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Research Article

LESSER KNOWN WILD EDIBLE PLANTS OF TEHSIL JAWALI, DISTRICT KANGRA, HIMACHAL PRADESH

Meenakshi Thakur*[1], Deepak Guleria[2] & Pawan K. Attri[2]

[1]*PSR Govt. Degree Collage Baijnath, Kangra, Himachal Pradesh, India*

[2]*Department of Interdisciplinary Studies, H. P. University, Shimla, Himachal Pradesh, India*

**Corresponding author: mins_pk@rediffmail.com*

ABSTRACT

In the era of population explosion and change of weather conditions, there is food insufficiency in and around the world, but fortunately people who are living in the lap of nature; depend on the nature for wide variety of food including wild edible plants. The plants which are lesser known to common people but widely used by rural tribal people for their livelihood are very important in the diet and in the social life of the rural population as they are always collected when in a particular season, and sold by villagers in the near markets. In the present survey trees (67%) are dominant species in the study area. Other highly dominant species are shrubs (27%) and herbs (6%). The most frequently utilized wild edible plants parts were fruits (36%) followed by leaves and flowers (13%), seed and kernel (9%), bark and root (6%) each, and shoot (3%) from recorded fruit species in the month of December 5 fruit plants like *Bauhinia variegata*, *Zizhiphus mauritinia* fruiting this month. And in the month of October plants like *Ficus palmata*, *Terminalia bellirica*are fruiting. The present study has been conducted in the different villages of the Jawali Tehsil of Kangra district of Himachal Pradesh. The study of underutilized fruits is important not only to identify the potential sources, which could be utilized as an alternative food but also to select promising types for domestication and which can be converted into various value added products. These documented underutilized fruits were selected for development of value added products which will enhance economy of rural population. Among them, some species have good prospects for marketing as well as for processing as they are of very attractive color, excellent taste, and flavor and are known to possess medicinal properties. Some of them are highly perishable in nature and are small in size (akhey and toot). Some plant species are considered as a delicacy are marketed in large quantities viz. desi ambla, toot, dhura, lassiyade.

Keywords: Lesser Known, Wild Edible Plants, Jawali, Kangra, H.P

1. INTRODUCTION

Wild edible plants have played vital role in human life since ages. Throughout the history, wild edible plants have sustained human populations in each of the inhabited continents [1]. Wild edible fruits are rich sources of biodiversity on the earth. A wild edible fruit plays a highly important role in human diet as vitamins, minerals and a source of dietary fiber. They have also become a significant part of human life due to their medicinal and environmental uses as well as aesthetics and economic values. Food security is the main concern in recent scenario, therefore; use of wild edible resources can be a great alternative footstep towards balancing human demand and utilization of resources. Wild edible plants can be used not only a staple food but can be used as supplement food as well as a source of income to native communities.

Many people in tribal areas still use them as a supplement of their basic needs of food even the dependence on these fruits has gradually declined as more exotic fruits have been introduced. They are immune to many diseases and often used in different formulations of 'Ayurveda' in Indian Folk medicine. They provide fibers which prevent constipation [2, 3].

The wild edible fruits which have multiple uses such as food, additives and medicine, contribute significantly to the food security and livelihood improvement of local communities. South and Southeast Asia are home to more than 500 fruit species. Unfortunately, there is no authentic data regarding the production and trade of wild tropical fruits produced worldwide, about 90 percent is consumed domestically [4]. There is much diversity of wild fruits in India, the major work done by Jeeva et al. [5] explore the Meghalaya and reported 151 wild plant

species belonging to 49 families and 86 genera whereas Rashingam [6] also listed 38 wild edible fruit plant species belonging to 24 families used by rural tribes of Coimbatore district of Tamilnadu. Bramha *et. al*. [7] listed 32 species of wild fruits plant species belonging to 23 families used by Bodo tribes of Kokrajhar in Assam. Jain et al [8] described 32 plant species belonging to 19 families being used by Gond tribes of Bastar district. In another work on wild edible fruit plants of Chanda forest of Dindori district described 22 species belonging to 17 plant families.

