

DIVERSITY OF ORCHIDS IN SHIURENI FOREST, AADHIKHOLA RURAL MUNICIPALITY, SYANGJA, NEPAL

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ABSTRACT

The elevational gradient is one of the important factors that determine the distribution pattern of many wild ornamental plants. In this study, we explored the diversity of the orchid flora along different elevation gradients from Thumki to Thapley viewpoint in Siureni forest, Syangja, Nepal. The study was done by the transect walk method. In all 11 transect points altogether 25 orchid species were found belonging to 12 genera out of which 10 genera were of medicinal importance i.e., *Acampe*, *Aerides*, *Calanthe*, *Coelogyne*, *Cymbidium*, *Dendrobium*, *Oberonia*, *Pholidota*, *Rhynchosstylis*, *Vanda*, etc. One of them was endemic orchid i.e., *Oberonia nepalensis*. The larger genera found were *Bulbophyllum* and *Coelogyne* with seven and three species respectively followed by *Dendrobium*, *Rhynchosstylis*, *Vanda*, *Aerides*, *Oberonia* each with two species. The remaining genera had one species of each. This research output will be helpful in sustainable management and acquiring knowledge about the diversity of orchids in Aadhikhola Rural municipality, Syangja district, Gandaki Province, Central Nepal.

Keywords: Elevation gradient, Orchids, Transect point, Aadhikhola, Syangja.

INTRODUCTION

Orchids in Nepal are known by the vernacular names "Sungava or Sunakhari" which refers to their shining yellow pseudobulbs (Subedi *et al.*, 2013). Orchidaceae plant family is classified under the division Magnoliophyta, class Liliopsida, order Orchidales. Orchids, the members of the family Orchidaceae, are well known for possessing exquisite flowers and having a great diversity in color, and fragrance (Dressier, 1981). Orchids are one of the largest families of flowering plants, and they are also one of the most threatened families, due to their complex life history strategies (Fay, 2018). Orchids are diverse, occur in a wide range of habitats, and dominate threatened species lists (Wraith and Pickening, 2018). They are the largest groups of flowering

plants with about 25000 species and 800 genera in the world (Chen *et al.*, 2009). They are one of the widest-spread families of flowering plants (Cribb *et al.*, 2003). Orchids include terrestrials that occur in temperate regions and epiphytes which only occurs in tropical region (Dressler, 1993).

Nepal also contains many species of orchid flora due to the wide range of climatic diversity. They are the important natural resources of Nepal. Orchid comprises various attractive flowers, they not only add beauty but also have many medicinal benefits. In Nepal, Rajbhandari *et al.*, (2014) reported 107 genera and 451 species of orchids. Orchids are perennial herbs. They lack a permanent woody structure. In different elevation gradients, different species of orchids are found or they adapt in different elevation

gradients. Different elevation gradient offers different suitable climate for different orchid species. The correlations of mean niche breadth and mean distribution with maximum elevation, latitude and longitude were significant for all orchid taxa and their subsets (Tsiftsis *et al.* 2019). Although the orchids in the Himalayan region are generally well known in low lands there is little or no information about them in Nepal. The orchids in the trees, on rocks, on ground were recorded along a total of 200 line transects: 40 in the Barandabhar corridor forest (BCF), 105 in the Chitwan National Park (CNP), and 55 in the Mahabharat range (MR). For it, first 50 trees within 10 m of the transect line were sampled (Traxmandlová *et al.*, 2011). A hump-shaped relationship between orchid species richness and elevation was observed in Nepal and Bhutan, with maximum richness at 1600 m a.s.l. corresponding to 16□. The richness of endemic epiphytes peaked at elevation zones similar to those for total richness, but the peak in numbers of endemic terrestrial species occurred at a higher elevation (Acharya *et al.*, 2011). Climate warming is likely to affect all regions worldwide, although in a different manner when its consequences (eg. increase of temperature, lower seasonality) are considered. Thus, global change is likely to affect the distribution and survival of species (Tsiftsis *et al.*, 2019).

In this study, following the transect method, we explored the diversity of orchid flora along an elevation gradient in Shiureni forest, Syangja, Nepal. As the study area is a remote forest area, a detail study of orchids had not been done yet. The people of the locality are unaware of the importance of orchid flora. People of the locality are unknowingly deteriorating orchid flora by forest fire and deforestation. The findings of this research would thus shed light on the diversity of orchid at Shiureni forest.

MATERIALS AND METHODS

Study site

The study site lies in Aadhikhola, Syangja. The total area of Aadhikhola rural municipality is 69.61 sq. km. The average annual temperature of this area is 15.45°C and the average annual precipitation of this area is 242.61mm. The study was carried out at the Shiureni forest of Aadhikhola-6, Syangja district, which lies in the south of the Gandaki province central Nepal. The elevation gradient of the study site ranges from 990 m to 1996 m asl.

