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CHECK LIST OF BASIDIOMYCETES (APHYLLO. AND PHRAGMO.) OF KAGHAN VALLEY-11

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Abstract

The present list of Basidiomycetes: orders: Tremellales, Dacrymycetales and Aphyllophorales (toad stools) of Kaghan valley includes 110 species belonging to 57 genera. Taxonomically they were treated under 3 orders after Ahmad, 1972. *Auricularia* and *Cantharellus* genera were edible while the other hard toad–stools like *Ganoderma* and *Polyporus* reported as medicinal. These were collected mostly from Sharhan, Kamal ban, Shogran, Naran and Lalazar locallities ranging from 5000 feet to 9000 feet. More over the forest become scanty in alpine (upper most) region, however at Babusar top (13684 feet) few *Polyporus* species and *Stereum* were growing on pine twigs.

Introduction

The Kaghan valley is one of the most beautiful places in Pakistan. It is subtropical continual region of Hazara (Ahmad, 1969). It is situated between 34' 30'to 35' 15'latitude N and 73 18' to 74 5' longititude E. It extends over about 160 km rising from an elevation of 1,343 meters to its highest point, the Babusar Pass at 4150 meters (13684`). This valley lies in the North of district Mansehra of Hazara Division, North West Frontier Province (N.W.F.P.). It is at its best in the summer months, 12^{o}C and minimum 3.3^{o}C from the middle of May up to the middle of October.

Champion (1965) divided the Hazar division into three major zones. Later the whole Kaghan valley was divided into four ecological zones (Anwar, 1971): 1) Sub tropical pine zone:,Balakot, Kewai, Mahandari, Baunja sharif. 2) Temperate zone (Trans Himalayan): Sharhan, Kamal Ban, Shogran, Sari hut, Bella, Kaghan. 3) Subalpine (Trans Himalayan): Naran, Saif ul Maluk, Lalazar, Batakundi, Burawai & Besal. 4) Alpine (TransHimalayan): Lulusar lake, Gittidas, Babusar.

The Kaghan valley is drained by the River Kunhar. The average rain fall for spring, summer and winter are 14.3, 25.8, and 7.5 inches respectively. The snow fall received annually at Jared (1333 m) up to one meter average; Kaghan: (2221 m) 3-3 m; Shogran: (2583 m) 3-4 m; Naran: (2333 m) 6-7 m and increasing above in Trans-Himalayan and Alpine zones. This valley is at its best in the summer months from May to September. The climate in summer remains moderate.

Major work on taxonomy of fungi of Pakistan (Higher & Lower) was done by Ahmad (1910, 1983), who published about 172 research papers and monographs. In the monograph of Basidiomycetes (Larger fungi) (1972), under 95 genera about 239 species were described. He recorded many basidiomycetes and many other fungi in his papers entitled Contributions to the Fungi of Pakistan (1956,1969,1982). Beg (1974) recorded many higher fungi, Chaudhary, 1934 studied *Scizophyllum commune* from Lahore as a parasite on tree; Khan (1975) studied wild and exotic mushrooms in Pakistan (PL 480 project) and reported about 91 different mushrooms from different parts of the country. Mirza & Qureshi (1978) compiled all the published fungi of Pakistan. The Japanes scientists during the Cryptogamic Expedition of Northeren areas (1991-1993) recorded many higher fungi: Shibata (1992); Aoshima (1992); Hattori &

Murakami (1993). Zaka & Khan worked on the pathological fungi occurring on chir and pine forests of N.W.F.P areas, especially Kaghan, Swat and Kohistan. The fungi of Pakistan has been compiled by Ahmad, Iqbal & Khalid (1997). Gardezi (1998) studied mushrooms of Azad Jammu and Kashmir for his Ph.D. degree. Khan (1952) worked on wood rotting fungi. In addition to the above described literature the following books were consulted for identification: Bon (1987); Smith (1973); Svrcek (1983). These studies show that the higher fungi (Aphyllphorales) of Pakistan are extremely rich. The described species seem to be a fraction of the fungal flora, which remains to be described.

Materials and Methods

The species cited were collected by the author herself and Muddassar Fida, Field Assistant. These were dried in the sun and identified by comparing the field data and observations with the existing literature. They were subjected to microscopic studies: description of trama, basidium, basidiospores, their measurements etc for species identification. The terminology used follows Korf (1973). The samples were deposited in the mycology herbarium of Pakistan Museum of Natural History, H-7, Shakarparian, Islamabad. Edibility was recorded from literature and locals.The first time recorded species for Pakistan are indicated by an asterisk mark (*).

Results and Discussions

Subclass: Heterobasidiomycetes

Basidia septate, Basidiospores germinating by producing secondary spores; fruit body, when formed, gelatinous.

This subclass has three orders: Uredinales (rusts) and Ustilaginales (smuts) are internal parasites and are without distinct (macro) fruit bodies. (Both these orders are treated separately under the headings rusts and smuts)

Order: Tremellales

Saprophytes, with well developed gelatinous fruiting body, produced on to surface of substratum, rarely parasites. Sporocarp or fruitingbody usually gelatinous when wet and horny when dry, some times waxy and fleshy. Basidia transversely septate or cruciately divided, each cell producing basidiospores either on short sterigmata or directly on basidial portion.

Family: **Auriculariaceae**

Basidia long, cylindrical, transversely septate, sterigmata lateral.