Around one billion people rely on wild harvested products for nutrition and income and this "invisible" trade in wild resources is estimated to be reached $90 billion/annum [9]. In India alone the livelihoods of around 6 million people are dependent on forest products [10] and a great number of studies highlighted just how important wild harvested plants, particularly obtained from forests, are to the economy of the rural poverty in the world [11]. The stem, leaf, flowers, roots and the fruits of fruit crops have the highest potential of export [12, 13]. More recently, food and nutritional security have been regarded as one of the key concerns around the world. In addition, low food intake and poor access to food in underdeveloped countries remain unresolved issues [14, 15]. A number of recent studies have indicated that the dietary use of wild fruits appears in numerous records especially in underdeveloped countries and some botanical studies and publications have emphasized on the diversity and food value of wild edible fruit plants [16-18].

Wild edible fruits are very important in the diet and in the social life of the village people and they are always collected when in season, and brought by the villagers into the urban markets. The people themselves had a host of uses for many wild edible fruit species throughout world.

Underutilized fruits and vegetables were important source of food for mankind before the dawn of civilization and domestication of present day food scenario. Underutilized/wild foods are those which are neither cultivated in an organized farming system nor processed by established commercial processing methods [19]. These underutilized species are also referred by other terms such as minor, orphan, neglected and under exploited, under developed, lost, new, novel, promising, alternative, local, traditional, niche species [20]. Since most of them are not cultivated and hence are not utilized for routine consumption due to their low production, limited seasonal availability, highly perishable nature, lack of knowledge regarding their nutritive value and proper technology to preserve it. The dependence on few cultivated plant species for meeting the food needs of growing population has increased the vulnerability of food production system. In strengthening the national and global food security system, we need identification of our untapped, unutilized food sources.

The study of underutilized fruits and vegetables is important not only to identify the potential sources, which could be utilized as an alternative food but also to select promising types for domestication and which can be converted into various value added products. There is a great scope for the processed products from these fruits and vegetables, not only because of their peculiar, distinct flavor but also due to nutraceutical importance and therapeutic values.

Moreover, the tribal/local inhabitants have started discarding their traditional food culture and have switched over to urbanized form both in food habits and culture. Before the indigenous knowledge is lost forever, it is necessary to record the information and to acquire more knowledge on effective and economic uses of plants which is still hidden with these tribal's/local inhabitants/rural population and bring it to the notice of the scientist and public for proper and sustainable utilization of these resources. So, proper strategy needs to be developed for promotion of these neglected and underutilized plants through documentation, nutritional evaluation and value addition. Comparatively little attention was given for documentation of wild edible plants of Himachal Pradesh, because the information is scattered, sparse and has various gaps [21].

Therefore, we have to enlarge the components of our food basket through diversification of diets and more extensive inclusion of underutilized fruits and vegetables. Himachal Pradesh too has a wide variation in altitudes and has valley type of topography. The varied agro-climatic conditions of Himachal Pradesh support growth of various plant species giving it a rich biological diversity. Also the State presents unique, physical and ethnic diversity and is inhabited by tribes in certain pockets. The diverse forest ecosystem plays a vital role in the life, economy and healthcare of these people living near forests and other rural areas. They gather many wild plant foods from the ambient vegetation as well as practice ethno-herbal therapy from them treating their diseases and disorders for meeting their primary healthcare.

This study was taken to congregate data related to traditional knowledge, diversity, utilization and enumeration of wild edible plants of Kangra districts of Himachal Pradesh. The information pertaining to underutilized fruit and vegetables of Jawali tehsil Himachal Pradesh is limited and thus needs further attention. Lack of attention has meant that their potential value is under estimated and under exploited due to lack of research support for improvement and post harvest utilization. So, proper strategy needs to be developed for promotion of these neglected and underutilized plants through documentation, nutritional evaluation and value addition. Keeping in the view the present study was under taken with the following objectives: to Inventorization and identification of lesser non wild edible fruits used in tehsil Jawali Himachal Pradesh.

