


Mycorrhiza - a vital component of plant life

Mycorrhiza are symbiotic association between plant root and fungi with a bidirectional nutrient exchange between the partners. About 90-95% land plants are in association with Mycorrhiza. This association is not found in cruciferae, Chenopodiaceae and Resedaceae. Mycorrhizal fungi are species of fungi that intimately associate with plant roots forming a symbiotic relationship, with the plant providing sugars for the fungi and the fungi providing nutrients such as phosphorus, to the plants. Mycorrhizal fungi can absorb, accumulate and transport large quantities of phosphate within their hyphae and release to plant cells in root tissue. A mycorrhiza ("fungus - root") is a type of endophytic, biotrophic, mutualistic symbiosis prevalent in many cultivated and natural ecosystems. There are three major groups of mycorrhiza: Ectomycorrhiza, Ectendomycorrhiza and Endomycorrhiza. Ectomycorrhiza and endomycorrhiza are important in agriculture and forestry. Endomycorrhiza (vesicular arbuscular mycorrhiza (VAM). Arbuscular mycorrhiza, (AM) play a very important role on enhancing the plant growth and yield due to an increase supply of phosphorus to the host plant. Mycorrhizal plants can absorb and accumulate several times more phosphate from the soil or solution than non-mycorrhizal plants. Plants inoculated with endomycorrhiza have been shown to be more resistant to some root diseases. Arbuscular Mycorrhizal (AM) fungi (or Vesicular-Arbuscular Mycorrhizal, VAM fungi), belonging to the Phylum Glomeromycota are symbionts with terrestrial plant roots. The most important genera involved in VAM are Glomus, Gyrosopora, Acaulospora. It is now recognized that they improve not only the phosphorus nutrition of the host plant but also its growth, which may result in an increase in resistance to drought stress and some diseases. Therefore, AM fungi offer a great potential for sustainable agriculture, and the application of AM fungi to agriculture has been developed. In fact, in some countries the AM fungal inocula have been commercialized.

Mycorrhiza increase root surface area for water and nutrients uptake. The use of mycorrhizal biofertilizer helps to improve higher branching of plant roots, and the mycorrhizal hyphae grow from the root to soil enabling the plant roots to contact with wider area of soil surface, hence, increasing the absorbing area for water and nutrients absorption of the plant root system. Therefore, plants with mycorrhizal association will have higher efficiency for nutrients absorption, such as nitrogen, phosphorus, potassium, calcium, magnesium, zinc, and copper; and


PRINCIPAL
Dhruva Chand Halder College
P.O.-11, Narayan, P.S. -
South 24 Parganas, Pin-743377

also increase plant resistance to drought. Benefits of mycorrhizal biofertilizer can be summed as follows:

1. Allow plants to take up nutrients in unavailable forms or nutrients that are fixed to the soil. In the extreme acidic or basic soil, phosphorus is usually bound to iron, aluminum, calcium, or magnesium, leading to water insolubility, which is not useful for plants. Mycorrhiza plays an important role in phosphorus absorption for plant via cell wall of mycorrhiza to the cell wall of plant root.
2. Enhance plant growth, improve crop yield it was found that the crop yield improved by more than 50%, and the farmers' income increased 61% higher than when chemical fertilizer alone was used.
3. Improve plant resistance to root rot and collar rot diseases

Role in Agriculture: Mycorrhiza help in profuse root growth by formation of dichotomous branching of root and thus increasing the absorbing surface area. Help in mineral uptake. Help in absorption of Ca, P, Zn, Na, Fe etc. Act as effective Biofertilizer by supplementing or rebalancing soil fertility; stimulating soil life and stimulating the crop productivity. Enhance soil quality by increasing organic matter, porosity to hold water and air. The high soil porosity (large spaces between soil particles) caused by microbes is important, because it aids water infiltration. Help in soil borne disease resistance (Glomus, by secretion of glomalin). It lowers the pH of soil by uptake of NH_4^+ ion and release of H^+ ion. Thus in basic soil where cultivation is problematic, application of Mycorrhiza could solve the problem without applying any chemical.

Role in Forestry: Act as pioneer in plant succession. Play an important role in establishment of forest in barren land, waste land etc. In forest ecosystem, the roots of different plants are connected by common ectomycorrhizal fungal mat. This system helps in mutual transfer of nutrients between different plant types. In this way stressed plants become benefitted. Mineral nutrients like phosphate and nitrate salts are transferred in unidirectional way from Mycorrhiza to plants. Sp. Like Phellinus has lignicolous property. It helps in forest litter decomposition to increase organic matter in the soil. Protect forest plants from root diseases. Mycorrhiza like Strobilurus produce antifungal substance (strobilurin) and prevent plants from fungal root diseases. It is obligatory for germination of orchid seeds. Seeds of orchidaceae are non endospermic. Orchid seedlings cannot grow without active participation of Mycorrhiza. Enable plants to grow in nutrient deficient land.


Signature of Coordinator


Signature of the Principal

PRINCIPAL
Dhruva Chand Halder College
P.O. - D. Barasat, P.S. - Jaynagar
Dist. - 24 Pgs. (S). Pin- 743322