



# Homogeneity in traditional knowledge and cultural importance of wild edible plants in Kishtwar – a Himalayan district in North-West Himalaya

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## Abstract

Wild edible plants play an important role in the rural life. A total of 130 such plant species are documented from district Kishtwar of UT Jammu and Kashmir. During the survey 78 informants were interviewed in the region and data collected were analyzed for homogeneity in traditional knowledge and cultural importance using Factor informant consensus (*Fic*) and Cultural importance index (*CI*). Higher *Fic* more than 0.90 describes more homogeneity of knowledge among the informants regarding the use of wild edible plants in the study area. *Ferula jaeschkeana*, *Ehwendia persica*, *Diplazium esculentum*, *Berberis lycium* and *Juglans regia* are identified as culturally most important vegetable and fruit species in the study area. Rosaceae contributed maximum species in the traditional culture of the inhabitants of Kishtwar as wild edible species.

**Key words:** Wild food, Cultural importance index, Factor informant consensus, Kishtwar.

## INTRODUCTION

The uncultivated plant species that are accessed from natural habitats and used as food are known as wild edible plants (Beluhan & Ranogajec 2010). These are collected traditionally from the forests, waste lands, roadsides and banks of streams and rivers. People of developing countries generally reside in local villages, ethnic communities and tribal villages. Most of them have a long history of use of such plant species for driving their livelihood (Schippmann *et al.* 2002). People are using these plant species since time immemorial and may have utilized more than 7000 such plants so far, but many more such food species are not documented till date (Grivetti and Ogle 2000; Mohan Ram 2000).

According to a report of Food and Agricultural Organization (FAO), about one billion people of the world use wild plants as the source of their diet (Burlingame 2000). These plant species not only provide nutrition to many malnourished people but also act as source of food during food shortage and famine periods (Hussain *et al.* 2009). In India wild edible plants have achieved an important place in the ethnic and traditional cultures. In this context, various workers have recorded the use of wild edible plants from different parts of Himalaya (Jain 1964; Negi, 1988; Haridasan *et al.* 1990; Pundir & Singh 2002; Kulkarni *et al.* 2003; Kumer 2003; Sundriyal *et al.*, 2004; Kayang, 2007; Rashid 2008; Rathore 2009; Bhatia *et al.* 2018; Singh *et al.* 2019; Pandita & Dutt 2018; Thakur *et al.* 2020a) and other parts of India (Binu, 2010; Vizhi & Lohidas, 2020).

Kishtwar - a hilly district of UT of Jammu and Kashmir in north-west Himalaya is characterized by temperate to alpine conditions. Due to tough terrain, geography and peculiar cold climate during winter various villages of the district remain cut off from the major cities of the province for 3-4 months. The instinct, need, observations, trials and errors along with

experiences gained through day-to-day human life in such areas has led to the use of the wild edible plants. The people are familiar with the wild natural resources and derive majority of their livelihood from them. The major occupation of the people is agriculture and livestock rearing. During the favorable climatic conditions these people also derive their earnings by selling the wild produce to the nearby markets. Among the wild resources the wild edible plants are the major chunk for utilization and generation of economy by the inhabitants of the villages of the district. The acquired traditional knowledge is transferred from one generation to the other by these people through oral dialogue. In many other regions of the world this age-old traditional knowledge is seen to be getting faded away in the light of developmental activities, mass migration from rural to urban areas, modern education, changing cultures and traditions, decline in natural resources and attraction towards western ways of life (Luczaj *et al.* 2013; Rao *et al.* 2015; Reyes-Garcia *et al.* 2015; Bhatia *et al.* 2015). Therefore, it is important to collect, document, preserve and disseminate this age-old traditional knowledge for the betterment of the society. The present study was undertaken to document and evaluate the cultural significance and consensus among the local people with respect to usage of wild edible plants in Kishtwar.

### MATERIAL AND METHODS

Situated between 31°06' to 32°18' N latitude and 75°24' to 76°42' E longitude Kishtwar district is spreadover in an area of 7737 sq. Kms. It is the largest district of Union Territory of Jammu and Kashmir (J&K) with altitude ranging from 900 to 6300 meters above msl. Its boundaries touch Doda district in south-west, Anantnag district of Kashmir in west, Ladakh in north-east and Himachal in south-east directions (Figure 1). It is the largest and least popu-

