

Biodiversity of Leh Town of Ladakh UT



G.B. Pant National Institute of Himalayan Environment
Ladakh Regional Centre, Leh, 194101

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Prof.(Dr.) Sunil Nautiyal, Director, G.B. Pant National Institute of Himalayan Environment, Kosi-Katarmal, Almora 263643, Uttarakhand

Reviewers:

1. Dr. Padma Gurmet, Director, National Institute of Sowa Rigpa, Leh, Ladakh UT
2. Dr. K ChanDra Sekar, Head, NIHE-GRC, Srinagar Garhwal, Uttarakhand
3. Dr. Maheswar Singh Kanwar, Head, ICAR-CAZRI Regional Research Station, Leh, Ladakh UT
4. Mr. Pankaj Raina, Wildlife Warden, Department of Wildlife Protection, Govt. of Ladakh UT
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4. BMC Members of MCL

FOREWORD



Shri Brij Mohan Sharma, IFS
APCCF & CWLW, Ladakh

The enactment of the Biological Diversity Act, 2002 (Amd. 2023) and the Rules made thereunder, aim at conserving, sustainably utilizing, and fairly distributing the benefits generated from biological resources and traditional knowledge in the country, with a focus on equity and gender inclusivity. These laws comprehensively emphasise on the sustainable utilization and conservation of biological resources by the different stakeholders.

The said Act, has adequate provisions for documenting biodiversity at the local level, ranging from villages to municipal areas, through the establishment of Biodiversity Management Committees (BMC's) for preparing People's Biodiversity Registers (PBRs). It mandates the preparation of these registers by every local body, empowering them to regulate and utilize biological resources sustainability, within their jurisdiction.

It is encouraging to learn that the Ladakh Regional Centre of GB Pant National Institute of Himalayan Environment (NIHE) has completed the first People's Biodiversity Register of Ladakh for the urban area of Leh town and submitted it to the Municipal Committee Leh. Furthermore, the book "Biodiversity of Leh Town of Ladakh" is a commendable outcome of the "Preparation of People's Biodiversity of Leh Urban Area Project" undertaken by the Ladakh Regional Centre of NIHE, as assigned by the Municipal Committee Leh, Ladakh UT.

This publication will serve as a valuable resource for stakeholders and naturalist, facilitating collaborative efforts towards the conservation and protection of biodiversity for the benefit of future generations. Such information shall play a crucial role in raising awareness, providing guidance and evolving the conservation strategies, ensuring the long-term sustainability of biodiversity in Leh urban area.



(Brij Mohan Sharma)

MESSAGE



Prof. (Dr.) Sunil Nautiyal

Alexander von Humboldt
Fellow
Director

Ladakh, situated in the northernmost part of the Indian Himalayan Region, is renowned for its distinctive biodiversity. This high-altitude desert showcases a diverse array of landscapes, from stark mountain peaks to verdant valleys, and is teeming with a rich variety of flora and fauna, much of which is unique to the region. Consequently, the assessment of biodiversity in Ladakh is essential for the conservation, sustainable development, and safeguarding of traditional knowledge. It offers invaluable scientific insights that can guide policy formulation and enhance awareness of the critical importance of biodiversity conservation.

I am happy to know that, Ladakh Regional Centre of GB Pant National Institute of Himalayan Environment (NIHE) is publishing this book “Biodiversity of Leh Town of Ladakh UT”. I am also delighted to know that, this book is the outcome of the project “Preparation of People Biodiversity of Municipal Committee Leh” assigned to Ladakh Regional Centre of NIHE by Municipal Committee Leh, Ladakh UT. The book presents a thorough inventory of 193 flora species, which includes 27 cereals and vegetables, 9 horticultural fruit plants, 43 medicinal plants, and 55 wild herbs and shrubs, among others. Additionally, it documents 154 faunal species, including 10 domestic animals, 5 wild animals, 55 bird species, 2 reptiles, 2 fish species, and 37 insects, among others. Notably, 97 of these species (12 flora and 85 fauna) are categorized under various IUCN threatened Categories, underscoring the importance of conservation measures within the Leh town area.

I extend my heartfelt congratulations to the entire team of authors and contributors for their efforts in producing this book. I trust that the book will prove to be a valuable resource for all stakeholders, including students, academicians, researchers, environmentalists, policymakers, and the international botanical community, who wish to learn more about the flora and fauna wealth of Leh town.

(Sunil Nautiyal)

MESSAGE



Shri. Stanzin Rabgais,
Executive Officer,
Municipal Committee Leh,
Ladakh UT

The Leh urban area, nestled within the Zanskar mountain range is unique for its biological resources and alluring natural landscape. However, the region is also going through rapid urban development ensuing pressure on its flora and faunal diversity. In order to conserve and prioritise management of the biological resources of this urban area, extensive and systematic documentation is required. Efforts initiated in this endeavour by the Ladakh Regional Centre of the GB Pant National Institute of Himalayan Environment, Leh along with Municipal Committee, Leh have culminated the People's Biodiversity Register (PBR) for the Municipal Committee Leh area in 2024. This book is an additional accomplishment of this endeavour, and is a testament to the collaborative efforts for documenting natural bioresources by scientific community, authorities, and relevant stakeholders. The identified bioresources of Leh town, highlighted in this book, not only would enable the local administration to promote conservation efforts of critical and endangered species, information provided here have effectively captured the essence of our town's biodiversity and created a valuable resource. Furthermore, this document is a testament to our commitment to the mandates of the Biological Diversity Act, 2002, and provides cues for preserving the natural heritage of Leh Town. This document also provides a roadmap for sustainable use, conservation, and equitable sharing of the benefits derived from our diverse biological resources.

I would like to express my sincere appreciation to the Ladakh Regional Centre of GB Pant National Institute of Himalayan Environment, Leh, Ladakh UT for preparing such a resourceful document with enthusiasm and dedication. Let us build upon this achievement to further strengthen our efforts in conserving the unique and valuable biodiversity geographical area covered within the Municipal Committee Leh.

A handwritten signature in blue ink, appearing to read "Stanzin Rabgais".

Executive Officer
Municipal Committee Leh, Ladakh UT



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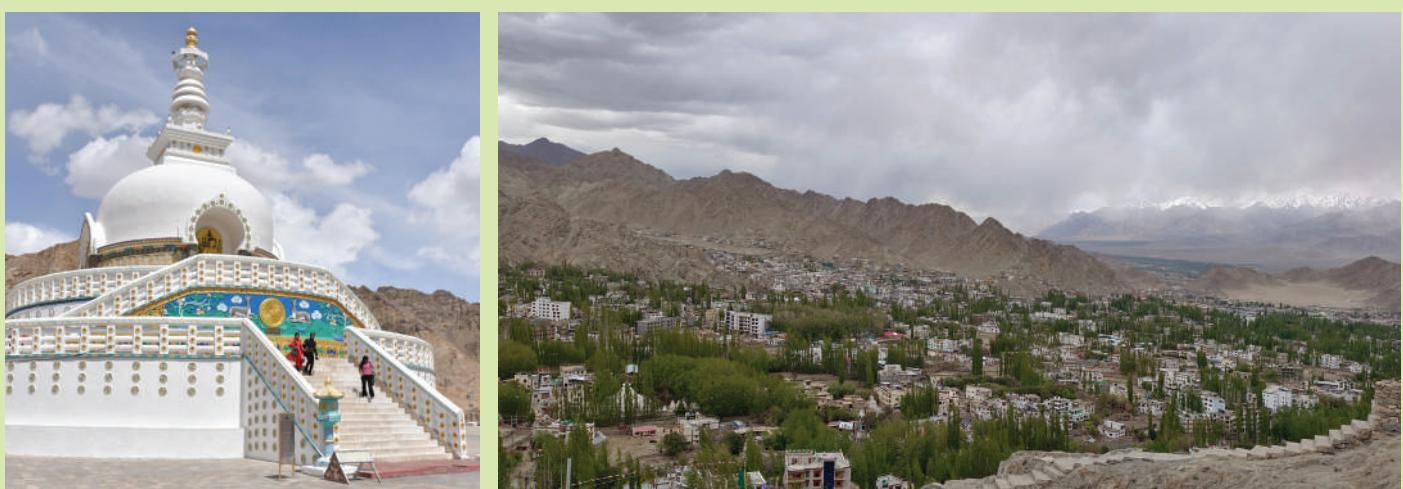
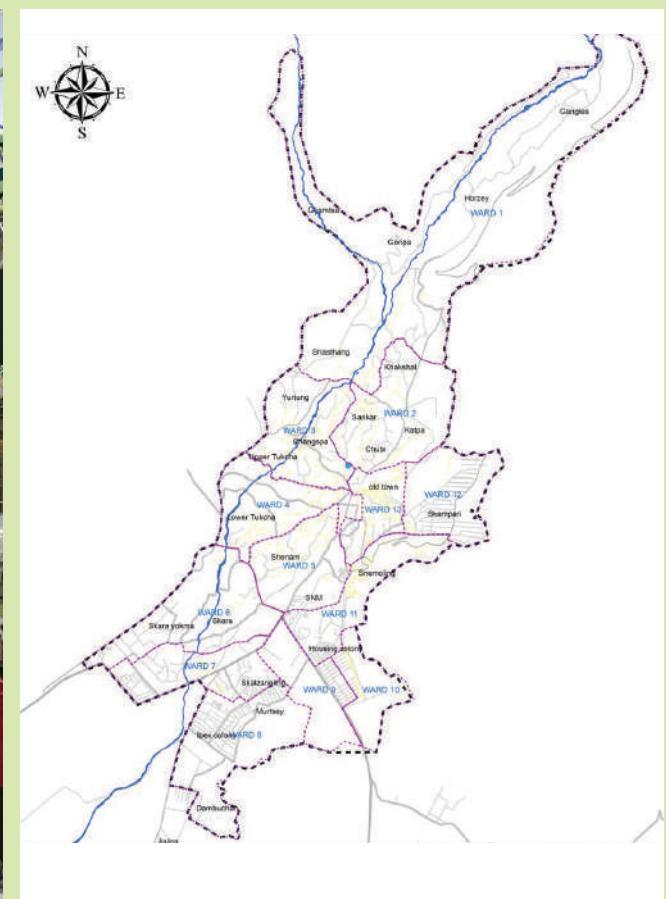


Plate 1. The map and glimpses of Municipal Committee Leh

INTRODUCTION

Ladakh is a region located in the northernmost part of India, bordered by the Karakoram Range in the north and the Great Himalayas in the south. Ladakh is known for its stunning landscapes, including high mountain ranges, vast deserts, and picturesque lakes. The unique geography of the region, wherein altitudes ranging from 2,700 meters to over 7,500 meters, contributes to its distinctive biodiversity. Ladakh experiences an arid cold desert climate, with extremely low precipitation and temperatures that can plummet well below freezing during winter. Due to the harsh climate and terrain, Ladakh has a sparse population, and its culture is predominantly influenced by Tibetan Buddhism.

Leh is the largest town in Ladakh and serves as the administrative capital of the Ladakh region. It is situated at an elevation of approximately 3,500 meters (11,500 feet) above sea level. Leh is historically an important trading post along the ancient trade routes connecting India, Tibet, and Central Asia. The town of Leh is characterized by its traditional Ladakhi architecture, which includes flat-roofed houses made of stone and mud bricks. Leh attracts tourists from all around the world due to its breathtaking natural beauty, Buddhist monasteries, and adventure-sport opportunities, such as trekking, mountaineering, etc.

The Municipal Committee Leh (MCL) is the local governing body responsible for the administration and development of Leh town. MCL operates under the provisions of the Ladakh Municipal Act and is tasked with various civic responsibilities to improve the quality of life for its residents. MCL comprises of 13 wards (i.e., Gonpa Gangles, Sankar Yourtung, Changspa Karzoo, Tukcha, Shenam, Skara, Skalzangling, Murtsey, Housing Colony A, Housing Colony B, Maneytselding, Skampari, and Zangsti Skynos) with a native population of about 30,870 as per the Census 2011, and the current population is estimated to be around 50,000, indicating an increase of nearly 74%. In the short summer of 2022 (from May to September), over 4 lakh tourists visited Leh.

Despite the harsh climatic conditions, Leh showcases a diverse array of unique flora and fauna, which have evolved to flourish in its extreme cold and arid environment. However, systematic documentation of the flora and faunal diversity within the Leh town area remained unaddressed. In order to address this knowledge gap, efforts were initiated by the Ladakh Regional Centre of NIHE through financial support from the Municipal Committee Leh, Ladakh UT under the project “Preparation of People’s Biodiversity of Leh Urban Area” during 2023-24. This book is the culmination of outcome of the effort, and provide detail inventory of the floral and faunal diversity within the Leh town area of Ladakh UT.

The inventory of this book encompasses a comprehensive listing of 193 floral and 154 faunal taxa found within the Leh town area, and first of its kind. Furthermore, the inventory is categorized into two sections: Agrobiodiversity and Wild biodiversity. The Agrobiodiversity section covers a range of categories including Cereals and Vegetables, Horticulture, Fodder Species, Weeds, Pests/Insects of Crops, cultivated Medicinal plants, cultivated Ornamental plants, and cultivated Timber Plants/Trees, along with Domesticated Animals. In addition, the Wild Biodiversity section comprises Herbs, Shrubs, Climbers, Medicinal plants, Mammals, Birds, Reptiles, Fishes, and Insects. A detailed breakdown of the quantity of each category is provided in Table 1. Notably, 97 of these floral and faunal taxa (12 flora and 85 fauna) are categorized under various IUCN Threatened Categories, underscoring the importance of conservation measures.

