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Effect of AM fungi on mycorrhizal colonization, growth and nutrition of *Arachis hypogea* L.

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SUMMARY

An investigation was carried out on the mycorrhizal colonization, growth and nutrition of *Arachis hypogea* inoculated with *Glomus fasciculatum (GF)* in nutrition deficient sterilized soil using earthen pots. Significantly higher percentage of mycorrhizal colonization was recorded in the treatment where GF were present. After 30, 45 and 60 days of plant growth 32.4, 45.2 and 68.2 per cent root colonization were recorded in GF inoculated plants as compared to control. GF combination has improved plant growth, shoot and root dry weights and uptake more than uninoculated control plants.

Key words : *Arachis hypogea,* AM Fungi, Root colonization

Arbuscular mycorrhizal fungi (AMF) form symbiotic association with plant roots. The association is beneficial to plants as the AMF improves uptake of P, Cu, Zn, water relations and disease resistance in plants (Harley and Smith, 1983). AMF inoculum has been reported to improve its P uptake due to growth (Menge, 1986). Increase in P uptake due to AMF colonization has been attributed to extrametrical hyphae that spread into soil and transport P from non- photosphere zone. Although the effect of mycorrhizae has been studied in several agricultural and horticultural crops (Khaliq and Sanders, 2000; Raghuramulu, 2001), only few studies have been made on VA mycorrhizal inoculum in oil yielding plants.

MATERIALS AND METHODS

Soil and plant material:

The soils investigated in the present study were taken from field of Parner area, Distt. Ahmednagar, M.S. and it had the following characteristics: clay 14.3%, silt 13%, sand, pH 6.8, N_2, P_2O_5 and K_2O available 260, 20 and 42 ppm, respectively. Sterilized soil was placed in earthen pots with a hole in the bottom to release excess water.

Seeds of *Arachis hypogea* were used in the present study. Healthy seeds of *Arachis hypogea* were collected. Seeds were surface sterilized with 0.5% Sodium hypochlorite solution for 2-3 minutes, rinsed in 2 to 3 changes of sterile distilled water and dried overnight (Willer and Cook, 1983). For rooting, seed were grown in root trainers. After rooting they were transplanted in *Glomus fasciculatum* inoculated pots and non-inoculated pots served as control.

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Multiplication of Glomus fasciculatum:

Glomus fasciculatum, the predominant AM fungal species in the rhizosphere soils supporting *Arachis hypogea* was used. *Sorghum vulgare* as mother plant. *Sorghum vulgare* plants were allowed to grow for a period of 2 months, the roots were checked for colonization at 30 days interval. When 70-80 per cent infection is established, the roots were chopped and used as inoculum. The inoculum consisted of spores, sporocarps, hyphae and infected root material.

Experiment design:

Treatments given to the plants for the pot experiment were abbreviated as:

C: Control plants without inoculation of AMF

GF: *Glomus fasciculatum* alone

The rooted seeds were transferred to earthen pots (28 cm diameter). Before transferring, *G. fasciculatum* inoculation was added to each planting hole in the appropriate treatment to provide many propagules as determined by most probable number method (Porter, 1979). Two planting holes were made and two plants were maintained. Hogland nutrient solution without phosphorus was added to the plants for necessary nutrient supply. Continuous monitoring of humidity and temperature was done. 60 per cent soil moisture was maintained by adding sterilized water.

Plant growth and nutrient determination:

Plants were harvested 30, 45 and 60 days after transplanting. The roots were washed in distilled water, blotted dry and separated from shoot. Shoot height was observed using a gridline intersect method (Tennant, 1975). Sub samples of roots were removed prior to drying and stored in 50% ethanol. The shoots and root sub-