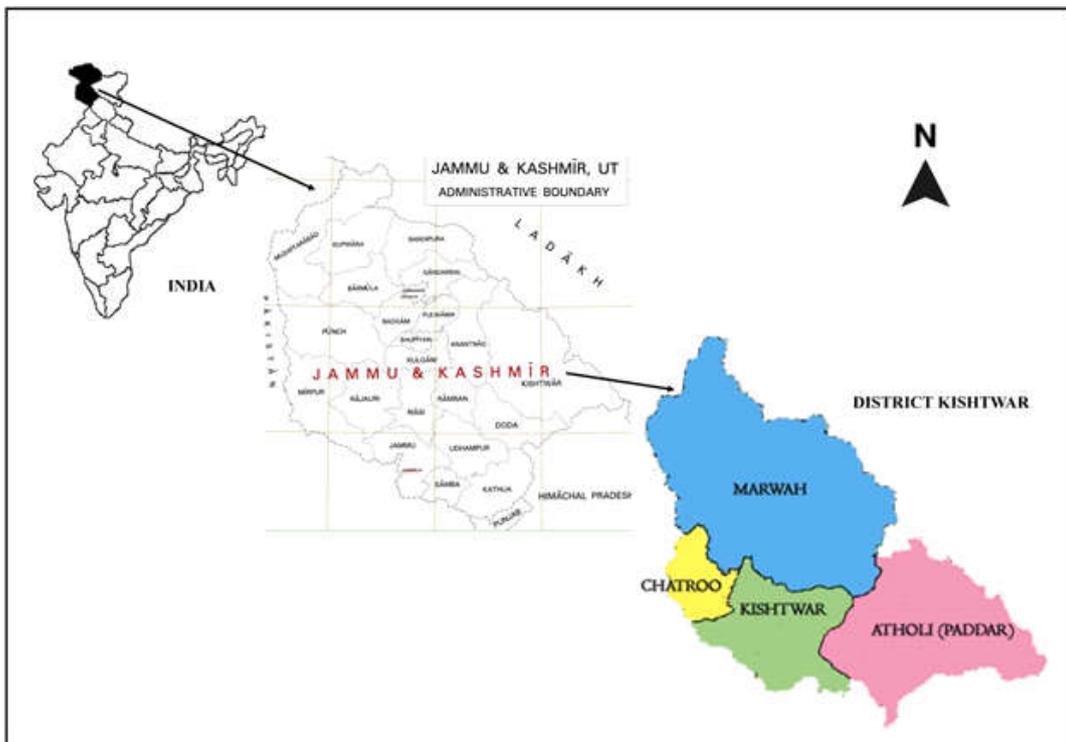


Figure 1. Map of the Study area

lous district of UT of J&K. This mountainous area is characterized by temperate vegetation dominated by *Pinus wallichiana* AB Jacks. (Pinaceae) at low and *Cedrus deodara* (Roxb. ex D.Don) G.Don (Pinaceae) at high elevations. Agricultural system is mostly dependent on seasonal rains and therefore only rain-fed crops such as maize, wheat, barley, oats and mustard are cultivated by local inhabitants in the region. Among fruit trees apple, apricot, pear, quince and walnut are the main horticultural crops. The region is also known for cultivation of saffron (*Crocus sativus* L.), and is considered as the second largest region of saffron production after Pampore in Jammu and Kashmir, India (Thakur *et al.* 2020b).

Various systematic and extensive ethno-botanical surveys were conducted in different areas of Kishtwar district during March 2019 to October 2020 for the collection of information on wild edible plant species being used by the local people. The informants were selected randomly and information was gathered by conducting personnel interviews and group discussions with the informants in their local language on the indigenous uses of wild flora as food. A total of 78 informants (33 male and 45 female) between the age group 15–75 years were interviewed with a semi structured questionnaire. The information collected included common wild edible plant species, local names, plant part used, and recipe prepared. The plant species were identified from the herbaria of the Department of Botany, University of Jammu, Jammu, and Indian Institute of Integrative Medicine, Jammu, and also with the help of various regional floras (Sharma & Kachroo, 1983; Swami & Gupta, 1998). The final list of the plants was prepared following the online database “Plants of the world online- [www.plantsoftheworldonline.org](http://www.plantsoftheworldonline.org)” for the correct botanical nomenclature.

The data gathered through questionnaire and interviews were analyzed quantitatively using two ethnobotanical indices as follows:

**Factor informant consensus (Fic):** This index is used to test the homogeneity of knowledge about the wild edible plants among the informants and is calculated according to Heinrich *et al.* (1998):

$$\text{Fic} = \text{Nur}^{-\text{Nt}} / \text{Nur}^{-1}$$

Where, *nur* refers to the number of use-reports for a particular use category and *nt* refers to the number of taxa used for a particular use category by all the informants. Fic values are low (near 0) if plants are chosen randomly or if there is no exchange of information about their use among informants, and approach one (1) when there is a well-defined selection criterion in the community and/or if information is exchanged between informants (Gazzaneo *et al.* 2005; Sharma *et al.* 2012).

**Cultural importance index (CI):** This index determines the cultural importance and significance of a species as source of wild food and is calculated after Tardio and Pardo (2008) as below:

$$\text{CI} = \sum_{u=u_1}^{u-NC} \cdot \sum_{i=i_1}^{iN} \text{UR}_{ui} / N$$

CI index can also be seen as the sum of the proportion of informants that mention each species use. This additive index takes into account not only the spread of the use (number of informants) for each species but also diversity in usage. The theoretical maximum value of the index is the total number of different use-categories (NC), reached in the unlikely case that all the informants would mention the use of the species in all the use-categories considered in a survey.

