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Preliminary Study on the Macrofungi of Bazal-Baubo Watershed, Aurora Province, Central Luzon, Philippines

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Abstract - A preliminary study on the macroscopic fungi was conducted at the watershed of Aurora Province. Four transect lines were established from 50m to 1040 m asl with 20m x 50m quadrat sampling each transect line (TL) and with an interval of 200m between quadrats. The fungal species within the quadrats along the TL's were collected, identified and recorded. Opportunistic sampling method was also used during the survey. Field sampling of fungi resulted to the identification of 38 families, 68 genera, and 107 species with a total of 684 individuals. Some 91 are basidiomycetes, 14 are ascomycetes, and two are myxomycetes. Results show that *Aseroe rubra* Labill., *Lycoperdon echinatum* Pers., *Macrolepiota rhacodes* (Vittadini) Singer, and *Cookeina tricholoma* (Mont.) Kuntze, are the new record of fungal species in Aurora, and one possible new species of the genus *Hexagonia*. Further field surveys of the watershed is anticipated to uncover a rich and diverse fungal flora in the area. Although generally well protected, the watershed is currently experiencing some degree of anthropogenic disturbances such as carabao logging, minor forest products gathering, and Slash-and-burn making or slash-and-burn farming. Fungal diversity research efforts need to be encouraged to evaluate the effects of these human disruptions on the ecology of the watershed.

Keywords - macrofungi, Bazal-Baubo watershed, field survey, diversity, ecology

INTRODUCTION

The Bazal-Baubo watershed is located in the municipality of Ma. Aurora in Aurora Province, Luzon Island. It is a portion of the foothills of the Sierra Madre Mountain Ranges, a key biodiversity area in the Philippines (Brown, Diesmos and Duya 2007). The watershed is important within the context of natural lowland forest – the most threatened habitat in the Philippines. Moreover, recent study of the macrofungal biodiversity found high species diversity. Initial reports from more recent fungal diversity inventories conducted within Aurora likewise indicate high species richness (Vallejo, Sagabain, Viernes, Angara, Kalaw, and Reyes 2009); these reports, however remain unpublished, hence vital information may not readily be accessible to the scientific arena.

Aurora is one of the least explored portions of Luzon's Central Province. Before this survey, only 50 fungi are attributed to this province. Previous mycological collections (Vallejo, Sagabain, Viernes, Angara, Kalaw, and Reyes 2009) from this province almost exclusively collected from Bugkalot tribe area in Ma. Aurora, although few specimens were collected from Baler areas.

In the conservation of global biodiversity, the importance of the Sierra Madre Mountain Range, where the watershed belongs has already been recognized. The Sierra Madre is one of the priority sites for biodiversity conservation in the Philippines, harboring the largest block of forest in Luzon, which has rich biodiversity and diverse ecosystems. The overall state of knowledge of its biodiversity remains poorly known; in fact, many new species of plants and animals continue to be discovered from this province alone. Based on current knowledge of Philippine biogeography, many species are restricted in distribution to the Sierra Madre Mountain (Brown,Diesmos, and Duya 2007).

This study provides a preliminary report on the fungal diversity, ecology, and species richness along the elevational and vegetation type gradients at Bazal-Baubo watershed, particularly Villages of Bazal and Baubo towards the summit of Maria Aurora. It also gives updates on the existence and distribution of fungi as well as the discoveries of new fungal species.

MATERIALS AND METHODS

A preliminary survey of fungi was conducted along elevational and microhabitat gradients (500-1,040 masl) in Bazal-Baubo watershed, Aurora Province, in Central Luzon from May 16-19 and July 3-13, 2010. Transect line and quadrat methods were used in field sampling (Tadiosa 1998). Using transect line (TL) method, four transect lines were established from the baseline (50m asl) toward the peak (1,040m asl) with 20m x 50m quadrat sampling each transect line and with an interval of 200 meters between quadrats. All in all, 20 quadrats were laid out.

