

Guide to the Major Genera of Gilled Mushrooms
The Dark Spored Mushrooms Part II:
Cortinariaceae 2, *Bolbitiaceae*, *Strophariaceae* and *Psathyrellaceae*
and some Gilled Boletales (51.5 Minutes)

Slide 1. In this program I have included representative species from roughly half of the major genera of gilled mushrooms with brown to black spore prints. I have included all of the most poisonous species and the best edible species from these genera. I have attempted in this short space to give the viewer a sense of the range of diversity within each major genus as well as the diversity of the dark-spored mushroom species. My aim is to help you develop a feel for the look of each genus so that even when you do not know the exact species of a mushroom that you find in the fields or woods, you will recognize the genus and will have a much easier time in figuring out what species you have because you will be able to go to the right part of your field guide or to the proper monograph to solve the puzzle of what you have found.

Slide 2. I am Michael Beug, a member of the Education Committee of the North American Mycological Association and Professor Emeritus of The Evergreen State College. Elsewhere on this CD you can read my fungal biography, learn more about NAMA and learn how to customize this program for your specific needs.

Slide 3. There are about 75 species of *Gymnopilus* in North America. They are medium to large mushrooms normally found on wood. They have a smooth or scaly dry cap, a veil that sometimes forms a ring on the stipe and an orange to bright rusty brown spore print. *Gymnopilus penetrans*, *Gymnopilus bellulus* and *Gymnopilus picreus* are three of several relatively indistinguishable and undistinguished *Gymnopilus* species in the *Gymnopilus sapineus* group. They all share a habitat on rotting wood, yellow to orange-brown coloration and orange-brown spore prints. Similar members of the *Pholiota* genus are differentiated by having a darker brown spore print. None are of any interest as edibles, most are bitter. These species like most *Gymnopilus* species prefer conifer wood but will grow on hardwoods. They are widespread. *Gymnopilus picreus* has no veil, no odor and a mild to slightly bitter taste. *Gymnopilus bellulus* is a bit smaller with much smaller spores, has no veil, no odor and a bitter taste. *Gymnopilus penetrans* has a fleeting white veil, no odor and a bitter taste. *Gymnopilus punctifolius* has no veil. It grows on conifers and may be restricted to the west. It has a mild odor and a very bitter taste.

Slide 4. *Gymnopilus ventricosus*, shown here in the upper left image, is one of the largest and most spectacular western mushrooms, with individual caps reaching the size of a dinner plate and clusters weighing in at over 10 pounds. The bright orange spore print, membranous veil and rusty orange coloration make *Gymnopilus ventricosus* very easy to recognize. It is far too bitter to be eaten.

East of the Rockies you can find a common extremely close look-alike, *Gymnopilus junonius* which is also known as *Gymnopilus spectabilis*. *Gymnopilus*

junonius is known as the big laughing mushroom because it frequently contains significant levels of psilocybin, a hallucinogenic substance that I have not been able to detect in the western species. The specimens in the image by Peter Katsaros show a darkening of the orange color of the mushrooms. This is a result of the bluing caused by decomposition of some of the psilocybin and psilocin. I can thus tell just from the picture that those specimens are loaded with hallucinogenic material. *Gymnopilus junonius* has caused severe poisoning and so it should not be eaten.

Gymnopilus luteofolius is a widespread species almost always found on coniferous wood or wood chips. It has a mild to alkaline pungent odor and a very bitter taste. The discoloration seen on several of the specimens is the hint to the presence of psilocybin and psilocin. This is a hallucinogenic species but after tasting it I do not see how anyone could choke it down.

Gymnopilus aeruginosus is a widespread species that grows on either hardwoods or conifers. As you might guess from the blue-green coloration seen in the lower right image, it is a hallucinogenic species containing psilocybin and psilocin. It has a mild or an oily farinaceous odor with a trace of anise. The taste is bitter. It has a yellow fibrillose veil that leaves a fleeting zone on the stipe as can be seen in some of the specimens.

Slide 5. *Phaeocollybia* is a small genus with 25 species known from the West Coast of North America with a few additional species found in eastern North America.

Phaeocollybia species are distinguished by a stem that forms a long, slender, deeply rooting base; rusty-brown spores; and a sticky to slimy cap. The mushrooms are generally rare except in the strip along the Pacific Ocean and in some places in the Southeast. They are sufficiently unattractive that there are no reports of their edibility and I certainly have never been tempted to try them – even the texture is unappealing.

Phaeocollybia “similis” as understood by Alexander Smith is very small and fruits in moderate size troops of mushrooms.

Phaeocollybia scatesiae is one of several species with a cord-like pseudorhiza that goes very, very deep into the ground.

