

## A PRELIMINARY SURVEY OF MACROMYCETES IN BURMA

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### Abstract

Report lists 24 orders, 56 families, 117 genera, 176 identified and 65 half-identified species within 292 collections combined from both old and new sources of macrofungi. The most collected and represented families and their predominant genera enclosed within brackets are Clavicipitaceae (*Claviceps*) and Xylariaceae (*Xylaria*) among ascomycetes, and Agaricaceae (*Agaricus*, *Leucoagaricus*), Bolbitiaceae (*Agrocybe*, *Conocybe*), Coprinaceae (*Coprinus*, *Psathyrella*), Marasmiaceae (*Marasmius*), Tricholomataceae (*Termitomyces*) and Polyporaceae (*Lentinus*) among basidiomycetes. Old and recent collections are held mostly in Herb. K, IMI, BPI, and HCIO. Habitats and their characteristic mycofloras are described with notes on the possible roles of macrofungi as biodiversity and function indicators of the ecosystem.

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### Introduction

A mandatory en masse relocation moving away from well-established plant taxonomic resources to a remote bush countryside of Yezin in Central Burma on the foothills of the Shan Plateau (3000-6000 ft.) in the mid 1970's triggered a switch of study from familiar foliicolous microfungi to unfamiliar macrofungi, notably the fleshy ones. They added wonderful color and character to the landscape, and were hard to escape, and there for everyone's attention. Their ubiquity and local curiosity also sparked an interest in their taxonomic identity through an exploratory area survey. In addition, it provided an opportunity to update and integrate earlier records of Burman macrofungi from Butler & Bisby (1931) and Rhind & Seth (1945) since they had undergone name changes and family dispositions. The survey combined with the integration could also lead to developing a perspective on the biodiversity of macrofungi in the north-to-south geographic region of lowland Central Belt (Henderson *et al.* 1971) with Yezin just about at the middle. Consequently, specimen

collections were initiated of the larger fungi from the Yezin area during mushroom seasons of 1976-77. The foray yielded some 150 specimens of which about 120 turned out to be wholesome enough for morphological systematics analysis. The survey ended in 1978, which is now being published after a very long hiatus lest the results thereof would otherwise be lost.

Macrofungi herein mean and include fungi visible or attractive to the naked eye by size, habit, or colour or any combination thereof. As such the term 'macrofungi' is less restrictive and more inclusive of any 'mycetes' with their tissue large enough by themselves to be discernible to unaided eyes regardless of their stage, state, shape, site, or substrate. They are therefore an assemblage of eumycetes (macrofungi), myxomycetes, and plasmodiophoromycetes in this report, which is one of the contributions to the morphologic and taxonomic knowledge of the Burman fungi, focusing on identity, diversity and ecology of macrofungi in Central Belt and Yezin area.

A historical overview of the macromycetes in Burma is presented by way of an introduction. About the years 1864-1866, Wilhelm Sulpiz Kurz (1833-1878), Curator of the Herbarium at Royal Botanic Gardens, Calcutta, India (Banglapedia 2006) made the first collections of Burman fungi from the Pegu Yoma Range in Lower Burma. His collections contained a significant number of forest macrofungi. Mycologist Frederick Currey of England reported on the Kurz collections in 1876 (Butler & Bisby 1931). Imperial Mycologist Edwin J. Butler from India made further collections in 1908 (BPI 693022, 693351 & 52, HCIO 1037) and 1912 (BPI 694423, 694428, 696630).

Mycological work in Burma commenced in 1923 with resident mycologists viz. Rhind (1924), Seth (1945), and Su (1931) in the Department of Agriculture, carrying out subsequent collections and investigations until World War II broke out in 1942 (Rhind & Seth 1945). In the context of time, territory, political reality, and work identity of those days, it is presumed that most of the collections from Burma were deposited at Herb. HCIO and/or K, Burma then being a colony of British Empire. Specimens and records on file in Burma were lost during World War II. As of 1945, macrofungi reckoned from among the fungi on the country lists of Butler & Bisby (1931) and Rhind & Seth (1945) totaled 105 species in 70 genera in Ascomycota and Basidiomycota.

Amongst the then British colonies, Lister (1925) cited Ceylon, India, Malay, and Singapore, but not Burma specifically, for specimens of myxomycetes on deposit in the British Museum. Butler and Bisby (1931) stated that myxomycetes remained unexplored for British India to which Burma was annexed at that time until 1937. Mundkur (1938) reported some 84 species of mycetozoa or myxogastres from India none of which represented Burma. Myxomycetes were unknown of Burma until Reynolds and Alexopolous (1971) cultivated and published seven spp. of them from the moist chamber material. An actual field specimen of a *Stemonitis* species (LAM 220954) was collected in 1978 from a living floral garden herb. There was no subsequent encounter or conscious, untoward collection

effort made since then. Myxomycetes need further attention.

### Materials and Methods

Macrocharacters of basidiomes collected fresh from the field were described, including colours of spore prints taken overnight on a white blotting paper, and the basidiomes were then dehydrated in an air stream of a sterilizer at 50°C or treated in 10% formalin for subsequent examination. Basidiomata were drawn in pencil on white paper for records.

Microcharacters were examined under an Olympus microscope with a drawing tube attachment, especially for basidia, spore size, shape, and ornamentation. To ensure rehydration, a 5% KOH was used as a mounting medium. Twenty spores and ten basidia were selected at random, drawn, and measured.

Based almost exclusively on macroscopic features plus some limited, microscopic work, mushroom specimens were provisionally identified to genus in accordance with Largent (1986), Largent *et al.* (1977), Largent and Thiers (1977), Stuntz *et al.* (1977) and Watling (1973). Vouchers for the identified specimens were forwarded together with their notes to the Royal Botanic Gardens, Kew, England (Herb. K) for further, final, and authoritative determinations. *Claviceps* sp. identifications from anamorph *Sphacelia* on host plants follow Pezoutova (2004).

Colour terms for comparison are obtained from Munsell (1976), herbarium codes on-line from Index Herbariorum database, author abbreviations for plant names from IPNI database, and current accepted fungus and family names from Index Fungorum database and CBS Aphylophorales database (<http://www.cbs.knaw.nl/databases/index.htm>).

Specimen citations appear under each identified species with references to their habitat, location, and collection date. Morphological features provided are intended to assist in identification. Colours are described in full gamut for a species to accommodate variations among different specimens collected thereof. Location is Yezin unless otherwise

stated. With very few exceptions, new collections represent Yezin area. These collections are deposited in Herb. K through D.N. Pegler.

As to old records of Butler & Bisby (1931) and Rhind & Seth (1945), collection dates and herbarium accession numbers are not seen in literature, and hence, not available to report here. These old records are updated, if any, to carry current accepted names vis-à-vis old names retained for historical linkage, and listed individually, or together with new collections, without frequent references to their above two main sources to which a recourse should be made absent any citations. All taxa are classified mainly after Eriksson (2006) for ascomycetes, NZFungi (2006) for basidiomycetes and plasmodiophoromycetes, and Martin *et al.* (1983) for myxomycetes. They are enumerated in alphabetical and hierarchical order.

### Taxonomy

#### Species determined and/or recorded as present in Burma

Division **BASIDIOMYCOTA** R.H. Whittaker 1959

Class **BASIDIOMYCETES** G. Winter 1880 [1884]

Order **Agaricales** Clem. 1909

Family **Agaricaceae** Chevall. 1826

1. ***Agaricus tornocephalus*** Berk. & Broome 1871 (= *A. nymphidius* Berk. & Broome 1871) with white cap and fawn spore print, on grass, 24-vi-1977 {K [H 960/77 #38]}.

2. ***Agaricus*** spp. on gravelly soil near foot of an *Ocimum* sp., 25-x-1976 {K [H 519/77 #13]}; chicken droppings, 24-v-1977 {K [H 960/77 #22]}; on gravelly soil, 20-vi-1977 {K [H 1045/77 #54]}; at the foot of a banana plant, 11-vii-1977 {K [H 1045/77 #78]}; at the foot of a bamboo plant, 19-ix-1977 {K [H 1821/77 #119]}.

3. ***Chlorophyllum molybdites*** (G. Mey.) Masee 1898 (= *C. morganii* (Peck) Masee 1898) in grassland, 9-vii-1977 (R. Watling pers. comm. 28-iv-1978). Note: pileus broadly

convex to umbonate, buff, with honey to livid red scales; stipe annulate; spore print pale luteous to luteous.

4. ***Cystolepiota pseudogranulosa*** (Berk. & Broome) Pegler 1986 (= *Lepiota pseudogranulosa* (Berk. & Broome) Sacc. 1887) on grass, 23-vi-1977 {K [H 1045/77 #61]} Note: a small inedible mushroom - pileus bell shaped with powder cells, white; annulus not persistent; spores nonamyloid, 3.6-5.5 x 2.6-3.1 µm; spore print white.

5. ***Lepiota carphophylla*** (Berk. & Broome) Sacc. 1887 at the foot of a teak tree, 30-vi-1977 {K [H 1045/77 #62]}. Note: a mushroom bearing a white-ochreous cap with fawn-isabelline scales, volvate stem, and white spore print.

6. ***Lepiota micropholis*** (Berk. & Broome) Sacc. 1887 on mountainside, Pho-to-pin village east of Yezin, 30-x-1976 {K [H 519/77 #15]}.

7. ***Lepiota viriditincta*** (Berk. & Broome) Sacc. 1887 on mountainside, Pho-to-pin village east of Yezin, 30-x-1976 {K [H 519/77 #16]}.

8. ***Lepiota*** sp. (probably *Macrolepiota mastoidea* (Fr.) Singer 1951 = *Lepiota mastoidea* (Fr.) P. Kumm. 1871, edible in India) on the ground amongst grass (edible), Mandalay. Note: a small mushroom - pileus convex to planar, prominently umbonate, white, ochreous, with small fawn-isabelline scales, even at margin; lamellae white, free; stipe annulate, easily detachable; annulus fugacious when mature; spore print white (not metachromatic in cresyl blue, and without germ pore per Largent 1986).

9. ***Leucoagaricus meleagris*** (Sowerby) Singer 1952 (= *Leucocoprinus meleagris* (Sowerby) Locq. 1945) on damp soil, 20-vi-1977 {K [H 1045/77 #58]}; on gravelly soil, 3-vii-1977 {K [H 1045/77 #69]}; on gravelly soil in rozelle field, 17-x-1977 {K [H 1821/77 #7]}. Note: pileus mostly white to sulfur yellow, conic, prominently striate at the margin, ± small scales; stem annulate and bulbous at base; spore print pale straw to white.

