

ETHNO-BOTANY OF TRADITIONAL WILD EDIBLE PLANTS FROM COLD ARID DESERT OF LADAKH— A POTENTIAL SOURCE OF WINTER VEGETABLES

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Introduction

Ladakh is a part of Indian Himalaya, at an altitude of 8,787-20,000 feet above mean sea level, is characterized by diverse and complex land formations. It has many unconquered peaks of impregnable heights, uncharted glaciers and valleys. It is located at the latitude of 31°44' 57" – 32°59' 57" N and longitude of 76°46' 29" – 78°41' 34" E, which covers more than 65,000 km² area and is characterised by low annual precipitation (20-30 mm rainfall/snowfall), temperature ranges between +35°C in summer to -35°C during winter along with low relative humidity (20-40 %). These climatic features make this region a typical cold arid desert. Under these unique geographical position and adverse climatic conditions many plant species were able to establish themselves and some of these plants are found nutritionally potential to be used as non conventional vegetables. These plants were identified by local people through over the years of experience perhaps via trial and error method which led to the selection of plants which are edible. These selected plants were gradually added to the repositories of the edible plants (Singh, 1995, Mishra *et al.*, 2009, Singh *et al.*, 2008).

The rich and unique diversity of flora in this region have attracted a number of workers and researchers for ethnobotanical studies in the past (Singh, 1995; Chaurasia *et al.*, 2007; Ballabh and Chaurasia, 2007) which focused on plant diversity, its documentation and scattered ethno-botanical uses by the tribal communities.

Due to lack of proper records and over-exploitation of these wild edible plants by local people; the natural resources along with related indigenous knowledge are depleting day by day (Roy, 2003). It is worthwhile to note that the amalgamation or maintenance of edible wild plants resources could be beneficial not only for the locals but also for army deployed in these harsh regions of the country especially during winters when roads are closed due to heavy snowfall. Keeping this in view, an attempt has been made to explore and document the traditional knowledge being practiced in Ladakh for culinary preparations since ages.

Material and Methods

Study Site: Ethnobotanical survey and sample collection from two districts i.e. Leh and Kargil covering five main valleys viz., Indus, Nubra, Suru, Zaskar and Changthang were undertaken during 2007-2009 in different seasons. Brief information about these valleys is given below.

'Indus valley' is the central part of Ladakh region in Leh district and densely populated. Indus river is the main source of irrigation in villages like Phey, Phyang, Nimu, Choglamser, Thiksey, Karu, Hemis, etc. Nubra valley is situated at the northern side of Ladakh and is known for its rich flora due to favourable climatic conditions. Nubra and Shyok rivers are the main source of water, besides several glacier flows. Changthang valley is one of the most elevated valley (3604-4505 m) of Ladakh with few important villages like Tangtse, Lukung, Spangmik, Merak etc. *Zaskar valley* is situated on the bank of Zaskar river which is the source of irrigation in villages like Padam, Zangla, Chazar, Phe, Sani etc. This valley is quite rich in diversity of flora as well as fauna. *Suru valley* is comparatively greener than rest of valleys. The villages like Batalik, Lalung, Sod, Urdas, Dakchik etc. are situated on the bank of Suru River (Chaurasia and Singh, 1996a, 1996b, 1997, 1998 and 2001).

Methodology: The field survey has been carried out by the authors during flowering and fruiting seasons of the year (mostly July-September). The plants were collected as voucher specimens (Jain and Rao, 1997) and carefully identified with the help of various monographs and herbarium such as Forest Research Institute (FRI), Dehradun, Botanical Survey of India (BSI), Dehradun and Herbarium of Jammu and Kashmir University. The field study was performed by interview through questionnaire (Jain, 1995; Martin, 1995) and our own observations, to collect information about traditional knowledge regarding use of plants. In the tribal communities, knowledge of edible and medicinal herbs was learnt from the elders and community members who share knowledge about mode of preparation and culinary uses.

Many remote villages of Ladakh region were visited to interact with the tribals. These respondents

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were local farmers, village headman and housewives between 35 to 70 age groups. The selection of respondents was based on their recognition as knowledgeable members concerning folk uses of plant in kitchen. Prior consent was taken from the respondents for recording the information. We questioned about the use of plant as non conventional vegetable and mode of preparation of folk dishes. As per information, their knowledge of folk culinary uses was acquired mainly through parental heritage. The information was gathered and confirmed by repeated queries raised time to time among Boto tribal community particularly village heads and old aged persons.

Enumeration of the species: The present ethnobotanical survey has identified 58 plant species belonging to 36 genera and 21 families, used in the preparation of many local dishes. These taxa are arranged alphabetically with their correct names, families, common names, local names, distribution, and culinary uses.

