Survey of Medicinal Herbs in Ladakh (Jammu-Kashmir)

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Abstract- *Ladakh, "The Moon Land", is located in the state of J&K, India (320 151 to 360 151 N Latitude and 750 151 to 800 151 E Longitude) the extreme North region of India; extends to over 640 kilometers from North to South and 480km from to West. Ladakh covers the 70% area of J&K State. When the melting of snow provides abundant moisture. The flora is in full bloom in the month of august and September. The mountain slopes, meadows and alpine pasturelands give a spectacular display of cold desert Barren Mountain. The vegetation is categorized into:- (i) Alpine mesophytes (ii) Oasitic vegetation (iii) Desert vegetation.*

It's estimated that the ladakh region harbor close to 1100 species of vascular plants and ferns as many as 23 species of flowering plants are endemic to ladakh. The high medicinal and nutritional value of the cold desert of ladakh plants makes the products highly beneficial for local residents as well as for troops developed at high altitude. The major products developed in Ladakh are herbalmulti vitamin beverage from hippophae rhamnoides, a high altitude bushy plant and medicated herbal health beverage from eleven potential high altitude medicinal plants. Root of plant aconintium is anti-inflammatory, antiperodic, astringnent, analgesic and antipyretic.

Keywords- Amaranthus spinosus, antiperodic, astringnent, aniti-inflammatory

I. INTRODUCTION

Ladakh, "the land of high-rising passes", is located in the state of J&K, India ($32^0 15^1$ to $36^0 15^1$ N latitude and $75^0 15^1$ to $80^0 15^1$ E longitude) the extreme North region of India; extends to over 640 kilometers from North to South and 480 km from East to West. Ladakh covers the 70% area of J&K State. Ladakh is bounded on the North and East by China and in the West by Pakistan. Siachen is the largest galicer located in the extreme North West of Ladakh. The barren mountain landscape of Ladakh is characterized by extreme temperature (-40 to +30), high radiation, strong wind, low precipitation, low humidity, and desert like extensive barren landscape, rugged topography steep and vertical glaciated slopes, minimal forest cover and few pasture lands at high elevations. The whole Ladakh region remains cut off Srinagar and Jammu for 5-6 months. As the whole region remains cover by 3-4ft snow. It is highest inhabited plateau of the world known for its inaccessible remoteness and cool climatic conditions with human population approximately 200000. Drass, the second coldest place -45^0 recorded in Drass (Ladakh). Ladakh forms parts of Trans Himalayas, cold desert and steppes.

High Altitude Vegetation:-Ladakh comes under alpine and high alpine zones and is dominated by annual and perennial herbs, followed by few stunted shrubs and bushes. The vegetative growth starts at beginning of summer. When the melting of snow provides abundant moisture. The flora is in full bloom in the month of august and September. The mountain slopes, meadows and alpine pasturelands give a spectacular display of cold desert Barren Mountain. The vegetation is categorized into:- (i) Alpine Mesophytes (ii) Oasitic vegetation (iii) Desert vegetation

Floral Diversity:-Though relatively poor insect species, Ladakhs flora has a considerable biological interest depicting, with its diversity of origin and endemic species, a high adaptability to extreme climatic condition and biotic pressure. Ladakh is rich repository of medicinal and aromatic plants. Its estimated that the ladakh region harbor close to 1100 species of vascular plants and ferns as many as 23 species of flowering plants are endemic to ladakh. The high medicinaland nutritional value of the cold desert of ladakh plants makes the products highly beneficial for local residents as well as for troops developed at high altitude.

Some of the valuable species of high altitude plants are *Achillea millefoliul, Benium persicum, Caparis, spinosa, Carum carvi, Dectylorhiza hatagirea, Rheum webbianum, Saussura lappa.* The major products developed in Ladakh are herbalmulti vitamin beverage from hippohae rhamnoides, a high altitude bushy plant and medicated herbal health beverage from eleven potential high altitude medicinal plants.