Genus: **Auricularia** Merat.

Auricularia auricula-judae (L.) Schroet. Jew`s ear, Edible and medicinal

Sporocarp like a cup then becomes ear-saped, outer surface velvety, olivaceous brown, when dry inner surface become concave, black and become brittle, spores 12-15 x 5-7 µ. (Ahmad, 1972: 4).

Auricularia polytricha (Mont.) Sacc. Edible and medicinal
On deteriorating branches of different plants, Kamal Ban, 10-7-89.

Family: **Tremellaceae**

Basidia globose, oval, 2-4 longitudinally septate, sterigmata terminal

Genus: **Sebacina** Tul.

Sebacina incrustans (Pers. ex Fr.) Tul.
Fruiting body whitish, in crusting form. Basidia ovoid; spores 10-15 x 5.8 µ. On grass, twigs, Mosses etc. Shogran, (Ahmad, 1962, 1969, 1972a: 6.)

Genus: **Gyrocephalus** Pers.

Gyrocephalus helvelloides (Dc. ex Fr.) Keissl.
Phlogiotus helvelloides (Dc. ex Fr.) Martin.
Gyrocephalus rufus Bref.
On ground, Sharhan & Shogran, (Ahmad 1972: 8.)

Genus: **Exidia** Fr.

Fruiting body gelatinous, often deliquescent with age; Hymenium unilateral and inferior, characteristically covered by a tough, outer layer formed by the interwoven tips of the paraphyses and often marked by wart-like, sterile protuberances. Spores reniform.

Exidia glandulosa Fr.,
On branches of deciduous trees, Sharhan: (Ahmad 1956b, 1972: 8)

Subclass: **Homobasidiomycetidae**
(Autobasidiomycetes)

Basidia aseptate, basidiospores germinating by a germ tube.

Order: **Dacrymycetales**
Saprophytic in nature, fruitingbody gelatinous to waxy, cushion shaped, translucent of uniform colour.

Family: **Dacrymycetaceae**

Gelatinous, with long narow horn-like, 2-spored basidia.

Genus: **Calocera** Fr.

Fruiting body clavaroid, on drying horny. Basidia bifurcate; spores ovate to cylindric.

Calocera cornea (Fr.) Loud.

On decayed frundose and wood, Sharhan, (Ahmad, 1956: 39; 1972: 10).

Calocera stricta Fr.

On coniferous logs, Sharhan & Shogran, (Ahmad, 1969, 1972: 10).

On coniferous logs, Sharhan & Shogran, (Ahmad 1956b, 1972a: 10).

Genus: **Dacrymyces** Nees ex. Fr.

Fruiting body sessile or substipitate. Basidia bifurcate or turning fork type.

Dacrymyces stillatum Nees ex Fr.

D. deliquescens (Bull. ex. Fr.) Duby.

Sporocarp orange to yellow when young, turning reddish brown on drying, firm and gelatinous. On coniferous logs, Shogran, (Ahmad, 1956, 1972: 9).

Order: **Aphyllophorales**

Hymenium even, toothed or tubulate, very rarely lamellate. The basidia lining the surface of tubes rarely covering the lamellae. On ripening the hymenium exposed to air for dispersal of spores. The fruit body become tough and hard on drying.

Family: **Sparasidaceae**

Fruiting body stalked, branching into a few, or great mass of flattened, lobes having more or less wavy margin. The hymenium well developed on the underside of horizontally oriented portions of branches. Basidia clavate with clamp at the base. Spores short, ellipsoid, hyaline, smooth, nonamyloid.

Genus: ***Sparassis*** Fr

Sparassis crispa Wulf. ex: Fr.

On ground, Shogran, Ahmad 1956b; Hattori & Murakami, 1993: 94.

Sparassis laminosa Fr. On ground Sharhan, Ahmad, 1969a: 4; 1972b: 38.

Family: **Hericiaceae**

Fruiting body clavarioid, branched with ultimate fertile branches (teeth) directed downwards. Contex hyphae with calmps; gloeocystidial hyphae not darkening with sulfo aldehyde. Spores smooth, amyloid.

Genus: **Hericium** Pers. ex. F. Gray

Fruiting body clavarioid, strongly branched with a well developed stipe-like rooting base.

Hericium ramosum (Bull. ex. Merat) Letellier

On dead parts of trunk of *Quercus dilata* Shogran, Hattori & Murakami 1993: 109.

Family: **Hydnaceae**

Fruiting body resupinate, effuso reflexed or pileate, stipe lateral or central, context hyaline or coloured or zonate or azonate, fleshy, leathery or woody; hymenium borne on distinct, cylindrical spine like; cystidia or gloeocystidia present or absent. Spores hyaline or coloured smooth or warted, non-amyloid.

Genus: **Hydnum** L. ex.Fr.

Fruiting body pileate, stipitate, fleshy. Spores subglobose, ovoid, hyaline, smooth, non amyloid. Cystidia and gloeocystidia absent.

Hydnum repandum L.: Fr.
On ground, (Ahmad 1956b, 1972b: 82-83) (Malakandi) Shogran, (Shibata 1992:156).

Hydnum rufescense Fr.
On ground in *Cedrus Picea Pinus Abies* forest, Shogran, Murakami 1993: 109.

Genus: **Hydnellum** Karst.

