

# RHODODENDRON: SPECIES AND TRADITIONAL USES

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## ABSTRACT

Rhododendron is a Greek-derived word “Rodo” means rose and “dendron” means trees, it is included in the family of Ericaceae and it was earliest studied and narrated in 1837 by Carl Linnaeus. Rhododendron was originally found in the valleys of Himalayas Kashmir, Manipur, Assam, in India and in Bhutan as well. They are so beautiful and attention-seeking visitors due to which this flower has been titled the regional flower of Himachal Pradesh India and the national flower of Nepal. They are mostly evergreen or deciduous and commonly have very bright colored flowers mostly red, pink, and white, which blooms from late winter to early summer and they bloom twice a year. In this paper, we mentioned the species of rhododendron in Uttarakhand and also mentioned its traditional uses.

**Keywords:** Rhododendron; trees; flower; Uttarakhand

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## INTRODUCTION

Rhododendron ranges from shrubs and small to large trees. These are mainly found in Asia, these are highly widespread in lowland and montane forests of the Pacific Northwest, Northeastern United States, California, and high lands of North America Mountains. Rhododendron naturally possesses many health benefits, as they are helpful in the treatment and prevention of so many diseases correlated with dysentery, heart, diarrhea, detoxification, fever, inflammation, bronchitis, constipation and asthma. Their leaves have a high antioxidant activity [1, 2]. The leaves are spirally arranged, the size of leaves range from 1-2cm to 50 cm, 100 cm exceptionally available in *R. sinogrande*. The leaves are covered with scales (lepidotes) or hairs (indumentum). These scales are unique in all species of Rhododendron. Their flower appears as clusters or bunches having 5-7 flowers. The new or the young leaves are pre-owned in elevation of headache. the wood or the bark of this plant is preowned for producing khukri handles, gift boxes, gun stocks, posts, packsaddles, etc. the flowers are limitedly available but these flowers are used in food and pharmaceutical sectors with few limitations [3]. Rhododendron accommodate various minerals such as copper, iron, zinc, manganese, chromium, sodium, cadmium, Cobalt, nickel, lead, arsenic, molybdenum, which take part in many physicochemical processes essential for life. They also act as an important cofactor established in the structures of enzymes and in innumerable biochemical pathways. Sodium is predominant in the prolongation of osmotic balance between interstitial fluid and cells. They also contain many secondary metabolites like flavonoids, saponins, alkaloids, glycosides, tannins,

steroids, and phlobatannins which are essential for plant endurance and also take part in many outstanding roles in human health [4, 5].

Rhododendrons are excessively grown as ornamental plants in both temperate and sub-temperate regions. Many species are commercially grown for the nursery trade. Rhododendrons can be propagated by cutting the stem and air layering. They can be self-propagated as well. In Himachal Pradesh, India where the flowers are used for making flower wines. Most Rhododendron plants prefer acid soil having a pH of 4.4-5.5. They have fibrous roots and need well-drained soil having organic material content. Rhododendron species were used in traditional medicine. The flowers are very attractive and might be scented and are normally tubular or the shape of the funnel and appears in a wide range of colors like white, yellow, pink, scarlet, purple, blue, and red. They provide food to several insects and they are an essential source of nectar and pollen to many bumble bees, which in return pollinated the plant. Also, there are rhododendrons which are poisonous to many grazing animals when intake [6, 7]. Some rhododendrons are commonly known as azalea. They lack in having scales on leaves, they have soft, thin and pointed leaves, and they grow one flower on a stem instead of clusters. The poisonous rhododendrons have a toxin known as grayanotoxin present in their nectar and pollen. These cause hallucination when consumed [5-8]. There are around 80 species in India and about 6 species has been recorded in Uttarakhand. Plants fabricate a very miscellaneous group of metabolites with immunological prospective. The study center is mainly relied on the diversified metabolites available in various extracts by non-identical methods which might be analogous to the adaptogenic activity. Plants used in traditional medicine hold an assemblage of substances that are utilized to manage chronic and infectious diseases. Secondary metabolites serve as plant defense mechanisms against microorganisms, insects, and herbivores. Some of the herbs and spices used by humans to season food yield useful medicinal compounds; Herbs such as terpenoids, give plants their odours; others like quinines and tannins are accountable for plant flavor [9, 10].

### **SPECIES OF RHODODENDRON IN UTTARAKHAND**

***Rhododendron arboreum***- The most extensively disseminate species in the western to eastern Himalayan region of India is *R. arboreum*. *R. arboreum* is designated as the state flower of Uttarakhand. The common/local name is "burans". It is known to be the world's largest Rhododendron and holds a Guinness World record. They have bright red flowers and appear as small evergreen trees with somewhat crooked trunks. They have soft bark generally used as fuel and timber. This species is considered special because it beholds various medicinal benefits and economic values. In Uttarakhand, these are widely popular for their processed juice and squash from flowers [2-5].

***Distribution and habitat***--- common trees of western Himalayas are chiefly occurring at 2500-2800 meters in height.

***Flowering and fruiting***- they show up with red and pink colored flowers blooming usually in March-May.

***R. barbatum***- They are evergreen trees present at the altitude of 2,100-4,000 m in height in Aka hills and Balipara tract of Assam. They have a smooth, purple red, peeling off barks. The flowers appear fleshy with a deep crimson or deep red colour.

