Diversity and traditional knowledge of wild edible plants in Jiyuni valley, Mandi district, Himachal Pradesh, India

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ABSTRACT

A study was conducted in the Jiyuni valley of Himachal Pradesh to document the diversity, distribution and utilization patterns of wild edible plants. The research, carried out from 2023 to 2025, involved extensive field surveys and interviews with local residents. A total of 70 wild edible plant species, belonging to 37 families and 55 genera, were documented, including 66 angiosperms, 2 gymnosperms, 1 pteridophyte and 1 fungus. The flora comprised 13 trees, 16 shrubs, 39 herbs, 1 fern and 1 fungus. The most species-rich families were Rosaceae (12 species), Balsaminaceae (4 species), Berberidaceae (4 species) and Asteraceae (4 species). Of the documented species, 34 were native to the Himalayan region, with one species, *Angelica glauca*, identified as endemic to the Indian Himalayan region. The study found that local communities utilized various plant parts, with fruits (28 species) and leaves (25 species) being the most frequently consumed. These plants were used in various ways, including being eaten raw, cooked as vegetables or processed in the form of jams, chutneys and oils. In addition to their dietary role, these plants were used for medicinal purposes, fuel, fodder and religious practices, highlighting their socio-economic and cultural importance. The findings underscore the need for scientific validation and sustainable management of these resources to support local livelihoods and address increasing nutritional demands. The study's documentation serves as a valuable resource for preserving traditional knowledge and guiding future research and conservation efforts.

Keywords: Wild edible plants; ethnobotany; Jiyuni valley; biodiversity; traditional knowledge

INTRODUCTION

India, well-known for its enormous range of plants and rich ethnic diversity, is recognized as one of the world's mega biodiversity centres (Sasi et al 2011). The Indian Himalayan region serves as a significant reservoir of biodiversity, which is actively harnessed by the rural communities for various essential needs, including medicines, wild edibles, fodder, fuel, timber, agricultural tools, religious practices and numerous other uses (Samant and Dhar 1997). Wild edible plants are non-cultivated species gathered from natural environments, primarily utilized to enhance diet, nutrition, medicine and various other requirements by indigenous communities worldwide (Shaheen et al 2017). Throughout human history, wild edible plants have played a significant role in many geographical locations of the world (Sekeroglu et al 2006). The use and consumption of wild edible plants is part of the traditional and cultural practices of indigenous rural and tribal groups around the world (Samant and Dhar 1997). Native forests in the Himalayan areas are easily accessible, naturally free and simple to use, meeting over 76 per cent of the local population's demands for natural resources (Chettri and Sharma 2006).

Himachal Pradesh may be divided in three geographical regions viz outer Himalayas, the lesser Himalayas and the greater Himalayas or the Alpines and covers 55,673 km^2 area (Gill 2023). The state is endowed with rich biodiversity representing the uniqueness of the region (Kumar and Gupta 2023).

The presence of high species abundance and diverse community structure makes Himachal Pradesh a stunning repository of floral diversity in the Himalaya (Aswal and Mehrotra 1994). Since time immemorial, inhabitants in remote areas have utilized forest resources for medicines, resins, fuel, timber, fibre, gums, agricultural equipment, religious purposes and other uses (Samant and Dhar 1997).

Among their multiple uses, wild edible plants are of particular dietary significance, as they exhibit a rich phytochemical profile and possess higher nutritional value compared to several conventionally cultivated crops (Assefa and Abebe 2010, Vanzani et al 2011), In India and other developing countries, wild edible plants serve as an important alternative source of income for local communities (Shrestha and Dhillion 2006).

The consumption of most wild edible plants and the knowledge of their consumption remain confined to specific local groups, while largely unknown to the wider population. However, the availability of these plants is declining due to multiple factors, including depletion of natural resources, migration from rural areas and change in cultural practices (Rao et al 2015). With the rapid depletion of traditional knowledge of wild edible plants and the increasing dependence on a limited number of staple crops, the documentation, valuation and scientific assessment of these plants have become increasingly important.

