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## THE AGARICACEAE OF TROPICAL NORTH AMERICA—IV

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All of the tropical genera with rose-colored spores are treated in this article. Those growing mostly on dead wood, like *Pluteus*, are well represented; while those growing normally in the soil, like *Entoloma*, have few tropical species. The probable reason for this has been discussed in a previous article. As may be seen from the following key, only one of the genera is provided with a volva, and this contains few species. None of the species possesses an annulus. The principal characters used in distinguishing genera are the attachment of the gills and the consistency of the stipe, which may at times leave the position of a species rather in doubt.

Volva and annulus wanting.

Stipe slender, cartilaginous.

Margin of pileus incurved when young.

Lamellae adnate or adnexed.

1. LEPTONIELLA.

Lamellae decurrent.

2. ECCILIA.

Margin of pileus straight and appressed when young; lamellae free or adnexed.

3. NOLANEA.

Stipe fleshy, usually stout.

Lamellae free.

4. PLUTEUS.

Lamellae sinuate or adnexed.

5. ENTOLOMA.

Lamellae decurrent.

6. PLEUROPUS.

Volva present, annulus wanting.

7. VOLVARIOPSIS.

1. LEPTONIELLA Earle, Bull. N. Y. Bot. Gard. 5: 424. 1909  
*Leptonia* (Fries) Quél. Champ. Jura Vosg. 88. 1872. Not  
*Leptonium* Griff. 1843.

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This genus includes species with adnate or adnexed lamellae and cartilaginous stipe, the margin of the pileus being incurved when young instead of straight as in *Nolanea*. The plants are usually small, with attractive blue, gray, or purple coloring. Only two species have been previously described from our tropics.

1. **Leptoniella hypoporphyra** (Berk. & Curt.)

*Agaricus* (*Leptonia*) *hypoporphyrus* Berk. & Curt. Jour. Linn. Soc. 10: 289. 1868.

Described from Wright's Cuban collections and found later in Guadeloupe by Duss. The spores are angular, 7–9  $\mu$ . The types at Kew are in poor condition.

2. **Leptoniella miniata** (Pat.)

*Leptonia miniata* Pat. Bull. Soc. Myc. Fr. 16: 176. 1900.

Collected on dead trunks of various trees in Guadeloupe by Duss. Pileus red, striate; spores angular, 10–13  $\mu$ . Abundantly represented in Dr. Patouillard's herbarium.

3. **Leptoniella atosquamosa** sp. nov.

Pileus broadly convex, slightly depressed, regular, solitary, 2 cm. broad; surface avellaneous, striate, clothed with innate, imbricate, fuliginous scales which are upturned at the end, the depressed umbo being decorated with black tufted scales; lamellae adnate, narrow, distant, about three times inserted, edges entire, concolorous; spores angular, 8–10  $\mu$ ; stipe cylindric, equal, murinous, 3.5 cm. long, 2–3 mm. thick.

Type collected on dead wood at Morce's Gap, Jamaica, 5000 ft. elevation, December 30, 1908, *W. A. & Edna L. Murrill* 708. Resembling *L. serrulata* in general appearance.

4. **Leptoniella Earlei** sp. nov.

Pileus convex, umbilicate, thin, solitary, 2 cm. broad; surface pale-tan, subfurfuraceous, the disk scaly, margin thin, not striate; lamellae adnexed, distant, broad, dirty-pink, heterophyllous; spores angular, irregular, 10–13  $\times$  7–8  $\mu$ ; stipe cylindric, glabrous, subpruinose above, slightly paler than the pileus, hollow, 4 cm. long, 2 mm. thick.

Type collected on the ground in woods on El Yunque, Cuba, 1800 ft., March, 1903, *Underwood & Earle* 427.

5. *Leptoniella cinchonensis* sp. nov.

Pileus thin, irregular, convex, umbilicate, gregarious, 2–2.5 cm. broad, less than 1 cm. high; surface dry, striate, avellaneous, fuliginous at the center, margin lobed; lamellae adnate, rather broad and distant, pale-russet; spores angular, uninucleate,  $10\text{--}12 \times 7\text{--}9\mu$ ; stipe cylindric, smooth, fumous, slightly tapering upward, 3 cm. long, 2.2 mm. thick.

