HIGHER FUNGI OF THE HAWAIIAN ISLANDS[1]

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The fungi enumerated in the present list consist of the *Basidiomycetes* collected by Professor F. L. Stevens in the Hawaiian Islands during the summer of 1921, and of the fungi in the Bernice Pauahi Bishop Museum Herbarium which were brought to the United States for study in connection with the Stevens collections. Most of the specimens from the Museum were collected by Professor C. N. Forbes.

The 150 numbers which comprise this lot of specimens belong to 61 species; more than three-fifths of the specimens and nearly half of the species are Polypores; 11 per cent, or the 7 species, *Lepiota xylophila*, *Crepidotus rhizomorphus*, *Fomes hawaiensis*, *Fomes fasciculatus*, *Poria fasciculata*, *Corticium granulare*, and *Epithele hydnoides*, are regarded as indigenous. *Lepiota xylophila* Pk. and *Fomes hawaiensis* Forbes were described several years ago; the other 5 species named above are now described as new. Of the species fully determined, which occur in other countries besides the Hawaiian Islands, about 43 per cent are of cosmopolitan distribution, 13 per cent are confined to tropical regions of both America and Asia and East Indies, 24½ per cent occur in the Philippines and East Indies but not in America so far as known at present, and about 6 per cent of the species are regarded as indigenous members of the fungal flora of the north temperate region of North America. Hence the purely North American component in the higher fungal flora of the Hawaiian Islands is hardly a fourth as great as that of Asiatic, East Indian, and Philippine sources, so far as the present small number of species show.

In accordance with the instructions received, a portion of each specimen, if sufficiently ample, has been retained in the Missouri Botanical Garden Herbarium and the remainder returned to

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Dr. Stevens for himself and the Bernice Pauahi Bishop Museum Herbarium. The following descriptions and notes are based on characters retained by the dried specimens.

AGARICACEAE

Lepiota xylophila Peck, Torr. Bot. Club Bul. **34**: 97. 1907.
Type: in Mo. Bot. Gard. Herb., 3365, and probably in N. Y. State Mus. Herb.

"Pileus thin, campanulate or convex, umbonate, minutely squamulose, white or whitish and even on the margin when fresh, becoming brownish with age or in drying, with the umbo darker and the margin widely and distinctly plicate-striate; lamellae rather narrow, free, denticulate on the edge, minutely pulverulent, whitish, faintly tinged with yellow or greenish-yellow; stem slender, equal or nearly so, hollow, pale-yellowish or greenish-yellow; spores elliptic, uniguttulate, 8–12 μ long, 6–7 μ broad.

"Pileus 2–4 cm. broad; stem 2–4 cm. long, 2–4 mm. thick.

"On wood of red fir, Douglas fir and redwood. Hawaii. Collected by N. A. Cobb; communicated by H. von Schrenk."

Peck added further that this species is closely related to *L. cepaestipes*, from which it may be separated by its different colors, its peculiar habitat, the even margin of the fresh pileus, and its stem, which is not enlarged at the base. To this species I refer two more recent gatherings, the one without definite Hawaiian locality, *F. L. Stevens, 232;* the other, on lawn, Kamehomeha School grounds, Oahu, *Forbes & Stokes, 2196.O.* These later collections agree well with the type, but it seems probable that at least those labelled "on lawn" were growing on the ground.

Pleurotus ostreatus Jacqu.
Lanai, *G. C. Munro, 4.L;* Molokai, *C. N. Forbes, 6.M; C. N. Forbes, 13a-S.*

Pleurotus flabellatus Berk. & Br.
F. L. Stevens, 319, 668, 695, 750, 950, 997, 1149, 1151.

Pleurotus sp.
On bark, *F. L. Stevens, 592.*

A dimidiate, sessile pileus, glabrous, drying cinnamon-buff, 2 cm. long, 3 cm. broad; spores hyaline, even, 8–10 × 3½–4 μ; no cystidia.

Schizophyllum commune Fr.

On *Acacia poa*, Kauai, *C. N. Forbes, 1182.K;* Molokai, *C. N. Forbes, 6.S.a; C. N. Forbes, L 52 F; F. L. Stevens, 399,* (on Koa) *426, 549, 1118.*

Pholiota marginata (Batsch) Fr.

On ground, Maui, *C. N. Forbes, 1615.M.*

Crepidotus fulvotomentosus Peck.

F. L. Stevens, 586.

Crepidotus rhizomorphus Burt, n. sp.