Many studies have been conducted on wild edible plants (wild edible) in Indian Himalayan region (Gaur and Semwal 1983, Samant et al 2001, Samant and Dhar 1997, Ballabh et al 2007, Chaithanya et al 2015, Chandra et al 2013, Jana and Chauhan 1998, Rashid and Anand 2009, Sundriyal et al 1998, Sundriyal and Sundriyal 2001, Tiwari et al 2010, Singh et al 2023) and in Himachal Pradesh (Negi and Subramani 2015, Sharma et al 2013, 2018, Lata et al 2016, Pant et al 2014, Sen et al 2013, Singh et al 2014, Jhamta et al 2019, Bharti and Verma 2021, Prakash et al 2020, Kumar et al 2023) but in specific, nobody explored these plants (wild edible) in Jiyuni valley of Himachal Pradesh. Therefore, it was essential to systematically document the diversity of wild edible plants utilized by the local inhabitants of the valley, not only to support future research and development initiatives but also to serve as a freely accessible reference for knowledge preservation. In light of these gaps, efforts have been made in the current study to diversity and distribution pattern assessment of wild edibles, analysis on endemism, analyze the traditional practices and native uses and provide suitable management strategies.

Study area

The current study was conducted in the Jiyuni valley, situated in the Mandi district of Himachal Pradesh, which lies in the mid-Himalayan zone with an altitudinal range of 1,300-2,500 m amsl. The valley is characterized by diverse altitudinal gradients, rich forest cover and varied agro-climatic conditions that support high floral diversity. The valley encompasses sub-tropical, temperate and sub-alpine habitats, sustaining a wide range of plant and animal populations. Here, the temperatures range between –10 to 25°C. The vegetation is dominated by sub-tropical Chir pine forests, western mixed coniferous forests and moist temperate deciduous forests. The valley supports sensitive biodiversity elements, including orchids, aromatic and medicinal plants, rare wild edibles, endemic plants, endangered, native and unique faunal species.

METHODOLOGY

The current study based on extensive and intensive surveys was carried out in the Jiyuni valley, Mandi district, Himachal Pradesh from 2023 and 2025. Periodically, surveys and visits were conducted to neighbour villages, namely Jahal, Dhangyara, Dhisti, Bhurla, Bag, Karnala, Tunna, Dari, Bakhrog, Shalla, Nauna etc. Local residents were interviewed and one of the local knowledgeable people was hired for survey and collection of the wild edible plants samples from their natural habitats. Samples of every species were collected and information regarding each species like habitat, habit, altitudinal range, local uses and use pattern was generated. The method of interview was open ended and informal instead of using strict questionnaire. The language used to interact with the informants was the local dialect of the study area, ie Pahadi and in some cases, Hindi. Local and regional floras were used to identify the samples of edible wild plants (Aswal and Mehrotra 1994, Chowdhery and Wadhwa 1984, Singh and Rawat 2000). Additionally, information about indigenous uses was gathered from the available literature (Samant and Dhar 1997, Sharma et al 2018, Jhamta et al 2019, Prakash et al 2020, Thakur and Gupta 2020, Bharti and Verma 2021, Gajurel et al 2023, Kumar et al 2023). The nomenclature was obtained from International Plant Name Index, WFO Plant List and Index Kewensis. Endemic species were those

restricted to the Indian Himalayan region, whereas, near-endemic species had wider distribution in the neighbouring countries.

RESULTS

Diversity and distribution pattern

A total of 70 species (angiosperms: 66, gymnosperms: 2, pteridophytes: 1, fungus: 1) of wild edible plants belonging 37 families and 55 genera were recorded (Table 1). A total of 13 trees, 1 fern, 1 fungus,16 shrubs and 39 herbs were observed (Fig 1). The most abundant wild edible families were Rosaceae (12 spp), followed by Balsaminaceae, Berberidaceae and Asteraceae (4 spp each) and Apiaceae, Lamiaceae, Polygonaceae and Viburnaceae (3 spp each). Among the genera, *Rubus* and *Impatiens* (4 spp each), *Viburnum* and *Berberis* (3 spp each), *Chenopodium, Trifolium, Rosa* and *Pinus* (2 spp each) were the rich genera of species.

Nativity and endemism

Thirty four species of wild edibles were native to the Himalayan region, while the rest species were non-natives. One species ie *Angelica glauca*, was found endemic to the Indian Himalayan region, while 15 other species were found near endemic (Table 1, Fig 2).