Allium humile Kunth. (Amaryllidaceae)

Local/ Common Name(s): Skotze, Wild onion

Distribution: Changthang valley

Culinary uses: Dried leaves are used as condiments by local peoples.

Allium loratum Baker (Amaryllidaceae)

Local/ Common Name(s): Skotze, Wild garlic

Distribution: Nubra and Zaskar valley

Culinary uses: Leaves are used as flavoring agent.

Allium oreoprasum Schrenk (Amaryllidaceae)

Local/ Common Name(s): Skotze, Wild onion

Distribution: Changthang valley

Culinary uses: Dried leaves are used as condiments.

Allium przewalskianum Regel (Amaryllidaceae)

Local/ Common Name(s): Skotze, Wild garlic

Distribution: Indus and Zaskar valley

Culinary uses: Dried leaves are used as condiments.

Allium ramosum Jacq. (Amaryllidaceae)

Local/ Common Name(s): Skotze

Distribution: Suru valley

Culinary uses: Young leaves are used as condiments.

Allium thomsonii Baker (Amaryllidaceae)

Local/ Common Name(s): Skotze, Wild garlic

Distribution: Nubra valley

Culinary uses: Dried leaves are used as condiments and flavoring agent.

Amaranthus spinosus L. (Amaranthaceae)

Local/ Common Name(s): Neu, Amaranthus

Distribution: Nubra and Changthang valley

Culinary uses: The young leaves are used as leafy vegetable and dried leaves are used in winter as vegetable. Young leaves dried and stored for winter

consumption.

Arabidopsis himalaica Schulz. (Brassicaceae)

Local/ Common Name(s): Byi'u la phug, Arabiodopsis

Distribution: Changthang valley

Culinary uses: Leaves are used as a green vegetable.

Arabidopsis mollissima Schulz. (Brassicaceae)

Local/ Common Name(s): Sikiang, Arabiodopsis

Distribution: Zaskar valley

Culinary uses: Tender shoots and young leaves are used as a leafy vegetable after proper boiling.

Arabidopsis thaliana Schulz. (Brassicaceae)

Local/ Common Name(s): Byi'u la phug, Arabiodopsis

Distribution: Zaskar valley

Culinary uses: The young herbs are collected, washed, boiled and used as vegetable during early summer.

Arabis alpina Krock. ex steud (Brassicaceae)

Local/ Common Name(s): Snowcap

Distribution: Changthang valley

Culinary uses: the tender shoots and leaves are edible and used as leafy vegetable.

Arabis tibetica Hook. f. (Brassicaceae)

Local/ Common Name(s): Tiktso, Arabiodopsis

Distribution: Zaskar valley

Culinary uses: It is commonly used as potherb.

Arenaria holosteoides Edgew. (Caryophyllaceae)

Local/ Common Name(s): Chik

Distribution: Indus, Nubra valley

Culinary uses: Tender leaves are cooked as leafy vegetable.

Arenaria serpyllifolia L. (Caryophyllaceae)

Local/ Common Name(s): Chiki

Distribution: Changthang valley

Culinary uses: The tender leaves are cooked as leafy vegetable.

Arnebia euchroma I. M. Johnson (Boraginaceae)

Local/ Common Name(s): Demok, Ratanjyot

Distribution: Nubra valley

Culinary uses: The roots are source of dye which is used for colourings the food items such as butter, cheese and ghee.

Arnebia guttata Bunge (Boraginaceae)

Local/ Common Name(s): Demok, Ratanjyot

Distribution: Changthang, Zaskar and Suru valley

Culinary uses: The roots are source of dye which is used for colorings the food items such as butter, cheese and ghee.

Bunium persicum B. Fedtsch. (Apiaceae)

Local/ Common Name(s): Zeur, Caraway black

Distribution: Suru valley

Culinary uses: the seed are used as spice or condiments and bulbous root used as a vegetable.

Capparis spinosa L. (Capparidaceae)

Local/ Common Name(s): Kabra, Caper bush

Distribution: Indus, Nubra, Suru and Zaskar valley

Culinary uses: Tender shoots and young leaves are used as a leafy vegetable after proper boiling. The tender shoots are mixed with curd and prepared a local delicious dish known as 'Tantur'.

Capsella bursa-pastoris Medic (Brassicaceae)

Local/ Common Name(s): Shamso, Shepherd's purse

Distribution: Indus valley

Culinary uses: Tender shoots and young leaves are boiled and cooked as leafy vegetable.

Capsella elliptica C. A. Mey (Brassicaceae)

Local/ Common Name(s): Shamsho

Distribution: Nubra and Changthang valley

Culinary uses: Tender leaves are used as a leafy vegetable.

Capsella thomsonii Hook. f. (Brassicaceae)

Local/ Common Name(s): Shamsho

Distribution: Zaskar and Suru valley

Culinary uses: Tender leaves are used as a leafy vegetable.

