Study of AM Fungi Associated with some plants of Acanthaceae

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Abstract

Some Medicinal, Ornamental and Natural weed plants are belonging to the family of Acanthaceae investigated for AM Fungal association. The plants from Acanthaceae family, *Andrographis echiodes(L)Nees*., *Andrographis paniculata Nees,Barleria prionitis L. Crossondra infundibuliformis (L.)Nees, Depterocanthus prostratus (Poir),Hygrophila auriculata(Schumach.&Thonn.)Heine, Justicia glauca Rottler, Lepidagathis cristata willd, Peristrophe bicalyculata(Retz.)Nees., Ruellia tuberosa L.* were studied in this investigation 81 AM Fungal spores Associated with these plants were identified up to species level.

Key words: Arbuscular mycorrhiza, Acanthaceae, Fungal spores

Introduction

Mycorrhizae are non-pathogenic symbiotic soil growths which invade the root arrangement of plants. Arbuscular Mycorrhizal Fungi (AMF) are associated with about 80% of the plant families on the planet (Giovannetti and Sbrana 1998). The event of Arbuscular Mycorrhizal Fungi has been accounted for in many plant communities such as woods (Raman et al. 1993; Sengupta et al. 1998), grasslands, stepper and prairies (Sanders and Fitter 1992), deserts (Khaliel 1988) and mangroves (Sengupta and Chaudhuri 1989).The primary preferred position of mycorrhiza is its more prominent soil investigation and expanding take-up of P, N, K, Zn, Cu, S, Fe, Mg, Ca and Mn and the supply of these nutrients to the host roots (Sundar et al.2010; Javot et al. 2007). Arbuscular Mycorrhizal Fungi (AMF) can likewise incite changes in the accumulation of secondary metabolites, including phenolics, in host plant roots (Vierheilig et al. 2000; Devi and Reddy 2002; Yao et al. 2003). Relatively little is thought about the impacts of AM colonization on the accumulation of dynamic phytochemicals in shoots of medicinal plants, which are frequently the harvest items. In any case, it was as of

late detailed that Glomus mosseae straightforwardly expands the essential oil content in shoots of Origanum sp. (Khaosaad et al. 2006) just as sweet basil (Copetta et al. 2006).

Material and Methods

Rhizosphere soil samples were collected from the family members of Acanthaceae from Warangal, Khammam, Hyderabad and Rangareddy districts of Telangana State. AM Fungal spores were isolated from the soil samples by Wet-sieving and decanting method (Gerdemann and Nicolson 1963).The identification was done based on Morphotaxonomic criteria (Schenck and Perez 1990).

Results and Discussion:

In the present study reveals that the Acanthaceae was associated with 81 AM fungal species belonging to 8 genera viz*., **Acaulospora, Ambispora, Archaeospora, Entrophospora, Gigaspora, Glomus ,Intraspora, and Scutellospora.*** Of which 18 species belongs to ***Acaulospora,*** 2 belong to ***Ambispora*** 1 belong to ***Archaeospora,*** 3 belong to ***Entrophospora***, 7 belong to ***Gigaspora*** 42 belong to ***Glomus***, 1 belong to ***Intraspora,*** 7 to ***Scutellospora***.

The highest AM fungal spore count per 100gm of rhizosphere soil was recorded in Hyderabad with 272 AM fungal spores with 95.12 % root colonization followed by with 154 AM fungal spores with 97 % root colonization and Warangal with 207 AM fungal spores with 96.45 %root colonization. The lowest AM fungal spore count per 100gm of rhizosphere soil was recorded in Khammam with 168 AM fungal spores with 82.67 % root colonization. The lowest root colonization 73% was recorded in Khammam (Schenck N.C. and Perez Y. 1990). The AM spore number of Acanthaceae family was higher in Hyderabad, Rangareddy and Warangal samples compared to that of Khammam sample which might be due to the presence of sandy loam soil in Hyderabad , Rangareddy, Warangal and clay loam soil in the Khammam. Rachel et al (1993) reported more AM fungal infection in sandy loam soil followed by other soil types.

The AM fungal association with Acanthaceae of all the 4 Districts investigated in the present study (Table 1). From the research, we could conclude that the biodiversity of AM fungi was abundant, though *Glomus* was the dominant genus. The AM fungal spore density and root colonization varied markedly among 4 districts. Considering the potential application of AM fungi on Acanthaceae, it seems that more attention should be paid

to the predominant AM fungi during the process of their cultivation, especially mycorrhizal performance i.e., improving growth, increasing secondary metabolite production.

