Guide to the Major Genera of Gilled Mushrooms
The Dark Spored Mushrooms Part I:
Agaricaceae (dark spored members), *Bolbitiaceae* and *Cortinariaceae* 1
(52 Minutes)

Slide 1. In this program I have included representative species from about 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. The genus *Agaricus* is characterized by having free gills so that the cap breaks from the stalk in a ball and socket fashion, the spore print (and mature gills) are chocolate brown, and the mushrooms are terrestrial saprophytes. The mushrooms have a membranous or cottony veil when young that typically leaves a ring on the stalk.

Agaricus augustus is one of the most distinctive and spectacular members of the genus. *Agaricus augustus* is distinguished by its large size, almond odor, and tendency to stain yellow. It is very choice and has a bunch of choice edible look-alikes that have a variable degree of almond fragrance and a variable degree of staining yellow. If you think that you have found *Agaricus augustus,* just make certain that all specimens have a delightful odor on cooking, because there are several somewhat similar, though smaller, species that have an unpleasant odor when cooking and cause upsets in many people. Also watch out for species that quickly bruise bright yellow. *Agaricus augustus* is a very widespread species that is common in the western states, but fairly rare in eastern North America.

Agaricus silvaticus is a medium-sized and meaty *Agaricus* found widespread in woodlands, typically under conifers, but sometimes under hardwoods. A distinctive feature is its tendency to bruise slightly to intensely red when cut or bruised. There are a large number of similar species that form a confusing species complex with cap colors ranging from almost white to brown and with varying degrees of pileus squamules. Once you start to study the genus, you will become accustomed to experiencing total confusion and bewilderment. The redeeming feature is that any *Agaricus* that smells delightful when cooked will treat you well afterwards. Some members of this complex smell and taste good when fresh and when cooked and others are not so pleasant when being cooked and especially after being eaten.

Slide 4. *Agaricus arvensis*, the "Horse Mushroom" is easily confused with a number of other species and is one of many members of the genus that I never feel confident about. *Agaricus arvensis* is a sweet edible mushroom that usually has a distinct anise odor and a tendency to discolor yellowish in age. The growth in grass is characteristic. Unfortunately different mushrooms pass by this name in different parts of North America and Europe.

Agaricus campestris "The Meadow Mushroom" or "Pink Bottom" ranges from the size of a golf ball to the size of a baseball, but generally is not as large as a softball. When young the gills are a pretty pink and at maturity they are a deep chocolate brown. The smell will be pleasant when cooked.

The "Woodland" or "Sylvan Agaricus" usually is known as *Agaricus silvicola* but some experts would argue that its correct name is *Agaricus fabaceus* and it is sometimes known as *Agaricus abruptibulbus*. Some authors recognize two species, *Agaricus silvicola* and *Agaricus abruptibulbus* and would apply the name *Agaricus abruptibulbus* to the specimens shown which have an abrupt flaring bulb at the base of the stipe. *Agaricus silvicola* is sometimes rated as edible and choice, but some gastro intestinal poisonings have been reported. *Agaricus silvicola* looks much like a "Horse Mushroom" but it is identified in the field by the fact that it grows in the woods rather than in grassy areas. The real trick is telling which is which when mushrooms are found growing in grass under trees! It is also important to note the slight similarity between these white *Agaricus* species and the deadly *Amanita* species. It is easy once you remember that *Amanita* gills are white to yellowish cream and *Amanita* gives a white spore-print, not chocolate brown. You would be surprised how many people eat an *Amanita* thinking that they have an *Agaricus.* To me that is like eating melon thinking you have an orange – a major failure in observation.

Agaricus xanthodermus bruises chrome yellow, especially at the base of the stem. It has an unpleasant creosote-like odor and taste and is poisonous to many people who eat it, causing mild to severe gastrointestinal upset. While there are some people who can eat *Agaricus xanthodermus* without ill effect, it is definitely not recommended. It grows commonly in lawns and near trees, throughout much of North America and Europe, though generally not in deeply forested areas. Because it frequently shows up in lawns, it is often grazed by young children and inattentive adults, sometimes sending them to the hospital with significant gastrointestinal distress. While they soon recover, the experience is most unpleasant.