Fruiting body with a central or acentral stipe, corky, zonate. Pileus brown. Basidia clavate. Spores globose to angular, coarsely tuberculate and brown.

Hydnellum ferrugineum Fr.
On the ground under bushes on wood, Malakandi 27.9.90.

Genus: **Steccherinum** S.F. Gray

Fruiting body lignicolous, hyphae dimitic, the generative hyphae with clamps, spine to some extent flattened. Basidia clavate. Spore ellipsoid, smooth and non amyloid. Cystidia numerous, thick walled.

Steccherinum ochraceum (Pers.) S.F. Gray
On wood Shogran, 30.8.89, Ahmad 1972: 84.

Genus: **Donkia** Pilat

Fruiting body sessile, sometime imbricate, tough, white. Basidia lacking, clamp connections and Gloeocystidia numerous. Spores hyaline, smooth. On stumps of deciduous trees, Sharhan, Ahmad, 1956: 40; 1969, 1972: 85.

Genus: **Heterobasidion** (Murr.) Ryv.

Heterobasidion insulave (Murr) Ryv.
On pine wood, Sharhan and Kawai, (Aoshima 1992: 142)

Family: **Polyporaceae**

Flesh light coloured, somewhat soft. Hymenium with pores. Spores white, distinctive cystidia absent

Laetiporus sulphureus (Bull., Fr.) Murr.
On the basis of *Quercus,* (Ahmad, 1956b; Aoshima 1992: 143; Hattori & Murakami, 1993:95).

Genus: **Poria** Pers. ex S.F. Gray,

Fruiting body annual, resupinate, floccose, fleshy or coriaceous. Context white to bright coloured; hymenium lining the tubes through out their length but not continuous over the edges; tubes coherent not separating from the context. Cystidia present or absent. Spores hyaline, smooth, variable in shape.

Poria sp.

On dead logs, branches of Pine, Kamalban, 10.7.89, PMNH, no. 8554.

Family: **Corticiaceae**

Fruiting body strictly resupinate, effused, arachnoid, waxy or rarely gelatinous; slightly folded or with warts/teeth. Spores hyaline, smooth rarely sculptured, amyloid or non-amyloid.

Genus: ***Cytidia*** Quel.

Fruiting body coriaceous gelatinous, cup shaped, sessile, scattered; hymeniun smooth, veined. Basidia elongated. Spore hyaline, globose or cylindrical and curved, amyloid.

Cytidia salilcina (Fr.) Burt.
On branches of *Salix*, Shogran, (Ahmad 1962 & 1972: 17)

Genus: **Peniophora** Cooke

Fruiting body resupinate, closely attached to the substratum, bright to dull coloured; cystidia generally present. Gloeocystidia present or absent. Basidia clavate. Spores cylindrical or ellipsoid, smooth, pale, red in mass and non-amyloid

Peniophora cinerea (Pers.) Cooke,
On dead branches, Shogran, Ahmad, 1956: 64 & 1972: 18.

Peniophora quercina (Pers.) Cooke
On dead branches & on broad leaved bushes, on oak, (Ahmad 1956b, 1972b) Khan, 1961; Malakandi, Shogran.

Genus **Merulius** Hall. ex Fr.

Fruiting body resupinate, effuso flexed, hymenium wrinkled to form irregular folds which are fertile over their edges. Spores uaually allantoid, long, non dextrenoid.

Merulius aureus Fr.
On burnt branches of pine, Shogran (Ahmad 1956b, 1972b: 21) and Khan, 1960.

Merulius lacrymans Wulf. ex Fr.
Serpula lacrymans (Wulf. ex Fr.) S. F. Gray
On *Pinus wallichiana*, Kaghan, (Ahmad, 1972: 28.)

Genus: **Phelebia** Fr. em. Donk.

Fruiting body resupinate, thin or thick, closely adnate. Cystidia thin walled (leptocystidia) or thick walled (lamprocystidia), usually encrusted at the apex. Basidia small, clavate. Spores up to 12 µm long, ovoid, subcylidrical, hyaline, non amyloid.

Phelebia roumeguerii (Bres.) Donk.
Peniophora roumeguerii Bres.
Cystidia thick walled.
On dead wood, Shogran, (Ahmad, 1969a, 1972b: 22 23.)

Family**: Coniophoraceae**, Dc. ex Merat.

Indefinitely spreading fruiting bodies, thin, arid to fleshy, hymenial surface smooth, veined. Spores ochre brown to russet.

Genus: **Coniophora** Dc. ex Merat

Fruiting body resupinate, effused membranous; hymenophore even or somewhat warted, cystidia lacking. Basidia vericillate, clamp connections present.

Coniophora betula Karst.
On decayed wood, Sharhan, (Ahmad, 1956b, 1972b: 27).

Coniophora fusispora (Cke. & Ell.) Cke.
On decayed wood (Ahmad 1972a: 27).

Genus: **Plicaturopsis**

Fruitingbody narrowly spreading, soon reflexed to form fan shaped cap, upper surface some what zoned, fawn or yellow ground, velvety; hymenial surface whitish, with radiating gills like folds which tend to break up and anastamose.

Plicaturopsis crispa (Pers.) Reid.
Plicatura crispa (Pers. ex Fr.) Rea,

On decaying stumps of broad leaved bushes, common in woods, Sari Hut, & Kamal ban PMNH nos. 8571, 8557, 8558, 8565.

