



Article ID: AEN-2020-01-01-011

## ***Cotoneaster microphyllus* – The Orphan berry of alpine**

Antul Kumar\*, Harmanjot Kaur and Anuj Choudhary

Department of Botany, Punjab Agricultural University, Ludhiana 141004

\*Corresponding author. E-mail: antulkumar007@gmail.com

Rosaceae have drawn the attention of investigators, because of the variety and beauty of their flowers and fruits as well as their horticultural value. The low sized shrub preferred temperate of hills and favoured by the dry as well moist soil in barren or stapes. The article emphasizes the distribution, characterization and importance of *cotoneaster microphyllus*. Due to modernization these orphan berries proved to be important horticulture crop in upcoming future.

### **Introduction**

Orphan plants – What they are, is it matter? The plant we see only matter when it serves us in a plate, no matter which technology is used for it. Food is a technology, which need innovation every day. Numerous terminology given to orphan crop such as regional, minor, traditional or underutilized. Due to modernization of agriculture, these plants are neglected due to poor shelf life, unawareness of consumers, supply constrains and unidentified nutritional value, but still they are considered as poor man's or famine food.

Rosaceae is a large and varied family with wide distribution range. Many examples of polyploidy and apomixes have been reported in this family so far. *Cotoneaster microphyllus* belongs to family rosaceae, is also known as Rockspray or Little-leaf cotoneaster. In Latin 'cotoneaster' derived from *cotōneum*, quince; see quince and *aster* -partially resembling. These are native to south-east Tibet. Very rarely offered, this wild collected seed was found at an altitude of 4,000 meters in Nepal, where it is named as 'Khareto'. It covers rocks and ground with total creeping carpets smoothers in white flowers in spring. Later comes impressive display of dazzling red berries. It is a strong perennial evergreen contender in Shrubs native high altitude plants to India. The *Cotoneaster* had four sub-species on the basis of their morphological characterization. These are *Cotoneaster microphyllus* var. *Conspicuous*, *Cotoneaster microphyllus* var. *glacialis*, *Cotoneaster microphyllus* var. *cochleatus*, *Cotoneaster microphyllus* var. *Thymifollyus*. The variation is found on the basis of habit, their nativity, leaf variations, flowering time, fruit morphology and growing conditions.

### **Distribution**

It is a moderate to creeping type hardy shrub which is widely distributed through the Himalayan regions of Sikkim, Nepal, Yunnan and south western China. The low sized shrub preferred temperate of hills and favoured by the dry as well moist soil in barren/stapes. It is restricted in river valley and grown on trailing of barren rocks at an elevating 2100-4200m. It is shrub of temperate and sub-temperate climate, found throughout the high altitudinal drier regions of India, often gregarious on trans of alpine meadows, open grassland and stony steeps slopes. The root sucker and seeds owing its ability to survive in harsh and fragile conditions.

### **Habitat**

It is tough and adaptable plant that can withstand poor soils, including rocky ones. The native habitat of these plants mostly comes under cold arid desert and receive very less rain, while summer are dry and winter are generally snowy. The shrub is frost hardy and very drought resistant, although leaves are persistent throughout the life-cycle. It can reside in localities where precipitation is very low. It can grow on broad range of soils including sandy, gravelly sites, loamy light, moist, fertile,



and poor dried soils. It can have cultivated on wild habitat of all type of pH including acidic, basic and neutral.

### **Propagation**

It is propagating by stem cuttings or seeds. Plants do not perform well in the hot and humid summer conditions of the deep South. The seeds require vernalization as it can ripe by cold stratification of 4-6<sup>0</sup>C temperature for 7-9 weeks. Stored seeds are easily germinated at 15<sup>0</sup>C if exposed to warm stratification. These treatments require photoperiodic response by artificial light to create long days to induced flowering. The cuttings of half ripe wood is also used to propagate in July season. The fruit resembles to bees and germinate after stratification seed treatment. The stratification of 3 month warm and cold temperature at 4-8<sup>0</sup>C provokes seeds germination. Plant growth is very slow at optimum temperature of 15<sup>0</sup>C and it takes 2 years to attain 1-8m length (Swati et al., 2018).

### **Vegetative Characteristics**

It is creeping medium sized shrub, attain height of 50-100m and diameter of about 1to 1.5 cm when it matures at age of 10 years or so on. Stem is dark brown, hard in colour. The main branches are creeping and horizontal runner, but lateral branching are arching and have up righting especially when weighted with fruits.

