INTERNATIONAL JOURNAL OF SCIENCE AND NATURE

www.scienceandnature.org

MACROFUNGAL DIVERSITY IN DANGS DISTRICT, GUJARAT, INDIA

Ravat Hirendrasinh, R. & *Priya John
Department of Plant Pathology, N.M. College of Agriculture, Navasri Agricultural University, Navsari 396540, Gujarat, India.
*Corresponding author email: priyajohn75@gmail.com

ABSTRACT
Mushroom is a macro fungus with a distinctive fruiting body, which can be either epigeous or hypogeous and large enough to be seen with naked eye and can be picked by hand. Dangs distict is one of the richest floristic areas located in between 20.39° to 21.05° north latitude and 73.29° to 73.51° east longitude with a wide range of ecosystem and species diversity. Studies on the taxonomy and diversity of macrofungi are gaining importance, as many macrofungi are becoming extinct and facing threat of extinction because of habitat destruction. The current study deals with the studies on morphological characterization of fleshy fungi from Dangs district; the average rain fall is about 3,048 mm. The average maximum and minimum temperature is 22°C. A survey was conducted from July 2012 to December 2012 at 5 selected sampling stations (Waghai, Kukadnakhi, Chichingavtha, Kudkachh and Bhenskatri) of Dangs using the opportunistic sampling method. The fleshy fungi were collected and photographed. They were further detected morphologically and taxonomically. From the collected 111 samples, a total of 37 species were identified after grouping the similar samples into the same genus. They were identified with the help of available literature. Among them *Auricularia polytricha*, *Schizophyllum commune*, *Xylaria carpophila*, *Ganoderma applanatum*, *Macrolepiota procera*, *Clavulina cristata*, *Psathyrella candolleana* were observed as most dominant species and found at all selected places and *Ascobolus furfuraceus*, *Calocera cornea*, *Crepidotus variabulis*, *Phellodon confluence* were very rarely collected during the survey. In Ascomycota, 3 families reported were Pyrenomataceae, Xylariaceae and Ascobolaceae. Among the phylum Basidiomycota, 18 families reported were Auriculariaceae, Agaricaceae, Crepidotaceae, Marasmiaceae, Pleurotaceae, Physalacriaceae, Psathyrellaceae, Tricholomataceae, Schizophyllaceae, Cantharellaceae, Clavulinaceae, Dacrymycetaceae, Hymenochetaceae, Ganodermataceae, Meruliaceae, Phallaceae, Russulaceae and Bankeraceae.

KEY WORDS: Diversity, survey, fleshy fungi, morphology.

INTRODUCTION

Mushroom is a macro fungus with a distinctive fruiting body, which can be either epigeous or hypogeous and large enough to be seen with naked eye and to be picked by hand. Wild mushrooms have a profound biological and economical impact. They had a long association with humankind. From ancient times, wild mushrooms had been consumed by man with delicacy probably for their texture and pleasant flavour. They have rich nutritional value with high content of proteins, vitamins, minerals, fibers, trace elements and low/no calories and cholesterol. The most basic data obtained from fungal surveys contribute to our knowledge of the number of species of fungi and fungus-like organisms that exist and their distribution across habitats landscapes and around the globe. Such information constitutes the baseline against which to measure changes in the presence and abundance of species at particular locations in response to natural or, especially, human-induced (Muller *et al.*, 2004). The most common type of mushrooms is umbrella shaped with pileus and stipe, while other species additionally have a volva or annulus or with both of them. Furthermore, some mushrooms are in the form of pliable cups, while others are round like golf boll. Some are in the shape of small clubs, some coral; others are yellow or orange jelly like globs and some even much resemble the human ear, Infact, there are countless varieties of mushrooms (Chang and Miles, 2004). India is a rich treasure of natural resources; among them macromycetes are one of them. Studies on mushrooms with special references to their edibility, utility and medicinal values with the early references on larger fungi may be beneficial for humanity (Hedawoo, 2010). Dangs district is a part with naturally rich biodiversity region of Gujarat. The average rainfall is about 3,048 mm and the average maximum and minimum temperature is of 22 °C. Due to high humidity, humus accumulation with low disturbance, it provides the luxuriant growth of fleshy fungi

