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*Research Article*

# ***Dactylorhiza hatagirea*: a highly valued medicinal plant in cold desert of Ladakh and its conservation**

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## **Abstract**

*Dactylorhiza hatagirea* (D. don), locally known as ‘*Angulagpa*’ in Ladakh, is a terrestrial orchid found in subalpine to the alpine region, at an elevation ranging between 2500 and 5000 mean sea level. With palmately lobed rhizome and lanceolate leaves having a sheathing leaf base, it bears pink flowers with purple-colored notches and a curved spur. Although *Angulagpa* is widely been used in modern system of medicine but this plant has great application in in Amchi System of Medicine (Sowarigpa) to cure many disorders of the digestive, reproductive, circulatory, nervous, respiratory, and skeletal systems. Its use as a dietary supplement was found to be beneficial in increasing testosterone levels, resulting in improve sexual desire and arousal. The unsustainable and overexploitation of this medicinally important herb has resulted in the dwindling of its populations in the wild. Consequently, it’s been categorized as critically endangered plant species. As the root of this plant is used for medicinal purposes, the whole plant is uprooted, which pose a serious issue of its survival. Moreover, the locals alleged, that foreigners often visit different parts of Ladakh and used to takeout germplasm of this medicinally important plant.

**Keywords:** *Dactylorhiza*, Sowarigpa, Critically Endangered, Medicinal herb, Overexploitation, Unsustainable.

## **INTRODUCTION**

The name is derived from the Greek words daktylos (finger) and rhiza (root) (Renz & Taubenheim, 1984). The genus *Dactylorhiza* is also called as marsh orchid has approximately 75 species, belongs to the family Orchidaceae. In India, the genus is represented by three species: *D. hatagirea* (D. Don) Soo, *D. kafiriana* Renz and *D. viridis* (L.) R. M. Bateman, Pridgeon & M.W. Chase. These three species are mainly distributed in the Western Himalayas (Deva & Naithani 1986; Misra 2007; Adhikari et al. 2013). In Ladakh, *D. hatagiera* has been reported from various parts like Suru valley, Sapi area (C.P.Kala, 2006). Its distribution is ranging from temperate to alpine regions, ranging from India, Pakistan, Afghanistan, Nepal, Bhutan and India (Badola et al., 2003). Due to the presence of the finger-like tuberosities, this plant is differing from other members of the orchidaceae family.

### **The Plant**

*D. hatagirea* is a perennial herb, up to 60 to 70 cm in height, bears slightly flattened, 3–7-fingered, palmately lobed, creamish-colored, tuberous roots measuring 5–12 ± 3.3 cm in length, lanceolate leaves arranged more or less along the stem. Flowers grow in dense spike inflorescences

and are zygomorphic, having gynostemium, column, or gynostegium present, which is nothing but the fused male and female reproductive organs. Flowers are purple in colour but sometimes it also bears white flowers. Each flower has six free perianth segments and the innermost segment is modified in such way that it forms a sculptured labellum which can be used by the pollinators as a resting pad, while as the rest of the segments are similar in shape and size. One of the interesting features of the flower is that it shows resupination at 180degree, which brings the labellum perpendicular to the ovary. Ovary is tricapellary, inferior, twisted and consists of one chamber with parietal placentation, having a large mass of ovules. The types of fruits are loculicidal capsule having many seeds with embryo liberated at globular stage.

### **Medicinal Uses**

This plant has diversity of uses especially in Indian medicine system, like Ayurveda, Unani, and Siddha including in some Traditional medicinal systems, like Amchi medicinal system. During our survey across different regions and hamlets of Ladakh, it has come to know that people are been using this plant for various medicinal purposes. The extract from *D. hatagiera* shows considerable effects to the body abnormalities like diarrhea, dysentery, cough, wounds,

cuts, burns, diabetes, chronic fever, stomachache, fractures, sexual problems, including the dreadful disease like cancer.

It has been observed that extract from *D. hatagirea* shows considerable effect on cancerous cell lines (Sood et al., 2016). The antimicrobial activity of this plant has been explored against all Gram positive and Gram Negative bacteria, and they have potential enough to be used for extracting antimicrobial compounds to cure diseases like dysentery caused by *E. coli* (Ranpal, 2009). We have seen humans are dealt with the issue of sexual impotency; Extract of *D. hatagirea* shows its effectiveness against such problems. The herb shows the effectiveness in improving and preventing the functionality of sexual organ and may be helpful in improving the sexual behavior and performance also the herb shows the effectiveness in improving and preventing the functionality of sexual organ and may be helpful in improving the sexual behavior and performance also (Thakur & Dixit, 2007).

The tubers of *D. hatagirea* are known to yield a the high quality '*Salep*' can be yielded from the tubers of this plant which is been widely used in Amchi system of medicine as nervine tonic for its astringent and aphrodisiac properties (Vij et al., 1992). During our survey across different hamlet of This is also well supported by our survey conducted in Ladakh, where high quality of '*Salep*' is used as farinaceous food, expectorant, aphrodisiac and as nervine tonic. Natives of Ladakh often using the root of this plant along with the milk and honey as tonic. People believe that this also increases the body stamina.

## CONSERVATION AND CONCLUSION

Although the whole Himalyan belt is known for the rich biodiversity, especially the presence of wide variety of medicinal plants. *D. hatagiera* is one of the highly useful medicinal plant, but every thing is not alright for this natural gift. The main concerning issue is uprooting the whole plant for its use. During our discussion with the practicing Amchis of Ladakh, many issues has been come out. They too concerned about this issue, but as of now there is no other choice but to uproot the whole plant. They do feel that cultivation of this plant needs to be carried out bot at the level of government and through NGOs. *D. hatagirea* has been categorized as critically endangered species (CAMP status), critically rare (IUCN status) and is listed under Appendix II of CITES (Kala, 2000; Samant et al., 2001). There is a huge demand of this plant across the region of whole Ladakh and other parts of India. Even in the remote corners of Ladakh, people realize its economic and medicinal value and in the process, they uproot the whole plant from wild without practicing the cultivation. This leads to decrease

its number each year. According to a report, the annual demand of this species is approximately 5000 tons (Kala, 2004).

There is a need to demarcate the places like marshy areas, where this plant grows abundantly and put them under protected area network. In the recent times UT administration of Ladakh, in particular the wild life department Kargil, has proposed two important sites to be protected under Protected area network. These two sites are Suru-Valley and Kainjiwala site in Kargil. Moreover, there is a need to have a surveillance mechanism and task force on ground to contain the practices of alleged siphoning of germplasm and raw form of medicinal plants to other parts of India and abroad.

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