

SLIME MOLDS AND FUNGAL SPECIES IN AND NEAR BROOKSDALE FOREST PLOTS

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Executive Summary

This report provides a summary of fungi encountered during surveys of the forest biodiversity plots at Brooksdale Environmental Centre, Surrey, BC. Surveys of macro-fungi were conducted from fall 2013 through fall 2014. The objective was to obtain a relatively complete listing of the fungal species present and fruiting in the forest biodiversity plots during fall and winter. Slime molds were recorded simply because they can look like fungi and were encountered during surveys. Unlike other surveys in the forest biodiversity macroplots (e.g., vascular plants or bryophytes), these surveys were plotless and conducted over 11 days in a 2-month period. Incidental observations of fungi that were identified during other sampling in the biodiversity plots are included.

The report begins with a brief discussion of the importance of fungi. The study area and methods are treated briefly. Much of the remainder provides descriptions and photos for each species identified. When microscopic features are required for unequivocal identification, species are identified as either/or. Descriptions for each species are provided under four headings: edibility, habitat, field features and notes that typically include the etymology of the species name. Species and their descriptions are presented within broad morphological groups based on readily visible features. The groups are intended to aid amateurs exploring fungi and often have no strong taxonomic basis. Descriptions and illustrations of these groups are found in Bunnell et al. (2013).

Numbers of species identified by morphological group were:

Slime molds [3]	Crusts and parchment fungi [6]
Gilled mushrooms, no or very short stem [5]	Coral and club fungi [7]
Gilled mushrooms, small and frail [21]	Jelly fungi [4]
Gilled mushrooms, robust, cap >3 cm [30]	Puffballs & earthstars [1]
'Mushrooms' with pores [2]	Cup fungi [2]
Conks and bracket fungi [5]	Flask fungi [1]

Two morphological groups that we expected to be present have not yet been encountered – bird's nest fungus and earth tongues. Fungi don't build fruiting bodies every year. There are more to be found.

In total, 87 species were identified. At least four species have rarely been reported in BC – *Clavulina castaneopes*, *Leptonia parva*, *Psathyrella longipes*, and *Stereopsis humphreyi*. When reported, these species typically are from more maritime sites. Vegetation analysis of the biodiversity macroplots indicates that they are representative of the Redcedar-Skunk cabbage site association of the Coastal Douglas-fir Biogeoclimatic zone (Bunnell and Bunnell 2014). To facilitate gradual augmentation of a species list for the area, laminated cards with descriptions and photos of individual species were prepared.

Acknowledgements

We wish to thank Paul Kroeger (assistant curator of the fungal collection at the University of British Columbia) for help with identification. All three authors participated in identification. Any errors are F. Bunnell's who made 'the final call'.

Recommended Citation

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Cover illustrations:

Top row left to right: *Lycogala epidendrum* (Corey Bunnell), *Fomes fomentarius* (Anthea Farr), *Marasmiellus candidus* (Anthea Farr). Middle row left to right: *Boletus zelleri* (Anthea Farr), *Chlorociboria aeruginosa* (Anthea Farr), *Mycena acicula* (Corey Bunnell), with the coral fungus *Clavulina cristata* group (Anthea Farr) below. Bottom row left to right: top left *Marasmius (Gymnopus) androsaceus* (Fred Bunnell), bottom left *Lycoperdon perlatum* (Anthea Farr), *Trichoglossum hirsutum* (Anthea Farr), *Phlebia tremellosa* (Anthea Farr). All from Brooksdale.

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1 Introduction

The world would be different without mosses, lichens or people, but it would not stop. Without fungi and bacteria, the world would be gradually covered with organic debris that would not rot. Plants making food would be crowded out or buried. The simple compounds that plants absorb are products of fungal digestion. Surviving plants would find it much more difficult to acquire water and any nutrients left in the soil. Virtually all rooted plants (ferns, conifers and flowering plants) rely on fungi for effective root function. It is not just the terrestrial environment that would be utterly changed; marine fungi play roles similar to their counterparts on land. Beyond all that are the uses we make of fungi directly.

