

## *Rhododendron Campanulatum* (Gulabi Buransh) the State Flower of Himachal Pradesh in the Verge of Extinction

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Rhododendron is derived from the Greek words 'Rhodo' (rose) and 'Dendron' (tree). Rhododendrons have over 900 different species all over the globe. In India, the genus *Rhododendron* contains approximately 80 species. Rhododendrons are found throughout India in a wide range of climates and altitudes, predominantly in the Himalayas. Rhododendrons appear to be noticeably absent in the Shiwaliks, a few in the Lower Himalayas, and the majority in the Greater Himalayas of the four parallel ranges in the Himalayas. The majority of rhododendrons are found in humid temperate regions with high rainfall and naturally occurring organic, well-drained acidic soils. In Himachal Pradesh, the four main Rhododendron species found are *Rhododendron arboretum*, *Rhododendron campanulatum*, *Rhododendron anthopogon* and *Rhododendron lepidotum*.

The *Rhododendron campanulatum*, also known as the 'pink rhododendron' or 'gulabi buransh' or 'bell-flowered rhododendron' or 'bell rhododendron', is native to the Himalayan region and Tibet. It is indigenous to India and can be found at altitudes ranging from 2400 to 5200 metres in Himalayan regions ranging from Jammu and Kashmir to Sikkim. Pink Rhododendron is listed as an endangered flower species by the International Union for Conservation of Nature's (IUCN) Red Data Book. To prevent its extinction and raising awareness of this endangered species, Himachal Pradesh designated it as the state flower in 2007 replacing *Rhododendrum arboretum* (lal buransh). The pink rhododendron has been rapidly declining in the Himalayas due to its overexploitation for medicinal purposes, changing in the flowering pattern and shifting baselines of trees.

### Plant Morphology

It is a small tree or shrub that can reach a height of 5 metres. The stems are well-branched, with glabrous or glaucous branchlets. Simple, alternate leaves that are oblong to

elliptic in shape, rounded or cuneate at the base, entire at the margins, and acute to apiculate at the apex. Flowers bloom from April to May and are arranged in terminal clustered corymbose racemes in pale purple, pink-tinged white, or pink to rosy purple. Calyx has five lobes. The corolla is tubular-campanulate with a tube up to 4 cm long. Fruits are cylindrical, straight to curved, green, turning brown, with numerous black seeds.



***Rhododendron campanulatum*: a) Pink Rhododendron tree blooming in Himachal Pradesh's Seraj Valley b) Pink Rhododendron flower**

#### Ethano-medicinal value

Pink buransh flowers, like Lal buransh (flowers are consumed), are not consumed by the locals since they are believed to be toxic to the human health. Aside from that, the flower is a beneficial forest product as it is a traditional remedy for many diseases and it is preferred for its innumerable medicinal properties and low side-effect profile. It is used in the prevention and treatment of diarrhoea, detoxification, inflammation, fever, constipation, bronchitis, and asthma. Phenolic acids derived from its leaves and twigs are believed to have anti-HIV, anti-inflammatory, and anti-nociceptive properties, and its leaves and flowers are employed to treat illness, headache, diabetes, rheumatism, and other conditions. To treat hemicrania and the common cold, the bark of the Rhododendron tree is combined with tobacco and used as snuff. The leaves have been used to treat syphilis, chronic sciatica, and rheumatism. To relieve headaches, young leaves could be ground into a paste and applied to the forehead. Young leaves can be ground into a paste and applied to the forehead to relieve headaches. Its leaves are sold as a raw drug under the name "Kashmiri Patta."

The flowers aid in heart ailments and blood pressure control. The flowers are widely used in religious places such as temples and monasteries for religious rituals. The bark's juice has been employed to treat coughs, diarrhoea, and dysentery. It is used to treat dermatological

conditions, especially itchiness. When consumed in large quantities, grayanatoxin, which is found in *Rhododendron*, can cause severe vertigo, arterial hypotension, and bradycardia. The leaves seem to be poisonous to livestock due to the presence of andromedotoxin, a toxic substance. However, some studies have shown that it reduces blood glucose and lipid levels in diabetic rats. Its wood is moderately hard and serves well as a fuel. The smoke from the wood, on the other hand, is irritating.

### **Changes in the flowering pattern and shifting baseline**

As the cold in Himachal Pradesh thaws and spring approaches, the rhododendrons bloom first among the floral species in the wild, transforming the forest into a magnificent red and pink in color, signaling the start of spring. However, early flowering of rhododendron in February and March month in Himachal Pradesh is alarming because it has a detrimental impact on seed setting. It has been significantly affected by the rise in temperature and rainfall. To bloom, it requires a temperature of 15-20°C. It is the average temperature in April in the middle and upper higher regions of the Himalayas. Moreover, the winter months have been warmer than usual, which is likely to result in the earlier flowering. This year, the state received 80% less rain in February and 62% less rain in March. The changeable phenomenon in the flowering pattern of the rhododendron appears to necessitate extensive research. The sudden surge of high temperatures is concerning, and the changing flowering pattern represents a threat to the survival of these beautiful trees.

Aside from the changing flowering pattern, researchers are more concerned about the rhododendron's shifting baseline. Rhododendron is now becoming rare and shifting in elevation. The underlying reason is a transition in the rainfall pattern and an elevated temperature. Pink Rhododendron is a rare rhododendron found only near the treeline in the high mountains. Nowadays, the pink rhododendron is not noticeable in the lower altitudes at all anymore. The moment has come time to conserve and protect this beautiful flower. Several Rhododendron species are among the Himalayan alpine species which may face extinction in the coming years. Concerned about changing flowering patterns and shifting baselines of trees, scientists needed to conduct research on the impact of climate change on all Rhododendron species.

Furthermore, habitat destruction and felling have made this tree increasingly endangered over time. Rhododendrons are dealing with the effects of disturbed habitats as

green cover is disappearing almost everywhere. Some of the major causes of rhododendron rareness may well be changes in climatic factors of alpine, subalpine, and temperate habitats, glacier retreats, and natural catastrophes such like massive landslides and earthquakes. Anthropogenic activities such as overgrazing and overexploitation of plants for fuel and other purposes are all significant potential threats to ecosystems, posing yet another major threat to the extinction of this species. This could also result in a massive depletion of its natural inhabitants. The development of a sustainable use for this plant species' holds a great promise for local economy.

### **Preventive measures for conservation and management**

Plant extinction is on the rise, and it shows no signs of abating. Global warming is a major contributor to plant extinction. Scientists predict that one-third of plant species will become extinct by 2050. Moreover, any effort to slow global warming may well protect rhododendron natural habitat from any further degradation. We could even educate ourselves as well as others about threatened species by researching which plants are at risk in the areas we live in and the potential consequences of their extinction. Another significant aspect is that protecting endangered species' habitats is one of the most effective ways to save them by leaving them untouched and undisturbed. It has become critical to implement scientific conservation programmes to help these species recover. As a result, conservation steps have to be taken in order to maintain the species' current condition. In the conservation and management of such species, we must raise awareness among local people who rely on it and mass multiplication through conventional and *in-vitro* techniques, as well as their establishment and maintenance in the *in-situ* and *ex-situ* conditions, are recommended.

It is high time for the state and central governments to work together to recover rare, endangered, and threatened plant species. And at last, people must pledge to reduce their environmental footprint as much as possible by avoiding activities that harm the ecosystems and being aware that their actions can only have negative consequences.