OCCURRENCE OF VA MYCORRHIZAS ON DIFFERENT LEGUMES IN A LATERITE SOIL

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LEGUMES are known generally to form Vesicular-Arbuscular (VA) mycorrhizas, which are mainly implicated in the increased uptake of phosphorus[1,2]. Godse *et al*[3] had indicated that *Endogone* is widespread in Indian soils on the basis of its occurrence in a few crop plants. Jalali and Thareja[4] observed three spore types of *Endogone* spp. in the soils of Haryana. We report the occurrence of VA mycorrhizal associations in a wide range of leguminous plants of this locality.

Root and rhizosphere soil samples were collected from 25 legumes, some growing naturally and others cultivated on the University campus soil, which is an infertile, red lateritic type with an alkaline pH range (8.1). The roots from each sample were cut approximately into one cm segments, cleared by boiling in 10% KOH for one hr and stained with 0.1% trypan blue in lactophenol[5]. The presence or absence of the hyphae, arbuscules and vesicles or spores were recorded in 25 root segments of one cm length and the per cent infection calculated for each species. Spore types of VAM fungi and their abundance in soil samples of the locality were also recorded after extraction by the wet-sieving and decanting technique of Gerdemann and Nicolson[6].

The incidence of mycorrhizal infection and the number of spores present in the rhizosphere of each species are given in table 1. Out of 25 species examined, 18 showed mycorrhizas and *Glomus mosseae*

Table 1 *Mycorrhizal formation in legumes of University campus*

	Infection in roots				No. of spores in 50 g rhizosphere soil			
Plant species	Hyphae	Arbuscules	Infection (%)	No. of vesicles/ spores*	*Glomus mosseae*	*Gigaspora* sp.	Unidentified	Total no. of spores
Aeschynomene indica L.	–	–	–	–	–	–	–	–
Arachis hypogaea L.	+	+	80	155	26	19	3	48
Cajanus cajan L.	+	+	76	150	20	15	2	37
Cassia occidentalis L.	+	+	16	35	–	17	–	17
Cicer arietinum L.	–	–	–	–	2	–	–	2
Crotalaria biflora L.	–	–	–	–	1	–	–	1
C. ramosissima Roxb.	+	–	24	33	5	–	–	5
C. juncea L.	+	+	60	92	11	20	–	31
Dolichos biflorus L.	+	+	52	86	10	7	1	18
D. lab lab L.	+	+	56	98	16	10	–	26
Helandia latebrosa L.	+	–	28	36	8	–	–	8
Indigofera linnaei Ali.	+	–	12	37	5	–	–	5
I. linifolia Retz.	+	–	16	19	4	–	–	4
I. trita L. f.	–	–	–	–	–	–	–	–
I. tinctoria L.	–	–	–	–	–	–	–	–
Neptunia triquetra Benth.	–	–	–	–	1	–	–	1
Phaseolus aureus L.	+	–	60	105	20	6	1	27
P. mungo L.	+	–	64	112	20	–	–	20
P. trilobus L.	+	+	40	102	9	–	–	9
Rhynchosia minima DC.	+	–	60	59	15	–	–	15
Sesbania aculeata Poir.	+	+	8	24	7	–	–	7
Tephrosia hirta Buch. Ham.	+	–	12	15	5	–	–	5
T. purpurea L.	+	–	16	74	3	–	–	3
T. procumbens Buch. Ham.	+	–	20	28	4	–	–	4
Trigonella foenum-graecum L.	–	–	–	–	–	–	–	–

* Total number of vesicles/spores in 25 one cm root segments
\+ Presence
– Absence

was present in all of them. The identification of this species was on the same basis as reported by us earlier[7]. The most heavily infected species (> 50% of root segments showing the VAM fungus) were *Arachis hypogaea*, *Cajanus cajan*, *Crotalaria juncea*, *Dolichos biflorus*, *D. lab lab*, *Phaseolus aureus*, *P. mungo* and *Rhynchosia minima*. The remaining species showed 8 to 40% infection. Arbuscules were seen only in a few plant species *viz Archis hypogaea*, *Cajanus cajan*, *Cassia occidentalis*, *Crotalaria juncea*, *Dolichos biflorus*, *D. lab lab*, *Phaseolus trilobus* and *Sesbania aculeata*.

The relative abundance of spores of VAM fungus in the rhizosphere soil samples was positively related to the data on the per cent infection of the host species concerned. The most common spore type is that of *G. mosseae*. Another spore type was also found, but only in the rhizosphere of a few species. It is identified as *Gigaspora* sp. basing on spore characters (spherical, 300 to 490 μm diameter; hyaline or yellowish with bulbous attachment). As this fungus is not known to produce vesicles in host roots[8], its presence in the roots of the legumes examined could not be ascertained.

These results clearly bring out that mycorrhizal fungi colonize effectively in the roots of a variety of leguminous plants growing in the infertile lateritic soil of the University campus. Such a condition can be expected to be beneficial to the plants. Our preliminary observations also reveal that *G. mosseae* is the most widespread VAM fungus in this soil type. With the exception of *A. hypogaea*, *C. cajan*, *D. lab lab* and a species of *Phaseolus*[7], the occurrence of *G. mosseae* had not hitherto been reported on the other hosts on which it is now recorded. It is worthwhile to study the contribution of this isolate to the phosphorus nutrition of legumes.

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MODIFIED BLOTTER METHOD FOR THE DETECTION OF *PHOMA* AND *MACROPHOMINA* ON SEEDS

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MANY species of *Phoma* and *Macrophomina* are seed-borne pathogens of *Beta vulgaris*, *Capsicum annuum*, *Lycopersicum esculentum*, *Bellis perennis*, *Linum usitatissimum*, *Dolichos biflorus* in addition to some cereals and other legumes and cause seed rot, seedling blight, fruit rot and foliar diseases[1].

In the routine seed health testing to detect *Phoma* spp and *Macrophomina phaseolina*, standard blotter method is followed. However, Hagborg *et al*[2] and Neergaard[1] introduced a modified PDA and blotter method to detect *Phoma lingum* on cabbage seed.

Correct infection percentage of the seed-borne *Phoma* and *Macrophomina* species cannot be determined by the above methods due to the presence of saprophytic fungi and the natural resistance exerted by the germinated seeds. In the present study, a selective method has been devised to detect these pathogens. For this purpose, different salts of sodium, calcium, magnesium, cobalt at 0.1, 1, 2.5, 5, 10 and 15% have been used. In this method blotters were soaked in different concentrations of the salts instead of moistening with distilled water. Incubation was carried out according to the standard seed health testing procedure[3].

Of these, blotters treated with 5% calcium chloride gave better results over standard blotter method (table 1). Observations could be made easily as only *Phoma* and *Macrophomina* were found to grow profusely on the treated blotters around the infected seeds despite the presence of other fungi associated with the seed (figures 1, 2). Further the seeds did not germinate on treated blotter which facilitated easy scoring for the pathogen.

This modified method is found to be superior over