

THE GENUS GALERULA IN NORTH AMERICA.

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*Galerula*¹ is a genus of yellow-spored Agaricaceæ including small plants or those of medium size, but slender in form, and fragile. The species have no claim to rank of economic importance, while their ecological rôle as saprophytes is not large, owing to the comparatively small number of individuals. Many species are usually associated with mosses on logs or ground in the woods or swamps. A number of species occur on dung heaps or in recently manured grass lands. The larger number of species are some shade of yellow, or tawny, or ochraceous. In taxonomic works the genus is usually divided into sections according to external characters and ecological relations. By this method the species are not grouped according to their real affinities, and in a few cases forms not closely related are assembled under a single specific name.

A high degree of internal structural differentiation has taken place in the evolution of the species. In the present study this vantage point has been employed to group the species into sections more nearly in accord with their true relationships.

In some respects the genus, as usually recognized, occupies the same position in the yellow-spored Agarics that *Mycena* does in the white-spored group. The pileus is usually campanulate; the stem

¹ *Galera* Blume, *Bijdr.*, 415, 1825, is employed for a genus of orchids. *Galera*, by Fries in *Syst. Myc.*, 2: 264, 1821, as a tribe of *Agaricus*, was raised to generic rank by Quélet in 1872 ("Champ. Jura et Vosges," 135). Therefore while *Galera* Fries antedates *Galera* Blume by four years, it was used as a subgenus, or tribe, and cannot take precedence over *Galera* Blume, in accordance with rule 49 of the International Rules for Botanical Nomenclature. *Galerula* was employed by Karsten (*Bidr. Finl. Nat. Folk.*, 32, 442) in 1879 as a genus for several species which he separated from *Galera*. *Galerula* Karsten is employed here in the broader sense of the genus with practically the same limits as used by Murrill in 1917 ("N. Am. FL," 10, 161, 1917).

has a cartilaginous rind; in the young stage the margin of the pileus is straight, lying parallel with the stem, *i. e.*, the margin not being incurved; a distinct veil is usually absent, or if present it is not usually of sufficient tenacity to form a distinct annulus on the stem. This feature of the straight pileus margin is often difficult to determine, since, in many cases, the number of individuals of a species collected is often too few, and they are in a too advanced stage of development to determine the relation of the pileus margin to the stem. Nevertheless, to one possessing some familiarity with the genus, the external form or "habit" of the plants, taken in conjunction with their color, serves in a large number of cases as a reasonably sure provisional means of differentiation from the related genera.

In some well-recognized species of the genus, however, the margin of the pileus is incurved in the young stages and never becomes straight. A notable example is *Galerula angusticeps*. Furthermore, there appear to be structural characters of great importance which indicate that certain species with a convex pileus, or a few with the margin incurved when young, are more closely related to the *Galerula* type than to other types, for example, certain species which, on the basis of the "habit" principle would fall in the genus *Naucoria*, *Pluteolus*, or even *Hebeloma*; while a few species placed in *Galerula* because of the "habit" formula, are excluded when the morphological, or structural, principle is employed as the basis of determining relationships.

On the basis of the morphological principle the species can be arranged in two groups. First, those in which the pileus is homogeneous, and second, those in which the pileus is corticated. This principle of grouping the species was, in fact, employed a quarter of a century ago by Fayod² who carried the principle still further by recognizing two generic concepts. He recognized *Conocybe* for the species with a corticated pileus, and *Galera* for those with a homogeneous pileus.

In his concept of the genus *Conocybe*, the cortex of the pileus was merely indicated as "pseudoparenchymatous." This definition

² Fayod V., "Prodrome d'une histoire naturelles des Agaricinés," *Ann. Sci. Nat. Bot.*, VII., 9: 181-411, 1889.

of the cortex does not appear to be sufficiently clear, and does not separate the true species of this section of *Galerula* from species of *Naucoria* and *Hebeloma* having a more or less pseudoparenchymatous cortex. According to the principle followed in the present arrangement, the cortex of the pileus in this section of the genus is more highly differentiated than the simple pseudoparenchymatous cortex. There is an outer layer clavate to pyriform cells, in the young stage forming a more or less definite palisade layer. In age these cells in certain species swell to a large size, as well as certain cells beneath this layer, so that the cortex takes on a pseudoparenchymatous aspect, but close examination shows the large pyriform cells of the surface, and it can be seen that the pseudoparenchyma is of a different origin and structure from that which I have termed simple pseudoparenchyma in certain species of *Naucoria* and *Hebeloma*.

Still further differentiation is manifest in the structure of the lamellæ. All species recognized here as belonging to *Galerula* are provided with specialized cells in the hymenium, usually termed *cystidia*. These vary in form and in their distribution on the lamellæ. They will not be discussed in detail at the present time. In the synopsis of the species presented below their form and arrangement is clearly indicated. The species with a corticated pileus are regarded as more highly specialized, those of the last section having reached the highest stage of specialization with corticated pileus and lecythiform or stopper-shaped cystidia. This specialization is further indicated by the large number of species with two-spored basidia.

