Raw edible plants of cold desert Ladakh

Basant Ballabh1*, OP Chaurasia1, PC Pande2 & Z Ahmed1

1Field Research Laboratory, Defence Research & Development Organisation (DRDO), Leh-Ladakh, Jammu & Kashmir
2Department of Botany, Kumaon University SSJ Campus, Almora, Uttaranchal

Received 22 August 2006; revised 10 November 2006

The paper describes 31 plants species belonging to 15 families, used as raw edibles by the tribal communities of Ladakh region. Various plant parts, viz. bulbs, roots, leaves, leaf-stalks, fruits and seeds used in different ways such as edibles fruits, Chutnies, edibles in salads and used for flavouring food products are described. In far-flung areas where, there is no communication available, the tribal communities are still dependant on wild resources for fulfilling their daily needs.

Key words: Raw edible plant, Ladakh, Tribal communities, Cold desert

IPC Int. CL: A61K36/00, A01G1/00, A01G17/00, A47G19/00, A23L1/00, A23L1/06, A23L2/02

Cold deserts are usually confined to high altitudes and circumpolar regions. 16% of total landmass is under cold arid zones. Under the trans-Himalayan zone the largest cold desert of India, Ladakh covers more than 70,000 sq km area of Jammu and Kashmir and it lies between 31° 15’-36° N latitude and 75° 15’-80° 15’ E longitude. High mountains and barren landscapes determine the harsh climate particularly temperature during winter month, which fall below -30°C at Leh and -70°C at Dras for about 5-7 months (October to April) every year. Due to prolonged and extreme cold winter, the agriculture season is very short which starts from May and ends by September depending upon different altitudes. Physiographically, the cold arid zones of Ladakh can be divided into 5 valleys - Leh, Nubra, Changthang, Zanskar and Suru1. The flora of cold desert Ladakh comes under alpine and high alpine zone, which is situated between 2700m to 6000m. The high altitude flora is mainly dominated by dwarf bushes or shrubs. Beautiful meadows, vast pasturelands, colourful moraines, marshes and screes mostly cover the alpine zone2.

The most significant feature of high altitude species is specific adaptation to survive against adverse ecological conditions. Various adaptation like cushion, mat forming, profuse woolly habit, white hairs on plants, thorny nature, reduced leaves and abundance of spines, etc. are conspicuous in species of Astragalus, Caragana, Androsace, Arenaria, Rhodiola, Saussurea, Anaphalis, Leontopodium and Waldhieinia, etc. Similarly, most of the cold desert plants are perennial in nature and multiplied through various vegetative means such as roots, rootstocks, runners, bulbs, bulbils, rhizomes, tubers, etc.

Plants have always fulfilled primary need of man. The flora of Ladakh Himalaya is of immense importance particularly for edible purpose. The harsh climate, prolonged cold winter prevailing in this zone always enforced the far-flung inhabitants to search for their food, shelter, medicine, fodder and fuel, etc. A number of wild species are good source of raw edibles. The raw edible plants are mainly fruit bearing, such as Berberis lycium, Elaeagnus angustifolius, Ephedra gerardiana, Hippophae rhamnoides, Morus alba and Prunus armeniaca etc.3.

During literature survey, some uses of high altitude plants were also observed1, 4-6.

Methodology

Field Research Laboratory, an establishment of Defence Research & Development Organisation (DRDO) has carried out extensive survey of all the different valleys covering far-flung areas and higher passes since last 10-15 yrs and collected valuable informations on edible plants with the help of local tribes, shepherds and senior citizens. The edible use of these species was also observed personally during the present study7. The plant specimen were collected as voucher and carefully identified with the help of various floras, monograms, and herbaria of J & K and BSD. One set of the same was deposited to the Herbarium of Field Research Laboratory.
Enumeration

Fortyfour important species of cold desert Ladakh belonging to 20 families being used for edible purpose as raw are described with plant name, family name, vernacular name and uses.


2. *Berberis lyceum* Royle. (Berberidaceae), Berberry (E), *Daruhaldi* (H), Ripe fruits are consumed raw in Suru and Zanskar areas of Ladakh.

