

OCCURRENCE OF VESICULAR – ARBUSCULAR MYCORRHIZAE IN MEDICINAL PLANTS

K. K. SULOCHANA, P. SIVAPRASAD AND G. SREEKANTAN NAIR

College of Agriculture, Vellayani – 695 522, Trivandrum, Kerala.

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ABSTRACT: *Observations on the occurrence of vesicular arbuscular mycorrhizae association in 16 medicinal plants are reported in this communication.*

The occurrence of vesicular-arbuscular mycorrhizal (VAM) association and its beneficial effects on growth and soil nutrient uptake has been reported in majority of the plants (Mosse et al. 1973, Bagyaraj and Manjunath, 1980). The medicinal plants that are known to produce many secondary metabolites like alkaloids, tannins and phenolics are reported to be non-mycorrhizal (Mohankumar and Mahadevan 1984). However, the occurrence of VA mycorrhizal colonization in such plants has been reported recently (Govind Rao et al. 1989). Observations on the occurrence of VAM association in some of the medicinal plants are reported here.

Root samples were collected from 16 plants grown in the instructional farm, attached to the College of Agriculture, Vellayani, Trivandrum. The roots were thoroughly washed with water and made into small bits of 1 cm length and fixed in formalin: acetic acid: alcohol (5 : 5 : 90) mixture. The roots were cleared with 10 per cent KOH and

stained with trypan blue (Phillips and Haymann, 1970). The percentage of mycorrhizal colonization was determined as outlined by Read et al., (1976). Colonisation intensity of VAM with root tissue was scored as 0, 1, 2, 3, 4 & 5 for no, negligible, rare, medium, good and maximum infections respectively.

The relationship between intensity of colonization and infection per cent was analysed statistically (Sundararaj et al., 1972).

All the plants observed were found to harbor VAM fungi in the root tissue (Table – 1). **Panicum repens** recorded highest mycorrhizal colonization of 62.5 with an intensity score of 4 while **Cardiospermum halicacabum** showed least colonization (12.4%) with intensity score of one. There was significant positive correlation between the colonization per cent and the intensity score ($r = 0.78$).

TABLE 1
PERCENTAGE OF COLONISATION AND INTENSITY OF
VAM IN MEDICINAL PLANTS

Sl. No.	Name of the plant	Intensity of colonisation	Percent Colonisation
1	<i>Achyranthus aspera</i>	3	42.5
2	<i>Andrographis paniculate</i>	3	40.0
3	<i>Cardiospermum halicacabum</i>	1	12.4
4	<i>Clerodendron infortunatum</i>	4	60.0
5	<i>Cyperus rotundus</i>	2	16.2
6	<i>Desmodium latifolium</i>	4	57.5
7	<i>Emilia sonchifoelia</i>	3	30.0
8	<i>Euphorbia hirta</i>	3	45.0
9	<i>Leucas aspera</i>	4	55.0
10	<i>Merrimia tridentae</i>	3	42.5
11	<i>Panicum repens</i>	4	62.5
12	<i>Phyllanthus niruri</i>	3	32.5
13	<i>Physalis minor</i>	4	57.5
14	<i>Scoparia dulcis</i>	3	40.0
15	<i>Solanum indicum</i>	3	50.0
16	<i>Vernonia cineria</i>	2	25.0

The study indicates that medicinal plants can harbor VAM in the root. This observation is in agreements with the earlier reports on

other medicinal plants (Strzemska, 1975 and Govinda Rao et al. 1989). The absence of mycorrhizal observations by earlier workers

(Mohankumar and Mahadevan, 1984) was attributed to the secondary metabolites of the host plant. The plants observed in the present study are known to produce a variety of secondary metabolites (Nadakarni, 1954). Hence, the chemical substances present in

the plant may not affect the VAM colonization. Since the plants can harbor VAM in the root system, it is possible to make use of the VAM inoculation technology to improve growth and general conditions of medicinal plants.

REFERENCES

Bagyaraj, D. J and Manjunath, A. Response of crop plants to VA mycorrhizal inoculation in an unsterile Indian soil. **New Phytol.** 85 : 33 – 36 (1980).

Govinda Rao, Y. S., Suresh, N. S. Mallikarjunaiah, R. R. and Bagyaraj. D. J., Vesicular – arbuscular mycorrhizae in medicinal plants. **Indian phytopath** 42 : 476 – 478 (1989).

Mohankumar, V and Mahadevan, A. Do secondary substances inhibit mycorrhizal association? **Curr. Sci.** 53: 377 – 378 (1984).

Mosse, B., Haymann, D .S. and Arnold, D. J., Plant growth responses to Vesicular – arbuscular, mycorrhizae, **New Phytol.** 72 : 809 – 815 (1973).

Nadkarni, K. M. **In Indian Materia Medica**, 3rd Ed. PP 623 – 637, Popular Book Depot, Bombay Prakashan Ltd., Panvel (1954).

Phillips, J. M. and Haymann, D. S. Improved procedure for cleaning roots and staining parasitic and VAM fungi for rapid assessment of infection. **Trans. Br. Mycol. Soc.** 55 ; 158 – 160. (1970).

Read, D. J., Kouchekei, H. K. and Hodgson, J. Vesicular – arbuscular mycorrhiza in natural vegetarian systems. **New phytol.**, 77 : 641 – 653 (1976).

Strzemska, J. Occurrence of mycorrhizae in cultivated plants. In **Endomycorrhizas** (Ed.), Sanders, F. E. Moose, B. and Tinker, P. B. PP. 537 – 543. Academic Press, New York (1975).

Sundararaj. N., Nagaraju, S., Venkataramu, M. N., and Jagannath, M. K. **Design and Analysis of Field Experiments**. University of Agricultural Sciences, Bangalore, Misc., Series. No. 22, 146 – 207 (1972).