Phaeocollybia fallax is reported from eastern North America as well as the coastal forests of western North America. This is one of the smaller *Phaeocollybia* species, rarely more than 2” in diameter. It has the typical rooting stipe of the genus. A diagnostic feature is young gills and stipe apex that is dark bluish to lavender. It tends to grow solitary to scattered. It may turn out to be identical to the brown-capped *Phaeocollybia lilacifolia* A.H. Smith which is the name that would have priority. It is part of the *Phaeocollybia festiva* (Fr.) Heim complex. *Phaeocollybia festiva* itself is a European species not yet reported from North America.

Phaeocollybia californica is quite rare but in a few places in northern California under a mix of Douglas fir and redwood it fruits in abundance.

Slide 6. Members of the *Crepidotus* genus are characterized by sessile or shelf-like growth on wood. They superficially resemble the edible oyster mushrooms except that they are much smaller and have brown rather than white to lilac spore-prints. *Crepidotus applanatus* is very common and widely distributed, but there are nearly 100 similar *Crepidotus* species which are very difficult to distinguish. *Crepidotus applanatus* is

distinguished by distinctly round finely warty spores. It grows on deciduous wood, rarely on coniferous wood. These mushrooms are uninteresting as food and so their edibility is unknown and likely to remain that way.

Crepidotus mollis is a rather attractive little mushroom that is common, exceptionally widespread and conspicuous spring through fall. It is known as the “Jelly Crep” since the cap texture is rubbery and the gills are soft and gelatinous. It starts out rather pale and darkens in age. Sometimes the beautiful surface fibrils are so small and sparse as to be virtually indistinguishable except with a hand lens in which case this species would just blend in with all of the other *Crepidotus* species. *Crepidotus mollis* is neither edible nor known to be poisonous but possesses uninteresting soft, thin, pallid flesh.

Crepidotus crocophyllus is a widespread species with a minutely scaly cap that can closely resemble young specimens of *Crepidotus mollis* but *Crepidotus crocophyllus* does not have a gelatinous layer in the cap flesh. The young gills have a yellow tinge, discoloring ochre-orange and finally turning brownish from the spores. It grows almost exclusively on deciduous wood.

Crepidotus sublatifolius with its minutely scaly white cap and clustered growth habit is an attractive species. As far as I can determine, it is restricted to eastern North America.

Slide 7. Members of the genus *Galerina* are usually very difficult to identify to species. There are over 200 named species and most are passed over, lumped in the class of little brown mushrooms, LBMs. A great many *Galerina* species grow in moss. They can also be found on the ground, in grass and growing on wood. Some are shaped like a typical *Mycena* and look very much like a *Conocybe*, another genus with a brown spore print like *Galerina*. The brown-spored genus *Pholiota* also has some members that look like some *Galerina* species. *Galerina mniophila* is one of over 100 species that grow in moss. It is found across northern North America, Europe and Asia.

In the monograph on *Galerina* Smith and Singer describe a complex of variants of *Galerina vittaeformis* (same as *vittiformis*) and point to a likelihood that it intergrades with *Galerina atkinsoniana*. This species complex is found in North America, Europe and Asia where the mushrooms fruit scattered in moss or sometimes on moss-covered wood. The upper stipe is ornamented with minute hairs when viewed under a hand lens but the lower stipe is bald.

Galerina semilanceata is closely related to *Galerina heterocystis*. It grows on moss or in shaded moist grassy areas with moss intermixed and on grassy logs spring and fall. It is common in the Pacific Northwest and has been collected in Michigan, Tennessee and New York and was first named based on material collected in Europe.

Of *Galerina heterocystis* Smith & Singer remark in their 1964 monograph that here we have a complex of the order of the *Galerina vittaeformis* group. *Galerina heterocystis* is found across North America and South America, Europe and Asia. It is gregarious on moss but has rarely been found on *sphagnum*. It also occurs on *Podocarpus* needles in South America. In North America it is most frequently found in the fall during warm, relatively dry seasons. Some varieties have just a rudimentary veil when young and so the upper stipe is pruinose while the rest of the stipe is pretty bare. Other varieties

such as the specimens illustrated have a copious veil that leaves the stipe below where the cap was touching when young covered in faint white to pale cream fibrils. *Galerina heterocystis* and *Galerina semilanceata* are in the small 7 member *Tubariopsis* subgenus.

Slide 8. Some of the *Galerina* species have a cortinate veil that leaves a distinct ring zone on the stipe. The upper left specimens closely match *Galerina stylifera* var. *badia* in both macroscopic appearance and microscopic features. This species has not been widely reported but the collections Smith and Singer studied came from Idaho and Quebec so this could be a fairly widespread species. *Galerina stylifera* var. *badia* reportedly grows on conifer debris as these specimens clearly are.