Dried fructifications 5–7 mm. broad, membranaceous, sessile, pinkish buff of Ridgway, glabrous, even, the margin entire; lamellae radiating from a central point, ventricose, close, snuff-brown; spores ochraceous under the microscope, even, 6–7 × 4–4½ μ; a flattened rhizomorphic strand about 1 mm. broad, bone-brown in color, runs up the outside or within the grass culm.

On culm of an undetermined grass, Hawaiian Islands, *F. L. Stevens, 940,* type (in Stevens Herb.).

Two fructifications were present at about a centimeter apart; one was supported by a short, lateral branch of the rhizomorph, and the other had that portion of its upper surface in contact with the culm adnate to the latter, and the remaining surface free. This species is noteworthy by the thread-blight habit of its rhizomorphs.

Naucoria triscopoda Fr.

On rotten wood, *F. L. Stevens, 968.*

Agaricus ?

On dead wood, *F. L. Stevens, 1087.*

A species with pilei, 3 cm. broad, with characters too obliterated by pressure and in too fragmentary a condition for determination. Spores fuscous, even, 4½–5 × 3 μ.

Psathyra sp.

Near *Psathyra glareosa* Berk. & Br.

On ground, Kukui, *F. L. Stevens, 591.*
Stem white, hollow; spores black, even, 8–9 × 6–7 μ.

POLYPORACEAE

Polyporus arcularius (Batsch) Fr.
F. L. Stevens, 460.

Polyporus sulphureus (Bull.) Fr.
F. L. Stevens, 383, 848.

Polyporus chioneus Fr.
Mountains of Kona, Hawaii, *C. N. Forbes, 31,* in part.

Polyporus dryophilus Berk.
Waianae Range below Kolepole Pass, Oahu, *C. N. Forbes, 2034.O; J. F. G. Stokes, 8–S.*

Polyporus flabellaris Lloyd, Myc. Writ. **6:** 1035. *f. 1890.* 1921.
Maui, Aug., 1919, *C. N. Forbes, 1622.M.*

Polyporus gilvus Schw.
C. N. Forbes, 2n.2, 10–S, 11–S, 13–S; Kauai, *C. N. Forbes, 1190.K;* Molokai, *C. N. Forbes, 5.M;* on *Pithecolobium,* Oahu, *C. N. Forbes, 10–S; F. L. Stevens, 302, 410a,* (on Mango) *553, 554, 556, 557, 559, 560, 587, 1091.*

Polyporus lignosus Kl.
Molokai, *C. N. Forbes, 4.M*

Fomes Korthalsii (Lev.) Cooke as understood by Bresadola, Hedwigia **51:** 312. 1912.

An *Fomes senex* Nees & Mont.? Compare Lloyd, Myc. Writ. **4:** Syn. Fomes, 256, 259. 1917.

Slope of Mauna Loa, Hawaii, *C. N. Forbes, 14–S;* Kauai, *C. N. Forbes, 1193.K,* and an unnumbered specimen from Wapiawa Mts.; Maui, *C. N. Forbes, 17.M.*

These specimens agree with that distributed in Philippine Island Plants, *Elmer, 10646,* determined and cited by Bresadola as *F. Korthalsii.* Lloyd determined *Forbes, 17,* as *F. senex.* Lloyd does not state in his work that he has seen and compared with the type of *Fomes senex* Nees & Mont., coll. *Berteroa, 424,* in Juan Fernandez, hence it seems preferable to use for the present the name *Fomes Korthalsii. Fomes senex* has priority.

Fomes hawaiensis Forbes in Lloyd, Myc. Writ. 4: Syn. Fomes, 260, 287. 1917.

Type: *Forbes, 2.L* probably—a portion in Mo. Bot. Gard. Herb.

"Color bay, pore mouths 150 mic., otherwise as *Fomes senex*. Surely only a form, but of quite distinct form and pores one-half larger. Based on a collection from C. N. Forbes, Hawaii."

Hawaii, *C. N. Forbes* (on *Acacia*) *1075.H, 1077.H, 1079.H, 1080.H, 1081.H;* Kauai, *C. N. Forbes, 21;* Lanai, *C. N. Forbes, 2.L;* Molokai, *C. N. Forbes, 762.M, 1624.M;* Hawaiian Islands, *C. N. Forbes, 9-S, 11-S, 1076, 1629, 2116,* and *F. L. Stevens, 109, 548, 876.*

The above specimens show this species more triangular in section than *F. Korthalsii* and having a maximum thickness at the base of up to 9 cm. in specimens 5–8 cm. broad, with margin acute; pores about 4 to a mm., of the same color as the context and both between Brussels brown and antique brown; setae 30–35 × 6 μ; spores becoming colored, subglobose, even, 4½–5 × 4 μ. The coloration of all parts and the setae and spores are the same as in *F. Korthalsii.*

Fomes fasciculatus Burt, n. sp.