All fungal species found in each quadrat along the TLs were identified, recorded, and documented. Opportunistic sampling was done also. Those fungal species not encountered within the established quadrats but growing outside the quadrats were collected and became part of the collection data. When it was not possible to identify on site, taxonomic and morphological features of the fungi were noted. Simpson's Index of species richness, abundance or evenness of spread of the species in the habitat was used in assessing fungal species growing in the watershed (Dalisay 2001).

Because the species composition and richness of the fungi of Aurora are poorly known, two to three samples of fungal specimens were collected (as stipulated protocols detailed in research and collecting Gratuitous Permit Numbers 2009-04 and 2010-01 granted by the Department of Environment and Natural Resources) in the collecting sites. The collected bracket and woody specimens were dried while the fleshy and gelatinous were preserved in 70% ethanol. Field observations on the morphological characteristics, habitat and ecology, as well as other field data such as locality, altitude, habitats and economic uses, were carefully obtained per collection number (Magurran, 1998). These were then brought to the Philippine National Herbarium (PNH), National Museum in Manila for drying and fumigation, further processing, and identification.

Collection of fungal specimens

The data characteristics of each fungal species such as host tree, substratum, form, texture, size, color, odor and other noteworthy features were recorded at the time of collection (MSP 2001). Each of the specimens was wrapped in a newspaper together with the pertinent data and other relevant information. Fragile and fleshy specimens were separated from the woody ones in the same collection basket. The woody specimens collected were removed with a bolo together with the wood tissues, while a knife was used in collecting fleshy ones. These woody fungi were dried immediately and fumigated with paradichloro-benzene crystals and ethanol in an airtight improvised fumigation chamber to kill insects, particularly the destructive larvae.

Identification and classification of each fungus

Each specimen was properly labeled and brought to the laboratory for identification. They were examined promptly, air-dried or properly treated to avoid molding. These fungi were identified based on the macro- and microscopic characteristics of the fruiting body or the sporophores.

Sporophores were identified based on the characteristics described in the Workbook in Tropical Fungi by Quimio (2001); Handbook on Mushroom by Laessoe (1998); National Audubon Society Field Guide to Mushroom by Knopt (1995) and Illustrated Genera of Wood decay Fungi by Fergus (1960) for initial identification. The identification of the fruiting body was made also based on the taxonomic keys of Barnett and Hunter (1973); on Ainsworth & Bisby's Dictionary of Fungi (Hawks worth and James 1995), on key to the identification of fungi

(Quimio and Uyenco 1985) on the characteristics of the various fruiting bodies collected and the consultation with the specialists.

Collected specimens were compared with identified specimens in the Philippine National Herbarium (PNH) and the UPLB Museum of Natural History (CAHUP) for confirmation. After the identification, the collected fungi were classified according to families, genera and species.

Storage and preservation of collected species

The fleshy ones and soft specimens were immersed in a preparation of 10% formalin to make them rigid and firm. After one or two days, they were removed and washed with pure water and then transferred into a tightly covered clean jars containing 70% ethanol, where they could be kept and preserved indefinitely. Specimens of small size were placed in paper packets made up of ordinary typewriting paper or in bristol board depending upon the weight and amount of the specimens. For heavier and bigger fungi like *Ganoderma, Fomes* and *Daedalea*, the thicker and bigger envelopes were used. The packets were then pasted on standard mounting sheets. The collected samples were properly labeled (Tadiosa and Soriano 2004).

Measures of fungal diversity

Some measures of biological diversity include species richness, or the number of species in an area, specific number of individuals or biomass. Another measure is the relative abundance of the species. It means the more equally abundant the species in the area, the more diverse it is considered to be. A great model as shown below deriving diversity indices which include the previous premise is the Simpson's Index. It which gives the probability of any individual drawn at random from a community comprising different species. The model is as follows:

$D = Pi^2$

where: Pi = the relative proportion or abundance of the *i*th species.

Research Ethics

A permit was sought from the Department of Environment and Natural Resources of the Local Government of Aurora, and from the indigenous communities in the research sites.

