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SHORT COMMUNICATION

Isolation and Identification of *Arbuscular Mycorrhizal* fungi in the Rhizosphere of the fern *Adiantum capillus-veneris.*

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ABSTRACT
Diversity and species compostion of Arbuscular myocrrhizal fungi were investigated in the rhizosphere of fern Adiantum capillus-veneris. After analysis it is concluded that a total of 8 species of AM fungi linked to 4 genera (Glomus, Acaulospora, Gigaspora and Sclerocystis) were isolated. Glomus and Acaulospora were the most frequently detected generas of AM fungi. These findings indicate that Adiantum capillus-veneris is prosperous in AM fungal diversity. So AM fungi act as an alternative ecofriendly agent to application of synthetic fertilizer for improving this medicinal fern.
Key words*- AM fungi, Glomus, Acaulospora, Adiantum capillus-veneris, ecofriendly agent*

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INTRODUCTION

Mycorrhiza is the resultant structure of a relationship between fungi and roots of plants [1]. The fungus forms the structure called arbuscule, branched finger like hyphae, work as absorptive organ and characteristic vesicles, are the terminal swellings of hyphae, having a storage function. There are six generas of Endogenaceae family named- *Glomus, Gigaspora, Acaulospora, Sclerocystis, Entrophospora* and *Sclerocystis*. These generas are identified by their spores and *sporocarps* present in the root and rhizospheric soil [2, 3].

The herb *Adiantum capillus-veneris Linn* (Maidenhair fern) belongs to the *Pteridaceae* family. In medical and pharmacy textbooks of Iranian Traditional Medicine, it is referred to as "Pare-siavashan." Ancient physicians used Maidenhair fern fronds as a single medicine or in conjunction with other plants in multi-herbal formulations to treat a variety of diseases [4]. The herb fronds were also evaluated for their various pharmacological effects due to their distinct chemical compositions. Because of the benefits of *mycorrhizal* symbiosis, the use of AMF has become a common tool for sustainable agriculture [5].

Material and Methods

Study site and sampling

Soil samples were collected from Mount Abu, Sirohi (Rajasthan). They were packed in polythene bags and stored at 4 C until processing.

Isolation of AM fungal spore, Enumeration and Identification- 100 gms of rhizospheric soil samples were analyzed for spore isolation by the technique known as Wet Sieving and Decanting method proposed by Gerdmann and Nicolson, 1963. Soil samples was poured in 1000ml of water beaker, stir it gently with glass rod, allow the heavier soil particles to settle down. The suspension was passed through sieve series, each sieve plate was washed and washings were collected in beaker. Later on spores are picked up by needle on a glass slide with a drop of glycerol. Subsequently spores were identified by the key Morton and Benny (1990).

Estimation of AMF colonization

Collected root samples brought to the laboratory and washed in tap water, boiled at 90 C for 1-2 hours in KOH solution and rinse the root segments in tap water then acidifying the root segments in 0.25 % HCl in test tube for 3-4 min. and pour off the solution. These acidified root pieces are stained overnight in 0.05% trypan blue. Mount the root pieces in PVLG and observed under microscope. Stained fungal structures are easily identified [6, 7].

$$\% \text{ root colonization} = \frac{\text{No. of mycorrhizal positive root segments}}{\text{Total no. of root segments observed}} \times 100$$

AMF diversity- The AM fungi isolated in the soil samples of fern *Adiantum capillus veneris* included species of *Glomus, Acaulospora, Gigaspora* and *Sclerocystis*. Two dominant and frequently occurring indigenous AM fungal species namely *G. mossaeae* (Nicol. & Gerd.) and *Sclerocystis rubiformis.*

RESULTS

Table. 1. Coordinates of sampling areas-

S. no.	Sampling sites	Latitude	Longitude
1	Sun set point	24°36'01.5"N	72°41'47.0"E
2	Toad rock	24°35'44.5"N	72°42'43.2"E
3	Gau much	24°34'13.8"N	72°42'26.3"E
4	Near Lakki lake	24°35'44.5"N	72°42'16.8"E

Table 2. Association of different AM fungal species associated with *Adiantum capillus veneris*

S. no.	Site	Associated AM fungal species
1	A	*Glomus constrictum, G. fasciculatum, G. mosseae , Sclerocytis rubiformis, Scl. Ceremioides*
2	B	*G. fasciculatum, Scl. Rubiformis*
3	C	*G. fasciculatum, G. mosseae, Scl. rubiformis, Scl. ceremioides, Gigaspora margarita, Acaulospora laevis*
4	D	*Acaulospora foveata, A.mellea G.fasciculatum, Sclerocytis rubiformis*

Table 3. % Root colonization of AM fungi and Spore count per 100 gm soil.

Sites	% Root colonization of AM fungi	Spore count per 100 gm soil
A	67.3	112
B	45.2	86.3
C	78.6	120.3
D	39.1	45.6

DISCUSSION

The current study looked at AM colonization with the medicinal fern in Mount Abu. Based on the findings, we may infer that AM fungi have a diverse biodiversity, with Glomus being the most common and frequently occurred genus among AM fungi.

CONCLUSION

The present investigation forms a platform for further research directs screening and studies of appropriate AM fungal species which can be used as a biofertilizer agent for this medicinal fern. In the observation we concluded that *Glomus* and *Acaulospora* fungal species are the appropriate fungal biofertilizer for increasing the productivity of this medicinal fern.

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