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EXPLORING THE BOTANICAL RICHES OF THE WESTERN HIMALAYAS: A REVIEW ON ECHINOPS NIVEUS AND CHAMABAINIA CUSPIDATE

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ABSTRACT
The focus of this article is on Echinops niveus and Chamabainia cuspidata, two relatively lesser-known plant species found in the Himalayas, particularly in Himachal Pradesh. Echinops niveus, commonly referred to as the snow-white globe thistle, is a spiny, herbaceous perennial belonging to the Asteraceae family. It thrives at elevations between 1,400 and 1,700 meters and is indigenous to the western Himalayas. Recently, it has garnered interest for its potential medicinal properties, including the presence of neoflavonoids such as nivetin, alongside its distinctive fluffy white flower heads. In contrast, information regarding Chamabainia cuspidata from the Urticaceae family remains sparse, with only occasional reports emerging from the lower temperate and subtropical regions. This review brings together various sources to discuss the taxonomy, physical characteristics, preferred habitats, and cultural importance of both species. It also highlights areas that necessitate further research, particularly to better understand the chemical composition of these plants and their potential health benefits. The study underscores the importance of safeguarding native Himalayan flora and promoting research on lesser-known plant species within the diverse ecosystems of Himachal Pradesh.

KEYWORDS: Echinops niveus, Chamabainia cuspidata, ethnobotanical, phytochemistry, therapeutic uses.

1. INTRODUCTION

In many developing nations, an essential component of the healthcare system is herbal medicine. The use of herbal products is growing globally due to their special advantages. Herbal medications include herbs, herbal materials, herbal preparations, and finished herbal products with active substances derived from plant parts, other plant materials, or a combination of these. The preservation of knowledge, innovations, and practices connected to traditional and indigenous medicine has been given priority in international developments. The isolation, purification, and structural elucidation of novel chemical compounds from medicinal The discovery and characterization of novel and advantageous biological traits, the development of advantageous new analogs or derivatives, and the production of herbal medicine combinations in innovative dosage forms with enhanced therapeutic efficacy are all examples of patentable themes.

Furthermore, patentable are novel indications, the methods for preparing and processing standardized extracts, and the extraction and separation of active ingredients from herbal medications used in pharmaceutical manufacturing. (Swain et al.,2013; N Sahoo et al.,2011)

Medicine has been around since almost the dawn of time. Traditional medicine and treatment still serve as the foundation for allopathy, the widely accepted type of modern medicine, which has gradually developed over many years of scientific and observational work by scientists. Plants are the only source of medications for the majority of people on the globe. Traditional medicines, which are mostly derived from over 20,000 kinds of medicinal plants, are used by an estimated 80% of the four billion people on the planet. Higher plants are used to make 25% of allopathic medicine's prescription medications. With good reason, India is known as the "Botanical Garden of the World" and is perhaps the world's biggest producer of medicinal plants. Almost all commercially valuable medicinal plants are cultivated or harvested in this country. In one form or another, the traditional medical systems of Siddha, Unani, and Ayurveda have used medicinal herbs for thousands of years. (Soni et al.,2014)

Since achieving independence in 1947, India has made tremendous progress in a variety of areas, including agrotechnology, process technology, quality control, standardization, and research and development. Furthermore, the WHO acknowledged the importance of medicinal plants for public health care in developing nations and created guidelines to help member states create national policies on traditional medicine and investigate its possible advantages, such as efficacy, safety, and assessment. (Gairola et al.,2010)

1.1 Advantages of Herbal Medicine

Products made from herbal medicine are significantly less expensive than many pharmaceutical substitutes. They don't require drawn-out, costly clinical testing and, as a result of this lack of regulation, are also susceptible to healthy market forces. All of this results in improved health and more money in your pocket.

