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ORIGINAL ARTICLE **OPEN ACCESS**

Assessment of Arbuscular Mycorrhizal Fungi and Soil Characterization of *Caralluma fimbriata* Wall.

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ABSTRACT
Arbuscular mycorrhiza (AM) is an important biofertilier in nature which is most widely commercially exploited in agriculture/forestry. The present experimental work occurrence of Arbuscular Mycorrhizal Fungi (AMF) was reported from the rhizosphere of the Caralluma fimbriata growing site in Satara District of Maharashtra in India. The rhizosphere soil was collected and used saplings of Caralluma Fimbriata for a period of the vegetative growth phase of plants i.e. after 40 days. The species was studied with isolation of the AM fungal spores from the rhizospheric soil. The spores occurred in the soil after 40 days period. Ten AMF species belonging to three genera viz. Glomus, Aculospora, and Sclerocystis were identified on the basis of morphological studies. The occurrence of AMF species was showing fungal hyphae, with globose and subglobose structures. Among Glomus geosporum, Glomus intraradices, Acaulospora, and Sclerocystis genus was found but Glomus was found dominant
Keywords*: Arbuscular Mycorrhiza, Caralluma fimbriata, Glomus, Acaulaspora, Sclerocystis.*

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INTRODUCTION

From the family Asclepiadaceae *Caralluma fimbriata* is a most popular, edible succulent cactus from India that belongs to the Milkweed family, in Marathi named as 'Makad Shenguli' also called as a 'famine food' and thirst quencher when other sources of nourishment are in poor supply or absent. It grows interior, as well as roadsides. Its part is used for helping suppress appetite during long hunts. In last decades, people have been studied nature particularly plants, about new drugs, and this has resulted in the use of more medicinal plants with uninfected properties to treat various diseases [1]. About 1/3rd of the population of world depends on traditional medicines for primary remedy, most of which involve the use of plant extracts. Major plant communities are being inexorably converted to disturbed ones [2], suggested for an ever-increasing understanding of the mechanisms that use in natural ecosystems so that disturbing ones may be managed to restore and stabilize the environment [3,4]. Contribution of some factors that to the fragility of arid ecosystems, such as limiting water, nutrient, and temperature conditions [5,6] are recognized. Soil microbes are well recognized with [7,8], if their role in soil formation, plant establishment, and plant-community structure has been recognized. *Caralluma fimbriata* grows in alkaline soil and rocky area. The rhizosphere layer of soil inhabited by morenumber of microorganisms. Different types of activities carry out with these microorganisms, which are more beneficial to plants and organisms, so they live with plants in symbiotic association [9]. Mycorrhizal Association is the most prevalent and widespread type of association. In the rhizosphere maximum Arbuscular Mycorhiza strains are concentrated [10]. In the present research work screening of soil samples was carried out ingrown field of Satara District of Maharashtra state. Some AM fungal taxa belonging to 3 genera were isolated from *Caralluma fimbriata*. Some AM fungi form in temperature ranging from 18^0 C to 40^0 C with the optimum for most fungal host species higher temperature. Temperature controls the fungal germination, photosynthesis, and carbon flow to roots helpful for optimal range for the intact symbiosis. However, theeffect of temperature on arbuscular mycorrhizal plants is change and appears related to the perfect fungal host species combination as well as the growth stage of the plant. Spores of VAM fungi differ in their optimum germination relation with temperatures [11]. The aim of research work is assessment of Arbuscular Mycorrhizal fungi and soil characterization of *Caralluma fimbriata* are undertaken.

MATERIAL AND METHODS

Collection of soil samples: -

The rhizosphere soil samples were collected from area of Satara district of *Caralluma fimbriata*. In sterile polythene bags this rhizosphere soil were collected from the depth of 15cm with sterilized widger after 40 Days period [12].

Estimation of VAM fungal spores: -

Vescicular Arbuscular mycorrhizal fungal spores were collected from soils (Wet seiving& decanting method) were observed under stereo zoom microscope. The characters assessed for identification with the presence of Sporocarp, Size, Shape, colour of spores, wall thickness and septa. The mounted spores with (PVLG) and sporocarps were micro photographed in the laboratory and prepare permanent slides of fungal spores.

Process of root samples:

Under tap water the root samples were washed thoroughly, cut it in randomly 1 cm and cleared in 10 % KOH for 1 h at 90 ℃, acidified with 1 % HCL and stained with trypan blue (Philips and Hayman, 1970). AMF colonization was examined using stained root samples were mounted and observed under microscope with slides in lactoglycerol. Root segments with mycorrhizal colonization in the form of arbuscules, vesicles and hyphae in 100 root segments from each plant species were examined using the magnified intersect method [13].

