A REVIEW OF THE CLAVARIACEAE (CORAL FUNGI)
OF WESTERN PENNSYLVANIA

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The family Clavariaceae, or coral fungi, belongs to that class of Basidiomycetes in which the spores are borne upon the surface of undivided or branched coral-like structures. The fructifications are erect, simple or club-shaped, more or less forked or branched in a coral-like or dendroid manner, and in size vary from small simple clubs to much-branched masses. The texture is soft, fleshy, and brittle, or waxy, toughish, and pliable. A hymenium covers most of the fructifications except near the base of the stem and on the upper side of the oblique branches. Spores are white, yellowish, or brownish, smooth or rough to spiny. In color these fructifications are white, cream, yellow, ochraceous, orange, tan, pinkish, cinnamon, or brownish. These fungi grow chiefly on the ground in humus, on rotted wood, or on decaying leaves. Originally the majority of the species were included in the genus Clavaria, but recent workers, and particularly E. J. H. Corner, in his Monograph of Clavaria and Allied Genera (1950), divide them into about two dozen genera.

I have re-studied our collection at the Carnegie Museum Herbarium in the light of this work and find nine genera represented in our region. This review is based upon the specimens from western Pennsylvania now in the Herbarium. As the eastern boundary of western Pennsylvania, I have arbitrarily chosen the eastern borders of Potter, Clinton, Centre, Huntingdon, and Fulton counties. The majority of the collection was contributed by David R. Sumstine, Otto E. Jennings, and LeRoy K. Henry. Their initials follow the dates of collection given for the rarer or less frequent species.

Key to the Genera of Clavariaceae

1. With gloeocystidia ..........................................................Clavicorona
   Without gloeocystidia .................................................2

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2. Fructifications with flattened branches, tough, drying coriaceous or horny; white, pallid brownish or yellowish; hyphae not inflating, often thick-walled; spores smooth; mostly terrestrial .............................................. Aphelaria
Fructifications radial (rarely flattened), usually fleshy, waxy, or gelatinous; hyphae generally inflating .........................................................3

3. Spores mostly colored ..................................................................................4
Spores white (rarely with colored contents) .........................................................5

4. Fructifications often highly colored, mostly branched; spores yellow, ochraceous, or brown (color in the wall), smooth or generally variously marked, ellipsoid, often elongate, rarely subglobose, mostly guttulate; terrestrial or lignicolous .............................................. Ramaria
Fructifications white, pallid, tan, ochraceous, or brownish, tough, rarely simple; spores very pale yellowish or white, smooth, narrowly ellipsoid, aguttate; hyphae becoming thick-walled; lignicolous or epiphytic ................................. Lentaria

5. Fructifications simple, erect, large, massive, clavate, or filiform, yellow, brown, rufescent, umber, or tinged pink or violet; flesh spongy, firm or rigid, rarely tough; hyphae usually clamped and inflating; spores aguttate or vaguely so; terrestrial or lignicolous ................................................................. Clavariadelphus
Fructifications branched or simple, generally fleshy or brittle; hyphae typically inflating, sometimes secondarily septate without clamps; spores mostly 1-guttate or multi-guttulate, or if aguttate, then with secondarily septate hyphae; mostly terrestrial .........................................................................................6

6. Fructifications with radial, flattened, or cristate branching, or simple; basidia 2-spored, subcylindric, usually secondarily septate, often before discharge; sterigmata strongly incurved; rarely lignicolous .................................................. Clavulina
Fructifications branching or simple, never flattened or cristate; basidia clavate, mostly 4-spored with straight sterigmata, not secondarily septate after spore discharge .........................................................................................7

7. Fructifications simple or branched, mostly brittle; hyphae without clamps, mostly secondarily septate; basidia without clamps; spores aguttate or multi-guttate, rarely 1-guttate, smooth ............................................... Clavaria
Fructifications branched; hyphae clamped, not secondarily septate; spores mostly 1-guttate, minutely echinulate or verrucose ................. Ramariopsis
Fructifications simple or branched, mostly fleshy and somewhat brittle, a few gelatinous or tough, white or often orange, yellow, pink, or red; spores smooth, or occasionally aculeate or rough ......................... Clavulinopsis

Aphelaria Corner

Chiefly terrestrial but a few lignicolous. Twelve species are known, growing mostly in tropical areas, but a few are from temperate regions.
Aphelaria tuberosa Corner

*(Lachnocladium semivestitum* Berkeley and Curtis*)

Fructifications 6.5 cm. high, solitary, gregarious or caespitose, with flattened branching, the lower branches broadly palmately divided, the upper narrow and dichotomous, pale buff-straw, gray or drab tinged yellow, tips white, tough; stem 2 cm. long, distinct or not, often divided from base into palmate branches; hymenium apparently covering the whole fructification except the tips; spores 14-20 x 5-7 microns, white, smooth, elongate ellipsoid, subfusoid or subcylindric, blunt or subacute, attenuate to the oblique apiculus, granular-vacuolate or minutely guttulate.

On the ground in woods, in grass, or on bare soil in the open; temperate North America. Rare here. Clarion County: Clarion, Aug. 19, 1942, DRS; near Leeper, Aug. 18, 1942, DRS. Elk County: near Kane, Aug. 19, 1942, DRS.

