# CHAPTER 6

## 6. SUMMARY

The outcome of the present work entitled "Taxonomy and distribution of genus *Ophiorrhiza* L. (Rubiaceae) occurring in Assam" is the result of research work carried out during the period 2018–2022. The data presented in this study derive from systematic field surveys conducted across various seasons, extensive literature reviews, consultations with herbarium collections, and critical examination of the investigated species within the genus *Ophiorrhiza* in the present political boundary of Assam.

The details of the outcomes are as follows-

The current study focuses on eight species, including two varieties, within the genus *Ophiorrhiza* collected from diverse locations in Assam. Prior investigations have not comprehensively examined the genus as a whole, particularly regarding stem anatomical and foliar micromorphological characteristics from a taxonomic perspective and along with its conservation. Therefore, this work aims to fill this gap by providing essential data important for comprehensive taxonomic understanding and conservation considerations of the genus in Assam.

The field survey was conducted in the forest areas of Assam with due permission from Assam Biodiversity Board and Principal of Chief Conservator of Forest (PCCF) Assam. Necessary field observations were recorded along with place of collections, elevation and GPS data in the study area to facilitate the analysis of each species' distribution status and draw conclusive findings and also for using as occurrence data in Species distribution modelling (SDM). A distribution map of Assam illustrating the locations of the collected species has been included. Detailed discussions on the qualitative and quantitative characteristics of habit stem, leaves, inflorescences, flowers and fruits are provided for each species and terminologies used in the descriptions were consulted from the Kew Plant Glossary. Photographic plates and line drawing depicting each species were included. Specimens were collected and preserved following standard herbarium methodology. The specimens were examined and consulted with the help of protologues, relevant existing literatures, type specimens and supplementary herbarium specimens are housed in numerous national herbaria, and scanned images as well as web-based photographs of herbarium specimens from international herbaria. For correct nomenclature authentic literatures and taxonomic websites were consulted. Voucher specimen were submitted at ASSAM and the herbarium

of Bodoland University, Kokrajhar (BUBH). Comprehensive taxonomic descriptions of the genus with complete author citations, have been provided. The taxonomic enumeration for investigated taxon have been presented along with the author citation, literature citation, their type specimen details, additional herbarium specimens examined, phenology, distribution, vernacular name, habitat, ecology, associated species, important observations in the form of note were provided wherever necessary. Based on the macro morphological characters of the species a separate taxonomic key has been provided to facilitate easy identification.

The recent studies revealed that most of the members of the genus are perennial herbs with interpetiolar stipules, infundibuliform flowers, unequal opposite and decussate leaves and compressed fruits. The foliar epidermal studies were conducted under both light microscope and SEM following standard methodology. Based on the photomicrographic evidences both qualitative and quantitative features of the species were noted. Epidermal cell shape, epidermal cell wall, stomata types, nature and shape of stomatal pore, presence or absence of trichomes and raphides, were recorded and presented in tabulated form (qualitative). The average number of epidermal cells per vision, epidermal cell size, stomatal size, stomatal pore size, stomatal index were calculated and presented in tabulated form (quantitative). A taxonomic key for the easy identification of the species based on foliar epidermal features was provided.

The leaf architectural studies were conducted using standard methodology. Based on the photo micrographic evidences both qualitative and quantitative features of the species were noted and provided in a tabulated form. Various leaf architectural features of primary, secondary, tertiary vein, areolation and along with free vein endings were studied and detailed descriptions were recorded for each studied species. Based on the various characteristics taxonomic key was provided for the identification of the species.

Stem anatomy of the collected species were conducted using standard methodology. Based on the photo micrographic evidences nature of epidermis, endodermis, cortex, nature and types of vascular bundle, presence and absence of hairs, raphides, druses and calcium oxalates were studied and detail descriptions were provided and presented in a tabulated form.

Based on data from Red Data book of Indian Plants and IUCN, two species of *Ophiorrhiza* viz. *O. hispida* and *O. tingens* were selected and used for the accessing habitat status and to identify suitable areas and habitat for the reintroduction and conservation of these plant in Assam in order to prevent its extinction in the near future with the help Environmental Niche

Modelling. Distributional map and other important results of both the species was provided using modelling approach.

This study contributes to elucidating the taxonomic importance of morphological, foliar micromorphological and anatomical characteristics within the species under the genus. A probable habitat distribution of the investigated taxa would also help in reintroduction of the taxa to the identified habitat to provide effective measures on conservation of the species on its natural environment. Based on this work various studies on phytochemistry, pharmacognosy, phylogenetics and evolution, on the genus can be anticipated in near future.