

VP Bhide Memorial Award Lecture–2015

Mycorrhization in Sustainable Agriculture

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Abstract

Arbuscular mycorrhizal (AM) fungi are ubiquitous and widespread in soils all around the world. They form a link between the plant roots and soil. The root systems of most terrestrial plants (80%) and majority of crops harbour diverse communities of mycorrhizal fungi. The AM species form an intimate relationship with plant root systems that enables the flow of soil minerals to the plant in exchange for photosynthates. The fungus penetrates into the root cortical cells forming specialized structures such as arbuscules and vesicles. AM fungi are generally known to benefit plant health and play an essential role in plant nutrient uptake, soil aggregation, water relations, ecosystem establishment, plant diversity, and plant productivity. They also improve plant resistance against root pathogens and enhance foliar resistance. The improvement of phosphorus (P) nutrition by AM fungi has received most attention. The importance of AM fungi in restoration and revegetation of disturbed lands is also well known. The significance of mycorrhizal symbiosis in association with biodiversity and ecosystem functioning is now being revealed, particularly with respect to their potential to influence plant diversity and productivity. In this study, the diversity and structure of AM fungal communities, AM fungal inoculum production and multiplication for utilization as biofertilizer will be discussed, along with the importance of the AM role in growth of agro-economically important plants in sustainable agriculture and the functioning of natural ecosystems.

Key words: Arbuscular mycorrhizal fungi, symbionts, soil-based systems, sustainable agriculture

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