



## CHIRATA (*Swertia chirayita* Roxb. ex Fleming) IN ALPINE ZONE OF KUMAUN HIMALAYA: A STUDY OF THE KHALIA TOP MEADOWS

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### ABSTRACT

An attempt has been made to evaluate plants used for medicare by the tribal people of the Munshyari area of Kumaun Himalayas. Chirata, the local name for *Swertia chirayita* Roxb. ex Fleming, is a medicinal herb plant in the order Gentianales and family Gentianaceae, found primarily in subalpine regions, from 3200 to 4000 masl and is indigenous to temperate Himalaya. Its medicinal usage is reported in Indian pharmaceutical codex, the British and the American pharmacopoeias and in different traditional systems of medicines such as the Ayurveda, Unani and Siddha. Since it was found in parts of Garhwal and Kumaun Himalaya, massive exploitation has occurred, leading to a drastic decrease in wild populations. The present study investigates the results of an exploration and suggests policy initiative for its sustainable exploitation.

**KEY WORDS:** Gentianaceae, Pharmacopoeias, Sustainable exploitation, *Swertia chirayita*.

### INTRODUCTION

The mountain region in India is spread over 13 states in the Indian Himalayan Region (IHR) covering a geographical area of 500,000 km<sup>2</sup>. Over one million people (6% of the total population of India) live in the IHR. The Kumaun Himalaya on account of its unique setting within the Himalayan region possesses luxuriant and varied vegetation, most of which is important from nutritional, aesthetic and medicinal view point. Use of plants for medicare is as ancient as the human civilization. Since time immemorial, plants containing beneficial and medicinal properties have been known and used by human beings in some form or the other. Our dependence on medicinal plants has in no way been minimised by the use of modern system of synthetic drug the use of which is not without side effects. Among the different species of *Swertia* reported in India, *Swertia chirayita* is considered the most important for its medicinal properties. The bitterness, antihelmintic, hypoglycemic and antipyretic properties are attributed to amarogentin, swerchirin, swertiamarin and other active principles of the herb. The genus *Swertia* is a rich source of xanthenes, relevant for the biological activity. Uttarakhand Himalayan region is

famous for its rich medicinal plants resources. The climatic, topographic and soil diversity of this region has resulted in the occurrence of several valuable and economically important medicinal herbs of great therapeutic value (Alam and Kop, 2005). In Uttarakhand, about 701 species are used in different forms as medicine (Nautiyal *et al.*, 1997). The degree of threat to natural population of these medicinal plants has increased due to many reasons, viz., overgrazing, prolonged seed dormancy, high seedling mortality and ecological constraints, but the main and important reason is unsustainable exploitation of the medicinal plants for the drug industry and local medicinal use. The medicinal plant sector in Uttarakhand can provide an important source of income to the rural population, especially because returns from traditional crops are declining (Alam, 2003). Due to unsustainable extraction of raw material coupled with many other wrong and illegal practices, four species of *Swertia chirayita* of Uttarakhand have been enlisted in a different threat category by International Union for the Conservation of Natural Resources (IUCN) in the Red Data Book.

**TABLE 1:** Percentage of medicinal plants reported in World, India and Indian Himalaya

Country/region	Total number of native species in flora	No. of medicinal plant species reported	% of medicinal Plants	Source
World	297,000	52,885	10	Schippmann <i>et al.</i> , 2002.
India	17,000	7,500	44	Shiva <i>et al.</i> , 1996.
Indian Himalaya	8,000	1,748	22	Samant <i>et al.</i> , 1998.