Our direct uses of fungi are almost as diverse as the fungi themselves. It is likely that hundreds of millions of us have benefited from penicillin and its derivatives or from fungal-based adjuvants to cancer therapy. Most of us enjoy fungi as tasty morsels themselves, or through their contribution to other products – bread, tempeh, dumplings, soy sauce, Stilton or Roquefort cheese and a delightful range of alcoholic drinks. We've learned how to use some in pest control and others to produce industrial chemicals like citric, gluconic, lactic and malic acids, or industrial enzymes, such as the lipases for detergents, amylases, cellulases, invertases, proteases and xylanases. They even contribute to the production of stonewashed jeans. Their ability to disassemble almost anything permits them to degrade insecticides, herbicides, pentachlorophenol, creosote, coal tars and other undesirables into CO₂, water and basic elements. They even appear capable of biomineralizing uranium oxides.

Fungi make their living in three broad ways: as parasites (feeding on living things), as saprobes (feeding on dead things) and in mutually beneficial mycorrhizal relationships with mosses and rooted plants. For each species encountered in the survey, we note which broad way of living it uses. The parasitic fungi can be pathological to whatever they feed on, including us. Those in the forest, however, are doing some good. Although they kill and damage trees, polypores are absolutely indispensable to the forest and many of the creatures living there. They are the major group of wood-rotting fungi. Without them, large areas would be buried in accumulated wood. In living trees, the heartwood or dead tissue in the centre of the trunk is more susceptible to attack than the sapwood of living tissue just inside the bark. Often, the only visible clue that something is removing a tree's innards is the fruiting body of the fungus on the outside (conks and bracket fungi).

The fungi can digest sufficient heartwood that the tree breaks or dies, but the tree fights back and living sapwood often walls off the heartwood. That creates the perfect, and often only, opportunity for our larger cavity-nesting birds, such as the Pileated Woodpecker and Northern Flicker who can pound through the sound sapwood and create a nesting cavity for themselves and the more numerous secondary cavity users in the rotten heartwood. In the Pacific Northwest, there are 67 vertebrate species that rely on cavities; only 22 of these excavate their own (Bunnell 2013). Some, like the fisher, need cavities too large to be excavated by woodpeckers; they rely on heart rots (Figure 1).

Most fungal species are saprobic; as a group, they are capable of decomposing anything organic, including dung, carcasses, your toenails and shower curtains. Many saprobes are not capable of killing anything, but will digest anything killed by their pathological relatives. Without fungi breaking down dead plant and animal matter, carbon and other molecules essential to life would be locked into molecules too big for plants to absorb. Fungi break large organic molecules into simpler molecules, such as carbon and nitrogen, that can be absorbed. We tend to think of plants making food and animals eating food. Fungi do neither; they absorb food. They send parts of their body (hyphae) directly into their food, secrete chemicals that break the food down, then absorb the food directly into their cells. Organic compounds can be very complex, so it takes an entire suite of fungi and their enzymes to decompose wood, and other suites to decompose fur, feather, insects and dung. Brown rot fungi digest only hemicellulose and cellulose, leaving red-brown cubical blocks of lignin that bacteria then degrade.



Figure 1. This Northern Flicker is raising young in an aspen that has experienced heart rot (photo credit: F. Bunnell)

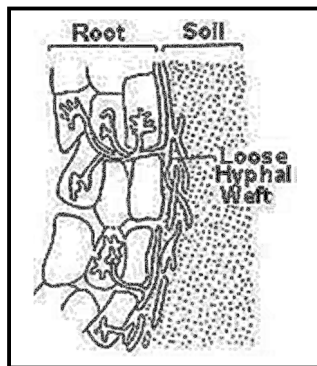


Figure 2. Mycorrhizal fungi.
(Shrestha 2009)

Mycorrhizae ('fungus' 'root') are mutually beneficial associations of fungi on or in plant roots. They aid almost all vascular plants in various ways, beginning by greatly increasing the surface area of the roots. One centimeter of root has about 3 meters of hyphae, greatly increasing the surface area for absorption of water and nutrients. A cubic centimeter of soil may have 1 kilometer of mycorrhizal fungal hyphae in a loose weft of 300 cm² of fungal surface area interfacing with the soil (Figure 2). Through this surface area, the fungus actively and selectively absorbs minerals (especially phosphate ions) that the plant needs and transfers them to the plant, while excluding toxic metal ions that the plant does not need or want.

