SHORT COMMUNICATION

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Association of arbuscular mycorrhizal fungi in some medicinal plants of Rutaceae and Apiaceae from Telangana State, India

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13 host plants belonging to Rutaceae (6) and Apiaceae (7) were screened for arbuscular mycorrhizal fungal association in their rhizosphere soils. All plants which were either medicinal or ornamental were found to harbour AM fungi.20 AM fungal species representing *Acaulospora*, *Redeckera* and *Scutellospora* with 6 species each form dominant genera. *Claroideoglomus*, *Funneliformis* and *Rhizophagus fasciculatus* with one species each were also identified. All the host plants surveyed form new host records for AM fungi reported in this paper.

Key words: Mycorrhizae, medicinal plants, colonization, rhizosphere soil, *Glomus*

INTRODUCTION

Arbuscular Mycorrhizal (AM) fungi (Glomeromycota) (Schüâler and Walker, 2010) represents an obligate symbiotic group which cannot complete their lifecycle without host plants. They form symbiotic association with 90% of the families of all phyla of land plants. (Giovannetti *et al* 1994) including ferns and some mosses (Smith and Read, 1997). According to Dodd (2001) these fungi are primarily responsible for nutrient transfer from soil to plant, soil aggregation and protection of plants against drought stress.

AM fungi are omnipresent in nature and they form unique structures namely dimorphic hyphae, arbuscules and vesicles inside the root cortices while some hyphae bearing spores/sporocarps and sometimes extramatrical vesicles are also present outside the roots. Information available on AM fungal association in medicinal and ornamental plants is still far from adequate and fragmentary. The present investigation was carried out surveying the soils for association of AM fungi supporting medicinal/ornamental plants belonging to the families Apiaceae and Rutaceae.

AM fungal spores were extracted from the rhizosphere soil samples employing wet-sieving and decanting technique (Gerdemann and Nicolson, 1963). Different spore types were mounted on slides in polyvinyl alcohol, sealed with Dinitro paraxylene (DPX). Later, all such slides were carefully examined under Leitz microscope and photographed with Nicon SLR camera. AM fungi were identified up to species level based on morphotaxonomic criteria such as hyphae, spore and sporocarp morphology, subtending hyphae, ornamentation, wall layers, suspensor cells, shape, colour etc using taxonomic keys proposed by Walker (1986) and Schenck and Perez (1990). All the slides/photographs are deposited at The Department of Botany, Osmania University Hyderabad with Osmania University Fungal Herbarium (OUFH No. 81).

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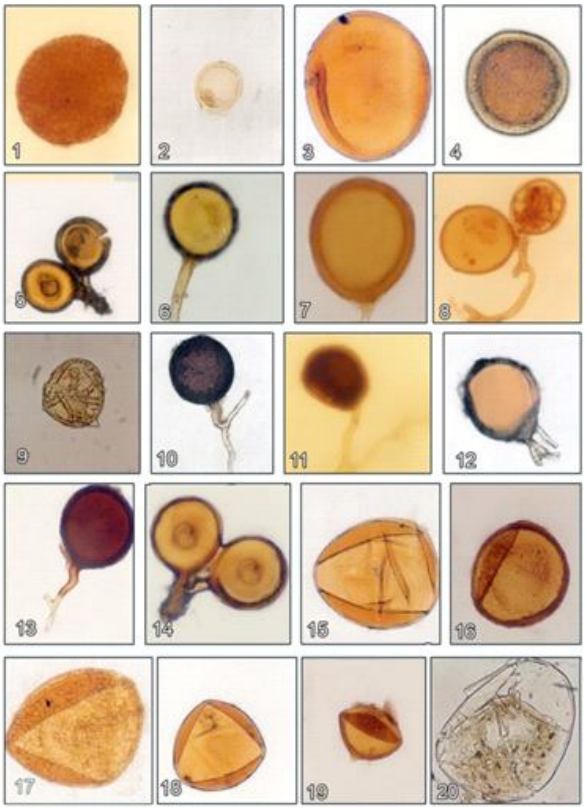
Table 1: Different AM fungal species in host plants of Rutaceae and Apiaceae

