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# Multiple Site Dissimilarities of Herbaceous Species Due to Coal Fly Ash Dumping Based Soil Heavy Metal Toxication

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**Abstract:** The present study analyzes the determinants and patterns of the regional, local, and differential plant diversity of two different sites with similar climatic but varied edaphic factors. This research was undertaken to study the plant diversity and population structure as a consequence of variation in the soil quality between two biotopes: Guru Ghasidas Vishwavidyalaya in Koni (site-I) and National Thermal Power Corporation in Sipat (site-II). The soil of site-I was found to be fertile and showed rich vegetation. On the other hand, the soil of site II was found to be contaminated with heavy metals, which impacts the flora of the region. The ecology of both sites was studied, and their quantitative and qualitative aspects were compared and contrasted. The abundance, density, and richness of the plants in site II were fairly lower than in site-I, which was confirmed by utilizing Simpson's and Shannon's diversity indices. Many of the species collected from site II were heavy metal accumulators and could also serve as indicators of heavy metal toxicity.

**Keywords:** heavy metals; species diversity; species count; edaphic factors

## 1. Introduction

The unusual distribution and diversity of plants have always been a subject of interest among researchers [1]. A fair number of equilibrium and non-equilibrium theories have been proposed to explain different diversities, such as spatial variation in resource availability, fire, grazing, climate, etc. The most common perspective on plant ecology is that a region's climate is the only deterministic factor of plant diversity [2]. However, finer environmental features, such as edaphic factors, have a significant role in shaping the flora of a place [3]. The question of which factor determines the occurrence and distribution of species certainly is still unanswered for much of the world. Biodiversity is one of the important factors of a healthy ecosystem, and it must be maintained. However, nowadays, biodiversity is being lost due to several factors, including climate change, invasive species, the over-exploitation of natural resources, pollution, and urbanization [4].



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