

## **Ethnomedicinal and Ceremonial Plants of Kukshow- Veiled Village of the Trans-Himalayan Cold Desert of Ladakh**

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### **Abstract**

Cold desert landscape of Ladakh holds endemic and unique biodiversity of ethnobotanically important medicinal plants. These medicinal plants have been regarded as rich resources of traditional medicines since the advent of human civilization. As a result of rugged terrain, inaccessible landscape, harsh climate and lack of medical facilities in the region, the indigenous community is totally dependent on the local flora for healing. Study was based on seasonal reconnaissance surveys in years 2021 and 2022. 35 villagers were questioned based on semi-structured questionnaire to record ethnobotanical information. It enumerates 32 important and unique plant species. Asteraceae (6 species) is the most dominant family followed by Polygonaceae (3 species), Scrophulariaceae (3 species), Apiaceae, Fabaceae, Ranunculaceae and Rosaceae, each representing 2 plants; whereas the other families were represented by single taxa. The habit of the plants comprised a majority of 27 herbs, 3 shrubs and 2 trees. 15 plants among them were exclusively utilized for medicinal purpose only. Enumeration of the medicinal plants along with their usage will act as the baseline data for further chemical investigation of plant constituents in pharmacological industries. This current information on plants used by native communities could be promulgated to the new generation for awareness and sustainable utilization of plants. The festivity with which they celebrate the flowers in spring time is a valuable heritage and conservation ethos, which needs to be understood by the new generations.

**Keywords:** Documentation, Medicinal plants, Sustainable utilization, Traditional knowledge

### **Introduction**

The Indian Himalayan Region (IHR) has been considered as a crucial hotspot for the biological diversity (Myers et al., 2000). Union Territory of Ladakh and Lahaul-Spiti region of Himachal Pradesh account for more than 90% area of Indian cold desert, the remaining 10% area lies in the states of Uttarakhand and Sikkim (Jishtu & Goraya, 2020; Saxena et al., 2011). The high altitude (2438 m to 7315 m), jarring natural environment of Ladakh is designated by extreme temperature (-30°C to +30°C), excessive radiation, strong winds, low precipitation (< 100 mm.yr<sup>-1</sup>), low humidity and massive desolate landscape, rough topography, steep and vertical glaciated slopes, minimum forest cover and shrunk pasture lands at high ascent (Chaurasia & Singh, 1996; Kumar et al., 2009). The region lying amidst the great Central Himalayas and the mountains encircling Tibetan plateau is often referred to as the “Dust Bowl of India” (Jishtu et al., 2003). Human settlements residing in these difficult

areas have stood secluded due to inaccessible terrain and discordant climatic conditions. As a result an eccentric culture and traditions were born and shaped in this region (Uniyal et al., 1973). Plants have been used by humans and this relationship has existed ever since the emergence of human civilization. Near about 350,000 plant species have been identified till date, out of which 35,000 are still being used worldwide for medicinal use and mere 0.5% have been chemically investigated (Comer & Debus, 1996). Traditional knowledge about plants and their association with man is generally passed verbally from one generation to another or is imbibed from their spiritual manuscripts (Buth & Navchoo, 1988; Malik et al., 2011a; Malik et al., 2011b). Ethnobotany is a multidisciplinary science that agrees with direct relationship between man and plants. The use of plants in restoring and healing is as old as man himself (Hedberg, 1987). Nonetheless, the cold arid areas lying in the Indian trans-Himalaya have not received adequate attention till date. Multitude ethnic and tribal groups with mosaic

culture domiciled in the remote and isolated parts of Ladakh offer a great scope for ethnobotanical studies. The trans-Himalayan community is no more cut off from urban settlements and, therefore, communal and cultural transformation has already begun. Consequently, the locals are shifting towards materialism and modernization (Norberg-Hodge, 1999). Before these fragile habitats (Chauhan et al., 2020; Kala & Manjrekar, 1999) are long lost due to destructive harvesting of medicinal plants, uncontrolled tourism and grazing pressure, it is essential to document this crumbling traditional knowledge and floristic attributes in this region. This study focuses on a remote, far flung Kukshow village of Kargil district of Ladakh. We have tried to document the local flora and traditional knowledge from the village of Kukshow for the very first time.

