofera pulchella*, *Cordia oblique*, *Sesbania grandiflora* and *woodfordia fruticosa* are available during winter season and the flower of *Tamarindus indica*, *Madhuca indica* and *Azadirachta indica* are available in both winter and summer seasons.

The edible tubers are consumed as vegetable are root, rhizome,

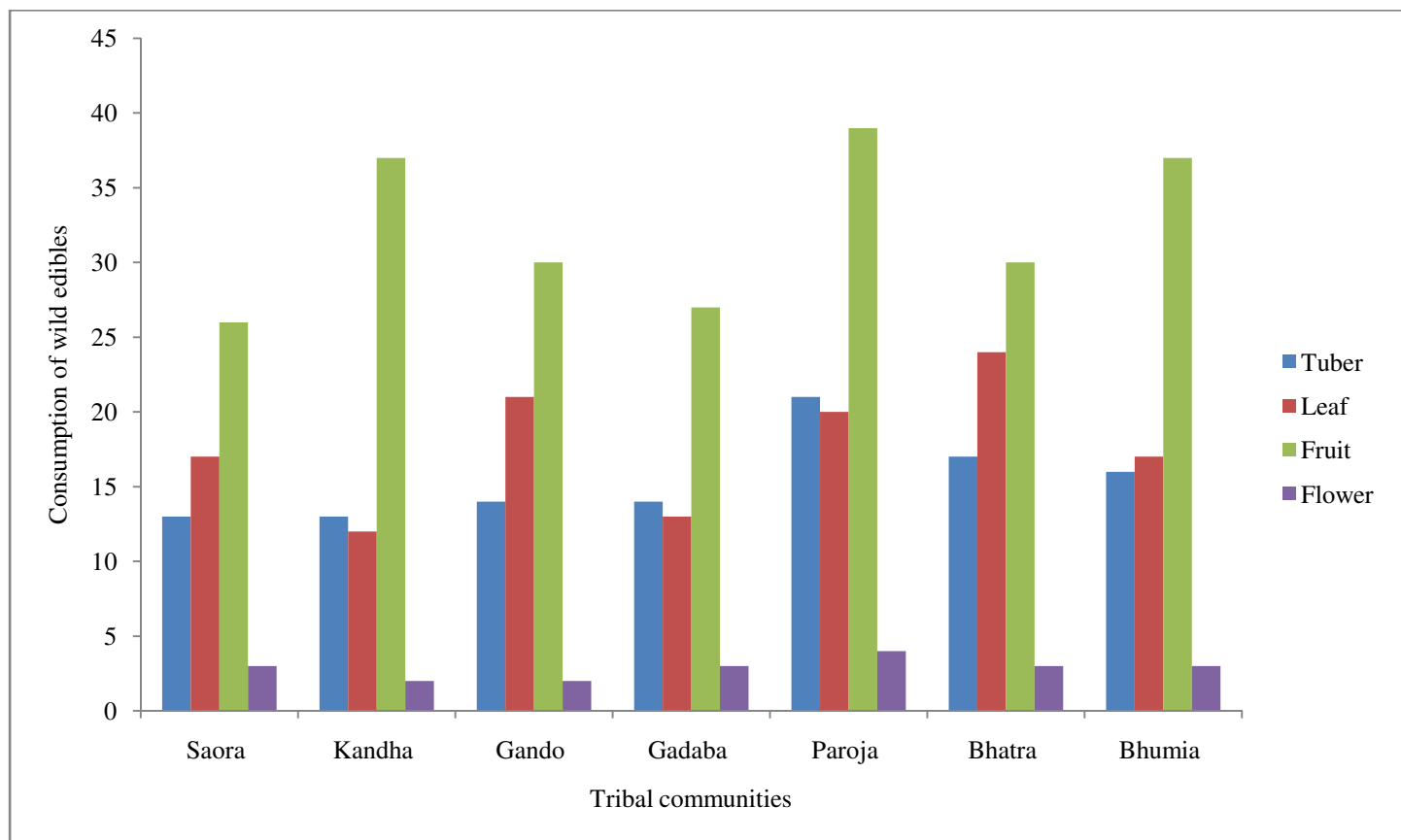


Figure-2
 Consumption pattern of wild edible plants by different tribal community of Koraput