There are just a lot more herbal medicine products on the market because the FDA strictly regulates the pharmaceutical sector. Because these products can be purchased without a prescription, the doctor an additional factor contributing to the

high cost of pharmaceutical drugs is eliminated. Additionally, you can grow the herbs you need to help you on your path to better health. (Aziz et al.,2013)
The majority of herbal remedies are made from comparatively innocuous plant material that the The human body digests food with ease. Contrarily, prescription medications are made up of a wide range of products that enhance the main ingredient.
A complete lack of harm is never guaranteed by the clinical trials those medications go through, and many negative side effects are only reported rather than used as an excuse for rejection. For example, because of their effects on the digestive system, the majority of herbal medicines have the worst side effects, such as constipation or diarrhea, whereas pharmaceutical drugs can lead to cardiovascular issues and even obesity. Additionally, there are numerous product reviews for the majority of herbal medicines, enabling customers to separate the good from the bad. (Indian Medicinal Plants.,2nd edition)
Natural goods from all over the world, herbal medicines complement your body's immune system to create a well-rounded detoxification process. One of the core ideas of eastern medicine is the creation of a state of harmony between the mind and body, and being in peace with nature is a terrific method to achieve this.
Although natural lead compounds are commonly found in pharmaceutical medications, they are often mixed with synthetic and artificial components, which can have negative side effects. (Indian Medicinal Plants)

1.2 Medicinal herbs in India

In world's population concerning 60 percent of the people use herbal medicines. Those medicines which obtained from in both rural and urban parts of developing nations, as well as in industrialized nations where modern medications predominate, herbs are utilized for primary healthcare.
Approximately 45,000 of India's various plant species are used medicinally, and they are primarily found in the Eastern Himalayas, Western Ghats, and Andaman and Nicobar Islands. The officially documented plants with therapeutic potential are 3000 yet traditional practitioners use more than 6000 herbs. (Samal and Janmejaya.,2016)
India is frequently referred to as the botanical paradise of the globe and is the world's leading producer of medicinal herbs. Ayurveda and Kabiraji, or herbal medicine, are two well-known and extensively used versions of the nation's many alternative medical options. Ayurveda, an ancient medical system that has been used for thousands of years and is deeply ingrained in the country's rich cultural legacy, originated in India.
The ancient Ayurvedic texts contain some 25,000 plant-based formulae that have been refined and altered over time. Additionally, more than 50,000 different formulations have been developed based on tribal and traditional practices. India is the world's leading producer of medicinal herbs and is widely acknowledged as a botanical refuge. While there are many alternative therapies available in the country, traditional and kabiraji (herbal medicine) are two popular and extensively utilized forms. Ayurveda, a traditional medical system deeply embedded in Indian culture, has been used for a very long time. The ancient Ayurvedic texts contain some 25,000 plant-based recipes that have been improved throughout time. In addition, there are over 50,000 compositions based on traditional and tribal customs. (Rasool Hassan, 2012)

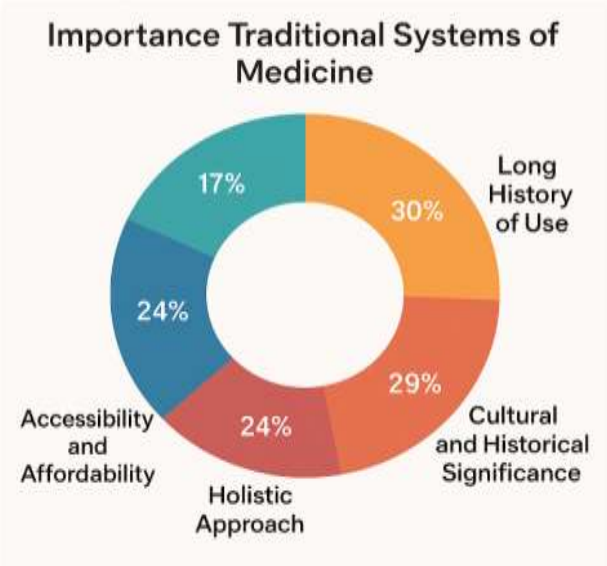


Fig 1: Importance of Traditional System of Medicine

1.3 Importance of Medicinal Plants in Himachal Pradesh

The beautiful Himalayan state of Himachal Pradesh is well known for its diverse range of flora and fauna, particularly its vast array of therapeutic herbs. A vast variety of herbs that have long been utilized in medicine can be grown in the area thanks to its distinct climate and ecosystems.
Unfortunately, overharvesting, habitat degradation, and the consequences of climate change are just a few of the many problems that Himachal Pradesh's medicinal plants face. It is vital that conservation initiatives are done to conserve these unique resources. The establishment of medicinal plant conservation areas (MPCAs), sustainable harvesting techniques, and cultivation methods are all crucial measures being taken to guarantee these plants' continuous availability.