10. **Leucoagaricus naucinus** (Fr.) Singer 1951 on gravelly soil of a rozelle field, 25-x-1976 {K [H 519/77 #7]}; on hog dung, 24-vi-1977 {K [H 960/77 #48]}. Note: pileus conic, hemispheric to convex, flat, fleshy, heavy, white, sulfur yellow, striate at margins, with minute scales; lamellae free, close; stipe annulate, easily detachable, bulbous at base; spore print white.

11. **Leucocoprinus cepistipes** (Sowerby) Pat. 1889 in charcoal dump, 18-x-1976 (D.N. Pegler pers. comm. 8-xi-1976 #3). Note: mushroom with volva-like, elongated swelling towards the base, a ring, and white spore print.

12. **Leucocoprinus zeylanicus** (Berk.) Boedijn 1940 on pebble ground, 19-x-1976 (D.N. Pegler pers. comm. 8-xi-1976 #4); beside a stump, Pho-to-pin village, east of Yezin, 30-x-1976 {K [H 519/77 #14]}. Note: pileus conic, umbonate, broadly convex to flat, sulfur yellow or white, with very thin flesh, tiny scales, striae, furrows or grooves at margin, and easily splits radially; lamellae free, white; stipe annulate, fibrillose, elongated to a bulbous base (volva), easily detachable; spore print pale straw, whitish to white; occurrences tropical to subtropical, ± temperate.

13. **Macrolepiota procera** (Scop.) Singer 1948 var. **procera** (= *Macrolepiota procera* (Scop.) Singer 1946) on sawdust in a rozelle field, 5-x-1976 (D.N. Pegler pers. comm. 8-xi-1976 #1). Note: a parasol mushroom - pileus oval, convex planar, brownish, with a dark central hump and brown scales; lamellae free, white to tan; stipe long, slender, annulate, volvate, hollow, 1.6 cm in diam., with scales and easily removable; spore print white (metachromatic in cresyl blue, and has a large germ pore).

14. **Podaxis pistillaris** (L.) Fr. 1829 (edible) on rich sandy soils, Madaya.

Family **Bolbitiaceae** Singer 1948, 1946

1. **Agrocybe broadwayi** (Murrill) Dennis 1953 on grass, 13-v-1977 {K [H 960/77 #20]}; Nyaung-ein village east of Yezin Campus, on grass, 26-v-1977 {K [H 960/77 #28]}; on grass, 20-vi-1977 {K [H 1045/77 #53]}; on grass, 24-vi-1977 {K [H 960/77

#31]}; on grass, 26-vi-1977 {K [H 960/77 #33]}. Note: pileus pale primose, buff or honey to ochreous; exumbonate; stipe squat; spore print dark brick to sepia or cinnamon to umber.

2. **Agrocybe pediades** (Fr.) Fayod 1889 (= *A. semiorbicularis* (Bull.) Fayod 1889) on gravelly soil near foot of an *Ocimum* sp., 27-vii-1976 {K [H 519/77 #10]}. Note: pileus exumbonate to planar, usually dry, pale yellow to honey, ochreous, buff, cinnamon, pale primose; stipe squat; spore print dark brick to sepia, cinnamon to umber.

3. **Bolbitius reticulatus** (Pers.) Ricken 1911 on rotten pseudostem of a fallen, banana plant, 8-ix-1977 {K [H 1821/77 #8]}. Note: pileus conic-convex to flat, fragile, thin, hazel, buff to vinaceous buff, viscid when moist, plicate-striate, or with a network of minute ridges; lamellae free, colored due to spores; stipe equal, fragile, hollow to stuffed; annulus absent; spore print fawn, fulvous to umber.

4. **Bolbitius vitellinus** (Pers.) Fr. 1838 on paddy straw, 3-vi-1977 {K [H 960/77 #41]}. Note: pileus hazel; spore print fulvous to umber.

5. **Conocybe pubescens** (Gillet) Kühner 1935 on manure in the field, 2-vi-1977 {K [H 960/77 #42]}. Note: pileus bell shaped, striate, fulvous with long stipe; spore print cinnamon.

6. **Conocybe semiglobata** Watling 1980 on grass, 2-vi-1977 {K[M]: 60065}; {K [H 960/77 #39]}. Note: pileus hoary and umber.

7. **Conocybe zeylanica** (Petch) Boedijn 1951 (= *Galera zeylanica* Petch 1917) on the ground, Mandalay.

8. **Conocybe** spp. on grass, 1-vi-1977 {K [H 960/77 #32]}; on gravelly soil, 20-vi-1977 {K [H 1045/77 #80]}; on gravelly soil, 8-ix-1977 {K [H 1821/77 #118]}.

9. **Copelandia cyanescens** (Berk & Broome) Singer 1951 (= *Panaeolus cyanescens* (Berk. & Broome) Sacc. 1887) on dung heaps, Mandalay (Rhind & Seth 1945); on cow dung, 2-vi-1977 {K [H 960/77 #43]}. Note: pileus

hemispheric to campanulate, fleshy and isabelline when young, turning whitish grey to dark and membranaceous with age; stipe long, slender, often rough with flakes or knots of tissue; spore print greenish black. It possesses psychoactive properties.

10. *Panaeolus albellus* Massee 1902 in field, 25-v-1977 {K [H 960/77 #23]}. Note: a white mushroom with black gills and black spore print.

11. *Panaeolus fimicola* (Pers.) Quél. 1872 on dung, 24-vi-1977 {K [H 960/77 #35]}. Note: pileus bell-shaped, conic-convex, hygrophanous, white or hazel, glabrous; lamellae mottled light and dark, black; stipe long, slender, cartilaginous; annulus often present when young; spore print mouse grey to purplish grey or black.

Family **Clavariaceae** Chevall. 1826 [as '*Clavariae*']

1. *Clavaria* spp. on bamboo sheath, 22-vii-1977 {K [H 1821/77 #130]}, near Poh-hto-pin village; on ground, 24-vii-1977 {K [H 1821/77 #131]}.

Family **Coprinaceae** Overeem & Weese 1924

1. *Coprinus atramentarius* (Bull.) Fr. 1838 on paddy straw, 2-vi-1977 {K [H 960/77 #40]}. Note: a mushroom with black gills and dark brown spore print.

2. *Coprinus plicatilis* (Curtis) Fr. 1838 on gravelly soil, 27-vii-1976 {K [H 519/77 #11]}; on grass, 2-vi-1977 {K [H 960/77 #37]}; on gravelly soil, 10-viii-1977 {K [H 1821/77 #125]} Note: specimen on grass displays purplish cap and dark mouse grey spore print whereas the one on gravelly soil wears a pale vinaceous buff, flat, striate cap, and leaves behind a vinaceous buff spore print.

3. *Coprinus radians* (Desm.) Fr. 1838 on gravelly soil, 15-v-1977 {K [H 960/77 #21]}. Note: a mushroom with striated cap, black gills and black spore print.

4. *Coprinus* spp. on paddy straw, 2-vi-1977 {K [H 960/77 #36]}; on gravelly soil, 31-vi-1977 {K [H 1045/77 #65]}; on dung and paddy straw heaps, Mandalay. Cf. *C.*

*fimbriatus* Berk. & Broome 1871 and *C. niveus* (Pers.) Fr. 1838. Note: grass could be contaminated by dung and urine from cattle grazing or working in the fields.

5. *Psathyrella discolor* (Berk.) Sacc. 1887 on a pile of chicken droppings underneath a banana plant, 1-viii-1976 {K [H 519/77 #12]}.

6. *Psathyrella* spp. on the ground, Mandalay; on rotten pseudostem of a fallen banana plant, 10-x-1976 {K [H 519/77 #8]}; on dung, Seinsar-bin Village near Yezin, 10-v-1977 {K [H 960/77 #46]}; on ground, 31-v-1977 {K [H 960/77 #30]}; on gravelly soil, 20-vi-1977 {K [H 1045/77 #55]}; on sandy soil, 25-vii-1977 (C. Bas pers. comm. 23-vii-1979); on soil under a plum tree, 30-vii-1977 (C. Bas pers. comm. 23-vii-1979); on log, 29-ix-1977 {K [H 1821/77 #126]}.

Family **Cortinariaceae** (Fayod) R. Heim ex Pouzar 1983 [nom. cons.]

1. *Gymnopilus chrysites* (Berk.) Singer 1962 on grass, 23-vi-1977 {K [H 1045/77 #60]}; on decaying bamboo, 25-vii-1977. Note: pileus convex to broadly convex, nearly plane in age, luteous, rust, with small fibrillose warts or scales; stipe luteous, slightly eccentric; spore print sienna, orange.

2. *Gymnopilus micromegas* (Berk.) Manjula 1983 (= *Naucoria micromegala* [sic] (Berk.) Sacc. 1887) on log, 15-viii-1976 {K [H 519/77 #19]}. Note: pileus convex, depressed, yellowish-orange brown; lamellae not marginate; stipe equal, without ring, bulbous near the base; spore print pale apricot.

3. *Gymnopilus* sp. on the ground, Mandalay (Rhind & Seth 1945).

Family **Lycoperdaceae** Chevall. 1826 [as '*Lycoperdoneae*']

1. *Bovista brasiliensis* (Fr.) De Toni 1888 on the ground, Toungoo.

2. *Bovista pusilla* (Batsch) Pers. 1801 (= *Lycoperdon pusillum* Batsch 1789), Mandalay, 14-x-1972 {K [H 1110/72 #5]}; in woodland, 10-vii-1977 (C. Bas pers. comm. 23-vii-1979); in elephant grass jungle, Kayosoo, Lower

Burma (Butler & Bisby 1931). Puffball - fruit-body luteous, globose.

3. **Lycoperdon perlatum** Pers. 1796 on grass, 10-vii-1977 (C. Bas pers. comm. 23-vii-1979).

4. **Lycoperdon** sp. on the ground, Madaya. Puffball - fruit-body rosy buff, globose, narrowed into a stipe, edible.

Family **Marasmiaceae** Roze ex Kühner 1980 [nom. rejic.]

