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Documentation of traditional knowledge on edible wild plants of forests in Burdwan district, West Bengal (India)

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Abstract

Due to population overgrowth and increase in demand for various products of natural resources, destruction has escalated to a great extent. Since early times, man had been using plants from natural habitats to meet his subsistence needs. Although the use of medicinal plants is well known the knowledge concerning edible wild plants is much limited. A scientific study of edible wild plants is important for pin pointing the potential sources which could be even utilized at the time of scarcity and cultivated as well as a source of food for the growing population. In view of this, the present work was undertaken which documents as many as 76 plant species belonging to 70 genera and 50 families.

Keywords: Wild edible plants, potential sources, scarcity, increasing population

1. Introduction

Earth is a treasure house of innumerable plant species of which, only about 3,000 species are used as agricultural crops and only 150 species of them are under large scale cultivation. Now-a-days there is a high tide for development of genetically improved and high yielding varieties of these plant species in order to meet the needs with respect to overgrowth of human population and this fact is forcing scientists to address the issues of food security for future generations by developing new crops from the edible wild species in use among the indigenous communities all over the world. India is one of the mega-diversity nations of the world and rated as the top 12th Global Biodiversity Hotspots by IUCN and recognized as one of the 200 eco-regions of the Globe (Tag *et al.*, 2014) [18]. Historically, wild plants and animals were sole dietary components for forage culturers and still remain a key to many agricultural communities. Provision of and access to these sources of food may be declining as natural habitats come under increasing pressure from development, conservation-exclusions and agricultural expansion. Despite their value, wild foods are excluded from official statistics on economic value of natural resources (Bharucha & Pretty, 2010) [3]. There are about 450 tribal communities in all over India (Deb *et al.*, 2013) [9]. In view of this, the present ethno-botanical work was undertaken in forested areas of Burdwan district of West Bengal State where the tribal communities, mainly Santhals, still depend to a great extent on food plants growing in the wild. Although there have been publication on floristic aspects (Bouri & Mukherjee 2011 & 2012) [4, 5], Non-Timber Forest Produce (Bouri & Mukherjee 2013; Bouri *et al.* 2015) [6, 7] and ethnomedicinal plants (Mukherjee & Bouri 2012; Bouri & Mukherjee 2013) [5, 6], edible wild plants have remained unattended. In view of this, the present authors felt the urgency of documenting the traditional knowledge from the local inhabitants the edible use of wild plants growing in their ambience.

2. Materials and Methods

Ethnobotanical explorations were undertaken since 2009 following standard methodology (Rao 1989) [16] for documentation of the wild edible plant species consumed by the people of Santhal and other folk communities dwelling mainly in the forested areas of the district. The concerned plant species were taxonomically worked out, described and identified with the help of pertinent literature (Prain 1903, Guha Bakshi 1984, Bennet 1987) [15, 10, 2]. The nomenclature was updated using the website <http://www.theplantlist.org>. The voucher specimens have been preserved in the Herbarium of the Ecotaxonomy Laboratory of the Department of Botany, Burdwan University.

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3. Result and Discussion

India is one of the most biodiversity rich countries round the Globe and hence, a large number of species are native to this nation. The indigenous communities dwelling in this country are mainly dependent on the edible wild plants because of their easy availability in the proximity of their abodes. Most of the urbanized people are still ignorant about their use, in view of which a huge number of species are still available in the wild which are edible. The present authors have made an attempt to

document such plants in order to bring them in the knowledge of scientists with an expectation of justice undeed to them on basis of its proximate principles, nutritive values and medicinal properties.

As many as 76 plants species belonging to 70 genera and 50 families were documented and tabulated by using certain parameters like scientific names, families, parts used and mode of consumption (table- 1).