## Materials and Methods

### *Study area*

Kukshow village sits in the trans-Himalayan region, between the Zaskar and the Ladakh ranges of the cold desert area. It is an off road village which remains hidden from the world but still harbors a treasure house of unique flora along with its rich culture. Geographically, the village is located at an elevation of 3,472 m and lies between longitude and latitude of 34.44836°N and 76.62428°E respectively. The village is sparsely populated with nearly 432 people living in 57 households. The vegetation of this region is an admixture of more oasisitic vegetation and lesser of desert vegetation. Oasisitic vegetation mainly comprise of native species growing along the water streams in addition to some non-native flora along the cultivated fields while the desertic vegetation is made up of plants adapted to very scanty rainfall and extremes of temperature.

### *Methodology*

A number of primary and secondary sources were used to document the information of the study area. Primarily, a general reconnaissance of the study area to familiarize with the topographic features, broad vegetation types, floristic components and logistics was undertaken. The primary surveys comprised

of documenting floral wealth of the region. The survey was carried out during 2020-2021. A simple questionnaire was framed for the collection of data on ethnobotany. The villagers were interviewed and group discussions were also organized. Informal interactions were carried out with the inhabitants of the village, targeting elder folks in particular. Traditional knowledge in relation to the use of plants such as medicinal and ceremonial was documented. Majority of information was gathered from the elderly people as their experience in this context is more relevant. Usual methods of herbarium preparation as suggested by Jain & Rao (1993) were adopted during collection and processing of plant specimens collected during field surveys. Preliminary identification of the plant specimens and enumeration of information was done with the help of various floras and other published literature (Chaurasia & Singh, 1996; Gurmet & Stobgias, 2016; Jishtu & Goraya, 2020; Srivastava & Shukla, 2015; Stewart, 1916). Attempts have been made to adopt the most recent and correct nomenclature by referring to Plants of the world online ([www.plantsoftheworldonline.com](http://www.plantsoftheworldonline.com)). The herbarium specimen were deposited in the Himalayan Forest Research Institute, Shimla and the duplicate specimen will be deposited in DD Herbarium and National Institute on Sowa Rigpa (NISR), Leh.

## Results and Discussion

Over all 32 plant species were documented from the study area (Table 1) along with their diverse ethnomedicinal usage. The entire flora belonged to 19 families; most dominant family being Asteraceae (6 spp.) followed by Polygonaceae (3 spp.), Scrophulariaceae (3 spp.), Apiaceae, Fabaceae, Ranunculaceae and Rosaceae, each representing 2 plants; whereas the other families were represented by single taxa. Families with single taxa were namely Berberidaceae, Betulaceae, Boraginaceae, Campanulaceae, Capparidaceae, Elaeagnaceae, Geraniaceae, Lamiaceae, Orchidaceae, Solanaceae, Tamaricaceae and Zygophyllaceae (Figure 1). The habit of the plants comprised a majority of 27 herbs, 3 shrubs and 2 trees (Figure 2). Among them, 16 plant

species were entirely utilized as a whole whereas for other plants either bark (4), seeds (2), leaves and flowers (2) and various other plant parts such as fruits, wood, leaves, stems or flowers were used for various day to day purpose (Figure 3). Some of the important plants from the study area are *Aquilegia fragrans*, *Dactylorhiza hatagirea*, *Podophyllum*

*hexandrum*, *Betula utilis*, *Juniperus semiglobosa* and *Elagnus angustifolia* (Figure 4). *Dactylorhiza hatagirea*, *Podophyllum hexandrum* and *Betula utilis* have been named as Critically Endangered (CE), Endangered (EN) and Endangered (EN) respectively according to CAMP (Conservation Assessment Management Plan) Workshop, 2003.