## RESULTS

A total of 130 plant species belonging to 104 genera and 52 families served as wild food in Kishtwar district (Table 1; Figure 2). Most represented plant genus was *Rubus* with 6 species followed by *Allium* and *Rumex* with 3 species each. Maximum species are contributed by Rosaceae (14 species) followed by Apiaceae and Polygonaceae (9 species each), Fabaceae (8 species) and Asteraceae and Brassicaceae (7 species each). Herbaceous species (85 species) is a life form which contributed maximum number followed by shrubs (24 species), trees (19 species) and climbers (2 species) (Figure 3) as wild plant species. People in Kishtwar consume leaves of 49 species fruits of 42 species, root and complete shoot of 10 each, seeds of 10, flowers of 6, bulb of 4, tuber of 3, bark of 2 and rhizome of 1 plant species (Figure 4).

**Table 1.** Edible usage and cultural index of wild edible plants of district Kishtwar.

Botanical name [Family]	Local name	Habit	Part used	Uses	CI
<i>Aesculus indica</i> (Wall. ex Cambess.) Hook.	Bankhod	T	Fruit	Nuts are processed into flour and mixed with Barley flour to make traditional bread called "Khamerey" (12) *	0.15
<i>Allium atropurpureum</i> Waldst. & Kit. [Amaryllidaceae]	Wanpraan	H	Leaf	Leaves are used as spice in vegetable (10)	0.13
<i>Allium humile</i> Kunth [Amaryllidaceae]	Jangli pyaz, Kuthe, Shauth	H	Leaf, Bulb	Leaves are used for making vegetable, either with other vegetables or separately (18). Bulb is used as spices (15).	0.42
<i>Allium roylei</i> Stearn [Amaryllidaceae]	Bazun	H	Leaf	Dried leaves used as spices (28)	0.36
<i>Amaranthus cruentus</i> L. [Amaranthaceae]	Seol	H	Seed, Leaf	Seeds are cooked as pudding (Kheer) (13) and leaves are eaten as vegetable (23).	0.46
<i>Amaranthus viridis</i> L. [Amaranthaceae]	Zerar	H	Leaf, Shoot	Young shoots and leaves are cooked as vegetable (26).	0.33
<i>Anethum graveolens</i> L. [Apiaceae]	Soa	H	Seed	Seeds are used as spice and condiment (12).	0.15
<i>Angelica glauca</i> Edgew. [Apiaceae]	Chorai	H	Root	Roots are used as spice and condiments (14).	0.18
<i>Apteranthes tuberculata</i> (N.E.Br.) Meve & Leide [Apocynaceae]	Charungli	S	Tuber	Tubers are cooked and also pickled for winter consumption (25).	0.32
<i>Arenaria nevadensis</i> Boiss. & Reut. [Caryophyllaceae]	Chiki	H	Leaf	Tender leaves are cooked as vegetables (18).	0.23
<i>Arisaema propinquum</i> Schott [Araceae]	Jamushung	H	Bulb	Bulbs used for preparation of local wine (9) *	0.12
<i>Arnebia euchroma</i> (Royle ex Benth) I.M.Jonst. [Boraginaceae]	Aamokh	H	Root	Roots used to make soups and stews (20) *	0.26
<i>Arnebia guttata</i> Bunge [Boraginaceae]	Demokh	H	Root	Roots used to make soups and stews (12). *	0.15
<i>Astragalus chlorostachys</i> Lindl. [Fabaceae]	Aiste-Kachh	H	Fruit	Fruits eaten raw (21).	0.27
<i>Berberis aristata</i> DC. [Berberidaceae]	Khumlai	S	Fruit	Fruit is edible (38).	0.49

