



Seabuckthorn in India

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Systematic position of Seabuckthorn in plant Kingdom

Kingdom	: Plantae
Division	: Spermatophyta
Subdivision	: Dicotyledoneae
Subclass	: Monochlamydeae
Order	: Daphnales
Family	: Elaeagnaceae
Genus	: Hippophae
Species	: <i>Rhamnoides*</i> , <i>Salicifolia*</i> , <i>Tibetana*</i> , <i>Yuanensis</i> , <i>Gytanensis</i> and <i>Goniocarpa</i> (*species found in India)

Seabuckthorn (*Hippophae* spp. L.) is an important plant of cold zones of Himalayas in India. In India, Seabuckthorn grows in high altitude, cold arid conditions of Ladakh (Leh and Kargil), Lahaul – Spiti, parts of Chamba (Pang) and upper Kinuar districts of Himachal Pradesh and Badrinath and Chamoli in Uttarakhand (Dwivedi *et al.*, 2006). Seabuckthorn has also been reported from Sikkim (Basistha *et al.*, 2001) and in Dibang valley in Arunachal Pradesh (Tiwari and Singh, 2001).

Area and distribution :

Ladakh (Jammu & Kashmir) : In Ladakh in the state of Jammu & Kashmir (India), Seabuckthorn is known as “Tsermang” and its fruits are called as “Tsestalullu”. Plant is being used as fence and fodder since long (Dwivedi, 2002). Two species *H. rhamnoides* spp. *turkestanica* and *H. tibetana* have been reported from Ladakh. Among *H. rhamnoides* spp., *turkestanica* is widely distributed species of Ladakh and whereas *H. tibetana* has been distributed at higher elevations in Zaskar valley of Ladakh. *Hippophae rhamnoides* L. grows naturally in all five valleys of Ladakh *viz.* Indus, Nubra, Suru, Zaskar, and Changthang having altitude ranging from 8500 to 12500 ft above mean sea level. Limited patches of the species have been noticed at shani and Manda villages (Zaskar) at 13600 ft above msl and Tangtsey (Changthang) at an altitude of 15400 ft above msl. The maximum biodiversity of Seabuckthorn has been found in Nubra, Leh and Suru valleys of the region. Seabuckthorn has been growing naturally mainly along the rivers, channels and around the agricultural fields. It has also been found growing in rocky,

barren, waste land and even in salt affected soils (Singh *et al.*, 2005). The major population of Seabuckthorn has been recorded around the villages like Stakana, Chhuchot, Thiksey, Shey, Nimboo, Bazgo etc. It also grows on the banks of Suru and Drass rivers in kargil district. Thus Seabuckthorn has ubiquitous distribution in leh and Kargil districts of



Ladakh with excellent ability to tolerate distribution in leh and kargil districts of Ladakh with excellent ability to tolerate abiotic stresses like soil, moisture and nutrient besides tolerating -30⁰ C temperature during winter months (Dwivedi *et al.*, 2002). Most of the populations of Seabuckthorn in Ladakh are wild and are of seedling origin. Though, dense and impenetrable population is due to profuse suckering ability of the plant. There is no record about the genesis and introduction of the crop in Ladakh, however it has been proved that Seabuckthorn has been growing in the area since ages. It is believed by locals that migratory birds from Siberia might have introduced Seabuckthorn in the region. Satellite imagery conducted by field Research laboratory (DRDO), leh in collaboration with Defence Electronics Application laboratory (DRDO), Dehradun has shown about 11,500 hectare areas purely and 30,000 ha under mixed forest plantation in Ladakh region (Dwivedi *et al.*, 2003).

Himachal Pradesh : The dry temperate and cold deserts of Himachal Pradesh, comprising lahaul – Spiti, upper parts of Chamba and Kinnaur districts, are characterized by extreme climatic conditions, high rates of soil erosion and landslides, shortage of fuel wood, timber and fodder, low productivity of agricultural lands and sparse vegetation (Dwivedi, 2009).