Sl. No.	Scientific name	Family	Part (s) consumed	Use
1.	<i>Abutilon indicum</i> (L.) Sweet.	Malvaceae	leaves, seeds	cooked as vegetable
2.	<i>Achyranthes aspera</i> L.	Amaranthaceae	young leaves	cooked as vegetable
3.	<i>Aegle marmelos</i> (L.) Corr.	Rutaceae	ripe fruits	eaten raw, as soft drink
4.	<i>Aeschynomene aspera</i> L.	Fabaceae	leaves	cooked as vegetable
5.	<i>Alangium salvifolium</i> (L.f.) Wangerin	Alangiaceae	fruits	eaten raw
6.	<i>Amaranthus spinosa</i> L.	Amaranthaceae	leaves	cooked as vegetable
7.	<i>Anacardium occidentale</i> L.	Anacardiaceae	ripe fruits	eaten raw
8.	<i>Annona squamosa</i> L.	Annonaceae	ripe fruits	eaten raw
9.	<i>Argyrea nervosa</i> (Burm.f.) Boj.	Convolvulaceae	leaves	cooked as vegetable
10.	<i>Artocarpus heterophylla</i> Lam.	Moraceae	fruits	cooked as vegetable and ripe fruits eaten raw
11.	<i>Artocarpus lakoocha</i> Roxb.	Moraceae	seeds	eaten raw
12.	<i>Asparagus racemosus</i> Willd.	Liliaceae	white tuberous roots	eaten raw
13.	<i>Atylosia scarabaeoides</i> Benth.	Fabaceae	fruits	eaten raw or cooked
14.	<i>Azadirachta indica</i> A. Juss.	Meliaceae	leaves	fried
15.	<i>Bambusa arundinacea</i> Willd.	Poaceae	young shoots	cooked or pickled
16.	<i>Bauhinia purpurea</i> L.	Caesalpiniaceae	leaves and flower bud	cooked as vegetable
17.	<i>Bauhinia vahii</i> Wight. and Arn.	Caesalpiniaceae	seeds	roasted and eaten
18.	<i>Borassus flabellifer</i> L.	Arecaceae	young fleshy roots, seeds	eaten raw or roasted
19.	<i>Bridelia retusa</i> Spreng	Euphorbiaceae	ripe fruits	eaten raw
20.	<i>Buchanania lanzan</i> Spreng.	Anacardiaceae	ripe fruits	eaten raw
21.	<i>Cajanus cajan</i> Druce	Fabaceae	fruits	taken raw or cooked
22.	<i>Careya arborea</i> Roxb.	Lecythidaceae	ripe fruits (seeds)	After roasting
23.	<i>Carissa caranda</i> L.	Apocynaceae	unripe fruits, ripe	pickled or processed for Jam, chutney
24.	<i>Cassia sophora</i> L.	Caesalpiniaceae	tender leaves	boiled and cooked
25.	<i>Cayratia pedata</i> (Lam.) Juss ex Gagnep	Vitaceae	fruits	taken as vegetable
26.	<i>Centella asiatica</i> Urb.	Apiaceae	whole plants	cooked as vegetable
27.	<i>Cinnamomum tamala</i> (Ham.) Th. G. Fr. Nees	Lauraceae	leaves	used as flavouring agent
28.	<i>Commelina benghalensis</i> L.	Commelinaceae	leaves	cooked as vegetable
29.	<i>Corchorus acutangulus</i> Lamk.	Tiliaceae	leaves	cooked as vegetable
30.	<i>Cordia dichotoma</i> Forst	Boraginaceae	ripe fruits	pickled or taken raw
31.	<i>Costus speciosus</i> (Koenig) Smith	Costaceae	young shoots	cooked as vegetable
32.	<i>Dillenia pentagyna</i> Roxb.	Dilleniaceae	succulent calyx	pickled
33.	<i>Dioscorea alata</i> L.	Dioscoreaceae	bulbils	cooked as vegetable
34.	<i>Dioscorea bulbifera</i> L.	Dioscoreaceae	bulbils	cooked as vegetable
35.	<i>Diospyros melanoxylon</i> Willd.	Ebenaceae	ripe fruits	eaten raw
36.	<i>Emblica officinalis</i> Gaertn.	Euphorbiaceae	fruits	eaten raw
37.	<i>Enydra fluctuans</i> Lour.	Asteraceae	leaves	cooked as vegetable or taken as salad
38.	<i>Ficus hispida</i> L. f.	Moraceae	leafy buds	cooked or pickled
39.	<i>Ficus racemosa</i> L.	Moraceae	receptacle	cooked as vegetable
40.	<i>Flacourtia indica</i> (Burm.f.) Merr.	Flacourtiaceae	ripe fruits	taken raw
41.	<i>Glinus oppositifolius</i> (L.) DC.	Molluginaceae	leaves	cooked as vegetable
42.	<i>Grewia asiatica</i> L.	Tiliaceae	ripe fruits	taken raw
43.	<i>Hemidesmus indicus</i> (L) R.Brown	Periplocaceae	root powder	flavouring agent
44.	<i>Hibiscus cannabinus</i> L.	Malvaceae	fruits	pickled
45.	<i>Holoptelea integrifolia</i> Planch	Ulmaceae	seed	eaten raw
46.	<i>Hygrophila schulli</i> (Ham.) M. R. Almeida & S. M. Almeida	Acanthaceae	leaves	cooked as vegetable
47.	<i>Hyptis suaveolens</i> Poit.	Lamiaceae	shoot tips	for flavouring curries
48.	<i>Ipomoea aquatica</i> (L.) Forsk.	Convolvulaceae	leaves and shoots	cooked as vegetable
49.	<i>Lagerstroemia speciosa</i> (L.) Pers.	Lythraceae	ripe fruits	taken raw
50.	<i>Limonia acidissima</i> L.	Rubiaceae	ripe fruits	taken raw
51.	<i>Madhuca longifolia</i> Macbride	Sapotaceae	unripe fruits	cooked as vegetable
52.	<i>Mangifera indica</i> L.	Anacardiaceae	ripe and unripe fruits	eaten raw or cooked
53.	<i>Melochia corchorifolia</i> L.	Sterculiaceae	leaves	cooked as vegetable