Botanical name [Family]	Local name	Habit	Part used	Uses	CI
<i>Berberis lycium</i> Royle [Berberidaceae]	Khumlai	S	Fruit	Fruits are edible once turned black (40).	0.51
<i>Bergenia ciliata</i> (Haw.) Sternb. [Saxifragaceae]	Lau	H	Leaf	Leaves are used for making fritters (Pakora) (14).	0.18
<i>Betula utilis</i> D.Don [Betulaceae]	Bhojpatr,	T	Bark	Powder of bark used for preparing tea (11). *	0.14
<i>Bistorta amplexicaulis</i> (D.Don) Greene [Polygonaceae]	Remu	H	Root	Roots used as a tea substitute (7).	0.09
<i>Bupleurum falcatum</i> L. [Apiaceae]	Jeeraghas	H	Seed	Seeds are used as spice (17).	0.22
<i>Cannabis sativa</i> L. [Cannabaceae]	Bhang	H	Leaf	Leaves are used in sedative drinks (26).	0.33
<i>Capsella bursa-pastoris</i> (L.) Medik. [Brassicaceae]	Khathkram	H	Leaf	Leaves are cooked as vegetable (13).	0.17
<i>Cardamine hirsuta</i> L. [Brassicaceae]	Kukdi	H	Leaf	Tender leaves are used for making vegetables (9).	0.12
<i>Carum carvi</i> L. [ Apiaceae]	Makoh-zeera	H	Seed	Seeds are used as spices (20).	0.26
<i>Cassiope fastigiata</i> (Wall.) D.Don [Ericaceae]	Tolo	H	Flower	Dried flowers are used for making tea (8).	0.1
<i>Celosia argentea</i> L. [Amaranthaceae]	-	H	Leaf	Leaves are cooked as vegetable (16).	0.21
<i>Celtis australis</i> L. [Cannabaceae]	Khidik	T	Fruit, Seed	Ripe fruits eaten raw (10) and ground to prepare flour (14)	0.31
<i>Centaurea iberica</i> Trevir. ex Spreng. [Asteraceae]	Krotzkond	H	Leaf	Tender leaves are eaten as vegetable (11).	0.14
<i>Chaerophyllum reflexum</i> Lindl. [Apiaceae]	Nyoch	H	Root	Roots are eaten as salad (8) and vegetable (10).	0.23
<i>Chaerophyllum villosum</i> Wall. ex DC. [Apiaceae]	Nyoch	H	Root	Roots are eaten as salad (6) and vegetable (6).	0.15
<i>Chenopodium album</i> L. [Amaranthaceae]	Bajarbhang	H	Leaf	Leaves are cooked as vegetable (15).	0.19
<i>Cicer songaricum</i> Stephan ex DC. [Fabaceae]	Seri-jriboo	H	Fruit	Unripe legumes are cooked as vegetable (7).	0.09
<i>Cichorium intybus</i> L. [Asteraceae]	Kasini	H	Shoot	Tender plants are cooked as vegetable (8).	0.1
<i>Cirsium arvense</i> (L.) Scop. [Asteraceae]	Kandmool	H	Root	Roots are eaten raw (5).	0.06
<i>Codonopsis ovata</i> Benth. [Campanulaceae]	Ludut	H	Root	Root are cooked as vegetable (6).	0.08
<i>Colocasia esculenta</i> (L.) Schott [Araceae]	Alvathur	H	Leaf	Leaves are cooked as vegetable (10).	0.13
<i>Commelina benghalensis</i> L. [Commelinaceae]	Chura	H	Shoot	Plant used as vegetable (8) and to make fritters (8).	0.21
<i>Coriaria nepalensis</i> Wall. [Coriariaceae]	Hang	S	Fruit	Fruits edible (6).	0.08
<i>Cornus macrophylla</i> Wall. [Cornaceae]	Khagsoo	T	Fruit	Ripe fruits are eaten raw (12).	0.15

Botanical name [Family]	Local name	Habit	Part used	Uses	CI
<i>Corylus avellana</i> L. [Betulaceae]	Thanki	T	Fruit	Kernels are edible (23).	0.29
<i>Corylus jacquemontii</i> Decne. [Betulaceae]	Thanki	T	Fruit	Kernels are edible (26).	0.33
<i>Cotoneaster microphyllus</i> Wall. ex Lindl. [Rosaceae]	Reunsh	S	Fruit	Ripe fruits are eaten (18).	0.23
<i>Crataegus songarica</i> K.Koch [Rosaceae]	Khring	T	Fruit	Fruit is edible (13).	0.17
<i>Crucihimalaya himalaica</i> (Edgew.) Al-Shehbaz, O'Kane & R.A.Price [Brassicaceae]	Sikiang	H	Leaf	Tender leaves are washed, cut, boiled and fried to make vegetable (6).	0.08
<i>Daphne gnidioides</i> Jaub. & Spach [Thymelaeaceae]	Chikoh	S	Fruit	Ripe fruits are used for making local wine (9).*	0.12
<i>Debregeasia saeneb</i> (Forssk.) Hepper & J.R.I.Wood [Urticaceae]	Tushiari,	S	Fruit	Ripe fruits are eaten raw (8).	0.1
<i>Dioscorea deltoidea</i> Wall. ex Griseb. [Dioscoreaceae]	Shingli	C	Tuber	Tubers cut into slices, tied in cloth and kept in running water in streams or riverbeds overnight; these are then boiled like potato and eaten (6) *; tubers sometimes roasted in low fire to eat (9)	0.19
<i>Diospyros lotus</i> L. [Ebenaceae]	Amlok	T	Fruit	Fruits eaten raw (17).	0.22
<i>Diplazium esculentum</i> (Retz.) Sw. [Aspleniaceae]	Vani/Dhed	H	Leaf	Fronds cooked as vegetable (46).	0.59
<i>Diplazium maximum</i> (D.Don) C.Chr. [Aspleniaceae]	Kakhish	H	Leaf	Young leaves and fronds cooked as vegetable (31).	0.4
<i>Dipsacus inermis</i> Wall. [Caprifoliaceae]	Wapal hakh	H	Leaf	Leaves cooked as vegetable (15).	0.19
<i>Elaeagnus umbellata</i> Thunb. [Elaeagnaceae]	Goain	S	Fruit	Fruits edible (10)	0.13
<i>Elwendia persica</i> (Boiss.) Pimenov & Kljuykov [Apiaceae]	Krishun Zeur	H	Seed	Seeds used as spice and condiment (46)	0.59
<i>Ephedra gerardiana</i> Wall. ex Klotzsch & Garcke [Ephedraceae]	Cheldum	H	Fruit	Ripe fruits are sweet and consumed by Shepherds when they go to forest with their sheep (21).	0.27
<i>Equisetum arvens</i> L. [Equisetaceae]	Paccu	H	Shoot	Young shoots are consumed raw (13).	0.17
<i>Eremurus himalaicus</i> Baker [Asphodelaceae]	Hulla	H	Leaf	Leaves cooked as vegetable (14).	0.14
<i>Erodium tibetanum</i> Edgew. & Hook.f. [Geraniaceae]	Tikziang	H	Leaf	Tender leaves are used for making vegetable (9).	0.12
<i>Ferula jaeschkeana</i> Vatke [Apiaceae]	Hing	H	Leaf	Tender leaves and shoots are used as vegetable (18). Latex is used as spice (32).	0.64

