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# Diversity and potential of indigenous and minor vegetables of Himachal Pradesh

**Indigenous crops are used at small scale within local communities but is having the potential to contribute to food security and to be cultivated at commercial level. There is need to gather the knowledge about indigenous and minor vegetables from the local community in order to facilitate research. The present article focuses on the indigenous vegetables adapted to North-Western Himalayan region of India, their diversity, nutritional importance and potential. Indigenous or traditional vegetables are defined as the species that are of local importance for the sustainability of economy, nutrition and social systems but lacking global recognition to the level of cultivated species/crops. Indigenous vegetables can play an important role in alleviating food security, malnutrition, hunger and have therapeutic potential, but they are mostly neglected in research. These are also tolerant to climate change than the exotic vegetables. Therefore, there is a need to initiate an awareness campaign on large scale to educate the people about their nutritional importance.**

IN North-Western Himalayan region of India, indigenous/ traditional vegetables are consumed traditionally in the form of special dishes in different areas. With the risk of a shrinking cultivated area due to climate change, addition of indigenous and minor vegetable crops into local food systems will help to mitigate malnutrition since they are well adapted to extreme weather conditions. Crops such as faba bean, colocasia etc. are adapted to extreme weather (drought and heat stress). Indigenous crops generally require less water and have high water use efficiencies. They can also be grown in those areas which are no longer suitable for commercially cultivated crops such as marginal lands, dry lands and swamps. Therefore, the cultivation and expansion of indigenous crops must be supported at a large scale.

**Diversity of indigenous and minor vegetable crops**

Indigenous and minor vegetable crops form a part of species rich agro-biodiversity. Cultivation of indigenous vegetable crops could provide nutritional diversity for people, other benefits like crop rotation to disrupt pest and disease cycles, creates niche markets in local economies, utilize and protect knowledge, agro-biodiversity and ecosystem. Therefore, harnessing local knowledge about indigenous crop species has huge potential to improve food security. The important indigenous crop species and their distribution in north-western Himalayas have been described in Table 1.

***Amaranthus* species**

These are leafy vegetables having various local types that possess varying degree of pungency. Species are consumed as soups after boiling or as leafy vegetables. These also provide as a substitute for spinach. Under domestication, high variability occurs in *A. viridis*. Tender shoots of *A. lividus* and *A. viridis* are rich in minerals and are often used as substitute for *Asparagus*. Young plants of *A. retroflexus* are rich source of nitrogen, while those of *A. spinosus* are rich in calcium. Leaves are good source of vitamin A, $B_6$, C, riboflavin, folate and dietary minerals such as calcium, iron, magnesium, phosphorus, potassium, zinc, copper, and manganese. *A. gangeticus* Linn. syn. *A. tricolour* Linn, a leafy herb is largely cultivated but also found wild. The leaves and young shoots of *A. viridis* are eaten and found as a weed in rainy season.

**Buckwheat (*Fagopyrum* spp.)**

There are two species of buckwheat, viz. *F. esculentum* (common buckwheat, *Kotu*) and *F. tataricum* (Bitter buckwheat, Duck wheat, Indian Buckwheat). Flowers produce nectar, which is used in the preparation of honey. It is also used as a medicinal plant due to the presence of a glucoside named 'rutin' which reduces haemophilia and heart attack chances. In India, it is grown entirely in the temperate part of Himalayan range and in South Indian hills. The species can withstand poor unferti1e and acidic soils. The leaves and young shoots are boiled and eaten like spinach and in summer, it is used as potherb.

**Mountain spinach, garden orach and sea purslane (*Atriplex hortensis*)**

It is an annual herb and locally known as Phaltora

Buck Wheat

*Allium zummi*

Lasoda

and Ustak in Ladakh region. The leaves are rich source of calcium, fat, carbohydrate, fiber, carotene and saponin. Besides, they are diuretic and effective to treat gout. It is used as health tonic and helps in nutrition absorption, digestion and enhances the metabolism. It is also high in flavonoids and amino acids.

***Allium* species**

*Allium stracheyi* and *A. victoralis* are important species as edible types and plants are perennials. Dried leaves of *A. stracheyi* are stored semi-powered used for flavouring and garnishing soups and curries. The shoots of *A. tuberosum* and *A. victoralis* are boiled as soup, consumed as salad and also cooked as vegetable. Zimmu leaves are more pungent and consumed both as raw, cooked and in *chutney*. Sun dried and crushed leaves of it are used as condiments for garnishing cooked dishes. Its leaves are heart stimulant and have bactericidal properties. It also lowers the cholesterol in the blood, while dried foliage is used for culinary purposes as a spice. *Allium govanianum* is a herb found in the Himalayas. The young aromatic leaves are used as green vegetable and for garnishing after drying. *A. stracheyi* Baker, *A. wallichii* hunth, herbs are found in Himalayas. *A. sphaerocephalum* is an herb from north western Himalayas. Its leaves are eaten in Lahaul (Himachal Pradesh). Other species consumed likewise are *A. carolinianum* DC. *A. consanguineum* Kunth, *A. rubellum* M. Bieb, *A. semenovii* Regel and *A. victorialis* Linn.

