World Journal of
Current Scientific Research

Journal Homepage: www.wjcsr.com

Arbuscular Mycorrhizal Fungi in *Capparis zeylanica* plants of Maharashtra, India

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ARTICLE INFO

Keywords:
AM fungi
Capparis zeylanica
Root colonization

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ABSTRACT

The objective of the present study was to investigate the extent of AM Association in *Capparis zeylanica* plants around Osmanabad, Beed, Jalna, and Aurangabad in Marathwada region of Maharashtra. The result showed that all the different sites of *Capparis zeylanica* plants had AM fungal association in the roots and spore population in the rhizosphere soil. Maximum percent root colonization of AM fungi was observed in Osmanabad sites (75 %) followed by others, while minimum in Beed sites (20%). Osmanabad sites (160) showed more spore density whereas less observed in Beed sites (60). Total five genera of AMF were identified up to species level in which *Acaulospora spp* and *Glomus spp* were found dominate followed by, *Sclerocystis spp*, *Entrophosphora spp* and *Gigaspora spp* were found poorely distributed. Highest numbers of AMF species were found in Osmanabad sites (09) while the lowest number of AM fungal species was recorded in Aurangabad sites (03).

1. Introduction

Arbuscular mycorrhizal fungi (AMF) establish symbiotic associations with most terrestrial plants. AMF are soil microorganisms that form a symbiotic relationship with 80–90% of vascular plant species and 90% of agricultural plants (Smith and Read, 2010).

Capparis zeylanica L. belongs to the family Capparidiaceae and commonly known as Waghata. It is a thorny, climbing, woody shrub distributed throughout the greater part of India. The bark of the root is used in the indigenous system of medicine as bitter, cooling, sedative, stomachic and antihidrotic. Whole plant showed the presence of saponin, p-hydroxybenzoic, syringic, vanillic, ferulic and p-coumanic acid. Leaves and seeds showed presence of β-carotene, thioglycoside, glycocapparin, n-tricortane, α-amyrin and fixed oil whereas root bark showed presence of an alkaloid, a phytosterol, a water soluble acid and a mucilaginous substance (Selvamani et al., 2010; Padhan et al., 2010). The roots of *C. zeylanica* were reported to have antibacterial, antioxidant activities, it also found to act as endothelin receptor antagonists (Duke, 2000). It is also reported to possess anti-inflammatory and analgesic activity in its root. (Chaudhary et al., 2004; Upaganlawar et al., 2008).

Hence a study was conducted to obtain information on AM fungal status of *C. zeylanica* plants around Osmanabad, Beed, Jalna, and Aurangabad in Marathwada region of Maharashtra.

2. Materials and Methods

Rhizosphere soil and roots sample were collected from each plant in three replications. Root samples were brought to the laboratory which were then washed in tap water and cut in to 1 cm pieces in length. Root samples were cleared and stained using Phillips and Hayman (1970) technique. Root colonization was measured according to the Giovannetti and Mosse (1980) method. Hundred grams of rhizosphere soil samples were analyzed for their spore isolation by wet sieving and decanting method Gerdemann and Nicolson (1963). Identification of AM fungal species was done by using the Manual for identification by Schenck and Perez (1990).

3. Results and Discussion

C. zeylanica along with their AM fungi characterizations are presented in the Table 1. The result shows that, all the tested

Cite this article as Prakash. P. Sarwade, Kavita N. Gaisamudre (Sarwade) and Vikas P. Sarwade 2021. Arbuscular Mycorrhizal Fungi in *Capparis zeylanica* plants of Maharashtra, India. World J.Cur. Sci. Res.,1(3):191-193.

Table 1. Percent root colonization and spore population in *C. zeylanica*

Sr No.	Location	Colonization (%)*	Types of colonization	Spore population *	AM fungal Species
1	Jalna	55	HV	72	*A. scrobiculata,* *A thomii,* *E. hexagoni,* *G. ambisporum,* *G. intararadices.*
2	Beed	20	H	60	*E. hexagoni,* *G. mosseae* *G. austral,* *Sc. sinuosa.* *Gi.albida*
3	Osmanabad	75	HV	160	*Sc. leptoticha,* *A. scrobiculata,* *G. multicaule,* *G. intraradices,* *G. geosporum,* *G. flavisporum,* *G. fasciculatum,* *S. pellucida* *Gi.margarita*
4	Aurangabad	60	HV	70	E. hexagoni, G. multicaule, G. constrictum

*Mean of three samples; H-Hyphae; V-Vesicular, A-*Acaulospora,* E-*Entrophosphora,* G-*Glomus*
Gi- *Gigaspora, Sc.-Sclerocystis.*

plants were colonized by AM fungi. Maximum percent of colonization were found in Osmanabad sites (75 %) than other three sites whereas, minimum percentage was found in Beed sites (20%). Hyphal and vesicular types of colonization were found in roots of different *C. zeylanica* plants. Maximum numbers of spores (160) were observed in rhizosphere soil of Osmanabad sites than Beed, Jalna, and Aurangabad sites.

Total five genera were observed *viz. Glomus spp, Acaulospora spp*, *Sclerocystis spp*, *Entrophosphora spp* and *Gigaspora spp*. Highest number of AMF species were found in Osmanabad sites (09) while the lowest number of AM fungal species were recorded in Aurangabad sites (03). Among five AM fungal species *Acaulospora spp* and *Glomus spp* was dominant whereas *Sclerocystis spp*, *Entrophosphora spp* and *Gigaspora spp*. were poorely distributed. Deepak et al., (2007), Sanjay, (2008), Prakash et al., (2012), Sharada and Rodrigues, (2008) reported that *Glomus* species was dominant and recovered from all the study sites.

4. Conclusion

Mycorrhizal spores in rhizosphere soil and root colonization of *C. zeylanica* indicated that these plant species might be considered good host for AMF under natural conditions. Studies on distribution and mycorrhizal status of plants should enable us to understand the influence of these mycobionts on plant species and distribution.

Conflicts of Interest

The author declares that there are no conflicts of interest.

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