WILD LEAFY VEGETABLES OF JHARKHAND

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FOREWORD

It is an undisputed fact that biological resources have a very crucial role in ensuring food and nutritional security to the ever increasing human and animal population. Jharkhand is a biodiversity rich state and is inhabited by tribal and other ethnic communities which predominantly depend on the bio-resources available in abundance in adjoining forest land, waste land, water bodies, cultivated and non cultivated lands. Wild leafy vegetables are very popular in Jharkhand because they come up on their own as weeds. These are collected by the tribal and other local communities without any cost. These vegetables are eaten by cooking it as 'Sag'. Surplus quantity is sold in the local market or dried for off season use. These vegetables are very rich in nutrients, vitamins, minerals especially in Iron. Thus these wild edible leafy plants provide not only food and nutritional security to the poor population specially tribal and other communities, but can provide sufficient Iron intake to the anaemic population of this state.

This publication on Wild leafy vegetables of Jharkhand is a welcome effort as it compiles the various wild leafy vegetables of Jharkhand being used by different ethnic groups of state with the description of habit, habitat, morphology, propagation method, seasonal availability and mode of consumption of each such vegetable. I believe that this book will be very helpful for students, research scholars, scientists, civil society organisations and policy makers. In situ conservation and ex situ cultivation possibilities may serve to mitigate anaemia & malnutrition prevalent in local communities. I congratulate the Jharkhand Biodiversity Board for this publication.

(Dr. D. K. Tiwari)

PREFACE

Jharkhand is blessed by nature and is considered among the most biodiversity rich states of India. Biodiversity plays an amazing role in nutritional security of the human population through its major contribution in world food production, as it provides the genetic resources for all crops, livestock, and marine species harvested for food and maintains the sustainable productivity of soils. It is well known that 75 % of world's food comes from just a dozen agricultural crops and five animal species. Food supply by a few species is a cause of worry because it makes the food supply vulnerable to pests or disease that can sweep through large areas of monocultures. The possibility of further decrease in future production is looming large due to ongoing climate change. Ever increasing world's population faces a threat of food scarcity in coming decades. Wild leafy vegetables are an important component of the biodiversity of agro-ecosystems that provides traditional, site specific and culturally appropriate alternatives to help mitigate both chronic, diet and malnutrition related diseases and micronutrient deficiency concurrently.

Jharkhand is significantly rich with respect to the diversity of wild leafy vegetables that are collected from wild and some of these are being now cultivated. Seasonal plants contributes lion's share in the wild leafy food of local communities. Tender leaves of some of the trees and shrubs are also eaten by the local people. From rainy season to winter months, such wild leafy vegetables are abundantly available. These plants come up by their own and are collected by the tribal and other local communities from their surrounding forests, waste lands, agricultural and non agricultural fields, from the sides of roads and water bodies. These leafy vegetables are cooked as saag, eaten raw or dried and stored for uses round year. The diversity of leafy vegetables provide dietary diversity, contributes to household food and nutritional security. Since the surplus collection is sold in the local market, it also helps them in generating additional income and as a source of livelihood.

Wild leafy vegetables occupy an important place in cultural, socio-economical and medicinal arena of the Jharkhand. Malnutrition, which is the widespread in poor population of the Jharkhand state, can be tremendously reduced with an increase in utilization of wild leafy vegetables – a natural food rich in energy, proteins, iron and vitamins, most especially those from the rural environment. Traditional knowledge regarding medicinal value of these vegetables have been validated by several studies in which these WLVs have

been found to be rich in alkaloids, flavonoids, saponins, tannins, terpenoids, cardiac glycosides having therapeutic properties.

Wild leafy vegetables are multi valued natural resource. These resources are under threat from multiple reasons namely over harvesting, over-grazing, invasive species, habitat destruction and land use change. Sustainable scientific management of these resources is essential not only for conserving bio-diversity but also for the well being of the tribal and other local communities. In this way their cultural value can also be preserved.

The present book presents an inventory of the wild leafy vegetables available and being consumed by the ethnic groups of Jharkhand with the details of their habits, habitat, season of availability, mode of consumption and method of propogation. Book also has the detail description of each vegetable with its coloured photograph for making the visual identification simpler. Plants can be found by their local name as well as botanical name given in alphabetical order.

I am grateful to all the villagers , forest officers and staff who helped me in survey work and compilation of data. I hope this book will be of a great help for the students, reserchers, foresters, farmers, forest visitors , police, para military personnel and the planners engaged in food security, climate change mitigation and malnutrition prevention.

Lal Ratnakar Singh

CONTENTS

INTRODUCTION

Jharkhand State is one of the most biodiversity rich states of India due to its diverse physiographic and climatic conditions. Jharkhand has an area of 79,714 km2 which constitutes 2.42% of the geographical area of India with 24 districts (Fig 1). The population of the state is 32.98 million (Census, 2011) which constitutes 2.72% of the country's population. Undulating terrain, water scarcity and lack of sufficient irrigation facilities do not provide sufficient opportunity for agriculture. Prevalent agricultural practices do not provide sufficient food to local people and therefore they are primarily dependent on natural food resources. Nature provides different wild leafy vegetables to them throughout the year which supplement their nutritional requirements.

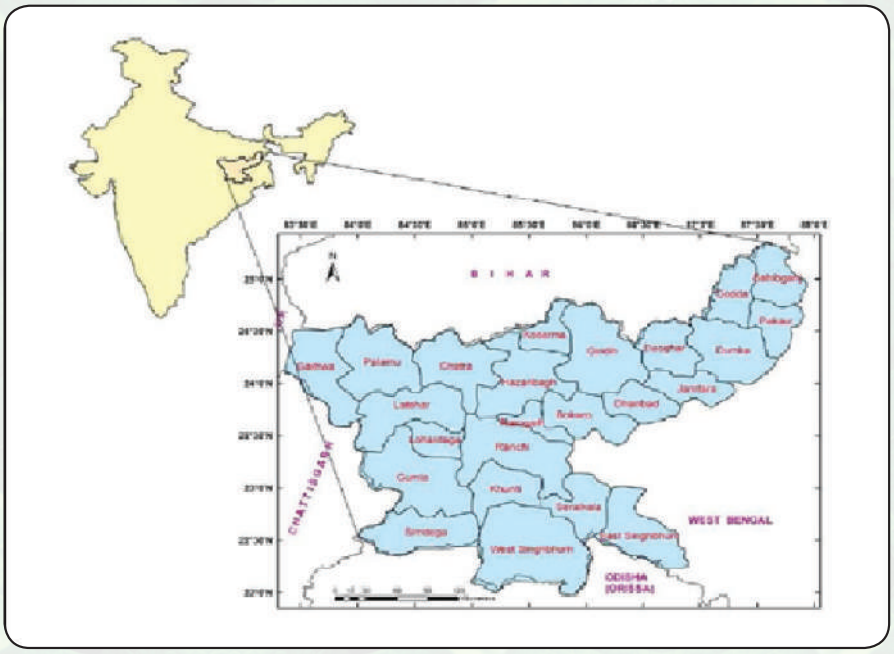

Fig.1 – District Map of Jharkhand State

Much before the advent of systematic agricultural practices, human population used to gather food from the edible plants and animals available in natural surroundings. Even now, such wild leafy edible plants are their staple diet and important for their sustenance because leafy plants are the predominant harvesters of solar energy and they constitute primary sources of carbohydrates, vitamins, proteins, essential fatty acids and provide enough calories for consumers. According the Plant Genetic Resources for Food and Agriculture (PGRFA) these plants are the biological basis of world food security

and directly or indirectly support the livelihood of every person on earth (FAO, 1997). In general, plants provide 65% of the global requirement of edible protein (Young and Pellett, 1994) and in particular about 80% of the protein consumed by the humanity in developing countries comes from plants (Singh and Singh, 1992).

The plant wealth available as weeds vis-a-vis its utilization is of great importance for mankind in view of ever increasing population and shrinking cultivable lands. In the perspective of growing demand of food in future, studies on the diversity and distribution of such edible plants, especially wild types are relevant to codify exploitation of bio-resources. That is why out of the various kinds of plants, food plants received the earliest attention of mankind (Burkill, 1952) and reflect man's search for knowing more and more about the nutrient qualities of food plants. It is a known fact that out of each 10 plants on Earth, one plant is a weed. There are approximately 30000 weed spe¬cies globally (Duke, 1992). Although scientists and agricultural exten¬sion officers recommend eradicating them, 89% of the most widespread and aggressive weeds in the world are edible (Rapoport et al., 1995). Moreover, many of these species have a high nutritional value and medicinal properties. India has second position in the world ,next to china, in vegetable production. However, this is much less than the recommended requirement of 300 gm per capita per day of vegetables for a balanced diet. About 175 major and minor vegetable crops are grown in India including 82 leafy vegetables, yet we are far from the target of 160 million tons of vegetables to fulfil the recommended requirement by 2020 (Mishra et al., 2008).

When we try to juxtapose the cultivated leafy vegetables and wild varieties of leafy vegetables, most of the varieties of leafy vegetables which are cultivated are very much susceptible to diseases. Contrary to that, wild edible plants and the wild relatives of cultivated crops have advantageous genes for resistance against insects and pests, have much higher level of nutrients and are more tolerant to environmental stress. Because of that, they are actively considered for genetic improvement. Wild species of several cultivated plants act as reservoirs for crop improvement including developing resistance to pests and pathogens (Ignacimuthu and Babu, 1987; Babu et al., 1988; Burdon and Jarosz, 1989; Doney and Whitney, 1990; Rajaram and Janardhanan, 1991a; Mohan and Janardhanan,; 1994; Vadivel and Janardhanan, 2000a).

The tribal population and other communities living in dense and remote forests of India are repositories of rich knowledge on various uses of plant

genetic resources, which have hitherto remained unknown (Khoshoo, 1991). But with the advent of several developmental activities around tribal areas which are, after all, not related to their welfare, the tribal people are losing their traditional identity resulting in a good deal of loss of such treasure house of knowledge on plant genetic resources (Shankar, 1995). The studies on the relationship between the aboriginal or primitive people and their surroundings including a critical evaluation of some of the important plants used by the tribal and other communities have received considerable attention in recent years (Das et al., 1983).

Edible weeds, in general, have three sorts of use values (Price and Ogle, 2008). Direct use value refers to the benefit from the actual use as vegetables for food as well as the overlap with medicine among other direct uses. Indirect use value of the weed vegetables include the cultural and social value of the diversity of wild vegetables expressed for example in local culinary recipes or ritual use. The last kind of value is option value which is that of having and managing the species as a form of insurance for the future such as insurance against times of calamities like drought.

Edible weeds also possess multiple additional uses besides food, such being a source of animal fodder and medicine (Marceelino et al., 2005). For instance, the multiplicity of uses of edible weeds has been reported in India (Datta & Banerjee, 1978), Vietnam (Van Chin, 1999) and Thailand (Maneechote, 2007). The overall utility of weeds for farmers in various ASEAN countries is expounded upon in "Utility of weeds and their relatives as resources" (Kim et al., 2007).

It is evident that wild leafy vegetables (WLVs) provide nutritious food as well as cash income for local communities and plays a very significant role in ensuring food security. Many of them also play an important role in maintaining the productivity and stability of traditional agro-ecosystems. Besides, most of them have medicinal value ; a knowledge earned by the local communities and passed from generation to generation. Some WLVs are crop wild relatives and could provide useful genes for crop improvement, which may have significant consequence on global food security. With the social and economic development, WLVs are threatened and the associated traditional knowledge is in danger of being lost. Threats are not only limited to wild food plants, the traditional knowledge associated with WLVs is also endangered. Therefore, sustainable management of these resources as well as conserving biodiversity is of the utmost importance and systematic documentation of indigenous knowledge and biological resources being used in Jharkhand is of great significance.

DESCRIPTION OF WILD LEAFY VEGETABLES OF JHARKHAND

1. *Achyranthus aspera* L.

Family Name	Amaranthaceae
Vernacular Name	Chirchithi (Oraon), Chirchithi (Munda), Chirchithi (Santhal), Latjira, Apamarg.
Habitat	Weed, found on waste ground, roadside, fields and open ground.
Habit	An erect or procumbent, annual or perennial herb with spreading branches, usually up to 1 m tall, often with a woody base.
Stem	Angular, ribbed, pubescent, and simple or branched from the base, often reddish purplish tinged.
Leaves	Opposite, thick, ovate elliptic or obovate rounded, but variable in shape and size, 4-12 cm long and up to 8 cm wide, velvety tomentose.
Flowers	Greenish-white, numerous, in axillary or terminal spikes up to 75 cm long; bracts Membranous, oblong, enclosed in the hardened parianth.
Fruits	Utricle, oblong-cylindrical, truncate at apex, rounded at base.
Seeds	Sub-cylindrical and reddish brown.
Seasonal Availability	Aug. to Feb
Propagation	By seeds
Mode of consumption	Fresh leaves together with other spinach greens are cooked and eaten. Seeds are also edible as raw or cooked.

2. *Aerva lantana* (L.) Juss.

Family Name	Amaranthaceae
Vernacular Name	Lopong Sag (Santhal & Bhumiz), Lupu aa (Ho & Mundari), Lendra (Oraon)
Habitat	Weed, found on waste ground.
Habit	A semi erect, many branched, under shrub.
Stem	Branched, woolly branches arising from the woody base. Grows up to 50 cm in height .

Leaves	Simple, alternate, short petioled, leaf stalks upto 2 cm long, tomentose, nearly circular to lance-shaped elliptic, wedge shaped at the base, rounded to sharp at the tip and become smaller in the flowering twigs; Finely pubescent above, white woolly beneath, leaves on main stem are 1-5 cm long, 0.5-3.5 cm wide . Leaf stalks up to 2 cm long.
Flowers	Minute, sessile, greenish or creamy-white, born in axillary spikes solitary or in clusters, usually 3-4 together.
Fruits	Utricle greenish, round or ovoid, acute, compressed.
Seeds	Black, small and kidney shaped.
Seasonal Availability	Rains and winter season
Propagation	By seeds.
Mode of consumption	Fresh leaves are cooked and eaten.

3. *Alternanthera philoxiroids* (Mart) Griseb.

Family Name	Amaranthaceae
Vernacular Name	Saronchi (Oraon), Garundi arak (Santhal), Salanti
Habitat	Weed, found on wet and moist places.
Habit	A perennial herb grows as emerged aquatic plant rooted in the soil or in the substrate below in shallow water.
Stem	grows up to 100 cm long, Fistular.
Leaves	Simple, dark-green waxy leaves which are lance-shaped and opposite. They are up to 10 cm long and 1.5-2.5 cm wide.
Flowers	The inflorescence is white, ball-shaped, 1.5 cm in diameter and papery. Flowers are reduced, bisexual in round white heads on long stalks from upper leaf axils. Each flower has 4-5 papery bracts, 5 stamens and 1 pistil.
Fruits	One seeded tiny Utricle, membranous and rarely open to release the seeds. It reproduces vegetatively from axillary buds at each node.
Seeds	Disc shaped to flattened wedge shaped, 0.7-0.9 mm diameter, reddish brown, smooth and undulated.
Seasonal Availability	July to Jan.
Propagation	By seeds and rooted stem cuttings.

Mode of consumption	Leaves and young shoots are fried/roasted then eaten. Soup is also prepared.

4. *Alternanthera sessilis* (L.) R. Br. ex DC.

Family Name	Amaranthaceae
Vernacular Name	Saronchi (Oraon), Garundi arak (Santhal), Salanti
Habitat	Weed, found on moist places, waste and cultivated fields.
Habit	A prostrate or procumbent, annual or perennial herb.
Stem	The stems are generally prostrate, 0.2-1 m high, with strong creeping tap roots, often rooting at the nodes, sometimes floating, creeping or ascending at the tips, cylindrical and slightly hairy, with numerous erect branches.
Leaves	Simple, opposite, shortly petiolate or sessile, broadly lanceolate or spatulate to almost linear, 0.6-5 cm long, and 0.3-1 cm wide. They are attenuated at the base, and the apex is acute to blunt, with entire, glabrous or pilose margins.
Flowers	Flowers inconspicuous, white, borne in small, axillary, dense, sessile, silvery-white clusters of compressed spikes.
Fruits	Utricle cordiform and strongly compressed.
Seeds	Dark-brown to black, disc-shaped and shiny, about 0.8-1 mm in diameter.
Seasonal Availability	July to Jan.
Propagation	By seeds and rooted stem cuttings.
Mode of consumption	Leaves and young shoots are fried/roasted then eaten. Soup is also prepared.

5. *Amaranthus blitum* L.

Family Name	Amaranthaceae
Vernacular Name	Achpar aa/ leper aa (Ho), Purple Amaranth.
Habitat	Monoecious annual weed, found on waste ground, cultivated and non cultivated fields and gardens.
Habit	An erect, tall and succulent herb.
Stem	Stems are prostrate or ascending; sometimes erect, sometimes radiating from base and forming mats; glabrous, green to brown (occasionally reddish), usually highly-branched.

Leaves	Alternate, ovate, 3-11 cm long, 1.5-5.0 cm wide,obtuse, notched at the tip, glabrous, base cuneate, main nerve slender prominent beneath. Petioled (petiole 1.0–4.0 cm long).
Flowers	In axillary clusters and in terminal simple and branched spike; bracteoles shorter than tepals, Perianth 1.5 mm long, tepals 3, linear, oblong, obtuse or acute.
Fruits	An utricle, broadly ovate, undehiscent, very short about 2.5 mm long.
Flowering & Fruiting	March – June
Seeds	1.5 mm across, lenticular smooth, shinning brown black
Seasonal Availability	Rainy & Winter
Propagation	By seeds.
Mode of consumption	Fresh leaves are cooked as spinach and have mild flavor. Young leaves and shoots are chopped into small pieces and fried in vegetable oil with tomato. Salt is added to taste.

6. ***Amaranthus gangeticus* L.**

Family Name	Amaranthaceae
Vernacular Name	Lal Sag (Oraon), Jenga Leper aa (Ho)
Habitat	Weed, found on waste ground and cultivated fields, cultivated also.
Habit	An erect, tall and succulent herb.
Stem	Sparingly to densely Branched, glabrous to pubescent.
Leaves	Traingular ovate to narrowly rhombic, upto 12 cm long, 1.5-5.5 cm wide, tip usually notched or round.
Flowers	Whitish green or red.
Fruits	Fruits with no distinct 'neck'.
Seeds	Very small, red or brown.
Seasonal Availability	April to June
Propagation	By seeds
Mode of consumption	Fresh leaves are cooked as spinach and have mild flavor.

7. *Amaranthus spinosus* L.

Family Name	Amaranthaceae
Vernacular Name	Achcharaka (Oraon), KanteliChaulai (Santhal), Achparara (Mundari)
Habitat	weed, found on waste ground.
Habit	An erect or occasionally ascending annual herb. Usually 30 to 150 cm tall.
Stem	Sparingly to densely branched, erect, sometimes with reddish tinge. The striated, often reddish, stem with two sharp, long spines at the base of the petioles.
Leaves	ovate to rhombic – ovate, elliptic, lanceolate-oblong, or lanceolate, blade 1-12 cm long, 0.9 – 6 cm wide, smooth, leaf stalk 1-9 cm long.
Flowers	Green, in axillary clusters in the lower part of the plant and in unbranched or branched spikes, the upper flowers in the spike staminate.
Fruits	one-seeded, opening by a line around the centre.
Seeds	Reddish-brown, lens-shaped, shiny.
Seasonal Availability	Whole Year
Propagation	By seeds
Mode of consumption	Leaves and young shoots are cut into small pieces, cooked with salt and chilly and then eaten.

8. *Amaranthus viridis* L.

Family Name	Amaranthaceae
Vernacular Name	Bhaji Sag (Oraon), Lotia Sag (Santhal), Marshi (Bhumiz)
Habitat	weed, found on waste ground, cultivated and non cultivated fields.
Habit	An erect or occasionally ascending annual herb. Usually 10 to 80 cm tall.
Stem	Sparingly to densely Branched, channelled, glabrous to pubescent.
Leaves	Traingular ovate to narrowly rhombic, 2-7 cm long, 1.5-5.5 cm wide, tip usually narrow and with a small narrow notch, petiole 1-10 cm long.

Flowers	Green, in leaf axils or at the end of branches. Unisexual, both sexes are mixed throughout the spike, female flowers are more numerous, bracts and bracteoles whitish, triangular ovate to broadly lance shaped. Sepals 3, those of staminate flowers ovate – oblong 1.5 mm long, tip pointed, mucronate; those of pistillate flowers narrow spoon shaped to oblong,1.3-1.8 mm long, tip more or less mucronate, stigmas 2-3.
Fruits	Nearly round, 1.3-1.5 mm, not or only slightly exceeding the sepals, surface rough.
Seeds	1-1.25 mm, round, slightly compressed, dark brown or black with a paler thick border.
Seasonal Availability	Whole Year
Propagation	By seeds
Mode of consumption	Roasted then eaten.

9. *Amorphophallus paeonifolius* (Dennst.) Nicolson

Family Name	Araceae
Vernacular Name	Oal (Oraon), Ol (Santhal)
Habitat	Weed, found on moist waste land. It is found in secondary forest or highly disturbed areas, up to 800 m above sea level.
Habit	Elephant Yam is a striking aroid.
Stem	It is the thickened underground stem (Corm). Dark brown, flattened-globe-shaped, up to 50 × 30 cm with prominent root scars. Weighing up to about 15 kg.
Leaves	Usually one (sometimes two) per tuber. Petiole (leaf stalk) up to 2 m tall and 20 cm in diameter with rough, warty surface. Background colour pale to dark green or blackish-green with pale blotches and numerous tiny dark dots. Leaf blade up to 3 m in diameter and deeply divided into segments. Leaflets up to 35 × 12 cm.

Flowers	Flower spike (Spadix) is Up to 70 cm long. The lowermost portion of the spadix is female and is covered with pistils (female parts). Each pistil consists of a pale green or maroon ovary with a maroon stalk (style) and two- or three-lobed yellow head (stigma). The next floral zone is male and contains tightly-packed yellowish stamens. At the tip of the spadix is a bulbous, dark maroon, rounded to deeply wrinkled appendix. Spathe (bract surrounding spadix)is Bell-shaped, broader than long, up to 45 × 60 cm, pale green to dark brown with paler blotches on exterior. The plants only blooms when mature and even so it does not bloom every year. During this phase, the plant generates heat. The heat and the smell mimics rotting flesh to attract the flies that pollinate the flower.
Fruits	About 2 × 1 cm, bright red when ripe. Borne on a spike up to 50 cm long and 8 cm in diameter, the fruiting part held aloft on a peduncle (stalk) 20–100 cm long.
Seasonal Availability	Young leaves before the rains and rainy season
Propagation	By seeds.
Mode of consumption	Cooked as vegetable. Young leaves are fried with Besan in vegetable oil.

10. *Anethum graveolens* Linn.

Family Name	Apiaceae
Vernacular Name	Soya (Oraon) , Sowa (Santhal)
Habitat	Monoecious annual weed, found on waste ground, cultivated and non cultivated fields.
Habit	An erect freely branching annual herb with finely dissected lacey blue green leaves. The plant grows 3-5 ft tall.
Stem	Stems are prostrate or ascending; sometimes erect, sometimes radiating from base and forming mats; glabrous, green to brown (occasionally reddish), usually highly-branched.
Leaves	The leaves are divided pinnately 3 or 4 times into thread like segments each bout 1 inch long.
Flowers	The inflorescence can be 25 cm across, the umbels are borne on stiff, hollow stems. The flowers are yellow and borne in large, rounded, compound umbels, like all carrot family flowers.

Fruits	Flattened pod about 3 mm long.
Seeds	The seeds are not true seeds. They are the halves of very small, dry fruits called schizocarps. The seeds are smaller, flatter and lighter than caraway and have a pleasant aromatic odor.
Seasonal Availability	Winter
Propagation	By seeds
Mode of consumption	Fresh or dried leaves are used for boiled or fried meats and fish, in sandwiches and fish sauces. It is also an essential ingredient of sour vinegar.

11. *Antidesma diandrum* (Roxb.) B.Heyne ex Roth

Family Name	Euphorbiaceae
Vernacular Name	Kundui (Oraon) ,Matha arak (Santhal), Mata ara (Munda), Mata aa (Ho)
Habitat	Common throughout Jharkhand in evergreen or deciduous forests, borders of forests, scrubs, along the streams.
Habit	Shrubs, 1 - 3 m high or rarely trees up to 15 m tall, deciduous.
Stem	Erect
Leaves	Leaves obovate to oblanceolate or oblong to elliptic, cuneate or acute at base, acute to apiculate at apex, 5 – 12 x 1.5 - 7 cm, membranous to chartaceous, glabrous above, sparsely pilose on midrib or occasionally tomentellous beneath; lateral nerves 3 - 8 pairs; petioles 1 - 5 x 0.6 - 2 mm.
Flowers	Male inflorescences axillary and terminal, simple, 1 or 2 branched, 2 - 12 cm long; bracts 0.5 - 1 mm long, ciliate. Male flowers: pedicels 0.5 - 1.5 mm long; calyx cup-shaped, 0.8 - 1 x 1 -1.3 mm; segments 4 or 5, deltoid or suborbicular, ca 0.3 x 0.5 mm; disc cushion-shaped, enclosing the bases of filaments, pubescent; stamens 2, 1.2 - 2.5 mm long; anthers ca 0.6 mm broad. Female inflorescences simple or rarely once-branched, 2 - 5 cm long; bracts as in male. Female flowers: pedicels 0.5 - 1.5 mm long; calyx urceolate, 1 - 1.5 x ca 1.2 mm; segments 4, triangular or deltoid, ca 0.5 mm long; disc annular; ovary ovoid, ca 1 x 1 mm, glabrous; styles terminal, 0.5 - 1 mm long.
Fruits	Drupe, ellipsoid to suborbicular or often broadly oblong, somewhat laterally compressed, with short terminal persistent style at apex, 4 - 6 x 3 - 5 mm, glabrous, often white pustulate; fruiting pedicels 2 - 3 mm long.

Seeds	It can be propagated by seeds.
Flowering	March to Oct., Fruiting – June to Jan.
Seasonal Availability	Rainy season
Propagation	By seeds
Mode of consumption	Young leaves are used in curry and as vegetable. Young leaves are dried and fine powder is made. Onion and tomato is fried in vegetable oil, some water, starch and leaf powder is then added. Salt is added to taste.