1. **Anthracophyllum** sp. on decaying bamboo, 20-vii-1977 (C. Bas pers. comm. 23-vii-1979). Note: pileus semi-orbicular, fan-shaped, shallow dish, spongy, mouse grey, wavy at the margin, underside exposed upwards, astipitate; lamellae broadly spaced, with both long and short gills, not interveined; spore print white.

2. **Campanella** sp. on bark of a decaying tree, 19-vii-1977 (C. Bas pers. comm. 23-vii-1979). Note: pileus shallow dish, short broad bell, umber, with a network of veins (shallow ridges) on the underside, sessile; spore print white.

3. **Favolaschia** sp. on log, 10-vii-1977; woodland, 3-viii-1977 (R. Watling pers. comm. 28-iv-1978). Note: pileus fan-like with honeycomb on the underside, white, rubbery when fresh, sessile; spore print white.

4. **Gerronema holochlorum** (Berk. & Broome) Raitheh. 1977 on decaying bamboo, 6-vii-1977 {K [H 1045/77 #72]}. Note: pileus plano-convex to depressed, funnel-like, honey to hazel, leathery; lamellae running down the stem, yellowish white to pale yellow; stipe more or less equal, dry, yellowish white, pale greyish; spore print white.

5. **Marasmius atrorubens** Berk. 1842 on decaying wood, 6-vii-1977 {K [H 1045/77 #74]}. Note: a small mushroom with orange cap.

6. **Marasmius burmensis** Cooke 1882 on twigs, Moulmein.

7. **Marasmius sacchari** Wakker 1896 on exotic varieties of *Saccharum officinarum* L., Mandalay.

8. **Marasmius subrufotula** Singer 1964 on decaying bamboo, 6-vii-1977 {K [H 1045/77 #76]}. Note: a very small mushroom with a saffron cap and a black stalk.

9. **Marasmius** spp. in woodland, 19-vii-1977 (C. Bas pers. comm. 23-vii-1979); on decaying wood/fallen leaves, 19-vii-1977 (C. Bas pers. comm. 23-vii-1979); on bark of a standing tree, 19-vii-1977; on grassland, 30-vii-1977 (C. Bas pers. comm. 23-vii-1979). Note: mushrooms – very small to small (e.g. cap 2-3 mm in diam.), tough, marcescent, with pileipellis being hymeniform or composed of broom cells or diverticulate-nodulose elements. Pileus gibbous, umbonate, convex to broadly convex, buff to vinaceous buff at center, fulvous, luteous to ochreous, orange, saffron, distinctly and deeply striate or sulcate from margin to center; stipe wiry, corneous, umber, whitish to ochreous, **black**, shiny; spore print white. The *Marasmius* can usually be identified by their **black** stipes.

Family **Nidulariaceae** Dumort. 1822 [as '*Nidulariae*']

1. **Cyathus hookeri** Berk. 1854 on decaying leaf, 6-vii-1977 {K [H 1045/77 #75]}. A bird's nest fungus.

Family **Pleurotaceae** Kühner 1980 [nom. rejic.]

1. **Hohenbuehelia atrocaerulea** (Fr.) Singer 1951 on decaying bamboo, 6-vii-1977 {K [H 1045/77 #71]}; on decaying *Ocimum* sp., 6-vii-1977 {K [H 1045/77 #73]}. Note: a small mushroom with a lavender grey, vinaceous buff to smoke grey, rubbery, sessile pileus and white spore print. Anamorph *Nematoctonus* can trap nematodes to supplement nitrogen intake.

2. **Pleurotus** spp. on hardwood, 19-vii-1977; hardwood, 19-vii-1977 (R. Watling pers. comm. 28-iv-1978). Note: pileus semicircle to fan, convex to flat, or lung shaped, lobed or wavy at the margin, pale luteous, umber, fleshy; lamellae decurrent, entire at edge; veil absent; stipe excentric, short; smell butter or none; spore print white.

Family **Pluteaceae** Kotl. & Pouzar (1972) [nom. inval. Art. 32.1(b); see Art. 18.4]

1. **Amanita princeps** Corner & Bas 1962 at the foot of a *Dipterocarpus* sp. in jungle, east of Yezin Campus, 10-x-1976 (D.N. Pegler pers. comm. 8-xi-1976 #2); in woodland, 8-ix-1977 {K [H 1821/77 #2]}. Note: pileus white, flat, striate at the margins with white ring and cup-shaped volva on the stem and white spore print.

2. **Amanita virginea** Masee 1908 on grass, 24-vi-1977 {K [H 960/77 #34]}. Note: pileus white with white spore print.

3. **Amanita xanthella** Corner & Bas 1962 at the foot of a papaya plant, 30-vi-1977. {K [H 1045/77 #63]} Note: pileus ochreous and warty; spore print white.

4. **Amanita** sp. very close to **A. gemmata** (Fr.) Gillet 1874 in woodland, 30-vii-1977 (C. Bas pers. comm. 23-vii-1979). Note: pileus convex to flat, white, luteous, ochreous, warty; stipe annulate and saccate-volvate; spore print white; spores somewhat longer and considerably more slender than in *A. gemmata*.

5. **Amanitopsis** sp. on the ground, Kanbalu.

6. **Volvariella diplasia** (Berk. & Broome) Singer 1951 (= *Volvaria diplasia* (Berk. & Broome) Sacc. 1887) on rotten paddy straw heaps all over Burma (Edible).

7. **Volvariella gloiocephala** (DC) Boekhout & Enderle 1986 (= *V. speciosa* (Fr.) Singer 1951) at the foot of a banana plant, 4-vii-1977 {K [H 1045/77 #66]} Note: pileus white, glutinous, prominently striate near the margin; spore print sienna-rust.

8. **Volvariella hypopithys** (Fr.) M.M. Moser 1957 (= *V. pubescentipes* (Peck) Singer 1951) in grassland, 23-vi-1977 {K [H 1045/77 #59]}. Note: pileus conic to ovoid-convex, becoming flat with umbo, pale vinaceous, glutinous, soft, prominently striate near margin; lamellae close to crowded, broad, free, soft, cream to pinkish; stipe saccate-volvate around the swollen base or caligiate-volvate, white, partial veil absent; spore print cinnamon. **V.**

**volvacea** (Bull.) Singer 1951 is the straw mushroom cultivated in tropical Asia.

Family **Schizophyllaceae** Qué. 1888 [as 'Schizophylle']

1. **Schizophyllum commune** Fr.: Fr. 1815 on hardwood, 15-vii-1977 (R. Watling pers. comm. 28-iv-1978); on dry fruits of *Garcinia mangostana* L., Mudon and on dead wood throughout Burma (Rhind & Seth 1945). Note: pileus fan-like, white, tough, hairy, incurved at the margin; lamellae distinct, longitudinally split into two parts; stipe absent; spore print white.

Family **Strophariaceae** Singer & A.H. Sm. 1946

1. **Stropharia aureofulva** (Berk.) Sacc. 1887 on dung, 6-vii-1977 {K [H 1045/77 #70]} Note: pileus nearly conic to convex, infrequently slightly umbonate, pale luteous to luteous; lamellae not decurrent, not mottled, isabelline; stipe with annular zone; spore print brown vinaceous to fuscous black.

Family **Tricholomataceae** (Fayod) R. Heim ex Pouzar 1983 [nom. cons.]

1. **Clitocybe** spp., immature, on log, 13-vii-1977 {K [H 1045/77 #79]}; in woodland, 8-ix-1977 {K [H 1821/77 #127]} Note: pileus plano-convex to depressed at center, luteous to dark brick; lamellae pale amber; stipe without annulus, caespitose at base; spore print white to cream.

2.. **Collybia reineckeana** Henn. 1896 on log, 4-xi-1976 {K [H 519/77 #17]}; on ground underneath a *Ficus religiosa* L. tree, 21-x-1977 {K [H 1821/77 #129]}. Note: pileus convex, with thick, white flesh, white when fresh, tinged cinnamon when dry; lamellae decurrent, honey; stipe white, bulbous and caespitose at base; spore print white.

3. **Collybia** spp. (sterile) on firewood, 1-vii-1977 {K [H 1045/77 #67]}; on damp soil, 1-vii-1977 {K [H 1045/77 #68]}. Note: pileus convex to plano-convex, cinnamon; stipe cylindrical or flat.

4. **Crinipellis** sp. on decaying bamboo, 25-vii-1977 (C. Bas pers. comm. 23-vii-1979). Note:

pileus convex, white or buff, hairy with coral scales and hairy (appendiculate) margin; stipe corneous, buff, slender; spore print white.

5. **Lactocollybia epia** (Berk. & Broome) Pegler 1986 (= *Lactocollybia angiospermarum* Singer 1948) on log, 20-vi-1977 {K [H 1045/77 #57]}. Note: pileus convex to flat, upturned, pure white; stipe slender, white, without annulus; spore print white.

6. **Lepista hyalodes** (Berk. & Broome) Pegler 1986 (= *Entoloma crassipes* Petch 1924) in abandoned pigsty (? dung and urine residue), 31-vi-1977 {K [H 1045/77 #64]}. Note: pileus convex and umbonate, thick fleshed, pale luteous, irregularly spotted/frosted in appearance; stipe fleshy, fibrous, spotted; annulus none; spore print cinnamon.

7. **Mycena** spp. on log, 3-vi-1977 {K [H 960/77 #44]}; on bark of decaying wood, 3-viii-1977 (C. Bas pers. comm. 23-vii-1979). Note: tiny mushrooms - pileus obtuse-conic to campanulate, pointed at umbo, white, red, hazel, membranous, striated at margin to near the disc; lamellae white; stipe thin, stuffed to hollow, cartilaginous, without annulus; spore print white.

8. **Resupinatus** sp. on log, 19-vii-1977. Note: a very small mushroom - pileus fan to circular, cup-shaped, dark grey, brown, gelatinous, attached by the upper side, sessile; lamellae ventricose, free; spore print white.

9. **Termitomyces cartilagineus** (Berk.) R. Heim 1942 (Vernacular name = *hmo-oo* or *hmo-ohn-net*) in and around termite mounds, 60B Golden Valley, Rangoon, 21-x-1973 {K [H 1802/73 #1]}. Note: mushrooms single or in tufts - pileus umbonate, drab to pale ocher; stipe central, fibrous, spongy, white, swollen up to about 1 inch near the middle; spore print white; spores 5-6 x 5-7(-8)  $\mu$ m.