AM Fungal Species	Rutaceae					Apiaceae							
	1	2	3	4	5	6	7	8	9	10	11	12	13
Acaulospora bireticulata F.M. Rothwell & Trappe	+	-	-	+	-	-	+	-	-	-	-	-	+
A. delicata Walker, C.M. Pfeiff & Bloss	-	-	-	-	+	-	-	-	-	-	+	-	-
A. foveata Trappe & Janos	-	-	-	-	+	-	-	-	-	-	+	-	-
A. elegans Trappe & Gerd	-	-	-	-	-	+	-	-	-	-	-	-	-
Redeckera arborense McGee	-	-	-	+	-	-	-	-	-	-	-	-	-
R. australe (Berk.) S.M. Berch	-	-	-	+	-	-	-	-	-	-	-	-	-
R. canadense (Thaxt.) Trappe & Gerd	-	-	-	-	-	-		+	-	-	-	-	-
Rhizophagus fasciculatus (Thaxt.) C. walker & A. Schüβler	-	-	-	+	+	-	-	+	-	-	-	-	-
Claroideoglomus claroideum (N.C. Schenck & G.S. Smith) C.Walker & A. Schüβler	-	-	+	-	-	-	-	-	-	-	+	-	-
Funneliformis geosporum (Nicolson & Gerd.) C.Walker & A. Schüβler	-	-	-	-	-	-	+	+	-	-	-	-	-
R. melanosporum Gerd & Trappe	-	-	-	-	-	-	+	+	-	-	-	-	-
R. multisubtensum Mukerji, Bhattacharjee & J.P. Tewari	-	-	-	-	-	-	+	+	-	-	-	-	-
R. pansihalose Berch & Koske	-	-	-	-	-	-	-	-	-	-	+	-	-
R. pulvinatum (Henn.) Trappe & Gerd	-	-	-	-	-	-	-	-	-	+	-	-	-
Scutellospora arenicola (Koske & Halverson)	-	-	-	-	-	-	+	-	-	-	-	-	-
S. auriglobosa Walker, C Hall, I.R.	-	-	-	+	-	-	-	-	-	-	-	-	-
S. corolloides (Koske & C.Walker)	-	-	-	-	-	+	-	-	-	-	-	-	-
S. dipurpurascence J.B. Morton & Koske	-	-	-	+	-	-	-	-	-	-	-	-	-
S. erythropa (Koske & C.Walker) C.Walker & F.E. Sanders	-	-	-	-	-	-	+	-	-	-	-	-	-
S. pellucida (Nicol. & N.C. Schenek) C. Walker & F.E. Sanders	-	-	-	-	-	-	-	-	-	-	+	-	-

1-6 (Host plants of Rutaceae) ; 1. *Aegle marmelous* Correa 2. *Citrus limon* Burm F 3. *Feronia limon* (L) Swingle 4. *Murraya koenigii* Speng 5. *Murraya exotica* (L) 6. *Ruta graveolens* (L); 7-13 (Host plants of Apiaceae); 7. *Anethum graveolens* (L) 8. *Carum copticum* Benth & Hook 9. *Carum bulbocastrum* Kock 10. *Carum roxburghianum* Benth & Hook F. 11. *Centella asciatica* (L) 12. *Foeniculum vulgare* Mill 13. *Pimpinella anisum* L.

A total of 20 AM fungal species belonging to Rutaceae and Apiaceae were isolated and identified up to species level. (Table 1). Soils supporting plants belonging to Rutaceae and Apiaceae were investigated and are of red-sandy, sandy-silty, and clayee type with pH ranging from 7.4-8.5 and 7.7-8.5 and moisture content of 2.24-2.52 besides being poor in nutrients. No chemical fertilizers were used to grow medicinal/ornamental plants. Altogether 20 AM fungal species (Figs. 1-20) were found associated with six host plants of Rutaceae and seven host plants of Apiaceae. *Redeckera* and *Scuttellospora* were found as dominant genera representing 6 species each followed by *Acaulospora* with six species. *Claroideoglomus, Rhizophagus*, and *Funneliformis* were represented by one species each. *Carum copticum* and *Centella asiatica* belonging to Apiaceae and have harboured 5-6 AM fungal species than others. *Murraya koenigii* of Rutaceae have harboured 5 AM fungal species than others. All the six host plants of Rutaceae and seven of Apiaceae form new hosts for AM fungi.



Figs. 1-20 : AM fungal species isolated from samples of Rutaceae and Apiaceae: 1. *Acaulospora bireticulata*, 2. *A delicata*, 3. *A foveata*, 4. *A elegans*, 5. *Redeckera arborense*, 6. *R australe*, 7. *R canadense*, 8. *Rhizophagus fasciculatus*, 9. *Claroideoglomus claroideum*, 10. *Funneliformis geosporum*, 11. *R melanosporum*, 12. *R multisubtensum*, 13. *R. pansihalos*, 14. *R. pulvinatum*, 15. *Scutellospora arenicola*, 16. *S auriglobosa*, 17. *S corolloides*, 18. *S dipurpurascense*, 19. *S erythropa*, 20. *S pellucida*.

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