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EXPLORATION, DISTRIBUTION AND IDENTIFICATION OF MUSHROOM SPECIES IN KHURDA DISTRICT OF ODISHA, INDIA

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Abstract

The objective of the present investigation was to study the mushroom diversity in Khurda district of Odisha, India with special reference to their distribution and economic value. Field survey was conducted at regular intervals in Khurda district of Odisha, India, from the month of June to October, 2018 and mushroom samples were collected from 12 different sites of varied ecological habitat. Plant materials collected were taxonomically studied for proper identification with the help of available literature. A total number of 108 mushroom samples were collected during the present investigation, of which 92 were morphologically identified and 16 specimens remained as unidentified. All the mushroom specimens were categorised under 34 families belonging to 60 genera. Among the families Agaricaceae and Polyporaceae were found dominant represented by 14 species by each. *Clavaria vermicularis, Marasmius haematocephalus, Phellinus gilvus* were reported with frequent occurrence and with widely distributed. As regards to the economic use of the collected mushroom samples 32 were found edible, 56 non-edible species and 20 species reported having medicinal properties. Among various sites surveyed during the study Chandaka forest area and RPRC campus were the two places which recorded high species richness which may be due to more green vegetation in the site. Mushroom diversity seems to be higher in moist forest as compared to other and it affected significantly by environmental factor like light, temperature, humidity etc. It can be concluded that the warm and humid climate during the most part of the year favours the distribution of mushrooms which should be exploited further for their nutraceuticals and medicinal properties.

Key words : Mushroom flora, Economic importance, Species richness, Khurda.

Introduction

The fungi refer to a special group of heterotrophic microbes that consist of a thallus being an assemblage of vegetative cells and body undifferentiated into organ system. The mushroom is belonging to one of the most diverse and peculiar groups of organisms on earth and also play a vital role in maintaining the ecosystems, and forms a large number of species richness (Keizer 1998; Seen-Irlet *et al.,* 2007). Food, medicine, biocontrol agent, many bioactive and most pharmaceutical compounds also been obtained from mushrooms, which indicates its economic value towards the society (Duarte *et al.,* 2006). Now a days, many organic pollutants are decomposed by most of the mushroom species, one of the best species is *Trametes versiocolor* (Tran *et al.,* 2010; Tran *et al.,* 2013). In most of the countries, bioremediation of domestic waste, industrial waste and heavy metals from the environment is done by using microbes, especially micro fungi (Demirbas 2000; Kalac *et al.,* 2004). Important and remarkable antimicrobial activity has been indicated from secondary metabolites of mushrooms (Hur *et al.,* 2004). These can be cultivated and used as cash crop (Mandeel & Al-Laith 2007). Many of them have beneficial activity, however detrimental effect also been detected. These have been defined by many authors but all definition made on priority to the production of fruiting body. Fruiting body can be visible in naked eye and picked by hand (Da Silva 2005; Seen-Irlet *et al.,* 2007). These are fleshy, with pleasant taste and flavour and are highly demandable and some cases considered culturally important (Da Silva 2005). Mushrooms are popular terms such as gilled fungi, cup fungi, bracket fungi, puffballs and truffles etc. According to ecological point of view, all the macro fungi can be placed in 3 groups such as the saprophytes, the parasites and the symbiotic (mycorrhizal) species. Some terrestrial micro fungi are plant pathogen

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and also shows pathogenicity towards some other fungi. Mushrooms found on woody substrate may be saprobes or plant pathogens, but most terrestrial macro fungi are saprobes or mycorrhizal symbionts (Mueller *et al.,* 2007).

Mushrooms are considered as a very strange group, very difficult to study and understood which may be due to its hidden nature and frequently sporadic and short-lived sporocarps. Therefore, they have largely been untended and overlooked in national and international nature conservation actions.

However, through the research, our erudition of macrofungi has crucially increased. It is now highly sensible to assess the adjacent status and future for macro fungi species in their diversity by human activities such as land management (Seen-Irlet *et al.*, 2007). Mushrooms are all around in nature and they remain the earliest form of fungi known to human being (Okhuoya *et al.,* 2010). The controversy of fungal diversity, its scope and conservation, has attracted more attention in the last 10-15 years (Hawksworth 2004). Mushrooms appear to be collected and consumed during almost the entire year, but most fungi are collected during the rainy seasons, prescribed the importance of rainfall patterns in fungal diversity (Dijk *et al.,* 2003).

Till date there are no detailed reports on survey and documentation of mushroom in the region of Odisha, India, although mushroom diversity in northern part of Odisha is smeary exploited from Similipal Biosphere Reserves (SBR) and its nearby areas by some mushroom workers (Thatoi & Singdevsachan 2014; Panda & Tayung 2015). Occurrences of mushrooms have also been meagrely studied in different forest areas and some special green vegetation of Odisha (Satapathy *et al.,* 2016; Tripathy *et al.,* 2015). There are many reserve forests, several green moist microhabitats, protected green campus and forest area in Khurda district of Odisha, which creating a suitable environment for growth of mushrooms and variously utilized. Hence, a systematic survey was carried out during the present work to study the occurrence of different type of mushroom in Khurda district of Odisha and their economic importance.

Materials and Methods

Study area

Khurda is a supervisory division of the state of Odisha, India. The district Khurda came in to existence on 1st April 1993, by dividing it off the earlier Puri district. Puri was divided into three districts Puri, Khurda and Nayagarh. The geographic location of Khurda district stands at 19º.55"- 20º.25" North latitude and 84°.55"- 86°.5" East longitude. Area of the district is 2888 square kilometers and forest area covers 618.67 km. Its bioclimatology is much influenced for the short radial distance from the Bay of Bengal and presence of a huge water body like the Chilika lake. The district enjoys normal rainfall of 1408 mm with maximum and temperature 42.2 °C and 11.1 °C respectively. Similarly, the mean relative humidity ranges from 46% to 89%. It is situated in the East & South-eastern coastal plain and the agro-climatic zone is blessed with sandy-loam, loam, clay-loam and clayey soil with a varied agro-ecosystem.

A systematic plan was made for study the location for the presence of mushroom diversity. Survey area was divided into a number of sites such as Regional Plant Resource Center campus (RPRC), Shikhar Chandi hill (SCH), Nandan Kanan (NK), Institute of Mineral and Material Technology campus (IMMT), Utkal University campus (UU), Barunei forest (BRN), Barbara Forest (BAF), Khurda town area (KT), Khandagiri hill (KH), Dhauli hill (DH), Jatani (JA) and Chandaka forest (CF) region under Khurda district.

Sampling and Collection of Specimen

Macro fungi were collected from all sampling sites and found associated with grassland, tree, dead woody trunks, termite nests and ant hills. For proper sampling various equipments were used such as knife, scissor, digging tools, wax paper bags for wrapping and polythene sampling bags for carrying the samples. After sampling, all the mushrooms were labelled and photographed by following a standard method (Demirel & Uzun 2002; Fadime & Mustafa 2002; Yesil & Yildiz 2004). Mushrooms were detached carefully from the host to avoid damage to the basal region of the macro-fungi and other parts. Unwanted materials like soil, dust etc. was removed by very gently through brush (Stochev *et al.,* 1998; Swapna *et al.,* 2008). Mushrooms were collected and brought to the laboratory without any desiccation for identification (Afyon *et al.,* 2005; Atri & Saini 2000).

Identification and preservation

All mushroom samples collected during survey were studied for morphological characteristics. All the important features like pileus diameter, context, colour, attachment, gills arrangement, sets of lamella, veil presence and absence, its characteristics, volva shape and its presence were studied. In case of stipe, rings, stuffness, presence of rhizoid and attachment of stipe to the substratum were assessed for taxonomic studies and identification (Mohapatra *et al.,* 2013; Robert & Evans 2011; Pace 1998; Satapathy *et al.,* 2016).