Utilization pattern

Local inhabitants consumed wild edible plants in diverse forms, including boiled, raw, roasted, fried, cooked as spices, processed into oils or preserved as jams and pickles. The natives used a variety of parts, including leaves, fruits, seeds, roots, entire plants, flowers, tubers, rhizomes etc. Amongst the parts used, fruits (28 spp) were used maximum, followed by leaves (25 spp), seeds (11 spp), roots (7 spp), whole plant (5 spp), aerial parts (4 spp), tubers and flowers (3 spp each) and stem (2 spp) (Table 1, Fig 3).

Out of the total reported species, 37 were eaten as raw, while 33 were eaten as cooked such as roasted, boiled as vegetables, soup, flavouring agents etc. The majority of plants (23 spp) were eaten as ripe fruits, 18 spp as vegetables and 2 spp as tea.

Indigenous uses and traditional practices of wild edibles

The local inhabitants used different parts of the plants viz leaf, fruit, whole plant, root, flower, seed, aerial part etc. Different parts of wild edibles were used in different seasons. Mostly the raw eaten plants were consumed as a fruit; such plants included *Berberis lycium*, *B aristata*, *Elaeagnus umbellata*, *Juglans regia*, *Fragaria nubicola*, *Duchesnea indica*, *Rubus biflorus*, *R foliolosus*, *R niveus*, *Morus serrata*, *Pyrus pashia* etc. The processed form included cooked, fried, roasted, tea, grinded, dried, boiled, pickle, oil etc. The leaves of *Sonchus asper*, *Urtica dioca*, *Phytolacca acinosa*, *Chenopodium album*, *C foliosum* and *Fagopyrum acutatum*, fruits of *Pistacia chinensis* subsp *integerrima* and aerial parts of *Diplazium esculentum* were cooked and eaten as vegetable. A delicious chutney was prepared from flowers of *Rhododendron arboretum* and whole plant *of Origanum vulgare*. In addition to this, flour was obtained from the seeds of *Aesculus indica* to make chapati and Halwa. Some species viz *Thymus linearis* and *Elsholtzia fruticosa* were used as spices. Some of the species were also oil yielding like *Juglans regia*, *Elsholtzia fruticosa*, *Prinsepia utilis* and *Pinus roxburghii.* These plants were also used for medicine, fuel, fodder, religious purposes, fiber, agricultural tools, timber, soap and as an insecticide.

DISCUSSION

Biological resources, upon which human societies critically depend, are renewable when managed sustainably; however, unsustainable exploitation can lead to their depletion and eventual extinction (Heywood 1995). The Indian Himalayan region is rich in edible plant diversity, with over 675 species of wild edible plants (Samant and Dhar 1997, Pal et al 2014). The local inhabitants of the valley possessed extensive knowledge regarding the utilization of native flora. This study documents the distribution, diversity, endemism, indigenous uses and local practices related to wild edible plants in Jiyuni valley, Mandi district, Himachal Pradesh. The occurrence of 70 wild edible species in the area emphasises their high socio-economic significance. The occurrence of 34 native species, 15 near-endemic species and one endemic species indicates that the area holds considerable potential as a biodiversity hotspot, warranting focused conservation efforts. Since local communities have a history of using these species for sustenance and health, they represent a promising resource for meeting the region's increasing nutritional needs if they are properly managed and subjected to scientific validation. The extensive collection and commercialization of several of these species have the potential to enhance the income of local communities. Traditional knowledge

Table 1. Distribution, utilization, endemism and traditional uses of wild edible plants in Jiyuni valley, Himachal Pradesh

