

Association of AM fungi in important Pteridophytic plants of Maharashtra, India.

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Abstract

Four pteridophytic plants were studied for their Arbuscular mycorrhizal (AM) fungal association. All tested plants were distributed in Maharashtra state. The result revealed that all the tested pteridophytic plants (viz. *Equisetum* spp, *Marsilea* spp, *Nephrolepis* spp, and *Adiantum* spp) had AM association in the roots and spore population in the soil. However, maximum root colonization was observed in *Equisetum* spp (96%) where as minimum was observed in *Nephrolepis* spp (28%). *Equisetum* spp (208) showed more spore density where as less in *Adiantum* spp (27). Total 15 AM fungal species were identified and quantified in which *Glomus* spp were dominant followed by *Acaulospora* spp *Sclerocystis* spp and *Gigaspora* spp were found less frequently distributed.

Keywords: AM Fungi, Pteridophytic plants, Root colonization.

INTRODUCTION

Most of the pteridophytic plants are important role in ecosystem, medicines and ornamental. Arbuscular mycorrhizal fungi (AMF) are the symbiotic association with most vegetation types and constitute an important component of the soil microflora (Cardoso and Kuyper, 2006) [13]. AM affect about 80% - 90% land plants in natural agriculture and forest ecosystems (Brundrett, 2002 [15]), AM symbiosis is the most widespread mycorrhizal association type with plants that have true roots i.e Pteridophytes, Gymnosperms and Angiosperms (Read et al 2000[14])

Hence extensive survey was conducted around Osmanabad district in the Marathawada to observe AM fungal association with four pteridophytes.

MATERIALS AND METHODS

Roots and rhizosphere soil samples of four pteridophytes (viz. *Equisetum* spp, *Marsilea* spp, *Nephrolepis* spp and *Adiantum* spp) were collected from three locations around Osmanabad district in Marathawada region of Maharashtra state. The root samples were brought to the laboratory which were then washed in tap water and cut into one cm pieces in length. Root segments were cleared and stained using Phillips and Hayman's (1970) [10] technique. Root colonization was measured according to the Giovannetti and Mosse (1980) [3] method.

Hundred grams of rhizosphere soil sample were analyzed for

spore isolation by wet sieving and decanting method (Gerdmann and Nicolson 1963[4]) and quantification of spore density of AMF was carried out using the method of Gaur and Adholeya (1994) [5]. Identification of AMF species by using the manual for identification Schenck and Perez, (1990) [11] and INVAM (<http://www.invam.caf.wvu.edu>)

RESULT

The result shows that all the test pteridophytic plants (viz. *Equisetum* spp, *Marsilea* spp, *Nephrolepis* spp and *Adiantum* spp) colonized by AMF. Maximum percent root colonization was found in *Equisetum* (96%) more than *Marsilea* (74%) *Nephrolepis* (25%) and *Adiantum*(58%) where as minimum percent root colonization was found in *Nephrolepis*(28%). Hyphal vesicular and arbuscules colonization were found in roots of different tested pteridophytic plants. Hyphae and Arbuscules were almost common in all tested plants.

Maximum number of spores were found in rhizosphere soil of *Equisetum* (208/100 gm soil) followed by, *Nephrolepis* and *Adiantum*. Minimum numbers of spores were recorded in rhizosphere soil of *Adiantum* (27/100 gm soil). Total four genera were represented of AMF i.e *Acaulospora*, *Gigaspora*, *Glomus* and *Sclerocystis*. Highest number of AM fungal genera were associated with *Equisetum* (3) and *Nephrolepis* (3) while the lowest number of AM fungal genera was recorded in *Adiantum* (1) and *Marsilea* (1).

Total 15 numbers of AM fungal species were found from four test pteridophytes. Maximum number of species were found in *Equisetum* spp (9) where as minimum number of species were found in *Marsilea* spp (2) Among 15 AM fungal species *Glomus* spp was dominant with all the four tested plants where as *Gigaspora* spp was less distributed.

DISCUSSION

The occurrence of AMF in pteridophytic plants has reported

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earlier by Copper (1976), Berch and Kendrick (1982) [1], Harley and Harley (1987) [7], Gemma et al (1992) [6] and in India Mishra et al (1980) [8], Ragupathy and Mahadevan (1993) [12]. Recently Muthukumar and Udaiyan (2000) [9] have reported the occurrence of AMF in pteridophytic plants from India. The result obtained from the study suggests that the colonization percentage, number of spores differ with different four pteridophytic plants. Among the *Glomus* spp was found much more frequent than other genera. The highest number of AM spores in rhizosphere soil and infection in the roots of *Equisetum* spp indicated that these plant species might be considered good host.

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