Himachal Pradesh's rich history of medicinal plants has enormous potential for sustainable development, scientific study, and healthcare. These plants can continue to be important in both traditional and modern medicine for many years to come with the help of successful conservation efforts and scientific confirmation. (Raghuvanshi D et al.,2021)
Subtropical and high-altitude plants usually exhibit unique phytochemical and ecological adaptations. Among these, Echinops niveus and Chamabainia cuspidata are notable for their biochemical traits, traditional uses, and contributions to biodiversity conservation. Despite their regional importance, there hasn't been much in-depth scientific research. This review gathers the most recent data on both species to support future research and conservation efforts.

2. Echinops niveus (Asteraceae)

Fig 2.: Showing leaves, flowers, stems of plant Echinops niveus

Taxonomical Classification

Kingdom	Plantae
Clade	Tracheophytes
Clade	Angiosperms
Clade	Eudicots
Clade	Asterids
Order	Asterales
Family	Asteraceae
Genus	Echinops
Species	E. niveus

2.1 Botanical Description

Height: Typically grows till 1-2 meters tall.
Stem: Erect, branched, and covered with white woolly hairs.
Leaves: Alternately arranged, deeply lobed, and spiny with a white tomentose (woolly) underside.
Flowers: Dense, spherical flower heads (capitula) that are white or pale blue. Each capitulum is composed of numerous tubular florets.
Roots: Deep taproot system, enabling it to thrive in dry conditions

2.2 Geographical Distribution It is commonly known as White globe thistle and Snow Globe thistle, locally this plant known as Oontktara. It is a shrub found in Western Himalyas on altitude of The plant is mainly distributed in Himachal Pradesh, Jammu Kashmir, Uttrakhand, Nepal, Bhutan, Pakistan, Uttar Pradesh (Echinops niveus.,2018).
1500-3000m.

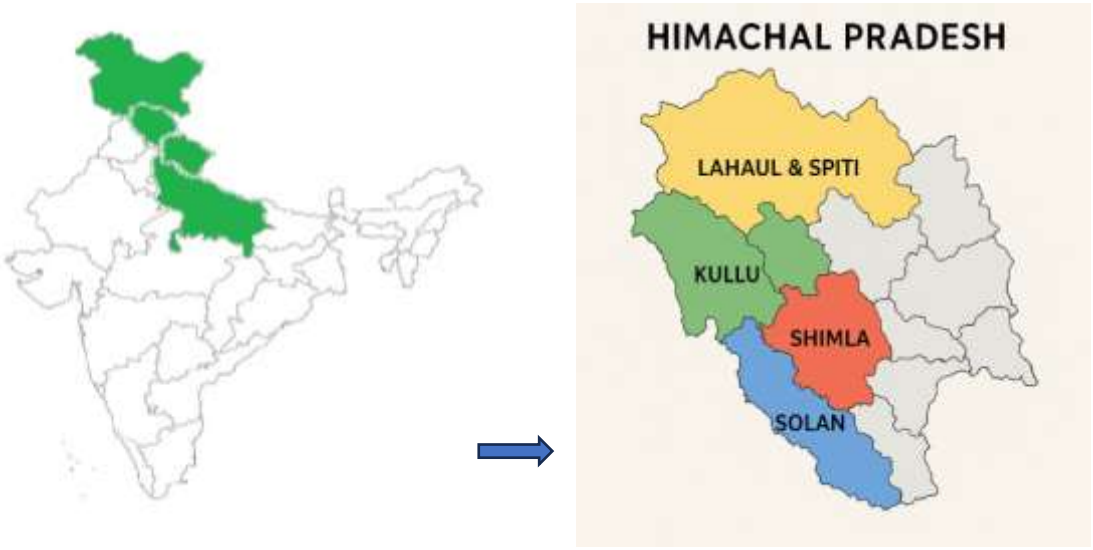
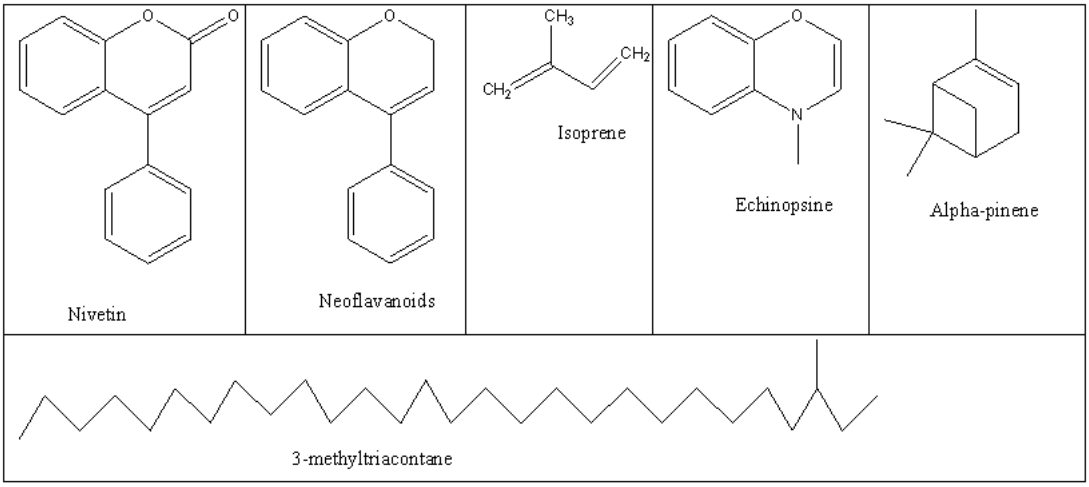


