



# Occurrence of AM fungi associated with xerophytes from Ghodnadi area of Pune District

Kokare A. D and Shinde B.P

Department of Botany, Fergusson College Pune (MS) India.

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## ABSTRACT

An attempt has been made to survey biodiversity of arbuscular mycorrhizal (AM) fungi associated with five xerophytes from Ghodnadi area Dist. Pune, Maharashtra. The xerophytes surveyed were *Argemon Mexican*, Linn., *Aristolochia bracteata*, Rrtz., *Chlorophytum tuberosum*, Baker., *Scilla indica*, Baker., *Tribulus terrestris*, Linn., Soil samples and roots of these plants were collected from four different localities. Five genera with twenty one species were reported from Ghodnadi area. The genus *Glomus* was dominant with 13 species. It was followed by *Acaulospora* with 4 species, two species of *Scutellospora* were reported. Whereas one species each of *Gigaspora* and *Sclerocystis* was reported from above area. The maximum number of AM propagules per 100 gm soil was 1980 and minimum was 4 per 100 gm soil. The percentage root infection was ranging between zero and 90 percent.

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## Introduction

Mycorrhizae form a mutualistic symbiotic (non-pathogenic) association between soil borne fungi and roots of higher plants (Sieverding, 1991.). This positive association with plants may have facilitated the development of land plants (Simon *et. al.*, 1993). It has been observed that the presence of AM fungi increases the overall absorption capacity of roots, mobilization and transfer of nutrients and the tolerance of roots to soil-borne pathogens such as nematodes. AM fungi also improve the soil quality (Koide and Mosse, 2004).

The soils chosen for present investigation generally have low nutrient availability, making establishment of the new plants difficult. Therefore, the presence of arbuscular mycorrhizal fungi (AMF) may be essential for ecosystem sustainability (Janos 1980) as they favor the establishment of plants (Allen and Allen 1980). Ghodnadi area Dist.

Pune is drought prone area where there is low rain fall, high temperature and bright light intensity. The soil type is red sandy. The purpose of present investigation was to check the biodiversity of AM fungi associated with some selected xerophytes under the adverse conditions from Ghodnadi area Dist. Pune, Maharashtra.

## Materials and Methods

The AM spores were extracted from the soil samples by wet-sieving and decanting method (Gerdemann and Nicolson, 1963). They were mounted on the slide in PVLG (Poly Vinyl alcohol Lacto Glycerol). All the slides were observed under Olympus Trinocular research microscope (model no. CH-20iTR). Spores were photographed using Digital camera (Canon A 640).

The spores of AM fungi were identified up to species level by using the manual for the identification of VA mycorrhizal fungi (Schenck and Perez, 1990). The number of spores per 100 gm soil was counted under Olympus Trinocular research microscope on Whatman filter paper No. 1. Root clearing and staining was carried out by Phillips and Hayman (1970) method.

Roots of all plants were analyzed for percent root infection method (Giovannetti and Mosse, 1980).

## Results and Discussion

Five genera were reported from Ghodnadi area Dist. Pune (Maharashtra). The genus *Glomus* was dominant with 13 species. It was followed by *Acaulospora* with 4 species. *Scutellospora* showed two species. One species each of *Gigaspora* and *Sclerocystis* was reported which was least abundant.

Five Seasonal xerophytes were assessed for AM fungi which included *Argemon*, *Aristolochia*, *Chlorophytum*, *Scilla* and *Tribulus*. The spore count of all the soil samples was done per 100 gm rhizosphere soil. Maximum (1980 spores per 100 gm soil) spores were reported from the rhizosphere soil of *Aristolochia*. During the month of August. Minimum (4 spores per 100 gm soil) spores were reported from the rhizosphere soil of *Tribulus* in the month of November.