Table-1
List of wild edible underground parts/tubers used by tribals of Koraput

Scientific Name	Local Name	Family	Medicinal importance
<i>Abelmoschus moschatus</i> Medik.	Bana bhendi	Malvaceae	Root paste is used for diarrhea and applied to the affected area of snake bite
<i>Alocasia macrorhiza</i> (L.) G. Don.	Mansaru	Araceae	Tuber paste is used for treatment of piles and constipation
<i>Amorphophallus paeoniifolius</i> (Dennst.) Nicolson	Olua kanda	Araceae	Tuber paste is applied for treatment of toothache
<i>Arisaema tortuosum</i> (Wall.) Schott	Olua kanda	Araceae	The tubers have insecticidal properties
<i>Asparagus racemosus</i> Willd.	Satbari	Liliaceae	Paste of fresh tuber is used for increase lactation in nursing women and treatment of stomach disorder
<i>Colocasia esculenta</i> (L.) Schott	Saru	Araceae	Tuber paste is applied to the affected area of scorpion sting
<i>Cheilocostus speciosus</i> (J. Koenig) C.D. Specht	Kau Kanda	Zingiberaceae	Tuber paste is applied to the affected area of snake bite, and eaten during diarrhea, vomiting and constipation
<i>Curculigo orchioides</i> Gaertn.	Talmuli	Hypoxidaceae	In case of scorpion bite, the paste of tuber is applied on the affected part and also for anemia, stomach disorder and dysentery
<i>Curcuma angustifolia</i> Roxb.	Palua kanda	Zingiberaceae	Tuber powder is drink with water during diarrhea, indigestion and stomach disorder
<i>Cyperus ochraceus</i> Vahl.	Maisadeti Kanda	Cyperaceae	Root juice is used during nose bleeding
<i>Dioscorea tomentosa</i> J. Koenig. Ex Spreng.	Targai Kanda	Dioscoreaceae	Use as tonic for strengthening the body
<i>Dioscorea bulbifera</i> L.	Pita Kanda	Dioscoreaceae	Powder is used to kill the hair lice, piles and dysentery
<i>Dioscorea hamiltonii</i> Hook. f.	Sika Kanda	Dioscoreaceae	Stomach ache and piles
<i>Dioscorea hispida</i> Dennst.	Kulia kanda	Dioscoreaceae	Tubers are roasted, pounded and its paste is applied on wounds and injuries
<i>Dioscorea oppositifolia</i> L.	Pit Kanda	Dioscoreaceae	Used as excellent food tonic and tuber paste are used in treatment of swelling, scorpion and Snake bites
<i>Dioscorea pentaphylla</i> L.	Soronda kanda	Dioscoreaceae	Joint pain, stomach pain and rheumatism
<i>Dioscorea wallichii</i> Hook.f.	Cherenga Kanda	Dioscoreaceae	Stomach pain
<i>Hedychium coronarium</i> J. Koenig.	Ram kedar	Zingiberaceae	Anti-rheumatic, loose motion
<i>Hemidesmus indicus</i> (L.) R. Br. ex Schult.	Dudhamali kanda	Asclepiadaceae	Worm infection and eczema
<i>Ipomoea mauritiana</i> Jacq.	Bhuin kumda	Convolvulaceae	Skin disease, snake bite and fever
<i>Kaempferia galanga</i> L.	Adaphul kanda	Zingiberaceae	Indigestion, Skin disease, fever and malaria
<i>Leea indica</i> Merrill	Manabadakili kucha	Vitaceae	Diarrhea
<i>Maranta arundinacea</i> L.	Krishna Kanda	Marantaceae	Tuber juice is used for digestion, diarrhea and dysentery

