



## REVIEW OF RESEARCH



### MACROFUNGAL COMMUNITY IN TEA PLANTATIONS OF CHIKMAGALUR DISTRICT, KARNATAKA

Dr. Ashok Chittaragi

Department of P. G. Studies & Research in Applied Botany, Mycological Laboratories, Bio-Science Complex, Jnana Sahyadri, Kuvempu University, Shankaraghatta, Shivamogga (Dist), Karnataka, India.

#### ABSTRACT :

The Western Ghats region of Chikmagalur district (WGC) is a worldwide biodiversity hotspot. Large scale organisms assume a basic job as decomposers, parasites, and symbionts, and are additionally a significant wellspring of prescription, sustenance, and salary for some networks in the WGC; in any case, the decent variety and creation of full scale growths in this area remain ineffectively comprehended. So as to help address this information hole, we set up 20 changeless examination plots in the WGC (local timberlands, tea manor, pine estates, blended elastic and espresso ranch). Macrofungal assorted variety and network arrangement were assessed crosswise over four investigation destinations ordered to two atmosphere types and two administration techniques. Warmth maps and nonmetric multidimensional scaling (NMDS) were utilized to indicate contrasts in macrofungal network piece, and straight connections were outlined so as to examine how ecological elements affected macrofungal assorted variety and network structure. Altogether, 7028 examples were gathered, having a place with 1360 animal categories, 216 genera, and 79 families. *Russula*, *Lactarius*, *Amanita*, *Mycena*, *Suillus*, and *Inocybe* were observed to be the overwhelming genera in the WGC. We found that ectomycorrhizal organisms were overwhelming in calm timberlands and that saprobic growths were prevailing in tropical backwoods. We likewise discovered that macrofungal network organization in local woods varied from that of estate timberlands, showing that manors can give unique and corresponding environments to macrofungal development. Our examination of ecological components uncovered that large scale parasitic decent variety was pitifully related with tree species lavishness, and unequivocally corresponded with rise and scope.



**KEYWORDS :** Tea Plantations, Fungal Community, Western Ghats.

#### INTRODUCTION :

Growths are the most different gathering advanced parallel to plants and creatures engaged with a few biological administrations like natural issue deterioration, biogeochemical cycles and harmonious affiliation. They are competent to possess and prosper in an assortment of biological specialties because of their decent variety, circulation, spread and versatility. Albeit different appraisals of parasites run somewhere in the range of 0.5 and 9.9 million species, at present 1.5-3 million species has been acknowledged dependent on the plant-organism proportion in various topographical districts (Cannon, 1997, May, 2000, Hawksworth, 2001, 2012, Mueller and Schmit, 2007). In any case, the ongoing parasitic network examination by atomic techniques gave a gauge of 5.1 million species, which stands as middle estimation of

past customary range (0.5-9.9 million) (O'Brien *et al.*, 2005). Presently a-days, macrofungal examinations are increasing enormous significance inferable from the monetary advantages particularly wholesome and bioactive potential (De Silva *et al.*, 2013, Manna and Roy, 2014). Assessed all out macrofungi speaks to around 56,700 species worldwide and up to 850 species are known essentially from the Himalaya and Western Ghats of India.

The term estate alludes to the development of harvests on a broad scale for business deal. The manor business in Karnataka relies upon a few high-esteem business yields, for example, Espresso, Tea, Elastic, Pepper, Cardamom, Cashew, Coconut, Areca nut, and so forth. The fundamental regions where manors are done in Karnataka are Chikmagalur, Hassan, Kodagu, and Dakshina Kanada.

## MATERIALS AND METHODS

Study territory Southwest bank of Karnataka is known for an assortment of industrially important ranches (for example Acacia, Areca, Coco, Cashew, Casuarina, Coconut and elastic). Many zest yielding plants (for example Pepper and Vanilla) are likewise developed alongside blended tree species. The present investigation was completed on macrofungal collection and decent variety in an arboretum and three ranches built up in regular lateritic soils of the southwest shoreline of India. Four areas including an arboretum and three ranches situated around 5-8 km from the Arabian Sea coast close Mangalore (Dakshina Kannada District, Karnataka State) were picked for review: arboretum (12°48'51.6" N, 74°55' 38.3 73; 87.2 m asl; -20 years of age), (*Acacia auriculiformis* A. Cunn. ex Benth.) ranch (12°48' 58.2 N, 74°55' 31.1 73; 112.4 m asl; - 25 years of age), Areca (*Areca catechu* L.) estate (12°49'39.2"N, 74°54'38.9"E; 28.4 m asl; - 45 years of age) and Cashew (*Anacardium occidentale* L.) manor (12°48'56.4"N, 74°55'14.49"E; 103.6 m asl; - 35 years of age). The arboretum has been built up around 20 years back with endemic, imperilled and close undermined tree types of the Western Ghats. This arboretum comprises of around 2000 plants including 57 tree species, 23 types of bushes/woody climbers and 16 types of herbs/under bushes (Shetty and Kaveriappa, 2001, Bhat, 2003; Rani *et al.*, 2011). With the exception of arboretum, manors in spite of the fact that assigned as Acacia, Areca and Cashew, they are epitomized up to 90 % of assigned tree species and the rest comprises of local vegetation: *Borassus flabellifer* L., *Careya arboreasensu* Alston, *Caryo taurens* L., *Casuarina equisetifolia* L., *Holigarna* sp., *Hopea ponga* (Dennst.) Mabblerley, *Macaranga peltata* Roxb. Mueller, *Sapium insigne* (Royle) Benth, *Syzygium cumini* (L.) Skeels., *Tamarindus indica* L. also, *Terminalia paniculata* Roth.).