The fungus also secretes growth factors that stimulate root growth and branching, as well as antibiotics that protect the root from pathological bacteria and fungi. It's a war out there; the root is living in a world filled with dangerous chemicals, bacteria, fungi and wee animals. The root needs all the help it can get. Mycorrhizal fungi are plants' friends, critical to the health, growth and function of roots. For their services, fungi receive energy as carbohydrates from the host plant.

2 Study area and methods

Surveys were conducted in or near the Brooksdale forest biodiversity plots, within riparian forest adjacent to the Little Campbell River, South Surrey, BC (Figure 3).

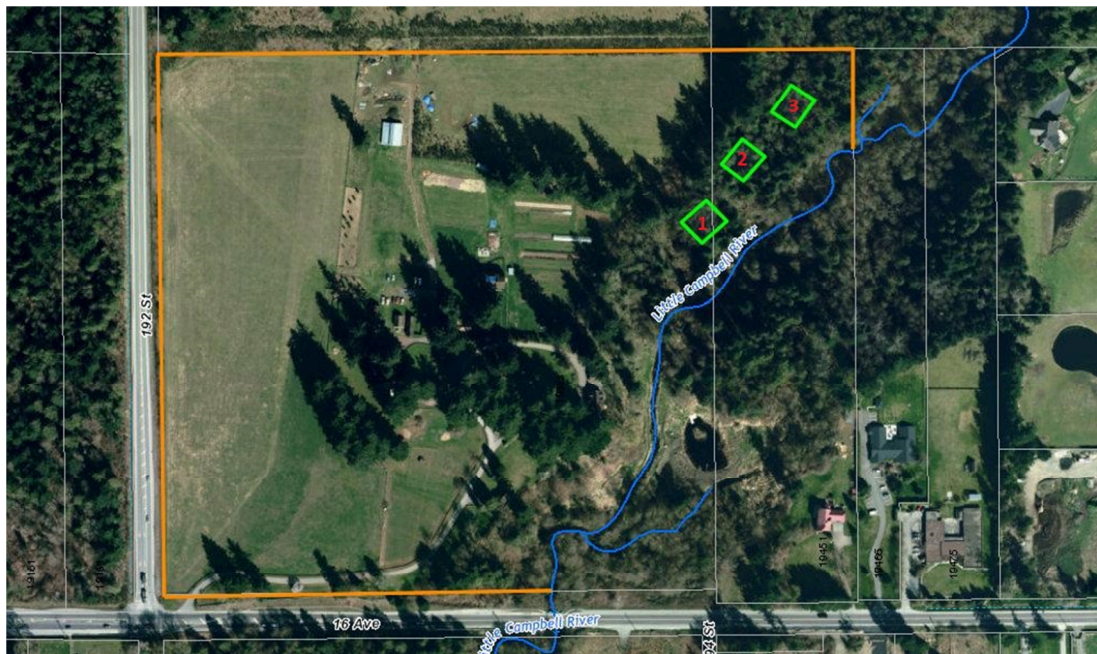


Figure 3. The three macroplots are outlined in lime green. On the ground, they are marked by yellow corner stakes.

The macroplots sample second-growth forest stands and are described by Bunnell and Bunnell (2014). There is abundant down wood to host saprobic fungi. Rooted vegetation of the stands closely matches the description provided by Nuszdorfer, Klinka & Demarchi (1991) for the Redcedar-Skunk cabbage zonal site association of the Coastal Douglas-fir Biogeoclimatic zone (see Bunnell and Bunnell 2014).

