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Species Richness, Morphological Features and Inventory of Wild Macrofungi found in Akwa Ibom State, Nigeria

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ABSTRACT

The macrofungi diversity in Akwa Ibom State, Nigeria has been inadequately sampled and never documented; this situation makes the status of macrofungi in the State unclear. It is from this reason that this study was necessitated. A total of 60 species of wild macrofungi belonging to 25 families we documented during the period of this study (April to July 2021). *Agaricaceae* family recorded the highest number of species (12), followed by *Polyporaceae* (10), *Psathyrellaceae* (5), *Marasmiaceae* (4), *Amanitaceae* (3), *Gomphaceae*, *Lycophyllaceae, Physalacriaceae, Hymenochaetaceae, Gamodermataceae* and *Strophariaceae* recorded 2 species each. *Pluteaceae, Stereaceae, Bondarzewiaceae, Schizophyllaceae, Entolomaceae, Cortinariaceae, Pleurotaceae, Dacrymycetaceae, Auriculariaceae, Tricholomataceae, Hygrophoraceae, Hydnangiaceae, Tubiferaceae* and *Lycoperdaceae* recorded 1 species respectively. Out of the 60 macrofungi recorded, 36 species (60.00%) were non-edible, 13 species (21.67 %) were edible, 2 (3.33%) were choice edible and 2 (3.33%) edible but not recommended respectively. 1 species (1.67%) each were poisonous, psychoactive, edible while young, not recommended, non-poisonous but leathery, edible but shows allergic reactions in some individuals and unknown edibility status. Analysis on the growth substrate of the macrofungi species found revealed that; 32 species (53.33%) grew on dead wood, 25 species (41.67%) on soil, 2 species (3.33%) on living tree trunk and 1 species (1.67%) on decaying organic matter. The list and inventory provided by this study will give baseline information that will be needed in the assessment of changes that may occur in wild macrofungi diversity in Akwa Ibom State, Nigeria. The rich diversity of wild occurring macrofungi in Akwa Ibom State offers huge economic life for the local inhabitants in terms of nutriton, health and medicine as well as ecosystem stability at large. Inclusion of macrofungi biodiversity conservation in Akwa Ibom State and Nigerian forest management policies will be an appropriate step towards conservation of these wild macrofungi.

Keywords

Agaricaceae
Macrofungi
Marasmiaceae
Mushroom
Polyporaceae
Psathyrellaceae

INTRODUCTION

Fungi are regarded amongst the most diverse group of organism on earth, they do not possess chlorophyll and meets their nutrients requirements by absorption. Reproduction is via spores [1] and they include *Basidiomycota* and *Ascomycota*. Macrofungi which are sometimes referred to as mushrooms possess a very distinguishing fruiting bodies which are usually produced above ground (soil) (Chang and Miles 1992), dead woods, occasionally found on living trees as well as other food sources. Macrofungi are typically large enough to be handpicked and seen with the naked eyes [2].

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The presence of fungal species is of utmost importance to the ecosystem; fungal communities play vitals roles [3] as decomposers by degrading ecosystem organic which is essential for nutrient cycling [4]. Fungal species such as the mycorrhizal fungi form symbiotic associations with about 80% of higher plants aiding in the acquisition of nutrients and water [5]. [6] reported the use of fungal species as bioindicators for the assessment of forests health and quality. Aside ecological and ecosystem functions, fungal species have been of immense benefits to mankind, they are sold and purchased in the markets globally [7] providing great economic benefit to the rural communities as well as culinary benefits [8].

Macrofungi are widely distributed globally and are considered to be one of the earliest forms of fungi known to man [9]. Providing information with regards to macrofungal diversity contributes essentially to global diversity, community diversity in particular which is essential in fungal diversity [9]. It has been reported that only about 6.7% out of the 1.5 million fungal species assessed globally have been described mostly in the tropic, whereas the tropical regions with the seemingly highest rate of fungal diversity have not been fully evaluated [10].

