



Ethnomycological survey of Cape Coast Metropolis, Ghana

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Yafetto L, Osei-Bonsu V 2017 – Ethnomycological survey of Cape Coast Metropolis, Ghana. *Current Research in Environmental & Applied Mycology (Journal of Fungal Biology)* 7(4), 258–266, Doi 10.5943/cream/7/4/2

Abstract

This study aimed to survey the ethnomycological knowledge of residents of Cape Coast Metropolis, an indigenous, but cosmopolitan community, south of Ghana. First, one hundred and fifty questionnaires were randomly administered to members of the metropolis to survey their knowledge about fungi. Second, 75 natives of selected indigenous communities within the metropolis were orally interviewed to evaluate their indigenous beliefs and utilization of fungi. Results suggest that most respondents are familiar with fungi, notably mushrooms (locally called *mre*) and the baker's yeast (*Saccharomyces cerevisiae*). Paradoxically, most respondents agreed that fungi are plants. Most respondents disagreed that all fungi are edible, but agreed that some are edible, others poisonous and medicinal. An overwhelming majority of respondents agreed that yeast is used in baking, and that yeast found in palm wine is responsible for its alcoholic content. The study revealed most respondents agree fungi cause candidiasis, some skin infections and that worms cause ringworm (dermatophytosis or tinea). One interesting finding also is that whereas the elite read about fungi, ethnomycological knowledge among the natives is still transmitted through cultural practices and folklore. Responses from the natives in the indigenous communities largely corroborated most of the responses from respondents to whom questionnaires were administered. The natives identified at least one wild edible mushroom with its local name, and are mostly involved in their collection. They use the wild edible mushrooms for food and sell some for household income.

Key words – Ethnomycology – fungi – indigenous community – indigenous knowledge – mushrooms

Introduction

Cultures and societies around the world are defined by unique traditions. These unique traditions characterize the activities of the peoples of these cultures, namely farming, fishing, hunting, drumming, dancing, singing, etc. And over a long period of time, traditional or local knowledge, which is strongly tied to the local culture, and often acknowledged as indigenous, is developed and transmitted from one generation to the other. According to the United Nations Educational, Scientific and Cultural Organization (UNESCO), the accumulated and complex bodies of knowledge, know-how, practices and representations that are maintained and developed by peoples with extended histories of interactions with the natural environment is called Indigenous Knowledge (UNESCO 2003). Grenier (1998) and Berkes (1999) have also variously defined

indigenous knowledge, and collectively shared the view that (i) indigenous knowledge is unique to a single culture or society and (ii) it results from over many years of group experience that is transmitted from one generation to another.

Indigenous knowledge has generated interesting discussions among anthropologists, geographers, biologists and other scholars of related fields. It was during such interesting discussions that fields such as ethnobotany and ethnomycology originated and evolved. Ethnobotany, on one hand, involves the scientific study of the traditional knowledge and customs of people concerning plants and their medical, religious, and other uses; ethnomycology, on the other hand, involves the study of traditional knowledge about fungi. Admittedly, a considerable amount of gap still exists in the field of ethnomycology, in spite of the fact that fungi remain one of the most diverse groups of organisms with a current estimated range between 2.2 and 3.8 million species in the world, from the previous estimate of 1.5 million species (Hawksworth 1991, 2001, Levetin & McMahon 1996, Læssøe 1998, Hawksworth & Lücking 2017). Surprisingly, very scant literature exists on ethnomycology (Zent et al. 2004). This notwithstanding, most work on ethnomycology has been reported in North and Central America (Franck & Radcliffe 1957, de Avila et al. 1980, Mapes et al. 1981, Gonzalez 1982, Hazlett 1986, Timbrook 1990, Shepard & Arora 1992, Moreno–Fuentes et al. 1994, 1996, Wasson 1995, Blanchette 1997, 2001, Shepard 1997). Additionally, there are worldwide reports of the use of fungi for rituals and religious purposes (Wasson 1961, 1968).