Type collected on the ground on a shaded bank at Cinchona, Jamaica, 5000 ft. elevation, December 25–January 8, 1908–9, *W. A. & Edna L. Murrill* 562.

6. *Leptoniella mexicana* sp. nov.

Pileus convex to expanded, umbilicate, gregarious, 1.5 cm. broad; surface smooth, silky-fibrillose, pale-avellaneous, margin thin, fragile; lamellae adnate, broad, distant, heterophyllous, pale ashy-gray with a slight rosy tint; spores polygonal, uninucleate,  $7 \times 4.5\text{--}5\mu$ ; stipe slightly larger below, concolorous, glabrous, cartilaginous, 2.5 cm. long, 1.5 mm. thick.

Type collected on the ground in humus in a coffee plantation near Orizaba, Mexico, January 10–14, 1910, *W. A. & Edna L. Murrill* 837.

2. *ECCILIA* (Fries) Quél. Champ. Jura Vosg. 90. 1872  
*Hyporhodium* Schröt. Krypt. Fl. Schles. 3<sup>1</sup>: 613. 1889.

A small genus readily distinguished by its cartilaginous stipe and decurrent gills. One species, *E. rhodocylix*, has been reported from Cuba and Bermuda, but such tropical material as I have seen so determined does not agree with the European plant.

1. *ECCILIA ATRIDES* (Lasch) Quél. Champ. Jura Vosg. 90. 1872

A well-known European and temperate North American species reported as far south as North Carolina. The edges of the gills are black and denticulate; spores angular,  $7\text{--}9\mu$ .

Troy and Tyre, Jamaica, *W. A. Murrill & W. Harris* 1069; Jalapa, Mexico, *W. A. & Edna L. Murrill* 77.

2. *Eccilia cubensis* sp. nov.

Pileus convex, 1 cm. broad; surface dark-tan, darker at the disk, innate-scaly, not striate; lamellae decurrent, rather distant,

broad, dirty-white to slightly pinkish; spores octahedral, irregular,  $7-9\mu$ ; stipe cylindric, paler than the pileus, slightly granular-floccose, 2 cm. long, 1 mm. thick.

Type collected in a thicket on the bank of a stream near Herradura, Cuba, October 14, 1906, *F. S. Earle* 554.

### 3. *Eccilia Earlei* sp. nov.

Pileus thin, convex-umbilicate, 2 cm. broad; surface pale-tan, fibrillose-scaly, margin thin, substriate; lamellae decurrent, distant, broad, subarcuate, yellow to pinkish; spores irregularly angled,  $7-9\mu$ ; stipe cylindric, hollow, glabrous, dull-yellow, 4 cm. long, 2 mm. thick.

Type collected on a dead stick on El Yunque, Cuba, 1800 ft., March, 1903, *Underwood & Earle* 428.

### 4. *Eccilia jamaicensis* sp. nov.

Pileus thin, convex, umbilicate, solitary, nearly 2 cm. broad; surface smooth, glabrous, blackish, margin entire, concolorous; lamellae broad, distant, decurrent, straw-yellow; spores angular, pinkish,  $8-10 \times 7\mu$ ; cystidia none; stipe equal, hollow, flattened on drying, cartilaginous, glabrous, ardesiacous, 2 cm. long, 2 mm. thick.

Type collected on decayed wood at Chester Vale, Jamaica, 3000 ft., December 21-24, 1908, *W. A. & Edna L. Murrill* 367.

### 3. *NOLANEA* (Fries) Quél. Champ. Jura Vosg. 89. 1872

This genus has a cartilaginous stipe, free or adnexed gills, and a campanulate cap with straight margin. Berkeley described one species from Bermuda, and reported one of our northern species, *N. Babingtonii*, from Cuba. Several species appear to occur in South America.

1. *NOLANEA HELICTA* (Berk.) Sacc. Syll. Fung. 5: 729. 1887  
*Agaricus (Nolanea) helictus* Berk. Jour. Linn. Soc. 15: 48. 1877.

Collected by the Challenger Expedition on rotten leaf-mould in Bermuda. Several type specimens are at Kew. The name refers to the twisted stipe.

2. *Nolanea cubensis* sp. nov.