Slide 5. *Agaricus placomyces* is found East of the Rocky Mountains and probably not as far south as Florida. There is considerable confusion over the correct application of this name and material from Europe and from Western North America representing at least three different species has been incorrectly called *Agaricus placomyces. Agaricus placomyces* is more slender than typical western material. The distinctive feature that correctly separates *Agaricus placomyces* from similar species is a somewhat elastic partial veil that remains attached to the edge of the cap (at least in places) until the cap is nearly fully expanded. The currently unnamed western look-alikes have a veil that separates from the cap margin as soon as the cap begins to expand. Compare the upper

images to the lower right image. Both eastern and western material tends to bruise yellow at the base of the stem, though the mushrooms do not dry yellow. They turn yellow when a drop of KOH is applied to the flesh of the stipe. The odor is mildly to strongly of coal tar or phenol and most people who eat these species suffer gastrointestinal distress. They are closely related to *Agaricus xanthodermus*. These species can all contain phenol, which partially accounts for their toxicity.

Slide 6. *Agaricus dulcidulus* is a member of the widespread *Agaricus diminutivus* group with a mild or faintly fragrant anise odor and a very petite size. *Agaricus purpurellus* is a synonym. Note how the cap can be separated from stipe. The cap easily breaks off in a ball-and-socket fashion typical of *Agaricus* species (and also *Lepiota* and *Pluteus* species). The pink gills that turn chocolate brown in age are definite marks of the genus *Agaricus*. Poisonous *Inocybe* species would not break in a ball and socket fashion and not have pink gills when young.

Agaricus micromegathus, the "Anise Agaricus" is a very small *Agaricus* species found in grassy areas in many parts of North America. It is difficult to gather enough to be worth making a meal of *Agaricus micromegathus*. Consequently, I am unable to comment personally on whether or not it would cause gastric upset, though other authors say it is edible and given the clue of the pleasant odor, I suspect that the meal would be enjoyable. Be aware that the rule of pleasant odor and taste indicating edibility only works with the genus *Agaricus*. For example, *Amanita phalloides* is delicious but deadly.

Agaricus semotus is another one of the widespread diminutive members of the genus and it shares the odor of anise or almonds. The taste is mild and it is probably edible and it grows in woods and under trees.

Agaricus bitorquis, also known as *Agaricus rodmani* and *Agaricus edulis* by contrast is a stocky, meaty *Agaricus* of good size. It is commonly known as the “Banded or Urban Agaricus." *Agaricus bitorquis* is characterized by a prominent, flaring band-like ring in most collections; thick, very firm flesh that doesn't bruise; and growth in hard-packed disturbed soil, often fruiting underground. *Agaricus bitorquis* is considered by many to be the best eating of the *Agaricus* species.

Slide 7. *Coprinus comatus* is very closely related to the genus *Agaricus* and is not at all closely related to most other mushrooms that until recently have resided in the genus *Coprinus*. *Coprinus comatus* is commonly known in North America as the “Shaggy Mane”. *Coprinus comatus*, the "Shaggy Mane", is a very popular and very distinctive mushroom that is edible and choice when young. The shaggy bullet-shaped cap is distinctive. It is exceptionally widely distributed and can fruit in vast quantities. Unfortunately, *Coprinus comatus* soon deliquesces and turns into an inedible mess of black ink. *Coprinus comatus* frequents disturbed or open areas. DNA work now points to *Coprinus comatus* being actually a complex of closely related species occurring in various habitats around the world.

Coprinus quadrifidus, illustrated here by Emily Johnson, is known as the "Feltscale Inky Cap" and grows clustered on hardwood logs and debris from the Great Lakes area eastward. Numerous inky caps have felty scales which are the remnants of a universal veil and *Coprinus quadrifidus* is the most common large one. Edibility reports

vary and so this and similar species are not recommended for the table. The general appearance of this mushroom makes me suspect that when studied again it will wind up moved to one of the new segregate genera, presumably *Coprinopsis.* Like all members of *Coprinus sensu lato*, the gills are crowded close together but are free and not attached to the stipe. The spores in mass are black.

Coprinopsis atramentaria formerly *Coprinus atramentarius*, the "Inky Cap", is a very common wide-spread mushroom that grows scattered to densely clustered in the woods and in open areas, often on hard-packed ground. It is generally considered edible but it contains variable amounts of an unusual compound named coprine that causes an adverse reaction in some people who consume alcohol with their meal or as long as two weeks after the meal. What little I know of the chemistry of coprine leads me to recommend that *Coprinopsis atramentarius* not be eaten.

Slide 8. *Coprinopsis cinerea,* formerly *Coprinus cinereus*, is one of several look-alikes to *Coprinopsis lagopus,* a woodland species*. Coprinopsis cinerea* is a widespread species that grows on rich soil and can occur on dung. An individual can appear one morning and by the next morning the cap is fully expanded and beginning to thin out, only to have disappeared by the third morning, but often to be replaced each day by new fruiting bodies.