Family/taxa	Local name	Altitudinal range (m)	PT	E/NE	Part used	Indigenous use
Amaranthaceae						
Amaranthus spinosus L	Sariyara	1,300-2,500	H	-	Leaf, stem	Spinach prepared from stem, leaves
Anacardiaceae						
Pistacia chinensis subsp *integerrima* (JL Stewart) Rech f	Kakare/ Kakar Singhi	1,800-2,200	T	-	Fruit	Young shoots, leaves cooked; used as vegetable
Apiaceae						
Angelica glauca Edgew	Chaura	2,000-2,500	H	E	Whole plant	Rootstocks, seeds used to enhance food flavour
Chaerophyllum villosum Wall & DC	Khelti	2,100-2,500	H	-	Root	Fresh roots eaten straight with milk as high-nutrition dish
Heracleum candicans Wall ex DC	Badiyacha	1,800-2,500	H	-	Leaf	Tender shoots loaded with curd consumed
Araliaceae						
Aralia cachemirica Decne	-	2,300-2,500	H	NE	Root	Used as condiment
Asparagaceae						
Asparagus racemosus Willd	Sansarpali	1,500-1,700	H	-	Tuber	Tubers eaten
Asteraceae						
Artemisia maritima L	-	2,300-2,500	H	-	Leaf, root	Extract from fresh, dry leaves utilized
Balsaminaceae						
Impatiens glandulifera Royle	-	2,200-2,500	H	-	Seed, leaf	Raw leaves, seeds consumed
I racemosa Hook f	-	1,800-2,500	H	-	Seed, aerial part	Raw leaves, seeds consumed
I scabrida DC	-	1,800-2,500	H	-	Seed, whole plant	Raw leaves, seeds consumed
I sulcata Wall	-	2,000-2,500	H	NE	Seed, aerial part	Raw leaves, seeds consumed
Berberidaceae						
Berberis aristata DC	Kasmal	1,800-2,500	Sh	NE	Fruit, leaf	Flowers, foliage, fruits consumed raw
B jaeschkeana CK Schneid	Kasmal	2,700-2,500	Sh	-	Root, fruit	Ripe fruits eaten
B lycium Royle	Kasmal	1,800-2,200	Sh	NE	Fruit, leaf	Flowers, foliage, fruits consumed raw
Podophyllum hexandrum Royle	Ban Kakri	2,100-2,500	H	-	leaf	Ripe fruits consumed
Cannabaceae						
Cannabis sativa L	Bijya	1,800-2,000	H	-	Leaf, seed, fruit, flower	Roasted Bhang seeds with wheat seeds consumed
Caprifoliaceae						
Lonicera angustifolia Wall ex DC	-	1,700-2,500	Sh	NE	Fruit	Ripe fruits utilized

Family/taxa	Local name	Altitudinal range (m)	PT	E/NE	Part used	Indigenous use
Asteraceae						
Cirsium wallichii DC		1,800-2,500	H	NE	Root, stem	Root, stem consumed as food
Myriactis nepalensis Less	-	1,800-2,500	H	-	Leaf	Fresh leaves used as vegetable
Sonchus asper Wulfen ex DC		1,500-2,200	H		Leaf	Young leaves eaten raw or as salad
Taraxacum campylodes GE Haglund		1,500-2,500	H	-	Whole plant	Young leaves boiled, prepared like spinach; entire plant tastes harsh when eaten raw
Caryophyllaceae						
Silene conoidea L	-	1,800-2,500	H	-	Leaf	Young leaves utilized as green vegetable
Stellaria media (L) Vill	Bariyala	1,800-2,000	H	-	Aerial part	Aerial parts cooked as vegetable
Chenopodiaceae						
Chenopodium album L	-	1,800-2,500	H	-	Leaf	Young leaves utilized as green vegetable
C foliosum Asch	-	1,800-2,500	H	-	Leaf	Young leaves utilized as green vegetable
Cornaceae						
Cornus disciflora Moc & Sessé ex DC	Kreeva	1,800-2,000	T	NE	Fruit	Leaves, fruits used as vegetable, flower buds as flavouring agents; ripe fruits eaten raw
C macrophylla Wall	Khrembal	1,800-2,500	T	-	Fruit	Ripe fruits eaten
Dioscoreaceae						
Dioscorea deltoidea Wall ex Griseb	-	1,800-2,500	H	-	Tuber	Tubers consumed as vegetable
Elaeagnaceae						
Elaeagnus umbellata var *umbellate* Thunb	Geai	1,800-2,400	T	-	Fruit	Edible fruits used to make juice, jam, tea; dried leaves used in tea making
Ericaceae						
Rhododendron arboreum Sm	Brash	1,800-2,200	T	-	Flower	Flowers used for making juice, chutney
Juglandaceae						
Juglans regia L	Akhrot	1,800-2,000	T	NE	Fruit, flower	Ripe fruits eaten
Lamiaceae						
Elsholtzia fruticosa (D Don) Rehder	Pothi, Jaunkra	1,800-2,200	H	-	Seed	Ripe fruits eaten
Origanum vulgare L	Bantulsi	1,600-2,500	H	-	Whole plant	Used as spice for chutney making
Thymus linearis Benth	Ban Jira	2,000-2,500	H	-	Leaf	Leaves utilized as condiment
Liliaceae						
Polygonatum verticillatum (L) All	Salam Mishri	2,000-2,500	H	-	Tuber	Tubers eaten
Malvaceae						
Malva verticillata L	Sochali	1,800-2,000	H	-	Leaf	Leaves utilized as green vegetable
Moraceae						
Morus serrata Roxb	Cheemu	1800-2,200	T	NE	Fruit	Ripe fruits edible
Oxalidaceae						
Oxalis corniculata L	Malori	1,600-2,200	H	-	Leaf	Leaves eaten raw as vegetable