Surveys were plotless and similar to a Smithsonian Institution 'bioblitz' with one exception: they were not time constrained, but performed over parts of several days and seasons. Some bioblitzes seek anything organic – living or dead; others focus on a single group, like rooted plants or amphibians. This survey focused on fungi and slime molds (though other species groups were an ongoing 'distraction' and often photographed). Slime molds were included despite not being fungi, simply because they often look like fungi and are commonly encountered when searching for fungi. Surveys specifically for fungi were conducted over 11 days in October and November 2013 and 2014. Incidental observations were made during 8 days of sampling other features of the biodiversity macroplots.

Identification was limited to macro-features as no microscope of sufficient power (about 500x) was available to assess micro-features, such as spore characteristics. We have grouped fungi encountered by the 'user friendly' approach of David Arora's *Mushrooms demystified*. That approach uses broad physical features of fungi readily discerned in the field rather than a strict taxonomic approach.

3 Results

Numbers of species identified by morphological group were:

Slime molds [3]	Crusts and parchment fungi [6]
Gilled mushrooms, no or very short stem [5]	Coral and club fungi [7]
Gilled mushrooms, small and frail [21]	Jelly fungi [4]
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Of the 87 species identified, 72 (83%) were first observed in October and November. While sampling other plot features, 10 species were first observed in March or May and a further 5 were first seen fruiting in August or September. The findings confirm the general pattern that most fungal species fruit in the fall, but a smaller portion fruit first in spring and some can fruit at almost any time of the year. Two groups that we expected to find were not observed – bird's nest fungi and earth tongues. Opportunities for incidental observations occurred in March through November, but fungi do not create fruiting bodies every year. There are more to be found.

Some fungi encountered appear out of place geographically relative to historical records for the province, but do fit the reported ecological setting. That suggests the Brooksdale forest biodiversity plots represent an uncommon habitat for the region.

4 Species descriptions

Slime molds and fungi are ancient creatures whose taxonomy remains confused and unresolved by their bizarre approach to sex (fungi have no gender). The order of groups presented here follows that of David Arora's *Mushrooms demystified*, except for slime molds which he justifiably does not include. For each species, brief comments are offered on edibility, habitat, field features and notes of interest. Microscopic features are not reported. Dates of first sightings or collections are recorded. In a related project, cards with key field features and photos have been prepared for educational purposes and use in the field. Nomenclature follows E-Flora BC¹ where possible; in some instances where E-Flora offers no common names, common names in use elsewhere are used. Unless noted, all photos here are from within or adjacent to the Brooksdale forest biodiversity plots. Generally, only the first encounter is noted.

NOTE: Eating fungi can cause serious grief. Eat none whose identification is questionable.

¹ <http://www.geog.ubc.ca/biodiversity/eflora/>

4.1 Cellular Slime molds (Phylum Mycetozoa)

Cellular slime molds are not even in the same Kingdom as fungi, but have their own Phylum in Kingdom Amoebozoa. That organization reflects the fact that many are as much animal as fungus: they communicate, can move about and apparently remember (can solve and remember mazes). John Tyler Bonner, a world expert on cellular slime molds, summed it up simply, "[cellular slime molds] are no more than a bag of amoebae encased in a thin slime sheath, yet they manage to have various behaviors that are equal to those of animals who possess muscles and nerves with ganglia – that is, simple brains." The ones big enough for us to see are saprobic. They spend most of their life cycle feeding as separate amoeboid cells or disaggregated plasmodium, but when food is short all the cells near each other stream together to aggregate into a fungus-like fruiting body that releases spores.

Ceratiomyxa fruticulosa Coral or White-finger slime mold Ceratiomyxaceae

Edibility: Apparently not, though few have tried.

Habitat: **Clustered on pieces of dead wood**, sometimes in large masses, **June through October**. Omnivore becoming saprobic. Recorded: 8.19.2012.