Results

During the field survey, a total number of 108 species were collected of which 92 were identified

Table 1: Occurrence of different mushrooms in Khurda district.

No.	Name of the species	RPRC	SCH	NK	IMMT	UU	BRN	BAF	KT	KH	DH	JA	CF
1	*Agaricus bisporous* (J.E.Lange) Emil J. Imbach					+							+
2	*Agaricus campestris* L.	+			+				+				
3	*Agaricus silvicola* (Vittad) Peck.			+									+
4	*Amanita australis* G. Stev.					+				+	+		
5	*Amanita multisquamosa* Peck		+				+						+
6	*Amanita rubescens* Blusher									+	+		
7	*Amanita vaginata* (Bull.) Lam.	+											+
8	*Bovista longispora* (Peck) Kreisel						+	+				+	
9	*Bovista plumbea* Pers.		+			+				+			+
10	*Calvatia gigantea* (Batsch ex Pers.) Llyo	+			+								
11	*Chlorophyllum molybdites* (G. Mey.) Massee						+						+
12	*Clavaria aurea* Schaeff.	+	+		+	+		+	+	+	+		+
13	*Clavaria vermicularis* Sw.						+					+	
14	*Clavulinopsis fusiformis* (Sowerby) Corner	+		+									
15	*Coltricia cinamomia* (Jacq.) Murrill					+		+					+
16	*Coniophora puteana* (Schum.) P. Karst.			+					+				+
17	*Connopus acervatus* R.H.Petersen						+					+	
18	*Conocybe apala* (Fr.) Arnolds			+			+						
19	*Coprinus comatus* (O.F.Mull.) Pers.	+						+			+		
20	*Coprinus disseminates* (Pers.) Gray.									+			+
21	*Crinipellis scabella* (Alb. & Schwein.) Murrill	+				+							+
22	*Dacryopinax spathularia* (Schwein.) G.W. Martin		+			+					+		
23	*Daldinia concentrica* (Bolton) Cesati and de Notaris							+	+				
24	*Entoloma sinuatum* (Bull. ex Pers. Fr.) Kummer				+				+				
25	*Entoloma incanum* (Fr.) Hesler	+					+					+	
26	*Entoloma unicolar* (Perk) Hesler							+					+
27	*Fomes fomentarius* (L.) Fr.	+				+							+
28	*Fomitopsis pinicola* (Sw) P. Karst.	+								+			+
29	*Ganoderma lucidum* (Curtis) P. Karst.	+					+						
30	*Ganodrma tsugae* Murrill	+			+								+
31	*Geastrum fimbriatum* Fr.							+			+		
32	*Gleophyllum sepiarium* (Wulfen) P. Karst	+			+			+					
33	*Grifola frondosa* (Dicks.) Gray					+		+					
34	*Gymnopus acervatus* (Fr.) Murill.								+				+
35	*Gymnopus earleae* Murill						+					+	
36	*Gymnopus erythropus* (Pers.) Antonin, Halling & Noordel			+					+				
37	*Gymnopus fusifes* (Bull.Fr.) Gray					+						+	
38	*Heliocybe sulcata* (Berk.) Redhead & Ginns	+	+						+				
39	*Hirneola auricula* (Bull.) Berk			+					+				
40	*Hygrocybe russocoriace* (Berk. & Jos K. Mill.) P. D. Orton							+					+
41	*Lactarius deliociosus* (L.) Gray				+						+		
42	*Lentinus fusipes* Cooke and Mssee	+						+				+	
43	*Lentinus polychrous* Lev.					+	+						
44	*Lentinus torulosus* (Pers.) Lloyd		+					+					+
45	*Lenzites betulina* (L.) Fr.						+	+					+

Table 1 contd....

Table 1 contd....

No.	Name of the species	RPRC	SCH	NK	IMMT	UU	BRN	BAF	KT	KH	DH	JA	CF
46	*Lepiota cristata* (Bolton) P. Kumm.			+		+				+			
47	*Lepiota rhacodes* (Vittad.) Quel.		+						+				+
48	*Leucocoprinus cretatus* (Bull.) Locq.				+			+					
49	*Lycoperdon pyriformi* Schaeff.			+							+		+
50	*Macrolepiota clelandii* Grgur.	+											
51	*Macrolepiota dolichaula* Berk. & Broome			+				+					+
52	*Macrolepiota procera* (Scop.) Singer	+				+					+		+
53	*Marasmius anomalus* Peck		+				+	+					
54	*Marasmius haematocephalus* (Mont.) Fr	+	+						+	+	+		
55	*Marasmius plicatulus* Peck	+			+		+						+
56	*Marasmius rotulus* (Scop) Fr.			+				+			+		
57	*Microporus xanthopus* (Fr.) Kuntze					+		+				+	+
58	*Mollisia cineria* (Batsch) P. Karst	+			+					+			
59	*Peniophora incarnata* (Pers.) P. Karst.		+			+		+					+
60	*Peziza repanda* Pers.	+				+			+		+		
61	*Peziza vesciculosa* Saucher			+		+							+
62	*Phallus indusiatus* Vent.	+					+			+			+
63	*Phallus multicolour* (Berk. & Broome) Cooke	+			+				+			+	
64	*Phellinus gilvus* (Schwein.) Pat.		+			+		+			+	+	
65	*Phellinus igniarius* (L.) Quel.			+			+			+			
66	*Pisolithus arrhizus* (Scop.) Rauschert	+				+			+			+	+
67	*Pleurocybella porrigens* (Pers) Singer		+		+						+		
68	*Pluteus lutescens* (Fr.) Bres.			+					+				
69	*Podoscypha petaloides* (Berk.) Pat.	+					+				+		+
70	*Polyporus sulphureus* (Bull.) Fr.		+					+		+			
71	*Polyporus alveolaris* (DC.) Bondart. & Amp.	+					+						+
72	*Polyporus arcularius* (Batsch.) Fr.			+			+			+			
73	*Polyporus umbellatus* (Pers.) Fr	+					+						+
74	*Psathyrella piluliformis* (Bull.) P.D. Orton	+						+					
75	*Pycnoporus cinnabarinus* (Jacq.) Fr.			+		+							+
76	*Pycnoporus coccineus* (Fr.) Bondartsev & Singer.		+										
77	*Pycnoporus sanguineus* (L.) Murrill	+				+	+	+					+
78	*Ramaria botrytis* (Pers.) Ricken		+		+	+							
79	*Ramaria stricta* (Pers.) Quell			+					+		+		+
80	*Russula sanguinaria* (Velen.) Bon	+						+					
81	*Schizophyllum commune* Fries						+						
82	*Suillus luteus* (L.) Roussel			+		+		+				+	
83	*Termitomyces albuminosus* (Berk.) Pegler	+											
84	*Termitomyces clypeatus* R. Heim	+					+	+		+			+
85	*Termitomyces eurrhizus* (Berk) R. Heim	+			+								+
86	*Termitomyces medius* R. Heim & Grasse			+			+	+				+	
87	*Termitomyces microcarpus* (Berk & Broome) R. Heim						+		+			+	+
88	*Trametopsis cerviana* (Schwein) Tomsovsky	+					+						
89	*Trametes versicolor* (L.) Lloyd.	+		+						+			+
90	*Tricholoma lobayense* R. Heim				+		+	+				+	
91	*Volvoriella volvaceae* (Bul.) Singer								+		+		+
92	*Xylaria longipis* Nitschke		+	+			+	+					+

(+) indicates the presences of mushroom species where blank places reported the absences.

