

INFLUENCE OF HOST VARIETY ON THE NATURAL INCIDENCE OF VA-MYCORRHIZA IN COWPEA

Vesicular-arbuscular mycorrhiza is a mutualistic symbiotic association formed by certain phycomycetous fungi with the roots of higher plants. Among cultivated crops, this type of fungal symbiosis is more predominant in plant families like gramineae and leguminosae. However, the extent of root infection by VA-mycorrhiza in these crops is influenced by the host variety. Taking this fact into consideration, an investigation on the natural incidence of VA-mycorrhiza in ten different varieties of cowpea was conducted under pot culture conditions at the College of Agriculture, Vellayani, Trivandurum. The seeds of these varieties such as C 152, CG 11, HG 22, New Era, Ptb 1, Ptb 2, RC 25, S 488, U 16 and V 38 were obtained from the Regional Agricultural Research Station of the Kerala Agricultural University, Pilicode, Kasaragode district.

The potting mixture consisted of sand, soil and cowdung in the ratio of 2:2:1. The seeds were initially inoculated with an appropriate *Rhizobium* culture prior to sowing. There were two phosphate treatments, with and without rock phosphate application at the rate of 30 kg P_2O_5 /ha. Muriate of potash was used uniformly at the rate of 10 kg K_2O /ha. Three replications were maintained for each treatment. The plants were grown for 45 days when the extent of mycorrhizal infection in each variety was determined by the standard staining procedure of Philips and Hayman (1970). One hundred root bits of approximately 1 cm in length from each replication were examined segment-wise

for the occurrence of VA-mycorrhiza. Different grades from 0 to 4 were given for each segment, depending on the extent of mycorrhizal infection. The average value thus obtained is expressed as the mycorrhizal index for each variety.

There were significant differences between varieties in their mean mycorrhizal index with or without rock phosphate application. The infection was maximum in cowpea variety C 152 (1.19) followed by Ptb 2 and New Era (Table 1). However, in the remaining seven varieties such as CG 11, HG 22, Ptb 1, RC 25, S 488, U 16 and V 38 the extent of mycorrhizal infection was significantly low when compared to that of C 152. The occurrence of this type of varietal variations in the natural incidence of VA-mycorrhiza is reported earlier in the case of *Phaseolus* beans (Sutton, 1973), wheat (Bertheau *et al.*, 1980), lucerne (Lambert *et al.*, 1980) and mung bean (Pandher *et al.*, 1986). The presence or absence of certain stimulatory substances in the root exudates of a particular host variety favouring early germination of VA-mycorrhizal spores in the soil and its subsequent root infection, apart from the host photosynthetic efficiency, may be a factor in determining the extent of natural root infection by VA-mycorrhiza in crop varieties grown under identical soil and environmental conditions.

The application of rock phosphate at the rate of 30 kg P_2O_5 /ha had a more or less uniform significant effect in enhancing the mycorrhizal infection in

Table 1. Influence of host variety on the natural incidence of VA-mycorrhiza in cowpea

Host variety	Mycorrhizal index*		Mean for each variety
	With rock phosphate	Without rock phosphate	
C 152	1.79 (1.67)	0.64 (1.28)	1.19 (1.48)
CG 11	0.90 (1.38)	0.02 (1.01)	0.44 (1.20)
HG 22	0.88 (1.37)	0.00 (1.00)	0.42 (1.19)
New Era	1.76 (1.66)	0.30 (1.14)	0.96 (1.40)
Ptb 1	0.77 (1.33)	0.19 (1.09)	0.46 (1.21)
Ptb 2	1.79 (1.67)	0.37 (1.17)	1.02 (1.42)
RC 25	0.28 (1.13)	0.06 (1.03)	0.17 (1.08)
S 488	0.08 (1.04)	0.04 (1.02)	0.30 (1.14)
V 38	0.90 (1.38)	0.02 (1.01)	0.44 (1.20)
Mean	0.99 (1.41)	0.17 (1.08)	—

* Mean of three replications

Figures in parentheses are after $V(x + 1)$ transformation

CD (0.05) for comparison between varieties = 0.17.

CD (0.05) for comparison between phosphate treatment = 0.08

all varieties except in S 488 (Table 1). This indicates that in soils which are generally P fixing and thereby P limiting,

the use of phosphate fertilizer can be beneficial in enhancing root infection by VA-mycorrhiza.

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