Scientific Name	Local Name	Family	Medicinal importance
<i>Momordica dioica</i> Roxb. ex Willd.	Bana Kankad	Cucurbitaceae	Root paste is used for rheumatism, diarrhea and fever
<i>Nelumbo nucifera</i> Gaertn.	Padma kanda	Nymphaeaceae	Rhizome used as tonic and in the treatment of diarrhoea, dysentery and skin diseases
<i>Nymphaea pubescens</i> Willd.	Kain kanda	Nymphaeaceae	Blood dysentery, stomach pain and Diarrhea
<i>Phoenix acaulis</i> Roxb.	Sindi Kanda	Aracaceae	Tender roots are eaten for indigestion and mouth disease
<i>Smilax zeylanica</i> L.	Mutri kanda	Smilacaceae	Tuber paste with castor oil applied for skin disease
<i>Tacca leontopetaloides</i> (L.) Kuntze	Dhui kanda	Taccaceae	Paste of tuber is used to cure severe headache

Table-2
List of wild green leaves used by tribals of Koraput

Scientific Name	Local Name	Family	Medicinal Importance
<i>Achyranthes aspera</i> L.	Kukurjibi saga	Amaranthaceae	Asthma, skin disease and dog bite
<i>Aerva lanata</i> (L.) Juss.	Paunsia saga	Amaranthaceae	Dysentery
<i>Acacia sinuata</i> (Lour.) Merr.	Sikakai	Mimosaceae	Treatment for malarial fever
<i>Alternanthera philoxeroides</i> (Mart.) Griseb	Madaranga Saga	Amaranthaceae	Acute cough and intestinal worm
<i>Alternanthera sessilis</i> (L.) R.Br. ex Dc.	Paatru Saag	Amaranthaceae	Vomiting, diarrhea, dysentery, cough, snake bite and lactation
<i>Amaranthus spinosus</i> L.	Kanta bhaji saga	Amaranthaceae	Diarrhea and toothache.
<i>Amaranthus tricolor</i> L.	Lal bhaji saga	Amaranthaceae	Dysentery
<i>Amaranthus viridis</i> L.	Kut bhaji saga	Amaranthaceae	Good for pregnant lady
<i>Azadirachta indica</i> A. Juss.	Nema	Meliaceae	Worm infection, skin disease and snake bite
<i>Bambusa vulgaris</i> Schrad.	Kardi	Poaceae	Worm infection, constipation
<i>Basella alba</i> L.	Poi	Basellaceae	Skin diseases and as laxative in children and pregnant women
<i>Bauhinia purpurea</i> L.	Kailari sag	Fabaceae	Blood dysentery and piles
<i>Bauhinia variegata</i> L.	Kanchana sag	Fabaceae	Dysentery, skin disease and diarrhea
<i>Boerhavia diffusa</i> L.	Gada purni saga	Nyctaginaceae	Wound healing, skin disease and eye disease
<i>Cardiospermum grandiflorum</i>	Putputiya Saag	Spindaceae	Alleviate swelling and oedema
<i>Celastrus paniculatus</i> Willd.	Pengu sag	Celastraceae	Constipation and ear pain
<i>Celosia argentea</i> L.	Serili Saag	Amaranthaceae	Mouth disease
<i>Chenopodium album</i> L.	Bathua Saag	Chinopodiaceae	Fever

