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## BIOTECHNOLOGY FOR CONSERVATION OF *Lilium polyphyllum*- A RARE ENDANGERED HIMALAYAN LILY

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**L**ilies are the most important, beautiful, and economically viable blossoming plants found worldwide and a main floriculture crop for commercial purposes. *Lilium* is a genus of perennial herbaceous floral plants that grow from bulbs and are members of the Liliaceae family, grouped in 7 taxonomic sections (van Tuyl et al., 2018) comprising of 110 accepted species. *Lilium polyphyllum*, also known as white lily and Ksheerkakoli is a bulbous perennial herb. *L. polyphyllum* was discovered in 1839 by Royle at Taranda in northern India.. It is a shade loving lily and grows in dense, humus-rich forest floors at an altitudinal range 2200–3200 meter above sea level. They prefer northern slopes cooler region where soil dry less and loves acidic soil (pH 6.5-6.8). The plant grows up to 1.0–1.5 m height, has marvelous pendant flowers, bear winged seeds and bulbs with medicinal properties. This species habitat is mainly restricted to the Himalayan region. In the India, few populations of this species is found in Pulga–Kullu, Dhauladhar and Shimla region of Himachal Pradesh, Chatru and Doda of Jammu and Kashmir and mainly in Uttarakhand at Chakisain, Gargia-Pithoragarh, Chakrata, Raithal Harsil, Gangotri, Valley of Flowers, Kaddukhal and Dhanaulti regions.



**Fig 1:** Drawing of *Lilium polyphyllum* by W.C. Fitch

## Medicinal Properties

*Lilium polyphyllum* is one of the eight herbs of the Astavarga medicinal system. Bulbs are traded under the name Kakoli/Ksheerkakoli in the local and national markets. Paste of bulbs is the main component of an ancient herbal preparation Chywanaprasha. The bulb of the lily has medicinal properties like soothing, astringent, refrigerant, galactagogue, expectorant, aphrodisiac, diuretic and anti-inflammatory properties

Medical benefits of this plant are

- cure of fever, cough and bronchitis
- cure of seminal weakness,
- to promote the flow of urine
- cure of hyperdipsia and hematemesia
- as an expectorant
- to encourage milk production in pregnant lady
- main components of revitalizing creams

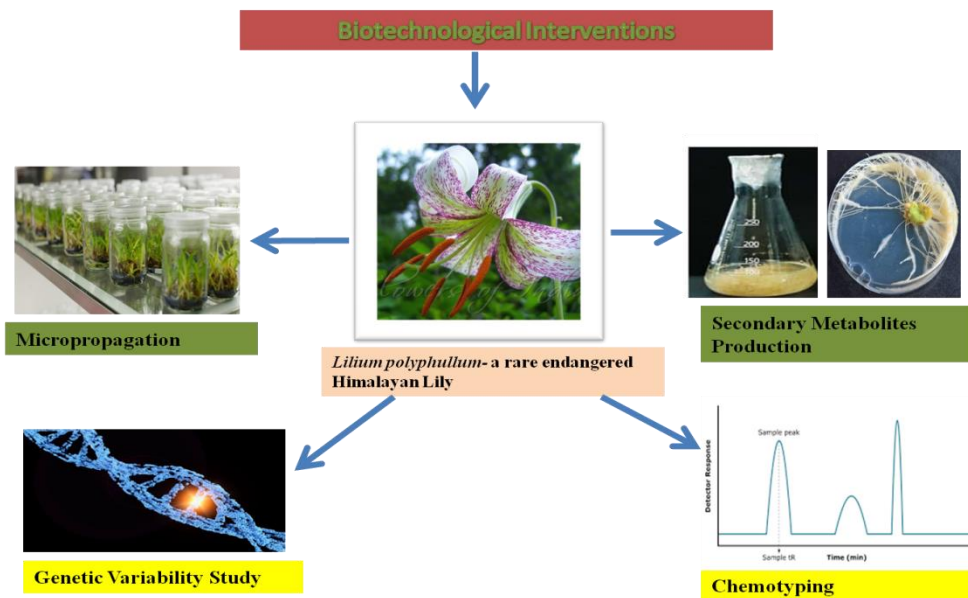
## Need for Conservation

Bulb of this plant is rich in therapeutical potential and there is huge demand for this plant in pharmaceutical and cosmetic industries. But overexploitation from natural habitat, habitat degradation, invasive species infestation and most important in today scenario global warming/climate change has caused shrinking of the species in the wild. Also seed dormancy in *L. polyphyllum* further provoked this situation (Dhyani et al 2013). Thus according to conservation Assessment Management Plan IUCN 2003 report, this species was found to be threatened with extinction and almost 80% of natural population has been lost. Subsequently IUCN has categorized it as critically endangered medicinal herb and included it under the Red Listed species.

## Role of Biotechnology

Seed germination and vegetative propagation of this species can be achieved using some hormonal treatments. These methods should be tried to preserve and reproduce this species. Biotechnological interventions are very important for the conservation and mass multiplication of *Lilium polyphyllum* (Panwar 2017).

- Micropropagation system assured effective propagation and mass multiplication of *L. polyphyllum*.
- Plant tissue culture will offers an alternative for the conservation of this valuable, critically endangered and endemic herb of North-West Himalaya.
- Secondary metabolite production using plant tissue culture techniques like cell suspension culture and hairy root culture can fulfill the need of pharmaceutical industries
- Use of molecular biology techniques to access genetic variability between and among different populations of *L. polyphyllum* for elite population selection for breeding and conservation programs.



**Fig 2:** Biotechnological interventions for *Lilium polyphyllum*-rare Himalayan lily

## Conclusion

*Lilium polyphyllum* (known as white lily or Ksheerkakoli) is an important critically endangered Himalayan (2200–3200 m above sea level) medicinal herb of Astavarga group, used in traditional medicinal system. Bulbs of this plant contain number of important metabolites and have therapeutical potential. This plant was kept under critically endangered category and there is a need for its restoration and production of bioactive compounds.

Biotechnological interventions are urgently needed for mass multiplication, conservation and secondary metabolite production for sustainable year-round production of this important Himalayan lily as well as for metabolite production.

### References

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