In Himachal Pradesh, Seabuckthorn grows mainly in the districts of Lahaul – Spiti, parts of Kinnur and Chamba, which are surrounded by Tibet of china and Ladakh region of J & K state in the north on the southern side. Seabuckthorn grows at 2,500 – 3,300 m asl in Lahaul. In lahaul it grows throughout the length of the Chandra valley

in the villages *i.e.* Sissu, Khorpani, Raling, Khongsar, Gondhla and Dalang. Several good stands of *Hippophae rhamnoides* sub species *turkestanica*, grows on both sides of Bhaga river (Tinu, Gemur, Jispa and Darcha). In Chandra – Bhaga (Chenab) valley, Seabuckthorn is found as component of agroforestry systems in the villages Kirting, Sansa, Jhalma, Jhunda, Jsratha and Madhgaon. In Mayar valley, Seabuckthorn is spread in Urgos and Chaling villages (Singh *et al.*, 1995). Prach (1994) studied the vegetational succession in river gravel bars in Lahul. It was found that early stages, dominated by the typical river gravel species *Myricarina germantica* and *H. rhamnoides*, were highly uniform among the study sites throughout the mountains. Spiti, a cold desert valley of district Lahaul – Spiti adjoins Tibet on its eastern border and Ladakh on its north. At the base, the altitude varies from 3,120 m at Sumdoh to 4,500 m amsl near Kunjam pass. Spiti is a broad and flat valley, which is intersected by high vertical cliffs of black, grey and brown sand. *H. rhamnoides* grows wildely from sumdoh (3,100 m) to upper area (3,900 m amsl). There are excellent stands of

this species at Thego – lara (3,760 m), lingthi (3,889 m) and Shichling (3,560 m). It grows mainly on riversides and beds, some farmers has raised windbreaks around their fields. *H. rhamnoides* have also been reported growing in upper area of Spiti in villages like Kiato, Kiamal, Morang, Sulming and Rangrik. *H. tibetana* has been reported growing in higher altytude areas at Loser (4,100 m) and Chicham (4,200 m amsl). *H. tibetana* has shown excellent growth at the undisturbed flat river and Chicham. Both *H. rhamnoides* and *H. salicifolia* have been found in upper Kinnur. Seabuckthorn has been found in the upper areas of Shimla and Kullu districts. There is about 1,200 ha area under Seabuckthorn in Lahul – Spiti and upper Kinnur, however, most of them are scattered and thin stands (Singh *et al.*, 1995).

Uttarakhand : Among various underutilized plant genetic resource, Seabuckthorn possesses a very important place with respect to the species of dry temperate regions of high Himalayan region, Seabuckthorn is also called Amesh, Chuk, Amil, Tarwar in different dialects of Uttarakhand state. Due to its wide adaptability, drought resistance

Table 1 : General characteristics of *Hippophae* species found in India

Species	Distribution	Growing altitude (m)	Plant height	Flowering time	Fruit ripening time
<i>Hippophae rhamnoides</i>	India, china, Tibet, Kyrgyzstan, Uzbekistan	600 – 4200	2 – 6 m	May	September- October
<i>Hippophae salicifolia</i>	India, Tibet, Bhutan, Nepal	2700 – 3700	3 – 10 m	June	October
<i>Hippophae tibetana</i>	India, Tibet, China	3000 - 5200	0.8 – 1.2 m	May	August –September

Source- Dwivedi *et al.*, 2006

Table 2 : Estimated areas of Seabuckthorn in Uttarakhand

District	Location	Approximate area in (ha)
Uttarkashi	Har- ki- Dun	100
	Yamunotri valley	1200
	Hanumanchatti-Bhandaligad (on the bank of Yamuna)	
	Kharsali – Digdalagad	
Rudraprayag	Hnaumanchatti-on the bank of Hanuman Ganga (3 km)	
	Gangotri valley	600
	Dabrani – Lanka (on the bank of Bhagirathi and both side of Nationl highway and adjoining areas)	
Chamoli	Gaurikund – Rambana	300
	Mana valley	100
Pithoragarh	Lambagad – Badrinath	200
	Gobind ghat – Ghagharia	600
	Niti valley	200
	Surraithota–Malari (on the bank of Vishnu Ganga and dornagiri hill in village Jhelum)	
	Munsiari (Kali and Gori river valley), Dharchula	450
	Total	3750

Source – Yadav *et al.* , 2009

capabilities, and deep root system and capacity to fix atmospheric nitrogen through frankia symbiosis, the plant has been widely planted in China to control soil erosion and reclamation of degraded lands. The leaves, berries and seeds of Seabuckthorn have high nutritional and medicinal value and are excellent source of vitamins C, B, B2, E, F, K, and P, pro- vitamin A, sugars and organic acids. High content of vitamin C and E and other bio-active substances makes it a food industry (Yadav *et al.*, 2005 and Rao *et al.*, 2006).