Akwa Ibom State, Nigeria has a rich fungal diversity which has remained poorly exploited. With the rapid development going on in the State, certain developmental accompanying activities like deforestation, crude oil exploration and exploitation, environmental pollution and stresses all leads to environmental degradation which is a key factor in the loss of biodiversity globally which in most cases are usually irreversible. According to literature search, the macrofungi diversity in Akwa Ibom State, Nigeria has been inadequately sampled and never documented; this situation makes the status of macrofungi in the Akwa Ibom State, Nigeria unclear. It is from the reason stated above that this study was necessitated. It is therefore pertinent to create an inventory on the existing wild macrofungi as well as document their morphological characteristic. This research is the first attempt to provide baseline information about macrofungi assemblage and diversity in Akwa Ibom State, Nigeria.

MATERIALS & METHODS

Study Area

This study was carried out in Mkpat Enin, Etinan, Onna and Ikot Ekpene Local Government Areas of Akwa Ibom State, Nigeria. Akwa Ibom State is located in the Southern region of Nigeria, lying between latitudes 4º32'N and 5º33'N, and longitudes 7º25'E and 8º25'E. Etinan Local Government Area (Latitude 4.51ºN and Longitude 7.50ºE), Akwa Ibom State, Nigeria, with an annual rainfall of about 4000 mm and mean temperature variation of 26 – 36ºC. Mkpat Enin Local Government area is situated within geographical coordinates of Latitude 4°44'5"N, Longitude 7°44'56"E. Onna lies between the coordinates 4º39'0'N and of 7º52'0'E. Ikot Ekpene lies between the coordinates 5º11'N and of 7º43'E.

For Mkpat Enin; Ekim Town, Ikot Akpaden, Ikot Enin, Ikot Aba, Ikot Obiondoho, Ndon Obodom, Ikot Isehe and Ikot Ukwa were sampled. For Onna; Mkpok, Ndon Eyo, Nkan, Ikot Ebiere and Okom were samped. For Etinan; Mbioto 1, Ikot Ekan, Afaha Effiat, and Ikot Nseyen were sampled. For Ikot Ekpene; Utu Ikpe, Utu Edem Usung and Abiakpo Edem Idim were sampled.

Identification of Macrofungi

Accessibility of the study area was a major criteria in the selection of the sampling sites. Repeated sampling was carried out following the laid down field protocol outlined by [11]. The survey and inventory studies took place from April to July 2021 using transects of 50 × 20m in triplicate plots. İn-situ photographs of the wild macrofungi species were taken as well as the morphological features measurement. İdentification of the macrofungi species was done by a mycologist using taxonomic keys and descriptions described by [12].

RESULTS

A total of 60 species of wild macrofungi belonging to 25 families we documented during the period of this study. Agaricaceae family recorded the highest number of species (12), followed by Polyporaceae (10), Psathyrellaceae (5), Marasmiaceae (4), Amanitaceae (3), Gomphaceae, Lycophyllaceae, Physalacriaceae, Hymenochaetaceae, Gamodermataceae and Strophariaceae recorded 2 species each. Pluteaceae, Stereaceae, Bondarzewiaceae, Schizophyllaceae, Entolomaceae,Cortinariaceae,Pleurotaceae,Dacrymycetaceae, Auriculariaceae, Tricholomataceae, Hygrophoraceae, Hydnangiaceae, Tubiferaceae and Lycoperdaceae recorded 1 species respectively as shown in Table 1 and Figure 1.

Results obtained from the edibility assesment of the wild macrofungi found in Akwa Ibom State, Nigeria revealed that out of the 60 macrofungi recorded, 36 species (60.00%) were non-edible, 13 species (21.67 %) were edible, 2 (3.33%) were choice edible and edible but not recommended respectively. 1 species (1.67%) each were poisonous, psychoactive, edible while young, not recommended, non-poisonous but leathery, edible but shows allergic reactions in some individuals and unknown edibility status as shown in Figure 2.