RESULTS AND DISCUSSION

A total of 684 numbers of fungi were collected during this study representing some 107 species, 68 genera, and 38 families. Despite limited collection in time and effort, this part of Bazal-Baubo watershed is home to nearly one-half (50%) of the total fungi species recorded from Luzon's Central Province of Aurora (about 215 species) and approximately 10% of the total species currently reported to occur in the Philippines. Further and intensive sampling effort in the watershed will undoubtedly uncover more species including some possible new species.

Noteworthy discoveries

This field survey has added to our knowledge not only on the diversity of fungi in this part of Central Luzon but more importantly on existence and distribution of some taxa. Among the significant fungal species collected in the watershed include *Aseroe rubra* Labill., *Lycoperdon echinatum* Pers., *Macrolepiota rhacodes* (Vittadini) Singer, and *Cookeina tricholoma* (Mont.) Kuntze. (Fig.7 A-D). These species were first recorded in this province. Other important species that were recorded and collected include unidentified species of a polypore hexagonia of the genus *Hexagonia* (Fig. 7-E). The identity of this fungus cannot be ascertained to currently known Philippine species, hence may represent taxa that are new to science. Further taxonomic study is needed to verify their identity.

Species composition of fungi in different microhabitats at an elevational gradient

The fungal flora of Bazal-Baubo watershed in Bazal Village and Baubo were enumerated below. Some species found in heavily vegetated areas are the *Auricularia auricula, Auricularia delicata, Auricularia polytricha, Canthatrellus sp., Hexagonia tenuis, Amauroderma rogusom, Amauroderma sp., Exidia sp., Ganoderma applanatum, Ganoderma lucidum, Dascyscyphus apalus, Hexagonia glaber, Hymenochaete rubiginosa (*Dai, Zhang, and Zhon 2000*), Lycoperdon echinatum, Marasmius ramealis,* *Macrolepiota rhacodes, Cymatoderma africanum, Podoscypha bolleana, Aseroe rubra, Armillaria sp., Daedalea sp., Favolus sp., Fomes fomentarius, Microporus xanthopus, Polyporus hirsutus, Aleuria aurantia, Otidea sp., Cookeina tricholoma, Cookenia sulcipes, Stereum sp., Trametes sp., Pholiota sp., Clitocybe sp.*, and *Tuber sp.*

The logging trails trail and foot path are home to *Amanita fulva, Auricularia auricula, Auricularia delicata, Conocybe sp., Coprinus atramentarius, Coprinus sp., Cortinarius sp., Enteloma sp., Exidia sp., Strobilomyces strobilaceus, Trametes sp., Ganoderma lobatum, Hygrocybe coccinea, Hygrocybe miniata, Hymenochaete sp., Lactarius sp., Lycoperdon sp., Marasmius androsaceus, Podoscypha subaffinis, Oudemansiella canarii, Fomes sp., Microporus sp., Polyporus picipes, Stemonites sp., Collybia sp., Mycena sp., Omphalina sp., Pluteus sp., Tricholomopsis sp., and Xylaria sp.*

Most species along riverbanks are *Agaricus sp., Calvatia sp., Hygrocybe sp., Hymenoscyphus herbarum, Lepiota aspera, Lepiota sp., Coprinus disseminatus, Hebeloma sp., Lentinus sp., Marasmius rotula, Omphalotus sp., Panaeolus sp., Oudemansiella radicata, Pluteus sp., Panus rudis, Polyporus sp., Poria sp., and Galiella sp.*

The Slash-and-burn areas are dominated by *Auricularia sp., Corticium sp., Dacryopinax spathularia, Lenzites sp., Pycnoporus sanguineus, Hexagonia glaber, Ganoderma sp., Phellinus sp., Volvariella volvacea, Microporus affinis, Schizophyllum commune, Stemonites fusca, Daldinia concentrica, Xylaria allantodea, and Xylaria hypoxylon.*

