

Evaluation of pest and diseases affecting cultivated mushroom in Awka, Anambra State, Nigeria

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Submitted: 07 Dec 2021; **Accepted:** 13 Dec 2021; **Published:** 03 Jan 2022

Citation: Okigbo, R N., and Uwah, C. C. (2022). Evaluation of pest and diseases affecting cultivated mushroom in Awka, Anambra State, Nigeria. *Adv Nutr Food Sci*, 7(1), 83-87.

Abstract

Mushrooms, which are saprophytes have been used in biodegradation. This work studied the pest and diseases of mushrooms in Awka South Local Government Area and their control measures. Questionnaires were distributed to three (3) different markets namely: Eke Awka, Aman sea and Umuawulu and a total of 20 Questionnaires were collected. The respondents were Mushroom farmers and traders. They explained that insects, rodents and termites were the major pest that affects their mushroom farms and store houses. The diseases most common were Damping, Rot and Mold. This study showed that the various pest and diseases that affects mushrooms in Awka South Local Government Area can be effectively controlled and managed when properly cared for. Regular sanitary practices and use of recommended pesticides and fungicides can be used to check the various pest and diseases of mushrooms.

Keywords: Farmers, Fungi, Awka, Insects, Pests, Diseases.

Introduction

Mushroom, called 'elo' in Igbo language of Nigeria is a fleshy, spore bearing fruiting body, typically grown above the ground on the soil or on its food sources [1]. Most mushrooms belong to the phylum Basidiomycota that have a stem (stipe), a cap. It is a macro fungus with a distinctive fruiting body which can be either epigynous or hypogous and large enough to be seen with the naked eye [2].

Documented that the mushroom is about 16.5% dry matter and in the dry matter is 7.4% crude fiber, 14.0% crude protein and 4.48% fats and oil [3]. Based upon dry weight, Protein levels compared to shitake at 18%, Pleurotus ostreatus at 35%, wheat 13% and milk at 25%. Fat levels are comparable to other mushroom species. Total sugar content is about 18.6% with high concentration of galactose and low concentration of glucose and maltose. Levels of oxalic acid which can reduce food values were low, as well as levels of hydrocyanic which can be toxic. The mushroom also contains low levels of vitamin [4].

In Nigeria, Pleurotus tuberregium is used as food and medicine. The Sclerotium which is hard is peeled and grounded for use in Vegetable and Egusi soup [5]. Nigerian native doctors use various combinations of herbs and other ingredients as well as Pleurotus tuberregium to cure ailments such as headaches, fever, cold, stom-

ach ailments, asthma, chicken pox, high blood pressure [5, 6].

In Anambra State, indigenes gave several reasons for mushroom consumption which include: for medicinal purposes, as substitute for meat, as thickening, nutritional values and palatable taste. Mushrooms are the major forms of potent pharmaceutical products and over S300 species of mushrooms have been identified to possess medicinal properties [7].

Mushrooms like other vegetable crops are subject to pest and disease attack. According to the major constraint to mushroom production is pest infestation (77.7%) and Shortage of water (70.5%). Plant diseases and pests are a normal part of nature and one of many ecological factors that helps keep hundreds of thousands of living plants and animals in balance with one another.

Reported that Fungal and bacterial diseases are the major problem in mushroom cultivation. A high percentage of products are lost due to lower productivity, decrease in quality and shortened shelf life. Disease is just one of the many hazards that may be considered when plants are taken out of their natural environment and grown in pure stands under what are often abnormal conditions. Cultivated plants are more often susceptible to disease than their wild relatives [8]. This is because the large number of the same species, having a uniform genetic background and are grown to-

gether, and a pathogen may spread rapidly under these conditions. The aim of this study is to be able to identify the various pests and diseases that hinders the successful cultivation and consumption of mushrooms in Awka, Anambra State. The objective is to be able to identify mushroom pests and diseases and solutions to how they can be prevented and /or controlled.

Materials And Methods

Location of Study

Awka South is a local Government in Anambra State and the capital city of the state. It is bounded on the North by Awka North local government, on the east by Oji –River of Enugu state, on the South by Anaocha Local government and on the west by Njikoka Local Government. It lies within the coordinates of Latitude 6 09'60.00"N and Longitude 7 03'60.00"E.

Population of Study

The study population of this study was mushroom farmers and traders in Awka South Local government Area, Anambra state.

Data Collection and Analysis

A survey was conducted in 3 different markets in Awka town; Eke Awka , Oye Amansea and Umuawulu market. Interviewees were chosen without description of gender after seeking the consent from each respondent, a well-structured questionnaire was designed to assist in obtaining crucial information from the people in this area. A total of 50 questionnaires were used in this survey. Respondents were assessed based on their encounter and daily experiences in handling mushrooms.