2. STUDY AREA

Jawali Town is situated in District Kangra, Himachal Pradesh, India, (Railway Station Name: Jawanwala Sheher) its geographical coordinates is 32° 9' 0" North, 76° 1' 0" East and its original name (with diacritics) is Jawāli. Jawali is second largest Assembly constituency in the state of Himachal. It is located 250 km distance from its State Capital, Shimla and is located 50 km distance from its District headquarters Dharamshala. The information on floristics such as the presence and distribution of plant species along with range of complex environmental factors is of utmost importance to understand the phytogeography of any area. In this regard district Kangra includes both plain as well as hilly area. In the area under study, major portion of the district lies in subtropical and temperate zones except Bara-bhangal (4, 000-4,500m) which may be taken as alpine zone.

Detailed personal interview were conducted with the PRA technique (Participatory Rural Appraisal), and local people to identify plants and collect the information (from December 2017 to July, 2018) covering different villages of Jawali Tehsil. The information was collected from different ethnic groups, villagers and traditional healers (Vaid) who use the plants for health care practices. The plant uses data were also collected through discussions among the traditional practitioners in their local language (Kangri). Identification was done with the help of traditional healers, village heads, women folks and the people in the region respected elderly persons, whose empirical knowledge. Some plant species also identified in Himalayan Forest Research Institute (HFRI). The different information was collected from research papers, journal, books and publications.

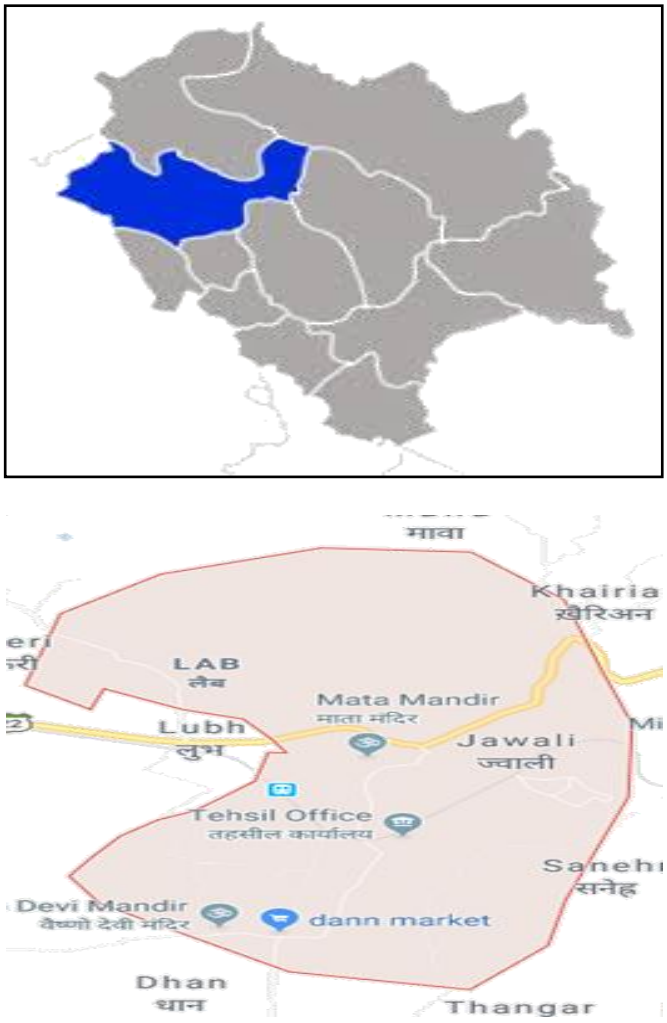

Fig. 1: Map of District Kangra in Himachal Pradesh and Map of Jawali Tehsil

3. RESULT AND DISCUSSION

Wild edible fruit plants have played vital role in human life since ages. Throughout the history, wild edible plants have sustained human populations in each of the inhabited continents, a number of wild plants, used by rural and tribal populations and contributing significantly to their livelihood. There are 15 wild edible fruit plants are recorded in 15 genera and 14 families. Among these Moraceae was the largest family contributing 2 species, Rutaceae and Euphorbiaceae contributing 1 species each. Myrtaceae, Musaceae and Borginaceae contributed 1 species each. Rhamnaceae, Tiliaceae, Cactaceae and Ebenaceae contributed 1 species each. Rosaceae and Fabaceae also contributing 1 species each. (Table:1, Fig: 4). Jain [22] listed 33 wild edible fruit species belonging