This book offers a glimpse into the rich and distinctive biodiversity of the Leh Town Area, featuring scientific names, local (Bodhi) names, habitats, current status, special features, associated traditional knowledge, and more. We anticipate that this book will serve as a fundamental field guide for Amchis, students, botanists, researchers, nature enthusiasts, and tourists alike. Moreover, this book also highlights conservation priorities of selected species through identification of threatened taxa.

Biodiversity	Nos. of species
Agrobiodiversity	
<i>Cereals and Vegetables</i>	27
<i>Horticulture (Fruit plants)</i>	9
<i>Fodder Species</i>	14
<i>Weeds</i>	12
<i>Pests/Insects of Crops</i>	9
<i>Medicinal</i>	17
<i>Ornamental</i>	50
<i>Cultivated Timber Plants /Trees</i>	6
<i>Domesticated Animals</i>	10
Wild Biodiversity	
<i>Herbs and grasses</i>	28
<i>Shrubs and Climber</i>	7
<i>Plants of Medicinal Importance</i>	32
<i>Mammals</i>	5
<i>Birds</i>	86
<i>Reptile</i>	1
<i>Fishes</i>	2
<i>Insects</i>	41

AGROBIODIVERSITY

... is the variety and variability of animals, plants, and micro-organisms that are used directly or indirectly for food and agriculture...



AGROBIODIVERSITY

1. Cereals, Vegetables and Pulses

1	2	3	4	5	6	7	8	9	10	11	12
Crop	Scientific Name	Local/ common Name	Variety	Landscape / Habitat	Local Status	Special Features	Cropping season	Uses	Associated TK	Other details	Source of Seeds/ Plants
Wheat	<i>Triticum aestivum</i>	Tow	Local	Agriculture Land	Yes	Yes	Seed grains edible for human consumption. Stalks used as animal fodder.	May–Oct	Flour used for the preparation of chapatti.	Used in preparation of local wine (Chang)	Local
Barley	<i>Hordeum vulgare</i> var. <i>nudum</i>	Nass	Local	Agriculture Land	Yes	Yes	Rich source of fibre	May–Oct	Flour used for the preparation of Sattu, Paba, Thukpa, Kholak (local traditional dish)	Also used in preparation of local wine (Chang)	Local
Mustard	<i>Brassica campestris</i>	Yungs-dkar	Local	Agriculture Land	Yes	Yes	—	May–Oct	Seeds are used for cooking oil.	Mustard oil is used for massaging	Local
Onion	<i>Allium cepa</i>	Tsong	Agriculture department	Agriculture Land/ Green house/ Kitchen Garden	Yes	Yes	Food flavouring agent	May–Oct	Used as condiment in vegetable curry, also eaten as salad	Reducing the symptoms of bladder infections, promoting prostate health and lowering blood pressure.	Local

Garlic	<i>Allium sativum</i>	Local	Kitchen garden/Green house	No	Cylindrical hollow leaves	Yes	Used as vegetable, and flavoring agent in food items	Cardiovascular diseases, regulating immune system and having antitumor properties	Effective against bacterial, viral, fungal and parasitic infections, enhancing the immune system and having antitumor properties	Nearest market
									Beetroots are versatile vegetables that can be consumed both raw and cooked. They are often boiled, roasted, steamed, or pickled.	Nearest market
Beetroot	<i>Beta vulgaris</i>	Nyungma marpo	Agriculture land/Green house	Yes	Beetroots are known for their vibrant red color and earthy flavour.	Yes	Beetroots help lower blood pressure, improve athletic performance, and support heart health.	May–Oct	–	–
Cabbage	<i>Brassica oleracea</i> var. <i>capitata</i>	Ice berg	Agriculture Land	No	There are endless health benefits of cabbage as it is rich in Vitamin K, C and antioxidants.	Yes	Used as vegetable.	May–Oct	Cabbage is also used to treat asthma and morning sickness. It is also used to prevent weak bones (osteoporosis), as well as cancer of the lung, stomach, colon, breast and other types of cancer.	Benefits of cabbage include relief from constipation, stomach ulcers, obesity, skin disorders, eczema, scurvy, etc.

Turnip	<i>Brassica rapa</i> subsp. <i>rapifera</i>	Nyungma	Local	Agriculture Land/ Green house/ Kitchen Garden	Yes	Yes	It has been found to improve cardiovascular health, aid digestion, prevent arteriosclerosis, improve bone health, fight inflammation, and strengthen the immune system.
Cauliflower	<i>Brassica oleracea</i> var. <i>botrytis</i>	Phool gobi	—	Agriculture Land/ Kitchen Garden	No	Yes	Source of high calories and low fat.
Kohlrabi	<i>Brassica oleracea</i> var. <i>gongylodes</i>	Kadam/ Ghanth Gobi	—	Agriculture Land/Kitchen Garden	No	Yes	The edible part is the swollen stem, which can be green, purple, or white, depending on the variety.
Broccoli	<i>Brassica oleracea</i> var. <i>italica</i>			Agriculture land/ Green-house/ Kitchen Garden	No	Yes	A hybrid or a new vegetable developed from cabbage or any other cruciferous vegetable
							It has a high content of vitamin C
							Used as food and salad
			May–Oct				Used as vegetable
							May–Oct
							May–Oct
							Nearest market
							Nearest market
							Local/Nearest market
							Nearest Market

Chilli	<i>Capsicum annuum</i>	Mirchi	Agriculture land/Green-house/ Kitchen Garden	–	Used as vegetable	May–Oct	Helps prevent cell damage, cancer and diseases related to ageing, and promotes hair growth.	Rich in Vitamins A, C, and K,	Vitamins A, C, and K,	Nearest market
Coriander	<i>Coriandrum sativum</i>	Ussu	Local	Agriculture land/ Green house/ Kitchen Garden	Yes	May–Oct	It is an excellent appetizer, helps in proper secretion of enzymes and digestive juices in the stomach, stimulates digestion, etc.	Used as spice and for food garnishing purposes	Coriander is used for digestion problems including upset stomach, loss of appetite, hernia, nausea, diarrhea, bowel spasms, and intestinal gas.	It is also used to treat measles, hemorrhoids, toothaches, worms, etc.
Kheera	<i>Cucumis sativus</i>	–	Kitchen garden/Green-house	Cucumber	No	May–Sep	Cucumber plants are vines that can be grown vertically on trellises or allowed to sprawl on the ground.	It is known for its crisp texture and mild flavor and is often used in salads, sandwiches, and various culinary dishes.	The greatest and most important skin benefit of cucumber is that it helps in revitalizing the skin Reverses Skin Tanning.	Local market
									Cucumber skin is edible and contains additional fiber and nutrients.	

zucchini	<i>Cucurbita pepo</i>	—	Kitchen garden/Green-house	No	Yes	The fruits come in various shapes, sizes, and colors, ranging from small, round pumpkins to elongated and bumpy squashes	Used as a vegetable	Seeds, also known as pepitas, are popular snacks and are rich in nutrients like protein, fiber, and healthy fats	—	Local market
									—	
Carrot	<i>Daucus carota</i>	Sarakturn-man	Local	Agriculture land/Green-house/Kitchen garden	Yes	Yes	—	May–Oct	—	Local market
Lettuce	<i>Lactuca sativa</i>	Salad	Iceberg, Romaine, Butter-head and Leaf Lettuce	Agriculture Land	No	Yes	It is commonly cultivated and consumed as a salad green worldwide	May–Oct	Used as vegetable	It also provides dietary fiber, which is essential for digestive health.
Mint	<i>Mentha piperita</i>	Phooling	Local	Kitchen garden	Yes	Yes	It is commonly cultivated as refreshing minty flavour to various dishes, salads, teas, and beverages	June–Oct	Used as culinary	Leaf and oil have been used historically to treat digestive disorders, to manage gallbladder disease, and to relieve headaches.
									—	Local

<p>Kidney Beans</p> <p><i>Phaseolus vulgaris</i></p> <p>Rajma</p> <p>Agriculture Land</p> <p>No</p> <p>Yes</p> <p>Kidney beans are high in soluble fiber, potassium, lean protein, folate, Mg and Zn and zinc. They are also rich in iron and folate.</p>	<p>Rajma can be used in various different ways, they are to be soaked and eaten as steamed, boiled or even in the gravies.</p> <p>May–Oct</p>	<p>The high content of complex carbohydrates and dietary fibre in kidney beans lowers cholesterol levels in the blood.</p>	<p>The health benefits of rajma are not just limited to its fibre and protein content as it is full of antioxidants too.</p>	<p>Local</p>
<p>Beans</p> <p><i>Phaseolus vulgaris</i></p> <p>Beans</p> <p>Local</p> <p>No</p> <p>Yes</p>	<p>The manganese in dried beans activate enzymes that help the body metabolize protein and carbohydrate while the choline in dried beans facilitates the digestion of fat.</p>	<p>Used as vegetable</p> <p>May–Oct</p>	<p>Their nutrient content includes fibers, vitamins, minerals and very less carbohydrates. They also contain protein, calcium, dietary fiber, etc.</p>	<p>Local</p>
<p>Pea</p> <p><i>Pisum sativum</i></p> <p>Matar</p> <p>Agriculture Land / Green house</p> <p>No</p> <p>Yes</p>	<p>Peas are a good source of vitamins such as B6 and B12.</p>	<p>May–Oct</p>	<p>Widely used as food and can be eaten both raw and cooked.</p>	<p>Local/Nearest Market</p>

Radish	<i>Raphanus sativus</i> var. <i>longipinnatus</i>	Labuk	Local	Agriculture Land /Green house	Yes	Yes	–	May–Oct	Used as vegetable and eaten as salad	–	It is also used in making of local achaar.	Local
Tomato	<i>Solanum lycopersicum</i>	Tamatara	–	Agriculture land /Green house	No	Yes	High water content capacity	May–Oct	Major cash crop of the village and used as food. Tomato is consumed in diverse ways, including raw, as an ingredient in many dishes, sauces, salads, etc	Treats blood sugar, cardiovascular diseases, skin ailments and cancer	–	Nearest Market
Brinjal	<i>Solanum melongena</i>	Bangain	Arka, Keshav , Arka Nidhi, H8	Agriculture Land /Green house	No	Yes	The skin of the eggplant is rich in antioxidants, fiber, potassium, and magnesium.	May–Oct	Used as vegetable	Used as vegetable	It is highly nutritious, and is very effective in the treatment of diabetes, obesity, hypertension, acne, and hair loss.	–
Potato	<i>Solanum tuberosum</i>	Zagok/ Aalu	Local	Agriculture Land	Yes	Yes	Tubers round-ed shape	May–Oct	Used as vegetable	Used against ulcers, rheumatic complaints and constipation etc.	Rich in calories, sodium, vitamin C etc.	Local people

Spinach	<i>Spinacia oleracea</i>	Palak	Agriculture department	Kitchen Garden /Green house	No	Yes	Rich source of Potassium.	May–Oct	Used as food.	Lowering blood pressure. Improves bone health. Promotes regularity, healthy skin and hair.	Diabetes management. Cancer prevention. Asthma prevention.	Nearest market
	<i>Spinach-chard</i>	<i>Beta vulgaris L. var. cicla</i>	Mongol	Local	Kitchen Garden /Green house	Yes	Yes	A leafy green vegetable.	May–Oct	Used as food	—	Diabetes management. Cancer prevention.