Research Instrument

The study utilized both primary and secondary data. The data were collected with using a well-structured questionnaire with both open and closed ended questions. Fifty (50) questionnaires were distributed. Materials needed include: Questionnaire, pens, sample bags/ nylon bags, hand gloves.

Identification of Pest and Diseases

All the pest and diseases were identified on the basis of their morphology and characteristics. Pest species were identified with the use of keys, manuals, and descriptions. Entomologist were also visited in the department of Parasitology and Entomology in Nnamdi Azikiwe University, Awka.

Data Analysis Techniques

The data collected was analyzed statistically. Raw data was first classified into sub-theories then edited and cleared to reduce ambiguity. The cleaned data was then coded and analyzed.

Results

The highest number of questionnaires eight (8) was retrieved from Eke-Awka market and the least (4) was obtained from Aman sea village (Table 1). The highest age bracket of respondents who are into mushroom farming/business was obtained in Eke-Awka market (41-50 and 51-60) years old with 8.62% respondents respectively, while the least occurred in Umuawulu village (61-70) years having 1.09% (Table 1). Age bracket of 71-80 had no respondent in all locations (Table 1).

Table 1: Age Range of Respondents from Three Locations in

Location	Number of Questionnaire Retrieved	31-40	41-50	51-60	61-70	71-80
		(%)	(%)	(%)	(%)	(%)
Eke Awka	9	4.55	8.62	8.62	2.54	-
Amansea	5	1.67	3.11	6.24	-	-
Umuawulu	6	3.63	9.09	2.75	1.09	-

The highest years of experience of respondents who are into mushroom farming/business was obtained in Eke-Awka market (>11 years) with 8.20% respondents, while the least occurred in Aman sea village (1-5) years having 1.67% (Table2).

Table 2: Respondents Reply on Years of Experience in Mushroom Business from Three Locations in Awka

Location	1-5	6-10	>11
	(%)	(%)	(%)
Eke Awka	4.55	5.62	8.20
Amansea	1.67	3.11	6.24
Umuawulu	2.75	7.09	3.63

Findings on the size of mushroom farm of the respondents indicate that 8.62% of the respondents in Ekw-Awka have a mushroom farm size of 50m²-99m² while 9.09% has a mushroom farm size of 50m²-99m² in Umuawulu. 4.55%, 2.75% and 3.63% of respondents in Eke-Awka , Amansea and Umuawulu has a mushroom farm size of 10m²-49m² respectively. No respondent indicated having a farm size of above 100m² in Eke-Awka and Umuawulu (Table 3).

Table 3: Mushroom Farm size of Respondents from Three Locations in Awka.

Location	10m ² -49m ²	50m ² -99m ²	Above 100m ²
	(%)	(%)	(%)
Eke Awka	4.55	8.62	-
Amansea	2.75	3.11	1.67
Umuawulu	3.63	9.09	-

Findings on the type of mushroom farm of the respondents showed that 7.62% of the respondents in Eke-Awka operate an outdoor mushroom farm, 5.75% and 6.63% of respondents in Amansea and Umuawulu operates an indoor mushroom respectively (Table 4).

Table 4: Type of Mushroom Farm Run by Respondents from Three Locations in Awka

Location	Indoor	Outdoor
	%	%
Eke Awka	3.54	7.62
Amansea	5.75	3.11
Umuawulu	6.63	4.09

Findings on the preservation method of mushroom by the respondents showed that 8.55%, 6.67% and 6.63% of the respondents use the sun drying method for preserving their mushroom in Eke-Awka, Amansea and Umuawulu respectively. In Eke-Awka and Amansea 5.62% and 6.24% respondents use chemical preservation method, in Amansea and Umuawulu, 3.11% and 3.09% uses the oven heat method. Very few respondents agreed to use plant/botanical preservation while no respondents used the application of salt on their mushroom for preservation (Table 5).

Table 5: Method of Mushroom Preservation Used by Respondents from Three Locations in Awka

Location	Sundry	Over heat	Chemical Preservation	Plant /Botanical Preservation	Salt Application
	%	%	%	%	%
Eke Awka	8.55	2.62	5.62	1.54	-
Amansea	6.67	3.11	6.24	1.54	-
Umuawulu	6.63	3.09	3.75	1.10	-

Findings on pests affecting mushroom farm of respondents showed that 9.09% and 8.60% of the respondents in Umuawulu and Ekw-Awka said termites was a prevalent pest in the mushroom farm. In Eke-Awka and Amansea, 7.55% and 8.75% said rodents was prevalent in their mushroom farm while in Umuawulu and Eke-Awka 8.22% and 6.50% of respondents said insects like cockroach was prevalent in their mushroom farm (Table 6).