The field Research Laboratory (FRL):- Leh; the world's highest research laboratory, located in the extreme height of Leh Ladakh. Ladakh is situated at 2900-5900 m asl. The temperature drops below -30 or less at different location in winter months, where it remains frozen for more then 5-7 months every year. There extremely harsh climatic condition provide favorable environment for high altitude plants of medicinal property. The benefit of these products also providing better adaptational and functional health to the tourists, surveyors, researchers, common people and tribal communities. The multi vitamin herbal beverage successfully launched in all state of India with trade name ladakh berry, Madrid berry, Sindhu berry, Leh berry by ladakh foods ltd., new Delhi.

Faunal Diversity:-Ladakh host a surprisingly diverse fauna. Ladakh's fauna exhibits several interesting characteristics which have evolved as adaptations to the region's extreme climatic conditions such as seasonal migration, hibernation, thick fur, long hair, bushy tails, and large nostril. (i) Mammals:- 30 species of mammals occur in ladakh. This includes 8 ungulates, 11 rodents, 2 hairs, mouse hairs, 3 felids, 3 candies and 4 mastoids. (ii) AVI-FAUNAL:- Ladakh's bird diversity is impressive. 309 avifaunal species have been recorded in ladakh. Around 110 species among them are known to breed regularly in the high-altitude cold desert of ladakh. Magpie is the near endemic bird of this region. The cold desert of ladakh is a catchment of the Indus, shayok and Suru River which supplies water to several million people in India and Pakistan. 32 species of fish occur in the river, streams and lacks of ladakh, of which most of them are cold water fishes and adapted to live in the freezing environment. Kinnaur snow trout and Tibetan snow trout are most common species in ladakh.

Geography:-Ladakh is the highest altitude plateau region in India (much of it being over 3,000 m), incorporating parts of the Himalayan and Karakoram mountain ranges and the upper Indus River valley. The mountain ranges in this region were formed over a period of 45 million years by the folding of the Indian Plate into the stationary landmass of Asia. While the Himalayas were formed from the base material of the Indian plate, the Zanskar Range consists of layers of sediment from the ocean floor, and the Ladakh Range of granite was born of the immense heat generated by the friction between the two plates. In Ladakh, the suture zone between the continental masses runs a little to the south of the Indus Valley. The drift continues and is the cause of the frequent earthquakes in the Himalayan region. Crossing the Himalayas by the dip of the Zoji-la, the crest-line of the range remains at a relatively modest level, the highest peaks near the pass being little more than 5000-5500 m above sea level. South-east of Zoji-la the scale increases, reaching a climax in the mighty massif of Nun-Kun, with two summits over 7000m. The Suru and Zanskar valleys form a great trough at the foot of the northern, heavily glaciated flank of the Himalayas, while opposite rise the mountains of the Zanskar range. The Suru, after receiving the combined waters of the Dras and Shingo Rivers a short distance north of Kargil, joins the Indus at Marol in Baltistan, which is now on the Pakistan side of the Line of Control. Rangdum Monastery and the attendant village of Julidok is the last inhabited region in the Suru valley; it is also the destination of the nomadic herdspeople called Bakarwals, who trek up every summer from the Jammu region. From Rangdum the valley rises to 4400 metres at the Pensi-la, the gateway into Zanskar. Kargil, the only town in the Suru valley, was an important staging post on the routes of the trade caravans before 1947, being more or less equidistant, at about 230 kilometres from Srinagar, Leh Skardo, and Padum. Rangdum, though on the northern side of the Pensi-la, is regarded as socially and culturally part of Zangskar rather than of Suru. The Indus River is the backbone of Ladakh; the entire major places historically and currently such as Shey, Leh, Basgo, and Tingmosgang are situated close to their river. The Ladakh Range has no major peaks; its average height is a little less than 6000 metres, and few of its passes are less than 5000 m. Within Ladakh it forms the northern boundary wall of the Indus valley, though when the river enters present-day Indian-controlled Ladakh at Demchok, some 250 km south-east of Leh, it is actually flowing along the foot of the northern flank of these granite mountains , which it crosses by a great gorge close to its confluence with the Hanlse River. The Panggong rage runs parallel to the Ladakh range some 100 km northwest from Chushul, along the southern shore of the Panggong Lake. It is divided from the main range by the Tangtse River. Its highest range is 6700 m, and the northern slopes are heavily glaciated. The Shyok River rises near the Karakoram Pass. The region comprising the valley of Shyok and Nubra Rivers is known as Nubra. The Karakoram Range in Ladakh is not as mighty as in Baltistan. The massifs to the north and east of the Nubra-Siachen valley include the Apsarasas group (highest point 7245 m), the Rimo group (highest point 7385 m) and the Teram Kangri group (highest point 7464 m), together with Mamostong Kangri (7526m) and Singhi Kangri (7202m.) North of the Karakoram lay the Kum Lun Mountains. Thus, between Leth and eastern Central Asia, there is a triple barrier: the Ladakh Range, the Karakoram Range and the Kun Lun. Nevertheless, a major trade route was established between Leh and Yarkand. The enormous mass of the Himalayas creates a rain shadow, denying entry to the moisture-laden clouds of the Indain monsoon. Ladakh is thus, a high altitude desert. The main source of water is the winter snowfall on the mountains. The regions on the north flank of the Himalayas-Drass, the Suru valley and Zanskar-experience heavy snowfall and