Field features: The 'fingers' or tiny, erect, branched or simple structures that produce spores **look like small icicles and when aggregated like tiny pieces of coral**. They are **whitish & translucent**, becoming fuzzy as spores are produced.

Notes: *Fruticulosa* means abundance or fullness of fruit – each little finger is a fruiting body. Any 'fuzziness' on the fingers is the spores; they are produced on the outside surfaces. In members of this family, the plasmodium breaks up into individual cells before forming sporangia.



A. Farr

Fuligo septica Dog's vomit or scrambled egg slime mold Physaraceae

Edibility: You wouldn't want to try.

Habitat: Occurs **on rotten wood** (bark mulch after rains) and **plant debris**, but also the leaves & stems of living plants. **May through November**. Saprobic. Recorded: 11.20.2013.

Field features: Typically seen as a white to bright yellow, spongy layer of near any shape. *Physarum polycephalum* is similar but often more discontinuous and 'bubbly'.

Notes: If you are very patient, you may see it move. Look closely and you may see the slime trail of where it has been. In Scandinavian folklore, *Fuligo septica* is identified as the vomit of troll cats; we have no troll cats so went with dog's vomit. *Fuligo* is Latin for 'soot'; the species name is from *septicus*, Latin for 'putrid' (as in septic tank). The intent is to convey the putrescence of bacterial decomposition; *F. septica* starts out yellow and gradually turns black (sooty) with age.



A. Farr

Lycogala epidendrum Wolf's milk Reticulariaceae

Edibility: **Avoid it;** some consider it dangerous.

Habitat: Occurs **scattered or** in sizable **groups** on **damp rotten wood, especially trees and large logs**. **Summer through fall**. Saprobic. Recorded: 10.17.2013.

Field features: The **globular fruiting bodies** are at first **pinkish-gray** to bright cinnabar-red **when young**. At this stage the flesh is a pinkish, paste-like substance (like toothpaste, but not worth trying). With maturity the fruiting body becomes yellow-brown or olive-brown and the spore mass becomes powdery and pinkish-gray to ochre.

Notes: The scientific name translates loosely as wolf's milk on a tree. The 'on the tree' part is correct.



C. Bunnell

4.2 'Mushrooms' with gills (Agaricales)

Throughout our treatment, the fungi are grouped by broad structural features. That is not a taxonomic grouping, but used to facilitate identification by readily visible features. The key feature of this group is clearly visible gills. By 'mushrooms' we mean the common form of cap with gills and clearly apparent stem or stipe (Figure 4). Some gilled mushrooms have no apparent or a very short stem. They are included in a separate group below. There is great variety among gilled mushrooms (e.g., Figure 4).