3. *B. ulicina* Hk. f. & T. (Berberidaceae): Berberry (E), *Kiraring* or *Chhiner* (L), Unripe seeds are eaten raw in winter. Apricot kernel is valued as a foodstuff.


5. *Cicer microphyllum* Benth. syn. *C. soongaricum* auct. non. Stepf. ex DC. (Fabaceae), Wild Gram (E), *Seri* or *Srad-Kar* (L), Unripe seeds are eaten by shepherds and children.

6. *Codonopsis clematidea* (Schrenk) Cl. (Campanulaceae), *Bruktung, Mokhting* (L), Tribal people usually consume raw roots in the fields.

7. *C. ovata* Benth. (Campanulaceae), *Ludut, Chamelia* (L), Roots are consumed raw in the field.

8. *Elaeagnus angustifolius* L. syn. *E. hortensis*, M Bieb.; (Elaeagnaceae), *Chhiolik* (H), *Oleaster* (E), *L. (incl. var. royleana)* Hk. f. (Lamiaceae), *Jangali Pudina* (H), Horse Mint (E), *Phololing* (L), Leaves are commonly used in chutany. Dried leaves are used to flavour local dishes during winter months.

9. *Elsoltzia densa* Benth. (Lamiaceae), *Tstase, Philongtso, Bye-rug nag-po* (L), Leaves are eaten raw as chutany and in salads. It is dehydrated for flavouring local dishes in winter.

10. *E. eriostachya* (Benth.) Benth. syn. *Aphanochilus eriostachya* Benth. (Lamiaceae), *Tsatsa, Betso, Bye-rug ser-po* (L), Leaves are eaten raw as chutany and in salads. Sometimes dehydrated for flavouring local dishes in winter.

11. *Ephedra gerardiana* Wall. ex Stapf. (Ephedraceae), *Asmania* (H), *Ephedra* (E), *Chhapat or mTshe-ldum Lugh-mtshe* (L), Ripe fruits are sweet and eaten by shepherds and children.

12. *E. intermedia* Schrenk et Mey. (Ephedraceae), *Asmania* (H), *Ephedra* (E), *Chhapat* (L), Ripe fruits are sweet and edible.

13. *Gentiana tianschanica* Ruper. (Gentianaceae), *Wanglo* (L), Whole plant is used in salads.

14. *Hippophae rhamnoides* L. spp. turkestanica Rousi. (Elaeagnaceae), Seabuckthorn (E), *Tsermang, Sastalulu, Cherker or sTar-bu* (L), Children and shepherds sometimes eat strong acidic fruits. The fruits are also used in the preparation of juice and squash.

15. *H. tibetana* Schlect. (Elaeagnaceae), Seabuckthorn (E) & *Tsermang, Sastalulu* (L), Fruits are eaten in Zanskar regions.

16. *Lactuca sativa* L. syn. *L. scariola*; (Asteraceae), *Salad* (H), Lettuce (E), Young leaves are eaten raw in salads and dried for use in winter season.

17. *Lathyris humidus* (Ser.) Fisher. ex Sprengel. Syn *L. altaicus* Lede. (Fabaceae), *Kaown* (L), Seeds and pods are eaten raw.

18. *Lathyris sativus* L. (Fabaceae), *Khesar* (H), Local pea (E), *Sanma* (L), Seeds and pods are eaten raw.

19. *Mentha longifolia* L. Hudson. Syn *M. sylvestris* L. (incl. var. *royleana* Wall. ex Benth.) Hk. f. (Lamiaceae), *Jangali Pudina* (H), Horse Mint (E), *Phololing* (L), Leaves are commonly used in chutany. Dried leaves are used to flavour local dishes during winter months.

20. *Morus alba* L. (Moraceae), *Sahtoot* (H), *Mulberry* (E), *Oshe* (L), Ripe fruits of wild species are edible in Turtuk village and lower altitudes.