Now we move to the *Galerina* species that grow on wood. These species, while never bigger than a 25 cent piece, are larger than the *Galerina* species we have just seen. *Galerina marginata* is sometimes mistaken for *Armillaria mellea* and its relatives by foragers more interested in dinner than in taxonomy. However, it does not pay not to know your taxonomy when it comes to the wood-inhabiting *Galerina* species. Many contain α -amanitin, the same toxin that is present in *Amanita phalloides* and other deadly “Destroying Angels.” *Galerina marginata* is deadly poisonous. It is found in North America, Europe and Asia. It usually grows on or near the wood of conifers, has a hygrophanous cap (the cap changes color and gets paler as it dries out) and lacks a differentiated pellicle – that is to say that there is not a distinct gelatinous skin-like layer on the surface of the cap.

Galerina autumnalis is another deadly poisonous mushroom that could be, and indeed has been, mistaken for hallucinogenic *Psilocybe* mushrooms. *Galerina autumnalis* also shares the toxins present in several deadly species of *Amanita*. I have found *Galerina autumnalis* growing in bark chip mulch next to collections of several different *Psilocybe* species. On two occasions that I have been consulted in, young people seeking a hallucinogenic high have mistakenly picked this *Galerina*, once with fatal results. In eastern North America *Galerina autumnalis* has been implicated in deaths where people confused it with members of the larger white-spored *Armillaria mellea* complex.

Slide 9. *Flammulaster erinaceella* was placed in the genus *Pholiota* by Peck and Singer had placed it in *Phaeomarasmius*. It is difficult to distinguish *Flammulaster erinaceella* from *Flammulaster muricatus* and the two have often been confused in North America. *Flammulaster granulosa* has often been identified as *Flammulaster muricatus* in North America. These species are found in northern North America and in eastern North America. The spore print is pale brown to rust brown and the cap skin has pear shaped to rounded sphaerocysts that give it a granular appearance reminiscent of a *Cystoderma*. They grow on woody substrates. Current thinking places this 15 member genus in the *Cortinariaceae*.

Slide 10. *Tubaria punicea* is simply gorgeous. These specimens were originally thought to be *Naucoria vinicolor* but DNA work showed that it was a different species. Then Joe Ammirati found it described in a monograph on *Pholiota* by Smith and Hesler where they named it *Pholiota punicea*. However, the DNA work clearly places it closely related to

Tubaria confragosa and *Tubaria furfuracea* and not a *Pholiota* at all. *Tubaria furfuracea* is composed of a complex of similar entities that are hygrophanous, have an evanescent partial veil, and a brown spore print. *Tubaria furfuracea* is widespread in North America, Europe and Asia. *Tubaria* is a small genus with just a handful of species.

Slide 11. The genus *Pholiota* is a large genus which once had over 200 species of brown-spored mushrooms usually found on wood or woody debris, sometimes on the ground. It is the only brown-spored genus in the *Strophariaceae*. A fibrillose, cottony, membranous or slimy veil is always present in young specimens usually leaving a ring or ring zone on the stipe, often with scales below the ring zone. Many are LBMs but some *Pholiota* species are large, striking mushrooms. We have been seeing changes to the *Pholiota* genus in recent years as researchers have moved mushrooms out based on microscopic differences. Indeed, our current understanding of the DNA evidence indicates that the genus *Pholiota* as monographed for North America in 1968 by Smith and Hesler included groups of mushrooms that were not genetically closely related. Also cultivation and mating studies have shown that some mushrooms thought to be distinct based on subtle macroscopic and microscopic features are actually not separate species. Name changes can be expected to continue as our understanding of this group improves. While some *Pholiota* species are large, meaty and beautiful, I have yet to find any really worth eating.