**Table 1:** Details of plants enumerated from the study area

S.N.	Scientific name	Common name	Local name	Family	Habit	Habitat	Ethnobotanical importance	Part used	Collection no.
1	<i>Achillea millefolium</i> L.	Common Yarrow	Chuang	Asteraceae	Herb	Moist meadows, near cultivated fields	Leaves chewed for acute toothache and gum swelling. Tea prepared from the plant treats cold-cough. Poultice prepared from the plant is applied to cure skin infections.	Whole plant	HFRI-Herbarium 6419
2	<i>Koenigia tortuosa</i> (D.Don) T.M. Schust. & Reveal	Aconogonum	Nyalo	Polygonaceae	Herb	Open slopes	Treats dysentery and diarrhoea.	Roots	HFRI-Herbarium 6401
3	<i>Anaphalis triplinervis</i> (Sims) C.B. Clarke	Woolly pearly everlasting	Spra-rgod	Asteraceae	Herb	Dry rocky slopes	Heals wounds and epidemic fever and flowers collected for decoration in religious ceremonies.	Flowers, leaves, fruits	HFRI-Herbarium 6415
4	<i>Aquilegia fragrans</i> Benth.	Fragrant columbine	Cho-cho	Ranunculaceae	Herb	Moist places	Ornamental, cooked as vegetable, leaves are put in "lassi" (buttermilk) to make "Dantur" which is believed to cure stomach ailments.	Flowers	HFRI-Herbarium 6402
5	<i>Arnebia euchroma</i> (Royle ex Benth.) I.M. Johnston.	Ratanjot	Demok	Boraginaceae	Herb	Dry rocky and sandy slopes	Roots are used as hair tonic and the water extract from leaves and flowers treat fever.	Roots	HFRI-Herbarium 6404
6	<i>Arctium lappa</i> L.	Greater burdock	Shiking/Pizums	Asteraceae	Herb	Open slopes	Plant paste is applied to treat blisters, pimples and burns.	Whole plant	HFRI-Herbarium 6405
7	<i>Betula utilis</i> D.Don	Himalayan Birch	Stakpa/Bhooj	Betulaceae	Tree	Along water streams	Bark is burnt and mixed with water and sugar and it treat cold and cough. Bark paste is applied on the vaginal wall to expel the placenta and also in fractured bones. Tree is considered sacred.	Bark	HFRI-Herbarium 6407

S.N.	Scientific name	Common name	Local name	Family	Habit	Habitat	Ethnobotanical importance	Part used	Collection no.
8	<i>Bistorta affinis</i> (D. Don) Greene	Himalayan fleecy flower	Rambu	Polygonaceae	Herb	Open slopes	Treats dysentery and diarrhoea. Flowers are used in religious ceremonies.	Whole plant	HFRI-Herbarium 6414
9	<i>Bistorta macrophylla</i> (D. Don) Sojak	Large leaf knot-leaf	Pangram	Polygonaceae	Herb	Open slopes and cultivated fields	Strengthens body and treats diarrhoea.	Whole plant	HFRI-Herbarium 6406
10	<i>Capparis spinosa</i> L.	Caper bush	Kabra	Capparidaceae	Herb	Dry rocky slopes	Root bark is used as tonic and expectorant. The leaf poultice is used to relief gout pain. The fruits are useful against scurvy. The extract of the plant is also a constituent of Liv-52.	Whole plant	HFRI-Herbarium 6408
11	<i>Carum carvi</i> L.	Caraway	Kosnyot	Apiaceae	Herb	Cultivated fields and grassland	Seeds are used as condiment to flavour local dishes and increases appetite. Tea is prepared from flowers to treat fever and skin eruptions. Fruit is useful in treating amenorrhoea and worm infestation.	Whole plant	HFRI-Herbarium 6409
12	<i>Codonopsis clematidea</i> (Schrenk) C.B. Clarke	Clematis bonnet bell flower	Phak-phakmo	Campanulaceae	Herb	Cultivated fields and grassland	Flowers are eaten raw as they taste sweet and roots treat stomach-ache and enhance digestion.	Whole plant	HFRI-Herbarium 6410
13	<i>Dactylorhiza hatagirea</i> (D. Don) Soo	Spotted heart orchid	Angulakpa/Hathpanja/Salam panja	Orchidaceae	Herb	Moist grassy meadows	Roots used as nerve tonic, aphrodisiac while the root powder treats fever. Mucilage from root taken with water is nutritious and useful in treating diarrhoea and dysentery. It is also effective against urinary troubles.	Roots	HFRI-Herbarium 6411
14	<i>Echinops cornigerus</i> DC.	Globe thistle	Aczema	Asteraceae	Herb	Dry rocky slopes, grazing grounds	Entire plant treats general weakness, cold, cough and fever. Water extract used to get rid of skin eruptions. Leaf paste is applied to septic wounds and leaf powder cures jaundice.	Whole plant	HFRI-Herbarium 6412
15	<i>Elaeagnus angustifolia</i> Blanco	Russian olive	Sarsing	Elaeagnaceae	Shrub	Cultivated fields and along pathways	Oil is extracted from roots and is used as hair tonic. Fruit is edible.	Roots and fruit	HFRI-Herbarium 6413