Table 1: The AM fungal association with Acanthaceae in 4 District

slno	AM Fungal species	***Hyderabad***	***Rangareddy***	***Warangal***	***Khammam***
1.	***Acaulospora bireticulata***	+	-	+	+
2.	***Acaulospora dilicata***	+	+	-	+
3.	***Acaulospora delatata***	-	+	+	-
4.	***Acaulospora elegans***	+	-	+	+
5.	***Acaulospora foveata***	+	+	+	-
6.	***Acaulospora gardemannii***	-	+	+	+
7.	***Acaulospora laevis***	+	-	+	-
8.	***Acaulospora mellea***	-	+	+	+
9.	***Acaulospora myriocarpa***	+	+	-	+
10.	***Acaulospora nicolsoni***	-	+	+	+
11.	***Acaulospora rehmi***	+	+	-	-
12.	***Acaulospora rugosa***	+	+	+	+
13.	***Acaulospora scrobiculata***	+	-	+	-
14.	***Acaulospora spinosa***	+	+	+	+
15.	***Acaulospora splendida***	+	+	+	-
16.	***Acaulospora sporocarpia***	-	+	+	+
17.	***Acaulospora tuberculata***	+	+	+	+
18.	***Acaulospora undulate***	-	+	-	+
19.	***Ambiospora fecundispora***	-	+	-	+
20.	***Ambiospora leptoticha***	+	+	+	-
21.	***Archaeospora trappei***	+	+	-	+

22.	***Entrophospora columbiana***	-	+	+	+
23.	***Entrophospora infrequens***	+	+	-	+
24.	***Entrosphospora Schenckli***	-	+	+	+
25.	***Gigaspora albida***	+	+	+	-
26.	***Gigaspora candida***	-	+	+	+
27.	***Gigaspora decipiens***	+	+	+	-
28.	***Gigaspora gigantia***	-	+	-	+
29.	***Gigaspora margarita***	+	+	+	-
30.	***Gigaspora ramisporophora***	+	+	-	+
31.	***Gigaspora rosea***	+	-	+	+
32.	***Glomus aggregatum***	+	+	+	-
33.	***Glomus albidum***	-	+	-	+
34.	***Glomus arborense***	+	-	+	-
35.	***Glomus austral***	+	-	+	+
36.	***Glomus celedonium***	-	+	+	-
37.	**Glomus *canadense***	+	-	+	+
38.	***Glomus citricola***	-	+	+	-
39.	***Glomes clarum***	+	+	+	+
40.	***Glomus clavisporum***	-	+	-	+
41.	***Glomus constrictum***	+	+	+	-
42.	***Glomus diaphanum***	+	-	+	-
43.	***Glomus dimorphicum***	-	+	+	_
44.	***Glomus fasciculatum***	+	-	+	+
45.	***Glomus fistulosum***	+	+	+	-
46.	***Glomus fragilistratum***	-	+	+	+

47.	***Glomus fuegianum***	+	-	+	-
48.	***Glomus geosporum***	+	-	+	+
49.	***Glomus globiferum***	+	+	-	+
50.	***Glomus glomeratum***	+	-	+	+
51.	***Glomus heterosporum***	+	-	+	-
52.	***Glomus hoi* Berch**	+	-	+	+
53.	***Glomus intraradices***	+	+	+	-
54.	***Glomus intraradix***	+	-	+	+
55.	***Glomus invermaium***	+	+	-	+
56.	***Glomus liquidambaris***	-	+	+	+
57.	***Glomus macrocarpum***	+	-	+	-
58.	***Glomus maculosum***	-	+	-	+
59.	***Glomus microaggregatum***	+	-	+	-
60.	***Glomus microcarpum***	-	+	-	+
61.	***Glomus minuta***	+	-	+	-
62.	***Glomus monosporum***	-	+	-	+
63.	***Glomus mosseae***	+	-	+	-
64.	***Glomus multicaule***	-	+	-	+
65.	***Glomus multisubtensum***	+	-	+	-
66.	***Glomus pakistanica***	-	+	-	+
67.	***Glomus palladium***	+	-	+	-
68.	***Glomus pulvinatum***	-	+	-	+
69.	***Glomus rubiformis***	+	-	+	-
70.	***Glomus segmentatum***	-	+	-	+
71.	***Glomus sinuosa***	+	-	+	-
72.	***Glomus tenebrosum***	-	+	-	+

73.	***Glomus warcupli***	+	-	+	-
74.	***Intraspora schenckii***				
75.	***Scutellospora arenicola***	-	+	-	+
76.	***Scutellospora auriglobosa***	+	-	+	-
77.	***Scutellospora calospora***	-	+	-	+
78.	***Scutellospora pellucida***	-	+	+	-
79.	***Scutellospora sculata***	+	-	+	-
80.	***Scutellospora tricalyptra***	+	+	-	+
81.	***Scutellospora verrucosa***	-	+	-	+

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