The grassland is home of *Amanita sp., Coprinus niveus, Coprinis plicatilis, Lepiota cristata, Macrolepiota rhacodes, Enteloma serrulatum, Inocybe sp., Pluteus umbrosus, Mycena galericulata and Oudemansiella radicata.* (Bresadola and Sydow, 1914; Graff, 1913; Ricker 1906)

The present data suggest that the most number of species (36 species) of fungi is found in heavily vegetated areas where large trees, shrubs, and lianas abound. There were plenty of fallen branches, stumps and rotten trunks of wood. The presence of leaf litters favors the luxuriant growth of the fungi. It has an altitude ranging from 800-1000 meter above sea level (masl). The average temperature was 24^0C while relative humidity was 74%.

This was followed by the logging trails (30 species), the area is located on a rolling terrain consisting mostly of tall and big trees, shrubs and lianas. There were some patches of open areas wherein

Saccharum sp. grew. The leaf litters were so thick because of the trees present in the area. These areas had an altitude ranging from 650-800 masl. The average temperature was 25^0C while relative humidity was 75.20%. The soil pH ranged from 5.6 to 7.1 with an average of 6.9. This means that the soil in this area was slightly acidic. The growth of the plants were favorable, thus the number of plants including trees were abundant. This attributed as an abundant habitat in order for the fungi to grow.

The riverbanks had 16 species. The vegetations were composed of big and short trees, shrub and vines. Tree ferns and ground ferns were scattered on the area. There were some open areas, that is why the weeds and grasses grew as well. These areas had an altitude ranging from 450-650 masl. The average temperature was 24^0C while relative humidity was 76.1%. These areas were considered the coolest areas because of the riverine waters. The soil pH ranged from 6.5 to 7.3 with an average of 7.1. This value was considered neutral but growth of plant is still favorable, thus also favorable for the growth of fungi.

The Slash-and-burn areas had 15 species. These areas are located on a flat to rolling terrain consisting of small and medium trees, shrubs, bushes and vines. There were some patches of closed areas wherein medium size residual trees grew (Santos 1986). These areas had an altitude ranging from 250-450masl. The average temperature was 25^0C while relative humidity was 75.10%. The soil pH ranged from 5.5 to 7.0 with an average of 6.5. The growth of fungi and their hosts and habitat were abundant because of the favorable condition.

The grassland has the least number of fungal species (10 species). These areas are located on a flat to rolling terrain consisting of small and medium trees, shrubs, and bushes. There were areas wherein *Imperata sp.,Panicum sp., Brachiaria sp., Eleusine sp., Papalidium sp., Paspalum sp., and Triticum sp.,* grew. These areas had an altitude ranging from 50-250 masl. The average temperature was 25^0C, while relative humidity was 75.10%. The soil pH ranged from 5.5 to 7.0 with an average of 6.5. The growth of fungi is relatively low because some habitat like stump, rotten wood and branches, structural timbers were not present in these areas. Only soil inhabiting fungi grew (Hawksworth and James 1971).

Table 1. Initial checklist of macrofungi on Bazal-Baubo Watershed,Ma. Aurora, Aurora province, Central Luzon, Philippines.

(Tadiosa and Militante 2006; Tadiosa, Arsenio and Marasigan 2007; Teodoro 1937; Uyenco 1974; Wen and Sun 1999)

FAMILIES	HOST/ SUBSTRATUM	GROWTH HABIT
AGARICACEAE		
Agaricus sp.	soil, grassland	solitary
Lepiota aspera (Pers.) Quel.	soil, along riverbanks	solitary
Lepiota cristata (Bolt.) Kumm.	soil, grassland	solitary
Lepiota sp.	soil, along riverbanks	solitary to gregarious (2-3 in a group)
Macrolepiota rhacodes (Vittadini.) Singer	soil, thickets	gregarious
AMANITACEAE		
Amanita fulva (Schaeff.) Fr.	soil, along the trail	solitary to gregarious (2-3 in a group)
Amanita sp.	soil, grassland	solitary
AURICULARIACEAE		
Auricularia auricula (Hook.) Underw.	on rotten branch of kakawate	solitary to gregarious (2-4 in a group)
Auricularia delicata (Fr.) Henn.	on rotten stump of Ficus	solitary to gregarious (3-5 in a group)
Auricularia polytricha (Mont.) Sacc.	on bark of ipil-ipil	solitary to gregarious (2-3 in a group)
Auricularia sp.	on stump of rain tree	solitary to gregarious
Exidia sp.	on bark of narra	resupinate, jelly-like
BOLBITIACEAE		
Panaeolus sp.	soil, grassland	gregarious
BOLETACEAE		
Strobilomyces strobilaceus (Stop.) Berk.	soil, along the trail	solitary