Table 6: Pests Affecting Mushroom Farm of Respondents from Three Locations in Awka

Location	Rodents	Termites	Insects
	%	%	%
Eke Awka	7.55	8.60	6.50
Amansea	8.75	8.11	5.67
Umuawulu	6.63	9.09	8.22

Findings on diseases affecting mushroom by respondents showed that 6.36% and 9.11% of the respondents in Umuawulu and Amansea said damping was the disease affecting their mushroom farm. In Eke-Awka and Amansea, 8.60% and 8.50% said molds were affecting their mushroom farm while in Umuawulu and Eke-Awka 8.12% and 8.23% of respondents said insects rot was prevalent in their mushroom farm (Table 7).

Table 7: Diseases Affecting Mushroom Farm of Respondents from Three Locations in Awka

Location	Damping	Mold	Rot
	%	%	%
Eke Awka	5.87	8.60	8.23
Amansea	9.11	8.50	5.50
Umuawulu	6.36	5.54	8.12

Discussion

Documented that insects and other pest which usually attack cultivated mushrooms, and those of which complaints are most frequently made, may be divided roughly into five classes namely: Mushroom maggots, mites, springtails and sow bugs, mushroom flippest. Of these, the maggots are the most generally injurious, the mites following in order of importance, owing to the difficulty with which their eradication is accomplished and then come springtails and sow bugs in the order named. In accordance with the findings on pest affecting mushroom farms of respondents showed that respondents in Umuawulu and Eke Awka said termites were the prevalent pest in their mushroom farms. Also, in Eke Awka and Amansea, rodents were the major pest in their mushroom farms while in Umuawulu and Eke Awka other pests such as cockroaches and spiders were prevalent in their farms [9, 10].

The journal, Mushroom pest and Disease Control by Fletcher and Gaze (2008) explained the many fungal diseases that affect mushrooms and their control. This journal explains that wet bubble diseases occur on the caps of the mushrooms which are as a result of damping. Also, wart-like growth due to *Canicillum* which also affects mushrooms is as a result of damping. Cobweb like mycelium growing over the mushroom causes soles and envelops the mushroom which could lead to death or restriction of growth. Grey spots also found on the mushrooms are a result of rot.

Mushroom fleas cause so much damage to the mushroom bed. They cause more harm in their larvae stage as they bore holes in the mushrooms as maggots. These larvae cause mold and damping on the mushroom [11]. The findings on the pest and diseases affecting mushroom farms in Awka showed that damping, mold and rot affects mushrooms cultivated by the respondents in Eke Awka, Amansea and Umuawulu. Damping was the major disease faced by Umuawulu and Amansea respondents, Eke Awka and Amansea respondents had the highest percentage for mold and respondents from Umuawulu and Eke Awka complained of insect rot being prevalent in their mushroom farms.

This study did justice to the various preservation methods of pest and diseases of mushroom by the respondents. Results showed that the respondents use the sun drying method for preserving their mushroom in Eke-Awka, Amansea and Umuawulu respectively. In Eke-Awka and Amansea, respondents use a chemical preservation method while in Amansea and Umuawulu, they use the oven heat method. Very few respondents agreed to use plant/botanical preservation while no respondents used the application of salt on their mushroom for preservation.

Conclusion

The experiment carried out in Awka South Local Government, was targeted at evaluating the pest and diseases of mushroom in the area. It was observed that most of these pests live and breed under mushroom caps. The majority of the diseases faced by the mushrooms were damping, molds and rots. The following insect/pests; rodents (such as rats, rabbits), termites, mites and some flippest (such as cockroaches, dark-winged fungus gnat) were observed to cause harm to mushrooms cultivated and sold in Awka South Local Government. Meanwhile, the occurrence, abundance, severity, and activity of these mushroom pests and diseases are dependent on the environmental conditions of the mushroom farms and stores [12-26].

Recommendation

It is recommended that strategies should be put in place to combat these pests in mushroom farms and storage places. The various pests and diseases that affect mushrooms can be effectively and efficiently managed under proper care and control. These care and control include:

1. Cleaning of mushroom store houses
2. Maintenance of farm and surroundings in a hygienic way
3. All equipment for spawning and the floor and walls of the spawning area must be washed and disinfected.
4. Most bacterial diseases can be managed by oxytetracycline or streptomycin when used at 400ppm.
5. Mushroom spawn should be purchased only from reliable dealers.
6. All windows and ventilators should be screened with fine wire gauze to prevent the entrance of both fungus gnats and mites.

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