Table 1: Checklist of wild macrofungi found in Akwa Ibom State, Nigeria

S/N	Scientific Name	Family	Comon Name	Local Name	Colour/ Appearance	Edibility Status
1	*Agaricus pocilator*	Agaricaceae	Agrocybe	Tinaba	Milky	Edible
2	*Agaricus semotus*	Agaricaceae	Button mushroom	Udip isong	Brown	Edible
3	*Agaricus arvensis*	Agaricaceae	Horse Muchroom	Unknown	White	Edible
4	*Amanita caesarae*	Aminataceae	Caesar mushroom	-	Milky/brown	Non-edible
5	*Amanita pantherina*	Aminataceae	Panther muchroom	Unknown	Brown	Non edible
6	*Aminata vaginata*	Aminataceae	The grissette	Udip iton	Gray to grayish-brown	Edible but not recommended
7	*Armillaria ostoyae*	Physalacriaceae	Honey fungi	Unknown	Brown	Non edible
8	*Armillaria mellea*	Physalacriaceae	Honey mushroom or stump mushroom	Unknown	honey coloured, yellowish	Choice edible but can cause allergic reaction
9	*Bondarzewia berkeleyi*	Bondarzewiaceae	Berkeley's polypore	Unknown	Pale-grey	Edible
10	*Calvatia gigantea*	Agaricaceae	Giant puffball	Unknown	Brown	Edible
11	*Calvatia cyathiformis*	Agaricaceae	Purple-spored puffball, puffball cap.	Nsenunen isong	Purple or brownish	Edible while young
12	*Chlorophyllum molybdites*	Agaricaceae	False parasol	Udip eto	Milky	Poisonous
13	*Clitopilus prunulus*	Entolomataceae	Dead Dough Clitopilus	Nkokobingo	Grey-white	Edible
14	*Coltricia perennis*	Hymenochaetaceae	Tiger's eye	Unknown	Grey	Non edible
15	*Coprinopsis lagopus*	Psathyrellaceae	Hare's foot inkcap	Udip Ekpeyop	Pale to very dark brown, slivery grey veil	Unknown
16	*Coprinus lagopus*	Psathyrellaceae	Harefoot mushroom	Akpoktoi	Ash	Non-edible
17	*Coprinus plicatilis*	Psathyrellaceae	Umbrella Mushroom	Akpoktoi	Ash	Non-edible
18	*Cortinarius malicorius*	Cortinariaceae	Yellow malicorius	Unknown	Bright-yellow	Non edible
19	*Dacryopinax spathularia*	Dacrymycetaceae	Sweet osmanthus	Udip ekpo	Yellow	Non-edible
20	*Exidia recisa*	Auriculariaceae	Willow brain or amber jelly roll	Utong ekpu	Honey Brown	Edible
21	*Ganoderma lingzhi*	Gamodermataceae	Reishi muchroom	Unknown	White	Non edible
22	*Ganoderma resinaceum*	Ganodermataceae	Bracket fungus	Awod-oyop	Brown with whitish edge kining	Non edible, medicinal
23	*Gerronema strombodes*	Marasmiaceae	Golden gilled gerronema	Unknown	Milky	Non edible
24	*Gymnopilus luteofolius*	Strophariaceae	Yellow-gilled gymnopilus	Udip Ekpo	Reddish, purple to yellow caps	Psychoactive
25	*Hygrocybe squamulosa*	Hygrophoraceae	Waxy cap	Unknown	Brightly coloured in shades of red, orange or yellow	Edible but not recommended
26	*Laccaria laccata*	Hydnangiaceae	Laccaria Muchroom	Unknown	Reddish-brown	Edible
27	*Laetiporus sulphureus*	Polyporaceae	Chicken mushroom	Nsasam	Brown	Non edible
28	*Leiotrametes lactinea*	Polyporaceae	Poroid white rot fungi	Unknown	Whitish, milky	Non edible