Plate 2. Some glimpses of Cereals and Vegetables of Leh; a.Wheat (*Triticum aestivum*), b. Buckwheat (*Fagopyrum esculentum*), c. Mustard (*Brassica campestris*), d. Potato (*Solanum tuberosum*), e.Wild cabbage (*Brassica oleracea*), f. Tomato (*Solanum lycopersicum*), g. Broccoli (*Brassica oleracea* var. *italica*), h. Cauliflower (*Bracissa oleracea* var. *botrytis*), i. Cabbage (*Bracissa oleracea* var. *capitata*), j. Beans (*Phaseolus vulgaris*), k. Kohlrabi (*Brassica oleracea* var. *gongylodes*), l. Pea (*Pisum sativum*), m. Carrot (*Daucus carota*), n. Raddish (*Raphanus sativus* var *longipinnatus*), o. Zucchini (*Cucurbita pepo*)

2. Horticulture (Fruits Plants)

1	2	3	4	5	6	7	8	9	10	11
Plant Name	Scientific Name	Local Name	Variety	Landscape / Habitat	Local Status	Source of Seeds/Plants	Season of Fruiting	Associated TK	Uses	Other details market / own use
Apricot	<i>Prunus armeniaca</i>	Chuli	Raktsay Karpo and Khanteh	Agriculture land/Kitchen Garden	Yes	Yes	Vegetative	July–Aug	Fruits are edible.	Own use/ dry apricot for commercial purpose
Apple	<i>Malus domestica</i>	Kushu	Mongol, Tha-Kushu, Khachui–Kushu	Agriculture land/Kitchen Garden	Yes	Yes	Vegetative	Aug–Sept	Not reported	Fruit is edible Own/commercial use
Cherry	<i>Prunus cerasifera</i>	—	—	Agriculture land/Kitchen Garden.	No	Yes	Sapling	Sept–Oct	Not reported	Fruit is edible
Mulberry	<i>Morus alba</i>	Otse	—	Agriculture land/Kitchen Garden	No	Yes	Sapling	Apr–Aug	Not reported	Fruit is edible Own use
Grape	<i>Vitis vinifera</i>	—	—	Kitchen Garden	No	Yes	Vegetative	Sept–Oct	Not reported	Fruit is edible Own use
Musk melon	<i>Cucumis melo</i>	—	—	Agriculture land/Kitchen Garden/Green house	No	Yes	Seeds	Sept–Oct	Not reported	Fruit is edible Own use
Raspberry	<i>Rubus idaeus</i>	—	—	Kitchen Garden/Green house	No	Yes	Vegetative/ Seeds	Sept–Oct	Not reported	Fruit is edible Own use
Strawberry	<i>Fragaria ananassa</i>	—	—	Kitchen Garden/Green house	No	Yes	Vegetative	Aug–Sept	Not reported	Berries are edible.
Watermel-on	<i>Citrullus lanatus</i>	Zagoon marpo	—	Agriculture land/Kitchen Garden/Green house	No	Yes	Seeds	Sept–Oct	Not reported	Fruit is edible Own use



a



c



d



b



e

Plate 3. The glimpses of some horticulture plants found within municipal area of Leh; a. Apple (*Malus domestica*) b. Apricot (*Prunus armeniaca*), c. Cherry (*Prunus carasifera*), d. Rusberry (*Rubus idaeus*), e.- Watermelon (*Citrullus lanatus*)

3. Fodder Species

1	2	3	4	5	6	7	8	9
Plant Name	Scientific Name	Local Name	Landscape /Habitat	Local Status	Source of Plants/ Seeds	Associated TK	Parts used	Other details
				Past	Present			
Bentgrass	<i>Agrostis gigantea</i>	—	Along the agriculture land and water channels	Yes	Yes	Naturally growing	Not reported	Whole plant Not reported
Astragalus	<i>Astragalus oplites</i>	Nanchu,S-bi-chu	Along the agriculture land and water channels	Yes	Yes	Naturally growing	Not reported	Whole plant Not reported
Caper bush	<i>Capparis spinosa</i>	Kabra	Stony slopes and dry rocks	Yes	Yes	Naturally growing	Not reported	Leaves, shoot and leaves Not reported
Perennial herb	<i>Cirsium arvense</i>	Yangchher	Along the agriculture land and water channels	Yes	Yes	Naturally growing	Not reported	Whole plant Not reported
Seabuck-thorn	<i>Hippophae rhamnoides</i> var turkestanica	Tsermang	Along the agriculture land and water channels	Yes	Yes	Naturally growing	Not reported	Leaves, dry seeds, fruits and twigs Not reported
Wild Iris	<i>Iris lactea</i>	Tesma	Along the agriculture land and water channels	Yes	Yes	Naturally growing	Not reported	Whole plant Not reported
Perennial herb	<i>Lepidium latifolium</i>	Shang-sho	Agriculture land	Yes	Yes	Naturally growing	Not reported	Leaves, Young tender shoots Not reported
Alfalfa Herb	<i>Medicago falcata</i>	Oll	Agriculture land	Yes	Yes	Cultivated by locals, also provided by agriculture department	Not reported	Leaves and shoot Not reported
Alfalfa	<i>Medicago media</i>	Oll	Agriculture land	Yes	Yes	Cultivated by locals, also provided by agriculture department	Not reported	Leaves and shoot Not reported
Alfalfa	<i>Medicago sativa</i>	Oll	Agriculture land	Yes	Yes	Cultivated by locals, also provided by agriculture department	Not reported	Leaves and shoot Not reported
Alfalfa	<i>Medicago varia</i>	Oll	Agriculture land	Yes	Yes	Cultivated by locals, also provided by agriculture department	Not reported	Leaves and shoot Not reported

Alfalfa	<i>Melilotus officinalis</i>	Oll	Agriculture land	Yes	Yes	Cultivated by locals/ also provided by agriculture department	Not reported	Leaves and shoot	Not reported
Wild Rose	<i>Rosa webbiana</i>	Siah, Madpo	Along the agriculture land and water channel	Yes	Yes	Naturally growing	Not reported	fruits	Not reported
Patience dock	<i>Rumex patientia</i>	Shoma	Kitchen garden/ Agriculture Land	Yes	Yes	Naturally growing	Not reported	Leaves	Not reported

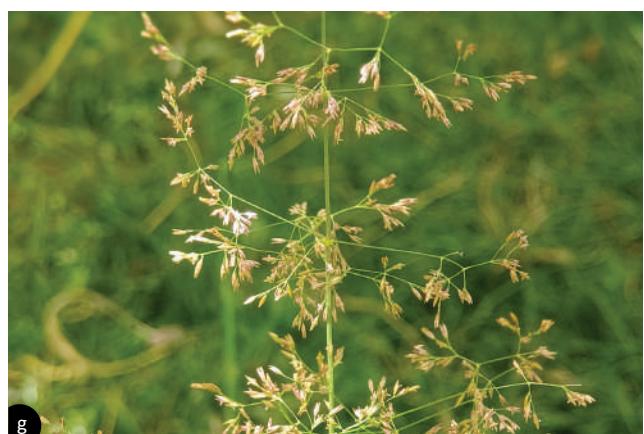
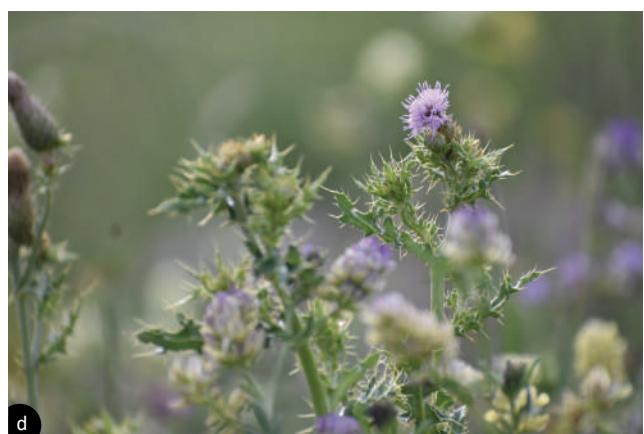


Plate 4. Some glimpses of fodder species found within municipal area of Leh; a. Dittander (*Lepidium latifolium*), b. Alfa-alfa (*Medicago falcata*), c. Milkvetch (*Astragalus oplites*), d. *Cirsium arvense*, e. Patience dock (*Rumex patientia*), f. Wild iris (*Iris lactea*), g. Bentgrass (*Agrostis gigantea*)

4. Weeds

1	2	3	4	5	6	7	8	9	10	11
Plant Type	Scientific Name	Local Name	Affected crop	Impact	Landscape /Habitat	Local Status	Uses if Any	Management options	Associated TK	Other details like Exotic
Herbs	<i>Artemisia sieversiana</i>	Khamchu	Vegetables	Competes with crops	Kitchen garden/ Agriculture Land	Past	Present	Leaves are boiled and taken as antimicrobial and intestinal worm	Manually uprooting the plant	A decoction of the plant, combined with <i>Ajuga lupulina</i> and <i>Ephedra gerardiana</i> , is used as a wash to relieve painful joints.
Herb	<i>Avena fatua</i>	Yugho	Crops (wheat and barley) & vegetables	It does not allow the growth of other plants	Kitchen garden/ Agriculture Land	Yes	Yes	Fodder	Manually uprooting the plant	Not reported
Herb	<i>Carex sp.</i>	-	Crops and vegetables	It competes with other crops	Agriculture Land	Yes	Yes	Used as fodder or the animals are left around to graze.	Manually uprooting the plant	Not reported
Herbs	<i>Chenopodium botrys</i>	Sneugu	Crops and vegetables	It does not allow the growth of other plants	Kitchen garden/ Agriculture Land	Yes	Yes	Stew is prepared and taken with "Paba" (local dish)	Manually uprooting the plant	Cancer treatment, used in the treatment of several conditions, such as coughing, pectoral complaints
Herb	<i>Chenopodium album</i>	Sneugu	Crops and vegetables	It competes with other crops	Kitchen garden/ Agriculture Land	Yes	Yes	Used as fodder.	Manually uprooting the plant	Young leaves are consumed as vegetable.

	<i>Dysphania botrys</i>	Sta-men	Vegetables	It competes with other crops	Kitchen garden/ Agriculture Land	Yes	Yes	The plant has been utilized for the treatment of different ailments like asthma, cold, influenza, head ach, liver and digestive problems and healing of wound	Manually uprooting the plant	Not reported	Not reported
Herb	<i>Fagopyrum esculentum</i>		Tayat	Crops and vegetables	Less growth of plants	Kitchen garden/ Agriculture Land	Yes	Yes	Manually uprooting the plant	Not reported	Leaves with onion and served with rice and roti
Herb	<i>Festuca brevipila</i>		Rampa	Crops and vegetables	It does not allow the growth of other plants	Kitchen garden/ Agriculture Land	Yes	Yes	Manually uprooting the plant	Not reported	
Herb	<i>Nepeta sp.</i>		Jatukpa	Crops and vegetables	Less growth of plants	Kitchen garden/ Agriculture Land	Yes	Yes	Manually uprooting the plant	Not reported	
Herb	<i>Potentilla anserina</i>		Toma	Crops and vegetables	It does not allow the growth of other plants	Kitchen garden/ Agriculture Land	Yes	Yes	Used as medicine (leaves decoction) during Pnemonia	Not reported	
Herbs	<i>Thalictrum sp.</i>		Shiche	Crops and vegetables	Less growth of plants	Kitchen garden/ Agriculture Land	Yes	Yes	Sore throat, menstrual cramps (dysmenorrhea), premenstrual syndrome (PMS)	Roots are uprooted washed and eaten raw	
Herb	<i>Stellaria sp.</i>			It competes with other crops	Agriculture Land	Yes	Yes	Used as fodder	Manually uprooting the plant	Not reported	
Herb	<i>Sgo-rpin</i>			Crops and vegetables	Agriculture Land	Yes	Yes	Used as fodder	Manually uprooting the plant	Not reported	



Plate 5. Some glimpses of weeds found within municipal area of Leh; i.e., a. *Dysphania botrys*, b. *Chenopodium karoi*, c. *Festuca brevipila*, d. *Avena fatua*

5. Pests/Insects of Crops

1	2	3	4	5	6	7	8	9
Host	Insect/Animal	Scientific Name	Local Name	Habitat	Time/Season of Attack	Management mechanism	Associated TK	Other details like Exotic
Cauliflower, cabbage, turnip, potato	Larvae	<i>Agrotis ipsilon</i>	Meljab	Vegetative parts of the plants	Summer season	Manually cutting of the leaves before egg hatching	Not reported	Not reported
Leafy Vegetables	Aphid	<i>Aphis doidea</i>	Penzay	Vegetative parts of the plants	Summer season	Cutting off the infected parts	Not reported	Not reported
Onion	Larvae (onion maggots)	<i>Delia antiqua</i>	—	Bulb of onion	Summer season	Pluck the infected onion bulb	Not reported	Not reported
Cabbage	Larvae of cabbage white	<i>Pieris brassicae</i>	Pema laptse	Vegetative parts of the plants	Summer season	Manually cutting of the leaves before egg hatching.	Not reported	Not reported
Cabbage, turnip and mustard	Larvae	<i>Pieris rapae</i>	Pema laptse	Vegetative parts of the plants	Summer season	Manually cutting of the leaves before egg hatching	Not reported	Not reported
Kale, cauliflower, mustard, turnip, radish	Larvae	<i>Pontia daplidice</i>	Pema laptse	Vegetable	Summer season	Manually cutting of the leaves before egg hatching	Not reported	Not reported
Wheat	Fungi	<i>Ustilago tritici</i>	—	Glumes and kernels	Summer season	Pluck the infected crops	Not reported	Not reported
Wheat and barley	Fungal thread or hyphae (mycelium)	<i>Ustilago tritici</i>	—	Vegetative parts of the plants	Summer season	Pluck the infected crops	Not reported	Not reported
Wheat and barley	Grub	<i>Melantha furcicauda</i>	—	Seedling and root	Summer season	Pluck the infected crops	Not reported	Not reported



Plate 6. Some glimpses of Pests/Insects of Crops of Leh;
a. Aphid (*Aphis* sp.), b. Loose smut (*Ustilago tritici*),
c. Caterpillar of Cabbage or White butterfly (*Pieris rapae*)

6. Medicinal Plants (Herbs, Shrubs, Trees etc.)

1	2	3	4	5	6	7	8	9	10	11
Plant Type	Local Name	Scientific Name	Variety	Land-scape / Habitat	Source of Plants/ seeds	Local Status	Uses (Usage)	Parts used	Associated TK	Other details market / own use
Herb	Chuang	<i>Achillea millefolium</i>	Wild	Cultivated area	Seed	Past Present	Medicinal use	Whole plant parts	The extract of leaves is useful in urinary problem, tooth-ache and gum inflammation. The whole herb is credited with having properties of an astringent, stimulant, tonic, diaphoretic, treatment for cold and colic. The herb contains an alkaloid 'Achilleine'.	Own use
Herb	Skotse	<i>Allium przewalskianum</i>	Wild	Cultivated area	Seed	Yes	Yes	Leaves	It treats headache caused by microorganisms and any kind of lung diseases. A paste is prepared from its leaves, which is molded into balls known as 'Skoirr'. These balls are dried and then used for flavouring.	Own use
Herb	-	<i>Allium</i> sp.	Wild	Cultivated area	Sapling	Yes	Yes	Leaves	The sulfur rich compounds are reported in reducing blood cholesterol	Own use
Herb	Demok	<i>Arnebia euchroma</i>	Wild	Cultivated area	Saplings	Yes	Yes	Roots	Roots are collected in October and dried in shade, then powdered. One to two grams powder is given with hot water upto one week to reduce cold and cough. It is also used as edible dye to colour various herbal preparation.	Own use