MATERIALS & METHODS

Study area: Dangs district is a part of naturally rich biodiversity region of Gujarat. It is situated between 20.39° to 21.05° north latitude and 73.29° to 73.51° east longitude. The geographical area of the district is about 1,764 sq. km. with average rainfall about 3,048 mm. Maximum and minimum temperature is 37°C and 6°C respectively. Luxuriant growth of fleshy fungi occurs due to high humidity, humus accumulation and low disturbances. The study area comprised of 5 locations of Dangs district, which were Waghai, Kukadnakhi, Chichingavtha, Kudkachh and Bhenskatri. The soil in these areas is most fertile due to high rate of decomposition.

Survey: Surveys are particularly sensitive to timing and location. Macrofungi exhibit pattern of diversity that is related to substratum and host availability (Natrajan *et al*., 2005). Surveying is best just during the period of rain and

after the period of rain. Therefore, present surveys were done during July 1st 2012 to December 31st 2012.

Sampling: Vegetative zone and plant association were useful criteria to divide a landscape for sampling. Many macrofungi occur only in association with particular family or plants. The macrofungi generally fruit when temperature may be above 15^0C and relative humidity more than 80-85%. Sampling was done using opportunistic sampling method (Mueller *et al*., 2004).The samples were collected as per the standard methods (Stojchev *et al*., 1998, Kaya, 2005 & Afyon *et al*., 2005).

Detection of collected fleshy fungi: The collected sporocarps were detected for the morphological characters like pileus color, diameter, shape, stipe color, length, diameter, gills color and attachment. A brief note of distinguishing microscopic features was studied under microscope. For this purpose, scale, Petri plate, black-white paper for spore print, microscope (40X) with camera under scope photo software and measuring scale (µm) were used for identification.

RESULTS

To find out the distribution and occurrence of fleshy fungi in a particular area, survey was conducted in 6 months, July 2012 to December 2012 at the locations of Waghai, Cookadnakhi, Chichingavtha, Coodkachh and Bhenskatri. A total of 111 samples of mushrooms were collected during the survey. Maximum of 28 samples were collected from Waghai region and minimum of 17 samples from Kudkachh region. The samples collected were from decaying wood, leaf litter, woody debris, organic debris, wood chips, soil inhibiting, pastures and lawns habitats. The collected samples were further grouped and identified as 37 species, on the basis of morphological characters like pileus colour, diameter, shape, stipe colour, length, diameter, gills, colour and attachment. A brief note of distinguishing macroscopic and microscopic features was studied of the collected sample (Fig.1-4).