Family: **Stereaceae**

Fruiting body reflexed, upper (surface) cuticular differentiated into concentric sections, leathery; hymenium often with cystidia. Spores smooth, amyloid or non amyloid

Genus: **Xylobolus** Karst. em. Boidin

Fruiting body almost sessile, usually perennial and woody, upper surface of the pileus zoned, the lower surface smooth, even or cracked; spores hyaline, thin walled smooth, amyloid.

Xylobolus subpileatum Berk & Curt
Stereum subpileatum Berk. & Curt.
On fallen trunk of tree, Shogran, Ahmad 1972a: 30 31.

Genus**: Lopharia** (Kalch.) MacOwan

Lopharia fulva (Lev.) Boidin
Stereum schomburghkii Berk
On stump, Naran (Ahmad, 1956b, 1969a, 1972a: 31 & 32).

Genus: **Chondrostereum** Pouz.

Fruiting body sessile, pileus reflexed; hymenial surface purple or reddish brown, smooth. Spores smooth, ellipsoid, non amyloid.

Chondrostereum purpureum (Pers. ex Fr.) Pour.
Stereum purpureum Pers. ex Fr.
On mossy bark of *Pinus wallichiana*, Kaghan, (Ahmad, 1956: 66); Qureshi and Jamal, 1971.

Genus: **Stereum** Pers. ex S.F. Gray

Fruiting body effuso reflexed, pileus surface covered by a thick tomentum. Spores cylindric, hyaline,smooth, amyloid.

Stereum hirsutum (Willd.) S.F. Gray,
On stumps of deciduous tree, Sharhan, (Ahmad, 1956b, 1972: 35;) Qureshi and Jamal, 1971; Khan 1960.

Stereum osterea (Fr.) Fr.
Stereum fasciatum Schw. ex Fr.: S. lobatum (Kze. ex Fr.) Fr.
On wood and stumps of deciduous trees, Shogran, (Ahmad, 1972: 35).

Stereum venosum Quell.
On *Pinus wallichiana*, Kaghan, (Qureshi & Jamal, 1971).

Family: **Thelephoraceae**

Fruiting body pileate, reflexed, sessile or stiped species. Hymenium smooth. Spores spiny or knobbly.

Genus: **Thelephora**, Ehr. ex Fr.

Spores subglobose to angular, verrucose or echinulate.

Thelephora arbuscula Corner,
On ground Shogran, (Ahmad 1972a: 68.)

Thelephora caryophylla Fr.
Fruiting body centrally stipitate. funnel saped, purple brown, more or less zoned. On the ground, Naran, 25.8.89.

Thelephora terrestris Ehrenb.
On miost ground among grass, under walnut trees, Naran, 25.8.89.

Genus: **Tomentella**, Peck.

Hymenial surface smooth or rough, basidia clavate, 2-4 spores. Spores globose, oval, brown and verrucose.

Tomentella calcicola (B. & G.) M.J.Larsen
Caldesiella ferruginea var. *calcicola* B.& G.
On pieces of wood, Kund, Nadi-Sharhan, (Ahmad: 1972: 65).

Family: **Ramariaceae**, (Fairy clubs)

Fruiting body erect, branched, more or less fleshy. Spores ochraceous or brown, or hyaline, smooth verrucose or echinulate, the exosporium strongly absorbing.

Genus: **Ramaria** S.F. Gray

Spores distinctly thickened wall, echinulate or verrucose.

Ramaria botrytis (Pers.) Ricken.
Common during summer and autumn.
On soil under broad leaved bushes; Kamal ban, 24.9.90; Sharhan, 24.8.89.

Ramaria farmosa Fr.
On soil Burawai, 28.8.89.

Ramaria mairei Pers.
On soil Burawai, 28.8.89.

Ramaria invalii Pers.
On soil, Burawai, 28.8.89.

Genus: **Lentaria**, Corner

Spores white to pale, ochraceous, thin walled, smooth.

Lentaria michneri (B. & C.) Corner,
On leaves of *Quercus,* Shogran, Ahmad, 1969; 1972: 78.

Lentaria mucida (Fr.) Corner,
On rotten wood, Sharhan, (Ahmad, 1969:39; 1972: 78).

Lentaria surcula (Berk.) Corner,
According to Prof. Corner it is temperate counter part of *Lentaria soluta*.
On rotten wood, Sharhan, Shogran, (Ahmad, 1972:78; 1980: 78)

Genus: **Clavulinopsis** V. Over

Fruiting body simple or branched, yellow to orange-red; branching alternate, flesh waxy to rather tough, never so brittle as in *Clavaria*; hyphae not secondarily septate. Spores hyaline, globose or ellipsoid, smooth or echinulate
.
Clavulinopsis miniata (B.) Corner,
Clavulinopsis miyabaena (S.1to) S.1to
Growing on and among the deteriorating needles under bushes in woods. Lalazar, 25.9.90.

Clavulinopsis sp.
On wood, Kamal ban, 24.9.90.

Family: **Clavariadelphaceae**

Fruiting body branched, erect, flesh firm; hyphae without clamps. Spores hyaline or ochraceous, smooth rarely amyloid.

Genus: **Clavariadelphus** Donk,

Fruiting body massive, clavate or ligullate.

