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DIVERSITY OF WILD MUSHROOM FROM FOOTHILL REGION OF UTTARAKHAND, INDIA : NEW REPORTS

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ABSTRACT

The present investigation was undertaken in foothill regions of Uttarakhand from July-2016 to December-2019. A total of thirty four different sites ranging from the roadside areas, grasslands to forests were studied and Mushroom fruiting bodies were collected. A total of One Hundred sixty six fruiting counts were obtained and 68 mushroom genera belonging to 15 orders and 43 families were identified. Mushroom were obtained from organic debris of diversified habitats ranging from humid soil; grassland; leaf litter; living tree trunk; dead wood log of forest zone. Maximum fruiting bodies (75%) were obtained between July to September and minimum i.e., 6% between November – February. Out of all collected mushroom sample the frequency of Mushroom belonging to order Agaricales was 45.18% followed by Polyporales i.e., 27.7%. Comparative statistical study revealed that *Schizophyllum commune* has been the most dense (1.85 ± 0.33) while *Crepidotus variabilis*, *Schizophyllum commune*, *Ganoderma applanatum* were most frequent (14.71 ± 0.04) followed by *Laccaria laccata* and *Chlorophyllum molybdites* (11.46 ± 0.04). The collected mushroom were cultured on PDA medium and their mycelial forms were preserved for further studies.

Keywords : Diversity; Density; frequency; fruiting bodies; mushroom; culture.

INTRODUCTION

Macrofungal fruiting bodies having fleshy, sub-fleshy, leathery, and umbrella like appearance, bearing their spore either on lamellae (gills) or lining the tubes, opening out by means of pores designated as Mushroom (Sharma and Jaitly, 2017). These fruiting bodies falls under the category of gilled mushroom, bracket mushroom, puffballs, coral mushroom, jelly mushroom, stinkhorns, earthstars, birds nest mushroom on the testimony of their sporocarps (Bates, 2006). Taxonomically mainly Basidiomycetes are known as mushroom however also some species of Ascomycetes have been known to produce mushroom like fruiting bodies (Atkinson, 1961). Mushroom are inseparable parts of ecosystem being soil replenisher due to their strong property of degrading cellulose and other organic polymers. The presence or absence of mushroom are useful trafficator to assess the damage or the maturity of an ecosystem (Stametes, 2000). Mushroom in the 21st century has been explored as crucial component for food safety and security. They have rich nutritional value with high content of proteins, vitamins, minerals, fibers, trace elements, limited calories and less cholesterol (Okoro *et al.*, 2012). Besides, they also contain good amount of secondary metabolites and were reported to possessed antioxidant, anticancer, anti-mutagenic, antimicrobial and antiradical properties (Barros *et al.*, 2007). The rate of consumption of fleshy fungi in many countries has increased in recent years and hence it becomes imperative to explore the treasure of wild mushrooms. The

day by day increasing population and its developmental activities are detrimental to ecological diversity. India is rich in diversity, of its fauna and flora consequently, may possess virtuous heterogeneity of Mushroom. The first scientific study on Indian mushroom was handled by Linnaeus in 18th century with the identification and description of *Podaxis pistillaris* (Thatoi and Singdevsachan, 2014). Several mycologists have reported ethno-mycological usage and additional lists appeared in between 18th to 21st century culminating with this natural resource as wealth of India. The studies on mushroom have been mainly aimed at describing only common cultivating varieties and validating its status but, there are relatively a few studies that have been undertaken on wild mushroom mainly due to their short life span of their fruiting bodies. Ecological value, diversity and economic importance of mushroom are three key aspects in the world of biology (Sarma *et al.*, 2010). However, indigenous knowledge about edible and medicinal mushrooms has not been given significant attention in Foothill region of Uttarakhand. The study area was located between 28° 43' – 31° 27' N latitudes and 77° 34' – 81° 02' E longitudes, 64% of which is covered with alpine rain forest. The Foothills of Uttarakhand in the south is bounded by Bareilly region of Uttar Pradesh. It has a subtropical climate and the weather is cool to pleasant. The temperature ranges between 32°C - 4°C. The cities of Uttarakhand have a rich repository of the unexplored macro-fungal wealth due to its varied climatic and topographic conditions. Therefore,

present study has been undertaken to explore the biodiversity of mushroom from Foothill region of Uttarakhand.