Table 2: Occurrence of different unidentified mushrooms in Khurda district.

Name of the species	RPRC	SCH	NK	IMMT	UU	BRN	BAF	KT	KH	DH	JA	CF
Un. Sp.-1	+			+						+		+
Un. Sp.-2					+		+				+	
Un. Sp.-3	+			+				+		+		
Un. Sp.-4					+		+					+
Un. Sp.-5	+					+	+					+
Un. Sp.-6			+	+			+					
Un. Sp.-7		+		+			+					+
Un. Sp.-8	+				+	+						+
Un. Sp.-9					+	+			+		+	
Un. Sp.-10		+						+		+		+
Un. Sp.-11	+		+									+
Un. Sp.-12					+	+			+			
Un. Sp.-13	+	+					+					
Un. Sp.-14							+					+
Un. Sp.-15						+			+			
Un. Sp.-16			+			+			+			+

(+) indicates the presences of mushroom species where blank places reported the absences.

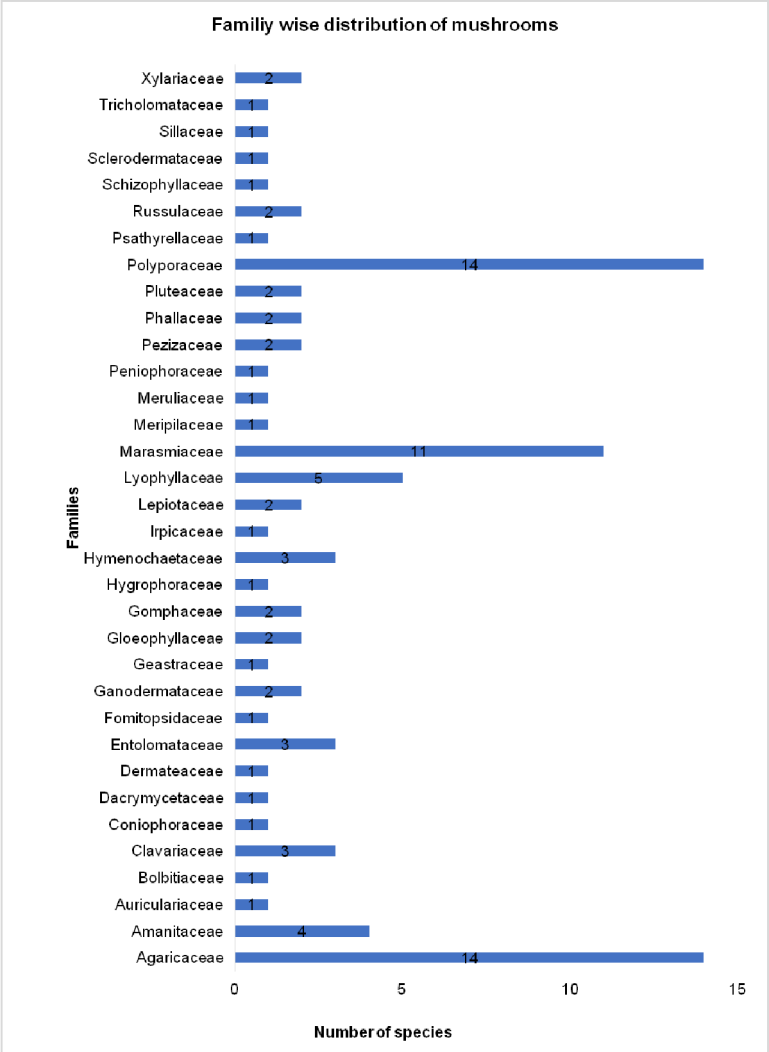

Fig. 1: Figure presenting family-wise distribution of mushroom species found in the study area.

Table 3: A periodical occurrence of mushrooms in different part of Khurda district.

No.	Name of Mushroom	June	July	August	September	October
1	*Agaricus bisporous* (J.E.Lange) Emil J. Imbach	+				
2	*Agaricus campestris* L.		+			
3	*Agaricus silvicola* (Vittad) Peck.			+	+	
4	*Amanita australis* G. Stev.		+			
5	*Amanita multisquamosa* Peck		+			
6	*Amanita rubescens* Blusher				+	
7	*Amanita vaginata* (Bull.) Lam.		+			
8	*Bovista longispora* (Peck) Kreisel			+	+	
9	*Bovista plumbea* Pers.			+		+
10	*Calvatia gigantea* (Batsch ex Pers.) Llyo	+				
11	*Chlorophyllum molybdites* (G. Mey.) Massee		+			
12	*Clavaria aurea* Schaeff.		+			
13	*Clavaria vermicularis* Sw.		+	+	+	+
14	*Clavulinopsis fusiformis* (Sowerby) Corner		+			
15	*Coltricia cinamomia* (Jacq.) Murrill				+	+
16	*Coniophora puteana* (Schum.) P. Karst.	+				
17	*Connopus acervatus* R.H.Petersen	+	+	+		
18	*Conocybe apala* (Fr.) Arnolds		+		+	
19	*Coprinus comatus* (O.F.Mull.) Pers.			+		
20	*Coprinus disseminatus* (Pers) Gray.					
21	*Crinipellis scabella* (Alb. & Schwein.) Murrill	+	+			
22	*Dacryopinax spathularia* (Schwein.) G.W. Martin			+		
23	*Daldinia concentrica* (Bolton) Cesati and de Notaris			+		
24	*Entoloma sinuatum* (Bull. ex Pers. Fr.) Kummer		+	+	+	
25	*Entoloma incanum* (Fr.) Hesler			+		
26	*Entoloma unicolar* (Perk) Hesler		+			
27	*Fomes fomentarius* (L.) Fr.		+			
28	*Fomitopsis pinicola* (Sw) P. Karst.		+			
29	*Ganoderma lucidum* (Curtis) P. Karst.	+	+	+	+	
30	*Ganodrma tsugae* Murrill		+	+		
31	*Geastrum fimbriatum* Fr.			+	+	
32	*Gleophyllum sepiarium* (Wulfen) P. Karst				+	+
33	*Grifola frondosa* (Dicks.) Gray		+	+	+	
34	*Gymnopus acervatus* (Fr.) Murill.		+			
35	*Gymnopus earleae* Murill	+			+	
36	*Gymnopus erythropus* (Pers.) Antonin, Halling & Noordel					
37	*Gymnopus fusifes* (Bull.Fr.) Gray				+	
38	*Heliocybe sulcata* (Berk.) Redhead & Ginns		+			
39	*Hirneola auricula* (Bull.) Berk		+		+	
40	*Hygrocybe russocoriace* (Berk. & Jos K. Mill.) P.D. Orton			+		
41	*Lactarius deliociosus* (L.) Gray			+		
42	*Lentinus fusipes* Cooke and Mssee		+	+		
43	*Lentinus polychrous* Lev.		+		+	
44	*Lentinus torulosus* (Pers.) Lloyd				+	
45	*Lenzites betulina* (L.) Fr.				+	
46	*Lepiota cristata* (Bolton) P. Kumm.		+			

Table 3 contd....

Table 3 contd....