Herb	<i>Artemisia brevifolia</i>	Wild	Cultivated area	Seeds/ sapling	Yes	Yes	Medicinal purposes: ant寄生虫, stomach complaints	Leaves, flower, stem and fruits.	Fresh or shade dried leaves are pounded with leaves of <i>Azadirachta indica</i> , <i>Tanacetum dolycophyllum</i> , <i>Tanacetum gracile</i> , seeds of <i>Punica granatum</i> and mineral salts, then made into tablets. Three tablets are given twice a day for 5–6 days against remedy of fever.	Own use
Herb	<i>Pushkar-mol</i>						The roots, in particular, are considered the most medicinally valuable part of the plant and have been used in herbal preparation.	Roots	Traditionally used to cure respiratory, digestive issues and regulate and support the immune response. The plant is also considered to have anti-inflammatory properties, which could be beneficial in managing inflammatory conditions.	Own use
Herb	<i>Inula racemosa</i>	Wild	Cultivated area	Seed	Yes	Yes		Seeds	The seeds of the plant contain several alkaloids, including harmine and harmaline, which are believed to have psychoactive and medicinal effects. Some cultures use the plant to treat digestive issues, respiratory conditions, and skin ailments.	Own use
Herb	<i>Balti shukpa</i>			<i>Peganum harmala</i>			Sacred plants of Muslims community having some medicinal properties.			
Herb	<i>Esskiling</i>			<i>Perovskia abrotanoides</i>			Ornamental and aesthetic value, Tender shoots are used for making brooms and leaves are used in traditional medicine for treating abdominal and urinary ailments.	Shoot and leaves	It has a pleasant aromatic scent, and when the leaves are crushed or bruised, they release a mint-like fragrance.	Own use

Herb	Tha-ram, Kara-ru-tse	<i>Plantago depressa</i>	Wild	Cultivated area	Seed	Yes	Medicinal and edi- ble value	Leaves	Leaves are harvested, cooked and consumed by locals. Moreover, its various parts are used for medicinal purposes. It treats dysentery, burned wounds, bleeding, inflammation wounds and lymph fluids, etc.	Own use
Herb	Lachu	<i>Rheum tibeticum</i>	Wild	Cultivated area	Seeds	Yes	Used as food as well as medicine.	Whole plant parts	It has been used as an ingre- dient of many herbal formu- lations, which are used for the cure of various ailments, in particular the regulation of blood pressure, fat, hepatitis, fever and cancer.	Own use
Herb	Shorolo	<i>Rhodiola imbricata</i>	Wild	Cultivated area	Sapling	Yes	Aerial shoot of plants are con- sumed as vegeta- bles (i.e., Thukpa).	Flower and stem	Use in traditional medicine, it heals lungs disorder, asthma and any type of mouth disor- ders, infectious cough, act as health tonic.	Own use
Herb	–	<i>Salvia sclarea</i>	Wild	Cultivated area	Sapling	No	Essential oil is also used in aromatherapy, it treats any type of mouth problems tooth aches and liver disorder.	Whole plant	Essential oil is used widely in perfumes and as a muscated flavouring for vermouths, wines, and liquors	Own use
Herb	Zatsot	<i>Urtica hyperborea</i>	Wild	Cultivated area	Sapling	Yes	It promotes diges- tive and physical heat, cures dis- ease associated with chronic fever, indigestion of green leaves and any type of cold diseases.	Leaves and shoots	Used in medicinal purpose and leaves and tender shoots of plants used in local cuisine. Widely used to treat rheumatism and sciatica, asthma, coughs, dandruff, diabetes, diarrhea, eczema, fever, gout, hemorrhoids, nose bleeds, scurvy, snake bites, and tuberculosis	Own use

Shrub	Tsepad	<i>Ephedra gerardina</i>	Wild	Cultivated area	Seeds	Yes	Used for their potential medicinal properties	Berries and stems	Medicinal use includes treating respiratory conditions like asthma and bronchitis, as well as acting as a stimulant and diuretic.	Own use
Tree	Shukpa	<i>Juniperus semiglobosa</i>	Wild	Cultivated area	Sapling	Yes	Considered to be sacred among Buddhist communities. Leaves and twigs used for incense.	Twigs and leaves.	The plant is used in treatment of nervous disorders, heart related diseases and kidney disorders. The plant is also used as antibiotic for animals and for repelling flies.	Own use
Tree	Chuli	<i>Prunus armeniaca</i>	Wild	Cultivated areas	Sapling	Yes	Fruits are edible. Oil is extracted from sweet kernel and bitter kernel has cosmetics and medicinal values and its wood is useful as fuel and timber	Seed kernel, fruit, stem	Apricots are rich in vitamins and minerals, including vitamin A, vitamin C, potassium, and dietary fiber. They are a good source of antioxidants, which help protect the body against oxidative stress and inflammation.	Own use/ Commercially sale as dry apricot
Shrub	Khi-Tser, Umila	<i>Lycium ruthenicum</i>	Wild	Cultivated area	Seed	No	The plant produces small, round, black, which are edible and have a sweet and slightly tangy flavor..	Berries	The berries are considered a rich source of antioxidants, vitamins, and minerals.	Own use



Plate 7. Some cultivated medicinal plants found in Leh; a. *Salvia sclarea*, b. *Urtica hyperborea*, c. *Perovskia abrotanoides*, d. *Allium stracheyi*, e. *Rheum tibeticum*, f. *Allium przewalskianum*, g. *Inula racemosa*, h. *Achillea millefolium*, i. *Plantago depressa*, (j) *Lycium ruthenicum*, (k) *Matricaria chamomilla*

7. Ornamental Flower/Tree/Herbs/Climbers, etc.

1	2	3	4	5	6	7	8
Plant Type	Local Name	Scientific Name	Source of plant/ seeds	Common name	Commercial/ non-commercial	Uses	Associated TK
Herb	Haloo-mentok	<i>Alcea rosea</i>	Seeds	Hollyhock	Non-commercial	Ornamental value	Not Reported
Herb	-	<i>Aloe vera</i>	Vegetative	Aloe	Non commercial	Ornamental/medicinal value	Not Reported
Herb	Khi nama mentok	<i>Amaranthus caudatus</i>	Seeds	Foxtail amaranth	Non commercial	Ornamental value	Not Reported
Tree	-	<i>Araucaria heterophylla</i>	Seeds	Araucaria	Non commercial	Ornamental value	Not Reported
Herb	Serpan	<i>Aster alpinus</i>	Seeds	Aster	Non -commercial	Ornamental value	Not Reported
Herb	-	<i>Calendula arvensis</i>	Seeds	Calendula	Non-commercial	Ornamental value.	Not Reported
Herb	-	<i>Clarkia amoena</i>	Seeds	Mountain garland	Non-commercial	Ornamental value	Not Reported
Herb	Mentok skyang rtsag	<i>Cosmos bipinnatus</i>	Seeds	Cosmos	Non-commercial	Ornamental value.	Not Reported
Herb	Serpan	<i>Chrysanthemum indicum</i>	Seeds	Indian cry-sathemum	Commercial	Ornamental value.	Not Reported
Shrub	Alu mentok	<i>Dahlia pinnata</i>	Seeds	Dahlia	Commercial	Ornamental value.	Not Reported
Herb	Flax lilies	<i>Dianella tasmanica</i>	Vegetative	Flax	Non -commercial	Ornamental value	Not Reported
Herb	-	<i>Dianthus chinensis</i>	Seeds	Dianthus	Non-commercial	Ornamental value	Not Reported
Herb	-	<i>Dimorphotheca sinuata</i>	Seeds	Namaqualand daisy	Non-commercial	Ornamental value.	Not Reported
Herb	Cactus	<i>Echinopsis camarguensis</i>	Vegetative	Peanut cactus	Non-commercial	Ornamental and aesthetic value	Not Reported

Herb	Utpalwangmo	<i>Epilobium latifolium</i>	Seeds	Dwarf fire weed	Non-commercial	Ornamental and aesthetic value.	Not Reported
Herb	-	<i>Gaillardia pulchella</i>	Seeds	Blanket flower	Non-commercial	Ornamental value	Not Reported
Herb	Gazania	<i>Gazania rigens</i>	Seeds	African daisies	Non-commercial	Ornamental value	Not Reported
Herb	-	<i>Gladiolus hybridus</i>	Bulb	Gladiolus	Non-commercial	Ornamental value	Not Reported
Herb	-	<i>Glebionis coronaria</i>	Seeds	Crown daisy	Non-commercial	Ornamental value	Not Reported
Herb	Kang-la-nyishar	<i>Helianthus annus</i>	Seeds	Sunflower	Non-commercial	Ornamental value	Not Reported
Herb	-	<i>Hyptothelphium spectabile</i>	Seed	Showy	Non-commercial	Ornamental value	Not Reported
Tree	Shukpa	<i>Juniperus semiglobosa</i>	Seeds	Juniper	Commercial	Ornamental value	Has religious value in Buddhism. Twigs and leaves are used for incense
Herb	Lily	<i>Lilium sp.</i>	Bulb	Lily	Commercial	Ornamental value	Not Reported
Herb	-	<i>Lobularia maritima</i>	Seeds	Allysum	Non-commercial	Ornamental value.	Not Reported
Herb	Lupine	<i>Lupinus polyphyllus</i>	Seeds	Lupine	Commercial	Ornamental value.	Not Reported
Herb	Gal chanm pa	<i>Malva arborea</i>	Seeds	Tree mallow	Non-commercial	Ornamental value.	Not Reported
Herb	Chamomile	<i>Matricaria chamomile</i>	Seeds	Commercial	Commercial	Ornamental/Medicinal value	Petals are used as herbal tea as an antioxidant
Herb	-	<i>Papaver somniferum</i>	Seed	Poppy	Non-commercial	Ornamental value	Not Reported
Climber	-	<i>Parthenocissus tricuspidata</i>	Vegetative	Boston ivy	Non-commercial	Aesthetic value	Not Reported
Herb	-	<i>Pelargonium zonale</i>	Vegetative part	Garden geranium	Non-commercial	Ornamental value	Not Reported

Herb	Petunia	<i>Petunia hybrida</i>	Seeds	Petunia	Commercial	Ornamental value.	Not Reported
Herb	Phlox	<i>Phlox drummondii</i>	Seeds	Phlox	Non-commercial	Ornamental value.	Not Reported
Tree	Bakma-tselle	<i>Pinus wallichiana</i>	Seeds	Himalayan blue pine	Commercial	Ornamental value	Not Reported
Herb	-	<i>Portulaca grandiflora</i>	Vegetative part	Moss rose purslane	Non-commercial	Ornamental value	Not Reported
Herb	Chaipeh mentok	<i>Ranunculus longicaulis</i>	Seeds	Long stem butter cup	Non-commercial	Ornamental value	Not Reported
Tree	-	<i>Robinia pseudoacacia</i>	Seeds	Black locust	Non-commercial	Ornamental value	Not Reported
Shrub	Sia	<i>Rosa webbiana</i>	Vegetative	Wild rose	Non commercial	Ornamental value/ Medicinal Value	Not Reported
Herb	-	<i>Rudbeckia laciniata hort- ensia</i>	Vegetative part	Tall cone-flower	Non -commercial	Ornamental value	Not Reported
Herb	-	<i>Sedum rubrotinctum</i>	Vegetative	Jelly beans plant	Non commercial	Ornamental value	Not Reported
Herb	Baisharam	<i>Sempervivum spp.</i>	Sapling	Common houseleel	Ornamental value	Ornamental value	Not Reported
Herb	-	<i>Sympphytum novi-bel- gii</i>	Seeds	New England Aster	Non-commercial	Ornamental value.	Not Reported
Herb	Guru makhmal	<i>Tagetes erecta</i>	Seeds	Marigold	Commercial	Ornamental/religious value	Not Reported
Herb	Guru makhmal	<i>Tagetes tenuifolia</i>	Seeds	Marigold	Non-commercial	Ornamental value.	Not Reported
Tree	Gya-shuk	<i>Thuja orientalis</i>	Seeds	Thuja	Commercial impor- tance	Ornamental value	Not Reported
Herb	-	<i>Tropaeolum majus</i>	Seed	Nasturtium	Non -commercial	Ornamental value	Not Reported
Herb	-	<i>Verbena hybrida</i>	Seed	Vervain	Non -commercial	Ornamental value	Not Reported

Shrub	–	<i>Viburnum opulus</i>	Vegetative	Snowball tree	Non commercial	Ornamental value	Not Reported
Herb	–	<i>Viola witrockiana</i>	Seeds	Garden pansy	Non –commercial	Ornamental value	Not Reported
Tree	–	<i>Xanthocyparis vietnamensis</i>	Seeds	Golden Cy- press	Non commercial	Ornamental value	Not Reported
Herb	–	<i>Zinnia elegans</i>	Seeds	Zinnia	Commercial	Ornamental value	Not Reported