Clavaria Fries

Terrestrial, in temperate or tropical regions; 24 species and 16 doubtful species.

**KEY TO THE SPECIES OF Clavaria**

1. Fructifications simple, solitary or gregarious, wholly yellow or with yellow stem; spores 6-13 x 3.5-7 microns .............................................*C. argillacea*

Fructifications simple, caespitose, pale yellowish or alutaceous, then fuliginous; spores 5-8 x 3-4 microns .............................................*C. fumosa*

Fructifications simple, caespitose, white, sometimes aging yellow; stem indistinct; spores 5-8.5 x 3-6 microns .............................................*C. vermicularis*

**Clavaria argillacea** Fries

*(C. subfalcata Atkinson)*

Fructifications 3-8 cm. high, simple, solitary or in small tufts of 2-10, whitish yellow, cream, yellowish clay, pale citron-yellow, or greenish yellow, 2-8 mm. wide, cylindric and subacute, becoming clavate and obtuse, often compressed and with 1-2 longitudinal furrows, barely branched, gradually attenuate into the stem; stem 1.5 cm. long, distinct, more deeply colored than rest of plant, clear yellow to sulphur-yellow; rather brittle; odor none; taste like tallow, or ill-defined or none; hymenium not thickened, or very slightly, fertile over the truncate head; spores 9-12 x 4.5-6 microns, white, smooth, ellipsoid or subcylindric, often slightly curved, multi-guttulate; basidia multi-guttulate with wide looplike clamp at the base.

Terrestrial, in peat bogs or in grass on hillsides; western Europe, United States, and Japan. Infrequent here. Clearfield County: State Game Refuge, south of Medix Run, July 9, 1940, LKH. Indiana County: 1 mile north of Rossiter, Aug. 5, 1947, LKH.

**Clavaria fumosa** Fries

Fructifications 1.5-14 cm. high, simple, densely caespitose, pale cream, whitish
or grayish alutaceous, then pale mouse-gray or fuliginous, rarely deeply colored or fuscous, cylindric then subclavate, becoming compressed and more or less fusiform, often twisted, acute then obtuse, slender or rather stout, whitish toward the sterile base, becoming hollow; stem indistinct or none; flesh whitish, brittle; odor none; taste marked, pleasant, or none; basidia without clamps; spores 5-8 x 3-4 microns, mostly 5.5-6.5 x 3.5 microns, white, smooth, thin-walled, ellipsoid or rather pip-shaped, blunt, with a distinct apiculus, aguttate or with granular contents.


**Clavaria vermicularis** Fries

Fructifications 6-12(15) cm. high, simple, densely caespitose or in small fasciculate clusters, white, very brittle, 3-5 mm. wide, cylindric then elongate fusiform, becoming flattened and sulcate, often curved or flexuous, occasionally once furcate, solid then generally hollow, acute becoming obtuse, often yellowish toward the tip, wholly pale yellowish with age; stem indistinct; basidia finely multi-guttulate, without clamps; spores 5-7 x 3-4 microns, white, smooth, ellipsoid or pip-shaped, generally aguttate or very finely granular guttulate, sometimes 1-guttate, thin walled, shortly apiculate; odor and taste none; edible.


**Clavariadelphus** Donk

Terrestrial in humus of coniferous or deciduous woods or on twigs, leaves, or cones; 9 species in north temperate region.

**Key to Species of Clavariadelphus**

1. Fructifications very large, often club-shaped, 7-30 x 2-6 cm., flesh color or rose-pink, becoming brownish vinaceous on bruising; on ground in frondose woods ................................................................. *C. pistillaris* var. *americanus*

Fructifications small, 3-15 x .05-0.2 cm., filiform or subclavate, slender, pale ochraceous to brownish; on humus and sticks in frondose woods and on the ground ................................................................. *C. junceus*
Clavariadelphus junceus (Fries) Corner

[Typhula juncea (Fries) Karsten]

Fructifications 3-15 cm. high and 0.5-2 mm. wide, solitary or gregarious, filiform-acute, then often narrowly fusiform or subclavate, rather stiff and rigid, flaccid with age, pale brownish, ochraceous, becoming pallid or brownish drab; stems distinct, 1-5 cm. long, slightly more narrow than the fertile club, attached by appressed fibrils at base; flesh rather firm and rigid, not brittle, juicy, becoming hollow in age; taste and odor rank, sour; spores 6-12 x 3.5-5.5 microns, white smooth, more or less amygdaliform, thin-walled, aguttate.

Among dead leaves and twigs, generally attached to small rotten twigs and petioles, in frondose woods, rarely on coniferous needles; Europe, North America, Asia, North Africa, and southern Australia. Rare here. Allegheny County: Stowe Township, near Fleming Park, Sept. 29, 1949, LKH.

Clavariadelphus pistillaris var. americanus Corner

(Clavaria pistillaris Fries)

Fructifications 7-25 cm. tall by 2-5 cm. wide, subcylindric and acute, then blunt and more or less strongly clavate, often longitudinally rugose, flesh color or rose-pink, then ochraceous or alutaceous at maturity, often more or less flattened or ligulate, occasionally with a few short antler-like branches, solitary or caespitose in small clusters; stem indistinct, white villous at base; flesh firm and dense when young, becoming soft, spongy-floccose, white, quickly turning purplish brown when cut or bruised; basidia elongate, clavate, projecting up to 10 microns; taste rather bitter, edible; spores 10-12.5(14) x 4.5-7.5 microns, white or tinged yellowish, smooth, broadly ellipsoid, apex blunt.


