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E: ISSN NO.: 2349-980X **Shrinkhla Ek Shodhparak Vaicharik Patrika**

Arbuscular Mycorrhizal Fungi Growing on Medicinal Herbs Dhubela Forest

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Abstract

Geologically Dhubela forest cames under the vidhyan and decan trap of rock system chief soil types are brown loam locally called “Bhuri Mitti” which is the most common soil, black soil locally known as “Kali Mitti” which from the soil of the area.

Present study deals with the occurrence of Arbuscular Mycorrhizal Fungi in some grasses growing in the forest it was observed that there was significant variation in the AMF associated with different grasses. However maximum number of AMF species was recorded with Cynodon dactyton and minimum with Hetropogon contortus. Glomus 7 species, Acaulospora 5, Scuttespora 2 and Entrospora single spicies of Gigaspora wer also recorded.

Keywords: AM Fungi Colonization Spore Population.

Introduction

AM fungi are ubiquitously associated with large majority of plant families in different system across the world ranging from the tropics (Janos 1980, Zhao et al 2001, Vyas et al, 2008 or arctic-alpine habitate (Haselwandter and Read) Inghan and Wilson 1999, Muthukumar and Udaiyan 2000) and arid habitate. Plant faced different condition during their life span and there for they developed numerous strategies to cope with diverse biotic and abiotic challenges that are consequence of their sedentary life cycle one of the most successful strategies is the ability of root system of establish mutualistic and reciprocally beneficial symbiotic relationship with micro organism. The soil environment plant physiology and mycorrhization can be change through different fertilization system change in soil management by fertilization can crop almost independent of AM fungi or eliminate certain.

Generally high rates of fertilizaers are applied to obtain maximum yield but indiscriminate use of fertilizer can effect AMF acivity and diversity negatively (Liu et al 2000, Burrows and pillager 2002 : Treased and allen 2002, Madder et al 2000.Menedez et al. 2001. Soni et al 2006) for example the application of high level of fertilizer leads to the build up a P-tolerent AM fungi community depress my corrhizal spore germination spore viability.

Among many medicinal herbs plants cultirated India for obtaing valuable essential oils and medicine Cynodan dactylon, Cymbopogon martini and Vetiveria Zizanoides are the most important herbs plants of large family Poaceae.

Review of Literature

The sybiotic association betbeen fungi and plant roots.among the types of mycorrhizae observed in nature ,arbuscular mycorrhiza (AM) is found on the vast majority of cultivated plants arbuscular mycorrhizas may have been described as early as 1842 (Nageli, 1842) but most of Nagelis drawing only remotely resamble the as arbuscular mycorrhiza.Trappe and Berch (1985) and Rayner(1926-1927) cite other early observation of symbiosis during the period 1875-1895.Extensive surveys of host plant and sophistcated anatomical description ofwhat are most certainly arbuscular mycorrhizas are given by Schlicht(1889), Daggered(1896),Janse(1897), Petri(1905)Gallaud (1905), Peyronel (1924), Jones (1924) and Lohman (1927). As early as1889, Schlicht had already observed the basic anatomical relationship between host fungal tissues Janse (1897) called extrametrical spores vesicle and determined that other stracture named arbuscules by Gallaud (1905), were located in the inner cortex. Gallaud (1905) made very accurate observation of the arbuscule and conduced for example that it is entirely surrounded by a host membrane which was later confimed by Cox and Sander (1974) using trasmission electron microscopy. Gallaud (1905) also noted that partial digestion of the arbuscule resulted in a strecture called the sponrangial by Janise (1897)

this observation was confirmed by electron micriscopy years later (Cox and Sander,1974) .Trappe and Schenck 1982 recognized another mycorrhizal genus Entrophasphora In 1987, Walkeralso recognignized five arbuscular mycorrhizal fungal genra .In the early 1970 it become clear to Gerdermann and Trappe 1974.

Aim of the Study

1. Distribution of AM fungi and status of mycorahhization in selected medicinal herbs.
2. Effect of function diversity on AM fungi.
3. Effect of root colonization and spore isolation.

Material and Method

The present experiment were conducted in the Dhubela forest for such experiment were used collection of soil and root sample was done periodically from the rhizosphere of each selected medicinal plant at regular inter vals. Soil sample were taken by digging out a small amount of soil closer to the plant at the depth of 5-10 cm after removing the topsoil.

Root sample were collected at the fime of soil collection roots were excavated carefully with the help of hoe and care taken to prevent damage to the fine root.

All the sample (soil and root) were brought to the laboratory in labeled polytene bage.

Physical Analysis Soil

Soil Texture

Soil texture was determined by pipette method (piper luau)

Colour and Odor

The color and odor of soil was determined by producedure following the method Mishra (1968)

Chemical Analysis of Soil

Ph

The pH was determined in is suspension of

Soil

Deionizer water ratio, electrometrically by glass electrode pH meter 335 (Jackson 1962)

Conductivity

The conductivity was determined by electrical glass conductivity meter (Cromwell 1955)

Organic Carban

Organic Carban content of the soil sample was determined by walker and Black rapid filtration Method (Pandeya et al 1968)

Result

Numbers of asbuscular mycorrhizal fungi (AMF) were isolated from the rhizosphere of 5 test plant growing in Dhubela Forest. Respectively over all five genra of AM were identified among the are table 1.1 present study Glomus with (7 species) and Acaluhospora with (5 species) Scutellospara with (2 species) Entrophaspora and Gigaspora with single species.