Continuation of Table 1

CANTHARELLACEAE		
Cantharellus sp.	on rotten twig of banaba	gregarious
COPRINACEAE		
Coprinus atramentarius (Bull.) Fr.	soil, along the trail	solitary
Coprinus dessiminatus (Pers.) Gray	soil, along the riverbanks	gregarious
Coprinus niveus (Pers.) Fr.	soil, grassland	solitary to gregarious (2-3 in a group)
Coprinus plicatilis (Curt.) Fr.	soil, grassland	solitary
Coprinus sp.	soil, along the trail	solitary to gregarious (3-6 in a group)
CORIOLACEAE		
Hexagonia glaber (Beauv.) Ryvarden	on rotten branch of bayanti	solitary
Hexagonia tenuis (Hook.) Fr.	on branch of igyo	solitary to gregarious (2-3 in a group)
Lenzites sp.	on stump of mahogany	solitary to gregarious (2-3 in a group)
Trametes sp.	on rotten branch of anubing	gregarious
CORTICIACEAE		
Corticium sp.	on rotten branch of guava	resupinate
CORTINARIACEAE		
Cortinarius sp.	soil, along the trail	gregarious
DACRYMYCETACEAE		
Dacryopinax spathularia (Schwein.) Martin	on rotten stump of white lauan	solitary to gregarious (4-6 in a group)
ENTELOMATACEAE		
Enteloma serrulatum (Pers.) Hesl.	soil, grassland	solitary
Enteloma sp.	soil, along the trail	solitary

Continuation of Table 1

GANODERMATACEAE		
Amauroderma rogusom (Berk.) Torrend.	on rotten roots of Colona	solitary to gregarious (2-3 in a group)
Amauroderma sp.	on rotten roots of Nauclea	solitary
Ganoderma applanatum (Pers.) Pat.	on rotten stump of kakawate	gregarious
Ganoderma lobatum (Schwein.) Atk.	on branch of talisay-gubat	gregarious
Ganoderma lucidum (Leys.) Karst.	on rotten trunk of balitantan	gregarious
Ganoderma sp.	on stump of kalantas	gregarious
HELOTIACEAE		
Hymenoscyphus herbarum (Pers.) Dennis	on rotten branch of tree fern	solitary to gregarious
HYALOSCYPHACEAE		
Dasyscyphus apalus (Berk.& Broome) Dennis	plant debris, soil	solitary to gregarious
HYGROPHORACEAE		
Hygrocybe coccinea (Schaeff.) Kumm.	soil, plant debris	solitary
Hygrocybe miniata (Fr.) Kumm.	soil, along the trail	solitary
Hygrocybe sp.	rotten bamboo	gregarious
HYMENOCHAETACEAE		
Hymenochaete rubiginosa (Dicks.) Lev.	on rotten stump of molave	gregarious
Hymenochaete sp.	on branches of kakawate	solitary to gregarious (3-5 in a group)
Phellinus sp.	on rotten trunk of Anthocephalus	gregarious
HYMENOGASTRACEAE		
Hebeloma sp.	on plant debris	solitary to gregarious (3-4 in a group)