Clavicorona Doty

Lignicolous or terrestrial; 8 species; temperate and tropical regions.

Clavicorona pyxidata (Fries) Doty

(Clavaria pyxidata Fries)

Fructifications up to 13 cm. high, copiously pyxidately branched, 4-6 branches in a whorl, clear yellow, becoming dull ochraceous with age or on bruising, sometimes pallid white, then tan or alutaceous, even pale pinkish or somewhat rufescent, arising from an amorphous base; flesh white or pale, pliable, rather tough; taste peppery, sometimes slight or mild; spores 4-5 x 2-3 microns, white ellipsoid, pip-shaped, aguttate, smooth.
On dead wood, especially *Salix* and *Populus* in northern hemisphere, gregarious or caespitose; widely distributed in Europe, North America, and Asia Minor. Common in our region.

**Clavulina** Schroeter

Mostly terrestrial, few lignicolous; 32 species in temperate and tropical regions.

**Key to Species of Clavulina**

1. Hyphae of fructification with fuscous-brown walls, robust; branches rather stout, few, palmate, tips subulate; stem up to 6 cm. long by 2-8 mm. thick, densely strigose spiculose; spores white...............................C. *ornatipes*
   Hyphae of fructification with colorless walls, usually inflated, with clamp connections at all septa, without cystidia ......................................................2

2. Fructifications gray or fuliginous from the beginning, rarely cristate, 2.5-10 cm. high ...........................................C. *cinerea*
   Fructifications clear lilac-purple or lilac-violet, 2-6 cm. high, branches many, obtuse .................................................................C. *amethystina*
   Fructification white, sometimes becoming yellowish or grayish, generally cristate, variable, much branched, 2.5-8 cm. high ...............................C. *cristata*
   Fructification white to cream, drying yellow, simple or sparingly branched in some forms, often longitudinally rugulose or sulcate, hollow, 4-12 cm. high ..................................................C. *rugosa*

**Clavulina amethystina** (Fries) Donk

*(Clavaria amethystina* Fries)*

**Figure 1**

Fructifications 2-6 cm. high, solitary or caespitose, lilac-violet, paler or whitish at base; stem short and stout or almost none; branches numerous, cylindric, smooth, then rugulose, obtuse or toothed, not cristate; flesh slightly brittle, concolorous; taste and odor slight; spores 7-11 x 6-8 microns, white, ovoid-ellipsoid to subglobose, 1-guttate.

On ground in frondose woods; central and western Europe; rather rare according to Corner. Coker found it frequent in eastern United States. We have specimens from twelve counties.

Fig. 1. *Clavulina amethystina*—natural size. Fig. 2. *Clavulina cristata*—natural size. Fig. 3. *Clavulinopsis aurantio-cinnabarina*—natural size. Fig 4. *Clavulinopsis fusiformis*—half natural size. Fig. 5. *Ramaria flaccida*—twice natural size. Fig. 6. *Ramariopsis kunzei*—natural size. Drawings by Mrs. Leroy K. Henry.
Clavariaceae of Western Pennsylvania
Clavulina cinerea (Fries) Schroeter
(Clavaria cinerea Fries)

Fructifications 2.5-10 cm. high, solitary, gregarious or caespitose, much branched; branches compact, stout below, dichotomous above with blunt tips, sometimes flattened and toothed, becoming longitudinally rugulose, occasionally subsimple, grayish to dark cinereous, often purple tinged or brownish with age; stem up to 1 cm. thick, sometimes absent, white or concolorous; flesh firm, grayish white; taste and odor slight; edible; spores 6.5-11 x 6-10 microns, white, yellow, or ochraceous in age or on drying, smooth, subglobose or broadly ellipsoid, 1-guttate.

On ground in woods and fields; north temperate, Brazil, southern Australia; common according to Corner. Coker reported it in eastern United States. We have specimens from fifteen counties.

Clavulina cristata (Fries) Schroeter
(Clavaria cristata Fries)

Figure 2

Fructifications 2.5-8 cm. high, solitary, gregarious or caespitose, much branched; branches dichotomous to polychotomous below, tips acute and generally becoming cristate-fimbriate, white, often becoming tinged yellowish, ochraceous, or fuscous; stem none or up to 3 cm. long; flesh rather tough or moderately brittle when turgid, sometimes hollow, drying whitish; taste and odor slight; edible; spores 7-11 x 6.5-10 microns, white, smooth, subglobose, slightly thick-walled, 1-guttate.

On ground in deciduous or coniferous woods; temperate regions of world; common. We have specimens from fifteen counties.

