

Microhabitat Influencers in Native Orchids of the Western Ghats: Insights from Wayanad, India

Mr. Sabu V.U

Vayalarikil (H), Kalthuvayal(PO), Ambalavayal. 673593, Wayanad.

Abstract

The Western Ghats, recognized as a global biodiversity hotspot, is home to a remarkable diversity of native orchids, many of which are endemic to specific regions and microhabitats. These orchids are highly specialized, with ecological adaptations that allow them to survive and flourish in unique, often challenging, environmental niches. This study focuses on understanding the critical microhabitat factors that influence orchid diversity, distribution, and adaptive strategies within Wayanad, a district in Kerala, India, known for its ecological richness and habitat variability.

We conducted extensive fieldwork across various forest types in Wayanad, analyzing key microhabitat variables such as altitude, soil composition, moisture availability, light exposure, and the presence of specific mycorrhizal fungi. Orchids in this region exhibit significant variability in their ecological strategies; for instance, higher elevations support orchid species that have developed efficient water conservation mechanisms and are adapted to lower temperatures and increased cloud cover. In contrast, orchids in lowland regions rely more on symbiotic relationships with specific fungi, which enhance nutrient uptake and resilience against variable soil conditions. Additionally, the attraction of specific pollinators, facilitated by unique flower structures and scent compounds, highlights an essential ecological interaction that supports orchid reproduction.

Our findings underscore that the intricate interplay of microhabitat elements within Wayanad's forests is central to the survival and adaptability of native orchids. These environmental factors shape not only the distribution and abundance of orchids but also their physiological and reproductive adaptations. Preservation of these microhabitats is thus critical, as changes in soil, climate, or forest structure could severely impact orchid populations. This research provides a foundational understanding of the environmental requirements of orchids in the Western Ghats and offers valuable insights for conservation strategies aimed at maintaining biodiversity in these fragile ecosystems. The study advocates for habitat-specific conservation efforts, emphasizing the need to maintain microhabitat conditions as part of larger ecological preservation initiatives across the Western Ghats.

Keywords: Western Ghats, Orchid diversity, Endemic species, Microhabitat, Ecological adaptation, Wayanad Conservation, Pollinator interactions, Symbiosis, Elevation gradient, Habitat management.

1. Introduction

The Western Ghats, recognized as one of the world's eight "hottest hotspots" of biological diversity, is a critical region for conservation efforts due to its rich endemic flora and fauna. Among its diverse