Pileus thin, convex to subexpanded, subumbonate, 2–3 cm. broad; surface pale-fuscos, minutely silky-fibrillose, at length rimose, striate to the umbo; lamellae free, crowded, rather broad, ventricose, white to pale-roseous; spores subglobose, smooth,  $6\mu$ ; cystidia none; stipe cylindric, solid, white, glabrous above, brownish-flocculose at the base, 3 cm. long, 2 mm. thick.

Type collected on a piece of board on the ground in a coffee grove at Santiago de las Vegas, Cuba, August 29, 1904, *F. S. Earle* 155.

3. *Nolanea jamaicensis* sp. nov.

Pileus campanulate with conic umbo, about 4 cm. broad; surface striate, glabrous, avellaneous, umbrinous to fuliginous at the umbo, margin entire, concolorous; lamellae rather broad, close, adnexed, salmon-colored from the copious spores, which are angular, somewhat longer than broad,  $9-11 \times 7-9\mu$ ; stipe cylindric, equal, smooth, glabrous, pale-avellaneous, 6 cm. long, 3 mm. thick.

Type collected at Cinchona, Jamaica, December 25–January 8, 1908–9, *W. A. & Edna L. Murrill* 566.

## 4. PLUTEUS Fries, Gen. Hymen. 6. 1836

This genus is best known through its large and common representative, *P. cervinus*. The lamellae are free, the stipe fleshy or fibrous, and most of the species are found on decayed wood. The spore characters are similar throughout the genus. Cystidia occur rarely, and in one species they are peculiar in having the apex divided into two or more points.

## 1. PLUTEUS CERVINUS (Schaeff.) Quél. Champ. Jura Vosg. 81. 1872

Abundant in various forms throughout the United States and Europe on decayed wood and sawdust piles. Spores ellipsoid, smooth,  $7-8 \times 5-6\mu$ ; cystidia bottle-shaped, large and conspicuous, divided at the apex into two, three, or more points. The tropical stations given below are all at 5000 ft. elevation.

Cinchona, Jamaica, *W. A. & Edna L. Murrill* 452, 602; Jalapa, Mexico, *W. A. & Edna L. Murrill* 164; Cuernavaca, Mexico, *W. A. & Edna L. Murrill* 380.

**2. *Pluteus reticulatus* sp. nov.**

Pileus plane to depressed, umbonate, solitary, 5 cm. broad, about 1 cm. thick; surface velvety, dark-isabelline with pale-fuliginous reticulations, which are more pronounced on the umbrinous umbo; lamellae free, ventricose, salmon-colored; spores subglobose, smooth, uninucleate.  $4-5 \times 3.5-4 \mu$ ; cystidia fusiform, pointed, not divided at the apex, rather abundant, about  $60 \times 17 \mu$ ; stipe cylindric, subequal, glabrous, stramineous with a pale-melleous tint, 4 cm. long, 5 mm. thick.

Type collected on dead wood near Moneague, Jamaica, about 2000 ft., January 17-18, 1909, *W. A. Murrill 1159*.

**3. *PLUTEUS NITENS* Pat. Bull. Soc. Myc. Fr. 14: 53. 1898**

Type collected by Paul Maury on dead wood at Motzorongo, Mexico, February 12-25, 1891. The original specimens, accompanied by a drawing, are in the herbarium of Dr. N. Patouillard, in Paris.

Motzorongo, Mexico, *Maury, W. A. & Edna L. Murrill 1028, 1055*; Santiago de las Vegas, Cuba, *Earle 260, 501*.

**4. *Pluteus Earlei* sp. nov.**

Pileus rather thick, expanded, somewhat gibbous, 10 cm. broad; surface dry, densely floccose, uniformly pale-yellow, margin even, not striate; lamellae free, crowded, broad, becoming dull-pinkish; spores regular, ovoid, smooth, uninucleate, dark-pink when fresh,  $7-8 \times 6 \mu$ ; cystidia none; stipe slightly tapering upward, solid, white, glabrous, 8 cm. long, 1 cm. thick.

Type collected on a dead log near Guanajay, Cuba, September 14, 1904, *F. S. Earle & P. Wilson 1525*. Similar to *Pluteus cervinus* in size and shape, but differing in several important characters.

