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Symbiotic response of *Dianthus caryophyllus* root stock to different mycorrhizal fungi

ANJANA S. KERUR AND H.C. LAKSHMAN

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SUMMARY

Nine different VAM fungi *viz. Acaulospora laevis, Gigaspora margarita. Glomus caledonium, G. fasciculatum. G. intraradices, G. leptotihum, G. macrocarpum. G. mosseae* and *Scutellospora calospora* were screened for their ability to enhance the growth and P uptake in *Dianthus caryophyllus* under glass house condition. Among the fungi studied *Acaulospora laevis* and *Glomus mosseae* significantly increased plant height, stem girth and total biomass of *Dianthus caryophyllus* as compared to uninoculated plants. Similarly, the per cent root colonization and P uptake were also significantly higher in *A. laevis* and *G. mosseae* inocuated plants as compared to uninoculated plants. These results suggest that *A. laevis* and *G. mosseae* are better symbionts for inoculating *Dianthus caryophyllus* a member of *Caryophyllaceae.*

Key words : AMF (Arbuscular Mycorrhizal Fungi), *Dianthus caryophyllus*

Vesicular arbuscular mycorrhizal fungi with their extramatrical network are known to have high affinity towards P and enhance P uptake especially in soils with low available P status and with high P retention capacity (Read, 1998). Inoculation of soil with arbuscular mycorrhizal fungi has been observed to increase the uptake of P, Cu and Zn, there by increase the dry matter yield of several legumes cereals and horticultural crops (Marschner and Dell, 1994; Kerur *et al.*, 2005). Arbuscular mydorrhizal fungi are known to occur in some of the tropical plantation crops (Plenchette *et al.*, 1983).

Dianthus caryophyllus is an important horticultural plant, its flowers are exporting to different countries earning crores annually. It generally cultivated in gardens with low fertility. It is under such situations the mycorrhizal dependency of the host plant becomes more evident and pronounced (Azcon – Aguilar and Barea, 1985). A preliminary work conducted on the effect of different mycorrhizal isolates revealed the need for screening and selecting of efficient inoculant mycorrhizal fungus for *Dianthus caryophyllus*. Early, workers (Harley and Smith, 1983; Allen, 1991), ruled out the association of AM fungi in *Caryophyllaceae*. Therefore, the present finding brings the association of AM fungi and its efficacy in promoting growth and biomass production in *Dianthus caryophyllus*.

Correspondence to:
H.C. LAKSHMAN, Department Post Graduate Studies in Botany (Microbiology Lab), Karnatak University, DHARWAD (KARNATAK) INDIA
Authors' affiliations:
ANJANA S. KERUR, Department Post Graduate Studies in Botany (Microbiology Lab), Karnatak University, DHARWAD (KARNATAK) INDIA

MATERIALS AND METHODS

The VAM fungi used in this study were maintained in a glass house as pot cultures using-sterilized sand: soil mix (1:1 v/v) as the substrate and Rhodes grass as the host. The hyphae, spores and root segments present in the substrate served as the inoculum. The inoculum potential (Infective propagules/g of inoculum) of the cultures was estimated using the most probable number technique (MPN).

Healthy seeds of *Dianthus caryophyllus* were sown in polythene bags of size 25 cm × 15 cm holding 2 kg of unsterilized sand : soil : compost in the ratio of 1:1:0.25. Equal number of infective propagules (12,500 IP/bag) were inoculated. One seed per bag was sown and plants were maintained for 120 days in a poly house.

The plant height and stem girth was recorded at 30,60 and 90 days after sowing. Plants were harvested after 90 days of sowing, data obtained after 90 days of sowing only is presented in this paper. Stem girth was measured by vernier callipers. The harvested plant samples were oven dried and total dry weight was determined.

Phosphorus content of plant samples was estimated by vanado molybdate phosphoric acid yellow colour method (Jackson, 1973).

Per cent mycorrhizal root colonization was determined following the gridline intersect method (Giovannetti and Mosse, 1980) after staining the roots with acid fuchsin. The mycorrhizal spore number per 50 ml of root zone soil was determined by wet sieving and decantation method (Gerdemann and Nicolson, 1963).

RESULTS AND DISCUSSION

Dianthus caryophyllus plants responded quite well