Pholiota squarrosoides is known as the "Bristly *Pholiota*" and is very similar to *Pholiota squarrosa* except that it lacks greenish tones on the gills and has a gelatinous layer under the scales. It also can be mistaken for *Pholiota aurivella* or *Pholiota limonella*, but its color is whitish to pale tawny or yellowish or light brown. Its flavor is unremarkable. *Pholiota aurivella* is one of two or more visually indistinguishable "Golden *Pholiotas*" all having a flavor described by the late Dr. Daniel Stuntz as most like a marshmallow without sugar. Some cause gastric upset. The species are widely distributed on hardwoods and conifers. *Pholiota aurivella* can reach 8 inches in diameter and has a very sticky-glutinous cap in damp weather, unlike the dry cap of *Pholiota squarrosa*. The scales on the yellow to rusty-orange caps are large and scattered. *Pholiota limonella* is a close look-alike to *Pholiota aurivella*. It is inedible and can cause gastric upset. *Pholiota limonella* can fruit by the hundreds on one log and is the most common of the species in the complex, fruiting on both hardwoods and conifers in North America and Europe. *Pholiota squarroso-adiposa*, *Pholiota abietis*, *Pholiota connata*, and *Pholiota subvelutipes* all appear to be somewhat different from *Pholiota limonella* and were long considered to be separate species but mating studies have shown them all to be mutually compatible, *i.e.* all one species and since *Pholiota limonella* is the oldest name, all of the others are now considered to be synonyms of *Pholiota limonella*. *Pholiota aurivella* was not compatible in mating studies and so it remains a separate species.

Slide 12. *Pholiota flammans*, the "Flaming *Pholiota*" or "Flame Scalecap" is closely related to *Pholiota limonella* but is readily identified by its beautiful brilliant yellow coloration. *Pholiota flammans*, like most *Pholiota* species, grows on wood, yields a

dull-brown to cinnamon spore-print, has a ring and a central scaly stem. It grows on conifer wood, especially western hemlock. It is edible but insipid.

Pholiota decorata is common in the Pacific Northwest and Rocky Mountains. It is a member of a complex of species centered around *Pholiota lubrica*. There are several similar small to medium sized *Pholiota* species and other species that also share its habit of appearing solitary to gregarious but not often growing in large clusters. The edibility of *Pholiota decorata* and *Pholiota lubrica* is not recorded and doubtlessly not worth investigating.

Pholiota destruens is a widespread, common and rapid decomposer of cottonwood, poplar and sometimes aspen and willow. It can get quite large, approaching dinner-plate size. *Pholiota destruens* is tough and not a tasty edible. It is also known as *Pholiota populina* and is found in river bottom habitats. *Pholiota destruens* is in a separate small subgenus of *Pholiota* called *Hemipholiota*.

Slide 13. *Pholiota terrestris* is a member of this large genus that grows on the ground and only rarely is found on wood. It is a very common species but is not always easy to recognize because of wide variations in size, scaliness and color. *Pholiota terrestris* is edible but of poor quality.

Pholiota astragalina is a distinctive and beautiful *Pholiota* that could most easily be confused with a *Hypholoma* (*Naematoloma*) except that its spore print is brown rather than purplish-brown. *Pholiota astragalina* is widespread in North America and in Europe on conifer logs, stumps and debris and is common in the Northwest in the late Summer and Fall. I remember the epithet *astragalina* by thinking about the strangling sensation that arises from tasting this bitter mushroom.

Pholiota spumosa the "Slender *Pholiota*", grows solitary to gregarious on the ground and in debris under conifers and is widely distributed. Friends who have eaten the mushroom have reported that it was pretty tasty but that was not enough to get me to try it since confusion with similar species is simply too easy. It belongs to a group of *Pholiota* species with yellow to greenish-yellow flesh, viscid caps and a quickly disappearing veil. It is readily confused with the poisonous *Hypholoma fasciculare* and could be confused with the deadly *Galerina autumnalis*. While these latter two species grow on wood and *Pholiota spumosa* grows on the ground or hardwood or conifer debris. There are several closely related species and it is very difficult to figure out which is which.

Pholiota highlandensis grows in ground rich in charcoal and can fruit in great abundance after a forest fire. It is a gregarious species that has been known as *Flammulina carbonaria* and *Pholiota carbonaria*. There is considerable variation in cap color, veil development and size causing Smith and Hesler to split this into many different species in their monograph. Seven different species are currently recognized. How many are truly separate remains to be fully explored if we find someone who cares to deal with these uncharismatic species.

Slide 14. *Stropharia* species are small to fairly large, often colorful decomposers. They are most often confused with *Agaricus* but *Stropharia* have notched rather than free gills and the stipe does not break from the cap in a nice ball and socket fashion. The often

viscid caps are typically convex and expand to plane. There is usually a membranous partial veil, though only a few species have a ring at maturity. *Stropharia* is a medium size genus.

Stropharia aeruginosa is a special favorite of mine because of its striking coloration. *Stropharia aeruginosa* is distinctive and easy to learn to identify, though it has been confused with *Agaricus* because of its chocolate-brown spores. It is probably at least mildly poisonous, though it is reported as edible in Europe. I have analyzed it for psilocybin and psilocin and found none. The blue color here is a pigment that fades, and in the sun these mushrooms lose nearly all of the blue-green coloration, bleaching out to a yellowish tan. *Stropharia aeruginosa* is reported from North America, Europe, Asia and North Africa.

