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## MYCORRHIZAE AND PLANTATION PROGRAMMES

- By J. D. Bhat\*

The beneficial role of mycorrhizae in plant growth and productivity is well recognized (Hayman, 1980). Only in the last 20-30 years has research on mycorrhizae made real progress although the concept has been well known since the turn of the century (Plenchette, 1981). About 90% of the higher plant species living on earth are believed to form mycorrhiza on their underground organs (Trappe, 1981) and in many cases the mycorrhizal symbiosis is obligate.

Mycorrhiza, literally means "Fungus root" is a mutually beneficial symbiotic association of fungal hyphae with roots of higher plants. This is a healthy physiological association during which the fungal partner absorbs nutrients (especially phosphorus which is often limiting for plant growth) from the soil and translocates them to the host plant; the plant partner in return provides photosynthates to the fungal partner. In this type of association the interphase becomes in fact the absorbing organ of the plant.

Mycorrhizal plants exhibit quick establishment, better survival and an increased uptake of water and nutrients such as Phosphorus particularly when grown in arid and infertile soil. Lack of mycorrhizal development in seedlings can lead to failure of planting, especially silvicultural practices (Plenchette, 1982). Mycorrhizal association is also known to afford protection to plants from infection by root pathogens. Mycorrhizae are particularly relevant to afforestation programmes in denuded areas and to agriculture and rangeland productivity in region degraded by stress or soil erosion and soil exhaustion.

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Of the mycorrhizae, vesicular-arbuscular mycorrhizae (VAM) are known to be associated with the vast majority of plant species. VAM fungi are filamentous, non-septate and zygomycetous belonging to the family Glomaceae of the order Mucorales. These are obligate symbionts. The distributive hyphae of VAM branch within roots, intra- and intercellularly, and produce terminal or intercalary saclike vesicles which contain large accumulation of soil and serve as storage organs. Spores and sporecarps in soil serve as inoculum in the soil. There is evidence that water uptake, translocation of elements such as Zn, Cu, etc. are increased by VAM interaction (Manjunath & Bagyaraj, 1984). Experiments conducted elsewhere have conclusively established that plantation programmes will benefit by the use of mycorrhizae inoculation.

Mycorrhizae research in India was initiated in the 1960s by Bakshi at the Forest Research Institute, Dehra Dun, with emphases on forest trees such as pine, eucalyptus, sal and silver fir. He attempted to use these principles in nursery management practices and outlined the importance of mycorrhizae in future afforestation programmes. A good deal of work has been carried out on use of VAM by University of Agric. Science, Bangalore, C. P. C. R. I., I. A. R. I. New Delhi and Forest Department, Tamilnadu.

It is hoped that a proper and scientific use of mycorrhizae on plantations of ornamental, forest and agriculture plants, will aid quick growth of these even in infertile or abandoned rocky soil. A great deal of research will have to be undertaken to prepare a VAM recipe and to ascertain compatibility with plant partner before the principle is used in revegetation programmes.

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