S.N.	Scientific name	Common name	Local name	Family	Habit	Habitat	Ethnobotanical importance	Part used	Collection no.
16	<i>Euphrasia officinalis</i> L.	Eye bright	Kaukngch	Scrophulariaceae	Herb	Moist places	Infusion of dried herb treats conjunctivitis	Whole plant	HFRI-Herbarium 6403
17	<i>Geranium pratense</i> L.	Meadow Cranesbill	Gugchuk/ Spoldo	Geraniaceae	Herb	Stony and moist places	Leaf extract treats fever and dysentery. The boiled roots are applied as poultice to bruises.	Leaves and roots	HFRI-Herbarium 6428
18	<i>Heracleum pinnatum</i> C.B. Clarke	Pinnate leaved hogweed	Spru	Apiaceae	Herb	Along pathway	Roots treat inflammation and pain caused by fever. A constituent, xanthotoxin-A from the plant is used in sun tan lotion and posses anti-leucodermal properties.	Roots	
19	<i>Hyoscyamus niger</i> L.	Black Henbane	Lantang/ bazerbhang	Solanaceae	Herb	Along pathway and wastelands	Dried leaves and flowers smoked for hallucinations. Leaves and seeds are used as sedative. It is also used to get relief from spasms in the urinary tracts. Seeds are used to get relief from toothache.	Seeds	HFRI-Herbarium 6430
20	<i>Lancea tibetica</i> Hook.f. & Thomson	Chinese milkwort	Raikse/ Chagna	Scrophulariaceae	Herb	Moist places	Extract prepared from the plant is used as a tonic.	Whole plant	HFRI-Herbarium 6416
21	<i>Medicago lupulina</i> L.	Black medick	Bukshuk/ol	Fabaceae	Herb	Cultivated fields and along pathways	Treats cold, cough and fever and is also cooked as vegetable.	Whole plant	HFRI-Herbarium 6431
22	<i>Melilotus officinalis</i> (L.) Lam.	Yellow sweet clover	Gyasposdm anpa	Fabaceae	Herb	Cultivated fields and along pathways	Used to treat swelling and bacterial diseases	Roots, leaves and flowers	HFRI-Herbarium 6441
23	<i>Myricaria elegans</i> Royle	Elegant false tamarisk	Umbo	Tamaricaceae	Shrub	Sandy slopes and along water streams	Treats headache, stomach pain and diarrhoea.	Leaves and flowers	HFRI-Herbarium 6427
24	<i>Peganum harmala</i> L.	Wild Rue	Sepan	Zygophyllaceae	Herb	Open slopes and wastelands	The entire plant is used as an aphrodisiac, abortifacient and in syphilis. Seeds are narcotic and treat fever and stomach complaints.	Seeds	HFRI-Herbarium 6426
25	<i>Podophyllum hexandrum</i> Royle	Himalayan May Apple	Denmo-kushu	Berberidaceae	Herb	Moist places	The entire plant is used to treat gynaecological disorders and the ripe fruit treats high altitude sickness. Resin from the roots and rhizomes is used	Whole plant	HFRI-Herbarium 6425