**Leaves:** These are pubescent dark green, revolute narrower and hairy beneath. These are ovate-elliptic in shape with pointed tips. Leaves morphology is a major difference between *C. microphyllus* and *C. macrophylla* and act as identification marks during fields surveys. This feature distinguishes it from sub species of very closely resembling species. The leaves are tiny evergreen, alternate, small and typically rolled margin margins downward. Sepals are densely hairy.

**Flowers** These are solitary, produce early pink buds, white five stellate, flower is open. It commonly flowers in month of mid-June to august. Small flower/sessile white flower more than 8-10 mm size, appeared in either single and grouped of 2-4. Hairs are completely covered on sepals. Inflorescence usually solitary and present in groups. Petals are sub orbicular in shape, 4-5 mm in length.

**Fruits:** These are red or deep red, drupe like pome, globose, 5-7cm in diameter enclosing brown coloured two pyrenes. This plant is loved for its showy scarlet berries.

**Economic Value:** As *C. microphyllus* and *C. macrophylla* is a very popular garden plant in many countries, it is widely raised and sold by nurseries. *C. microphyllus* well suited for ornamental plantation because of its attractive white flowers in dry summer and bright radish berries in autumn. Leaves are used for intensive purpose by Buddhist. A specific dye known as rose-tan is extracted from the berries. The dry stem is often very hard and used for making baskets. The plant grown traditional in village areas in north western Himalayan range used from fencing that exclude from wild animals and other livestock's. It is also used for fuel and marked out boundaries for cultivated lands purposes. Plants are notably susceptible for honey fungus. Fruits are edible if cooked, but are not recommended for consumption raw.

**Social Benefit:** *C. microphyllus* is widely grown as an ornamental low-maintenance ground cover on banks and slopes, and as a hedge or screen against walls. It is considered very decorative, due to the orange and red autumnal colour of the leaves and the bright red fruits which make a bright and cheerful display in autumn and winter.

**Landscape improvement:** This cotoneaster is an interesting landscape plant that offers good foliage, small but attractive flowers and showy red fruit.

**Medicinal value:** Plant has antioxidant, anticancer and hepatoprotective properties, like ethanolic extracts of the branches contained  $\beta$ -carotene, ascorbic acid and lesser amounts of  $\alpha$ -tocopherol and amygdalin. Toxicity testing showed that the ethanolic extracts could be considered as a potential



source of natural antioxidant with hepatoprotective, hypolipidaemic and other properties. The stolon of *C. microphyllus* is considered as astringent in nature. Stolons are also used as homeostatic.

**Environmental Services:** The flowers have unpleasant smell, but are very attractive to bees and other insects as sources of nectar, while the berries attract birds and help sustain them through the winter. The berries are good source of winter food for birds. When grown against a wall, the plant provides sheltered nesting and roosting sites for birds. These are trailing on hillsides and rocks, thickets and barren land along river valley sided. These species prevent soil erosion as it forms a hard and sense mat or carpet of thick woody structure on open lands, so they can have used as soil binder Dickore and Kasperek (2010).

**Table 1:** Difference between two identical species *C. microphyllus* and *C. macrophylla*

Sr.No.	Characters	<i>Cotoneaster microphyllus</i>	<i>Cotoneaster macrophylla</i>
1.	Leaves	Small with pointed tip, pubescent dark green, revolute narrower and hairy beneath	Large, oval, deeply veined, dark green leaves, turning to red in autumn
2.	Flowers	Solitary pink flower and sessile white flowers	Clusters of small pink flowers
3.	Habitat	Alpine meadows	Coastal areas
4.	Fragrance	Present	Absent
5.	Fire blight	Resistance	Susceptible



**Figure 1.** A. Cotoneaster berries consumption during field survey by native peoples.

B. Cotoneaster species: *C. microphyllus* (Left), *C. macrophylla* (Right)

## Conclusion

The species can hybridize freely so if we want to utilize its potential in horticulture, we need to domesticate and put them in the pipeline of breeding using advanced breeding strategies. The drought tolerant traits can be an ideal feature of this plant in drought improvement programs.

## Reference

- Dickore, W.B.& Kasperek, G. (2010) Species of cotoneaster indigenous to naturalising or commonly cultivated in central Europe Willdenowia 40:13-15.
- Swati, S., Manjula, R.R., Sowjanya, K., Vennela, Y., & Tanuja, K. (2018) A Phyto Pharmacological Review on Cotoneaster microphyllus Species Journal of Pharmaceutical Science and Research, 10(9), 2166-2168.