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FOLK USES OF MUSHROOMS BY THE AKOKO-EDO PEOPLE OF NIGERIA

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Abstract - A study carried out on the folk uses and ethnomycology of wild edible and medicinal mushrooms by five selected communities: Igarra, Sasaru, Egbigere, Ikpeshi and Aghor in Akoko-Edo Local Government Area of Edo State, Nigeria showed that about 86% of respondents consumed mushrooms. About 12.5% of the respondents consumed mushrooms because of its taste, 54.2% used them as substitutes for meat or fish, 16.7% use certain mushrooms e.g. sclerotium of *Pleurotus tuberregium* and *Schizophyllum commune* while 9.2% sold them for extra incomes. *Auricularia judae, Cortinarius melliolens, Macrolepiota procera, Lactarius edulis, Lycoperdon* sp., *Pleurotus tuberregium, P. squarrosulus, Termitomyces robustus* and *Tricholoma lobayense* were identified as edible species, while *Daldinia concentrica, Ganoderma lucidum, G. applanatum* (Pers.) Pat. and *Nothopanus* sp. were used in traditional medicine practices. The source of utilitarian mushrooms remained forests, agroforests and farms in many communities studied, and their collection and/or sales reserved for women and children.

INTRODUCTION

The study of the use of fungi including mushroom-forming fungi by humans is broad-based and has influenced the evolution of cultures, religion, mythology, edibility and toxicity within the context of ethnomycology (Yongabi *et al*. 2004). Mushrooms have gained an age-long recognition and usage as food and medicine sources over other fungi in many cultures worldwide because of their visible and/or distinctive fruit bodies (Arora, 1989). This unprecedented attention was reportedly linked to many reasons which included their (i) pre-human existence on earth (Chang *et al*. 1993); (ii) alluring and diverse arrays of visible shapes, colours and textures of fruit bodies spatially and temporally distributed across wide ecological niches and systems (Mueller *et al*. 2004); (iii) recreational qualities (hunting trills, decoration and games) and ecological values such as biogeochemical cycle, biodegradation, soil management/conditioning and maintenance of detritus ecosystem balance (Weedon *et al*. 2009); (iv) food, medicinal, spiritual and socioeconomic benefits (Dijk *et al*. 2003); (v) fruit body sensitivity to climate changes which qualify them as ecological indicators for plant biodiversity loss and declining global forest cover (Kauserud *et al*. 2008).

Wild mushrooms are important natural resources valued as food by people from all nationalities because they contain high level of dietary fibre that is comparable to those in other vegetables, substantial amount of protein, vitamins and minerals, and low in fat calorie (Arora, 1989). They are used as a sexual potentiator and immunomodulator in many developed nations (Chang *et al*. 1993). In addition, wild mushrooms have potential healthcare benefits as hyperlipidaemia and hypercholesterolaemia coupled with their use as anti-microbial, anti-viral, anti-inflammatory, anti-oxidant and anti-tumour resources (Boa, 2004; Okhuoya and Akpaja, 2005). It is based on this premise that ethnomycological studies of some tribes and cultures in Nigeria were initiated (Osemwegie *et al*. 2006). Scientific reports

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also abound on the use of mushrooms in the preparation of native soups and food, either as flavour, supplement or replacement for animal and plant protein, and as secondary or primary ingredients in traditional healthcare practices and spiritualism in many parts of Africa (Chang and Mshigeni, 2001). Yongabi *et al*. (2004) identified the collection of edible and medicinal mushrooms as critical small income generator for the rural populace. It is imperative at this juncture to assert that existing information on the indigenous uses and knowledge of native mushrooms and mushroom heritage in Nigeria is far from holistic and may be an under-representation of the nation's ethnomycological and socio-cultural trends.

This study aims, therefore, at increasing data on the diversity and ethnomycology of indigenous wild edible and medicinal mushrooms in Akoko-Edo local government of Edo State, Nigeria.

MATERIALS AND METHODS

Study area

The data were randomly collected from five different communities, namely Ikpeshi, Egbigere, Sasaro, Igarra and Aghor which varied in location within the Akoko-Edo Local Government Area of Edo State, South of Nigeria. Information were gathered through the use of interview and structured questionnaire. The study area, commonly referred to as Afenmai is situated North of Edo State and precisely North-East of the State Capital, Benin City. It is located between longitudes 5′ 30^{0}E and latitude 6′ 30^{0}N, altitude that ranged from 183-305m. The selected communities had a unified language with slight dialectic differences as well as common cultural and traditional believes. Vegetation is savannah, and climate is tropical, characterized by the wet (April-September) and the dry (October-March) seasons, and a dry misty harmattan period of not more than 8 weeks between November and December.