No.	Name of Mushroom	June	July	August	September	October
47	*Lepiota rhacodes* (Vittad.) Quel.		+	+		
48	*Leucocoprinus cretatus* (Bull.) Locq.	+				
49	*Lycoperdon pyriformi* Schaeff.	+				
50	*Macrolepiota clelandii* Grgur.	+	+			
51	*Macrolepiota dolichaula* Berk. & Broome	+				
52	*Macrolepiota procera* (Scop.) Singer	+	+	+	+	+
53	*Marasmius anomalus* Peck			+		
54	*Marasmius haematocephalus* (Mont.) Fr.	+		+		
55	*Marasmius plicatulus* Peck				+	
56	*Marasmius rotulus* (Scop) Fr.		+	+		
57	*Microporus xanthopus* (Fr.) Kuntze	+	+	+	+	+
58	*Mollisia cineria* (Batsch) P. Karst.		+			+
59	*Peniophora incarnata* (Pers.) P. Karst.		+			
60	*Peziza repanda* Pers.	+				
61	*Peziza vesciculosa* Saucher			+	+	
62	*Phallus indusiatus* Vent.		+		+	
63	*Phallus multicolour* (Berk. & Broome) Cooke		+	+	+	
64	*Phellinus gilvus* (Schwein.) Pat.		+			
65	*Phellinus igniarius* (L.) Quel.	+	+			
66	*Pisolithus arrhizus* (Scop.) Rauschert	+	+		+	
67	*Pleurocybella porrigens* (Pers) Singer		+		+	
68	*Pluteus lutescens* (Fr.) Bres.	+				
69	*Podoscypha petaloides* (Berk.) Pat.					
70	*Polyporus sulphureus* (Bull.) Fr.		+		+	
71	*Polyporus alveolaris* (DC.) Bondart. & Amp.		+			
72	*Polyporus arcularius* (Batsch.) Fr.		+			
73	*Polyporus umbellatus* (Pers.) Fr		+			
74	*Psathyrella piluliformis* (Bull.) P.D. Orton	+		+		
75	*Pycnoporus cinnabarinus* (Jacq.) Fr.				+	
76	*Pycnoporus coccineus* (Fr.) Bondartsev & Singer.		+			
77	*Pycnoporus sanguineus* (L.) Murrill	+		+		
78	*Ramaria botrytis* (Pers.) Ricken	+			+	
79	*Ramaria stricta* (Pers.) Quell					+
80	*Russula sanguinaria* (Velen.) Bon		+			+
81	*Schizophyllum commune* Fries	+	+	+	+	
82	*Suillus luteus* (L.) Roussel		+			
83	*Termitomyces albuminosus* (Berk.) Pegler				+	
84	*Termitomyces clypeatus* R. Heim	+	+	+	+	
85	*Termitomyces eurrhizus* (Berk) R. Heim			+		
86	*Termitomyces medius* R. Heim & Grasse		+	+		
87	*Termitomyces microcarpus* (Berk & Broome) R. Heim		+			
88	*Trametopsis cerviana* (Schwein) Tomsovsky			+	+	
89	*Trametes versicolor* (L.) Lloyd.	+	+	+		
90	*Tricholoma lobayense* R. Heim		+			
91	*Volvoriella volvaceae* (Bul.) Singer		+			

Table 3 contd....

Table 3 contd....

No.	Name of Mushroom	June	July	August	September	October
92	*Xylaria longipis* Nitschke		+			
93	*Un-1*	+				
94	*Un-2*		+			
95	*Un-3*		+			
96	*Un-4*		+			
97	*Un-5*		+			
98	*Un-6*		+		+	
99	*Un-7*		+			
100	*Un-8*		+			
101	*Un-9*		+			
102	*Un-10*		+			
103	*Un-11*		+			
104	*Un-12*		+		+	
105	*Un-13*		+		+	+
106	*Un-14*		+			
107	*Un-15*		+	+	+	
108	*Un-16*		+			

(+) indicates the presence of mushroom species where blank places recorded the absences.

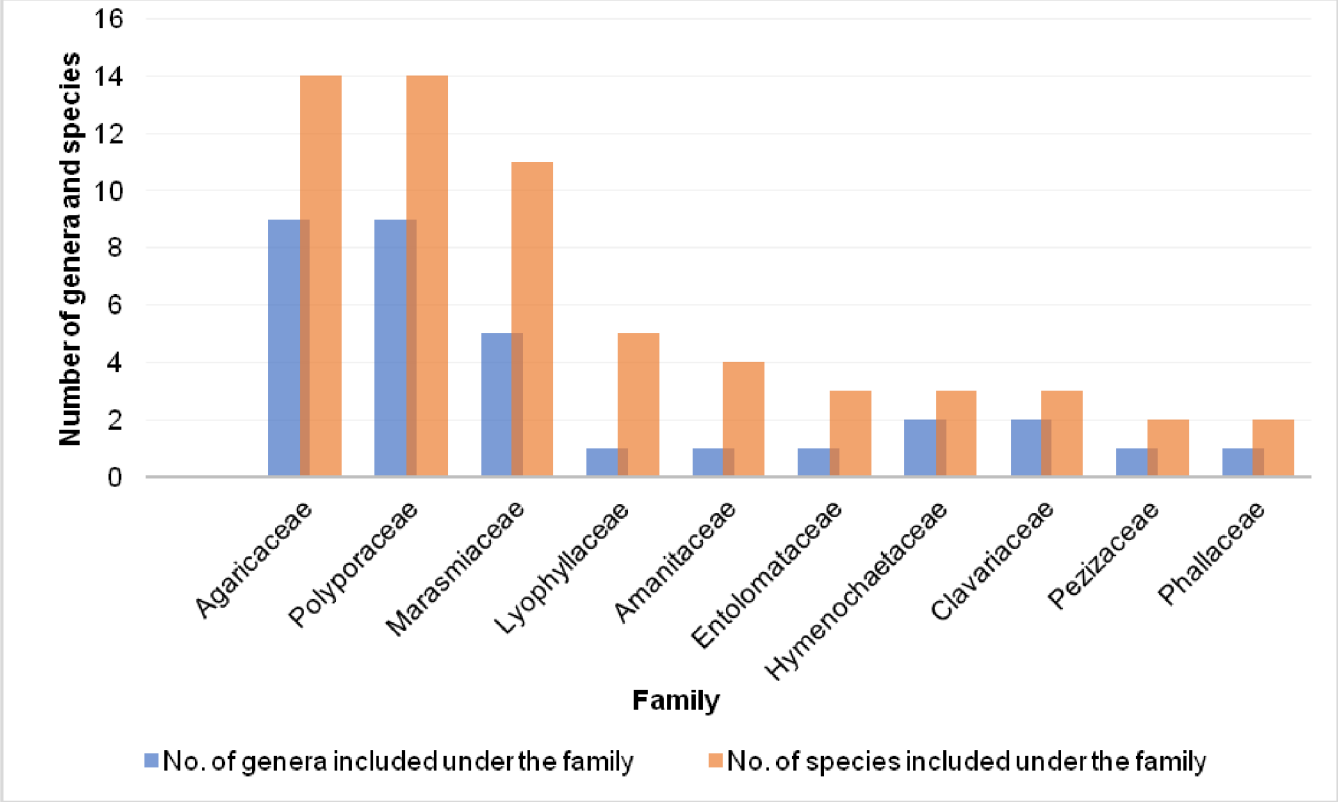

Fig. 2: Figure showing the 10 dominant families of the study area and number of genus and species included under it.

morphologically table 1 and 16 species remained as unidentified (Table 2). Taxonomically these 92 species belonging to 34 families and 60 genera. Occurrence of mushroom species were found to be more in Chandaka forest as compared to other locations besides very low occurrence was reported during July as compared to August and September. During the survey, mushroom species like *Clavaria vermicularis*, *Marasmius*

Table 4: Frequency of occurrence of mushrooms in different sites.