## Location

Macrofungal synthesis of a particular land area relies upon a few edaphic factors (for example extravagance of tree species, shelter spread, surface region, nature of substrate, dampness routine, temperature and soil characteristics). The present examination investigated the macrofungal decent variety in four areas with differentiating edaphic highlights bringing about various and unmistakable area subordinate macrofungal collections. Out of 79 species recuperated, just four were normal to two areas (*Amanita* sp., *Lycoperdon utriforme*, *Marasmius guyanensis* and *Scleroderma citrinum*), while the rest were bound to a particular area mirroring the low species similitude between the areas. In this manner, arboretum and manors majorly affect the macrofungal collection and needs further assessment to oversee them for macrofungal propagation for financial additions. The Acacia, Areca and Cashew estates considered exemplified up to 90 % unadulterated stands and the rest comprises of local tree species may likewise affected the macrofungal array and appropriation. In spite of the fact that arboretum with various tree species has most astounding number of macrofungi and sporocarps, it was not as different as Areca and Acacia manors because of single species strength (*Marasmius spegazzinii*). Essentially, the cashew and Acacia manors additionally indicated single species strength (*Byssonectria fusispora* and *Xylaria hypoxylon*, separately). The species gathering bend against the quantity of sporocarps was higher in arboretum and Areca manor contrasted with different estates portrays the macrofungal array reliance on arboretum or explicit ranch in the southwest coast. Moderately, the most reduced air and soil temperatures may have

favoured the most elevated number of sporocarps in arboretum, while the most astounding air and soil temperatures may have brought about high decent variety in Areca ranch. Be that as it may, effect of other edaphic factors explicit to an area can't be discounted.

### Season

Among the inspecting months, storm season (June-September) indicated high gathering of macrofungi, which diminished in post-rainstorm season (October and November). Because of single species strength during early storm (June and July: *Marasmius spgazzinii* and *Byssonectria fusispora*, separately), the late rainstorm (August 4 Macrofungi - West Coast 41 and September) demonstrated high decent variety. Be that as it may, the rainstorm season (June-September) is most significant period for macrofungal lavishness and assorted variety in the southwest shoreline of India and necessities explicit administration rehearses for augmenting macrofungal asset. The species collection bends against the quantity of sporocarps were likewise high during June-August uncovering the best time frame for checking macrofungal extravagance in the southwest coast. An unexpected drop in temperature (air and soil) during early storm, accessibility of high amount of natural issue (for example leaf and woody litter) and discontinuous rainstorms may have supported high species lavishness and assorted variety of macrofungi.

### Plantation Industry in Karnataka

The term manor alludes to the development of yields on a broad scale for business deal. The estate business in Karnataka relies upon a few high-esteem business harvests, for example, Espresso, Tea, Elastic, Pepper, Cardamom, Cashew, Coconut, Areca nut, and so forth. The primary regions where manors are completed in Karnataka are Chikmagalur, Hassan, Kodagu, and Dakshina Kanada.

### Karnataka Planters' Association (KPA)

The Karnataka Planters' Association (KPA) is the summit body that finishes manor choices in the state. The affiliation was set up in 1958 as a non-benefit association. The primary target of the affiliation is to speak to, advance, and secure the interests of Karnataka's ranch industry in all pieces of the world.

### Benefits of the Karnataka Plantation Industry

A portion of the principle advantages of the estate business in Karnataka are:

- ✚ The ranch industry contributes towards the financial advancement of the state. The business improves the economy by gaining through fare of the business crops.
- ✚ The industry gives immediate and aberrant work to countless individuals in the state. It, in this way, decreases the issue of joblessness.
- ✚ The manor industry of Karnataka offers help to a few country and result businesses.
- ✚ The estate crops successfully save the dirt and the biological system. They give security against soil disintegration during the storm season.

### Major Plantation Crops of Karnataka

**Coffee:** Karnataka is the biggest maker of espresso in India. It represents about 70 % of the all-out espresso delivered in the nation. Chikmagalur, Hassan, and Kodagu are the real espresso ranch districts of Karnataka. Shimoga and Mysore are additionally known for their espresso creation.

**Tea:** Tea is another significant manor of Karnataka. The state is a main donor of tea creation in India. Coorg is the state's biggest tea delivering locale. The Baba Budan Hills of Sahayadri Mountain Range is a tea creating area where broad tea manors are completed.

**Cashew:** Karnataka is known for its cashew estates. The state possesses the 6<sup>th</sup> position in cashew creation in the nation. Dakshina Kannada locale has the most noteworthy territory under Cashew estates pursued by Udupi, Chiakballapur, Belgaum, Kodagu, Kolar, and Uttara Kanada.