MATERIAL AND METHODS

Collection Area

Regular collection visits were conducted in different months during July-2016 to December-2018 from Bareilly to Uttarakhand. Prior and during the collection from selected

sites a standard protocol had been followed (Natrajan *et al.*, 2005). The study area has been divided into four sub areas *i.e.*, 1.Nainital; 2.Udham Singh Nagar; 3.Haridwar; 4.Garhwal along with adjacent foothill bordering geographical region *i.e.*, 5.Bareilly (*fig1.*) A total of thirty four sites were selected from above mentioned sub areas for the collection of fruiting bodies in different environmental conditions.

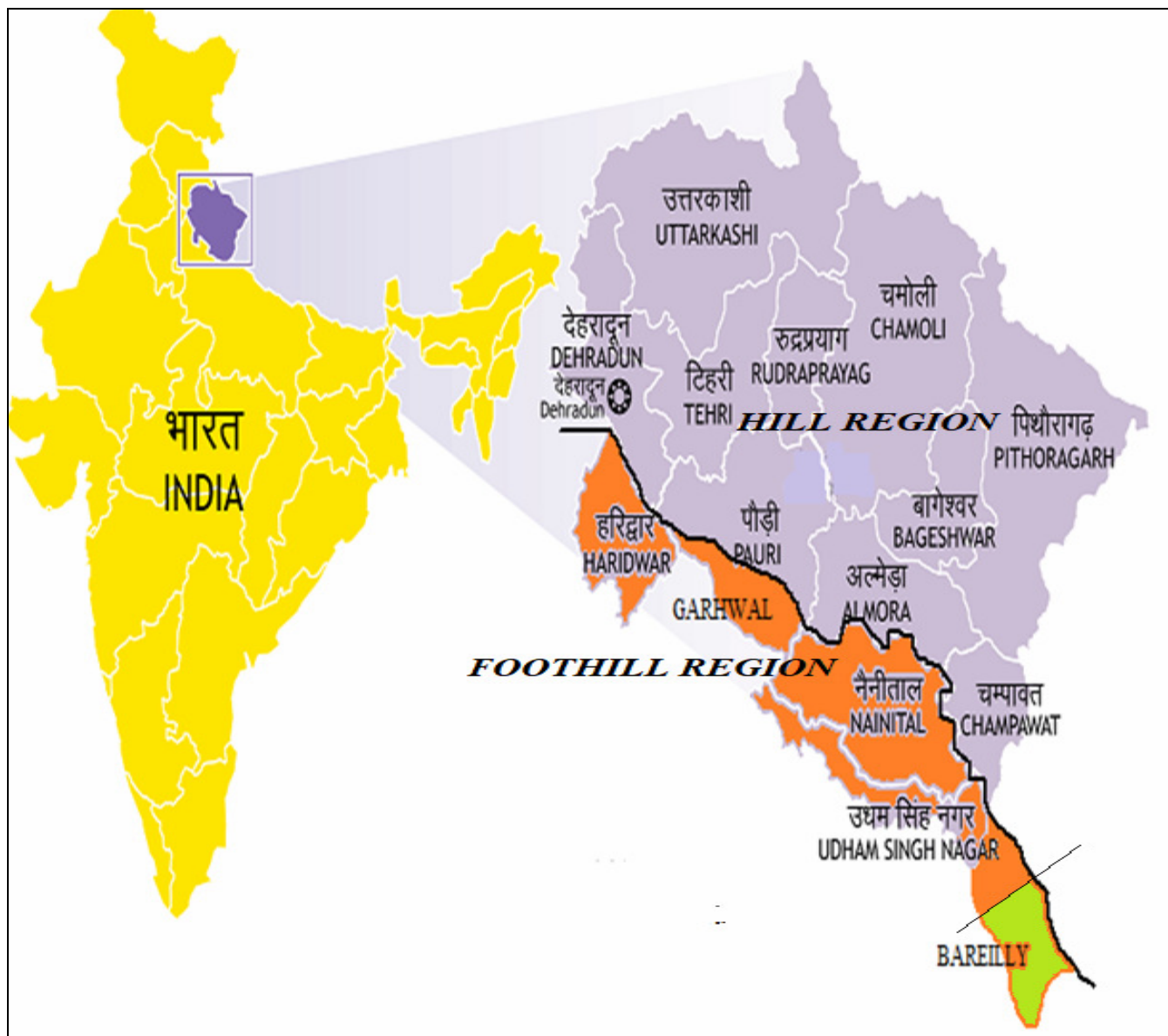


Fig. 1 Map of collection area

Collection Procedure

The full bloomed and complete fruiting bodies of fresh samples were photographed with the aid of Nikon D3400 camera and collected from their natural habitats. All of the physicochemical parameters of collection sites were recorded with the help of a multimeter, and a digital thermometer. The entire collected Mushroom were brought to Microbiology Laboratory under aseptic conditions in cooling thermocol containers for further evaluation.