**5. *Pluteus rimosus* sp. nov.**

Pileus conic to convex, 4-5 cm. broad, 2-3 cm. high, gregarious; surface fuliginous when young, becoming umbrinous, smooth, glabrous, at length radiate-rimose and showing white in the cracks; lamellae free, close, rather narrow, white, becoming roseous from the spores; spores regular, globose, smooth, uninucleate,  $4 \mu$ ; cystidia none; stipe white, glabrous, much enlarged below, crooked, 4.5 cm. long, scarcely 1 cm. thick above, 2 cm. thick at the base.

Type collected in a field near the shore east of Port Antonio, Jamaica, on soil mixed with decayed wood, December 17, 1908, *W. A. Murrill 214*.

6. *Pluteus multistriatus* sp. nov.

Pileus convex, depressed about the umbo, somewhat clustered, 3 cm. broad; surface fuliginous, subglabrous, with numerous shallow furrows, or striations, extending from the umbo to the margin; lamellae free, close, broad, pallid; spores globose or subglobose, smooth, uninucleate,  $5-7\mu$ ; cystidia none; stipe slender, equal, glabrous, white, 4 cm. long, 2-3 mm. thick.

Type collected on a decayed railway tie at Jalapa, Mexico, 5000 ft., December 12-20, 1909, *W. A. & Edna L. Murrill III*. No. 112 of the same collection represents depauperate forms of this species.

7. *Pluteus Harrisii* sp. nov.

Pileus convex to depressed, obtuse, 2-3 cm. broad; surface avellaneous-fuliginous to dark-chestnut, glabrous, subrugose, finely asperate and striate; lamellae free, subcrowded, slightly ventricose, white to salmon; spores broadly ellipsoid to subglobose, regular, smooth, uninucleate, about  $7\mu$  long, rarely  $9\mu$ , and  $5-6\mu$  broad; cystidia none; stipe cylindric, solid, white, glabrous, shining, 3-4 cm. long, 2-3 mm. thick.

Type collected on dead wood in Troy and Tyre, Jamaica, 2000 ft., January 12-14, 1909, *W. A. Murrill & W. Harris 956*. Also collected on El Yunque, Cuba, 1800 ft., March, 1903, *Underwood & Earle 425*.

8. *PLUTEUS ALBORUBELLUS* (Mont.) Pat. Bull. Soc. Myc. Fr.  
15: 196. 1899

*Agaricus (Mycena) alborubellus* Mont. Ann. Sci. Nat. IV. 1: 96. 1854.

Originally described from French Guiana, and later collected in Guadeloupe by Duss, on dead branches of *Bignonia*.

9. *PLUTEUS LAETIFRONS* (Berk. & Curt.) Sacc. Syll. Fung.  
5: 677. 1887

*Agaricus (Pluteus) laetifrons* Berk. & Curt. Jour. Linn. Soc. 10: 289. 1868.

Collected by Wright on rotten wood in Cuba. Pileus about

5-10 mm. broad, glabrous, radiate-striate, orange-red; lamellae yellow; stipe slender, glabrous, red.

10. *Pluteus jamaicensis* sp. nov.

Pileus thin, expanded, obtuse, subcespitose, 1-3 cm. broad; surface dark-brown, paler with age, rugose, crustose-areolate, not striate; lamellae free, subcrowded, broad, ventricose, white to pink; spores globose, smooth,  $4\mu$ ; cystidia none; stipe enlarged above and below, solid, glabrous except at the base, which is conspicuously whitish-tomentose, 2 cm. long, 2 mm. thick.

Type collected on rotten wood at Castleton Gardens, Jamaica, October 28, 1902, *F. S. Earle* 220. The dried plants resemble closely the faded type specimens of *P. lactifrons* at Kew, but the two species are very dissimilar in a fresh condition.

11. *PLUTEUS TEPHROSTICTUS* (Berk. & Curt.) Sacc. Syll. Fung.  
5: 669. 1887

*Agaricus (Pluteus) tephrostictus* Berk. & Curt. Jour. Linn. Soc.  
10: 289. 1868.

Collected by Wright on the under side of old logs in Cuba. The types at Kew are in poor condition. Pileus 1.2 cm. broad, umbonate, white, covered with a black, glandular pubescence.