Botanical name [Family]	Local name	Habit	Part used	Uses	CI
<i>Ficus palmata</i> Forssk. [Moraceae]	Fag	T	Fruit	Fruits are edible (28).	0.36
<i>Fragaria nubicola</i> (Lindl. ex Hook.f.) Lacaíta [Rosaceae]	Ingdach	H	Fruit	Fruit is edible (23), roots used as tea substitute (10).	0.44
<i>Fritillaria cirrhosa</i> D.Don [Liliaceae]	Sheetkar	H	Bulb	Bulb eaten raw (6).	0.08
<i>Gagea lutea</i> (L.) Ker Gawl. [Liliaceae]	-	H	Leaf, Bulb	Leaves are cooked as vegetables (7), while bulb is used as condiment (7).	0.18
<i>Heracleum candicans</i> Wall. ex DC. [Apiaceae]	Patrala	H	Root	Raw roots are eaten (5).	0.06
<i>Himalaiella heteromalla</i> (D.Don) Raab-Straube [Asteraceae]	Shublut	H	Root	Roots eaten raw (6).	0.08
<i>Humulus lupulus</i> L. [Cannabaceae]	Hops	C	Flower	Flowers are dried and used for making local wine (13).*	0.17
<i>Impatiens glandulifera</i> Royle [Balsaminaceae]	Phutong	S	Seed	Seeds are eaten raw (10).	0.13
<i>Juglans regia</i> L. [Juglandaceae]	Dun	T	Fruit	Kernels edible (28), catkins cooked as vegetable (12).	0.51
<i>Koenigia alpina</i> (All.) T.M.Schust. & Reveal [Polygonaceae]	Tsokladar	H	Leaf	Tender leaves are used as vegetable (10).	0.13
<i>Lathyrus aphaca</i> L. [Fabaceae]	Jungli matar	H	Leaf, Fruit	Young leaves are eaten as vegetable (13) and fruits and seeds are eaten raw (18).	0.41
<i>Lepidium sativum</i> L. [Brassicaceae]	Jungli matar	H	Leaf	Young leaves or plant cooked as vegetable (8).	0.1
<i>Lepidium virginicum</i> L. [Brassicaceae]	Jungli matar	H	Shoot	Young shoot occasionally taken as vegetable (8).	0.1
<i>Lonicera angustifolia</i> Wall. ex DC. [Caprifoliaceae]	Sagtso	S	Fruit	Ripe fruits are eaten raw (6).	0.08
<i>Malva neglecta</i> Wallr. [Malvaceae]	Soc hal	H	Leaf	Leaves cooked as vegetable (28).	0.36
<i>Medicago polymorpha</i> L. [Fabaceae]	Ispit	H	Leaf	Tender leaves used as vegetable (15).	0.19
<i>Medicago sativa</i> L. [Fabaceae]	Ispit	H	Seed	Sprouted seeds are eaten as vegetable (12).	0.15
<i>Melanoseris lessertiana</i> (DC.) Decne. [Asteraceae]	Gundula	H	Leaf	Fresh leaves are eaten as vegetable after boiling, older leaves are parboiled (8).	0.1
<i>Mentha longifolia</i> (L.) L. [Lamiaceae]	Jangli Putna	H	Leaf	Leaves used as spice and condiment (10) and in preparation of <i>chutney</i> (11).	0.27
<i>Mentha spicata</i> L. [Lamiaceae]	Putna	H	Leaf	Leaves used as spice and condiment (12) and preparation of <i>chutney</i> (16).	0.36
<i>Morus alba</i> L. [Moraceae]	Tul	T	Fruit	Ripe fruits are eaten raw (34).	0.43