FIGURE 1: Different fleshy fungi collected from Dangs

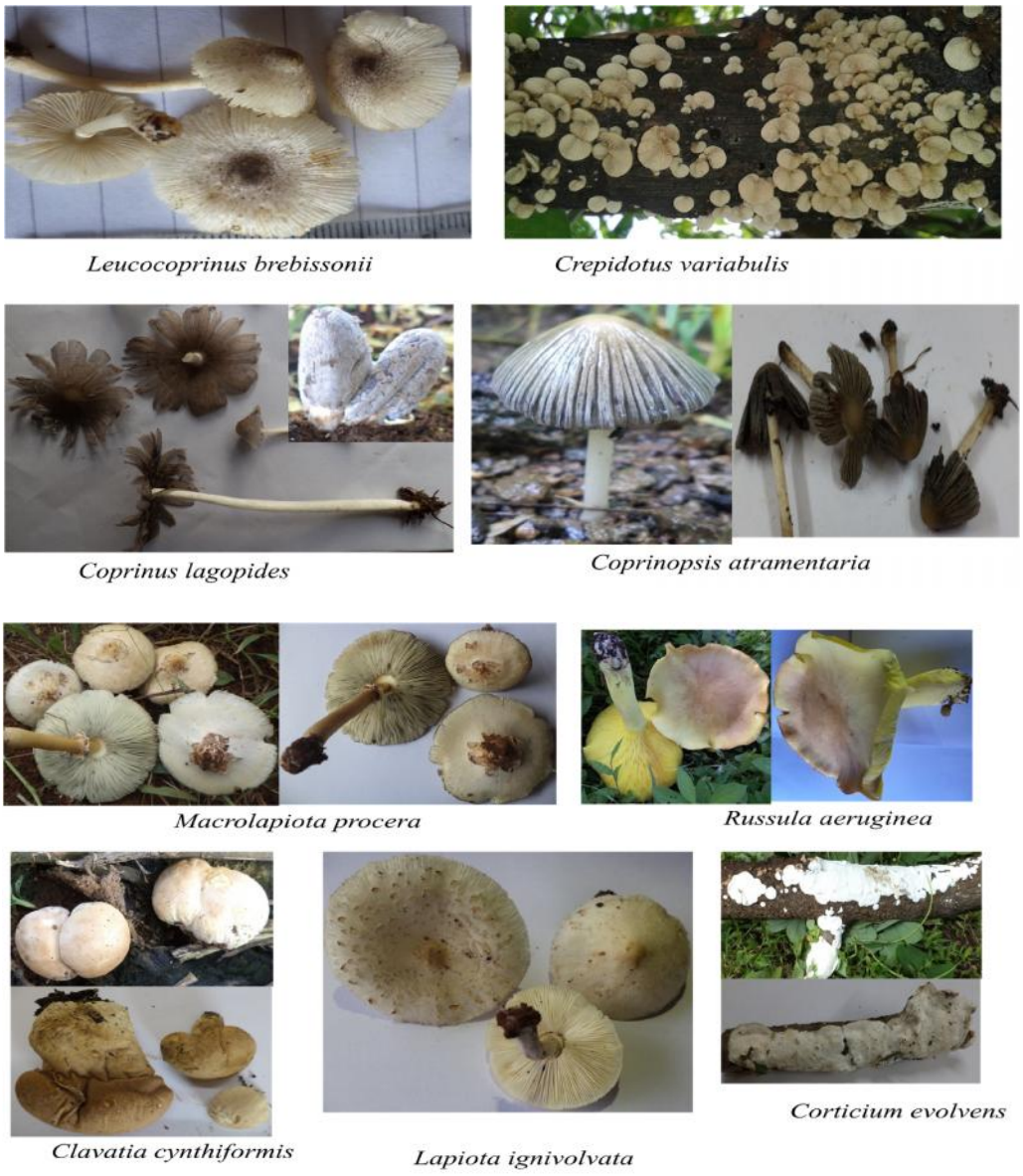

FIGURE 2: Different fleshy fungi collected from Dangs

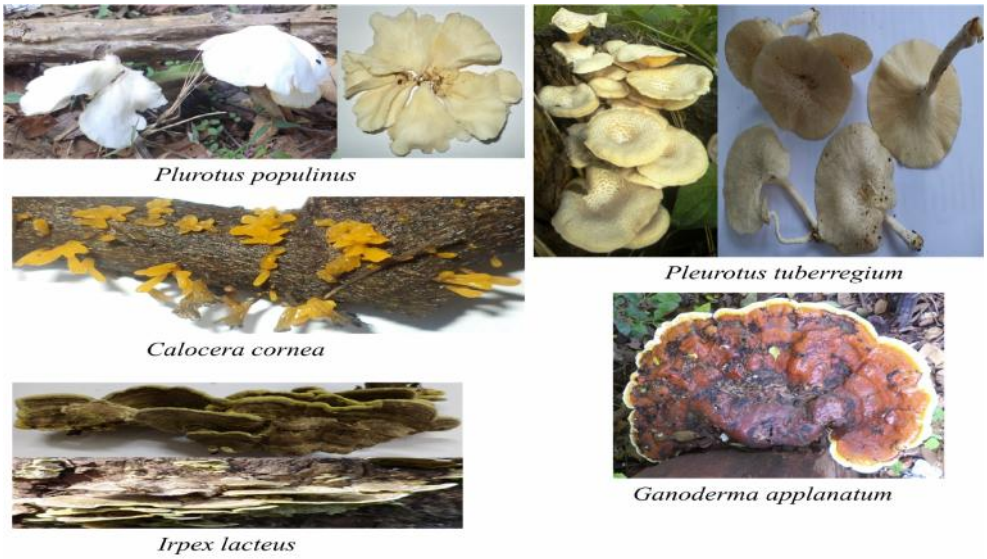

FIGURE3: Different fleshy fungi collected from Dangs

FIGURE 4: Different fleshy fungi collected from Dangs

TABLE 1: Taxonomical position of the collected fleshy fungi from Dangs

Kingdom	Phyllum	Class	Order	Family	Genus	Species
Fungi	Basidiomycota	Dacrymycetes	Dacrymycetales	Dacrymycetaceae	*Calocera*	*cornea*
		Agaricomycetes	Auriculariales	Auriculariaceae	*Auricularia*	*polytricha*
			Phallales	Phallaceae	*Dictyophora*	*indusiata*
			Russalales	Russulaceae	*Russula*	*aeruginea*
			Hymenochetales	Hymenochetaceae	*Coltricia*	*cinnamomea*
			Cantharellales	Cantharellaceae	*Cantharellus*	*subalbidus*
				Clavulinaceae	*Clavulina*	*cristata*
			Polyporales	Ganodermataceae	*Ganoderma*	*applanatum*
				Meruliaceae	*Irpex*	*lacteus*
			Thelephorales	Bankeraceae	*Phellodon*	*confluence*
			Agaricales	Schizophyllaceae	*Schizophyllum*	*commune*
				Agaricaceae	*Macrolepiota*	*procera*
					Coprinus	*atramentaria,lagopides*
					Parasola	*auricoma*
					Lepiota	*ignivolvata*
					Agaricus	*hondensis,paraeclaresquamosus*
					Leucocoprinus	*brebissonii, cepestipes*
				Psathyrellaceae	*Psathyrella*	*candolleana*
				Marasmiaceae	*Marasmius*	*siccus, sullivantii,felix*
				Tricholomataceae	*Clitocybe*	*nuda,nebularis*
					Collybia	*confluence*
				Pleurotaceae	*Pleurotus*	*populinus, tuberregium*
				Physalacriaceae	*Armillaria*	*mellea*
					Corticium	*evolvens*
				Crepidotaceae	*Crepidotus*	*variabulis*