54.	<i>Meyna spinosa</i> Roxb.	Rubiaceae	ripe fruits	eaten raw
55.	<i>Murraya koenigii</i> (L.) Spr.	Rutaceae	leaves	flavouring agent
56.	<i>Nelumbo nucifera</i> Gaertn.	Nelumbonaceae	young leaves and petiole, rhizomes seeds	cooked as vegetable or roasted
57.	<i>Nymphaea pubescens</i> Willd.	Nymphaeaceae	rhizome seed	boiled or raw
58.	<i>Ocimum gratissimum</i> L.	Lamiaceae	leaves	chutney
59.	<i>Phoenix acaulis</i> Buch-Ham ex Roxb.	Arecaceae	fruits	eaten raw
60.	<i>Phoenix sylvestris</i> (L.) Roxb.	Arecaceae	fruits	eaten raw
61.	<i>Piper longum</i> L.	Piperaceae	fruit-powder	eaten raw
62.	<i>Polygonum barbatum</i> L.	Polygonaceae	leaves	cooked as vegetable
63.	<i>Portulaca oleracea</i> L.	Portulacaceae	leaves	cooked as vegetable
64.	<i>Psidium guayava</i> L.	Myrtaceae	fruits	taken raw
65.	<i>Schleichera oleosa</i> (Lour.) Oken	Sapindaceae	ripe aril	directly
66.	<i>Semecarpus anacardium</i> L.f.	Anacardiaceae	ripe fruits	eaten roasted
67.	<i>Shorea robusta</i> Gaertn. f.	Dipterocarpaceae	seeds	eaten roasted
68.	<i>Smilax zeylanica</i> L.	Smilacaceae	ripe berries	eaten raw
69.	<i>Solanum surattense</i> Burm.f.	Solanaceae	seeds	eaten roasted
70.	<i>Syzygium cumini</i> (L.) Skeels	Myrtaceae	fruits	eaten raw
71.	<i>Tamarindus indica</i> L.	Caesalpiniaceae	fruits	eaten raw
72.	<i>Terminalia bellirica</i> (Gaertn.) Roxb.	Combretaceae	ripe fruits	eaten raw
73.	<i>Trema orientalis</i> (L.) Blume	Ulmaceae	ripe fruits	eaten raw
74.	<i>Vitis reticulata</i> L.	Vitaceae	ripe fruits	eaten raw
75.	<i>Ziziphus mauritiana</i> Lam.	Rhamnaceae	fruits	eaten raw
76.	<i>Ziziphus oenoplia</i> (L.) Mill.	Rhamnaceae	fruits	eaten raw

A taxonomic analysis (table 2) was found to be 6.6, 7.5 and 6.14 for species, genus and family respectively (fig 1).