Stropharia rugosoannulata, the "Wine-Red Stropharia" or "Garden Giant" is another distinctive *Stropharia* that is easy to identify. It grows in gardens in North America and can be found growing in natural habitats in Europe, and Asia. It is very easy to cultivate. The one my then young son Ben is holding was grown by my former student Paul Stamets. The flavor is variable. I have eaten barely passable collections and have found other collections to be absolutely delicious. *Stropharia rugosoannulata* is a beautiful wine red when it first comes up but the color is easily bleached out to tan by the sun. The name means wrinkled and ringed, referring to the prominent annulus.

Slide 15. *Stropharia ambigua* is an attractive Northwest species with a simply awful flavor that I have always heard described as that of "old leaves". The partial veil is evanescent, leaving transitory remnants on the cap and edge of the cap. I find *Stropharia ambigua* of most interest as a target for my camera lens.

Stropharia riparia is a similar normally smaller species found from the Rocky Mountains westward. It often has some scattered veil remnants all over the cap and has a fleeting but often observable ring on the stipe. It prefers sandy soils, alluvial plains and soils with debris of willow and alder.

Stropharia hornemannii grows wide-spread in North America under conifers or on well-decayed conifer wood. One taste and you would probably not want to eat any more since *Stropharia hornemannii* tastes rather like old decaying leaves and conifer needles.

Stropharia hardii is found in deciduous woods, especially Beech in Ohio and eastern North America. It has a superficial resemblance to an *Agaricus* but the stipe does not break from the cap in a ball and socket fashion as in *Agaricus*. It is most common in the southeast but is rarely abundant and there is no information to indicate that it is worth eating.

Slide 16. *Stropharia squamosa* grows singly to clustered on forest debris or decayed logs. It is widespread in Northern regions and can be confused with *Stropharia hornemannii* when fresh or with *Stropharia coronilla* after the rain has washed off its scales. A more orange to brick red variety, *Stropharia squamosa* var. *thrausta* is found in eastern North America and has now been raised to species rank as *Stropharia thrausta*. *Stropharia thrausta* is found on hardwood debris. Neither mushroom is considered edible.

Stropharia semiglobata, the "Hemispherical Stropharia" or "Manure Roundhead", grows typically on horse or cow dung. It is a widespread common species that is harmless if eaten, though the slimy cap is enough to discourage most mycophagists. It is probably most often consumed by confused seekers of a hallucinogenic high who think that they have encountered *Psilocybe cubensis*.

Psilocybe coprophila, the "Meadow Muffin Mushroom", also resembles *Psilocybe cubensis* and shares the same habitat, but *Psilocybe coprophila* is smaller, lacks a ring, does not bruise blue and is not hallucinogenic.

Stropharia coronilla, "the Garland Stropharia" is a grass-inhabiting species that has sometimes been mistaken for the Meadow Mushroom, *Agaricus campestris*, with mildly unpleasant results since it can cause gastric upset when consumed. There are a few similar *Stropharia* species that can also be confused with *Agaricus* species if you do not notice that *Stropharia* species do not have free gills but rather have gills that are bluntly attached to the stalk or are notched at the point of attachment. Some authors place *Stropharia coronilla* in *Psilocybe* and it has been mistaken for *Psilocybe cubensis*, but *Stropharia coronilla* does not contain psilocybin or psilocin.

Psilocybe cubensis is a large distinctive hallucinogenic mushroom that fruits on cattle and horse manure in the U. S. Southeast and southward into Mexico. It is readily cultivated and is grown by illicit drug operations throughout the United States. Some strains are very potent, though most are 0.2% to 0.4% psilocybin plus psilocin by dry weight. *Psilocybe cubensis* is distinguished by its tendency to bruise blue, brownish to yellow or pallid cap, and membranous ring. It closely resembles *Stropharia coronilla* and some other *Stropharia* species and has sometimes been placed in the genus *Stropharia*.

Slide 17. David Arora says of the genus that "Psilocybes as a group are difficult to characterize: the majority are listless little brown mushrooms ("LBMS") with a viscid cap (when moist) and dark (purplish to nearly black) spores. The hallucinogenic species usually turn blue or greenish when bruised, especially on the stem." For hallucinogenic *Psilocybe* species in North America, there are two centers – southern Mexico and the Pacific Northwest although there are also some hallucinogenic species including *Psilocybe cubensis* in and near the gulf states.

Psilocybe semilanceata, the "Liberty Cap", is a common hallucinogenic mushroom of the coastal zone of the Pacific Northwest, the British Isles and possibly the maritime Northeast. It grows scattered to gregarious in boggy grasslands. *Psilocybe semilanceata* contains about 1.6% by dry weight psilocybin and can cause anything from a giggly laughing state to full-scale hallucinations that will persist for 6 hours.

