



EFFECT OF COINOCULATION OF GLOMUS FASCICULATUM AND BACILLUS ON GROWTH OF OKRA PLANT

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Abstract

It is found that presence of Pathogens of Bacterial categories in the rhizosphere soil of plant affects badly on plant growth resulting in wilting of seedlings at nursery stage. The effect of coinoculation of Bacteria and VAM fungi on growth of three cultivars of Okra plant was assessed. The inoculation of *Glomus fasciculatum* suppressed the activities of bacteria and shown enhancement in plants % seed germination, wilting of seedlings, Length of root (cm), Length of shoot (cm), over uninoculated plants.

Keywords

Okra, *Glomus fasciculatum*, *Bacillus* sp. plant growth

Introduction

In many parts of the world vegetable forms a major part of the diet. Okra (Bhindi) is an annual vegetable crop used for various purpose. Mycorrhizal hyphae interact with soil inhabiting fungi, bacteria, actinomycetes, virus insects, nematodes, and several root borne pathogens (Bagyaraj and Menge, 1978). in the rhizosphere soil. VAM fungi have a unique ecological position as they are partly inside and partly outside the root (Menge et al, 1978). The effectiveness of VAMycorrhiza in protecting plants against the disease varies according to the species of the VAM fungus and host plants involved. The evaluation of VA-mycorrhizae as biocontrol agent remains one of the challenging areas. In fact prior root colonization by VA-fungi can reduce root disease then this would be of vital interest for many crops which are grown in nurseries before transplantation. This dimension of VAMycorrhiza in inducing suppression of soil borne diseases holds a great promise. So in present paper attempts were made to assess Some varieties of Bhindi plants against Bacteria and VAMycorrhizae.

Material and Method





Selection of plants :Three important local crop varieties of Bhindi Viz, parbhani kranti, Arkanamica, selection-51 were used to study the response of VAM fungi. Pot culture experiments were conducted with 5 kg of local soil sample (loamy clay soil) with low fertility. It was infested with VAM inoculum of soil (100 gm) containing chlamydospores, root bits. five seeds of each cultivars after surface sterilization with 0.01 % aqueous Hgcl₂ and washing thrice with sterile Distilled water were sown at depth of about 3 cm. After 60 days. Various parameters were recorded. Inoculation of VAM fungi :Fungal inoculum containing extramatrical chlamydospores, infected root segments and hyphae having the uniform infective propagules were prepared .inoculation with VAM fungi was done by the layering method (Jackson et al 1972). Pots were filled 2 cm less than regular filling. Mycorrhizal inoculum 100 gm was spread over the soil surface by hand to form a thin layer and over which 2 cm soil was added. Five surfaces sterilized seeds were placed on the surface and pushed down to 1 cm depth.Three replicates were maintained for each fungus inoculum and a single control pot for each treatment. All the pots were regularly watered keeping laboratory condition. Culture medium for growth of Bacteria: Peeled potato -250 gm ,Dextrose -20 gm,Agar- 20 gm,Distilled water - 1000ml ,pH-6.5Peeled potato was cut into thin chips, boiled in 500ml of distilled water and extracted. To the extract 20 gm of dextrose was added. The Agar was melted in the other half of the distilled water and mixed with potato Dextrose solution and the volume was made up to a litre before sterilization in an Autoclave. Isolation and inoculation of Bacteria: Bacillus bacteria were isolated on PDA medium from the Rhizosphere soil samples of wilted seedling .and pure culture was maintained in laboratory.5ml of pure culture containing about 100 conidia were used for inoculation in test pots





Result and Discussion

The inoculation effect of Bacillus bacteria were assayed on three different cultivars of okra. The data revealed that.(Table 1) the percent seed germination, wilting of seedling, length of root, length of shoot was maximum in pots not inoculated by Bacillus over control plants .in Parbhani Kranti, Arkanamika and Selection – 51. The length of shoot was maximum (13.6, 11.4, 10.4cm) in control plants but in test plants it was less (12.7, 9.8, 9.9 cm). By comparing all three varieties Arkanamika found most susceptible to bacteria bacillus. The co inoculation effect of Bacillus and Glomus fasciculatum was tested in three cultivars of okra. (Table 2). The percent seed germination was found less (70, 60, 60) in control pots while maximum noted (80, 70, 80) in test pots containing dual inoculum. .The wilted seedlings noted maximum in control pots (1,2, 1) while only one wilted seedling was recorded in test pot. The length of root was less (3.2, 2.7, 4.2) than the test plants (3.6, 3.4,4.8). The length of shoot was maximum in test plants (14.2, 12.4, 12.4) while the length was minimum in dual inoculated plants (13.6, 12.3, 11.9).So in test pot the number was less this may be due to Glomus fasciculatum. The length of root and shoot was also less in control plants than the test plants in all the three cultivars of Okra. Similar type of results were recorded in Prosopis juliflora.

The improvement in the efficiency of VAM has been attributed to a lowering of soil pH by the introduced bacteria in rhizosphere, bacteria secrete growth substances and antibiotic secondary metabolites, which contribute to seed germination and plant growth The coinoculation effect of Bacillus and Glomus was significant in Parbhani kranti and selection – 51. Significant increase in root length, shoot height, dry weight was observed due to coinoculation of Glomus fasciculatum and Rhizobium (Kamalprasad, 2002). The effect of Gigaspora and Bacillus sp. was studied in green gram grown in sterilized soil. Gigaspora increased significantly grain yield but dual inoculation with Bacillus resulted in elimination of beneficial effect of Gigaspora (Bayan and Taludkar, 1997).





Conclusion

The inoculation of *Glomus fasciculatum* in the rhizosphere soil of plants suppresses the disease causing effect of pathogenic bacteria, increases percent seed germination and enhances plant growth.

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Table 1: Response of three cultivars of okra to inoculation of *Bacillus* sp.

Parameters	Parbhani kranti		Arkanamika		Selection – 51	
	Control	Test	Control	Test	Control	Test
% seed germination	90	80	80	70	90	80
Number of wilted seedlings	1	2	2	1	0	2
Length of root (cm)	3.2	2.4	2.9	1.9	2.8	2.1
Length of shoot (cm)	13.6	12.7	11.4	9.8	10.4	9.9
Number of root galls/gm root	0	0	0	0	0	0

Test = *Bacillus* sp. Control = Without *Bacillus* sp.

Table 2 : Effect of coinoculation of *Bacillus* sp.and *Glomus fasciculatum* on three cultivars of Okra

Parameters	Parbhani kranti		Arkanamika		Selection – 51	
	Control	Test	Control	Test	Control	Test
% seed germination	70	80	60	70	60	80
Number of wilted seedlings	1	0	2	1	1	0
Length of root (cm)	3.2	3.6	2.7	3.4	4.2	4.8
Length of shoot (cm)	13.6	14.2	12.3	12.4	11.9	12.4
Number of root galls/gm root	0	0	0	0	0	0

Test = *Bacillus* sp. + *Glomus fasciculatum* Control: With *Bacillus* sp.