Identification & Isolation

Microscopic examination under microscope (cell image centre Llyod) and further evaluation. Identification had been

undertaken as per mentioned procedure at the sites www.rogersmushrooms.com, www.mushroomexpert.com and comparing the external morphology, pictures and microscopic slides preparations with standard manual and field guides of Christensen (1972); Laessoe (2000); Lamaison and Polese (2005). Isolation of pure culture of fruiting body had been obtained on PDA media and pure forms were stored at 4°C for further biochemical and physicochemical analysis.

Quantitative analysis:

The important quantitative analysis of frequency and density of mushroom species were determined with certain amendments as per Curtis and McIntosh (1950).

(a) **Frequency (%)**: This term refers to the degree of dispersion of individual species in an area and usually expressed in terms of percentage. It was studied by sampling the study area at several sites and recorded the name of the species that occurred in each site. Frequency of the collected mushroom was calculated by the following formula:

$$\% \text{Frequency of mushroom species} = \frac{\text{Number of sites in which the species occurred}}{\text{Total no of sites}} \times 100$$

(b) **Density**: Density is an expression of the numerical strength of a species where the total number of individuals of each species in all the sites is divided by the total number of sites studied. Density is calculated by the equation:

$$\text{Density} = \frac{\text{Total number of individuals of a species in all sites}}{\text{Total number of sites studied}}$$

RESULTS AND DISCUSSION

A total of 166 Mushroom samples were collected and identified during 2016-2019 (Table 2, Figure 3). The collected mushroom were found to grow naturally in different habitats under the study having different environmental conditions (figure 3). Most of the collected mushrooms were found to prevail from July to November due to the favorable temperature and humidity for their fruiting bodies to bloom (Table 1). Complete absence of fruiting bodies were recorded in months of January, February, April, May, June and December correlating with the previous findings done in Uttar Pradesh (Chandrawati *et al.*, 2014). Sufficient rainfall occurs during the month of August, thus the emergence of fruiting bodies increased as highest collection percentage in September (30%) of total collection. The occurrence and

collection per cent of mushroom has been recorded predominantly where pH was ranged from 7.1-7.5 (Table 1). Agaricales and Polyporales emerged out to be the dominant mushroom orders (Fig. 2.) in the studied region with their per cent frequencies of 45.18 and 27.7 respectively. Heloteliales were represented only by one species. Results observed under present investigation, particularly for dominance of Agaricales are in agreement with the results obtained in different forest of India (Swapna *et al.*, 2008; Tapwal *et al.*, 2013). A of total 166 isolates belonged to 102 different species of 15 orders and 43 families (Table 2, Figure 3). Comparative statistical study of Frequency and Density of individual mushroom species (Table 2.) revealed that *Schizophyllum commune* was the most dense (1.85 ± 0.33) while *Crepidotus variabilis*, *Schizophyllum commune*, *Ganoderma applanatum* were most frequent ($14.71\% \pm 0.04$) followed by *Laccaria laccata* and *Chlorophyllum molybdites* ($11.46\% \pm 0.04$), whereas jelly fungi were rarely found *viz.* *Dacrymyces palmatus*, *Auricularia mesentrica*. A number of medicinally important mushroom were collected in the study *i.e.* *Cantherallus spp.*, *Ganodema spp.*, *Coprinus spp.*, *Auricularia spp.* and substantially more to be explored further. There was a need to grow live tissues in the laboratory, maintain these tissues in the laboratory, and develop the techniques required to domesticate these mushrooms. This rich biodiversity of Foothill region of Uttarakhand needs further exploration to widen the nutritional and medicinal base of the rural population with their conservation, cultivation and commercialization activities.