Sl. No.	Mushroom name	Frequency (%)	No.	Mushroom name	Frequency (%)
1	*Agaricus bisporous* (J.E.Lange) Emil J. Imbach	25	55	*Marasmius plicatulus* Peck	33.33
2	*Agaricus campestris* L.	16.67	56	*Marasmius rotulus* (Scop) Fr.	25
3	*Agaricus silvicola* (Vittad) Peck.	16.67	57	*Microporus xanthopus* (Fr.) Kuntze	33.33
4	*Amanita australis* G. Stev.	25	58	*Mollisia cineria* (Batsch) P. Karst	25
5	*Amanita multisquamosa* Peck	25	59	*Peniophora incarnata* (Pers.) P. Karst.	33.33
6	*Amanita rubescens* Blusher	16.67	60	*Peziza repanda* Pers.	25
7	*Amanita vaginata* (Bull.) Lam.	16.67	61	*Peziza vesciculosa* Saucher	33.33
8	*Bovista longispora* (Peck) Kreisel	25	62	*Phallus indusiatus* Vent.	33.33
9	*Bovista plumbea* Pers.	33.33	63	*Phallus multicolour* (Berk. & Broome) Cooke	33.33
10	*Calvatia gigantea* (Batsch ex Pers.) Llyo	16.67	64	*Phellinus gilvus* (Schwein.) Pat.	41.67
11	*Chlorophyllum molybdites* (G. Mey.) Massee	16.67	65	*Phellinus igniarius* (L.) Quel.	25
12	*Clavaria aurea* Schaeff.	16.67	66	*Pisolithus arrhizus* (Scop.) Rauschert	41.67
13	*Clavaria vermicularis* Sw.	75	67	*Pleurocybella porrigens* (Pers) Singer	25
14	*Clavulinopsis fusiformis* (Sowerby) Corner	16.67	68	*Pluteus lutescens* (Fr.) Bres.	16.67
15	*Coltricia cinamomia* (Jacq.) Murrill	16.67	69	*Podoscypha petaloides* (Berk.) Pat.	33.33
16	*Coniophora puteana* (Schum.) P. Karst.	25	70	*Polyporus sulphureus* (Bull.) Fr.	25
17	*Connopus acervatus* R.H.Petersen	25	71	*Polyporus alveolaris* (DC.) Bondart. & Amp.	25
18	*Conocybe apala* (Fr.) Arnolds	16.67	72	*Polyporus arcularius* (Batsch.) Fr.	25
19	*Coprinus comatus* (O.F.Mull.) Pers.	16.67	73	*Polyporus umbellatus* (Pers.) Fr	25
20	*Coprinus disseminatus* (Pers) Gray.	25	74	*Psathyrella piluliformis* (Bull.) P.D. Orton	16.67
21	*Crinipellis scabella* (Alb. & Schwein.) Murrill	16.67	75	*Pycnoporus cinnabarinus* (Jacq.) Fr.	25
22	*Dacryopinax spathularia* (Schwein.) G.W. Martin	25	76	*Pycnoporus coccineus* (Fr.) Bondartsev & Singer.	8.33
23	*Daldinia concentrica* (Bolton) Cesati and de Notaris	25	77	*Pycnoporus sanguineus* (L.) Murrill	41.67
24	*Entoloma sinuatum* (Bull. ex Pers. Fr.) Kummer	16.67	78	*Ramaria botrytis* (Pers.) Ricken	25
25	*Entoloma incanum* (Fr.) Hesler	16.67	79	*Ramaria stricta* (Pers.) Quell	25
26	*Entoloma unicolar* (Perk) Hesler	25	80	*Russula sanguinaria* (Velen.) Bon	16.67
27	*Fomes fomentarius* (L.) Fr.	16.67	81	*Schizophyllum commune* Fries	16.67
28	*Fomitopsis pinicola* (Sw) P. Karst.	25	82	*Suillus luteus* (L.) Roussel	33.33
29	*Ganoderma lucidum* (Curtis) P. Karst.	25	83	*Termitomyces albuminosus* (Berk.) Pegler	8.33
30	*Ganodrma tsugae* Murrill	16.67	84	*Termitomyces clypeatus* R. Heim	41.67
31	*Geastrum fimbriatum* Fr.	25	85	*Termitomyces eurrhizus* (Berk) R. Heim	25
32	*Gleophyllum sepiarium* (Wulfen) P. Karst	16.67	86	*Termitomyces medius* R. Heim & Grasse	33.33
33	*Grifola frondosa* (Dicks.) Gray	25	87	*Termitomyces microcarpus* (Berk & Broome) R. Heim	33.33
34	*Gymnopus acervatus* (Fr.) Murill.	16.67	88	*Trametopsis cerviana* (Schwein) Tomsovsky	16.67
35	*Gymnopus earleae* Murill	16.67	89	*Trametes versicolor* (L.) Lloyd.	33.33
36	*Gymnopus erythropus* (Pers.) Antonin, Halling & Noordel	16.67	90	*Tricholoma lobayense* R. Heim	33.33
37	*Gymnopus fusifes* (Bull.Fr.) Gray	16.67	91	*Volvoriella volvaceae* (Bul.) Singer	25
38	*Heliocybe sulcata* (Berk.) Redhead & Ginns	16.67	92	*Xylaria longipis* Nitschke	41.67
39	*Hirneola auricula* (Bull.) Berk	25	93	*Un-1*	33.33
40	*Hygrocybe russocoriace* (Berk. & Jos K. Mill.) P.D. Orton	16.67	94	*Un-2*	25

Table 4 contd....

Table 4 contd....

Sl. No.	Mushroom name	Frequency (%)	No.	Mushroom name	Frequency (%)
41	*Lactarius deliociosus* (L.) Gray	16.67	95	*Un-3*	33.33
42	*Lentinus fusipes* Cooke and Mssee	25	96	*Un-4*	25
43	*Lentinus polychrous* Lev.	16.67	97	*Un-5*	33.33
44	*Lentinus torulosus* (Pers.) Lloyd	25	98	*Un-6*	25
45	*Lenzites betulina* (L.) Fr.	25	99	*Un-7*	25
46	*Lepiota cristata* (Bolton) P. Kumm.	25	100	*Un-8*	33.33
47	*Lepiota rhacodes* (Vittad.) Quel.	25	101	*Un-9*	33.33
48	*Leucocoprinus cretatus* (Bull.) Locq.	16.67	102	*Un-10*	33.33
49	*Lycoperdon pyriformi* Schaeff.	25	103	*Un-11*	25
50	*Macrolepiota clelandii* Grgur.	8.33	104	*Un-12*	25
51	*Macrolepiota dolichaula* Berk. & Broome	25	105	*Un-13*	16.67
52	*Macrolepiota procera* (Scop.) Singer	33.33	106	*Un-14*	25
53	*Marasmius anomalus* Peck	25	107	*Un-15*	16.67
54	*Marasmius haematocephalus* (Mont.) Fr	41.67	108	*Un-16*	33.33