12. ***Azadirachta indica*** **A.Juss.**

Family Name	Meliaceae
Vernacular Name	Neem
Habitat	Common around villages, native of India and China.
Habit	Fast growing evergreen tree, can reach a height of 15-20 mt or more.
Stem	The trunk is relatively short, straight and may reach a diameter of 1.2 mt. The bark is fissured or scaly, hard, whitish grey to reddish brown.
Leaves	Alternate, pinnate leaves are 20-40 cm long with 20-31 medium to dark green leaflets about 3-8 cm long.
Flowers	White and fragrant flowers are arranged axillary, normally drooping panicles, up to 25 cm long. The inflorescence bears 150-250 flowers. Individual flower is 5-6 mm long and 8-11 mm wide.
Fruits	Drupe, glabrous, varies in shape from elongate oval to nearly roundish, and when ripe are 1.4-2.8 x 1-1.5 cm, one seeded.
Seeds	Seed ovoid or spherical; apex pointed; testa thin, composed of a shell and a kernel (sometimes 2 or 3 kernels), each about half of the seed's weight
Flowering	Early summer
Seasonal Availability	March April new leaves are preferred.
Propagation	By seeds
Mode of consumption	Cooked as Vegetable

Photo - 1 : ***Achyranthus aspera*** **L.**

Photo - 2 : ***Aerva lantana*** **(L) Juss.**

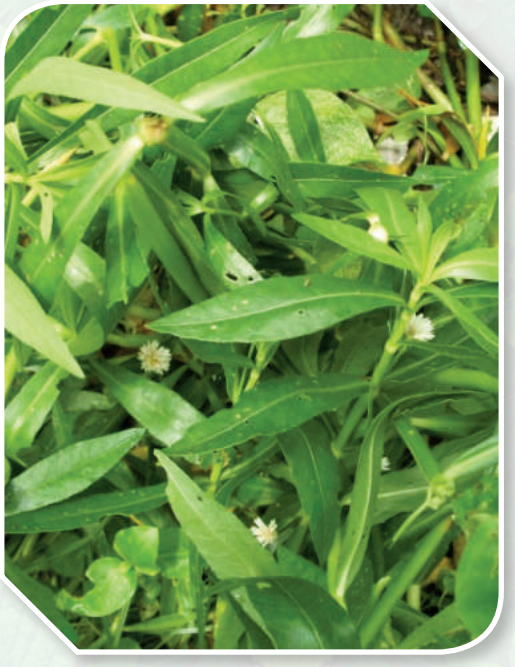

Photo - 3 : ***Alternanthera philoxiroids*** **(Mart.) Griseb.**

Photo - 4 : ***Alternanthera sessilis*** **(L)R. Br. exDC**

Photo - 5 : ***Amaranthus blitum*** **L.**

Photo - 6 : ***Amaranthus gangeticus*** **L.**

Photo - 7 : ***Amaranthus spinosus*** **L.**

Photo - 8 : ***Amaranthus viridis*** **Linn.**

Photo - 9 : ***Amorphophallus paeoniifolius*** **(Dennst.) Nicolson**

Photo - 10 : ***Anethum graveolens*** **Linn.**

Photo - 11 : ***Antidesma diandrum*** **(Roxb.) B. Heyne ex Roth**

Photo - 12 : ***Azadirachta indica*** **A. Juss.**

13. *Bacopa Monnieri* Linn.

Family Name	Scrophulariaceae
Vernacular Name	Brahmi
Habitat	found on wet lands and muddy shores.
Habit	Perrenial creeping herb.
Stem	Stem rooting at nodes.
Leaves	Thick, succulent, oblanceolate, opposite.
Flowers	Blue, purple or white ,8-10 mm, obscurely 2-lipped; flower stalk is 0.5-3.5 cm long, bracteoles 2, linear below calyx, sepals5 about 5 mm long, Lower and upper sepals are ovate-lanceolate, lateral 2 sepals are lance shaped to linear.
Fruits	Capsules are narrowly ovoid, covered in persistent sepal cup, tip pointed.
Seeds	Yellow-brown, ellipsoid, truncate at one end, longitudinally channelled.
Flowering	May – Oct
Seasonal Availability	Rainy & winter
Propagation	By seeds.
Mode of consumption	Leaves are used as vegetable. All plants are useful.

14. *Basella alba* Linn.

Family Name	Basellaceae
Vernacular Name	Poi sag (Oraon) Poi Sag, Uttu ara(Munda)
Habitat	Moist deciduous forests and also in plains.
Habit	Perennial twining herb.
Stem	Stem stout at the base, 1.5-2.0 cm in diameter, upper branches slender, fleshy and climbing.
Leaves	Leaves dark green, broadly ovate, 5-13 cm long and 2.5-8 cm broad, acute or acuminate, basally cordate, cuneate or truncate; petiole 0.5-3 cm long.

Flowers	Inflorescence an axillary or terminal spike, 8-14 cm long; rachis stout. Flowers white, pinkish or red, subsessile, remaining closed at anthesis. Sepals 3-5 mm long, united up to the middle, lobes short, 2-3 mm broad, cucullate. Bracts scaly, small; bracteoles similar to calyx, acute. Stamens included; filament short. Anther cordate. Ovary 1-locular.
Fruits	Pea size, dark purple, juicy fruits follow the flowers, which add another ornamental dimention enclose in calyx about 1.0 cm long..
Seeds	Seed globose, indehiscent..
Flowering	May-Oct.
Seasonal Availability	Rainy & winter
Propagation	By seeds.
Mode of consumption	cooked as vegetable.

15. *Basella alba* var. Rubra Linn.

This is another species of Poi sag which is eaten by the local communities.

16. *Bauhinia Purpuria* L.

Family Name	Ceasalpiniaceae
Vernacular Name	Koinar sag, Sing aa (Ho), Koma
Habitat	Native of India, Moist deciduous forests and also in plains.
Habit	Perennial, Middle sized Tree.
Stem	Stems erect or ascending, Stems greater than 2 m tall, Stems solid, Stems or young twigs sparsely to densely hairy,
Leaves	The foliage light green and deeply notched at the tip.Leaves alternate, Leaves petiolate, Stipules conspicuous, Stipules green, triangulate to lanceolate or foliaceous, Stipules deciduous, Stipules free, Leaves simple, or appearing so, Leaf or leaflet margins entire, Leaflets lobed or hastate, Leaflets 1, Leaves glabrous or nearly so, Leaves hairy on one or both surfaces, Inflorescences racemes,

Flowers	Fruit a legume, Fruit stipitate, Fruit unilocular, Fruit freely dehiscent, Fruit elongate, straight, Fruit oblong or ellipsoidal, Fruit coriaceous or becoming woody, Fruit exserted from calyx, Fruit glabrous or glabrate, Fruit hairy, Fruit 3-10 seeded
Fruits	Pea size, dark purple, juicy fruits follow the flowers, which add another ornamental dimention enclose in calyx about 1.0 cm long..
Seeds	Seeds ovoid to rounded in outline, Seed surface smooth, Seeds olive, brown, or black. Seeds 12-15, almost round, c. 1.2-1.3 cm in diameter, brown, smooth.
Flowering	Sept – Nov.
Seasonal Availability	Rainy season
Propagation	By seeds.
Mode of consumption	Young leaves and flowers are eaten as vegetable. Young leaves are chopped into small pieces. Onion and tomato is fried in vegetable oil, chopped pieces are added to it with salt, some water and starch.

17. *Bauhinia Retusa* Roxb.

Family Name	Ceasalpiniaceae
Vernacular Name	Kathul sag, Koinar sag., Teor (Oraon), Laba (Munda)
Habitat	Native of India, Moist deciduous forests and also in plains.
Habit	Perennial, Middle sized Tree.
Stem	Stems erect or ascending, Stems greater than 2 m tall, Stems solid, Bark dark brown.
Leaves	Leaves compound, rigidly coriaceous, broader than long, entire to shallow cleft only at the tip, base cordatum.
Flowers	White (dotted pink), on corymbosely branched, terminal panicles, bracts small, calyx nearly split to the base into 2-3 segments. Stamens 10, ovary stipitate, densely hairy.
Fruits	Pods 10, flat, deep red when immature, glabrous, hard.
Seeds	Seeds dark brown, smooth.
Flowering	October – December, Fruiting – Jan. to March.
Seasonal Availability	Rainy season

Propagation	By seeds.
Mode of consumption	Young leaves and flowers are eaten as vegetable. Young leaves are chopped into small pieces. Onion and tomato is fried in vegetable oil, chopped pieces are added to it with salt, some water and starch.

18. *Bidens Pilosa* L.

Family Name	Asteraceae
Vernacular Name	Maina Sag (Munda), Mayna arxa (Oraon)
Habitat	Moist deciduous forests and also in plains
Habit	An erect ,simple or much- branched annual or perennial herb, 60-90 cm tall.
Stem	Glabrous or more or less pubescent, quadrangular, grooved; branches opposite.
Leaves	Very variable, sometimes trifoliate, but usually consisting of 2 sub opposite pairs of leaflets and a larger, deeply 3-lobed, terminal leaflets.
Flowers	The inflorescence is an isolated or grouped pedunculated capitula, emerging from the leaf axil. Heads borne singly at the ends of long, slender, nearly leafless branches; narrow, discoid, the disk 4-6 mm wide at anthesis; ray florets white or pale-yellow and disk florets yellow.
Fruits	Black, Achenes 0.8-1.7 cm long, linear, quadrangular, slightly tapering towards the apex, glabrous, bearing a few pale stiff hairs on theangles in the upper part; pappus bristles 2-4, straw-coloured, 2-3 mm long.
Seeds	Seeds covered by pappus hair hooked and barbed.
Flowering	Flowering from October-April. Fruiting December onwards.
Seasonal Availability	Rainy
Propagation	By seeds.
Mode of consumption	Shoots, tips and young leaves are good potherbs. Its dry leaves are also kept for use and flavour.

19. *Bigonia Picta* Sm.

Family Name	Bigoniaceae
Vernacular Name	Pakhanachatta (Oraon),Pakhanachatta (Santhal), Lundi Ara (Munda)

Habitat	prefers moist places and well drained soil.
Habit	A perennial tuberous herb , 20 cm tall.
Stem	Glabrous or more or less pubescent, quadrangular, grooved; branches opposite.
Leaves	Leaves are few, 4-12 cm long, 3.5-10 cm wide, broadly ovate, doubly toothed, base heart shaped, tip long pointed. Upper leaf surface is hairy, lower hairy on veins. Leaves are often blotched purple or variegated., leaf stalk is 3-10 cm long and hairy.
Flowers	Light Pink Flowers, male flowers have 4 petals, outer petals 1.2x2 cm, nearly round to broadly ovate, obtuse, pink, inner petals 3x8 mm, oblong, pink white. Stamens are numerous. Female flower have 5 petals, 8-12 mm long, ovate-oblong. Styles are 3, persistent,
Fruits	Capsule is pendulous, 7-20 mm long.
Seeds	Brown, oval.
Flowering	Aug-Sept.
Seasonal Availability	Aug. to Nov.
Propagation	By seeds.
Mode of consumption	Leaves are collected, cooked as curry and taken. The sour testing stalks and stems are pickled.

20. *Boerhaavia diffusa* L.

Family Name	Nyctaginaceae
Vernacular Name	Khapra arxa (Oraon) Khapra sag (Santhal) Kecho Ara (Mundari)
Habitat	Found in grassy waste grounds
Habit	A very variable, diffusely branched, pubescent or glabrous, prostrate herb.
Stem	Creeping, often purplish, swollen at the nodes, up to 1.2 m long with a stout woody root stock..
Leaves	Long-petioled, ovate or oblong-cordate, entire or sinuate, usually whitish and smooth beneath and rough green on upper surface..
Flowers	Flowers red, pink or white, borne in small umbels arranged in axillary and terminal panicles

Fruits	Ovate, oblong, 1.3 cm long, five-ribbed, pubescent, viscid, glandular.
Seeds	Obovoid, Pale brown.
Flowering	August to December
Seasonal Availability	Rainy
Propagation	By seeds.
Mode of consumption	Season Tender leaves and young shoots are collected, fried/ roasted then eaten.

21. *Brassica Juncea* (L.) Czern.

Family Name	Brassicaceae
Vernacular Name	Sarson, (Oraon) (Santhal) (Mundari)
Habitat	Found in cultivated grounds, grown also.
Habit	A cool season annual growing perrenial herb. It is widely cultivated.
Stem	It has long, erect branches. It is about 100 cm tall or more.
Leaves	It's lower leaves are petioled, green and sometimes with a white bloom, ovate to obovate, variously lobed with toothed, scalloped or frilled edges, lyrate-pinnatisect, with 1-2 lobes or leaflets on each side and a larger sparsely setose, terminal lobe; upper leaves subentire, short petioled, 30-60 mm long, 2-3.5 mm wide, constricted at intervals, sessile, attenuate into a tapering, seedless, short beak 5-10 mm long.
Flowers	Inflorescence raceme corymbs, axillary or terminal, many flowered, elongated in fruit, ebracteate, flowers bisexual, yellow rarely white or pink, actinomorphic, pedicel slender, sepals 4, erect, oblong or ovate, glabrous or pubescent, basal pair saccate or not, petals 4, spathulate-obovate, margin entire, apex obtuse, almost twice long as than sepals, clawed, almost equal or slightly longer than sepals. Stamens 6, tetradynamous, filaments not dilated at the base, anthers oblong ovate, nectar glands 4, lateral and median, ovary superior, bicarpellary, syncarpous, linear, ovules 4-48, style distinct, stigma capitates or bilobed.

Fruits	Fruit siliqua, dehiscent, linear oblong, erect or slightly curved, compressed, valves papery, prominent midveined, torulose or smooth, glabrous or rarely pubescent, style short or obsolete.
Seeds	Seeds few to many, uniseriate, rarely biseriate, not winged, globose-ovoid, minutely reticulate, muvilaginous or not when soaked, cotyledons conduplicate.
Flowering	Winter season
Seasonal Availability	Winter
Propagation	By seeds.
Mode of consumption	Cooked as Vegetable

22. *Bryonopsis lacinosa* (L.) Naudin

Family Name	Cucurbitaceae
Vernacular Name	Toktoyan Sag (Oraon) , Toktoyan (Santhal)
Habitat	Monoecious annual weed, found on waste ground, cultivated and non cultivated fields.
Habit	Perrenial climber.
Stem	Stem ishairless, becoming thickened and white dotted on ridges when older.
Leaves	The leaves are broadly ovate, 3.5-14 X 4-14.5 cm palmately lobed, lobes are linear lance shaped to elliptic, hairless. Leaf stalk 1.5 -9 cm long.
Flowers	Flowers are small, white or yellowish, male in stalkless clusters of 2-8 along with 5 female flowers in the same axil. Sepal cup is 3-4 mm long in male, 1.5-2.5 mm long in female, sepals smaller than tube. Flowers of male larger than female.
Fruits	Solitary or in cluster of 2-5. It is ovoid, round, 1.5-2.5 cm when ripe. Fruit is red with longitudinal white strips, and reminds one of lollipop, hence the common name.
Seeds	The seeds are obovate, creamy-white or pale yellow, minutely scorbiculate.
Flowering	August – Oct.

Seasonal Availability	Whole year
Propagation	By seeds.
Mode of consumption	Cooked as Vegetable

23. *Butomopsis latifolia* (D.Don) Kunth

Family Name	Alismataceae
Vernacular Name	Lundi ara (Munda)
Habitat	Annual, Aquatic and marshy weed. Grows in shallow water after wet season, plant becomes emergent and flowers as water dries.
Habit	Herb
Stem	Rhizomtus, upto 50 cm tall.
Leaves	Petioles (5–)10–20(–25) cm. long; leaf-blade 3–11(–15) × 1.5–3.5(–5) cm.; base cuneate; apex bluntly acuminate; nerves 3–7.
Flowers	Whorls of 3–11 flowers, rarely up to 20; pedicels 6–11 cm. long, angular; bracts membranous, triangular-lanceolate, up to 1.5 × 0.5 cm.; bracteoles about 6, membranous, smaller than the bracts. Sepals up to 7 × 4 mm. Petals white, very delicate. Stamens with filaments 2 mm. long elongating to 4 mm. long at maturity; anthers 2 mm. long. Carpels about 5 × 2 mm., with sessile stigmas.
Fruits	Fruitlets with tips exserted from calyx..
Seeds	Seeds less than 0.5 mm. long, minutely warted
Flowering & Fruiting	Sept-Apr. Fruiting carpels 9 to 12 mm long.
Seasonal Availability	Whole Year
Propagation	By seeds.
Mode of consumption	Boiled then water is squeezed out and then cooked as pot herb.

24. *Cassia occidentalis* L.

Family Name	Caesalpiniaceae

Vernacular Name	Koha Chakonda (Oraon) BarkaChakonda (Santhal) Murang Chakonda (Munda).
Habitat	Annual weed, found on waste ground, cultivated and non cultivated fields.
Habit	An erect, fetid, woody herb or undershrub.
Stem	60-150 cm tall, smooth, purplish or green.
Leaves	Leaf compound, Alternate, pinnate, 15-20 cm long, stipulatewith a sessile dark brown gland near the base ofthepetiole;leaflets 4-6 pairs having sharp tip, opposite, shortstalked,membranous, ovate or lanceolate, 3-9cm long and 1.5-4 cm wide, base rounded, apex acute or attenuate, glabrous above, glaucous beneath.
Flowers	Yellow, in short, few-flowered axillary orterminalracemes. Sepals green and 6-9 mm long, petals yellow and 1-2 cm long, stamens 6-7 in two layers.
Fruits	dark brown seed pods, 8-12 cm long & 7-10 mm wide, curve slightly upwards.
Seeds	Dull brown, 4-5 mm long and flattened on both ends.
Flowering	August - September
Seasonal Availability	March to May
Propagation	By seeds.
Mode of consumption	Tender leaves are cooked and eaten.

Photo - 13 : ***Bacopa monnieri* (L) Wettst.**

Photo - 14 : ***Basella alba* Linn.**

Photo - 15 : ***Bauhinia purpurea* L.**

Photo - 16 : ***Bauhinia retusa* Roxb.**

Photo - 17 : ***Bidens pilosa* Linn.**

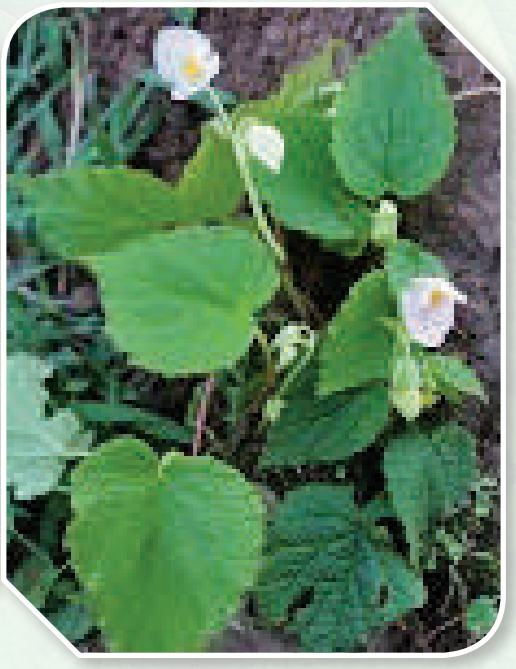

Photo - 18 : ***Bigonia picta* Sm.**

Photo - 19 : ***Boerhaavia diffusa* Linn.**

Photo - 20 : ***Brassica juncea* L.**

Photo - 21 : ***Bryonopsis laciniosa*** **(L.) Naudin**

Photo - 22 : ***Butomopsis latifolia*** **(D. Don) Kunth**

Photo - 23 : ***Cassia occidentalis*** **L.**

Photo - 24 : ***Cassia Cassia tora*** **L.**

25. *Cassia tora* (L.) Roxb.

Family Name	Caesalpiniaceae
Vernacular Name	Chakor (Oraon) Chakoara (Santhal)
Habitat	Annual weed, found on waste ground, cultivated and non cultivated fields.
Habit	An erect, fetid, annual herb or undershrub.
Stem	0.3-1 m tall with glabrous branches.
Leaves	Leaves 6-12.5 cm long; leaflets in 2-4 oppositepairs with a conical gland between each of thetwo lowest pairs of leaflets; blades 1.5-5 cmlong and 1.5-2.5 cm wide, membranous, ovateoblong,apex acute to subacute, oftenmucronate, base acute to asymmetricallyrounded.
Flowers	Usually in pairs, on very short axillarypeduncle; pale yellow, upper petal 2-lobed andthe others entire.
Fruits	Pods stout, 4-angled, 15-25 cm long, containing25-30 seeds.
Seeds	4-5 mm long, rhomboidal, yellowish brown to tan red, shiny.
Flowering	October to February
Seasonal Availability	Rainy Season
Propagation	By seeds.
Mode of consumption	Leaves are cooked and eaten as vegetable.

26. *Catharanthus pusillus* (Murray) G.Don

Family Name	Apocynaceae
Vernacular Name	Marchi sag (Santhal), Maricha arxa (Oraon)
Habitat	Annual weed, found on waste ground, cultivated and non cultivated fields.
Habit	An erect, glabrous annual herb.
Stem	Much branched with four angled branches, up to 60 cm tall.
Leaves	Leaves lanceolate, 2-7 cm long and 0.5-2 cmwide, apex acuminate; petioles 1.5-5 mm long.
Flowers	Solitary or in pairs, white.
Fruits	Small, divaricate, membranous follicles, inpairs.

Seeds	Subcylindrical, black and ribbed.
Flowering	July – August
Seasonal Availability	Rainy season
Propagation	By seeds.
Mode of consumption	Very tender leaves are cooked as vegetable.

27. *Celosia argentia* L.

Family Name	Amaranthaceae
Vernacular Name	Kim Araxa (Oraon) Siliari (Santhal) Sirgiti Ara (Munda)
Habitat	Annual weed, found on agricultural fields.
Habit	An erect annual herb.
Stem	Branched , angular, grooved, up to 100 cm tall.
Leaves	Linear-lanceolate to elliptic-lanceolate, acuminate, narrowed at the base, entire, up to 12 cm long and 4 cm wide.
Flowers	White or pink, glistening, borne in feathery, conical to cylindrical spikes. Flower heads have metallic sheen because individual flowers are silvery at the base
Fruits	Membranous utricle.
Seeds	1.3-1.5 mm long, 1.0-1.2 mm wide, glossy black, slightly reticulate.
Flowering	March to June
Seasonal Availability	Aug. to Jan.
Propagation	By seeds.
Mode of consumption	Young leaves and shoots are collected, roasted then eaten.

28. *Centella asiatica* (L.) Urb.

Family Name	Umbelliferae
Vernacular Name	Beng Sag, MukhaArka (Oraon) Chauke Ara (Munda), Brahmi Buti (Ho).
Habitat	Perrenial weed, found in wet places throughout the year.
Habit	Perennial creeping herb.

Stem	Prostrate, slender, creeping with long stolans and nearly glabrous or hairy on young parts.
Leaves	Cordate or hastate or orbicular or reniformorsub entire or palmately lobed consisting of long petiole and small stipules. Leaf blades are dentate, crenate with thick radiate veins anddark green in color. Leaves are glabrous on both surfaces.
Flowers	Inflorescence simple umbel of 3 – 6 flowers at the ends of slender peduncles arising from the axils of leaves and much shorter than petioles supported below by an involucre of 2–boat shaped membranous persistent bracts. Flowers are small, sessile and dark pink in color.
Fruits	Carpels oblong, sub–cylindric, curved and lessin length, much laterally compressed, readilyseparating into 2 indehiscent halves (mericarps) united by a very narrow plane of junction.
Seeds	Seeds are pumpkin shaped nutlets 0.1-0.2 inch long.
Flowering	July to August
Seasonal Availability	Whole Year, mainly in rains & spring
Propagation	By seeds.
Mode of consumption	Leaves and young shoots are collected, roasted then eaten.

29. *Chenopodium album* Linn.

Family Name	Chenopodiaceae
Vernacular Name	Bathua
Habitat	Erect shrubs, stem sangled, glabrous green stem irregular,
Habit	Erect shrubs upto 2 m tall,
Stem	Stem sangled, glabrous green, irregular,
Leaves	Leaves variable, 4-8 × 3-6 cm across, petiole 3-4 cm, rhombic, deltoid or lanceolate acute or obtuse, lyserate, entire or toothed.
Flowers	Spike axillary terminal, clusters or compact lax panicled, thyrsoid;
Fruits	Utricle
Seeds	Seeds smooth, keeled.

Flowering & Fruiting	Aug-Dec; Sept-Feb.
Seasonal Availability	Rainy Season
Propagation	By seeds.
Mode of consumption	Leaves and young shoots are collected, fried/ roasted then eaten.

30. *Cissus adnata* Roxb.

Family Name	Vitaceae
Vernacular Name	Khatta Sag (Oraon), Burlai ara, Jojo ara(Munda)
Habitat	found in forests throughout the year.
Habit	climbing shrub
Stem	climbing woody branches subterate, straite, pubescent, tendrils stout, creeping with long stolans and nearly glabrous or hairy on young parts.
Leaves	ovate, 5-12X4-9 cm, acute –acuminate at apex, truncate to cordate at base, bristly serrate at margins, nearly glabrousabov, dense, pubescent, petioles 3-8 cm long, hairy. Stipules glabrous, 3x2 mm long.
Flowers	Inflorescence umbellate cymes, 5-8 cm long, bracteolate, peduncles 2-4 cm long, hairy. Flowers 1.7 mm long, pedicels 2 mm long, hairy, calyx copular,truncate, hairy. Petals oblong 1.2x1 mm, acute, hooded, hairy. Stamens 1mm long, anthers ovoid, disc 4 notched, conspicuous, covering ovary. Ovary 1 mm across, style stout, stigma minute.
Fruits	Berries obovoid to obellipsoid, 5 mm across, black, one seeded.
Seeds	Seeds obovoid, 6x4 mm, oblique at base.
Flowering & Fruiting	July to Jan.
Seasonal Availability	Whole Year
Propagation	By seeds.
Mode of consumption	Leaves cooked as vegetable.

31. *Cleome gynandra* L.