Coprinellus laniger, formerly *Coprinus laniger* has an interesting reddish-brown to dark tawny universal veil on a tawny pileus. I find these little emphemeral species quite fascinating. This species and the larger *Coprinellus radians* both fruit from a mat of yellow-orange threads about the stipe base leading to the common name “Orange-mat Coprinus.”

Coprinellus micaceus grows in large clusters on and near wood. The fruiting season of *Coprinellus micaceus* is spring, summer and fall during cool moist weather. If you do decide to try it for the table, collect only young material where the gills are still white or at most light gray. The gills soon turn black and inky and then the mushroom is no longer edible.

Parasola plicatilis, formerly *Coprinus plicatilis,* is a strikingly beautiful small species that stands less than an inch tall and typically less than ½ inch wide. It is normally only found east of the Rocky Mountains. There are actually a number of *Parasola* species. All are small and delicate. Some fruit in grass and on rich humus like *Parasola plicatilis* and others fruit on dung. They can be found during cool wet weather from spring through fall and are widely distributed.

Slide 9. Now we leave the *Agaricaceae* family and move on to the *Bolbitiaceae* family. *Agrocybe praecox* is found most commonly in wood-mulched plantings. The cracking of the cap in dry sunny weather is characteristic of many of the *Agrocybe* species. *Agrocybe praecox* has a membranous veil that often fails to leave a distinctive ring on the stipe at maturity. White rhizomorphs look like roots attached to the base of the stipe. The spore color typical of all *Agrocybe* species is a dull brown and can be observed on the remnants of the partial veil on the large mushroom to the left in the image. *Agrocybe praecox* is exceptionally widespread and fruits in lawns, mulch beds, humus and grass. It is edible, but mediocre and there are a number of pretty similar *Agrocybe* species whose edibility is

untested so this is not a good bet as an edible. The ones I tried went into the garbage after one bite.

Agrocybe acericola is another widespread *Agrocybe* species. It is distinguished from *Agrocybe praecox* by its tendency to form a persistent membranous ring. It too has white rhizomorphs. *Agrocybe acericola* is found on rotten logs and stumps or on buried wood. It is very common, the odor is mild to fungoid, the taste is farinaceous. Farinaceous is a taste of meal that you need to experience once to appreciate. It is a distinct and not an altogether pleasant odor and taste. The mushroom is considered inedible. There is, however, one somewhat similar choice edible *Agrocybe* species, *Agrocybe aegerita (= A. cylindracea)* which grows in clusters on often living hardwoods in the South and is also cultivated by some people.

Agrocybe molesta and *Agrocybe dura* both are current valid names for what appears to be the species illustrated in the lower left image. *Agrocybe molesta/dura* has an evanescent ring like *Agrocybe praecox* and the cap cracks like drying mud in the sun. It also has rhizomorphs like *Agrocybe praecox* and is indeed hard to distinguish. It does not grow on wood and is found more often in grass than in humus or litter. The odor is fungoid and the taste is mild but the aftertaste makes it a less than delicious choice for the table.

Agrocybe pediades is a very common small grassland species with no discernable veil. A former name is *Agrocybe semiobicularis.* It could easily be confused with *Agrocybe paludosa* another slender grassland species, but possessing smaller spores. *Agrocybe pediades* is very widely distributed. The odor and taste are mealy. It is unsuitable as an edible not only due to its disagreeable flavor but due to the possibility of confusion with poisonous species. It is strikingly similar to *Stropharia semiglobata,* which is slimy and disagreeable and somewhat similar to small poisonous species of *Hebeloma.*

Slide 10. *Bolbitius* is a small genus of little ephemeral mushrooms that are quite pretty but are of no interest as edibles due to their thin flesh. All yield a brown spore print. *Bolbitius vitellinus* is the member of the genus that I find most frequently. It is often found directly on dung, but it is also found on rich soil and in grass. The mushroom has long reminded me of a tiny *Coprinus* but with bright yellow coloration, with gills that fade away but do not deliquesce, kind of like a yellow *Coprinopsis cinerea.* Within a day the mushrooms tend to appear and expand to full width. By the next day they are senescent.

Bolbitius reticulatus is distinguished by its veined cap. Though it is widely distributed and fruits spring through early fall, I have only encountered it once growing on a horse manure and sawdust pile. It can occur in troops on decayed wood and on soil rich in manure. It is small and fleshless.

Bolbitius variicolor has been known as *Bolbitius vitellinus* var. *olivascens.* It fruits May through October scattered to clustered on manured areas, rich ground and along horse trails. It is common in eastern North America though I have never encountered it out west.