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29	*Leucoagaricus rubrotinctus*	Agaricaceae	Red-eyed parasol, red-tinged parasol.	Aduok	Reddish brown to pinkish brown	Non edible
30	*Lenzites betulina*	Polyporaceae	Gilled polypore	Udip isong	White	Non edible
31	*Lentinus triginus*	Polyporaceae	Tiger sawgill	Tinapaa	Whitish	Edible
32	*Lycogala epidendrum*	Tubiferaceae	Wolf's milk slime or toothpaste slime	Nkuaunen isong	Pinkish grey to yellowish brown or greenish black	Non edible
33	*Lycoperdon nigrescens*	Lycoperdaceae	Dusky puffball	Nkwa Unen isong	Brown	Non edible
34	*Lycoperdon utriforme*	Agaricaceae	Hankea	Ibodo udip	Brown	Non edible
35	*Leratiomyces percevalii*	Strophariaceae	Redlead round head	Unknown	Honey yellow/whitish	Non edible
36	*Macrolepiota xanthopus*	Agaricaceae	Parasol	Udip adine	Milky	Non edible
37	*Macrolepiota albuminosa*	Agaricaceae	Parasol	Asaka isong	Brown	Non edible
38	*Macrolepiota rhacodes*	Agaricaceae	Shaggy	Udip adine	Ash	Edible
39	*Macrolepiota procera*	Agaricaceae	Parasol muchroom	Udip ison	Brown	Choice Edible
40	*Marasmiellus candedus*	Marasmiaceae	Marasmus	Atontong	White	Non edible
41	*Marasmius rotula*	Marasmiaceae	Pinwhell mushroom	Ntan unoh	Whitish	Non edible
42	*Mycena pura*	Tricholomataceae	Poison radish ground mycena	Nyeye	Purple	Non edible
43	*Ossicaulis lignatilis*	Lycophyllaceae	Mealy oyster	Unknown	Whitish	Non edible
44	*Parasola plicatilis*	Psathyrellaceae	Cap inc	Unknown	White	Non edible
45	*Phellinus populicola*	Hymenochaetaceae	Hardwood trunk muchroom	Udip etop	Brown	Non edible
46	*Pleurocybella porrigens*	Marasmiaceae	Angel Wing	Udip	White	Not Recommended
47	*Pleurotus ostreatus*	Pleurotaceae	Oyster muchroom	Akpaab	White	Choice Edible
48	*Pleuteus cervinus*	Pluteaceae	Deer shield, the deer or fawn mushroom	Udip ediene	Light ochre-brown to dark brown	Edible
49	*Polyporus varius*	Polyporaceae	Bat	Ndana	Brown	Non edible
50	*Psathyrella candolleana*	Psathyrellaceae	Fringed crumble cap, pale brittle stem.	Unknown	Honey brown when young but fades to nearly white	Edible
51	*Ramaria stricta*	Gomphaceae	Coral fungi	Nwen udip	Ash	Non edible
52	*Schizophyllum commune*	Schizophyllaceae	Split gill	Unknown	Creamy yellow to pale white in colour	Non-poisonous, Leathery
53	*Stereum hirsutum*	Stereaceae	Shelf fungus	Udip	Brown	Non edible
54	*Termitomyces striatus*	Lyophyllaceae	-	Udip	Brown	Edible
55	*Trametes pubescens*	Polyporaceae	White rot fungus	-	cream-coloured	Non edible
56	*Trametes gibbosa*	Polyporaceae	Lumpy bracket fungi	Udip etop	Yellow	Non edible
57	*Trametes versicolor*	Polyporaceae	Turkey tail	Udip etop	Brown	Non edible
58	*Trametes suaveolens*	Polyporaceae	Bracket fungi	Udip etop	Cream-coloured	Non edible
59	*Trametes trogi*	Polyporaceae	Bracket fungi	Udip etop	Yellow	Non edible
60	*Turbinellus floccosus*	Gomphaceae	Scaly Chanterelle	Unknown	Yellow	Non edible