Plate 8. Some ornamental plants of Leh; a. Garden Dahlia (*Dahlia pinnata*), b. Treasure flower (*Gazania rigens*), c. Petunia (*Petunia x hybrida*), d. Red Rose (*Rosa sp.*), e. Stonecrop (*Sedum sp.*), f. Daisy (*Aster amellus*), g. Hollyhock (*Alcea rosea*), h. Sweet alison (*Alyssum maritimum*), i. Geranium (*Pelargonium x hortorum*), j. Marigold (*Tagetes minuta*), k. Royal lily (*Lilium regale*), l. Common zinnia (*Zinnia elegans*)

8. Cultivated Timber Plants /Trees

Plant Type	Local Name	Scientific Name	Habitat	Local Status	Wild/ home-Garden	Other uses (multi)	Associated TK
				Past	Present		
Tree	Starga	<i>Juglans regia</i>	Agriculture land/Kitchen Garden	Yes	Yes	Home grown	Used as timber, fuel, for construction, greening Not Reported
Tree	Yarpa	<i>Populus deloides</i>	Along the Agriculture land and water channel	Yes	Yes	Grown in both	Used as timber, fuel, construction, and greening Not Reported
Tree	Yulat	<i>Populus nigra</i>	Along the Agriculture land and water channel.	Yes	Yes	Grown in both	Used as timber, fuel, construction, and greening Not Reported
Tree	Malchang	<i>Salix alba</i>	Along the Agriculture land and water channel	Yes	Yes	Grown in both	Used as timber, fuel, for construction, greening Not Reported
Tree	Selchang	<i>Salix tetrasperma</i>	Along the Agriculture land and water channel	Yes	Yes	Grown in both	Used as timber, fuel, construction, and greening Not Reported
Tree	Thakchang	<i>Salix elegans</i>	Along the Agriculture land and water channel	Yes	Yes	Grown in both	Used as timber, fuel, construction, and greening Not Reported



Plate 9. Some Cultivated Timber Plants of Leh; a. Yulat (*Populus nigra*), b. Malchang (*Salix alba*), c. Thakchang (*Salix elegans*), d. Selchang (*Salix tetrasperma*)

9. Domestic Animals

1	2	3	4	5	6	7	8	9	10
Animal type	Local name	Scientific Name	Breed (local/ hybrid)	Features	Method of keeping	Local Status	Uses	Commercial rearing	Other details including products and services
					Past	Present			
Yak	Yak	<i>Bos grunniens</i>	Local	Strongly built, beast of burden	Usually kept outside	High count	Low count	Ploughing, Load carrier	Breeding, Transportation in winter
Yak	Dzo	<i>Bos grunniens x Bos primigenius</i>	Hybrid	Strongly built, durable	Usually outside, kept in stable also	High count	Low count	Ploughing, Load carrier	Transportation.
Cow	Balang	<i>Bos taurus</i>	Local	Weakly built Female and strongly built male	Females always kept in stable. Males are not kept in stable	Stable Population	Mulching	No	Milk, curd & other dairy products
Domestic Dog	Khee	<i>Canis lupus familiaris</i>	Local	Fierce, protective.	Usually kept in kennel	Low count	High count	Protect domestic animals as well as house	Used as protection from thieves and strangers.
Goat	Rama	<i>Capra aegagrus hircus</i>	Local	Easily domesticated	Inside shed, also kept in stable	High count	Low count	Milk and meat	Yes
Donkey	Bungbu	<i>Equus asinus</i>	Local	Load carrier	Usually kept outside	High count	Low count	Load carrier, grazing.	Used as load carrier, nowadays neglected.
Horse	Staa	<i>Equus caballus</i>	Local	Strongly built	Sometimes kept in stable	High count	Low count	Transportation	No
Domestic Cat	Bila	<i>Felis catus</i>	Local	Predator	Usually kept in house	Stable population	Predation of household rodents	No	Hairs are used in painting brushes.

Hen	Chamo/ chapo	<i>Gallus gallus domesticus</i>	Local	Easily domesticated	coop	Low count	Low count	For chicken, eggs	Yes	-
Sheep	Lug/luggy/ luk	<i>Ovis aries</i>	Local	Heavy wool on body	Inside Sheep shed, stable also	High count	Low count	Wool is used for many purposes.	Yes	Wool is used for clothing, insulation etc. some maybe used for milking



a



b



c



e



d



f

Plate 10. Some domestic animals of Leh; a- Cow (*Bos taurus*), b- Dzo (*Bos grunniens x Bos primigenius*), c- Dog (*Canis lupus familiaris*), d-Donkey (*Equus asinus*), e- Cat (*Felis catus*), f- Hen (*Gallus gallus domesticus*)

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1. Herbs and grasses

Plant type	Local name	Scientific name	Habit	Habitat	Local status	Com-mercial/ Own use	Parts collected	Associated TK	Other details
1	2	3	4	5	6	7	8	9	10
Herb	—	<i>Aquilegia fragrans</i>	Herb	Rocky and meadows	Yes	Yes	—	—	Not reported Used for medicinal purposes.
Herb	—	<i>Arabis tibetica</i>	Herb	Rocky or sandy habitats	Yes	Yes	—	—	—
Herb	Khampa nagpo	<i>Artemisia</i> sp.	Herb	Banks of streams	Yes	Yes	Own use	Whole plant	Not reported Used as a fodder
Herb	Singyalo	<i>Astragalus confertus</i>	Herb	Stony slopes	Yes	Yes	Own use	Whole plant	Not reported Used as a fodder
Herb	Singyalo	<i>Astragalus opilites</i>	Herb	Stony slopes	Yes	Yes	Own use	Whole plant	Not reported Used as a fodder species
Herb	Chels-thut	<i>Astragalus thomsonii</i>	Herb	Alpine meadows	Yes	Yes	—	—	Not reported —
Herb	—	<i>Cardamine hirsuta</i>	Herb	Grassland and Banks of stream	Yes	Yes	Own use	Whole plant	Weed or edible herb —
Herb	Snué	<i>Chenopodium karoi</i>	Herb	Roadside and barren land	Yes	Yes	Own use	Leaf	Weed or edible herb —

Herb	Tata kanou	<i>Chesneya cuneata</i>	Herb	Stony slopes	Yes	Yes	Own use	Whole plant	Not reported	Used as fodder species.
Herb	Lzangzer	<i>Cirsium arvense</i>	Herb	Banks of streams and rivers	Yes	Yes	Own use	Whole plant	Not reported	Used as a fodder and fuel.
Herb	Spangyan snonpo	<i>Comastoma pedunculatum</i>	Herb	Alpine meadows and pastures	Yes	Yes	Own use	Whole plant	Not reported	Used as a fodder.
Herb	Ekzima	<i>Echinops cornigerus</i>	Herb	Baren land and roadside	Yes	Yes	—	—	Not reported	—
Herb	Tesma	<i>Iris lactea</i>	Herb	Riverbanks and Baren and near cultivated land	Yes	Yes	Own use	Whole plant	Ornamental and aesthetic value	Fodder species
Herb	Khalsak	<i>Lactuca tatarica</i>	Herb	Meadows and near cultivated land	Yes	Yes	Own use	Whole plant.	Not reported	Young plant consume as vegetables.,
Herb	Hong len	<i>Lagotis cashmeriana</i>	Herb	Rocky slopes, grasslands and meadows	Yes	Yes	Own use	Roots	Has medicinal value	—
Herb	Palu, Tzigma	<i>Leontopodium ochroleucum</i>	Herb	Moist rocky slopes, meadows	Yes	Yes	Own use	Whole plant	Parts of this sacred plants are used a incense in Buddhist community with ornamental and aesthetic value	—
Herb	Shang-sho	<i>Lepidium latifolium</i>	Herb	Stony slopes, along streams	Yes	Yes	Own use	Whole plant	Leaves are nutritious and are consumed as vegetables	—
Herb	Shamalolo	<i>Nepeta floccosa</i>	Herb	Rocky and dry slopes	Yes	Yes	Own use	Leaf	Used as flavouring agent in local dishes like 'Tangtur'	—

Herb	Zatuk-pa	<i>Nepeta leucoleaena</i>	Herb	Rocky crevices, dry slopes	Yes	Yes	Own use	Whole plant	Not reported	Used as a fodder
Herb	Lgantser	<i>Onopordum acanthium</i>	Herb	Road side and dry slope	Yes	Yes	Own use	Whole plant	Not reported	Used as a Fodder
Herb	Lung-sho	<i>Oxyria digyna</i>	Herb	Stony areas, near streams, near grasslands	Yes	Yes	Own use	Leaf	Not reported	Leaf is edible and has medicinal properties
Herb	Rechakpa	<i>Oxytropis microphylla</i>	Herb	Rocky and open dry slopes	Yes	Yes	Own use	Whole plant	Not reported	Used as a fodder
Herb	Lugru marpo	<i>Pedicularis punctata</i>	herb	Marshes and river banks.	Yes	Yes	Own use	Whole plant except root	Not reported	Use to diffuse toxins in body
Herb	Lugru serpo	<i>Pedicularis longiflora</i>	Herb	Marshes, river banks	Yes	Yes	Own use	Whole plant	Flower used in traditional medicine	Used as fodder and also used in traditional medicine.
Herb	Toma	<i>Potentilla anserina</i>	Herb	Wet grassland	Yes	Yes	Own use	Root	Young roots are consumed by local inhabitant	—
Herb	—	<i>Potentilla pamirica</i>	Herb	Alpine meadows, dry stony slopes	Yes	Yes	Own use	Leaf	Used as fodder	—
Herb	Chaipteh mentok	<i>Ranunculus longicaulis</i>	Herb	Wet meadows with along streams	Yes	Yes	Own use	Whole plant	Aesthetic value	Fodder species
Herb	—	<i>Ranunculus trilobus</i>	Herb	Open slopes and dry alpine areas	Yes	Yes	Own use	Leaf	Used as fodder	—

Herb	Lung-sho	<i>Rumex acetosa</i>	Herb	Moist places and roadside areas	Yes	Yes	Own use	Leaf	Leaves consumed by people as vegetables, has medicinal values also	-
Herb	Shoma	<i>Rumex patientia</i>	Herb	Roadsides, banks of irrigation canals.	Yes	Yes	Own use	Leaf	Young leaves are consumed by local inhabitant	-
Herb	Shurupa	<i>Sedum ewersii</i>	Herb	Stony slopes, dry areas	Yes	Yes	Own use	Leaf	Plant consumed as vegetable	-
Herb	-	<i>Sedum sp.</i>	Herb	Dry stony slopes	Yes	Yes	Own use	Leaf	Used as a vegetable and Salad	-
Herb	Khuamenla	<i>Silene moorcroftiana</i>	Herb	Slopes and rocky slopes	Yes	Yes	Own use	Leaf	Used as a fodder	-
Herb	Dakshall	<i>Silene rechingerii</i>	Herb	Alpine meadows	Yes	Yes	Own use	Whole plant	Not reported	Used as forage species by livestock
Herb	-	<i>Sonchus sp.</i>	Herb	Baren land and roadside	Yes	Yes	Own use	Leaf	Leaves are eaten as salad greens or cooked like spinach	-
Herb	Khalta	<i>Stellaria graminea</i>	Herb	Wet habitat	Yes	Yes	Own use	Whole plant.	Not reported	Used as a Fodder
Herb	-	<i>Stellaria media</i>	Herb	Baren and roadside	Yes	Yes	Own use	Leaf	Used as fodder	-
Herb	Khamchu	<i>Tanacetum gracile</i>	Herb	Stony slopes and dry river bed	Yes	Yes	Own use	Whole plant	Flower used for religious purpose.	Used as a fodder and fuel.
Herb	-	<i>Veronica anagalloides</i>	Herb	Baren land and roadside	Yes	Yes	Own use	Leaves	Used as fodder	-

Herb	—	<i>Veronica polita</i>	Herb	Baren land and roadside	Yes	Yes	Own use	Leaves	Used as fodder	—
Herb	Leomentok	<i>Viola kunawurensis</i>	Herb	Grasslands and alpine meadows	Yes	Yes	Own use	Whole plant	Not reported	Used as a fodder species
Grass	Chips—kyang	<i>Agrostis gigantea</i>	Herb	Mountain, grass-land, shaded field margins	Yes	Yes	Own use	Leaves	Used in the making of household usage brooms	—
Grass	Rtsa	<i>Carex</i> sp.	Herb	Forms mats on river banks, meadows, grasslands, nearby pools or wetlands	Yes	Yes	Own use	Whole plant	Not reported	Used as fodder
Grass	Rtsa Dam-bu	<i>Cortaderia selliana</i>	Herb	Found in meadows and nearby fields	Yes	Yes	Own use	Whole plant	Not reported	Used as fodder
Grass	—	<i>Cynodon dactylon</i>	Herb	Gardens, lawns, fields, and roadside	Yes	Yes	Own use	Leaf	Used as fodder	—
Grass	—	<i>Digitaria</i> sp.	Herb	Alpine meadows	Yes	Yes	Own use	Whole plant	Not reported	Used as fodder
Grass	Nyuk-rang	<i>Elymus nutans</i>	Herb	Gravel and rocky areas in the open slopes or near human habitat	Yes	Yes	Own use	Whole plant	Not reported	Used as fodder
Grass	—	<i>Festuca brevipila</i>	Herb	Baren land and roadside	Yes	Yes	Own use	Leaves	Used as fodder	—
Grass	—	<i>Festuca</i> sp.	Herb	Baren land and roadside	Yes	Yes	Own use	Leaves	Used as fodder	—

