

CHAPTER - 2: AIMS AND OBJECTIVES

Plant taxonomy is the science of diversity, which is primarily concerned with the study of variation pattern for the distinguishing establishment of the various plant species. The environmental factors or the ecological influence upon the species plays a major role in inducing variations. Therefore ecology and taxonomy go hand in hand in deciding the correct status of a taxon. Northeast region of India with favourable climatic condition is congenial for the growth of orchid species and considered as the richest orchid belt. The genus *Dendrobium* Sw. is one of the most attractive and beautiful genera that harbours throughout the northeastern region with enormous diversity. The species of *Dendrobium* with varied morphological features in size, shape, colour and fragrance are important from horticultural, ornamental and medicinal points of view. The genus is playing a vital role in international trade market by contributing remarkable hybrids of outstanding merit. In spite of its potentiality in many aspects the genus in the northeastern region has been inadequately studied from ecology and taxonomic point of view.

1. In the present research, an attempt is made to observe the ecological adaptation of all the *Dendrobium* species of Northeast region of India in its natural habitat and cultivated medium in relation to environmental factors such as rainfall, temperature, relative humidity, sunlight, soil quality, phorophyte nature and altitude governing their growth and development.
2. Epiphytes are dependent on the limited part of local precipitation that penetrates the upper canopy supplemented by the flow of water down the branches and trunk. Their survival depends on the atmospheric humidity that prevails at different levels above the ground in the type of forest concern. Equally they are dependent on receiving an adequate light intensity. The northeastern region of India with varied topography i.e. mountains and slopes persist different vegetation types from tropical to alpine forests with altitudinal variation up to 5000 m. This altitudinal variation exerts indirect influence on the growth of plant species by influencing the

abiotic environmental factors like rainfall, temperature, light, relative humidity and moisture of the habitat. *Dendrobium* being epiphytic in habit is greatly influenced by the vegetation of northeast region of India. Therefore the present research is an attempt to provide a systematic study on the altitudinal distribution of the *Dendrobium* species in different climatic zones (Tropical, Sub-tropical, Temperate, Sub-alpine and Alpine). This altitudinal analysis is important from ecological point of view to understand the range of tolerance of all the species occurring in each zone, which indirectly narrates their optimum requirements of macroclimatic factors affecting their growth and development.

3. Plant phenology deals with the study of the seasonal patterns of leafing, flowering and fruiting in relation to the climate. The study of orchid phenology is also important from the point of view of conservation as well as for better understanding of the ecological adaptations or the range of tolerance of individual species and their interactions with the environmental factors like rainfall, temperature, relative humidity, photoperiod. Therefore, the present investigation is an attempt to observe the entire flowering and fruiting periods of the *Dendrobium* species in the northeast region of India. The growth behaviour of few important species in two phenophases i.e. vegetative and reproductive phase from the initial stage of seedling to withering of flowers in both natural and artificial condition is also attempted to understand the response of the species to the climatic factors with the seasonal variations.

4. Northeast region of India with favourable climatic condition is congenial for the growth of orchids and considered as the richest orchid belt. The region has close borders with Bangladesh, Bhutan, China, Myanmar, Nepal, Malaya, Thailand and there has been frequent transmigration and intermixing of the floral elements with the help of various biotic and abiotic agencies. The region is considered to be a meeting place of the Indo-Malayan and Sino-Japanese flora, and as a result plant species from geographically far separated regions as well as neighbouring countries like Tibet, Bhutan, China, Myanmar, Malaya, Bhutan, Thailand etc. also occur in

this region. It is therefore obvious that the number of species keeps changing in light of new discoveries, additions and revisions that are made from time to time by various workers. Therefore, the present research aims to study the *Dendrobium* diversity and the affinity in all the states of Northeast India, rest part of India and neighbouring countries. It also aims to find out if there is any rediscovery of *Dendrobium* species and new addition to each state and India.

5. The genus being important from floricultural, horticultural and medicinal point of view have lead to over exploitation of a number of species from its natural habitats in the northeast region of India. Similarly with the practice of shifting cultivation in the region along with natural calamities such as seasonal floods, landslides and botanical collection by educational institutions and various developmental project together are responsible for the depletion of *Dendrobium* species and many of which are threatened and are at the verge of extinction. Therefore in the present investigation an attempt has been made to analyse the present status like R-rare, C-common, Ex-probably extinct, eR-extremely rare, E-endangered, T-threatened, En-endemic, V-vulnerable and also to suggest possible measures for its conservation (in situ and ex situ), propagation and management.
6. Another important point that emphasis the importance of ecology in taxonomy is the development of ecads, ecotypes and new species. Environmental factors not only influence the morphology of a particular species but the genetical behaviour is also affected which leads to ecads, ecotypes and gradually to new species. Therefore, in the present investigation an attempt is made to analyse and identify the floral structures of all the species of *Dendrobium* found in Northeast region of India and to provide detailed taxonomic description on the morphological and reproductive characters of each species along with correct nomenclature, illustrations, type locality or protologues, flowering period, notes on ecology and habitat, etymology, chromosome number, notes, general distribution, and specimens examined from different herbaria for easy and clear identification of each species in the region and elsewhere in the country through extensive

exploration, literature and herbarium consultation etc. and to find out whether there is any possibility of formation of ecads, ecotypes and new species.

7. Further the present investigation is an attempt to solve any taxonomical problems like superfluity of names, synonyms, misidentified specimens that is raised while describing each species of *Dendrobium* by the aid of available literatures, type materials and herbarium specimens deposited in Central National Herbarium (CAL), Kolkata, Regional Herbarium (ASSAM), Shillong, Botanical Survey of India Itanagar (ARUN), Botanical Survey of India, Sikkim Himalayan Circle (BSHC), Orchid Herbarium Tipi, (OHT), Bhalukpong, Arunachal Pradesh.