Slide 11. *Conocybe* species are of no interest as edibles since they are small and thin fleshed. *Conocybe* species have a rich brown spore print. Two species are hallucinogenic and at least two other species are deadly poisonous making this a very dangerous genus to experiment with. *Conocybe lactea* is fragile and ephemeral, difficult to even bring home for study let alone consider for the table. It is a common inhabitant of summer lawns. Like *Bolbitius vitellinus* its appearance is short-lived. The gills go from pallid to a rich brown as the spores mature and color the gills. Discovered in the morning, *Conocybe lactea* is usually gone by late afternoon. Former names for this species include *Conocybe lateritia* and *Galera lateritia. Conocybe lactea* is small and nonpoisonous.

Conocybe tenera is another small thin-fleshed species but is longer lived than *Conocybe lactea* or a *Bolbitius* species. *Conocybe tenera* grows both in grassy areas and in forest stands. It is very widely distributed. There are several *Conocybe* species that answer to the general description of *Conocybe tenera*. *Conocybe* species often grow mixed in with white-spored *Mycena* species and black-spored *Panaeolus* species, both of which they can superficially resemble.

Conocybe filaris, once known as *Pholiotina filaris,* may be the most widely distributed of the veiled *Conocybe* species. Its small size assures that it would only be eaten by small children out indiscriminately foraging or by people seeking a high from hallucinogenic mushrooms, a threat that is most real in the Pacific Northwest where this mushroom grows intermixed with similar sized hallucinogenic species. Unfortunately, *Conocybe filaris* is deadly poisonous, containing the same toxins as the deadly *Amanita* species. It grows in grassy areas, among wood chips and among mosses.

Slide 12. The few members of the genus *Panaeolus* are small slim-stemmed mushrooms that are conic to umbonate; usually some shade of brown, have a mottled look to the gills and have a deep purple brown to black spore print. Only one species has a partial veil. A few species are hallucinogenic.

The “Hay-maker’s Panaeolus,” *Panaeolina foenisecii* is found in lawns in the summer throughout North America. Just in the time I have been studying mushrooms it has also been known as *Panaeolus foenisecii* and as *Psathyrella foenisecii*. It is intermediate in microscopic features between *Panaeolus* and *Psathyrella. Panaeolina foenisecii* is probably the most common mushroom found in lawns of the temperate Northern Hemisphere. In the eastern U.S. it has been reported to be hallucinogenic, though I have never detected psilocybin or psilocin in any western collections. I suspect that the hallucinogenic reports come from consumption of the highly similar *Panaeolus subbalteatus* or *Panaeolus castaneifolius*. *Panaeolus castaneifolius* is a widespread small species that contains small amounts of psilocybin and psilocin. It is common in lawns and may easily be mistaken for the “Haymaker’s Panaeolus”. *Panaeolina foenisecii* is harmless if eaten but is not a recommended edible.

Panaeolus subbalteatus, the "Belted Panaeolus", is a hallucinogenic species that is widely distributed in North America, appearing on horse and cow manure as well as in manured lawns. It contains fairly small and variable amounts of psilocybin and psilocin but rarely stains blue or greenish, as most mushrooms that contain psilocybin do. There is either more than one species of mushroom generally called *Panaeolus subbalteatus* or this species is fairly variable ranging from rather small and slim to robust, with caps the

size of a 50 cent piece. The belted look typical of all three of these species is because they are hygrophanous as a result of a cellular cap texture that changes color from dark brownish to tan on loss of moisture.

Slide 13. *Panaeolus campanulatus, Panaeolus sphinctrinus, Panaeolus retirugis* are all synonyms of *Panaeolus papilionaceus,* a very variable species*, "*The Bell Mottlegill" or "Bell-Shaped Panaeolus." *Panaeolus papilionaceus* can be light tan to dark gray with a smooth or wrinkled cap and a more or less appendiculate cap margin. It is a widespread, common mushroom that grows on horse or cow dung in rainy seasons. This mushroom has frequently been collected by seekers of a "Magic Mushroom High." I have analyzed a large number of collections from many areas and have never turned up any hallucinogens in *Panaeolus papilionaceus.*

Panaeolus acuminatus is another widespread species frequently picked for hallucinogenic effect but also lacking in psychedelic activity. *Panaeolus acuminatus* does not have a partial veil when young and thus has no remnants of a ring. It occurs on manure and on rich grassland.

Panaeolus semiovatus comes in two varieties*,* var. *semiovatus*, the "Ringed Panaeolus" or "Sticky Mottlegill" with a ring and var. *phalaenarum* which lacks a ring. Both grow on horse dung. *Panaeolus semiovatus* is widely distributed and reportedly edible, though small. I would not recommend it for the table. It is also not hallucinogenic.