Type: in Mo. Bot. Gard. Herb.

Fructification narrowly effuso-reflexed or resupinate, 8–15 mm. thick, resupinate portion up to 10 cm. in diameter, the reflexed margin 5–10 mm. broad, becoming dark quaker-drab of Ridgway, glabrous, not shining, horny, the extreme margin light buff; context and tubes drab; tubes stratified; mouths light buff to pale drab-gray, circular, 6–8 to a mm.; hyphal fascicles present in the hymenium, no setae nor cystidia; a few loose spores hyaline, even, 4 × 3 μ.

The external aspect and coloration are somewhat suggestive of *Fomes fraxinophilus.* The hyphal fascicles, to which the specific name refers, are similar to those in the hymenium of *Polystictus hirsutus* and are a constant and distinctive specific character in many other Polypores, although not heretofore recorded for this family.

On dead Koa tree, Kauai, *A. A. Heller, 2677,* type (in Mo. Bot. Gard. Herb., 4588), distributed by Heller under the herbarium name *Poria albogrisea;* Lanai, *G. C. Munro, 1.*

Fomes robustus Karst.

Hawaii, *C. N. Forbes, 28, 29.H;* Lanai, *C. N. Forbes, 1.L;* Molokai, *C. N. Forbes, 1.M;* Hawaiian Islands, *F. L. Stevens, 595,* and *J. F. G. Stokes.*

Fomes rimosus Berk.

Kauai, *C. N. Forbes, 1189.K;* Lanai, *G. C. Munro, 2;* Hawaiian Islands, Bernice Pauahi Bishop Mus. Herb., *7-S.*

Fomes Fullageri (Berk.) Cooke.

C. N. Forbes, 10; F. L. Stevens, 91, 194, 362, (on *Acacia koa*) *584.*

Fomes (Ganoderma) australis Fr.

Hawaii, on *Acacia, C. N. Forbes, 1070.H, 1078.H;* Kauai, on *Acacia koa, C. N. Forbes, 1194.K;* Oahu, *C. N. Forbes, 2115.O, 2283.O, 2415.O,* and an unnumbered specimen, *F. L. Stevens,* an unnumbered specimen on *Eucalyptus;* Hawaiian Islands, *C. N. Forbes, 8-S, 25, 2006, H. L. Lyon, 89, G. C. Munro, 3.*

Fomes (Ganoderma) applanatus (Pers.) Wallr.

F. L. Stevens, 9189; Kawailoa, Oahu, *C. N. Forbes, 2114.O.*

Fomes (Ganoderma) fasciatus (Sw.) Fr.

C. N. Forbes, 3.

Polystictus microloma Lév.

F. L. Stevens, 417.

Polystictus fibula Fr.

F. L. Stevens, 1013.

Polystictus hirsutus (Wulf.) Fr.

F. L. Stevens, 847, 850, 956, 1013; Hawaii, *C. N. Forbes, 30.H.*

Polystictus floccosus (Jungh.) Fr. ?

F. L. Stevens, 1013, in part.

Polystictus pinsitus Fr.

F. L. Stevens, 917.

Poria fasciculata Burt, n. sp.

Type: in Mo. Bot. Gard. Herb.

Fructifications resupinate, effused, adnate, thin, warm buff of Ridgway, the margin whitish and cottony; tubes unequal,

angular, 1½–2 to a mm., 1–1½ mm. long; hyphal fascicles present in the hymenium but no setae, cystidia, nor gloeocystidia; basidia simple, with 4 sterigmata; spores copious, hyaline, even, subglobose, 4–5 × 3–4 μ.

Fructifications 3–7 cm. long, 2 cm. wide. On very rotten wood, Hawaiian Islands, *F. L. Stevens, 235*, type (in Mo. Bot. Gard. Herb., 59514).

In aspect *P. fasciculata* somewhat resembles *Poria Radula* and young *Irpex deformis* but has larger pores and is noteworthy by the hyphal fascicles in the hymenium—such as are present in *Polystictus hirsutus*.

Poria sp.

Inside rotting log, Kauai, July, *C. N. Forbes, 1191.K.*

Pores circular, about 4 to a mm.; fructification too deteriorated for determination.