Clavariadelphus truncatus (Quel.) Donk,
On ground, Shogran, (Ahmad, 1956:69.)

Family: **Hymenochaetaceae**,

Fruiting body annual, perennial, resupinate, sessile or even pileate and stipitate; context yellow, brown to dark brown, darkening in KOH, the generative hyphae without clamps; Hymenium smooth or tubulate with distinctive cystidia or setae; setae absent or present. Spores hyaline or brown, smooth, non amyloid.

Genus: **Coltricia** S.F. Gray,

Hymenophore tubulate, stipitate; context coreaceous fibrillose, setae present or lacking. Spores coloured.

Coltricia cinamoneus (Jacq. ex S.F. Gray) Murr.
Polystictus cinnamoneus Jacq. ex Gray: Sacc.
On ground, Shogran, (Ahmad, 1956:75, 1972:45-46).

Coltricia tomentosus (Fr.) Murr.
Polystictus tomentosus Fr.; Sacc.
On wood, Sharhan, Shogran, (Ahmad, 1956:75; 1972:46-47).

Genus: **Hymenochaete** Lev.

Hymenophore smooth, hymenium bear the simple setae.

Hymenochaete cruenta (Pers. ex Fr.) Donk
Hymenochaete monigeotii (Fr.) Cke.
On bark of tree, Sharhan, (Ahmad 1972:42).

Hymenochaete rheicolor (Mont.) Lev.
Hymenochaete tenuissima Berk. & Br.
On branches of *Quercus*; Sharhan, (Ahmad, 1956b; 1972b: 44).

Genus: **Inonotus** Karst

Fruiting body pileate and sessile, annual, often imbricate; context hyphae, chestnut brown or yellowish brown, branched, septate, without clamps, darkening in KOH; setae brown, thick-walled. Spores hyaline or coloured, smooth. It is causing soft white rot to Oak trees.

Inonotus radiatus (Sow.) Karst
Fruiting body radially wrinkled on the upper surface, velvety, rusty; margin yellowish brown, flesh bright fawn to orange. It is usually found in pine forest, willow, birch trees. On dead wood, Shogran, 30.8.89. PMNH no. 8363.

Genus: **Irpex** Fr.

Fruiting body sessile, effuso reflexed or resupinate. Pileus thin coriaceous, the upper surface glabrous, white or yellowish. Hymenophore or hymenium broken up into teeth, spines compressed, simple or fused to form plates. Context white when fresh, becoming

brownish on drying, changing to reddish brown in KOH; cystidia thick walled, projecting. Spores ellipsoidal, hyaline.

Irpex zonatus Breb.
On wood, Bhunja Sharif, 11.7.89. PMNH no. 8380.

Genus: **Phaeolus** Pat.

Hymenophore tubulate, stipitate, context spongy, fragile; cystidia present. Spores hyaline ovoid or ellipsoid

Phaeolus schweinitzii (Fr.) Pat.
Polyporus schweinitzii Fr.
Serious parasite of conifers, Kaghan, (Zaka, 1978).
On stump of coniferous tree, Sharhan, (Ahmad, 1972: 45).

Genus: **Polyporellus** Fr.

Polyporellus picipes (Fr.) Karst.
Naran, Sari, (Aoshima 1992:143).

Genus: **Phellinus** Quel

Fruiting body pileate, sessile or totally resupinate, perennial, with yellowish or dark brown context, darkening permanently with KOH. Setae present or absent, Spores hyaline or coloured.

Phellinus caryophylli, (Racib.) Ahmad comb. nov.
Fomes caryphylli (Racib.) Berb
Trametes caryophylli Racib.
On *Quercus incana*, Shogran, (Ahmad 1972: 56 57).

Phellinus linteus (Berk. & Curt.) Ahmad.
Polyporus linteus Berk. & Curt.
On living tree of *Lonicera* sp., Shogran, (Ahmad, 1972: 54).

Phellins pini (Thore ex Fr.) Ames
Fomes pine (Thor ex Fr.) Ames
Serious parasite of conifers, Kaghan, Zaka 1978.
On living tree of *Pinus excelsa*, Shogran, Sharhan, (Ahmad, 1972: 58).

Phellinus gilvus (Schw. ex Fr.) Pat. var ***hookeri*** Lloyd.
Polyporus gilvus Schw. ex Fr.
On *Prunus conruta* Shogran, (Ahmad, 1972:58-59) Kawai, (Aoshima, 1992: 143).

Phellinus torulosus (Pers.) Bourd. & Galz.
Fomes torulosus Pers. ex Lloyed

On living tree of *Quercus dilatata*, Sharhan, (Ahmad, 1972: 60).

Phellinus rimosus (Berk.) Pilat
On wood, Sharhan, (Ahmad no. 27161).

Phellinus rubustus (Karst.) Boud. & Galz.
Fomes rubustus Karst.
On dead or living trunk of deciduous tree, Nadi-Sharhan, Shogran, Naran, (Ahmad, 1972:61-62).

Phellinus punctatus (Fr.) Pilat.
Fuscoporia punctata (Fr.) G.H. Cunn.
On living tree of *Olea cuspidate*, Sharhan, (Ahmad, 1972: 63. Ahmad, *et al*., 1997).

Phellinus scruposus (Fr.) Pat.
Polypors hookeri Lloyd.
On *Prunus cornuta*, Shogran, (Ahmad, 1972: 59).

