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WILD EDIBLE MUSHROOM RESOURCES USED BY ETHNIC TRIBES OF MALNAD DISTRICTS OF KARNATAKA

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ABSTRACT:

The palatable wild mushrooms are most significant in sustenance security of ethnic gatherings and tribals all through the world. Different indigenous procedures are pursued to follow wild mushrooms appropriate for human utilization. Information displayed in this article ventures ethnic learning on 51 consumable wild mushrooms (in 23 genera) in the Western Ghats locale of India. Data gathered with help of ethnic gatherings/tribals relates to living spaces, substrates, mutualistic affiliation, degree of accessibility, degree of edibility and technique for handling of wild mushrooms. Broad field visits and communications with ethnic gatherings were performed to gather the information on each mushroom. At first, the vast majority of these mushrooms were recognized dependent on the indigenous techniques and assigned with vernacular names (Are-Gowda, Kodava and Tulu). In view of macro morphology (in field) and micro morphology (in research center), each mushroom was related to its deliberate name. Among the 51 wild mushrooms independent of degree of accessibility, the most favored incorporate Astraeus hygrometricus, Clitocybe infundibuliformis, Fistulina hepatica, Lentinus sajor-caju, Pleurotus (5 spp.) and Scleroderma citrinum and Termitomyces (18 spp). This information estimates the significance of documentation of customary learning, insurance of living spaces, the executives of assets (tree species and substrates) and manageable abuse of wild mushrooms.

Endophytes comprise a significant segment of microbial assorted variety, and in the present examination, seven plant species with rich ethno botanical uses speaking to six families were broke down for the nearness of endophytic organisms from their regular living spaces during rainstorm (May/June) and winter (November/December) periods of 2011. Parasitic endophytes were confined from solid plant parts, for example, stem, root, rhizome, and inflorescence utilizing standard disengagement techniques. One thousand five hundred and twenty-nine parasitic segregates were acquired from 5200 parts. Stem pieces harbored more endophytes (80.37 %) than roots (19.22 %). 31 parasitic taxa contained coelomycetes (65 %), hyphomycetes (32 %), and ascomycetes (3 %). Fusarium, Acremonium, Colletotrichum, Chaetomium, Myrothecium, Phomopsis, and Pestalotiopsis spp. were normally confined. Assorted variety files contrasted altogether between the seasons.

Species wealth was more noteworthy for storm seclusions than winter. Host explicitness was watched for couple of contagious endophytes. UPGMA bunch examination assembled the endophytes into unmistakable groups based on hereditary separation. This examination is the principal report on the assorted variety and host-particularity of endophytic parasitic taxa were from the semi evergreen timberland type in Talacauvery sub cluster of Western Ghats.

KEYWORDS : *Preservation, Ethnic populace, Food security, Forests, Macrofungi, Mutualistic affiliation, Nutraceuticals, Substrate, Traditional information, Tree species, Tribes.*

INTRODUCTION

The microorganisms living in the inside pieces of plant tissues called "endophytes" comprise a gathering of plant symbionts and are a segment of microbial decent variety. Endophytes offer plenty of obscure points of interest to the host with tremendous applications in farming and medication. As of late, testing speculations identified with endophyte assorted variety their job in oxidative pressure insurance substantial metal resilience, and as parts of tropical network biology have risen. An examination of the writing over the previous decades demonstrated numerous ethno medicinal plant species with rich organic history, inspected from one of kind environmental specialties animal categories are known to harbor potential endophytic microorganisms.

There has been an expanding flood of enthusiasm among the exploration bunches for the detachment of endophytes from the tropical plant species, attributable to high plant decent variety. One such district speaks to the Western Ghats, extending a length of 1,600 Km from the stream Tapti in the province of Gujarat toward the Southern tip of Kerala, perceived as one of the 34 problem areas of biodiversity. The Western Ghats speak to rich vegetation with tremendous species assorted variety just as endemic taxa and are along these lines perceived as one among the problem areas of the world. Western Ghats are isolated into seven sub clusters. A proposition to incorporate and proclaim 39 locales in this district as the World Natural Heritage Cluster Site by UNESCO is in progress.