Curios bibliographical search that aimed to find accounts of indigenous knowledge and traditional uses of fungi among the various tribes in Ghana turned up only two scientific papers namely, Apetorgbor et al. (2006) and Dzomeku (2009). One other study, Kubi (2013) was the only available literature at our disposal, from a preliminary study on mushroom consumption in Cape Coast. This situation confirmed our worst fears that, in spite of rich indigenous knowledge about plants, animals, and fungi among the various tribes in Ghana, there is little work done in the field of ethnomycology in Ghana. To this end, we aimed to survey the ethnomycological knowledge of residents of Cape Coast Metropolis, Ghana. The current work presents the findings of the ethnomycological survey.

Materials & Methods

Study Site

The study site, Cape Coast is a historic town that served as the capital of the Gold Coast (now Ghana) until 1876 when the capital was moved to Accra (Fig. 1). It is currently classified as a metropolis and serves as the administrative capital of the Central Region of Ghana. The natives of Cape Coast Metropolis are of the Fante tribe, but due to its unique geopolitical relevance to Ghana, Cape Coast is now a diverse, multicultural community with several suburbs, where other settlers from different parts of the country have come to reside and work. It boasts some of the best secondary schools in Ghana, and two tertiary institutions (the University of Cape Coast and Cape Coast Technical University). It has also a former slave post, the Cape Coast Castle, which is a designated world heritage site by the (UNESCO). Geographical coordinates are 5° 7' 53.44" North, 1° 16' 53.11" West.

Respondents

Residents of the metropolis (both natives and settlers from other parts of Ghana) were served as respondents in this study. One hundred and fifty respondents responded to the questionnaires administered; while 75 natives from the indigenous communities were orally interviewed. These respondents were randomly selected based on their willingness and availability to participate in the survey.

Survey Questionnaire and Interview

A five-point Likert scale questionnaire was designed for the study with a Cronbach's alpha of 0.71, suggesting that the items had an acceptable level of consistency. The items of the questionnaire were developed to capture and generate information of interest about the ethnomycological knowledge among residents of Cape Coast. The survey instrument was designed such that respondents were required to not disclose their identities to ensure that, in confidence, they provided relevant responses tailored to the aims of the study. The questionnaire comprised 26 items, with two sections: Section A contained 5 items that collected data on the demographic of respondents; there were 21 items in Section B that gathered information on respondents' knowledge about fungi. The items were appropriately worded in the English language and pitched at a level that respondents easily comprehended. The questionnaire was peer-reviewed, and revised, after which it was pilot-tested to 30 residents as a measure to improve its content validity and reliability. One hundred and fifty questionnaires were administered to collect data for analyses; all answered questionnaires were retrieved from respondents. We also interviewed 75 natives from the indigenous communities (Duakor, Kwaprow and Akotokyer), most of who could neither read nor comprehend the English language, but were fluent in the native dialect (Fig. 1). None of the natives was coerced to partake in the survey if no interest was shown. Statistical software, IBM® Statistical Package for Social Sciences (SPSS version 24) was used to analyze data collected. The data from the survey and interviews are presented in tables.