26 genus and 19 families in Bastar district. Singh and Ahirwar [21] listed 22 wild fruits belonging to 18 genus and 18 families in Chanda forest district Dindori. In Bandhavgarh National park documentation by Singh and Ahirwar [19], listed 20 species of wild fruits belonging to 16 genus and 16 families. Shrivastava [23] listed 10 wild edible fruits in their survey belonging to 10 genus and 9 families from Chhindwara district. In Chhattisgarh Neelam *et al.* [24] describes 30 wild edible fruits species belonging to 21 genera with 18 families. Maikhuri *et al.* [25] reported the seasonal availability of 13 species of wild edible fruits from Garhwal, India. Thakur and Bajpai [26] documented 16 fruits species in respect to Ethnobotanical studies, it consists of 16 genus and 13 families. Fruiting season of these fruits vary with respect to time or month. November-December and October is the best month for fruiting. The fruiting, however, varies from species to species.

Table: 1. List of plant species with part/parts used for edible purpose

S.NO	Botanical name	Common/Vernacular name	Family	Part used	Habit
1.	***Rubus ellipticus***	Akhey, Golden Himalayan Raspberry, Yellow Himalayan Raspberry	Rosaceae	Bark/Fruits	Shrub
2.	***Emblica officinalis***	Emblic Myrobalan, Indian Goseberry, Amla	Euphorbiaceae	Fruits	Tree
3.	***Musa paradisia***	Desi kela,Banana	Musaceae	Fruits	Herb
4.	***Morus alba***	Toot, Sehtoot, Mulberry, White mulberry	Moraceae	Leaves, Fruits, Bark, Root	Tree
5.	***Cordia dichotoma***	Lassiyade, Lassora, Fragrant Manjack, Lasoda Tenti	Boraginaceae	Fruits, Leaves, Seed, Kernal	Tree
6.	***Ficus palmata***	Anjiri, Bedu, Fegda, Dhura	Moraceae	fruits and shoots	Tree
7.	***Terminalia bellirica***	Belliric Myrobalan, Bahera	Combretaceae	Seeds and Kernel	Tree
8.	***Syzgium cumini***	Jambol, Jaman	Myrtaceae	fruits	Tree
9.	***Ziziphus mauritiana***	Ber, Chinee apple, Jujube, Indian plum	Rhamnaceae	Fruits	Tree
10.	***Carissa spinarum***	Conkerberry or Bush Plum, Garna, Garnu	Apocynaceae	Fruits and roots	Shrub
11.	***Grewia asiatica***	Dhamin,Phalsa, Parsuha,farnu	Tiliaceae	fruits	Tree
12.	***Murraya koenigii***	Curry leaves tree, Gandhela, Kathnim.	Rutaceae	Fruits and leaves	Shrub
13.	***Opuntia dillenii***	Prickly pear, Slipper thorn.	Cactaceae	Fruits	Shrub
14.	***Diospyros virginiana***	kunnu,kinnu,wild persimmon.	Ebenaceae	Fruits and kernal seeds	Tree
15.	***Bauhinia variegata***	Bauhinia, mountain ebony, Kachnar,karal.	Fabaceae	Flowers, leaves	Tree

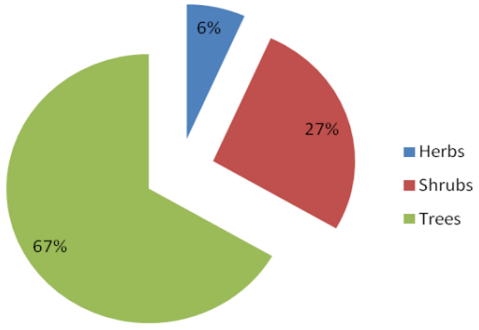

Fig. 2: Pie Chart showing dominant plant species of wild edible fruits in study area