12. *PLUTEUS AETHALUS* (Berk. & Curt.) Sacc. Syll. Fung.  
5: 674. 1887

*Agaricus (Pluteus) aethalus* Berk. & Curt. Jour. Linn. Soc. 10:  
289. 1868.

Described from plants collected by Wright on rotten wood in Cuba. Pileus date-brown, less than 1 cm. broad; spores globose,  $5\mu$ . Two small type specimens are preserved at Kew.

Cuba, *Wright* 50; Tepeite Valley, Mexico, *W. A. & Edna L. Murrill* 471.

DOUBTFUL SPECIES

*Pluteus leoninus* (Schaeff.) Quél. Champ. Jura Vosg. 82. 1872. A temperate species reported from Guadeloupe by Duss, but specimens not examined.

5. *ENTOLOMA* (Fries) Quél. Champ. Jura Vosg. 83. 1872  
*Rhodophyllus* Quél. Ench. Fung. 57. 1886.

This genus differs from *Pluteus* in having sinuate or adnexed lamellae, corresponding to *Tricholoma* in the white-spored series. The species are abundant in temperate regions, but none have heretofore been reported from tropical America.

1. *ENTOLOMA MURRAII* (Berk. & Curt.) Sacc. Syll. Fung. 14: 127. 1899

*Agaricus* (*Entoloma*) *Murraii* Berk. & Curt. Ann. Mag. Nat. Hist. III. 4: 289. 1859.

First collected in New England by Murray, and later found as far north as Maine and as far south as Alabama. With the habit and brilliant coloring of *Hydrocybe*, it unites a peculiar shape and remarkable many-angled or irregularly stellate spores. The coloring and striation of the cap varies with age, climate, etc.

Morce's Gap, Jamaica, *W. A. & Edna L. Murrill* 676; Sir John Peak, Jamaica, *W. A. Murrill* 794; Troy and Tyre, Jamaica, *W. A. Murrill & W. Harris* 881; Rose Hill, Jamaica, *F. S. Earle* 289; British Honduras, *Morton E. Peck*.

2. *Entoloma cinchonensis* sp. nov.

Pileus hemispheric, slightly depressed at the center, solitary, 1–1.5 cm. broad; surface smooth, dry, subglabrous, ochroleucous; margin very thin, sometimes eroded; lamellae sinuate, broad, rather close, heterophyllous, pale-citrinous to salmon-colored, edges notched or irregular; spores subglobose to ovoid, smooth,  $4-5 \times 3-3.5 \mu$ ; stipe slightly tapering upward, smooth, glabrous, cremeous above, ochraceous below, 1.5 cm. long, 1.5 mm. thick.

Type collected on much decayed wood at Cinchona, Jamaica, 5000 ft. elevation, December 25–January 8, 1908–9, *W. A. & Edna L. Murrill* 661. Also collected on dead wood at Morce's Gap, Jamaica, 5000 ft. elevation, near Cinchona, December 29–January 2, 1908–9, *W. A. & Edna L. Murrill* 687.

6. *PLEUROPUS* Roussel, Fl. Calvados ed. 2. 67. 1806

*Clitopilus* (Fries) Quél. Champ. Jura Vosg. 87. 1872.

*Rhodosporus* Schröt. Krypt. Fl. Schles. 3<sup>1</sup>: 617. 1889.

This genus has a fleshy or fibrous stem and decurrent gills. It is represented by a number of temperate species, but has heretofore been unknown in tropical America.

1. **Pleuropus abortivus** (Berk. & Curt.)

*Agaricus* (*Clitopilus*) *abortivus* Berk. & Curt. Ann. Mag. Nat. Hist. III. 4: 289. 1859.

*Clitopilus abortivus* (Berk. & Curt.) Sacc. Syll. Fung. 5: 701. 1887.

This species, originally described from Sprague's collections in New England and known to occur from Canada to Alabama and west to Wisconsin, is peculiar in having aborted sporophores more frequently than normally developed ones. These irregularly globose abortions, distantly resembling puff-balls, were found in the market at Jalapa, having been collected in the surrounding forests by the Indians for food.

