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## Ethnobotanical study of wild fruits in Pabbar Valley, District Shimla, Himachal Pradesh

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### Abstract

Wild fruits are widely consumed in rural Himalayas and are potential source of various compounds and are also used in folk medicines. A study of wild fruits as eatable of Pabbar valley was carried out with the aim of documentation, identification and exploration of the ethnobotanical knowledge of local people. Total 33 plants species have been collected and they were arranged alphabetically with Botanical name, family vernacular name, habit, fruiting and flowering season and folk use. Free listing, individual interviews and direct observations were used to gather information. The plants were collected, identified and mounted on herbarium sheets. The indigenous knowledge that exist about wild edible plants could be used for their conservation and further cultivation in the area for human consumption. Photographs of some selected plants have been provided.

**Keywords:** Ethnobotany, wild Fruits, Pabbar Valley, and Himachal Pradesh

### 1. Introduction

Himachal Pradesh is a small North western Himalayan state of India. The total forest cover of state is around 26.4% and is shelter for varieties of edible plants. The state is famous for cultivation of temperate fruits. Besides use of cultivated fruits, the practice of harvesting and consuming the seasonal wild fruits and nuts is also common in this hilly state. Edible wild fruits play an important role in providing nutritional food supplement. There are about 1532 edible wild food species available in India out of these 675 species are found in Himalayan region (Kala CP; 2007, Reddy *et al.*, 2007) [12, 22]. The villagers who are in constant association and dependence on the forest and its products for their daily needs have developed much deeper knowledge on edible wild fruits which are fit for human consumption. Indigenous knowledge of wild fruits is important for sustained utilization of these edible plant species (Jasmine *et al.*, 2007) [11].

Phytochemical investigations on fruits have attracted recently great deal of attention because, they play a great role in preventing diseases caused as a result of malnutrition (Sathyavathi R and Janardhanan K; 2014) [26]. International Institute for environment Development (1995) [7] reported that many wild edible are nutritionally rich and can supplement nutritional requirements, especially vitamins and micronutrients. Wild fruits contain a significant level of biological active components, are generally high in fibers, rich sources of vitamins, minerals and other nutrients. These constituents are essential for normal physiological well-being of human and help in maintaining healthy state. However, different factors such as abundance, availability, cultural preference, economic conditions, shortage periods or unsecure food production systems affects preference and use of wild food products (Ghorbani *et al.*, 2012) [5]. Another important factor, which has decreased the use and dependence on wild fruits recently is the introduction of exotic varieties of fruits in the area. At present heavy destruction of natural habitat, wild edible plants resources are degrading fast along with associated indigenous knowledge (Jamir NS; 1996 and Mengistu F & Hager H; 2008) [8, 15]. Relatively little research and development attention has been given to the development of indigenous fruit crops for their wider cultivation. Initiation to establish nurseries, to encourage propagation of wild fruits will offer opportunity for economic diversification and nutrition to local people. By improving linkage between production and utilization, the biodiversity of traditional crops can be safe guarded (Jeeva, S. 2009) [10].

Literature survey reveals that there are some researchers who have worked on wild fruits of Himalayas, however such studies are missing from this particular area [6, 17, 14, 21, 19, 20, 24, 2].

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The main aim of the study was to explore and identify the wild edible fruits of the area and to record local knowledge and practices, so these fruits can be used as food supplements and these fruits can be cultivated for larger population and help in economic growth of the area.

## 2. Material and methods

### 2.1 Study area

Pabbar valley being extended from 1100 m. to high mid Himalayas up to 5400 m high in mountainous or semi-mountainous area, with a great diversity in plant population. The valley lies in the Eastern most part of Himachal Pradesh, located 117 km from state capital Shimla. The valley gets its name from river Pabbar which flows in the middle of valley

north-south direction and in turn joins the river Yamuna. The scenic valley known for its ethnic identity and is guarded from both sides by mountains, having natural, long and open pastures in high area. The area is located between 77°-29'-40" to 78°-18'-42" East and 30°-57'-0" to 31°-25'-20" North in Rohru Sub division.

