International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 06 Issue: 04 | Apr 2019 www.irjet.net p-ISSN: 2395-0072

Diversity of Arbuscular Mycorrhizal Fungi (AMF) in selected Phoenix sp. collected from Bhuj Taluka, Kachchh District, Gujarat, INDIA.

Dipika Dalal[1] and Hiteshkumar Solanki[2]

[1]Research scholar, Dept., of Botany, Gujarat University, INDIA
[2]Professor, Dept. of Botany, Gujarat University, Gujarat, INDIA

Abstract - *Date palm is an economically important plant in dry lands of the world this study is an approach towards an investigation of AM fungi diversity and their association with the date palm in Kachchh. It is important to understand the relation of root colonization, spore analysis and spore density in the study. As the plants uptake phosphorus through root with the help of Arbuscular Mycorrhizal Fungi (AMF) and is probably of great importance in the environment, because of its positive effect on plant nutrition and stress tolerance, as well as on structuring the soil This study is carried out for the composition of AM fungi at an agricultural site. Also, to understand the relevance of species composition and their relationship with abiotic factors. In the present work soil of agricultural field has been taken into consideration to understand the relevance.*

Key Words: **Agriculture, Date palm, Arbuscular Mycorrhizal Fungi**.

1. INTRODUCTION

Green Revolution primarily emphasized on chemical enrichment of soil in form of fertilizers and prevention of pests in the form of pesticides and fungicides. This led to decrease in soil fertility status as the land are not allowed to regain their fertility through fallow. At the same time, it has caused harmful side effects to human health. To meet the food requirements of ever-growing population, to decrease stress on soil sustainability in agricultural production has emerged as one of the most significant concern in the 21st century. Mycorrhizal fungi allow plants to draw more nutrients and water from the soil. They also increase plant tolerance to different environmental stresses. Moreover, these fungi play a major role in soil aggregation process and stimulate microbial activity.

1.1 Semi-arid region and Arbuscular Mycorrhizal Fungi

Date palm are one of the most crucial components of the arid and semi-arid ecosystems as they guard the surrounding environment against the desertic effects and provide an adequate microclimate to the undergrounds. Keeping this in mind, the study was analyzed to establish a correlation between AM fungi and the soil by physical parameters. Since, Kachchh is a semi-arid region and date palm plays a key role in its economy this work has been carried out to assess various species associated with Phoenix dactylifera in this region.

2. STUDY AREA

The study area is an agricultural land of a town BHUJ 23.24° N and 69.66° E of Kutch district. Kutch is virtually an island, as it is surrounded by the Arabian Sea in the west, by the Gulf of Kutch in south and southeast and by Rann of Kutch in north and northeast. Two samples were studied for a comparative analysis one was from Bhuj and the second was from Baladiya. The soil samples were collected at the depth of 45cm in a zip-lock bag to maintain the moisture content and were immediately taken to the lab for further work, and the physical parameters result were taken into consideration on the basis of India soil standards of agriculture. 100 gm soil was taken for the spore analysis and the spores were identified on the basis of (Gerdemann and Nicolson, 1963) method the root sample were collected in glass bottles for the analysis of root colonization (Phillips and Haymen, 1929) method.

Identification was done on the basis of spore colour, size, surface ornamentation and wall structure with the reference to the description provided by the International Collection of AMF (http://invam.caf.wvu.edu) [1] and the speci description given by Schench and Perez (1988). The permanent slides were mounted in polyvinyl-lacto-glycerol and were stored.

Table -1: Physical parameters of soil.

Physical parameters	Sample 1 (Bhuj)	Sample 2 (Baladia)
pH	7.5	8.35
% Moisture content	6.4	11.5
% Water holding capacity	90.00	90.75
Bulk density	1.40	1.20
% Porosity	65	57

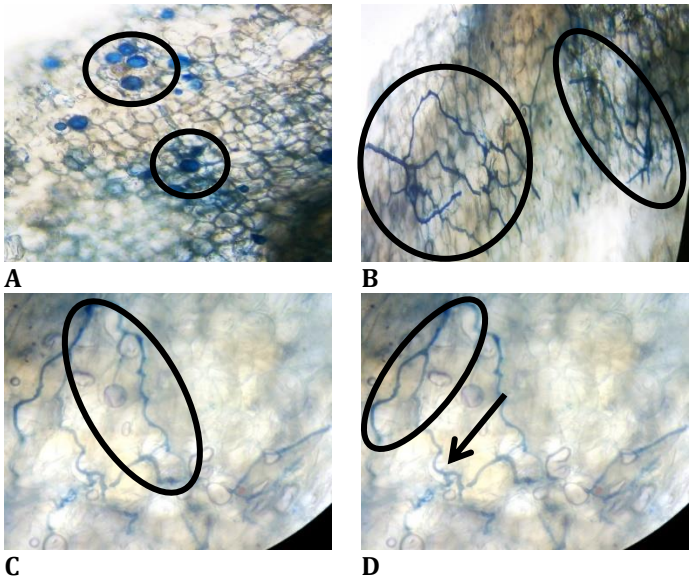

Fig -1: A- Vesicles B- Hyphae (Sample 1) C- Hyphae D- Hyphae (Sample 2)