Scientific Name	Local Name	Family	Medicinal Importance
<i>Cissus quadrangularis</i> L.	Hadbhanga	Vitaceae	Bone fracture
<i>Cleome icosandra</i> L.	Hulhulia	Cleomaceae	Good for pregnant lady
<i>Cocculus hirsutus</i> (L.) Diels	Musani Saag	Menispermaceae	Anemic mother
<i>Commelina benghalensis</i> L.	Kena Saag	Commelinaceae	Skin disease, burnt and leprosy
<i>Cordia obliqua</i> Willd.	Bahal Saag	Boraginaceae	Cough and chronic fever
<i>Elephantopus scaber</i> L.	Mayurachendia saga	Asteraceae	Toothache
<i>Emilia sonchifolia</i> (L.) Dc.	Chelkani saga	Asteraceae	Good for pregnant lady
<i>Ficus religiosa</i> L.	Peepal	Moraceae	Toothache and prevent nose bleeding
<i>Hibiscus sabdariffa</i> L.	Kaunria saga	Malvaceae	Skin disease and mouth disease
<i>Ipomoea aquatica</i> Forsk.	Kolam Saag	Convolvulaceae	Good for lactating mother
<i>Leea indica</i> Merrill	Manabadakili kucha	Vitaceae	Diarrhea
<i>Leucas aspera</i> (Willd.) Spreng.	Bana gubi	Lamiaceae	Cough, fever and swelling
<i>Marsilea minuta</i> L.	Sunsunia	Marsileaceae	Sleeping
<i>Momordica charantia</i> L.	Kalara	Cucurbitaceae	Worm infection and skin disease
<i>Murraya koenigii</i> (L.) Spr.	Versunga	Rutaceae	Indigestion
<i>Paederia foetida</i> L.	Pasaruni	Rubiaceae	Worm infection and dysentery
<i>Momordica dioica</i> Roxb. ex Willd	Bana Kankad Kanda	Cucurbitaceae	Diarrhea, rheumatism and fever
<i>Physalis minima</i> L.	Tipali	Solanaceae	Urinary disorder
<i>Portulaca oleracea</i> L.	Nuni saga	Portulacaceae	Dysentery and Diarrhea
<i>Premna mollissima</i> Roth.	Putrani Saag	Verbenaceae	Menstrual disorder and wound
<i>Senna tora</i> (L) Roxb	Chakunda Saag	Caesalpinioideae	Skin disease, worm infection, asthma and piles
<i>Sida rhombifolia</i> L.	Chercher Saag	Malvaceae	Skin disease and rheumatism
<i>Tamarindus indica</i> L.	Tentuli	Caesalpinaceae	Piles, inflammation and indigestion
<i>Solanum nigrum</i> L.	Kakamachi	Solanaceae	Fever and pyorrhea
<i>Trianthema portulacastrum</i> L.	Puruni saga	Aizoaceae	Anemic mother
<i>Vitex negundo</i> L.	Neelgundi Saag	Lamiaceae	Fever

