



# Morphological and molecular insights into the wild *Ficus* species of Mizoram, Northeast India

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## Abstract

**Background** The genus *Ficus* L., commonly known as fig and belonging to the family Moraceae, is widely distributed across tropical and subtropical regions of Asia, Africa, America, and Australia. *Ficus* species hold significant importance in horticulture and traditional medicine due to their aesthetic, edible, and therapeutic properties. Nevertheless, the pronounced morphological diversity and intricate genetic makeup of these species require the application of molecular techniques for precise identification and comprehensive assessment of genetic diversity.

**Methods and results** This study focuses on the morphological, molecular characterization, and phylogeny of wild *Ficus* species in Mizoram, Northeast India. Morphological traits of the plants and fruits were observed, and molecular analysis was conducted using DNA barcoding of the *rbcL* gene, with the resulting sequences submitted to NCBI GenBank. Significant variation in morphological traits was observed among the studied *Ficus* species. Phylogenetic analysis based on *rbcL* gene sequences confirmed genetic diversity, with notable genetic similarity identified in *Ficus velutina* (MTMZU12 and MTMZU13) despite their morphological similarity.

**Conclusions** The study underscores how genetic and environmental factors shape morphology and shows that integrating molecular and morphological data improves phylogenetic resolution in Northeast India, a critical biodiversity hotspot.

**Keywords** Northeast India · Wild *Ficus* species · Morphology · DNA barcoding · *rbcL* · Phylogeny

## Introduction

The genus *Ficus* L., commonly known as fig, belonging to the family Moraceae, is one of the most ancient and diverse genera of fruit-bearing plants. *Ficus* is considered both conspicuous and elusive due to its unique reproductive structures, featuring minute flowers encased within a closed fleshy receptacle known as the syconium [1]. Encompassing over 750 species, the genus displays remarkable phenological diversity [2, 3]. Members of *Ficus* include trees, hemi-epiphytes, shrubs, creepers, and climbers that are distributed across tropical and subtropical regions of Asia, Africa, America, and Australia [4, 5]. With around 500 species occurring in the Asian-Australian region, this area represents 66% of the global species diversity of *Ficus* [6]. The diverse growth habits of *Ficus* species enable their adaptation to a wide range of environments, making them key subjects for genetic and ecological research [7].

*Ficus* species hold considerable significance in horticulture and ethnomedicine [8]. They are extensively utilized

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