Carum carvi L. (Apiaceae)

Local/ Common Name(s): Kosnyot, Kala Jeera

Distribution: Indus and Suru valley

Culinary uses: Seeds are used as condiments.

Cerastium vulgatum L. (Caryophyllaceae)

Local/ Common Name(s): Tyndong

Distribution: Suru valley

Culinary uses: The young leaves are used as vegetable.

Chenopodium album L. (Chenopodiaceae)

Local/ Common Name(s): Neung, Wild spinach

Distribution: Indus valley

Culinary uses: After proper boiling whole plant is used as a vegetable and for making 'Paratha'.

Chenopodium botrys L. (Chenopodiaceae)

Local/ Common Name(s): Sagani

Distribution: Indus valley

Culinary uses: Tender leaves are used as vegetable after proper boiling.

Chenopodium foliosum (Moench) Ascherson (Chenopodiaceae)

Local/ Common Name(s): Sangsti

Distribution: Nubra valley

Culinary uses: Tender leaves are used as vegetable after proper boiling or mixed with curd to prepare local delicious dish called 'Tantur'.

Chenopodium glaucum L. (Chenopodiaceae)

Local/ Common Name(s): Kupald, Wild spinach

Distribution: Changthang and Zaskar valley

Culinary uses: After proper boiling whole plant is used as a potherb.

Cicer microphyllum Royle (Fabaceae)

Local/ Common Name(s): Chana

Distribution: Changthang valley

Culinary uses: Pods and seeds are edible.

Codonopsis clematidea C. B. Clarke. (Campanulaceae)

Local/ Common Name(s): Brukutang

Distribution: Suru valley

Culinary uses: Roots are consumed by local peoples as raw or cooked.

Draba alpina Asso. (Brassicaceae)

Local/ Common Name(s): Piang

Distribution: Suru and Zaskar valley

Culinary uses: During early summer young leaves are used as a potherb.

Draba tibetica Hook. f & Thoms. (Brassicaceae)

Local/ Common Name(s): Mulanku

Distribution: Changthang valley

Culinary uses: Young shoots are used as a leafy vegetable.

Eremurus himalaicus Baker (Liliaceae)

Local/ Common Name(s): Nyamgtso, Dessert candle

Distribution: Changthang valley

Culinary uses: Young flower buds are edible.

Erigeron multiradiatus (Wall) Benth. (Asteraceae)

Local/ Common Name(s): Durang-phang

Distribution: Changthang valley

Culinary uses: Tender leaves are used as potherb.

Ermania himalayensis Schulz. (Brassicaceae)

Local/ Common Name(s): Fiam

Distribution: Zaskar valley

Culinary uses: Tender leaves are used as leafy vegetable.

Ermania stewartii Schulz. (Brassicaceae)

Local/ Common Name(s): Tschalu

Distribution: Zaskar valley

Culinary uses: Tender leaves are used as leafy vegetable.

Erodium tibetanum Edgew. & Hook. f. (Geraniaceae)

Local/ Common Name(s): Tikziang

Distribution: Changthang and Zaskar valley

Culinary uses: Leaves are used as vegetable.

Fagopyrum esculentum Monech (Polygonaceae)

Local/ Common Name(s): Dayat, Buckwheat

Distribution: Indus and Suru valley

Culinary uses: Tender leaves are used as leafy vegetable and seeds are used for making flour to prepare different dishes.

Fagopyrum tataricum Gaertn (Polygonaceae)

Local/ Common Name(s): Dayat, Duckwheat

Distribution: Nubra and Changthang valley

Culinary uses: Tender leaves are used as leafy vegetable.

Lactuca decipiens C. B. Clarke (Asteraceae)

Local/ Common Name(s): Khala

Distribution: Suru valley

Culinary uses: Tender leaves are used as leafy vegetable.

Lactuca dolichophylla Kitamura (Asteraceae)

Local/ Common Name(s): Khala

Distribution: Indus and Nubra valley

Culinary uses: Tender leaves are used as leafy vegetable.

Lactuca lessertiana C. B. Clarke (Asteraceae)

Local/ Common Name(s): Chumaseo

Distribution: Suru valley

Culinary uses: Tender leaves are used as leafy vegetable.

Lactuca scariola L. (Asteraceae)

Local/ Common Name(s): Khala

Distribution: Changthang valley

Culinary uses: Tender leaves are used as leafy vegetable and salad.

Lavatera kashmiriana Mast. (Asteraceae)

Local/ Common Name(s): Sazposh, Wild Hollyhock

Distribution: Suru valley

Culinary uses: Tender leaves are used as leafy vegetable.

Lepidium capitatum Hook. f & Thoms. (Brassicaceae)

Local/ Common Name(s): Sangtso, Dittander

Distribution: Suru valley

Culinary uses: Tender leaves are used as leafy vegetable.