Clavulina ornatipes (Peck) Corner
(Clavaria ornatipes Peck)

Fructifications 2.5-9 cm. high, gregarious or solitary, long-stalked; branches flattened, palmate, occasionally dichotomous below, few to many, smooth or longitudinally rugulose, rather tough, fuscous-ferruginous to fuscus-vineaceous with pale ochraceous or whitish, conical acute to filiform tips; stem 1-6 cm. x 2-3 mm. or flattened and up to 8 mm. wide, usually cylindric, same color as branches, strigose-hispid below or throughout with concolorous apicular or fastigiate fibrils; flesh concolorous, rather fibrous-tough; taste mild or somewhat bitter; odor none; spores 8-10.5 x 7.5-9.5 microns, ovoid, or subglobose and 12-15 microns, white, smooth, 1-guttate or multi-guttulate.

On ground in humus in frondose or coniferous woods; widely distributed throughout the world. Infrequent here. Forest County: Allegheny National Forest, Aug. 6, 1942, Marie B. Knauz. Indiana County: near Glenn Campbell, Aug. 4, 1938, LKH. Venango County: State Game Lands No. 39, 6 miles southwest of Franklin, Sept. 6, 1948, Neil D. Richmond.
Clavulina rugosa (Fries) Schroeter
(Clavaria rugosa Fries)

Fructifications 4-12 cm. high, solitary or subcaespitose, simple or with 1-3 un-divided short branches, often antler-like, cylindric, subacute, becoming somewhat clavate, obtuse, longitudinally rugulate, even cerebriform, often flattened, narrowed downward into an indistinct stem, white to cream, rarely yellow, drying light ochre-yellow or antimony-yellow; flesh rather tough, firm; taste and odor slight; spores 9-14 x 8-12 microns, white, smooth, broadly ovoid-ellipsoid, 1-guttate.


Clavulinopsis van Overeem

Terrestrial or exceptionally lignicolous; about 60 species, throughout the world.

Key to the Species of Clavulinopsis

1. Fructifications branched, up to 8 cm. high, yellow or ochraceous, tips bifurcated and crescent shaped; odor of meal; spores 4-7 microns wide, subglobose... C. corniculata

Fructifications simple, rarely branched, without cystidia... 2

2. Spores globose, subglobose, or subtriangular... 3

Spores ellipsoid (longer than broad)... 4

3. Stem deeper yellow than the pale hymenium; fructification up to 9 cm. high, pale yellow to creamy yellow; spores 5-7.5 x 4-6.5 microns... C. appalachiensis

Stem paler than the deeper colored hymenium; fructification yellow, fusiform, caespitose, up to 14 cm. high; spores 5-9 x 4.5-8.5 microns, strongly apiculate... C. fusiformis

Stem not distinct; fructifications solitary or gregarious, up to 7 cm. high, deep orange-red to scarlet; spores subglobose, smooth, 5-7 x 4-4.5 microns, 1-guttate... C. aurantio-cinnabarina

4. Spores with a strong apiculus, 1-2 microns long; fructifications up to 10 cm. high, solitary, gregarious, or fasciculate, clear deep yellow or orange; spores 5-7.5 x 3.5-5.5 microns... C. pulchra

Spores with slight apiculus, less than 1 micron long; fructifications up to 8 cm. high, bright yellow, apricot, or orange, often pallid or white; spores 5-8 x 2.5-4 microns, guttate... C. luteo-alba
Clavulinopsis appalachiensis (Coker) Corner
(Clavaria appalachiensis Coker)

Fructifications 3-9 cm. high, simple, solitary or gregarious, pale flesh yellow to light creamy yellow, straight or curved, round but sometimes compressed or finely longitudinally rugulose, tips blunt, concolorous, withering brownish; stem 1-4 cm., very distinct, lemon yellow, base white tomentose, brittle; odor and taste none; spores 5-7.5 x 4-6.5 microns, white, smooth, subglobose, 1-guttate.

On humus and rotted logs in frondose and coniferous woods; United States and Canada. Rare here. Huntingdon County: Sideling Hill at Coles Summit, 2.5 miles northwest of Saltillo, August 31, 1948, Dorothy E. Long.

Clavulinopsis aurantio-cinnabarina (Schweinitz) Corner
(Clavaria aurantio-cinnabarina Schweinitz)

Figure 3

Fructifications 1.5-7 cm. high, simple, solitary or gregarious, deep orange-red, varying salmon-orange to scarlet, fading buff-orange, cylindric, subacute or blunt, sometimes flattened and rugulose or channeled, tip of club generally sterile; stems not distinct; flesh deep orange-red, not fading, moderately brittle; odor rather fetid aromatic; spores 5-7 x 4-5.5 microns, white or pale yellow, smooth, subglobose, 1-guttate.

On ground in woods and in grass; North and South America and eastern Asia. Frequent here; recorded from nine counties.

Clavulinopsis corniculata (Fries) Corner
(Clavaria muscoides Fries)

Fructifications 2-8 cm. high, gregarious or caespitose, wholly egg-yellow or ochraceous yellow, finally brownish from base upward, generally branched dichotomously two or three times into cylindric, divaricate branches, occasionally simple with incurved subulate tips, firm, rather tough; stem 0.6-4 cm. long, occasionally none, white, subtomentose at base; flesh concolorous; odor of new meal; taste rank, bitter; spores 4.5-7 microns wide, white, nearly globose, smooth, with apiculus, 1-guttate.