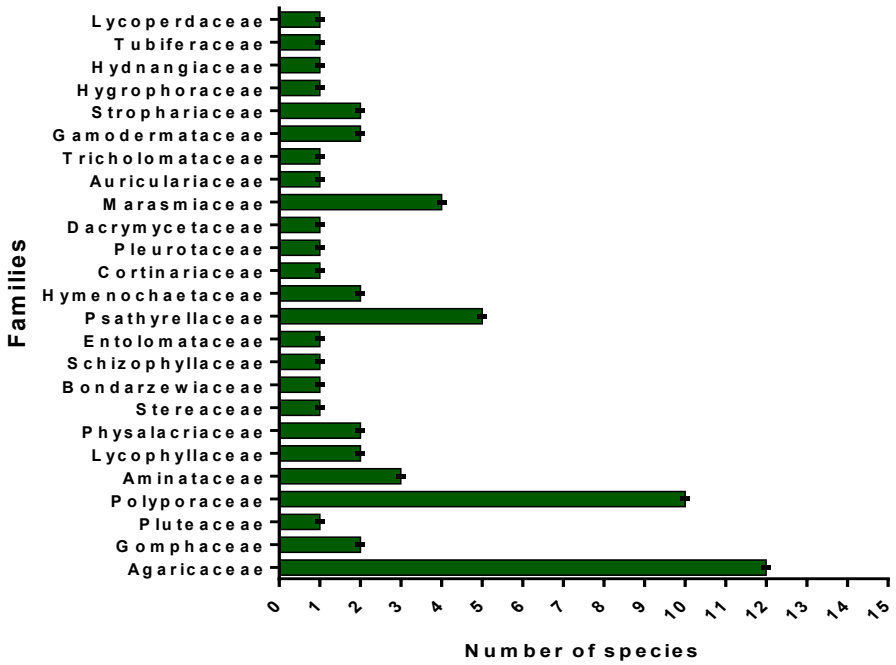

Figure 1: Species richness of macrofungi families found in Akwa Ibom State, Nigeria.

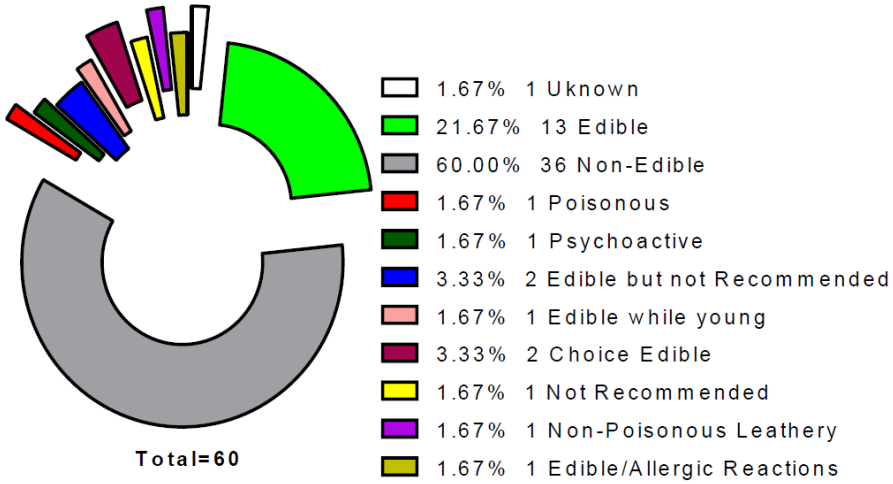

Figure 2: Edibility status of wild macrofungi found in Akwa Ibom State, Nigeria.

Table 2 shows the morphological features of wild macrofungi found in Akwa Ibom State, Nigeria; these include; cap colour, cap shape, stipe colour, stipe length, volva, gills and annulus as well as growth substrate and location found.

Analysis on the growth substrate of the macrofungi species found revealed that; 32 species (53.33%) grew on dead wood, 25 species (41.67%) on soil, 2 species (3.33%) on living tree trunk and 1 species (1.67%) on decaying organic matter (Figure 4).

DISCUSSION

Results obtained in this research is in line with the work of [13] who also recorded abundance of species from the family Agaricaceae, Psathyrellaceae, Polyporaceae, Lycophyllaceae. The Agaricaceae family from this study presented the most abundant species. The family Agaricaceae are conspicuous macrofungi, thus, it would not be surprising to find a higher occurrence during sampling. Similar findings was reported by [14], they recorded abundance of species from the families Auriculaceae, Formitopsidaceae, Polyporaceae, Russulaceae,

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Table 2: Morphological features of wild macrofungi found in Akwa Ibom State, Nigeria.

