Chapter 12
The Role of Mycorrhizae in Invasive Plants Ecology

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ABSTRACT

Mycorrhizae are symbiotic fungi that live on plant roots and essential for plant communities and ecosystems stability. Mycorrhizal networks are often used by invasive species, which drastically disrupt ecosystems by surpassing native flora, reducing biodiversity and altering ecological processes, to facilitate their establishment. Mycorrhizal associations, enhance nutrient uptake, improve resilience to drought and disease. The complex interaction between mycorrhizae with native, environments and invasive plants are examined in this chapter. The impacts of invasive plants cover biodiversity loss and influence ecosystem functions. Understanding the molecular, ecological, and environmental factors driving invasions is essential to comprehending invasive species persistence and the effects they have on native ecosystems. Strategies should emphasis on restoring native plant communities and monitoring invasive species. The restoring mycorrhizal networks, mitigating soil

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disruptions, and enhancing the resilience of native plants to combat the ecological challenges posed by invasions.

INTRODUCTION

Even while the amount of research on the effects of invasive plants is growing, much of it focuses on statistically describing the pattern of ecological consequences and the potential processes at play in specific case studies rather than creating a synthesis (He et al., 2024). Either particular ecosystems or effect categories have been the focus of recent efforts to utilize meta-analyses to assess plant impact research (Raihan et al., 2024). Because of this, we still do not have a comprehensive quantitative synthesis of how consequences differ depending on the characteristics of the invading plants and the receiving ecosystems (Ding and Eldridge, 2024). For instance, rather of focusing on effect, most species trait research aims to pinpoint the qualities that characterize a plant's invasiveness. Invasive plant species have a variety of effects on native species, communities, and ecosystems (Nunez-Mir and McCary, 2024). Invasion lessens the individuality of biological communities at different spatial scales by lowering the species richness and abundance of native biota as well as the local species diversity (Lefebvre et al., 2024).

Plants are sessile living organisms mostly depend on their surrounding environment to manage their basic needs light, water and nutrients. Plant distribution effects their utilization of these resources in a community. Mostly nutrients are biological and chemical processes in the soil. Plants rely on their environment mostly for nitrogen fixation, nutrient uptake, pollination and seed dispersal. The new range land introduction plants need some other mutualistic approaches. Plants form associations with several soil microbial symbionts that enhance their nutritional intake. The predominant link is mycorrhizal symbiosis (khan et al., 2024), which involves soil fungus and plant roots, believed to be ancestral and originating with the colonization of terrestrial ecosystems (Bhunjun et al., 2024). Invasive plants invade on non-native place to establish, survive and grow.

Globalization make nonnative plants to invade on new place. Invasive plants can form novel symbiotic association with mycorrhizae for their successful invasion worldwide with large impact on native biota. These mycorrhizae help the invasive plant for easy uptake of nutrients particularly Phosphorus. Species invasion greatly influenced ecosystem dynamics by altering nutrients cycle. Invasive plant ecology significantly influenced by mycorrhizal association as 75% of vascular plants facilitate nutrient uptake, and provide protection againt pathogen (Duan et al., 2024).