**Chayote (*Sechium edule* (Jacq.) Sw)**

In India, the fruit and roots of chayote are not only used as food but also as fodder. The fruit and seeds are rich source of amino acids. Infusions of the leaves are used to dissolve kidney stones and to assist in the treatment of arteriosclerosis; infusions of the fruit are used to alleviate urine retention. It also possesses hypoglycemic properties.

**Lasoda, Indian cherry (*Cordia myxa*)**

Unripe fruits are eaten as vegetable, pickles whereas, ripe fruits are used in making country liquor. Fruits are useful in gastric problems, ulcer, leprosy, skin diseases, dry cough, bronchitis, chronic fever and arthritis. This tree is found in lower hill region of Himachal Pradesh. The mucilage and the kernel are reported to have useful medicinal properties.

**Kachnar, Orchid tree, Mountain Ebony (*Bauhinia variegata*)**

The buds and flowers are traditionally eaten as vegetable in different areas of Himachal Pradesh. Flowering in Kachnar occurs in March and fruiting in rainy season. Buds are boiled, mixed with curd and spices and local preparation are well-liked. The boiled stuff is also fried and eaten as vegetable. Dried buds are used in dysentery, piles and worms. The buds have high phenol contents and have antioxidant properties. The protein in Kachnar is 46.5 g and oil is 17.3 g per 100 g of fruit. Fruit oil is rich in unsaturated fatty acid. Flavonol glycoside possesses anti-inflammatory activity.

**Broad bean (*Vicia faba*)**

Pods and seeds are used as vegetable. It has certain unique qualities such as fruiting on main stem from base of the plant, responsiveness to irrigation and rich source of protein (25%). It contains L-Dopa which helps to check Parkinson disease.

**Diplazium (Lungru) (*Diplazium esculentum*)**

Lungru is used as cooked vegetable and in pickle. It is most commonly consumed fern, quite tasty, giving it the name 'vegetable'. Young fronds, rich in iron, manganese and zinc, are eaten as salad, vegetable or pickle.

**Khatta Palak, Sorrel (*Rumex* species)**

More than 10 species are reported from different regions of India, mainly from the Himalayas and consumed as potherbs. In the Western Himalayas, *Rumex acetosella, R. hastatus, R. patientia* and *R. scutatus* are mostly confined to temperate habitats up to 3,600 m. Some are also distributed in the Western ghats or peninsular hilly tracts such as *R. acetosella, R. dentatus* and *R. maritimus*. *R. acetose* and *R. hastatus* are more diverse exhibiting more variability in plant type, flavour and colour. They are strongly acidic to less acidic. Mostly consumed raw, as salad and considered as a famine food. The leaves of *R. dentatus* are rich in calcium, carotene, and vitamin C and form a nutritious vegetable. *R. hastatus* leaves are mildly acidic and more preferred over other wild types. *R. patientia* has leaves that taste like sorrel. Its roots are also consumed raw.