10. **Termitomyces eurrhizus** (Berk.) R. Heim 1942 (Vernacular = *toung-bho-hmo*), Pegu, 5-ix-1904 (Ind. Herb. 23384 - K) per Pegler & Vanhaecke (1994); = *Collybia albuminosa* (Berk.) sensu Petch 1913 non Petch 1912 on termite's nests, Htonbo (Rhind & Seth 1945); Bazaar at Mandalay, 21-x-1973 {K [H 1802/73 #2]} on damp, black soil, 20-x-

1976 (D.N. Pegler pers. comm. 8-xi-1976 #5); on damp, black soil, 18-x-1977 {K [H 1821/77 #5]}; Pyinmana, 20-x-1976 and 18-x-1977 (Pegler & Vanhaecke 1994); sold at bazaar; Rangoon, ?-x-1999 {K[M]: 64522}. Note: mushrooms - pileus flat, hazel to isabelline or pale tan to pale, dull reddish brown; lamellae buff; stipe >15 inches long, central, hollow, tubular, fibrillose, bulbous at the soil level with a long 'root'; spore print pale cinnamon.

11. **Termitomyces microcarpus** (Berk. & Broome) R. Heim 1941 (= *Entoloma microcarpon* (Berk. & Broome) Sacc. 1887) on termite nests, Htonbo (Rhind & Seth 1945).

12. **Termitomyces schimperi** (Pat.) R. Heim 1942 (Vernacular name = *toung-bho-hmo* or *Naga-hmo*) on termite hills, jungle east of Yezin Campus, 10-x-1976 (D.N. Pegler pers. comm. 8-xi-1976 #6). Note: stipe with both ring and volva; spore print pale cinnamon.

13. **Termitomyces** sp., very young and immature in termite hills, 10-vii-1977 {K [H 1045/77 #77]}. Note: pileus conic to flat, buff, hazel to isabelline; stipe annulate, tapering or bulbous at soil level with a long "root"; spore print fulvous-sienna, pale cinnamon. Cf. *Termitomyces eurrhizus*.

Order **Auriculariales** J. Schröt. 1887

Family **Auriculariaceae** Fr. 1838 [as 'Ordo *Auricularini*']

1. **Auricularia auricula-judae** (Bull.) Quél. 1886 (= *Hirneola auricula-judae* (Bull.) Berk. 1860) on dead wood and fallen branches, Kanbalu.

2. **Auricularia delicata** (Fr.) Henn. 1893 on decaying wood, 22-vii-1977 (B. Lowy pers. comm. 11-viii-1977).

3. **Auricularia fuscusuccinea** (Mont.) Henn. 1893 on decaying log, Pegu, {K[M]: 45356, ex herb. M.C. Cooke}; 16-vi-1977 (B. Lowy pers. comm. 11-viii-1977).

4. **Auricularia mesenterica** ?var. **pusio** (Berk.) Bres. 1916 on decaying wood, Mandalay.



5. *Hirneola nigra* var. *nigra* Fr. 1848 on logs, North Yoma.

Order **Boletales** E.-J. Gilbert 1931

Family **Boletaceae** Chevall. 1826

1. *Boletellus* sp. in woodland, 8-ix-1977 {K [H 1821/77 #128]} Note: a bolete – pileus convex to flat, ochreous; pores pale citrine; stipe long, slender, not bulbous, furrowed; spores ridged; spore print olive brown.

2. *Boletus* sp. on log, 15-vi-1976 {K [H 519/77 #18]}. Note: a bolete – pileus convex to plano-convex, dry; color variable; pores ochraceous with tubes colored likewise; stipe solid; spore print olive brown. Cf. *B. microsporus* Corner 1972.

Family **Sclerodermataceae** Corda (1842) [as 'Sclerodermaceae']

1. *Astraeus hygrometricus* (Pers.) Morgan 1889 (Vernacular: *In-Oo* = *Dipterocarpus* Ball) terrestrial and associated with *Dipterocarpus* trees, Mandalay Bazaar, 12-vi-1972 {K [H 1110/72]} (D. M. Dring pers. comm. 22-vi-1972).

2. *Astraeus hygrometricus* var. *koreanus* V.J. Staněk 1958 terrestrial and NOT associated with *Dipterocarpus* trees, Mandalay, 14-x-1972 {K [H 1110/72 #1]}. Note: spores larger, 10-12 µm in diam.

3. *Pisolithus ?tinctorius* (Pers.) Coker & Couch 1928 terrestrial and near/attached to the roots of trees, Mandalay, 12-vii-1972 {K [H 1110/72]} (D.M. Dring pers. comm. 20-vii-1972). Fruit-body with unpleasant smell and straddling stipe. Note: size smaller, and texture harder, than in *P. tinctorius*. Trees need to be identified for a possible mycorrhizal relationship.

Order **Cantharellales** Gäum. 1926

Family **Cantharellaceae** J. Schröt. 1888 [1889]

1. *Cantharellus* spp. on ground (Vernacular = *hmo-thin-gun* = monk's robe mushroom), Mogok, 22-ix-1973 (D.N. Pegler pers. comm. 28-i-1974); in woodland, 19-vii-1977 (R. Watling pers. comm. 28-iv-1978). Cf. *C.*

*cibarius* Fr. 1821. Note: a very small, edible mushroom, about 1" in size - pileus umbonate to vase-shaped, but not funnelliform, irregular with wavy, decurved margins, pale luteous to luteous, stipitate; lamellae reduced to ridges; smell strong pungent; spore print primose.

Family **Hydnaceae** Chevall. 1826

1. *Grandinia granulosa* (Pers.) Fr. 1838, Pellowa, Toukyeghat (Butler & Bisby 1931).

Order **Ceratobasidiales** Jülich 1981

Family **Ceratobasidiaceae** G.W. Martin 1948

1. *Thanatephorus cucumeris* (A.B. Frank) Donk 1956 (= *Corticium solani* (Prill. & Delacr.) Bourdot & Galzin 1911) on parts of many living vegetables and other plants (Butler & Bisby 1931).

Order **Dacrymycetales** Henn. 1898

Family **Dacrymycetaceae** J. Schröt. 1888 [1889] [as 'Dacrymycetini']

1. *Dacrymyces* sp. on log, Mandalay, 14-vii-1975 (B. Lowy pers. comm. 1975). Note: sporocarp slimy, subglobose to cushion-shaped, becoming lobed, convoluted, wrinkled to cerebriform, soft, gelatinous, orange to orange yellow; basidia tuning-fork; spore deposit pale yellow.

2. *Dacryopinax spathularia* (Schwein.) G.W. Martin 1948 (= *Guepinia spathularia* (Schwein.) Fr. 1828) on old logs, Mandalay and Arakan; on decaying bamboo, Mandalay, 12-x-1975 (LSUM Acc. #146200), 18-x-1975 (LSUM Acc. #146198); orange red in colour on decaying log, Pyinmana, 25-vi-1977 (B. Lowy pers. comm. 11-viii-1977). Note: sporocarp petal or fan shaped, orange red, short-stipitate, with jelly-like texture, and predominantly tropical.

Order **Hymenochaetales** Oberw. 1977

Family **Hymenochaetaceae** Imazeki & Toki 1954

1. *Hymenochaete adusta* (Lév.) Har. & Pat. 1903 (= *Stereum adustum* Lév. 1844) on wood, Southern Yoma.

2. **Inonotus splitgerberi** (Mont.) Ryvarden 1972 (= *Polystictus splitgerberi* (Mont.) Fr. 1851), Natoung Hills (6-7000 ft) (Butler & Bisby 1931).

3. **Phellinus gilvus** (Schwein.) Pat. 1900 (= *Fomes holosclerus* (Berk.) Cooke 1885) on dead wood, Pegu Yoma.

4. **Phellinus lamaensis** (Murrill) Pat. 1923 (= *Fomes lamaensis* (Murrill) Sacc. & Trotter 1912) on roots of *Broussonetia papyrifera* Vent. and *Hevea brasiliensis* Müll.Arg, Thaton.

5. **Phellinus noxius** (Corner) G. Cunn. 1965 as brown root disease of *Hevea brasiliensis* Müll.Arg.

6. **Phylloporia spathulata** (Hook.) Ryvarden 1991 (= *Polystictus cumingii* (Berk.) Fr. 1851) on trunks, Mergui (Butler & Bisby 1931).

Order **Phallales** E. Fisch. 1898

Family **Geastraceae** Corda 1842 [as 'Geastridae']

1. **Geastrum** sp. (= *Geaster* E. M. Fries. 1832) (edible) on the ground, Kanbalu.

Family **Phallaceae** Corda 1842 [as 'Phalloideae']

1. **Phallus impudicus** L. 1753 (= *Ithyphallus impudicus* (L.) E. Fisch. 1886) on the ground, Mandalay.

2. **Phallus indusiatus** Vent. 1798 (= *Dictyophora indusiata* (Vent.) Desv. 1809) on the ground in rubber estates, Moulmein.

3. **Phallus rubicundus** (Bosc) Fr. 1823 beneath lumber pile, 17-x-1977 {K [H 1821/77 #124]}. Note: a stink-horn with dark mouse grey pileus and pale-coral, spongy, pitted stem (8-15 cm long) with a white volva.

Order **Polyporales** Gäum. 1926

Family **Corticaceae** Herter 1910 [nom. cons.]

1. **Corticium salmonicolor** Berk. & Broome 1873 as pink disease on stem and trunk of rubber trees with anamorph **Necator decretus** (Butler 1918).

2. **Corticium** species on branches of *Aleurites montana* E.H. Wilson, HsumHsai; on decomposing paddy straw, Mandalay (Rhind & Seth 1945).

Family **Fomitopsidaceae** Jülich 1982

1. **Daedalea discolor** Fr. 1828 on the ground, Pegu Yoma.

2. **Daedalea flavida** Lév. 1844 (= *D. tenuis* Berk. 1842) on dead wood, Pegu Yoma.

3. **Daedalea zonata** Schwein 1822 on dead wood, Toungoo.

4. **Fomitopsis feei** (Fr.) Kreisel 1971 (= *Polystictus feei* (Fr.) Fr. 1851), Pegu Yoma (Butler & Bisby 1931).

5. **Fomitopsis palustris** (Berk. & M.A. Curtis) Teixeira 1992 (= *Polyporus palustris* Berk. & M.A. Curtis 1872) causing brown rot of sapwood and heartwood of spruce (*Picea morinda* Link) in Burma frontiers with India in Assam (Bagchee 1960).