On ground in open pastures and lawns and in woods; northeastern North America, Europe, Japan, and southern Australia. Infrequent here. Allegheny Co.: 1 mile northeast of Ben Avon Heights, July 31, 1943, LKH. Butler County: Stone House on Route 8, south of Slippery Rock; 3 miles northeast of Harmony, August 4, 1941, LKH. Clearfield County: State Game Lands 34, south of Medix Run, Aug. 20, 1941, LKH. Elk County: near Kane, August 19, 1942, DRS. Fayette County: Ohiopyle, September, 1906, OEJ.

Clavulinopsis fusiformis (Fries) Corner
(Clavaria fusiformis Fries)
Fructifications 5-14 cm. high, simple, densely fasciculate, bright yellow, to brownish yellow with age, the tips withering brown, becoming fusiform and hollow, flattened, up to 12 mm. wide, subcylindric and acute, often longitudinally sulcate, rarely bifurcate near tip, moderately brittle; stems caespitose-connate at base, indistinct, thinly white villous; flesh yellow; odor none; taste bitter, occasionally mild; spores 5-9 x 4.5-8 microns, white or yellowish in mass, smooth, slightly thick-walled, broadly ellipsoid, broadly pip-shaped or subglobose with a strong apiculus.

In grass of fields and in woods; North America, Europe, and eastern Asia. Common here; recorded from 18 counties.

**Clavulinopsis luteo-alba** (Rea) Corner

*(Clavaria helveola Persoon sensu Coker)*

Fructifications up to 8 cm. high, simple, occasionally with 2 or 3 short branches, scattered or caespitose in small groups, cylindric or narrowly clavate, rarely flattened to 1 cm. wide, acute then blunt, often curved or flexuous; bright buff-yellow, often faintly greenish to deep rich yellow, orange, or apricot, tips often white, drying pale ochraceous; stem short, more or less distinct; flesh concolorous or orange-yellow, floccose, brittle; odor none; taste musty or of tallow; spores 5-8 x 2.5-4.5 microns, white, smooth, ellipsoid, generally somewhat ovoid, 1-several guttulate, with an apiculus.

On ground in pastures and woods, rarely on rotted wood; Europe, eastern North America and Japan. Rare here. Beaver County: along Raccoon Creek, 2.5 miles southeast of New Sheffield, July 21, 1941, LKH. Erie County: Presque Isle, 1931, OEJ.

**Clavulinopsis pulchra** (Peck) Corner

*(Clavaria pulchra Peck)*

Fructifications 1.5-10 cm. high, simple, solitary, gregarious or fasciculate in small tufts, clear yellow to deep yellow, orange or flame, drying deep orange, cylindric and acute, becoming blunt, compressed, sometimes spathulate or rugulose; stem 0.2-2 cm. long, distinct, drying finely subtomentose; flesh pale, floccose-firm, not brittle; odor and taste none, or sweetish, edible; spores 5-7.5 x 3.5-6 microns, white, smooth, slightly thick-walled, ovoid, broadly ellipsoid or subglobose, 1-2-guttate, with a strong sublateral apiculus.

In grass of fields or on ground in woods; widely distributed throughout the world. Frequent here; recorded from nine counties.

**Lentaria** Corner

Lignicolous or on leaf mold; 12 species, temperate and tropical.
Key to the Species of *Lentaria*

1. Spores 5-6 x 2-2.5 microns; fructifications small, slender, simple or sparingly branched, waxy tough, up to 2 cm. high ........................................ *L. mucida*
   Spores 7 microns or more long; fructifications small to large, much branched .................................................. 2

2. Fructifications caespitose with fastigiate branches; spores 10-18 x 3-6 microns, elongate or subsigmoid ........................................ *L. byssiseda*
   Fructifications branched, solitary or gregarious; spores 7-10 x 2.5-4 microns .................................................. *L. micheneri*

*Lentaria byssiseda* Corner
*(Clavaria byssiseda sensu authors)*

Fructifications 2.5-6 x 4.5 cm. high and broad, densely gregarious or caespitose; branches 2-4-chotomous below, radially branched, dichotomous above and often narrowly flattened, fastigiate, few to many, pale cream or yellowish white, becoming somewhat ochraceous or tan tinged pinkish flesh-color, then brownish or rufescent when old; the tips cream-white, short, very acute or elongate filiform; stem 3-14 cm. long x 1-4 mm. wide, branched from the base, pallid white, then concolorous, rough, scurfy; flesh pallid white or pallid ochraceous, tough, pliable or fleshy-fibrous, sometimes quickly turning brown when cut or bruised; spores 10-18 x 3-6 microns, white, cream or pale ochraceous, smooth, cylindrical, often sinuous or sigmoid, blunt at apex, acute at the oblique base, thin walled, aguttate.

On twigs, leaves, cones, and rotted wood of various deciduous and coniferous trees, generally connected by slender rhizomorphs; north temperate region, Europe and North America. Rare here. Allegheny County: along Beaver Grade Road, near Montour Run, July 3, 1940, LKH. Butler County: 4 miles northeast of Harmony, August 6, 1938, LKH; Slippery Rock, September 24, 1938, DRS.