Grass	Rtsa	<i>Kobresia</i> sp.	Grass	In the grasslands along streams, alpine meadows	Yes	Yes	Own use	Whole plant	Not reported	Used as fodder
Grass	—	<i>Oxalis</i> sp.	Herb	Baren lands, and roadside	Yes	Yes	—	—	Not reported	—
Grass	—	<i>Pennisetum flaccidum</i>	Herb	Along roads, weedy in field and around field margins	Yes	Yes	Own use	Whole plant	Not reported	Used as fodder
Grass	—	<i>Poa annua</i>	Herb	Alpine grasslands, and bare lands	Yes	Yes	Own use	Whole plant	Not reported	Used as fodder
Grass	Pilli	<i>Stipa orientalis</i>	Herb	Open slopes and dry alpine areas	Yes	Yes	Own use	Leaf	Used as fodder	—
Grass	—	<i>Stipa turkestanica</i>	Herb	Mountain slopes, steppe grasslands	Yes	Yes	Own use	Whole plant	Not reported	Used as fodder

2. Shrubs and Climbers

1	2	3	4	5	6	7	8	9	10
Plant type	Local name	Scientific name	Habit	Habitat	Local status	Commercial/ Own use	Parts collected	Associated TK	Other details
Shrub	Umbuu	<i>Myricaria elegans</i>	Shrub	Banks of river and stream	Yes	Yes	Own use	Whole plant	Source of fuel and fodder
Shrub	Kabra	<i>Capparis spinosa</i>	Shrub	Dry rocks and stony slopes	Yes	Yes	Own use	Leaf and shoot	Young leaves and shoots are consumed by local people
Shrub	Umbu	<i>Myricaria germanica</i>	Shrub	Banks of streams	Yes	Yes	Own use	Whole plant	Snow leopards are known use to consume the leaves of this family, which may help in digestion
Shrub	Siah, mad-po	<i>Rosa webbiana</i>	Shrub	Banks of river and stream	Yes	Yes	Own use	Whole plant	Flowers are used in herbal tea and other drinks.
Shrub	Tsesta lulu	<i>Hippophae rhamnoides</i>	Shrub	Along the water channel	Yes	Yes	Own/Commercial use	Whole plant	Sea buckthorn berries are considered a superfood due to their high nutritional content. They are rich in vitamins, minerals and omega-3, -6, -7, and -9 fatty acids.

Climber	Shasnya	<i>Clematis orientalis</i>	Climber	Dry areas/River banks and cultivated areas	Yes	yes	
Climber	Tiklikmo	<i>Convolvulus arvensis</i>	Climber	Found in lawns, roadside and cultivated areas.	Yes	Yes	Used as fodder species



Plate 11. Glimpses of some shrubs and climbers of Leh; a. *Myricaria elegans*, b. *Rosa webbiana*, c. *Convolvulus arvensis*, d. *Hippophae rhamnoides*

3. Plants of Medicinal Importance

1	2	3	4	5	6	7	8	9
Plant Type	Local Name	Scientific Name	Variety	Landscape / Habitat	Local status	Associated TK	Uses (Usage)	Parts used
Herb	Pisums	<i>Arctium lappa</i>	Wild	Non-agricultural and Barren land	Yes	Used to treat urinary problems and kidney ailments	Root extract mixed with <i>Bergenia ligulata</i> (roots); <i>Spondias axillaris</i> (fruits) + minerals and medicinal stones	Roots
Herb	Demok	<i>Arnebia guttata</i>	Wild	Non-agricultural and Barren land	Yes	Medicinal use	To promote blood circulation, to counteract toxicity, and to facilitate eruption	Whole plant
Herb	—	<i>Artemisia</i> sp.	Wild	Non-agricultural and Barren land	Yes	Artemisia amygdalina, and some other Artemisia species are known use for their potential medicinal properties, including being used as antimarial, antiparasitic, and anti-inflammatory agents.	Essential oils are known use for their distinctive fragrance and may have applications in aromatherapy, traditional medicine, or perfumery	Whole plant
Herb	Shok-ka-pa	<i>Capsella</i> sp.	Wild	Non-agricultural and Barren land	Yes	—	It is reputed to have astrin-gent and hemostatic proper-ties, leading to its historical use to help control bleeding and treat minor wounds	Whole plant

Herb	Lanthang	<i>Datura stramonium</i>	Wild	Near river Banks	Yes	Yes	Contains tropane alkaloids, including atropine, scopolamine, and hyoscyamine, which can be highly toxic to humans and animals	Flower & Seeds
Herb	Tsepad	<i>Ephedra gerardiana</i>	Wild	Non-agricultural and Barren land	Yes	Yes	It is used for many years in traditional medicine to treat allergies, bronchial asthma, chills, colds, coughs, edema, fever, flu, headaches, and nasal congestion.	It is source of natural alkaloids such as ephedrine, pseudoephedrine, and other related compounds. Whole plant
Herb	Tsepad	<i>Ephedra intermedia</i>	Wild	Non-agricultural and Barren land	Yes	Yes	—	— Whole plant
Herb	Tsepad	<i>Ephedra regeliana</i>	Wild	High altitude stony slope	Yes	Yes	—	Important food source for wild life Whole plant
Herb	Oma tsa	<i>Euphorbia tibetica</i>	Wild	Non-agricultural and Barren land	Yes	Yes	Having antiproliferative activity or anti-angiogenic effects	— Aerial parts
Herb	Gya-lantang	<i>Hyoscyamus niger</i>	Wild	Non-agricultural and Barren land	Yes	Yes	It is used in traditional herbal medicine for ailments of the bones, rheumatism, toothache, asthma, cough, nervous diseases, and stomach pain. It might also be used as analgesic, sedative, and narcotic in some cultures	— Seeds

Herb	Zhang	<i>Gentiana</i> sp.	Wild	Open slopes, wetlands, moist meadows.	Yes	Yes	Roots used in traditional medicine as sedative, regulates urine discharge, and controls burning sensation of urine	–	Roots
Herb	Dam–bu–ka–ra–machog	<i>Hippuris vulgaris</i>	Wild	Non-agricultural and Barren land	Yes	Yes	Leaf and stem are used in traditional medicine, it treats fever of the lungs, hepatic disease, fever of nerves, bones inflammation, brown use phlegm and lungs inflammation	–	Leaves and stem
Herb	Takta	<i>Inula rhizocarpa</i>	Wild	Non-agricultural, Barren and grazing land	Yes	Yes	Its roots have been used to make various herbal preparations, and it has been believed to have expectorant, anti-inflammatory, and diuretic properties.	–	Whole plant
Herb	Khaslak	<i>Lactuca tatarica</i>	Wild	Non-agricultural, Barren and grazing land	Yes	Yes	It is used for its potential soothing and sedative properties, often in the form of herbal teas or tinctures.	–	Leaf
Herb	Chagna	<i>Lancea tibetica</i>	Wild	Non-agricultural, Barren and grazing land	Yes	Yes	Used for preparing traditional health tonic, treats various kinds of diseases like: pulmonary diseases, diphtheria, lungs inflammation, cardiac diseases, amenorrhea, blood tumours, wounds, large intestine tumours	Shade dried Whole plant grounded along with seeds of <i>Punica granatum</i> , rhizomes of <i>Zingiber officinale</i> , minerals and rock salt, then made into small tablets. Three tablets are given twice a day till recovery from cold and cough	Whole plant
Herb	Phololing	<i>Mentha longifolia</i>	Herb	Non-agricultural, Barren and grazing land	Yes	Yes	In traditional herbal medicine, wild mint has been used for its potential digestive and calming properties	Leaves can be used to add a refreshing minty flavour to various dishes, salads, teas, and beverages.	Leaf

Herb	Shamalolo	<i>Nepeta discolor</i>	Wild	Non-agricultural, Barren and graz- ing land	Yes	Yes	Used for medicinal purposes (a decoction of leaves is given with common salt thrice a day to treat cold, cough and fever for 5–7 days)	–	Whole plant
Herb	Chum-tse	<i>Oxyria digyna</i>	Wild	Non-agricultural, Barren and graz- ing land	Yes	Yes	The leaves are rich in vitamin C and are used to treat scurvy. The roots, stems and leaves are cooked and eaten in the treatment of dysentery	Consume as a vegetable	Whole plant
Herb	Balti-shukpa	<i>Peganum harmala</i>	Wild	Non-agricultural, Barren and graz- ing land	Yes	Yes	Dried seeds and leaves are pounded and used as a remedy of fever. One to two grams powder is usually given twice a day for 6–7 days	Seeds have medicinal value and the plant is considered as sacred by Islamic community	Seeds and Whole plant
Herb	Lantang	<i>Psychotria praetexta</i>	Herb	Non-agricultural, Barren and graz- ing land	Yes	Yes	It has the belladonna-like property of causing mydriasis and is also used there as a topical medication in the treatment of boils	Root is poisonous	Roots
Herb	Tha-ram	<i>Plantago depressa</i>	Wild	Non-agricultural, Barren and graz- ing land	Yes	Yes	Plantain seeds contain up to 30% mucilage which swells up in the gut, acting as a bulk laxative and soothing irritated membrane	–	–

Herb	Lachu	<i>Rheum tibeticum</i>	Wild	Non-agricultural, Barren and grazing land	Yes	Yes	Used as an ingredient of many herbal formulations, which are used for the cure of various ailments, in particular the regulation of blood pressure, fat, hepatitis, fever and cancer.	Plants is edibles taken by people as raw.	Root and shoots
Herb	Kongpa-gab-skyes	<i>Saussurea nepalensis</i>	Wild	Non-agricultural, Barren and grazing land	Yes	Yes	Used in traditional medicine for treating blood related ailments	—	Roots
Herb	Yakzes	<i>Stachys tibetica</i>	Wild	Non-agricultural, Barren and grazing land	Yes	Yes	Treatment of various mental disorders and phobias	Used as a roofing material	Whole plant
Herb	Khurkhum	<i>Taraxacum officinale</i>	Wild	Non-agricultural, Barren and grazing land	Yes	Yes	Used in the treatment like hypertension, diabetes, dyspepsia, irritable bowel syndrome, and ovarian androgen excess.	Young leaves and shoots are used in local dishes	Leaves and shoot
Herb	—	<i>Thalictrum minus</i>	Wild	Non-agricultural, Barren and grazing land	Yes	Yes	Used for the treatment of lung inflammation, bacterial and fungal infection and tuberculosis	—	Leaves
Herb	Zatsot	<i>Urtica hyperborea</i>	Wild	Non-agricultural, Barren and grazing land	Yes	Yes	It has been long used for gout in traditional Tibetan medicine and is closely related to the effect of reducing uric acid	Leaves and tender shoots of the plant are use in local cuisine	Leaves and shoots
Herb	—	<i>Viola kunawurenensis</i>	Wild	Non-agricultural, Barren and grazing land	Yes	Yes	The dried plant has long been used as traditional medicine to treat various ailments such as pharyngalgia, headache, fever and acute pyogenic infection	—	Whole plant
Shrub	Testa lulu	<i>Hippophae rhamnoides</i>	Wild	Non-agricultural and Barren	Yes	Yes	It possesses strong antioxidant properties so it is used to improve blood pressure and lipids, to prevent and control cardiovascular symptoms (eg angina), to reduce free radicals levels and prevent atherosoma.	Sea buckthorn berries are considered a superfood due to their high nutritional content. They are rich in vitamins, minerals and omega-3, -6, -7, and -9 and fatty acids	Whole plant

Shrub	–	<i>Lonicera spinosa</i>	Wild	Non-agricultural, Barren and graz- ing land	Yes	Yes	It cures heart and gynaecological, asthma, headache disease	–	Flower, seeds and leaves
Shrub	Siah, marpo	<i>Rosa webbiana</i>	Wild	Non-agricultural, Barren and graz- ing land	Yes	Yes	Flowers are used as an appetite stimu- lant, while the decoction of the fruit is used to cure asthma and diarrhea. Its drink is consumed to treat impotence and jaundice, as well as to maintain good health. It is used in inflamma- tion, and mouth ulcers, to counter chest infections, nasal bleeding, nasal swelling, hepatitis, and liver disorders, memory enhancer, and as a brain tonic.	The plant has established neuroprotective, antioxi- dant, cytoprotective, and anticonvulsant action. Flowers are used in herbal tea and other drinks	Whole plant
Herbs	–	<i>Solanum nigrum</i>	Wild	Non-agricultural, Barren and graz- ing land	Yes	Yes	Used in treating pneumonia, aching teeth, stomach ache, tonsillitis, wing worms, pain, inflammation and fever, tumor, inflammation, and also as he- paprotective, diuretic, antipyretic	The fruits are used as a tonic, laxative, appetite stimulant, and for treating asthma.	Whole plant



Plate 12. Some Medicinal Plants of Leh; a. *Datura stramonium*, b. *Ephedra gerardiana*, c. *Mentha longifolia*, d. *Peganum harmala*, e. *Solanum nigrum*, f. *Physochlaina praeculta*, g. *Taraxacum officinale*, h. *Inula rhizocephala*, i. *Nepeta discolor*, j. *Arnebia euchroma*, k. *Arcticum lappa*, l. *Rosa webbiana*