Psilocybe cyanescens, the "Potent Psilocybe" or "Bluing Psilocybe", is a common inhabitant of flower beds and wood-mulched landscaped areas on the Northwest Coast. It contains both psilocybin and psilocin in variable amounts from less than 0.5% by dry weight to over 2%. Consumption of this mushroom can cause marked changes in perception. The sensation, which is usually pleasant, can at times be intensely terrifying. Children may develop high fevers and convulsions. At least one death has been reported from a child consuming what was reported to have been *Psilocybe baeocystis*, but I believe was *Psilocybe cyanescens*.

Psilocybe baeocystis is very similar to *Psilocybe cyanescens* in habitat but has no veil. *Psilocybe baeocystis* is a potent hallucinogen. Before you rush off in search of a chemical high you should be forewarned that not only can ingestion of hallucinogenic mushrooms sometimes produce unexpected and unwanted side effects but that possession of psilocybin and psilocin is illegal. *Psilocybe stuntzii*, "Stuntz's Blue Legs", is another wood-chip species of the Northwest Coast. It also grows in lawns and is often common in school playgrounds, college athletic fields and in prison exercise yards.

Psilocybe stuntzii does not always bruise distinctly blue unlike both *Psilocybe cyanescens* and *Psilocybe baeocystis*. It is also much less potent as a hallucinogenic species, sometimes containing no psilocybin or psilocin. All of these *Psilocybe* species have been confused with *Galerina autumnalis* by people seeking a chemical high and there have been several serious poisonings and one death as a result. The deadly *Conocybe filaris* is also quite similar to these species.

Slide 18. *Psilocybe montana* fruits in the moss across northern North American and the western mountains from Spring through Summer. *Psilocybe montana* is a small innocuous species of no known interest as an edible and it does not contain hallucinogenic compounds.

Psilocybe inquilina, the grass-rotting Psilocybe, is a small brown innocuous species that fruits in the spring on old blades of grass. I did not find any psilocybin or psilocin in this species either. *Psilocybe inquilina* does not bruise when handled and is not hallucinogenic. Interestingly, recent genetic studies have shown that these two non-bluing *Psilocybe* species are closely related to *Kuehneromyces mutabilis* and to *Melanotus* species but not to the bluing *Psilocybe* species.

Kuehneromyces mutabilis formerly *Pholiota mutabilis*, and *Galerina mutabilis* the "Two-tone Scalecap" or "Changeable Pholiota" is distinguished by a smooth cap, tendency to fruit in small to very large clusters, and change in cap color from rusty-brown to orange-brown when moist to yellowish or buff on loss of moisture, often assuming a two-tone look, fading from the center outward. There are a number of species with which it could fairly easily be confused, including *Hypholoma* species and the deadly *Galerina autumnalis*. *Kuehneromyces mutabilis* or *Pholiota mutabilis* is widespread but most common in the Northwest. It grows on hardwood logs and stumps in spring and fall.

Kuehneromyces vernalis was long known as *Pholiota vernalis*. It could also be confused with *Kuehneromyces mutabilis*, the former *Pholiota mutabilis*. *Kuehneromyces* species have a hygrophanous bald cap, brown colors, smooth spores, and a partial veil that is often membranous. Normally little brown mushrooms are difficult to positively identify to species but this one is easy because no similar species shares the small stature, hygrophanous bald cap and fruits in the spring on montane conifer logs.

Slide 19. *Hypholoma* is a small genus listed in most field guides as *Naematoloma*, the name I learned and still often use when I forget about the current classification of these mushrooms. *Hypholoma* species have spore prints that are grey-violaceous, black-violaceous, grey-brown to black. The caps are cinnamon-brown, yellow, greenish-red, orange-red or brick-red. There is usually a quickly disappearing veil that does not leave a ring and, unlike *Stropharia*, *Hypholoma* species do not have a viscid cap.

Psathyrella species are very similar and were once placed in the same genus. *Pholiota* species are distinguished by a cinnamon-brown spore print.

Hypholoma udum is a terrestrial species that grows scattered to gregarious on the ground in boggy areas and is often associated with *Sphagnum* mosses. *Hypholoma udum* is a widespread species and in northeastern North America is said to be the commonest agaric. It resembles some of the *Psilocybe* species but is too small to have attracted any interest as an edible. The odor is mild and there is little taste.