22. *Podophyllum hexandrum* Royle. *P. emodi* Wall ex Royle, (Berberidaceae), Himalayan Mayapple (E), *Demokusu, Papra, Ol-mose* (L), Fruits are eaten by children in Zanskar areas.

23. *Prunus armeniaca* L. (Rosaceae), *Khubani* (H), *Apricot* (E); *Chuli* (L).

24. Uses: Apricot is only natural fruit crop grown all over Ladakh, however many wild plants are grown in different places of lower valleys. The fruits are consumed fresh and dehydrated for prolonged winter. Apricot kernel is valued as local *badam*. 
25 **Rheum webbianum** Royle. (Polygonaceae), Himalayan Rhubarb (E), *Lachhu, Chu-rtsa* (L), Leaf stalks are rich source of vitamin C and used in salad, chutany and custard.

26 **Ribes alpestre** Wall. ex Decne. Syn *R. grossularia* auct. non. L. (Saxifragaceae), Asian gooseberry (E), *Askuta, Zasoot* (L), Shepherds sometimes eat ripe fruits.


28 **Rosa webbiana** Wall. ex Royle. (Rosaceae), Jangali Gulab (H), Wild Rose (E), *Siah, Madpo* (L), Shepherds sometimes eat ripe fruits.

29 **Rumex patientia** L. spp. *orientalis* Benth. ex Schult. (Polygonaceae), Patience dock (E), *Soma, Shommena* (L), Leaves are used in making chutany in some areas of Ladakh.

30 **Solanum nigrum** L. (Solanaceae), Black nightshade (E), *Makoi* (H), *Tsigma* (L), Children eat ripe fruits.

31 **Sonchus oleraceus** L. (Asteraceae), Milk Thistle (E), *Khala* (L), Green leaves are eaten raw in salads.

32 **Tulipa stellata** Hk. f. var. *chrysantha* Boiss. (Liliaceae), Wild Tulip (E), *Kapichog* (L), The locals consume raw bulbs.

**Discussion and conclusion**

The edible plants have played an important role as a natural source of food for human beings since ages. The extreme cold arid conditions of Ladakh enforced the tribal people to depend upon nature for their food, shelter, medicine, fodder, fuel and other necessities of life. The edible plant provides delicious fruits, nutritious leaves and other useful parts like bulbs, roots, seeds, & leaf stalk, etc. for the tribal people especially at the time of scarcity. *Prunus armeniaca* is the main cultivated plant and in Ladakh, wild fruits are also dehydrated for prolonged winter use. Leaves of certain plants like, *Mentha longifolia, Lactuca sativa, Elsholtzia densa, E. eriostachya*, etc. are used for the preparation of chutanys and are also dehydrated for flavouring local dishes during winters. Fruits of *Hippophae rhamnoides* are used for preparation of certain juices and squash, etc. Leaf stalks of *Rheum webbianum* are used for preparation of various dishes like custard, chutanys, etc.

In Ladakh, various tribal communities in far-flung and remote villages commonly use 31 plant species belonging to 15 families for raw edible purpose during scarcity. Out of 31 plants, 15 species are used for edible fruits; 5 species for edible leaves in salads; 3 species each used for edible roots/bulbs, edible seeds/pods, flavouring local dishes and in the preparation of chutanys, and single species is used for edible leaf-stalk for preparing custard. The sweet apricot kernels are valued as local *badam* in Ladakh.

Maximum number of wild species of fruit yielding plants is available in cold desert Ladakh. Though the cultivated fruits are very rare, only some apricots and local apples can be seen in summer season. Due to highly perishable fruits, apricots are dehydrated immediately and used throughout the year. Thus, the raw edible plants play very important role in daily life of tribal people because there are only few cultivated fruits available. Therefore, the raw edible plants of Ladakh need an immediate attention for cultivation, conservation and sustainable utilization and for overall benefit of the region.

**Acknowledgement**

Authors are thankful to Defence Research & Development Organisation (DRDO), Ministry of Defence for providing necessary facilities and financial support for the study. Authors are also thankful to tribal population, Amchis and village heads for sharing their valuable knowledge during the study.

**References**