Jalapa, Mexico, *W. A. & Edna L. Murrill* 194; Tepeite Valley, Mexico, *W. A. & Edna L. Murrill* 476.

2. **Pleuropus Earlei** sp. nov.

Pileus thin, firm, convex to subexpanded, umbilicate, gregarious, 1–2 cm. broad; surface pure-white, glabrous, margin entire, inrolled when young; lamellae short-decurrent, subcrowded, narrow, irregular, pure-white to pink; spores angular,  $7 \times 5\text{--}6\mu$ ; stipe short, subequal, often flattened, pure-white, fistulose, minutely pruinose to glabrous, surrounded at the base with whitish mycelium, 2–3 cm. long, 2–3 mm. thick.

Collected on the ground in a banana field at Santiago de las Vegas, Cuba, from May to September, 1904, *F. S. Earle* 31 (*type*), 70, 179. The fresh specimens have a strong odor of wild onions.

7. **Volvariopsis** nom. nov.

*Volvarius* Roussel, Fl. Calvados ed. 2. 59. 1806. *Volvaria* (Fries) Gillet, Champ. Fr. 1: 385. 1878. Not *Volvaria* DC. 1805.

The type of this genus is *Volvaria volvacea* (Bull.) Quél. The species are largely temperate, and form a natural group with distinctive characters, corresponding to *Amanitopsis* in the white-spored series. Only one species, *V. bombycina*, has heretofore been reported from tropical America. *Locellina hiatuloides* Pat., described from Guadeloupe, has the form and appearance of a species of this genus, but the spores are ochraceous. It is just possible that their color has become changed in drying.

1. **Volvariopsis bombycina** (Schaeff.)

*Volvaria bombycina* (Schaeff.) Quél. Champ. Jura Vosg. 80. 1872.

This very handsome species occurs on decayed trunks of hardwood trees from New England to Florida and west to California in the United States. It is also well-known in Europe and was collected by Wright in Cuba. The surface of the pileus is white and silky-fibrillose; the spores are broadly ellipsoid,  $6-8 \times 5-6 \mu$ .

Valparaiso, Cuba, *Wright* 63; Herradura, Cuba, *F. S. Earle* 564; Guane, Pinar del Rio, Cuba, *N. L. Britton, E. G. Britton & J. F. Cowell* 980.

2. **Volvariopsis Bakeri** sp. nov.

Pileus fleshy, ovoid to convex, densely gregarious, reaching a breadth of 10 cm.; surface dark-fuliginous, becoming much lighter with age, appressed-fibrillose from the cracking of the cuticle, not striate; context white, with mild taste and no appreciable odor; lamellae free, crowded, not very broad, white, becoming pink; spores broadly ellipsoid, rarely ovoid, smooth, roseous,  $6-8 \times 4-5 \mu$ ; stipe tapering upward, white, glabrous, solid, 8-9 cm. long, 1-1.5 cm. thick; volva free, open, dark-fuliginous, 3-4 cm. long, 2-3 cm. broad.

Type collected on a dead banana stump at Santiago de las Vegas, Cuba, May 19, 1906, *C. F. Baker* (*F. S. Earle* 521).

3. **Volvariopsis jamaicensis** sp. nov.

Pileus thin, convex to nearly plane, gregarious, 5 cm. broad; surface ashy-white, avellaneous at the center, radiate-striate, slightly granular, margin thin, entire; lamellae free, close, narrow, white to salmon-colored; spores narrowly ellipsoid, smooth, uninucleate, about  $5 \times 3 \mu$ ; stipe curved, slightly tapering upward, glabrous, whitish, hollow, with a tough rind, 5 cm. long, 3-5 mm. thick; volva rather delicate, narrow, avellaneous, 1-2 cm. long.

Type collected on the decaying roots of an upturned tree in a virgin forest near Moore Town, Jamaica, 800 ft. elevation, December 16, 1908, *W. A. & Edna L. Murrill* 150.

4. **Volvariopsis cubensis** sp. nov.

Pileus firm, fleshy, rather tough, irregularly expanded, obtuse, solitary, 7 cm. broad, with strong, unpleasant odor; surface dark



Murrill, William A. 1911. "The Agaricaceae of tropical North America IV." *Mycologia* 3(6), 271–282.

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