Fig 3: Geographical distribution of Echinops niveus showing in map of India and Himachal Pradesh

2.3 Phytoconstituents

Main constituents which are derived from the plant are Nivetin, neoflavonoid, echinopsine, echinopsidine and several lipid constituents,3-methyltriacontane.



2.4 Traditional Uses

Plant is diuretic, nerve tonic, and used in cough, indigestion and ophthalmia. (PK et al.,2004)

Echinops niveus is a valuable medicinal plant with a rich history in traditional medicine. Its pharmacognostical, phytochemical, and pharmacological properties highlight its potential as a source of natural therapeutics. Continued research and sustainable practices are essential to harness its benefits and ensure its conservation.

2.5 Pharmacological Aspects

Flavonoids extracted from the Echinops genus are primarily composed of flavones, with a majority being isolated from distinct parts of the plant and its aerial components. The prevalent flavonoid aglycone found is apigenin, which has been extracted from both the flowers and the entire plant of E. niveus Wall.

Antioxidant activity: The majority of studies do not provide information on the IC50 value regarding the effectiveness of antioxidants in vitro. Additionally, there was a lack of utilization of in vivo antioxidant models. Some studies on the hepatoprotective effects did not use standard drugs for comparison, instead only comparing results to a negative control group.

Wound healing activity: There have been reports of wound healing properties in members of this genus, however the specific dosage, administration method, and comparison to standard drugs have not been documented. (Helen B. and Ariaya H.,2019)

3. Chamabainia cuspidateWight(Urticaceae)

Fig 2. Showing leaves, flowers, buds and stems of plant Chamabainia cuspidata

3.1 Taxonomical Classification

Kingdom	Plantae
Phylum	Streptophyta
Class	Equisetopsida
Subclass	Magnoliidae
Order	Rosales
Family	Urticaceae
Genus	Chamabainia
Species	Chamabainia cuspidata (Plants of the World Online;2021)

3.2 Synonyms

Boehmeria squamigera Wedd, Chamabainiacuspidata var. dentculosa, Holotype—China, Yunnan: Fengqing, Wumulung, Chamabainia cuspidata var. morii (Hayata), Chamabainia morii Hayata, Chamabainia squamigera (Wedd.) (A. Sharma et al.,2023)

3.3 Botanical Description

Habitat: In Himachal Pradesh, Chamabainiacuspidata grows in tiny areas of shaded, damp woodlands, particularly along stream courses and damp rocks between 1,900 and 2,400 meters.

Monoecious or dioecious perennial creeping herbs that range in length from 10 to 60 cm

Slender, ascending or procumbent, purplish, reddish-brown, occasionally greenish, strigose or hairy with mixed pilose hairs, the stem and branches creep and root at lower nodes.

Leaves: Opposite leaves, usually equal or sub-equal in pairs (at nodes), occasionally unequal, narrow or broad, ovate to rhombic-ovate, sub-rotund, elliptc or elliptc-ovate, 1.5–6 x 1–4 cm, 3 veined from base, surfaces glabrous, sparsely pubescent or lower surface pilose or strigose, frequently densely so along veins.