The valley is bounded by Kinnaur district in the north and Uttarakhand in the east. The climate of region ranges from Sub-temperate to Alpine with average temperature 12-24° C. During winters most of the area remains snow covered and temperature falls to -2 °C to -6 °C. The economy is dominated by fruit crops (Apple, Pear), agriculture, cattle and sheep rearing which is still practised in the valley.



Fig 1: Map District Shimla, Himachal Pradesh

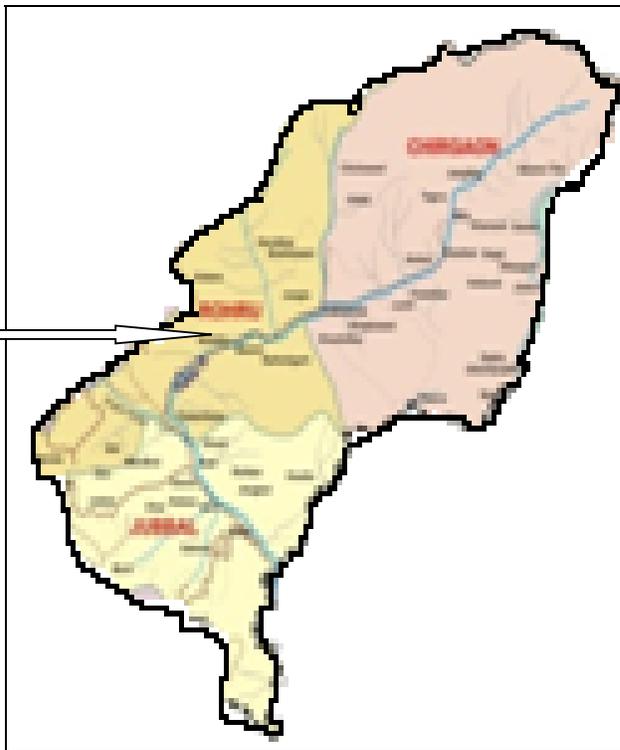


Fig 2: Map showing study area.

### 2.2 Data collection

Permission was sought from Forest Division Rohru for field visits and plant collections before starting field work and plant collection. Field survey was started in January 2013 and completed in December 2014. Different methods were used for Ethnobotanical data collection. A free list technique was used to get information about the knowledge of wild edible plant species from informants. This is an effective method that can even use with illiterate people also. Individual interviews were used to get more information from randomly selected informants. Data collection procedure was further improved by participation, field collection and direct observation to collect detail of local name and uses.

Plants specimens were photographed, collected, pressed dried and mounted on standard herbarium sheets following Jain and Rao 1977 [9]. All plant species are arranged alphabetically which includes botanical name, family, vernacular name, habit and ethnobotanical uses. The plants were identified with the help of existing standard literature available on the flora of the region (Flora Simlensis; Collett, 1902, Flora of Bashahr Himalayas; Nair NC; 1977, Flowers of Himalaya by Polunin O and Stainton A; 1997, IIHS, HP University, Shimla HP) [4, 16,

18]. The voucher specimens were stored at LBS Govt. Degree College Saraswatanagar.

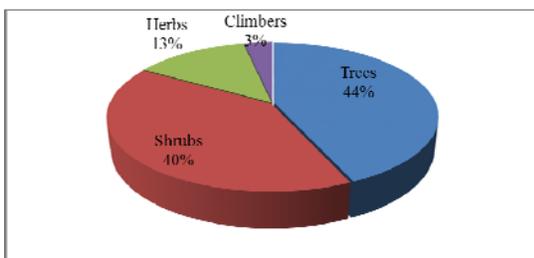
## 3. Result and Discussions

In present study it was found that fruits of 24 genera belonging to 33 species and 14 families are in use by people of Pabbar valley in western Himalaya, Himachal Pradesh (Table-1). Photographs of some of plants have been provided. These wild fruits are not the only source of nutrition and food but also serve the multipurpose role such as medicine, fodder, fuel, agriculture, tools and fencing. It was found apart from used as edible fruit 8 plants species are used as fodder, 17 as fuel wood, 10 species for agricultural tools, 5 species for fencing and 3 species have religious and cultural value.