Continuation of Table 1

INOCYBACEAE		
Inocybe sp.	on forest litter, plant debris	solitary
LYCOPERDACEAE		
Calvatia sp.	soil, grassland	gregarious
Lycoperdon echinatum Pers.	soil, plant debris	solitary
Lycoperdon sp.	soil, plant debris	solitary to gregarious (3-5 in a group)
MARASMIACEAE		
Marasmius androsaceus (Linn.) Fr.	leaf litter	gregarious
Marasmius ramealis (Bull.) Fr.	rotten wood	gregarious
Marasmius rotula (Scop.) Fr.	rotten wood	solitary to gregarious (3-5 in a group)
Marasmius sp.	plant debris	solitary
Omphalotus sp.	plant debris	solitary to gregarious (3-5 in a group)
MERULIACEAE		
Cymatoderma africanum Boidin	on rotten branch of Syzygium	solitary
Podoscypha bolleana (Mont.) Boidin	on rotten trunk of Albizzia	gregarious
Podoscypha subaffinis (Berk.& Curt.) Pat.	on rotten twigs of Kleinhovia	solitary to scattered
PEZIZACEAE		
Peziza repanda Pers.	on rotten branch of Celtis	solitary to scattered
PHALLACEAE		
Aseroe rubra Labill.	soil, forest floor	solitary
PHYSALACRIACEAE		
Armillaria sp.	rotten wood	gregarious
Oudemansiella canarii (Jungh.) Hohn.	soil, along the trail	solitary
Oudemansiella radicata (Relh.) Singer	soil, grassland	solitary to gregarious (2-3 in a group)

Continuation of Table 1

PLUTEACEAE		
Pluteus umbrosus (Pers.) Kumm.	soil, plant debris	gregarious
Pluteus sp.	soil, along the trail	gregarious
Volvariella volvacea (Bull.) Singer	banana leaf, soil	solitary to gregarious (2-4 in a group)
POLYPORACEAE		
Daedalea sp.	on rotten stump of narra	solitary
Favolus sp.	on branches of Trema	solitary
Fomes fomentarius (Linn.) Kickx.	on rotten trunk of Dillenia	solitary to gregarious (2-3 in a group)
Fomes sp.	on twigs of unidentified tree	gregarious
Lentinus sp.	plant debris	solitary
Microporus affinis (Blume & T. Ness.) Kuntze	on rotten branches of Albizzia	gregarious
Microporus vernicipes (Berk.) Kuntze	on trunk of Macaranga	gregarious
Microporus xanthopus (Fr.) Kuntze	on rotten branches of Aglaia	solitary to gregarious (5-6 in a group)
Microporus sp.	on branch of Macaranga	solitary
Panus rudis Fr.	plant debris	solitary to gregarious (3-5 in a group)
Polyporus hirsutus Fr.	on rotten stump of lanutan	solitary to gregarious
Polyporus picipes Fr.	on rotten twig of Harpullia	solitary
Polyporus sp.	on branch of Adenanthera	gregarious
Poria sp.	on trunk of Wendlandia	resupinate
Pycnoporus sanguineus (Fr.) Murr.	on rotten trunk of Shorea	gregarious
PYRONEMATACEAE		
Aleuria aurantia (Pers.) Fuckel.	on rotten branch of unidentified tree	solitary to gregarious (2-3 in a group)
Octospora humosa (Fr.) Dennis	on rotten trunk of Diospyros	solitary to scattered

Continuation of Table 1

Otidea sp.	on rotten twigs of ipil-ipil	gregarious
Scuttelinia scutellata (Linn.) Lamb.	plant debris	solitary to scattered
RUSSULACEAE		
Lactarius sp.	soil, along the trail	solitary
SARCOSCYPHACEAE		
Cookenia sulcipes (Berk.) Kuntze	on rotten twig of Wrightia	solitary
Cookeina tricholoma (Mont.) Kuntze	on rotten branches of Adenanthera	solitary
Phillipsia domingensis Berk.	on rotten trunk of Lansium	solitary to gregarious
SARCOSOMATACEAE		
Galiella sp.	on rotten twigs of Buchanania	gregarious
SCHIZOPHYLLACEAE		
Schizophyllum commune Fr.	on branches of kakawate	gregarious
STEMONITACEAE		
Stemonites fusca Roth.	on trunk of Calophyllum	gregarious
Stemonites sp.	on trunk of Albizzia	gregarious
STEREACEAE		
Stereum sp.	on rotten stump of Swietenia	resupinate
STROPHARIACEAE		
Conocybe sp.	soil, along the trail	solitary to gregarious (2-3 in a group)
Pholiota sp.	soil, plant debris	solitary
TRICHOLOMATACEAE		
Clitocybe sp.	plant debris, soil	gregarious
Collybia sp.	soil, along the trail	solitary
Mycena galericulata (Scop.) Gray	soil, grassland	solitary to gregarious (3-5 in a group)

