Research Paper :

Combined Inoculation of *Arbuscular mycorrhizal* Fungi and Azotobacter Beneficial to (Wheat) *Triticum aestivum* L.

R.H. RATAGERI AND H.C. LAKSHMAN

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See end of the article for authors' affiliations

Correspondence to :
R.H. RATAGERI
Department of Botany, Govt. Science College, P.G. Centre, CITRADURGA (KARNATAKA) INDIA

SUMMARY

The effect of *Glomus macrocarpum, Glomus fasciculatum* and *Azotobacter* on wheat (*Triticum aestivum* L.) was studied in sterilized soil. Compared to un-inoculated plants, chlorophyll content, height, weight, number and area of leaves of plant and weight were maximum in plants inoculated with *G. macrocarpum, G. fasciculatum* and *Azotobactor* or with *G. macrocarpum* and *G. fasciculatum* or with only *G. macrocarpum*, or *G. fasciculatum*. The levels of root colonization was higher in all AM inoculated plants. There was significant increase in N (3.86%) and P (0.18%) in the plant treated with a combination of *Glomus macrocarpum, Glomus fasciculatum* and *Azotobacter*. The results clearly indicated that compared to individual inoculation, AM fungal species with *Azotobacter* used in combinations were more beneficial for much improved growth of wheat.

Key words : *Glomus mosseae, G. fasciculatum, Azotobacter, Triticum aestivum*, Per cent colonization

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Soil provides the matrix for the biological processes involved in nutrient cycling. Among the biological processes involved in the rhizoplane, the unique role of symbiotic bacteria and the AM fungi which ensure fixation and mobilization, and availability to nitrogen and phosphorous to plants have been well recognized (Marchner, 1995). It is well-established fact that the AM always prefer certain host exhibiting maximum symbiotic response and increase the growth and yield of crop mainly through improved uptake of nutrients (Allen, 1991). A few scientists have observed wide variation among and within different species on AM fungi in their ability to promote plant growth (Read,1996). This led to the concept of host preference by AM fungi (Mosse, 1973). Hence, it is always better to select an efficient AM fungus for a particular host-soil-climate combination to harness maximum benefits. This study was aimed to find the response of *Triticum aestivum* to inoculation of *Glomus macrocarpum*, *G. fasciculatum* and *Azotobacter* in unsterile soil either singly or in combinations. There are some microorganisms which establish symbiotic relationships with different parts of plants and may develop special structures as the site of nitrogen fixation (Lakshman, 2009).

MATERIALS AND METHODS

Present investigation was carried out in sterilized soil of polyhouse during 2006 to 2007 using aromatic plant seedling of *Triticum aestivum*. The soil used for experiment contained organic carbon 0.86%, pH 6.8, available N 0.74%, available P_2O_5 2.8 kg/ha, available 91 kg/ha, Electrical conductivity (EC) was 0.17 ohm^{-1} and native AM spore population averaging 87 spores / 50 g soil. Seedlings used in the experiment were grown on sterile soil and 30 seedlings were transplanted in earthen pots measuring 25 x 15 cm diameter. Soil-root-cultures of *Glomus macrocarpum* and *G. fasciculatum* were cultivated on maize roots using mixture of soil : sand : FYM (1:1:1). The cultures containing clamydospores (96-112 spore/50 g soil) and root segments of maize colonized by particular AM fungus were used as mycorrhizal inoculum. Application of AM inoculum was 129 g soil / plant when single species was used and 5g soil/plant when two species used in combination in soil with seedling roots. *Azotobacter* as per treatment was 10g/ plant. The experiment was arranged in a completely randomized design with five replications. Observations were recorded, 30 and 60 d after planting. Observations such as chlorophyll content, plant height, number of leaves, size of stem and fresh and dry weight of shoot were recorded. The fresh weight of plant and leaves was recorded immediately after harvest. The dry weight was determined after drying the plant at 80^0 C for 48 hrs. The