S.N.	Scientific name	Common name	Local name	Family	Habit	Habitat	Ethnobotanical importance	Part used	Collection no.
							as purgative, heart tonic, vermifuge; also effective against allergy and skin inflammation.		
26	<i>Prunus armeniaca</i> L.	Armenian plum	Chuli	Rosaceae	Tree	Cultivated fields and along pathway	Oil is extracted from seeds and is a good hair tonic.	Fruit and seed	HFRI-Herbarium 6424
27	<i>Rosa webbiana</i> Wall. ex Royle	Wild Rose	Shia karpō	Rosaceae	Shrub	Rocky slopes and along pathways	Flowers used for ornamental purpose and used to make garlands and offered to local deity on "Snola" festival. Residue left after burning the stem is applied on skin rashes. Petals used to cure nasal bleeding and swelling. Fruits are edible and rich source of vitamin C.	Flowers, stem, fruits	HFRI-Herbarium 6423
28	<i>Stachys tibetica</i> Vatke	Tibetan wound wort	Yakzas/ Seigmanlo	Lamiaceae	Herb	Along pathway and rocky slopes	Tea made out of this plant reduces headache.	Whole plant	HFRI-Herbarium 6422
29	<i>Tanacetum dolichophyllum</i> (Kitam.) Kitam.	Long leaved Tansy	Kamchu	Asteraceae	Herb	Rocky slopes and along pathways	Dried leaves and flowers are source of essential oil. Dried leaves and flowers are used against intestinal worms. Leaf pill swallowed with water provides relief in stomach pain and indigestion. Root powder taken either with milk or tea provides relief from stomach pain.	Leaves and flowers	HFRI-Herbarium 6421
30	<i>Taraxacum officinale</i> F.H.Wigg.	Dandelion	Han/ Kanphul	Asteraceae	Herb	Moist places	Health tonic is also known to be prepared from the plant.	Whole plant	HFRI-Herbarium 6420
31	<i>Thalictrum foliolosum</i> DC.	Leafy Meadow-Rue	Bhonkshna	Ranunculaceae	Herb	Cultivated fields and moist places	Used to treat bacterial diseases.	Whole plant	HFRI-Herbarium 6418
32	<i>Verbascum thapsus</i> L.	Common Mullein	Serbi/Jungl itambaku	Scrophulariaceae	Herb	Open slopes and wastelands	Leaves smoked for asthma and sore throat. Small pills of crushed leaves given to treat constipation. Infusion of the plant given orally as an antidote against snakebite. Oil obtained from flowers is used to treat ear ache.	Whole plant	HFRI-Herbarium 6417

