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Arbuscular Mycorrhizal (AM) Association of Herbal Flora of Telangana University, Nizamabad (T.S.) India

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Abstract: ***Arbuscular mycorrhizae (AM) are known to enhance plant tolerance to a variety of stresses including, nutrients, drought, metal toxicity, salinity and Pathogens all of which my effect plant stress in a contaminated or polluted soils. A study was undertaken in 5 different plant species (Herbs) of Telangana University, Nizamabad, at different seasons i.e. summer, rainy and winter. VAM fungal species were specific for particular host and season. Some AM fungi were found in restricted to a particular host species, while others could infect a wide range of hosts. More abundant AM fungal species were recognized by relative frequency. A total number of 8 Arbuscular mycorrhizae (AM) were identified. The percentage frequency of Glomus fasciculatum was maximum (88.88%).***

Keywords: AM fungi, Herbs, Telangana University

1. Introduction

A major beneficial component of soil microbial community is mycorrhizal fungus, which contributes to plant growth and survival by reducing stresses through symbiosis (Sylvia & Williams 1992). There are several studies reporting the role of mycorrhizae in stressed habitats. The mycorrhiza very common in distributed areas which indicate their positive role in establishing and building AM in the plant community. AM fungi acts as an extension of host plant roots and serves as a direct link between roots and soil nutrients reserves. AM fungi plays a major role in soil fertility and nutrient acquisition (Karaki and Clark,1998), especially the uptake of phosphorus from the soil, and thereby enhance plant growth (Schenck,N.C and Perz,Y.,1987) and yield, provide greater resistance to plant diseases (Govanetti,M.,andMosses,B.,1980) and increased tolerance to drought(Jamaluddin,Harsh NSK and NathV.1997).The rhizosphere is site of complex interaction between plants and microorganisms, where environmental factors such as soil physico-chemical parameters as well as fertilizers or cultivation practices may have large effect on microbial communities. In India, only during the last decade the interest aroused on the role of AM in rehabilitation of distributed ecosystems (Kumar *et al.* 1999). The present work done to assess the AM association in plants colonizing and growing naturally on various sites of Telangana University compus, Dichpally, Nizamabad District (T.S.) India.

Telangana state is situated on the Deccan plateau in the central stretch of the eastern seaboard of the Indian Peninsula.Telangana is a semi-arid area and has a predominantly hot and dry climate. Summer start in March, and peak in May with average high temperatures in the 42 °C (108 °F) range. The monsoon arrives in June and ends in September with about 755 mm (29.7 inches) of precipitation. A drymild winter starts in late November and ends early February with little humidity and average temperatures in the winter 22–23 °C (72–73 °F) range.

Present paper deals with the study of presence AM in different plants like *Hibiscus rosa sinensis* (*Hibiscus rosa-sinensis* L. and its hybrids (1980)which belongs to Malavacea family,*Senna auriculata* (Martin 1983), (de Silva 1998) is legume tree which belongs to Caesalpinioideae,and this plant is the icon and reflects the culture and tradition of the Telangana State,*Ocimum sanctum*,(Warrier, P K 1995)holy basil is an aromatic plant in the family Laminaceae ,*Parthenium hysterophorus* L. 2015 is a genius of North American shrubs in the sunflower tribe within the daisy family,*Calotropis gigantea*(R.Br.Germplasm resourse information network. United states Department of Agriculture.2003-03-13.)is species of *Calotropis gigantea* native to cambodia,Indonesia, Malaysia, which belongs to the family Apocynaceae.

2. Materials and Methods

To study indigenous species richness and diversity of AM fungi associated with different herbs in rhizosphere soil samples were collected at three different seasons, from different areas of Telangana University campus, Dichpally, Nizamabad District of Telangana State. Total 5 plant species (Herbs) were selected and from each area three replicates of 50g soil together with fine feeder roots were collected in sterile sealed polythene bags. Each sample was labeled with collection details of collection, like sample number, harvesting date location, habitat, type of soil, condition of site etc. Each soil sample was divided into four sub samples for estimation of rhizosphere edaphic features, spore counting, root infectivity and identification of AMspores.

Extraction of VAM fungi from soil:
Large pieces of organic matter and leaves were manually removed from soil samples and stored at 4˚C until further use. Spores were collected from the soil by sieving decanting method followed by density gradient centrifugation and filtering over a gridded ordinary filter paper and counted under a dissecting microscope and expressed as spores per 50g soil sample. Intact spores were picked up using a wet dissecting needle in lactophenol or polyvinyl lactic acid . Spores of AM fungi were identified

according spore morphology and wall character (Trappe, 1982; Scheneck and Perez, 1987; Scheeck, 1982)

Collection of root samples:
The finer feeder roots were collected for mycorrhizal assessment in roots, because these roots are the preferential sites for AM development. Samples were collected from different sites of Telangana University campus. The collected roots were washed even and cut into 1-2cm pieces and stored at room temperature in individual vials containing formalin, acetic acid alcohol (FAA) solution. Clearing and staining of roots was done (Philips and Hayman, 1970). Stained roots were mounted in clear lacto phenol solution on microscopic slide. Percentage of root infection was calculated by using gridline intersecting method (Giovannetti *et. al.,* 1980).

3. Results and Discussion

In present study 5 plants were examined for study of AM association,AM species were recorded in summer ,winter season. SomeAM fungi were specific for some particular host and season. Some species were found in restricted to a particular host species,while others could infect a wide range of hosts. This ability can be attributed to the ability of AM fungi for root colonization and occurrences, their colonization differ to from species to species (Jamaluddin *et al.* 1997). More abundant AM fungi species was recognized by relative frequency (Table no. 1) The percentage frequency of *Glomus Sp.,* and *Glomus fasciculatum* maximum **88.88%**,*Aculospora sp.*,55.55%,*Scutelospora* 22.22%,*Glomus gerdemanni* 16.66% and minimum frequency showed by *Glomus dimorphicum* 22.22%, *Glomus masulosum* 16.66%, *Entrophodpora colombinana* 11.11%.(Harinikumar and Bagyaraj 1988) studied the effect of annual seasons of mycorrhizal colonization and sporulation by native mycorrhizal fungi in Mycorrhizal indica and Leucaena leucocephala and reported that the highest AM population reported in rainy season between June to October whereas a maximum colonization and sporulation occurred during winter November to January months. The result showing that in summer months April to June were unfavorable for colonization of AM fungi. There was a positive correlation between relative humidity and mycorrhizal activity: excessively high soil moisture may substantially reduce the infection by AM fungi(Khan 1972). In present study , we observed that in this summer & winter ,their is a variation in the distribution , root colonization and colonization of AM fungi association in the 5 Herbal plants species.

Table 1: Relative Frequency of VAM Species in Different Host Species

S. No.	*Name of VAM Fungi*	*Total No. of Host plant*	*VAM Fungi Present in Host*	*% of Frequency*
1	*Aculospora* sp.	5	10	55.55
2	*Entrophodpora colombinana*	5	02	11.11
3	*Glomus dimorphicum*	5	04	22.22
4	*Glomus fasciculatum*	5	**16**	**88.88**
5	*Glomus gerdemanni*	5	03	16.66
6	*Glomus masulosum*	5	03	16.66
7	*Glomus* sp.	5	14	77.77
8	*Scutelospora*	5	04	22.22

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