There appear to be rather clear evidences of progression in development from the simpler forms of the species with a homogeneous pileus, and diverging in two lines, one line culminating in the corticated species, the other line retaining the homogeneous structure of the pileus. *Galerula angusticeps* proves to be an interesting species in this connection. Some individuals have the pileus homogeneous in structure, while others show a rudimentary cortex of the *Galerula* type. It is therefore placed in both of the principal groups in the synopsis. After a critical study of the species in allied genera has been made, it may be possible to make some suggestions concerning the relationships within the group.

This structural study of the genus *Galerula* in North America is based on an examination of material collected by myself during many years in this country and in Europe. The latter material was collected principally in Sweden and France. The determinations were confirmed or made by Dr. Robert Fries, son of Elias Fries for the species from Sweden, and by E. Boudier for the species from France. Through the courtesy of the State Botanist, Dr. H. D. House, I have had the opportunity of examining Dr. Peck's types in the State Museum at Albany. Through the courtesy of Dr. N. L. Britton, director of the New York Botanical Garden, and Dr. W. A. Murrill, I have examined also nearly all of the types in the Herbarium of the N. Y. Bot. Gard., and some European species.

There are 58 species from North America in the following synopsis.

SYNOPSIS OF THE SPECIES.

PILEUS HOMOGENEOUS.

Cystidia flask-shaped-lanceoloid-fusoid.

Cystidia on sides and edges of lamellæ.

I.

Galerula besseyi (Pk.) Murr. N. Am. Fl. 10, 163, 1917.

Galera besseyi Peck, N. Y. State Mus. Bull. 131, 35, pl. 5, figs. 15-20, 1909.
Nebraska.

Galerula hypnorum (Fr. emend. Pat.) Atkinson.

Agaricus (*Galera*) *hypnorum* Fr. ex Schrank. Syst. Myc. 1: 267, 1821.

Galera hypnorum Quélet Champ. Jura et Vosgès, 1: 137, 1872;
Emend Patouillard, Tab. analyt. Fung. 1: 103, fig. 230, 1884.

Galerula hypni Murr. pr. pte. N. Am. Fl. 10: 163, 1917.

Galerula reflexa Murr. N. Am. Fl. 10: 169, 1917.

Oregon, Mexico, Europe.

Galerula muricellospora nov. sp. Gregaria vel solitaria: 4-7 cm. alta: pileo campanulato, interdum convexo, hygrophano, striato,

fulvo vel ochraceo, demum pallidore, glabro, homogneo, 3-6 mm. lato, 3-5 mm. alto: lamellis stipite adnaxis vel anguste adnatis, subventricosis, subdistantibus, pallide ochraceis: cystidiis in superficie et in acie lamellarum, sublanceoloideis vel subfusoides, ad basem subventricosis, $40-90 \times 10-15 \mu$: sporis binis, ferrugineis, ovatis vel late subfusoides, a latere inequilateralibus, demum minute echinulatis, $10-14 \times 6-9 \mu$: stipite æquali, recto vel flexuoso, ochraceo-brunneo, sursum pallide luteo et pruinoso, fistuloso, 1-1.5 mm. crasso.

No. 7837, type, C. U. Herb., among living mosses, Coy Glen, near Ithaca, N. Y. Oct. 12, 1901. J. M. Van Hook collector.

New York, Colorado.

Galerula paludicola nov. sp. Gregaria vel dispersens, 5-13 cm. alta: pileo campanulato, dein convexo-expanso et umbonato, 1-2.5 cm. lato, hygrophano, ochraceo, striatulo, demum ochroleuco, homogneo: lamellis stipite adnatis, leniter emarginatis, pallide ochroleucis vel pallide-brunneis: cystidiis in superficie lamellarum subfusoides, $45-50 \times 10-12 \mu$: in acie lamellarum cystidiis similibus: sporis quaternis, subellipsoideis, $10-14 \times 6-7 \mu$: stipite æquali, interdum bulbilloso, leniter floccoso-squamoso, luteo vel rubescente-luteo, deorsum obscuriore, 2-3 mm. crasso.

23576, type, C. U. Herb., among sphagnum, Malloryville Moor between McLean and Cortland, N. Y. Oct. 17, 1913. G. F. Atkinson collector.

New York.

Cystidia only on edges of lamellæ.

II.

Galerula cerina (Bres.) Atkinson nov. sp.

Galera cerina Bresadola n. sp. "in Herbario non publicaris."