Flowering: July–September

Fruiting: August–October (A. Sharma et al.,2023)

3.4 Geographical Distribution:

Meghalaya, Sikkim, Tamil Nadu, Uttarakhand, West Bengal, Assam), Bhutan, China, Indonesia, Myanmar, Nepal, Sri Lanka, Taiwan, and Vietnam. India (Arunachal Pradesh, Himachal Pradesh),

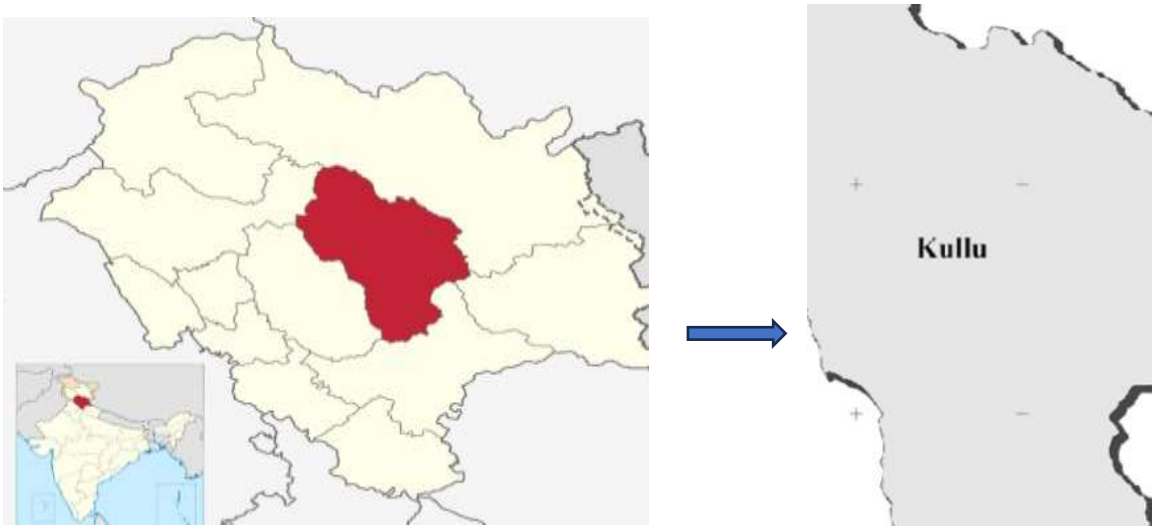


Fig 4: Geographical distribution of Chamabainiacuspidata showing in map of India and Himachal Pradesh

4.Ecological Importance

In their natural habitats, both species fulfill significant functions:

- Echinopsniveus may contribute to the diversity of pollinators, particularly benefiting bees and butterflies.
- Chamabainiacuspidata serves as a pioneer species in untamed regions, potentially helping to uphold soil stability.

5.Conservation Status and Challenges

- Despite their ecological and medicinal significance, these species are threatened by habitat loss, excessive grazing, and unsustainable collection practices.
- The harvesting of Echinopsniveus for textiles and traditional medicine may impact wild populations.
- Chamabainiacuspidata faces risks from deforestation and agricultural development, hindering its broader distribution.

6.Future Objectives

- To validate traditional pharmacological uses both in vivo and in clinical environments.
- To investigate the genetics associated with adaptive features and population dynamics; to develop sustainable harvesting techniques that support both conservation and utilization.
- To conduct trials of ex situ cultivation, especially for Echinopsniveus as a potential medicinal or ornamental plant.

CONCLUSION

Two significant yet underappreciated components of the floristic diversity in Himachal Pradesh are Echinopsniveus and Chamabainiacuspidata. Echinopsniveus holds potential for pharmacological and ecological exploration due to its distinctive morphology and the presence of bioactive compounds such as neoflavonoids. Its adaptability to mid-altitude regions of the Himalayas underscores its ecological resilience and possible uses in traditional medicine, necessitating comprehensive phytochemical and pharmacological studies. In contrast, Chamabainiacuspidata, belonging to the Urticaceae family, has garnered less attention, despite its possible undiscovered ecological or medicinal value.

Ethnobotanical investigations, conservation strategies, and thorough documentation are essential for both species. Such efforts not only contribute to the preservation of local biodiversity but also hold the potential for discovering new resources for bioeconomic applications and sustainable development.

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