Table-3
List of the wild edible fruits used by tribals of Koraput

Scientific Name	Local Name	Family	Medicinal importance
<i>Annona reticulata</i> L.	Ramaphal	Annonaceae	Dysentery
<i>Annona squamosa</i> L.	Badhal	Annonaceae	Snake bite and wound
<i>Anthocephalus chinensis</i> (Lam.) A. Rich. ex Walp.	Kadam Phal	Rubiaceae	Mouth disorder and wounds
<i>Antidesma acidum</i> Retz.	Amati Koli	Phyllanthaceae	Mouth disorder
<i>Artocarpus lacucha</i> Lam.	Jeutha	Moraceae	Stomach disorder, headache and inflammation
<i>Atylosia scarabeoides</i> Benth.	Ban Kalath	Fabaceae	Anaemia
<i>Bambusa vulgaris</i> Schrad.	Bauns manji	Poaceae	Worm infection
<i>Bauhinia vahlii</i> Wight and Arn.	Sialia	Caesalpiniaceae	Loose motion and gastric problem
<i>Borassus flabellifer</i> L.	Tal	Arecaceae	Mouth disorder and constipation
<i>Bridelia retusa</i> Spr.	Katha/Kshira Koli	Euphorbiaceae	Diarrhea and pyorrhoea
<i>Buchanania lanzan</i> Spr.	Char koli	Anacardiaceae	Wound, headache, toothache, constipation and cough
<i>Carissa carandas</i> L.	Karanda koli	Apocynaceae	Stomachache and itches
<i>Carissa spinarum</i> L.	Khirkoli	Apocynaceae	Headache and stomachache
<i>Citrus grandis</i> (L.) Osbeck	Tabha	Rutaceae	Diarrhea, cold and cough
<i>Cordia macleodii</i> Hook.f.	Silati	Boraginaceae	Wound healing
<i>Dillenia aurea</i> Sim. Null	Karmata	Dilleniaceae	Food poisoning
<i>Diospyros malabarica</i> (Desr.) Kostel.	Mankada kendu	Ebenaceae	Blood dysentery and loose motion
<i>Diospyros melanoxylon</i> Roxb.	Kendu Phal	Ebenaceae	Rheumatoid arthritis and abdominal pain
<i>Ficus bengalensis</i> L.	Bara	Moraceae	Rheumatism, Diarrhea and dysentery
<i>Ficus hispida</i> L.f.	Dumari	Moraceae	Gastric and abdominal pain
<i>Ficus religiosa</i> L.	Pipala	Moraceae	Earache, toothache, wound and dog bite
<i>Gmelina arborea</i> L.	Ghamari Phal	Verbenaceae	Cold fever
<i>Limonia acidissima</i> L.	Kainth	Rutaceae	Loose motion, asthma and rat bite
<i>Madhuca indica</i> Gmel.	Mahua (Tola Manji)	Sapotaceae	Chest pain and oils are used for cold fever
<i>Manilkara hexandra</i> (Roxb.) Dubard	Kir koli	Sapotaceae	Mouth disorder
<i>Melothria heterophylla</i> Cogn.	Bana Tundri	Cucurbitaceae	Constipation
<i>Meyna spinosa</i> Roxb. Ex Link.	Mamagoa	Rubiaceae	Wound healing

Scientific Name	Local Name	Family	Medicinal importance
<i>Phyllanthus emblica</i> L.	Anal	Euphorbiaceae	Abdominal discomfort, acidity and worm infection
<i>Psidium guajava</i> L. Pomiferum L.	Jamba	Myrtaceae	Diarrhea, indigestion and gum problem
<i>Schleichera oleosa</i> (Lour.) Oken	kusum	Sapindaceae	Worm infection and oils are used for prevent hair lice
<i>Semecarpus anacardium</i> L. f.	Ban Bhalia	Anacardiaceae	Piles and cough
<i>Shorea robusta</i> Gaertn. F.	Sargi	Dipterocarpaceae	Diarrhea, dysentery and earache
<i>Smilax zeylanica</i> L.	Mutrimalar Koli	Smilacaceae	Urinary disorder
<i>Solanum torvum</i> L.	Bana baigan	Solanaceae	Cough and asthma
<i>Spondias pinnata</i> (L.F.) Kurz.	Ambada	Anacardiaceae	Vomiting, dysentery and Diarrhea
<i>Syzygium cumini</i> (L.) Skeels	Goli Jaam	Myrtaceae	Mouth disease
<i>Terminalia bellirica</i> (Gaertn.) Roxb.	Bahada	Combretaceae	Cold, cough and indigestion
<i>Terminalia chebula</i> Retz. and Willd	Harda	Combretaceae	Diarrhea, wound and cough
<i>Xylia xylocarpa</i> (Roxb.) Taub.	Tangeni	Mimosaceae	Vomiting and diarrhea
<i>Ziziphus mauritiana</i> Lam.	Barkoli	Rhamnaceae	Anemia and headache
<i>Ziziphus oenoplia</i> Mill.	Katuau Koli	Rhamnaceae	Stomach ache
<i>Ziziphus rugosa</i> Lam	Chun koli	Rhamnaceae	Malnutrition

