

## ETHNO-BOTANICAL AND MEDICINAL USES OF SOME WILD EDIBLE FRUITING PLANTS IN HILLS REGION OF GARHWAL HIMALAYA

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### ABSTRACT

Garhwal Himalayas is characterized by the rich diversity of ethno botanical and medicinal plant, as well as rich heritage of wild edible fruits. A study was conducted to explore the ethno medicinal uses of different wild edible fruiting plants. The present study was carried out in 9 blocks and 45 villages of district Tehri Garhwal. Twenty-four wild edible fruiting plant species were identified from the study area viz; *Aegle marmelos*, *Benthamedia capitata*, *Berberis aristata*, *Berberis lyceum*, *Carissa opaca*, *Celtis australis*, *Embilica officinalis*, *Ficus auriculata*, *Ficus palmate*, *Ficus racemosa*, *Ficus semicordata*, *Flacourtia indica*, *Grewia optiva*, *Morus serrata*, *Myrica esculenta*, *Phoenix humilis*, *Punica granatum*, *Pyrus pashia*, *Rhus parviflora*, *Rubus ellipticus*, *Rubus paniculatus*, *Solanum nigrum*, *Syzygium cumini*, and *Ziziphus glaberrima*.

**KEYWORDS:** Wild Fruits, Nutrition, Protein, Medicines, Ethno Botanical, Consumption

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### INTRODUCTION

Garhwal Himalayan region is rich in diversity of wild plant species, and it plays a significant role in the life of human kind (Gaur RD, 1999). Wild edible plants are very important for the well-being of rural peoples in the hilly regions, not only as sources of supplementary food, nutritionally balanced diets, medicines, fibre, fodder and fuel, it also as source for their income generating potential (Gangwar et al., 2010). Uttarakhand is highly enriched with its vegetation, including wild edible fruits due to its varied eco-geographical and eco-climatic conditions (S Saklani, S Chandra, 2011). The Indigenous communities living in rural and mountainous territories of developing world consider livestock a vital source for economy, social security, and food and is thought to be a symbol of prestige for a particular family (Abbasi et al. 2013). Some wild fruits have been identified to have their better nutritional value than cultivated fruits (Eromosele et al., 1991; Maikhuri et al., 1994). Consumption of wild edible fruits meets proteins, carbohydrates, fats, vitamins and minerals requirement of poor rural peoples in hilly areas of Uttarakhand (Sundriyal and Sundriyal, 2001). The utilization of traditional remedies poses a cheaper, easier, and sustainable alternative to synthetic drugs and pharmaceuticals (Dilshad et al. 2010). People who do not have earning sources in hills, they wait for ripening time as it carries a lot of commercial importance. The popularity of the species can be judged from the fact that local people of the hills can earn more money in every season from selling of the wild fruits (Bhatt et al., 2000). The utilization of traditional remedies poses a cheaper, easier, and sustainable alternative to synthetic drugs and pharmaceuticals (Dilshad et al. 2010). The present study focused on ethno botanical and medicinal uses of wild edible fruiting plants in the hills of Garhwal.

## **MATERIALS AND METHODS**

District Tehri Garhwal is selected for the present investigation. It is composed of nine blocks i.e. Chamba, Pratapnagar, Hindolakhali, Thouldhar, Jakhanihar, Fakot, Jaunpur, Kirtinagar and Bhilangna, and five villages selected from each block. Based on availability of wild fruits, the study area was divided into three regions i.e. tropical, subtropical and temperate. Totally, forty-five villages surveyed during investigation in different seasons. The study based on intensive and extensive field survey. The main data collection centre was New Tehri town (District headquarters of Tehri Garhwal), and local information station was made in each selected villages for current information. Each selected village and identified areas visited over the year in different seasons, with the help of local inhabitants. Information station was contacted regularly, to know the availability of wild fruits in different season. The ethno medicinal property of each identified fruits obtained through informed consent semi-structured interviews, questionnaires, market survey, group conversation, unceremonious dialogue and village walks with key informants. Indigenous knowledge of local traditional healers about plants used for medicinal purposes was also collected through questionnaire and interviews. Ten questions asked to five people in each selected villages. Cultural significance of all identified plants calculated based on the use, as reported by participants at each study site. Different parameters i.e. medicinal value, ethno botanical uses and morphological features observed for all identified plants.

