

RUSSULA LESSON 4/15/19: Boston Mycological Association

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The genera *Russula* and *Lactarius* are distinctive enough to be in their own order – and apart from other agaricoid mushrooms. 40% of trees in eastern temperate zone have a mycorrhizal association with russulas.

Evolved especially during post Cretaceous in warm Eocene Epoch with angiosperms and pines. Correlated with period of widespread forests on earth. Continued to evolve and diversify with cooling of planet by 40 mya with ice sheets. Warm periods between glaciation fostered expansion of arid regions and grass. Russulas very adaptable to temperature and climate changes.

We see more russulas than any other kind of mushroom. There are 750 species that have been described in the world. Probably many more yet to be discovered and identified through DNA analysis. Some of the ones we ‘know’ may actually consist of several ‘cryptic’ species. Easy to identify to genus, yet we are often not able to identify them to species. Mycologists avoid them, too, because so many look like each other. Unfortunately, it is necessary to use detailed diagnostic features to determine the species of most russulas – including use of a microscope and chemicals. *The basics of russula identification are not difficult.* We can easily identify them at least to **genus**.

RUSSULA AND LACTARIUS

1. both have **amyloid spores**. Meltzer’s Solution (Meltzer’s reagent) is a combination of iodine with methyl chloride and potassium iodide. An amyloid reaction: refers to a chemical test using iodine or Meltzer’s reagent (which is mostly iodine) to produce a black or blue-black reaction to the starch in the spores or tissues. Since newspapers have lots of starch in them, it is recommended that you place the spores or tissue on glass or acrylic rather than newspaper or you will get a false reaction to the starch in the newspaper. (A non-amyloid reaction is a negative response to putting iodine

or Meltzer's reagent on the spores or context. The spores or tissue being tested won't change color. A yellowish to deep reddish reaction is called a pseudoamyloid or dextrinoid reaction).

2. **Spores of russula and lactarius are reticulate:** means they have raised ridges.
3. **Brittle:** Their **cells are composed of spahaerocysts**, which consist of round rather than cylindrical hyphae. That is why they break easily and unevenly like a piece of chalk rather than just bend with pressure as other cap and stem mushrooms do.
4. **Often**, although not always, **colorful**.
5. **Central stipe (with a few exceptions such as *Russula eccentrica*).**
6. **Ringless (no partial veil), no volval.**
7. **Adnate gill attachment** (broadly attached to the stem).
8. **Mycorrhizal association with pines and oaks.**

MACROSCOPIC CHARACTERS of RUSSULAS

Cap cuticle: how far does it peel back from margin toward disc?

What **color** is the cap? Does it become washed out over time?

Pileus: dry or tacky or viscid?

Cap size on average? (S, M, M-L, L)

Cap shape? Convex, vase-shaped

Gills: color; spacing; length and number of gills (equal, unequal)?

SPORE print color: range from white to ochre.

Stipe: color; firm or fragile (relatively-speaking), length, diameter, shape.

Taste and odor: mild, bitter, burning hot, peppery, fruity, rancid, cedarwood, marzipan, shrimp, crustacean, fish, parsley, etc.

Discoloration with handling, insects; quickly or slowly over time?

Rolf Singer divided russulas into 5 major groups and numerous sections, each having a set of certain characteristics: Note that these are NOT phylogenetic groupings that show related russulas. There are in fact many different ways to organize them in your mind to facilitate being able to identify them.

SECTIONS (and Subsections)

Compactae (Firm, white to tan, staining brown, or gray to black or red to black)

Decolorantes (Colorful, staining gray to black)

Ingratae (Ochre, cherry, almond or marzipan then foetid)

Rigidae (Dry-capped, greens, purples, mild taste generally)

Russula (Smooth, tacky to viscid, bitter, super fragile, fades with age)

There USED TO BE less than a total of 30 species in the first three of the five groups.

SECTION COMPACTAE

Cap colors: light tan; white; off-white to grayish or blackish; white bruising red then black; bruising red-brown; bruising black

FIRM context compared with most other russulas

Crowded gills and white spore print

DECOLORANTES SECTION

Cap colors: yellow, orange or red

White to pale ochre spore print

Context generally fragile

Flesh staining slowly grayish to black, sometimes also pinkish-red

Taste mild to somewhat acrid

Odor of shellfish

Most are edible

SECTION INGRATAE

Includes all the 'foetid' smelling russulas

Odor frequently of cherries, almonds or marzipan when young, becoming foetid in maturity

Cap colors yellow to orange, ochre, orange-brown or gray

Margins striate to tuberculate-sulcate (bumpy marginal rows of striations on cap margin)

Taste mild to acrid, disagreeable

Spore prints from white to light ochre, depending on the species

SECTION RIGIDAE

Cap colors: greens, violets, with yellow-tan and reds

Usually dry matte cap, often slightly fussy or velvety, or aerolate.

Fragile context

Spore-print white to deep ochre

Taste mild to acrid

Most are edible

One group has shrimp-like odor

SECTION RUSSULA (*R. emetica*)

Largest and most frustratingly impossible to identify

Charismatic cap colors: red, orange, yellow & white;

Colors fading with maturity

Viscid somewhat tacky cap especially central disc area

Shiny, glabrous (smooth)

Context very delicate

Very hot to acrid taste

Spore print from white to ochre