Genus: **Coltricia** S.F. Gray

Coltricia cinnamona (Jacq. ex. S.F. Gray) Murr.
Polystictus cinnamoneus (Jacq. ex S. F. Gray) Sacc.
On ground, Sharhan, (Ahmad, 1972: 46).

Coltricia perennis (L. ex Fr,) Murr.
Polystictus perennis L. ex Fr.
On ground, Shogran, (Ahmad, 1972:46).

Coltricia tomentosa (Fr.) Murr.
Polystictus toementosus Fr.
On burried pieces of coniferous wood, Shogran, (Ahmad, 1956 & 1972: 46).

Genus: **Polyporus**, Mick. ex. Fr.

Fruiting body annual, centrally or laterally stipitate, context white forming continuous layer with the tubes, tubulate, pores circular or angular. The tubes sometimes splits and looking like teeth. Spores hyaline, smooth variable in shape. Causing spongy decay to trees in woods.

Polyporus adustus Willd. ex Fr.
On decaying stumps of deciduous trees, Sharhan, (Ahmad, 1956: 73 & 1972: 96).

Polyporus aricularius, Batch ex. Fr.; Sacc.
On fallen branches, Shogran, (Ahmad, 1956:73 & 1972: 94).

Polyporus aurantiaceous Fr.
On *Pinus wallichiana* Shogran.

Polyporus biennis (Bull. ex. Fr.) Fr.
On stump of deciduous tree, Sharhan, (Ahmad, 1956; 1972: 89-90).

Polyporus candidulus Lev.: Sacc. Syll.
On decaying stumps of deciduous trees, Sharhan, (Ahmad, 1956: 73), Shogran 1972:96.

Polyporus dryaedeus Pers. ex Fr.
Causing weeping cock disease.
On *Pinus wallichiana*, Qureshi *et al*., 1970

Polyporus fibrillosus Karst.
On tree, Sharhan, (Ahmad, 1969: 43).

Polyporus hispidus Bull ex. Frs. Sacc.
On *Morus alba*. Balakot, Ahmad, 1956: 74.

Polyporus nummularius Bull. ex. Fr.; Sacc.
On fallen branches, Shogran, Ahmad, 1956: 74.

Polyporus schweinitzia Fr., Sacc.
On wood, Shogran (Ahmad, 1956: 74).

Polyporus squamosus Huds. ex. Fr.
On living or dead tree of *Juglan regia,* Shogran, (Ahmad, 1972: 91).

Polyporus sulphureus Bull. ex Fr.
At the base of *Quercus dilatata* (Ahmad 1972: 89).

Polyporus tomentosus Fr.
On *Pinus wallichiana*, Shogran.

Polyporus tomentosus Fr. var ***circinatus*** Fr.
On *Pinus wallichiana*, Qureshi & Jamal, 1971.

Polyporus varius Pers. ex. Fr., Sacc.
On decaying coniferus wood, Nadi-Sharhan, (Ahmad, 1956:75 & Ahmad, 1972: 91-92).

Genus: **Bijerkandera** Karst

Fruitingbody annual, sessile or effuso reflexed; pileus coriaceous when fresh, becoming corky and rigid on drying; hymenophore tubulate. Spores cylindrical or ellipsoid, hyaline. Causing white flaky rot to Beech trees.

Bijerkandera adusta (Wild. ex Fr.) Karst.
Polyporus adustus Willd. ex Fr.
On decaying stumps of deciduous trees, Sharhan, Shogran, (Ahmad 1972: 96).

Genus: **Tyromyces** Karst

Fruiting body lignicolous, sessile or effuso reflexed, fleshy & sub coriaceous when fresh, on drying rigid, tubes not separate from the context. Spores smooth, variable in form.

Tyromyces albellus (Peck.) Murr.
Naran (Kaghan) (Aoshima, 1992: 144).

Tyromyces mollis (Pers. ex Fr.) Kotl. & Pouz.
Polyporus millis Pers. ex Fr
On logs of conifers, Sharhan, (Ahmad 1972: 96).

Genus: **Pycnoporellus** Murr.

Fruiting body sessile, annual, soft and spongy when fresh, firm fragile on drying. Pileus sessile, effuso reflexed, orange red to light orange, becoming cherry red then rapidly black in KOH. Spores hyaline, smooth, ellipsoidal.

Pycnoporellus fulgens (Fr.) Donk.
Polyporus fibrillosus Karst.
On logs of pine tree, Sharhan, 24.8.89. PMNH no. 8370. On logs of *Pinus excelsa*, Sharhan, (Ahmad, 1972: 98-99).

Genus: **Hirschioporus** Donk.

Fruiting body sessile, annual, coriaceous; pileõ sessile, effuso reflexed or upper surface white or yellowish, azonate, or zonate; tube sunken to unequal depth; pore surface violaceous; cystidia abundant. Spores hyaline, cylindric to ellipsoid and smooth.

Hirschioprus abietinus (Dicks. ex. Fr.) Fr.
Polystictus abietinus (Dicks. ex Fr.) Fr.
On coniferous wood, Shogran, (Ahmad, 1972: 102-103).

Hirschiporus pargamenus (Fr.) Bond. et Sing.
Naran, Sari Hut, (Aoshima, 1992: 142).

Genus: **Coriolus** Quel.

