

MUSHROOM FLORA AND ASSOCIATED INSECT FAUNA IN NSUKKA URBAN, ENUGU STATE, NIGERIA

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ABSTRACT

The mushroom flora and associated insect pests of mushrooms in Nsukka urban was studied. The abundance of mushrooms from sampled communities is indicated with the family, Agaricaceae predominating "out of home" environment yielded more mushrooms (4.62) than the homestead environment (3.26). Insect pests associated with different mushrooms were Megasiela aganic Musca domestica Pygmaeophorus stercola Paychybolus ligulatus and Drosophilla melanogester among others.

Keywords: Mushroom, Pest, environment

INTRODUCTION

Total dependence on wild mushrooms entirely, for food should be regarded as a means of harnessing the resources associated with mushroom as a crop. In recent times specific mushrooms are cultivated for their food. Mushrooms are valuable health foods low in calories, high in vegetable proteins chitin iron zinc fibre essential amino acids, vitamins, and minerals, such as copper that help the body to produce red blood cells (Esminger and Esminger 1986). Most mushrooms in Nigeria which are edible are *Volvariella esculenta*, *Psathyrella atrombanata*, *Pleurotus sp*, *Lentinus subrudus*, *Schizyphyllum commune* and others. They are wild and seasonal (Adejoye *et al.*, 2007). The invaluable use of mushrooms as part of the diet and in medicine has been highlighted by Kidd (2000). Bringing wild mushrooms to our tables at regular times means that they have to be cultivated. This limits users to chances of collecting mushrooms from the wild with the attendant chances of collecting poisonous ones. Some individuals because of this risk shy away from eating mushrooms no matter what is known about such mushrooms (Zoberi, 1978).

Based on the invaluable importance of mushrooms, their abundance in any environment should be well known as a prelude to encouraging users in any such environment. A mushroom collector normally looks for mushroom in habitats that are very likely to favour its growth. Such habitats should include wood, soil, manure, grass and wood land areas (Rogers, 1991). A mushroom collector normally looks for mushrooms when the temperature is low and the relative humidity is as high as between 70 – 90 % (Kadiri, 2006).

Fairly wet environment with decomposing organic matter of leaves or wood favours its growth and fructification. Conversely mushroom pests also abound in such environment. The issues of mushroom diseases caused by bacteria, fungi, viruses are well known. Pests such as insects, mites and nematodes are associated with mushrooms.

Gbolagade (2006) while highlighting some pests of Nigerian mushrooms listed such insects as *Megasiela aganic*, *Megasiela boresi*, *Scaria fenestralis*, mites such as *Pygmaeophorus stercola*, *Tryophus sp* and the nematode *Ditylenchus*. These are pests even when they are not known to cause any physical damage to the mushrooms. Through their association, it is possible that they introduce propagules of mushroom pathogens. Nsukka is a derived savanna (Agwu, 1997). It has all the potentials favouring the growth of both poisonous and edible mushrooms as well as potential for thriving of animal pests of mushrooms.

With the current emphasis on mushroom domestication, knowledge of which mushrooms, when and where to get it is well as their associated pests is vital. It is against the background that this work is based.

MATERIALS AND METHODS

Study Area: Nsukka is a sub-urban town located on a Plateau at an elevation of 419.4m above sea level (Agwu *et al.* 2004). Nsukka is bordered to the south by plains and highlands of Udi area and to the north by Nkalagu and Okutu plains (Agwu, 1997).

Nsukka climate is tropical with mean monthly temperatures fluctuating between 24 °C and 29 °C with a range of about 10°C during the year (Inyang, 2000). During the rainy season at Nsukka the tropical maritime air mass dominates and the humidity is usually 65-85% (Agwu and Osibe, 1992). The high humidity condition favours mycelia formation and fructification of mushrooms (Rogers, 1991).

Mushrooms Collection: The sample communities in Nsukka were Isi Uja, Alor Uno, UNN compound and Obukpa. In each of these communities five spots were designated as "homestead environment" while

Table 1: List of Mushrooms by Families in Nsukka Urban

Families	Mushrooms	Number	% Composition	
Agaricaceae	<i>Inocybe fastigiata</i> ^P (Schaeff. ex Fr)	15	7.6	
	<i>Pholiota malicola</i> ^P (Kaufman ex) Smith	10	4.7	
	<i>Lentinus volpinus</i> ^{ENK} (Fr.) fr	7	3.3	
	<i>Pholiota terrestris</i> ^P (Overholts)	8	3.8	
	<i>Agaricus campestris</i> ^E (Fr)	20	10	
	<i>Clitocybe robusta</i> ^P (Pk).	3	1.4	
	<i>Leocoprinus birnbaumii</i> ^P (Corde)	10	4.7	
	<i>Clitocybe dilatata</i> ^P (Pers) Karsten	12	5.7	
	<i>Pleurotus tuber regium</i> ^F Fries singer	15	7.7	
	<i>Pleurotus oestreatus</i> Jacq ^P . Ex. Fr. Kummer	10	4.7	
	Polyporaceae	<i>Ganoderma lucidum</i> ^F (Curt. Ex. Fr)	5	2.4
		<i>Polyporus melanopus</i> ^P Fr	3	1.4
		<i>Trametes versicolor</i> ^P (L. ex Fr)	5	2.4
Lycoperdaceae	<i>Lycoperdon germinatum</i> ^F (Batssch)	10	4.7	
	<i>Clavatia cythiformis</i> ^E (Bosc) Morgan	1	0.5	
Boletaceae	<i>Boletus eludes</i> ^E Bull ex Fr.	1	0.5	
Clavariaceae	<i>Clavaria vermicularis</i> ^P Michel. Fr.	6	2.0	
Coprinaceae	<i>Psathyrella hydrophilla</i> ^F (Fr) maire	15	7.7	
	<i>Coprinus commatus</i> ^E (Fr) S. F. Gray	12	5.7	
Lactariaceae	<i>Lactarius indigo</i> ^F (Sch w.) Fr.	1	0.5	
tricholomalaceae	<i>Tricholoma aurantium</i> ^F (Fr) Richen.	2	1.0	
	<i>Marasimus siccus</i> ^{ENK} (Sch w) Fr	4	1.9	
Amanitaceae	<i>Amanita verna</i> ^P (Schaeff) Per	10	4.7	
Xylariaceae	<i>Xylaria polymorpha</i> ^P (Pers. Ex meraf) Grev.	3	1.4	
Laccariaceae	<i>Laccaria laccatus</i> ^E (Scop. Ex Fr) cke	6	2.9	
Cantharellaceae	<i>Cantharellus infundibuliformis</i> ^F Fr.	3	1.4	
Helvellaceae	<i>Verba bohemica</i> ^{ENK} (Kromh) Schroet	2	1.0	
Russlaceae	<i>Russula emetica</i> ^F (Scheff) S. F. Gray. Fr	1	0.5	
Hygrophoraceae	<i>Hygrophorus conicus</i> ^{ENK} (Fr).	7		