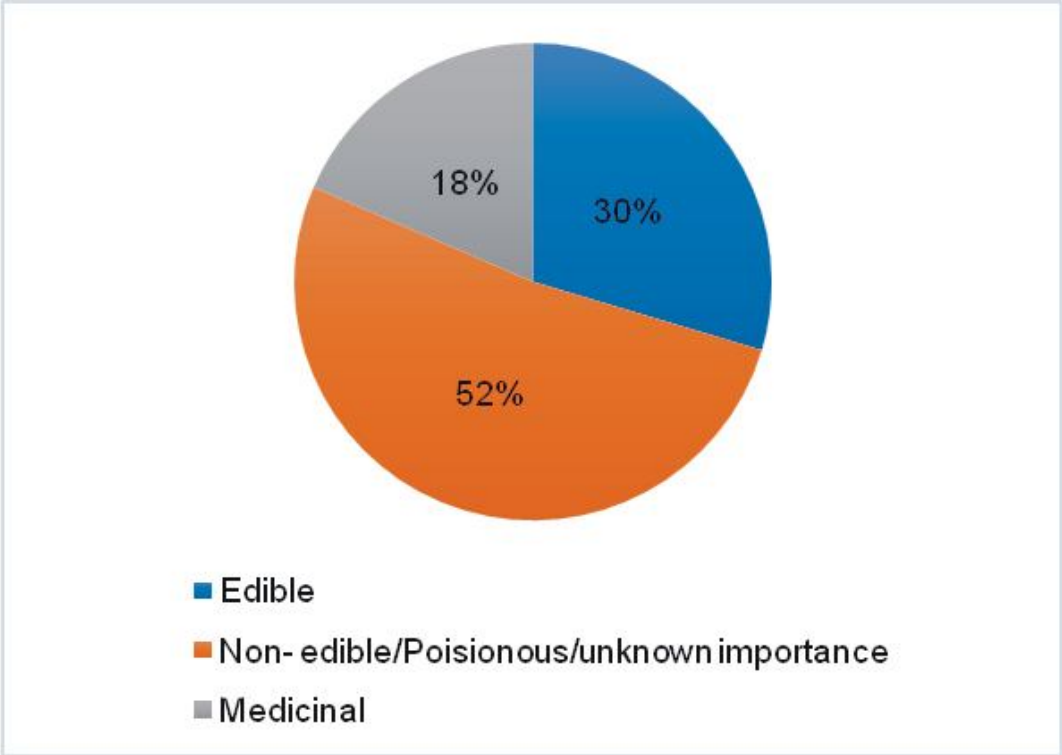

Fig. 3: Figure showing the % of mushrooms with their economic importance.

haematocephalus, Phellinus gilvus, Pisolithus arrhizus, Termitomyces clypeatus, Pycnoporus sanguineus, Xylaria longipis, Bovista plumbea and *Macrolepiota procera* etc. were found dominant with highest number of species under Agaricaceae and Polyporaceae family, each with 14 species followed by Auriculariaceae, Bolbitiaceae, Dacrymycetaceae, Hygrophoraceae etc. with single species.

During investigations large numbers of species were found in Chandaka forest whereas less occurrence were reported in Jatani location. Distribution of species like *Clavaria vermicularis* was found to be more and observed at 9 sites. However, more species like *Macrolepiota clelandii, Pycnoporus coccineus* and *Termitomyces albuminosus* etc. were found to occur in only single site.

Table 5: List of mushrooms with their genus and family.

No.	Name of the family	Name of the genus	Name of the species
1	Agaricaceae	*Agaricus*	*Agaricus bisporous* (J.E.Lange) Emil J. Imbach
2	Agaricaceae	*Agaricus*	*Agaricus campestris* L.
3	Agaricaceae	*Agaricus*	*Agaricus silvicola* (Vittad) Peck.
4	Agaricaceae	*Bovista*	*Bovista longispora* (Peck) Kreisel
5	Agaricaceae	*Bovista*	*Bovista plumbea* Pers.
6	Agaricaceae	*Chlorophyllum*	*Chlorophyllum molybdites* (G. Mey.) Massee
7	Agaricaceae	*Coprinus*	*Coprinus comatus* (O.F.Mull.) Pers.
8	Agaricaceae	*Coprinus*	*Coprinus disseminatus* (Pers) Gray.
9	Agaricaceae	*Lepiota*	*Lepiota cristata* (Bolton) P. Kumm.
10	Agaricaceae	*Lepiota*	*Lepiota rhacodes* (Vittad.) Quel.
11	Agaricaceae	*Macrolepiota*	*Macrolepiota procera* (Scop.) Singer
12	Agricaceae	*Calvatua*	*Calvatia gigantea* (Batsch ex Pers.) Llyo
13	Agricaceae	*Leucocoprinus*	*Leucocoprinus cretatus* (Bull.) Locq.
14	Agricaceae	*Lycoperdon*	*Lycoperdon pyriformi* Schaeff
15	Amanitaceae	*Amanita*	*Amanita australis* G. Stev.
16	Amanitaceae	*Amanita*	*Amanita multisquamosa* Peck
17	Amanitaceae	*Amanita*	*Amanita rubescens* Blusher
18	Amanitaceae	*Amanita*	*Amanita vaginata* (Bull.) Lam.
19	Auriculariaceae	*Auricularia*	*Hirneola auricula* (Bull.) Berk
20	Bolbitiaceae	*Conocybe*	*Conocybe apala* (Fr.) Arnolds
21	Clavariaceae	*Clavaria*	*Clavaria aurea* Schaeff.
22	Clavariaceae	*Clavaria*	*Clavaria vermicularis* Sw.
23	Clavariaceae	*Clavulinopsis*	*Clavulinopsis fusiformis* (Sowerby) Corner
24	Coniophoraceae	*Coniophora*	*Coniophora puteana* (Schum.) P. Karst.
25	Dacrymycetaceae	*Dacryopinax*	*Dacryopinax spathularia* (Schwein.) G.W. Martin
26	Dermateaceae	*Mollisia*	*Mollisia cineria* (Batsch) P. Karst
27	Entolomataceae	*Entoloma*	*Entoloma sinuatum* (Bull. ex Pers. Fr.) Kummer
28	Entolomataceae	*Entoloma*	*Entoloma incanum* (Fr.) Hesler
29	Entolomataceae	*Entoloma*	*Entoloma unicolar* (Perk) Hesler
30	Fomitopsidaceae	*Fomitopsis*	*Fomitopsis pinicola* (Sw) P. Karst.
31	Ganodermataceae	*Ganoderma*	*Ganoderma lucidum* (Curtis) P. Karst.
32	Ganodermataceae	*Ganoderma*	*Ganodrma tsugae* Murrill
33	Geastraceae	*Geastrum*	*Geastrum fimbriatum* Fr.
34	Gloeophyllaceae	*Gleophyllum*	*Gleophyllum sepiarium* (Wulfen) P. Karst
35	Gloeophyllaceae	*Heliocybe*	*Heliocybe sulcata* (Berk.) Redhead & Ginns
36	Gomphaceae	*Ramaria*	*Ramaria botrytis* (Pers.) Ricken
37	Gomphaceae	*Ramaria*	*Ramaria stricta* (Pers.) Quell
38	Hygrophoraceae	*Hygrocybe*	*Hygrocybe russocoriace* (Berk. & Jos K. Mill.) P. D. Orton
39	Hymenochaetaceae	*Phellinus*	*Phellinus gilvus* (Schwein.) Pat.
40	Hymenochaetaceae	*Phellinus*	*Phellinus igniarius* (L.) Quel.
41	Hymenochaetaceae	*Conocybe*	*Coltricia cinamomia* (Jacq.) Murrill
42	Irpicaceae	*Trametopsis*	*Trametopsis cerviana* (Schwein) Tomsovsky
43	Lepiotaceae	*Macrolepiota*	*Macrolepiota clelandii* Grgur.
44	Lepiotaceae	*Macrolepiota*	*Macrolepiota dolichaula* Berk. & Broome
45	Lyophyllaceae	*Termitomyces*	*Termitomyces albuminosus* (Berk.) Pegler

Table 5 contd....

Table 5 contd....