Methods for determination of transect points

A measuring tape was used to measure distance upward and find out the transect point. Firstly, one random point was taken which was our first transect point. From that very first transect point 100m upward distance was measured to find another transect point. This process was repeated to find another transect point. And 100m transect walk was done on both side of the transect point respectively.

Method of data collection

The study was carried out at 11 different transect points from 990m to 1990m elevation. For the data collection transect walk was done on every transect point. From each transect point, we moved 100m left and 100m right respectively to observe orchid species. Orchids diversity and their habitat status (epiphytic, lithophytic or terrestrial) was also recorded. Observed orchid species were collected and herbarium specimens were prepared. Identification keys were used to identify orchids at genera and species level and confirmed with the help of Catalogue of Life (2023). And species were also classified. Native or exotic categories with native range were obtained from plants of the world online (POWO).

RESULTS

Observations and Enumeration of plant species

During the field visit, altogether 25 types of orchid species were found belonging to 12 genera. Orchid species which were found during the field visit were enumerated with

their scientific name followed by their actual elevation, habitat (epiphytic, lithophytic, or terrestrial) (Table 1). Among the observed orchid genera, in which 10 genera: *Acampe*, *Aerides*, *Calanthe*, *Coelogyne*, *Cymbidium*, *Dendrobium*, *Oberonia*, *Pholidota*, *Rhynchostylis*, and *Vanda* were medicinal orchids. One species of endemic orchids was found i.e., *Oberonia nepalensis*.

Table 1: Enumeration of Orchid Species

S.N.	Name of Orchid Species	Habitat	Distribution Range	Observed Range
1	<i>Acampe rigida</i> (Buch.-Ham. ex Sm.) P.F.Hnt	Epi. / Litho.	200-1800m	990m
2	<i>Aerides multiflora</i> (Roxb.)	Epi.	200-1100m	990m
3	<i>Aerides odorata</i> (Lour.)	Epi.	200-1200m	1090-1190m
4	<i>Bulbophyllum affine</i> (Lindl.)	Epi.	600-1800m	1090-1290m
5	<i>Bulbophyllum bisetum</i> (Lindl.)	Epi.	1500-2000m	1590-1990m
6	<i>Bulbophyllum leopardinum</i> (Wall.) Lindl. ex Wall.	Epi. / Litho.	1500-3200m	1690m
7	<i>Bulbophyllum odoratissimum</i> (Sm.) Lindl. ex Wall.	Epi.	1000-2000m	1390-1990m
8	<i>Bulbophyllum rigidum</i> King and Pantl.	Epi.	1000-2000m	1290-1990m
9	<i>Bulbophyllum rolfei</i> (Kuntze) Seidenf.	Epi.	Around 2000m	1990m
10	<i>Bulbophyllum umbellatum</i> Lindl.	Epi.	300-1800m	1390-1790m
11	<i>Calanthe puberula</i> Lindl.	Terr.	1800-2500m	1890-1990m
12	<i>Coelogyne fuscescens</i> Lindl.	Epi.	1200-1800m	1790-1890m
13	<i>Coelogyne nitida</i> Hook.f.	Epi.	1300-2400m	1490-1990m
14	<i>Coelogyne ovalis</i> Lindl.	Epi.	1300-1700m	1390-1490m
15	<i>Cymbidium aloifolium</i> (L.) Sw.	Epi.	300-1600m	990-1190m
16	<i>Dendrobium anosmum</i> Lindl.	Epi.	1100-2900m	1090m
17	<i>Dendrobium fimbriatum</i> Hook.	Epi. / Litho. / Terr.	200-2100m	1190-1990m
18	<i>Eria coronaria</i> (Lindl.) Rchb.f.	Epi.	1500-2300m	1690-1990m
19	<i>Oberonia nepalensis</i> L.R.Shakya and R.P.Chaudhary	Epi.	200-1500m	1090m
20	<i>Oberonia recurvæ</i> Lindl.	Epi.	Around 1100m	1290m
21	<i>Pholidota articulata</i> Lindl.	Epi.	500-2300m	1790-1990m
22	<i>Rhynchostylis gigantea</i> (Lindl.) Ridl.	Epi.	Around 1000m	990m
23	<i>Rhynchostylis retusa</i> (L.) Blume	Epi.	300-1800m	1190-1490m
24	<i>Vanda alpina</i> (Lindl.) Lindl.	Epi.	1100-1800m	1390-1590m
25	<i>Vanda (Trudelia) cristata</i> Wall. ex Lindl.	Epi.	1200-2300m	1690-1990m