6. **Fomitopsis pinicola** (Sw.) P. Karst. 1881 (= *Fomes marginatus* (Pers.) Gillet. 1878) on dead trees, Toungoo Hills.

7. **Fomitopsis rhodophaea** (Lév.) Imazeki 1943 (= *Polyporus rhodophaeus* Lév. 1844) on dead wood, Toungoo.

Family **Ganodermataceae** (Donk) Donk 1948

1. **Amauroderma schomburgkii** (Mont. & Berk.) Torrend 1920 (= *Fomes brunneopictus* (Berk.) Cooke 1885) on old wood, Arakan (Butler & Bisby 1931). Note: Predominantly tropical on dead wood.

2. **Ganoderma amboinense** (Lam.) Pat. 1887 on Toungoo Hills (>4000 ft) (Butler & Bisby 1931).

3. **Ganoderma applanatum** (Pers.) Pat. 1887 on tree trunks, Toungoo.

4. **Ganoderma lucidum** (Curtis) P. Karst. 1881 on trunks of *Areca catechu* Burm.f., Madaya, causing the stem-bleeding disease; on *Morus* sp., Maymyo.

5. **Ganoderma philippii** (Bres. & Henn. ex Sacc.) Bres. 1932 (= *Fomes pseudoferreus* Wakef. 1918) on roots of *Hevea brasiliensis* Müll.Arg, Sandoway and Mergui, 12-viii-1925 {K[M]: 33790, '22' ex IMI 47091}; Burma (Steyaert 1975); (= *G. pseudoferreum* (Wakef.) Overeem & B.A. Steinm. 1925) as red root disease of *Hevea brasiliensis* Müll.Arg.

6. **Ganoderma** sp. on log, 17-ix-1977 {K [H 1821/77 #123]}. Note: predominantly tropical, wound and decay fungus - pileus flat, bay-colored, very sticky; stipe sticky, sepia; pores pale primose.

#### Family Meripilaceae Jülich 1982

1. **Antrodia albida** (Fr.) Donk 1966 (= *Lenzites albida* (Fr.) Fr. 1838) on dead wood, Toungoo.

2. **Rigidoporus microporus** (Sw.) Overeem 1924 (= *R. lignosus* (Klotzsch) Imazeki 1952) as white root rot of old stumps of *Hevea brasiliensis* Müll.Arg.in Burma (Pegler & Waterston 1968).

#### Family Phanerochaetaceae Jülich 1982

1. **Erythricium salmonicolor** (Berk. & Broome) Burds. 1985 (= *C. salmonicolor* Berk. & Broome 1873) as pink disease fungus on stem, trunk and branches of *Hevea brasiliensis* Müll.Arg., Mergui and Thaton; on branches of *Cinchona* sp., Mergui (Rhind & Seth 1945); Burma (Mordue & Gibson 1976).

2. **Lloydella membranacea** (Bory ex Fr.) Bres. 1901, Timeokee (Butler & Bisby 1931).

#### Family Podoscyphaceae D.A. Reid 1965

1. **Podoscypha elegans** (G. Mey.) Pat. 1900 (= *Stereum. elegans* (G. Mey.) Fr. 1838) on wood, Lower Burma.

#### Family Polyporaceae Fr. ex Corda 1839 [as 'Polypore']

1. **Cerrena unicolor** (Bull.) Murrill 1903 (= *Daedalea unicolor* (Bull.) Fr. 1821) on stumps, Pegu.

2. **Earliella scabrosa** (Pers.) Gilb. & Ryvarden 1985 (= *Polystictus parishii* Berk. ex

Cooke 1886 = *Polystictus persoonii* (Mont.) Cooke 1886) on dead wood, Nakawa, Tonkyeghat.; on trunks, Moulmein. (Butler & Bisby 1931). Note: most common polypore in the tropics.

3. **Fomes peguanus** (Mont.) Cooke 1885 on trunks of *Nauclea* sp. (Butler & Bisby 1931).

4. **Fomes spadiceus** (Peck) Cooke 1885 on *Xylia dolabriformis* Benth. (Butler & Bisby 1931).

5. **Hexagonia similis** Berk. 1846 on dead wood of *Mangifera indica* L., Mandalay.

6. **Hexagonia tenuis** (Hook.) Fr. 1838 on branches and trunks of trees, Pellowa, Toukyeghat (Butler & Bisby 1931). Note: *H. tenuis* is pantropical and most common in the tropics.

7. **Lentinus connatus** Berk. 1842 (= *L. revelatus* Berk. 1847) on log, 20-v-1977 {K [H 960/77 #26]}; on log, 12-vi-1977 {K [H 960/77 #45]}; on log, 20-vi-1977 {K [H 1045/77 #51]}; in woodland (edible), 1-x-1977 {K [H 1821/77 #122]}; = *L. infundibuliformis* Berk. & Broome 1873) in Burma, ?-iii-1931 {K[M]: 57570}. Note: pileus funnel shaped or depressed, white to honey yellow, thick, leathery, scaly; lamellae white; spore print white.

8. **Lentinus omphalomorphus** (Bertero & Mont.) Mont. 1856, Pegu Yoma (Butler & Bisby 1931)..

9. **Lentinus polychrous** Lévl. 1844 on dead wood, Yoma Range.

10. **Lentinus sajor-caju** (Fr.) Fr. 1825 on log, 20-vi-1977 {K [H 1045/77 #52]}; in pine forest in Karen Area (Butler & Bisby 1931). Note: pileus depressed, white, leathery, smooth; stipe short, central; spore print white to buff.

11. **Lentinus squarrosulus** Mont. 1842 (= *L. curreyanus* Sacc. & Cub. 1887) (Vernacular name = *wah-yon-hmo* = bamboo stool mushroom) on dead wood, Lower Burma; in the vicinity/inside of a bamboo clump,

Mandalay, 21-x-1973 {K [H 1802/73 #3]}; on wood, 26-vii-1976 {K [H 519/77 #9]}; on log, 25-v-1977 {K [H 960/77 #24]}; on log, 26-v-1977 {K [H 960/77 #25]}; on ground, Nyaung-ein village east of Yezin Campus, 29-v-1977 {K [H 960/77 #29]}; on log, 24-vi-1977 {K [H 960/77 #49]}. Note: pileus funnel shaped, whitish-greyish, thin, leathery; stipe eccentric to lateral; lamellae with saw-tooth edges.

12. **Lentinus strigosus** (Schwein.) Fr. 1825 (= *L. capronatus* Fr. 1838) on dead wood, Myodwine (Rhind & Seth 1945); on log, 10-iv-1977 {K [H 960/77 #27]}; on log, 20-vi-1977 {K [H 1045/77 #56]}; on log, 21-vi-1977 {K [H 960/77 #47]}. Note: pileus fawn with short hairs; stipe short, eccentric; spore print buff to pale luteous.

13. **Lentinus tuber-regium** (Fr.) Fr. 1832 (= *L. descendens* Fr. 1837) on dead wood, Toungoo.

14. **Lentinus velutinus** Fr. 1830 on dead wood, Pegu Yoma.

15. **Lentinus** spp. on dead shoots of *Bambusa* sp., Mandalay (edible); on hardwood, 19-vii-1977 (C. Bas pers. comm. 23-vii-1979). Note: generally tropical to subtropical leathery-textured mushroom-like fruiting bodies - pileus depressed to funnel-like, white, pale luteous, fawn, honey, cinnamon, ochreous, leathery, tough with short hairs, scaly, coarse, or smooth, involute at margin; lamellae short, decurrent, white, saw-toothed at edge; stipe short (up to 2.5"), white, central to excentric; spore print white, white to buff to pale luteous; spores inamyloid, smooth.

16. **Lenzites repandus** (Pers.) Fr. 1838 on dead tree trunks, Toungoo.

17. **Microporus affinis** (Blume & T. Nees) Kuntze 1898 (= *Polystictus affinis* (Blume & T. Nees) Fr. 1851; = *P. flabelliformis* (Klotzsch) Fr. 1851) on dead wood, Yoma Range and Karen Area (Butler & Bisby 1931, Rhind & Seth 1945).

18. **Panus** spp. on decaying wood, 10-vii-1977 (C. Bas pers. comm. 23-vii-1979); on dead wood, Mandalay (edible).

19. **Polyporus arcularius** (Batsch) Fr. 1821 with fawn cap on log, 24-vi-1977 {K [H 960/77 #50]}. Note: it is a cosmopolitan polypore and a wood rotter.

20. **Polyporus rubidus** Berk. 1847 (= *Polystictus rubidus* (Berk.) Fr. 1851) (Butler & Bisby 1931).

21. **Polyporus rugulosus** Lév. 1844 (= *Polyporus bicolor* Jungh. 1838) on wood, Toungoo. Note: pileus convex to a shallow vase, fawn to brown, smooth or somewhat scaly, finely hairy at the margin; flesh thin, tough, woody; pores whitish; stipe usually central, equal, brown; spore print white.

22. **Trametes cingulata** Berk. 1854 on dead wood, Pegu Yoma.

23. **Trametes incerta** (Curr.) Cooke 1886 on wood; Pegu (Butler & Bisby 1931).

24. **Trametes modesta** (Kunze ex Fr) Ryvarden 1972 (= *Polystictus modestus* (Kunze ex Fr.) Fr. on dead wood, Yoma Range.

Family **Steccherinaceae** Parmasto 1968

1. **Flavodon flavus** (Klotzsch) Ryvarden 1973 (= *Irpex flavus* Klotzsch 1833) on old wood, Arakan (Butler & Bisby 1931).

2. **Irpex lacteus** (Fr.) Fr. 1828 (= *Irpex pallescens* Fr. 1838; *Polystictus cinerascens* (Schwein.) Cooke 1886) on old wood, Pegu Yoma.

Order **Russulales** Kreisel 1969

Family **Auriscalpiaceae** Maas Geest. 1963

1. **Lentinellus micheneri** (Berk. & M.A. Curtis) Pegler 1983 (= *L. omphalodes* (Fr.) P. Karst. 1879) on gravelly soil, 17-ix-1977 {K [H 1821/77 #120]} Note: pileus convex to cushion-like with a central depression, later broadly convex to plane, white turning vinaceous brown later, somewhat rubbery; lamellae serrate or jagged; stipe lateral, compressed or furrowed, concolorous with the pileus; spore print white; spores amyloid, finely spiny/verrucose.