Fruiting body annual, coriaceous. Pileus sessile, effuso reflexed or resupinate; context white or coloured; tubes not distinct. Spores cylindrical, hyaline. Causing white fleky rot to roots of Beech.

Coriolus brevis (Berk.) Aoshima
On *Celtis* trunk, Naran, 28.8.89. PMNH no. 8645.

Coriolus hirsutus (Wulf.) ex Fr.) Quel.
Polystictus hirsutus (Wulf ex Fr.) Fr.
On stumps of deciduous tree, Shogran, (Ahmad, 1972: 105).

Coriolus versicolor (L. ex Fr.) Quel.
Polystictus versicolor L. ex Fr. Sacc.

On stumps and logs of deciduous tree, Shogran, (Ahmad, 1972: 105) (Aoshima 1992:139).

Coriolus tephroleucus (Berk.) Bondartz.
Polystictus tephroleucus (Berk.) Sacc.

On logs of deciduous tree, Shogran, Ahmad, 1972: 106.

Genus: **Trametes** Fr.

Fruiting body usually annual, sometimes perennial, sessile, effuso-reflexed or resupinate. Pileus coriaceous, context white, cinnamon to brown. Tubes in one or rarely in many layers, open by circular or angular pores; trama of tubes continuous with the context.

Trametes insularies Murr.

On *Abies pindrow*, Shogran, (Beg et al 1974: 123).

Trametes suaveolens (L. ex Fr.) Fr.

On deciduous tree, Sharhan, (Ahmad, 1972: 109).

Genus: **Lenzites** Fr.

Fruiting body annual, sessile, or subsessile. Pileus fan shaped or circular; context corky, coriaceous, white. Hymenophore lamellate, lamellae of white colour, Spores subglobose to ellipsoid, cylindric, hyaline.

Lenzites betulina (L. ex Fr.) Fr.

Common in woods and timber stores, often found Oak tree, lying in running water, 11.7.89. PMNH no. 8017. On wood, Malakandi, 27.9.90, PMNH no. 8505. On logs of deciduous trees, Shogran, (Ahmad, 1972:112.)

****Lenzites platyphyllous*** Lev.
Lenzites adusta Mass.

On wood, Malakandi, 27.9.90. PMNH no. 8560.

Lenzites saepiaria (Wulf.) Fr.

Causing elongated pocket- rot on *Pinus wallichiana*, Pakistan, (Qureshi & Jamal, 1971).

Genus: **Gloeophyllum** Karst

Context some shade of brown and turning black in KOH.

Gloeophyllum striatum (Sow. ex Fr.) Murr.
Lenzites stiriata Sow. ex Fr.

On coniferous logs, Shogran, (Ahmad, 1956; 1972: 113), Naran, Sari, Kawai, Shogran, (Aoshima 1992: 142).

Gloeophyllum subferrugineum (Berk.) Bond. & Sing.
Lenzites subferrugineum Berk.
On coniferous logs, Shogran, (Ahmad, 1956: 73 and 1972: 113-114).

Genus: **Fomes** (Fr.) Fr.

Fruiting body perennial, sessile, ungulate, upper surface glabrous. Concentrically sulcate with hard, smooth, grayish crust. Context dark brown, soft, becoming golden brown in KOH. Tubes in several distinct layers, pores circular, brown. Spores cylindric, smooth and hyaline. Causing creamy white rot with black fleck to Birch.

Fomes allerdii Bres.
On wood of deciduous tree. Sharhan, (Ahmad, 1969: 43).

Genus: **Fomitopsis** Karst.

Fruiting body perennial, aplanate or ungulate, sometimes resupinate; context white, light colured or brownish; hyphae with or without clamp connections; tubes at first in single layer but ultimately in many layers. Spores hyaline, not cyanophilous. Causing white, felt like mass to butt of Ash tree.

Fomitopsis browneonenis (Lloyd.) Ahmad
Trametes broneonensis Llyod
On coniferous logs, Sharhan, (Ahmad, 1956: 71.)

Fomitopsis robustus Karst.
On coniferous logs Nadi Sharhan, (Ahmad, 1956: 72).

Fomitopsis rosea (A. & S.ex Fr.) Cke.
Fomes roseus (A. & S. ex Fr.) Cke.
Serious parasite of conifers in Kaghan. On coniferous logs, Sharhan, (Ahmad, 1972: 117).

Fomitopsis pinicola (Sw. ex Fr.) Karst.
Fomes pinicola (Sw. ex Fr.) Cke.
Serious parasite of conifers: Zaka 1978; on logs of coniferous tree, Shogran, (Ahmad, 1972: 117).

Fomitopsois annosus var. ***indicus*** (Wakef.)
Fomes annosus (Fr.) Cke. var. *indicus* Wakef.
A serious parasite of conifers; on coniferous logs, Shogran, (Ahmad 1972:117-118).

Fomitopsis fomentarius (L. ex Fr.) Kichx.
On *Cedrus* wood, Kamal Ban, July 89, PMNH no. 8647; on living tree of *Juglans regia*, Sharhan, Ahmad, 972: 116; Kamal ban, (Aoshima, 1992: 140).

Genus: **Ganoderma** Karst.

