



A concise review on Geranium wallichianum D-Don Ex-Sweet and its Ethanomedicinal Perspectives

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Abstract

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The Himalayan region of Pakistan is home to the Geranium wallichianum D. Don ex Sweet, a member of the Geraniaceae family. It is very valuable medically. It is indigenous to Pakistan, but because to its limited geographic range, unique habitats, and impacts of human activity, the population has decreased by more than 75%. The most important risks include overgrazing of pastures, forest encroachment, erosion of soil slopes, poverty, forest fires, illegal trade, habitat degradation, invasive species, and a lack of proper training. The significant medicinal plant G. wallichianum's conservation status has been attempted to document as part of this evaluation. It needs special consideration because it is the most endangered species. Due to a lack of information, there is currently no organisational strategy for the conservation of this species. The importance of this plant species as a source of traditional medicine has attracted the attention of scientists who are trying to preserve it. It is being protected by several conservation studies and efforts, but in order to guarantee that it will be kept for future generations, comprehensive and durable conservation regulations are needed.

Keywords: Endangered species; endemic plants; ethnomedicine; ex situ; Geranium wallichianum

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Introduction

A plant called Geranium wallichianum can grow up to 0.30 metres tall and has a lifespan of several years. It is gathered from the wild to be used as a resource and a source of medicine in the neighbourhood. The hardy flowering herbaceous perennial plant Geranium wallichianum is only found in one species. This plant is a member of the family Geraniaceae and the genus Geranium. First discovered in the Himalayas (Mir, et al., 2022). It grows to a height of 60 centimetres and a width of 30 centimetres. Throughout

the summer, it produces an abundance of bright blue blossoms and hairy, serrated leaves (Jabeen, et al., 2022). On soil with a medium moisture content, sufficient drainage, and full sun exposure, it is simple to grow. One who enjoys a little afternoon shade in hot summer conditions? It can endure a considerable degree of drought due to its long taproot. A moderate moisture content in soils is kept by applying additional water during the summer. The flowing stems will cause the garden to quickly become swamped by plants. In order to revitalise,



shape, and/or encourage additional blooming, you can cut the plants back if they stop flowering and/or their foliage starts to droop due to the summer's heat. Geranium wallachianum, often referred to as Wallich geranium or Wallich cranesbill, is a prostrate plant that typically reaches heights of 6 to 12 inches but spreads by decumbent, trailing stems over a surface that is 24 to 36 inches wide. It is native to the Himalayan Mountains, more specifically the highlands that extend from Kashmir to northeastern Afghanistan. The stems are clad in green kidney-shaped leaves that are divided into three or five deeply lobed segments each. Lack of basal leaves. The five-petalled, purplish-pink flowers feature a white centre with pronounced purple veining and can grow to be two inches in diameter. The blossoming of flowers lasts all summer (June to August)(Muhammad, et al., 2012, Jabeen, et al., 2022).

The elements that humans need to survive are provided by plants, including things that are useful for food, medicine, and commerce. Step by step, until they are fully extinct, a region's plant species are being wiped out, along with the information that was contained in them also lost. The extinction of more than 10% of Pakistan's plant species. Despite the extremely limited information he has on the conservation status of native plant species, there is a lot of controversy in the material that has been provided. In Pakistan, there are 709 plant species that are regarded as vulnerable or endangered. Of these, about 580 are categorised as blooming plants. More recent estimates indicate that there are only 21 blooming plants in Pakistan that are thought to be endangered(Ismail, 2007). The preservation of a threatened plant species was at first a critical issue. Overharvesting has resulted in a considerable decline in the population of therapeutic plants. More than 10% of Pakistan's plant life is regarded as endangered. The significant medicinal plant G. wallichianum's conservation status has been attempted to document as part of this evaluation. Regional use is made of this plant. The species that is most in danger and

needs special care is G. wallichianum. Due to overharvesting of its resources, ineffective harvesting techniques, and insufficient post-harvest processing, this plant is experiencing growing levels of stress(Jan, et al., 2021, Abbasi, et al., 2019, Badoni, et al., 2019).

Geographical distribution and Occurrence

It exists in Jammu and Kashmir, Assam, and other regions of North East India in India. The East Asian-Himalayan region, which extends from Nepal to Bhutan via Pakistan, Afghanistan, and Afghanistan, is the region's natural environment, nevertheless. In India's mountainous regions, like Jammu & Kashmir and Assam, for instance, it is especially common. Commonly found between 2400 and 3600 metres in forests, shrubbery, and open slopes. It lives in damp, moist environments. The G. wallichianum ranges in altitude from 2500 to 4000 metres in the Indian Himalaya. The altitude range of Kashmir is 6000–8000 metres(Abbasi, et al., 2020, Jabeen, et al., 2022 and Ismail, et al., 2009).

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Morphological and taxonomic features

Although in the area it is more frequently referred to as "Ratanjot," Geranium wallichianum D. Don ex Sweet is more frequently called "Shepherd's needles." Another term for this building is a wallach cranes bill. In Tib, it is referred to as Rus Jot, whereas in English it is known as Buxton's blue. It is also known as Sra zeal in some circles. It is also referred to as mamekh. Additionally, it is referred to as srazela. In addition, it goes by the names ratinloog and rattenjot. The flowering plant known as Geranium wallichianum D. Don ex-sweet belongs to the Geraniaceae plant family. It has 750 different species and is spread throughout 750 different genera. It is most frequently found in temperate regions. It has 26 different species that are indigenous to Pakistan and is made up of 4 different genera. This family is divided into two subfamilies: the Pelargonieae and the Geraniaceae. The plant is at least 45 centimetres long(Abbasi, et al., 2019). The length, the adolescence, and the rising stem.



