An Asian Journal of Soil Science, (June, 2010) Vol. 5 No. 1 : 35-41

Research Paper :

Diversity of AM fungi in different farm soils

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Accepted : *February, 2010*

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ABSTRACT

The present investigation was focused on assessment of AM fungal diversity in different agricultural soils. Soil samples were collected from three different agricultural soils. All the three soil samples were analysed for physico-chemical characteristics (standard method) and diversity of AM fungi. By considering spore wall layers, shape and colour of the spore, 8 different species was observed morphologically in eastern block soil (sandy clay loam) namely, *Glomus clarum, Glomus fasciculatum, Gigaspora decipens, Glomus etunicatum, Glomus mosseae, Glomus viscosum, Scutellospora* sp. and *Glomus geosporum.* Six different AM species were identified from millet breeding station sample (clay loam) as, *Glomus mosseae, Gigaspora margarita, Glomus fasciculatum Scutellospora* sp. and *Glomus geosporum.* From dryland sample (sandy clay loam), six species identified are *Acaulospora* sp., *Glomus mosseae, Scutellospora* sp., *Gigaspora gigantean* and *Glomus albidum.*

Key words : Diversity, Assessment, AM species, Physico-chemical, Agricultural soils

Arbuscular mycorrhizal (AM) fungi form associations with the majority of terrestrial plant species and improve the growth and health of individual plants (Smith and Read, 1997). AM fungi are thought to be the oldest group of organisms living in symbiosis with land plants (Blackwell, 2000; Redecker *et al*., 2000). The fungi involved are in 19 genera and around 210 species belonging to the newly established phylum Glomeromycota (Schubler *et al*., 2001). AM fungi have been shown to have a pivotal role in plant community ecology by altering plant productivity and diversity (Klironomos *et al*., 2000), changing the course of succession (Gange *et al*., 1999), and affecting plant competition (Hartnett and Wilson, 1999). Until recently, AM fungal species were generally assumed functionally similar, so there was little focus on AM fungal diversity (van der Heijden *et al*., 1998) and ecosystem variability and productivity (Hart and Klironomos, 2002) since these are directly influenced by AM fungi diversity, making an accurate assessment of species richness and community composition is crucial to understand the role of AM fungi in ecosystem functioning.

The Vesicular–arbuscular forms are the most common and widely occurring mycorrhizal associations. In fact, it has been suggested that up to 25,000 plant species have potential to form vesicular arbuscular mycorrhiza with representatives largely from crop plants, herbs and tropical trees. These mycorrhizas are agriculturally important and have greater economic significance. These mutualistic associations may result in enhanced survival, nutrient acquisition, reproduction and growth for the component organisms (Smith and Read, 1997). The fungus invades plant root tissues and in general, gains a supply of carbon from the host, vegetative structures of these fungi (*i.e*. mycorrhizae and mycelium in the soil) occur largely under ground and are difficult to be tracked and identified. Identification of biological species in the AM fungi was mostly investigated based on the morphological and developmental characteristics of fungal spores (Morton and Benny, 1990). More than 150 AMF species are described based on their spore morphology (Walker and Trappe, 1993).

MATERIALS AND METHODS

Garden land and dryland field soil samples were collected from three different locations *viz.*, Eastern block, Millet breeding station and dryland having sandy loam and clay loam texture at Tamil Nadu Agricultural University, Coimbatore. From each soil, samples were collected from the top layer at 15-20 cm depth at 3 locations. Samples were pooled together and by quartering method, representative samples were made. Finally these three samples were used for analysis.

Extraction of AM fungal spores:

Spores of AM fungi associated with the respective soil samples were isolated by wet sieving and decantation with slight modifications as described by Gerdemann and Nicolson (1963).

Physicochemical characteristics of the collected soil samples:

Collected soil samples were first analysed for their