Lepidium latifolium L. (Brassicaceae)

Local/ Common Name(s): Sangtso, Dittander

Distribution: Indus, Nubra and Zaskar valley

Culinary uses: Tender young leaves are used as leafy vegetable.

Malva verticillata (Tourn.) L. (Malvaceae)

Local/ Common Name(s): Cam-pa ma-ning, Chinese Mallow

Distribution: Changthang and Suru valley

Culinary uses: Tender shoots and young leaves are boiled and cooked as leafy vegetable.

Mentha longifolia Host. (Lamiaceae)

Local/ Common Name(s): Phololing, Horse mint

Distribution: Indus, Changthang and Zaskar valley

Culinary uses: Leaves are used for making 'Chatani' and as flavouring agent.

Orabanche hansii Losc. & Pardo. (Orabanchaceae)

Local/ Common Name(s): Gro-shang-rtse

Distribution: Nubra, Changthang and Suru valley

Culinary uses: The tender shoots are used to make soup.

Oxyria digyna Hill. (Polygonaceae)

Local/ Common Name(s): Lamanchu, Mountain

Sorrel

Distribution: Indus, Zaskar and Suru valley

Culinary uses: The leaves are very nutritive and used as leafy vegetable and salad.

Pedicularis mollis Wall. (Scrophulariaceae)

Local/ Common Name(s): Lugru-mar-po

Distribution: Changthang valley

Culinary uses: Tender leaves are used green vegetable.

Rheum webbianum Royle (Polygonaceae)

Local/ Common Name(s): Lacchu, Himalayan Rhubarb

Distribution: Indus, Changthang and Zaskar valley

Culinary uses: Long and thick leaf stalk used as salad.

Rhodiola imbricata Edgew. (Crassulaceae)

Local/ Common Name(s): Shrolo, Rose root

Distribution: Indus, Nubra and Changthang valley

Culinary uses: The leaves are used as a leafy vegetable. The tender shoots are mixed with curd and prepared a local delicious dish known as 'Tantur'.

Rosa webbiana Wall. (Rosaceae)

Local/ Common Name(s): Siah, Wild rose

Distribution: Indus valley

Culinary uses: The leaves are used as a leafy vegetable and fruits contain vitamin C.

Rumex patientia Gaud ex Meissn. (Polygonaceae)

Local/ Common Name(s): Shoma, Patience dock

Distribution: Indus, Nubra and Suru valley

Culinary uses: The young leaves are used as leafy vegetable.

Sedum ewersii Ledeb. (Crassulaceae)

Local/ Common Name(s): Gomnu, Stone Crop

Distribution: Indus and Changthang valley

Culinary uses: The fresh leaves are used as a salad and for making sauce.

Sonchus oleraceus L. (Asteraceae)

Local/ Common Name(s): Khala, Milk thistle

Distribution: Indus valley

Culinary uses: The fresh leaves are used as a salad leafy vegetable.

Taraxacum sikkimensis Gandoger (Asteraceae)

Local/ Common Name(s): Khur-mang karmo

Distribution: Indus and Changthang valley

Culinary uses: The whole plant is used as vegetable and roots are eaten raw.

Urtica hyperborean Jacq. Ex Wedd. (Urticaceae)

Local/ Common Name(s): Zacchout, Stinging Nettle

Distribution: Indus, Changthang and Zaskar valley

Culinary uses: The young leaves are used as leafy vegetable and dried leaves are used in winter as vegetable. It is used in famous local dish known as 'Thupka'.

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SUMMARY

The findings of present investigation highlight the non-conventional high altitude plants. 58 plant species belonging to 36 genera and 21 families from cold arid desert of Ladakh are listed alongwith their local names and distribution which are used for culinary purposes.

Key words: Ethno-botany, Wild edible plants, Cold arid desert, Ladakh.

लद्दाख के शीत मरुस्थल में पाये जाने वाले पारंपारिक जंगली खाद्य पौधों का जाति वनस्पति विज्ञान - शीतकालीन सब्जियों के संभावित स्रोत
मनीष एस. भोयर, ज्ञान पी. मिश्र, राघवेंद्र सिंह व शशी बाला सिंह

सारांश

वर्तमान अध्ययन लद्दाख क्षेत्र में पाये जाने वाले उन जंगली खाद्य पौधों के विषय में है जो पारंपारिक सब्जियों के रूप में यहाँ के स्थानीय घरों में सदियों से महत्वपूर्ण भूमिका निभाते आ रहे हैं। इस अन्वेषण में 21 कुलों व 36 प्रजातियों में पड़ती 58 जातियों को उनके वनस्पतिशास्त्र नाम, कुल, स्थानीय/सामान्यत नाम, वितरण तथा व्यंजन उपयोग की विधि बताते हुए सूचीबद्ध किया गया है।

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