Gregaria, 1.5-4 cm. alta: pileo campanulato vel convexo, obtuso, interdum subumbonato, glabro, striato, 2-8 mm. lato, 2-5 mm. alto, hygrophano, ochraceo-fulvo vel pallide ochraceo, demum ochroleuco, homogneo: lamellis stipite adnatis, subventricosis, pileo concoloribus: cystidiis solum in acie lamellarum, numerosis, subcylindricis, ad basem subventricosis, interdum subcapitatis, rectis vel flexuosis, $30-60 \times 8-12 \mu$: sporis quaternis, ferrugineis vel ochraceo-fulvis, ovatis vel subnavicularibus, ad basem latioribus, levibus, $8-14 \times 6-8 \mu$: demum membrana sporæ rugulosa vel saccata: stipite æquali, subbulboso, pileo concolore vel decorsum obscuriore, sursum pruinoso, 1 mm. crasso.

No. 25019, type, C. U. Herb., on humus near sphagnum in swamp 2.5 miles south of Oakland, Md. Sept. 16, 1917. G. F. Atkinson collector.

Maryland, North Carolina, New York.

Galerula coniferarum Murr. N. Am. Fl. 10, 162, 1917.

New York.

Galerula hemispherica Murr. N. Am. Fl. 10, 164, 1917.

New York.

Galerula heterocystis nov. sp.

Galerula hypni Murr. pr. pte. N. Am. Fl. 10, 163, 1917.

Forma et color *Galerulae* hypnorum: cystidiis in acie lamellarum confertissimis, in superficie nullis, tibiiformibus vel clavato-mucronatis, $25-40 \times 10-14 \mu$: sporis quaternis, ovatis, a latere inequalateralibus, $12-15 \times 6-7 \mu$.

Type "Fungi of Jamaica, No. 435, Cinchona, 4,500-5,200 ft. alt.," N. Y. Bot. Gard. Herb.

Galerula inculta (Pk.) Murr. N. Am. Fl. 10, 165, 1917.

Galerula inculta Peck, N. Y. State Mus. Ann. Rep. 41, 169, 1888.

New York.

Galerula lignicola Murr. N. Am. Fl. 10, 165, 1917.

New York.

Galerula minuta (Quélet.) n. comb.

Galerula minuta Quélet, Champ. Jura, Vosges, 3, 438, pl. 1, fig. 5, 1875.

New York.

Galerula parvula Murr. N. Am. Fl. 10, 162, 1917.

Tennessee.

Galerula sphagnicola nov. sp. Gregaria vel solitaria, 5-8 cm. alta: pileo campanulato dein expanso, umbonato, 1.5-2.5 cm. lato,

hygrophano, cinnamomeo-brunneo, striato, demum pallidiore: contexto homogenero: lamellis stipite adnexis, in lineis decurrentibus, distantibus, cinnamomeo-brunneis, cystidiis solum in acie lamellarum, numerosis, crassis, cylindricis et deorsum ventricosis, interdum flexuosis, $30-45 \times 9-12 \mu$: sporis quaternis, ovalibus vel subnavicularibus, ad basem crassioribus, $8-11 \times 6-8 \mu$: membrana sporæ interdum rugulosa vel subinflata: stipite æquali, pileo concolore sed interdum pallidiore, demum pallide-cinnamomeo, glabro, sursum pruinoso, cavo, 2-4 mm. crasso.

No. 18587, type, C. U. Herb., among sphagnum in very wet places, Junius, N. Y. Sept. 15, 1904. H. H. Whetzel and H. S. Jackson collectors.

New York, Alabama.

Galerula sphagnum (Fr. ex Pers.) Murr. N. Am.

Fl. 10: 167, 1917, emend Atkinson.

Agaricus hypnorum sphagnum Pers. Syn. Fung. 386, 1801. Name only. Type not determined.

Agaricus hypnorum sphagnum Fr. Syst. Myc. 1, 267, 1821. Name only.

Agaricus sphagnum Lasch, Linnaea, 3: 417, 1828.

Galera sphagnum Sacc. Syll. Fung. 5: 869, 1887.

Galera hypnorum var. *umbonata* Peck, N. Y. State Mus. Bull. 25, 655, 1899.

Maryland, New York, Europe.

Galerula subhypnorum nov. sp.

Galerula hypni Murr. pr. pte. N. Am. Fl. 10, 163, 1917.

Gregaria vel dispergens, 2-6 cm. alata: pileo campanulato-convexo, obtuso vel umbonato, ad marginem striato, hygrophano, fulvo vel ochraceo-fulvo, demum pallidore, homogenero, 4-10 mm. lato: lamellis stipite adnatis, subdistantibus, ochraceo-fulvis: cystidiis solum in acie lamellarum, numerosis, lanceoloideis vel subcylindricis et ad basem subventricosis, in apice interdum crassioribus, $40-70 \times 6-11 \mu$: sporis quaternis, ochraceis, a fronte subellipsoideis vel subfusoides, a latere leniter inequilateralibus, levibus, $10-14 \times 6-8 \mu$: stipite pileo concolore sed pallidiore, ad basem interdum obscuriore, cavo, 1 mm. crasso.