Trametes corrugata (Pers.) Bresadola, Hedwigia **51**: 316. 1912.

Daedalea sanguinea Kl.—*Polystictus Persoonii* Cooke.

Hawaiian Islands, *F. L. Stevens, 74, 84, 85, 86, 88, 90, 191, 380, 410, 411, 552, 580,* (on Mango) *558, 920;* Hawaii, on *Aleurites, C. N. Forbes, 595.H, 595a.H;* Kauai, *C. N. Forbes, 765.K, A. A. Heller, 2653,* distributed under the name *Polyporus cupreo-roseus* (in Mo. Bot. Gard. Herb.); Molokai, *C. N. Forbes, 6-S-C, 797.M;* Oahu, on *Ficus elastica, W. T. Brigham, 6.S,* on dead *Aleurites molluccana, C. S. Judd.*

T. corrugata is probably common. When full grown it is a large bracket fungus; in section it is triangular, 9 cm. from margin to base, and with adnate base of 2–8 cm.; it is sometimes imbricated and the cluster may extend laterally 25 cm. In such specimens the greater part of the upper surface varies between vinaceous-brown and walnut-brown, with the margin and under surface and context pallid or whitish. Very young and small specimens are whitish everywhere, although very early the reddish brown color appears at the adnate base.

Trametes lactinea Berk.

Hawaii, *C. N. Forbes, 31.H;* Molokai, ——, *796.Mo.*

Trametes sp.

Molokai, *C. N. Forbes, 3.Mo, 9.Mo, 10.Mo.*

Laschia cucullata (Jungh.) Bresadola, Ann. Myc. 8: 587. 1910.
Merulius cucullatus Junghuhn, Crypt. Java, 76. 1838.—*Campanella cucullata* (Jungh.) Lloyd, Myc. Writ. 5: Myc. Notes 58: 815. *text f. 1358.* 1919.
On wood, Hawaiian Islands, *F. L. Stevens, 963, 1036.*

HYDNACEAE

Hydnum sp.
F. L. Stevens, 1148.
Small, sessile, dimidiate pilei about 1 cm. broad. The teeth have dried resin-color, like those of *H. pulcherrimum* but probably much too small for this although very immature. No hymenium yet present.

Odontia Wrightii (B. & C.) Pat.
F. L. Stevens, 966.
Easily recognized by the egg-yellow color of the fructifications. Common in North America and occurs also in South America and Japan.

Odontia?
On Kukui, *F. L. Stevens, L 397.*
The teeth do not retain their tips in my sections: hence this may be a resupinate *Hydnum.*

THELEPHORACEAE

Cyphella villosa (Pers.) Karst.
On dead stems of *Pipturus, F. L. Stevens, 589.*

Hymenochaete tenuissima Berk.
On decaying wood, *F. L. Stevens, 118, 967.*
This is the only pileate species of *Hymenochaete* received; the thin and pliant, sessile, tobacco-colored pilei make this easily recognizable.

Hymenochaete spreta Peck.
On frondose wood, *F. L. Stevens, 877.*

Hymenochaete cinnamomea (Pers.) Bres.
F. L. Stevens, 871, 878.
Always resupinate, like *H. spreta*, from which its most obvious difference is in not cracking in drying.

Stereum elegans (Mey.) Lloyd? See Burt, Mo. Bot. Gard. Ann. **7**: 105. *pl. 3, f. 15.* 1920.

On rotten, moss-covered wood, Oahu, Oct., 1911, *C. M. Cooke, 9-S.*

I should refer these specimens more confidently to *S. elegans*, had they been found growing on the ground and with the stem not glabrous.

Stereum latum Cooke & Mass. Grevillea **20**: 92. 1892; Sacc. Syll. Fung. **11**: 121. 1895.

F. L. Stevens, 236.

S. latum was described from specimens collected at Perak, Malay Peninsula, with my preparations and notes of which the Hawaiian specimens agree closely. The specimens have some resemblance to *Stereum cinerascens*, but are thinner and form large, easily separable, effuso-reflexed sheets, with the reflexed portion standing out 2–3 cm. and extending laterally more than 10 cm.; upper surface is strigose-hairy and concentrically sulcate; hymenium somewhat avellaneous when received and with a distinct tinge of pink suggestive of *Eichleriella Leveilliana;* cystidia incrusted, 30–50 × 11–16 μ; spores hyaline, even, 11 × 6 μ; KHO solution bleaches the sections and becomes somewhat vinaceous in their proximity by some substance which it dissolves.