Family/taxa	Local name	Altitudinal range (m)	PT	E/NE	Part used	Indigenous use
Myricaceae						
Myrica esculenta Buch-Ham ex D Don	Kaphal	1,800-2,400	T	-	Fruit	Ripe fruits edible
Papilionoideae						
Trifolium pratense L	Malori	1,800-2,500	H	-	Leaf	Leaves consumed as vegetable
T repens L	Malori	1,600-2,500	H	-	Leaf	Leaves consumed as vegetable
Phytolaccaceae						
Phytolacca acinosa Roxb	Jharka	2,000-2,500	H	-	Leaf	Leaves cooked, consumed as vegetable
Poaceae						
Cenchrus americanus (L) Morrone	Siuh	1,800-2,500	H	-	Seed	Like rice, seeds eaten sweet or savory; ground into powder, added to porridge, cakes, puddings, other dishes
Polygonaceae						
Fagopyrum cymosum (Trevir) Meisn	Fafra	1,800-2,500	H	-	Leaf	Leaves, seed flour used to make regional delicacy Thotha, eaten with Aloo curry
Persicaria nepalensis (Meisn) Miyabe	Nalora	1,800-2,000	H	-	Leaf	Roots utilized as tea substitute
Rumex hastatus Don	Malori	1,500-1,800	H	-	Leaf	Young, tender leaves prepared like vegetable
Rosaceae						
Cotoneaster horizontalis Decne	Chinchri	2,000-2,500	Sh	-	Root, leaf, fruit	Fruits edible
Duchesnea indica Focke		1,600-2,500	H	-	Fruit	Fruits edible
Fragaria nubicola (Lindl ex Hook f) Lacaita	Gamphal	2,000-2,500	H	-	Fruit, root	Fruits edible; roots used to make tea
Prinsepia utilis Royle	Bekhal	1,800-2,500	Sh	-	Seed, fruit	Fruits edible; used to extract oil
Prunus campanulata Maxim	Paja	1,800-2,200	T	-	Fruit	Fruits utilized
Pyrus pashia Buch-Ham ex D Don	Kainth	1,800-2,200	T	-	Fruit	Fruits utilized
Rosa brunonii Lindl	Kuja/Shami	1,800-2,200	Sh	-	Fruit	Fruits utilized
R sericea Lindl	-	2,000-2,500	Sh	-	Fruit	Fruits utilized
Rubus biflorus Buch-Ham ex Sm	Akhaey	1,800-2,500	Sh	-	Fruit	Fruits utilized
R foliolosus Halácsy	Akha	2,700-2,500	Sh	-	Fruit	Fruits utilized
R niveus Wall	-	1,800-2,500	Sh	-	Fruit	Fruits utilized
R thuillieri Poir ex Steud	Kalanche, Kalaakha	1,800-2,500	Sh	NE	Fruit	Fruits utilized
Rutaceae						
Zanthoxylum armatum DC	Tirmira, Trimbar	1,500-1,800	Sh	-	Seed	Seeds ground into powder, used as condiment
Sapindaceae						
Aesculus indica (Wall ex Cambess) Hook	Khanor	1,800-2,500	T	NE	Fruit	Flour mixed with wheat flour to make Chapati, Halwa