## **RESULTS AND DISCUSSIONS**

Totally, twenty-four wild fruiting plants identified from the study area and documented with their ethno medicinal value, including their botanical names, vernacular names, family names and parts used etc. as presented in Table 1. Morphological features viz shape, color, taste, fruiting season etc. of all observed wild fruits have been discussed in Table 2 and Figure 1. The identified fruiting plants grow abundantly across an altitudinal gradient in the forest of Garhwal Himalayas, and these fruiting plants bear maximum fruits during summer and winter season. Deforestation, construction of roads, and over exploitation of natural resources are major factors, which affects the natural habitat of wild fruiting plants, and due to such interference, these plants slowly becoming extinct. Wild fruiting plants are major in numbers, in that place, that are not affected by human interaction due to their difficult geography and climatic conditions that are not suitable for human survival (Tiwari et al., 2010). Wild fruits contain carbohydrates, vitamins, proteins, minerals, fibre and enormous rich ethno medicinal values. It is also an important source of balance diet, and its regular uses can increase immunity of human body. Almost poor people are dependent on wild fruits for nutrition and economy generation in hills. Even in all over the world, poor people use hundreds of wild fruits and it plays a significant role in his life. Even millions of people in many developing countries do not have enough food to meet their daily requirements, and are deficient in one or more nutrients (FAO, 2004). In many other developing countries, wild plants are exploited as sources of food and other life supporting commodities, and thus provide an adequate level of nutrition to the human beings (Aberoumand and Deokule, 2010). Fruits are also an important source of micro and macronutrients, which contribute essential nutritional requirements to the rural communities. The wild fruits are natural and pure due to their difficult geography and climatic conditions, and awesome taste of fruits, which attracts people as a rich source of their nutrition (Meyers et al., 2003). Poverty is the major contributor to the low consumption of fruits in hilly areas of Uttarakhand, but rural peoples believe on wild fruits and they consume enough in every season. The use of plant species of the Himalaya as food and medicine have been known for a long time, and several economically important plants have been reported from Indian Himalaya (Samant et al., 1998). *Aegle marmelos*, *Benthameia capitata*, *Embilica officinalis*, *Myrica esculenta*, *Pyrus pashia* and *Syzygium cumini*

are important sources of many nutrients, including potassium, calcium, fibre, vitamin C and folic acid, which increase the immune system of body and make strong against different pathogenic agents. Some wild fruits rich in poly phenols, minerals and regarded as one of the richest source of vitamin C (Krishnaveni M, Mirunalin S 2011). Some wild fruits belong to family Ficaceae are juicy with honey, and local peoples used it for digestive and respiratory disorder. Such juicy fruits are rich source of minerals and a small amount of Vitamin C, and beneficial in the disease of lungs and the gall bladder (Bhowmik et al. (2013). Jamun, Mol, Dalimu and Kaphal wild fruits are source of different alkaloids, after regular using of these fruits can remove the toxic substances from body. The fruiting plants yields large quantity of alkaloids in which, isoquinoline type alkaloids like berberine, palmatine, jetrorrrhizine, and columbamine are the most studied phytoconstituents in various wild fruiting plants (Dehar et al., 2012). Karonda is also one of the important juicy fruit, which is helpful in respiratory disorders. It is a strong purgative and used as one of the ingredients in some purgative preparations. A large dose of Karonda roots useful for the fatal owing to profuse purging (Parmar C, Kaushal MK, 1982). The wild fruits are do not spoiling very soon due its genetic and physical purity in comparison to cultivated fruits. Local inhabitants store it for long time after harvesting. Bel, Dalimu, Jamun and Bhamora are the common example of wild fruits, which can store for long time without refrigerator.