This species differs from *G. hypnorum* in the absence of cystidia

on the sides of the gills, in their different form, and in the lighter-colored, thinner-walled spores.

New York, Maine, Washington, Europe.

Cystidia tibiiform, only on edges of lamellæ.

III.

Galerula bryophila (Pk.) nov. comb.

Galerula bryophila Peck, N. Y. State Mus. Ann. Rept. 54, 149, 1901.

Galerula hypni Murr. pr. pte. N. Am. Fl. 10: 163, 1917.

New York, Colorado, Mexico.

Galerula lasiosperma nov. sp. Gregaria vel solitaria, 6–9 cm. alta: pileo ovali-campanulato, dein convexo et expanso, obtuso, hygrophano et ad marginem striatulo, 1 cm. lato, 4–5 mm. alto, castaneo, demum fulvo vel ochraceo-fulvo, homogæneo: lamellis stipite adnatis, ventricosis, subdistantibus, ochraceis: cystidiis solum in acie lamellarum, tibiiformibus, ad basem subventricosis, sersum teretibus et capitatis, $30-45 \times 6-8 \mu$: sporis quaternis, ferrugineis, ovalibus vel subreniformibus vel fabiformibus, leniter echinulatis, $7-11 \times 5-7 \mu$: stipite æquali, recto vel flexuoso, pileo concolore sed pallidiorè, sursum pruinoso, ad basem albo-myceleoidè, cavo, 1–1.5 mm. crasso.

No. 25033, type, C. U. Herb., on sphagnum in open field, Teet's Farm, Cranesville moor, Western Maryland. Sept. 18, 1917. G. F. Atkinson collector.

Maryland.

Galerula lenticeps (Pk.) nov. comb.

Agaricus lenticeps Peck, N. Y. State Mus. Ann. Rept. 31, 34, 1879.
Naucoria lenticeps Sacc. Syll. Fung. 5, 838, 1887.

New York.

Galerula pistillicystis nov. sp. Gregaria, 2–3 cm. alta: pileo hemisphaerico-campanulato, 4–10 mm. lato, hygrophano, striato, luteo, dein pallide ochraceo, homogæneo: lamellis stipite adnatis, subventricosis, ferrugineis: cystidiis solum in acie lamellarum, numerosis, pistilliformibus, ad basem ventricosis, sursum teretibus et capitatis, $25-35 \times 6-8 \mu$: sporis quaternis, ferrugineis, subellipsoideis, levibus, $7-10 \times 3.5-5 \mu$: stipite æquali, pileo concolore sed pallidiorè, glabro, sursum pruinoso, cavo, 1 mm. crasso.

No. 24072, type, C. U. Herb., on a rotten log among mosses, in a

swamp bordering on Labrador Lake, near Apulia, Onondago Co., N. Y. June 12, 1917. G. F. Atkinson collector.

New York.

Galerula rufipes (Pk.) Murr. N. Am. Fl. 10, 164, 1917.

Galera rufipes Peck, N. Y. State Mus. Ann. Rept. 42, 116 (20), 1889.

New York.

Galerula semilanceata (Pk.) n. comb.

Galera semilanceata Peck, Torr. Bot. Club Bull. 23, 415, 1896.

Washington.

Galerula stylifera nov. sp. Gregaria, 3-5 cm. alta: pileo ovali dein campanulato, matura expanso et subumbonato, 1-2 cm. lato, hygrophano, ochroleuco-fulvo vel pallide-ochraceo, demum ochroleuco, glabro, homoganeo: lamellis stipite adnatis, emarginatis, ventricosis, ochraceis: cystidiis solum in acie lamellarum numerosis, styliformibus vel tibiiformibus, ad basem subventricosis, apice capitato, $30-45 \times 5-8 \mu$: sporis quaternis, ochraceis, subellipsoideis, $6-8 \times 3.5-4.5 \mu$: stipite æquali, ochraceo-fulvo vel castaneo, subvillosa, sursum pruinosa, 2 mm. crasso.

No. 24399, type, C. U. Herb., on very rotten wood mold and decaying leaves of *Pinus strobus*, McGowan's Woods, near Ithaca, N. Y. Oct. 10, 1917. H. E. Stork collector.

New York.

Galerula subannulata nov. nom.

Naucoria lateritia Murr. N. Am. Fl. 10, 172, 1917.

Maryland, New York.

