

Seasonal fluctuation of VAM fungi on six commonly cultivated crops of Dharwad district in Karnataka

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The establishment of arbuscular mycorrhiza (AM) fungi was recorded in six cultivated crops. There was a seasonal fluctuation of AM fungal colonization in root bit and in root length on Jowar, wheat, safflower, sugarcane, pigeon pea and cotton. The root colonization and AMF spore numbers in soil samples not correlated with each other. Results revealed that O.M. and E.C. higher or lower level have no influence on colonization / spore number, on contrary higher P and N concentration in soil reduced root colonization. It shows, the distribution of AM fungi varied with climate and edaphic environments as well as land use patterns among cultivated crops.

Key words : Arbuscular mycorrhizal fungi (AMF), Seasonal fluctuation, Per cent colonization

INTRODUCTION

Arbuscular mycorrhizal (AM) fungi are ubiquitous. In distribution and physiologically are unspecialized. In the soils they occur in the form of chlamydo spores, zygo spores and azygo spores (Tisdall, 1991 and Coleman and Crossley, 1996). Root colonization with AM fungi has resulted in efficient uptake of immobile nutrients such as Phosphorus, Zinc and Copper. Mycorrhizal dependency is the degree to which a plant/crop is dependent on the mycorrhizal conditions to produce its maximum growth or yield (Bhagyaraj, 2006). Therefore, an attempt was made to study the fluctuation of AM fungi is commonly cultivated crops in Dharwad district in Karnataka, by determining the extent of root colonization, spore population and species composition.

MATERIALS AND METHODS

The present research was carried out at five different localities of Dharwad district. Soil samples from the root zone of each crop plant grown in different localities of the sites were randomly collected from zero cm up to a depth of 26cm. Physical and chemical properties of the soil were estimated by standard analytical methods (Piper, 1950; Jackson, 1973). Rhizosphere soil samples with tender roots of plants were collected randomly. The soil sampling was done at three different seasons. Roots were separated, washed, cut in to 1cm segments, cleared in 10% KOH and stained with 0.05% trypan blue (Phillips

and Hayman, 1970). Arbuscular mycorrhization of each plant species was determined by estimating the per cent root colonization (Giovannetti and Mosse, 1980). For AM fungal spore enumeration, 100g of the substrate was dispersed in 1 lit. water. after 15 min. the suspension was decanted through 750µ - 45µ, sieves and the remaining five of the sieves were washed in to beakers. The Supernatant was filtered through Grided filter papers. Each filter paper was spread on a microslide and observed under a dissecting microscope at 45X magnification. The intact AMF spores were counted. The AM fungal spores were picked up with a wet needle and mounted in poly-vinyl alcohol lactophenol on a microslide for identification

RESULTS AND DISCUSSION

A remarkable feature of the major crops examined was the extensive AM Fungal colonization which was frequently very high significantly highest level of AMF colonization was found in the survey in Jowar during monsoon and least root colonization was observed in pigeonpea during winter (Table 1). The sustainable crop line examined from all the localities reflects a well colonized AMF association. This suggests that nutrient or water stress determined the levels of colonization. Percentages of root colonization levels were low and also in roots of safflower and cotton in winter season (Table 2). This is probably because of the dry eutrophic nature of the substrate (Harley and Smith, 1983;

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