Family **Bondarzewiaceae** Kotl. & Pouzar 1957

1. ***Amylosporus campbellii*** (Berk.) Ryvarden 1977 (= *Polyporus anthelminticus* Berk. 1866) at the base of bamboo stems (Vernacular name: *Wa-mo* = *Wah-hmo* = Bamboo Mushroom or *Chan-mo* = Yard Mushroom), Pegu (Butler & Bisby 1931). Note: also found on the earth in bamboo forest (meso to xerophytic forest), and administered as indigenous antihelmintic medicine.

Family **Peniophoraceae** Lotsy 1907 [nom. rejic.]

1. ***Peniophora violaceolivida*** (Sommerf.) Masee 1890 (= *Corticium violaceolividum* (Sommerf.) Fr. 1838), Pegu Yoma (Butler & Bisby 1931).

Family **Russulaceae** Lotsy 1907

1. ***Russula*** spp. in woodland, 19-vii-1977; on highly moist soil, 25-vii-1977 (R. Watling pers. comm. 28-iv-1978). Note: pileus broadly convex, shallowly umbilicate to flat, finally uplifted, brittle, red/coral or hazel at the center, vinaceous buff at the margin, with iron grey, small scales; lamellae attached, distinct, ventricose; stipe short, equal, whitish, chalky brittle, not annulate; spore print white.

Family **Stereaceae** Pilát 1930

1. ***Amylostereum laevigatum*** (Fr.) Boidin 1958 (= *Corticium laevigatum* (Fr.) Fr. 1838), Pegu Yoma Range (Butler & Bisby 1931).

2. ***Stereum lobatum*** (Kunze ex Fr.) Fr. 1838 on dead wood, Toungoo.

3. ***Xylobolus princeps*** (Jungh.) Boidin 1958 (= *Stereum princeps* (Jungh.) Lév. 1844) on dead wood, Toungoo Hills.

Order **Tremellales** Fr. 1821

Family **Exidiaceae** R.T. Moore 1978

1. ***Exidia*** species, unknown substrate, location, and date, Burma {K[M]: 45357}.

Family **Tremellaceae** Fr. 1821 [as '*Tremellini*']

1. ***Tremella*** species on dead wood, Mandalay

Division **BASIDIOMYCOTA**

Class **USTILAGINOMYCETES** Bauer, Oberwinkler & Vánky

Order **Exobasidiales** Hennings emend. Bauer & Oberwinkler

Family **Exobasidiaceae** Hennings

1. ***Exobasidium vexans*** Masee 1898 on leaves of *Camellia sinensis* Kuntze; Toungoo Hills (Rhind & Seth 1945).

Division **ASCOMYCOTA** R.H. Whittaker 1959

Class **DOTHIDEOMYCETES** sensu O.E. Erikss & Winka 1997

Order **Dothideales** Lindau 1897

Family **Dothideaceae** Chevall. 1826

1. ***Scirrhia seriata*** Syd., P. Syd. & E.J. Butler 1911 (= *Scirrhodothis seriata* (Syd., P. Syd. & E.J. Butler) Theiss. & Syd. 1915) on leaves of *Bambusa* sp., Moulmein, 07-i-1908, leg. E.J. Butler 1295 (Herb. S!) per Eriksson & Yue 1998; Bassein, 30-xi-1912, leg. E.J. Butler (BPI 642368).

Order **Patellariales** D. Hawksw. & O.E. Erikss. 1986

Family **Patellariaceae** Corda 1838

1. ***Rhytidhysterium rufulum*** (Spreng.) Speg. 1921 (= *Rhytidhysterion rufulum* (Spreng.) Speg., 1921; = *Tryblidiella rufula* (Spreng.) Sacc. 1883) on dead branches of *Citrus* sp. and *Psidium guajava* L., Bassein, Sagaing, and Mandalay.

Order **Pleosporales** Luttrell ex M.E. Barr (syn. *Melanommatales*)

Family **Massarinaceae** Munk 1956

1. ***Massarina usambarensis*** (Henn.) Höhn 1910 on the bark of *Citrus aurantium* L., Moulmein, E.J. Butler 07-i-1908 (BPI 623425).

Class **PEZIZOMYCETES** sensu O.E. Erikss. & Winka 1997

Order **Pezizales** C. Bessey 1907

Family **Pezizaceae** Dumort. 1829

1. **Peziza** sp. (vinaceous buff and discoid in shape) on living stem of a standing bamboo, 22-vii-1977 (B. Lowy pers. comm. 1977).

Family **Pyronemataceae** Corda 1842 [as 'Pyronemeae']

1. **Humaria masseana** Sacc. & D. Sacc., Burma (Butler & Bisby 1931).

2. **Neottiella rutilans** (Fr.) Dennis 1960 (= *Humaria rutilans* (Fr.) Sacc. 1889) on mud banks, Toungoo.

Family **Tuberaceae** Dumort. 1822

1. **Tuber indicum** Cooke & Masee 1892 (Earthball or Earthnut or Black Truffle) in the earth among roots of trees, Mandalay.

Class **SODARIOMYCETES** sensu O.E. Erikss. & Winka 1997

Order **Hypocreales** Lindau 1897

Family **Clavicipitaceae** (Lindau) Earle ex Rogerson 1971

1. **Balansia andropogonis** Syd. & P. Syd. 1911 on inflorescence of *Chrysopogon aciculatus* Trin. (= *Andropogon aciculatus* Retz.), Mandalay and Pa-an; Katha, 21-xii-1974 (LAM 220854 - *Ephelis* state).

2. **Claviceps bothriochloae** Tanda & Y. Muray. 1991 on *Bothriochloa pertusa* (Willd.) A. Camus. (Rhind & Seth 1945).

3. **Claviceps cynodontis** Langdon 1954 on *Cynodon dactylon* Pers. (Rhind & Seth 1945).

4. **Claviceps ?hirtella** Langdon 1942 or **Claviceps ?sulcata** Langdon 1954 on *Brachiaria reptans* (L.) C.A.Gardner & C.E.Hubb. and *B. setigera* (Retz.) C.E.Hubb. (Rhind & Seth 1945); North of Kyaukchaw village near Mandalay, 12-xi-1974 (IMI 190419b).

5. **Claviceps paspali** F. Stevens & J.G. Hall 1910 on *Paspalum scrobiculatum* L. (Rhind & Seth 1945).

6. **Claviceps pusilla** Ces. 1848 on *Dichanthium annulatum* Stapf and *D. caricosum* A. Camus. (Rhind & Seth 1945).

7. **Claviceps sorghi** B.G.P. Kulk., Seshadri & Hegde 1976 (Anamorph: *Sphacelia sorghi* McRae 1917) on *Sorghum dochna* (Forssk.) Snowden throughout Burma (Rhind & Seth 1945).

8. **Claviceps** species – sclerotia with conidial stage (edible) (Vernacular name: *Kaing-Oo* = Tall Grass Ball) on tall elephant grass (probably *Saccharum arundinaceum* Retz.; *S. spontaneum* L.; *Coelorachis striata* A.Camus) in the Irrawaddy Delta, 14-x-1972 and 12-ix-1978; Sclerotia (*Kaing-Oo*) are skewered and grilled over red-hot charcoal for snacks. Over-consumption causes turbidity or loss of lucid head.

9. **Hypocrella discoidea** (Berk & Broome) Sacc. 1878 (Anamorph *Aschersonia samoensis* Henn. 1896) on *Aleyrodes* on *Tectona grandis* L.f., Rangoon (Rhind & Seth 1945).

10. **Hypocrella mollii** Koord. 1905 on *Aleyrodes* on *Tectona grandis* L.f., Rangoon; on *Aleyrodes* on *Castanopsis* sp., Shan States (Rhind & Seth 1945).

11. **Hypocrella raciborskii** Zimm. 1901 (anamorph *Aschersonia*) on *Dalbergia ovata* Graham, Rangoon, 9-i-1975 (IMI 191507).

12. Anamorphic **Hypocrella** — *Aschersonia* sp. on *Helicteres elongata* Wall., North of Kyaukchaw village, near Mandalay, 12-xi-1974 (IMI 190423a); *A. badia* Pat. 1897 on insects on living leaves of bamboo, Pegu Yoma; *A. blumenaviensis* Henn. 1902 on *Streblus asper* Lour., Kalewa, 12-xii-1972 (IMI 172445); *A. cinnabarina* Henn. 1899 on leaves of *Tectona grandis* L.f., Lower Burma; *A. tamurai* Henn. 1902 on *Streblus asper* Lour., Rangoon, 25-i-1975 (IMI 191508) and also on *Rubiaceae* with *Meliola psychotriae* Earle 1905 (IMI 199739a), Kyaikhtiyo Range, 23-xi-1975 (IMI 199739b).

Family **Nectriaceae** Tul. & C. Tul. 1844

1. **Calonectria ukolayii** Thaug 1976 with its anamorph **Cylindrocarpon ukolayii** Thaug 1976 in colonies of *Meliola tabernaemontanicola* Hansf. & Thirum 1948 on

living leaves of *Vallis heyneii* Spreng., Rangoon, 23-i-1975 (IMI 191468b, holotypus).

2. *Nectria bolbophylli* Henn. 1905 on grains of *Oryza sativa* L., Hmawbi.

3. *Nectria diploa* Berk. & M.A.Curtis 1868 (Anamorph state: *Fusarium juruanum* Henn. 1904) on a scale insect on *Indigofera* sp., Bassein.

4. *Nectria diversispora* Petch 1906 on fruits of *Hevea brasiliensis* Müll.Arg., Mergui and Moulmein.

5. *Nectria eugeniae* Curr. 1876 on dead leaves of *Eugenia* species, Pegu Yomah Range.

6. *Nectria heterosperma* Kalchbr. & Cooke 1880 on branches of *Citrus aurantium* L., Sagaing.

7. *Nectria mauritiicola* (Henn.) Seifert & Samuels 1985 (= *Sphaerostilbe repens* Berk. & Broome 1873; anamorph state: *Rhizostibella hibisci* (Pat.) Seifert 1985) on roots of *Hevea brasiliensis* Müll.Arg., Moulmein.

8. *Nectria/Calonectria* sp. on *Cinnamomum* sp., Pyinmana, 16-vii-1977 (LAM 220541b) displaying immature, setose, globose, yellow, ostiolate, thin-walled, superficial perithecia on a subiculum.