Data collection and analysis

Data was collected by the inventory interview method and structured questionnaire, which were administered to a total of 100 randomly selected respondents (20 per community) within the age of 14-70 years. The preliminary national population census of 2006 showed that Akoko-Edo comprising over 22 different communities had less than 7% of the total population of Edo State. The questionnaire was designed to randomly obtain information about mycophagy, types of edible and medicinal mushrooms, illnesses treated with mushrooms, and general socio-cultural influences of mushrooms with respect to gender, age and occupation of the respondent. Information gathered from the study was coded and analyzed using SPSS 14 software package for computing frequencies and percentages.

Wild mushroom collection

Mushrooms identified as ethnomycologically important by respondents were located, morphologically described and identified using standard taxonomic field guides and books (Arora, 1991; Lincoff, 2005). Each collection was vouchered and kept in the Mushroom Biology Unit of the Department of Plant Biology and Biotechnology, University of Benin, Benin City, Edo State, Nigeria for further molecular verification of their identity.

RESULTS AND DISCUSSION

There is *ab initio* no question concerning mushroom consumption among various cultural settings in Nigeria (Okhuoya and Akpaja, 2005), but the issues stirring interest amongst researchers were the extent and/or rate of mushroom consumption and the reason(s) for the disparity in mycophagy (mushroom consumption) between rural and urban areas. Other issues of interests include the factor(s) (social, cultural or economical) that facilitates mycophagy, identifying and domesticating more wild indigenous mushrooms used partially or wholly in medicine and food, and the socio-cultural relationship between the people of Nigeria and mushrooms. This study was, however, carried out to address these issues in addition to investigating the sustainability of indigenous mushroom heritage and /or knowledge amongst the people of the study area.

A total of 14 different species of wild mushrooms belonging to the Basidiomycetes were identified as ethnomycologically valuable to the Akoko-Edo people of Edo North, Nigeria. During the study, many of the local names of identifiable edible and medicinal mushrooms were observed to be of descriptive origin and binomial. The local name for mushrooms was "Itu" which hypothetically represents the generic name while the specific epithet was descriptive or defines the features (texture, colour or taste) and/or the use of a mushroom (Table 1). It was apparently observed

Table 1. Some wild mushrooms, their distribution and uses among the Akoko-Edo communities in Nigeria.

Scientific name	Local name	Meaning of local name	Community					Traditional use(s)
			Aghor	Egbigere	Igarra	Ikpeshi	Sasaro	
Auricularia auricular-judae (Bull.) Quél.	Itu-gieran	-	+	+	+	+	+	Substitute for meat in local soup.
Cortinarius melliolens Jul. Sch?ff ex Orton.	Unknown	-	+	+	-	+	-	Food
Daldinia concentrica (Bolton) Ces. & De Not.	Itu-rhue	-	+	+	+	+	+	Medicinal
Ganoderma applanatum (Pers.) Pat.	-	-	+	+	+	+	+	Medicinal
Ganoderma lucidum (Curtis) P.Karst.	Itu-oshi	Mushroom of fertility	+	+	-	+	-	Medicinal
Lactarius edulis Verbeken & Buyck.	Itu-erekhu-khokho	Mushroom of palm tree	+	-	-	+	-	Food
Lycoperdon sp	Itu-codormo	Mushroom of placenta	+	+	-	+	-	Food
Macrolepiota procera (Scop.) Singer.	Itu-ogiutun	-	+	-	+	-	+	Food
Nothopanus sp.	Itu-isose	-	+	+	+	+	+	Medicinal,
Pleurotus squarrosulus (Mont.) Singer.	Itu-eboga	Mushrooom that is tough	+	+	+	+	+	Substitute for meat in local soup.
Pleurotus tuber-regium (Rump. ex Fr.) Singer.	Itu-futumen	Mushroom of soup	+	+	+	+	+	Substitute for meat in local soup.
Psathyrella atroumbonata Pegler	Itu-eso	Mushroom of benthic putrid	+	+	-	+	-	Food
Termitomyces robustus (Beeli) R. Heim.	-			+	+		+	Delicacy
Tricholoma lobayense R. Heim.	Itu-achigha	Mushroom of beauty	+	-	-	+	-	Food