S/N	Scientific Name	Substrate	Cap Colour	Cap Shape	Stipe Colour	Stipe Length (cm)	Stipe Shape	Volva	Gills	Annulus	Location found
1	*Agaricus pocilator*	Dead wood	Milky	Round	White	2.40 ± 0.74	Short	Absent	Closely space	Absent	Ikot obion-doho
2	*Agaricus semotus*	Soil	Brown	Conical	White	9.00 ± 0.66	Long	Absent	Absent	Absent	Ikot obion-doho
3	*Agaricus arvensis*	Decaying Organic matter	White	cornical	Brown	4.50 ± 0.31	Short	Present	Crowded	Absent	Mkpok
4	*Amanita caesarae*	Dead wood	Brown	Round	Absent	-	Absent	Absent	Absent	Absent	Ikot obion-doho
5	*Amanita pantherina*	Soil	Brown	cornical	Brown	17.60 ± 2.71	Long	Absent	Widely Spaced	Present	Ndon Eyo
6	*Aminata vaginata*	Soil	Brown	Conical	Brown	7.90 ± 0.24	Long	Present	Closely packed	Absent	Utu Ikpe
7	*Armillaria ostoyae*	Dead wood	Brown	cornical	Absent	-	Absent	Absent	Crowded	Absent	Nkan
8	*Armillaria mellea*	Soil	Brown	Round	Brown	5.70 ± 0.74	Long	Present	Closely packed	Present	Utu Edem Usung
9	*Bondarzewia berkeleyi*	Living tree trunk	Pale-grey	Kidney shaped	White	5.50 ± 0.34	Short	Absent	Crowded	Absent	Ndon Eyo, Afaha Effiat
10	*Calvatia gigantea*	Soil	Brown	Row	Absent	-	Absent	Absent	Rough	Absent	Ndon Eyo
11	*Calvatia cyathiformis*	Soil	Brown	Round	Milky	3.00 ± 0.12	Short	Absent	Rough	Absent	Utu Ikpe
12	*Chlorophyllum molybdites*	Soil	Milky	Round	White	15.00 ± 2.21	Long	Present	Closely packed	Present	Utu Ikpe
13	*Clitopilus prunulus*	Dead wood	Grey-white	cornical	White	6.20 ± 0.72	Long	Absent	Crowded	Absent	Mkpok
14	*Coltricia perennis*	Dead wood	Brown	Round	Absent	-	Absent	Absent	Closely packed	Absent	Utu Ikpe
15	*Coprinopsis lagopus*	Dead wood	White	Round	Milky	5.00 ± 0.22	Long	Absent	Widely space	Absent	Ikot Isehe
16	*Coprinus lagopus*	Soil	Grey	Conical	White	6.9 0 ± 0.10	Long	Absent	Closely packed	Absent	Utu Ikpe
17	*Coprinus plicatilis*	Soil	Ash	Round	White	6.40 ± 0.30	Long	Absent	Closely space	Absent	Ikot Ekan, Ekim
18	*Cortinarius malicorius*	Dead wood	Bright-yellow	Kidney shaped	White	2.00 ± 0.20	Short	Absent	Crowded	Absent	Nkan
19	*Dacryopinax spathularia*	Dead wood	Absent	-	Yellow	2.40 ± 0.43	Short	Absent	Absent	Absent	Ekim, Ikot Nseyen
20	*Exidia recisa*	Dead wood	Brown	Round	Brown	0.30 ± 0.18	Short	Absent	-	Absent	Utu Ikpe
21	*Ganoderma lingzhi*	Dead wood	White	Kidney shaped	White	2.50 ± 0.37	Short	Absent	Crowded	Absent	Okom
22	*Ganoderma resinaceum*	Dead wood	Milky/ brown	Kidney shaped	Absent	-	Absent	Absent	-	Absent	Abiakpo Edem Idim
23	*Gerronema strombodes*	Dead wood	Milky	Round	White	4.70 ± 0.44	Long	Absent	Closely space	Absent	Ekim
24	*Gymnopilus luteofolius*	Dead wood	Red/ yellow	Round	Red	2.30 ± 0.11	Short	Present	Closely packed	Absent	Utu Ikpe
25	*Hygrocybe squamulosa*	Soil	Red	Round	Orange	3.40 ± 0.28	Short	Absent	Closely packed	Absent	Utu Edem Usung
26	*Laccaria laccata*	Dead wood	Reddish-brown	cornical	Brown	5.30 ± 0.35	Short	Absent	Crowded	Absent	Mkpok
27	*Laetiporus sulphureus*	Dead wood	Brown	Round	Absent	-	-	Absent	Absent	Absent	Ikot Aba
28	*Leiotrametes lactinea*	Dead wood	Milky/ brown	Round	-	-	-	Absent	Pore like	Absent	Utu Ikpe
29	*Leucoagaricus rubrotinctus*	Soil	Brown/ milky	Round	Brown/ milky	4.00 ± 0.18	Short	Absent	Closely packed	Present	Utu Ikpe
30	*Lenzites betulina*	Soil	White	Round	Brown	5.00 ± 0.98	Long	Absent	Widely space	Absent	Ikot Aba, Mbioto 1