Family Name	Capparidaceae
Vernacular Name	Sad Hurhuria Sag (Santhal), Charmani aa (Ho), Charmani (Munda)
Habitat	weed, found on waste ground.
Habit	An erect annual herb which is branched and stout. Usually 50 to 100 cm tall.
Stem	Branched, angular, ribbed, thickened above the node, densely hairy.
Leaves	Alternately arranged, stalked. Each leaf has 3-7 usually 5 leaflets which are pinnately dissected and stalkless. Leaflets vary from obovate to elliptic in shape, 2-10 cm long & 2-4 cm wide, finely toothed mrgins with round ends.
Flowers	Initially corymbose elongating into a densely bracteates racemes 30 cm in length. Flowers have long stalks, bracts smaller than leaflets. Flowers measure 1-2.5 cm in diam, 4 clawed petal, 4 sepals, 6 stamens with long purple filaments. Petals are white, pale, pink or lilac. Flowering – July to August
Fruits	Dark brown, about 1.2 mm across, rugose.
Seeds	The seed is a brown 1.5 mm diameter sphere.
Flowering	July to August.
Seasonal Availability	July to Feb.
Propagation	By seeds.
Mode of consumption	Leaves and young shoots are collected, roasted then eaten.

32. *Cleome monophylla* L.

Family Name	Capparidaceae
Vernacular Name	Hurhuria Sag (Santhal), Totasirio (Oraon), Hurhuria aa (Ho)
Habitat	weed, found on waste ground.
Habit	An erect annual herb. Upto 40 cm tall.
Stem	Branched, angular, striped, glandular, velvetty hairy..
Leaves	Simple, Alternately arranged, stalked, stalk upto 3.5 cm long, leaf size 1.5 -5 X 1-2.5 cm., ovate oblong or linear lanceshaped, bare flat, entire, fringed with hairs, tip pointed.

Flowers	Racemes upto 15 cm in length. Flowers 1-1.5 cm across,have long stalksupto 8 mm long,glandular, velvety, hairy. Petals pink or light purple, 6-10X1.5-2 mm, obovate or spoon shaped, base clawed,tip rounded. Stamens 6, filaments 5-8 mm long, unequal.Ovary 5-8 mm long, linear.
Fruits	Capsule 7-10 cm long, linear, nearly cylindrical, beaked, strongly ribbed, glandular, hairy.
Seeds	Dark brown, about 2 mm across, subobicular,ridged.
Flowering & Fruiting	February to August
Seasonal Availability	July to November
Propagation	By seeds.
Mode of consumption	Leaves and young shoots are collected, roasted then eaten. Leaves, young shoots and young flowering stems - cooked and used like spinach. As they are slightly toxic, it is advisable to eat the leaves a day after cooking to allow for the slightly toxic enzymes to break down. The plant has an unpleasant smell and acrid taste.

33. *Cleome viscosa* L.

Family Name	Capparidaceae
Vernacular Name	Sirioarkho(Oraon), Namkani (Santhal) Charmani aa (Ho)
Habitat	weed, found on cultivated and uncultivated fields.
Habit	An erect annual herb which is branched and upto 100 cm tall.
Stem	Branched, hairy with glandular and eglandular hairs. It has strong penetrating and unpleasant odour.
Leaves	Digitally compound ith 3-5 leaflets, leaflets obovate, elliptic oblong, very variable in size, 2-4 cm long,1.5-2.5 cm broad, middle one largest; petiole upto 5 cm long. Apex acute or obtuse.
Flowers	Whitish or yellowish, 10-15 mm across, pedicels 6-20 mm long, bracts foliaceous. Flowers borne on in the axils of reduced leaf like bracts. Sepals oblong lanceolate, 3-4 mm long, 1-2 mm wide glandular pubescent. Petals 8-15 mm long, 2-4 mm broad, oblong obovate. Stamens 10-12 rarely more not exceeding the petals, gynophores absent.

Fruits	Glandular, pubescent cylindrical capsule 3-10 cm long, 3-5 mm broad, linear, oblong, erect, obliquely striated, tapering at both ends.
Seeds	Dark brown, about 1 to1.4 mm across, glabrous with longitudinal striations and transverse ridges.
Flowering & Fruiting	July to October
Seasonal Availability	May to Oct.
Propagation	By seeds.
Mode of consumption	Leaves and young shoots are collected, fried/ roasted then eaten.

34. *Coccinia grandis* (L.) Voigt.

Family Name	Cucurbitaceae
Vernacular Name	Kundari (Santhal & Mundari), Van Kundri (Ho)
Habitat	Weed, found on waste lands.
Habit	An tropical perrenial herb which is aggressively climbing vine over fences, trees and other support.
Stem	Herbaceous climber with occasional adventitious roots forming where the stem runs along the ground. Long tendrils, elastic with coil like springy character.
Leaves	Palmately simple with 5 lobes with very variable shape from the heart to pentagon form. Size of the leaf is 5-10 cm in width and length.
Flowers	White in colour, large, about 4 cm in diameter, 5 tubular petals.
Fruits	Berry type, oval, hairless with thik sticky skin. Raw fruit is green and turns bright red when riped. Mature fruit is usually from 25-60 mm long by 15-35 mm in diameter.
Seeds	Several flattened seeds.
Flowering & Fruiting	July to September
Seasonal Availability	Most part of the year
Propagation	By seeds.

Mode of consumption	Cooked as Vegetable. Leaves and leafy shoots are collected, cut into small pieces, cooked with salt and chilly and then eaten.Edible fruit variety is cultivated.

35. *Colocasia esculenta* (L.) Schott

Family Name	Araceae
Vernacular Name	Pechki (Oraon), Kechu ara (Munda)
Habitat	weed, found on wet and moist waste lands.
Habit	Green taro is a tuberous bulb growing 100 -150 cm tall.
Stem	The corm shape is like a top with rough ridges, lumps and spindle roots. The skin is brown and the flesh is white or pink. It is a dasheen type of taro which has a large central corm and numerous small cormels arising from its surface.
Leaves	resembles elephant ears. Plant has heart shaped leaves, 2-3 ft long and 1-2 ft across on 3 ft large stalks that all emerge from an upright tuberous root stock, technically a corm.
Flowers	The inflorescence is rarely produced in cultivated plants is a green spathe and spadix, typical of arum family.
Seasonal Availability	June to Nov.
Propagation	By rhizome division.
Mode of consumption	Young tender leaves and leafy shoots are collected, cut into small piece, cooked with salt and chilly then eaten.

36. *Colocasia antichorum* L.

This is another species of Colocasia eaten by local communities. It is very much similar to Colocasia esculenta variety esculenta except that its base of petiole is deep purple, leaves are less green i.e. pale green, corm is large and more or less orbicular (approximately circular), cormels are small, numerous and round.

37. *Commelina bengalensis* Linn.

Family Name	Commenilaceae
Vernacular Name	Kenna Sag (Oraon) ,Kenna Sag (Munda), Upundu aa (Ho)
Habitat	Diffuse herb rooting at lower nodes.
Habit	A creeping or procumbent annual herb, 60-90 cm long.

Stem	Dichotomously branched with diffuse branches, often rooting at nodes.
Leaves	Leaves 2.5-7.5 cm long and 1.3-3.8 cm wide, ovate or oblong, apex obtuse, base unequal-sided, rounded, cuneate or cordate, sessile or shortpetioled, pubescent or villous on both surfaces.
Flowers	Spathes 1-3 together, funnel-shaped, auricled on one side, pubescent or hirsute; flowers blue, borne in branched cymes. Petals are blue, larger ones about 4x4.5 mm, broadly ovate. Stamens 3, staminodes 2, ovary up to 1 mm long.
Fruits	Capsules 0.6 cm long, pyriform, membranous.
Seeds	Oblong, closely pitted.
Flowering	September to November
Seasonal Availability	Sept. to Jan.
Propagation	By seeds.
Mode of consumption	Leaves and young shoots are collected, fried/ roasted then eaten.

Photo - 25 : ***Catharanthus pusillus*** **(Murr.) G. Don**

Photo - 26 : ***Celosia argentea*** **L.**

Photo - 27 : ***Centella asiatica*** **(L) Urb.**

Photo - 28 : ***Chenopodium album*** **Linn.**

Photo - 29 : ***Cissus adnata*** **Roxb.**

Photo - 30 : ***Cleome gynandra*** **L.**

Photo - 31 : ***Cleome monophylla*** **L.**

Photo - 32 : ***Cleome vlscosa*** **L.**

Photo - 33 : ***Coccinia grandis* (L.) Voigt.**

Photo - 34 : ***Colocasia antiquorum* Schott.**

Photo - 35 : ***Colocasia esculenta* (L.) Schott**

Photo - 36 : ***Commelina benghalensis* Linn.**

38. *Corchorus capsularis* Linn.

Family Name	Tiliaceae
Vernacular Name	Pat Sag (Oraon), Chench(Munda), Pat Sag (Santhal)
Habitat	Moist land, cultivated too.
Habit	An erect branched annual herb, 1-2 mt tall.
Stem	Usually purplish.
Leaves	Ovate-lanceolate, 5-12 cm long, pointed at the tip and rounded at the base with tail like projections on each side of the mid rib, and toothed at the margins.
Flowers	Yellow in colour, flowers are borne in small groups in the axils of the leaves, and are about 4 mm long. Sepals are often purplish.
Fruits	Capsules round to round obovoid and about 1 cm in diam.,have longitudinal ridges. when riped. Mature fruit is usually from 25-60 mm long by 15-35 mm in diameter.
Seeds	Cuneiform, 2 mm long, brown, glabrous.
Flowering	August to october
Seasonal Availability	May to November
Propagation	By seeds.
Mode of consumption	Leaves are eaten as vegetable. It is a favourite food during the summer months. Usually it is lightly sauteed and eaten along with rice or rice gruel.

39. *Corchorus olitorius* L.

Family Name	Tiliaceae
Vernacular Name	Koha Chanch (Oraon) Pat Sag (Munda)
Habitat	Weed, found on waste lands.It is also cultivtated.
Habit	An erect, annual, much branched herb, 90-120 cm tall.
Stem	Woody at base, branched.
Leaves	Broad, elliptic lanceolate, 6-10 cm long, 3.5-5 cm broad, serrate, lower serrations on each side prolonged into a filament like appendages over 6 mm long. Leaves are rounded at the base, leaf stalks 2-2.5 cm long.

Flowers	Pale Yellow in colour, bracts lance like, sepals 3 mm long, oblong, petals 5 mm long, oblong, spathulate. Stamens 10 to many, free, filaments short, anthers small.
Fruits	Capsules bilobed, 3-6.5 cm long, thin cylindrical, erect.
Seeds	Greenish-black, triangular, ovate, 2 mm long.
Flowering	August to October
Seasonal Availability	June to Nov.
Propagation	By seeds.
Mode of consumption	Tender Leaves and young shoots are collected, cooked then eaten.

40. ***Cordia dichotoma*** **G.Forst.**

Family Name	Boraginaceae
Vernacular Name	Dhanul (Oraon) Buch (Santhal) Bunch (Munda)
Habitat	found on moist deciduous to dry deciduous forest lands preferably along streams and moist places.
Habit	A small to moderate size deciduous tree.
Stem	Short bole and spreading crown. Stem bark is greyish brown, smooth or longitudinally wrinkled.
Leaves	Leaves are simple, entire and slightly dentate, elliptical-lanceolate to broad ovate with a round and cordate base.
Flowers	White in colour, short stalked, bisexual appear in loose corymbose cymes. Flowers open at night.
Fruits	Yellow or pinkish yellow showing globose or ovoid drupe seated in a saucer like enlarged calyx. It turns black on ripening and the pulp gets viscid.
Seeds	Solitary
Flowering	February to April
Seasonal Availability	March to April
Propagation	By seeds.
Mode of consumption	Tender leaves are cooked and eaten.

41. ***Cyanotis axillaris*** **(L.) D.Don ex Sweet.**

Family Name	Commenilaceae

Vernacular Name	Tena arxa (Oraon)
Habitat	found on waste moist land.
Habit	A creeping succulent herb. Common weed.
Stem	creeping with erect tops, 15-45 cm long.
Leaves	Stalkless, narrow, linear – lance like, 5-15 cm long.
Flowers	violet blue in colour, 5-6 mm across, couched in inflated sheaths in each leaf axil. Petals are broadly ovate and the filaments are bearded with long blue hairs which give the flowers a hairy appearance. Stamens 6, filaments pink with purple pilose hairs, ovary 1.5 mm, wooly, 3 celled, ovules 2 per cell, style 1.5 mm.
Fruits	Capsule 5-6 mm long, oblong, apex beaked.
Seeds	6 in number, 2mm across.
Flowering	August to october
Seasonal Availability	Rainy season
Propagation	By seeds.
Mode of consumption	Tender leaves are eaten as vegetable.

42. *Cyphostemma auriculatum* Roxb.

Family Name	Vitaceae
Vernacular Name	Lawaiarxa, amadsamad
Habitat	found in evergreen forests..
Habit	Scandent shrub. Large climber with densely velvety branches.
Stem	Bark on older stems deeply cracked; branches terete, succulent, softly pubescent; tendrils branched.
Leaves	Palmately divided into 5 leaflets. Leaflets are obovate, 6-14 cm long, 2.5-7.5 cm wide with a wedge shaped base and toothed margins. Leaflets end in a abruptly pointed tips.
Flowers	Greening cream, borne in flat topped clusters which are carried on long stout stalks which are longer than the leaf stalks. Sepals cup is 0.5 mm with 4 sepals. Petals are also 4, green, ovate, lance-shaped, 2.5 mm long.

Fruits	Round berry 1-2 cm across.
Seeds	one seed in each fruit.
Flowering	July to November
Seasonal Availability	Rainy & Winter
Propagation	By seeds.
Mode of consumption	Tender leaves and shoots are cooked and taken as food.

43. *Digera alternifolia* (L.) Aschers.

Family Name	Amaranthaceae
Vernacular Name	Kari Bhanji (Oraon), Kari Gendhari (Santhal)
Habitat	Grows wild in waste land.
Habit	False amaranth is a annual herb growing 20-70 cm tall.
Stem	Simple branched from the base, nearly hairless.
Leaves	Alternately arranged, 1-9 cm long and 0.2 to 5 cm broad, are narrow linear to broadly ovate. Leaf stalk is long upto 5 cm, base is narrowed and the tip pointed.
Flowers	Flowers are borne on slender spike like racemes, which can be as long as 30 cm long. The racemes are on a stalk that can be upto 14 cm long. Flowers are hairless, white mixed with pink to carmine or red, usually becoming greenish white in fruit.
Fruits	Sub globose, slightly compressed, 2-2.5 mm, bluntly ribbed along each side, surrounded by a thick rim.
Seeds	Small yellowish brown.
Flowering & Fruiting	February - march
Seasonal Availability	Rainy season
Propagation	By seeds.
Mode of consumption	Young plants are cooked and eaten as vegetable.

44. *Diplazium esculentum* (Retz.) Sw

Family Name	Athyriaceae
Vernacular Name	Dhenki Sag, Kukri Sag, Injjoarxa, Lindung bindung aa (Ho)

Habitat	Found on river banks, open places in wet ground.
Habit	Terrestrial fern ,grows about 50 cm tall.
Stem	Erect rhizome that is occasionally trunk like or can be creeping.
Leaves	Linear-lanceolate, margins dentate, petiole 30-60 cm, blae ovate, 2-pinnate to 2-pinnate – pinnatified, 50-100x15-50 cm, base narrowed, apex abruptly acuminate. Pinnae 1 – pinnate to 1-pinnate – pinnatified. Pinnules oblong, base truncate, auriculate, apex acuminate, incised or lobed halfway to costule. Veins pinnate, anastomosing.
Flowers	Flowers are borne on slender spike like racemes, which can be as long as 30 cm long. The racemes are on a stalk that can be up to 14 cm long. Flowers are hairless, white mixed with pink to carmine or red, usually becoming greenish white in fruit.
Sori	Sori elongate, 3.5 mm, single or double indusciate, thin.
Seasonal Availability	May to July
Propagation	By spores.
Mode of consumption	Young and immature leaves are cooked as vegetable. It is eaten either after boiling or frying.

45. *Dryopteris cochleata* (D. Don.) C. Chr.

Family Name	Dryopteridaceae
Vernacular Name	Kukri Sag, Kukri arxa (Oraon),Lindung bindung aa (Ho)
Habitat	In grasslands and forests.
Habit	Terrestrial herb with creeping rhizome.
Stem	Creeping
Leaves	Fronds 90-100X30-40 cm, bipinnate, stipe 40-50 cm, scaly towards base. Lamina rhomboid or ovate in outline.
Sori	Sori 2mm in diameter, circular yellowish brown in two rows, completely covering the entire lower side.
Seasonal Availability	March to May
Propagation	By spores.
Mode of consumption	Young and immature leaves are cooked as vegetable.

46. *Eclipta prostrata* L.

Family Name	Asteraceae
Vernacular Name	Bhringraj
Habitat	Found moist places in waste ground.
Habit	Annual herb about 90 cm tall.
Stem	Erector prostrate, entirely velvety, often rooting at nodes.
Leaves	Opposite, stalkless lower leaves sometimes shortly petioled, dull green, oblong,lance-shaped or elliptic measuring 2.5-7.5 cm long, 1-3 cm wide, apex acute or blunt, base attenuate or slightly serrate, pubescent, baselly swollen hairs on both surfaces, veins prominent.
Flowers	Flowers heads upto 1 cm in diam.; a cluster of sessile white glowers, in upper axils or terminal, solitary or two heads together. Peduncle thickened at top, variable in length, 0.5-7 mm long, hairy involucral bracts 5-6, usually shorter, hairy. Ray flowers marginal, pistillate, fertile, corolla white, ligulate, 2-3 mm long. Disc flowers numerous, central, perfect, fertile, corolla white, tubular,minute, 1.5-2 mm long. Stamens 5, separated filaments, anthers coalesced to form a tube around the style.
Fruits	Sub globose, slightly compressed, 2-2.5 mm, bluntly ribbed along each side, surrounded by a thick rim.
Seeds	Light brown to black, laterally flattened achenes, wedge shaped, 2-3 mm long, 0.9 mm wide.
Flowering	Aug.-Sept.
Seasonal Availability	Rainy season to early winter.
Propagation	By seeds.
Mode of consumption	Cooked as Vegtable

47. *Euphorbia hirta* L.

Family Name	Euphorbiaceae
Vernacular Name	Dudhia (Oraon) ,Dudhia (Santhal) ,Marang Dudhi (Munda)
Habitat	Found on waste ground and forests.
Habit	An erect or procumbent annual herb, 15-50 cm high.

Stem	Densely clothed with yellow hairs; branches often 4-angled.
Leaves	Opposite, 1.3-3.8 cm long and 0.6-1.6 cm wide, obliquely elliptic, apex acute, base usually unequal-sided, margins serrulate or dentate, hairy, dark green above and pale beneath.
Flowers	Numerous, less than 1.3 mm long, crowded in small, globose, greenish-yellow axillary cymes.
Fruits	Capsules minute, 1.25 mm in diameter, trigonous, appressed hairy.
Seeds	Angular, 0.8 mm long, light reddish-brown.
Flowering	In Summer
Seasonal Availability	Most part of the Year. The aerial parts of the plant are harvested when in flower during the summer and can be dried for later use.
Propagation	By seeds.
Mode of consumption	Tender leaves are cooked and eaten. It is a famine food.

48. *Enhydra fluctuans* Lour.

Family Name	Asteraceae
Vernacular Name	Muchari
Habitat	Semi-aquatic tropical herb common along ditches, Water course, margin of ponds and rice fields.
Habit	Annual prostrate spreading herb.
Stem	30 cm or more in length, somewhat fleshy, branched, rooting at the lower nodes and somewhat hairy.
Leaves	Stalklesslinear oblong, 3-5 cm in length, pointed or blunt at the tip, usually truncate at the base and somewhat toothed at the margins.
Flowers	White or greenish white. Flowers heads are without stalks, are borne singly in the axils of theleaves, and excluding the bracts are less than 1 cm in diam, outer pair of the involcral bracts is ovate, 1-1.2 cm long, the inner pair is somewhat smaller.
Fruits	The achenes are enclosed y rigid receptacle scales.
Seasonal Availability	April to June

Propagation	By seeds and vegetative mehod.
Mode of consumption	It is washed, chopped Cooked/Steamed and eaten.

49. *Eryngium foetidum* L.

Family Name	Apiaceae
Vernacular Name	Kanta Dhania, Acchodhania
Habitat	Open rocky places, waste lands, road sides, forest edges and lowland areas.
Habit	Annual or biennial herb, 15-45 cm high.
Stem	Green, Basal leaves numerous.
Leaves	Resolute, the blades lance shaped to inverted lance-shaped, up to 30x5 cm, rounded toothed to spinilose – saw toothed.
Flowers	White or greenish. Heads numerous, cylindric, about 10x5 mm, the involucral bracts lance shaped exceeding the heads, commonly 2-3 cm long.
Fruits	Greenish,sub-spherical about 1.5 mm in diameter.
Seeds	Seeds produced all round the year.
Flowering	April to December
Seasonal Availability	Rainy & Winter
Propagation	By seeds.
Mode of consumption	The leaves are used fresh as a culinary herb which has a similar, but stronger flavor than Coriander (Coriandrum sativum). It is often added to chutneys, a sauce containing fruits or vegetables that is eaten with other dishes.

Photo - 37 : ***Corchorus capsularis*** **Linn.**

Photo - 38 : ***Corchorus olitorius*** **L.**

Photo - 39 : ***Cordia dichotoma*** **G. Forst.**

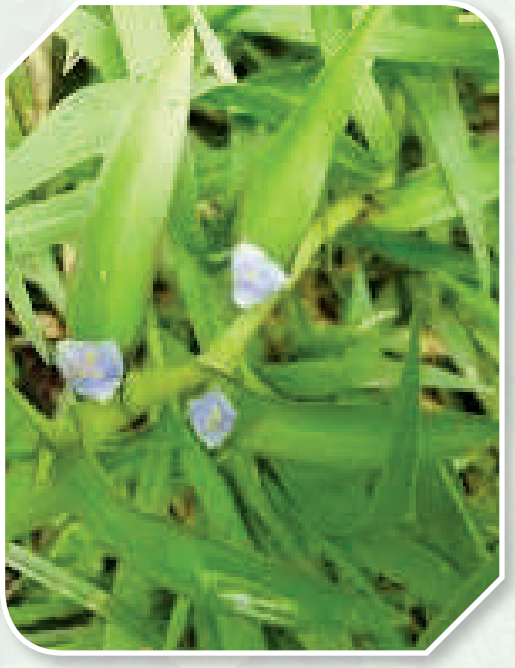

Photo - 40 : ***Cyanotis axillaris*** **(L) D. Don ex Sweet**

Photo - 41 : ***Cyphostemma auriculatum*** **Roxb.**

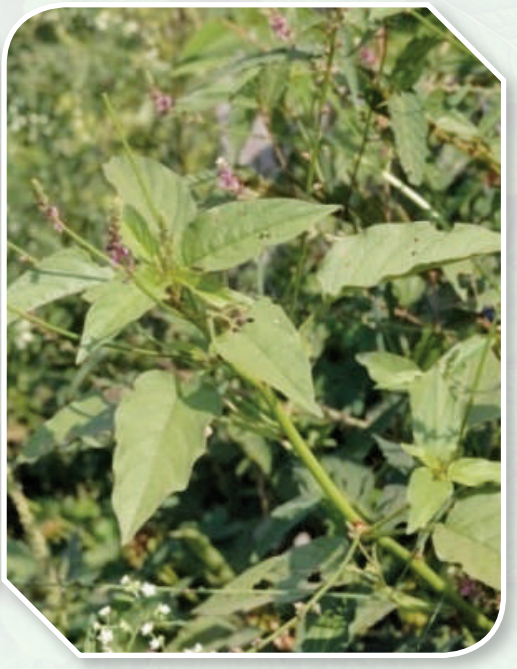

Photo - 42 : ***Digera alternifolia*** **(L.)Aschers.**

Photo - 43 : ***Diplazium esculentum*** **(Retz.) Sw**

Photo - 44 : ***Dryopteris cochleata*** **(D. Don.) C. Chr.**

Photo - 45 : ***Eclipta prostrata* L.**

Photo - 46 : ***Euphobia hirta* L.**

Photo - 47 : ***Enhydra fluctuans* Lour.**

Photo - 48 : ***Eryngium foetidum* L.**

50. *Fagopyrum esculentum* Moench

Family Name	Polygonaceae
Vernacular Name	Ugal sag
Habitat	Waste grounds
Habit	Annual herb, growing up to 1 m tall.
Stem	Stem is ribbed, reddish, hairless or minutely hairy.
Leaves	Traingular or arrow shaped, heart shaped, basal lobes rounded to long pointed, 1.5-10x 1-8 cm in size. Leaves are stlked, stalk 0.5-2 cm long. Lower leaves have long stalks, upper ones are nearly stalkless.
Flowers	Pink or white, borne on Stalked many flowered corymb like clusters in leaf axils and at the end of branches. Petals 5, ovate r oblong-ovate 3x2 mm. Stamens 8, unequal, about 1.5 mm long. Ovary is 3 angled, styles 3 as long as ovary.
Fruits	Nuts are deeply 3 angled, angles acute, brown, smooth,narrowed at both ends, 4-8x2.5-5 mm broad.
Seeds	Single seed inside a solid outer hull. It is similar to sun flower seed. It is used for making flour.
Flowering	May-September
Seasonal Availability	Summer months
Propagation	By seeds.
Mode of consumption	Eaten raw or Cooked as Vegetable.

51. *Ficus geniculata* Kurz.

Family Name	Moraceae
Vernacular Name	Putkal (Oraon) Putkal (Santhal) hesaJaitputkal (Munda)
Habitat	Forests
Habit	Evergreen tree
Stem	A large tree. Bark brownish grey, stipulately pubescent, reticulately fissured vertically, inside light brown, very finely fibrous, branchletslenticellate.

Leaves	Leaves clustered apically on branchlets; alternate, petiole 2-7 cm, glabrous; leaf blade ± elliptic to broadly ovate, 4.5-11 × 3-8 cm, adaxiallyglabrous and shiny when dry, base broadly cuneate to rounded, apex mucronate; secondary veins 5-12 on each side of midvein, raised on both surfaces.
Flowers	Male, gall, and female flowers within same fig. Male flowers: few, near apical pore; calyx lobes connate; stamen 1; filament short; anther broadly ovoid. Gall and female flowers: calyx lobes 2 or 3, lanceolate; style in female flowers longer than in gall flowers.
Fruits	Figs axillary on short woody branchlets or on leafless older branchlets, in clusters of 2-4, red when mature, depressed globose, 5-7 mm in diam, with conspicuous interfloral bristles, tuberculate, sessile or subsessile; involucral bracts broadly ovate. Achene obovoid, syconous fruit.
Seeds	Seeds are passed through the alimentary canals of birds and other animals that feed on the fruits.
Flowering	April-May
Fruiting	June-July
Seasonal Availability	March to April
Propagation	By seeds and vegetative method.
Mode of consumption	Young leaves and buds are cooked and eaten. Pickle is also made.