Medicinal plants are being used in oriental medicine for the treatment of various ailments ranging from the common cold to cancer. The meadow, open forest and scrub ecosystems of the mountainous regions of the country are the suitable habitats of *Swertia* species (Joshi, 2007). Information on ethnobotany and conservation of

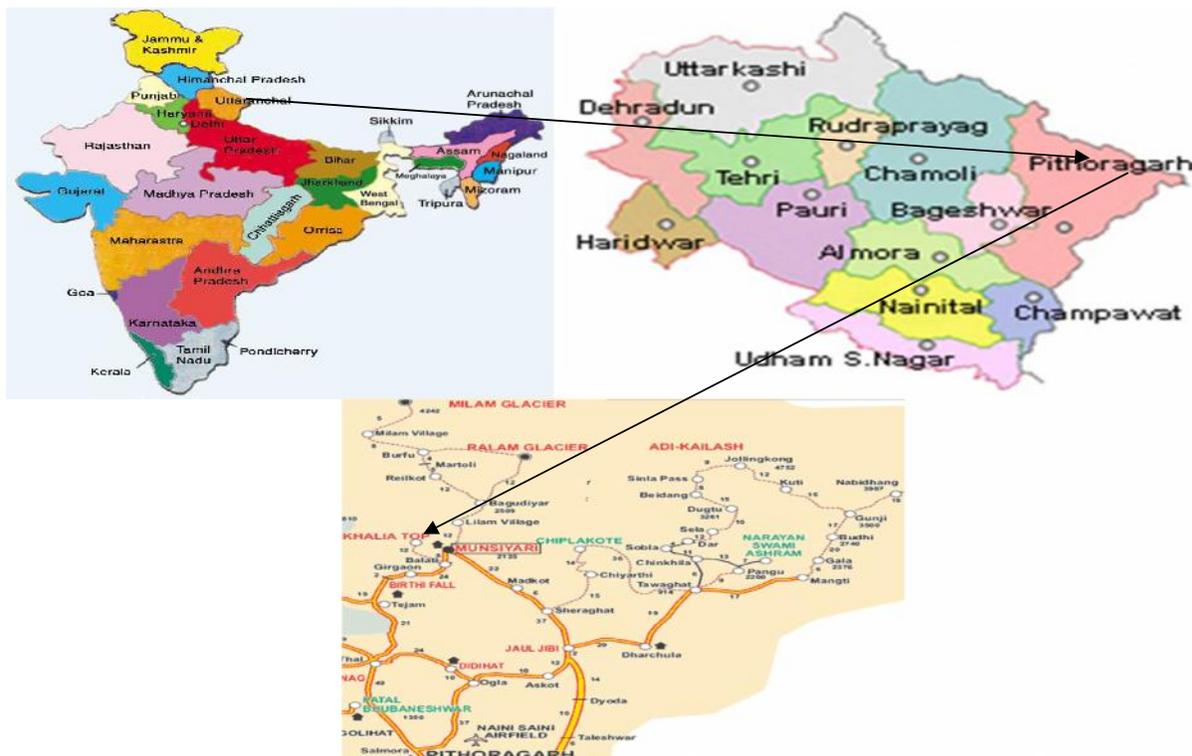
the *Swertia* species are very limited (Joshi, 1988; Joshi, 2000, 2004; Sacherer, 1979; Shrestha *et al.*, 1998). This paper presents the results of a field study conducted in alpine and subalpine zones of Kumaun Himalaya in a remote district of Pithoragarh, India.

**Medicinal uses**

This plant is credited with tonic, febrifuge, alterative, carminative, expectorant, laxative, stomachic, anthelmintic and anti-diarrhoeal properties. It is employed in drug formulations prescribed for the treatment of toxic fever; the plants are dipped in water overnight and the bitter juice is taken to cure malarial fever; decoction of the plant is used as tonic that influence on the digestive organs and also used as an anthelmintic, especially for children. Juice of

the root is taken to cure liver diseases and urinary disorders; paste of the plant is also used in common ailments like cough, cold, bronchial asthma, headache and fever, burning of the body, constipation, diarrhoea, dyspepsia, flatulence and skin diseases; roots crushed and paste rubbed over joints for quick relief; leaves warmed and paste prepared with mustard oil applied over boils and scabies.

**Study Area**



**FIGURE 1:** Map of the Study Area

Khalia Top grassland, the site of investigation, is situated between N 30.03'48.3" and E 80.12'15.9". The altitude of the area varies from 3200 to 4000 meters above mean sea level. It is located in Munsyari in Pithoragarh district of Uttarakhand and giving uninterrupted views of the snow-clad peaks including Panchachuli, Rajrambha, Hardeol, Nanda Kot, and Nanda Devi all standing tall exhibiting a marvelous panorama. (Fig.1). The study site harbours abundance of the *chirayita*, the vegetation and habitat types.