Family/taxa	Local name	Altitudinal range (m)	PT	E/NE	Part used	Indigenous use
Saxifragaceae				-		
Bergenia ciliata (Haw) Sternb	Pashan Bhed, Mirdu Ka Patta	1,800-2,000	H	NE	Leaf	Dried leaves utilized to make tea
Viburnaceae						
Viburnum cotinifolium D Don	Dab	1,800-2,500	Sh	NE	Fruit	Ripe fruits consumed
V brevitubum (PS Hsu) PS Hsu		2,000-2,500	Sh	-	Fruit	Ripe fruits consumed
V mullaha Buch-Ham ex D Don		1,800-2,500	Sh	-	Fruit	Ripe fruits consumed
Urticaeae						
Urtica dioica L	Kungshi	1,800-2,300	H	-	Leaf	Vegetable made from leaves
Gymnosperms						
Pinaceae						
Pinus roxburghii Sarg	Chir	1,800-2,200	T	NE	Seed	Seeds edible, used to extract oil
P wallichiana (Wall ex D Don) AB Jacks	Kail	2,000-2,500	T	NE	Seed	Seeds edible
Pteridophytes						
Athyriaceae						
Diplazium esculentum (Retz) Sw	Kisrod/ Lingdu	2,100-2,500	Fr	-	Aerial part	Aerial parts used as vegetable
Fungi						
Morchellaceae						
Morchella esculenta (L) Pers	Guchhi	1,800-2,500	FB	-	Whole plant	Has high nutritional value; eaten as vegetable

E = Endemic, NE = Near-endemic, PT = Plant type, H = Herb, T = Tree, Sh = Shrub, Fr = Frond, FB = Fruiting body

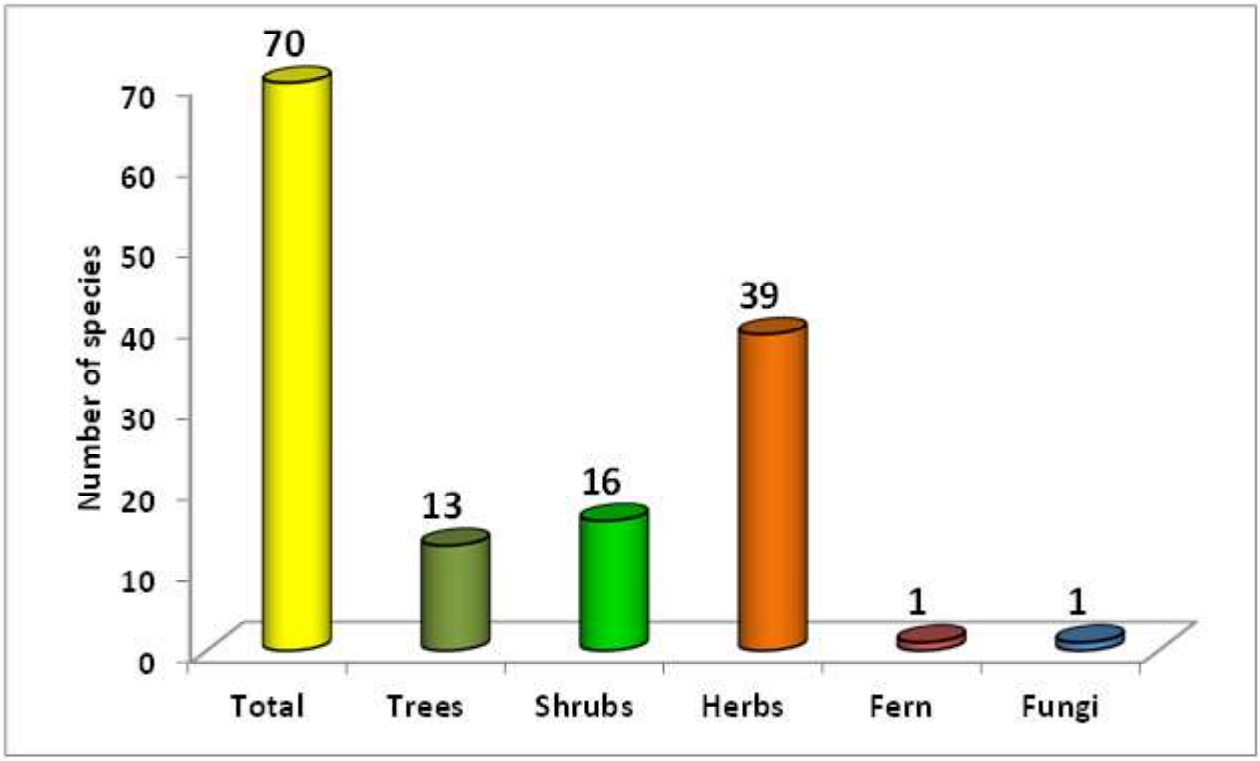


Fig 1. Plant types of wild edible plants recorded in Jiyuni valley, Mandi district, Himachal Pradesh

