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OCCURRENCE OF VESICULAR – ARBUSCULAR MYCORRHIZAE IN KAEMPFERIA GALANGAL LINN

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ABSTRACT: The presence of vesicular – arbuscular mycorrhizae in the roots of Kaempferia galangal is reported in the article.

INTRODUCTION

Much attention has been paid to vesicular – arbuscular mycorrhizal fungi (VAM) as a tool for improving the growth of agricultural and horticultural plants. (Gianinazzi et al., 1989). The occurrence of vesicular-arbuscular mycorrhizal association and its beneficial effect on growth and soil nutrient uptake has been report in most of the plants (Bagyaraj and Manjunath, 1980, Mosse et al., 1973). The medicinal plants which produce many secondary metabolites like alkaloids, tannins and phenolics are reported to the non-mycorrhizal (Mohankumar and Mahadevan, 1984). However the occurrence of VA mycorrhizal colonization in such plants has been reported (Govinda Rao et al., 1989) Kaempferia galangal is an economically important medicinal plant. The plant is known for its voltile oils which contain many medically important compounds such as n-pentadecane, ethyl p-methoxycinnamate (30%), ethyl cinnamate, 1Δ3 – careen, camphene, borneol and p-methoxystyrene (Grieve, 1931). Occurrence of VAM association in root rhizome and scale leaves of Kaempferia galangal is recorded here.

MATERIALS AND METHODS

The root, rhizome and scale leaves or rhizome samples were collected from eight different areas of Kaempferia cultivation of Ernakulam district. For further conformation of VAM association an experiment was conducted in pots in green house under sterile conditions with an artificial infection of 225 spores of VAM species of fungi, Glomus microcarpum. The roots rhizome and scale leaves of rhizome were thoroughly washed with water and made into small bits of 1 cm length and fixed in formalin: acctic acid: alcohol (5:5:90) mixture. The samples are then washed with 10% KOH and stained with trypan blue (Philips and Hayman 1970). The percentage of mycorrhizal colonization was determined as outlined by Read et al., (1976). Colonization intensity of VAM with root, and scale leaves of rhizome 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 percent was analysed statistically (Sundararaj et al., 1972).

Table -1

Percentage of colonization and intensity of VAM in the root of Kaempferia galangal

Sample No.	Location	Intensity of colonization	Percent colonization
1.	Pulluvazhy	4	69.0
2.	Pulluvazhy	4	73.3
3.	Pulluvazhy	4	71.0
4.	Kummanode	3	58.0
5.	Kummanode	4	75.0
6.	Kadayiruppu	4	75.0
7.	Kadayiruppu	3	46.3
8.	Kadayiruppu	4	70.3

Table -2

Percentage of colonization and intensity of VAM in the scale leaves of rhizome.

Sample No.	Location	Intensity of colonization	Percent colonization
1.	Pulluvazhy	4	66.0
2.	Pulluvazhy	3	43.6
3.	Pulluvazhy	4	71.0
4.	Kummanode	3	32.3
5.	Kummanode	4	63.0
6.	Kadayiruppu	3	4.3
7.	Kadayiruppu	3	44.0
8.	Kadayiruppu	3	57.3

RESULTS AND DISCUSSION

All the plants observed were found to harbour VAM fungi in the root tissue (Table -1) and scale leaves of rhizome (Table – 2) Infection was observed in rhizome also. Sample No.6 of root tissue recorded highest mycorrhizal colonization (75) with an intensity score of 4 while sample o & recorded least colonization (46) with intensity score of 3. sample No 3 of scale leaves of rhizome showed highest mycorrhizal colonization (71) while sample No.4 showed least colonization (32) with intensity score 3. There was significant positive correlation between the colonization per cent and the intensity score in root and scale leaves of rhizome (r=0.88 for root, 0.83 for scale leaves of rhizome). The experimental plants also showed an intensity score of 4 and highest mycorrhizal colonization of 73 and 69 in the root and rhizome respectively.

The study confirmed for the first time the Kaempferia plants can harbour VAM in the root. This observation is in agreement with the earlier reports on other medicinal plants (Strzemska, 1975 and Rao et al., 1989). The absence of mycorrhizal observation by earlier workers (Mohankumar and Mahadevan, 1984) was attributed to the secondary metabolites of the host plant. The plant observed in the present study is known to produce a variety of secondary metabolites (Grieve, 1931). Hence the chemical substances present in the plant may not affect the VAM colonization. Since Kaempferia can harbour VAM in the root, rhizome and scale leaves of rhizome, it is possible to make use of the VAM inoculation technology to improve growth and general conditions of this medicinal plant.

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