COMPARATIVE RESISTANCE OF MYCORRHIZAL FUNGI TO SEWAGE SLUDGE ON *VETIVERIA ZIZANIOIDES* (L.) NASH

D. Anusuya
Department of Botany, Bangalore University
Bangalore, India

Introduction

Soil pollution may be caused by the discharge of sewage and industrial effluents into the soil, deposition of acid, sulfur, ammonia on soil surface, or by addition of heavy metals in the soil.

Vetiveria zizanioides tolerates most heavy metals at much higher levels than other plants. It has been demonstrated to be a key plant for the rehabilitation of contaminated sites (Truong 1997; National Research Council 1993). Therefore, an attempt was made in the present study to study the effect of such soil pollutants on mycorrhizal development in *Vetiveria zizanioides*.

Material and Methods

Pot experiment was conducted in RBD with three replications. VAM fungal cultures were multiplied in the root zone soil of Rhodes grass. The inoculum had 685 spores/50 g of air-dried sample; for 25g of this, soil-based inoculum per plant was used. Rooted cuttings of vetiver prepared from grown clumps were used in the study.

According to the treatment, VAM fungi (*Glomus mosseae* and *G. fasciculatum*) soil-based inoculum at a rate of 55 g/pot was placed at 5-7 cm below the soil surface.

Results and Discussion

The effect of sewage water with or without VAM fungal inoculation was compared with tap water. The plants were harvested 90 days after planting.

From observation of the plant biomass, mycorrhizal root colonization was determined after staining the roots with trypan blue (Phillips and Hayman 1970). Mycorrhizal spore counts in the root zone. Soil was determined by wet sieving and decantation technique (Gerdeman and Nicolson 1963).

In the present study, root colonization and plant growth were very high in plants inoculated with effluents and *G. fasciculatum* compared to un-inoculated plant (Udaykumar et al. 1996).

Plant biomass was greatest with *G. fasciculatum* and effluents than both *G. mosseae* and effluents (Table 1).

Table 1. Effect of *Glomus mosseae* (*G.m.*) and *G. fasciculatum* (*G.f.*) (VAM) and sewage sludge on percent root infection spore number and plant biomass in *Vetiveria zizanioides.*

Treatment	Mycorrhizal colonization (%)	No. of spores/ 25 ml soil	Plant biomass (g/plant)
Control	18	15	22
G. mosseae	23	20	25
G. fasciculatum	24	28	27
G.m. + sewage	26	23	20
G.f. + sewage sludge	28	26	23

There was a significant increase in percent root infection and VAM spore number in rhizosphere soil treated with *Glomus fasciculatum* and effluents compared to *G. mosseae* and effluent and it was least in control plants.

The results of the experiment indicate that effluents exhibit the highest degree of mycorrhizal development in *Vetiveria zizanioides*.

References

Gerdemann, J.W.; and Nicolson, T.H. 1963. Spores of mycorrhizal endogone species extracted from soil by wet sieving and decanting. Tran. Br. Mycol. Soc. 46: 235-244.

National Research Council. 1993. Vetiver grass: a thin green line against soil erosion. National Academy of Science Press, Washington, DC.

Truong, P.N.V. 1997. Vetiver Newsletter, No. 17.

Phillips, J.M.; and Hayman, D.S. 1970. Improved proceedings for cleaning roots and staining parasitic and vesicular-arbuscular mycorrhizal fungi for rapid assessment of infection. Tran. Br. Mycol. Soc. 55:158-161.

Udaykumar, J.; Velu, V.; Arunachalam, G.; and Gopal, N.O. 1996. J. Soil Biol. Ecol. 16:124-128.