Table-4
List of wild flowers used by tribals of Koraput

Scientific Name	Local Name	Family	Medicinal Importance
<i>Indigofera pulchella</i> Roxb.	Girli	Fabaceae	Good for anemic mother and roots are use for cough
<i>Madhuca indica</i> Gmel.	Mahul	Anacardiaceae	Constipation
<i>Azadirachta indica</i> A. Juss.	Nema	Meliaceae	Worm infection, skin disease and snake bite.
<i>Tamarindus indica</i> L.	Tentuli	Caesalpinaceae	Indigestion
<i>Cordia obliqua</i> Willd.	Bahal Saag	Boraginaceae	Constipation and dysentery
<i>Woodfordia fruticosa</i> (L.) Kurz	Rekai phul	Lythraceae	Cut wound and diarrhea
<i>Sesbania grandiflora</i> (L.) Poiret	Agasthi phul	Fabaceae	Mouth disorder and headache

In India, the tribal and rural people traditionally used about 9500 wild plants for various purposes such as medicine, food, fodder, fuel, fiber, essence, culture and other miscellaneous purposes¹⁶. Out of these, about 3900 wild plants are used as foods that are mostly consumed during emergency¹⁹. Consumption pattern of wild food plants depends mostly upon their availability in nature. It is established that most of the wild

food plants are rich in nutrients and vitamins¹⁹⁻²¹. Majority of the wild edible plant species are consumed by tribal and non-tribal poor people due to their poor economic condition and medicinally used against different disease¹⁶. In the present study ethno-medicinal properties of different wild edible plants were documented and these plants play an important role in the primary health treatment of the local inhabitants. Most of the

wild plant species used for medicinal aspects comes under family Discoraceae followed by Combretaceae and Rutaceae. The plants were used to treat many diseases like fever, dysentery, joint pain, asthma, stomach disorder, snake bite, skin disease, mouth disorder, indigestion, vomiting, cold and cough. The herbal medicines are taken orally along with different additives such warm water, common salt and milk. They use more than one plant species for a particular disease or disorder and prepared medicine are mostly administered orally. Diseases like Asthma, arthritis, eczema, skin disease, worm infection of children, stomach disorder snake bite, dog bite and mouth disease are some major diseases treated by the local traditional healers. In certain cases, dietary restriction was strictly observed during the treatment and for the pregnant lady. In this area, most of the medicines are prescribed in the form of decoction and paste or powder form. Disappearance of species due to habitat alteration, over exploitation, pollution, global climate change and invasion of exotic species is so fast that many valuable taxa may vanish even before they are identified and their scientific value is discovered. So, important medicinal plants need immediate conservation and to prevent the extinction of potentially valuable species.

Conclusion

The results of this study have revealed that traditional knowledge on the use of edible plants is still practiced by the tribal people in Koraput district, Odisha, India. The preservation of this knowledge is due to continued reliance on wild edible plants for consumption at times of food shortage and these species have the potential to become valuable staple foods and important alternatives to the usual food crops by many households. The tribal community in the Koraput district have the knowledge about the use of wild edible plants including their sustainable collection, mode of preparation and consumption. Thus public awareness and community based programmes need to be encouraged at all levels for *ex situ* and *in situ* conservation of such species of future potential to enhance the food security of tribal communities of Koraput.

Acknowledgements

The authors are grateful to the tribal informants and old age people of the villages of Koraput district. The authors are grateful to the Head, Department of Biodiversity and Conservation of Natural Resources for providing necessary facilities for the work.