4. Wild Animals (Mammals)

1	2	3	4	5	6	7	
Animal Type	Local Name	Common name	Scientific Name	Habitat	Season when seen	Local status	
						Past	Present
Mammal	Skinn	Himalayan ibex	<i>Capra sibirica</i>	Mountain	All season	Yes	Yes
Mammal	Sabilik	House mouse	<i>Mus musculus</i>	Mountain	All season	Yes	Yes
Mammal	Lakimo	Mountain weasel	<i>Mustela altaica</i>	Mixed habitat	All season	Yes	Yes
Mammal	Shapo	Ladakh Uriyal	<i>Ovis vignei</i>	—	Oct-March	Yes	Yes
Mammal	Vatse	Red fox	<i>Vulpes vulpes</i>	Rocky and dry places	All season	Yes	Yes



Plate 13: Some glimpses of mammals of Leh; a. Ladakh Urial (*Ovis vignei*), b. Mountain weasel (*Mustela altaica*), c. Asiatic ibex (*Capra ibex sibirica*), d. Himalayan red fox (*Vulpes vulpes*)

5. Birds

1	2	3	4	5	6	7	
Animal Type	Local Name	Common name	Scientific Name	Habitat	Season when seen	Local status	
						Past	Present
Bird	Lag–rgot	Northern Goshawk	<i>Accipiter gentilis</i>	Vegetated area	Passage migrant	Yes	Yes
Bird	Chip–thra	Eurasian sparrow-hawk	<i>Accipiter nisus</i>	vegetated area	All season	Yes	Yes
Bird	Srakpa	Chukar partridge	<i>Alectoris chukar</i>	Mountain	All season	Yes	Yes
Bird	—	Rosy pipit	<i>Anthus roseatus</i>	Water body	Passage migrant	Yes	Yes
Bird	—	Water pipit	<i>Anthus spinolletta</i>	Water body	Winter visitor	Yes	Yes
Bird	—	Tree pipit	<i>Anthus trivialis</i>	Vegetated area	Passage migrant	Yes	Yes
Bird	Hyuk–rta	Common swift	<i>Apus apus</i>	Marshy land	Summer visitor	Yes	Yes
Bird	Lak–nak	Golden eagle	<i>Aquila chrysaetos</i>	Mountains	All season	Yes	Yes
Bird	Ukpa	Long-eared owl	<i>Asio otus</i>	Vegetated area	Passage migrant	Yes	Yes
Bird	Ukpa–bulu	Little owl	<i>Athene noctua</i>	Dry habitat	All season	Yes	Yes
Bird	Ukpa	Eurasian eagle owl	<i>Bubo bubo</i>	Mountain	All season	Yes	Yes
Bird	Chiu–barzi	Cattle egret	<i>Bubulcus ibis</i>	Water body	Passage migrant	Yes	Yes
Bird	—	Common buzzard	<i>Buteo buteo</i>	Mixed Habitat	Winter visitor	Yes	Yes
Bird	—	Himalayan buzzard	<i>Buteo reductus</i>	Mixed Habitat	Winter visitor	Yes	Yes
Bird	—	European goldfinch	<i>Carduelis carduelis</i>	Vegetated area	Summer visitor	Yes	Yes

Bird	Ichu–idma/	Common rosefinch	<i>Carpodacus erythrinus</i>	Vegetated area	Summer visitor	Yes	Yes
Bird	Lamachipa	Great rosefinch	<i>Carpodacus rubicilla</i>	Dry habitat	All season	Yes	Yes
Bird	Idmar–thikchan	Streaked Rosefinch	<i>Carpodacus rubicilliodes</i>	Dry habitat	All season	Yes	Yes
Bird	—	Fire capped tit	<i>Cephalopyrus flammiceps</i>	Vegetated area	Passage migrant	Yes	Yes
Bird	Tumbu–tangkar	White-throated dipper	<i>Cinclus cinclus</i>	Water body	All season	Yes	Yes
Bird	Chipa–tilli	Brown use dipper	<i>Cinclus pallasi</i>	Water body	All season	Yes	Yes
Bird	Phurgon	Rock pigeon	<i>Columba livia</i>	Human habitation	All season	Yes	Yes
Bird	Cha–thaga–bullu	Oriental magpie robin	<i>Copsychus saularis</i>	Vegetated area	Vagrant	Yes	Yes
Bird	—	Eurasian cuckoo	<i>Cuculus canorus</i>	Vegetated area	Summer visitor	Yes	Yes
Bird	—	Lesser whitethroat	<i>Curruca curruca</i>	vegetated area	Summer visitor	Yes	Yes
Bird	—	Common house martin	<i>Delichon urbicum</i>	Mountain	Summer visitor	Yes	Yes
Bird	—	Black drongo	<i>Dicrurus macrocercus</i>	Vegetated area	Vagrant	Yes	Yes
Bird	Dak–chi	Rock bunting	<i>Emberiza cia</i>	Vegetated area	Summer visitor	Yes	Yes
Bird	Ukpo–thakir	Horned lark	<i>Eremophila alpestris</i>	Mountain	All season	Yes	Yes
Bird	—	Asian koel	<i>Eudynamys scolopaceus</i>	Vegetated area	Passage migrant	Yes	Yes
Bird	Tha–mignak	Eurasian hobby	<i>Falco subbuteo</i>	Marshy habitat	Summer visitor	Yes	Yes
Bird	Thaa	Eurasian kestrel	<i>Falco tinnunculus</i>	Vegetated area	All season	Yes	Yes

Bird	Ting–tilling	Solitary snipe	<i>Gallinago solitaria</i>	Water body	Winter visitor	Yes	Yes
Bird	Skyag lak	Bearded vulture	<i>Gypaetus barbatus</i>	Mountain	All season	Yes	Yes
Bird	Thangkar	Himalayan vulture	<i>Gyps himalayensis</i>	Mountain	All season	Yes	Yes
Bird	Kuz–mok	Booted eagle	<i>Hieraetus pennatus</i>	Vegetated area	Summer visitor	Yes	Yes
Bird	Chiu jara/	Barn swallow	<i>Hirundo rustica</i>	Vegetated area	Passage migrant	Yes	Yes
Bird	Chiu shanzan	Long-tailed shrike	<i>Lanius schach</i>	Vegetated area	Summer visitor	Yes	Yes
Bird	Chiu–thasuk	White-browed tit warbler	<i>Leptopoecile sophiae</i>	Vegetated area	All season	Yes	Yes
Bird	—	Twite	<i>Linaria flavirostris</i>	Dry habitat	All season	Yes	Yes
Bird	Khata	Black kite	<i>Milvus migrans</i>	Vegetated area	Summer visitor	Yes	Yes
Bird	Dakchi–sngonpo	Blue rock thrush	<i>Monticola solitarius</i>	Dry habitat	Summer visitor	Yes	Yes
Bird	Richi–shoknak	Black-winged snowfinch	<i>Montifringilla adamsi</i>	Mountain	All season	Yes	Yes
Bird	Rol–bi	White wagtail	<i>Motacilla alba</i>	Water body	Summer visitor	Yes	Yes
Bird	Chiu–lukzee	Grey wagtail	<i>Motacilla cinerea</i>	Water body	All season	Yes	Yes
Bird	—	Yellow wagtail	<i>Motacilla flava</i>	Human habitation	Passage migrant	Yes	Yes
Bird	Chiu–sterzi	Citrine wagtail	<i>Motacilla citreola</i>	Water body	Summer visitor	Yes	Yes
Bird	Chu–shark	Blue whistling thrush	<i>Myophonus caeruleus</i>	Water body	All season	Yes	Yes
Bird	Seri–mayon	Indian golden oriole	<i>Oriolus kundoo</i>	Vegetated area	Summer visitor	Yes	Yes

Bird	—	Cinereous tit	<i>Parus cinereus</i>	Vegetated area	All season	Yes	Yes
Bird	Chipa—gyao	House sparrow	<i>Passer domesticus</i>	Human habitation	All season	Yes	Yes
Bird	Sintik	White-winged redstart	<i>Phoenicurus erythrogaster</i>	Vegetated area	All season	Yes	Yes
Bird	Sintik	White-capped water redstart	<i>Phoenicurus leucocephalus</i>	Water body	Winter visitor	Yes	Yes
Bird	Sintik—nakpo	Black redstart	<i>Phoenicurus ochruros</i>	Vegetated area	Summer visitor	Yes	Yes
Bird	—	Tickell's leaf warbler	<i>Phylloscopus affinis</i>	Vegetated area	Summer visitor	Yes	Yes
Bird	—	Common chiffchaff	<i>Phylloscopus collybita</i>	Vegetated area	Passage migrant	Yes	Yes
Bird	—	Sulphur-bellied warbler	<i>Phylloscopus griseolus</i>	Dry habitat	Summer visitor	Yes	Yes
Bird	—	Humes leaf warbler	<i>Phylloscopus humei</i>	Vegetated area	Summer visitor	Yes	Yes
Bird	—	Mountain chiffchaff	<i>Phylloscopus sindianus</i>	Vegetated area	Summer visitor	Yes	Yes
Bird	—	Greenish warbler	<i>Phylloscopus trochiloides</i>	Vegetated area	Summer visitor	Yes	Yes
Bird	Khata—thago/	Eurasian magpie	<i>Pica pica</i>	Vegetated area	All season	Yes	Yes
Bird	Tsildir	Alpine accentor	<i>Prunella collaris</i>	Mountain	All season	Yes	Yes
Bird	Tsildir	Brown use accentor	<i>Prunella fulvescens</i>	Vegetated area	All season	Yes	Yes
Bird	Altai—tsildir	Altai accentor	<i>Prunella himalayana</i>	Vegetated area	Winter visitor	Yes	Yes
Bird	Tsilder	Robin accentor	<i>Prunella rubeculoides</i>	Vegetated area	All season	Yes	Yes
Bird	Tsildir	Rufous breasted accentor	<i>Prunella strophiata</i>	Vegetated area	All season	Yes	Yes

Bird	Kalak–kukti	Eurasian crag matin	<i>Ptyonoprogne rupestris</i>	mountain	Summer visitor	Yes	Yes
Bird	Chungka–khaser	Yellow-billed chough	<i>Pyrrhocorax graculus</i>	Dry habitat	All season	Yes	Yes
Bird	Chunka–khamar	Red-billed chough	<i>Pyrrhocorax pyrrhocorax</i>	Dry habitat	All season	Yes	Yes
Bird	—	Plumbeous red-start	<i>Rhnocoris fuliginosa</i>	Water body	Winter visitor	Yes	Yes
Bird	—	Bank swallow	<i>Riparia riparia</i>	Vegetated area	Passage migrant	Yes	Yes
Bird	—	Siberian stonechat	<i>Saxicola maurus</i>	Vegetated area	Passage migrant	Yes	Yes
Bird	Spalba–mebar	Fire fronted serin	<i>Serinus pusillus</i>	Vegetated area	All season	Yes	Yes
Bird	Gondi–lang	Laughing dove	<i>Spilopelia senegalensis</i>	Human habitation	Summer visitor	Yes	Yes
Bird	Gondi–skyao	Eurasian collared dove	<i>Streptopelia decaocto</i>	Vegetated area	Passage migrant	Yes	Yes
Bird	Murgon	Oriental turtle dove	<i>Streptopelia orientalis</i>	Vegetated area	Summer visitor	Yes	Yes
Bird	Koshen chipa	European starling	<i>Sturnus vulgaris</i>	Vegetated area	Passage migrant	Yes	Yes
Bird	Ribja	Himalayan snow-cock	<i>Tetraogallus himalayensis</i>	Mountain	All season	Yes	Yes
Bird	Tecok	Tibetan snowcock	<i>Tetraogallus tibetanus</i>	Mountain	All season	Yes	Yes
Bird	Takla mebar	Wallcreeper	<i>Trichodroma muraria</i>	Mountain	All season	Yes	Yes
Bird	Ldok–bi	Green sandpiper	<i>Tringa ochropus</i>	Water body	All season	Yes	Yes
Bird	Chiu khamchuchik	Eurasian wren	<i>Troglodytes troglodytes</i>	Water body	All season	Yes	Yes
Bird	Sharika–skenak	Black-throated thrush	<i>Turdus atrogularis</i>	Vegetated area	Winter visitor	Yes	Yes

Bird	Sharika-skemar	Red-throated thrush	<i>Turdus ruficollis</i>	Vegetated area	Winter visitor	Yes	Yes
Bird	—	Tickell's thrush	<i>Turdus unicolor</i>	Vegetated area	All season	Yes	Yes
Bird	Utu tutse	Eurasian hoopoe	<i>Upupa epops</i>	Vegetated area	Summer visitor	Yes	Yes



Plate 14. Some glimpses of birds of Leh; a. Blue rock thrush (*Monticola solitarius*), b-Black redstart (*Phoenicurus ochruros*), c. Citrine Wagtail (*Motacilla citreola*), d. Eurasian hoopoe(*Upupa epops*), e. House sparrow (*Passer domesticus*), f. Common Rosefinch (*Carpodacus erythrinus*), g. Bearded vulture (*Gypaetus barbatus*), h. White-winged Redstart (*Phoenicurus erythrogaster*), i. Robin Accentor (*Prunella rubeculoides*), j. Eurasian Hobby (*Falco subbuteo*), k. Oriental turtle dove (*Streptopelia turtur*), l. Red billed choug (*Pyrrhocorax pyrrhocorax*), m. Long tailed shrike (*Lanius schach*)