**MATERIALS & METHODS**

The plant materials were collected from the Khalia Top alpine area of Munsyari, Pithoragarh District and identified at the Department of Biological Science, G.B. Pant University of Agriculture and Technology, Pantnagar, Uttarakhand. Information relating to the distribution, and conservation practices including people perception was gathered.

**RESULTS & DISCUSSION**

**Management and Conservation Status**

Chirata is mostly collected from government-owned forests with almost no control over collection. Who comes

to collect first, will collect more and earn more money. Thus, there is always competition for collection and collectors collect before seed dispersal. Seeds are only the medium for the propagation of this plant; so if the plant is collected before the maturation of seeds, there will be no future germination. Unhealthy competition between the collectors has led to the over-harvesting of Chirata without the consideration of sustainable regeneration. Not only does premature harvesting have a negative impact on regeneration, immature plants decrease the active ingredient quality of the final product. The rural people collect the Chirata or their products directly from the wild populations of the forest, meadow, scrub or shady habitats which are already dwindling due to over-exploitation and unsustainable land-use, thus accelerating their genetic erosion. Unsustainable collection of the species has been done due to their usefulness to cure various ailments, their increasing price, and increasing demand as raw materials for preparation of Ayurvedic and Allopathic medicines. Every year a huge amount of medicinal plants are collected for export. The income from the chirata was used by collectors for foodstuffs, including salt, clothes, to pay off loans and to buy cattle (Daniggelis, 1999). Exploitation of medicinal plants threatened to be endangered and some

on the verge of extinction, is now a matter of worldwide concern on which our civilization is based and thriving at cost of their biological sources. The problem of disappearing species has hitherto been tackled mainly from the standpoint of biology and ecology with less attention to the economical factors which bring species under threat. During the field survey, serious threats to the population of *Swertia* were noticed due to habitat destruction and land use change. Even without tree-removal, extensive grazing of domestic animals in the forests can be damaging to the species. When questioned about the changing status of *Swertia*, our respondents (villagers and traders) informed that the abundance and production of *Swertia* is decreasing every year in the central and eastern parts of the country. Therefore, appropriate conservation measures for these species are urgently needed.

#### **Sustainability Issues**

The whole plant is collected for the trade. November-December is the trading season of this product. Due to its high price, collectors have high competition for collection and it is collected before maturation. Thus, unmanaged exploitation of Chirata has resulted in the decrease in natural production.

#### **Formulation of Policy, Action Plan and Programmes**

Despite the implementation of various activities for the conservation of the species and their habitats, there is a growing consensus among the conservationists that the conservation of bio-resources is entering into a stage of crisis, since there has hardly been any attempt to conserve these resources in an integrated manner (Joshi and Joshi, 2005). Though some initiatives have already taken for conservation and sustainable utilization of the useful species, less priority is given to conserve these resources in an integrated manner. The existing policy related to conservation and sustainable management of useful plants is also fragmented in different sectoral policies. Therefore, priority should be given to formulate integrated national, regional and local policy, action plan and program related to the conservation and sustainable uses of the economic and useful plants, especially *Swertia* species, taking into consideration of the characteristics of ecosystems, productivity of the species, needs of the people and sustainable management of species.

#### **CONCLUSION**

For conservation of the species, top priority should be given to *in-situ* conservation. Such steps will not only contribute to protect the habitats but also help to maintain the ecological processes. Emphasis should also be given to conserve species in *ex-situ* conservation. The novel technique of *in vitro* conservation and micropropagation can help in conservation and production of a large number of disease-free, true-to-type plants (Wawrosch *et al.*, 1999). Poverty drives people to over-exploit Chirata, even though they are concerned about declining yields. Encouraging more villagers to cultivate other medicinal plants and, at the same time, spread traditional knowledge, will not only bring about an improvement in the economic conditions of these people but will go a long way to lessening the pressure on Chirata. Extension programmes and awareness campaigns should be carried out among the villagers involved to educate them in the best mode of

collection, such as leaving a few areas untouched each year to allow the regeneration of the species.

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