52. *Ficus infectoria* Roxb.

Family Name	Moraceae
Vernacular Name	Phutkal (Oraon) Phutkal (Santhal) hesaHesaputkal (Munda)
Habitat	Along stream sides

Habit

Deciduous tree with a spreading canopy. It usually grows up to 15 mt tall but sometimes up to 30 mt. The plant often begins life as an epiphyte, growing in the branch of another tree; as it grows older it sends down aerial roots which, when they reach the ground quickly form roots and become much thicker and more vigorous. They supply nutrients to the fig, allowing it to grow faster than the host tree. The aerial roots gradually encircle the host tree, preventing its main trunk from expanding, whilst at the same time the foliage smothers the foliage of the host. Eventually the host dies, leaving the fig to carry on growing without competition

Stem

Stem is up to 70 cm in diameter. The aerial roots commonly wrap around th main stem instead of forming props.

Leaves

Leaves are from 8-19 cm long and 3-6 cm wide, with a whitish midrib. Stipules are less than 1 cm long. Leaves begin to drop mid February. New leaf emerge in March with colors of purple and red and bronze, giving tree a wonderful look. The color transformation goes on till April.

Fruits

The pea size figs are in pairs and greenish white to brown with spots. The trees produce three types of flower; male, a long-styled female and a short-styled female flower, often called the gall flower. All three types of flower are contained within the structure usually thought as the fruit. Fig trees have a unique form of fertilization, each species relying on a single, highly specialized species of wasp that is itself totalydependant upon that fig species in order to breed. The female fig wasp enters a fig and lays its eggs on the short styled female flowers while pollinating the long styled female flowers. Wingless male fig wasps emerge first, inseminate the emerging females and then bore exit tunnels out of the fig for the winged females. Females emerge, collect pollen from the male flowers and fly off in search of figs whose female flowers are receptive. In order to support a population of its pollinator, individuals of a Ficus spp. must flower asynchronously. A population must exceed a critical minimum size to ensure that at any time of the year at least some plants have overlap of emmission and reception of fig wasps. Without this temporal overlap the short-lived pollinator wasps will go locally extinct.

Flowering	April-May
Fruiting	June-July
Seasonal Availability	March to April
Propagation	By seeds and vegetative method.
Mode of consumption	Young leaves and buds are cooked and eaten. Pickle is also made.

53. *Gamochaeta pensylvanica* (Willd.) Cabrera

Family Name	Asteraceae
Vernacular Name	Putam aa (Ho), Chitra sag, Ledra Sag
Habitat	Forests, moist waste land.
Habit	Annual herb 10-40 cm tall.
Stem	Erect, stem simple or branched from the base, with thin greyish to white tomentum.
Leaves	Lower stem leaves are sparsely velvety on lower, usually obovate and long wedge shaped, sometimes oblanceolate blunt to pointed,2-4 cm long,3-8 mm wide. Upper stem leaves are similar but smaller, narrower & broad based, sometimes folded.
Flowers	Flower heads are borne in dense clusters in leaf axils and at the end of stems. Involucral bracts are oblong, obtuse to apiculate, 2.5-3 mm long, sterome green lamina pale brown, gap and margins clear, outer bracts almost covered by hairs.
Fruits	Achenes minutely papillat, 0.4-0.5 mm long.
Flowering	September – October
Seasonal Availability	Rainy
Propagation	By seeds.
Mode of consumption	Tender shoots with leaves are cooked and eaten as vegetable.

54. *Glinus lotoides* L.

Family Name	Molluginaceae
Vernacular Name	Punernove, Dusera Sag

Habitat	Forests
Habit	Annual prostrate herb 40 cm long with various parts wooly.
Stem	More or less prostrate with spreading rosette-forming stems.
Leaves	0.6-2 cm long,0.5-1.8 cm broad, round or more or less wedge shaped, often with a sharp point at the tip, stalk 2-8 mm long. Leaves opposite, alternate or appearing whorled, elliptic, obovate or spathulate, up to 37 mm long, densely covered in whitish, woolly stellate hairs; margin entire
Flowers	Flowers in stalkless clusters of 5-6 at the nodes in leaf axils, greenish-white, sometimes tinged pink, stamens numerous. Flower stalk are up tp 1.5 mm long,sepals 4-4.5 mm long, upo 7 mm in fruits,persistent,ovate to ovate-oblong. Stamens – fertile stamens are 12, stigmas 5,linear,about 1 mm long,persistent..
Fruits	Capsule is round or oblong,about 6 mm long, membranous, enclosed in the sepals.
Seeds	Many, less than 1 mm long.
Flowering	Feb – May
Seasonal Availability	March to October
Propagation	By seeds.
Mode of consumption	Cooked as Vegetable . Young shoots and leaves are collected, roasted and then eaten.

55. *Glinus oppositifolius* (L.) Aug. DC.

Family Name	Molluginaceae
Vernacular Name	Gima
Habitat	Deciduous Forests and along lakes and streams.
Habit	An annual decumbent or prostrate creeping herb, hairless.
Stem	Stems up to 50 cm long, hairless.
Leaves	Leaves are in pseudowhorls of 3-6 or opposite, leaf blade spoon shaped or elliptic, 1-2.5 cmx3-6 mm, base attenuate, margin with sparse teeth, apex obtuse or acute. Leaf stalks are short.

Flowers	Flowers are greenish white in color around 5-8 mm across. Perianth segments white or tinged with pink. Stamens 3-5, carpels 3, style 3.
Fruits	Capsule up to 3 mm long, oblong, loculicidal, enclosed in erect calyx.
Seeds	Numerous.Seeds ovoid, curved, tubercled, dark reddish brown, with a pair of unequal white hilar appendages.
Flowering	Almost all year round.
Seasonal Availability	March to October
Propagation	By seeds.
Mode of consumption	Slightly bitter in taste. Cooked as Vegetable. Young shoots and leaves are collected, roasted and then eaten.

56. *Hedyotis scandens* Roxb.

Family Name	Rubiaceae
Vernacular Name	Lata Guji, Bislata(Santhal)
Habitat	Forests in humid soil.
Habit	A slender woody much-branched perennial climbing shrub.
Stem	Woody.
Leaves	Leaves opposite, narrow, oblong or elliptic. Size 3-5 inch, green when dry, sometimes caudate, acuminate smooth, flat, stipules membranous, ciliolate.
Flowers	Flowers white, turning cream in axillary and terminal compound compact trichotomouscymes. Pedicillate, calyx obconic, teeth ovate, acute or obtuse, corolla tube short, glabrous, lobes long bearded within.
Fruits	Capsule broadly ovoid, crown very prominent, loculicidallygaping, cells many seeded. Globose.
Seeds	Numerous
Flowering & Fruiting	November to March
Seasonal Availability	Whole Year
Propagation	By seeds.

Mode of consumption	Cooked as Vegetable

57. ***Hibiscus sibdariffa*** **Linn.**

Family Name	Malvaceae
Vernacular Name	Kudrum
Habitat	Disturbed grounds
Habit	An annual or perennial,erect, simple or branched shrub.
Stem	Stem with sparse, simple, bulbous, spiny hairs, up to 3 mt high.
Leaves	Alternate,Blade ovate and not lobed in the lowermost part, in the upper part 3-7 partite; lobes elliptic-lanceolate, coarsely serrate, nearly glabrous on both sides; stipules 6-8 mm long, filiform; petiole 4-15 cm long, almost somewhat spiny near the top.
Flowers	Flowers axillary, solitary, subsessile; epicalyx segments 7-8, linear, 6-10 mm long, sparsely prickly. Calyx fused at the base, 1-2.5 cm long, wooly, also setose or prickly, lobes long acuminate-aristate, with a swollen, linear gland on the central nerve at the base. Corolla yellow with a crimson centre, 3-5 cm across; petals obovate, 4-6 cm long, 2-4 cm broad. Staminal column inserted.
Fruits	Capsule 1.5-2 cm long, c. 1 cm across, conical, beaked, appressed-setose.
Seeds	Seeds many, 2-3 mm long, brown.
Flowering	August to october
Seasonal Availability	Whole Year
Propagation	By seeds.
Mode of consumption	Tender leaves and stem cooked as Vegetable. The leaves are steamed along with lentils and cooked with dal. Hibiscus acetosella has red leves. Leaves are edible.

58. ***Hygrophila auriculata*** **(Schum.) Hiene**

Family Name	Acanthaceae
Vernacular Name	Koilaara (Munda)

Habitat	Wet places, does well at the edges of seasonal pools or stagnant water bodies.
Habit	A stout aquatic perennial herb, 1-2 m high.
Stem	Erect, unbranched, hairy near swollen nodes.
Leaves	Lance like, stalkless,10-15 cm long densely hairy occurring in whorls of 6 at each node of the stem. Straight yellow, 4 cm long spines are present in the axil of each leaf.
Flowers	Occurs in 4 pairs at each node.The long purple blue flowers are 2 lipped-the upper lip is 2-lobed and the lower one 3-lobed with length wise folds. Flowers open in opposite pairs.
Fruits	Capsuls 8 mm long, linear-oblong, pointed.
Seeds	The seeds contain large amounts of tenacious mucilage and potassium salts, which are responsible for the diuretic property of the seeds.
Flowering	October to April
Seasonal Availability	Oct. to Feb.
Propagation	By seeds.
Mode of consumption	Cooked/Steamed and eaten.

59. *Ipomoea aquatica* Forssk.

Family Name	Convulvulaceae
Vernacular Name	Kalmi (Oraon)
Habitat	Weed, Common in water bodies, floating on mud or trailing in water
Habit	A sprawling vine, annual or perennial, creeping on mud or floating on water; up to 3 m long, to 1cm in diameter.
Stem	Branched, terete,Hollow and succulent allowing them to float. These root at the nodes.
Leaves	Emersed, glabrous, alternate; petioles succulent when grown in water, 3-20 cm long; blades greenish-brown, triangular, ovate, lanceolate, orlinear, entire to dentate, 3-15 cm long, 1-12 cm across, bases truncate, cordate, hastate, or sagittate, lobes rounded to acute, entire to dentate.

Flowers	Trumpet shaped, 3-5 cm dia., usually white in colour with a purple center. peduncles 0.5-18 cm long.
Fruits	A capsule, glabrous, globose to ovoid, 8-10 mm long.
Seeds	Brown or black, mostly pubescent, 3-ranked,rounded on back, about 5 mm long, about 4 mmwide.
Flowering &Fruiting	November to March
Seasonal Availability	Whole Year
Propagation	By cutting.
Mode of consumption	Leaves and tender shoots are collected, cooked and then eaten.

60. *Jussiaea repens* L.

Family Name	Onagraceae
Vernacular Name	Machli Sag, Nalkimarxa
Habitat	Weed, aquatic or subaquatic perennial herb, usually found in fresh water habitat.
Habit	It is aquatic herb, may be emergent, may be anchored with horizontal extensions over the water surface, or may be floating.
Stem	can float on the surface of water.
Leaves	Alternate, oblong, up to 7 cm long, apex rounded or obtuse, margin entire.
Flowers	consists of 5 creamy white petals, yellow at the base, ovate, apex rounded.
Fruits	Capsule. 2.5 cm long, terete, 10-ribbed, dehiscing by 4-5 valves.
Seeds	Seed uniseriate in each cell. Pendulous, each enclosed in and firmly attached to more or less quadrate piece of endocarp about 1.5 mm. long and wide, the actual seed 1–1.5 mm. long and 0.5–0.7 mm. wide. Plants have two types of roots, one that anchor plants to the soil and other which look like tiny banana (that is why also called water banana). The later contains air sac to keep the plant afloat and assist respiration.

Seasonal Availability	Rainy season
Propagation	Vegetative.
Mode of consumption	Tender leaves with shoot cooked as vegetable.

61. *Jussiaea suffructicosa* L.

Family Name	Onagraceae
Vernacular Name	Machli Sag, Nalkimarxa
Habitat	Weed, aquatic or subaquatic perennial herb, usually found in fresh water habitat.
Habit	Erect, branched half woody shrub, growing to 1 mt tall.
Stem	Sparsely covered with short hairs.
Leaves	5-8 cm long, leaflets are 9 to 11, oblong to oblong elliptic, 1-2 cm long, pale and hairy beneath.
Flowers	Red, about 5 mm long and borne on axillary and solitary racemes, 2-3 cm long.
Fruits	Pods are numerous, crowded, strongly curved, 1-1.5 cm long and contains 6-8 seed.
Seeds	Seeds pluriseriate in each cell, free, each with an enlarged raphe almost as big as the body of the seed, together forming a more or less round brown body 0.5–0.75 mm. in diameter, with a marked furrow running up its middle. It is source of natural indigo and along with indigoferatinctoria represents the chief commercial indigo. It is used as perennial cover crop for coffee .
Seasonal Availability	Rainy season
Propagation	Vegetative.
Mode of consumption	Tender leaves with shoot cooked as vegetable.

Photo - 49 : ***Fagopyrum esculentum*** **Moench**

Photo - 50 : ***Ficus geniculata*** **Kurz**

Photo - 51 : ***Ficus infectoria*** **Roxb.**

Photo - 52 : ***Gamochaeta pensylvanica*** **(Willd.) Cabrera**

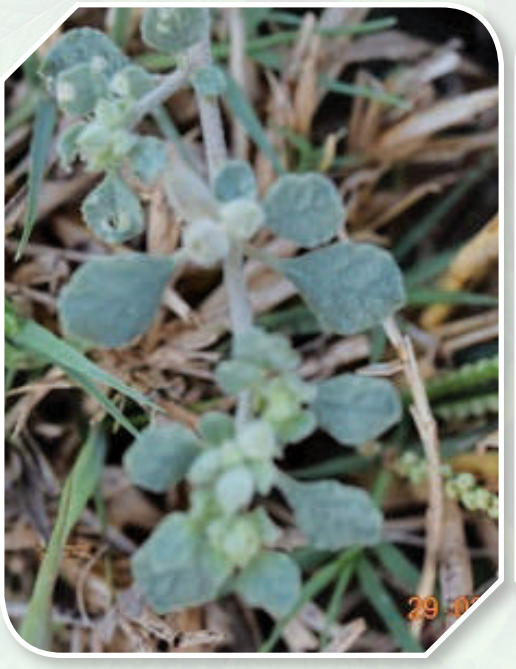

Photo - 53 : ***Glinus lotoides* L.**

Photo - 54 : ***Glinus oppositifolius* (L.) Aug. DC.**

Photo - 55 : ***Hedyotis scandens* Roxb.**

Photo - 56 : ***Hibiscus sibdariffa* Linn.**

Photo - 57 : ***Hygrophila auriculata*** **(Schum.) (Schumach.) Hiene**

Photo - 58 : ***Ipomoea aquatic*** **Forssk.**

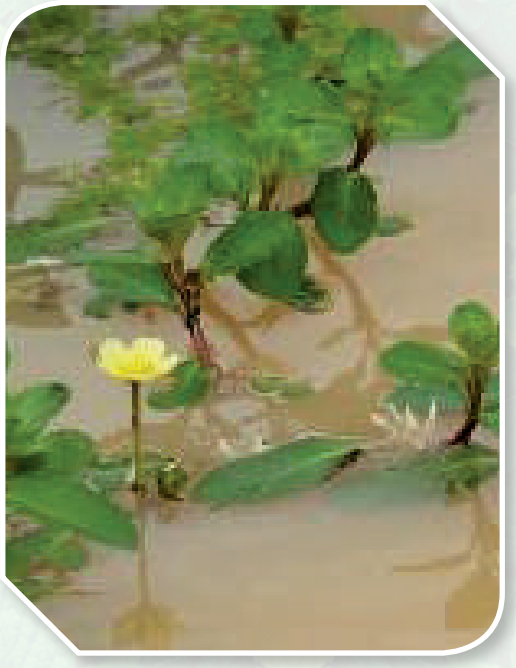

Photo - 59 : ***Jussiaea repens*** **L.**

Photo - 60 : ***Jussiaea suffruticosa*** **L.**

62. *Lasia spinosa* (L.) Thwaites

Family Name	Araceae
Vernacular Name	Kantasaru
Habitat	River bank, ditches and moist places.
Habit	Monocot Weed, evergreen, herbaceous, perennial plant growing 1-2 mt tall.
Stem	Spiny, creeping and upturning, up to 4 cm thick.
Leaves	Leaf blade sagitate, entire or pinnate fid, with aculei along veins on lowe5x35 cm, poeterior lobes to 25x10 cm; Peduncle to 75 cm, aculeate. Spathe coriaceous, greenish brown to purplish, to 55 cm long and slightly twisted, flexing open in lower 7 cm to expose spadix.
Flowers	Spadix 5x1 cm (7x4 cm in fruit), Pinkish and finally greenish tan. Flowers usually 2-merous, protogynous.
Fruits	Leathery, warty on top.
Seeds	Seed ovoid-cordate, 5-7 mm.
Flowering	July – September
Seasonal Availability	October to February
Propagation	By seeds.
Mode of consumption	Used as Vegetable. Peeled leaf stalked after removing the spines and tender leaves are eaten as vegetables.

63. *Lepisanthes rubiginosa* (Roxb.) Leenh.

Family Name	Sapindaceae
Vernacular Name	Jal Kusum
Habitat	Found in more open vegetation: in deciduous forests; young secondary forests; shrub land; along forest edges; roadsides; and river banks.
Habit	Large to medium sized tree, 16 mt tall.
Stem	Bark dark brown or grey, warty. Shoots pubescent.
Leaves	Alternate, Peripinnate, exstipulate; leaflets 8-12, subopposite, ovate, ovate- lanceolate or oblong lanceolate, 4.5-17x 2-7 cm, acute or acuminate, base obtuse, often oblique, softly villous on both sides, petiolules up to 5 mm long, Panicles terminal, rusty tomentose, 25-50 cm long.

Flowers	Male and bisexual in the same inflorescence, white, 0.4- 0.6 cm long, sepals 5, inner 2 smaller, pubescent outside up to 3.75 mm long, imbricate; Petal 4, slightly larger than sepals, glabrous, oblong rounded each with a wooly scale. Disc interrupted, glabrous. Stamens 8, filaments hairy, anthers oblong, ovary 3-merous, densely hairy.
Fruits	5-8 mm long, glabrous, black when ripe.
Seeds	Seeds 9-12 mm long. Cotyledons thick and fleshy, one larger than the other.
Flowering & Fruiting	Jan to Aug.
Seasonal Availability	Spring season
Propagation	By seeds and cuttings.
Mode of consumption	Young leaves are cooked and eaten as Vegetable.

64. *Leucas aspera* (Willd.) Link

Family Name	Lamiaceae
Vernacular Name	Guma (Chero&Kharwar), Tupi aa (Ho)
Habitat	Annual Weed of Rabi season found in cultivated fields of Wheat, maize & Arhar crops.
Habit	Erect and diffusely branched annual herb, 15-40 cm tall.
Stem	Erect, usually much diffusely branched frombelow, stout, hispid. Branches quadrangular, hispid.
Leaves	Linear or oblong, 2.5 to 7.5 cm long with blunt tips and scalloped margins.
Flowers	Whorls are large, terminal and axillary, about 2.5 cm in diameter and crowded with white bell shaped flowers. Calyx is variable with an upper lip and short traingulat teeth.
Fruits	Nutlets long-oblong sub-truncate at the apex, smooth and brown.
Seeds	Subcylinderic, truncate at apex, reddish brown.
Flowerin & Fruiting	Rainy Season
Seasonal Availability	July to Jan.

Propagation	By seeds.
Mode of consumption	Leaves and young shoots are chopped into small pieces, roasted and taken as food. Salt is added to taste.

65. *Leucas cephalotes* Spreng.

Family Name	Lamiaceae
Vernacular Name	ChotiGuma (Chero & Kharwar), Tupi aa (Ho)
Habitat	Annual Weed of Rabi season found in cultivated fields of Wheat, maize & Arhar crops.
Habit	Erect and unbranched or with few branches, annual scaberulous, stout herb, 60-90 cm tall.
Stem	Erect, Stem and branches quadrangular.
Leaves	Narrow, oblong-elliptic, cuneate, nearly entire to slightly toothed, up tp 8x2 cm with long and short eglandular hairs denser below. Leaf stalk on lower leaves is nearly absent to about 5 mm only.
Flowers	Flowers are white, about 1.5 cm, upper lip bearded, lower lip clearly longer than upper. Flowers are borne in 1-2 distant spherical dense whorls on branches, 2-3.5 cm in diam. Upto 50 flowered. Bracts are numerous, imbricate, narrow, ovate-lanceolate, acuminate, equally calyces, ciliate on margin. Sepal cup is 1.2-1.5 cm, tubular, slightly curved,clearly nerved, teeth 10, subequal, shortly triangular, mucronate about 1 mm.
Fruits	Nutlets are narrow, oblong, bluntly trigonous, about 3x2 mm.
Flowering & Fruiting	September to December
Seasonal Availability	Rainy
Propagation	By Seeds.
Mode of consumption	Leaves and young shoots are chopped into small pieces, roasted and taken as food. Salt is added to taste.

66. *Limnophila aromatica* (Lam.) Merr.

Family Name	Scrophulariaceae
Vernacular Name	Lasodh Ara (Munda)
Habitat	Around reservoir & other moist places, shallow ponds, marshy locations.

Habit	It is annual to perennial herb growing 30-100 cm tall..
Stem	Immersed under water, plant stem can attain an height of 25-50 cm. Stem quadrangular, pubescent.
Leaves	Green leaves with purple underside., 1-2 inches long. Leaves ternate, ovate-lanceolate, apex acute, amplexicaule, serrate, pubescent, membranous, sessile.
Flowers	Blooms only under immersed condition. It bears small pretty purple flowers at the left nodules.
Fruits	Capsule 6 mm long.
Flowering & Fruiting	February-April
	It has unique and tantalizing flavour reminiscent of lemon, nutmeg and curry. It can be propagated by cutting.
Seasonal Availability	Sept. to Feb.
Propagation	By seeds.
Mode of consumption	Cooked/Steamed and eaten. Chatni is also prepared.

67. *Limnophila gratioloids* R. Br.

Family Name	Scrophulariaceae
Vernacular Name	Lasodh Ara (Munda) Kado Sag, Chattor Sag
Habitat	It can lie both in water or on moist land.
Habit	Perrenial herb.
Stem	Submerged stem much branched, hairless. Aerial stems are upto 15 cm, simple or branched, hairless with stalked or stalklessglands.
Leaves	Submerged leaves are whorled, 1.5-2.5 cm, pinnately cut into segments which ae flattened to capillary. Aerial leaves are usually whorled, pinnately lobed, 0.4-2 cm, sometimes few opposite and toothed.
Flowers	White or Pale purple or reddish spot. Flowers arise singly in the axil of aerial leaves. Flower stalk is slender, 2-10 mm, usually longer than bract. Bracteoles 2, 1.5-3.5 mm, margin entire or sparsely serrate, apex acute. Sepal cup is 3.5-5 mm, with stalkless glands, sepals 2-3 mm, ovate to lance-shaped, tip short, pointed.

Fruits	Capsule is dark brown, compressed, ellipsoid to round, about 3 mm across.
Flowering	March – November
Seasonal Availability	Rainy & Winter
Propagation	By seeds.
Mode of consumption	Leaves and young shoots are collected, cooked and eaten as vegetable.

68. *Limnophila confirta* Benth.

Family Name	Scrophulariaceae
Vernacular Name	Muchari Sag, Hemcha Sag
Habitat	It is an annual plant growing in marshy places, rice fields particularly in low lying areas (Cook 1996). It is a very variable aquatic herb growing in wet places (Henry and Chitra 1987) and moist sandy soil (Singh 1997).
Habit	Erect or procumbent herbs with strong aromatic smell up to 45 cm tall.
Stem	Stems erect, basally prostrate or repent, simple or branched.
Leaves	Leaves opposite, sessile, narrowly elliptic, linear-lanceolate, or lanceolate-elliptic, 0.5-3 cm X 3-10 mm, adaxiallyhispidulous or subglabrous, base subamplexicaul, margin serrate; veins pinnate.
Flowers	Flowers solitary and axillary, or in axillary racemes. Pedicel 0.5-3 mm, hispidulous. Bracteoles 2-3 mm. Calyx 4-6 mm, hispidulous to subglabrous, with raised veins in fruit; lobes 1.5-3 mm, narrowly lanceolate, margin ciliate, apex acuminate. Corolla white, violet-pink, or blue, 5-10 mm, outside glabrous, inside white villous. Stamens4, stigma spathulate.
Fruits	Capsule 3-4 mm long, ellipsoid.
Seeds	Brown, angular
Flowering	Nov –May
Seasonal Availability	Sept. to Feb.
Propagation	By seeds.
Mode of consumption	Leaves and young shoots are roasted and taken as food.

69. *Limnophila rugose* Roth. (Merr.)

Family Name	Scrophulariaceae
Vernacular Name	Lasodh Sag
Habitat	It is an annual plant growing in marshy places, along streams, pools and rice fields.
Habit	Erect, semiaquatic, perrenial herb growing up to 50 cm tall.
Stem	Simple or branched, rootingat lower nodes, then ascending up to 16 cm high, adpressed hispid.
Leaves	Ovate lanceolate to ovate elliptic, 1.6-4 x 0.7-1.7 cm, tapering to base, subacute at apex, entire glabrous to scabrid above, hirsute on nerves beneath, petiole 7-10 mm long, densely hirsute.
Flowers	Solitary in leaf axils, sessile, calyx lobes divided to base, unequal, lanceolate, up to 7x1 mm, acuminate,minutely hispid. Corolla purple red to blue, up to 10 mm long.
Fruits	Capsule broadly ovoid, 5 mm long, invested by longer calyx lobes.
Flowering	Aug-Nov.
Seasonal Availability	Whole Year
Propagation	By seeds.
Mode of consumption	Cooked/Steamed and eaten. Chatni is also prepared Have essence of unripe mango. It is eaten as condiment raw or cooked.

70. *Lobelia alsinoides* Lam.