India has numerous locales of exceptional environmental specialty harboring assortment of restorative plants. One such area in the peninsular India is Kodagu District, the place that is known for espresso development. Kodagu is arranged in the Western Ghats of peninsular India and is known for its magnificent mountain ranges, espresso manors, and teak wood timberlands. The Talacauvery sub cluster (of the Western Ghats is arranged in Kodagu. The elevation ranges from 1525 above mean ocean level. Yearly precipitation of 3525 mm is to a great extent confined during May to October, in spite of the fact that premonsoon showers are normal during February to April. The normal temperature is 23°C. Kodagu has a store of woodland belts and assorted vegetation going from tropical wet evergreen timberlands to scour wildernesses. A few clans dwelling in the woods still utilize therapeutic plants of ethnopharmacological significance as the wellspring of normal prescription for their sicknesses Ethnomedicinal plants are frequently utilized in ayurvedic restorative framework in India for the treatment of different infections.

In spite of the reports of ethno medicinal plants of this area, the biodiversity and the endophytic microorganisms of this locale stay unexplored. Hence, in the present examination, seven therapeutic plants speaking to six families were exposed to decent variety thinks about on parasitic endophytes during two seasons.

METHODOLOGY

Plant Materials and Study Site

Plant parts, for example, stem, root, rhizome, and inflorescence were gathered from seven solid therapeutic plant species: *Tylophora asthmatica, Rubia cordifolia, Plumbago zeylanica, Phyllanthus amarus, Eryngium foetidum,Centella asiatica,* and *Zingiber* sp. possessing the characteristic vegetation of the Talacauvery Region of Western Ghats, situated at 012°17′ to 012°27′N and 075°26′ to 075°33′E of Kodagu, Karnataka, during the storm (May to June) and winter seasons (November-December) of 2011. The common vegetation is an evergreen/semi evergreen sort of timberlands. The mean temperature was 23°C and mean yearly precipitation is 3525 mm. Herbarium examples of the plants were arranged and submitted to the herbarium accumulations in the department of Applied Botany, Kuvempu University of Shimoga. Ten individual plants from each were pooled for disengagements. The examples were put in polyethylene sacks, named, transported in cooler to the lab, and set in an icebox at 4°C until disengagement. All examples were prepared inside 24 h of accumulation.

Data Analysis

Separation rate, the proportion of contagious lavishness of an example, was determined as the quantity of detaches got from tissue sections, isolated by the absolute number of portions, and communicated as parts yet not as rates [18]. The colonization recurrence, communicated as rate, was determined by Kumaresan and Suryanarayanan as follows: The level of overwhelming endophytes was determined dependent on the separated by the all out number of endophytes × 100.

Contrasts in the degree of colonization of the examples were investigated by univariant examination of fluctuation (single direction ANOVA) and Tukey's really noteworthy distinction (HSD) as post hoc test utilizing the factual programming SPSS16.0. The parasitic segregations were considered for examination of ANOVA and Tukey's HSD. Simpson and Shannon assorted variety records were determined for endophytic growths from various seasons with Estimate, programming (rendition Species extravagance was determined utilizing the online site page rare factor adding machine.

Rarefaction files were utilized to analyze the species wealth among the plant species during two seasons. The normal number of species in detachments was determined. Unweighted pair bunch technique with math mean (UPGMA) group investigation was connected for all the disconnects from plant species dependent on the quantity of detaches recuperated from each plant species utilizing a dendrogram developed dependent on Nei's hereditary separations utilizing devices for populace hereditary qualities examination (TFPGA) programming.

Results

A sum of 1529 confines was gotten from 5200 tissue parts from seven restorative plant species. The degree of endophytes colonization differed in plant parts with stem pieces harboring 80 % of endophytic separates pursued by root (19.22 %). In other plant parts, colonization was lower. Disconnections of endophytes from different plant parts indicated more prominent quantities of endophytes during storm than winter. The high disengagement rates (IR) of contagious endophytes were recorded as 1.41 to 1.58 for *T. asthmatica* in the two seasons, while in *Zingiber* sp., low rates of disconnections were acquired. Thirty-one parasitic taxa were recognized which comprised of coelomycetes (65 %), hyphomycetes (32 %), and ascomycete segregations of 3 %. The recurrence of contagious colonization (% CF) varied among the seven plant species. *Fusarium* sp., A*cremonium*, *Chaetomium*, and *Phoma* are a portion of the endophytes with high colonization recurrence. The overwhelming parasitic genera incorporate *Fusarium* spp. and *Acremonium*. Maybe a couple endophytic

parasites, for example, *A. strictum* had wide dispersions in host plants and were detached from most plants except for *Zingiber* sp. also, *Plumbago zeylanica*, while types of *Fusarium, Trichoderma, Curvularia,* and *Penicillium* were disconnected from in excess of three plant species.

