



Ethnobotany and Occurrence of Two Orchid Species in Pabbar Valley, Distt Shimla, Himachal Pradesh, India

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Abstract

The western Himalaya is known for its rich floral and faunal diversity. The topography of the Himalayas consists of valleys and mountains which provide a suitable habitat for orchids. The site is located in the eastern part of Shimla district, Himachal Pradesh endowed with rich habitat and life forms. The survey was conducted in the valley to investigate the knowledge and use of two rare species of orchids and to list their ethnobotanical importance. The orchids are one of the most valuable plants on the earth. India possesses a large number of Orchid species and 11 species are endemic to the western Himalayas. The present communication deals with the Ethnobotany & occurrence of two rare species of orchids; *Dactylorhiza hatagirea* and *Gastrodia falconeri*.

Keywords: *Ethnobotany, orchids, occurrence, Pabbar Valley, Himachal Pradesh*

Introduction

Himachal Pradesh is a rich repository of a large number of medicinal and aromatic plants. Pabbar valley which lies in district Shimla of Himachal Pradesh forms the part of the western Himalayas an area lying between rivers Satluj and Sharda in Uttarakhand (Jalal & Jayanti. 2015). The forest vegetation of the Western Himalayas varies with climate, rainfall, altitude, and soil. The elevation of this region varies from 800 m to 5200 m. The climate ranges from sub-tropical to alpine. The annual rainfall varies from 600 mm to 1310.8 mm (Prasad & Sharma. 2016). The region is characterized by a complex geologic structure deep river gorges cut by the Pabbar River and its tributaries. There are snow peaks at a higher level and the Chander Nahan glacier the origin of the Pabbar River.

Orchidaceae comprises one of the largest families of angiosperms consisting of 779 genera and 28,784 species (Willis. 2017, Vijay Kumar. *et al.*, 2017). They are cosmopolitan in distribution and are found almost everywhere. These orchids have adapted themselves to a variety of ecological niches due to their habitat specificity. They grow as

lithophytes, epiphytes, and terrestrial. The use of plant or their parts for folk medicine is prevalent throughout the world among tribal communities. In the Ayurvedic system of medicine, *Ashtavarga* a group of eight drugs is used in the preparation of various rejuvenating formulations and tonics, such as *Chyavanprash* (Chauhan. 1990; Pathak. *et al.*, 2010; Vasundhara. *et al.*, 2019). Out of eight drugs, four come from Orchids mainly Jeevak [*Malaxis muscifera* (Lindl.) Kuntze], Rishbhak [*Crepidium acuminatum* (D.Don) Szlach., *Malaxis acuminata* (D.Don)], Riddhi (*Habenaria intermedia* D.Don), and Vriddhi (*Habenaria edgeworthii* Hook .f.) (Kumari and Pathak. 2020).

The valley supports some economically and medicinally important orchids (Chauhan. 1999; Samant. 2002). The climate of the valley is sub-tropical to alpine favours the growth of orchids. According to (Vij. *et al.*, 2013), a total of 85 species in 44 genera are recorded in Himachal Pradesh. Studies on orchid diversity have been carried out in Himachal Pradesh & western Himalaya by (Chowdhery and Agrawala. 2013; Deva, S.

and H. B. Naithani. 1986; Duthie. 1906; Marpa and Samant. 2012; Sharma. *et al.*, 2015; Verma. *et al.*, 2013; Vij. *et al* 2013) but very few studies are available for the present areas of the state. This unique diversity of orchids needs to be documented and conserved as it is under severe threats due to various anthropogenic activities and natural processes.

Material & Methods

Study Area

The study was conducted in Pabbar Valley of District Shimla, Himachal Pradesh. The valley is known for its ethnic identity having rugged mountains, naturally long and open pastures at the high area, with elevation ranging from 800 m to 5200m. The area is located between 77° 29'40" to 78° 18'42" and 30° 57'0" to 31° 25' 20" North in Rohru Sub-division consisting of three different blocks Jubbal, Rohru, and Chirgaon.



Fig 1: Map of Himachal Pradesh



Fig 2: Map of Study Area (marked)

The study area shares its border with the tribal district of Kinnaur and Uttarakhand State. The climate of the region ranges from Sub-temperate to Alpine. (Fig 1& 2)

Field Data Collection

The present study was conducted to explore and identify the orchids and record the indigenous knowledge of their utilization. The survey was conducted in the years 2018 and 2019. The information was collected through semi-structured questionnaires, group discussions, and field observations. The questionnaire consists of questions on the local knowledge of identification of habitat, local name, medicinal use, and availability. The photographs of orchids were also taken. The

collected specimens were identified from manuals and standard literature and other publications from the area.

Results and Discussions

Dactylorhiza hatagirea (D. Don.) Soo

English Name: Himalayan Marsh Orchid

Local Name: Panja, Hathpanja.

Botanical Description

Critically endangered species. The plant is a perennial, terrestrial herb, hardy geophytes, and store water in tubers. The stem is 60-90cm tall stout, fistular and leafy. Roots are fleshy tuberous. Leaves many, oblong lance-shaped, with a sheathing base. Leaves higher on the stem are shorter than leaves lower on the stem.