Family Name	Companulaceae
Vernacular Name	Bari Ara
Habitat	It is an annual plant growing in marshy places, along streams, pools and rice fields.
Habit	Small annual herb growing to 15-30 cm tall.
Stem	Stems succulent, decumbent to ascending, laxly branched, glabrous, angular.
Leaves	Alternate, stalkless, lance shaped, 1- 3 cm long with toothed margins.apex rounded, obtuse, acute, or acuminate.

Flowers	Blue pink in colour, 2 lipped, upper lip is 2 lobed, erect and the lower lip is 3 lobed. Flowers have 5 stamens, the lower two protrude out.
Fruits	Capsule 2-3 mm long, invested by longer calyx lobes.
Flowering	Oct-Nov.
Seasonal Availability	Oct. to Feb.
Propagation	By seeds.
Mode of consumption	Tender leaves and shoots cooked/Steamed and eaten, often cooked in curry.

71. *Marsilia minuta* L.

Family Name	Marsiliaceae
Vernacular Name	Susuni (Oraon) Sunsunia (Santhal)
Habitat	Found in ponds, streams bank and rice fields.
Habit	It is a perennial fern with slender, rooted, creeping branching rhizomes bearing erect leaves(sterile fronds) along their length.
Stem	Slender, creeping rhizome.
Leaves	Consists of 4' clover like' leaflets at the apex of slender erect stalk, arising along the length of each rhizome. At the base of the petioles the sporocarp are formed on about 5 mm long stalks.
Flowers	Absent
Fruits	Fructifications (Sporocarps) are dark brown, hard, and bean shaped. The sporocarpsare 3-4 mm long, oblong with rounded ends with thir long axis at right angles to stalk. The sporocarp contains both megasporangia and microsporangia. The features of the sporocarps are important for distinguishin the species. A typical characterstic of M. minuta is that the sporocarps are unribbed and have 2 basal teeth. The upper tooth is shorter and obtuse.
Seasonal Availability	Nov. to March
Propagation	By spores and vegetative.
Mode of consumption	Tender leaves and young shoots are roasted and taken as food.

72. *Marsilia quadrifolia* Linn

Family Name	Marsiliaceae
Vernacular Name	Susuni (Oraon) Sunsunia (Santhal)
Habitat	Found in ponds, streams bank and rice fields.
Habit	It is a perennial fern with slender, rooted, creeping branching rhizomes bearing erect leaves(sterile fronds) along their length.
Stem	Slender, creeping rhizome.
Leaves	Consists of 4' clover like' leaflets at the apex of slender erect stalk, arising along the length of each rhizome. Leaves floating in deep water or erect in shallow water on land. Leaflets obdeltoid., up to ¾ inch long, petioles up to 8 inch long.
Flowers	Absent
Fruits	Fructifications (Sporocarps) are dark brown, hard, and ellipsoid. The sporocarpsare 3/16 inch long, on stalks upto ¾ inch long,attached to base of petiole.Thesporocarp contains both megasporangia and microsporangia. The features of the sporocarps are important for distinguishin the species. A typical characterstic of M. minuta is that the sporocarps are unribbed and have 2 basal teeth. The upper tooth is shorter and obtuse.
Seasonal Availability	Rainy& Winter
Propagation	By spores and vegetative.
Mode of consumption	Tender leaves and young shoots are roasted and taken as food.

73. *Medicago lupulina* Linn.

Family Name	Fabaceae
Vernacular Name	Neetho Sag, Bindo Sag
Habitat	It is found in lawn, garden, waste areas road sides, pastures and cropland.
Habit	A low growing, spreading annual or short lived perennial with stem that grow between 4 inches and 2 feet long.

Stem	Four angled branching outward from the base which arises from a central tap root.
Leaves	Alternate on stems and are each made up of 3 round to oval leaflets- one central and 2 lateral. Central leaflet arises from a short stalk. Leaflets are upto5/8 inch long and ½ inch wide. Leaflets margins are highly serrated at the top.
Flowers	Bright yellow, 1/8 inch long flowers develop in globe shaped cluster on the tips of the stalk borne in leaf axils. Flowers head clusters are ½ - ¾ inch in diameter and consists of as many as 50 flowers.
Fruits	Seed pods in 1 inch long clusters replace flower heads. Each seed pod is 1/8 inch long and contains one seed. Seed pods are kidney shaped.
Seasonal Availability	Winter
Propagation	By seeds.
Mode of consumption	Leaves are taken as vegetable.

Photo - 61 : ***Lasia spinosa*** **(L.) Thwaites**

Photo - 62 : ***Lepisanthes rubiginosa*** **Roxb.**

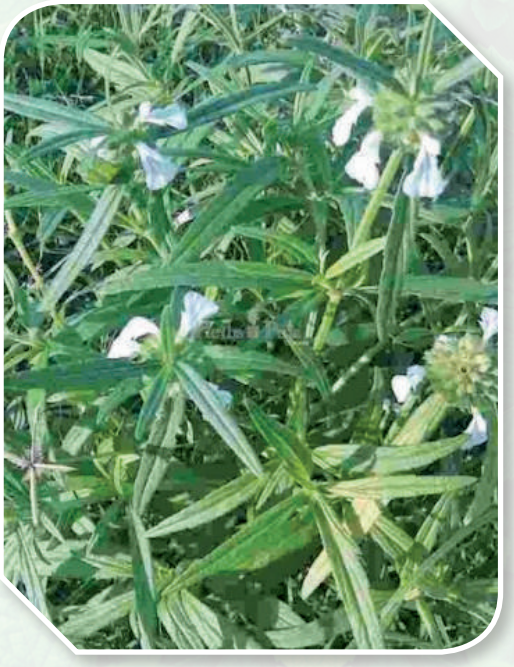

Photo - 63 : ***Leucas aspera*** **(Willd.) Link**

Photo - 64 : ***Leucas cephalotes*** **(roth) Spreng.**

Photo - 65 : ***Limnophila aromatica*** **(Lam.) Merr.**

Photo - 66 : ***Limnophila gratioloides*** **R. Br.**

Photo - 67 : ***Limnophila confirta*** **Benth.**

Photo - 68 : ***Limnophila rugosa*** **Roth. (Merr.)**

Photo - 69 : ***Lobelia alsinoides*** **Lam.**

Photo - 70 : ***Marsilia minuta*** **L.**

Photo - 71 : ***Marsilea quadrifolia*** **Linn.**

Photo - 72 : ***Medicago lupulina*** **Linn.**

74. *Medicago polymorpha* Linn.

Family Name	Fabaceae
Vernacular Name	Neetho Sag, Bindo Sag
Habitat	It is found in lawn, garden, waste areas road sides , pastures and cropland.
Habit	Annual herb growing up to 60 cm.
Stem	Prostrate or ascending, branched at base, subquadragular, glabrescent.
Leaves	petioles long and thin, 1-5 cm; leaflets obovate or triangular-obovate, 7-20 × 5-15 mm, papery, sparsely hairy baxially, glabrousadaxially, base broadly cuneate, margin shallowly serrate in apical 1/3, apex obtuse, truncate, or emarginate, apiculate.
Flowers	2-10 in axillary racemes; peduncles slender, 3-15 mm, usually longer than leaves; pedicel less than 1 mm. Corolla yellow, 3-4 mm; standard obovate, emarginated
Fruits	Legume ash-green to greenish brown, discoid, 4-6 mm, tightly coiled in 1.5-2.5 spirals, turning clockwise, radial veins connected near edge on coil face, spines or tubercles 15 in each row.
Seeds	Seed brown, reniform, ca. 2.5 × 1.25 mm, smooth.
Seasonal Availability	Winter
Propagation	By seeds.
Mode of consumption	Leaves are taken as vegetable.

75. *Mentha sativa* Linn.

Family Name	Lamiaceae
Vernacular Name	Pudina
Habitat	It is found in wet places.
Habit	Pudina is a herb widely cultivated in India.
Stem	erect, 1-2 ft tall, usually less, purplish, hairless.
Leaves	Almost stalkless, ovate to ovate-lanceolate 2-3x1.2-2 cm, papery, base rounded to shallow heart shaped, margin toothed,tip pointed.

Flowers	Born in spikes at the end of branches, 2.5-3 cm long, 1 cm wide, bracts are linear lanceolate, slightly longer tha calyx. Flower stalk 1 mm, Flowers are purplish about 3.5 mm, hairless, petals subequal, tip notched.
Fruits	Nutlets brown, triquetrous,ovoid upto 0.7 mm, sparsely glandular.
Seasonal Availability	Whole Year
Propagation	By seeds.
Mode of consumption	Leaves are used for flavour and chatni.

76. *Merremia macrocalyx* (Ruiz & Pav.) O'Donnel

Family Name	Convulvulaceae
Vernacular Name	Oye Munda aa (Ho)
Habitat	Forests
Habit	It is a climber. Robust twining perennial herb with stems up to 10 m long
Stem	Stems and petioles, hairless covered in small spine-like reddish-brown tubercles; older stems becoming woody.
Leaves	Leaves up to 13 cm in diameter, deeply palmately or pedately 7-9-lobed, lobes often pinnately lobed again, hairless.
Flowers	Flowers solitary or in few-flowered axillary clusters on a long peduncle, up to 8 cm. Corolla funnel-shaped, 6-8 cm in diameter, whitish to pale yellow with a dark purple centre.
Fruits	Capsule 4-valved or irregularly dehiscent.
Seeds	Seeds 4.
Seasonal Availability	Rainy season
Propagation	By seeds.
Mode of consumption	Young leaves and shoots are chopped into small pieces and fried in vegetable oil with tomato. Salt is added to taste.

77. *Melochia chorchorifolia* L.

Family Name	Sterculiceae
Vernacular Name	Susuni, Thuiak

Habitat	It is found in wet places.
Habit	Herb or Undershrub, 60 cm tall.
Stem	Hollow stems which ar erect or sometimes prostrate. Slender, branched, tough-barked, more or less hairy.
Leaves	Variable in shape, ovate-lanceolate, broadest near the base or narrow and parallel-sided, tip pointed or blunt, margins toothed, more or less hairy on both surfaces, 3- 6 cm long, 4 cm broad, leaf stalks up to 2.5 cm long as long as the blade.
Flowers	In close clusters at the branch ends, mixed with many hairy bristle-like bracts, petals white pink, yellow at the base.
Fruits	Capsule hairy, longer than the sepals, splitting into 5 parts.
Seeds	Ovoid, angular.
Flowering & Fruiting	May to October
Seasonal Availability	Rainy season
Propagation	By seeds.
Mode of consumption	Leaves are cooked and eaten.

78. *Monochoria vaginalis* (Burm.F.)C.Presl

Family Name	Pontederiaceae
Vernacular Name	SodomeLochkor Ara
Habitat	It is found101 in wet places.
Habit	It is an attached aquatic or perennial herb with immersed leaves to 50 cm tall.
Stem	Sheaths embracing the scape for a considerable distance so stem appears leafy.
Leaves	Variable in shape, 2-12.5 cm long 0.5-10 cm wide. In very young plant without lamina. In older plants, with a floating linear or lanceolate blade, in still older plants ovate oblong to broadly ovate, sharply acuminate . the base heart shaped or rounded, shining deep green in colour.

Flowers	In spike like inflorescence, basally opposite the sheath of the floral leaf, with a large bract arising from a thickened bundle on leaf stalk, about 2/3rd of the way up the stalk from the base. Flowers 3-25 in no., opening simultaneously or in quik succession, on pedicels 4-25 mm long, Petals 6, violet or lilac blue, spreading at flowering afterwards spirally contortd.
Fruits	Capsule oblong.
Flowering	Aug – March
Seasonal Availability	Apr. to Sept.
Propagation	By seeds.
Mode of consumption	Cooked/Steamed and eaten.

79. *Moringa oleifera* Lam.

Family Name	Moringaceae
Vernacular Name	Munga
Habitat	It is found in dry tropical forests and low land.
Habit	It is a small slender deciduous tree native to tropical asia reaching a height of about 9 mt.
Stem	Branching, having cork grey bark.
Leaves	Leaves petiolate, 3-pinnate, 25-60 cm, with stalked glands often exuding clear or amber liquid at base of petiole and leaflets; leaflets in 4-6 pairs, ovate, elliptic, or oblong, 1-2 × 0.5-1.2 cm, puberulous when young but glabrous at maturity, base rounded to cuneate, apex rounded to emarginate; petiolules slender, 1-2 mm. Inflorescence a widely spreading panicle, bracteate, 10-30 cm; bracts linear, ca. 1 mm.
Flowers	Flowers white to cream, fragrant, somewhat resembling an inverted Fabaceae flower with 2 dorsal sepals and 1 dorsal petal usually remaining unreflexed and forming a projecting "keel" while the rest of the perianth reflexes down to form a "banner" at right angles to the "keel", each flower borne on a false pedicel 7-15 mm; true pedicel 1-2 mm. Sepals lanceolate to linear-lanceolate, 0.7-1.4 mm, usually puberulent. Petals spatulate, 1-2 cm, glabrous or puberulent at base. Stamens hairy at base. Ovary hairy.

Fruits	Fruit a pendulous pod, 30-45 cm long, somewhat tomentose when young.
Seeds	Seeds embedded in the pits of the valves, 3 angled, winged, blackish, rounded.
Flowering & Fruiting	Year round, June to Dec
Seasonal Availability	Jan. to June
Propagation	By seeds and vegetative method.
Mode of consumption	Leaves are eaten after frying or roasting. Liquid curry is prepared with fermented rice water and rice granules.

80. ***Murrya koenigii*** **L.**

Family Name	Rutaceae
Vernacular Name	Kari Patta
Habitat	It is found in deciduos forests , in gardens.
Habit	It is a small slender tree growing 4-6 mt tall.
Stem	Branching, branches pubescent, trunk up to 40 cm diameter.
Leaves	Leaves pinnate with 11-21 leaflets, each leaflet 2-4 cm long and 1-2 cm broad, highly aromatic. Margins of leaflets entire or crenulate.
Flowers	Small, white and fragrant. Inflorescences terminal, paniculate, many flowered. Flowers 5-merous, ellipsoid in bud. Sepals ovate, less than 1 mm. Petals white, oblanceolate to oblong, 5-7 mm. Stamens 10. Stigma capitate.
Fruits	Small, black, shiny berries. edible.
Seeds	Seeds are poisionous. Seed coat membranous.
Flowering & Fruiting	March-April, July to Aug.
Seasonal Availability	Whole Year
Propagation	By seeds and vegetative method.
Mode of consumption	Used as flavoring agent.

81. ***Olax scandens*** **Roxb.**

Family Name	Oleaceae

Vernacular Name	Rimil Bilee aa, Rimil tundu aa (Ho), Bhadbhadalia (Oraon)
Habitat	Common in open forest or scrub forest.
Habit	Shrub or small tree
Stem	Round, smooth with rather zig zag branches.
Leaves	Leathery, Short stalked and nearly 2 inches long.
Flowers	White with 5 narrow petals.
Fruits	Drupe is of a size of currant partly covered by the calyx.
Flowering & Fruiting	April to December
Seasonal Availability	March to December.
Propagation	By seeds and vegetative methods.
Mode of consumption	Leaves are collected, roasted and then eaten. The fresh young leaves are cooked as leafy vegetable and also chewed during mouth ulcer.

82. *Ophioglossum reticulum* L.

Family Name	Ophioglossaceae
Vernacular Name	Sugga sag, Jibhia (HO)
Habitat	It grows fully exposed sandy soil along the river and in laterite areas during the wet season.
Habit	It is a herbaceous terrestrial fern. It is erect, biennial vegetable plant.
Stem	About 10-20 cm long with a fleshy small, sub-globose, subterranean rhizome, 1-1.5 x 0.5-0.8 cm.
Leaves	Fronds bipartite; sterile blade 3-7 x 3-4 cm, ovate, obtuse, herbaceous, veins anastomosing, common stalk 5-18 cm long; fertile spike 5-10 cm long, arising from the base of the sterile blade; oblong, acute, flattened, fleshy with wavy margins. Sporangia globose, sunken, arranged in a row on either side of the stalk.
Seasonal Availability	August to January.
Propagation	By spores.

Mode of consumption	Young fronds are commonly eaten as a salad or vegetable. The leaves should be blanched only; if boiled too much they turn into slime.

83. *Oxalis corniculata* Linn.

Family Name	Oxilidaceae
Vernacular Name	Netho Sag (Oraon) Tandi Chatom arak (Santhal)
Habitat	It is found in waste places, road sides, gardens, open fields.
Habit	A small annual or perennial, procumbent or more or less erect herb, 6-25 cm high.
Stem	Pubescent with appressed hairs.
Leaves	Palmately trifoliate; leaflets 1.2-2.5 cm long, obcordate, base cuneate, margins entire; petioles 3.5-9 cm long, very slender, pubescent.
Flowers	Yellow, axillary in umbellate clusters on slender axillary peduncles.
Fruits	Capsules 2 cm long, linear-oblong, 5-angles, tomentose.
Seeds	Dark brown, broadly ovoid, transversely striate.
Flowering & Fruiting	August to December
Seasonal Availability	Aug. to Dec.
Propagation	By seeds and vegetative method.
Mode of consumption	Leaves are plucked, fried and taken.

84. *Oxalis corymbosa* (DC.) Lourteig

Family Name	Oxilidaceae
Vernacular Name	Netho Sag (Oraon) Tandi Chatom arak (Santhal)
Habitat	It is found in waste places, road sides, gardens, open fields.
Habit	Perennials, 10-30 cm tall, stemless, pubescent. Subterranean bulb 1.5-3 cm; scales loose, papery, 3-veined; sessile bulbils 3-6 mm, numerous.
Stem	Subterranean bulb.
Leaves	Trifoliate; leaflets large 1.5-3 cm long, 2-4 cm broad, inverted heart shaped, leaf stalk up to 30 cm long.

Flowers	Pink, Flowers are borne in umbel, flower stalk is 1-2.5 cm long, velvety. Sepals are 4-5 mm long, lance shaped, tip with brownish red part. Petals 1.2-1.5 cm long, hinged at the base, pink.
Fruits	Capsules rarely formed.
Flowering	March – April.
Seasonal Availability	Winter
Propagation	By seeds and vegetative method.
Mode of consumption	Leaves are plucked, fried and taken

85. ***Oxalis latifolia*** **Kunth**

Family Name	Oxilidaceae
Vernacular Name	Netho Sag (Oraon) Tandi Chatom arak (Santhal)
Habitat	It is found in waste places, road sides, gardens, open fields.
Habit	Erect bulbous herb, 10-25 cm tall.
Stem	Subterranean bulb.
Leaves	Trifoliate; Leaves few, erect; leaflets obconical, 3 x 5 cm, base acute, apex retuse; petiole to 20 cm long
Flowers	Pink, 5 petalled funnel shaped about 1 in across and borne in loose open clusters throughout the summer and fall. Flower pedicel arise directly from the rootstock.
Flowering	March-April,
Seasonal Availability	Aug. to Dec
Propagation	By seeds and vegetative method.
Mode of consumption	Leaves are plucked, fried and taken.

Photo - 73 : ***Medicago polymorpha*** **Linn.**

Photo - 74 : ***Mentha sativa*** **Linn.**

Photo - 75 : ***Merremia macrocalyx*** **(Ruiz & Pav.) O'Donnel**

Photo - 76 : ***Melochia corchorifolia*** **L.**

Photo - 77 : ***Monochoria vaginalis*** **(Burm.F.) C.Presl**

Photo - 78 : ***Moringa oleifera*** **Lam.**

Photo - 79 : ***Murraya koenigii*** **(L.) Spreng.**

Photo - 80 : ***Olax scandens*** **Roxb.**

Photo - 81 : ***Ophioglossum reticulum*** **L.**

Photo - 82 : ***Oxalis corniculata*** **Linn.**

Photo - 83 : ***Oxalis corymbosa*** **(DC.) Lourteig**

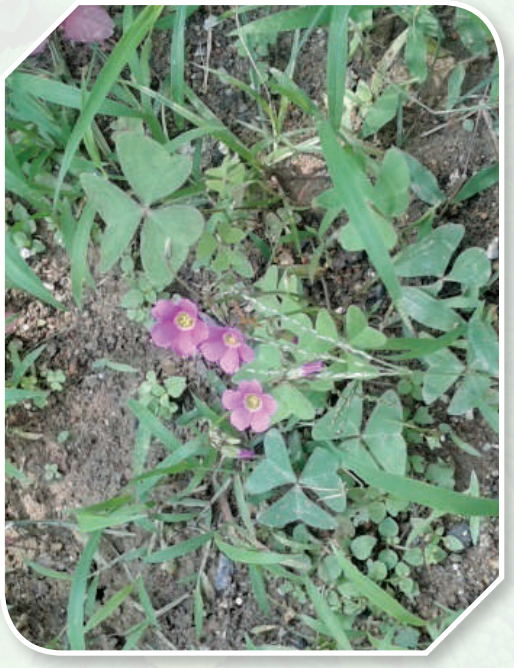

Photo - 84 : ***Oxalis latifolia*** **Kunth**

86 *Paederia scandens* (Lour.) Merr.

Family Name	Rubiaceae
Vernacular Name	Gandalpata, Gandhali (Ho), Guli Gandhari
Habitat	It is found in hill sides, in forests along forest edges, stream sides, twinning on trees.
Habit	It is perennial twinning vine arising from a woody root stock.
Stem	It grows up to 7 cm or more, climbing or prostrate and rooting at the nodes.
Leaves	Oppositely arranged, sometimes in whorls of 3, with prominent stipules. Leaf stalk up to 6 cm long. Leaves are oval to linear lanceolate, 2-11 cm long, hairy or smooth, often lobed at base. Leaves and stem have a stinking smell specially when crushed.
Flowers	Small, greyish pink or lilac, in broad or long, curving clusters at the end of branches or in leaf axils. Flowers are densely hairy, tubular with 5 spreading petals.
Fruits	Shiny brown, nearly round capsules up to 0.7 cm across with 2 black roundish seeds.
Seeds	Fruits with 2 black roundish seeds.
Flowering	September to November
Seasonal Availability	Whole year
Propagation	By seeds.
Mode of consumption	Cooked as Vegetables. Leaves are boiled and made into soup, the odour disappearing. The leaves and roots are considered wholesome and tonic. Plant is used internally and externally for rheumatism.

87. *Pergularia daemia* (Forssk.) chiov.

Family Name	Asclepiadaceae
Vernacular Name	Mausi sag
Habitat	It is found in hill sides, in forests along forest edges, stream sides, twinning on trees.

Habit	It is perennial twinning herb foul smelling when bruised and with much milky juice.
Stem	Branching, branches pubescent, trunk up to 40 cm diameter.
Leaves	Thin, broadly ovate, heart-shaped or nearly circular, hairless above, velvety beneath.
Flowers	Greenish yellow or dull white, and sweetscented, borne in lateral cymes which are at first corymb-like, afterwards raceme-like. The 5 petal are hairy and spreading outwards. Corolla outer and inner, outer truncate, inner curved high over the stamina column, spur acute.
Fruits	A follicle, with soft spines all over and a long beak.
Seeds	Densely velvety on both sides.
Flowering	Aug – Feb.
Seasonal Availability	Rainy
Propagation	By seeds.
Mode of consumption	Leaves are cooked and eaten as vegetable.

88. *Polygonum barbatum* L.

Family Name	Polygonaceae
Vernacular Name	Sake Sag, Madara
Habitat	It is found in paddy fields and river banks in the plains..
Habit	It is erect sometimes prostrate simple annual herb, 30-60 cm tall.
Stem	Branched, hairless, lineolate – grooved.
Leaves	Alternate, spiral, 1.5-15x0.25-3 cm, linear lanceolate, long pointed, hairless except margins, stalkless or leaf stalk 2-4 mm long. Ocrea are 1-3.5 cm long, tubular, brownish, strigose, cilia equally or larger than the ochrea.
Flowers	Inflorescence 5-10 cm long, many flowered branched raceme with 1-6 spikes in each raceme. Peduncle 0.5-3 cm long ,glabrous. Flowers White, 1-2 mm across, stalk 0.75-1.5 mm long. Ochreolae is 1.5-3 mm long, tubular, ovate, compact, ciliate, tepals are 5, 1.5-2.5x0.75-1.25 cm. Oblanceolate-ovate, obtuse, biseriate, unequal,eglandular.

Fruits	Fruit indehiscent, usually trigonous, sides flat or slightly convex, rarely lenticular, glossy black, 1.8-2 mm long.
Seeds	Seed with much endosperm.
Flowering & Fruiting	November to January
Seasonal Availability	June to Dec.
Propagation	By seeds.
Mode of consumption	Young plants are collected, cooked and consumed.

89. *Polygonum glabrum* Willd.

Family Name	Polygonaceae
Vernacular Name	Sauri, Sukripota
Habitat	Along streams, rivers and water bodies.
Habit	It is annual or perennial herb measuring 5-15 cm in height.
Stem	Red, ascending swollen stems often rooting at the nodes..
Leaves	Oblong lanceolate to narrowly lanceolate, 14-28 cm long, 3-6 cm wide, minutely postulate otherwise usually smooth, sometimes with scattered hairs on nerves of lower surface, leaf stalk 0.5 – 2 cm long, Ochrea tubular, usually 20-30 mm long, apex not ciliated, sometimes with a few small bristles upto 0.5 mm long.
Flowers	Inflorescence open raceme, sometimes paniculate, 5-10 cm long, each flower in a jointed pedicel, tepals white or pinkish, 3-4 mm long.
Fruits	Nuts, dark brown to nearly black, broadly ovoid, biconvex or subtrigonous, 2-2.5 mm long, surface glossy.
Seeds	Cotyledons acumbent.
Flowering & Fruiting	September to December, November to February
Seasonal Availability	June to Dec.
Propagation	By seeds.
Mode of consumption	Young plants are cooked and consumed.

90. *Polygonum plebejum* R.Br.

Family Name	Polygonaceae
Vernacular Name	Chimti Sag (Oraon) Mooze-ara (Munda)
Habitat	It is common in rabi season on waste land.
Habit	Prostrate densely branched annual herb..
Stem	Branched from base , branches numerous.
Leaves	Lance-like, elliptic, stalkless, 1.0-3.0 x 0.1-0.4cm, entire. Ochrea are 1-2 mm long,membranous, ovate, tube-shaped.
Flowers	Pinkish red, Inflorescence axillary, in cluster of 1-5. Flowerssunken between ochrea or hardly coming out,1-2 mm across, nearlystalkless. Tepals 5, 1.5-3x0.5-1 mm, inverted lance shapped-lance shaped, unequal. Outer tepals slightly longer and pointed, inner too blunt. Stamens 5, filaments long with broaden base, equal. Ovary small, trigonous with 3 styles and capitates stigmas.
Fruits	Nuts 1.0-1.75 mm long, circular to ovate, shining, black, glabrous.
Flowering & Fruiting	January to June
Seasonal Availability	Jan. to April
Propagation	By seeds.
Mode of consumption	Young plants are cooked and consumed.