remain virtually cut off from the rest of the country for several months in the year. Summers are short, although long enough to grow crops. The proportion of oxygen is less than in many other places at a comparable altitude because of lack of vegetation. There is little moisture to temper the effects of rarefied air. Naked barley (Urdu: grim), normal barley and wheat are the staple crops all over Ladakh, along with mustard (for oil), lentils and other pulses, and vegetable. The extreme limit of cultivation is at Korzok near Tso Moriri (lake), at 4560 m, said to be among the highest fields in the world. Historic Ladakh consists of a number of distinct area (mainly under Indian rule), including the fairly populous main Indus valley, the more remote Zanskar (in the south) and Nubra valleys (to the north over Khardung La in the Ladakh mountain range, a high motor able pass at 5359 meters (17582 fit), the almost deserted Aksai Chin (under Chinese rule) and the predominantly Shi'ite Muslim Kargil and Suru valley areas in the west (Kargil being the second most important town in Ladakh). The Baltistan and Skardu area, under Pakistani rule and entirely Muslim, used to be included in what is geographically referred to as Ladakh. Before partition, Baltistan was one of the districts of Ladakh. Skardo was the winter capital of Ladakh while Leh was the summer capital. People of Baltstan and Ladakh speak very similar languages closely related to Tibetan. Kargil is a district of Ladakh region in the Indian state of Jammu and Kashmir. Kargil lies near the Line of Control facing Pakistani to the west and the mostly Indian. Administered Kashmir valley to the south. Zanskar is part of Kargil district along with Suru, Kakha and Dras valleys. Pakistan attempted to recapture this territory in 1999 and lost this battle. Kargil was organized as a separate district in 1979. Kargil district is nestled in the Himalayas, giving it a cool, temperate climate. Summers are warm with cool nights, while winters are long and cold with temperatures often dropping to -30^0c with recorded temperatures of -45^0c in the tiny town of Dras, situated some 56 km (35 mi) from the Kargil town. The Zanskar plateau is even colder, making it thus a near-uninhabitable place for humans, except for the hardy Khampas. The entire Kargil district is spread over 14086 km2 (5439 sp mi). The Suru River flows through the district. National Highway 1D, connecting Srinagar to Leh, cuts through Kargil. This highway is typically opened for traffic only from June to mid-November due to heavy snowfall at the Zoji La, but in recent from the capital city of Srinagar.

