



MYCORRHIZAL STATUS OF SOME PLANTS OF THE EUPHORBIACEAE FAMILY IN SOLAPUR, MAHARASHTRA



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ABSTRACT:

A survey of the arbuscularmycorrhizal (AM) status of sixty plants belonging to family Euphorbiaceae were studied for their AM association during growing in the Barshi, District Solapur, Maharashtra of India. The result showed that all the plants (*Viz. Acalypha indica, Chrozophora prostrata, C.rottleri, Croton bonplandianum, Euphorbia geniculata, E. caducifolia, E. dracunculoides, E. hirta, E. laciniata, E. prostrata, E. pulcherrima, Jatropha curcas, J. glandulifera, J. gossypifolia, Phyllanthus acidus and P. amarus*) had AM fungal association in the roots and spore population in the rhizosphere soil. However, maximum root colonization was observed in *J. curcas* (94%) where as minimum in *C. rottleri* (35%). *J. curcas* (309) showed more spore density where as less in *C. rottleri* (20). AM fungal spores belonging to *Acaulospora, Gigaspora, Glomus, and Scutellospora* were

recorded. Among AM fungal species *Acaulosporaspp* were found dominant followed by *Glomus*spp, *Scutellosporasp* and *Gigasporasp* were found poorly distributed.

KEY WORDS: AM Fungi, Root colonization, Euphorbiaceae family.

INTRODUCTION :

Mycorrhiza is a mutualistic association between fungi and higher plants (1). Frank (2) coined the term mycorrhizae. The term 'mycorrhiza' in its broadest sense is the non-pathogenic association of fungi and the roots of higher plants. The root-fungus association is symbiotic and the whole association is being considered as a "functionally distinct organ" involved in mineral nutrient uptake from the soil (3).

Euphorbiaceae is large and extremely variable family which includes 300 genera and 5,000 species, cosmopolitan in distribution except in the Arctic region but they are most abundant in the tropical regions. In India the family is represented by about 61 genera and 336 species mostly in the tropical and subtropical Himalayas and the mountains of South India. Some members of this family (Viz. *Acalypha indica*, *Chrozophora prostrata*, *C. rottleri*, *Croton bonplandianum*, *Euphorbia geniculata*, *E. caducifolia*, *E. dracunculoides*, *E. hirta*, *E. laciniata*, *E. prostrata*, *E. pulcherrima*, *Jatropha curcas*, *J. glandulifera*, *J. gossypifolia*, *Phyllanthus acidus* and *P. amarus*) are multipurpose plant species commonly found in Maharashtra state. Hence a study survey was conducted in Solapur district, where the plant is grown throughout the year to observe AM fungal genera that are associated with sixty plants.

MATERIALS AND METHODS

Solapur district lies between 17°1' to 18°32' north latitudes and 74°42' to 76°15' east longitudes and is located entirely in the Seena basin. Barshi Talukais one of the 11 tehsils headquarter of Solapur District in the Indian state of Maharashtra. This tehsil occupies the Northeast corner of the district and is bordered by Osmanabad District to the north and east, Madha Taluka to the west, Mohol Taluka to the southwest and North Solapur Taluka to the south.

Collection of different plants with their roots and soil were done randomly around Barshi tehsil which in three replications. Root samples were washed in tap water and cut in to one centimeter pieces in length. Root samples were cleared and stained by using Phillips and Hayman (4) technique. Root colonization was measured according to the Giovannetti and Mosse (5) method. Hundred grams of rhizosphere soil samples were analyzed for their spore isolation by wet sieving and decanting method Gerdmann and Nicolson, (6). Identification of AM fungal genera up to species level by using the Manual for identification Schenck and Perez (7).

RESULTS AND DISCUSSION

Plant species along with their arbuscular mycorrhizal (AM) fungi characterizations are presented in the Table 1. All the tested plants were colonized by AM fungi. The percentage of colonization was highest in *J. curcas* (94%) than other plants whereas, lowest percentage found in *C. rottleri* (35%). Hyphal and vesicular types of colonization were found in roots of different plants. Hyphae were almost common in all tested plants. Maximum number of spores (309) was observed in rhizosphere soil of *J. curcas*. Minimum number of spores (20) was observed in rhizosphere soil of *C. rottleri*. Total four genera were observed viz., *Acaulosporasp*, *Glomus*spp, *Scutellosporasp* and *Gigaspora* spp. Highest number of AM fungal genera and species were associated with *J. gossypifolia* while the lowest number

was associated with *C.bonplandianum*. Among AM fungal species *Acaulosporaspp* were found dominate followed by *Glomusspp*, *Scutellosporasp* and *Gigasporasp* were found poorely distributed.