AMF species identified on the basic of their morphotytes each species are characterized on the basic of its colors, shape, spore wall, diametere, spore content, portion of subtending hyphae. Most of the Acaulospora species showed yellowish color spore wall thin and no subtending hyphae were oserved. Entrophaspora was represented by single species. E infrequence showed dull brown color single layered wall hyline to subtending hyphae observed where as Gigaspora albida showed light greenish yellow color large spherical shaped with light brown granules, single hyline subtending hyphae with bulbose suspensor attached to hyphae. Glomus species yellow to brown dark colors globose 2-3 layer wall attched with subtending hyphae scuttellospora showed hgline to prime or pale grey, globose or ellipsoid shape.Thick spore wall suspensor brone terminally separate subtending hyphae.

Date presented in the table 1.1 shows that AM fungi occurs in Five selected medicinal herbs growing site Dubela forest as it is clearly evident from the result that all the selected nerbs (grasses) harbour number of AM fungi in their respective rhizosphere occurrence of AM fungi varies plant to plants at the site among the selected grasses Cynodon dactylon was found good host under the nutural Condition because mximum number of AMF species recorded from its rhizosphe. Interestingly at the site no of AMF were recorded higher Cynodon dactylon during the period of 2013-2016 Cymbopogeo martinii which also show good number of AMF species during the study period Vetivaria Zizanoides harbors comparative of AMF species under the same period in 2013-2014 as it is clearly evident from the Result that Cynodon dactylon, Cymbopogon martinii and Vetivaria Zizanoides and other grasses.

Root colonization does not show any rupe there no clear cut trands regarding colonization some grasses showed good colonization when they are growing at Dhubela forest them year were result does not speak off any trends regarding occurrence of AMF and root colonization in selected grasses.

Table: Occorrence of AMF Species with Test Plant Dhubela Forest

Medicinal Herbs	2013-14	2014-15	2015-16	2013-14	2014-15	2015-16
	AMF Species			Root Colonization		
Acrache racemosa	10.1+1.4	11.2+1.9	11.2+3.1	37.1+2.1	40+1.2	41.1+1.5
Cynodon dactylon	13.1+2.1	10.1+3.2	18.3+3.1	56.31+1.6	65.1+4.2	70.1+2.5
Cymbopogon marfinii	14.1+1.2	14.2+3.1	13.1+1.6	47.1+1.6	55.1+2.4	66.1+4.2
Hentropogon contortus	10.1+2.1	11.1+2.1	10.1+1.2	41.1+1.7	49.2+3.4	52.1+2.4
Veteraria Zizaniodes	11.1+3.1	12.1+1.4	11.1+2.1	46.1+2.7	49.1+3.4	53.1+2.5
LSD p>00.5	2.10	2.46	3.14	2.86	4.65	4.32

Discussion

Morphological diversity in glom leon fungi is most infor mative within a developmental context where character are individuated according to their origen and stage in a transformational sequence the character are not all created equally nor are they independent of eachother, as curront taxonomic terminology would suggest.

Analysis of Vesicular arbuscular mycorrhizal fungal diversity though mcrphological character of

spore and intra-raidiculor hyphae was suggest that the vesicular arbuscular mycorrhizal fungal spore pulation of rhizosphere soil were varied indifferent medicinal plant Dhubela forest. A total of 7 AM fungal species were found associated with root of 5 plant species. It was observed that Cynodon dactylon harbour 10 species and subsequently Glomus hoi show mycorrhizal association with 10 different plant species (Koske 1987) had reported 2 to 6 different AM species in the root of Cymbopogon martinii. Vetivaria Zizanoides and Hetropogon contortes also resendal et al (1990) were able to identify one different mycorrhizal type in the root of several coaxing plant while sander and (Fitter 1992). The unspecifity in AM fungi also has been proofed by read et al. 1976. The wide spered occurrence of AM fungal association with medicinal plant in different location observed can be attributed to possible reasons firstly as in most areas of the sub tropics the soil was slow in phosphorous which coropared to other report from tropics (Musko et al 1994 : Brundrett et al 1996). Spore densities are known to varry grately in different ecosystem. Values range from dozens to 6000 spore per 50 gm-1/soil (Cuenca and lovera 1992; Johan son and wedin 1997; Piscine, 2000; Li et al 2004; Li and Zhao 2005). Glomus the small sported species mainly fall into the genera Glomus and Acaulospora (Morton 1988) An important observation in the present study was that all species of family poaceae examined were mycorrnizal.

Althoregh these families are presumed to be non-mycorrhizal (Tester et al. 1987) The previes study support the AM fungal Communities dominated by Glomus and Acaulospora and the lower abundance of species of Gigaspora and Scuttellospora in to the forested ecosystem (Helgason et al. 1998; Merry wheather and fitter 1988, 1998b; daieall et al. 2001, Jansa et al ; 2002; Eom et al ; 2004) (Gioverinetti et al ; 1999) Host medicinal plant species had a significant effect on both the number of AM species and their community stracture similar to observation in the other studies Johnson et al ; 1992; Musoko et al 1994; Bever et al ; 1996; Merry weather and fitter 1998 b Ecom et al 2003; Burrows and Pfieger 2002 and Husband et al ; 2002a) Also similar to earlier studies in the forest at La Salva (Lovelok et al ; 2003) and in other ecosystem (Frank et al ; 2003)

Conclusion

The contain review of the literature it is an important part of the work this give an overview of mycorrhizal reserch though out the world deals with material and method which also included the study of aera completrly methodology is discussed right fromthew study area mycorrhizal method such as sampling analysis of physiochemical properties of soil, enumeration identfication of AM fungal spore and root processing and assesment of colonization.

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