Botanical name [Family]	Local name	Habit	Part used	Uses	CI
<i>Morus nigra</i> L. [Moraceae]	Tul	T	Fruit	Fruit is edible (12).	0.15
<i>Nasturtium officinale</i> W.T.Aiton [Brassicaceae]	Nagbibir	H	Leaf	Leaves are cooked as vegetable (29).	0.37
<i>Origanum vulgare</i> L. [Lamiaceae]	Marzanjosh / Wanbibir	H	Leaf	Leaves and young shoot tips used as spice (14).	0.18
<i>Orobanche alba</i> Stephan ex Willd. [Orobanchaceae]	Subzgul	H	Shoot	Plant used as vegetable (11).	0.14
<i>Oxalis acetosella</i> L. [Oxalidaceae]	Dangchuch	H	Leaf	Leaves eaten raw or added to cooked food to give astringent taste (3).	0.04
<i>Oxalis corniculata</i> L. [Oxalidaceae]	Dangchuch	H	Leaf	Leaves eaten raw or added to cooked food (11).	0.14
<i>Oxyria digyna</i> (L.) Hill [Polygonaceae]	Shoop	H	Leaf	Leaves pleasantly sour in taste and refreshing are eaten raw (8) and also used to make <i>chutney</i> (8).	0.21
<i>Phytolacca acinosa</i> Roxb. [Phytolaccaceae]	Arail	H	Leaf	Leaves are cooked as vegetable (5).	0.06
<i>Pinus gerardiana</i> Wall. ex D.Don [Pinaceae]	Fita	T	Seed	Seeds are edible (35).	0.45
<i>Plantago lanceolata</i> L. [Plantaginaceae]	Gul	H	Leaf	Tender leaves are used as vegetable (15).	0.19
<i>Podophyllum hexandrum</i> Royle [Berberidaceae]	Bankakdi	H	Fruit	Ripe fruits are eaten raw by shepherds (11).	0.14
<i>Polygonum aviculare</i> L. [Polygonaceae]	Endrani	H	Leaf	Tender leaves are used as vegetable (9).	0.12
<i>Potentilla indica</i> (Andrews) Th.Wolf [Rosaceae]	Sarpingdakh	H	Fruit	Fruit is edible (18).	0.23
<i>Prunus armeniaca</i> L. [Rosaceae]	Cheir	T	Fruit	Fruits are edible (31).	0.4
<i>Prunus cornuta</i> (Wall. ex Royle) Steud. [Rosaceae]	Zamb	T	Fruit	Fruits are edible (26).	0.33
<i>Punica granatum</i> L. [Lythraceae]	Dan	T	Fruit	Fruit is edible and used to make <i>chutney</i> (27).	0.35
<i>Pyrus paschia</i> Buch.-Ham. ex D.Don [Rosaceae]	Naakh	T	Fruit	Fruits edible (26).	0.33
<i>Rheum australe</i> D. Don [Polygonaceae]	Lachu	H	Shoot	Young shoots are cooked as vegetables (24) and also used for making <i>chutney</i> (7).	0.4
<i>Rheum webbianum</i> Royle [Polygonaceae]	Lachu	H	Shoot	Young shoots are cooked as vegetables (17) and also used for making <i>chutney</i> (5).	0.28
<i>Rhododendron arboreum</i> Sm. [Ericaceae]	Pragu	S	Flower	Fresh flowers are eaten raw (7) and juice is also extracted from them (16).	0.29
<i>Rhododendron campanulatum</i> D.Don [Ericaceae]	Burshu	S	Flower	Flowers are used for making <i>chutney</i> (7) & juices (7).	0.18

Botanical name [Family]	Local name	Habit	Part used	Uses	CI
<i>Robinia pseudoacacia</i> L. [Fabaceae]	Robinia	T	Flower	Floral buds are boiled, squeezed and fried to make vegetable (5).	0.06
<i>Rosa webbiana</i> Wall. ex Royle [Rosaceae]	Jungli gulab	S	Flower	Petals used in making drinks (13).	0.17
<i>Rubus biflorus</i> Buch.-Ham. ex Sm. [Rosaceae]	Onchh	S	Fruit	Sweet fruits are eaten raw when ripe (12).	0.15
<i>Rubus ellipticus</i> Sm. [Rosaceae]	Onchh	S	Fruit	Fruits are eaten raw (28).	0.36
<i>Rubus fruticosus</i> L. [Rosaceae]	Onchh	S	Fruit	Sweet fruits are eaten raw (7).	0.09
<i>Rubus hoffmeisterianus</i> Kunth & C.D.Bouche [Rosaceae]	Onchh	S	Fruit	Fruits are eaten raw (7).	0.09
<i>Rubus niveus</i> Thunb. [Rosaceae]	Onchh	S	Fruit	Fruits are eaten raw when ripe (15).	0.19
<i>Rubus pedunculatus</i> D.Don [Rosaceae]	Onchh	S	Fruit	Sweet fruits are eaten raw when ripe (3).	0.04
<i>Rumex acetosa</i> L. [Polygonaceae]	Tsoktsin	H	Leaf	Leaves are cooked as vegetable (9).	0.12
<i>Rumex dentatus</i> L. [Polygonaceae]	Ambli	H	Leaf	Leaves are cooked as vegetable (8).	0.1
<i>Rumex nepalensis</i> Spreng. [Polygonaceae]	Habul	H	Leaf	Leaves are cooked as vegetable (6).	0.08
<i>Silene baccifera</i> (L.) Durande [Caryophyllaceae]	Shelich	H	Leaf	Tender leaves are cooked and eaten with rice (6).	0.08
<i>Solanum nigrum</i> L. [Solanaceae]	Kambai	H	Fruit	Fruit is edible (10).	0.13
<i>Sonchus asper</i> (L.) Hill [Asteraceae]	Dudhand	H	Leaf	Leaves are cooked as vegetable (5).	0.06
<i>Taraxacum officinale</i> F.H.Wigg. [Asteraceae]	Hand	H	Leaf	Leaves are cooked as vegetable (8).	0.1
<i>Taxus wallichiana</i> Zucc. [Taxaceae]	Pustil	T	Bark	Bark is used as substitute for tea (17).	0.22
<i>Thymus linearis</i> Benth. [Lamiaceae]	Piplichhi	H	Leaf	Fresh leaves are used for making vegetables (15).	0.19
<i>Thymus mongolicus</i> (Roniger) Roniger [Lamiaceae]	Ban-ajwain	H	Shoot	Aerial parts are used as spice (5).	0.06
<i>Trifolium repens</i> L. [Fabaceae]	Chopati	H	Shoot	Used as vegetable (13).	0.17
<i>Trillium govanianum</i> Wall. ex D.Don [Melanthiaceae]	Nagchattri	H	Leaf	Leaves cooked as vegetable (15).	0.19
<i>Tulipa clusianai</i> Redoute [Liliaceae]	-	H	Tuber	Tubers edible (6).	0.08
<i>Turritis glabra</i> L. [Brassicaceae]	-	H	Leaf	Tender leaves are used to make vegetables (4).	0.05
<i>Typha domingensis</i> Pers. [Typhaceae]	Petz	H	Tuber	Rhizome is eaten as vegetable (6).	0.08
<i>Urtica dioica</i> L. [Urticaceae]	Soy	H	Leaf	Leaves are boiled in water for about ten minutes and then cooked with salt and chili powder (18).	0.23