Table 1: Average Physicochemical Parameters of Sites

Site	Code	Temperature (°C)	pH	Light (lux)	Moisture
Lalkuan	S1	29	7.2	1200	6
Haldwani	S2	33	6.2	1000	3
Kathgodam	S3	25	7.5	800	4
Gola Beraj	S4	26	8	600	8
Dolmar	S5	23	7.8	300	10
Jeolikot	S6	22	7.2	200	9
Amdanda	S7	21	7.2	200	8
Garjiya	S8	31	5.9	500	3
Kaladhungi	S9	25	7.1	400	5
Ramnagar	S10	22	7.3	500	3
Pantnagar	S11	31	7.5	800	4
Haldi	S12	29	7.3	700	3
Pattarcachata	S13	29	7.2	600	3
Mundeli	S14	27	7.6	900	2
Pari	S15	26	7.5	700	2
Khatima city	S16	30	7.8	1000	3
Nanakmatta	S17	31	7.8	1200	3
Sitarganj	S18	32	7.9	1000	4
Jasipur	S19	31	7.6	900	5
Gadarpur	S20	31	7.5	800	3
Rudrapur	S21	30	7.6	600	3
Chidiyapur	S22	25	6.9	500	8
Laksar	S23	30	7.8	700	3
Jwalapur	S24	29	7.7	600	6
Raiwala	S25	26	7.8	300	4
Chiddarwala	S26	25	6.9	200	7
Asafpur	S27	31	7.6	800	3
Landsowne	S28	23	7.5	400	7

Dogadda	S29	22	7.7	300	5
Kotdwar	S30	26	7.1	600	7
University	S31	30	6.8	500	7
Kargaina	S32	29	7.2	900	2
Subhash Nagar	S33	32	7.3	1000	3
C.B. Ganj	S34	28	7.5	700	8

Table 2 : Habitat Diversity, frequency, density of Mushroom from Foothill region of Uttarakhand and Bareilly

SITE	STRAIN	IDENTIFIED SPECIES	HABITAT DIVERSITY	FREQUENCY ± 0.04	DENSITY ± 0.33
S1	M1	<i>Mycena polygramma</i>	Grassland	8.82	1.00
	M2	<i>Pycnoporus sanguineus</i>	Leaf litter	8.82	0.56
	M3	<i>Coprinus plicatilis</i>	Leaf litter	5.88	0.76
	M4	<i>Hygrocybe pratensis</i>	Base of Stem	5.88	0.56
	M5	<i>Dacrymyces palmatus</i>	Base of Stem	2.94	0.26
	M6	<i>Chlorophyllum molybdites</i>	Leaf litter	11.76	0.56
	M7	<i>Trametes versicolor</i>	Dead woodlog	5.88	0.44
	M8	<i>Stereum rugosum</i>	Leaf litter	14.71	0.38
	M9	<i>Daedalea quercina</i>	Deadwoodlog	5.88	0.44
	M10	<i>Crepidotus variabilis</i>	Base of Stem	14.71	1.21
S2	M11	<i>Pleurocybella porrnigens</i>	Base of Stem	5.88	0.59
	M12	<i>Laccaria laccata</i>	Base of Stem	11.76	0.62
	M13	<i>Coltricia perennis</i>	Grassland	5.88	0.41
	M14	<i>Mycena polygramma</i>	Grassland	8.82	1.00
S3	M15	<i>Volvopleutus gloiocephalus</i>	Base of Stem	5.88	0.50
	M16	<i>Hygrocybe pratensis</i>	Base of Stem	5.88	0.56
	M17	<i>Auricularia auricula judae</i>	Dead woodlog	8.82	0.26
	M18	<i>Chlorociboria aeruginascens</i>	Leaf litter	2.94	0.79
	M19	<i>Pleurotus ostreatus</i>	Leaf litter	5.88	0.59
	M20	<i>Pycnoporus cinnabarinus</i>	Leaf litter	2.94	0.65
	M21	<i>Marasmius alliaceus</i>	Base of Stem	5.88	0.29
S4	M22	<i>Pycnoporus sanguineus</i>	Dead woodlog	8.82	0.50
	M23	<i>Coprinopsis atramentaria</i>	Leaf litter	2.94	0.56
	M24	<i>Coltricia perennis</i>	Grassland	5.88	0.62
	M25	<i>Volvopleutus gloiocephalus</i>	Base of Stem	5.88	0.26
	M26	<i>Ganoderma curtissi</i>	Wood log	2.94	0.50
S5	M27	<i>Macrolepiota procera</i>	Grassland	8.82	0.21
	M28	<i>Lycoperdon pyriforme</i>	Grassland	5.88	0.56
	M29	<i>Hexagonia spp.</i>	Leaf litter	2.94	0.21
	M30	<i>Pleurocybella porrnigens</i>	Base of Stem	5.88	0.26
	M31	<i>Tricholoma sulphurium</i>	Grassland	5.88	0.65
S6	M32	<i>Coprinus domesticus</i>	Leaf litter	5.88	0.59
	M33	<i>Stereum rugosum</i>	dead woodlog	14.71	0.53
	M34	<i>Leptoporus adustus</i>	Deadwoodlog	2.94	0.21
	M35	<i>Coprinus plicatilis</i>	Leaf litter	5.88	0.35
	M36	<i>Ganoderma adspersum</i>	Wood log	2.94	0.76
	M37	<i>Climacodon septentrionalis</i>	Base of stem	2.94	0.15
	S7	M38	<i>Calvatia craniiformis</i>	Leaf litter	5.88
M39		<i>Laccaria bicolor</i>	Leaf litter	5.88	0.26
M40		<i>Cantharellus minor</i>	Grassland	5.88	0.79