Host-explicitness was watched for few of the contagious endophytes detached from two of the seven therapeutic plants. *Colletotrichum dematium, Nigrospora oryzae, Heinesia rubi, Pestalotiopsis guepinii,* and unidentified red pycnidial structure were disengaged from the stem portions of *T. asthmatica* just, while in *Rubia cordifolia* one endophytic Periconia displayed particularity. *P. islandicum* and *T. viride* were disengaged from root portions of *Phyllanthus amarus*.

Assorted variety lists of parasitic endophytes shifted inside plant species just as between seasons. High Shannon-Weiner decent variety list was recorded for *T. asthmatica* and *P. Amarus* during storm and winter seasons, though low files were recorded for *E. foetidum* and Zingiber during storm and winter seasons, separately. 42 % of the all out 31 taxa were found in storm season, while 55 % of them colonized in the two seasons. Simpson file was high for *T. asthmatica* with an extravagance of 19 contagious species during rainstorm season, while *P. amarus* recorded most elevated wealth of species during winter season. Rarefaction bends determined for the endophytic contagious segregations demonstrated greatest species lavishness for *T. asthmatica* and *P. amarus* during storm and winter separations, separately. Contrasts in the quantity of separates and colonization recurrence varied essentially between seasons as demonstrated.

DISCUSSION

Therapeutic plants are considered as a storehouse of "endophytic microorganisms" living in the inside tissues of plants. The journey for recognizing novel bioactives from the endophytic organisms has brought about the inspecting of host plants, for example, herbs, bushes, tree species, and vines in exceptional spots of biological adjustments around the rainforests of the world. Such specialties harbor incredible species decent variety, unintervened by human exercises. Endeavors toward this path to test plants situated in the rainforests around the globe with potential ethnomedicinal qualities have brought about the seclusion of parasitic endophytes, remarkable to a specific plant animal types with unmistakable bioactivity.

Endophyte Colonization in Medicinal Species

The therapeutic plant species were inspected from the Talacauvery sub cluster arranged in the Kodagu, Malnad regions of Shimoga Districts of Western Ghats of Southern India. This district is among one of the 34 problem areas of biodiversity. As of late, a proposition to incorporate this biodiversity spot in the rundown of UNESCO Heritage group site is in progress, the locals just as the ethnic clans occupying this area still rely upon the plants as a wellspring of medication to relieve a portion of the illnesses [12]. Seven therapeutic plant species alloted to six plant families were chosen for the investigation in characteristic populaces in two seasons from a solitary area from the examination territory extending over a zone of 25 kilometers. Examining was directed during rainstorm and winter seasons, as two of the herbaceous species, *E. foetidum* and *Zingiber* sp., become distinctly till the second 50 % of the year (June to December) and their no availability during summer (March to May) makes it hard to consider the late spring season for endophytic examination.

From 5200 sections of plant materials an aggregate of 1529 detaches were acquired; these were assembled into 31 taxa. *Mycelia sterilia*, the contagious taxa that neglected to sporulate, was additionally revealed from this examination. This contagious gathering is pervasive in endophytic examines [24]. The contagious endophytes were broke down from four plant parts, in particular, stem, root, rhizome, and inflorescence; be that as it may, their event in root and inflorescence was examined for few plant species just, as

the phenology and testing of plants never corresponded with seasons. The leaves were not considered for disengagements since a portion of the plants were climbers and stragglers with sensitive shaggy surfaces and stringent surface disinfection strategies would render them inadmissible for plating on agar medium. Relative rates of endophytic seclusions from stem fragments were more prominent (80.37 %) than segregations from roots (19.22 %). Our outcomes are upheld by the previous work of 29 conventional Chinese restorative plants that parasitic endophytes are more regular in stem tissues than roots. Among the contagious taxa, coelomycete separations were more overwhelming than hyphomycetes and have been found in before concentrates in endophytes of tree species.