91. *Portulaca oleracea* Linn.

Family Name	Portulacaceae
Vernacular Name	Golgola Sag (Santhal) Dali-ara (Munda)
Habitat	It is common on waste open wet ground .
Habit	A small, prostrate annul herb, upto 30cm.
Stem	Glabrous, fleshy with numerous decumbent branches.

Leaves	Leaves spiral or subopposite, often crowded at ends of branches, sessile or subsessile, obovate or spatulate to linear-oblong, cuneate or attenuate at base, rounded or truncate at apex, 1-3 x 0.2-1.5 cm; stipular hairs very few, inconspicuous, ca 1 mm long, caducous.
Flowers	Flowers are in a group at the end of the stem. The 2 sepals are fused at the base of the ovary and may form a wing-like carina 3-4 mm long that can cover the fruit. There are (4)5(6) yellow petals ranging from 3 to 10 mm long by 2 to 8 mm wide with 6-15 (3-20) stamens. The style branches are 3-6, the capsule ranges from 4 to 9 mm, opening at or just below the middle.
Fruits	Capsules obovoid to ovoid, 4-5 x ca 3 mm, enveloped by marcescent corolla, dehiscing transversely in middle.
Seeds	Seeds are black when mature, but may be red or brown when immature. The seeds are 0.6-1 mm long, usually with granulate to flat-stellate surfaces.
Flowering & Fruiting	June to September
Seasonal Availability	Whole year abundant in Rainy season.
Propagation	By seeds and vegetative methods.
Mode of consumption	Tender leaves and shoots are collected, roasted then eaten.

92. *Portulaca quadrifida* Linn.

Family Name	Portulacaceae
Vernacular Name	Golgola Sag (Santhal) Noni sag
Habitat	It is found in fallows, arable lands and scrub jungles from plains to 600m., also common on waste land and road sides.
Habit	Prostrate annual herb with a somewhat swollen tap-root.
Stem	Stem much branched, reddish, creeping, profusely, rooting at nodes; nodes with a whorl of dense silvery white hairs.
Leaves	Leaves opposite; petiole absent; leaf blade flat, ovate, obovate, or ovate-elliptic, 4-8 × 2-5 mm, slightly narrowed toward base, apex obtuse or acute.

Flowers	Flowers solitary, surrounded by involucre of 4 or 5 bracts, white pilose. Sepals obovate-oblong, 2.5-3 mm, membranous, veined. Petals 4, yellow, oblong or broadly elliptic, 3-6 mm, connate at base, apex mucronate. Stamens 8-10.
Fruits	Capsule conical-ovoid, dehiscing horizontally.
Seeds	Seeds many, 1 mm in diameter, greyish, reniform, verrucose with blunt tubercles.
Flowering & Fruiting	Throughout the year.
Seasonal Availability	Whole year
Propagation	By seeds and vegetative methods.
Mode of consumption	Tender leaves and shoots are collected, roasted then eaten.

93. *Rumex dentatus* L.

Family Name	Polygonaceae
Vernacular Name	Tissa Palakarxa (oraon) Tissa palak (Santhal)
Habitat	It is common in rabi season on waste land.
Habit	An annual or biennial herb, 20-60 cm tall.
Stem	Erect, often flexuous in inflorescence, branched, distal to middle, occasionally almost from base.
Leaves	Basal leaves are ovate oblong with a flat rarely heart shaped base. Leaves are sometimes slightly contracted above the base, fiddle shaped with blunt or slightly pointed tip. Leaf stalk is shorter or as long as lamina. Stem leaves are normally few, small and with shorter stalks than the basal one.
Flowers	Flowers are borne in whorls of many flowers, all or at least lower and middle one distant, most of them supported by a leaf, flower stalk rather thin, outer tepals are elliptic, 2mm long, inner ones enlarged in fruits.
Fruits	Achenes dark reddish brown, 2-2.8 × 1.4 -1.8 mm.
Flowering	May-June
Seasonal Availability	Rainy

Propagation	By seeds.
Mode of consumption	Leaves are collected , cooked and eaten.

94. *Rumex vesicarius* L

Family Name	Polygonaceae
Vernacular Name	TissaPalakarxa (oraon) Tissapalak (Santhal)
Habitat	It is common in dry areas amon loose stones, on grassy or gravely slopes.
Habit	An annual pale green glabrousherb, branched from the root, 15-30 cm high.
Stem	Rhizomatous, strongly branched from the base, rather flesh.
Leaves	2.5 – 7.5 cm, elliptic,ovate or oblong,obtuse or acute, base cuneate.
Flowers	Racemes, 2,5-3.8 cm, terminal and leaf opposed, flowers sometimes 2-nate and connate, valves large, orbicular, 2 lobed at each end, very membranous and reticulate without a marginal nerve.
Fruits	1.3 cm diam., white or pink..
Flowering	May – June
Seasonal Availability	Rainy
Propagation	By seeds.
Mode of consumption	Leaves are cooked and eaten.

95. *Rungia parviflora* Nees.

Family Name	Acanthaceae
Vernacular Name	Kawoa Sag (Oraon) Hasa-arak (Munda), Hasa aa (Ho)
Habitat	It is common on low land, waste land, gardens & harvested fields.
Habit	Small diffuse or creeping herb. Often 15-40 cm tall.
Stem	Much branched, often rooting from the lower nodes..

Leaves	Oval or lance like, rather obtuse. Fertile bracts are nearly round or unpointed, ciliated with membranous margin. Sterile ones are oval or oblong, acute.
Flowers	Purple-blue in 1-1.5 cm long, terminal oraxillary, onsided spikes. Flowers Small, only about 1-2 mm, two lipped and of fine blue colour. Upper lip is acute.
Fruits	Capsule, pubescent at the tip.
Seeds	2-4 orbicular, minutely achinulate, yellow
Flowering	Winter months
Seasonal Availability	Whole Year
Propagation	By seeds.
Mode of consumption	Tender leaves and shoots are collected, cooked then eaten.

96. *Saggitaria saggitifolia* L.

Family Name	Alismataceae
Vernacular Name	Luchkor (Munda), Bamal aa (Ho)
Habitat	It is aquatic and marshy weed growing well in standing water.
Habit	Perrenial stoloniferous aquatic deep rooted herb.
Stem	30-100 cm tall.
Leaves	Leaves are of 2 types – submerged leaves are ribbon shaped, and leaves which emerge above water develop characteristic arrow head shape.
Flowers	White, 3 petalled with a yellow center, reproduction is by achenes and vegetatively by immature plants and underground tubers.
Fruits	Fruits are achenes and ripen through the fall.
Seeds	Floats easily and can be carried long distances.
Flowering	July-August
Seasonal Availability	Whole Year
Propagation	By seeds.

Mode of consumption	Boiled then water is squeezed out and then cooked as pot herb.

97. *Smilax ovalifolia* Roxb.Ex D.Don

Family Name	Smilacaceae
Vernacular Name	Ramdatan
Habitat	It is common in forest areas, cultivated in gardens.
Habit	A large armed tendril climber.
Stem	30-100 cm tall.
Leaves	Alternate,Leathery, shining, 7-15x4-11 cm, broadly ovate to elliptic, base rounded or sharply wedge shaped, 3-5 nerved. Leaf stalk 1.5 cm long, base sheathing with tendrils at the end.
Flowers	White, Unisexual, in dense umbels in leaf axils, 1-3 on common peduncle. Bracts ovate, Perianth recurved in mature flowers, outer 3 segments, 4 mm long, oblong, inner narrower. Stamens about as long as perianth.
Fruits	Berry, round, Red.
Flowering & Fruiting	April to July, Nov. to January.
Seasonal Availability	Whole Year
Propagation	By seeds.
Mode of consumption	Cooked as Vegetable

Photo - 85 : ***Paederia scandens*** **(Lour.) Merr.**

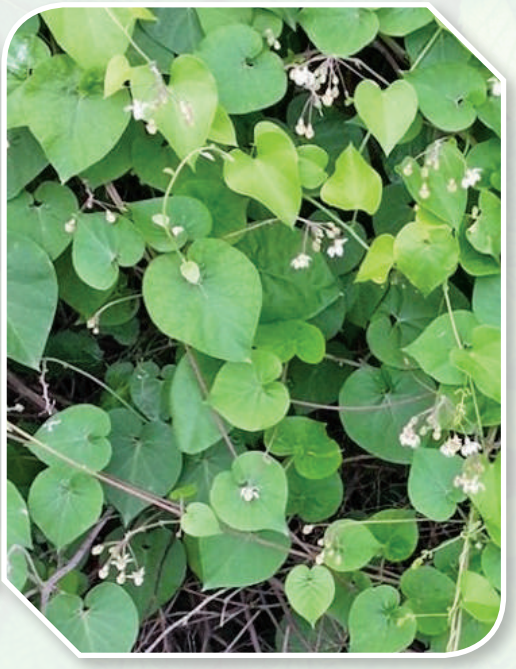

Photo - 86 : ***Pergularia daemia*** **(Forssk.) chiov.**

Photo - 87 : ***Polygonum barbatum*** **L.**

Photo - 88 : ***Polygonum glabrum*** **Willd.**

Photo - 89 : ***Polygonum plebejum*** **R. Br.**

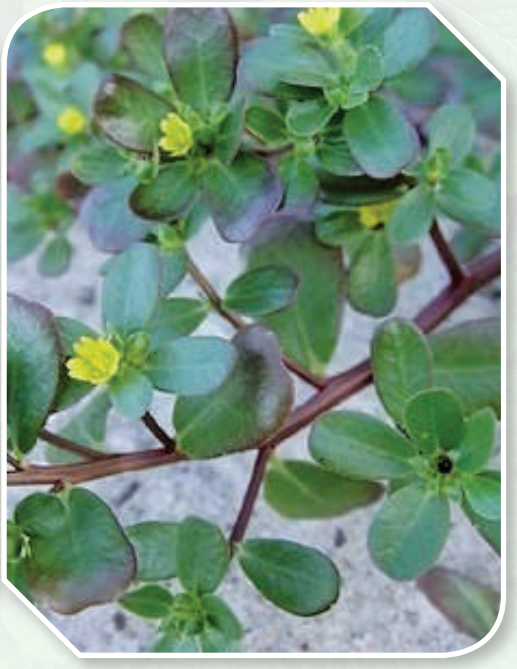

Photo - 90 : ***Portulaca oleracea*** **Linn.**

Photo - 91 : ***Portulaca quadrifida*** **Linn.**

Photo - 92 : ***Rumex dentatus*** **L.**

Photo - 93 : ***Rumex vesicarius*** **L.**

Photo - 94 : ***Rungia parviflora*** **Nees.**

Photo - 95 : ***Saggitaria saggitifolia*** **L.**

Photo - 96 : ***Smilax ovalifolia*** **Roxb. Ex D. Don**

98. *Solena amplexicaulis* (Lam.) GANDHI

Family Name	Cucurbitaceae
Vernacular Name	Van Kakari
Habitat	It is common in deciduous forests, also in plains.
Habit	A climbing perennial herb.
Stem	Slender, branched, furrowed stem with several tuberous roots and bearing several tendrils.
Leaves	Broadly ovate, 0.5-1.5 cm long and have many different forms. Can be nearly circular,oval, oblong or narrowly lance shaped, 3-5 angled or lobed, deeply heart shaped at the base. Margins are sometimes slightly toothed.
Flowers	Small, yellow or white, about 6x4 mm – males in umbel like racemes or fascicled. Female ones are born singly.
Fruits	Oblong, ovoid, cylindric, about 2.5x1.5 cm, ribbed, bright red when ripe.
Flowering	Apr – July.
Seasonal Availability	September to December
Propagation	By seeds.
Mode of consumption	Cooked as Vegetable

99. *Sphaeranthus hirtus* Willd.

Family Name	Asteraceae
Vernacular Name	Tonka Pudina, DanrPudina
Habitat	It is common as a weed in rice fields and moist places.
Habit	A strongly scented annual herb.
Stem	Much branched winged stem and the winged tooth.
Leaves	Alternately arranged, obovate, oblong, narrowed at the base, dentate and serrate, 1-3 cm long.
Flowers	Occur in purple spherical heads, 8-15 mm consisting of numerous tiny flowers. Flowers are purple and stamens red purple.
Fruits	Achenes surrounded by the corolla which consists of hairs, bristles and teeth margins, indehiscent, minute.

Seeds	Obconical seeds attached at the base with short pedicel.
Flowering	Oct– Jan.
Seasonal Availability	Rainy & Winter
Propagation	By seeds.
Mode of consumption	Tender shoots are cooked then taken as food.

100. *Spergula arvensis* Linn.

Family Name	Caryophyllaceae
Vernacular Name	Kharika arxa
Habitat	It is common as a weed in rice fields and moist places .
Habit	A strongly scented annual herb.
Stem	Much branched winged stem and the winged tooth.
Leaves	Alternately arranged, obovate, oblong, narrowed at the base, dentate and serrate, 1-3 cm long.
Flowers	Occur in purple spherical heads, 8-15 mm consisting of numerous tiny flowers. Flowers are purple and stamens red purple.
Fruits	Fruit round, a one-celled capsule splitting into five sections containing many seeds;
Seeds	Seeds thick, lens-shaped, dull black, the surface roughened by minute rounded, protruding bodies, rarely smooth, about 1.5 mm in diameter, with a conspicuous, narrow, light coloured wing on the margin.
Flowering	Oct– Jan.
Seasonal Availability	November to February(Winter)
Propagation	By seeds.
Mode of consumption	Leaves are collected , cooked and eaten.

101. *Trianthema decandra* Linn. (Zaleya decandra)

Family Name	Aizoaceae
Vernacular Name	Purni

Habitat	It is common as a weed in wasteland, roadside, lawns, gardens, cultivated fields & paddy fields .
Habit	Annual herb up to 50 cm long or more.
Stem	Stems are prostrate or rising, somewhat succulent, smooth or sparsely velvety.
Leaves	Flat, elliptic to obovate or spade shaped 1 – 2 cm long, 0.4-2 cm wide, margin entire, tip blunt, base rounded to wedge shaped. Leaf stalks are 0.5-2.5 cm long expanded into a sheath joined with opposing leaf base to form a cup.
Flowers	Pink, born solitary, stalkless, largely hidden in leaf axil. Petals are linear to narrowly deltate 4-5 mm long, inner surface pink or white, sparsely velvety externally, over cylindrical, style about 2 mm long.
Fruits	Fruit: a capsule 5 x 3 mm, almost hidden in the petiole sheath transversely breaking into an upper coriaceous lid containing 1-2 seeds and a lower membraneous cup with 3-5 or even 10 seeds which are dull black in colour with raised, interrupted, concentric lines.
Flowering & Fruiting	June to August
Seasonal Availability	July to Dec.
Propagation	By seeds.
Mode of consumption	Leaves and young shoots are collected, fried then eaten.

102 *Trianthema monogyna* Linn. (T.Porlulacastrum)

Family Name	Aizoaceae
Vernacular Name	Swet Punernava, Kecho
Habitat	It is common as a weed in wasteland, roadside, lawns, gardens, cultivated fields & paddy fields .
Habit	Annual prostrate, succulent herb up to 15 cm long.
Stem	Stems are prostrate or rising, somewhat succulent, smooth.

Leaves	Opposite or sub-opposite, unequal,1.2-3.5x0.8-2.2 cm, orbicular obovate, oblong or elliptic, base obtuse or attenuate, margin entire, purplish often undulate, apex obtuse, rounded or retuse, petiole sheathing with 2 stipule like appendages.
Flowers	7 mm across, axillary, solitary , sessile, sheathed by the base of petiole, lobes 5, white or pink, 4 mm long, oblong, obtuse. Stamens 15-20.
Fruits	Capsule up to 5 mm long, turbinate, apex truncate, 2 lobed, brown, circum scissile.
Seeds	Black with muricate concentric lines.
Flowering & Fruiting	May to November
Seasonal Availability	Rainy season
Propagation	By seeds.
Mode of consumption	The plant is eaten as a pot herb.

103. *Vanguira spinosa* Roxb.

Family Name	Rubiaceae
Vernacular Name	Sarla Sag, SarlaKanta
Habitat	It is common in evergreen forest
Habit	Large common shrub to small tree.
Stem	Armed with long straight supra axillary thorns.
Leaves	Leaves opposite, 4-7.5 x 2-4 cm, elliptic-lanceolate, acuminate at apex, cuneate at base, glabrous on both surfaces; petiole 1-1.6 cm long; stipules 2-4 mm broad, triangular, with 3-5 mm long acumen..Strong spines are bent at acute angles.
Flowers	Flowers greenish-white, cymes occurin leaf axils, pedicels 2-3 cm long. Calyx glabrous, tube 2-3 mm long, cupular; lobes 5, minute, triangular. Corolla tube 3-4 mm long, broad, throat hairy; lobes 5, equalling the tube, ovate, acute. Stamens 5, inserted on the throat of the corolla tube; filaments short; anthers to 1 mm or little longer. Ovary 5 locular with solitary pendulous ovule in each locule.

Fruits	Drupe 2-2.5 cm across, globose, smooth, yellow when ripe, succulent.
Seeds	Black with muricate concentric lines.
Flowering	March- April
Seasonal Availability	May to July
Propagation	By seeds.
Mode of consumption	Leaves are cooked and eaten.

104. *Vicia hirsuta* (L.) Gray

Family Name	Papilionaceae
Vernacular Name	Origara (Oraon), Chirinji Sag
Habitat	It is common in cultivated land, fallow land, waste ground, flower beds, road sides, rocky meadows.
Habit	An annual herb, tap root short, growing 20-60 cm tall.
Stem	Branched, delicate, climbing, bristly, glabrous, short hairs.
Leaves	Alternate, stalkless, stipulate, blade pinnate, 5-8 pairs, terminal leaflet modified into a tendril, leaflets linear, narrow, blunt, sharp pointed, margin entire, stipules 2-4 toothed.
Flowers	Bluish white, corolla zygomorphic, 3-5 mm long, petal 5, upstanding the 'standard' lateral 2 'wings' lower 2 united to form a keel, overall butterfly like corolla. Calyx 5 lobed, lobes larger than calyx tube. Stamens 10, filaments with fused bases, a single carpel. Inflorescence 2-5 flowered receme.
Fruits	6-10 mm long, two seeded pod(legume) blackening as it ripes,.
Seeds	The seeds are nearly orbicular, 1.5-2.8mm (usually >2mm), and greenish to reddish with dark spots in varying density.
Flowering	June- Oct.
Seasonal Availability	Whole Year
Propagation	By seeds.
Mode of consumption	Tender leaves are eaten as vegetables.

105. *Vicia sativa* Linn.

Family Name	Papilionaceae
Vernacular Name	Jhilo sag(Santhal), Jhilo arxa (Oraon)
Habitat	It is common in cultivated land, fallow land, wasteground, flower beds, road sides, rocky meadows.
Habit	An annual scrambling and climbing herb.
Stem	Almost hairless, up to 3 ft tall.
Leaves	Compound with 5-6 pairs of opposite leaflets and one terminal tendril. Leaflets narrow, linear, 2.5-3 mm long,2-3 mm wide. Stipules are small, arrow shaped with sharp teeth.
Flowers	Borne singly or in pairs from short stalks arising at the base of the leaves, blue to purple, up to 2 cm long.
Fruits	Pods are black, linear,4-6 mm broad, contains 10-12 round or angulated small seeds
Seeds	3-4 mm across, blackish.
Flowering	June- July
Seasonal Availability	Winter
Propagation	By seeds.
Mode of consumption	Tender leaves are cooked and eaten.

Photo - 97 : ***Solena amplexicaulis*** **(Lam.) Gandhi**

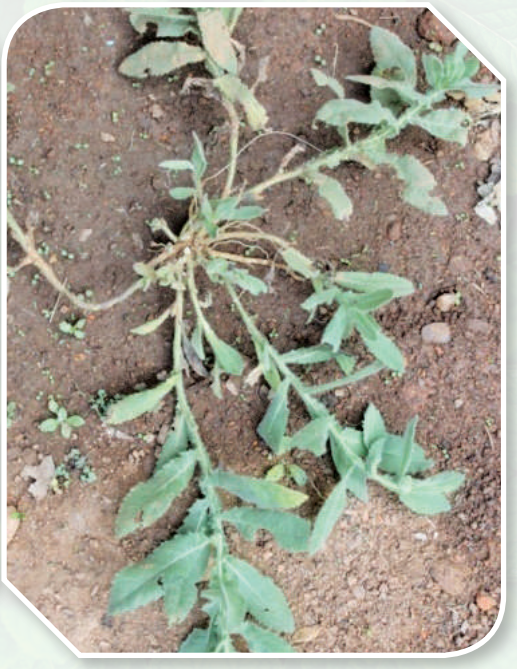

Photo -98 : ***Sphaeranthus hirtus*** **Willd.**

Photo -99 : ***Spergula arvensis*** **Linn.**

Photo - 100 : ***Trianthema decandra*** **Linn.**

Photo - 101 : ***Trianthema monogyna*** **Linn.**

Photo - 102 : ***Vanguira spinosa*** **Roxb.**

Photo - 103 : ***Vicia hirsuta*** **(L.) Gray**

Photo - 104 : ***Vicia sativa*** **Linn.**

CONCLUSION

1. The inventorization of wild leafy vegetable in entire Jharkhand state reveals that the tribal population and other communities in particular are highly dependent on them to replenish their food requirements as well as for their nutrition. The quantum of their use varies from one community to other as well as from one region to other because of different food habits and experience of ethnic communities, abundance and edibility time, distribution and taste preferences.

2. Wild leafy vegetables provide rural household with supplementary income opportunities through their sale in the local hats and markets. Many varieties of these wild leafy vegetables, both cultivated and wild are sold in these local markets in both fresh and dried form. During the rainy season, a large quantity of these leafy vegetables are harvested and dried in sun, to be consumed later in off season with cooked rice water in the form of soup during the lean period when the supply of vegetables is scarce and prices are high.

3. These wild leafy vegetables are among the most nutritious vegetables as they are high in fibre, extremely low fat and carbohydrates, and also provide a fair source of protein. These are also rich sources of minerals such as calcium, magnesium, iron and potassium as well as a good source of vitamins .Thus, these leafy vegetables play a significant role in reducing micronutrient deficiency and provides food security to the tribal population of rural Jharkhand. Besides, being a rich source of micronutrients and vitamins the leafy vegetables are also said to be a good source of antioxidants. Leafy vegetables contain number of phyto-chemicals which help to protect the cells from oxidative damage induced by free radicals and thereby help to reduce the oxidative stress (Wada and Ou, 2002).

4. Most popular, widely consumed, culturally important, highly nutritious, agronomically feasible and easy to trade vegetables among them are worth promoting. If these vegetables are popularized and commercialized, the supply to rural markets will likely increase. A larger supply could lead to increased consumption by local communities, which can help strengthen nutrition security. In urban areas, the willingness to consume traditional vegetables such as *Bauhinia* spp. or *Ficus* spp. buds is high, demand of centella asiatica, Basella alba, Ipomoea aquatica, Enhydra fluctuans, Portuluca olearacia etc is high but the supply is sporadic and seasonal in many cases.

5. Some indigenous wild leafy vegetables grown in the nature as wild plants and are readily available in the field as they do not require any formal cultivation. Many of them are resilient, adaptive, and tolerate adverse climatic conditions more than the exotic species. Although, they can be raised comparatively at lower management cost and on poor marginal soil, they have remained underutilized, due to lack of awareness of their nutritional values in favour of the exotic ones (Chweya and Eyzaguilre, 1999; Raghuvanshi and Singh, 2001; and Nnamani *et al.*, 2009). Green leaves are the means of livelihood in most of the developing nations of the world where the shortage of food and famines are common. In the present scenario of development, wild leafy vegetables are gradually being neglected and forgotten though they are more nutritious than the modern food.

6. Recommendations –

(i) Wild leafy vegetables are multi valued natural resource. These resources are under threat from over harvesting, over-grazing, invasive species, habitat destruction and land use change. Sustainable scientific management of these resources is essential not only for conserving bio-diversity but also for the well being of the tribal and other local communities. In this way their cultural value can also be preserved.

(ii) Inventorization and conservation of highest priority wild leafy vegetable species would ensure they are available for use in genetic improvements of crop species as a contribution towards food and nutritional security. Therefore, communities should engage in sustainable management and preservation of traditional knowledge of these multi-valued resources for the well-being local communities.

(iii) Malnutrition, which is the widespread in poor population of the Jharkhand state, can be tremendously reduced with an increase in utilization of of wild leafy vegetables – a natural food rich in energy, proteins, iron and vitamins, most especially those from the rural environment. In order to have a healthy population that can promote development, the relation between food, nutrition and health should be reinforced.

(iv) Wild leafy vegetables should be encouraged by the government as reliable ingredients of food security system because they promise

no cost or low cost food supplement and substitute for major food in times of food scarcity.

(v) Forest Management plans and the community forest management plans should have wild leafy vegetables and other wild edible plants included with the measures for their sustainable management and non destructible harvesting methods.

(vi) Acceptance and adoption level of these wild leafy vegetables can be enhanced through better communication methods and awareness programmes about their nutrients and medicinal properties. This will also help local population to improve the nutritional quality of daily diets. Traditional knowledge and mode of consumption of some WLVs can be disseminated to larger areas by wide publicity and awareness generation efforts.

(vii) Planning of in-situ conservation of wild leafy vegetables and efforts of ex-situ cultivation should be done for their conservation and better utilization.

(viii) Processing of these WLVs is still underdeveloped. The availability of quality seed with proper agronomic properties is the major constraints in their production. There is a potential for scientific institutions and private seed companies to enter the seed market for such traditional leafy vegetables provided by the nature.

(ix) Value addition in WLVs through proper storage and processing methods and commercialization can attract the planners and could widen the livelihood base. In Africa, such strategies have been quite successful in combating deficiency of micronutrients and vitamins in poor population. This can be effectively replicated in Jharkhand and India.