References

1. Bell J., The Hidden Harvest. In Seedling, the quarterly newsletter of Genetic Resources Action, *International (GRAIN)*, 1995, www.grain.org, Accessed 9 October, (2007)
2. Andersen LT, Thilsted SH, Nielsen BB and Rangasamy S, Food and nutrient intakes among pregnant women in rural Tamil Nadu, South India, *Public Health Nutr*, **6**, 131–137 (2003)
3. Mahapatra A.K. and Panda P.C., Wild edible fruit diversity and its significance in the livelihood of indigenous tribals: Evidence from eastern India, *Food Security*, **4**, 219–234 (2012)
4. Pegu R., Gogoi J., Tamuli A.K. and Teron R., Ethnobotanical study of Wild Edible Plants in Poba Reserved Forest, Assam, India: Multiple Functions and Implications for Conservation, *Res. J. Agriculture and Forestry Sci.*, **1(3)**, 1-10 (2013)
5. Farooq S. and Azam F., Food security in the new Millennium -I: The role of agricultural biodiversity, *Pak J Biol Sci*, **5(12)**, 1345–1351 (2002)
6. Rasingam L., Ethnobotanical studies on the wild edible plants of Irula tribes of Pillur Valley, Coimbatore district, Tamil Nadu, India, *Asian Pac J Trop Biomed*, 1493-1497 (2012)
7. Mishra M.K., Panda A. and Sahu D., Survey of useful wetland plants of south Odisha, India, *Indian Indian j. tradit. knowl*, **11(4)**, 658-666 (2012)
8. Mishra S., Swain S., Chaudhury S.S. and Ray T., Wild edible tubers (*Dioscorea* spp.) and their contribution to the food security of tribes of Jeypore tract, Orissa, India, *Plant Genet Resour Newsl*, **156**, 63-67 (2008)
9. Swain S. and Mohapatra G.C., Multiple usages of forest trees by the tribes of Kalahandi District, Orissa, India, *Int. J. Biodivers. Conserv*, **5(6)**, 333-341 (2013)
10. Mishra S. and Chaudhury S.S., Ethnobotanical flora used by four major tribes of Koraput, Odisha, India, *Genet. Resour. Crop Evol*, **59**, 793–804 (2012)
11. Dwebe T.P. and Mearns M.A., Conserving indigenous knowledge as the key to the current and future use of traditional vegetables, *Int J Inf Manage*, (2011)
12. Nayar MP, Singh AK and Nair KN, Agrobiodiversity hotspots in India. Conservation and benefit sharing, PPV and FR Authority, New Delhi, vol **II**, p 217 (2009)
13. Sundriyal M., Sundriyal R.C. and Sharma E., Dietary use of wild plant resources in the Sikkim Himalaya, India, *Econ. Bot*, **58(4)**, 626–638 (2004)
14. Das P.K. and Mishra M.K., Some medicinal plants used by the tribals of Deomali and adjacent areas of Koraput district, Orissa, *Indian J. Fores*, **10**, 301–303 (1987)
15. Mishra S. and Mishra M.K., Leafy Vegetable Plants of South Odisha, India, *Int. j. res. agric. food sci*, **3(4)**, 131-137 (2013)
16. Mishra S. and Mishra M.K., Ethno-botanical study of plants with edible underground parts of south Odisha, India, *Int. j. res. agric. food sci*, **4(2)**, 51-58 (2014)

17. Saxena H. O. and Brahmam M., The Flora of Orissa, Orissa Forest Development Corporation Ltd. and Regional Research Laboratory, Bhubaneswar, , vol **IV**, (1994-1996)
18. Haines H. H., The botany of Bihar and Odisha, Calcutta: Sri Gauranga Press; Vol. **I-III**, (1961)
19. Jain A.K. and Tiwari P., Nutritional value of some traditional edible plants used by the tribal communities during emergency with reference to central India, *Indian j. tradit. knowl*, **11**, 51-57 (2012)
20. Thakur A., Naqvi S.M.A., Aske D.K. and Sainkhediya J., Study of some Ethno Medicinal Plants used by Tribals of Alirajpur, Madhya Pradesh, India, *Res. J. Agriculture and Forestry Sci*, **2(4)**, 9-12 (2014)
21. Alam A., Ethno Medicinal Exploration of Wetland Plants of Champaran (E), *Res. J. Agriculture and Forestry Sci*, **2(10)**, 8-10 (2014)
22. Somen C.K., Rakesh R.R. and Roby T.J., Distribution, Population Status and Conservation of *Inga cynometroides* (Bedd.) Bedd.ex Baker; a Critically Endangered Tree Species from Kerala part of Western Ghats, India, *Res. J. Agriculture and Forestry Sci*, **2(4)**, 13-18 (2014)
- 23.