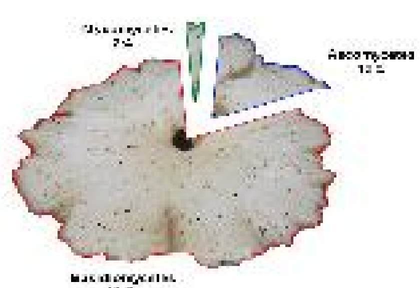
Continuation of Table 1

Mycena pura (Pers.) Kumm.	soil, along the trail	solitary to gregarious (2-3 in a group)
Mycena sp.	soil, along the trail	gregarious
Omphalina sp.	plant debris, soil	solitary to gregarious (3-5 in a group)
Tricholomopsis sp.	plant debries, soil	solitary
TUBERACEAE		
Tuber sp.	soil, forest litter	solitary
XYLARIACEAE		
Daldinia concentrica (Fr.) Ces.& de Not.	on trunk of Colona	solitary to gregarious (2-3 in a group)
Xylaria allantodea (Berk.) Fr.	on twigs of Canarium	solitary to gregarious (3-5 in a group)
Xylaria hypoxylon (Linn.) Grev.	on twigs of Ficus	gregarious
Xylaria sp.	on twigs of Antidesma	gregarious

Table 2. The total number of families, genera, and species belong to Class Ascomycetes, Basidiomycetes, and Myxomycetes.

	Number		
Class	Family	Genus	Species
Ascomycetes	7	12	91
Basidiomycetes	30	55	14
Myxomycetes	1	1	2
TOTAL	38	68	107

Composition of fungal species (n=107)



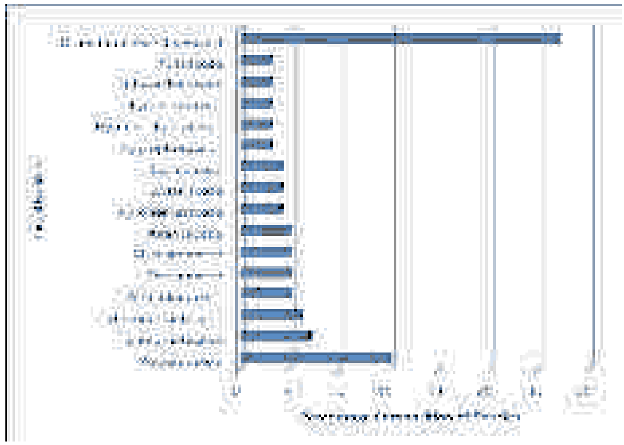


Fig. 2. Percentage composition of families in three classes with abundant species (n=107)

Factors affecting the growth of fungi

Climate, which has been a limiting factor in the diversity of fungi in the forest of Aurora, falls within the fourth type in accordance with the classification based on rainfalls. Rainfall is more or less evenly distributed throughout the year (Lancion 1995). The area is generally exposed to the southwest monsoon and gets a fair share of the rainfall brought about by the tropical cyclones occurring especially during the maximum rain period.