In subtropical and tropical regions there are species of *Panaeol*us, such as *Panaeolus cyanescens*, which markedly blue on bruising. These contain significant amounts of psilocybin and psilocin and are hallucinogenic. This *Panaeolus* fruits on horse dung and is sometimes found in northern areas when the horses have been transported from Florida and possibly other subtropical areas and bring a convenient culture with them in their droppings. These images were made in Olympia, Washington on horse manure and shavings near a riding stable.

Slide 14. *Hebeloma* is a large genus with over 100 species in North America. Though it is very difficult to tell one species from another, it is easy to tell that you have a *Hebeloma*. The caps are viscid when fresh and always convex, usually cream color to red-brown. The stipe is dry and may have a cortinate annulus. The spores are finely rugose or rarely smooth and yield a clay-brown spore print. *Hebeloma* has long been placed in the *Cortinariaceae* though some DNA work indicates that it may belong with the *Bolbitiaceae*.

Hebeloma crustuliniforme or "Poison Pie" is distinguished by the medium to large smooth, viscid cream colored to brownish cap, whitish stem, brownish gills and radish-like odor. The spore color typical of this genus is a mid-brown and can be seen on the caps of two of the mushrooms in the image. *Hebeloma crustuliniforme* is widely distributed, growing scattered or in groups on the ground in woods and in open areas near trees. As the common name suggests, it is considered to be poisonous, though our mushroom is different from the European species and may not actually be poisonous. I am not going to eat it to try to find out for myself.

Hebeloma sacchariolens looks a lot like *Hebeloma crustuliniforme* but is distinguished by an odor that is strong and sweet or fruity. *Hebeloma sacchariolens* does not have the radish odor or bitter taste that is characteristic of most *Hebeloma* species.

Hebeloma sinapizans, the "Scaly-Stalked Hebeloma" is a large sturdy *Hebeloma* that looks much like a brown-spored version of a *Tricholoma*. There are several similar variants and *Hebeloma sinapizans* may be a member of a species complex best recognized by the brown to reddish-brown slightly viscid cap, thick scaly stem, absence of a veil, and radish-like odor. Similar *Cortinarius* species posses a cobwebby veil. Ingestion of *Hebeloma sinapizans* causes nausea, vomiting and other most unpleasant results.

Hebeloma mesophaeum is widely distributed small to medium species that grows under conifers, principally in the northern boreal forest. It can be gregarious to cespitose. The odor is radish like and the taste is unpleasant. Note the cobwebby veil in the young specimens to the lower left.

Slide 15. There are over 500 species and may be as many as 1,000 species of *Cortinarius* in North America. Many remain unnamed. I recognize the genus by the rusty brown spore print. Nearly all species have a cobweb-like veil that is only easy to spot when the mushroom is very young, but the cobwebby hairs readily trap spores after they fall to the stipe and so you nearly always can learn the spore color and realize that you have a *Cortinarius* by an examination of the stipe.

Cortinarius violaceus is so strikingly beautiful that it is readily identifiable. It is widespread in northern hardwood forests and I also find it under conifers in the Pacific Northwest. It fruits in the fall and is safe to eat, though it does not have great flavor. *Cortinarius violaceus* is one of a relatively small number of *Cortinarius* species that is easy to learn and is in the tiny subgenus *Cortinarius*.

Cortinarius glaucopus, the "Blue-Foot Webcap," is medium to large with a yellowish to olive or brownish orange streaked cap and violaceus or blue-green tints on the young gills plus on the stem surface and interior. *Cortinarius glaucopus* has a very broad ecological range and is very variable in appearance with a few named varieties. As with many *Cortinarius* species, the distinctive color of the young gills is very transitory and must be noted in young specimens soon after they are picked. The cap is very fibrillose. The stem base has a conspicuous bulb, but that is true with 100 or so other species of *Cortinarius*. It can be found spring through fall under both hardwoods and conifers. *Cortinarius glaucopus* has an earth-like odor and a taste that is weakly farinaceous. *Cortinarius glaucopus* is in the *Phlegmacium* subgenus. You can find an entire website just devoted to *Phlegmacium*, species that all share a viscid cap and a dry stipe – check out www.cortinarius.com.

Cortinarius camphoratus also known as *Cortinarius caesiocyaneus* is separated from several other species of lilac colored *Cortinarius* species by its unpleasant odor of potatoes, rotting meat or rotting vegetables. It is in the subgenus *Sericeocybe* which contains species with a dry cap and dry stipe.