	M41	<i>Laccaria laccata</i>	Grassland	11.76	0.62
	M42	<i>Daedalea quercina</i>	Woodlog	5.88	0.65
	M43	<i>Trametes versicolor</i>	Dead woodlog	5.88	0.35
	M44	<i>Mycena marginata</i>	Dead woodlog	8.82	0.38
	M45	<i>Crepidotus variabilis</i>	Base of stem	14.71	0.85
	M46	<i>Schizophyllum commune</i>	Living tree base	14.71	1.50
	M47	<i>Mycena polygramma</i>	Base of stem	8.82	1.76
S8	M48	<i>Lycoperdon pyriforme</i>	Grassland	5.88	1.00
	M49	<i>Chlorophyllum molybdites</i>	Leaf litter	11.76	0.21
	M50	<i>Crepidotus variabilis</i>	Grassland	14.71	0.56
	M51	<i>Xylaria polymorpha</i>	Woodlog	2.94	1.04
S9	M52	<i>Meripilus giganteus</i>	Leaf litter	2.94	0.26
	M53	<i>Cantharellus minor</i>	Base of stem	5.88	0.62
	M54	<i>Schizophyllum commune</i>	Saprophitic	14.71	1.85
	M55	<i>Ganoderma applanatum</i>	Base of stem	14.71	1.76
	M56	<i>Crepidotus variabilis</i>	Leaf litter	14.71	0.62
	M57	<i>Laccaria bicolor</i>	Leaf litter	5.88	1.50
	M58	<i>Pleurotus ostreatus</i>	Woodlog	5.88	0.79
	M59	<i>Trametes gibbosa</i>	Woodlog	2.94	0.59
	M60	<i>Polyporus alveolaris</i>	Base of stem	2.94	0.24
	M61	<i>Coprinus comatus</i>	Dead woodlog	2.94	0.26
	M62	<i>Tricholoma sulphurium</i>	Grassland	5.88	0.74
S10	M63	<i>Amanita virosa</i>	Woodlog	2.94	0.59
	M64	<i>Schizophyllum commune</i>	Tree trunk	14.71	0.50
	M65	<i>Lentinus tigrinus</i>	Woodlog	2.94	1.36
	M66	<i>Psathyrella conopilus</i>	Grassland	2.94	0.56
	M67	<i>Collybia dryophila</i>	Dead wood	2.94	0.41
	M68	<i>Lactarius deliciosus</i>	Living treebase	5.88	0.68
S11	M69	<i>Entoloma conferendum</i>	Mycorrhizal	2.94	0.62
	M70	<i>Schizophyllum commune</i>	Mycorrhizal	14.71	1.85
	M71	<i>Clitocybe gibba</i>	Grassland	5.88	1.46
S12	M72	<i>Mycena marginata</i>	Leaf litter	8.82	1.00
	M73	<i>Hygrocybe calyptiformis</i>	Grassland	2.94	0.59
	M74	<i>Agaricus sylvaticus</i>	Leaf litter	2.94	0.50
S13	M75	<i>Cantharellus cibarius</i>	Debris	11.76	0.38
	M76	<i>Cliptopilus prunulus</i>	Debris	2.94	1.03
S14	M77	<i>Auricularia auricula judae</i>	Deadwood log	8.82	0.38
	M78	<i>Cantherellus cibarius</i>	Grassland	2.94	0.79
S15	M79	<i>Condrostereum pupureum</i>	Leaf litter	2.94	0.47
	M80	<i>Sparassis crispa</i>	Woodlog	8.82	0.26
S16	M81	<i>Tyromyces chioneus</i>	Deadwood log	2.94	0.74
	M82	<i>Auricularia mesenrtica</i>	Living tree trunk	5.88	0.50
	M83	<i>Polyporus brumalis</i>	Deadwood log	2.94	0.62
	M84	<i>Cortinarius spp.</i>	Debris	2.94	0.18
	M85	<i>Xylaria hypoxylon</i>	Deadwood log	8.82	0.35
S17	M86	<i>Coriolus versicolor</i>	Living Tree trunk	5.88	0.76
	M87	<i>Cantherallus subalbidus</i>	Leaf litter	2.94	0.24
	M88	<i>Daedaleopsis confragosa</i>	Living tree trunk	5.88	0.53
	M89	<i>Gymnophus dryophilus</i>	Deadwood log	2.94	0.47

