International Journal of Applied Research 2019; 5(7): 520-521

ISSN Print: 2394-7500
ISSN Online: 2394-5869
Impact Factor: 5.2
IJAR 2019; 5(7): 520-521
www.allresearchjournal.com
Received: 10-05-2019
Accepted: 15-06-2019

Dr. Sindhu Kumari
C/O Dr. VS Prasad, HOD Surgery, DMCH, Laheriasarai, Darbhanga, Bihar, India

Corresponding Author:
Dr. Sindhu Kumari
C/O Dr. VS Prasad, HOD Surgery, DMCH, Laheriasarai, Darbhanga, Bihar, India

Analysis of AR buscular mycorrhizal fungi associated with some medicinal plants

Dr. Sindhu Kumari

Abstract
Aarbuncular Miccorrhizal Fungi (AMF) which constitute a major group soil microbial community. The present study is aimed to determine natural AMF spore population dynamics in rhizosphere soil and its colonization in some medical plants under the influence of different season. The pre-dominate genera of AM fungi were also identified.

Keywords: Aarbuncular Miccorrhizal Fungi (AMF) and Medicinal Plants

Introduction
The associations of fungi with medicinal plants growing in different habitats have been studies by several earlier workers (Govind Rao *et al*., 1989, Selvaraj and Subramanian 1990, Aggarwal *et al*., 2005, Sharma *et al*., 2007a.) [1, 2, 3, 5] but information regarding the role of these microbes for the conservation of medicinal plants and their efficiency to promote growth yield are very few (Nelson *et al*., 2000, Sharma *et al*., 2007b.) [3-5]
AMF colonization varies with season and its effect also influence the establishment of plants under field condition (Giovannetti and Nicoloson 1983) [6]. The present study, all these plants were found to have AMF association, Percentage of AMF colonization was noticed less in winter, remained moderate in summer and highest in rainy season. Similarly the highest number of AMF spores was found in rainy season while moderate numbers in winter and the least in summer. Glomus sp. was recorded as dominant root symbiont.

Materials and Method
The root and rhizosphere soil samples of three medicinal plants *Viz*., *Andrographis Paniculata*, *Rauvolfia serpentine* and *Withania somnifera* were screened for association of AM fungi. Three replicates of each plants were randomly sampled.

AMF fungi spore population: AM fungi spores were isolated from soil samples using wet sieving and decanting method (Gerdemann and Nicolson 1963) [6, 7] and were quantified using the 'gridline intersect method' (Adholeya and Gaur 1994) [8].

AMF root colonization: Root colonization was observed by rapid clearing and staining technique. Percent root colonization was determined as mentioned under.

$$\% \text{ Root colonization} = \frac{Number\ of\ positive\ segments}{Number\ of\ segments\ observed} \times 100$$

Spores were examined and identified using manuals.

Results and Discussion
AMF colonization in roots and spore population in the rhizosphere soil samples of *R. serpentine*, *A. paniculata* and *W. somnifera* showed wide range of variation under different season as shown in (Table 1).

Table 1: Seasonal variation of mycorrhizal association in *R. serpentine*, *A. paniculata* and *W. somnifera* during the year 2015

Months	Number of spores/10g soil			% root colonization		
	Name of the plants			Name of the plants		
	R. serpentina	A. paniculata	W. somnifera	R. serpentina	A. paniculata	W. somnifera
January 15	20	18	21	55%	50%	60%
February	19	15	22	58%	48%	68%
March	18	16	22	61%	44%	58%
April	16	26	23	70%	42%	59%
May	15	22	24	58%	40%	70%
June	20	30	28	70%	70%	75%
July	25	34	27	74%	74%	78%
August	31	36	33	80%	84%	85%
September	20	14	26	62%	56%	80%
October	22	21	23	62%	54%	80%
November	16	22	18	60%	58%	60%
December	21	14	20	61%	60%	62%

Mean of three replicates ± 4.303 ✕ Standard error, Standard deviation - ± 2.48, CD - 3.52 in all the cases.