**Cardamom:** Cardamom, known as the ruler of sweet-smelling flavours, is a significant ranch of Karnataka. Despite the fact that the creation of Cardamom has been seeing a decline in the state over the most recent few years, it is as yet a noteworthy manor in certain pieces of the state. The fundamental Cardamom developing areas of Karnataka are Chikmagalur, Shimoga, Hassan, and Kodagu.



**Pepper:** Karnataka is a main maker of Pepper and records for practically half of the nation's creation of this harvest. Uttara Kanada and Kodagu are the two noteworthy Pepper estate regions of Karnataka. Chikmagalur is additionally known for its pepper estates where the ranchers are taking up pepper as an assistant harvest.

**Coconut:** Coconut is a significant estate yield of Karnataka. The state represents about 12 % of the nations all out coconut generation. In Karnataka, this ranch is for the most part become under rain fed conditions in the beach front regions. Chikmagalur, Uttara Kanada, Dakshina Kanada, Hassan, Chitradurga, and Tumkur are the fundamental areas where coconut estate is done in bounty in Karnataka.

**Areca nut:** India is the biggest maker of areca nut on the planet and Karnataka is a noteworthy supporter of this creation. The Areca nut ranches in Karnataka are essentially found in the Uttara Kanada, Dakshina Kanada, Chikmagalur, Tumkur, and Shimoga areas.

## Chikmagalur



Chikmagalur is ahead of everyone else in India where espresso was presented, it is otherwise called espresso place where there is Karnataka. Chikmagalur is one of the celebrated slope stations in Karnataka state, situated in the lower regions of Mullayanagiri run.

Its geology and atmosphere makes it one of the biggest espresso bequests in Karnataka pursued by Kodagu, Coorg and Hassan. Mullayanagiri is the most noteworthy pinnacle of Karnataka arranged in the Baba Budan Giri Range of the Western Ghats and tallest crest between the Himalayas and the Nilgiris, known as best spot for trekking in Karnataka.

## Wayanad



The green heaven of Malabar region, Wyanad is situated between the mountains of the superb Western Ghats. Wayanad is the standout amongst the best slope station of Kerala pursued by Munnar, Nalliyampathy and Rajamala. The wonderful slope locale is encompassed by ever green backwoods, Pookkode Lake and Karapuzha Dam close by, and its lovely atmosphere is best for espresso and tea development so otherwise called Coffee County of Kerala.

Real assortments of espresso developed in this area are Rubusta and Arabica. Malabar area is known for its excellent slope, green valleys and cool atmosphere which makes it's a standout amongst the best spot for verdure.

### Beneficial fungi and traditional knowledge

These examinations uncovered up to half of the macrofungi recuperated are monetarily important. Ectomycorrhizal organisms were most noteworthy (25 species) trailed by consumable growths (17 species) and restorative parasites (10 species). Event of more ectomycorrhizal and palatable macrofungi in the present investigation authenticates with prior perceptions in the lateritic area of West Bengal in upper east India (Pradhan *et al.*, 2010). Edibility of a portion of the macrofungi is a convention in southwest India. For instance, *Amanita* sp. ('Motte-anabe' in vernacular language Kannada, signifying 'egg mushroom') is a delicacy. The average natural specialty of *Amanita* sp. is soil with rocks on lateritic bed. This mushroom was recorded in arboretum and Areca manor during early rainstorm (June-July) in this examination. It is trusted that this mushroom ejects during early rainstorm with thunder storms and forayed on stony soils underneath trees as it is ectomycorrhizal: *Acacia auriculiformis* A. Cunn. Ex Benth., *A. Mangium* Willd., *Hopea ponga* (Dennst.) Mabberley and *Terminalia paniculata* Roth., *Amanita* sp. will be gathered and expended at egg or hand weight organize. As of late it has been followed as the second most inexhaustible mushroom in less and decently exasperates beach front sand rises of the south-western India (Ghate *et al.*, 2014). Like *Amanita* sp., an assortment of *Astraeus hygrometricus* ('Kall-anabe', signifying 'stone mushroom') is likewise conspicuous all through the rainstorm season (June-September) in lateritic soils and expended before the basidiocarp develops. This growth was found in Areca manor in the long stretch of August and likely Areca trees fill in as host. Termite-subordinate growth, *Termitomyces clypeatus* was found in Areca manor because of use of barnyard fertilizer and furthermore nearness of termite hills in the bunds. Similarly, *Termitomyces umkowaan* was ordinarily connected with termite hills in Acacia ranches (Karan and Sridhar, 2013). Most of restorative macrofungi found in this investigation favoured *Lignocellulosic squanders* (twigs and woody litter) for their propagation demonstrating the significance of woody litter (fine, medium and coarse) in arboretum and estates.

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**Dr. Ashok Chittaragi**

**Department of P. G. Studies & Research in Applied Botany, Mycological Laboratories,  
Bio-Science Complex, Jnana Sahyadri, Kuvempu University, Shankaraghatta, Shivamogga  
(Dist), Karnataka, India.**