No.	Name of the family	Name of the genus	Name of the species
46	Lyophyllaceae	*Termitomyces*	*Termitomyces clypeatus* R. Heim
47	Lyophyllaceae	*Termitomyces*	*Termitomyces eurrhizus* (Berk) R. Heim
48	Lyophyllaceae	*Termitomyces*	*Termitomyces medius* R. Heim & Grasse
49	Lyophyllaceae	*Termitomyces*	*Termitomyces microcarpus* (Berk & Broome) R. Heim
50	Marasmiaceae	*Connopus*	*Connopus acervatus* R.H.Petersen
51	Marasmiaceae	*Crinipellis*	*Crinipellis scabella* (Alb. & Schwein.) Murrill
52	Marasmiaceae	*Gymnopus*	*Gymnopus acervatus* (Fr.) Murill.
53	Marasmiaceae	*Gymnopus*	*Gymnopus earleae* Murill
54	Marasmiaceae	*Gymnopus*	*Gymnopus erythropus* (Pers.) Antonin, Halling & Noordel
55	Marasmiaceae	*Gymnopus*	*Gymnopus fusifes* (Bull.Fr.) Gray
56	Marasmiaceae	*Marasmius*	*Marasmius anomalus* Peck
57	Marasmiaceae	*Marasmius*	*Marasmius haematocephalus* (Mont.) Fr
58	Marasmiaceae	*Marasmius*	*Marasmius plicatulus* Peck
59	Marasmiaceae	*Marasmius*	*Marasmius rotulus* (Scop) Fr.
60	Marasmiaceae	*Pleurocybella*	*Pleurocybella porrigens* (Pers) Singer
61	Meripilaceae	*Grifola*	*Grifola frondosa* (Dicks.) Gray
62	Meruliaceae	*Podoscypha*	*Podoscypha petaloides* (Berk.) Pat.
63	Peniophoraceae	*Peniophora*	*Peniophora incarnata* (Pers.) P. Karst.
64	Pezizaceae	*Peziza*	*Peziza repanda* Pers.
65	Pezizaceae	*Peziza*	*Peziza vesciculosa* Saucher
66	Phallaceae	*Phallus*	*Phallus indusiatus* Vent.
67	Phallaceae	*Phallus*	*Phallus multicolour* (Berk. & Broome) Cooke
68	Pluteaceae	*Pluteus*	*Pluteus lutescens* (Fr.) Bres.
69	Pluteaceae	*Volvoriella*	*Volvoriella volvaceae* (Bul.) Singer
70	Polyporaceae	*Fomes*	*Fomes fomentarius* (L.) Fr.
71	Polyporaceae	*Lentinus*	*Lentinus fusipes* Cooke and Mssee
72	Polyporaceae	*Lentinus*	*Lentinus polychrous* Lev.
73	Polyporaceae	*Panus*	*Lentinus torulosus* (Pers.) Lloyd
74	Polyporaceae	*Lenzites*	*Lenzites betulina* (L.) Fr.
75	Polyporaceae	*Microporus*	*Microporus xanthopus* (Fr.) Kuntze
76	Polyporaceae	*Polyporus*	*Polyporus sulphureus* (Bull.) Fr.
77	Polyporaceae	*Polyporus*	*Polyporus alveolaris* (DC.) Bondart. & Amp.
78	Polyporaceae	*Polyporus*	*Polyporus arcularius* (Batsch.) Fr.
79	Polyporaceae	*Polyporus*	*Polyporus umbellatus* (Pers.) Fr.
80	Polyporaceae	*Pycnoporus*	*Pycnoporus cinnabarinus* (Jacq.) Fr.
81	Polyporaceae	*Pycnoporus*	*Pycnoporus coccineus* (Fr.) Bondartsev & Singer.
82	Polyporaceae	*Pycnoporus*	*Pycnoporus sanguineus* (L.) Murrill
83	Polyporaceae	*Trametes*	*Trametes versicolor* (L.) Lloyd.
84	Psathyrellaceae	*Psathyrella*	*Psathyrella piluliformis* (Bull.) P.D. Orton
85	Russulaceae	*Lactarius*	*Lactarius deliociosus* (L.) Gray
86	Russulaceae	*Russula*	*Russula sanguinaria* (Velen.) Bon.
87	Schizophyllaceae	*Schizophyllum*	*Schizophyllum commune* Fries
88	Sclerodermataceae	*Pisolithus*	*Pisolithus arrhizus* (Scop.) Rauschert
89	Sillaceae	*Suillus*	*Suillus luteus* (L.) Roussel
90	Tricholomataceae	*Tricholoma*	*Tricholoma lobayense* R. Heim
91	Xylariaceae	*Daldinia*	*Daldinia concentrica* (Bolton) Cesati and de Notaris
92	Xylariaceae	*Xylaria*	*Xylaria longipis* Nitschke

Table 6: List of 10 dominant families of the study area.

No.	Name of the family	No. of genera included under the family	No. of species included under the family
1	Agaricaceae	9	14
2	Polyporaceae	9	14
3	Marasmiaceae	5	11
4	Lyophyllaceae	1	5
5	Amanitaceae	1	4
6	Entolomataceae	1	3
7	Hymenochaetaceae	2	3
8	Clavariaceae	2	3
9	Pezizaceae	1	2
10	Phallaceae	1	2

Field survey was carried out from June-October 2018 and results revealed greater occurrence of mushrooms during the months of July, August and September (Table-3). In July most of the species were collected including some unique species like *Amanita australis, Amanita vaginata* and *Suillus luteus*. Mushroom species such as *Conocybe apala, Dacryopinax spathularia, Hygrocybe russocoriace, Termitomyces eurrhizus,* and *Marasmieus anomalus* were only found to be reported in the month of August. Least number of mushroom species was found in October. *Coltricia cinamomia, Leucocoprinus cretatus, Pluteus lutescens* were observed and reported in the month of June, while *Microporus xanthopus, Schizophyllum commune, Termitomycesclypeatus, Ganoderma lucidum* and *Macrolepiota procera* were found to occur during the rainy season. The seasonal or periodical occurrence of mushrooms is clearly evident in the present study is depicted as above.

The data on observation revealed that *Clavaria vermicularis* occur most frequently (75%) in the area under study followed by *Phellinus gilvus, Pisolithus arrhizus, Pycnoporus sanguineus, Termitomyces clypeatus, Marasmius haematocephalus* and *Xylaria longipis* (41.67 % frequency), *Bovista plumbea, Macrolepiota procera, Marasmius plicetus, Suillus luteus, Termitomyces microcarpus, Trametes versicolor, Termitomyces medius, Tricholoma lobayense* and other species (33.33 % frequency), and *Macrolepiota clelandii* only species found with very low frequency of 8.33% (Table 4).

A total 92 (morphologically identified) species collected belonging to 34 families and 60 genera were reported during the study. All the mushrooms grouped under different families and genera are depicted in Table-5.

From Fig. 1, it can be concluded that, highest number of species that is 14 numbers were found, belonging to the family Polyporaceae and Agaricaceae followed by Marasmiaceae Lyophyllaceae, Amanitaceae family found with 11, 5 and 4 species respectively. Clavariaceae, Entolomataceae and Hymenochaetaceae family were represented with 3 species each. Families like Ganodermataceae, Gloeophyllaceae, Gomphaceae, Lepiotaceae, Pezizaceae, Phallaceae, Pluteaceae, Russulaceae and Xylariaceae were found with 2 species each. Apart from these, rest all 17 families were represented by 1 species each.

Out of 34 families, 10 families were taken into consideration for a statistical analysis which revealed the presence of 32 genera comprising of 61 species. Agaricaceae and Polyporaceae family were considered dominant, since they represented with 14 species under each of the family. Family Marasmiaceae was found the second dominant reported with 5 genera and 11 species. Hymenochaetaceae and Clavariaceae families registered with 2 genera and containing 3 species each. Families such as Lyophyllaceae, Amanitaceae, Entolomataceae, Pezizaceae and Phallaceae had single genera with 5, 4, 3, 2 and 2 species respectively. All these observations were depicted in Table-6, Fig. 2.