***R. Campanulatum***- is commonly known as Chimura, simris in the Garhwal region. They are evergreen shrubs or small trees having a height of 3-5m. They have a thin, smooth, peeling off bark appearing grey or cinnamon colour. They are establishing in Himalayan alpine region of Uttarakhand and Sikkim, Bhutan and Nepal. They grow at the altitude of 3200-3400m. The flowers grow in large trusses or clusters. The flowers have a similar shape to a bell which is about 3-5cm long. They normally bloom from spring to early summer. The flowers appear pink, purple, yellow, red, orange and in many other shades [5-6, 11].

***R. anthopogon***- They are locally named as dhoop heightened to 40 cm bushes. Flowers are a little yellow and are known as medicinal herb. Their leaves are used in the religious organizations. They grow at the 3800m altitude in the Himalayan region, Bhutan and central Nepal [12].

***R. lapidotum***- They grow at 3800-4500m altitude and appear at the height of 35cm. They are commonly observed in pink flowers. They are dominantly found in Kedarnath wildlife sanctuary in tungnath. Traditionally the plant part is utilized for the treatment of various diseases like nose bleeding, rheumatism, healing wounds, fever, and amoebic dysentery. There are various phytochemical reported like alkaloids, xanthoprotein, reducing sugar, Flavonoid, phenols, saponins, steroids, proteins, coumarins, tannins, carboxylic acid, carbohydrates, phlobatanins, ascorbic acid, anthocyanins, terpenoids, glycosides and anthraquinones, they have been reported in leaves, flowers and barks [13].

***R. rawatii***- They grow at a very high altitude. Mostly found in Kedarnath and this was firstly recorded in 2012 [2-4].

### TRADITIONAL USES

The stem of the Rhododendron is used for fuel, timber and for making many other wooden products like packsaddles, handles, gift boxes and many other things. The flowers are used for house design and decoration. Due to the sweet- sour taste of flowers, they are raw eaten and are used as juices and chutney also. The juices are consumed as a freshener and are also useful during headaches, fever, stomach ache, diabetes, nose bleeding, and rheumatism. The flowers are dried and crushed to powder and are used as a drug which helps to cure bloody dysentery. The parts of barks are believed to help cure cuts and wounds. The decoction of roots is utilized to cure the early stages of cancer. The leaves are also used for external parasites. The juices made by flowers are commercialized as health tonics; they are also used to help when fish bones are stuck in the throat. The flowers when mixed with honey are used to cure blur vision and asthma. The powder is also used as a food coloring agent. They are a magic cure to menstrual disorders [3-9].

### Phytochemistry

Various phytochemicals have been isolated, identified and reported till now from different parts of *R. arboreum*. About 34 compounds have been identified by Painuli et al. In the Ethanolic leaf extract study, 13 compounds were identified. In the other reported study about 26, 24 and 17 compounds were identified by Gautam et al in the chloroform, ethyl acetate and hexane fraction respectively. Two flavonoids were reported in leaves [14, 15].

### Adaptogenic activity

Through HPTLC analysis the methanolic extract exhibits anti-stress activity because of the presence of a high quantity of gallic acid and quercetin compared to hydroethanolic and aqueous solutions [12-16].

### **RHODODENDRON ARBOREUM AND RHODODENDRON RAWATII**

Both these species are specifically found in Kedarnath wildlife sanctuary along the timberline zone. One of the other populations is found Chhirkila in Chhipla-Kedar in about 3120 m from sea level, Pithoragarh district of Uttarakhand. They grow in the area where the daily mean air temperature is always below 0<sup>0</sup>C for the maximum time in a year, and the soil remains acidic (4.3-5.0) and remains under the snow for nearly 3-4 months of a year.

*R. rawatii* and *R. arboreum* are also reported in Tungnath, Rudraprayag in Uttarakhand. These appear as small trees or Shrubs with young shoots, and are glabrous having oblong- elliptical to obovate or ovulate leaves. The leaf surface is densely wooly with hairs fasciculate. The new species *R. rawatii* hares so many common features altogether such as they both have a similar habit – both appear as shrubs to small trees having peeling barks, shiny flowers, glabrous young shoots and shining leaves at maturity [14-17]. There are major differences between two species of Rhododendron i.e. *R. arboreum* and *R. rawatii* as shown in **Table 1**.

**Table 1. Comparison of Rhododendron species (i.e. *R. arboreum* and *R. rawatii*)**

Characters	<i>R. arboreum</i>	<i>R. rawatii</i>
Habit	Small trees and shrubs	Shrub or small tree, evergreen
Bark	Smooth and peeling	Smooth, peeling, Whitish-red
Habitat	Found 3100-3350m from sea level	Found 3200-4300m from sea level
Shape of leaf	Leathery oval or elliptical	Oblong to elliptical, leathery
Petiole surface	glabrous	Glabrous
Length (cm)	Up to 1cm	From 1.5-2.7cm
Lateral veins	35-47pairs	30-44pairs
Lamina length (cm)	12.2-19.7cm	5-13cm
width (cm)	2.5-7cm	4.6-7.9cm
Apex	Round	Mucronate
Leaf surface	Dark green, shiny on maturity, thick with dark veins	Shiny green with whitish or brown cottony hair
Flowers		
Color	Pink, white	Dark red to pink
flowers per inflorescence	8-14 –compactly arranged	13-16 loosely arranged
Pedicel length (mm)	6-13mm	10mm

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