+ represents present and – represents absent.

from this study that there was extinction of native mushroom knowledge-base due to the fact that less than 50% of respondents below 55 years of age had difficulty in identifying the names of some of the wild mushrooms recorded. Further studies are however required to fully understand the main cause of this trend with a view to conserving knowledge of the nation's mushroom heritage. Adekunle and Ajao (2005) noted that the adult males, who are mostly traditional family heads in most African settings, were rather more involved in the initial location of renewable source of wild edible mushroom pools and the eventual mobilization of wife and children for their subsequent collection. Wild edible mushrooms, as observed by this study, were sold along highways and village markets by mainly children and women constituting about 9.7% of respondents at retail cost price of N 3,500 ($21.2) per kilogram. This augments their income from farm produce and "bush-meat" or processed forest games, and also adumbrates the headship role of adult males in mushroom affairs (Adekunle and Ajao, 2005).

The study showed that 75% of these mushrooms were consumed as food and/or food supplements, while 25% were used in native healthcare practices. *Auricularia auricula-judae*, *Cortinarius melliolens*, *Macrolepiota procera*, *Pleurotus*

Table 2. Medicinal mushrooms, preparation and mode of administration by Akoko-Edo people of Nigeria.

Mushroom	Type of ailment	Mode of preparation	Mode of administration
Daldinia concentrica (Bolton) Ces & De Not.	Open wound, boil and indigestion.	Sporophores ground and mixed with honey for boil and wounds and water for indigestion.	Applied manually to the affected parts or orally in case of indigestion.
Ganoderma applanatum (Pers.) Pat.	Obesity, fatigue/anemia, stimulant/tonic, virility and open wound	Milled, poured into hot water.	Drink as tea.
Ganoderma lucidum (Curtis) P. Karst.	Sterility in goat	Blend on a frying pan using pistle, make it into powdered form and mixed with palm oil.	Applied to the reproductive parts of the animal.
Lactarius edulis Verbeken & Buyck.	For killing flies, curing wound, diabetes and anaemia	As soup or milled and mixed with palm oil for wounds and repelling flies	Eat mushroom in form of soup or physically applied to wound.
Nothopanus sp.	Headache and fever	Mildly cooked with meat sauce and "pepper soup" spices.	Ingested
Pleurotus tuber-regium (Rump. ex Fr.) Singer.	Stomach-upset, mumps and heart problem, boil, malnutrition.	Hot water infusion paste, add spices and wrap in leaves and boil.	Eat boiled paste and applied on mumps and boil.

squarrosulus, *P. tuber-regium*, *Psathyrella atroumbonata*, *Schizophyllum commune*, *Termitomyces robustus*, *Tricholoma lobayense* and *Volvariella volvacea* were some of the edible species recorded during the study, while *Daldinia concentrica, Ganoderma lucidum, G. applanatum* and *Nothopanus* species were implicated in the remedy of specific human ailments (Table 2). *A. auricular-judae, P. tuber-regium* and *S. commune* were the most popular edible mushrooms recorded in Akoko-Edo during the study. This observation agrees with the work of Osemwegie *et al*. (2006) and reflected some significant level of similarity in the array of edible and medicinal mushrooms reported amongst different other cultural groups in Edo State and other southern States in Nigeria (Adekunle and Ajao, 2005). The reason for this trend can be attributed to the long-term effect of population dynamics (immigration and emigration), culture overlaps and/or common ancestral genealogy rather than the synergic impact of climate and the nature of tree assemblages characterizing the study area. Although equally edible, the sclerotia rather than sporophores of *P. tuber-regium* were identified by respondents as useful in the treatment of boil, mumps and stomach upsets in infants (Table 2). According to Okhuoya and Akpaja (2005) and Osemwegie *et al*. (2006) sclerotia of *P. tuber-regium* were also used in the treatment of asthma, cough and obesity.

Sixty-five percent of respondents that were mycophagists (Mushroom eaters) linked the knowledge of mushrooms fit for consumption to their progenitors and the folk myth that approves mushrooms growing on living tree plants, dead woods, but swamped by insects or snipped by animal of any sort, as non-poisonous to humans, suffice to say edible. These unwritten codes have served as guard to mushroom collectors and mycophagists for centuries, and may have been responsible for the reduced incidence of mushroom poisoning despite strong reliance by natives on naturally occurring macrofungi taxa rather than cultivated ones. Furthermore, close to half the population of mycophagist-respondents claimed to be unfamiliar and/or ingested artificially cultivated mushrooms. The respondents attributed this to ignorance, inchoate nature and slow spread of mushroom cultivation ventures, and inaccessible mushroom cultivation technology.