Cortinarius griseoviolaceus is also in the subgenus *Sericeocybe*. It is similar to *Cortinarius camphoratus* in coloration, but has an indistinct odor and taste. The flesh is pale violet but fades to winy in age. It has a silky white universal veil which at maturity

sheaths the stipe. *Cortinarius griseoviolaceus* is found widespread under conifers and hardwoods, especially beech and oak.

Slide 16. *Cortinarius iodes* is another lilac to purple colored *Cortinarius* species. The cap and stipe are both viscid, placing this species in the subgenus *Myxacium*. The gills and flesh both start out violet and fade in age. *Cortinarius iodes* is common in eastern North America and is believed to be present in western North America, though the mushroom found in western Canada may be *Cortinarius iodeoides* Kauffman which is very similar but has a pileipellis that is bitter to taste, while *Cortinarius iodes* is mild.

Cortinarius collinitus is a widespread species with several named varieties and several synonyms. It has a viscid cap and a viscid stipe which places it in the *Myxacium* subgenus. *Cortinarius trivialis* is a member of the *Cortinarius collinitus* group, though whether or not the species we call *Cortinarius trivialis* is the same as European material is still under debate.

Cortinarius mucosus is quite similar and was once known as *Cortinarius collinitus* var. *mucosus*. *Cortinarius collinitus, Cortinarius trivialis* and *Cortinarius mucosus* are widespread species in the *Myxacium* subgenus.

Cortinarius vanduzerensis is found in western North America and is a very striking member of the subgenus *Myxacium*. The cap is glutinous as is the stipe – and the glutinous slime veil on the stipe is purplish. Some color forms of this species look quite similar to members of the complex of species centered around *Cortinarius collinitus*

Slide 17. *Cortinarius rubellus* has been known as *Cortinarius orellanoides* in northeastern North America, *Cortinarius rainierensis* in the Pacific Northwest, and *Cortinarius speciosissimus* in Europe. It has been placed in the sec. *Orellani* of the subgenus *Leprocybe*. All members of this clade contain the nephrotoxin orellanine and similar fluorescent compounds. The mushrooms strongly fluoresce turquoise to blue under uv light and the tissues of individuals who have consumed the mushroom also fluoresce turquoise to blue. In Europe many fatalities have been attributed to another member of the clade, *Cortinarius orellanus*. The toxin is very slow acting and symptoms of poisoning typically do not show up for three days to three weeks after consumption of the mushrooms. The affected organ is the kidneys. It took the accumulation of 102 cases with 11 fatalities in Poland for a Polish epidemiologist to crack the case. Since then several fatalities in Great Britain, Norway and Sweden have been traced to *Cortinarius rubellus* (at the time known as *Cortinarius speciosissimus)*. Many Europeans who consumed this species thought that they were eating a Chanterelle.

Cortinarius gentilis is also in the subgenus *Leprocybe*. Members of this subgenus have dry caps and stipes and contain substances that fluoresce dark yellow to yellow-green, blue-green or blue under uv light. *Cortinarius gentilis* is in section *Limonei*, whose members have a weak yellow fluorescence. *Cortinarius gentilis* is a widespread species that prefers acidic pine woods. Along with *Cortinarius splendens, Cortinarius venenosus* and *Cortinarius atrovirens* it is suspected of being capable of causing orellanine-like poisoning. There is no confirmation as a result of any confirmed ingestions, but I am not about to experiment to find out. I recommend that no member of the subgenus *Leprocybe* be consumed. *Cortinarius clandestinus* is in the subgenus

Leprocybe and exhibits a bright yellow fluorescence. It has often been misidentified as *Cortinarius cotoneus,* a very similar European species found mainly under hardwoods. *Cortinarius clandestinus* is one of the easier species to recognize – I look for the small dark brown to blackish scales on a golden-brown to yellowish-olive cap. I usually find it in the Spring under conifers.

Slide 18. *Cortinarius obtusus* is one of a great many small brown *Cortinarius* species distinguished by a blunt to very acute umbo and is a member of the *Telamonia* subgenus. The mushrooms in the upper left image come very close to matching the *Cortinarius obtusus* of Europe. It is a widespread species. The mushrooms in the upper right are part of the *Cortinarius obtusus* group and is an unnamed species according to the current North American expert Joe Ammirati.

The mushrooms in the lower left image are a close match to the description for *Cortinarius impolitus* which has been called *Cortinarius incisus.* Probably the most frustrating and difficult task one can undertake within this large and difficult genus is the task of trying to put names on *Telamonia* species. For the most part, it simply is not going to be possible. The members of the *Telamonia* subgenus range from small to very large with brown, yellow-brown, ochre or violaceus colors. The cap is ± hygrophanous, the flesh and cap skin turn ±black-brown to black with alkali such as a drop of 5% KOH.