*Lentaria micheneri* (Berkeley & Curtis) Corner
*(Clavaria micheneri Berkeley & Curtis)*

Fructifications up to 4 cm. high, solitary or gregarious, drying drab-gray, brownish or subochraceous; branches becoming dichotomous above, rather congested with many acute tips; stem short, arising from a white byssoid or tomentose mycelial patch, 2-3 mm. wide, irregularly polychotomous; hymenium absent from upper sides of branches, the sterile parts subtomentose; flesh tough; taste bitter; spores 8-9 x 3-4 microns, white, slightly rough, or smooth.

On dead leaves, often *Fagus* or *Quercus*; Canada and United States. Rare here. Armstrong County: Kittanning, 1905, DRS. Fayette County: Ohiopyle, August 7, 1907, DRS.

*Lentaria mucida* (Fries) Corner
*(Clavaria mucida Fries)*

Fructifications 0.3-2 cm. high, mostly simple, sometimes forked into 2-6 linear
curved ascending branches, incised or minutely cristate at apex, gregarious, often in large colonies, not fasciculate, cylindric fusiform, attenuate into a scarcely distinct stem, white, yellowish, pale cream or even pinkish, apex sometimes becoming lateritious, brownish or blackish; flesh delicate but waxy-tough, not breaking in handling; odor none; taste woody; spores 4.5-7.5 x 1.8-3 microns, white, smooth, narrowly or oblong ellipsoid, 1-2 guttulate or aguttate.

On rotten wood, associated with film of chlorococcoid algae on the surface of the wood; Eurasia, North and South America, and Australia. Rare here. Armstrong County; Kittanning, August 1905, DRS. Erie County; Weiss Library Woods, southwest of Erie, August 9, 1932, OEJ.

Ramaria S. F. Gray emended by Donk

Terrestrial in humus, or lignicolous; cosmopolitan; 97 species.

Key to Species of Ramaria

1. Spores definitely spiny, verrucose or verruculose ..........................................2
   Spores coarsely to minutely rough, or nearly smooth ..................................3

2. Spores bluntly spiny, rusty-ochraceous, ovoid, 7.5-11 x 4.5-7 microns; fructifications up to 4 cm. high, cinnamon-tawny, tips lighter, often virescent, under frondose trees ..........................................................R. longicaulis
   Spores verruculose, ochraceous, short, 6-9 x 3-4 microns; fructifications small to medium in size, up to 4.5 cm. high, very compact, ochraceous, greenish when bruised; under conifers ...........................................R. ochraceo-virens
   Spores verrucose, ochraceous, 4-8 x 3-4 microns; fructifications up to 6 cm. high, pale, then deep ochraceous or brownish, not virescent; under conifers ..................................................R. flaccida

3. Lignicolous on dicotyledonous wood; spores 5-7.5 x 3-4 microns, rough; fructifications up to 5 cm. high, cream or tan, then ochraceous, tips concolorous ..................R. crispula
   Lignicolous; spores 7-11 x 4-5.5 microns; stems with abundant mycelium at base; fructifications small to medium size, tough .............................................4
   Terrestrial; spores 7-15 x 3.5-6 microns, minutely roughened ......................5

4. Vinescent or browning when bruised; fructifications up to 10 cm. high, pale fleshy tan or pale ochraceous, then cinnamon-brown; tips concolorous..................R. stricta var. concolor
   Not vinescent, usually on coniferous wood; fructifications up to 7 cm. high, cream or pale pinkish tan, then deep ochraceous, tips paler, concolorous or greenish, branches rather lax ......................R. apiculata

5. Fructifications pale cream, rich yellow, or orange-ochre, not reddening on bruising; branches elongate, tips not dilated; stem distinct, single, massive; spores 7.5-11(14) x 3-4.5 microns, rough .......................R. flavo-brunnescens
   Fructifications more or less pink or reddish; tips not expanded; stem yellowish or deeper pink; flesh more or less brittle, firm ...........................................6
6. Tips clear bright yellow, often vinescent; fructifications 7-30 cm. high, pinkish buff to orange-rose; stem massive, distinct; flesh drying chalky, friable..............R. formosa

   Tips rose-pink; fructifications massive, up to 16 cm. high; branches cream, then pinkish buff or tan, finally brownish .................R. botryoides

Ramaria apiculata (Fries) Donk
(Clavaria apiculata Fries; C. acris Peck)

Fructifications up to 7 cm. high, small to medium in size, solitary caespitose, light pinkish ochraceous or creamy yellow, becoming deeper ochraceous brown, vinaceous cinnamon or rufescent alutaceous from base upward; branches elongate and flattened, numerous, rather lax, ending in 2-3 long, acute, whitish or concolorous tips, with scurfy tomentose, sterile hymenium on upper sides; stem 3-4 mm. thick, branches from or near base, arising from an abundant fibrillose mycelium, or a white tomentose mycelial felt; flesh dense, tough, slightly bitter, drying dark; odor practically none; spores 6.5-10 x 3.5-5 microns, dull ochraceous, minutely rough or minutely verruculose to nearly smooth.

On dead wood, bark and branches of coniferous trees; United States, Europe, Siberia, and Japan. Rare here. Allegheny County: Falls Run woods, Glenshaw, August 15, 1939, LKH. Bedford County: Sulphur Springs, August 16, 1948, DRS. Potter County: Carter Camp, 7 miles north of Germania, November 12, 1943, Mrs. Paul Wible. Westmoreland County: Laurel Hill, 1 mile southeast of Kregar, August 2, 1936, LKH.