Order **Microascales**, genera of uncertain positions

Family *Incertae sedis* [?Ceratocystidaceae Locq. 1972]

1. *Ceratocystis fimbriata* Ellis & Halst. 1890 as mouldy rot of tapping panel on *Hevea brasiliensis* Müll.Arg. in Tenasserim Division.

2. *Ceratocystis paradoxa* (Dade) C. Moreau 1952 (= *Ceratostomella paradoxa* Dade 1928; anamorph state, *Thielaviopsis paradoxa* (De Seynes) Höhn 1904) in fruits of *Ananas sativus* Schult.f., Maymyo; on fruits of *Areca catechu* L., Madaya; on trunks of *Borassus flabellifer* L., Mandalay.

Order **Xylariales** Nannf. 1932

Family **Diatrypaceae** Nitschke 1869

1. *Eutypa phaselina* (Mont.) Sacc. 1882 in evergreen forests, Nakawa, Toukyeghat River, Toungoo (Butler & Bisby 1931).

2. *Peroneutypella pusilla* Syd.{} on dead branches of *Citrus* sp., Sagaing (Rhind & Seth 1945).

Family **Xylariaceae** Tul. & C. Tul. 1861

1. *Daldinia concentrica* (Bolton) Ces. & De Not. 1863 on dead wood of *Aleurites montana* E.H. Wilson, Hsipaw.

2. *Hypoxyylon annulatum* (Schwein.) Mont 1850 (= *H. marginatum* (Schwein.) Berk. 1860) on wood, Nakawa, Toukyeghat River, Toungoo.

3. *Kretzschmaria zonata* (Lév.) P.M.D. Martin 1976 (= *Ustulina zonata* (Lév.) Sacc. 1882) on upper stem and trunk base of *Hevea brasiliensis* Müll.Arg., Moulmein and Tavoy.

4. *Rosellinia sublimbata* (Durieu & Mont.) Pass. 1879 on stems of *Thysanolaena procera* Mez, Kanbalataung.

5. *Xylaria grammica* (Mont.) Fr. 1851 var. *grammica* Mandalay, 14-x-1972 {K [H 1110/72 #4]}.

6. *Xylaria guianensis* (Mont.) Fr. 1851 in ever-green forests, Toukyeghat, Toungoo.

7. *Xylaria hypoxyylon* (L.) Grev. 1824 on old tree stumps, Arakan.

8. *Xylaria hypoxyylon* subsp. *adscendens* (Fr.) D. Hawksw.1973, Mandalay, 14-x-1972 {K [H 1110/72 #3]}.

9. *Xylaria nigripes* (Klotzsch) Cooke 1883 on earth, Yoma and on termites nests, Mandalay.

Class *Incertae sedis* [Ascomycetes]

Order and Family *Incertae sedis*

1. *Cerebella andropogonis* Ces. 1851 on *Sphacelia* sp. (IMI 190419b) on *Brachiaria reptans* (L.) C.A.Gardner & C.E.Hubb., North of

Kyaukchaw village, near Mandalay, 12-xi-1974 (IMI 190419a).

2. ***Cerebella andropogonis-contorti***

Subraman. 1921 on ovaries of *Heteropogon contortus* (L.) Roem. & Schult. (= *Andropogon contortus* L.), Maymyo (Rhind & Seth 1945).

3. ***Cerebella burmanensis*** Subraman. 1921. on ovaries of *Brachiaria setigera* (Retz.) C.E.Hubb. (= *Panicum setigerum* Retz.), Mandalay (Rhind & Seth 1945).

4. ***Cerebella cynodontis*** Syd. & P. Syd. 1912 on ovaries of *Cynodon dactylon* Pers. and *Brachiaria reptans*, Mandalay (Rhind & Seth 1945).

5. ***Cerebella inquinans*** (Berk. & Broome) Sacc. 1891 on ovaries of *Paspalum scrobiculatum* L., Bassein and Hmawbi (Rhind & Seth 1945).

6. ***Cerebella volkensis*** (Henn.) Mundk. 1938 on ovaries of *Sorghum dochna* (Forssk.) Snowden throughout Burma (Rhind & Seth 1945). Note: all ***Cerebella*** spp. grow upon forms of *Sphacelia* on these hosts.

Division GYMNOMYCOTA

Class **MYXOMYCETES** Link 1833

Subclass **Myxogastromycetidae** Martin 1961

Order **Physarales** Macbride 1922

Family **Didymiaceae** Rost. 1873

1. ***Diderma hemisphaericum*** (Bull.) Hornem. 1829.

2. ***Didymium iridis*** (Ditmar) Fr. 1829.

Family **Physaraceae** Rost. 1873

1. ***Physarum cinereum*** (Batsch) Pers. 1794.

2. ***Physarum globuliferum*** (Bull.) Pers. 1801.

3. ***Physarum melleum*** (Berk. & Broome) Masee 1892.

Order **Trichiales** Macbride 1922

Family **Trichiaceae** Rost. 1873

1. ***Arcyria cinerea*** (Bull.) Pers. 1801

2. ***Hemitrichia intorta*** (Lister) Lister 1894 on dead wood, Rangoon, summer 1967 (BPI 838690); undetermined substrate, Rangoon, 00-iii-1968 (BPI 838689)

Subclass **Stemonitomycetidae** Ross 1973

Order **Stemonitales** Macbride 1922

Family **Stemonitaceae** Rost. 1873

1. ***Stemonitis ?herbatica*** Peck 1874 on leaves of a living garden flower herb (Vernacular name: *Kyauk-sein-pan*), Namtu, N.S.S., 14-ix-1978 (LAM 220954). Cf. ***Comatricha*** Preuss 1851.

Note: all myxomycetes listed above except *Stemonitis* were all cultivated from bark of living trees in Dalhouse Park (= *Bandoola* Park) and Royal Lake (= *Kandawgyi*) of Rangoon (Reynolds & Alexopolous 1971).

Division **PLASMODIOPHOROMYCOTA** R.H. Whittaker 1969

Class **PLASMODIOPHOROMYCETES** Engl. 1903

Order **Plasmodiophorales** F. Stevens 1919

Family **Plasmodiophoraceae** Zopf ex Berl. 1888 [as 'Plasmodiophoreae']

1. ***Spongospora subterranea f.sp. subterranea*** J.A. Toml. 1892 (= *Spongospora subterranea* (Wallr.) Lagerh. 1892) on tubers of *Solanum tuberosum* L., Hsipaw (Rhind & Seth 1945).

## Results

Tables 1-3 summarize all data and results to show assessments on biodiversity, ecology, and distribution.

## Discussion

Tables 1 and 2 together manifest a combined total of 24 orders, 56 families, 117 genera, 176 identified and 65 unidentified taxa from 292 collections representing both old and new sources. They also reveal two ascomycetes families – Clavicipitaceae (*Claviceps*) and Xylariaceae (*Xylaria*), and six basidiomycetes families – Agaricaceae (*Agaricus*, *Leucoagaricus*), Bolbitiaceae (*Agrocybe*, *Conocybe*), Coprinaceae (*Coprinus*, *Psathyrella*), Marasmiaceae (*Marasmius*),



Tricholomataceae (*Termitomyces*) and Polyporaceae (*Lentinus*) as the most frequently encountered or collected families. In other words, they too denote the genera enclosed within the brackets being more likely to be present than other genera in any

collection of that family. The larger fungi collections from the Yezin area yielded new records of 9 families, 34 genera, and 97 species, thereby enriching the inventory to 56 families, 115 genera, and 236 (determined and indeterminate) species.

**Table 1.** Hierarchical distributions, collection totals and prevalence frequencies of fleshy macrofungi.

Order	Family	No. of genera	Species X + Y = Z	Family total	Most frequent genus	Frq No.	Frq. %
<i>Basidiomycetes</i>							
Agaricales	Agaricaceae	8	12 + 6 = 18	22	<i>Agaricus</i>	6	6/22=27
					<i>Leucoagaricus</i>	5	5/22=23
	Bolbitiaceae	5	10 + 3 = 13	19	<i>Agrocybe</i>	6	6/19=32
					<i>Conocybe</i>	7	5/19=38
	Clavariaceae	1	0 + 2 = 2	2	<i>Clavaria</i>		
	Coprinaceae	2	4 + 11=15	17	<i>Coprinus</i>	8	8/17=47
					<i>Psathyrella</i>	9	9/17=53
	Cortinariaceae	1	2 + 1 = 3	4	<i>Gymnopilus</i>		
	Lycoperdaceae	2	3 + 1 = 4	6	<i>Bovista</i>	4	4/06=67
	Marasmiaceae	5	5 + 8 = 13	13	<i>Marasmius</i>	8	8/13=62
	Nidulariaceae	1	1 + 0 = 1	1	<i>Cyathus</i>		
	Pleurotaceae	2	1 + 2 = 3	4			
	Pluteaceae	3	6 + 2 = 8	9	<i>Amanita</i>	5	5/09=56
	Schizophyllaceae	1	1 + 0 = 1	2	<i>Schizophyllum</i>		
	Strophariaceae	1	1 + 0 = 1	1	<i>Stropharia</i>		
Tricholomataceae	8	7 + 9 = 16	24	<i>Collybia</i>	4	4/24=17	
				<i>Termitomyces</i>	12	12/24=50	
				<i>Auricularia</i>	5	5/06=83	
Auriculariales	Auriculariaceae	2	5 + 0 = 5	6			
Boletales	Boletaceae	2	0 + 2 = 2	2			
	Sclerodermataceae	2	3 + 0 = 3	3			
Cantharellales	Cantharellaceae	1	0 + 2 = 2	2	<i>Cantharellus</i>		
	Hydnaceae	1	1 + 0 = 1	1	<i>Grandinia</i>		
Ceratobasidiales	Ceratobasidiaceae	1	1 + 0 = 1	1	<i>Thanatephorus</i>		
Dacrymycetales	Dacrymycetaceae	2	1 + 1 = 2	5	<i>Dacryopinax</i>	5	5/06=83
Hymenochaetales	Hymenochaetaceae	4	6 + 0 = 6	6	<i>Phellinus</i>	3	3/06=50
Phallales	Geastraceae	1	0 + 1 = 1	1	<i>Geastrum</i>		
	Phallaceae	1	3 + 0 = 3	3	<i>Phallus</i>		
Polyporales	Corticaceae	1	1 + 1 = 2	2	<i>Corticium</i>		
	Fomitopsidaceae	2	7 + 0 = 7	7	<i>Fomitopsis</i>	4	4/07=57
	Ganodermataceae	2	5 + 1 = 6	8	<i>Ganoderma</i>	7	7/08=88
	Meripilaceae	2	2 + 0 = 2	2			
	Phanerochaetaceae	2	2 + 0 = 2	3	<i>Erythricium</i>	2	
	Podoscyphaceae	1	1 + 0 = 1	1	<i>Podoscypha</i>		
	Polyporaceae	10	22 + 3 = 25	39	<i>Lentinus</i>	24	24/39=62
	Steccherinaceae	2	2 + 0 = 2	2			
Russulales	Auriscalpiaceae	1	1 + 0 = 1	1	<i>Lentinellus</i>		
	Bondarzewiaceae	1	1 + 0 = 1	1	<i>Amylosporus</i>		
	Peniophoraceae	1	1 + 0 = 1	1	<i>Peniophora</i>		
	Russulaceae	1	0 + 2 = 2	2	<i>Russula</i>		
	Stereaceae	3	3 + 0 = 3	3			
Tremellales	Exidiaceae	1	0 + 1 = 1	1	<i>Exidia</i>		
	Tremellaceae	1	0 + 1 = 1	1	<i>Tremella</i>		
Total	11	38	88	121+60=181	228		