	M90	<i>Trametes hirsuta</i>	Deadwood log	2.94	0.56
S18	M91	<i>Ganoderma applanatum</i>	Living tree trunk	14.71	0.50
	M92	<i>Ganoderma resinaceum</i>	Deadwood log	8.82	0.62
	M93	<i>Macrolepiota procera</i>	Grassland	8.82	0.68
	M94	<i>Auricularia auricula judae</i>	Deadwood log	8.82	0.56
	M95	<i>Gleophyllum odoratum</i>	Deadwood log	2.94	0.79
	M96	<i>Ganoderma applanatum</i>	Living tree trunk	14.71	0.38
S19	M97	<i>Pseudohydnum gelatinosum</i>	Deadwood log	2.94	0.62
	M98	<i>Mycena marginata</i>	Debris	8.82	0.85
S20	M99	<i>Disciotis venosa</i>	Deadwood log	2.94	0.38
	M100	<i>Podoscypha petalodes</i>	Deadwood log	2.94	0.24
S21	M101	<i>Hymenochaete rubiginosa</i>	Deadwood log	2.94	0.62
S22	M102	<i>Lenzites betulina</i>	Deadwood log	2.94	0.21
	M103	<i>Phlebia tremellosa</i>	Living tree trunk	2.94	0.26
	M104	<i>Polyporus umbellatus</i>	Leaf litter	2.94	0.15
	M105	<i>Stereum rugosum</i>	Deadwood log	14.71	0.06
	M106	<i>Xylaria hypoxylon</i>	Leaf litter	8.82	0.06
	M107	<i>Ganoderma resinaceum</i>	Deadwood log	8.82	0.47
S23	M108	<i>Cymatoderma spp.</i>	Living tree trunk	2.94	0.38
	M109	<i>Heterobasidium annosum</i>	Deadwood log	2.94	0.47
S24	M110	<i>Crepidotus porringens</i>	Living tree trunk	5.88	0.29
	M111	<i>Gloeophyllum sepiarium</i>	Deadwood log	5.88	0.88
	M112	<i>Cantharellus cibarius</i>	Leaf litter	11.76	0.53
S25	M113	<i>Sparassis crispa</i>	Deadwood log	8.82	1.03
	M114	<i>Clitocybe nuda</i>	Grassland	2.94	0.74
	M115	<i>Polyporus squamosus</i>	Deadwood log	2.94	0.53
	M116	<i>Hygrophoris aurantiaca</i>	Grassland	2.94	0.38
	M117	<i>Ramaria stricta</i>	Leaf litter	2.94	0.53
	M118	<i>Phellinus spp.</i>	Living tree trunk	2.94	0.76
	M119	<i>Lactarius deliciosus</i>	Living tree trunk	5.88	0.35
	M120	<i>Fomes fomantarius</i>	Woodlog	2.94	0.62
S26	M121	<i>Crepidotus porringens</i>	Living tree trunk	5.88	0.24
	M122	<i>Clitocybe gibba</i>	Grassland	5.88	0.88
	M123	<i>Mycena pelianthina</i>	Leaf litter	2.94	1.00
	M124	<i>Lenzites tigrinus</i>	Leaf litter	2.94	0.59
	M125	<i>Thelophora terrestris</i>	Leaf litter	2.94	0.44
	M126	<i>Flemmulinas velutipes</i>	Leaf litter	2.94	0.24
	M127	<i>Lactarius trivialis</i>	Grassland	2.94	0.79
	M128	<i>Pleurotus sajor caju</i>	Living tree trunk	2.94	0.56
	M129	<i>Ganoderma applanatum</i>	Deadwood log	14.71	0.76
	M130	<i>Trichaptum abietum</i>	Leaf litter	2.94	0.65
S27	M131	<i>Clitopilus prunulus</i>	Deadwood log	2.94	0.62
	M132	<i>Pycnoporus sanguineus</i>	Deadwood log	8.82	0.44
S28	M133	<i>Daedaleopsis confragosa</i>	Deadwood log	5.88	0.56
	M134	<i>Gloeophyllum sepiarium</i>	Living tree trunk	5.88	0.47
	M135	<i>Laetiporus sulphureus</i>	Living tree trunk	2.94	0.53
	M136	<i>Scleroderma verucosum</i>	Grassland	2.94	0.38
	M137	<i>Bondarzewia berkeleyi</i>	Dead woodlog	2.94	0.29
	M138	<i>Tyromyces stipticus</i>	Dead woodlog	2.94	0.44