Botanical name [Family]	Local name	Habit	Part used	Uses	CI
<i>Viburnum grandiflorum</i> Wall. ex DC. [Viburnaceae]	Kullam	S	Fruit	Fruit is edible (22).	0.28
<i>Vicia faba</i> L. [Fabaceae]	Jungli matar	H	Seed	Seeds and fruits are edible (15).	0.19
<i>Zanthoxylum armatum</i> DC. [Rutaceae]	Timbru	S	Fruit	Fruits are used to make chutney (16).	0.21
<i>Ziziphus jujuba</i> Mill. [Rhamnaceae]	Bair	S	Fruit	Fruits eaten raw (27).	0.35
<i>Ziziphus oxyphylla</i> Edgew. [Rhamnaceae]	Bair	S	Fruit	Fruit is edible (22).	0.28

H= Herb; S= Shrub; T= Tree and C= Climber.

\* = new records on local traditional uses

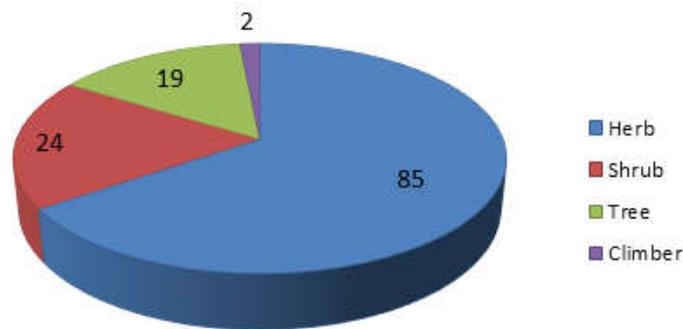
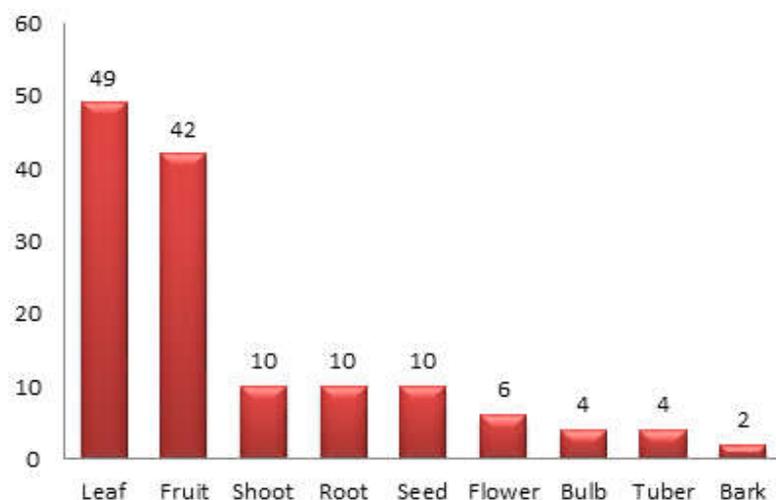


Figure 2. Habit-groups of wild edible plants of district Kishtwar

Table 2. Use reports and Factor informant consensus (Fic) of various categories of wild edible plants of district Kishtwar

S. No.	Category	Number of use reports (Nur)	Number of taxa (Nt)	Fic
1.	Bread and pudding	39	3	0.95
2.	Vegetables	734	56	0.92
3.	Spice and Condiments	246	15	0.94
4.	Beverages	146	12	0.92
5.	Soup	32	2	0.97
6.	Raw	814	51	0.94
7.	Fritters	37	3	0.94
8.	Chutney	97	8	0.93

*Ferula jaeschkeana* was observed to be most important wild edible plant species in the study area with high cultural importance index (CI= 0.64) followed by *Elwendia persica* and *Diplazium esculenta* (CI= 0.59 each) and *Berberis lycium* and *Juglans regia* (CI= 0.51 each) (Table 1). The species with maximum CI values are most used plant species as wild edible plant in the study area. Among the documented wild edible plants 56 were cooked as vegetable, 51 were eaten raw, 15 were used as spice and condiments and 12 were used to prepare beverages (local



**Figure 3.** Plant parts of wild edible plants of district Kishtwar

wine, tea and juices). Factor informant consensus (Fic) was greater than 0.90 for all the categories and which determine the maximum homogeneity of knowledge about the usage of wild edible plant species in the study area (Table 2).