The stipules are 0.9-1.4 cm long, pubescent to mildly villous, wide lanceolate, and occasionally apical. The leaves are palmately parted, reniform, 5.5-7 cm broad, the lamina is pubescent-villous, and the lobes are rhomboid and cuneate with 5 angles. The petiole is 7 centimetres long and very villous close to the base of the lamina. Peduncles 18.5 centimetres long, lancing, with late-flowering bracts that are hairy, glandular, and appressed. The sepals are elliptic

elliptical in shape, 10–12 mm long, and feature a 1-mm long awn. The basal villous of a flower is 1.4–2 cm long. The blue flowers of this perennial herb can range in size from 3.5 to 8.5 centimetres in diameter. It blooms in the months of March and April. Its flowering season has been identified as lasting from June to September. Its blossoming season, according to some reports, lasts from August through September (Shaheen, et al., 2017).



Figure 1. Morphology of the Geranium Wallichianum, G. plant

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Ethanomedicinal uses

Wallichianum, G. Only occurring in India and Pakistan, D. Don ex sweet is regarded as an endemic species. It doesn't happen often in Jammu. It is a threatened species in Kashmir. G. wallichianum, which represents the subalpine vegetation, can be found between 2,800 and 3,800 metres above sea level. On domestic and foreign markets, rhizome can be purchased for anywhere between 500 and 1000 rupees per kilogramme (Abbasi, et al., 2019).

Between 75 and 80 percent of people use herbal medicines for primary healthcare because to their higher traditional efficacy, better compatibility with the human body, and minimal side effects. This species is endemic, meaning it can only be found in Pakistan. Over a 75% decline has occurred in

population. Its main weaknesses are an unsustainable assembly method and an excessive use of its resources. The careless gathering and excessive exploitation of this species must be limited in some way because it is a medicinal plant. This plant must be protected right now in order to stop overharvesting and overusing it, which could lead to its extinction (Ismail, et al., 2007). Is it vital to conserve plants before it's too late and they go extinct because of overuse for local and commercial purposes? Some of the main factors that have been identified as contributing to the loss of plant variety are pasture grazing, forest encroachment, soil-slope erosion, collecting of medicinal plants, agro-system dangers, poverty, forest fires, and invasive species that worsen the ecosystem (Abbasi, et al., 2020 and Chand,



T.R., 1948). Broad field conservation requires more study, which is currently lacking. Regardless of latitude or altitude, climate variations have a substantial impact on the distribution and richness of plant variety margins. Deforestation, illegal trade, habitat loss, invasive species, rising demand for natural resources, industrial contamination, and a lack of adequate training are the main threats to the survival of this plant. This plant is still being removed illegally from the forest using a variety of methods(Iqbal, et al, 2019).

It has been the subject of various conservation studies and initiatives, but in order to guarantee its preservation, we need conservation policies that are more thorough and employ a variety of strategies. Indirect techniques like callogenesis and somatic embryogenesis can be utilised to create plantlets, which is beneficial for the building of massive plant nurseries. A process for producing synthetic seeds was devised by Ali et al. It involves the use of a complexing agent and a specialised coating substance (sodium alginate) (calcium chloride)(MONA, et al., 2009). Additionally, medicinal plants like species of the genus *G. wallichianum* can benefit greatly from the NIS synthetic seed technology. Nee seeds have a rather long shelf life and can keep their viability for a long period provided the correct conditions are present. The rate of germination of seeds can be improved by treating them with exogenous hormone-like compounds that are dissolved in water(Ismail, et al., 2012,Jabeen, et al., 2022 and Badoni, et al., 2019).

The adoption of long-term monitoring programmes and research on the species' reproduction may be beneficial for the preservation of such highly endangered endemic species. There aren't any recommendations made for future research. Among these suggestions are the dissemination of knowledge and awareness regarding biodiversity protection, the avoidance of anthropogenic activities, the establishment of a protected area for plant conservation, and the introduction of a forestation plan(Jan, et al., 2021). Efforts

must be taken to ensure public participation in conservation programmes and awareness. This can be achieved by education or the use of mass media, and it needs to be followed by constant monitoring mechanisms. Long-term monitoring systems and conservation strategies must be developed in order to safeguard threatened species(Muhammad, et al., 2012, Tewari, K., 2022 and Ashfaq and Khan, 1978).

Conclusion

In terms of its significance to the world of ethnobotany, *G. wallichianum* is a plant that cannot be overlooked. Because its population has dropped by more than 75%, it has been classified as an endangered plant. There are a number of variables that are contributing to the population's decline. The plant is used to treat a broad variety of ailments, ranging from relatively minor complaints like toothache to more serious conditions like high blood pressure and diabetes. Due to a lack of sufficient knowledge, there is currently no organisation strategy for the conservation of this plant, despite the fact that it is listed as an endemic species. As a result, this plant needs to be conserved by means of long-term monitoring, the reduction of pressure caused by humans on plant resources, and the right recording. This is the best strategy for its conservation. Proper conservation requires not only planned cultivation activities but also extinction actions, education about the relevance of plants, and education about the significance of plants.

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