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**Dharam Chand**  
High Altitude Plant Physiology  
Research Centre (HAPPRC),  
HNB Garhwal University  
Srinagar Garhwal- 246174,  
Uttarakhand (India)

**Zubair A Malik**  
High Altitude Plant Physiology  
Research Centre (HAPPRC),  
HNB Garhwal University  
Srinagar Garhwal- 246174,  
Uttarakhand (India)

**Presently at:** Department of  
Botany, Govt. Degree College,  
Beerwah Badgam (J&K)-193411

**MC Nautiyal**  
High Altitude Plant Physiology  
Research Centre (HAPPRC),  
HNB Garhwal University  
Srinagar Garhwal- 246174,  
Uttarakhand (India)

**Correspondence:**  
**Zubair A Malik**  
High Altitude Plant Physiology  
Research Centre (HAPPRC), HNB  
Garhwal University Srinagar  
Garhwal- 246174, Uttarakhand  
(India).  
Email: [malikmzubair081@gmail.com](mailto:malikmzubair081@gmail.com)

## Conservation of *Picrorhiza kurrooa* through cultivation in Garhwal Himalaya: A review

**Dharam Chand, Zubair A Malik, MC Nautiyal**

### Abstract

The state of Uttarakhand, located in the foothills of Himalaya, is a home to various rare, threatened and endangered species of medicinal plants, *Picrorhiza kurrooa* being one of them. Drugs like Picroliv, Picroside-I, II, III, V and Kutkoside extracted from dried stolons and roots of *Picrorhiza kurrooa* are responsible for its vast medicinal properties. Due to large demand in national and international markets, exploitation of this species in wild is going on. In Western Himalaya (India), the conservation status of this species is either rare or threatened. The studies on genetic diversity and conservation of this species have become a priority in recent years. The main goal is to protect and maintain the evolutionary viability of this species and to maximize the chances of its survival and persistence in the changing environment. This paper gives an overview of the conservation of this species through cultivation in Garhwal Himalaya.

**Keywords:** Medicinal Plants, *Picrorhiza kurrooa*, Agro-techniques, Cultivation, Conservation, Livelihood.

### 1. Introduction

Garhwal Himalaya (Uttarakhand), situated between 29° 26'-31° 28' N latitude and 77° 49'-80° 06' E longitude, is a home to various vulnerable, threatened and endangered medicinal and aromatic plants [1]. Alpine zone of Garhwal Himalaya serves as special habitat for native and high value medicinal plants [2]. The plants of this zone synthesize secondary metabolites and therefore, offer greater possibilities of having novel bio-molecules and even larger quantity of active components [3].

*Picrorhiza kurrooa* Royle ex Benth. is an important medicinal herb belonging to family Scrophulariaceae. The species is native of India, Nepal, Bhutan, China, Tibet and Pakistan. In India, this species is naturally distributed from sub-alpine to alpine regions of North-Western Himalayan range from Kashmir to Sikkim between 3000-5300m asl [4]. Kaul and Kaul [5] have reported its distribution in three hill states of Western Himalaya viz., Jammu and Kashmir, Himachal Pradesh and Uttarakhand. *P. kurrooa* grows in moist, rocky slopes as well as in organic soils. It prefers rocky crevices, sloppy and cliffy mountains. The generic name is derived from the bitter root, which is used in native medicine [6]. In Greek, "picros" means bitter, while "rhiza" means root. The vernacular name Kutki is derived from "Karu", the Punjabi name of the plant, which means bitter [7].

It is used either as an adulterant or as a substitute of Indian Gentian (*Gentiana kurroo*). Odour is slight and unpleasant. Taste is very bitter and long lasting. The medicinal properties of *P. kurrooa* are due to the iridoid glycosides like picrosides I, II, III, V, kutkosides [8] and other identified active constituents viz. Apocyanin, drosin and curcubitacins [9]. It is commonly used in both ISM (Indian system of medicine) as well as in modern pharmaceutical industries. In traditional medicine, it is considered to be a valuable tonic, blood purifier and has also been used to cure hepatitis, abdominal pain, stomach disorders, anaemia, jaundice, and for promoting bile secretion [10]. A wide range of biological activities have been attributed to iridoid contents of *P. kurrooa*, such as antihepatotoxic, choleric, anti-inflammatory, antitumor, antiviral, antioxidant and leishmanicidal activities [11]. The antifungal potential of alcoholic extract of *P. kurrooa* was tested against the fungi, *Candida albicans*. The extract of Kutki and its major constituents exhibited significant activity against the fungi [12].

Since past couple of decades, exploitation of this species has suddenly become a flourishing business for illegal collectors. This uncontrolled exploitation along with several other factors like destruction of habitats, overgrazing and tourism interference are responsible for the dwindling status of this valuable species especially from higher altitudes.