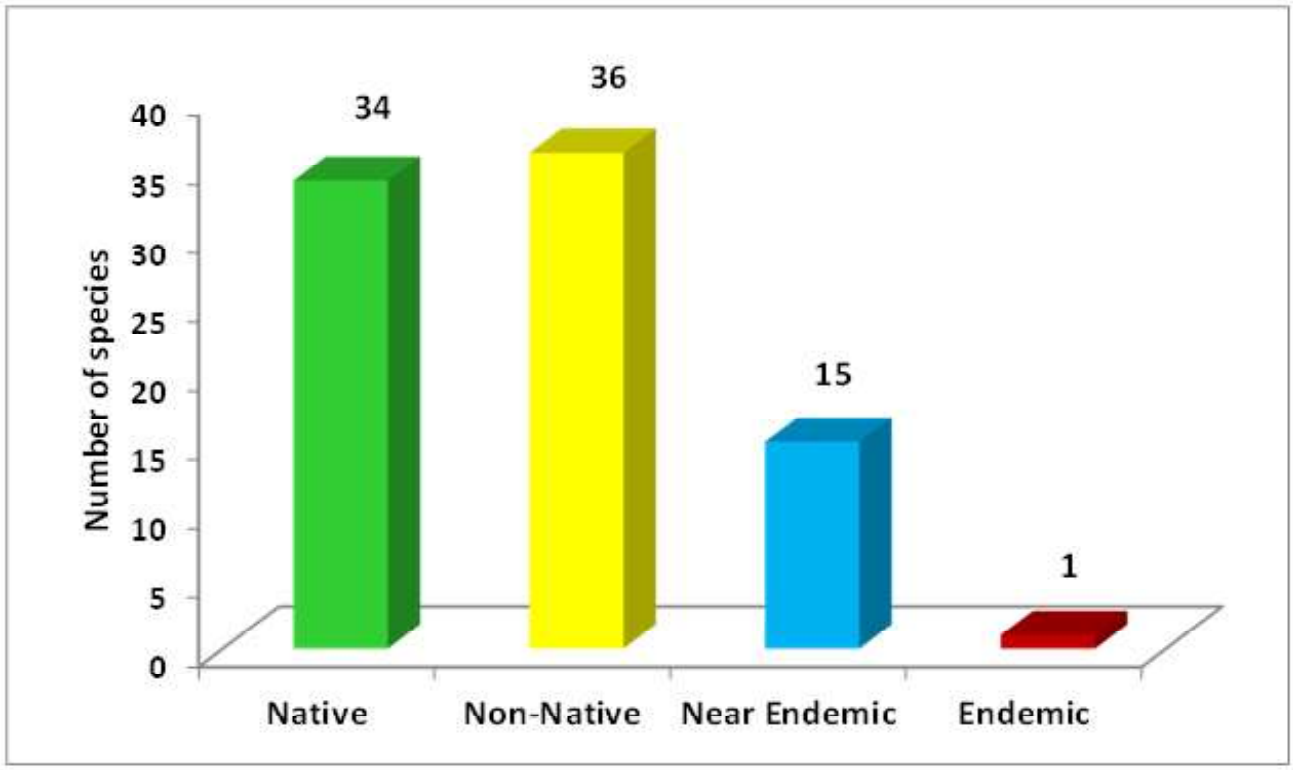
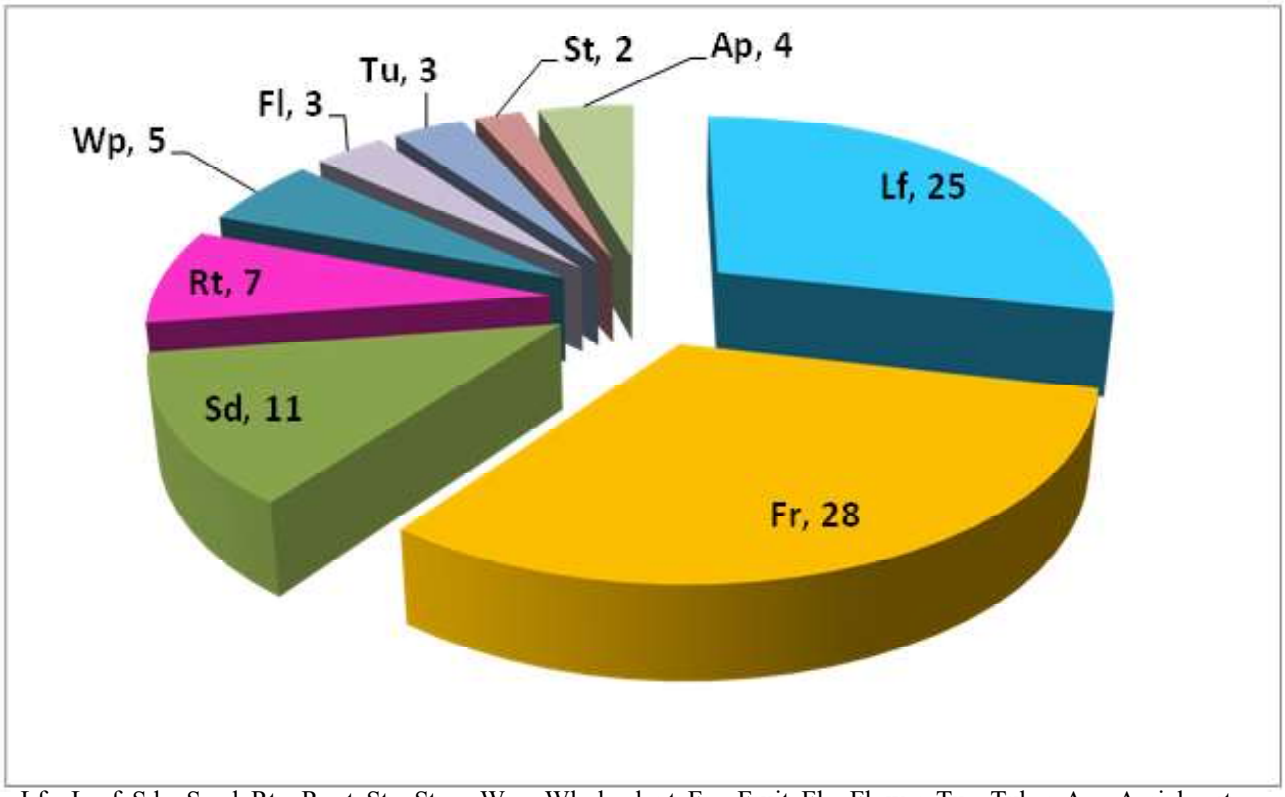