(x) Traditional knowledge regarding medicinal value of these vegetables have been validated by several studies in which these WLVs have been found to be rich in alkaloids, flavonoids, saponins, tannins, terpenoids, cardiac glycosides having therapeutic properties. The consumption of such WLVs should be encouraged and popularized as these could be beneficial resources for prevention, management and treatment of several diseases.

It can be concluded that the green leafy vegetables are abundantly available throughout length and breadth of Jharkhand, these are mostly neglected, have a good potential in terms of food value and can serve as an easily accessible food resource. Green leafy vegetables are rich sources of proteins and minerals, and are important source of nourishment provided by the nature to the poor tribal and other forest dwelling communities. There is every possibility that many of such leafy vegetables may disappear with the time due to climatic changes, forest degradation, forest fires and over exploitation. Therefore, every efforts should be done to enhance the awareness about such plants and for in situ and ex situ conservation of these plants. Thus, such nature's gift in the form of wild leafy vegetables can play an important role in alleviating hunger and malnutrition.

BIBLIOGRAPHY

Aberoumand, A., "Comparison of protein values from seven wild edible plants of Iran". African Journal of Food Science, 2008, 2: 073-076.

Aberoumand, A., "Nutritional evaluation of edible Portulaca oleracea as Plant Food." Food Analytical Methods, 2009, 2:204–207.

Aberoumand, A., "Comparative study of nutrients and mineral molar ratios of some plant foods with recommended dietary allowances." Advance Journal of Food Science and Technology, 2010, 2(2): 104-108.

Aberoumand, A. & Deokule, S. S., "Determination of elements profile of some wild edible plants." Food Analytical Methods, 2009(a), 2:116– 119.

Aberoumand, A. & Deokule, S. S., "Studies on nutritional values of some wild edible plants from Iran and India." Pakistan Journal of Nutrition, 2009(b), 8 (1):26-31.

Agrahar-Marugakar, D. and Pal, P.P., "Intake of nutrients and food sources of nutrients among the Khasi tribal women of India.", Nutrition, 2004, 20:268-273.

Agrahar-Marugakar, D.& Subulaxmi,G., "Nutritional values of wild edible fruits,berries,nuts,rootsand spices consumed by the Khasi tribe of India", Ecol Food Nutr, 2005, 44:207-223.

Andel, T.V., "Non-Timber Forest Products and the Value of Wild Plants.", Agromisa Foundation and CTA, Wageningen. Agrodok 39, 2006.

Ali-Shtayeh, M.S., Jamous, R.M., Al-Shafie, J.H., Elgharabah, W.A., Kherfan, F.A., Qarariah, K.H., "Traditional knowledge of wild edible plants used in Palestine (Northern West Bank): a comparative study", J Ethnobiol Ethnomed ; 2008,4:13. doi: 10.1186/1746-4269-4-13.

Angami, A., Gajurel, P. R., Rethy, P. Singh, B & Kalita, S. K. "Status and potential of wild edible plants of Arunachal Pradesh.", Indian J. Trad.Knowl., 2006, 5: 541- 550.

Anjula, P., Tomer, A.K., Bhandari, D.C., & Pareek, S.K., "Towards collection of wild relatives of crop plants in India.", J. Gen. Resour. Crop Evol., 2007, doi. 10.007/ s10722-007- 9227-4.

Arinathan, V., Mohan, V. R., John, De B. A. & Murugan, C " Wild edibles used by Palliyars of the Western Ghats Tamil Nadu." Indian J. Trad.Knowl., 2007, 6: 163-168.

Arora, R.K., "Native food plants of the north-eastern tribals. in: Glimpses of Indian Ethnobotany." Jain, S.K. (ed.), Oxford &IBH Publishing Co., New Delhi,1981, Pp. 91-106.

Arora, R.K., "Genetic resources of less-known cultivated food plants" Jain, NBPGR Sci. Monogr. ICAR, New Delhi,India,1985.

Arora, R. K. "Ethnobotany and its role in domestication and conservation of native plant genetic resources." In Jain, S. K. (Ed.) Manual of Ethnobotany. Scientific Publications, Jodhpur., 1987, Pp. 94-102.

Arora, R. K. & Chandel, K. P. S., " Botanical source areas of wild herbage legumes in India." Tropical Grasslands, 1972, 6 (3):213-221.

Arora, R.K. & Nayar, E.R.,"Wild relatives of crop plants in India." NBPGR Sci. Monogr, 1984, 7: 97.

Atal, C.K., Sharma, B.M. & Bhatia, A.K., " Search of emergency foods through wild flora of Jammu and Kashmir: Sunderbani area." Indian Forester, 1980, 106-219.

Atwater ,W.O., Bryant, A.P., "The availability and fuel value of food materials.", Washington, DC: US Government Printing Office, (Agriculture Experiment Station 12th Annual Report,1900, 73-110.

Badhwar, R. L. & Fernandes, R. R. " Edible Wild Plants of Himalayas." Daya publishing House, Delhi, 2011, Pp.100-400.

Bandyopadhyay, S. & Mukherjee, S. K., "Wild edible plants of Koch Bihar district, West Bengal."", Nat. Prod. Radiance, 2009, 8: 64-72.

Barrau, J., " The sago palms and other food plants of marsh dwellers in the south pacific islands"", Econ Bot.,1959, 13: 151.

Bhatt, S.C. & Bhargava, G.K., "Land and people of Indian States and Union Territories",Kalpaz publications, Dehi,2006.

Bhujel, R. B., Tamang , K. K. & Yonzone, G. S., " Edible wild plants of Darjeeling district. Journal of Bengal", Natural History Society (New Series), 1985, 3:176–83.

Binu, S ., "Wild edible plants used by the tribals in Pathanamthitta district, Kerala."Indian J. Trad. Knowl., 2010, 9: 309-312.

Borah, S., Baruah, A. M. & Das, A. K. & Borah, J. , "Determination of mineral content in commonly consumed leafy vegetables." Food Analytical Methods, 2009, 2:226–230.

Broin, M., "The nutritional value of *Moringa oleifera* Lam. leaves: what we can learn from figures", *Moringa News* Workshop. http://www. Moringanews. Org/doc/GB/ Posters/Broin_poster.pdf., 2006.

Brosnan, J., " Inter organ amino acid transport and its regulation.", *Journal of Nutrition*, 2003, 133:2068–2072.

Burkil, I.H., "Habits of Man and the origin of cultivated plants of the old world", Proc Limm Soc London, 1952, 164 : 12-42.

Burlingame, B. , " Comparison of total lipids, fatty acids, sugars and nonvolatile organic acids in nuts from Castanea species.", Journal of Food Composition Analysis, 2000, 13: 99-100.

Chadha, M. L., " Indigenous Vegetables of India with a Potential for Improving Livelihoods." AVRDC-Regional Center for South Asia, ICRISAT campus, Patancheru, Andhra Pradesh, India ,2009.

Chauhan,D., Srivastava, A.K. & Patra, S., "Diversity of leafy vegetables used by tribal people of Chattisgarh, India", 2014, pp. 611-622.

Chen, J., "Dietary transition in China and its health consequences Asia Pacific." Journal of Clinical Nutrition, 1994, 3:111-114.

Chaudhuri, R. H. N., Pal, D. C., Saha, N. C. & Roy, B., "Some wild edible plants in Calcutta markets. Man and Life", 1985, 11(l-2):45–58.

Choudhury, R., Datta Choudhury, M., De.B. & Paul, S. B , "Importance of certain tribal edible plants of Tripura.", Indian J. Trad. Knowl., 2010, 9: 300-302

Chowdhury, M., Mukherjee, R., " Wild Edible plants consumed by local communities of Maldah district of West Bengal, India", Indian J.Sci.Res., 2012, 3(2) : 163-170

Chweya, J. A. & Eyzaguilre, P. B. , "The Biodiversity of Traditional Leafy Vegetables", IPGRT,1999, p. 540.

Clements, S., "Harvesting and Marketing Edible Wild Plants. Oregon State University Extension Service", US., 1998, Pp. 2-4.

Cooper, H.D., Spilane, C., Anishetty, N.M.,Griffee, P.,"Promoting the identification, conservation and use of wild plants for Food and Agriculture in the Mediterranian", The FAO Global Plan of Action, FAO, Rome, 1966.

Dansi, A., Adjatin, A., Adoukonou-Sagbadja, H., Falade, V., Yedomonhan, H., Odou, D., Dossou, B., "Traditional leafy vegetables and their use in the Benin Republic." Gen Resour Crop Evol. ; 2008, 55:1239–56.

Das, S.N., Janardhanan, K.P. & Roy, S.C. " Some observations on the ethnobotany of the tribes of Totopara and adjoining areas in Jalpaiguri districts of West Bengal." J. Econ. Tax. Bot., 1983, 4(2): 453-474.

Datta, S.C., Banerjee, A.K., "Useful weeds of West Bengal rice fields." Econ Bot., 1978, 32(3):297–310.

Debarata, D., "Wild Food Plants of Madinapur, West Bengal Used During Drought and Flood.", Ethnobiology and Medicinal Plants of Indian Subcontinent, Maheshwari, J.K. (Ed.). Scientific Publishers, Jodhpur-India, 2002.

Deshmukh,B.S. & Shinde, V. "Fruits in the wilderness: A Potential of local food resource", International journal of Pharma and Bio sciences, 2010,VI(2)

Delang, C., "Not just minor forest products: the economic rationale for the consumption of wild food plants by subsistence farmers.", Ecol Econ., 2006; 59: 64-73.

Dewanji, A., Chanda, S., Barik, L. S. & Matai, S., " Extractability and nutritional value of leaf protein from tropical aquatic plants." Plant Foods for Human Nutrition, 1997, 50(4): 349-357.

Doley, B., Gajurel, P. R., Rethy, P. & Saikia, B., "A Check list of commonly used species by the Nyshi tribes of Papumpare District of Arunachal Pradesh." Journal of Biological Science Research, 2010a, 1(1): 9-12.

Doley, B., Gajurel, P. R., Rethy, P., Singh, B., Buragohain, R. & Potsangbam, S., " Lesser

known ethno medicinal plants used by the Nyshi community of Papumpare District, Arunachal Pradesh", Journal of Bio Science Research, 2010b, 1(1): 34-36.

Doney, D.L.& Whitney, E.D., "Genetic enhancement in beta for disease resistance using wild reltives; A strong case for the value of genetic conservation E.D.", Econ Bot., 1990, 44:445.

Duke, J.A., "Handbook of edible weeds." Boca Raton: CRC Press; 1992.

Dutta, P. K & Dutta, B. K. , "Potential of ethnobotanical studies in North East India: An overview." Indian Journal Traditional Knowledge, 2005, 4(1): 7-14.

FAO , "The State of the world's plant genetic resources for food and agriculture", Food and Agricultural organization of the United Nations, Rome 1997.

Gajurel, P. R., Rethy, P. & Singh. B. , "Wild edible plants of Dihang Dibang Biosphere Reserve, Arunachal Pradesh, India.'' In Das, A.P. & Pandey, A. K. (Ed.) Advances in Ethnobotany. Vedams Books, New Delhi, 2003, Pp. 73-82.

Gangwar, A. K. & Ramakrishnan, " Ethnobotanical notes on some tribes of Arunachal Pradesh, Northeastern India", 1990, Economic Botany 44:194–105.

García, V. R., Huanca. T., Vadez, V., Leonard, W. & Willkie, D., " Cultural, practical, and economic value of wild plants: a quantitative study in the Bolivian Amazon." Economic Botany , 2006, 60(1) 62-74.

Gaur R.D. , " Wild edible fruits of Garhwal Hills. JOHSARD", 1977, 1: 66-70.

Glew, R. H., Amoako-Atta, B., Ankar-Brewoo, G., Presley, J. C. Lu-Te., Millson, M., Smith, B. R. & Robert, G. H. "Non-cultivated plant foods in West Africa: nutritional analysis of the leaves of three indigenous leafy vegetables in Ghana." Food (Global Science Books), 2009, 3(1):39-42.

Gupta, S. P., *"Tribes of Chotanagpur Plateu: An Ethno-nutrition and Pharmacological Cross-section."* Bihar Tribal Welfare Research Institute, Ranchi, 1974.

Hajra P.K. & Chakraborty P. , "A Survey of Wild Plants Sold in the Lak Market of Gangtok." Indian J. Forestry, 1981, 4(3): 217-20.

Haridasan, K., Bhuyan, L.R. & Deori, M.L., "Wild edible plants of Arunachal Pradesh", Arunachal For.News,1990,18:1-8.

Horo S., Topno S., "Ethnobotanical studies on Wild leafy vegetables consumed by "Ho" tribe of W.Singhbhum district, Jharkhand India." The Biobrio., 2015,2(3&4); 133-139.

Ignacimuthu, S. & Babu, C. R. "Economically useful wild relatives of urd and mung beans Vigna radiatra var sublobata (Roxb) Verdc", Econ Bot, 1987, 41: 418-422.

Jain, A., Sundriya,l M., Roshnibala, S., Kotoky, R., Kanjilal, P.B., Singh, H.B., et al. , "Dietary Use and Conservation Concern of Edible Wetland Plants at Indo-Burma Hotspot: A Case Study from Northeast India", 2011, J Ethnobiol Ethnomed. 7:29.

Jain, S. K. , "Some less known plant foods among the tribals of Purulia district (West

Bengal)", Science & Culture, 1964a, 30 :285.

Jain, S. K., "Wild food plants of the tribals of Bastar (M P). Proceedings of the National Institute of Sciences of India", 1964b, 30 (B), 56.

Jain, S. K. , "Ethnobotany- Its scope and study", Indian Museum Bulletin, 1967a, 2:39-43.

Jain S.K. & Hajra P.K., "Survey of edible plants in bazaar of Meghalaya. Bull Meghalaya" Sci. Sco, 1977, 2:29-33.

Jain, S.K. "Forest vegetation of North East India: Prospects and constrains on utilization in North East.", African Forest Forum, 1976, 5:34-35.

Jain, S. K., "Contribution to Ethnobotany of India." Scientific Publishers, Jodhpur, India, 1990.

Jain, S. K., "Some aspects of biodiversity and Indian tradition. Indian Journal of History of Science", 1998, 33(1):51-62.

Jain, A., Sundriyal, M., Roshnibala, s., Kotoky, R., Kanjilal, P.B., Singh, H.B., et al., " Dietary use and conservation concern of edible wet land plants at Indo-Burma hotspots: A Case study from Northeast India", J Etnobiol Ethnomed., 2011, 7:2.

Jerath, S.G., Singh, A., Kamboj, P., Goldberg, G., Magsumbol, M.S., "Traditional Knowledge and Nutritive Value of Indigenous Foods in the Oraon Tribal Community of Jharkhand: An Exploratory Cross-sectional Study", *Ecol Food Nutr.*, 2015, 54(5): 493–519.

Johnson, L. M. A. , "Place that's good-Gitsan landscape perception and ethnoecology. Human Ecology", 2000, 28 (2):301–325.

Kala C.P., "Prioritization of cultivated and wild edibles by local people in the Uttaranchal hills of Indian Himalayas", Indian Journal of Traditional knowledge, 2007, 6: 239-243.

Kallas, J., "Edible wild plants from neighborhood to wilderness: a catalyst for experiential education", Association for Experiential Education, 24th Annual International Conference Proceedings, Spokane, W A, September 26-29, 1996, Pp.140-144.

Kar, A., "Common wild vegetables of Aka tribe of Arunachal Pradesh ", Indian J. Trad. Knowl., 2004, 3: 305-313

Katewa, S.S., " Contribution of some wild food plants from forestry to the diet of tribal of southern rajasthan" Indian Forester, 2003, 129 (9), 117-1131

Katiyar, S. K., Sharma, K., Kumar, N., & Bhatia, A. K., "Composition of some unconventional Himalayan wild fruits", Journal of Food Science and Technology, 1990, 27: 309–310.

Kayang, H., "Tribal knowledge on wild edible plants of Meghalaya, North east India.", Indian J. Trad. Knowl., 2007, 6: 177-181.

Kharkongor, P. & Joseph, J., "Folklore medicobotany of rural Khasi and Jaintia tribes in Meghalaya." In Jain, S. K. Glimpses of Indian Ethnobotany. Oxford and IBH Publishing Co., New Delhi, 1981, Pp. 124.

Khyade, M.S., Kolhe, S.R. and Deshmukh, B.S., "Wild Edible Plants Used By the Tribes of Akole Tahasil of Ahmednagar District (Ms)", India, Ethnobotanical Leaflets, 2009, 13, 1328-1336

Kidane, B., Van der Maesen, L.J.G., Asfaw, Z., Sosef, M.S.M., Andel, V.T., "Wild and semi-wild leafy vegetables used by the Maale and Ari ethnic communities in southern Ethiopia", Gen Resour Crop Evol, 2015, 62(2):221–34.

Kim, K.U., Shin, D.H., Lee I,J., editors. "Utility of weeds and their relatives as resources", Daegu: Kyungpook National University, 2007.

Kinyua, A. M., Kofi-Tsekpo, W. M. & Dangana, L. B., "Indigenous Medicinal Plants and Wild Relatives of Food Crops.", Nairobi, UNESCO, 1997, Pp. 107-112.

Kochhar, A., Nagi, M. & Sachdeva, R., "Proximate composition, available carbohydrates, dietary fibre and anti nutritional factors of selected traditional medicinal plants.", Journal of Human Ecology, 2006, 19(3): 195-199.

Kristensen, M. & Balslev, H., "Perceptions, use and availability of woody plants among the Gourounsi in Burkina Faso.", Biodiversity and Conservation, 2003, 12 (8):1715–1739.

Ksoshoo, T.N., "Conservation of Biodiversity in Biosphere", In: Indian Geosphere Biosphere Pragramme, Some aspects, (national Academy of Science, Allahabad, India), 1991, 178-233.

Kunwar, R.M., Kshhetri, B.K., Rai, S.K. & Bussman, R.W., "Ethnomedicine in Himalaya: a case study from Dopla, Humla, Jumbla and Mustang district of Nepal.", J. Ethno. Ethnomed, 2006, 2:27.

LaRochelle, S. & Berkes, F., "Traditional ecological knowledge and practice for edible wild plants: Biodiversity use by the Rarámuri in the Sierra Tarahumara, Mexico.", International Journal of Sustainable Development and World Ecology, 2003, 10:361-375.

Ladio, A. H. and Lozada, M., "Patterns of use and knowledge of wild edible plants in distinct ecological environments: A case study of a Mapuchecommunity from Northwestern Patagonia.", Biodiversity and Conservation, 2004, 13: 1153-1173.

Lee, Y. Y., Tsou, C. S., Lin, H. C. Ien, C. H. & Wu, Y. T., "Global perspective of health related edible plants from the agricultural point of view.", Asia Pacific Journal of Clinical Nutrition, 2008, 17 (S1):95-98.

Lentini, F. & Venza, F., "Wild food plants of popular use in Sicily.", Journal of Ethnobiology and Ethnomedicine, 2007, 3:15 doi:10. 1186/1746-4269.

Maikhuri, R.K., "Nutritional value of some lesser known wild edible food plants and

their role in tribal nutrition: A case study in North-East India.", J. Trop. Sci.,1991, 31: 397-405.

Manickam, R., Kaur, D.P., Warwick, E., Kumar, B.B., "Traditional Leafy Vegetables of a Tribal Community in Jharkhand, India", 2014. Conference: International Horticultural Congress (IHC 2014), Brisbane, Australia; 08/2014.

Mannan, M. M., Maridass, M. & Victor, B., "A Review on the potential uses of ferns.", Ethnobotanical Leaflets, 2008, 12: 281-285.

Maneechote, C., "Utilization of weeds and their relatives as resources in Thailand. In: Kim KU, Shin DH, Lee IJ, editors. Utility of weeds and their relatives as resources.", Daegu: Kyungpook National University; 2007. p. 107–121.

Marcelino, L.R., Inocencio, A.I., Zaballa, C.C., Paller, E.C., "Bicol's weed recipes.", Philipp J Weed Sci., 2005;23:40–43.

Mishra, R.K., & Jayram, V. "Agricultural development of Jharkhand at a glance through figures",2006,Agricultural data bank, Ranchi,PP:188.

Mishra, S., Maikhuri, R.K., Kala, C.P., Rao, K.S. & Saxena, K.G., "Wild life vegetables: A study of their subsistence dielectric support to the inhabitants of Nanda Devi Biosphere Reserve, India.", Journal of Ethnobiology and Ethnomedicine, 2008, 4: 15

Misra, S. & Misra, M. K., "Leafy vegetable plants of South Odisha, India.", Intl. J. Agric. Food Sci., 2013, 3: 131-137.

Mohan, V.R. & Janardanan, K., "The biochemical composition and nutrient assessment of less known pulses of the genus Canavalia" , Int Food Sci Nutr, 1994,45 : 255-262.

Murtem, G., "Common wild vegetables of Nyishi tribe of arunachal Pradesh", Arunachal forest News, 2000, 18(1&2) 66.

Murugan, M. P., Raj. X. J. G., Gupta S. & Singh, S. B., "Phytofoods of Nubra valley, Ladakh -The cold desert.", Indian Journal of Traditional Knowledge, 2010, 9 (2): 303-308.

Narayanan, M.K.R., Kumar, N.A., " Gendered knowledge and changing trends in utilization of wild edible greens in Western Ghats, India.", Indian Journal of Traditional Knowledge ,2007, 6:204-216

Nayar, M. P., "Endemism and patterns of distribution of endemic genera (angiosperms).", Journal of Economic Taxonomic Botany, 1980, 1: 99-110.

Nayar, M. P., "In-situ conservation of wild flora resources. National Symposium on Conservation and Sustainable Management of India's Genetic Estate. ",WWF, New Delhi, 3-4 November, 1989.

Nazarudeen, A., "Nutritional composition of some lesser-known fruits used by the ethnic communities and local folks of Kerala.", Indian Journal of Traditional Knowledge, 2010, 9 (2):398-402.

N'danikou, S., Achigan-Dako, E.G., Wong, J.L.G., "Eliciting local values of wild edible

plants in Southern Bénin to identify priority species for conservation.", Eco Bot. , 2011, 65(4):381–95.

Nnamani, C. V., Oselebe, H. O. & Agbatutu, A.," Assessment of Nutritional Values of Three Underutilized Indigenous Leafy Vegetables of Ebonyi State, Nigeria", *African J. of Biotechnology,* 2009, Vol. 8, No. 9, pp. 2321-2324.

Odhav, B., Beekrum, S., Akula, U. & Baijnath, H., "Preliminary assessment of nutritional value of traditional leafy vegetables in KwaZulu-Natal, South Africa.", Journal of Food composition Analysis, 2007, 20 (5):430-435.

Oduro, I.; W.O. Ellis, Owusu D., "Nutritional potential of two leafy vegetables: Moringa oleifera & Ipomoea batatas leaves", Sci. Res. Essay, 2008, 3, 57-60.

Ogle, B.M/, Grivettim, L.E., "Legacy of the chameleon: edible wild plants in the Kindom of Swaziland, Southern Africa. A cultural, ecological, nutritional study. Part II – demographics, species availability and dietary use, analysis by ecological zone.", Ecol Food Nutr., 1985;17(1):1–30.

Pardo-de-Santayana, M., Tardio, J., Morales, R., "The gathering and consumption of wild edible plants in the Campoo (Cantabria, Spain).", Inter J Food Sci Nutr., 2005, 56: 529-542.

Parmar, C. & Kaushal, M.K., "Wild fruits of the sub Himalayan Region", Kalyani Publishers, New Delhi, 2001.

Parvathi, S. & Kumar, V.J.F., "Studies on chemical composition and utilisatiion of the wild vegetable Athalakkai (Momordica tuberosa)." , J. Plant food Hum. Nutr., 2002, 57: 3-4. doi: 10.1023/A:102188406024.

Pemberton, R.W., Lee, N.S., "Wild food plants in South Korea; market presence, new crops, and exports to the United States.", Econ Bot. 1996', 50(1):57–70.

Ponnuswamy, S. & Wesely, J. D. E.G., "Comparative study of primary metabolites in different plant parts of Clitoria ternatea Linn.", Journal of Chemical and Pharmaceutical Research, 2011, 3(4): 614-617.

Pradeep Kumar T., Indira V., Shankar, M., "Nutritional evaluation of wild leafy vegetables consumed by tribals in the Wayanad district of Kerala.", Proc. Natl. Acad. Sci. India, Sect. B Biol. Sci. , Official publication of National Academy of Sciences, India, 2014.

Pramila, S. S., Kumar, A., Raghuvanshi, R., "Nutrient composition of some uncommon foods consumed by Kumaon and Garhwal hill subjects.", J. Food Sci. Technol.,1991, 28, 237–238.

Price, L., Ogle, B.M., "Gathered indigenous vegetables in Mainland Southeast Asia: a gender asset. In: Resurreccion BP, Elmhirst R, editors. Gender and natural resource management livelihoods, mobility and interventions.", London: Earthscan, 2008, p. 213–242.

Raghuvanshi, R. S. & Singh, R.,"Nutritional Composition of Uncommon Foods and

their Role in Meeting Micronutrient Needs", *International J. Of Food Science Nutrition*, 2001, Vol. 52, No. 4, pp. 331-335.

Rai, N., Asati, B. S & Yadav, D. S., "Conservation and genetic enhancement of underutilized vegetable crop species in North Eastern region of India.", ENVIS Bulletin, LEISA, 2004, www. agriculturesnetwork.org.

Rajaram, N. and Janardanan, K., "Ex-situ conservation of genetic resources of tribal pulses and their wild related species", FAO/IBPGR Pl Genet Res Newslet,1993, 91/92, 29-32.

Rajasab, A.H. & Mahamad, I., "Documentation of folk knowledge on edible wild plants of north Karnataka", Indian J Trad Knowledge, 2004, 3(4): 419-429.

Raju, D.C.S. & Krishna, B., "Wild edible plants of Sikkim.", In Proceeding of National Symp Environ. Protection and Hill Dev. Sikkim Sci. Soc., 1988, 38-44.

Raju, D.C.S., & Krishna, B., "Less known edible plants of Sikkim", in R.P. Porkayastha, ed. Economic plants and microbes. Today and tomorrow's Printers and publishers, New Delhi, India, 1990, 83-86.

Rajyalakshmi, P., Geervani, P., "Nutritive value of the foods cultivated and consumed by the tribals of South India.", Plant Food. Hum. Nutr., 1994, 46:53–61.