AM association are the most frequent symbiosis found in nature because of their broad association with plants and cosmopolitan distribution (8).Occurrence of AM fungi in Euphorbiaceae plants has reported earlier by MohanandNatrajan (9), Raja et al., (10), Raghupathy et al., (11), Parmeshwaran et al., (12).Recently, Mulaniand Prabhu (13) and Sandhya et al., (14) reported the occurrence of AM fungi in Euphorbiaceae plants from India.

AM spore population also showed variation in the rhizosphere soil selected plants (Table no. 1). Variations of spore number have been reported recently by Sarwade et al., (15) recorded difference in spore numbers between plant species.

Present study revealed the occurrence of four AM fungal genera viz. *Glomus*, *Acaulospora*, *Gigaspora* and *Scutellospora*. *Acaulospora* were the most dominant plants growing in soils of Barshi,taluka.Recently it has been confirmed by Sarwade et al., (15). It contrast with the Prakash et al., (16) reported that *Glomus* species was dominant.

The root colonization by AM fungi is a dynamic process.The result obtained from the present study suggest that, all the test plants showed good colonization. However, percent root colonization varied from plant to plant (Table no.1).Variations in extent medicinal plant species were observed and confirm earlier findings of Muthukumar and Udaiyan, (17) in their studies on arbuscularmycorrhizas of plants growing in Western Ghat region of Southern India reported variation in colonization levels in various plant species.

The study suggests that the colonization percentage and number of AM fungal spores differ with different sixty plants.Highest number of mycorrhizal spores and root colonization of *Jatropha curcas* indicated that these plant species might be considered good host for AM fungi under natural conditions. Therefore, here concluded that, occurrence or distribution of AM fungi varies with host ranges. Studies on the distribution and mycorrhizal status of plants should enable us to understand the influence of these mycobionts on plant species diversity and distribution.

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Table1. Percent root colonization and spore population in plants of Euphorbiaceae.

Sr No.	Plant species	* Colonization (%)	Types of colonization	* Spore population	AM fungal genera
1	<i>Acalypha indica</i> L.	48	H	57	<i>Glomus</i> spp <i>Acaulosporas</i> spp
2	<i>Chrozophora prostrata</i> Dalz.	64	H	80	<i>Glomus</i> spp <i>Acaulospora</i> spp <i>Gigaspora</i> spp
3	<i>Chrozophora rotteri</i> (Geis.) Juss. Ex Spreng.	35	H	20	<i>Glomus</i> spp <i>Acaulosporas</i> spp
4	<i>Croton bonplandianum</i> Baill.	87	HV	281	<i>Acaulosporas</i> spp
5	<i>Euphorbia geniculata</i> Orteg.	53	HV	134	<i>Glomus</i> spp <i>Acaulospora</i> spp <i>Gigaspora</i> spp
6	<i>Euphorbia caducifolia</i> Haines	87	HV	142	<i>Glomus</i> spp <i>Acaulosporas</i> spp
7	<i>Euphorbia dracunculoides</i> Lamk.	56	HV	184	<i>Glomus</i> spp <i>Acaulosporas</i> spp
8	<i>Euphorbia hirta</i> L.	85	H	138	<i>Glomus</i> spp <i>Acaulosporas</i> spp
9	<i>Euphorbia laciniata</i> Panigrahi	34	H	84	<i>Glomus</i> spp <i>Acaulosporas</i> spp
10	<i>Euphorbia prostrata</i> Ait.	65	HV	93	<i>Glomus</i> spp <i>Acaulospora</i> spp <i>Gigaspora</i> spp
11	<i>Euphorbia pulcherrima</i> Willd. ex Klotzsch	38	HV	234	<i>Glomus</i> spp <i>Acaulosporas</i> spp
12	<i>Jatropha curcas</i> L.	94	HV	309	<i>Glomus</i> spp <i>Acaulospora</i> spp <i>Gigaspora</i> spp
13	<i>Jatropha glandulifera</i> Roxb.	89	HV	145	<i>Glomus</i> spp <i>Acaulosporas</i> spp
14	<i>Jatropha gossypifolia</i> auct.	38	HV	163	<i>Glomus</i> spp <i>Acaulospora</i> spp <i>Gigasporas</i> spp <i>Scutellosporas</i> spp
15	<i>Phyllanthus acidus</i> (L.) Skeels	54	HV	183	<i>Glomus</i> spp <i>Acaulosporas</i> spp
16	<i>Phyllanthus amarus</i> Schumacher & Thonn.	57	H	138	<i>Glomus</i> spp <i>Acaulosporas</i> spp

*Mean of three samples, H- Hyphae V- Vesicular