**Table 1: Ethno-Medicinal Uses of Some Wild Edible Fruiting Plants in Hills**

| S.N | Botanical Name                                 | Vernacular Name | Family        | Ethno Botanical and Medicinal Uses   |
|-----|--|-----------------|---------------|--|
| 1   | <i>Aegle marmelos</i> (L.)                     | Bel             | Rutaceae      | Ripe fruits edible, juice used in digestive, cardiac and respiratory disorder. Leaves commonly known Belpatri and offered to lord Shiva.                                   |
| 2   | <i>Benthamidia capitata</i> (Wall. Ex. R.)     | Bhamora         | Cornaceae     | Fruits source of calcium, multivitamin. Wood used to make agricultural implements.   |
| 3   | <i>Berberis aristata</i> (DC. Syst.)           | Kingor          | Berberidaceae | Fruit edible, bark and root extract used in jaundice, diabetes and fever. Root extract used in eye flue. Yellow dye obtained from root and bark.                           |
| 4   | <i>Berberis lyceum</i> (Royle. Tr.)            | Kingor          | Berberidaceae | Root extract used in Jaundice, eye ailments. Root, and bark source of yellow dye.  |
| 5   | <i>Carissa opaca</i> (Stapf ex. Hai.)          | Karaunda        | Apocynaceae   | Fruits chewed with Tungla leaves as pepper. Roots used for fatal owing to profuse purging. Leaves browsed by goats and sheep, wood used as fuel.                           |
| 6   | <i>Celtis australis</i> (L. Sp. Pl.)           | Kharik          | Ulmaceae      | Fruit edible, leaves fodder, wood used as fuel and making small agricultural implements, bark source of dye, and its paste applied for bones fracture and joint pain.      |
| 7   | <i>Embilica officinalis</i> (Gaert. Fru. Sem.) | Awnla           | Euphorbiaceae | Fruits edible and rich source of vitamin C. Fruits used as pickle and ingredient of Trifala, commonly used for several disorders. Leaves fodder and bark source of tannin. |
| 8   | <i>Ficus auriculata</i> (L. Fl. Coch.)         | Timla           | Moraceae,     | Leaves fodder, cup and plates are making from leaves, ripe fruits edible and contain honey, unripe fruits made into vegetable after toast, white latex anti diabetic.      |

| <b>Table 1 Contd.,</b> |   |                  |                |   |
|------------------------|---|------------------|----------------|---|
| 9                      | Ficus palmate (For. Fl. Aeg.)               | Bedu             | Moraceae       | Leaves fodder, fruit edible, bud and unripe fruits often used as vegetable after fried. Fruit used for digestive disorder. Plants are also useful in agro forestry.                                   |
| 10                     | Ficus racemosa (L. Sp. Pl.)                 | Umra             | Moraceae       | Fruits edible, immature fruits cooked and fried. Leaves used as fodder, plant useful in Hindu religious.  |
| 11                     | Ficus semicordata (Buch. Ham. Ex.JE)        | Khaina           | Moraceae       | Fruit edible, wood used as fuel and leaves fodder.  |
| 12                     | Flacourtia indica (Burm. F.)                | Kangu            | Flacourtiaceae | Leaves fodder, fruit edible and used in hepatitis fever, dysentery, diarrhea. Leaves and bark paste applied on wounds.  |
| 13                     | Grewia optiva (J.R. Dru. Ex Bu.)            | Bhimal           | Tiliaceae      | Fruit edible, leaves used as fodder, sticks fiber used as soap and shampoo, sticks lit fire. Ropes, nets, brushes, brooms and cattle tie ropes making from fiber and fruits used in Urinary troubles. |
| 14                     | Morus serrata (Roxb. Fl. Ind.)              | Sahtoot          | Moraceae       | Fruit edible, leaves used as fodder, agricultural implements making from wood.  |
| 15                     | Myrica esculenta (Buch. Ham. Ex. Ddun)      | Kaphal           | Myricaceae     | Fruit edible, soup used in digestive and cardiac disorder. Bark used to yield dye. Wood used as fuel and agricultural implements.   |
| 16                     | Phoenix humilis (Roy. II. Bot. H.)          | Khajoor          | Arecaceae      | Fruit edible, leaves used mats, hats and brooms. Dry leaves also used to prepare strong roof of mud houses.   |
| 17                     | Punica granatum                             | Dalimu           | Punicaceae     | Fruits edible, source of minerals and used in cough and cold.   |
| 18                     | Pyrus pashia (Buch. Ham. Ex. Ddun)          | Mole             | Rosaceae       | Fruits edible and blood purifier, leaves used as fodder, wood make into sticks and agricultural implements.   |
| 19                     | Rhus parviflora (Rox. Fl. Indica)           | Tungula          | Anacardiaceae  | Fruits edible, leaves mixed with tobacco and used for smoking. Leaves often used as bio-fence. Wood used as fuel, stem used for toothbrush and used intoothache.                                      |
| 20                     | Rubus ellipticus (Smith Res. Cy.)           | Hinsar           | Rosaceae       | Fruits source of vitamin C. Flowers are useful in apiculture.   |
| 21                     | Rubus paniculatus (Smith Res. Cy.)          | Kali Hinsar      | Rosaceae       | Fruit source of energy and flowers useful in apiculture.  |
| 22                     | Solanum nigrum (L. Sp. Pl.)                 | Makoi            | Solanaceae     | Fruit edible and stem extract used in diarrhea, fever Liver. Fruits used indigestive disorders & dysentery. Leaves extract useful in ear pain.  |
| 23                     | Syzygium cumini (L. Sk. US Dept. A.B.)      | Phalendu / Jamun | Myrtaceae      | Fruit edible, multivitamin, used in diabetes, bark used for dyeing and tannin.  |
| 24                     | Ziziphus glaberrima (L. Mill. G. Dict. Ed.) | Ber              | Rhamnaceae     | Fruit edible and more nutritive, rich source of calcium and potassium, root is useful and applied to old wounds and ulcers. Leaves extract helpful in liver trouble, asthma and fever.                |