<table>
<tr><th colspan="5">Aconitum heterophyllum</th></tr>
<tr><td rowspan="2">Classification
(Buttercup Family)</td><td>Kingdom- Plantae</td><td>Division - Magnoliophyyta</td><td>Class - Magnoliopside</td><td>Family - Ranaculaceae</td></tr>
<tr><td>Genus - Aconitum</td><td>Species - Heterophyllum</td><td>Local Name - Bona-Karpo</td><td>Hindi Name - Salam Panja</td></tr>
<tr><td colspan="5">Range Description:-The species endemic to the Himalayas range of India, Pakistan and Nepal. It has been recorded in Ladakh (alpine slopes), in an altitude range of 3600-4800m asl. This species is found in the glacial revering and alpine slopes of rocky moisture areas.</td></tr>
<tr><td colspan="5">Morphology:-Aconitum heterophyllum is a highly traded medicinal plant. Raw drugs, particularly the roots, are collected from the high altitude of Ladakh. Aconitum heterophyllum is a perennial herb, with a dense spike of many dark, pale blue variegated with white. The plant is 10-30 cm tall. Flowers are 2-2.5 cm hood broader then the long, bracts small, linear. Shape of the root as conical, tapering toward to a point. The plant has a bitter taste and a cooling tendency.</td></tr>
<tr><td colspan="5">Plant Part use:-Root and Tubers.</td></tr>
<tr><td colspan="5">Chemical constituents:-Many alkaloids reported in Aconitum heterophyllum are: Benzoylmecasonine, mesaaconite, aconite, hypaconite, heteratisine, atidine, isotisine, hetidine, hestinone. Hetrophllisidine, hetrophyllisine, hetrophylline.</td></tr>
<tr><td colspan="5">Medicinal use:-Root of plant is anti-inflammatory, antiperodic, astringnent, analgesic and antipyretic. Beside this, plant is also used in treating of liver disorder, diarrhea, indigestion, vomiting, piles and coughs.</td></tr>
<tr><td colspan="5">External use:-The seed crushed in honey are used to be applied on throat to treat tonsillitis. Naps insufflations of roots are beneficial in headache.</td></tr>
<tr><td colspan="5">Internal use:-Respiratory System:-The juice of root along with milk is an expectorant. Root power is given orally in cervical lymphadenitis. Urinary System:-The seeds are diuretic; the root decoction reduces burning of urinary tract. It increases volume of urine. The tuberous roots of Altees help in making digestive system strong. It is also effective in children in disease like fever, cough, cold and vomiting.</td></tr>
<tr><td colspan="5">Toxic Effect:-Over dosage produces symptoms like dryness of mouth, tremors.</td></tr>
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<table>
<tr><th colspan="5">Argentina anserine</th></tr>
<tr><td rowspan="2">Classification</td><td>Kingdom-Plantae</td><td>Family - Rosaceae</td><td>Genus - Argentina</td><td rowspan="2">Local Name - Troma</td></tr>
<tr><td>Order-Rosales</td><td>Subfamily - Rosoideae</td><td>Species -A. anserina</td></tr>
<tr><td colspan="5">Argentina anserine, also known as common silverweed, silverweed cinquefoil or just "silverweed", is a flowering perennial</td></tr>
</table>

plant in the rose family Rosaceae. It is native throughout the temperate Northern Hemisphere, often on river shores and in grassy habitats such as meadows and road-sides in Ladakh. The plant was formerly classified in the genus Potentilla but was reclassified into the resurrected genus Argentina. It is a species aggregate which has frequently been divided into multiple species.

Description:-Silverweed leaves nit are covered in fine silvery hairs that give the plant its name Silverweed is a low-growing herbaceous plant with creeping red stolons that can be up to 80 cm long. The leaves are 10-20 cm long, evenly pinnate into in create leaflets 2-5 cm long and 1-2 cm broad, covered with silky white hairs, particularly on the underside. These hairs are also present on the stem and the stolons. These give the leaves the silvery appearance from which the plant gets its name. The flowers are produced singly on 5-15 cm long stems, 1.5-2.5 cm diameter with five (rarely up to seven) yellow petals. The fruit is a cluster of dry achenes.

Habitat:-Silverweed is most often found in sandy or gravelly soils, where it may spread rapidly by its prolific rooting stolons. It typically occurs in inland habitats, unlike A. egedii, which is a salt-tolerant coastal salt marsh plant.

Cultivation and uses:-Herbal tea from the underground roots is used to help delivery, and as antispasmodic for diarrhea. The plant was also put in shoes to absorb sweet it is believed to use in Ladakh medicine system. Amchi internally as tea for treatment of disorders of the gastrointestinal tract, gynecological problems, and spasm. The plant has been cultivated as a food crop for its edible roots. The usual wild forms, however, are impractical for this use, as they are small and are hard to clean. It may also become a problem weed in gardens. Travelers visiting Tibet reported on the food use of the plant's root in the region. It is believed that who did not have any vegetables other than turnips, would often dig out roots Argentina anserina (whose local name he gave as djuma), which could be easily dried and stored for later use. In Ladakh the root of the plant, under a Ladakhi name variously transcribed as toms, doma or droma, was served cooked in butter and ghee.