The most frequently used wild fruits are from family Rosaceae (16) Berberidaceae (3) Elaeaginaceae, Moraceae and Caprifoliaceae (2) each, rest of the eight families are mono-specific and mono-generic. Distribution of plant according to their habit it was recorded that tree species were markedly high (14) followed by shrubs (13), herbs (05) and climbers (1) (Fig-3). Majority of these fruits are available from mid of summer to end of the rainy season.

**Table 1:** List of wild fruits from Pabbar valley

Sr. No	Botanical Name	Family	Local Name	Habit	Flowering	Fruiting	Folk Uses
1	<i>Aesculus indica</i> (Colebr.ex Camb.) Hook	Hippocastanaceae	Khanor	Tree	April-May	Sept.-Oct.	Fruit edible, serve as drought food, the peeling is given to cattle in colic pain, leaves used as fodder.
2	<i>Berberis aristata</i> DC	Berberidaceae	Karmashal	Shrub	April-May	August-Sept.	Fruit edible. Roots decoction used in Jaundice. Used for Fencing.
3	<i>Berberis lycium</i> Royle	Berberidaceae	Karmashal	Shrub	March - April	July -August	Fruit edible. Roots decoction is given in Jaundice. Used for Fencing.
4	<i>Berberis chitria</i> Edward	Berberidaceae	Chochoor	Shrub	March - April	July -August	Fruit edible.
5	<i>Corylus jacquemontii</i> Dacne	Betulaceae	Shalodi	Tree	April-May	August-Sep.	Nuts edible, Leaves used as fodder.
6	<i>Cotoneaster rotundifolius</i> Wall. ex Lindl.	Rosaceae	Riunsh	Shrub	April-May	September	Fruit edible, wood used for making walking sticks and agriculture tools, used as fodder.
7	<i>Elaeagnus umbellata</i> Thunb	Elaeagnaceae	Ghaiyin	Shrub	April -May	June-July	Fruit edible.
8	<i>Ficus palmata</i> Fross.	Moraceae	Feru	Tree	March-April	June -Oct	Cooked fruit used as vegetable. Latex used to cure toothache & moles.
9	<i>Fragaria indica</i> Andr.	Rosaceae	Bhumla	Herb	April -May	June- July	Fruits edible.
10	<i>Fragaria vesca</i> L.	Rosaceae	Bhumla	Herb	April -May	June- July	Fruits edible.
11	<i>Hippophae salicifolia</i> D.Don	Elaeagnaceae	Chhuchha	Tree	April-May	June- Sept.	Fruits edible, Rich source of Vitamin -C, care need to be taken as excess may cause crack in tongue. Used as fodder and Fuel.
12	<i>Juglens regia</i> L.	Juglandaceae	Khod	Tree	March-April	August -Sept	Fruit edible, Twigs are used as toothbrush. Bark & leaves for curing toothache. Nuts considered as brain tonic, yield edible Oil. Wood is used for woodcarving & making Furniture. Roots are used as dye.
13	<i>Malus baccata</i> (L) Borkh	Rosaceae	Barol	Shrub	March-April	June-August	Fruit edible, seedling rootstock for apple plants.
14	<i>Morus serrata</i> Roxb	Moraceae	Kemu	Tree	April-May	June	Fruits edible, leaves used as Fodder, agricultural tools and fuel.