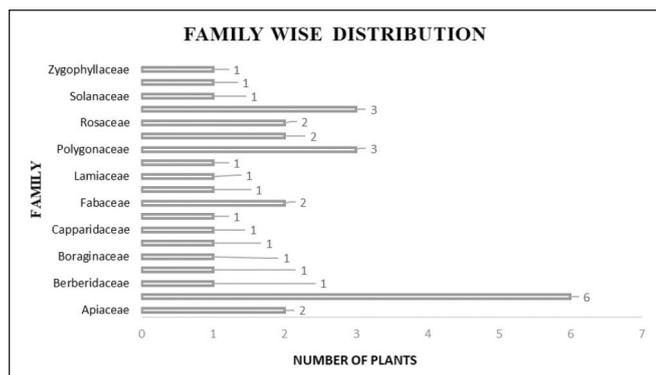


Figure 1: Family wise representation of the flora

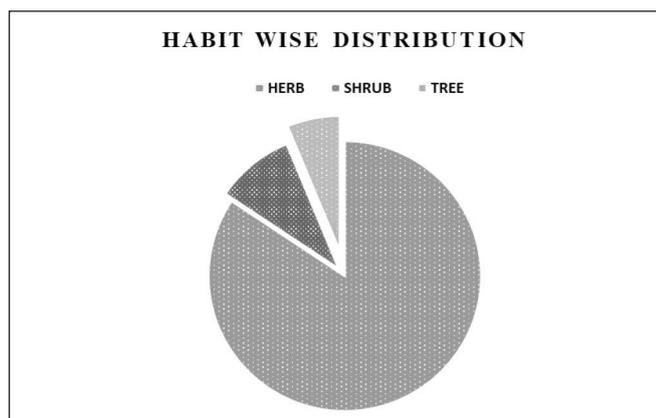


Figure 2: Habit wise representation of flora from study area

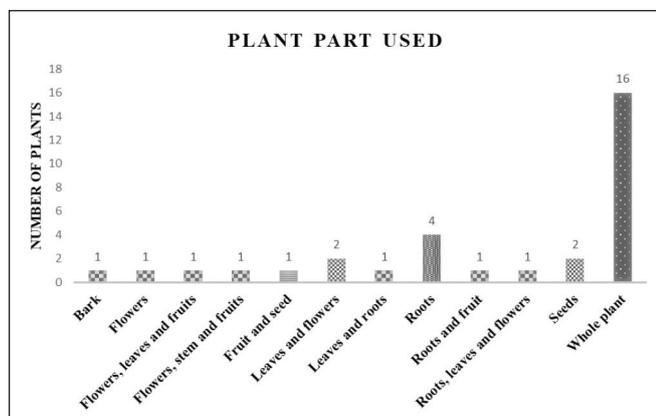


Figure 3: Different plant parts used locally by the community

### Role of Kukshow community in plant conservation

*Snola* (Annual Ceremonial Festival of Flowers) is much-awaited celebration at Kukshow and falls generally on 16-17 July each year. It is mainly a Buddhist festival which, however, is equally important to the majority Muslim community of the villages, who readily participate and enjoy the activities. Village portrays a rare epitome of