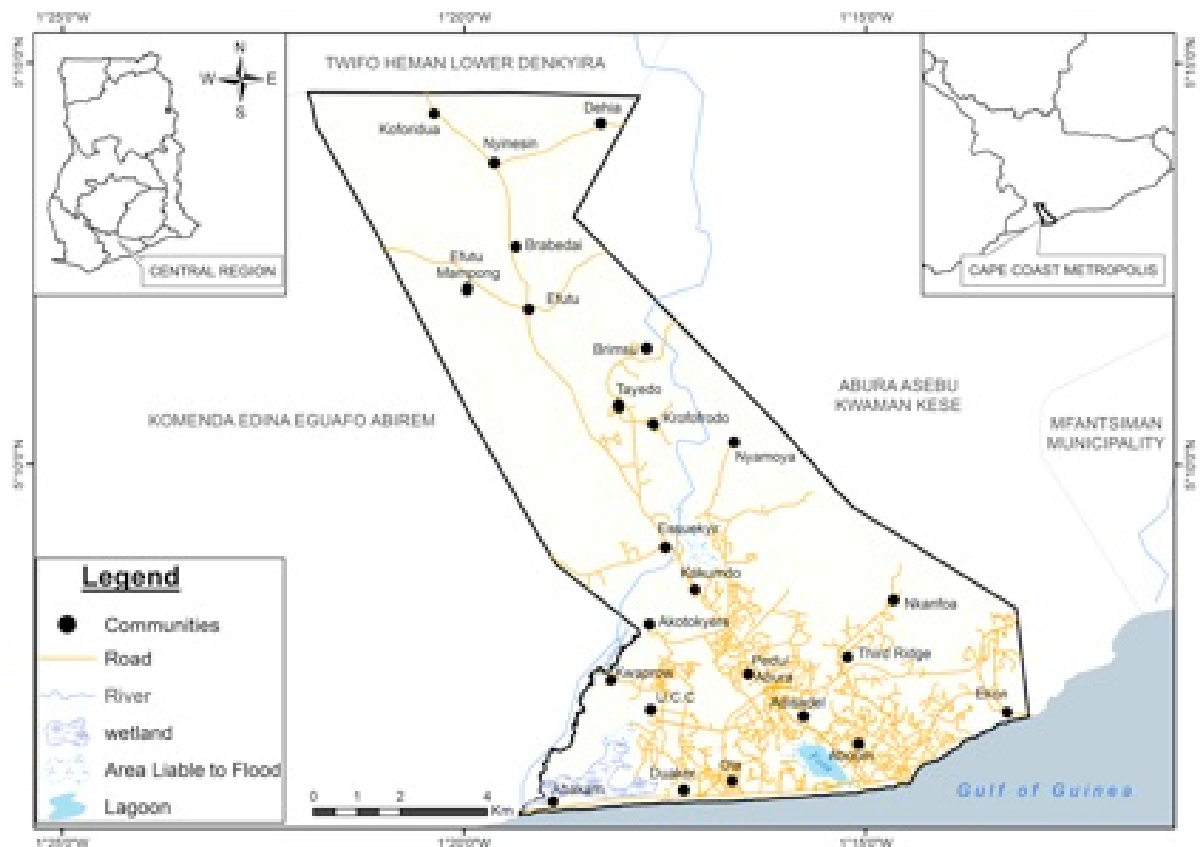


Fig. 1 – Map of Cape Coast Metropolis showing some communities

Collection of Wild Edible Mushrooms

Five well-known wild edible mushrooms that are common to the Cape Coast Metropolis were obtained from collectors of two northern farming communities, Efutu and Dehia, (Figs 1, 2, Table 1) to further evaluate the natives' indigenous knowledge about mushrooms. The mushrooms were stored in zip locks, appropriately labeled and transported to the communities, where they were shown to the randomly selected respondents for identification based on local names, growing

habitat and traditional uses (Table 1). Mushrooms selected for microscopic examination and identification were preserved in 5% KOH, sectioned with razor blades and stained with lactophenol cotton blue. Both microscopic and macroscopic identifications were done in consultations with appropriate identification literature (Overholts 1953, Pegler 1977, Ryvardeen & Johnsen 1980, Phillips 1981, Gilbertson & Ryvardeen 1986, Courtecuisse & Duhem 1995, Læssøe 1998, van der Westhuizen & Eicker 1994).

Table 1 Wild edible mushrooms collected from the northern communities of Cape Coast Metropolis.

Local Names	Growing Habitat	Traditional Uses	Scientific Name
Domo	Logs/decaying oil palm/sawdust	Food	<i>Volvariella volvacea</i>
Efuo	Pasture land/lawns	Food	<i>Calvatia cyathiformis</i>
Mirefufuo	Forest floors/logs	Food	<i>Pleurotus tuber-regium</i>
Nkankum	Termite mound	Food	<i>Termitomyces robustus</i>
Sibre	Termite mound	Food	<i>T. schimperi</i>



Fig. 2 – Mushrooms of *Termitomyces* collected from the northern communities in Cape Coast Metropolis.

Results and Discussion

Demographics of Respondents

Data collected from respondents (76 females; 74 males) indicate that (i) majority of respondents are between 15 and 24, (ii) all respondents had attained some level of formal education, (iii) most respondents are students, with the rest engaged in blue and white collar jobs,

and (iv) respondents have diverse ethnic backgrounds, although overwhelming majority are from the predominant Akan ethnic group of which natives of Cape Coast belong (Tables 2, 3).