RESULT AND DISCUSSION

Mycorrhizal spores in rhizosphere soils of *Caralluma fimbriata* were isolated by wet sieving and decanting method [14]. It was an estimated method [15. Results were observed in the observation table1 and Fig no.1. Nine AM species were recorded in *Caralluma fimbriata* from rhizosphere soil. In general, all data showed a gradual increase parallel to the increase in plant age as 20, 40, and 60 days of plant growth. The highest (47 %) percent root colonization found in 60 days plant while lowest (33%) recorded at 40 days plant. No of AM spores were recorded at increasing order (56, 64, and 73) at 20 to 40 accordingly ingrown plants. In this study highest qualitative characters, Extrametrical Hyphae, arbuscules and vesicles were observed in 40 and 60 days plants. Table no 1 and Fig.no1. The occurrence of AM species was depicted in 30 to 60 days plant are *Glomus geosporum, Sclerocystis* Species, *Acaulospora delicate, Glomus intra radices Acaulospora spp, Acaulospora laevis, Acaulospora alpina*, *Acaulospora sirverdingii Acaulospora dilatata.*

The response of growth is recorded with uptake of phosphorus content in *Phyllanthusemblica*L.. Most of the results attributed that the host plants had much more effect on the spore population. The number of spores also found variable with the growing season of the host plant. The studies carried out indicated the maximum spore abundance at the end of harvesting period. This assessment was performed collectively and individually on all medicinal plants. Fungal population and diversity affecting with Soil pH, organic content, and water are the main factors. After 60days found the highest AM population. Climatic factors, soil type affects the seasonal variation in spore's population nutrients status of growth, and metabolic activities of plants in tropical forests [12-14].

Table1. Quantitative and qualitative characters of AM fungi associated with *Caralluma fimbriata* wall.

	Quantitative Characters		Qualitative Characters			
Days	% root colonization	No of AM spores in 50g soil	Extrametrical Hyphae	Arbuscules	Vescicles	AM species occurred
20	37	56	+	--	+	*Glomus geosporum Sclerocystis Species Acaulospora delicata*
40	33	64	++	++	+++	*Glomus intra radices Acaulospora spp. Acaulospora laevis*
60	47	73	+++	+++	+++	*Acaulospora alpina Acaulospora sirverdingii Acaulospora dilatata*

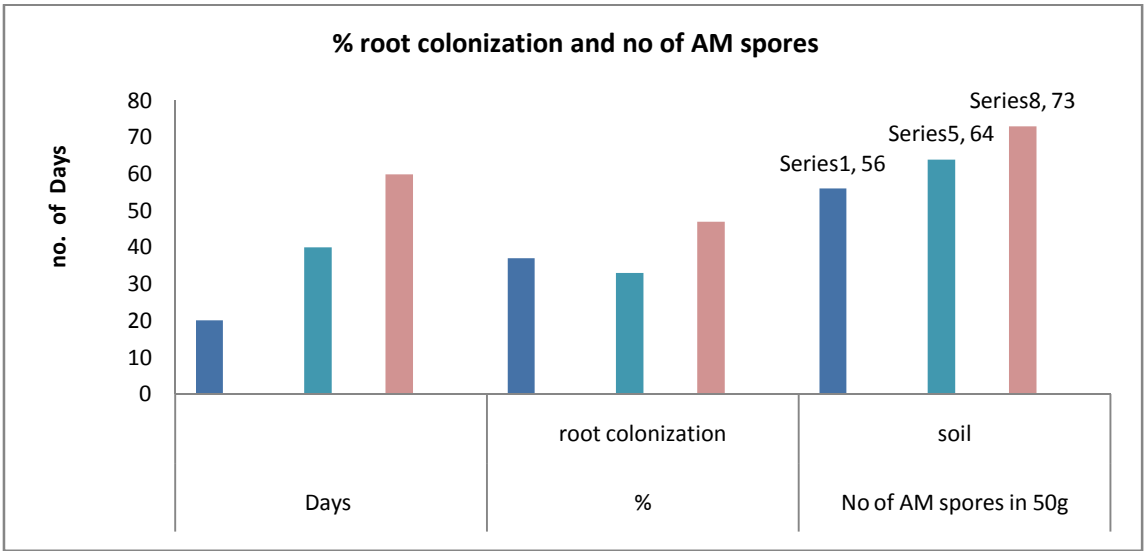

Fig. no. 1. Quantitative and qualitative characters of AM fungi associated with *Caralluma fimbriata* wall.

CONCLUSION

Supply of FYM and Phosphorus every time to Plant improved NPK and protein content of crop and maintain soil fertility. Cultivation of medicinal plant with ought phosphorus fertilization drastically decreases available P status of Soil. AM fungi are the best option for chemical fertilizer.

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