Ramaria botryoides (Peck) Corner
(Clavaria botrytis sensu Coker and Burt)

Fructifications 7-16 cm. high and 3-15 cm. wide, massive, branching at ground from a short, white, rooting base, with numerous abortive pink-tipped branches, pallid cream, pinkish toward the rose-pink tips, becoming tan or brownish tan with dull brick-brown tips in age; branches curving upright, rather elongate, rugose, much branched distally; flesh firm, turgid, brittle, concolorous; edible, taste like green pea hulls; odor similar; spores 7-11.5 x 3.5-4.5 microns, ellipsoid, light buff-yellow, rusty brown or cinnamon, rough or nearly smooth, not striate.

On ground in woods; Australia, Tasmania, and throughout the United States. Rare here. Armstrong County: Buttermilk Falls, Kitanning, 1905, DRS. Cameron County: 2 miles south of Sinnemahoning, September 12, 1950, LKH. Centre County: Woodward, August 4, 1946, DRS. Mercer County: Transfer, August 9, 1912, DRS.

Ramaria crispula (Fries) Quelet
(Clavaria decurrens Persoon)

Fructifications 1.5-5 cm. high, tan then ochraceous or ochraceous tinged alutaceous or bister-cream, tips concolorous or paler in old specimens, caespitose, much branched; branches flexuous, multifid, divaricate, acute, often setaceous; stems
1-3 mm. wide, slender, villous with copious rhizomorphs at base; flesh rather tough, unchanging; spores 5-7.5 x 3-4 microns, ochraceous, laxly asperulate or finely rugulose.

On fallen trunks and logs of frondose trees, and on surrounding earth; Europe, southern Australia, and United States. Rare here. Allegheny County: near Sandy Creek, August 25, 1935, LKH. Westmoreland County: Shades Ravine, 2 miles east of Trafford, August 11, 1937, LKH.

*Ramaria flaccida* (Fries) Ricker
*(Clavaria flaccida* Fries)*

Figure 5

Fructifications 1.5-6 cm. high, alutaceous or pale cream-ochraceous, becoming bright ochraceous, brownish ochre or cinnamon, slender, flaccid, growing from a white floccose mycelial felt; branches numerous, erect, crowded, 1-3 times divided, incurving, tips becoming acute, pale concolorous; stem 0.5-1.5 cm. long, or branched from base; flesh white, yellowish upward, unchanging, tough and elastic, then flaccid; odor and taste not particular, or slightly fragrant and subacid; spores 5-8 x 3-4 microns, ochraceous, verrucose, ellipsoid or pip-shaped.

On coniferous needles, rarely on frondose humus, chiefly under *Abies*, *Picea*, and *Tsuga*; Europe, North America, China, Japan, southern Africa, and southern Australia. Rare here. Bedford County: Sulphur Springs, August 7, 1940, DRS. Butler County: near Slippery Rock, October 2, 1965, LKH. Centre County: Woodward, September 6, 1939, DRS. Clarion County: near Leeper, August 18, 1942, DRS. Elk County: south of Kane, August 19, 1942, DRS.

*Ramaria flavo-brunescens* (Atkinson) Corner
*(Clavaria flava sensu Burt and Coker)*

Fructifications 7-20 cm. high and 7-18 cm. wide, clear pale cream to light creamy yellow, Naples yellow, deep primrose, antimony or chrome yellow, or ochraceous orange, paler at maturity, tips concolorous but turning brown on withering or bruising; branches numerous, rather irregular, internodes short or rather elongate, rugulose; stem short, attenuate downward, rooting, branching at ground level and with abortive branches around the periphery; flesh concolorous, not reddening, very brittle, with age brown and watery; odor and taste mild, faintly sweetish, nutty, or like green peas, edible; spores 7.5-12(15) x 3.5-4.5(5.5) microns, pale yellow to light ochraceous, minutely roughened or nearly smooth.

On ground in frondose and coniferous woods; Europe, North America (widely distributed), China, and southern Australia. Frequent here; recorded from nine counties.

*Ramaria formosa* (Fries) Quelet
*(Clavaria formosa* Fries)*

Fructifications 7-30 cm. high and 6-15 cm. wide, gregarious or caespitose, pinkish buff, orange-rose or pinkish ochraceous, with lemon-yellow tips; branches
many, polychotomous below, ultimately bifid, internodes short or elongate, very variable, often longitudinally rugulose, tips blunt or subacute; stem 3-6 x 2.5-6 cm., whitish at base, soon breaking up into many branches; flesh white or subconcolorous, often turning vinous brown, then blackish where cut or bruised, fragile, not hygrophanous, drying chalky friable; taste slightly bitter, poisonous, causing diarrhea; spores 8-15 x 4-6 microns, very variable in size, ochraceous, oblong ellipsoid, coarsely or finely rough, 1-3 guttulate.

On humus in woods, chiefly frondose, arising from white rhizomorphs; Europe, temperate North America, Asia, and southern Australia. Frequent here; recorded from nine counties.

