DIVERSITY OF FUNGI IN CULTIVATED AND UNCULTIVATED SOILS OF BIKKEMANE (V) IN CHIKKAMAGALURU (D) KARNATAKA.

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Abstract: Soil fungi were isolated from different crop fields of Bikkemane (V) i.e. Paddy, Coffee, Ragi, Chilly, Potato, Maize, Ginger and uncultivated land. In the present study maximum number of fungal colonies obtained in Paddy field (206) followed by uncultivated soil (190) , Coffee (39), Ginger(28) and least in Potato field soil sample. A total of 33 species belonging to 11 genera and two types of non sporulating fungi were recorded from eight samples. Fugal class Deuteromycetes (87%) was recorded with highest % in all the samples followed by Zygomycetes (0.6%). *Aspergillus sydowii* recorded with highest percent contribution (74.35) , *Fusarium incarnatam* with 1.6% and 15.09 to 16.98 % non sporulating fungi. Maximum number of number of *Aspergillus* and *Penicillium* species were recorded because of heavy sporulation. The study area showed wide range of pH in Paddy soil with slightly acidic to alkaline pH, Coffee and uncultivated soil with acidic pH, Ginger growing soil with alkaline pH showed more number of colonies and species. The diversity of soil fungi vary in different plots may be due to the difference in pH, micro and macro nutrients status.

Key words: Cultivated, Diversity, Fungi, Variation, Crop fields.

I.INTRODUCTION

Soil is an aggregation of eco physiological compounds with manifold micro-organisms like Bacteria, Actinomycetes, Algae, Fungi, etc. Among these organisms fungi inhabited foremost place in the living world. Fungi are ubiquitous organisms radiated about a billion years ago and are given a prime importance because of the biochemical transformations and recycling activity became an integral part of human welfare. But saddest part is that only a fraction (1.1%) of total fungal wealth has been subjected to scientific scrutiny and mycologists have to unrevealed the unexplored and hidden wealth (Manoharachary .*et.al*.2005). The quantity, diversity and distribution pattern of fungal population in the soil affected by organic matter ,topography, vegetation and abiotic factors (Tsai. *et.al*.2007, Bhattacharyya and Jha,2011). Soil fungal distribution vary based on soil texture, temperature, carbon content (Saksena and Nand.1966) etc. So the present study was undertaken to record the diversity of soil fungi in cultivated and uncultivated soils of Bikkemane village in chikkamagaluru with physicochemical analysis.

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II. MATERIALS AND METHOD

2.1. Study area

Bikkemane is located ten km away from Chikkamagaluru is one of the floristic areas with wide range of eco system and species diversity with 160 hectares of land area mainly constitutes scrubby forest in major part and agriculture land with cultivations of crops like Paddy [*Oriza sataiva*], Ragi [*Eleusina coracana*], Maize *[Zea mays*], Ginger [*Zingiber officinale*] , Coffee [*Coffea arabica and robosta*], Potato [*Solanum tuberosum*], Chilly [*Capsicum annuum*]. It is situated between 12^0 54' 42" and 13 53'53" north latitude and between 75 04'46" and 76 21'50" east longitude. In Bikkemana the temperature varies from minimum of 11^0c – 32^0c Average rain fall is 19 - 90 mm and wind 4km/hour and atmosphere pressure is 1489.8 milli bars, 47% of humidity**.** Before collecting the soil sample eight sampling sites Were selected such as cultivated land i.e. Paddy, Coffee, Ragi, Chilly, Potato, Maize, Zinger and uncultivated land which are differed by a distance of about one km each other. The study was conducted during January to February for the analysis of soil fungi.

2.2. Collection of samples

Eight soil samples were collected out at the depth of 10 -15 cm after scraping away an inch of surface soil with a sterilized trowel directly into fresh polythene bags. Then soil samples were carried to laboratory for the isolation of fungi and physicochemical analysis.. Isolation of soil fungi were enumerated by serial dilution method (Waksman.1944). Ten grams of soil samples were serially diluted and one ml of sample was poured on PDA medium for the growth of fungi then incubated in an inverted position for 3-7 days at room temperature 25 ± 2^0 c. Obtained fungal isolates were identified on the basis of Cultural characteristics such as color, size, shape etc. with the help of relevant literature (Barnett .1972, Gilman.2001, Nagamani.*et.al*.2006).The obtained data was presented in terms of Percent contribution (Saravanakumar and Kaviyarasan. 2010). It represents total number of colonies of an individual species in a sample against the total number of all colonies of all species in a sample.

III. RESULTS AND DISCUSSION

Soil fungi were isolated from different cultivated land i.e. Paddy, Coffee, Ragi, Chilly, Potato, Maize, Ginger and uncultivated fields of Bikkemane (V). The abundance of soil fungi showed variation in different sampling sites. In the present study maximum number of fungal colonies obtained in Paddy field (206) followed by Uncultivated soil (190) , Coffee (39), Ginger(28) and least in Potato field soil sample. A total of 33 species belonging to 11 genera and two types of non sporulating fungi were recorded from eight samples. Fugal class Deuteromycetes (87%) was recorded with highest % in all the samples followed by Zygomycetes (0.6%). *Aspergillus sydowii* recorded with highest percent contribution (74.35) and *Fusarium incarnatam* with 1.6% and 15.09 to 16.98 % non sporulating fungi (Table 2). Analysis of physicochemical properties showed slight variation of soil parameters like p^H, Electrical conductivity, Carbon, Nitrogen etc. in selected study plot(Table.1.).