Of the 75 natives randomly sampled from the indigenous communities for the oral interview, 43 had received formal education up to the elementary level; 32 had received no formal education. This situation meant that most of the respondents could not read and fully comprehend the survey questionnaire that was administered. This category of respondents comprised mostly farmers and fishermen who have supported their children to attain a higher level of formal education hoping that these children may not turn up to be farmers and fishermen, but rather gain white or blue collar jobs to provide additional financial support to the larger family.

Table 2 Demographic of Cape Coast Metropolis Respondents.

No. of Respondents	Gender		Age			Educational Background			Occupation		
	Male	Female	15-24	25-44	45-up	Elementary	High School	College	Student	White Collar	Blue Collar
150	74	76	75	69	6	14	44	92	68	30	52

Table 3 Additional Information on the Demographic of Cape Coast Respondents.

No. of Respondents	Ethnic Background					
	Akan	Ewe	Fafra	Gonja	Guan	Others
150	108	26	5	3	2	6

Indigenous Knowledge and Utilization of Fungi

The utilization of macrofungi as food and medicine is common knowledge in most indigenous cultures around the world. This is no different from Ghana, where a large amount of ethnomycological knowledge abounds and is firmly integrated into the culture and traditions of the tribes. This ethnomycological knowledge has been transmitted from one generation to the other, but because of poor traditional documentation and lack of ethnomycological research, valuable knowledge has been lost.

Results of the survey reveal that majority of the respondents agreed that they know about fungi, and are more familiar with mushrooms and baker's yeast (Table 4). All respondents called mushrooms with the universally accepted local name, *mre*, although there are different local names by which mushrooms are called (Table 1, Apetorgbor et al. 2006, Dzomeku 2009). Overwhelmingly, 132 respondents indicated that they had consumed mushrooms before Kubi (2013) also reported 78.3% of residents in Cape Coast Metropolis consumed mushrooms compared to 21.7% who do not consume mushrooms. This notwithstanding, 88 respondents disagreed that all fungi are edible, and agreed that some fungi are poisonous and medicinal (Table 4). Indigenous peoples have used mushrooms as food in many other cultures as reported by Pegler & Pierce (1980), Montoya et al. (2004), Zent et al. (2004), Christensen & Larsen (2005) and Garibay-Orijel et al. (2006).

Table 4 shows most respondents either strongly agreed (45) or agreed (35) that yeast is a fungus and remarkably, 101 respondents strongly agreed that yeast is used to make bread. The results further revealed that most respondents either strongly agreed or agreed that yeast is found in palm wine (the sweet, white, cloudy sap obtained from the African oil palm, *Elaeis guineensis*) and that yeast in palm wine is responsible for the production of its alcoholic content.

The study sought to probe respondents' view about some human fungal infections and the data revealed that 40 respondents strongly agreed whereas 34 agreed that a fungus causes candidiasis (commonly called "white" in Ghana). Interestingly, 43 respondents neither agreed nor

disagreed that a fungus causes candidiasis, whereas 28 respondents together disagreed that a fungus causes candidiasis (Table 4).

Ironically, 85 respondents either strongly agreed or agreed that a worm causes ringworm (dermatophytosis or tinea), whereas 34 respondents either strongly disagreed or disagreed. Twenty-nine (29) respondents, however, indicated they neither agreed nor disagreed. Interestingly, however, an overwhelming majority of the respondents (122) either strongly agreed or agreed that fungi cause some skin diseases. This result confirms that indeed the use of the name ringworm to designate dermatophytosis is not only a misnomer but also misleading. The following was revealed when it was stated that plants produce penicillin: (66) respondents either strongly agreed or agreed; 23 respondents either strongly disagreed or disagreed and 58 respondents neither agreed nor disagreed. Dzomeku (2009) suggested that natives of some indigenous communities in the Brong Ahafo and Volta regions of Ghana used the extract from *Pleurotus tuber-regium* to treat fungal skin infections.

Table 4 Knowledge on Fungi of the Cape Coast Respondents.