Aleurodiscus perideniae (Berk. & Br.) Henn.

On dead wood having a large pith, E. Maui, July, 1910, comm. by F. L. Stevens, 26.

The fructifications are very beautiful, having the aspect of those of *Stereum ochraceo-flavum* but a more orange hymenium and wholly different structure.

Corticium arachnoideum Berk.

On dead stems of *Cibotium, F. L. Stevens, 964.*

Corticium granulare Burt, n. sp.

Type: in Mo. Bot. Gard. Herb.

Fructification effused, adnate, snow-white, pulverulent under a lens, very thin, only 15–30 μ thick, not bearing a continuous hymenium but consisting of bushy branched, suberect hyphal

clusters standing out from the substratum and near together, with their main trunks up to 6 μ in diameter and short-celled; no cystidia nor gloeocystidia; basidia simple, 15 × 4½ μ, with 4 sterigmata; spores hyaline, even, flattened on one side, 4–4½ × 3–4 μ, copious.

Fructifications scattered along the substratum, 1–3 cm. long, 4–8 mm. wide.

On dead herbaceous stems, Hawaiian Islands, *F. L. Stevens*, *381*, type.

Epithele hydnoides Burt, n. sp.

Type: in Mo. Bot. Gard. Herb.

Fructifications effused, adnate, drying pallid to olive-buff of Ridgway, very thin, 30 μ thick, with often not more than a basal cell between each basidium and the substratum; hymenium a plane surface parallel with the substratum and bristling with conical hyphal fascicles about 10 to a mm. which start from the substratum; hyphal fascicles 90 μ long, 20–30 μ in diameter at the base, with crystalline matter in the axis; basidia simple, 20–30 × 12 μ, with 4 large, divergent sterigmata; spores hyaline, globose, 9 μ in diameter, copious along the surface of the hymenium but none seen attached to the sterigmata.

Fructifications in numerous small patches 5 mm.–2 cm. long, 2–4 mm. wide, often becoming confluent.

On dead stems of *Cibotium*, Hawaiian Islands, *F. L. Stevens*, *957*, type.

Under a lens the fructifications have the aspect of a whitish, resupinate *Hydnum* but the hymenium does not clothe the organs resembling teeth. The whitish color, large, globose spores, and large basidia distinguish *E. hydnoides* from other species of the same genus.

AURICULARIACEAE

Auricularia auricula-Judae (L.) Schrt.

F. L. Stevens, *379*, *412*, *413*.

Auricularia nigrescens (Swartz) Farl.

Hirneola nigra Fr.—*Exidia polytricha* Mont.

F. L. Stevens, *89*, *590*; *H. L. Lyon*, in Sydow, Fungi Exot., 322, under the name *Auricularia nobilis;* Kauai, *C. N. Forbes*,

1184.K; Molokai, *C. N. Forbes, 5.M, 6.M;* cited from Oahu by Fries, Nov. Symb. Myc. 118. 1851

Auricularia tenuis (Lev.) Farl.

F. L. Stevens, 194a, 919, 943; cited from Oahu by Fries, Nov. Symb. Myc. 118. 1851.

This species differs from the preceding one in becoming glabrous; Nos. 919 and 943 show this change in progress, in 194a it is completed.

GASTEROMYCETES

Mycenastrum Corium (Guers.) Desv.

Slopes of Mauna Loa, Hawaii, *C. N. Forbes, 16-S.*

Myriostoma coliforme (Dicks.) Cda.

Geaster coliformis (Dicks.) Pers.

South of Omaopoili and near flow of 1843, 6300 ft. altitude, Hawaii, *C. N. Forbes, 1072.H.*

Lycoperdon cepaeforme (Bull.) Lloyd.

On lawn of Kamehameha School grounds, Oahu, May and September respectively, *C. N. Forbes, 2195.O, 2269.O.*

Lycoperdon gemmatum Batsch.

Maui, *C. N. Forbes, 1616.M.*

Lycoperdon Wrightii B. & C.

Aina Hoa, altitude 6000 ft., Hawaii, June 21, *C. N. Forbes, 906.H.*

Lycoperdon sp.

On *Sadleria* trunks, ridge, Mokai Gap, Kauai, *C. N. Forbes.*

PYRENOMYCETES

Ustulina vulgaris Tul.

Conidial stroma differentiating perithecia. This stage is often mistaken for a *Stereum.*

F. L. Stevens, 587.