Hypholoma fasciculare, formerly *Naematoloma fasciculare*, the "Sulfur Tuft" or "Green-Gilled Wood-Lover", grows widely distributed singly and apparently on the ground as well as in dense clumps on both hardwoods and conifers. It has caused several deaths in Europe and Asia, but not in the North America. The toxic component appears to be associated with a very bitter compound and North American specimens are generally less bitter and have to date only caused gastric upsets. There are several similar *Hypholoma* species as well as similar *Pholiota* species and it is best to avoid both *Hypholoma fasciculare* and its close look-alikes when collecting for the table.

Hypholoma capnoides long known as *Naematoloma capnoides* is commonly known as the "Orange Stump Mushroom", "Conifer Tuft", and "Gray-Gilled Wood-Lover." *Hypholoma capnoides* is distinguished by a grayish cast to its gills rather than the yellow to greenish-yellow gills found in *Hypholoma fasciculare*. *Hypholoma capnoides* is a widespread species that fruits on conifer wood. Some consider it to be edible and very good, but I have found it to be mediocre and avoid it because of its close similarity to the poisonous "Green-Gilled Wood-Lover".

Hypholoma sublateritium which I learned as *Naematoloma sublateritium*, the "Brickcap", is typically brick red near the center of the cap and yellowish-pink near the margin. It is common in hardwood forests throughout North America where it grows clustered on hardwood stumps and logs. *Hypholoma sublateritium* is edible, but be careful not to confuse it with *Hypholoma fasciculare* or with a *Pholiota*.

Slide 20. Typical members of the *Psathyrella* genus are found mostly on wood or on humus, are some shade of tan, brown or gray, are very fragile with a slender pallid stalk and have a deep brown to blackish spore print. While there are no toxins in *Psathyrella* that I am aware of, I am also not aware of any good edibles and this group is best avoided. Most are thin-fleshed.

Normally, when I find a *Psathyrella*, I figure that I do not have a chance of identifying it. However, if there is a ring on the stalk and it is a western species, I know that I have found *Psathyrella longistriata*. *Psathyrella longistriata* is a common species found under conifers in the Pacific Northwest. *Psathyrella gruberi* and *Psathyrella caput-medusae* are closely related and can appear quite similar. I am struck by the similarity to *Stropharia* and Alexander Smith put these two species into a small subgenus, *Pseudostropharia*, which also contains *Psathyrella longistriata*.

Psathyrella velutina is not a typical *Psathyrella* because it is robust. *Psathyrella velutina* is distinguished by its fibrillose-scaly cap and stipe and hairy veil when young. Because of its distinctive features some consider the subgenus, *Lacrymaria*, a separate genus in its own right. *Psathyrella velutina* is reportedly edible, but not recommended.

Psathyrella rigidipes often occurs in large numbers along gravel paths, in grassy areas and in damp places under herbs. It is found throughout North America. *Psathyrella rigidipes* is readily distinguished from *Psathyrella velutina* which has more distinctly wrinkled spores that are not truncate.

Slide 21. *Psathyrella candolleana* is a very widely distributed species that fruits in grass or in openings in the forest. It can appear spring, summer or fall and has a membranous partial veil that rarely leaves a ring on the stipe. It has a fungoid odor and a mild taste. There are over 400 species of *Psathyrella* in A.H. Smith's monograph, The North American Species of Psathyrella published in 1972. *Psathyrella candolleana* was placed in the subgenus *Candolleana*, species that have a partial veil that leaves veil remnants on the edge of the cap, a stipe typically more than 2.5 mm thick and microscopically they lack pleurocystidia.

Psathyrella hymenocephala is in the subgenus *Candolleana* along with *Psathyrella incerta* and *Psathyrella candolleana*. *Psathyrella hymenocephala* intergrades with *Psathyrella candolleana* making it truly a nightmare trying to put a name on what you have found. It is a very abundant and widespread species.

Psathyrella hydrophila has a partial veil that leaves veil remnants on the cap margin but it has pleurocystidia so it was placed in another subgenus, *Pannucia*. There is often an outer veil that covers the cap as well. As was the case in the subgenus *Candolleana*, telling the various members of this group apart can give you a real headache. *Psathyrella hydrophila* grows on the decayed wood of hardwood trees and when appearing to grow on the ground it will actually be fruiting on buried wood. It is found in Europe and throughout North America.

Psathyrella spadicea, the Date-colored *Psathyrella*, is the type for the subgenus *Homophron*, a group that features thick-walled pleurocystidia but that intergrades with members of the subgenus *Pannucia*. *Psathyrella spadicea* differs from *Psathyrella hydrophila* macroscopically in the absence of a veil at all stages. *Psathyrella spadicea* is a more northern or a montane species.