## DISCUSSION

As major population of our country India resides in villages and far-flung areas, so wild edible plants are the noteworthy source of food in these areas as a source of nutrition. Women folks are the main nutrition provider of maximum of the village families. In the present study females (57.7%) possessed maximum knowledge of wild edible plants as compared to males (42.3%). The females of the villages during every collect different wild edible plant species which are available during different seasons. They possess more knowledge about wild edible plants as compared to male folks as they are directly associated with the household and food preparation activities (Junsongduang *et al.* 2014). Singh *et al.* (2016) have reported 111 wild edible plants from Kashmir Himalaya whereas Thakur *et al.* (2017) have recorded 50 plant species from tribal areas of Western Himalaya as wild edible plants. Bhatia *et al.* (2018) have reported 90 species from Udhampur district of Jammu and Kashmir whereas, in present study 130 plant species are reported as wild edible foods from the district Kishtwar of UT of J&K. In study area Rosaceae is the most dominant family (Thakur *et al.* 2017; Singh *et al.* 2016; Menendez-Baceta *et al.* 2015; Geng *et al.* 2016). Maximum 56 plant species in the present study are cooked as vegetable and also have maximum CI values. Thakur *et al.* (2017), Misra *et al.* (2008), Singh *et al.* (2016) and Kumar and Hamal (2009) have also reported maximum vegetables as the source of wild food with higher CI values.

A total of 6 species (*Oxyria digyna*, *Punica granatum*, *Rheum australe*, *Rheum webbianum*, *Rhododendron campanulatum* and *Zanthoxylum armatum*) in the study area are used in the preparation of chutney which is ready to eat food for instant consumption. Chutney is a part of daily meal in the study area especially during summer season as it is a very good appetizer, antigastric, antispasmodic and improves digestion (Rao *et al.* 2015; Bhatia *et al.* 2014). Owing to aromatic properties of *Carum carvi*, *Elwendia persica*, *Ferula jaeschkeana*, *Mentha longifolia*, *Mentha spicata*, *Origanum vulgare* and *Thymus mongolicus* are added to vegetables and pulses as a source of spice and condiments in district Kishtwar. Majority of these spices like *Elwendia persica*, *Carum carvi*,

*Mentha longifolia* and *Mentha spicata* are used to cure stomachache, indigestion and other digestive problems (Thakur & Dutt 2019; Saini & Reddy 2013; Thakur *et al.* 2020b).

The local people in district Kishtwar possess rich traditional knowledge about the use of plants as a source of medicine especially against gastrointestinal ailments (Thakur *et al.* 2020b). Likewise, in present species the Fic values greater than 0.92 revealed once again that there is good homogeneity of knowledge among the local people in district Kishtwar about the use of wild plants as a source of food.

## CONCLUSION

The current study revealed that the oral traditional knowledge about the use of wild edible plants is still in practice among the local populace of district Kishtwar. Rich plant diversity as a source of wild food with greater categorical consensus for their local usage also supports this account. The people in the study area are dependent on the wild resources not only for their food and nutrition but also for income generation. These plant species are greatly used in the Himalayan region which is an outcome of the occurrence of similar traditions and cultures in the region. Out of 130 plant species reported as edible ones eight species i.e., *Aesculus indica*, *Arisaema propinquum*, *Arnebia euchroma*, *Arnebia guttata*, *Betula utilis*, *Daphne gnidioides*, *Dioscorea deltoidea* and *Humulus lupulus* are exclusively used for food and drink purposes by the people of Kishtwar district and are reported first time. The current study also reveals that sap of *Ferula jaeschkeana*, seeds of *Elwendia persica* and fronds of *Diplazium esculenta* have significant cultural importance index in the region and consumed on regular basis. Further, all the dietary preparations made by the people using 130 plant species have shown high factor informant consensus between 0.92 to 0.97, which determines the homogeneity of traditional knowledge on usage of wild edible plants among the informants in the region. High value of this index also determines the undeviating transfer of the oral traditional knowledge from generation to generation in Kishtwar district. The persistence of knowledge for the consumption of conventional foods is a powerful tool in the conservation of ethnic identity and cultures and plant diversity in one or the other way. So, it is very much important that national and international authorities recognize the contribution of rural communities to the diversification of traditional knowledge on human nutrition. Higher authorities need to work in collaboration with local folk for the reappraisal of folk knowledge on wild edible plants which will be helpful in eradication poverty from global level.

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