6. Reptile, Fishes and Insects

1	2	3	4	5	6	7	
Animal Type	Local Name	Common name	Scientific Name	Habitat	Season when seen	Local status	
						Past	Present
Reptiles	Lama— galchik	Himalayan rock agama	<i>Paralaudakia himalayana</i>	Dry area	All season	Yes	Yes
Fishes	Nya	Common minnow	<i>Phoxinus phoxinus</i>	Freshwater streams and ponds	All season	Yes	Yes
Fishes	Nya	Leh triphophysa loach	<i>Triphophysa microps</i>	Freshwater streams	All seasons	Yes	Yes
Insect	—	Dung beetle	<i>Aphodius</i> sp.	Dung	Summer	Yes	Yes
Insect	—	Ladakh tortoise-shell	<i>Aglais ladakensis</i>	Vegetated area	Summer	Yes	Yes
Insect	Penzay	Aphid	<i>Aphis</i> sp.	vegetated area	Summer	Yes	Yes
Insect	Pema laptsé	High brown silverspot	<i>Argynnis jainadeva</i>	Vegetated area	Summer	Yes	Yes
Insect	Buunga	Bumblebee	<i>Bombus trifasciatus</i>	Vegetated area	Summer	Yes	Yes
Insect	Pema laptsé	Hill hedge blue	<i>Celastrina argiolus kollaris</i>	Vegetated area	Summer	Yes	Yes
Insect	—	Ladybird	<i>Coccinellidae</i> sp.	Vegetated area	Summer	Yes	Yes
Insect	—	Pale clouded yellow	<i>Colias erate</i>	Vegetated area	Summer	Yes	Yes
Insect	—	Ladakh clouded yellow	<i>Colias ladakensis</i>	Vegetated area	Summer	Yes	Yes
Insect	—	—	<i>Coleoptera</i> sp.	Vegetated area	Summer	Yes	Yes
Insects	Burpa	—	<i>Cyphogenia</i> sp.	Human habitation	Summer	Yes	Yes
Insect	—	Earwig	<i>Dermoptera</i> sp.	Mixed habitat	Summer	Yes	Yes

Insect	Rau	Shore fly	<i>Ephydriidae</i> sp.	Stagnant wa-ter body	Summer	Yes	Yes
Insect	Bua	Drone fly	<i>Eristalis tenax</i>	Mixed habitat	summer	Yes	Yes
Insect	–	Diptera	<i>Graphomya maculata</i>	Mixed habitat	Summer	Yes	Yes
Insect	Pema laptse	/ White edged rock brown	<i>Hipparchia parisatis</i>	Vegetated area	Summer	Yes	Yes
Insect	–	Tawny meadow brown	<i>Hyponephele pulchella</i>	Vegetated area	Summer	Yes	Yes
Insect	–	Woodlouse	<i>Isopod species</i>	Vegetated area	Summer	Yes	Yes
Insect	–	Common wall	<i>Lasiommata chakra</i>	Vegetated area	Summer	Yes	Yes
Insect	Parpar tse	Moth	<i>Lepidoptera</i> sp.	Mixed habitat	Summer	Yes	Yes
Insect	–	Silver fish	<i>Lepisma</i> sp.	Human habi-tation	All season	Yes	Yes
Insect	–	Diptera	<i>Lispe</i> sp.	Stagnant Wa-ter body	Summer	Yes	Yes
Insect	–	Grasshopper	<i>Locusta migratoria</i>	Vegetated area	Summer	Yes	Yes
Insect	Rau	Common green bottlefly	<i>Lucilia sericata</i>	Mixed habitat	Summer	Yes	Yes
Insect	–	Common cooper	<i>Lycaena phlaeas</i>	Vegetated area	Summer	Yes	Yes
Insect	–	Hymenoptera	<i>Megachile rotundata</i>	Mixed habitat	Summer	Yes	Yes
Insect	Rau	Housefly	<i>Musca domes-tica</i>	Mixed habitat	Summer	Yes	Yes
Insect	Butsik –marpo	Berry bug	<i>Neotrombicula autumnalis</i>	Vegetated area	All season	Yes	Yes
Insect	–	Lygaeidae	<i>Nysius</i> sp.	Dry area	Summer	Yes	Yes

Insect	Chuski– gyalmo/	Dragonfly	<i>Odonata</i> sp.	Vegetated area	Summer	Yes	Yes
Insect	Bungbu gyalpo/	Wood louse	<i>Oniscidea</i> sp.	Human habitation	All season	Yes	Yes
Insect	Bua	Wasp	<i>Podalonia hirsuta</i>	Mixed habitat	Summer	Yes	Yes
Insect	Rau	Tachinid fly	<i>Peleteria varia</i>	Mixed habitat	summer	Yes	Yes
Insect	–	Physiphora	<i>Physiphora elba</i>	Mixed habitat	Summer	Yes	Yes
Insect	Bua	Wasp species	<i>Pimpla</i> sp.	Mixed habitat	Summer	Yes	Yes
Insect	–	Leaf beetle	<i>Plagiодera versicolora</i>	Salix leaves	Summer	Yes	Yes
Insect	–	Yellow dung fly	<i>Scathophaga stercoraria</i>	Mixed habitat	Summer	Yes	Yes
Insect	–	Spider	<i>Arachnids</i> sp.	Mixed habitat	Summer	Yes	Yes
Insect	–	Thick legged hoverfly	<i>Syritta pipiens</i>	Vegetated area	Summer	Yes	Yes
Insect	–	Hover fly	<i>Syrphidae</i> sp.	Mixed habitat	Summer	Yes	Yes
Insect	Pema laptse	Painted lady	<i>Vanessa cardui</i>	Vegetated area	Summer	Yes	Yes



Plate 15. Some glimpses of Butterfly of Leh; a. Small cabbage white (*Pieris rapae*), b. White edged rockbrown (*Hipparchia parisatis*), c. Tawny meadowbrown (*Hyponephele pulchella*), d. Cabbage white (*Pieris brassicae*), e. Ladakh clouded yellow (*Colias ladakensis*), f. Hill hedge blue (*Celastrina argiolus*), g. Short branded meadow brown (*Hyponephele brevistigma*), h. Ladakh Highrown silverspot (*Argynnis jainadeva*), i. Lesser bathwhite (*Pontia chloridice*), j. Painted lady (*Vanessa cardui*), k. Ladakh tortoiseshell (*Aglais ladakensis*), l. Tibetan jewel blue (*Plebejus eversmanni*).



Plate 16. Some glimpses of insects of Leh; a. Green bottle fly (*Lucilia cuprina*), b. Buunga/ Bumblebee (*Bombus tunicatus*), c. Diptera (*Lispe* sp.), d. Dung beetle (*Melolontha hippocastani*), e. *Odonata* sp., f. *Coccinellidae* sp. g. *Hover fly* (*Eristalis* sp.), h. Dung beetle (*Aaphodius* sp.), i. Woodlouse (*Isopod* species), j. *Cyphogenia* sp. k. *Arachnids* sp., l. *Coleoptera* sp.

IUCN Threatened Taxa

(VU-Vulnerable, NT-Near Threatened, LC-Least Concern, DD- Data Deficient)

SN	Species	IUCN Threatened Category
FLORA		
1	<i>Achillea millefolium</i>	LC
2	<i>Salvia sclarea</i>	LC
3	<i>Ephedra gerardina</i>	VU
4	<i>Juniperus polycarpos</i>	LC
5	<i>Prunus armeniaca</i>	DD
6	<i>Arctium lappa</i>	LC
7	<i>Capsella bursa pastoris</i>	LC
8	<i>Hippuris vulgaris</i>	LC
9	<i>Lactuca tatarica</i>	LC
10	<i>Mentha longifolia</i>	LC
11	<i>Taraxacum officinale</i>	LC
12	<i>Hippophae rhamnoides</i>	LC
FAUNA-MAMMALS		
13	<i>Capra sibirica</i>	NT
14	<i>Mus musculus</i>	LC
15	<i>Mustela altaica</i>	NT
16	<i>Pseudois nayaur</i>	LC
17	<i>Vulpes vulpes</i>	LC
FAUNA-BIRDS		
18	<i>Accipiter gentilis</i>	LC
19	<i>Accipiter nisus</i>	LC
20	<i>Alectoris chukar</i>	LC
21	<i>Anthus roseatus</i>	LC
22	<i>Anthus spinosus</i>	LC
23	<i>Anthus trivialis</i>	LC
24	<i>Apus apus</i>	LC
25	<i>Aquila chrysaetos</i>	LC
26	<i>Asio otus</i>	LC
27	<i>Athene Noctua</i>	LC
28	<i>Bubo bubo</i>	LC
29	<i>Bubulcus ibis</i>	LC

30	<i>Buteo buteo</i>	LC
31	<i>Buteo reductus</i>	LC
32	<i>Carduelis carduelis</i>	LC
33	<i>Carpodacus erythrinus</i>	LC
34	<i>Carpodacus rubicilla</i>	LC
35	<i>Cephalopyrus flammiceps</i>	LC
36	<i>Cinclus cinclus</i>	LC
37	<i>Cinclus pallasi</i>	LC
38	<i>Columba livia</i>	LC
39	<i>Copsychus saularis</i>	LC
40	<i>Cuculus canorus</i>	LC
41	<i>Curruca curruca</i>	LC
42	<i>Delichon urbicum</i>	LC
43	<i>Dicrurus macrocercus</i>	LC
44	<i>Emberiza cia</i>	LC
45	<i>Eremophila alpestris</i>	LC
46	<i>Eudynamys scolopaceus</i>	LC
47	<i>Falco Subbuteo</i>	LC
48	<i>Falco tinnunculus</i>	LC
49	<i>Gallinago solitaria</i>	LC
50	<i>Gypaetus barbatus</i>	NT
51	<i>Gyps himalayensis</i>	NT
52	<i>Hieraetus pennatus</i>	LC
53	<i>Hirundo rustica</i>	LC
54	<i>Lanius schach</i>	LC
55	<i>Leptopoecile sophiae</i>	LC
56	<i>Linaria flavirostris</i>	LC
57	<i>Milvus migrans</i>	LC
58	<i>Monticola solitarius</i>	LC
59	<i>Montifringilla adamsi</i>	LC
60	<i>Motacilla alba</i>	LC
61	<i>Motacilla cinerea</i>	LC
62	<i>Motacilla flava</i>	LC
63	<i>Motacilla citreola</i>	LC
64	<i>Myophonus caeruleus</i>	LC
65	<i>Oriolus kundoo</i>	LC

66	<i>Passer domesticus</i>	LC
67	<i>Phoenicurus erythrogaster</i>	LC
68	<i>Phoenicurus leucocephalus</i>	LC
69	<i>Phoenicurus ochruros</i>	LC
70	<i>Phylloscopus affinis</i>	LC
71	<i>Phylloscopus collybita</i>	LC
72	<i>Phylloscopus griseolus</i>	LC
73	<i>Phylloscopus humei</i>	LC
74	<i>Phylloscopus sindianus</i>	LC
75	<i>Pica pica</i>	LC
76	<i>Prunella collaris</i>	LC
77	<i>Prunella fulvescens</i>	LC
78	<i>Prunella himalayana</i>	LC
79	<i>Prunella rubeculoides</i>	LC
80	<i>Prunella strophiata</i>	LC
81	<i>Ptyonoprogne rupestris</i>	LC
82	<i>Pyrrhocorax graculus</i>	LC
83	<i>Pyrrhocorax pyrrhocorax</i>	LC
84	<i>Riparia riparia</i>	LC
85	<i>Serinus pusillus</i>	LC
86	<i>Spilopelia senegalensis</i>	LC
87	<i>Streptopelia decaocto</i>	LC
88	<i>Streptopelia orientalis</i>	LC
89	<i>Sturnus vulgaris</i>	LC
90	<i>Tetraogallus himalayensis</i>	LC
91	<i>Tetraogallus tibetanus</i>	LC
92	<i>Tringa ochropus</i>	LC
93	<i>Troglodytes troglodytes</i>	LC
94	<i>Turdus atrogularis</i>	LC
95	<i>Turdus ruficollis</i>	LC
96	<i>Turdus unicolor</i>	LC
97	<i>Upupa epops</i>	LC

ABOUT THE INSTITUTE



G.B. Pant National Institute of Himalayan Environment (NIHE) was established in 1988-89, during the birth centenary year of Bharat Ratna Pt. Govind Ballabh Pant, as an autonomous Institute of the Ministry of Environment, Forest and Climate Change (MoEFCC), Govt. of India. The Institute has been identified as a focal agency to advance scientific knowledge, to evolve integrated management strategies, demonstrate their efficacy for conservation of natural resources, and to ensure environmentally sound management in the entire Indian Himalayan Region (IHR). The Institute has Headquarters at Kosi-katarmal, Almora (Uttarakhand) and six Regional Center, namely, Ladakh Regional Center (LRC) at Leh (Ladakh, UT), Himachal Regional Center at Mohal (Kullu, HP), Garhwal Regional Center at Srinagar (Garhwal, Uttarakhand), Sikkim Regional Center at Pangthang (Sikkim) and North East Regional Center at Itanagar (Arunachal Pradesh), and Mountain Division Regional Center at MoEFCC New Delhi.

Among the regional centres of the Institute, Ladakh Regional Centre is the newest centre, established on December 2019 at Leh, Ladakh UT to ensure NIHE's research and development outreach in Trans Himalayan Landscape.



For more details Please contact to :

Head, Ladakh Regional Centre

G.B. Pant National Institute of Himalayan Environment (NIHE)

DIHAR Road, Near Islamia Public School, Leh 194101, Ladakh (UT).

Phone No: 01982-256202

Email Id: lrc-nihe@gbpihed.nic.in