E-Edible, Enk- Edibility not known, P-Poisonous

Table 2: Mean Number of Edible Mushrooms from Sampled Communities in Nsukka Urban

Communities	Environment	
	Homestead	Out of Home
Isi-Uja		
<i>Pholiota terrestris</i>	1.8	2.8
<i>Agaricus campestris</i>	2.6	3.0
<i>Pleurotus tuber-regium</i>	1.9	0.0
<i>Lactarius indigo</i>	3.0	1.2
<i>Psathyrella hydrophilla</i>	3.0	4.6
<i>Pleurotus oestreatus</i>	5.0	6.3
Alor Uno		
<i>Lycoperdon germinatum</i>	6.3	9.2
<i>Pleurotus oestreatus</i>	9.3	5.2
<i>Cantherella infudiformis</i>	3.8	10.1
<i>Lactarius lacaria</i>	2.6	41
UNN Compound		
<i>Pleurotus tuber regium</i>	3.6	3.7
<i>Pholiota terrestris</i>	00	1.0
Obukpa		
<i>Boletus infundibulis</i>	3.2	4.0
<i>Calvation cythiformis</i>	3.2	3.0
<i>Coprnus commatus</i>	1.2	0.0

the other five spots were designated as "out of home environment". Between the months of June-August 2006, survey trips and inventory of mushrooms in these areas were taken at seven day intervals. Mushrooms were collected using a medium sized hand trowel or machet for obtaining part of the substratum (wood) on which mushrooms may be growing. Mushrooms were packaged in labelled cellophane bags and taken for identification.

Identification was done after the methods of Enst, (1964), Christensen (1970), Zoben, (1978), Roger, (1991).

Associated insect pests were collected and preserved in 4% formalin. Identification of the insects to species level was after NRI (1996). Accuracy of identified insects was done by a taxonomist in the museum for natural history Dept of Zoology, University of Nigeria, where voucher specimens were kept.

Both edible and inedible mushroom abound in Nsukka Urban (Table 1) Predominance of the family Agaricaceae is indicated out of the fifteen families encountered. Edible and non-edible mushrooms are found in the same environment. Mushrooms encountered were previously reported in Nigeria (Kadiri, 1990).

Such mushrooms as *Pleurotus tuber regium*, *Pleurotus oestreatus*, *Coprinus commatus*, *Agaricus campestris* are collected from the wild and are currently employed in research works involving their cultivation (Singh *et al.*, 1993).

The homestead environment had fewer number of mushrooms than out of home (Table 2). Around the homes unlike out of home environment human disturbances as a result of continuous cropping are popular in relation to most of farms outside the home, which have been on shifting cultivation from up to four years. When an environment is left undisturbed for years more mushrooms are observed (Rogers, 1991). Constant human disturbances affect mushroom growth cycle (Akins, 1966).

Table 3: Insect Pests Encountered on Mushrooms from Nsukka Urban; Relative % Abundance and Shannon Weiner Index

Mushrooms	Associated insects	Number of insects	Relative% abundance	Shannon Weiner Diversity index
<i>Pholota terrestris</i>	<i>Drosophila melanogaster</i>	37	18.1	0.11
	<i>Megasiella agaric</i>	10	4.9	0.003
<i>Agaricus campestris</i>	<i>Pachybolus ligulatus</i>	3	1.5	0.009
	<i>Drosophila melanogaster</i>	22	10.8	0.0066
	<i>Megasrella agaric</i>	6	2.9	0.018

The menace of pest is not felt on photosynthetic plants alone. Non photosynthetic plants such as mushrooms are greatly prone to insect. Insect pest encountered in association with mushrooms were *Musca domestica*, *Megasiella agaric*, *Pygmaemophorus stercola*, *Pachybolus ligulatus*, and *Drosophila melanogaster* (Table 3). They were regarded as mushroom pests even when they may not cause physical damage but for the possibility of their transporting pathogen propagules onto mushrooms.

The decay of a single mushroom stand attracts many insects which also climb healthy mushrooms and in this way it is regarded as a pest. Gbolagade (2006) reported the presence of *Megasiella agaric*, *Megasiella beresli*, *Scaria fenestralis* as mushroom pathogens in Nigeria. *Scaria fenestralis* and *Megasiella agaric* are reported to be associated with *Pholita sp* and many other mushrooms while the *Pygmaemophorus stercola* is recorded as a great pest of many other mushrooms.

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