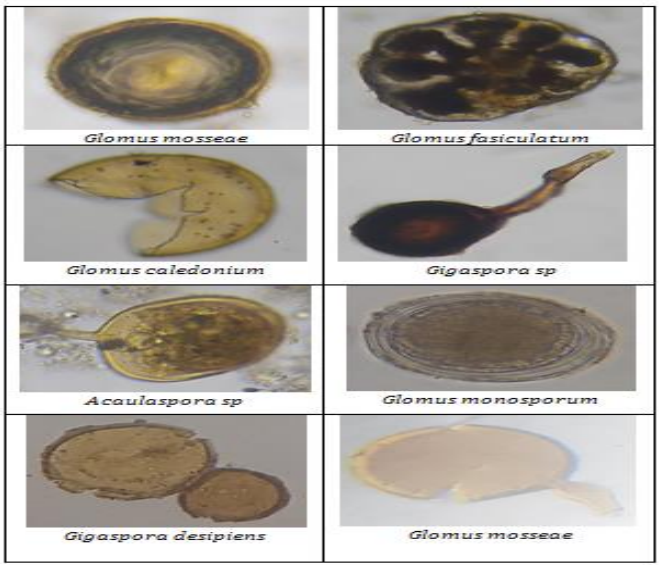

Fig -2: Spores

Table - 2: Spores found in soil for both the samples.

Sr no.	Species	Sample 1 (Bhuj)	Spores density in sample 1	Sample 2 (Baladia)	Spore density in sample 2
1	*Glomus sp*	+	176	+	40
2	*Glomus mosseae*	+	108	+	82
3	*Glomus versiformae*	+	10	+	12
4	*Glomus fasiculatum*	+	15	-	-
5	*Glomus intraradices*	+	24	-	-
6	*Glomus monosporum*	+	6	-	-
7	*Glomus ebrnum*	+	55	+	28
8	*Gigaspora sp*	-	-	+	62
9	*Gigaspora dispiens*	+	14	+	20

3. RESULTS

The above result shows that the soil was moderately alkaline. The % moisture content of the samples are respectively 6.4 and 11.5 %. Water holding capacity observed in sample 1 was 90 %, sample 2 was 90.75 %. The bulk density of soil was found to be 1.40 and 1.20 gm/cm^3 respectively. Also, the porosity of the sample was 65 and 57 % respectively. In a recent paper studies show that, Kutch provides suitable factors like a well-drained, deep, sandy type of soil having adequate aeration (12%) with a bulk density of 1-1.5 g/cm3 and water holding capacity of at least 15%. (Shah, 2015) Bulk density higher than 1.6 gm/cm^3 tend to restrict root growth. Bulk density is inversely proportional to pore space.

4. DISCUSSION

As observed in both the samples *Glomus mosseae* was predominant species. *Gigaspora* were also recorded. Whereas Rich diversity was recorded in Sample1. Morphological diversity of AM fungi in the studied habitats is supposed to be underestimated and the actual number of endomycorrhizal species could be higher. This underestimation could be due to the small number of soil samples analyzed. Bouamri(2006) [2]. reported the presence of 10 species in the date palm rhizosphere of Tafilalat (five species belong to the genus *Glomus*, three *Acaulospora* and two *Scutellospora*). Species of the genus *Gigaspora* are considered best suited for this kind of habitats subject to drought and soil salinity (Fadoua Sghir *et al.*, 2015) [3].

5. CONCLUSIONS

The soil analysis revealed moderately alkaline.

Intraradical hypha, vesicles, and arbuscules were detected in all date palm root samples from the Rhizosphoric soil surveyed. Root colonization reached between 72 and 48%. The highest root colonization was observed in the Sample 1 site. At the opposite extreme the lowest level of root colonization were observed in the Soil of Sample 2. Similar to root colonization, significant differences were observed between sites for spore density parameter At the Sample 1site, spore density reached 408 spores/100 g of soil, whereas spore density reached 244 spores/100 g of soil at the Sample 2 site.

Nine species of AMF were found from the study area. The genus *Glomus* was represented by 6 species: *Glomus mosseae* (Nicol and Gerd.) Gerd.and Trappe, *G. fasciculatum* Gerd. And Trappe emend.Walker and Koske, *G. formosanum*, *G. aggregatum* Schenck and Smith emend. Koske. *Glomus mosseae* were the most abundant and frequently observed AMF.

REFERENCES

[1] http://invam.caf.wvu.edu

[2] R. Bouamri1*, Y. Dalpé2, M.N. Serrhini3, A. Bennani1 “Arbuscular mycorrhizal fungi species associated with rhizosphere of Phoenix dactylifera L. in Morocco” African Journal of Biotechnology Vol. 5 (6), pp. 510-516, 15 March 2006.

[3] Fadoua Sghir1, Jihane Touati1, Mohamed Chliyeh1, Amina Ouazzani Touhami1, Abdelkarim Filali Maltouf2,Cherkaoui El Modafar3, Abdelmajid Moukhli4, Ahmed Oukabli5, Rachid Benkirane1, and Allal Douira1, Diversity of arbuscular mycorrhizal fungi in the rhizosphere of date palm tree (Phoenix dactylifera) in Tafilalt and Zagora regions (Morocco), The Ame J Sci & Med Res, 2015.

BIOGRAPHIES

Research scholar Dipika Dalal from Department of Botany, Gujarat University, Gujarat, India

Prof, Dr. HITESHKUMAR A SOLANKI, Department of Botany, Bioinformatics and Climate Change Impact Management, Gujarat University, Gujarat, India