Galerula tibiicystis nov. sp. Gregaria, 6-9 cm. alta: pileo campanulato dein convexo et interdum umbonato, 1-2 cm. lato, hygrophano, fulvo, glabro, demum pallido-ochraceo, homoganeo: lamellis stipite adnatis uncinatis, ventricosis, subdistantibus: cystidiis solum in acie lamellarum, numerosis, tibiiformibus, ad basem subventricosis, apice capitato, $30-45 \times 7-9 \mu$: sporis quaternis, ovatis vel subellipsoideis, a latere inequilateralibus, ferrugineis, $8-12.5 \times 5-7.5 \mu$: stipite æquali, pileo concolore sed pallidiore, sursum pruinosa, 2-2.5 mm. crasso.

No. 25080, type, C. U. Herb., on sphagnum in a spruce moor

near Miller's Run, 3-4 miles north of Oakland, Md. Sept. 25, 1917.
G. F. Atkinson collector.

Maryland, New York, Massachusetts, Sweden (Upsala).

Cystidia lecythiform or stopper-shaped, only on edge of lamellæ.

IV.

Galerula angusticeps (Pk.) Murr. N. Am. Fl. 10, 168, 1917.

Galera angusticeps Peck, Torr. Bot. Club Bull. 24, 143, 1897.

Conocybe angusticeps Murr. Mycologia, 4, 248, 1912.

California.

Galerula teneroides (Pk.) Murr. N. Am. Fl. 10, 166, 1917.

Agaricus teneroides Peck, N. Y. State Mus. Rept. 29, 39, 1878.

Galera teneroides Sacc. Syll. Fung. 5, 861, 1887.

This species is placed here provisionally. The portion of the type material examined was in such poor condition that the structure of the pileus could not be determined.

New York.

PILEUS CORTICATED.

Cystidia large, fusoid or clavate, or sublanceoloid, not specialized.

Cystidia on sides and edges of lamellæ, emerging.

V.

Galerula kellermani (Peck) Murr. N. Am. Fl. 10, 165, 1917.

Galera kellermani Peck, Jour. Myc. 12, 148, pl. 89, 1906.

Ohio.

Galerula cervinialba (Murr.) nov. comb.

Prunulus cervinialbus Murr. N. Am. Fl. 9: 326, 1916.

Cystidia subfusoid: basidia large, sterile, therefore the pure white lamellæ.

New York.

Cystidia only on edge.

VI.

Galerula cyanopus nov. sp. Gregaria vel solitaria, 2-3 cm. alta: pileo ovali, campanulato-convexo, dein expanso, obtuso, ad marginem striatulato, fragili, brunneo-ferrugineo, 5-10 mm. lato: cortice pilei cellis pyriformibus prædito: lamellis stipite adnexis, angustatis, ochraceis: cystidiis in acie lamellarum numerosis, ad basem ventricosis, in apice cylindricis vel mucronatis, $30-40 \times 10-17 \mu$: sporis quaternis, ellipsoideis, apice minute truncato, $8-10 \times 5-6 \mu$: stipite 1-1.5 mm. crasso, leniter bulboso, albo ad basem cyaneo, sursum pruinoso, deorsum leniter velutino, fragili.

Ground among grass, No. 23302, type, C. U. Herb., Ithaca, N. Y. New York.

Galerula filipes nov. sp. Gregaria, 4-6 cm. alta: pileo ovali dein campanulato, obtuso, ochraceo, 3-6 mm. lato: cortice pilei cellis obovalibus vel pyriformibus prædito: lamellis stipite late adnatis, dente decurrentibus, ochraceis vel ochraceo-fulvis: cystidiis solum in acie lamellarum, lanceoloideis vel anguste ovatis, ad basem ventricosis, $30-50 \times 10-18 \mu$: sporis quaternis, ferrugineis vel fulvo-ochraceis, ellipsoideis, $7-8 \times 4-5 \mu$: apice sporæ truncato: stipite æquali, bulbilloso, sursum pruinoso, 1 mm. crasso.

The type material consists of specimens collected by Peck in a grass plot at North Elba, Essex Co., Adirondack Mts., N. Y., now in the N. Y. State Mus., Albany, as *Galera capillaripes* (see N. Y. State Mus. Bull. 94: 32, 1905).

This species resembles in form and color *Galerula capillaripes*, but the basidia are four-spored, the spores are much smaller and the cystidia are different.

New York.

Galerula mirabilis nov. sp. Gregaria vel dispergens, 4-6 cm. alta: pileo campanulato-convexo, dein expanso et umbonato, 1.5-2 cm. lato, glabro, striatulo vel rugoso, vinaceo-cinnamomeo, in centrum castaneo, cortice cellis obovalibus vel pyriformibus prædito: lamellis stipite adnexis, subdistantibus, subventricosis, fulvo-ochraceis, acie lamellarum alba: cystidiis solum in acie lamellarum, numerosis, abrupte clavatis, $40-70 \times 12-18 \mu$: sporis binis, a fronte navicularibus vel cymbiformibus, a latere inequilateralibus, demum minute tuberculatis, fulvis, $12-25 \times 7-11 \mu$: stipite æquali, recto vel flexuoso, cavo, glabro, pileo concolore sed pallidiore, sursum pruinoso.