	M139	<i>Schizophyllum commune</i>	Dead woodlog	14.71	0.53
S29	M140	<i>Cantharellus cibarius</i>	Grassland	11.76	1.03
	M141	<i>Crelophus cirrhatus</i>	Living tree trunk	2.94	1.06
	M142	<i>Phellodon tomentosus</i>	Grassland	2.94	0.47
S30	M143	<i>Sparassis crispa</i>	Dead woodlog	8.82	0.38
	M144	<i>Auricularia mesenrtica</i>	Dead woodlog	5.88	0.74
	M145	<i>Bovista plumbae</i>	Grassland	2.94	0.41
	M146	<i>Tremella mesentrica</i>	Dead woodlog	2.94	0.29
S31	M147	<i>Chlorophyllum molybdites</i>	Leaf litter	11.76	0.62
	M148	<i>Laccaria laccata</i>	Leaf litter	11.76	0.74
	M149	<i>Irpex lacteus</i>	Deadwood log	5.88	0.44
	M150	<i>Calvatia utriformes</i>	Grassland	2.94	0.35
	M151	<i>Crepidotus variabilis</i>	Living tree trunk	14.71	0.29
	M152	<i>Cantharellus cibarius</i>	Grassland	11.76	0.76
	M153	<i>Marasmius sullivanti</i>	Grassland	2.94	0.35
	M154	<i>Ganoderma resinaceum</i>	Deadwood log	8.82	0.62
	M155	<i>Agaricus bisporus</i>	Ground	2.94	0.76
S32	M156	<i>Ganoderma applantum</i>	Living tree trunk	14.71	0.56
	M157	<i>Chlorophyllum molybdites</i>	Leaf litter	11.76	0.44
	M158	<i>Laccaria laccata</i>	Grassland	11.76	0.62
	M159	<i>Stereum rugosum</i>	Deadwood log	14.71	0.38
S33	M160	<i>Macrolepiota procera</i>	Grassland	8.82	0.56
	M161	<i>Trametes versicolor</i>	Living Tree trunk	5.88	0.35
	M162	<i>Xylaria hypoxylon</i>	Deadwood log	8.82	0.29
S34	M163	<i>Coprinus domesticus</i>	Leaf litter	5.88	0.44
	M164	<i>Calvatia craniiformis</i>	Grassland	5.88	0.50
	M165	<i>Marasmius alliaceus</i>	Base of Stem	5.88	0.62
	M166	<i>Stereum rugosum</i>	Deadwood log	10.71	0.47