15	<i>Prunus armeniaca</i> L.	Rosaceae	Chulti, Shadi	Tree	March-April	June-August	Fresh fruit used for making chutney has cooling and appetizing property, ripe fruits edible, fermented to make local wine. Kernel expressed to make oil used for body massage, hair tonic, in rheumatism & for cooking.
16	<i>Prunus cerasoides</i> D.Don	Rosaceae	Pajja	Tree	Dec-March	May -June	Fruit edible, seedlings are used rootstock for sweet Cherry plants, religious plant.
17	<i>Prunus cornuta</i> Steud	Rosaceae	Jamun	Tree	April-May	August-Sept.	Fruit edible, leaves used as fodder
18	<i>Prunus mira</i> Koehne	Rosaceae	Behmi	Tree	March - April	June-July	Fruit and oil edible. Oil used for body massaging.
19	<i>Prunus persica</i> var. <i>Kateru</i> Batsch	Rosaceae	Auru, Artee	Tree	March - April	August	Fruit edible, kernel paste is applied in forehead for headache, twigs used toothbrush, leaves for fodder.
20	<i>Prunus prostrata</i> Labill	Rosaceae	Phirlu	Shrub	March - April	August	Fruit edible.
21	<i>Punica granatum</i> L.	Punicaceae	Daru	Shrub	Feb-March	August-Dec.	Fruit edible. Source of anardana.
22	<i>Pyracantha crenulata</i> (D.Don) M. Roemer	Rosaceae	Choota Seb	Shrub	March-April	August-Sept.	Fruit edible, used for making walking sticks.
23	<i>Pyrus pashia</i> Ham.	Rosaceae	Shegal, Kainth	Tree	March-April	August -Sept	Fruits edible, religious and cultural significance. Seedlings used root stock for pear plants
24	<i>Rosa canina</i> L.	Rosaceae	Kuin	Shrub	March-April	July-August	Fruits edible, leaves used as fodder, fencing. Unopened flower are picked up in the morning before sunrise and kept in the home for sweet smell.
25	<i>Rubus ellipticus</i> Smith	Rosaceae	Hinsur	Shrub	March-April	June-August	Fruits, fodder & fencing
26	<i>Rubus niveus</i> Thunb.	Rosaceae	Kalka	Shrub	March-April	July-August	Fruits, fodder & fencing.
27	<i>Solanum nigrum</i> L.	Solanaceae	Dhakh	Herb	Throughout Year	Throughout Year	Fruits edible, taken for abdominal pain.
28	<i>Solena amplexiculis</i> Lam.	Cucurbitaceae	Maukhari	Climber	April-June	September	Fruits edible
29	<i>Sorbus lanata</i> (D.Don) S. Schaur	Rosaceae	Bhomphal	Tree	April-may	Sept.-Oct	Fruits edible, leaves lopped for fodder
30	<i>Taxus wallichiana</i> Zucc.	Taxaceae	Thuna	Tree	March-May	Sept.-Oct	Fruits edible bark & needle needles used for making tea. Tea used for Cough and Congestion. Leaves and twigs used in religious and marriage ceremony.
31	<i>Viburnum continifolium</i> D.Don	Caprifoliaceae	Zaphara	Shrub	April-May	June-July	Fruits, fodder species.
32	<i>Viburnum grandifloram</i> Wallich ex. DC	Caprifoliaceae	Thaline	Shrub	Feb- March	July-August	Fruits & fodder
33	<i>Zanthoxylum armatum</i> DC	Rutaceae	Timar	Shrub	March-April	June- Oct.	Fruits and seeds are used against toothache. Seeds and Leaves are used as condiments. Twigs are used for toothbrush. Wood uses for making walking sticks.



