

# A Review of Studies of Mycorrhizal Fungi on Ornamental Plant

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## Abstract:

Mycorrhiza, also spelled mycorrhiza, an intimate association between the branched, tubular filaments (hyphae) of a fungus and the roots of higher plants. The association is usually of mutual benefit; a delicate balance between host plant and symbiont results in enhanced nutritional support for each member. In recent decades, interest in this symbiosis has increased substantially, not only because of its potential benefits to agriculture, forestry and phytoremediation but also because it helps us to understand the basis of complex mechanisms involved in plant. Trappe and Fogel (1977) said 'most woody plants require mycorrhizae to survive', and most herbaceous plants need them to thrive.

**Key words :** Flowering plants, AM fungi.

## Introduction :

The aim of this work was to summarize the most recent research focused on the study of ornamental plant- arbuscular mycorrhizal fungi (AMF) symbiosis. The most significant studies on the ornamental plant advantages taken from this association are reviewed herein. Noticeable advances that have been reported from mutualistic relationship between the plant and the mycorrhizal fungus. As we know fungi play a crucial role in the balance of ecosystem. AMF Arbuscular Mycorrhizal Fungi help in plant growth and in enhancing resistance to drought, temperature and salinity besides helping in seedling establishment and control on pathogens. Mycorrhiza studies and the recent progress in research in this sector have shown a possible solution for environmental sustainability. The great demand of ornamental plants due to urban greening and rural construction, while the growing environment of plants, especially the soil environment, is deteriorating. Hence the application of AMF to ornamental plants can be one of the eco-friendly ways to achieve the objective. Soil AMF establish mycorrhizal symbiosis with roots of ornamental plants, which can develop a marvelous mycorrhizal mycelium network in the rhizosphere to stimulate nutrient and water acquisition of host plants. Numerous researches have proven that AMF improved the quality of ornamental plants, like fruit yield, height, biomass, seed quality, the size and number of flowers, leaf, and root. AM plants always exhibited higher values of root hydraulic conductivity and reduced transpiration rate under drought stress. From plants subjected to drought, only the AM plants recovered their root hydraulic conductivity completely after the 3 d recovery period. As a whole, the results indicate that AM plants regulate their ABA levels better and faster than non-AM plants, allowing a more adequate balance between leaf transpiration and root water movement during drought and recovery. (Ricardo Aroca et al., 2008)

## Role of AMF :-

Symbiotic associations between arbuscular mycorrhizal fungi and plant roots are widespread in the natural environment and can provide a range of benefits to the host plant. These include improved nutrition, enhanced resistance to soil-borne pests and disease, improved resistance to drought, tolerance of heavy metals and better soil structure. Arbuscular mycorrhizal fungi are a symbiotic obligate that live in the roots of 80% of flowering plants. The host plant provides photosynthates and a safe place for the fungi to live. The fungi, through its extensive external hyphae network, can provide greater access to nutrients (Marschner and Dell, 1994) and water (Hardie, 1985; Busse and Ellis, 1985). Arbuscular mycorrhizal fungi can help plants mitigate water stress-induced deleterious changes (Newsham et al., 1995; Ruiz-Lozano, 2003). Under water-stress conditions, the positive impact of AMF association has been studied, mostly at physiological levels such as regulation of water absorption, transpiration, and photosynthesis (Marschner and Dell, 1994;

Auge, 2004). Under water-stress conditions, AMF association helps plants to maintain leaf water potential so that any drop in turgor is prevented (Dixon et al., 1994; Subramanian and Charest, 1995, 1997).

### **Ornamental Plant:-**

Floriculture, branch of ornamental horticulture concerned with growing and marketing flowers and ornamental plants as well as with flower arrangement. Because flowers and potted plants are largely produced in plant-growing structures in temperate climates, floriculture is largely thought of as a greenhouse industry, though many flowers are cultivated outdoors in nurseries or crop fields. Both the production of bedding plants and the production of cuttings to be grown in greenhouses or for indoor use as houseplants are usually considered part of floriculture. Worldwide more than 140 countries are involved in commercial Floriculture. The leading flower producing country in the world is Netherlands and Germany is the biggest importer of flowers. Countries involved in the import of flowers are Netherlands, Germany, France, Italy and Japan while those involved in export are Colombia, Israel, Spain and Kenya. USA and Japan continue to be the highest consumers.

Floriculture is an age old farming activity in India having immense potential for generating gainful self-employment among small and marginal farmers. In the recent years it has emerged as a profitable agri-business in India and worldwide as improved standards of living and growing consciousness among the citizens across the globe to live in environment friendly atmosphere has led to an increase in the demand of floriculture products in the developed as well as in the developing countries worldwide. The production and trade of floriculture has increased consistently over the last 10 years. In India, Floriculture industry comprises flower trade, production of nursery plants and potted plants, seed and bulb production, micro propagation and extraction of essential oils. Though the annual domestic demand for the flowers is growing at a rate of over 25% and international demand at around Rs 90,000 crore India's share in international market of flowers is negligible. However, India is having a better scope in the future as there is a shift in trend towards tropical flowers and this can be gainfully exploited by country like India with high amount of diversity in indigenous flora.

### **Role of AMF in Ornamental Plants :-**

Researches demonstrated that mycorrhizal inoculation determines beneficial effects on plants that can translate in economic advantages for flower growers. Suitable for inoculation with AMF are both greenhouse and field cultivated ornamental plants that are able to establish this kind of symbiose. Arbuscular mycorrhizal fungi are a symbiotic obligate that live in the roots of 80% of flowering plants. The host plant provides photosynthates and a safe place for the fungi to live. The fungi, through its extensive external hyphae network, can provide greater access to nutrients (Marschner and Dell, 1994) and water (Hardie, 1985; Busse and Ellis, 1985).

We have seen a lot of enthusiasm for urban horticulture and those who practice it are discovering the benefits of a healthy soil. However, due to the heat island and wind factor on the roof of buildings, growing conditions can be stressful for plants. There are numerous challenges but they can be minimized by using mycorrhizal fungi inoculants to increase the plant's resistance to these difficult environmental conditions. Floriculture branch of ornamental horticulture concerned with growing and marketing flowers and ornamental plants as well as with flower arrangement. Because flowers and potted plants are largely produced in plant growing structures in temperate climate, floriculture is largely thought of as a green house industry, though many flowers are cultivated outdoors in nurseries or crop field. Nearly 90% of plant species including flowering plants, bryophytes, and ferns can develop interdependent connections with AMF (Zhu et al., 2010a; Ahanger et al., 2014).

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