Legend: X = identified sp.; Y = half-identified sp.; Z = sp. total; Frq. = frequency

**Table 2.** Hierarchical distributions, collection totals and prevalence frequencies of non-fleshy macrofungi.

Order	Family	No. of genera	Species X + Y = Z	Family total	Most frequent genus	Frq. %
<i>Ustilaginomycetes</i>						
Exobasidiales	Exobasidiaceae	1	1 + 0 = 1	1	<i>Exobasidium</i>	
<i>Dothideomycetes</i>						
Dothideales	Dothideaceae	1	1 + 0 = 1	2	<i>Scirrhia</i>	
Patellariales	Patellariaceae	1	1 + 0 = 1	1	<i>Rhytidhysterium</i>	
Pleosporales	Massarinaceae	1	1 + 0 = 1	1	<i>Massarina</i>	
<i>Pezizomycetes</i>						
Pezizales	Pezizaceae	1	0 + 1 = 1	1	<i>Peziza</i>	
	Pyronemataceae	2	2 + 0 = 2	2		
	Tuberaceae	1	1 + 0 = 1	1	<i>Tuber</i>	
<i>Sodariomycetes</i>						
Hypocreales	Clavicipitaceae	3	14 + 2 = 16	19	<i>Claviceps</i>	8/19
	Nectriaceae	2	7 + 1 = 8	8	<i>Nectria</i>	
Microascales	<i>Incertae sedis</i>	1	2 + 0 = 2	2	<i>Ceratocystis</i>	
Xylariales	Diatrypaceae	2	2 + 0 = 2	2		
	Xylariaceae	5	9 + 0 = 9	9	<i>Xylaria</i>	5/9
Class <i>Incertae sedis</i>						
Incertae sedis	Incertae sedis	1	6 + 0 = 6	6	<i>Cerebella</i>	
<i>Myxomycetes</i>						
Physarales	Didymiaceae	2	2 + 0 = 2	2		
	Physaraceae	1	3 + 0 = 3	3	<i>Physarum</i>	
Trichiales	Trichiaceae	2	2 + 0 = 2	2		
Stemonitales	Stemonitaceae	1	0 + 1 = 1	1	<i>Stemonitis</i>	
<i>Plasmodiophoromycetes</i>						
Plasmodiophorales	Plasmodiophoraceae	1	1 + 0 = 1	1	<i>Spongospora</i>	
Total	13 18	29	55 + 5 = 60	64		

Legend: X = identified sp.; Y = half-identified sp.; Z = sp. total; Frq. = frequency.

Macrofungi, though basically terrestrial, occupy a wide range of habitats as presented in Table 3. Some prefer forest trees to open fields while others stick to special niche, and still many more choose to live or cross the line in between two extremes. They function for nutrition as woodland rotters and recyclers, grassland colonizers and decomposers, ground inhabitants and dung dwellers, ectomycorrhizas and food suppliers, and so on in the ecosystem. Composts and dung decompose to create a warm, moist, nitrogen-rich environment whereas gravelly soils with buried wood under ground offer dry, airy, nitrogen-poor alternative for the fungi to exploit. These

interactions and relationships produce characteristic mycofloras typical of the habitats. For illustrations, genera typical of nutritionally poor habitats are *Agrocybe*, *Bovista*, *Clitocybe*, *Galera*, *Lycoperdon*, *Marasmius*, *Mycena* and *Podaxis*, and those on rich sites are *Agaricus*, *Bolbitius*, *Conocybe*, *Panaeolus*, *Stropharia*, and *Volvariella*. Taxa with adaptive capacity turn cosmopolitan, e.g., *Coprinus*. *Marasmius*. *Astraeus* is associated with *Dipterocarpus* trees. These sensitive, saprobic macrofungi and putative ectomycorrhizas can thus serve as both biodiversity and habitat indicators.

**Table 3.** Habitat preferences, communities, demographics, diversities and distributions of macrofungi in Burma.

Habitats	Genera of Macrofungi
FARMLAND:	<i>Agaricus, Agrocybe, Amanita, Bolbitius, Bovista, Chlorophyllum, Collybia, Conocybe, Coprinus, Corticium, Cystolepiota, Gymnopilus, Hohenbuehelia, Lentinellus, Lepiota, Leucoagaricus, Leucocoprinus, Lycoperdon, Marasmius, Podaxis, Psathyrella, Russula, Termitomyces, Volvariella.</i>
1. Animals, Banana, Papaya	
2. Grass, <i>Ocimum</i> sp., Rozelle	
3. Gravelly, Dry-Moist Soil	
4. Paddy Straw Heap/Compost	<i>Bolbitius, Corprinus, Corticium, Volvariella.</i>
5. Over-ground/Mud Bank	<i>Amanitopsis, Bovista, Clavaria, Collybia, Conocybe, Daedalea, Geaster, Gymnopilus, Lentinus, Lycoperdon, Neottiella, Phallus, Podaxis, Psathyrella, Xylaria.</i>
6. Under-ground	<i>Tuber.</i>
7. <i>Poaceae</i>	<i>Balansia, Cerebella, Claviceps</i> (Anamorph: <i>Sphacelia</i> ).
8. Plantation Crops	<i>Ceratocystis, Erythricium, Exobasidium, Nectria</i> (Anamorph: <i>Rhizostibella</i> ).
9. Scale Insects	<i>Hypocrella</i> (Anamorph: <i>Aschersonia</i> ), <i>Nectria</i> (Anamorph: <i>Fusarium</i> ).
10. Bamboo (Decaying)	<i>Anthracocephillum, Clavaria, Crinipellis, Dacryopinax, Gerronema, Gymnopilus, Hohenbuehelia, Lentinus, Marasmius.</i>
11. Bamboo (Living): on/near	<i>Peziza, Scirrha</i> (on bamboo); <i>Agaricus, Amyloporus</i> (near bamboo stool).
12. Saw Dust	<i>Macrolepiota.</i>
13. Charcoal Dump	<i>Leucocoprinus</i>
14. Dropping or Dung	<i>Agaricus, Conocybe, Copelandia, Coprinus, Lepista, Leucoagaricus, Panaeolus, Psathyrella, Stropharia.</i>
15. Ectomycorrhizas (suspect)	<i>Amanita, Astraeus, Pisolithus, Thanatephorus, Tuber.</i>
16. Termites	<i>Termitomyces.</i>
17. Termite Hills/Mounds	<i>Termitomyces, Xylaria.</i>
WOODLAND (Xerophytes):	
1. Mixed Forests	<i>Amanita, Boletellus, Bovista, Cantharellus, Clitocybe, Favolaschia, Lentinus, Lepiota, Marasmius.</i>
2. Foothill jungles	
3. Leaf/Twig/Chip Litters	<i>Anthracocephillum, Bolbitius, Clavaria, Cyathus, Hohenbuehelia, Marasmius, Psathyrella.</i>
FORESTLAND (Pegu Yoma) (Mesophytes to hydrophytes)	
1. Barks	<i>Campanella, Marasmius, Massarina, Mycena, Peniophora.</i>
2. Wood (Dead or Decay) Branches, Butts, Logs, Roots, Stumps, and Trunks	<i>Amauroderma, Amylostereum, Antrodia, Auricularia, Boletus, Cerrera, Clitocybe, Collybia, Corticium, Dacrymyces, Dacryopinax, Daedalea, Daldinia, Earliella, Exidia, Favolaschia, Flavodon, Fomes, Fomitopsis, Ganoderma, Grandinia, Gymnopilus, Hexagonia, Hirneola, Hymenochaete, Hypoxylon, Inonotus, Irpex, Kretzschmaria, Lactocollybia, Lentinus, Lenzites, Lloydella, Microporus, Mycena, Panus, Phellinus, Phylloporia, Pleurotus, Podoscypa, Polyporus, Psathyrella, Resupinatus, Rhytidhysterium, Rigidoporus, Rosellinia, Schizophyllum, Stereum, Trametes, Tremella, Xylaria, Xylobolus.</i>

South-east Asian rain forest provides scope, support, and substrate for a phenomenal biodiversity of macromycetes as, for instance, *Mycena* and allied genera (Boonpratuang *et al.* 2004). Many macromycetes are common and paleotropical throughout Southeast Asia (Richards 1952) despite environmental variables and ecological processes. Examples of such fungi include, but are not limited to, several common spp. in *Amanita, Arcyria, Astraeus, Copelandia, Daldinia, Earliella, Ganoderma, Hexagonia, Lentinus, Microporus, Panaeolus, Phellinus, Physarum, Pisolithus, Schizophyllum, Termitomyces*, etc. amongst others listed hereinabove (Allen 2005,

Anonymous 2005, Chalermpongse & Ramanwong 2005, Corner & Bas 1962, Pegler & Vanhaecke 1994, Reynolds & Alexopoulos 1971). The same is true of grass endophytes *Balansia, Cerebella*, and *Claviceps* spp. and entomopathogenic and/or mildly phytopathogenic *Hypocrella* and *Nectria* spp. (Farr *et al.* 2005, Lutthisungneon & Hywel-Jones 2002). Mycofloristic ties therefore exist in the region.

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