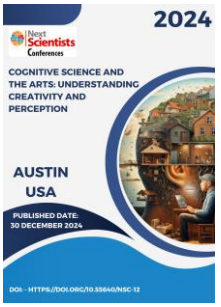

PLANT-MICROBE INTERACTIONS AND ECOLOGICAL ADAPTATIONS IN THE KYZYLKUM DESERT

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ABSTRACT

Understanding the interactions between plant microbiomes and their environment in arid regions like the Kyzylkum Desert is essential for addressing ecological and agricultural challenges. This study explores the unique soil-climatic characteristics of the Kyzylkum Desert to elucidate the ecological and physiological dynamics of plant-microbe interactions in extreme conditions.

KEYWORDS: Plant-microbe interactions, Kyzylkum Desert, soil-climatic adaptation, biofertilizers, sustainable agriculture, desert ecosystems.

INTRODUCTION

The research employs both ecological and physico-chemical methods to investigate key factors influencing plant microbiomes. Soil properties, including pH, moisture, salinity, and nutrient content (nitrogen, phosphorus, potassium), were analyzed to understand their role in shaping plant-microbe relationships. Field observations were conducted to monitor ecological parameters such as climate variability, temperature, and humidity, which are crucial for assessing the impact of abiotic stressors on microbial communities.

Preliminary findings highlight the Kyzylkum Desert's distinct soil composition and climate as pivotal factors in defining plant-microbe interactions. The data provide critical insights into the adaptive strategies of desert ecosystems, offering a comprehensive understanding of the biological and ecological processes at play.

This research has significant practical implications, particularly in sustainable agriculture. By leveraging beneficial microorganisms, biofertilizers can be developed to enhance soil fertility and reduce dependency on external inputs. Such innovations can increase agricultural productivity while addressing environmental sustainability challenges in arid and semi-arid regions. The study's findings contribute to global efforts in developing climate-resilient agricultural practices, offering potential solutions for both Uzbekistan and other dryland ecosystems worldwide.

This work underscores the importance of interdisciplinary approaches in studying plant microbiomes under extreme ecological conditions, paving the way for future research in the field of desert microbiology and sustainable land management.

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