Slide 22. The *Gomphidiaceae* is a small easily recognized family of mushrooms with distinctly decurrent gills and a smoky olive to black spore print. The species are mycorrhizal, exclusively with conifers. There are two common genera, *Gomphidius* where the immature gills and flesh in the cap is white to grayish and *Chroogomphus* where the immature gills and flesh in the cap is colored buff to orange or reddish.

Gomphidius subroseus, the "Rosy Gomphidius", is the most attractive member of the *Gomphidius* genus and is distinctive. It is widespread under or near conifers. *Gomphidius subroseus* is edible, but bland and difficult to prepare since you must peel the caps to remove a glutinous layer.

Gomphidius glutinosus var. *glutinosus*, the "Slimy Gomphidius" or "Slimecap", is widespread and abundant under many different conifers but can be especially abundant under spruce. *Gomphidius glutinosus* is larger than *Gomphidius subroseus* and colored differently, though both have yellow flesh in the stipe base. *Gomphidius glutinosus* is widespread, though more abundant in the West.

Gomphidius maculatus, the "Spotted Gomphidius", is distinguished by its tendency to bruise black and by the absence of a partial veil. Its range is northern regions worldwide, always in the presence of larch. Like the other members of the genus, *Gomphidius maculatus* is slimy when fresh and remains so when cooked.

Chroogomphus ochraceus the North American look-alike to the European *Chroogomphus rutilus*, the "Brown Slimecap" or "Pine Spike", grows widespread under conifers, especially pines, and has a smooth cap that is sticky when moist and often shiny when dry. All members of the genus are considered edible and this one is supposed to have the best flavor, though it is better dried than fresh. *Chroogomphus ochraceus* can be orange, gray, brown, and/or wine-red. The flesh is pale orange, the gills are decurrent and the spore print is smoky-black.

Slide 23. *Phylloporus rhodoxanthus* is widely distributed in North America, one of 10 species in the genus. The bright yellow decurrent gills are unmistakable. The cap is minutely velvety brown to reddish and very reminiscent of *Boletus subtomentosus* and its relatives. *Phylloporus* species are in the *Boletaceae* family and share the tendency of some Boletes to bruise green or blue (sometimes brownish). Also, the gills easily rub off just like Bolete pores. Indeed, the case can readily be made that *Phylloporus* species are actually gilled boletes. Like the boletes that it most closely resembles, *Phylloporus rhodoxanthus* is edible but not great eating. It should be noted that the blue staining is due to boletol and not to the presence of psilocybin or psilocin.

Slide 24. As with *Phylloporus* species, *Paxillus* species are in the Boletales. There are five species in North America, two of which are sessile, *Paxillus panuoides* and *Paxillus corrugatus*. *Paxillus* is the only species in the *Paxillaceae* family.

Paxillus involutus is easy to learn to identify because of the inrolled cap margin, the brown staining, and the decurrent, often forking gills that readily separate from the cap. It is frequently associated with birch and is one of the most common urban mushrooms, showing up in lawns near trees. It has long been a popular mushroom in Europe, but raw, improperly cooked or possibly even when fully cooked it can cause severe poisoning and so should be strictly avoided. Several deaths have been reported in Europe as a result of ingestion. *Paxillus involutus* can cause hemolytic anemia in individuals who have consumed the mushroom for years but who begin to produce IgG antibodies to some component of the mushroom and then at a subsequent meal antigen-antibody complexes form and ultimately red blood cells undergo intravascular hemolysis. Ultimately there can be kidney failure and occasionally death. There is also evidence for compounds in the mushroom that cause chromosome damage that can lead to mutagenicity and carcinogenicity.

Tapinella atrotomentosa, long known as *Paxillus atrotomentosus*, at its prime is a beautiful mushroom with a lovely dark brown furry stem and a lighter brown minutely velvety cap. This large, distinctive mushroom grows on decaying conifers and is widespread Summer and Fall. The flesh is thick and rather tough and this species is not recommended for the table, though the edibility or lack thereof is not clearly established. While some evidence points to this species belonging in the *Paxillaceae*, other stronger evidence points to an affiliation with the *Hygrophoropsidaceae*.

Tapinella panuoides or *Paxillus panuoides* appears to be rather similar to a *Crepidotus* in that it has brown spores, has at most a rudimentary stem, and grows on wood. It is distinguished by forking gills that easily separate from the cap, a feature of boletes to which *Paxillus* mushrooms appear to be somewhat related. *Paxillus panuoides* is widespread, though rarely abundant, and is of unknown edibility. It should not be sampled and is hardly tempting in any case. *Paxillus panuoides* is listed as poisonous.

This concludes Part II of the Major Dark Spored Genera.