No. 15117, type, C. U. Herb., in mixed woods in a swamp near McLean, N. Y. June 17, 1903. H. H. Whetzel collector.

New York.

Galerula plicatella (Pk.) Murr. N. Am. Fl. 10: 164, 1917.

Agaricus coprinoides Peck, Buffalo Soc. Nat. Sci. Bull. 1, 52, 1873.

Agaricus plicatellus Peck, N. Y. State Mus. Rept. 29, 66, 1878.

Galera coprinoides Sacc. Syll. Fung. 5, 867, 1887.

Galera plicatella Earle, Torreya 3, 136, 1903.

New York.

Galerula sulcatipes (Pk.) Murr. N. Am. Fl. 10, 166, 1917.

Agaricus sulcatipes Peck, N. Y. State Mus. Ann. Rept. 35, 132, 1884.

Galera sulcatipes Sacc. Syll. Fung. 5, 866, 1887.

New York.

This species is very closely related to *Galerula tortipes*, from which it differs only in its smaller size.

Galerula tortipes (Mont.) Murr. N. Am. Fl. 10, 167, 1917.

Agaricus tortipes Mont. Syll. Crypt. 119, 1856.

Galera tortipes Sacc. Syll. Fung. 5, 867, 1887.

Ohio.

Galerula viscosa (Clem.) nov. comb.

Galera viscosa, Clements, Cryp. Form, Coloradensum, No. 380, 1906.

Colorado.

**Cystidia specialized, lecythiform or stopper-shaped,
on edge of lamellæ.**

*Cystidia on sides imbedded, clavate or clavate mucronate,
on edge lecythiform or stopper-shaped.*

VII.

Galerula cryptocystis nov. sp. Gregaria, 6-10 cm. alta: pileo ovali dein campanulato, 1.5-2.5 cm. lato, ochraceo, ochraceo-fulvo vel ferrugineo, demum pallidiore, sparsim villosa: cortice pilei cellis pyriformibus vel ovalibus prædito: lamellis stipite adnexis, latis: cystidiis in acie lamellarum lecythiformibus, 15-22 × 6-8 μ , in superficie lamellarum clavatis, non projicientibus: sporis binis, a fronte late ellipsoideis, 12-22 × 8-12 μ : stipite æquali, pileo concolore sed pallidiore, striato, sursum pruinoso, 2-4 mm. crasso.

No. 127, Pacific Slope Fungi, distributed as "*Galera tenera*" by C. F. Baker, type in C. U. Herb. "A common little mushroom on decayed horse manure in old pastures. Foothills near Stanford University, Santa Clara County, California, November 30, 1901, Coll. C. F. B."

This species is related to *Galerula macrospora*, but differs in the striate stem, imbedded cystidia on the sides of the lamellæ, etc.

California, Europe (Trento, May, 1901, Bresadola).

Cystidia only on edge.

VIII.

Galerula angusticeps (Pk.) nov. comb.

See above under section IV. Pileus homogeneous. Some specimens have a rudimentary cortex.

Galerula antipus (Lasch) emend Atkinson.

Agaricus antipus Lasch in *Linnaea*, 3, 415 (no. 401), 1828.

Galera antipus Quéf. *Champ. Jura et Vosges*, 1, 136, 1872.

Galera antipus Gillet, *Champ. France*, 553, with figure, 1878.

Galera antipoda Sacc. *Syll. Fung.* 5, 863, 1887.

Spores in front view limoniform to subangular, in side view ellipsoid.

North Carolina.

Galerula capillaripes (Pk.) Murr. *N. Am. Fl.* 10, 163, 1917.

Galera capillaripes Peck, *Torr. Bot. Club Bull.* 26, 166, 1899.

Ohio, New York.

Galerula crispa (Longyear) Murr. pt. pte.

N. Am. Fl. 10, 167, 1917.

Galera crispa Longyear, *Bot. Gaz.* 28, 272, 1899.

Michigan, New York.

Galerula crocospora (Berk. & Curt.) Murr.

N. Am. Fl. 10, 168, 1917.

Agaricus crocosporus B. & C. Ann. Mag. Nat. Hist. II, 12, 421, 1853.*Galera crocospora* Sacc. Syll. Fung. 5, 866, 1887.

South Carolina. This species probably belongs here but the type material examined was too badly collapsed to determine with certainty.

Galerula curta nov. sp. Gregaria, 4–6 cm. alta: pileo campanulato dein subexpanso, 2–4 cm. lato, 1–2 cm. alto, obtuso, glabro, non striato, ochraceo vel ochraceo-fulvo demum ochroleuco, cortice pilei cellis obovalibus vel pyriformibus prædito: lamellis stipite adnexis, ellipsoideis, ochraceis: cystidiis solum in acie lamellarum, numerosis, lecythiformibus, 15–25 \times 7–10 μ : sporis binis, obovalibus vel late ellipsoideis, ochraceis, 10–18 \times 8–11 μ : stipite æquali, glabro, striatulo, sursum pruinoso, cavo, 3–5 mm. crasso.