In *R. serpentine*, percent root colonization and mycorrhizal spore counts steadily increased from June and reached to a maximum value i.e., 80% and 31 spores/10g dry soil respectively in August month of rainy season. However, both the spore population and root colonization were recorded higher in winter than in summer season. In *A. paniculata*, percentage root colonization and spore population was observed to vary from 40-84% and 14-36 spores respectively and their maximum level was recorded during July to August (rainy season). In *W. somnifera*, maximum percentage root colonization *i.e.* 85% and spore population *i.e.* 33 spores were observed during rainy season thereafter declined during winter season.

AMF spores isolated from the rhizosphere soil samples of plants understudy were identified as *G. macrocarpum*, *G. microcarpum*, *G. reticulatum* in case of *R. serpentine*, *G. mosseae*, *G. deserticola*, *Sclerocystis pakistanica* from *A. paniculata* and *G. mosseae*, *G. macrocarpum*, *G. reticulatum* from *W. somnifera* whereas *Glomus fasciculatum* and *Gigaspora margarita* were found commonly associated with all the plants.

In all the cases soil was more or less alkaline, reported that Glomus is frequently observed in alkaline soil. The influence of different seasons on root colonization in case of *A. paniculata* and *W. somnifera* and *R. serpentine* were recorded almost same and it was observed maximum in rainy season followed by winter and summer.

The level of AM fungal association depends on root morphology, metabolism and rate of plant growth as well as on specific soil plants system in terms of chemical nature of root exudates. In addition to these factors, pH of the soil may also play very decisive role in controlling AMF root colonization and spore population but it was found to be ineffective in the present investigation as the pH remained within narrow range of 5.0-8.5. In natural system, that seasonal fluctuations of mycroohizal associations were closely related to plant phenology. Maximum spore population in the present investigation was observed during rainy seasons which coincides with flowering time of all three plants.

Conclusion

It might be correlated with the fact that during this period most photosynthate is allocated to roots and rhizomes, which helps fungal symbiont to produce more spore (Gemma and Koske 1988, Wallen 1980) [10].

Percent root colonization in all plants understudy was recorded highest during rainy season may be correlated with the work of Mason *et al*., (1992) [11].

References

1. Govind Rao RR, Mallikar, Dagyarj DJ. VAM in medicinal plants. Indian Phytopath 1989;42:472-478.
2. Selvaraj T, Subramanian G. Incidence of VAM fungi in medicinal plants. In: Mycorrhiza symbiosis and plant growth. Bagyaraj DJ & Manjunath. Proceeding of the Second National Conference on Mycorrhiza Banglore 1990, P34-35.
3. Sharma S, Aggarwal A, Kaushisg S. Biodiversity of endomycorrhizal fungi associated with some medicinally important plants of Himanchal Pradesh. J Indian bot soc 2007;86(3&4):14-17.
4. Nelson R, Krishanamurti KV, Senthikumar S. Growth stimulation of santalum album seeding by Vesicular Arbuscular Mycorrhizal fungi. Mycorrhiza News 2000;12(2):14-15.
5. Sharma S, Sggarwal A, Kaushish S. Effect of two arbuscular mycorrhizal fungi on the growth of Stevla rebaudiana Bertoni. J Indian bot soc 2007;86(3&4): 100-104.
6. Giovannetti M, Nicolson TH. Vesicular Arbuscular mycorrhiza in Italian sand ounes. Trans British Mycol Soc 1983;80:552-557.
7. Gerdemann JW, Nicolson TH. Spores of mycorrhizal Endogone species extracted from soil by wet sieving and decanting. British Mycol Soc 1963;46:235-244.
8. Adholeya A, Gaur A. Estimation of VAMF spore in soil. Mycorrhiza News 1994;6:10-11.
9. Gemma JN, Koske RE. Seasonal variation in spore abundance and dormancy of Gigaspora gigantean and in mycorrhizal inoculums potential of dune soil. Mycologia 1988;80:211-216.
10. Wallen B. Change in structure and function of Anmophila during primary succession. Oikes 1980;34: 227-238.
11. Mason PA, Musko MO, Last FT. Short term changes in vesicular arbascular mycorrhizal spore population in Terminalia plantation in Cameroon. In: mycorrhiza in Ecosystem, read DJ, Lewis DH, Hater HA & Alexander IJ Cambridge University Press 1992, P216-267.