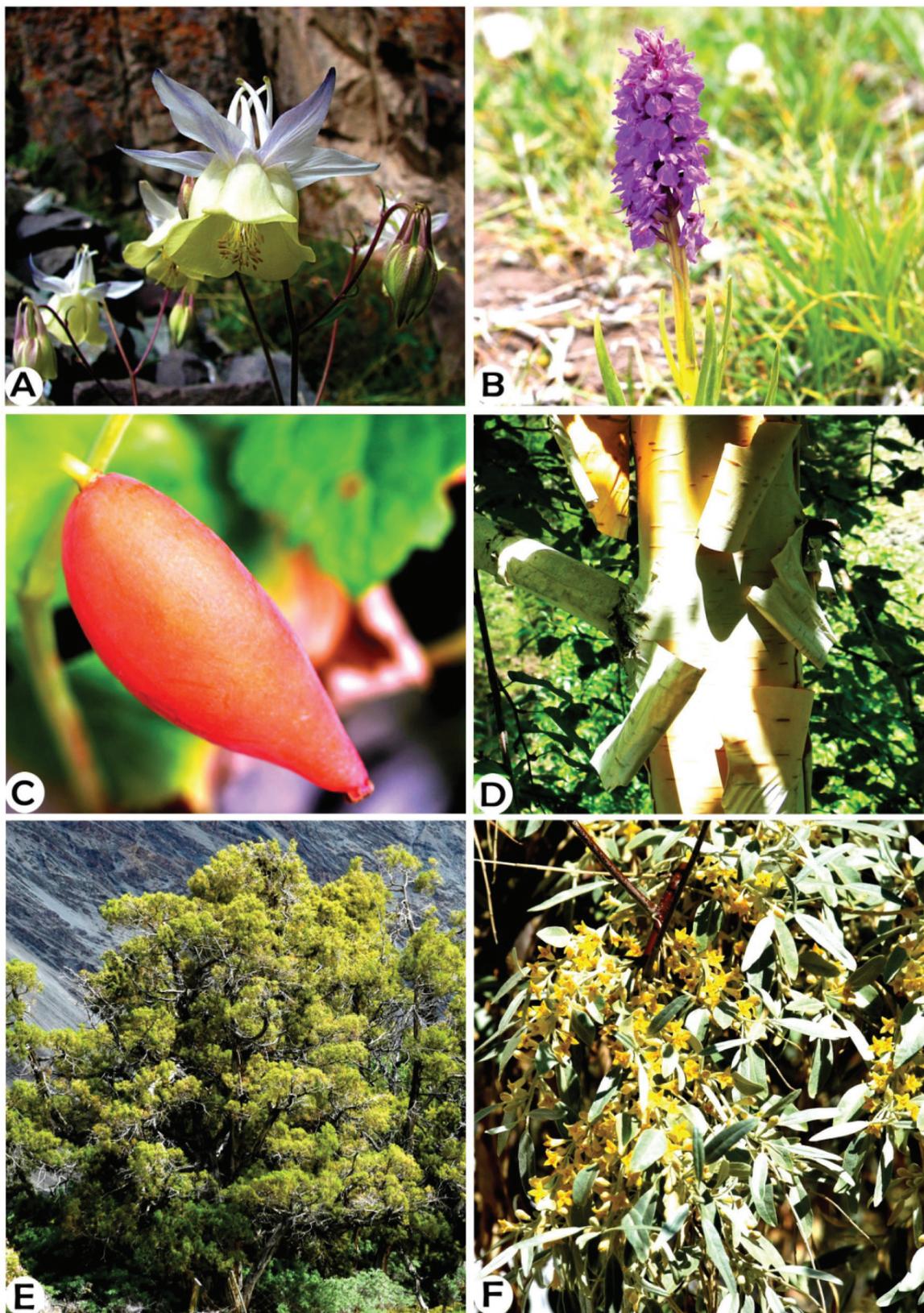
harmony as the two residing religious communities share cordial relations amongst each other. More so, the place of worship in the village is also shared with one half a Gompa and the other half Masjid. Elders informed that the religious communities were formed much later and that there was initially no specific religious community in the village. *Snola* is an exuberant and colorful festival for the celebration of the native wildflowers with which they share an intimate relation. This unique festival is celebrated with rich feasting and joyful dancing.

### Conclusion

This short term study adds to the floristic diversity of the cold desert region and the precious ethnobotanical data contributes to the fading knowledge. It brings forth, Kukshow, the hidden, far flung village of the cold desert landscape of Ladakh into the much required spotlight. The indigenous communities harbor infinite ethnobotanical knowledge as it is directly related to their sustenance. This knowledge directly contributes to sustainable development. Comprehensive knowledge possessed by the local communities is liable to erosion as it is passed from one generation to another by word of mouth. Development and modernization stand among the major cause for this knowledge depletion. Therefore, this study forms the baseline for future quantitative analysis of flora and ethnobotany along with conservation measures, which can be adopted to protect this invaluable apprehension. Not only will it help in formulation of novel drug, but will also boost the pharmaceutical sector. Therefore, it is evident from the present study that Kukshow region in the trans-Himalaya is home to various unique and endemic flora.

### Author Contributions

Dr. Vaneet Jishtu, Astha Chauhan and Hasina Bano conducted the field surveys for data collection and documentation. Astha Chauhan analyzed the collected field data and composed the manuscript. Dr. Vaneet Jishtu identified the plant species of the study area, and edited the manuscript.



**Figure 4:** From top left to bottom right, **A.** *Aquilegia fragrans* Benth., **B.** *Dactylorhiza hatagirea* (D.Don) Soo, **C.** *Podophyllum hexandrum* Royle, **D.** *Betula utilis* D.Don, **E.** *Juniperus semiglobosa* Regel, **F.** *Elaeagnus angustifolia* L.

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