Cortinarius armillatus, the "Bracelet Cortinarius," is a common eastern species that also turns up from time to time in western North America. It is characterized by reddish "bracelets" on the stem and it is an easy species to learn to recognize, one of the few readily recognizable members of the *Telamonia* subgenus. “Bracelets” on the stipe are a common feature of members of the *Telamonia* subgenus and are the result of a well developed veil in addition to the cortina. *Cortinarius armillatus* has long been considered edible, just be certain that you can distinguish the potentially deadly poisonous *Cortinarius rubellus* which also has reddish-orange veil remnants on the stem and could be mistakenly collected in place of *Cortinarius armillatus*.

Slide 19. *Cortinarius caperatus* is an atypical *Cortinarius* that has long been known as *Rozites caperata* and was once known as *Pholiota caperata.* It differs from all other members of the *Cortinarius* genus by the presence of a membranous annulus. The frosted look of the cap and the tendency for wrinkles help identify this species. Some consider it an excellent edible. I was not impressed enough to try it more than once.

Cortinarius renidens is a very distinctive member of the subgenus *Telamonia* that for a long time was placed in the genus *Gymnopilus* as *Gymnopilus terrestris* because it lacks a cortina. However, its other features clearly place it in *Cortinarius.* The name *renidens* means shining, gleaming. It is a widespread species found in coniferous forests. It has a mild to slightly radish-like odor and little taste.

Slide 20. *Cortinarius semisanguineus* is in the subgenus *Dermocybe* which many argue should be raised to the rank of a separate genus. *Dermocybe* species are of particular interest to people who like to dye fabrics with natural dyes. Many members of the genus yield interesting colors for dyers. *Cortinarius semisanguineus* is one of the members of the subgenus that is very widespread. The distinctive features are the yellow-brown to

orange-brown cap, red gills and yellow stipe. The name *semisanguineus* means half blood-red.

Cortinarius sanguineus is a *Dermocybe* with red cap, red gills and red stipe. A western species, *Cortinarius phoeniceus* var. *occidentalis* has a red cap and gills, but a yellow stipe. *Dermocybe* species have bright yellow, red or greenish colors mainly due to anthroquinone and related pigments. The young gills can be yellow, saffron, orange, flame-colored or ± olive-green in sections *Dermocybe, Holoxantha,* and *Malicoria*. The gills are blood red, cinnabar- or carmine-red or red brownish in section *Sanguinei.* There are about 30 species of *Dermocybe* in Europe but much work still remains to clarify concepts in North America so it is hard to say how many species we have here.

Slide 21. There are a number of members of the subgenus *Dermocybe* that have yellow to orange gills when young. *Cortinarius malicorius* is found throughout North America and is especially common in the East. The young gills are bright orange and there are yellow-orange to reddish-orange fibrils on the cap margin. It is found in coniferous and deciduous woods, often with alder.

Cortinarius croceus is a widespread but very variable species in size, shape and color. Different authors have different concepts of what *Cortinarius croceus* species should encompass. Generally when the gills are this orange, the specimens are placed in the *cinnamomeus* group, and the more yellow gill colors belong to the *croceus* group.

Cortinarius zakii appears to be a Northwest species and the gills are bright orange when young. It is found associated with Pacific Madrone, Douglas fir and Grand fir.

Cortinarius cinnamomeoluteus is always near willow in damp woods.

Slide 22. *Inocybe whitei,* listed in most field guides as *Inocybe pudica*, the "Blushing Inocybe," is one of the few LBMs (little brown mushrooms) that I long thought was distinctive enough to identify without a microscope. A feature of this mushroom is that it is whitish when young, developing pink or reddish tones as it ages – but I now realize that a lot of *Inocybe* species are white to off-white when young and several bruise reddish. For *Inocybe pudica* make certain that the stem ends in at most a small bulb, not an abrupt bulb (*Inocybe goedyi* is white, blushes red but has an abruptly bulbous base). *Inocybe whitei* is common in North America and Europe and like most members of the genus; *Inocybe whitei* is poisonous, containing a significant dose of muscarine. Ingestion leads to PSL symptoms - perspiration, salivation and lacrymation. Your pupils may constrict until you think that you have gone blind and the vomiting and diarrhea can be heavy duty. *Inocybe whitei* is in the subgenus *Inocibium* which includes all of the *Inocybe* species with smooth spores.