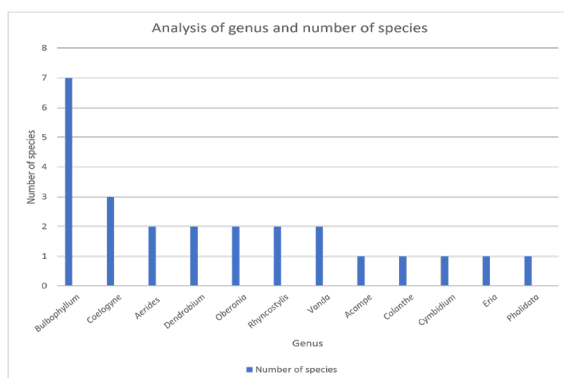


Figure 1: Bar Graph showing the number of species of different orchid genera

DISCUSSION

In this study, 25 species of orchids were found belonging to 12 genera. The larger genus was *Bulbophyllum* i.e., 7 species followed by *Coelogyne*, *Aerides*, *Dendrobium*, *Oberonia*, *Rhynchostylis*, *Vanda* i.e., 3, 2, 2, 2, 2, 2 species respectively. Remaining 5 genera have one species each. Rajbhandari (2015) reported 107 genera and 450 species of orchids where largest genus was *Bulbophyllum* which contains 37 species. He reported 18 endemic species and more than 100 medicinal orchids from Nepal. In our study (Shiureni), 25 species of orchid belonging to 12 genera were found where 10 genera of medicinal orchid were found i.e., *Acampe*, *Aerides*, *Calanthe*, *Coelogyne*, *Cymbidium*, *Dendrobium*, *Oberonia*, *Pholidota*, *Rhynchostylis*, *Vanda*, etc. and 9 genera of ornamental orchids i.e., *Bulbophyllum*, *Acampe*, *Aerides*, *Calanthe*, *Coelogyne*, *Cymbidium*, *Dendrobium*, *Rhynchostylis*, *Vanda*. One endemic species was also reported i.e., *Oberonia nepalensi*. Seven species of *Bulbophyllum* were reported which was the largest genus found in this forest. Similarly, 3 species of *Coelogyne* were also found. At Panchasey forest 107 species of orchids were reported by (Jana *et al.*, 2010) which lies in same district near Shiureni forest. Again, at Panchasey forest which lies at the border of Syangja, Parbat, Kaski districts, 61 orchid species were reported

(Rai *et al.*, 2021). They reported *Cymbidium*, *Dendrobium*, *Bulbophyllum* as the largest genera or as the most commonly found genera. These genera also contained largest number of species in Shiureni forest. Higher elevation had a higher number of species.

The distribution of orchids was affected by logging, charcoal burning, and conversion of forest land for agricultural use and for road construction (Kawaka *et al.* 2014). Different types of orchid species play an important role to increase the beauty of that forest. They are the important natural resources of Shiureni Forest. They have beautiful flowers which attract tourists. Hence, people collect or pick orchids destructively for ornamental purposes. So, some orchid genera are becoming highly endangered day by day. Hence, the main reason for the extinction of orchids might be the destructive harvesting and clearing of forest trees.

CONCLUSIONS

This study concluded that in Shiureni forest of Aadhikhola, 25 species of orchids were found belonging to 12 genera. They have medicinal as well as ornamental value. The larger genera found were *Bulbophyllum*, *Coelogyne*, *Dendrobium*, *Rhynchostylis*, *Vanda*, *Aerides*, *Oberonia* i.e., 7, 3, 2, 2, 2, 2, 2 species respectively. And remaining genera had one species each. Almost all species were found to be Epiphytic (tree) while some were Terrestrial (land), Epiphytic / Lithophytic. (rocks). At transect point 1990m., a higher number of different species i.e., 10 orchid species were found. At 1790m., 1890m, seven species were found while at other transect points, lesser species were found i.e., at 1090m, 1190m, 990m, 1290m, 1390m, 1490m, 1590m, 1690m transect point 5, 5, 4, 4, 4, 4, 4, 4 species were found respectively. Higher elevation has a higher number of species.

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Appendix



1: *Acampe rigida*



5: *Bulbophyllum bisetum*



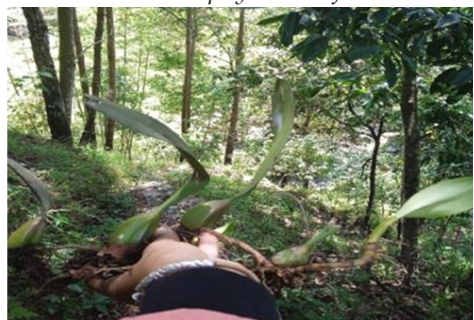
2: *Aerides multiflora*



6: *Bulbophyllum rolfei*



3: *Aerides odorata*



7: *Bulbophyllum umbellatum*



4: *Bulbophyllum affine*



8: *Coelogyne fuscescens*

9: *Coelogyne nitida*13: *Oberonia recurva*10: *Cymbidium aloifolium*14: *Pholidota articulata*11: *Dendrobium anosmum*15: *Rhynchostylis gigantea*12: *Eria coronaria*16: *Vanda alpina*