	Ascomycota	Pezizomycetes	Pezizales	Ascobolaceae	*Ascobolus*	*f urfuraceus*
				Pyrenomataceae	*Aleuria*	*aurantia*
		Sordariomycetes	Xylariales	Xylariaceae	*Xylaria*	*carpophila*
					Daldinia	*concentrica*

TABLE 2: The distribution of collected fleshy fungi in Dangs

Kingdom	Phyllum	Class	Order	Family	Genus	Species
Fungi	2	2	9	18	25	32
		2	2	3	4	4

From the collected 111 samples, fleshy fungi having similar morphology were sampled in a single group collected from sampling location. This sampling resulted in identification of 37 species. Among them *Auricularia polytricha, Schizophyllum commune*, *Xylaria carpophila, Ganoderma applanatum*, *Macrolepiota procera*, *Clavulina cristata, Psathyrella candolleana* were most dominant species, found in Waghai, Kudkachh, Kukadnakhi, Chichingavtha and Bhenshkantri places. *Daldinia concentrica*, *Marasmius siccus*, *Marasmius sulivantti*, *Marasmius felix*, *Coprinus atramentaria*, *Coprinus lagopides*, *Parasola auricoma*, *Clitocybe nuda*, *Clitocybe nebularis*, *Dictyohora indusiata* and *Canthrellus subalbidus* were found as dominant during the survey. *Auleria aurantia*, *Pleurotus populinus*, *Pluerotus tuber-regium*, *Lapiota ignivolvata*, *Armillaria mellia*, *Collybia confluence*, *Calvatia cynthiformis*, *Corticium evolvens*, *Agaricus hondensis*, *Agaricus praeclaresquamosus*, *Lucocoprinus cepaestipes*, *Lucocoprinus brebissonii*, *Irpex lacteus*, *Russula aeruginea*, *Coltrica cinnamonea* were rare in their occurrance. *Ascobolus furfuraceus*, *Calocera cornea*, *Crepidotus variabulis*, *Phellodon confluence* were very rarely collected during the survey.

