International Journal of
Life Sciences
International Peer Reviewed Open Access Refereed Journal

Special Issue A 9: January 2018
UGC Approved Journal No 48951

Original Article Open Access

VAM association in some Ferns of Bhiwandi Maharashtra

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Manuscript details:

Available online on
http://www.ijlsci.in

ISSN: 2320-964X (Online)
ISSN: 2320-7817 (Print)

Editor: Dr. Arvind Chavhan

Cite this article as:
Jain Ritu L (2018) VAM association in some Ferns of Bhiwandi Maharashtra, *Int. J. of. Life Sciences*, Special Issue, A9: 117-119.

ABSTRACT

Studies carried out in Adiantum and Pteris for Arbuscular Mycorrhizal fungal (AMF) colonization. These fern taxa were collected from Bhiwandi, Maharashtra. Investigation reveals that the root of these ferns has Vesicular Arbuscular Mycorrhiza. Mycorrhizal association is also affected by seasons, it is maximum in winter season and minimum in rainy season.

Key words: Adiantum, Pteris, VAM, Ferns

INTRODUCTION

Vesicular arbuscular muycorrizal association between fungi hyphae belonging to glomates (Zygomycota) and roots of plants. The fungi involved are non pathpogenic and now have been reported to enhance growth of the host plant. These fungi help in mineral transport especially phosphorous to the plant and in return gets photosynthetic sugar from the latter (Varma and Schuepp 1995). Aids in soil aggregates formation (Foster and Nicolsen 1981, Clough and Sulton 1978) and provides method for nutrient exchange between roots of non-related plant species.

Though systematic investigation of many Pteridophytic floras have been carried out by Boullard (1957), Cooper (1976), Berch and Kendrick (1982), Harley and Harley (1987) and Gemma *et al*. (1992) but only a little is known about the mycorrhizae in Indian Pteridophytes (Mishra *et al*. 1980, Raghupathy and Mahadevan 1993, Muthukumar and Udaiyan 2000, Prasher *et al*. 2006 Prasher and Baghla 2007).

Thus, the purpose of the present study is to investigate the presence of AMF association in some common lithophytic Pteridophytes of Bhiwandi, Mumbai. These pteridophytes are *Adiantumcapillus-veneris* L., *Adiantumincisum forssk*, *Adiantumphilippense* L and P*terisvittata* L. which

usually grows on derelict house and dilapidated walls. This study was also carried out to note the type of arbuscular mycorrhizal colony formed, seasonal fluctuations in the formation of vesicles and Arbuscules.

MATERIALS AND METHODS

Material for the present study were collected from Bhiwandi Maharashtra during different season of the year. The cleaning and staining of roots was done according to Phillips and Hayman (1970) as follows: Root segments were heated at 90c for about two hours in 10% KOH. Thicker roots were heated for 3 hours. Cleared roots were then rinsed in distilled water and acidified with N/10 HCL. For about 3-5 minutes and stained by simmering for five minutes in 0.05% Trypan blue in Lactophenol. After staining root segments were mounted in lactophenol. A slight pressure on converslip flattened the roots for investigation. The colonization levels in roots was studied under the microscope and present VAM colonization was calculated following Nicolson (1960).

$$\text{\% of root colonization} = \frac{\text{No. of Segments with VAM}}{\text{Total No. of Segments}}$$

Mycorrhizal infections were scored according to the percentage of root length containing vesicles and arbuscular.

RESULTS AND DISCUSSION

Formation of vesicles, arbuscules and spores within the roots. The number of these mycorhizal structures varied for different species in different seasons and shown in Table-I. The vesicle was large in size and oval to round in shape. The arbuscules were fully matured. Percentage of root colonization for any species was maximum in winter and minimum in rainy season.

AMF root colonization of Pterisvitatta was 79% in winter 40% in summer and 15% in rainy season and this variable trend of AMF *root* colonization were also noted in other members highest Percentage of arbuscules was noted in *Pterisvitatta L* followed by *Adiantumcapillus-veneris* L in winter month while lowest record of arbuscules was met in A. capillus-veneris L (6%) followed by *A. incisum* (7%) in rainy season. Colonization Percentage of vesicles was higher in winter season but there was no vesicle in *A. phillipense* during Rainy season. and in *Pterisvittata* during summer season. The presence of VAM colonization suggests that majority of vascular plant in a natural Ecosystem have Mycorhizal association. The presence of Mycorhizal association is depend on various Factors like Seasons (Muthukumar and Udaiyan, 2000).

Table-1: Percentage infection of VAM and formation of Vesicles and Arbuscles in roots of different species of Ferns.

Sr. No	Plants	% Infection	*Seasons*	*% of Arbuscle*	*% of Vesicle*
1	Adiantumphillipense	81	Summer	42	2
			Rainy	14	0
			Winter	45	8
2	A.capillusveneris	80	Summer	14	13
			Rainy	6	8
			Winter	51	16
3	A.incisum	75	Summer	26	7
			Rainy	7	2
			Winter	45	10
4	Pterisvittata	79	Summer	28	0
			Rainy	15	4
			Winter	50	18

Conflicts of interest: The authors stated that no conflicts of interest.

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