Rakesh, K.M., Kottapalli, S.R. & Krishna, G.S., "Bioprospecting of Wild Edibles for Rural Development in the Central Himalayan Mountains of India.", Mountain Res. Dev., 2004, 24(2): 110-113.

Ramachandran, V. S., "Wild edible plants of the Anamalais, Coimbatore district Western Ghats, Tamil Nadu.", Indian J. Trad. Knowl., 2007, 6: 173-176.

Rapoport, E.H., Raffaele, E., Ghermandi, L., Margutti, L., "Edible weeds: a scarcely used resource.", Bull Ecol Soc Am., 1995,76(3):163–166. http:// dx.doi. org/10.2307/20167947 .

Rashid, A., Anand, V.K. & Jawaid, S., "Less known wild edible plants used by the Gujjar-Tribe of district Rajouri, Jammu and Kashmir State, India.", Int. J. Bot.,2008, 4(2): 219-224.

Rawal, A.K., Sharma, H.P., Singh, B., Sharma, L.K., Pandey, N.K., "Study on Under-Utilized Nutraceuticals Plants (Potherbs) of Tribal Belts of Jharkhand, India.", Am. J. PharmTech Res., 2013, 3(6): 592-606.

Rawat, D.S., Dangwal, L.R. & Gaur, R.D., "Some Pycnoplinthopis Bhutanica (Hara) Jafri (Brassicaceae): a new record from North-West Himalaya.", Journal of the Bombay History society, 1994, 93: 109-111.

Reddy, K. N., Pattanaik. C., Reddy, C. S, Raju, V. S., "Traditional knowledge on wild food plants in Andhra Pradesh.", Indian J. Trad. Knowl., 2007, 6: 223- 229

Reddy, K. N., "Ethnobotany of Andhra Pradesh: A Review.", Ethnobotanical Leaflets, 2008, 12: 305-310.

Redzic, S. J., "Wild edible plants and their traditional use in the human nutrition in Bosnia-Herzegovina.", Ecology of Food and Nutrition, 2006, 45(3):189-232.

Saikia, A. & Shadeque, A., "Nutritional evaluation of underexploited leafy vegetables of Assam.", Indian Journal of Agricultural Science, 1993, 63:409-411.

Saka, J.D.K., Msonthi, J.D. & Sambo, E.Y., " Dry matter, acidity and ascorbic acid contents of edible wild fruits growing in Malawi.", J. Trop. Sci.,1992, 32(3): 217-221.

Saklani, S. and Chandra, S., "Evaluation of Garhwal Himalaya wild edible fruit Pyrus pashia pulp.", Journal of Pharmacy Research, 2012, 5(6): 3030-3032.

Samant S.S. and Dhar U., "Diversity, endemism and economic potential of wild edible plants of Indian Himalaya.", International Journal of Sustainable Development and World Ecology, 1997, 4:179-191

Samati, H., "Kitchen garden plants of Pnar tribe in Jaintia Hills district, Meghalaya.", Ethnobotany, 2004, 16 (1 & 2):125-130.

Sanchez-Machado D.I., J.A. Nunez-Gastelum, C. Reyes-Moreno; B. Ramirez-Wong; Lopez-Cervantes J. *Food and Analytical Methods*, 2010, 3,175-180.

Saunders, C. F., "Useful Wild Plants of United States and Canada.", Illustrated photographs and by numerous line drawing by Aring, L. H. New York, Robert M. McBride & Co., Revised Ed., 1926.

Seal T. "Evaluation of nutritional potential of wild edible plants, traditionally used by the tribal people of Meghalaya state in India.", Amer J Plant Nutr Fertil Tech., 2012, 2:19–26.

Shadeque, A., "Genetic resources diversity in horticultural crops of the northeastern region.", Proceedings of the National Academy of Sciences, 1989, 55: 473-476.

Shankar, R., "Tribal communities in India and PGR In: Farmer's Rights and Plant genetic Resources Recognition and Reward: A Dialogue", (Ed Swaminathan MS), macmillan, India, Madras, India,1995, pp 106-111.

Sharma, S.C. "Preliminary survey of wild vegetable plants in the markets of Shahjahanpur(U.P.)", Journal of Economic and Taxonomic Botany, 1992,16(3):569-572.

Shefana, A. G. & Ekanayake, S., "Some nutritional aspects of Lasia spinosa (kohila), Vidyodaya.", Journal of Science, 2009, 14 (1): 59-64.

Singh, H.B., Puni, L., Jain, A., Singh, R.S., Rao, P.G., "Status, utility threats and conservation options for rattan resources in Manipur.", Curr Sci., 2004, 87: 90–4.

Singh, N. R. & Singh, N. S., "Wild medicinal plants includes in Red List.", Asian Agri-History, 2009, 13 (3):221-225.

Singh, S. R. & Singh, N. I., " A preliminary ethnobotanical studies on wild edible plants in the markets of Manipur.", Journal of Economic and Taxonomic Botany, 1985, 6(3):699–703.

Singh, G. & Kumar, J., "Studies on Indigenous Traditional knowledge of some aquatic and marshy wild edible plants used by the Munda tribe of District Kunti, Jharkhand, India.", Int. J. Bioassays, 2014, 3: 1738- 1743

Singh, V., "Lesser Known wild edibles of Sikkim Himalaya.", J. Econ. Taxon. Bot., 1995, 19:385- 390.

Singh. H.B. & Arora, R.K., "Wild Edible Plants of India", (1st Ed.), ICAR Publication. New Delhi,1978, 88p.

Singh. H.B., Puni, L., Jain, A., Singhhhhh, R.S., Rao, P.G., "Status, utility threats and conservation options for rattan resources in Manipur", Curr Sci., 2004, 87:90-94.

Singh, L. R., "Food security through wild leafy vegetables in Chotanagpur Plateau, Jharkhand.", Int. J. Res. Envi. Sci. Tech., 2014, 4:114-118.

Singh, U. & Singh, B., "Tropical grain lrgumes as important human food",Economic Botany, 1992, 46; 310-312.

Sinha, R. and Lakra, V., "Wild tribal food plant of Orissa.", Indian J. Trad. ., 2005, 4: 246-252.

Sinha, R., Lakra, V., "Edible weeds of tribals of Jharkhand, Orissa and West Bengal.", Indian J Tradit Know., 2007, 6(1):217–222.

Siswovo, T. A., Mardiana, E., Lee. K. O. & Hoshkawa, K., "Isolation and characterization of antioxidant protein fractions from Melinjo (Gnetum 251 gnemon) seeds.", Journal of Agricultural Food Chemistry , 2011, 25, 59(10): 5648-56.

Souza, J.D.; Kulkarni, A.R., " Comperative studies on nutritive values of tender foliage of seedlings and mature plants of Moringa oleifera", Lam. J. Econ. Taxonomy, 1993, 17: 479-485.

Sturtevants, E. L., "Sturtevants Edible Plants of the World.", Ed. Book of Hedrick, U.P., New York Agricultural Experimental Station, 1919.

Sundriyal, M. & Sundriyal, R.C., "Wild edible plants of the Sikkim Himalaya: marketing, value addition and implications for management", Economic Botany, 2004, 58(2): 300-315.

Sundriyal, M.& Sundriyal, R.C., "Wild edible plants of the Sikkim Himalaya: Nutritive values of selected species.", Economic Botany, 2001, 55:377-390.

Teklehaymanot, T., Giday, M., "Ethnobotanical study of wild edible plants of Kara and Kwego semi-pastoralist people in Lower Omo River Valley, Debub Omo Zone.", SNNPR Ethiopia J Ethnobiol Ethnomed , 2010, 6:23. doi: 10.1186/1746-4269-6-23.

Tewari, P.D., & Sharma, A.N., "Tribal ecosystem and malnutrition in India" Northern Book Center, new Delhi, 1989.

Thakur, S., Sudhansu Kumar, Arvind Kumar, "Potential of some wild leafy vegetables as natural source for supplementation of micro nutrients in vegetarian diets of santhal pargana area of Jharkhand", Indian Journal of Fundamental and Applied Life

Sciences, 2012, Vol. 2 (3) July-September, pp.65-67.

Toledo, A. & Burlingame, B., "Biodiversity and Nutrition: A common path toward Global food Security and sustainable development", Journal of Food composition and analysis, 2006, 19:477-483.

Vadivel, V. & Janardanan, K., "Nutritional and anti nutritional composition of velvet bean an under utilized food legume in South India", Int Food Sci Nutr, 51 (2000) 279-287.

Van Chin, D., "Utilization of weeds in Vietnam.", Proceedings II of the 17th Asian-Pacific Weed Science Society Conference "Weeds and environmental impact", 22–27 November, 1999. Bangkok: The Organisation of the 17th APWSS Conference; 1999.

Veerachari, U. & Bopaiah, A. K., "Preliminary phyto-chemical evaluation of the leaf extract of five Cassia species.", Journal of Chemical and Pharmaceutical Research, 2011, 3(5):574-583.

Vongsaroj, P., Nuntasomsaran, P., "Weed utilization in Thailand.", Proceedings II of the 17th Asian-Pacific Weed Science Society Conference "Weeds and environmental impact", 22–27 November, 1999. Bangkok: The Organisa- tion of the 17th APWSS Conference; 1999.

Wada, L., Ou, B., "Antioxidant activity and phenolic content of Oregon cranberries.", Journal of Agricultural and Food Chemistry. 2002; 50:3495-3500

Wujisguleng,W.,Khasbagen,K., " An integrated assessment of wild vegetable sources in Inner Mangolian Autonomous region", China J Ethnobiol Ethnomed, 2010, 6:34, doi: 10.1186/1746-4269-6-34.

Young, V.R. & Pellet, P.L., "Plant proteins in relation to human protein and amino acid nutrition", American Journal of Clinical Nutrition, 1994, 59, 1203S-1212S .

GLOSSARY OF TECHNICAL TERMS USED

Achene : One celled, one seeded fruit, or one seeded carpel of an apocarpus small dry indehiscent fruit.

Actinomorphic Capable of being divided into equal halves along any diameter.

Aculeate : Armed with prickles.

Acumen : A sharp tapering point more or less prolonged.

Acuminate : Terminating in acumen.

Acute : Evenly tapering and ending in a narrow angle, but without a prolongation.

Adaxial : Facing towards the stem of a plant (in particular denoting the upper surface of a leaf).

Adnate : Organs of different series united.

Alternate : Placed on opposite sides of stem on different line.

Amplexicaule : Clasping the stem as the leaves of Parnassia.

Anastomosing: Interconnection between parts of a branching system forming a network, as in leaf anastomosis.

Angular : Used when an organ shows a determinate number of angles, as the quadrangular stem of Labiateae.

Annual : Plants which perish within one year.

Annulus : The row of specialized cells with thickened walls surrounding each sporangium in ferns.

Anthesis : *Anthesis* is the period during which a flower is fully open and functional. It may also refer to the onset of that period.

Apiculate : A short pointed tip.

Apiculum : A sharp and short but not stiff point in which a leaf may end.

Apocarpous : With carpels free and distinct.

Apogamous : A peculiar breeding system in which prothalli give rise directly to the sporophyte plant without fertilization.

Attenuate : Reduce in thickness.

Auricles : Rounded; ear like; lobes forming part of the frond.

Axil : The upper angle formed by a leaf or a similar organ and the supporting stem or axis.

Axillary : Growing in an axil.

Axile : Relating to the axis, generally said of kind of placentation in which the ovules are born on the central axis of the ovary.

Berry : A simple succulent fruit, without a stone, and generally with more than one seed.

Blade : The lamina or flat part of leaf.

Bract : A rudimentary or modified leaf subtending a flower or an inflorescence.

Bracteate : Having bracts.

Bracteole : Bract immediately beneath or next to flower.

Bulb : Stock consisting of an axis and leaf formations with bud in their axils.

Capitate : Having a globose head.

Capitula : A dense cluster of flowers or foliage.

Capsule : A dry syncarpous fruit, the carpels of which open or separate at maturity.

Carpel : The ovary of an apocarpous pistil, or one of the components parts at a syncarpous ovary.

Caudate : With a tail or with a slender tail like appendage.

Ciliate : Fringed with thick marginal hairs (cilia) like eye lashes.

Companulate : Bell shaped.

Cordate : Heart shaped.

Coriaceous : Leathery, rough and thick.

Corymb : Inflorescence of the indefinite kind in which the branches although starting from the different point, all attain the same level.

Corymbose : Arranged in Corymbs.

Costate : Ribbed.

Crenate : With rounded teeth.

Cucullate : Having the shape of a cowl or hood; hooded: *cucullate* sepals.

Cuneate : Wedge shaped, triangular.

Cuspidate : Having a sharp rigid point.

Cyme : An inflorescence of the definite type or centrifugal type.

Deciduous : Quality of falling once a year.

Decumbent : Reclining but the summit ascending.

Decurrent : Running down as the blade of many thistles.

Decussate : Leaves arranged in alternating pairs forming vertical rows.

Dehiscence : The mode of opening of a capsule or an anther.

Deltoid : Triangular shaped.

Dentate : Toothed.

Denticulate : With small teeth, with reference to the margin of the leaf.

Dichotomous : Forked in pairs.

Diffuse : Loosely spreading.

D**igitate :** Spreading like fingers of hand.

Dimorphic : Of two forms.

Dioecious : Unisexual, with male and female flowers on separate individuals.

Divaricate : *Means* branching, or separation, or a degree of separation. The angle between branches is wide.

Drupe : A stone fruit.

Echinate : Long, hedgehog like spines.

Ellipsoid : Shaped like an *ellipse*; *elliptical*.

Elliptical : Oblong or oval with rounded ends.

Entire : Having unbroken margins.

Epicalyx : Accessory lobes of the calyx.

Epiphyte : Plants growing on other plants but not drawing its nourishment from host plants.

Exindusiate : When sori are not covered.

Exine : Outer coat of spore.

Exstipulate : Without stipules.

Fascicled : Clustered.

Floret : Applies to individual flowers of Asteraceae and other plants, of which the inflorescence is popularly termed.

Foliaceous : Of or pertaining to or resembling the leaf of a plant.

Follicle : Several seeded carpel dehiscing along the inner or ventral suture.

Frond : Leaves of ferns and some other group of plants or aerial axes of the fern sporophyte.

Glabrate : Somewhat glabrous.

Glabrescent : Becoming glabrous.

Glabrous : Without hairs.

Glandular : Having glands.

Glaucous : Of bluish gray color, often covered with fine blumes.

Globose : Having the shape of a globe; globelike.

Habit : The general appearance of a plant, whether erct, prostrate, climbing etc.

Herbaceous : All green parts which are not woody.

Hirsute : Clothed with long and short hairs.

Hispid : Clothed with long stiff hairs.

Imparipinnate : Unequally pinnate; pinnate with terminal leaflets.

Indefinite : Too many to be readily counted.

Indehiscent : Not opening in a regular manner.

Indusium : Protective flap or other device protecting the sorus and is of characteristic shape and structure in each genus.

I**nflorescence :** The mode in which flowers are arranged on the stem.

Involucre : A circle of bracts subtending a flower cluster.

Labiate : Lipped; as the corolla of Labeaceae, verbenaceae etc.

Lamina : Blade of a leaf or frond.

Lanceolate : Shaped like lance head, means 2-4 times as long as broad.

Lateral : Two sides of petals or wings.

Leaflet : Ultimate articulate division of a compound leaf.

Legume : A *legume* is a simple, dry fruit that is contained within a shed or a pod.

Lenticel : A lentil shaped corky process developed on bark.

Lenticular : Shaped like double convex lens.

Ligulate : Star-shaped, as ray flowers of Asteraceae.

Linear : Narrow with almost parallel edges,

Lobe : Division of leaf, leaflet or petal.

Lyrate-pinnatisect: Having a pinnately divided leaf with an enlarged terminal lobe and smaller lateral lobes.

Monoecious : Unisexual with male and female flowers on the same individuals.

Mucronate : Abruptly terminating into a short, stiff and straight sharp point.

Numerous : When there are many organs.

Nut : A hard one seeded indehiscent fruit resulting from syncarpous ovary.

Oblanceolate : Inversely lanceolate, means long, narrow, and tapering at both ends but broadest over the middle.

Oblong : Much longer than broad,with sides nearly parallel.

Obovate : Inversely ovate, distal ends broader.

Obtuse : rounded or blunt tip.

Ovate : Egg shaped in outline.

Ovoid : To have a solid with ovate or oval longitudinal sections.

Ovule : Under developed seed in ovary.

Palmate : The midrib of the lobes or leaflets, all radiating from the apex of the petiole.

Panicles : A panicle is a flower cluster that usually grows at the end

of a stem or a shoot. Panicles are sometimes referred to as racemes.

Pappus : A ring of fine feathery hairs surrounding the fruit example calyx limb of Asteraceae, composed of hairs or bristles.

Paripinnate : Evenly pinnate, pinnate without the terminal leaf.

Pedicel : When flowers are solitary, as in the axils of leaf, the stalk is called pedicel.

Peduncle : Common stalk of many flowers.

Pellucid : Translucent but coloured.

Pendulous : Pendulous most commonly refers to branches of trees or bushes, or other plant matter like flowers or leaves that droop or bend downward.

Pentamerous : Having the members in each whorl of flowers in five.

Perianth : Floral envelop; means when calyx and corolla are similar in form and texture.

Pericarp : Shell of a fruit or seed vessel.

Perisporiate : When there is exine.

Perrenial : Flowering more than once from the same root stock, especially applied to herbs that die down annually.

Persistent : Remaining attached.

Petiolate : Having a stalk.

Petiole : Leaf stalk.

Pinna : Primary division of bipinnate or tripinnate leaves or one of the first major divisions of the fern frond.

Pinnate : Leaflets are so arranged on either side of the common axisin the same way as the webs of the feather on its shaft.

Pinnatified : Applied to leaves and other organs, signifies that they are divided but not to the mid rib.

Pinnules : One of the division of pinna;secondary division of frond.

Procumbent : Lying along the ground.

Pubescent : Covered with soft, straight, and short hairs.

Pustulate : Having a slight elevation like a pimple or little blister.

Racemes : Inflorescence of indefinite kind in which the flowers are borne on pedicels of more or less the same length along a single undivided axis.

Rachis : The principal axis of pinnae or inflorescence or central midrib of the frond.

Radicle : First root of a plant growing from seed.

Recurved : curled or turned backwards'

Rhizome : Creeping, underground stem, producing erect stems at intervals.

Rhombic : May refer to: Rhombus, a quadrilateral whose four sides all have the same length (often called a diamond)

Rugose : Full of wrinkles.

Sagittate : Shaped in the form of an arrowhead.

Scaberulous : Having or covered with scales or small projections and rough to the touch: a *scabrous* scar; a plant with *scabrous* leaves.

Scalloped : Curved surface.

Sepal : Each of the parts of the calyx of a flower, enclosing the petals and typically green and leaflike.

Serrate : Toothed like a saw, teeth directed forward.

Sessile : Without a stalk.

Setose : Bristly; having the surface set with bristles.

Siliqua : The long, narrow seed pod of many plants of the cabbage family, splitting open when mature.

Sinuate : Having a wavy or sinuous margin; with alternate rounded notches and lobes.

Spadix : A spike of minute flowers closely arranged round a fleshy axis and typically enclosed in a spathe, characteristic of the arums.

Spathe : Leafy bract enclosing the inflorescence.

Spathulate : Oblong and tapering downwards into a stalk.

Spatulate : Having a broad rounded end.

Spike : A form of indefinite inflorescence bearing sessile flowers on an undivided, elongated common axis.

Sporangia : A club shaped or cylindrical structure borne on fine aerial branches and having three layered walls. Sporangia contain large number of spores.

Squamatus : Clothed with scales.

Stellate : Star shaped.

Stipitate : Stalked as applied to ovaries, carpels and pods.

Stipule : *Stipule* (Latin stipula: straw, stalk) is a term coined by Linnaeus which refers to outgrowths borne on either side (sometimes just one side) of the base of a leafstalk (the *petiole*).

Stone : Hard endocarp of fruit.

Sorus : A group of sporangia together having a shape and position characterstic of a genus.

Spinose : Bearing spines.

Spinulose : Bearing small spines.

Sporangia : Structure containing the spores.

Sporophyte : Proper fern plant.

Stigma : The stigma is the receptive tip of a carpel or of several fused carpels, in the gynoecium of a flower.

Stipe : The stalk of the frond.

Straited : Markedwith striae; furrowed; striped; streaked.

Strigose : Covered with short, stiff adpressed hairs.

Style : It is a long, slender stalk that connects the stigma and the ovary.

Tendril : Twining organ by means of which the plant climbs.

Tepal : A tepal is one of the outer parts of a flower (collectively the perianth). The term is used when these parts cannot easily be classified as either sepals or petals.

Terete: Cylindrical.

Tetramerous : Of four members.

Tomentose : Covered with hairs that are short, soft, dense and intricate.

Torulose : Of a cylindrical or ellipsoid body; swollen and constricted at intervals.

Trimerous : Flowers having the parts arranged in each whorl in threes.

Tripartite : three major parts.

Triquetrous : Sharply three-angled; and especially with the sides concave, like a bayonet.

Truncate : When the tip of an organ is more or less square as if cut off.

Tuber : Underground, fleshy stem or stock.

Umbel : Inflorescence in which the flower stalk radiates from a point.

Undulate : With a wavy edge or surface.

Urceolate : Shaped like a pitcher; swelling out like the body of a pitcher.

Utricle : A small usually indehiscent one-seeded fruit with thin membranous pericarp.

Vareigated : It is used in botany to describe the presence of two or more colors in the leaves, petals, or other parts of plants.

Verrucose : When exine is spiny or irregular.

Viscid : Covered by a sticky substance.

Whorls : Collective name for similar members that are arranged in circles around an axis.

Winged : Furnished with membranous or leafy expansion.

Zygomorphic : Having floral parts unequal in size or form so that the flower is capable of division into essentially symmetrical halves by only one longitudinal plane passing through the axis.

INDEX TO BOTANICAL NAMES OF WILD LEAFY VEGETABLES

FAMILY	BOTANICAL NAME	PAGE NO.
BIGNONIACEAE	***Bigonia picta*** *Sm.*	19
BORAGINACEAE	***Cordia dichotoma*** Forst.	41
BRASSICACEAE	***Brassica juncea*** L.	21
CAESALPINIACEAE	***Bauhinia purpurea*** L.	17
	Bauhinia retusa Roxb.	18
	Cassia occidentalis L.	23
	Cassia tora L.	28
CAPPARIDACEAE	***Cleome gynandra*** L.	32
	Cleome monophylla L.	32
	Cleome vlscosa Linn.	33
CAROPHYLLACEAE	***Spergula arvensis*** Linn.	100
CHENOPODIACEAE	***Chenopodium album*** Linn.	30
COMMELINACEAE	***Commelina benghalensis*** Linn.	35
	Cyanotis axillaris Roem.	41
COMPANULACEAE	***Lobelia alsinoides*** Lam.	69
CONVULVULACEAE	***Ipomoea aquatica*** Forssk.	58
	Merremia macrocalyx (Ruiz & Pav.) O'Donnel	77
CUCURBITACEAE	***Bryonopsis laciniosa*** L.	22
	Coccinia grandis L.	34
	Solena amplexicaulis (Lam.) GANDHI	99
DRYPTERIDACEAE	***Dryopteris cochleata*** Don.	44
EUPHORBIACEAE	***Antidesma diandrum*** Roxb.	11
	Euphobia hirta L.	45
FABACEAE	***Medicago lupulina*** Linn.	71
	Medicago polymorpha Linn.	76
LABIATAE	***Leucas aspera*** Spreng.	65
	Leucas cephalotes Spreng.	66
LAMIACEAE	***Mentha sativa*** Linn.	76
MALVACEAE	***Hibiscus sidariffa*** Linn.	57
MARSILIACEAE	***Marsilia minuta*** L.	70
	Marsilia quadrifida L.	71
MELIACEAE	***Azadirachta indica*** A.Juss.	12
MOLLUGINACEAE	***Glinus lotoides*** L.	54
	Glinus oppositifolius L.	55
MORACEAE	***Ficus geniculata*** Kurz	51
	Ficus infectoria Roxb.	52

FAMILY	BOTANICAL NAME	PAGE NO.
MORINGACEAE	***Moringa oleifera*** Lam.	79
NYCTAGINACEAE	***Boerhaavia diffusa*** Linn.	20
OLEACEAE	***Olax scandens*** Roxb.	80
ONAGRACEAE	***Jussiaea repens*** Linn.	59
	Jussiaea suffruticosa L.	60
OPHIOGLOSSACEAE	***Ophioglossum reticulum*** L.	81
OXILIDACEAE	***Oxalis corniculata*** Linn.	82
	Oxalis corymbosa Linn.	82
	Oxalis latifolia Linn.	83
PAPILIONACEAE	***Vicia hirsuta*** Koch.	103
	Vicia sativa Linn.	104
POLYGONACEAE	***Fagopyrum esculentum*** Moench	51
	Polygonum barbatum L.	88
	Polygonum glabrum Willd.	89
	Polygonum plebejum R.Br.	90
	Rumex dentatus L.	92
	Rumex vesicarius L.	93
PONTEDERIACEAE	***Monochoria vaginalis*** (Burm.F.)C.Presl	78
PORTULACACEAE	***Portulaca oleracea*** Linn.	90
	Portulaca quadrifida Linn.	91
RUBIACEAE	***Hedyotis scandens*** Roxb.	56
	Paederia scandens (Lour.) Merr.	87
	Vangueira spinosa roxb.	102
RUTACEAE	***Murraya koenigii*** L.	80
SAPINDACEAE	***Lepisanthes rubiginosa*** Roxb.	64
SCROPHULAR-IACEAE	***Bacopa monnieri*** Linn.	16
	Limnophila aromatica (Lam.) Merr.	66
	Limnophila confirta Benth.	68
	Limnophila gratioloids R.Br.	67
	Limnophila rugosa Roth.(Merr.)	69
SMILACACEAE	***Smilax ovalifolia*** Roxb.	95
STERCULIACEAE	***Melochia corchorifolia*** Linn.	77
TILIACEAE	***Corchorus capsularis*** Linn.	40
	Corchorus olitorius L.	40
UMBELLIFERAE	***Centella asiatica*** Linn.	29
VITACEAE	***Cissus adnata*** Roxb.	31
	Cyphostemma auriculatum Roxb.	42

INDEX TO LOCAL NAMES OF WILD LEAFY VEGETABLES

LIST OF PHOTOGRAPHS