Fig 2. Nativity and endemism of wild edible plants recorded in Jiyuni valley, Mandi district, Himachal Pradesh



Lf = Leaf, Sd = Seed, Rt = Root, St = Stem, Wp = Whole plant, Fr = Fruit, Fl = Flower, Tu = Tuber, Ap =Aerial part

Fig 3. Plant part consumption pattern of wild edible plants recorded in Jiyuni valley, Mandi district, Himachal Pradesh

and practices related to wild edibles are confined to local communities. In this context, the present study described the distribution, diversity, local uses and traditional practices of wild edible plants in the study area.

CONCLUSION

This study successfully documented the rich diversity of wild edible plants in the Jiyuni valley, Mandi district, Himachal Pradesh highlighting their critical role in the sustenance, health and cultural practices of local communities. The identification of 70 species, including 34 native and 1 endemic, confirms the valley's status as a significant biodiversity hotspot. The extensive utilization of these plants from fruits and leaves for daily consumption to seeds for oil and plants for medicinal and religious purposes, demonstrates the deep-rooted traditional knowledge present in the region.

However, the findings also point to an urgent need for conservation. The rapid erosion of traditional practices, coupled with the potential for over-exploitation, puts these valuable resources at risk. Therefore, it is essential to combine this traditional knowledge with modern scientific validation to ensure the sustainable management of these plants. By promoting their proper cultivation and processing, these wild edibles can not only help meet the nutritional needs of the growing population but also create new economic opportunities for local communities. The documentation provided in this study is a vital step toward preserving this invaluable heritage for future generations.

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