OCCURRENCE OF ARBUSCULAR MYCORRHIZAL FUNGI IN SOME MEDICINAL PLANTS OF KERALA

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ABSTRACT

The occurrence of mycorrhiza in 40 selected medicinal plants was studied. The percentage of mycorrhizal colonization in each of the plant was calculated. The colonization was found to be very less in four plants and very high in six plants. All others showed a moderate level of colonization. The present work suggests the use of mycorrhiza as a biofertilizer to enhance the growth and yield of medicinal plants.

INTRODUCTION

In India, a large number of medicinal plants occur in the wild state. With the growing importance of Ayurveda, it has become a necessity to cultivate these plants. However, the use of chemical fertilizers and pesticides has resulted in the reduction of quality of medicine. Hence the present strategy is to cultivate medicinal plants through organic farming techniques. Addition of biofertilizers can enhance the growth and provide resistance to the plant against microbial attack.

Arbuscular mycorrhizal fungi is a potent biofertilizer. It is known to control the deleterious effects of pathogenic microbes by chemical, physiological and morphological alterations in the host[1]. It can also enhance plant growth by better uptake of nutrients especially phosphorous and enhance tolerance of plants towards drought and salt stress [2, 3, 4, 5]. Hazarika etal., (2004)[6] have reported the influence of AMF on growth and biomass production in *Mimosa* and *Crotalaria.*

The present study was undertaken to estimate the percentage of mycorrhizal colonization in the roots of some selected medicinal plants, so as to form a base for subsequent work on AMF as a biofertilizer for the commercial cultivation of these plants.

MATERIALS AND METHODS

The mycorrhizal colonization percentage in the root samples were estimated following the procedure of Phillips and Hayman, 1970 [7]. The root samples were

cleaned off soil particles, cut in to 1cm bits and fixed in FAA for 24h. The roots were cleared by autoclaving with 10% KOH, washed with 1% HCl and stained with 0.05% Trypan blue in lactophenol. The roots were observed for the presence of mycelium, vesicles and arbuscules. The AMF colonization percentage was calculated as

$$\text{AMF colonization percentage} = \frac{\text{Number of root bits } +^{ve} \text{ for AMF infection}}{\text{Total number of root bits investigated}} \times 100$$

A minimum of 24 root bits from each sample was scanned to estimate the AMF colonization percentage.

RESULTS AND DISCUSSIONS

All the medicinal plants studied show AMF associations. The percentage of AMF colonization was found to be very less in *Desmodium gangeticum, Cyclea peltata, Tabernamontana divaricata and Hedychium coronaria*. A high level of colonization was noted in *Physalis minima, Bacopa moneiri, Aporosa lindleyana, Chlorophytum borivillianum, Acorus calamus and Vetiveria zizanioides*. All others showed a medium range of colonization.

In plants showing low and medium range of colonization, the AMF infection can be enhanced by the addition of specific mycorrhizal fungi as biofertilizer. This would surely enhance the vigor of the plant and hence the yield. The application of mycorrhiza will also reduce the chance of pathogenic attack and hence medicines of superior quality without harmful pesticides and chemicals can be prepared.

Further studies have to be done in each of the medicinal plant so as to select the suitable mycorrhiza that can be applied as a biofertilizer.

Sl. No.	**Name of the plant**	**Family**	**Percentage of colonization**
1	*Cyclea peltata*	Menispermaceae	15
2	*Sida rhombifolia*	Malvaceae	44
3	*Oxalis corniculata*	Oxalidaceae	49
4	*Glycosmis pentaphylla*	Rutaceae	38

5	*Cissus quadrangularis*	Vitaceae	44
6	*Cardiospermum halicacabum*	Sapindaceae	50
7	*Schleichera trijuga*	Sapindaceae	40
8	*Moringa olefera*	Moringaceae	72
9	*Abrus precatorius*	Papilionaceae	54
10	*Desmodium gangeticum*	Papilionaceae	14
11	*Bauhinia racemosa*	Caesalpiniaceae	44
12	*Cassia fistula*	Caesalpiniaceae	42
13	*Acacia intsia*	Mimosae	39
14	*Adenanthera pavonina*	Mimosae	69
15	*Calicopteris floribunda*	Combretaceae	62
16	*Mussaenda frondosa*	Rubiaceae	65
17	*Plectronia rheedii*	Rubiaceae	85
18	*Elephantopus scaber*	Asteraceae	77
19	*Scaveola frutescens*	Goodeniaceae	61
20	*Plumbago rosea*	Plumbaginaceae	71
21	Olea dioica	Oleaceae	72
22	*Ichnocarpus frutescens*	Apocynaceae	42
23	*Tabernamontana divaricata*	Apocynaceae	10
24	*Thevetia neriifolia*	Apocynaceae	46
25	*Physalis minima*	Solanaceae	97
26	*Bacopa moneiri*	Scrophulariaceae	95
27	*Vitex negundo*	Verbenaceae	50
28	*Ocimum sanctum*	Lamiaceae	47
29	*Boerhaavia diffusa*	Nyctaginaceae	51
30	*Cinnamomum zeylanicum*	Lauraceae	92
31	*Aporosa lindleyana*	Euphorbiaceae	99
32	*Emblica officinalis*	Euphorbiaceae	71
33	*Tragia hispida*	Euphorbiaceae	50
34	*Alpinia galanga*	Zingiberaceae	82
35	*Curcuma aromatica*	Zingiberaceae	78

36	*Hedychium coronaria*	Zingiberaceae	14
37	*Chlorophytum borivillianum*	Liliaceae	98
38	*Gloriosa superba*	Liliaceae	54
39	*Acorus calamus*	Araceae	99
40	*Vetiveria zizanioides*	Poaceae	97

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