

Abstract

In this thesis, I focused mainly on orchids and also carried out some research on different pharmaceutically potential plants in Nepal. I compiled both data from field and secondary data sources and one of my first outputs was complete checklist of orchids in Nepal. I also studied distribution patterns and affinities of orchids with different floristic regions in Nepal. My next work on epiphytic orchids is related to diversity, distribution and host-species associations and their future in the context of climate change in Nepal. In addition to this, I also worked on factors affecting epiphytic orchids along an altitudinal gradient in central Nepal. Working on population dynamics of terrestrial orchid species, *Crepidium acuminatum*, lasted for 6 years. Together with orchids, I determined secondary compounds present in a highly important Nepal endemic medicinal plant, *Swertia multicaulis*. I also compiled the information on uses, phytochemistry, pharmacology and toxicity of highly important Himalayan endemic medicinal plant, *Neopicrorhiza scrophulariiflora*. The last research of my Ph.D. project ended up by gathering the information on uses of different medicinal plants, including orchids that were used to treat various gastrointestinal diseases in Nepal. The results of my doctoral thesis are presented in nine papers, out of which five papers are published, three are submitted for publication in journals, and one paper was published in proceedings of a conference.

Paper I listed 458 taxa of orchids including 104 genera, 437 species, 16 varieties, 3 subspecies and 2 forma. There were 18 endemic orchids. **Paper II** is focused on phytogeography and economic importance of orchids in Nepal. The study on epiphytic orchids revealed a high diversity of epiphytic orchids and big differences in species richness, abundance and species composition of orchid communities in different localities in Nepal. Species richness and composition were strongly associated with various host characteristics (habit-shrub/tree/climber, bark, nature-deciduous/evergreen and strata of host species) as well as host species and family. (**Paper III**). An increase in temperature is likely to threaten the existence of several epiphytic orchids and their hosts in Nepal (**Paper IV**). Along an altitudinal gradient in the Kathmandu valley, species richness was only affected by altitude. Species composition was, however, affected by altitude, distance

from the forest edge, host types, soil pH and precipitation (**Paper V**). In **Paper VI**, six-years study on population dynamics of *Crepidium acuminatum*, showed that growth rates (λ) among various years were relatively similar and stable but were significantly reduced by harvesting.

Paper VII showed that *Swertia multicaulis* was rich in secondary metabolites, which could have pharmaceutical potential. In this plant, xanthone content was close to 13 g per 1 kg of dry matter. **Paper VIII** detailed the information on botanical characteristics, traditional uses, plant growth, cultivation, micropropagation, conservation status, secondary metabolites, pharmacology and toxicity of *Neopicrorhiza scrophulariiflora*. This plant species can serve as a promising source of non-harmful and potential medicinal herbal remedies for various human diseases. **Paper IX** comprised of the documentation of 947 species belonging to 158 families and 586 genera used to treat gastrointestinal disorders in Nepal. This list comprised 16 medicinal orchids.