Women and men between 35-70 years of age in all the communities studied comprising 63% of the total sampled population were more skilled in identifying wild mushrooms of utilitarian values compared to the younger respondents (< 35 year of age). This observation was in concordance with Dijk *et al*. (2003) who attributed this to vertical knowledge acquisition and confirmed other traditional uses of wild mushrooms as tinder, dye, and in spiritualism and mythology.

The nearness of the Aghor, Egbigere and Ikpeshi communities to the lowland forests of Edo-central zone may have accounted for the increased number of mycophagists (18, 17 and 17 respondents,

Table 3. Rate of mushroom consumption by respondents and distribution of mycophagy among Akoko-Edo communities, Nigeria.

Mycophagist	
Respondents	Percentage (%)
= Once a week	16.7
2 times a week	35
= 3 times a week	18.3
Daily per week	15
= Twice a month	8.3
Once a month	6.7
Distribution	
Location	Percentage (%)
Aghor	23
Egbigere	21.2
Igarra	15.4
Ikpeshi	21.2
Sasaro	17.95

Table 4. Some of the reasons given by respondents for consuming wild mushrooms.

Factor	Respondent (%)
Substitute for meat	54.2
Appealing taste	12.5
Soup thickener	16.7
Trade only	9.2

respectively) and mycophagy activities recorded compared to Igarra community, which recorded the least of 15% (Table 3). About 85% of mushroom-eating respondents interviewed sourced edible and medicinal mushrooms from plantation, forests, farmlands and meadows, which they subsequently prepared for consumption by soaking in boiled/hot water or saline water before introducing into soup and/or fry mildly with groundnut oil for snack. Fourteen percent and 12% of respondents from Igarra and Sasaro communities respectively, preserved their wild edible mushroom collections by first washing in a running stream to remove sand particles, sprinkling with salt and sun-dried and/or placed close to a local make-shift firewood-fueled burner (Dijk *et al*. 2003; Yongabi *et al*. 2004; Adekunle and Ajao, 2005).

Reasons advanced by respondents for consuming mushrooms were categorized into three aspects: culinary, cultural and economic. Culinary reasons that were popular amongst the Akoko-Edo people included in order of rating taste, texture, flavour and nutritiousness of the mushroom. Some respondents (6%) gave habit and/or mushroom being a part of their traditional food-base as cultural reasons (Boa, 2004), while others (4.8%) cited their affordability and accessibility when compared to other sources of protein such as animals/games (meat and fish) as economic reasons for mushroom consumption (Yongabi *et al*. 2004; Adekunle and Ajao, 2005). These may be reason why about 35% of respondents consumed mushrooms twice a week (Table 3), while 54.2% substituted them for meat compared to 16.7% and 6.7% of respondents who used them as soup thickener and native treatments respectively (Table 4).

The use of mushrooms as remedy of human ailments, according to Boa (2004) has been *ab initio* overshadowed by leafy plants (herbs, shrubs and trees). This has accounted for the relatively low record of respondents (6.7%) and mushrooms utilized in traditional healthcare practice of the Akoko-Edo people. Furthermore, the relatively inconsistent phenology (fruit-body appearance), seasonality and small size of mushroom taxa may have also affected their regular use in traditional healing in Akoko-Edo area of Edo State, Nigeria (Osemwegie *et al*. 2006). *Ganoderma* species were observed from the study to be used by the people of Akoko-Edo, Edo State, in curing infertility problems in goats, virility, anemia and indigestion in humans, while *Lactarius* was effective in the treatment of surface wounds. This agrees with the work of Adekunle and Ajao (2005) on medicinal uses of macrofungi.

Mycophagy was observed by the study, to be independent of social class, occupation, culture, domicile, gender and age of respondents (Okhuoya and Akpaja, 2005). Yongabi *et al*. (2004) and Osemwegie *et al*. (2006) remarked that mycophagy is more common in the rural and suburban areas compared to the urban. Poor mushroom domestication initiatives, under-developed and low numbers of commercial mushroom growing industries, difficulties in accessing adaptable mushroom cultivation technology, poor mushroom marketing strategies/concepts and lack of individual and government interest are factors identified to be responsible for the low level of mycophagy amongst Nigerian especially those living in urban areas.