Arnebia euchroma				
Classification	Kingdom-Plantae	Phylum - Magnoliophyta	Class - Magnoliopsida	Order - Boraginales
Local Name-Demoeks	Family-Boraginaceae	Genus - Arnebia	pecies- Arnebia Euchroma	Species-Arnebia Euchroma

Morphology:-Herbs perennial, Roots stout, to 2 cm in diam, containing copious purple dye. Stems usually 1 or 2, erect, branched above, sheathed with remaining bases of leaves, 15-40 cm tall, and spreading white or pale yellow hirsute. Leaves sessile, sparsely semi apprised hirsute. Basal leaves linear to linear-lanceolate, 7-20 x 0.5-1.5 cm, base sheath like, apex short acuminate; stem leaves lanceolate to linear-lanceolate, smaller without sheath like base. Cymes terminal, 2-6 cm at anthesis, many flowered; bracts lanceolate. Flowers heterostylous. Calyx lobes linear, 1.2-1.6 cm, to 3 cm in fruit, densely pale yellow hirsute on both sides, apex subacute. Corolla dark purple, sometimes pale yellow and purple-red tinged, tubular-campanulate, glabrous or sparsely short pubescent outside; tube straight, 1-1.4 cm; limb 6-10 mm wide; wide; lobes spreading, ovate. Anthers ca. 2.5 mm. style apex 2 lobed; stigmas 2, obovate. Nutlets black-brown, broadly ovate, ca. 3.5 x 3 mm, scabrous reticulate lined, with few tubercles, adaxially almost flat, center line prominent, abaxially convex, apex subacute; attachment scar somewhat triangular.

Medicinal uses:-The root is antipyretic, cancer, contraceptive, emollient and vulnerary. It is used in the treatment of measles, mild constipation, burns, frostbite, eczema, dermatitis etc. experimentally it has shown contraceptive action on rats, inhibiting oestrus, the fertility rate and the release of pituitary gonadotrophin hormone and chorion gonadotrophin hormone. It inhibits the growth of cancer cells on the chorion membrane. The roots are used medicinally.

Fig-1- Aconitum heterophyllum

Fig-2- Argentina anserine

Fig-3- Arnebia euchroma

II. RESULT & DISCUSSION

Ladakh, "The Moon Land", is located in the state of J&K, India (32^0 15^1 to 36^0 15^1 N Latitude and 75^0 15^1 to 80^0 15^1 E Longitude) the extreme North region of India; extends to over 640 kilometers from North to South and 480km from to West. Ladakh covers the 70% area of J&K State. When the melting of snow provides abundant moisture. The flora is in full bloom in the month of august and September. The mountain slopes, meadows and alpine pasturelands give a spectacular display of cold desert Barren Mountain. The vegetation is categorized into:- (i) Alpine mesophytes (ii) Oasitic vegetation (iii) Desert vegetation.

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The Corydalis plant has several medicinal uses. The root has alterative anti-periodic, appertiazr, diuretic and tonic properties. It is used in the treatment of syphilis and cutaneous infections. The plant is also used as an antidote aniti-inflammatory, febrifuge and vermifuge. It is helpful in the treatment of disorders from poisoning, swelling of the limbs and stomach/intestinal pain due to worm infestation. It has been reported that Corydails species are potentially toxic in moderate doses. The decotion of the follower used by the local peoples of Ladakh in the treatment of stomach or intestinal problems. Dactylorhiza hatagirea (from the orchid family orchidaceae and synonyomous with Orchis nacula) is an Aphrodisiac herb form Ayurveda and native to the Himilaya region (of altitudes of around); it is known as Vajikaran due to its reported ability to enhance male virility strength. (2) this plant is known in the local and surrounding region by various names such as Hatta Haddi, Salam Panja ,Wang lak, Lovha, Hathejadi, Panchaule, and Airula; (3) it is medicinally used as a juice where it is drank to heal wounds, cuts, and gastritis (3) beyond its usage as a sexual stimulant. Henbane leaves are official in all pharmacopoeias. Fruit and seeds are also used by local communities. Crushed seeds are applied on tooth by local peoples to relief toothache.

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