**Ramaria longicaulis** (Peck) Corner

(*Clavaria longicaulis* Peck)

Fructifications 2.5-9 cm. high, gregarious or sub-caespitose, cinnamon-tawny then darker brown, tips somewhat lighter; branches upright, closely appressed, cylindric, rather elongate, irregularly branched; stem 1.3-4 cm. long, whitish downward, arising from threadlike, white rhizomorphs, the mycelial strands and white part of stem turning pink when bruised; flesh whitish or cinnamon, in some cases turning dull vinaceous on bruising, not very brittle; odor slight; spores 7.5-11 x 4.5-7 microns, ferruginous-ochraceous, rather bluntly echinulate, ovoid or broadly pip-shaped.

On humus in frondose woods; United States. Rare here. Westmoreland County: Waterford, September 12, 1942, DRS.

**Ramaria ochraceo-virens** (Junghuhn) Donk

(*Clavaria abietina* Persoon)

Fructifications 1.5-4.5 cm. high, very compact, dull yellow, dull ochraceous, or olive-ochraceous, greenish or olive-green when bruised or weathered, caespitose from a floccose white mycelium with rhizomorphs; branches 1-2 mm. thick below, numerous, crowded, erect, irregularly branched, dichotomous, blunt; stem 0.5-1.5 cm. long, short, soon branched, white tomentose at base; flesh concolorous, greenish, rather tough; taste bitterish; odor rather strong or none; spores 5-9 x 3-5 microns, ochraceous or brownish ochraceous, finely verruculose or merely rough, ovoid, pip-shaped or oblong, often clumped together.

On humus in coniferous woods; Europe and United States (common in north and west, rare in south). Rare here. Butler County: Stone House on Rt. 8, south of Slippery Rock, August 27, 1942, DRS. Elk County: south of Kane, August 19, 1942, DRS.

**Ramaria stricta** var. concolor Corner

(*Clavaria stricta sensu* Coker)

Fructifications 4-10 cm. high and 3-8 cm. wide, often caespitose, pale fleshy tan, cinnamon-brown at maturity, deeper or reddish brown to pinkish-buff or vinaceous where bruised; branches numerous, much branched, dichotomous, erect,
fastigiate, elongate, straight, acute, tips concolorous or creamy white; stem 1-6 cm. long, distinct, pale, arising from a white myceloid felt or from thread-like rhizomorphs; flesh white or yellowish, tough, pliant; taste bitter or slightly papyry; odor faint, often aromatic or of anise; spores 6-10 x 3.5-5 microns, cinnamon-buff or ochraceous, minutely rough or almost smooth, oblong or pip-shaped.

On wood of frondose or coniferous trees; United States, Canada, China, and southern Australia. Common here; recorded from 22 counties.

Ramariopsis Donk

Terrestrial, rarely lignicolous; 10 species, mostly north temperate; two in southern Australia, one in tropical America.

Key to the Species of Ramariopsis

1. Fructifications much branched, wholly white or pallid; stem villous-tomentose

   R. kunzei

Fructifications sparingly branched, golden to orange; stem smooth or scurfy

   R. crocea

Ramariopsis crocea (Fries) Corner

(Clavaria crocea Fries)

Fructifications up to 5 cm. high, branched, solitary or 2-4 together, wholly golden yellow to rich chrome-orange, occasionally greenish when bruised; branches laxly dichotomous 2-4 times, cylindric, axis lunate, tips acute or blunt; stem up to 1 cm. long, distinct, minutely furfuraceous; flesh tender but elastic, not brittle; odor none; taste none or bad; spores 3-4 x 3.5 microns, white, obscurely asperulate, subglobose, 1-guttate.

On ground among grass in woods; Europe, United States, southern Australia, and Japan. Rare here. Elk County: south of Kane, August 19, 1942, DRS. Venango County: 3 miles northeast of Emlenton, September 25, 1942, LKH.

Ramariopsis kunzei (Fries) Donk

(Clavaria kunzei Fries)

Figure 6

Fructifications 2-12 cm. high, snow-white, ivory-white, or cream-white, rarely tinged pink or flesh colored, solitary, gregarious or caespitose, much branched or with few branches; branches 3-5-chotomous below, becoming narrow and dichotomous above, erect, fastigiate, crowded or loose, generally cylindric, sometimes flattened, tips acute or blunt, never cristate; stem 0.5-2.5 cm. long, sometimes absent, generally distinct, sometimes becoming yellow or pink at base, shortly villous-tomentose; flesh rather pliant and elastic, varying more or less brittle; odor and taste none or slight; spores 4-5.5 x 2.3-4.5 microns, white, minutely echinulate,
verruculose or merely asperulate, broadly ellipsoid to nearly globose, with small apiculus, 1-guttate.

In woods and pastures, mostly terrestrial, occasionally on decayed wood; north temperate, rather common in Europe, North America, and Japan; some in tropical America, Africa, and Australia. Frequent here; recorded from 8 counties.

**Summary**

Keys, adapted from Corner (1950), to the genera of the Clavariaceae and to the species involved have been provided. A total of thirty species and three varieties, representing nine genera, are described and their distribution noted. Collecting data are given for those that are rare or infrequent in our region.

**References Cited**

**Coker, W. C.**

**Corner, E. J. H.**

**Doty, Maxwell S.**

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