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Research Article

Effect of Glomus mosseae on growth of selected plant species

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Abstract: Effect of inoculating *Cajanus cajan, Arachis hypogaea, Ocimum tenuiflorum* and *Phyllanthus amarus* with mycorrhizal fungi (*Glomus mosseae*) was studied using potted seedlings. Vegetative growth and root length were compared between inoculated and non-inoculated plants. Result showed that there was a high mycorrhizal dependency of the selected plants on *G. mosseae*. Mycorrhizal fungal inoculated selected plants seedlings grew significant better compared to non-mycorrhizal controlled seedlings, and had increased height. *C. cajan, A. hypogeae* and *O. tenuiflorum* showed well established root colonization 87.6%, 86% and 93.5% respectively. Plant architecture and reproductive traits were changed by mycorrhizal fungi inoculation. Plants inoculated with *G. mosseae* invested more in the root development for effective nutrient absorption, which was the fundamental to achieve the maximum growth of the plants. The symbiosis of mycorrhizal fungi and rice would be of benefit to crop growth and grain yield.

Keywords: *Cajanus cajan, Arachis hypogaea, Ocimum tenuiflorum* and *Phyllanthus amarus, Glomus mosseae.* mycorrhizal fungi, symbiosis.

Introduction

Mycorrhizal fungi are relevant members of the rhizosphere populations. Upon root penetration and colonization mycorrhizal fungi develop an externai mycelium which connects the root with surrounding soil (Toro et al., 1997). Seven different types of Mycorrhiza were found, among them *Arbuscular Mycrorrhiza* (Vesicular and Arbuscular Mycorrhiza) are the most common in occurance (Mosse et al., 1983). These are found as key components of soil microbiota (Barea et al., 2004). AM fungi are obligately biotrophic organisms that live symbiotically with the roots of most plants. The establishment of a function symbiosis between AM fungi and host plants involves a sequence of recognition events leading to the morphological and physiological interaction of two symbions (Giovanetti & Sbrana, 1998). One of the most dramatic effects of these fungi on the host plant is the increasing phosphorus (P) uptake (koide, 1991) mainly due the capacity of the mycorrhizal fungi to absorb phosphate from soil and transfer it to the plant, (Asimi et al., 1980). Arbuscules are structures produced within the host plant cells by the AM fungi. These structures are responsible for the transfer of absorbed nutrients from the fungus to the plant. The present paper reports the influence of AM fungi on five different selected species of plants on plant height, mychorizal colonization root and shoot length, number and size of leafs and number of flowers.

Materials and Methods

To assess the effect of *Glomus mosseae* on the growth of different plant species, a pot culture experiment was done and plants were growing in earthern pots (30 cm diameter and 40 cm height) containing 7 kg of soil. The plants used are *Cajanus cajan, Arachis hypogaea, Ocimum tenuiflorum* and *Phyllanthus amarus.*

Preparation of cultures: Mycorrhizal cultures were raised in the soil mixed with sand in the ratio of 1:1 and sterilized twice on alternate days. The cultures were raised employing the spores or sporocorps. For the raising of culture a technique provided by Gour and Adholeya, (1994) was followed. The top soil was removed upto the length of 3-5cm. AM inoculum *Glomus mosseae* (Nicolson and Gerdemann) was uniformly spread over the soil in a layer next soil was covered and seeds or seedlings are inoculated in soil above the inoculum. The *Glomus mosseae* culture was obtained from oil palm research centre, Peddavegi, Near Eluru, Andhra Pradesh, India.

Five seeds or seedling were sowed per pot. Pots were watered regularly. Observations per plant height, root and number and size of leaves, percentage of mycorrhizal colonization in roots and number of spores were recorded. The mycorrhizal colonization was determined using the method described by Philip and Hayman (1970). Mycorrhizal spores in the soil were estimated using wet sieving and decanting technique (Gerdemann and Nicolson, 1963). Plant height, root length, number of leaves and flowers, mycorrhizal colonization and number of spores present in soil were determined after 90 days after sowing.

Results and Discussions

Inoculation with fungi resulted in significant increase in plant height in *C. cajan, A. hypogaea* and *O. tenuiflorum* than control plants. These plants showed the significant increase in plant height 41.3

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cm, 23.03 cm, 31.0 cm than control plants 41.3 cm, 34.23cm, 30.6 cm respectively when inoculated with AM fungi. AM fungi also showed significant effect on these three plants root length and number of leaves than plants, the present findings has similarity with observations Dwivedi (2004) who inoculated AM fungi in wheat which showed maximum increase in plant height. *C. cajan, A. hypogeae, O. tenuiflorum* showed well established root colonization 87.6%, 86% and 93.5% respectively. Champawat (1992) reported that root colonization of mycorrhiza was 76% to 86% in chick pea plants grown in sterile soils. *Glomus mosseae* in the rhizospere soils of wheat plant not only increased mycorrhizal root colonization (73%) but also helped in the nutrient uptake result in better growth of the plant and higher grain yield (Dwivedi, 2004). A. hypogeae culture plant showed significant increase in mean number of flowers (38) than mean number of control plant (19.8). These finding showed that *Glommus mosseae* not only showed its effect on plants height, root length but also showed its effect on number and size of flowers and leaves also.

AM fungal inoculation in *P. amarus* did not show any significant effect on growth plant when compared to control. In some field studies mycorrhizal colonization has been shown to increase plant growth and survival, but these are many accounts of null or even negative effect (Gonigle and Fitter, 1998). The present findings in *P. amarus* showed less positive effect of AM inoculation. It may also be due to fewer interactions between fungus and plants at the cell wall and or middle lamellae level (Tester et al., 1987).

Plant name	Type	Shoot height (cm)	Root length (cm)	Number of leaves	Number of flowers	% of colonization	Number of spores
Cajanus cajan	Control	41.3	13	33	…	…	…
	Culture	79	16	74	…	87.6	29
Arachis	Control	23.03	9	72	29.8	…	…
hypogaea	Culture	34	11	109	38	86.0	10
Ocimum	Control	31	14	51	4	…	…
tenuiflorum	Culture	71.9	18	80	2	93.5	37
Phyllanthus	Control	29	11	70	…	…	…
amarus	Culture	29	10	84	…	…	42

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