Nos. 3209 and 3210, type, C. U. Herb., in grass in curbing at foot of Buffalo St., Ithaca, N. Y. July 20, 1899. G. F. Atkinson collector. New York.

Galerula distantifolia Murr. N. Am. Fl. 10, 169, 1917.

Mexico.

Galerula flava (Pk.) Murr. N. Am. Fl. 10, 166, 1917.*Galera flava* Peck, N. Y. State Mus. Ann. Rept. 45, 79, (19) 1893.

New York.

Galerula flexipes (Karst.) nov. comb.*Galera flexipes* Karsten, Myc. Fenn. 3, 371.

New York.

Galerula fragilis (Pk.) Murr. N. Am. Fl. 10, 164, 1917.*Galera fragilis* Peck, Torr. Bot. Club Bull. 24, 144, 1897.

Kansas.

Galerula "lateritia." A medium-sized *Galerula* very closely related to *Galerula crispa*, which may be only a variety. It is usually regarded in this country as equal to *Agaricus lateritius* Fr.; I am not

at present convinced of the correctness of this interpretation. It is common in lawns and grassy places in rainy weather, May to July, and also occurs on dung.

Galerula macrospora nov. sp.

Galera tenera obscurior Peck, N. Y. State Mus. Rept. 50, 130, 1899.

Gregaria, 6–15 cm. alta: pileo campanulato, 1–2.5 cm. lato, 6–10 mm. alto, ochraceo vel ferrugineo, non striato, demum ochroleuco, cortice pilei cellis pyriformibus vel obovatis prædito: lamellis stipite adnexis, ellipsoideis, ochraceis: cystidiis solum in acie lamellarum, numerosis, lecythiformibus, 15–25 × 6–9 μ: sporis binis, late ellipsoideis, 12–25 × 8–15 μ: stipite æquali, recto vel flexuoso, sursum pruinoso, pileo concolore, cavo, 1.5–2.5 mm. crasso.

No. 15759, type, C. U. Herb., on ground among mixed grasses and moss (*Hylocomium squarrosum*), on the edge of a coniferous wood, near Stockholm, Sweden. Aug, 24–28, 1903. G. F. Atkinson collector.

North America (New York), Europe (Sweden and France).

Galerula mexicana Murr. N. Am. Fl. 10, 169, 1917.

Mexico.

Galerula neoantipus nov. sp. Gregaria, 3–7 cm. alta: radix 2–5 cm.: pileo campanulato-convexo, 1.5–2.5 cm. lato: cortice pilei pseudoparenchymato: lamellis cum in *Galerula antipus*: cystidiis solum in acie lamellarum, numerosis, lecythiformibus, 15–30 × 6–9 μ: sporis quaternis, ellipsoideis, 12–17 × 6–9 μ.

On newly seeded lawn, Middlebury, Vt., Aug. 1896, E. A. Burt collector, in E. & E. N. Am. Fungi, second edition, No. 3510, type, C. U. Herb. The specimens in Cooke's Ill. Brit. Fungi, No. 463, "spores ellipsoid, 16 × 8 μ," probably belong here.

Vermont, (?England).

Galerula ovalis (Fr.) Karsten, Bidr. Finl. Folk 32, 443, 1879.

Agaricus (*Galera*) *ovalis* Fr. Monogr. Hymen. Suec. 1, 389, 1857.

Galera ovalis (Fr.) Gillet, Champ. France 3, 554, 1876.

New York, North Carolina, Europe.

Galerula pilosella (Fr. ex Pers.) Atkinson emend.

Agaricus (Galera) tener var. *pilosellus* Fr. Syst. Myc. 1, 266, 1821.

Agaricus pilosellus Pers. Synop. Fung. 387, 1808.

Gregaria vel solitaria, 3–6 cm. alta: pileo campanulato, ad marginem interdum expanso, 1–2.5 cm. lato, 1 cm. alto, hygrophano, ochraceo vel cinnamomeo-brunneo, striatulato, demum pallide ochraceo vel fulvo-ochraceo, leniter villosus: cortice pilei cellis pyriformibus et rare cystidiis prædito: lamellis stipite adnexis, angustatis, ellipsoideis, numerosis, luteo-ochraceis vel ochraceo-cinnamomeis: cystidiis in acie lamellarum lecythioideis, $15-24 \times 6-9 \mu$: sporis quaternis, anguste ellipsoideis, apice minute truncato, $6-8 \times 3-4 \mu$: stipite æquali, subtiliter villosus.