Inocybe geophylla var. *lilacina* and *Inocybe geophylla* var. *geophylla* are widespread fairly easily identifiable *Inocybe* species, especially var. *lilacina* with its lilac-tinged cap when fresh. The white form without the lilac coloration is var. *geophylla* and it has a distinct umbo. It closely resembles *Inocybe pudica* except that it doesn't turn pinkish with age. Both have a disagreeable spermatic odor (Miller reports a green corn odor). Both varieties contain muscarine and are poisonous. Both are in the subgenus *Inocibium*.

Inocybe albodisca may or may not prove to be the same as the European species *Inocybe grammata.* If they are the same, the correct name is *Inocybe grammata.* The North American species is found in many parts of North America and is readily recognized by the white disc with a tan band on the cap. It is found in many kinds of woods and has a spermatic odor. The spores are angular placing this species into the subgenus *Inocybe.* It is poisonous like virtually all *Inocybe* species.

Slide 23. *Inocybe sororia*, the "Corn Silk Inocybe" has a distinctive odor of freshly husked corn or green corn. It is widespread and loaded with the toxin muscarine which can be fatal in large amounts. While it is a challenge to tell one *Inocybe* from another (Daniel Stuntz devoted his lifetime to distinguishing the 1,000 or so species), the genus is fairly easy to recognize as a group. Its members are known as fiberheads and the caps are radially fibrous or scaly and readily split as these specimens of *Inocybe sororia* illustrate. It is in the subgenus *Inocibium* and is found in both coniferous and deciduous woods in much of North America.

Inocybe rimosa which I learned as *Inocybe fastigiata*, the name in most field guides, looks very similar to *Inocybe sororia* but has an unpleasant spermatic odor, not a green corn odor. *Inocybe rimosa* is found in many parts of North America and Europe and is sufficiently variable to have been given about 10 different names. It grows in both coniferous and deciduous woods.

Inocybe intricata comes in two varieties, var. *intricata* (shown) and var. *pallidistipata* a variety with a pallid stipe. *Inocybe intricata* var. *intricata* is found in eastern North America and var. *pallidistipata* is found on both east and west. It grows mainly in hardwood forests and can occur in mixed woods. There is no distinct odor and the spores are angular with coarse nodules placing it in the subgenus *Inocybe.*

Inocybe radiata is a widespread species that is found in deciduous woods. The broad dark umber umbo is diagnostic. The odor is earthy and the taste is mild. The spores are angular, somewhat wedge-shaped.

Slide 24. *Inocybe hirsuta* var. *maxima* is one of the largest of the *Inocybe* species and is distinguished by its degree of scaliness and large diameter stem with bluing at the base. It is generally reddish-brown but I have seen much lighter collections as illustrated in the right hand image. *Inocybe hirsuta* var. *maxima* is common in the west but also occurs in the east. It grows under conifers.

Inocybe calamistrata has the same general coloring but is smaller with a fairly slender stem. *Inocybe hirsuta* var. *maxima* and *Inocybe calamistrata* var. *calamistrata* have a fishy-resinous odor while *Inocybe calamistrata* var. *mucideolens* has a strong mix of pleasant flowers, ripe pears or green corn or geraniums. *Inocybe calamistrata* is very common and widespread in North America and Europe. *Inocybe calamistrata* has been reported to contain psilocybin and *Inocybe hirsuta* most likely contains psilocybin as well, though I have not had a chance to analyze either species. Like all *Inocybe* species, they should not be eaten. Both are in the subgenus *Inocibium.*

Slide 25. *Inocybe lacera* is a very common and widespread species with a broad host range that is found in both hardwood and coniferous forests, often in disturbed areas and

on acid soils. Cathy Cripps has proposed that it be used in mine site remediation. The odor is mild. Viewed with a hand lens, the cap looks like it has been sanded with glistening particles. It has smooth spores and so is in the subgenus *Inocibium.*

Inocybe subochracea is a common *Inocybe* species in eastern North America and it is also found in western North America. Neither odor nor taste are distinctive. It fruits under conifers and hardwoods. The spores are smooth placing it in the subgenus *Inocibium.*

Inocybe napipes and *Inocybe mixtilis* are similar widespread species in the subgenus *Inocybe,* the group with interesting nodulose spores. *Inocybe napipes* is known as the "Turnip Bulb Inocybe" because of the turnip-shaped bulb at the base. It has a strong fruity or rancid odor. *Inocybe mixtilis, "*The Blond Hairy Inocybe" is distinguished by the absence of a cortina and a sharper edge to the bulbous base. Its odor is none or faintly fruity. Both grow under either hardwoods or conifers. *Inocybe mixtilis* is especially abundant where aspens grow, but it is found on both coasts and many places in between.

This concludes Part I of the Major Genera of Dark Spored Mushrooms.