Endophytes, for example, *Colletotrichum, Phoma, Acremonium, Chaetomium, Botryodiplodia,* and *Trichoderma* were detached with. Barely any parasitic taxa that are less every now and again disconnected are *Pestalotiopsis, Penicillium islandicum, Cladosporium herbarum, Alternaria alternata, F. graminearum, Phomopsis, Sphaeronema*, *Colletotrichum* spp. are the most as often as possible experienced endophytic parasites, while *Pestalotiopsis* spp. are all around reported as endophytes of numerous rainforest plants tropical tree species, to be specific, *Terminalia arjuna, Azadirachta indica* and numerous herbs and bushes. It is important to screen more up to date plant species for the segregation of parasitic endophytes, as Hawksworth and Rossman gauge that there are as yet a huge number of types of growths yet to be recognized. Contrasts in the colonization frequencies of endophytes during two seasons were watched and more detachment during storm season is because of the way that the foul conidia of contagious spores are scattered better by downpour sprinkles and germination of conidia is impacted by climatic variables.

Host-Specificity of Fungal Endophytes

We saw that some parasitic taxa displayed have explicitness, a marvel frequently connected with endophytes. Three plant species, *T. asthmatica, R. cordifolia*, and *P. amarus,* were have explicit to endophytes. The red pycnidial endophyte (TA-005) was secluded from the stem parts of *T. asthmatica* just, recommending the host-explicitness of this endophyte. *Pestalotiopsis guepinii* was separated from the stem fragments of *T. asthmatica*. It has been accounted for as an endophyte of *Wollemia nobilis*, developing in Sydney, Australia. *Heinesia rubi, P. islandicum*, and TA-005 are new reports of growths as endophytes. Host-particularity of endophytic parasites has been watched before for grasses [36], orchids [37], and timberland tree species [38, 39]. As of late, emphasized the expression "particularity" as taxa that happen only on an expressed host however not on different has in a similar environment [41]. Our examinations additionally demonstrate the host-explicitness of endophytes as the plant species were inspected from a solitary living space.

Seasonal Diversity of Fungal Endophytes

Assorted variety files for parasitic endophytes as broke down by Shannon-Weiner and Simpson lists demonstrated contrasts in occasional variety and species wealth. High records were noted for *T. asthmatica* and *P. amarus* during storm and winter seasons, separately. The contagious species did not vary essentially between plant species, though they varied between seasons. Regular variety in parasitic detaches and colonization recurrence has been accounted for some, have plants [42, 43]. High colonization recurrence just as the species extravagance of endophytic organisms is constrained to leaf fragments as opposed to stem or bark portions of host plants inspected from five restorative types of Kudremukh Region of Western Ghats [44]. Species wealth in our examination is restricted to stem pieces among the plant parts considered for investigation.

Most examinations on parasitic endophytes in tropics have uncovered noteworthy examples of endophyte colonization and appraisals of decent variety in foliages of woodland tree species speaking to

different destinations, for example, Panamanian Forest [45] and Iwokrama Forest Reserve, Guyana [39]. In the Nilgiri Biosphere Reserve, Western Ghats, India, 75 dicotyledonous species in three distinctive tropical woodland types were examined to ponder foliar endophytes and decent variety [10]. The endophyte assorted variety in woods types was constrained because of free host affiliations among endophytes. Concentrates on foliar endophytes from the testing of herbaceous and shrubby restorative plant species have uncovered contrasts in the colonization rates just as regular assorted variety in Malnad Region of Bhadra Wildlife Sanctuary in Southern India [32, 46].

The present examination gives firsthand data on the assorted variety and regular effect on the colonization frequencies of endophytic growths from chose therapeutic plants from one of the subclusters of biodiversity problem areas in the Western Ghats of Southern India. In spite of the fact that the disconnection and examination of endophyte networks in herbs, bushes, and trees are normal, every one of the investigations is remarkable with reference to number of hosts, types of contagious endophytes, and their explicitness. The parasitic endophytes have been exposed to maturation studies, and concentrates are being tried for organic exercises.

CONCLUSION

The investigation gives firsthand data on the assorted variety and occasional impact on the colonization frequencies of endophytic organisms from seven restorative plants from one of the subclusters of biodiversity problem areas in the Western Ghats of Southern India. The present examination is the primary disconnection of endophytes from the restorative species and their plant parts. In spite of the fact that disengagement of endophytes has been practiced from different woods types and areas around the world, each investigation is extraordinary in recording more up to date endophytic taxa. We are at present chipping away at the aging of parasitic endophytes to get more up to date cancer prevention agents with helpful applications.

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