A combination of the climatic factors, such as rainfall, temperature, relative humidity, wind velocity, and direction are responsible for the existing mycological composition of the area. During the dry season, fungi have lesser species on exhibit considering that moisture on substratum is not sufficient for the growth of their fruiting bodies (Bernicchia 2001). The rainy season, on the other hand, is a prolific time for them due to the rather constant and often high moisture content of the substratum and the humidity of the air. Temperature variation within Aurora is very slight. The mountainous eastern areas, where the Watershed is confined, are little bit cooler than the western plain and coastal areas, an effect being caused by the elevation and vegetation. This explains the considerable richness of the fungal flora in the watershed as compared to the other areas.

Wind velocity with a speed of over 20 kph plays a role in the distribution of fungi although much higher if the typhoon occurs. A high velocity is usually brought about by the tropical cyclones and thunderstorms. Aurora is a typhoon-prone area. This wind force is sufficient enough to break the branches of trees and even make them fall down, thus providing more substrata for the wood-decay fungi.

CONCLUSIONS

Despite limited time and effort for collection, the result of this survey indicates that Bazal-Baubo watershed is species rich with nearly a half of the total species recorded in the Province of Aurora and around 10% of the entire Philippine mycoflora. The discovery of some species previously known only in the other region of the Philippines and the possible new species implies that Bazal-Baubo watershed, and perhaps other contiguous forests of Central Luzon with similar habitats, still support a large percentage of the country's fungal flora. Hence, it deserves continuous research to gain more information on Philippine biodiversity which is badly needed for conservation and other scientific endeavor.

RECOMMENDATIONS

Following study requirements of macrofungi in Bazal-Baubo watershed, it is recommended that a similar study be made on other watersheds and forests whether it is dipterocarp, beach forest, mangrove forest, mid-montane and pine forests.

Additional important taxonomic works will enable all mycologists to document altogether the macrofungi in the entire Philippine archipelago to come up with more substantial information along this area.

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Fig. 3. Map of Aurora Province showing Ma. Aurora's location

Fig. 4. Top view of Bazal-Baubo watershed (Google Earth)

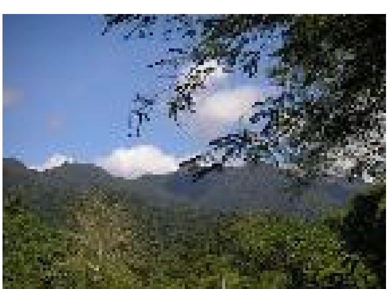


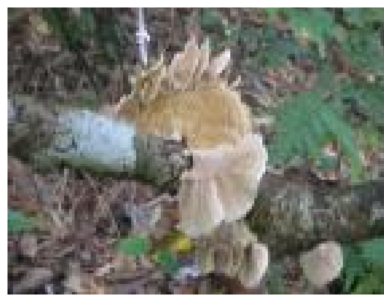
Fig. 5. Bazal-Baubo watershed in Aurora with highest elevation (1,040masl)

Fig. 6. Interior part of the Watershed.

A. *Aseroe rubra* Labill.
(anemone stinkhorn)

B. *Macrolepiota rhacodes*
(Vittadini) Singer, (shaggy parasol)

C. *Cookeina tricholoma* (Mont.) Kuntze.
(red cup/copitas)



D. *E. Hexagonia* sp.
(Possibly new species)

E. *Daldinia concentrica* (Fr.) Ces. & de Not.
(carbon balls)

Fig. 7. New records in Aurora Province

Fig. 8. Other species of fungi collected in the watershed

A. *Pycnoporus sanguineus* (Fr.) Murr.
B. *Lycoperdon echinatum* Pers.
C. *Cymatoderma africanum* Boidin
D. *Ganoderma lucidum* (Leys.) Karst.
E. *Microporus xanthopus* (Fr.) Kuntze.
F. *Auricularia auricula* (Hook.) Fr.
G. *Schizophyllum commune* Fr.
H. *Stemonites fusca* Roth.
I. *Volvariella volvacea* (Bull.) Singer
J. *Ganoderma applanatum* (Pers.) Pat.
K. *Hexagonia tenuis* (Hook.) Fr.
L. *Hygrocybe coccinea* (Schaeff.) Kumm.