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Commentary

Beneficial Effects of Arbuscular Mycorrhiza to Host Plants

Rosella Rachel*

Department of Agriculture, The University of Queensland, St. Lucia QLD 4072, Australia

DESCRIPTION

The term Mycorrhiza, was used for the first time in the year 1885 by A.B Frank. Mycorrhiza is defined as the mutual beneficial relationship between fungi and plant roots. In these associations, the fungus obtains organic compounds from its photosynthetic partner and provides it with minerals and water in return, so that the partners' nutrition is also promoted. Mycorrhiza are commonly divided into echo mycorrhiza (the hyphae of fungi do not penetrate individual cells within the root) and endomycorrhiza (the hyphae of fungi penetrate the cell wall and invaginate the cell membrane). Endomycorrhiza are variable and are further classified as arbuscular, ericoid, arbutoid, onotropoid and orchid mycorrhiza.

Arbuscular mycorrhiza benefits plant by increasing growth plant growth. Plant growth is directly influenced by the availability of nutrients in soil and their absorption through the root system which in turn depends on the concentration of nutrients in the soil and their transport to absorbing sites, either by mass flow or by diffusion. Extramatrical hyphae of arbuscular mycorrhiza have the capacity of absorption and transport of nutrients to cortical cells and improve the nutrient uptake by the root system. As the extramatrical 6 hyphae extend several centimeters in the soil, they by-pass the depletion zone surrounding the roots. They overcome the limitations on the absorption of slow diffusing ions, therefore they have a great functional importance in nutrient acquisition by the roots It has been emphasized that AM fungi complement root system especially when it is less developed or when the environment is stressed, nutrient poor or competitive. Arbuscular mycorrhizal plants have greater tolerance to toxic metals root pathogens, drought, high soil temperature, saline soils, adverse soil pH and transplant shock than non-mycorrhizal plants. Besides, they affect and improve disease fighting ability of the host. Several studies have demonstrated that some arbuscular mycorrhizal fungi exhibit biocontrol properties. The fungal hyphae play an important role in soil stabilization through formation of soil aggregates and provide microsites for microbial colonization and growth. Plants colonized with AM fungi are healthy and well adapted to its environment.

CONCLUSION

AM fungi protect the plants against environmental stresses, such as cold, salinity and pollution. These are because extra radical hyphae of mycorrhizal fungi may interact with other soil organisms either directly by physically and/or metabolically interacting with other organisms in the rhizosphere or indirectly by changing host plant physiology including root physiology. Application of organic matter stimulates the development of mycorrhizal fungi, and in return a mycorrhizal fungus also increases soil organic matter. There are reports that AM fungi enhance the mobilization of organically bound nitrogen from plant litter due to plant-to-plant transport of nitrogen and helps in reducing the rate of fertilizer application. Arbuscular mycorrhiza benefits plants by increased phosphorus uptake which may be attributed to increased physical exploration of soil; increased movement of "P" into the vesicular arbuscular mycorrhizal hyphae; modification of root; increased storage of absorbed "P"; efficient transfer of "P" to roots, and efficient utilization of "P" within the plants. The main advantage of mycorrhiza is greater soil exploration and increasing uptake of N, P, K, Zn, Cu, S, Fe, Ca, Mg and Mn supply to the host roots.

Correspondence to: Rosella Rachel, Department of Agriculture, The University of Queensland, St. Lucia QLD 4072, Australia, India, E-mail: rosellar@gmail.com

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