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Soil Chemical Analysis and Spores of Mycorrhizal Endogone Species for Chilli

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ABSTRACT

VAM fungi have received considerable attention in recent years with regard considerable attention in recent years with regard to nutrition and development of host plants. VAM root colonization is the results of the interaction between the host soil and fungus. This study clearly brings out the influence of soil type on VAM development, i.e. the red soil type was found to be superior to the black clayey soil.

***Keywords*—** VAM fungi, *Glomus macrocarpum*, chilli

I. INTRODUCTION

Vasicular-arbuscular mycorrhizal (VAM) fungi have received considerable attention in recent years with regard to nutrition and development of host plants. The principal benefit from VAM fungi to plant growth is phosphorus nutrition (Jeffries, 1987). The obligate symbiotic nature of VAM fungi presently dictates that all VAM inoculum must be grown on the roots of an appropriate host plant (Sreenivasa and Bagyaraj, 1988). Due to major bottleneck, the application of this technology to commercial crop production has been minimal. Added to this, many ecological aspects of VAM fungi like the optimum quantity of inoculum, shelf like, etc., are yet to be worked out. It was the aim of present investigation to study the influence of different levels of an efficient local isolate of VAM fungus, *Glomus macrocarpum* (Sreenivasa, 1992) on the growth and yield of chilli in two types-black clayey soil and red soil. This was done so that an optimum level of *G. macrocarpum* inoculum could be selected for chilli and the influence of soil factor on VAM activity could be varified.

II. MATERIALS AND METHODS

Earthen pots of 12" diameter were filled with non-sterile black clayey/red soil at 10 kg/pot. Black clayey soil had 235 kg P O /ha while red soil had 10 kg P O /ha (NH +HCI extractable). Fertilizers were applied at the recommended levels (150 : 75 : 75 kg NPK/ha respectively). Pot cultures of an efficient local isolate of VAM fungus, *Glomus macrocarpum*, maintained in Rhodes grass (Sreenivasa, 1992) was tried at different levels, i.e., 0. 25. 50, 75 and 100 g/10 kg soil. The inoculum was placed 2 cm below the soil surface as uniform thin layer. Thirty-day-old chilli seedling, raised in nursery pots containing sterilized soil, were transplanted at three seedlings per pot. There were altogether 10 treatments with 9 replication each. The crop was maintained for 122 days after transplantation. After crop harvest, the plant dry weight, number of fruits, and fruit weight (fresh) were recorded. The percentage of mycorrhizal colonization in roots was determined by staining the roots with trypan blue (Phillips and Hayman 1970) and the mycorrhizal spore count in soil by the wet sieving and decanting technique (Gerdemann and Nicolson 1963). The number of infective propagules in the pot ball, after chopping the roots to 1 cm bits, was determined by the Most probable Number technique using sorghum as the test plant (Porter 1979). Shoot P concentration was estimated by the vanadomolybdate phosphoric yellow colour method (Jackson, 1967).

III. RESULTS

The percentage of root colonization and the number of extramatrical chlamydospores increased with increases in the level of inoculum in both the soil types. However, the increase in the percentage of root colonization beyond 50 g inoculum level was not significant (Table 1). The number of infective propagules also increased in the level of inoculum up to 75 g/10 kg soil, beyond which they remained practically constant in both the soil types (Table 1). Mycorrhizal parameters were better in the red soil when compared to the black clayey soil (Table 1). A similar trend was observed in plant characteristics-plant dry weight, number of chilli fruits, fruit weight and shoot P concentration-which increased with increases in the levels

of inoculum in both the soil types. However, they were the highest in red soil when compared to the black clayey soil (Table 2). Increase in these parameters beyond 50 g inoculum level were not significant (Table 2).

IV. CONCLUSION

VAM root colonization is the result of the interaction between the host, soil, and fungus. Few cientists earlier reported host preference to VAM endophytes. This study clearly brings out the influence of soil type on VAM development, i.e., the red soil type was found to be superior to the black clayey soil, and 50 g/10 kg of soil can be used an optimum level of *G. macrocarpum* inoculum in chilli.

Table 1: Effect of different levels of *Glomus macrocarpum* inoculum on the percentage of root colonization, spore count, and the number of infective propagules in chilli (two soil types)

Level of *Glomus macrocarpum* inoculum (g/10 kg)	Root Colonization (%)		Spore count (per 50 g soil)		Number of infective propagules/g pot ball (number x 10^4 /g)	
	BCS	RS	BCS	RS	BCS	RS
0	43	41	122	130	0.074	0.074
25	78	79	165	174	0.090	0.092
50	92	91	350	391	0.100	0.100
75	93	93	382	422	0.120	0.120
100	94	93	446	460	0.120	0.120
VAM levels	0.80	2.30	10.20	28.50	-	-
Soil types	0.51	NS	6.50	18.00	-	-
Interaction	1.13	NS	14.50	NS	-	-

BCS-black clayey soil; RS-red soil; NS-not significant; SEM ± CD at 0.05

Table 2:Effect of different levels of *Glomus macrocarpum* on plant dry weight, number of fruits fruit weight, and Shoot P concentration, in chilli (two soil types)

Level of *Glomus macrocarpum* Inoculum (g/10 kg)	Plant dry weight (g/plant)		No. of chilli fruits/plant		Fruit weight (g/plant)		Shoot P Concentration (%)	
	BCS	RS	BCS	RS	BCS	RS	BCS	RS
0	13.516.6		28	28	61.0	61.0	0.06	0.09
25	20.627.1		36	39	90.0	92.0	0.17	0.22
50	27.030.7		48	51	110.0	118.0	0.22	0.29
75	28.332.4		49	52	111.0	119.0	0.23	0.29
100	28.732.5		50	53	112.0	119.0	0.24	0.29
VAM levels	1.323.88		1.67	4.92	0.80	2.35	0.01	0.038
Soil types	0.832.45		1.06	NS	0.501.48		0.01	0.024
Interaction	1.86NS		2.36	NS	1.123.32		0.014NS	

BCS-black clayey soil; RS-red soil; NS-not significant; SEM ± CD at 0.05

REFERENCES

[1]Gerdemann J. W. and Nicolson T. H.;1963. Spores of mycorrhizal endogone species extracted from soil by wet sieving and decanting. Transactions of the British Mycological Society, 46 : 235-244.
[2]Jackson M. L. ;1967. Soil Chemical Analysis. Prentice-Hall of India (Ltd)New Delhi :498.
[3]Jeffries P. ;1987. Use of mycorrhizae in agriculture. CRC Critical Review of Biotechnology, 58 : 319-359.
[4]Phillips J. M. and Hayman D. S. ;1970. Improved procedures for clearing roots and staining parasitic and vesicular-arbuscular mycorrhizal fungi for rapid assessment of infection. Transactions of the British Mycological Society, 55 : 158-161.
[5]Porter W. M. ;1979. The most probable number method for enumerating infective propagules of vesicular-arbuscular mycorrhizal fungi in soil. Australian Journal of Soil Research, 17 : 515-519.
[6]Sreenivasa M. N. ;1992. Selection of an efficient vesicular-arbuscular mycorrhizal fungus for chilli. Scientia Horticulturae, 50 : 515-519.
[7]Sreenivasa M . N. and Bagyaraj D J. ;1988. Chloris gayana (Rhodes grass) . A better host for mass production of Glomus fasciculatum inoculum. Plant and Soil, 106 : 289-290.