**Fig 3:** Fruit Habit

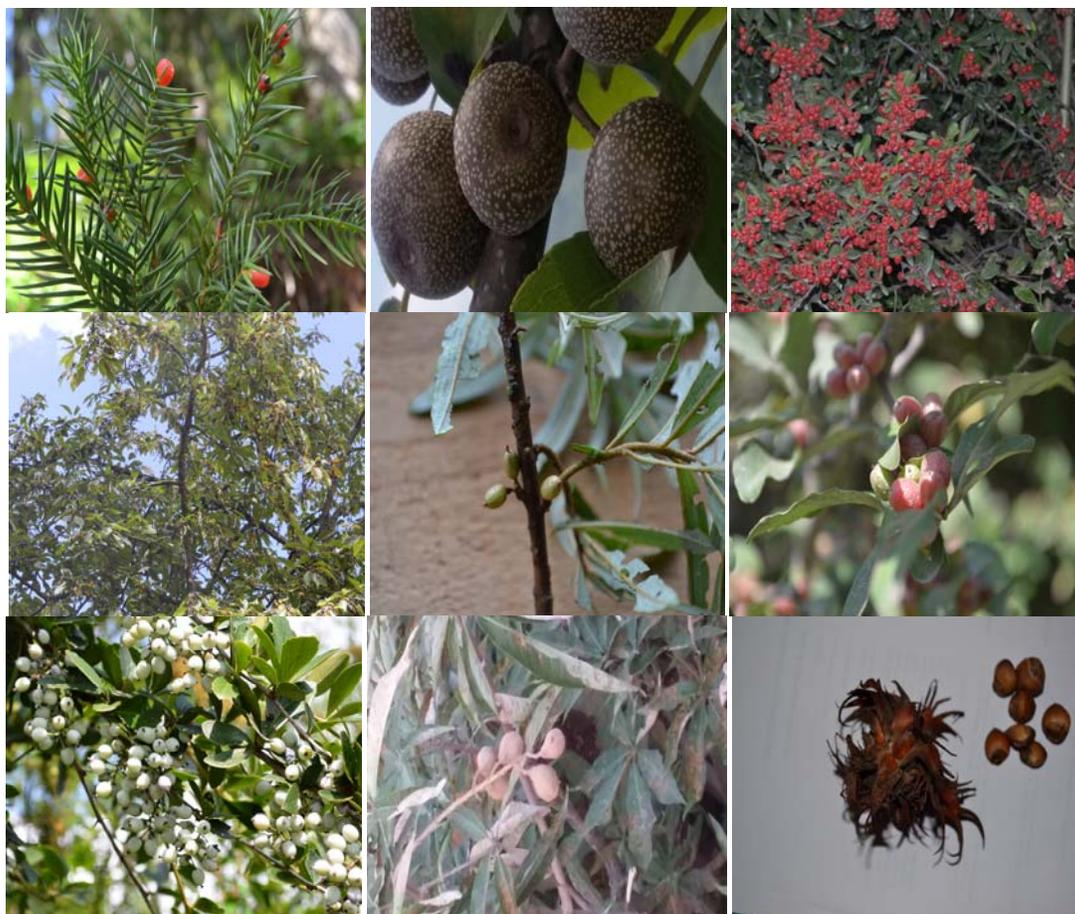
Most of the ripe fruits are consumed raw except fruits of *Ficus palmata* which are cooked as vegetable. Fruits and leaves of *Zanthoxylum armatum* are used as condiments (Arshad MA *et al.* 2013) [1]. Fruits of *Prunus armeniaca* are used both as fresh and dried form. Raw fruit are used for making “chutney” which have cooling and appetizing properties, ripe fruits are fermented for making local wine served during fair and festivals. Fruits nuts of *Juglens regia*, *Prunus armeniaca* and *Prunus mira* are expressed to get oil. These oils are used for cooking and for body massage especially for infants. Wild fruit contain high value of fats, proteins, fibbers and minerals as compare to cultivated fruits (Saklani S and Chandra S. 2012) [24]. *Hippophae* and *Punica granatum* stands out from other fruits for its high Vitamin-C content and acidity but care need to be taken while consuming the fruits of *Hippophae* as excess use of these may cause cracks in the tongue. The fruits reported in present study also find similar use in other part of India (Kala CP. 2007; Arya D. 2013) [12, 2]. Only three wild fruits species *Juglens regia*, *Prunus armeniaca* and *Punica granatum* have commercial value, are collected and sold in the market. Saklani *et al.*, 2011 [23] during chemical analysis found that fruits of *Ficus palmata*, *Pyrus pashia* and *Pyracantha*

*crenulata* have good antioxidant property could be used as functional food ingredient.