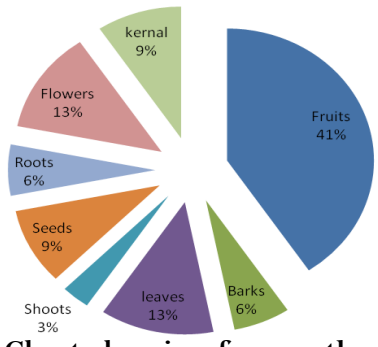

Fig. 3: Pie Chart showing frequently plant parts used in study area

In the present survey trees (67%) are dominant species in the study area. Other highly dominant species are shrub (27%) and herbs (6%) (Fig. 2). Ramalingam Parthiban *et. al.*, [27] also recorded 42% herbs, 36 % trees and 11% climbers and shrubs in their study at Thiruvarur district, Tamil Nadu, India. The common use of the herbaceous medicinal plants was also reported in other parts of the world [28].

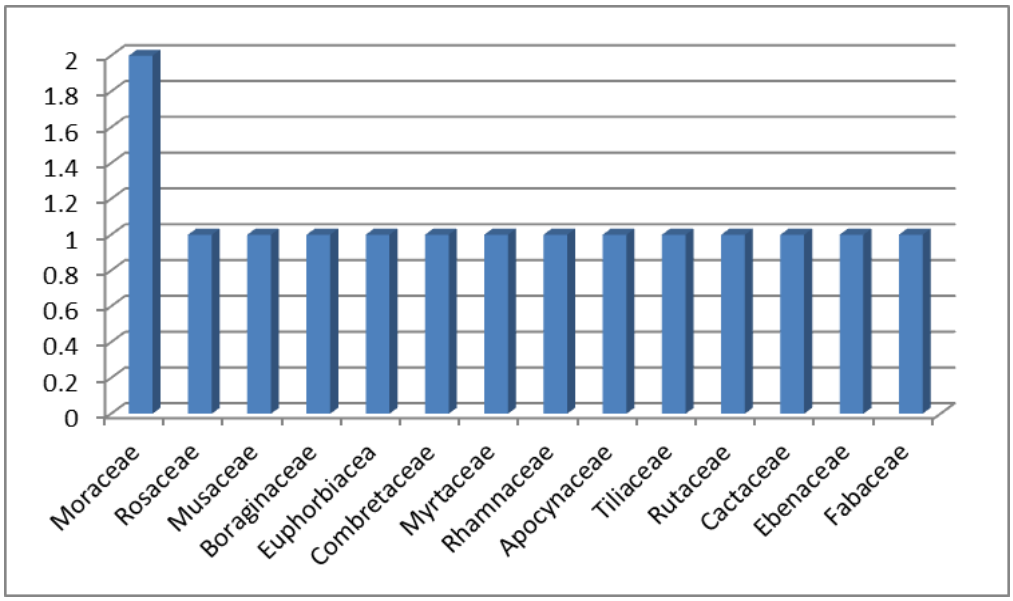

Fig. 4: Histogram Showing the family of wild fruits plants

The most frequently utilized wild edible plants parts were fruits (36 followed by leaves and flowers (13%), seed and kernel (9%), bark and root (6%) each, and shoot (3%) as shown in Fig. 2. The reason why leaves are used mostly is that they are collected very easily than underground parts, flower and fruit etc. [29] and in scientific point of view leaves are active in photosynthesis and production of metabolities [30]. This is infecting a positive note as uprooting of the plant is avoided and also the output in terms of leaf is more.

The phenological characters, especially flowering and fruiting are the essential elements to understand ways of conservation measures for the particular species [31]. From recorded fruit species in the month of December 5 fruit plants like *Bauhinia variegata*, *Zizhiphus mauritinia* fruiting this month. And in the month of October plants like *Ficus palmata*, *Terminalia bellirica*are fruiting. Most of plants having the fruiting season in November. As far as the fruiting season is concerned, 12.8% of plants produced fruits during November-January, followed by April-June 10.6%, December-March 8.5%. The seasonal availability of wild fruits does have an effect to a certain extent, it is important to note that most of the fruits are available during winters and early spring. The flowering starts between January and March, in the case of the majority of the species, which accounted for about 52 per cent of the total plant species described.

