

## **Overlooked mistletoes amid rich Nepalese floral diversity**

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In general, mistletoe is a term given to a special group of plants that are flowering and perennial in habit and grow as parasites attached to the branches of host trees and shrubs. They are very efficient in absorbing water, nutrients and even food material from their host by a special absorptive organ, the haustorium. Almost all mistletoes are aerial stem parasites, so “mistletoe” is synonymous with the habit of shrubby epiphytic parasites. In Nepalese they are called “Ainjeru” or “Lisso”.



Mistletoe in Langtang (Photo: Mohan Prasad Devkota)

### **Why mistletoes are important in plant communities?**

Worldwide, among the biologists, mistletoes have been the subjects of special interest for a long time due to their fascinating physiology and importance in natural plant communities. Despite their harmful effects on the host plants, mistletoes are considered an important component of plant diversity and forest ecosystems throughout the world. They play a vital role in the natural ecosystems by interacting with other plants, birds and mammals by providing nutritional and nesting resources for a diverse range of wildlife, thus are valuable resources in the plant communities. The indispensable roles of birds for pollination and dispersal, and mistletoe nectar and fruits as food for birds have established an intricate mutual relationship between them. Recently, mistletoes have been proposed to function as key resources in forests and woodlands throughout the world, having a disproportionately large effect on faunal community composition and structure (Watson, 2001).

### **Why mistletoes remained unexplored in Nepal Himalayas?**

In comparison to the New World mistletoes, the Old World mistletoes are less studied despite their large geographical distribution, and there is scanty information available on their biology, ecology and physiology. An amazing gap of knowledge is evident regarding the mistletoes of Nepal Himalayas, a biogeographically interesting transition zone between Eastern and Western Himalayan flora and a biodiversity hot spot. Although the history of botanical exploration in Nepal started in the beginning of the 19<sup>th</sup> century with Buchanan-Hamilton (1802) and was later followed by many international and national botanists; nevertheless, this fascinating group of parasitic plants remained neglected by Nepalese biologists in the past. Except some information available from Eastern and Western Himalayan regions of India and Pakistan, information has been completely lacking from the Nepal Himalayas. Very recently the work of Devkota and colleagues,

between 2003 and 2007, has studied mistletoes in various parts of Nepal and has reported five mistletoe species as new to Nepal.

### **How many mistletoe species are there in Nepal?**

For the first time D. Don in 1825 enumerated seven species of mistletoes from Nepal and later Hara et al. (1982) listed the largest number of 15 mistletoes species from Nepal in their excellent compilation Enumeration of the Flowering Plants of Nepal. After 23 years of Hara et al. Devkota and Glatzel (2005), Devkota and Koirala (2005) and Devkota and Joshi (2009) are able to add five previously unrecorded mistletoe species to the flora of Nepal. So finally the number of mistletoe species for Nepal has reached twenty, which contributes very little when compared to the world list. There has been an amazing gap in mistletoe studies in the past and mistletoes of the Nepal Himalayas have remained completely overlooked by Nepalese biologists. Unfortunately, there are no reasons for this neglect for such a long time given the rich floral diversity of Nepal.



*S. gracilifolia* (Photo: Mohan Prasad Devkota)

### **Threats to mistletoes in Nepal Himalayas**

The parasitic nature of mistletoes is their biggest threat and they have always been considered as a serious menace to forests all over the world. Nepal's forests are facing severe stress because of ever increasing demands for agricultural land, timber, fuel wood and fodder, and the encroachment of forest areas for settlements. It has been estimated that the present rate of deforestation in mountain areas of Nepal is 2.3 percent per year. Changes in land use pattern in the mountain regions caused by deforestation and land degradation are serious problems in Nepal; they are major threats to the natural population of mistletoes. It has been estimated that the highest mistletoe diversity is found in the broad-leaved forests between 1,500 metres and 2,500 metres and unfortunately this is the region which is under highest pressure of human encroachment. Generally the upper limit of major cultivation in the Nepal Himalayas is not above 2,500 metres, but a large amount of land above the agricultural areas is used for livestock grazing and is exploited for wood and foliage collection. Pastoralism often causes clearing and burning of forest habitats for an increasing demand of grazing land. Mistletoes are highly host specific but the depletion of the potential host population due to habitat destruction, leading towards changes

in vegetation patterns could be detrimental to the mistletoe population. Exotic plant species used in afforestation programmes in Nepal may not prove suitable host species. Mistletoes depend on their avian partners for pollination and dispersal but threats to the mistletoe bird population due to changing vegetation patterns may have a negative role on mistletoe survival.

Plant species are very sensitive to changing climate. A shift in climate change patterns could result in an upward movement of various host plant species, which could also lead to an upward movement of many mistletoe species along with hosts. As the mistletoes have co-evolved with their avian partners, the upward movement of mistletoes may also favour the upward migration of these mistletoe bird species. Thus both mistletoes and mistletoe birds could be used as indicators of changing climate in the mountain areas of Nepal Himalayas.

Mistletoes are facing extinction worldwide due to various reasons. Unfortunately, the exact status of mistletoes from the Nepal Himalaya is unknown due to inadequate studies, but as the above mentioned threats are true for Nepal, it is most likely that they may be under threat of extinction even before being recognised by biologists. The role of mistletoes in the rich biodiversity of the Nepal Himalayas is unexplored and it is still unknown how mistletoes are affecting Nepalese biodiversity. This fascinating group of parasitic plants of Nepal has been remained unknown for a long time and now the time has come to study and conserve them as they are facing the threat of extinction due to an alarming rate of deforestation in Nepal.

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