Maximum (90) percentage root infection was reported in the roots of *Scilla* during the month of June and. In Oct. Zero percentage root infection was reported in the roots of *Scilla* and Nov. in *Tribulus*. Thirteen species of *Glomus* were found in Ghodnadi area which, include *Glomus aggregatum*, *G. albidum*, *G. australe*, *G. boreale*, *G. botryoides*, *G. caledonium*, *G. citricola*, *G. dimorphicum*, *G. deserticola*, *G. fecundisporum*, *G. gerdemannii* and *G. hoi*. *G. spp.*

The genus *Glomus* was abundant as a characteristic property of tropical soil. Four species of *Acaulospora* were reported. These are *Acaulospora scrobiculata*, *A. laevis*, *A. delicata*, and *A. nicolsonii*.

Two species of *Scutellospora* and one *Sclerocystis* were reported these were *Scutellospora minuta* and *S. pellucida* and *Sclerocystis coremioides* respectively. Only one species of *Gigaspora* was reported which include *Gigaspora albida* (Table-2).



1. *Scutellospora pellucida* 2. *Glomus hoi* 3. *Glomus fecundisporum* 4. Vesicles and Arbuscules in root.

### Conclusions

The AM fungi show very rich biodiversity in this area due adverse environmental conditions. All the soil samples were rich in AM fungi. Five genera and 21 species were found in Ghodnadi area. The dominant AM fungus in the soil was *Glomus*. The spore count and percentage root infection was maximum during rainy season and minimum during summer season. Similar results were reported by Borde et.al. (2008), from dry land area of central Maharashtra. Hence, we can conclude that the Ghodnadi area is ideal for mycorrhizal growth. All the five selected plants were associated with AM fungi.

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**Table 1 Number of Propagules per 100 gm of soil and Percentage Root Infection of xerophytes from Ghodnadi area**

Sr. no.	Month	<i>Argemon</i>		<i>Aristolochia</i>		<i>Chlorophytum</i>		<i>Scilla</i>		<i>Tribulus</i>	
		Prop	% RI	Prop	% RI	Prop	% RI	Prop	% RI	Prop	% RI
1	Jun	190	30	1620	70	690	30	820	90	90	20
2	Jul	320	30	1820	70	920	80	880	90	140	20
3	Aug	280	10	1980	50	1190	85	970	95	210	20
4	Sep	580	15	580	15	1180	85	1190	80	140	40
5	Oct	-	-	180	10	-	-	200	00	140	40
6	Nov	-	--	-	-	-	--	-	-	4	00

Note: Prop. Propagules per 100gm soil, % RI- Percentage root infection.

**Table - 2 Arbuscular Mycorrhizal fungi reported from rhizosphere soil of seven non perennial xerophytes from Ghodnadi area**

S. N.	AM Fungi	Host
1.	<i>Acaulospora scrobiculata</i>	4.
2.	<i>A. laevis</i>	2.
3.	<i>A. delicata</i>	2.
4.	<i>A. nicolsonii</i>	1.
5.	<i>Scutellospora minuta</i>	1,3,4,5
6.	<i>S. pellucida</i>	1,2
7.	<i>Gigaspora albida</i>	5.
8.	<i>Glomus aggregatum</i>	2,5
9.	<i>G. albidum</i>	1, 3, 4.
10.	<i>G. australe</i>	1.
11.	<i>G. boreale</i>	2
12.	<i>G. botryoides</i>	2, 5.
13.	<i>G. caledonium</i>	5.
14.	<i>G citricola</i>	2.
15.	<i>G. dimorphicum</i>	1.
16.	<i>G. deserticola</i>	5.
17.	<i>G. fecundisporum</i>	1
18.	<i>G. gerdmanii</i>	5
19.	<i>G. hoi</i>	5
20.	<i>Glomus spp.</i>	2
21.	<i>Sclerocystis coremioides</i>	4

Note: 1. *Argemon* 2 *Aristolochia* 3 *Chlorophytum* 4 *Scilla* 5 *Tribulus*