We have recorded more number of *Aspergillus* and *Penicillium* species because of heavy sporulation and toxins producing capacity favors there development than other species of fungi by inhibiting the growth of other fungal and bacterial members (Satish.*et.al.*2007) and effect of physicochemical properties also causes great variation in diversity of fungi.

In the study site Paddy soil with slightly acidic to alkaline pH, Coffee and uncultivated soil with acidic pH, Ginger growing soil with alkaline pH showed more number of colonies and species. There is a controversy regarding effect of pH on fungal population in the study area. Because fungal abundance slightly increases as soil pH decreases (Rousk,*et.al.*2010). Increased pH is responsible for less abundance in the soil (Behera and Mukerji. 1985, Banakar,2012). Fungal population remains relatively constant in culture condition of pH (Matthies, 1997) 2.2 – 6.5. Marginal variations in soil pH fail to influence fungal populations (Behera.*et.al.*1991, Panda, *et.al.* 2010). But the quantity and quality of organic carbon present in soil could govern the microbial population numbers by affecting the microbial activity (Tiwary, *et.al.*1992). So pH and soil organic carbon does not appear to be a conclusive pattern since alterations in pH and soil carbon in several cases has insignificant effects on fungal dominance. Several researchers have reported similar effects of pH and soil carbon on fungal distribution (Högberg *et.al*, Strickland and Rousk 2010) Excess use of fertilizer also alters the soil pH that affects the diversity of fungi in the selected study plots, Both acid as well as alkaline soils supports large number of fungi (Rao.1970). Our results revealed that fungi have wider pH tolerance for optimum growth and thus are less affected by pH gradients. Few of the isolated fungal flora were appeared sporadically during different study plots while *Aspergillus* species were found predominantly in all most all samples.

Table.1, **Physico-chemical parameters of cultivated and uncultivated soils during the study period**

Different soils	Soil P^H	EC dSm^{-1}	N Kg ha^{-1}	C %	P (Kg ha^{-1})	K (Kg ha^{-1})	Ca ppm	Mn ppm	S (Kg ha^{-1})	Soil moisture
Paddy	6.13	0.14	210	1.42	13.8	115	5.5	3.1	Traces	9.8
Coffee Soil	5.7	0.16	154	2.01	33.6	210	13	2.3	174	7.5
Ragi	5.13	0.13	116	1.26	40.0	60	8.56	3.63	13	9.1
Chilly	5.5	0.18	**104**	**1.06**	**44.5**	**97**	**7.55**	**3.20**	14	9.1
Potato	7.84	0.36	97	0.90	32.4	59	13	2.30	Tr	9.6
Maize	7.38	0.20	90	0.92	36.4	135	7.43	4.01	320	8.9
Ginger	7.14	0.21	110	1.20	40.2	87	14	2.40	236	9.4
Uncultivated Soil	5.67	0.06	130	56.0	90	15	4.5	3.42	Tr	4.1

Note;* Soil PH, EC- Electrical conductivity(dSm^{-1}), C- Organic Carbon(%), N- Nitrogen(kg.ha-1),
P- Phosphorus(kg.ha-1), K- Potassium(kg.ha-1), S- Sulphur(kg.ha-1), Mn-Manganese(ppm), Ca, Calcium(ppm),

Table.2.Diversity and percent contribution of fungi isolated from cultivated and uncultivated soil.

Samples	Ragi	Maize	Potato	Coffee	Chilly	Ginger	Paddy	Uncultivated soil	Percent contribution
Fungi									
Absidia corymbifera								+	2.8
Absidia repans	+								66.6
Absidia repens							+		5.9
Absidia spinosa							+	-	3.9
Aspergillus candidus						+			3.5
Aspergillus fischeri					+	+			12.5
Aspergillus flavipes					+				6.25
Aspergillus flavus	+								11.1
Aspergillus nidulans					+	+			12.5
Aspergillus niger	+								11.1
Aspergillus niger							+	+	39.47
Aspergillus ochraceus				+					2.56
Aspergillus sulphureus				+					2.56
Aspergillus sydowii				+					74.35
Aspergillus terreus						+			35.5
Aspergillus ustus		+							12.5
Aspergulls versicolor							+	+	5.2
Cylindrocladium parvum		+							6.25
Fusarium incarnatam							+	+	1.6
Geotrichum candidum		+							37.5
Humicola fuscoatra		+							6.25
Mucour hiemalis				+					2.56
NSF - Curdy white							+	+	38.8
NSF- Pure white							+	+	0.98
Penicillim sp.			+						50%
Penicillium chrysogenum				+					7.69
Penicillium chrysogenum							+	+	15.1
Penicillium citrinum							+	+	5.9
Penicillium islandicum							+	+	85.5
Rhizopus oryzae			+			+			21.4%
Trichoderma fertile		+							37.5
Trichoderma virens				+					10.25
Trichoderma viride	+					+			11.1
Trichoderma viride							+		0.99
Tritirachium dependens					+				12.5

IV. CONCLUSION

The present study on diversity of soil mycoflora in different crop fields revealed that *Aspergillus* and *Penicillium* sp. were dominant due to heavy sporulation, toxins and antibiotic production which prevent the growth of other fungal species. pH, micro and macro nutrients of the study plot indicates that fungi can thrive well in all sort of environmental and nutritional condition by utilizing available substrate.

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