During the survey 37 fleshy were identified (Table 1and 2. Out of the 29 genera, 4 species were grouped taxonomically under the phylum Ascomycota and 32 species under phylum Basidiomycota. In Ascomycota, 2 genus in order Pezizales and 2 genus in Xyleriales were described. In Basidiomycota, 1 species in order Auriculariales, 6 genus in order Agaricales, 2 genus in order Canthrellales, 2 genus in order Polyparales, 1 genus in order Phallales, 1 in order Russulales, 1 in Hymenochaetales, 1 in order Thelephorales and 1 in order Dacrymycetales were described.

DISCUSSION

The present investigation detection of mushroom morphology was in agreement with earlier reports of several scientists. Dehariya *et al.* (2010) found 18 species of mushrooms in Sagar forest of Madhya Pradesh and described morphologically. Dwivedi *et al.* (2012) reported 16 species of mushroom with their morphological characters from Amarkantak forest. Vishwakarma and Bhatt (2013) studied macrofungal biodiversity in Khirsu forest of Garval Himalaya, where they detected 15 species of mushrooms based on morphology. The taxonomy position described by Anonymous (2007), Geoffrey (1982) and Hard (1961) were matching with our observations and hence the mushrooms were confirmed as particular species. Peksen and Karaca (2003) reported 169 species of macrofungi, out of which 19 belonged to the Ascomycota, 149 to the Basidiomycota and one to the Myxomycota and Natarajan *et al*., 2005 also described the distribution of fleshy fungi in the Western Ghats.

CONCLUSION

A massive survey was conducted in the Dangs district of South Gujarat region for the collection of fleshy Fungi.It has been found that several fleshy fungi is present in this region belonging to Ascomycota and Basididomycota which shows biodiversity in fleshy fungi.

REFERENCES

Afyon, A., Konuk, M., Yagiz, D. and Helfer, S. (2005) study of wood decaying macrofungi of the Western black sea region of Turkey. *Mycotaxon* 93, 319-322.

Anonymous (2007) http://www.mushroomexpert.com

Chang, S. and Miles, P. (2004) Mushroom cultivation, Nutritional value, Medical effect and Environment impact. Second edition. CRC press 2-4

Dehariya, P., Choubey, A., Jadav, A. and Vyas D. (2010) Wild mushrooms of Parthiya forest of Sagar. *J. Mycol. Pl. Pathol*. 40, 179-186.

Dwivedi, S., Tiwari, M. K., Chauhan, U. K. and Pandey, A. K. (2012) Biodiversity of mushrooms of Amarkantak Bioshere Reserve forest of Central India. *Int. J. Pharm. & Life Sci.* 3, 1363-1367.

Geoffrey, K. (1982) Mushrooms and Toadstools. Chartwell Books Inc, USA.

Hard, M.E. (1961) The Mushrooms-Edible and Otherwise. Hafner Publishing Co., New York.

Hedawoo, G.B. (2010) Wild Mushroom Flora from Amaravati Region, Mahaarashtra, India. *J. Mycol. Pl. Pathol.*40, 441-444.

Kaya, A. (2005) Macrofungi determined in Golbasin (Adiyaman) District. *Turk. J. Bot*. 29, 45-50.

Mueller, G.M., Bills, G.F. and Foster, M.S. *(*2004) *Biodiversity of fungi-inventory and monitoring methods*. Elsevier Academic Press, London.

Natarajan K., Senthilarasuv G., Kumaresan, V. and Taiana, R. (2005) Diversity in ectomycorrhizal fungi of a Dipterocarp forest in Western Ghats, *Curt. Sci.* 88, 1893-1895.

Peksen, A. and Karaca, G. (2003) Macrofungi of Samsun Province. *Turk. J. Bot*,. 27, 173-184.

Stojchev, G., Asan, A. and Gucin, F. (1998) Some Macrofungi species of European part of Turkey. *Turk. J. Bot*, 22, 341-346.

Vishwakarma, M. P. & Bhatt, R. P. (2013) Macrofungal diversity in Khirsu Forest of Garhwal Himalaya, Uttarakhand, India. *J. Mycol. Pl. Pathol.* 43, 216-228.