**Source of Data:** local inhabitants and Flora of the District Garhwal North West Himalaya, RD Gaur 1999.

**Table 2: Morphological Characters of Wild Edible Fruits**

| S.N. | Botanical Name       | Color              | Shape            | Fruiting Season | Taste                 |
|------|----------------------|--------------------|------------------|-----------------|-----------------------|
| 1    | Aegle marmelos       | Pale yellow        | Pyriiform        | Summer          | Sweet-sour            |
| 2    | Benthamidia capitata | Dark brown         | Round            | Winter          | Bitter-sweet          |
| 3    | Berberis aristata    | Purple             | Oblong           | Summer          | Sweet-sour            |
| 4    | Berberis lyceum      | Purple             | Oblong           | Summer          | Sweet-sour            |
| 5    | Carissa opaca        | Black              | Oval             | Summer          | Sweet                 |
| 6    | Celtis australis     | Light red          | Oval             | Winter          | Sweet                 |
| 7    | Embilica officinalis | Pale yellow        | Round            | Winter          | Sour                  |
| 8    | Ficus auriculata     | Red                | Pyriiform        | Summer          | Sweet                 |
| 9    | Ficus palmate        | Purple             | Pyriiform        | Summer          | Sweet                 |
| 10   | Ficus racemosa       | Red                | Pyriiform        | Summer          | Sweet                 |
| 11   | Ficus semicordata    | Red                | Pyriiform        | Summer          | Sweet                 |
| 12   | Flacourtia indica    | Light green yellow | Round            | Summer          | Sweet                 |
| 13   | Grewia optiva        | Black              | Oblong (4 lobed) | Winter          | Bitter-sweet          |
| 14   | Morus serrata        | Violet             | Oblong           | Summer          | Sweet-sour            |
| 15   | Myrica esculanta     | Red                | Round            | Summer          | Sweet                 |
| 16   | Phoenix humilis      | Black              | Oval             | Summer          | Sweet                 |
| 17   | Punica granatum      | Red                | Oval             | Winter          | Sweet-sour            |
| 18   | Pyrus pashia         | Black              | Round            | Winter          | Bitter-sweet          |
| 19   | Rhus parviflora      | Red yellow         | Round flat       | Winter          | Sweet-sour            |
| 20   | Rubus ellipticus     | Yellow             | Round            | Summer          | Sweet                 |
| 21   | Rubus paniculatus    | Black              | Round            | Summer          | Sweet                 |
| 22   | Solanum nigrum       | Red                | Round            | Winter          | Sweet                 |
| 23   | Syzygium cumini      | Purple             | Oblong           | Summer          | Bitter-sweet and sour |
| 24   | Ziziphus glaberrima  | Red                | Oval             | Winter          | Sour-sweet            |

Source of data from local inhabitants

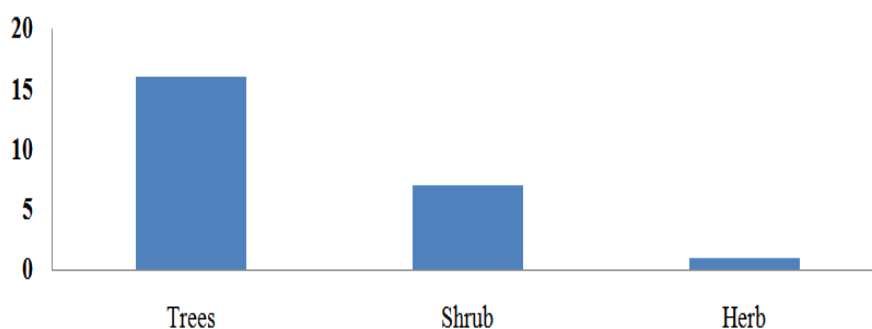


Fig.1. Wild edible fruits obtained from herb, shrub and trees.

Figure 1.

## CONCLUSIONS

Local inhabitants are using seasonal wild fruits in large scale and earn more money in every season. It is not only a source of supplementary food, but also plays a significant role in the life of poor people. Migration from hills and ignorance of wild fruits management is two serious problems which can loss the existence of wild fruits from hills. Need of the hour is to develop and protect it by the scientific techniques and methods. Therefore, it can make the strong source of local people for nutrition and economic generation.

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