Although Seabuckthorn grows naturally in the state of Uttarakhand but the local inhabitants are still not well – verse with this wonder plant. The fruit is utilized on limited scale for the preparation of chutney, pickle and juice in some areas of the state. The local people plant it in controlling soil erosion and in land slide prone zones.

Out of three species found in India, only two species *i.e.* Hippophae salicifolia D. Don and Hippophae Tibetana are reported so far from Uttarakhand. Among them Salicifolia is the most common and widely distributed species. Seabuckthorn is reported to exist in abundance in three districts of Garhwal division *viz.*, Uttarakashi, Rudraprayag and Chamoli and pithoragarh district of Kumaon division. *H. salicifolia* is reported from Gangotri, Harsil, Yamuntori valley and Har – ki – Dun area of district Uttarakashi, Hanumanchatti, Badrinath area, Jhelum – Malari area of Niti valley in district Chamoli and Rambara in district – Gauri kund area in district Rudraprayag of Garhwal division. In Kumaon division this species reported from Kali valley, Bogdiar, Gori valley, Budhi, Byanse, Darma area in district Pithoragarh. However, *H. tibetana* was reported from Rani, Niti, Gomukh area of Garhwal, while Gori valley, Milam and Shin – La are other areas of kumaon division of the state (Yadav *et al.*, 2006).

Seabuckthorn is growing wild in different parts of the state and therefore no systematic domestication work of any kind is available on the species. Yadav *et al.* (2009) reported that survey done by researchers in 2004 of naturally occurring areas of Seabuckthorn revealed that the estimated area in different parts of the state is about 3750 ha which occurs naturally between 1700 - 3000 m amsl (Table 2)

Sikkim : Sikkim Himalaya is having great variation regarding climatic conditions of the state because of the presence of altitudinal variations, steep slopes and different aspects of mountains and heavy monsoon lead to wide range of climatic variations within short distances, is known to be a hot spot of biodiversity (Lachungpa, 2002). According to (Srivastava, 2000) the highest density of

vegetation was found in eastern Himalaya of the state.

Seabuckthorn mostly grows in and around rivers banks and sea shores, bearing fruits in clusters and with thorny branches. Locally in North Sikkim, the Butia called the plant as Tarobo. The natural habitat of Seabuckthorn in Sikkim lies in the dry temperate hills especially in the north district ranging from altitude of 2,800 to 3,300 m amsl. The plants were observed in areas of 250 – 300 ha of riverine, and non riverine and torrential areas as natural orchard. The plant for its regeneration favoured the landslide areas of sun facing slopes and river bank areas. The total distribution of Seabuckthorn in Sikkim is approximately 500 ha spreading in dry temperate region over altitude ranges of 2,800 – 3,300 a msl. They are widely distributed in different slopes and and river bank areas in and around Lachen, Ze ma I, Zema II, Zema III and Lachung regions and mainly in the North – eastern aspects of the slopes. Hippophae in Sikkim is mostly observed to be of Salicifolia species with small patches of *H. rhamnoids* in upper belt of natural habitat which extends from 2,800 to 3,300 a msl. The plant is observed to be colonized at either side or river banks of River Zema, Lachung and sandy slopes of River Lchung and near by Thangu in North Sikkim. There is distinct variation of plant size and density of population of Hippophae in different altitudes and slope facet. The soil type and climatic features of the region are dominant factors for plant density and production characteristics (Basistha, 2009).

The ethnic population of the native area loves the plant for its desirable qualities. They use the plant as a cheap source of fire wood, as per local respondents, the wood of Seabuckthorn burns with almost blue flame and give a good heat with minimum of smoke and ash. People prepare jam and pickles out of the fruits, which they say is a good digestive agent too. The local women weavers, craftsmen use the juice from the fruit as dyeing ink for their traditional blankets, bedcovers and sweaters etc. According to local people, the bear and other animals also like the ripened fruits. However, due to excessive deforestation for fire wood and cultivation of other agricultural / horticultural crops the plant seems to be in danger, for it the preventive measures are to be initiated on time (Basistha, 2009).

Regarding the multiple use of the tree, it gets very important to spread awareness among the masses in the higher reaches of Himalaya for the conservation and cultivation of the Miracle plant namely Seabuckthorn by which economical plight of the people can be uplifted.