*Pyrus pashia*, *Prunus cerasoides* and *Taxus Wallichiana* have cultural significance. These species are used in religious and marriage ceremonies. Seedling of *Pyrus pashia*, *Malus baccata* and *Prunus cerasoides* are used root stock for Pear, apple and sweet Cherry respectively. Twigs of *Pyrus pashia* are kept in the agricultural field to ward off evil spirit.

The wild edible fruit plant recorded in present study are also used to cure several ailments viz. cold, cough, headache, jaundice, Colic pain, toothache and rheumatism. Plants of *Juglens regia*, *Prunus persica* var. *Kateru* and *Zanthoxylum armatum* are used in toothache and twigs are used as tooth brush. The kernels of *Prunus persica* var. *Kateru* Batsch are powdered and decoction applied on forehead to treat headache. *Berberies* spp. are used for curing jaundice. *Solanum nigrum* fruit are also used for abdominal pain. *Ficus palmata* fruit and bark is used for curing constipation. Fruits *Aesculus indicus* are used colic pain for horses. Bark and needle of *Taxus wallichiana* is used for making tea, used for curing cough, cold and also have anti-cancerous properties.

*Corylus jacquermontii*, *Morus serrata*, *Prunus cornuta*, *Sorbus lanata*, *Rosa canina*, *Aesculus indica* and *Viburnum* spp. leaves are used as fodder. Exudates from stem *Prunus armeniaca* plant are used for making gum, used for pasting papers. *Berberies* spp. *Rosa canina* and *Pyrus pashia* are used for fencing. *Pyrus pashia*, *Prunus cerasoides*, *Taxus wallichiana*, *Cotoneaster rotundifolius*, *Morus serrata*, *Prunus armeniaca*, *Pyracantha crenulata*, *Juglens regia*, *Malus baccata* and *Zanthoxylum armatum* are used for making agricultural tools. The *Juglens regia* leaves are used in granaries as insect repellent.





1. *Sorbus lanata* (D.Don) S. Schaur 2. *Viburnum grandiflorum* Wallich ex. DC 3. *Corylus jacquemontii* Dacne 4. *Aesculus indica* (Colebr.ex Camb.) Hook 5. *Berberis aristata* DC 6. *Elaeagnus umbellata* Thunb 7. *Hippophae salicifolia* D.Don 8. *Prunus cornuta* Steud 9. *Pyracantha crenulata* (D.Don) M. Roemer 10. *Pyrus pashia* Ham. 11. *Taxus wallichiana* Zucc 12. *Rubus niveus* Thunb.

#### 4. Conclusions

The results shows that most of fruits are collected by local while doing other activities like farming, visiting forests for fuel wood and fodder collection or grazing their live stocks. The finding of this paper provides first-hand knowledge of availability and use of wild fruits. The use and availability of wild edible fruits is declining gradually. The reason for this is introduction of exotic fruits in the area and clearing the area for raising new orchards. The waste land called 'Ghasni' or open grazing pasture in the vicinity of villages, which were the natural abode of these plants are now being cleared for cultivating exotic fruits. But as wild fruits constitute a large portion of edible fruits there is a need to conserve and cultivate these fruits on waste land, so that more people can get protective food essential for maintenance of health and combating nutrient deficiency diseases easily from their surroundings. The area is under high anthropogenic pressure; therefore it is necessary to take steps for conservation, restoration and improvement of original vegetation.

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