31	*Lentinus triginus*	Dead wood	Milky	Round	Milky	1.00 ± 0.03	Short	Present	Closely packed	Absent	Abiakpo Edem Idim
32	*Lycogala epidendrum*	Dead wood	Brown	Round	-	-	-	-	-	Absent	Abiakpo Edem Idim
33	*Lycoperdon nigrescens*	Soil	Brown	Round	Absent	-	Absent	Absent	Rough	Absent	Ndon Eyo
34	*Lycoperdon utriforme*	Soil	Brown	Conical	Milky	4.50 ± 0.41	Short	Absent	Absent	Absent	Ikot Aba
35	*Leratiomyces percevalii*	Soil	Milky	Round	Milky	2.50 ± 0.17	Short	Present	Closely packed	Absent	Utu Ikpe
36	*Macrolepiota xanthopus*	Soil	Brown	Conical	Brown	4.20 ± 0.19	Short	Absent	Absent	Absent	Ndon Obodom
37	*Macrolepiota albuminosa*	Soil	Brown	Round	Absent	-	-	Absent	Absent	Absent	Ndon Obodom
38	*Macrolepiota rhacodes*	Soil	Milky	Round	Milky	13.20 ± 2.13	Long	Present	Widely space	Present	Ndon Obodom
39	*Macrolepiota procera*	Soil	Milky/ brown	Conical	Milky	7.60 ± 1.17	Long	Present	Rough	Absent	Utu Edem Usung, Mbioto 1
40	*Marasmiellus candedus*	Dead wood	Milky	Round	Absent	-	-	Absent	Widely space	Absent	Ikot Oyoro
41	*Marasmius rotula*	Soil	Milky	Round	Brown	7.90 ± 0.48	Long	Absent	Widely spaced	Absent	Utu Edem Usung
42	*Mycena pura*	Soil	Purple	cornical	White	14.30 ± 3.15	Long	Absent	Widely Spaced	Absent	Ndon Eyo
43	*Ossicaulis lignatilis*	Dead wood	White	Round	Milky	0.50 ± 0.15	Short	Absent	Closely packed	Absent	Utu Edem Usung
44	*Parasola plicatilis*	Soil	Milky/ brown	Round	White	9.30 ± 1.48	Long	Absent	Closely packed	Absent	Utu Ikpe
45	*Phellinus populicola*	Living tree trunk	Brown	Kidney Shaped	Absent	-	Absent	Absent	Crowded	Absent	Nkan
46	*Pleurocybella porrigens*	Dead wood	Milky	Round	Milky	0.20 ± 0.01	Short	Absent	Closely packed	Absent	Utu Ikpe
47	*Pleurotus ostreatus*	Dead wood	Brown	Round	Brown	4.20 ± 0.14	Short	Absent	Closely packed	Absent	Utu Ikpe
48	*Pleuteus cervinus*	Soil	Grey/ brown	Round	Milky	6.30 ± 0.41	Long	Present	Closely packed	Absent	Abiakpo Edem Idim
49	*Polyporus varius*	Dead wood	Brown	Round	Absent	-	Absent	Absent	Closely packed	Absent	Ikot Oyoro
50	*Psathyrella candolleana*	Soil	Milky	Conical	Milky	4.60 ± 0.22	Long	Present	Weblike	Absent	Utu Edem Usung
51	*Ramaria stricta*	Dead wood	Ash	Conical	Ash	2.30 ± 0.14	Short	Absent	Absent	Absent	Ukam, Afaha Effiat
52	*Schizophyllum commune*	Dead wood	Grey	-	Grey	0.30 ± 0.04	Short	Absent	Closely packed	Absent	Utu Edem Usung
53	*Stereum hirsutum*	Dead wood	Milky/ yellow	-	-	-	-	Absent	-	Absent	Utu Ikpe
54	*Termitomyces striatus*	Soil	Grey	Round	Milky	4.30 ± 0.94	Long	Absent	Closely packed	Absent	Mbioto 1, Ikot Ekan
55	*Trametes pubescens*	Dead wood	cream-coloured	Kidney shaped	Absent	-	Absent	Absent	Crowded	Absent	Nkan
56	*Trametes gibbosa*	Dead wood	Yellow	Kidney shaped	Absent	-	Absent	Absent	Crowded	Absent	Ikot Ebiere
57	*Trametes versicolor*	Dead wood	Brown	Round	Absent	-	-	Absent	Closely spaced	Absent	Ikot Enin
58	*Trametes suaveolens*	Dead wood	Cream-coloured	Kidney shaped	Absent	-	Absent	Absent	Crowded	Absent	Ikot Ebiere
59	*Trametes trogi*	Dead wood	Yellow	Kidney shaped	Absent	-	Absent	Absent	Crowded	Absent	Ikot Ebiere
60	*Turbinellus floccosus*	Dead wood	Yellow	Row	Brown	7.50 ± 0.17	Long	Absent	Rough	Absent	Mkpok