Results shown for frequency and density are \pm SD values

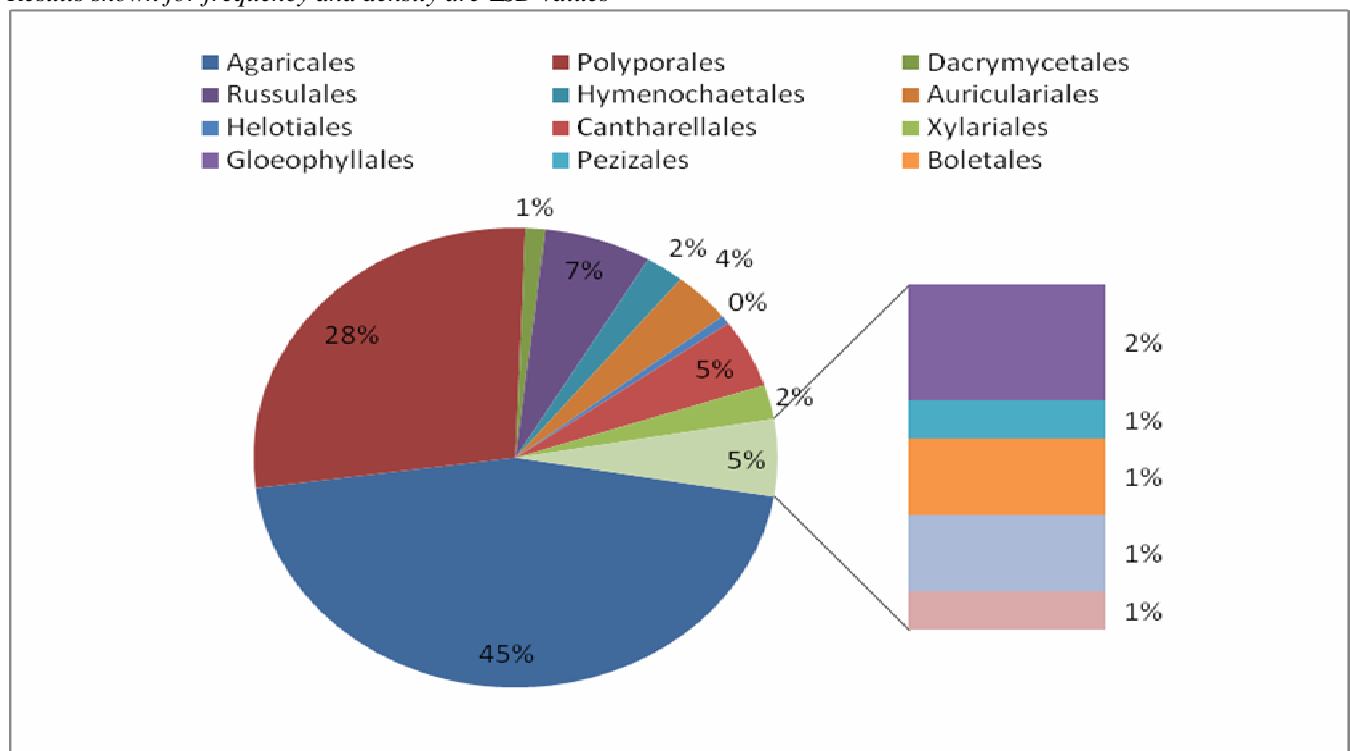


Fig. 2 : % Share of Different Mushroom Orders from Studied region



Fig. 3 : Some Photographs of the collected wild mushroom from area under study

*Scientific names given in Table2.

CONCLUSION

This study was aimed to collect and identify wild mushroom that grow naturally in different habitats in Foothill region of Uttarakhand. High diversified mushroom were collected from the foothill where members of Agaricales and Polyporales were maximum indicating that this ecological site contains the high content of organic matter and these two orders has been reported to pay into the recycling of lingo-cellulosic and hemi-cellulosic organic matter of forest region (Valaskova and Baldrian, 2006); Kumla *et al.*, 2020). Moreover the high rainfall from mid June to July contributes a favorable environment for their growth and activity. During the study it has also being found that majority of the poor population depends on their food on these wild mushroom. The rich diversity of mushroom in Foothill region and Bareilly, offers huge socio-economic potentials. Such a diversified nutrient rich food and further we have to explore new good sources of antioxidants and pharmaceutical compounds from these wild mushroom. However, they need to be properly documented for optimum application. Hence, this study is an important first step towards producing a checklist of mushrooms of Foothill region of Uttarakhand and Bareilly

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CONFLICTS OF INTEREST

The author(s) declare that they have no competing interests.

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