This study has also shown that several communities in Akoko-Edo area of Edo State, Nigeria actively consume wild mushrooms for food and/or as medicine. It was also observed from

the study that mushrooms are consumed by people of diverse age, culture, educational backgrounds and locations. In addition, it illuminates the need to develop artificial cultivation or domestication of edible and medicinal mushrooms to eradicate dependence on wild and naturally occurring ones. This will also improve mushroom consumption and/or access to mushroom of socio-economic values, and de-suburbanize mycophagy. Further, long-term scientific studies are required, that will document mushroom traditional uses and local names in Nigeria prevent their oblivion. Regular access to utilitarian mushrooms in Nigeria can be achieved through collective local and government interest in improving mushroom cultivation, yields, preservation and nutrient status as well as packaging and marketing concepts.

REFERENCES

Adekunle,V.A.J. and Ajao, K. 2005. Contributions of edible mushroom (a non-timber forest product of tropical forest ecosystem) to rural livelihood in Oyo State, Nigeria. *Pakistan Journal of Social Sciences.* 3 (5) : 809-812.

Arora, D. 1989. Ethnobotany and plant domestication: Global perspective. In: *Methods and Approaches in Ethnobotany*. Jain, S.K (ed.). Society for Ethnobotany, Lucknow.

Arora, D. 1991. All that the Rain Promises and More. Biosystem Analysis Inc. Santa Cruz, California, USA.

Boa, E.R. 2004. *Wild Edible Fungi: A Global Overview of Their Use and Importance to People*. FAO Publishing Management Services, Rome.

Chang, S.T., Buswell, J.A. and Chiu, S.W. 1993. *Mushroom Biology and Mushroom Products*. Chines University Press.

Chang, S.T. and Mshigeni, K.E. 2001. *Mushrooms and Human Health: Their Growing Significance as Potent Dietary Supplements*. University of Namibia Press, Windhoek.

Dijk, V.H., Onguene, A.N. and Kuyper, W.T. 2003. Knowledge and utilization of edible mushrooms by local populations of the rainforest of South Cameroon. *Ambio.* 32 : 19-23.

Kauserud, H., Stige, C.L., Vik, O.J., Okland,H.R., Hoiland, K. and Stenseth,C.N. 2008. Mushroom fruiting and climate change. *Proceedings of the National Academy of Sciences*. 105 (10) : 3811-3814.

Lincoff, G.H. 2005. The Audubon Society Field Guide to North American Mushrooms. Alfred A. Knopf, New York.

Mueller, G.M., Schmit, P.J., Leacock, R.P., Buyck , B., Cifuentes, J., Desjardin, E.D., Halling, E.R., Hjortstam, K., Hurriaga, T., Larsson, H.K., Lodge, J. D., Way, W.T., Minter, D., Rajchenberg, M., Redhead, A.S., Ryvarden, L., Trappe, M.J., Watling, R. and Wu, Q. 2007. Global diversity and distribution of macrofungi. *Biodiversity and Conservation.* 16 : 37 - 48.

Okhuoya, J.A. and Akpaja, E.O. 2005. Mycomedicine and Ethnomycology: The Nigerian Experience. *International Jr. of Medicinal Mushrooms.* 7 (3) : 439-440.

Osagualekhor, D.O. and Okhuoya, J.A. 2005. Sociocultural and ethnomycological uses of mushrooms among the Esan people of Nigeria. *International Jr. of Medicinal Mushrooms.* 7 : 442-445.

Osemwegie,O.O., Eriyaremu, E.G. and Abdulmalik, J. 2006. A survey of macrofungi in Edo/Delta region of Nigeria, their morphology and uses. Global *Journal of Pure and Applied Science*. 12 (2) : 149-157.

Weedon, T.J., Cornwell, K.W., Cornelissen, C.H.J., Zanne, E.A., Wirth, C. and Coomes, A.D. 2009. Global meta-analysis of wood decomposition rates: a role for trait variation among tree species. *Ecology Letters*. 12 : 45-56.

Yongabi, K., Agho,M. and Martinez-Carrera,D. 2004. Ethnomycological studies on wild mushrooms in Cameroon, Central Africa. *Micologia Applicada International*. 16 (2) : 34-36.

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