Fruitingbody sessile or stalked, annual or perennial; context dark brown, fibrous, woody to corky, the surface formed of upwardly growing hyphae which thickened and become encrusted and in some species appear varnished; Hymenophore tubulate, pores circular. Basidia rather short, clavate. Spores ovoid, brown, truncate at the apex, the walls differentiated in two layers, the inner layer coloured, bearing spines, the outer layer hyaline, smooth. Causing white decay to Beech and Oak trees.

Ganoderma applanatum (Pers. ex S.F. Gray) Pat.

On living and deciduous tree common in plains and hills, Shogran, Sharhan, (Ahmad 1972:120); Kamal ban PMNH no. 8628, 8323, 8325, 8326, 8327; on living tree, Shogran, PMNH no. 8634;. (Ahmad, 1956, 1972: 120); (Aoshima, 1992 : 140 141).

Ganoderma calossus (Fr.) Bose.
Fomes. lucidus (Leyss) Fr.

Bhunja Sharif, 11.7.89 PMNH no. 8377; Naran no. 8378; (Ahmad, 1972: 121) .

Ganoderma flexipes Pat.

On burried wood, Sharhan, (Ahmad, 1972: 122).

Genus: **Deadalea** Pers. ex Fr.

Fruiting body annual, sessile or effuso reflexed. Pileus corky and rigid; context white, yellowish or pale brown; tubes not sharply distinct from the context; hymenial some times in lamellae, the lamellae united by cross veins. Spores elliptic, smooth, hyaline.

****Deadalea albida*** Fr.

Spores elliptical, smooth, hyaline 5-7 x 3-4 µ.

On deciduous tree, throughout the year, Kaghan valley, 1989.

Genus: **Deadaleopsis** Schroet

****Deadaleopsis ctysacina*** (P. Hnniet) Shire Imazer

On dead wood, Bhunja Sharif 11.7.89. PMNH no. 8382.

Genus: **Trichamptum** Murrill

Hirschioporus Donk

Fruiting body annual, sessile, coriaceous. Pileus effuso reflexed, upper surface covered with hair (villos), tubes sunken at unequal depths; Cystidia abundant. Spores elliptic, smooth, hyaline.

Trichamptum abietinum (Dicks.) Ryv.
Polystictus abietinus (Dicks ex Fr.) Fr.

On coniferous wood, (Ahmad, 1972: 103).

Genus: **Hetrobasidion** Bref.

Fruiting body reflexed with thin flat cap, chocolate brown to dark. Spores ovoid, minutely ornamented

Hetrobasidion insulare (Murr.) Ryv.
On coniferous logs. Sari, Kawai, Sharhan;(Aoshima 1992: 142).

Genus: **Phaeolus** Pat.

Fruiting body annual, centrally or laterally stipitate sometimes sessile, effuso reflexed or almost resupinate. Pileus surface villose or tomentose. Context yellowish to dark brown, spongy, fragile, darkening in KOH. Hymenophore tubulate, the pores more or less angular. Setae absent, Cystidia present. Spores hyaline, ovoid or ellipsoid.

Phaeolus schweintzii (Fr.) Par.
Kawai, Sharhan; (Aoshima 1992: 143).

Family: **Cantharellaceae**

Fruiting body stipitate, infundibuliform yellow; Basidia long. Spores yellow or pink in mass, smooth, non-amyloid.

Genus: **Cantharellus** Adans ex Fr.

Fruiting body stipitate, pileate, the pileus fleshy, firm. Hymenophore folded with crossed veins when well developed. Basidia club shaped, 2 to 8 spored. Spores globose or subglobose, hyaline smooth, non amyloid.

Cantharellus cibarius Fr.
On soil, Sari Hut, Shogran, 26.9.90. PMNH no. 8511. Sharhan, Shogran (Ahmad 1972: 124); (Murakami, 1993:108).

Family: **Gomphaceae**

The spores are ochraceous and cyanophilous.

Genus: **Gomphus** S.F. Gray

Fruiting body pileate. The hymenophore lamellate, the lamellae folds bear with blunt, fertile edges, frequently forked or anastmosing, decurrent to the base of stipe. Spores ochraceous in mass, walls strongly absorbing cotton blue (cyanophilous).

Gomphus megasporus (Pers. ex Fr.) S.F. Gray,
Smell faint, taste sweetish, under broad leaved forests in mountaneous districts.
On ground Sharhan, (Ahmad, 1972:125.)

Family: **Soleniaceae**

Fruiting body solitary or caespitose, membranous or cupullate, the surface hairy, margin straight or inrolled; hymenophore smooth, the hymenium lining the inner suface of the tube like or cupulate sporophore. Basidia clavate, 4 spored. Spores globose or cylindric to elliptic, hyaline and smooth.

Genus: **Solenia** Pers.
(same as above)

Solenia anomala (Pers. ex Fr.) Fuckel
On decaying wood, Kawai, Ahmad, 1972: 123.

Family: **Schizophyllaceae**,

Fruiting body lignicolous, sessile, sometimes with a stalk like base, coriaceous, hymenophore appearing as split lamellae, hirsute on the abhymenial side. Basidia 2 to 4 spored with clamps at the base. Spores hyaline smooth, oblong to cylindric, non amyloid.

Genus: **Schizophyllum** Fr.
(Same as above)

Schizophyllum commune Fr.
On different hosts wood & barks, common through out in Pakistan. (Ahmad, 1956: 78; 1972: 125); (Murakami, 1993: 109;) (Chaudhry, 1934).

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