**Table 1.** Diversity of Indigenous vegetable in North-Western Himalayan region of India

| Crop | Family | Edible part | Diversity and distribution |
|---|---|---|---|
| Amaranth greens | Amaranthaceae | Leaves and young shoots | About 15 species exist wild in India, with more diversity in the Himalayas |
| Buck Wheat | Polygonaceae | Seeds | In India, it is grown in the temperate part of Himalayan range |
| *Allium* species | Alliaceae | Leaves and young shoots | In temperate zone, mainly in alpine meadows in the Himalayas about 30 species occur wild in India. As edible types *Allium stracheyi* and *A. victoralis* are more important. More diversity occurs in small-plot cultivation near hutments in high altitudes at 3,000- 4,000 m in the Western Himalayas. Chinese chive*, Allium tuberosum, Zimmu,* (a natural cross between onion and garlic) is reported wild in Himachal Pradesh and in adjoining Western Himalayas |
| Chayote | Cucurbitaceae | Fruits | It is widely distributed in sub-tropical, sub-temperate Western and Eastern Himalayas |
| Lasoda | Boraginaceae | Unripe fruits | Tree is most commonly found in lower hills of Himachal Pradesh |
| Kachnar | Fabaceae | Buds and flowers | Kachnar occurs in sub Himalayan tract, dry forests of Central, Eastern and Southern India as well as in the lower dry regions of Himachal Pradesh |
| Broad bean | Fabaceae | Young pods and seeds | In India, it is grown as a source of vegetable and fodder mostly as in Himalayan hills |
| Lungru | Athyriaceae | Fruits | It is commonly found in the hilly areas of North India |
| Sheep sorrel or Khatta palak | Polygonaceae | Leaves and roots | It is consumed as potherbs. Over 10 species are reported from different regions of India, mainly from the Himalayas. *Rumex acetosella, R. hastatus, R. patientia* and *R. scutatus* are mostly confined to temperate habitats upto 3,600 m in the Western Himalayas. Some are also distributed in the Western Ghats or peninsular hilly tracts such as *R. acetosella, R. dentatus* and *R. maritimus*. *R. acetose* and *R. hastatus* are more diverse exhibiting variability in plant type, colour and flavour. They are strongly acidic to less acidic. |
| Curry leaf | Rutaceae | Leaves and shoots | It is an evergreen shrub found naturally in Shivalik hills especially at an altitude of 300-900 m amsl |
| Endive | Compositae | Leaves and flowers | This herb is commonly found as weed in Punjab and also in the colder parts of Western Himalayas |
| Brahmi sag | Cruciferae | Tender shoots and leaves | It is found at many places especially in mid hills of Himachal Pradesh |
| Mountain spinach | Chenopodiaceae | Leaves | It is an annual herb which is locally known as *Phaltora* and *Ustak* in Ladakh region |
| Blackjack | Asteraceae | Tender shoots | It is found in India in Ladakh Himalaya, Jammu and Kashmir |
| Spine gourd | Cucurbitaceae | Green fruits | It is commonly found in Asia with extensive distribution in India and Bangladesh. |
| *Arenaria holosteoides* | Caryophyllacease | Entire plant | A slender herb occurring in Western Himalayas is used as vegetable in Ladakh and Chamba |
| *Crambe cordifolia* | Cruciferae | Young leaves | It is an herb found in north western Himalayas |
| Himalayan Desert Candle | Liliaceae | Leaves | It is a tall herb occurring in Western Himalayas. The leaves are used as vegetable in Lahaul valley. It is used as emergency food in Majauri-Kirchi tract of J&K and other parts of north western hills |
| Rocket Salad | Cruciferae | Young plants | An herb mainly cultivated in Western Himalayas up to 3000 meters |
| *Polygonum alpinum* | Polygonaceae | Leaves and stems | An herb found in Western Himalayas is eaten raw or cooked and is believed to be taste like rhubarb |
| Ravandchini, Chuchi | Polygonaceae | Tender leaves | It is an herb found in the Himalayas. People of Lahaul (Himachal Pradesh) use the leaves as vegetable |
| Kindut | Crassulaceae | Leaves | An herb found in rocky habitats of the Western Himalayas and the leaves are eaten in Lahaul (Himachal Pradesh) |
| Taro | Araceae | Tuber | It is mainly distributed in humid tropical regions. It is common in foothills of Himalayas. More diversity occurs in north eastern and peninsular region where cultivated and feral forms exist |

Kachnar

Artiplex

**Endive** (***Cichorium endivia***)

This herb is commonly found as weed in Punjab, and extending to colder parts of Western Himalayas. Leaves and flowers are edible parts. The young shoots are used as salad, and the leaves are eaten as vegetable. It is rich in vitamins and minerals, especially in folate and vitamins A and K, and is high in fibre. It acts as a stomachic tonic, has hepato-protective properties, favors blood circulation and acts as a laxative.

**Watercress** (***Nasturtium officinale***)

The tender shoots or leaves are cooked as vegetable, used in soups and also to garnish for various dishes. Leaves are exceptionally rich source of vitamin C, folic acid, ascorbic acid and minerals especially iron. It is used as a detoxifier, antiscorbutic, diuretic and stimulant.

**Blackjack or Spanish needle** (***Bidens pilosa***)

It is a medicinal herb in Chinese medicine. Its edible parts are tender shoots. It is high in beta-carotene, vitamin E, ascorbic acid, iron, calcium and protein. It contains anti-inflammatory, antioxidant and anti-gastrointestinal properties.


**SUMMARY**

There is a need to develop a clear plan for research and development of indigenous and minor vegetable crops through concerted efforts involving all the stakeholders from farmers and consumers to researchers and policy makers. There is a need to exploit these indigenous resources through coordinated efforts for the improvement of existing diversity for more methodized cultivation. Globally these crops would significantly contribute to food and nutritional security. They represent a rich heritage of genetic material which is of global importance. For the promotion of indigenous and minor vegetable crops, it will be important to enhance research and development programme to collect genetic variability, conserve it and utilize for development of improved cultivars or for harnessing fruitful results in future.



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