Inflorescence compact raceme, spurred with 20-25 flowers. Pink purple flowers are produced in upright spikes. The bract green narrow lance-shaped, lower larger upper slightly shorter. Seeds many, in clusters of 2-6 per head (Fig 3).



Fig 3: *Dactylorhiza hatagirea* (D. Don.) Soo

Distribution

3000-4200m, Pakistan to southeast Tibet. In India plant is found in Jammu & Kashmir, Himachal Pradesh, Uttarakhand, Sikkim, and Arunachal Pradesh.

Flowering and Fruiting: June and July

Habitat & Ecology

The plant is a perennial, terrestrial herb, hardy geophytes, and stores water in tubers. The plant is found growing from 3000 to 4200 m. It was reported from the Chansal Pass and Kalka Pattan area of the valley.

Plant part(s) used: Roots.

Ethnobotanical Uses

It is widely used to cure various diseases like dysentery, diarrhoea, chronic fever, cough, stomachache, wounds, cuts, burns, and general weakness, the tuber yield mucilaginous jelly used as aphrodisiac and nerve tonic. The tubers mixed with other herbs are used for treating general

weakness in women after delivery (*Panjiri*).

Threats & Conservation

A Critically Endangered Species

A very limited number of plants were reported from the Chansal area; however, the population of species is quite a good number at Kalka Pattan. Anthropogenic pressure may be responsible for the dwindling population at the Chansal, as the area can be easily accessed due to the opening of the road, in comparison to Kalka Pattan which is quite remote.

Gastrodia falconeri D. L. Jones & M. A. Clem

English Name: Potato Orchid.

Local Name: Ullu, Jangli Aalu

Botanical Description

The genus *Gastrodia* constitutes a group of mycoheterotrophic orchids distributed throughout the temperate and tropical regions of Asia, Oceania, and Madagascar. It contains approximately 50 species, which are characterized by their fleshy tuber or coralloid underground stem, as well as the absence of leaves, the union of sepals and petals, and two mealy pollinia lacking caudicles (Kenji Suetsugu, 2014). *Gastrodia falconeri* is a terrestrial, mycoheterotrophic herb. Roots are few, slender, or occasionally thickened, mostly extending from the apex of the rhizome. Rhizome tuberous, fusiform or cylindrical, 4-8 cm long, 8-12 mm in diameter, pale brown with numerous scales. Inflorescence raceme erect, pale brown, 9-18 cm long, 3-5 mm in diameter. Flowers numerous, reddish-brown to yellow tubular, slightly upwards or downwards, resupinate, 15-18 mm long, 5-6 mm in diameter. The sepals and petals are fused to form a bell-shaped or irregular tube with the tip free. The petals are usually much smaller than the sepals and the labellum has three lobes and is fully enclosed in the tube. Pollinia 2, obvate, granulate. Fruit a Capsule cylindrical, 3-3.5 cm long, Seeds fusiform, 2-4 mm long (Fig 4).



Fig 4: *Gastrodia falconeri* D. L.Jones and M.A.Clem. {a) Plant body (b) Rhizome}

Distribution

Western Himalaya (Jammu & Kashmir, Himachal Pradesh, and Uttarakhand).

Flowering & Fruiting: July –August.

Habitat & Ecology

Mycoheterotrophic, temperate to sub-alpine found from 2300 m to 3200 m. The plants were found growing in shady portions singly or in a group of two to three plants only. The plants were spotted in Kharshali forest (Chirgaon) and Panju forest of Jubbal. The population of species spotted was rare.

Ethnobotanical Use

The rhizomes are edible. They are either roasted on fire or cooked as a vegetable. Rhizome has medicinal value used for treating dysentery. The rhizome can be used in fresh or dried form. The rhizome is cut into small pieces; a string of these pieces is made. It is dried by hanging near the fire. The rhizome paste (rubbing on stone) or small dose of its powder is taken in the morning and evening to cure acute dysentery.

Threats & Conservation

This species is known to get food through mycorrhizal association, so are slow growers. It is vulnerable to grazing and collection by locals for its medicinal as well as for its food value. Proactive ap-

proaches are needed to conserve this orchid in nature due to its value and rarity.

Conclusion

Orchids are generally known for their beauty and only a few are known for their medicinal properties. The wild orchids used in traditional medicines in the western Himalayas require proper study with experimental trials for their acceptance in medicinal use. The harvesting of the plants is carried out unscientifically. The use of underground parts for curing ailments is responsible for a decrease in the population of these two species in the area. There is a need to create awareness among people about these two species to change its harvesting procedure, to conserve their population in natural settings before they are lost forever.

Acknowledgment

The author is thankful to the local inhabitants for sharing the information about indigenous uses of Orchid species during field surveys.

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Source of support: Nil; **Conflict of interest:** Nil.

Cite this article as:

Chauhan, P. P. "Ethnobotany and Occurrence of Two Orchid Species in Pabbar Valley, Distt Shimla, Himachal Pradesh, India." *Annals of Plant Sciences*.11.02 (2022): pp. 4777-4782.

DOI: <http://dx.doi.org/10.21746/aps.2022.11.2.9>