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Figure 3: Some species of Wild Macrofungi found in Akwa Ibom State, Nigeria.

Agaricaceae, Corpinaceae, Tricholomataceae, Lyophyllaceae, Pleurotaceae and Russulaceae in their research investigation to catalogue and identify some wild edible macro-fungi in Nigeria. [15] on his survey of Zuru Local Government area of Kebbi State, Nigeria collected twelve wild mushroom species which include; *Agaricus semotus, Panus fulvus, Fomes lignosus*, *Amanita caesarea, Chlorophyllum molybdite, Lactarius deliciosus, Pleurotus ostreatus, Ganoderma lucidum, Tramates elegans, Lenzites betulina, Lepiota procera,* and *Trametes versicolor* were documented for the first time in

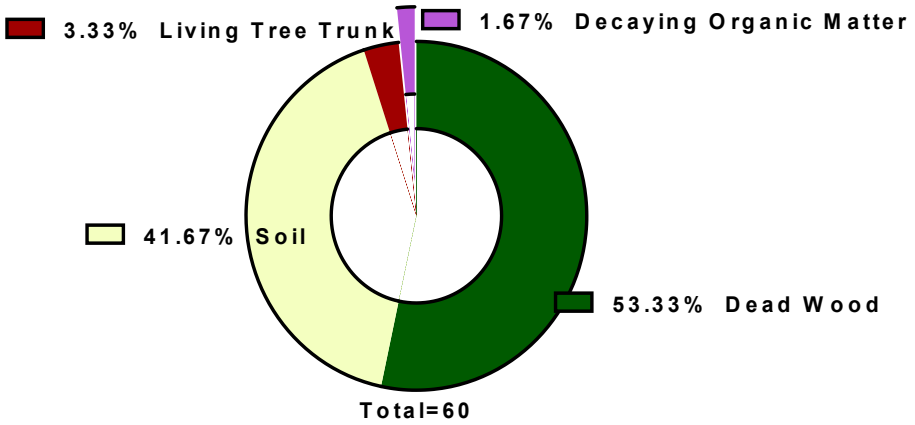

Figure 4: Different growth substrates of Wild Macrofungi found in Akwa Iboom State, Nigeria.

study area (Zuru) most of which were also recorded in this study. This supports previous findings, that diversity of Nigeria mycoflora is underestimated [16].

From this study growth substrate of the macrofungi species found revealed that; 32 species (53.33%) grew on dead wood, 25 species (41.67%) on soil, 2 species (3.33%) on living tree trunk and 1 species (1.67%). This is in line with the work of Keta et al. (2019) who also reported that mushroom growth environment observed during fruiting bodies collection, 42.4% of the samples were collected from soil and dead wood (27.8%). This agrees with the previous reports by [17] and [18] which stated that, dead wood and soil debris are most common and favourable mushroom substrates for the growth of mushroom species as a result of higher nutrient content that are easily degradable and reabsorb by these mushroom mycelia growing on it.

CONCLUSIONS

The list and inventory provided by this study will give baseline information that will be needed in the assessment of changes that may occur in wild macrofungi diversity in Akwa Ibom State, Nigeria. The rich diversity of wild occurring macrofungi in Akwa Ibom State offers huge economic life for the local inhabitants in terms of nutrition, health and medicine and ecosystem stability at large. However, the usefulness of these macrofungi has resulted in its overexploitation which needs to be curbed. Thus, conservation of these macrofungi can be done through cultivation, creation and protection of the mushroom habitats and forest reserves where these mushrooms are found. Also, inclusion of macrofungi biodiversity conservation in Akwa Ibom State and Nigerian forest management policies will be appropriate.

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