Taxa	Dicot	Monocot	Ratio Dicot: Monocot
Species	66	10	6.6
Genus	62	8	7.75
Family	43	7	6.14

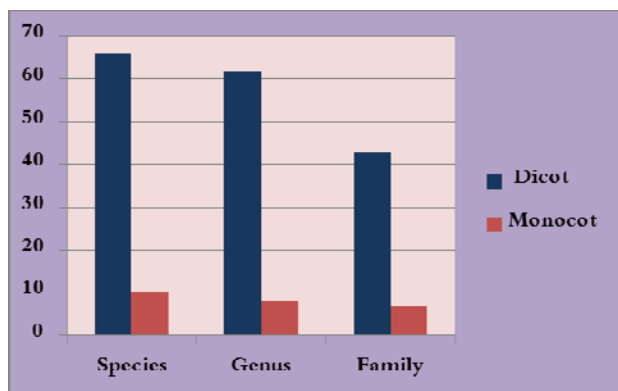


Fig 1

The threat perception was analyzed by segregating the documented plants on the basis of their parts consumed and it was found that the species whose whole plant, roots, seed, fruits and flowers are consumed are exposed to high threat perception, whereas, the plant species whose shoots and leaves are consumed face low threat perception (table 3). The number of species whose whole parts is consumed is 1; roots 3; seeds 10; fruits 35; flowers 4; shoots 7 and leaves 21 in number (fig 2).

Plant parts	No. of plant species	Threat Perception
Whole plant	1	High
Roots	3	High
Seeds	10	High
Fruits	35	High
Flowers	4	High
Shoots	7	Low
Leaves	21	Low

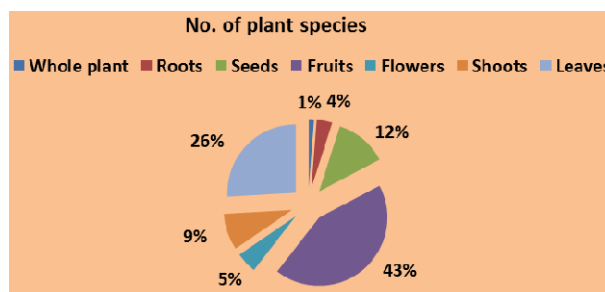


Fig 2

An analysis of the documented plants on the basis of their mode of consumption was also tabulated under the categories: cooked, eaten raw, pickled and used as flavouring agents, for which the number of species recorded were 36, 38, 7 and 4 in number respectively (table 4; fig 3).

Sl. No.	Uses	No. of plants species
1.	Cooked	36
2.	Eaten raw	38
3.	Pickled	7
4.	Used as flavouring agent	4

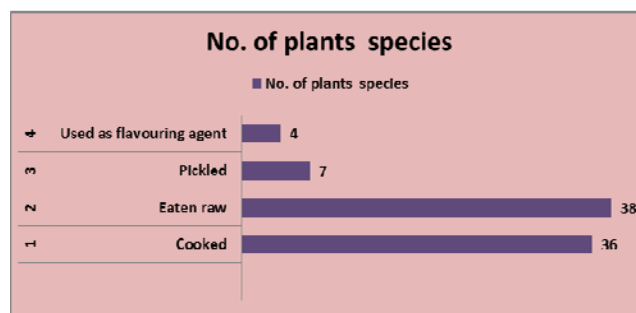


Fig 3

4. Conclusion

Recording of as many as 76 species of food plants are seen to be quite significant although they have been undergoing shrinkage mainly due to habitat depletion. Over-exploitation of these species is likely to damage the forest ecosystem. In

view of these, the forests must be saved and these species should be sustained as such. The scientists have to come up for judicious selection of edible species from the wilderness for their large scale cultivation based on assessment of their proximate principles, nutrient status and medicinal properties to address the issue of food security for the future generations.

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