Item	Response				
	SA	A	N	D	SD
1. I have come into contact with fungi	42	50	30	20	6
2. I know what mushroom is	96	42	4	4	0
3. Mushrooms are fungi	57	35	33	15	8
4. I have eaten mushroom before	96	36	8	4	6
5. All fungi are edible	6	19	32	60	28
6. Some fungi are edible	51	64	21	10	4
7. Some fungi are poisonous	56	56	23	6	9
8. Some fungi are medicinal	56	44	34	7	4
9. Yeast is a fungi	45	35	41	18	7
10. Yeast is used to make bread	101	37	6	5	1
11. Yeast is found in palm wine	42	40	40	19	5
12. Yeast produces alcohol in palm wine	51	48	30	16	4
13. A fungus causes candidiasis	40	34	43	23	5
14. Ringworm is caused by worms	38	47	29	22	12
15. Some fungi can infect the skin	56	66	18	6	1
16. Penicillin is produced by plants	24	42	58	14	9
17. Fungi are plants	32	46	28	18	24
18. Fungi are used for religious rites in other cultures	20	23	68	19	18
19. Fungi are nutritious and are used to treat high blood pressure	40	33	60	11	6
20. I learned about mushrooms through my readings	50	49	16	26	6
21. I learned about mushrooms through my parents and friends	50	53	17	20	9

SA= Strongly Agree, A = Agree, SD= Strongly Disagree, D= Disagree, N= Neither Agree nor Disagree

It was revealed in this study also that most respondents (78) either strongly agreed or agreed that fungi are plants, with 42 respondents who strongly disagreed or disagreed; 28 respondents neither agreed nor disagreed (Table 4). Findings by Kubi (2013) confirm this when she reported that 195 (66.1%) respondents believed that mushrooms are plants, 17% believed mushrooms are fungi and 14.5% had no idea what mushrooms are.

Sixty-eight (68) respondents neither agreed nor disagreed that fungi are used for religious rites in some cultures; 43 strongly agreed or agreed and 37 strongly disagreed or disagreed. This is not surprising because fungi are not used for religious rites in the Ghanaian cultural setting and folklore. Interestingly, some of the natives interviewed spoke of fungi as organisms that originated from God; others also believed that mushrooms emanated from the path previously walked by ghosts in the night still others believe that mushrooms sprout as a result of lightning and thunder

during the rainy season. Most respondents (73) agreed that mushrooms are nutritious and can be used to treat some medical conditions, 60 respondents neither disagreed nor agreed. Most indigenous people in Ghana consider edible mushrooms are nutritious and medicinal, and as protein supplement or alternative to meat and fish (Apetorgbor et al. 2006, Dzomeku 2009, Kubi 2013).

Some revealing findings from the survey are that (i) most respondents to the questionnaire learned about mushrooms through their readings and (ii) most natives had knowledge about mushrooms orally transmitted to them by their parents, friends and herbalists, suggesting that while substantial amount of ethnomycological knowledge is still transmitted through cultural practices and local folklore in the indigenous communities (Apetorgbor et al. 2006, Dzomeku 2009), others learn about fungi and their traditional uses through formal education.

Most of the natives interviewed shared interesting information, most of which were in agreement with data collected from the survey questionnaire. When the collected mushrooms are shown for identification, all 75 natives could easily identify at least one mushroom with its local name. They also indicated that all the mushrooms they had identified were used to prepare soup and sauce as food. Most of them also mentioned some of the familiar growing habits (Table 1). Interestingly, none of the respondents and the natives could identify fungi or mushrooms by scientific name.

Findings from this study on the ethnomycological survey in Cape Coast add to the extremely thin literature available on the use of fungi within the Ghanaian cultural setting. A comprehensive, long-term research effort, tailored to explore more indigenous communities in the various regions of Ghana, is needed to (i) elucidate the ethnomycological knowledge base of natives of Ghana, and (ii) establish a robust database of indigenous wild edible mushrooms (Apetorgbor et al. 2006, Dzomeku 2009).

Acknowledgements

The authors thank Emmanuel Birikorang, Department of Laboratory Technology, University of Cape Coast for assistance with data analyses, and Adams Osman of the GIS/Remote Sensing and Cartographic Unit of the Department of Geography and Regional Planning, University of Cape Coast, for providing the map of the study site. We are grateful also to residents of Cape Coast Metropolis for participating in the survey making this study possible.

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