All the identified mushroom specimen were documented along with their utilities and the data revealed that 32 number of mushrooms were observed as edible, collected from different sources during the investigation. Non-edible species recorded during the survey were 40 in number, while mushrooms with medicinal value was recorded in 20 number of species and results are depicted in (Table 7). It may be noted that the sixteen botanically unidentified mushroom specimens are non-edible which may be due to being poisonous or not having any medicinal use.

Discussion

Mushrooms are well-known for their ethnic uses and considered as good source of food. In this investigation, mushroom flora of the present area has been surveyed with special reference to their diversity and uses. The observation of rich biodiversity of mushrooms in the study sites providing a healthy and appropriate condition for-macro fungal growth can be attributed the favourable climatic factor in the area. A total 108 species of mushrooms were collected from 12 different localities of the district which were preserved in the laboratory for their detailed taxonomic and other studies. A remarkable number of species were reported during the present

Table 7: List of edibles, non-edible and medicinal mushrooms of the area.

Edible	Non-edible	Medicinal
Agaricus bisporous (J.E.Lange) Emil J. Imbach	*Amanita vaginata* (Bull.) Lam.	*Amanita australis* G. Stev.
Agaricus campestris L.	*Amanita multisquamosa* Peck	*Clavaria vermicularis* Sw.
Agaricus silvicola (Vittad) Peck.	*Amanita rubescens* Blusher	*Clavulinopsis fusiformis* (Sowerby) Corner
Bovista longispora (Peck) Kreisel	*Bovista plumbea* Pers.	*Coltricia cinamomia* (Jacq.) Murrill
Clavaria aurea Schaeff.	*Chlorophyllum molybdites* (G. Mey.) Massee	*Connopus acervatus* R.H.Petersen
Calvatia gigantea (Batsch ex Pers.) Llyo	*Coniophora puteana* (Schum.) P. Karst.	*Daldinia concentrica* (Bolton) Cesati and de Notaris
Coprinus comatus (O.F.Mull.) Pers.	*Conocybe apala* (Fr.) Arnolds	*Ganoderma lucidum* (Curtis) P. Karst.
Coprinus disseminatus (Pers) Gray.	*Crinipellis scabella* (Alb. & Schwein.) Murrill	*Geastrum fimbriatum* Fr.
Dacryopinax spathularia (Schwein.) G.W. Martin	*Entoloma incanum* (Fr.) Hesler	*Lactarius deliociosus* (L.) Gray
Entoloma sinuatum (Bull. ex Pers. Fr.) Kummer	*Fomes fomentarius* (L.) Fr.	*Lentinus torulosus* (Pers.) Lloyd
Grifola frondosa (Dicks.) Gray.	*Fomitopsis pinicola* (Sw) P. Karst.	*Lenzites betulina* (L.) Fr.
Gymnopus acervatus (Fr.) Murill.	*Ganodrma tsugae* Murrill	*Marasmius anomalus* Peck
Lentinus fusipes Cooke and Mssee	*Gleophyllum sepiarium* (Wulfen) P. Karst	*Marasmius haematocephalus* (Mont.) Fr
Lepiota cristata (Bolton) P. Kumm.	*Gymnopus earleae* Murill	*Marasmius plicatulus* Peck
Macrolepiota clelandii Grgur.	*Gymnopus erythropus* (Pers.) Antonin, Halling & Noordel	*Microporus xanthopus* (Fr.) Kuntze
Macrolepiota dolichaula Berk. & Broome	*Gymnopus fusifes* (Bull.Fr.) Gray	*Peniophora incarnata* (Pers.) P. Karst.
Macrolepiota procera (Scop.) Singer	*Heliocybe sulcata* (Berk.) Redhead & Ginns	*Phallus multicolour* (Berk. & Broome) Cooke
Phallus indusiatus Vent.	*Hirneola auricula* (Bull.) Berk	*Phellinus gilvus* (Schwein.) Pat.
Pleurocybella p[orrigens (Pers) Singer	*Hygrocybe russocoriace* ((Berk. & Jos K. Mill.) P.D. Orton	*Polyporus sulphureus* (Bull.) Fr.
Pluteus lutescens (Fr.) Bres.	*Lentinus polychrous* Lev.	*Trametes versicolor* (L.) Lloyd.
Ramaria botrytis (Pers.) Ricken	*Lepiota rhacodes* (Vittad.) Quel.	
Ramaria stricta (Pers.) Quell	*Leucocoprinus cretatus* (Bull.) Locq.	
Russula sanguinaria (Velen.) Bon	*Lycoperdon pyriformi* Schaeff	
Schizophyllum commune Fries	*Marasmius rotulus* (Scop) Fr.	
Suillus luteus (L.) Roussel	*Mollisia cineria* (Batsch) P. Karst	
Termitomyces albuminosus (Berk.) Pegler	*Peziza repanda* Pers.	
Termitomyces clypeatus R. Heim	*Peziza vesciculosa* Saucher	
Termitomyces eurrhizus (Berk) R. Heim	*Phellinus igniarius* (L.) Quel.	
Termitomyces medius R. Heim & Grasse	*Pisolithus arrhizus* (Scop.) Rauschert	
Termitomyces microcarpus (Berk & Broome) R. Heim	*Podoscypha petaloides* (Berk.) Pat.	
Tricholoma lobayense R. Heim	*Polyporus alveolaris* (DC.) Bondart. & Amp.	
Volvoriella volvaceae (Bul.) Singer	*Polyporus arcularius* (Batsch.) Fr.	

Table 7 contd....

Table 7 contd....

Edible	Non-edible	Medicinal
	Polyporus umbellatus (Pers.) Fr	
	Psathyrella piluliformis (Bull.) P.D. Orton	
	Entoloma unicolar (Perk) Hesler	
	Pycnoporus coccineus (Fr.) Bondartsev & Singer.	
	Pycnoporus sanguineus (L.) Murrill	
	Pycnoporus cinnabarinus (Jacq.) Fr.	
	Trametopsis cerviana (Schwein) Tomsovsky	
	Xylaria longipis Nitschke	

investigation as compared to the earlier findings (Panda & Tayung 2015; Satapathy *et al.,* 2016; Tripathy *et al.,* 2015) in Odisha. Exploration of edibility and curative properties of some of the mushroom samples collected from Chandaka forest area are the uniqueness of this piece of work.

Conclusion

Odisha with diverse habitat and varied ecological conditions harbours wide varieties of mushrooms. The present study on mushroom diversity in Khurda district of Odisha revealed mushrooms belonging to family Agaricaceae, Polyporaceae and Marasmiaceae with prominent species like *Clavaria vermicular, Marasmius haematocephalus, Phellinus gilvus, Pycnoporus sanguineus* were abundantly found in most of locations surveyed. Chandaka forest area and RPRC campus are the two places showing high species richness of mushrooms which might be due to rich vegetation of moist deciduous pattern. It is evident that mushroom diversity seems to be higher in moist forest area as compared to other habitats which are affected seriously by environmental factor like light, temperature, humidity etc. Diversity can be considered as a parameter for monitoring the ecological succession and other adverse effect of urbanization and industrialization leading to environmental pollution. The rich diversity of mushrooms in Khurda district are not only need conservation measures but also can be exploited further for their nutraceuticals and medicinal properties. Further investigation on medicinally important samples may reveal the presence of bioactive compounds through pharmacological evaluation and chemical analysis.

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