These peoples conserve and use domestic and wild species sustainably, which helps to ensure food security, improved livelihoods, incomes and participation in markets. These communities also provide food to other societies all over the world. They can reduce food insecurity risks by complementing their traditional knowledge and practices with information and support from governments and other agencies including rapid response systems and capacity building for disaster preparedness, mitigation and management. It is expected that the database generated could contribute in filling the gaps for the compilation of a local biodiversity register, a key gadget for achieving the goals of regional and global biodiversity conservation and sustainable development. In view of seeing the exploitation of the biodiversity, traditional knowledge in developing countries like India is eroding at a faster rate. Therefore, it is imperative to document all the ethno botanical information available into diverse ethnic communities before the traditional culture is completely lost.

The Present study has been conducted in the surrounding villages of the tehsil Jawali of Kangra district of Himachal Pradesh. The study of underutilized fruits is important not only to identify the potential sources, which could be

utilized as an alternative food but also to select promising types for domestication and which can be converted into various value added products. There is a great scope for the processed products from these fruits and vegetables, not only because of their peculiar, distinct flavor but also due to nutraceutical importance and therapeutic values. The findings study will be of immense importance not for rural people who are using lesser non wild edible fruits but also it will open new vistas for the scientists, researcher engaged in the preparation of various health nutrients and supplements for human healthcare and curing the diseases. The documentation of the findings may also useful to the field workers, associated in developing production technology on scientific lines helping of the farmers in generation of additional income by the cultivation of lesser non wild edible fruits.

In the present investigation, 15 underutilized fruits are documented. These documented underutilized fruits were selected for development of value added products. Among them, some species have good prospects for marketing as well as for processing as they are of very attractive color, excellent taste, and flavor and are known to possess medicinal properties. Some of them are highly perishable in nature and are small in size (akhey, and toot). Some plant species which are considered as a delicacy are marketed in large quantities viz. desi ambla, toot, dhura, lassiyade.

The evaluation of physical characteristics of underutilized fruits revealed that most of the fruits (desi-ambla, desi kela, lassiyade and dhura) had tints and shades of green color peel. Akhey and wild persimmon were yellow; baheda had light to dark brown surface whereas Falsa and toot had range of brilliant red to reddish purple hue. Desi ambIa, akhey, were round in shape, dhura exhibited globose shape and dheun was round. The selected underutilized fruits varied greatly in their taste and mouth feel. Desi ambla had sour and astringent taste. Desi kela was sweet, toot and lal akhey were sweet and succulent. Dhurawere sweet and astringent but had gritty mouthfeel. Baheda tasted bitter and astringent.

4. CONCLUSION

In the present investigation, 15 underutilized fruits under 15 genera and 14 families are documented. These fruits were selected for development of value added products. Among them, some species have good prospects for marketing as well as for processing as they are of very attractive color, excellent taste, and flavor and are known to possess medicinal properties. Some of them are highly perishable in nature and are small in size (akhey, and toot). Some plant species which are considered as a delicacy are marketed in large quantities viz. desi ambla, toot, dhura, lassiyade. The selected underutilized fruits varied greatly in their taste and mouth feel. Desi ambla had sour and astringent taste. Desi kela was sweet, toot and lal akhey were sweet and succulent. Dhura were sweet and astringent but had gritty mouth feel. Baheda tasted bitter and astringent. Traditional, indigenous and local communities conserve and use domestic and wild species sustainably, which helps to ensure food security, improved livelihoods, incomes and participation in markets. They can reduce food insecurity risks by complementing their traditional knowledge and practices with information and support from governments and other agencies including rapid response systems and capacity building for disaster preparedness, mitigation and management. In view of seeing the exploitation of the biodiversity, traditional knowledge in developing countries like India is eroding at a faster rate. Therefore, it is imperative to document all the ethnobotanical information available into diverse ethnic communities before the traditional culture is completely lost.

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