No. 20851, C. U. Herb., type of the emended species, on ground in a spruce forest north of Pontarlier, Jura Mts., France, Aug. 21, 1905, G. F. Atkinson collector. No. 24314, C. U. Herb., near Seventh Lake, Adirondack Mts., N. Y. Aug. 15, 1917. G. F. A. and F. C. Stewart collectors.

New York, Maryland, Europe.

Galerula plumbeitincta nov. sp. Gregaria, 3–5 cm. alta: pileo convexo, dein campanulato, 1–1.5 cm. lato, adolescente lubrico, substriato, plumbeitincto, cortice cellis clavato-pyriformibus prædito: lamellis stipite late adnatis, subdistantibus, ventricosis, ochraceo-cinnamomeis: cystidiis solum in acie lamellarum, numerosis, ampullæformibus, frequenter subcapitatis, $25-35 \times 12-15 \mu$: sporis quaternis, ochraceo-cinnamomeis, late ellipsoideis, $12-15 \times 7-10 \mu$: stipite albo dein plumbeitincto, sursum pruinoso, deorsum substriato, cavo, 2–3 mm. crasso.

On dung hills, Cascade Glen, Ann Arbor, Mich. June 9, 1906. C. H. Kauffmann collector, no. 565, type, C. U. Herb.

Michigan.

Galerula procera nov. sp. Gregaria, 10–12 cm. alta: pileo campanulato, obtuso, ad marginem demum leniter expanso, 3–4.5 cm. lato, 2–2.5 cm. alto, ochraceo-fulvo, dein ochraceo vel pallide ochroleuco, glabro, non striato: cortice pilei cellis obovalibus vel pyriformibus prædito: lamellis stipite adnexis, ellipsoideis, ochraceis: cystidiis solum in acie lamellarum, numerosis, lecythiformibus, $18-25 \times 6 \mu$: sporis quaternis, ochraceis, a fronte late ellipsoideis, apice minute truncata, $12-20 \times 8-11 \mu$: stipite æquali, ad basem leniter crasso, recto vel flexuoso, glabro, striato, sursum pruinoso, pileo concolore sed pallidiore, 3–4 mm. crasso.

No. 9910, type, C. U. Herb., on ground, in humus, among leaves in moist woods, Buttermilk Gorge, near Ithaca, N. Y. July 23, 1902. C. H. Kauffmann collector.
New York.

Galerula pulchra (Clem.) Murr. N. Am. Fl. 10, 166, 1917.

Galera pulchra Clements, Bot. Surv. Nebr. 4: 22, 1896.
Nebraska.

Galerula spartea (Fr.) nov. comb.

Agaricus (Galera) sparteus Fr. Syst. Myc. 1: 266, 1821.
Galera spartea Quélet, Champ. Jura, Vosg. 1: 254, 1872.
New York.

Galerula tenera (Fr. ex Schaeff.) Murr.
N. Am. Fl. 10, 166, 1917.

Agaricus (Galera) tener Fr. Syst. Myc. 1, 265, 1821.
Galera tenera Quélet, Champ. Jura et Vosges, 136, 1872.
Throughout greater part of N. Am., Europe.

Galerula tenerella (Atkinson) Murr. N. Am. Fl. 10, 164, 1917.

Galera tenerella Atkinson, Ann. Myc. 7, 369, 1909.
New York.

Galerula tenuissima (Weinm.) nov. comb.

Agaricus tenuissimus Weinm. Fl. Ross, 219, 1836.
Galera tenuissima Quélet, Assoc. Fr. Av. Sci. 1884, 280, pl. 12, fig. 8, 1885.
New York.

SPECIES NEEDING FURTHER STUDY.

GALERULA GLABRA Murr. N. Am. Fl. 10: 163, 1917, has not been examined.

GALERA GRISEA Earle, No. 43 Inform. An. Estac. Centr. Agron. Cuba 1: 237, 1906, needs further examination of fresh material.

GALERA SIMULANS Earle, Inform. An. Estac. Centr. Agron. Cuba
1: 236, 1906, is probably identical with *Galerula "lateritia."*

SPECIES EXCLUDED.

GALERA ALBA Peck, Torr. Bot. Club Bull. 24: 143, 1897.

AGARICUS (GALERA) CALLISTUS Peck, Buff. Soc. Nat. Sci. Bull.
1: 52, 1873.

AGARICUS (GALERA) EXPANSUS Peck, Buff. Soc. Nat. Sci. Bull.

1: 52, 1873.

GALERA RETICULATA Peck, N. Y. State Mus. Ann. Rept. 54: 150,
1901.

GALERA STRIATULA Clements, Bot. Surv. Nebr. 3: 13, 1894.

GALERA VERSICOLOR Peck, Torr. Bot. Club Bull. 24, 143, 1897.

CORNELL UNIVERSITY,

ITHACA, N. Y.,

May, 1918.