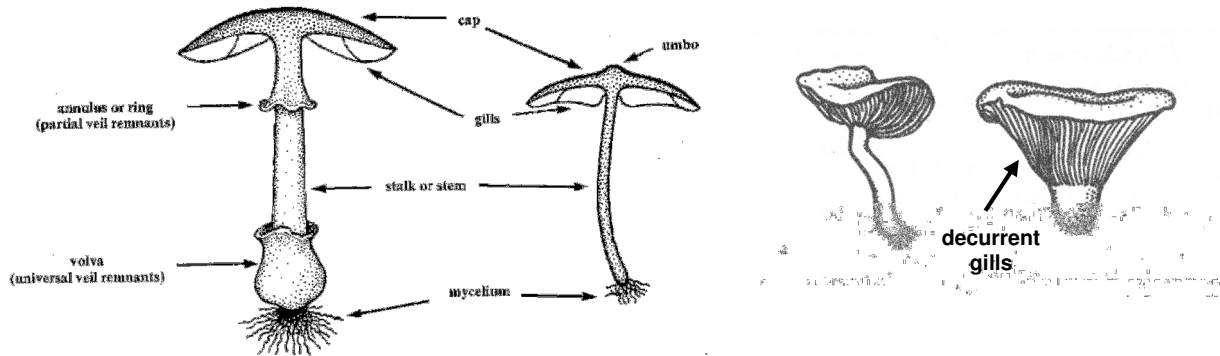


Figure 4. Mature *Amanita* (far left) has cap, gills, annulus & volva. The partial veil covers the gills when young & breaks to form a ring (annulus) on the stalk; the universal veil envelopes the entire fruiting body & breaks to form a volva (sack, collar or series of rings at the base of the stalk). To its right a mature *Marasmius* has neither annulus nor volva, but often has an umbo (knob). Gills may be free (unattached to stem), adnexed (narrowly attached), sinuate (notched where they attach), adnate (broadly attached) or decurrent (running down the stem, arrow). Cap, stem and gills of gilled mushrooms have distinctive features and colours. Gilled mushrooms exploit all modes of feeding. Adapted from Arora (1986) p. 5 & 52.

We use three relatively distinct morphological groups of gilled mushrooms: 1) gilled species with a very short or no apparent stem (may be 'small' or 'large'), 2) gilled species that are generally frail and small, and 3) robust, moderate to large gilled mushrooms. Groups 2 and 3 are particularly arbitrary. We have chosen a cap diameter of about 3 cm as the upper boundary of 'small'. Some mushrooms with a 'small' cap have surprisingly long stems but these stems are frail, not robust. See Glossary for unfamiliar terms.

4.2.1 Gilled mushrooms with no apparent or a very short stem

Cheimonophyllum candidissimum White oysterette Cyphellaceae

Edibility: Unknown, flesh insubstantial.

Habitat: Gregarious on decaying and dead wood of conifers and hardwoods; July to fall. Saprobic. Recorded: 10.25.2014.

Field features: Small white splashes with gills, but no stem. Cap 0.3-2 cm broad, shell-shaped, expanding to nearly flat; white covered with soft white hairs; gills white, usually somewhat decurrent, broad, subdistant to close, narrowing toward ends; stem rudimentary or absent, when present stub-like or lateral, whitish.

Notes: Similar to *Panellus mitis* which has a rubbery gelatinous layer on cap & grows only on conifers. The scientific name most simply translates into very white: the Greek *cheimon* meaning 'winter' or 'frost', *phyllon* meaning 'leaf', emphasized by the Latin *candidus* meaning 'shining white' and Latin *'issimum'* indicating 'superlative'.



C. Bunnell

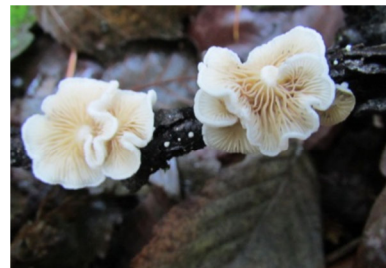
Marasmiellus candidus White marasmius Marasmiaceae

Edibility: Inconsequential.

Habitat: In **groups or rows** on **dead sticks, branches**, berry canes, swordfern, on bark or barkless wood of spruce, hemlock and alder, etc. **Fall through spring**; appear after heavy rains. Saprobic. Recorded: 11.03.2013.

Field features: **Shiny white cap** (≤ 3 cm) and **widely-spaced gills** give it away; **stem** is 0.5 to 3 cm long and 1-2 mm thick, **often off centre**, but not lateral.

Notes: Often inverts itself so gills are exposed, looking like a wee, white sea shell. The genus name derives from the Greek *marasmus* or 'wasting' (the genus houses some serious plant pathogens); *candidus* is from Latin meaning 'bright, shining, white'.



A. Farr

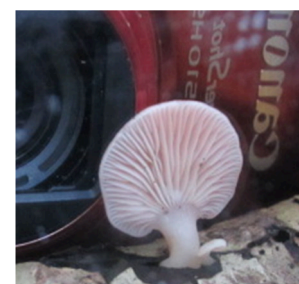
Panellus longinquus no common name Tricholomataceae

Edibility: Unknown, too small to worry about.

Habitat: **Single to clumped** or shelved on **logs and branches of red alder**, rarely on conifers. **Late summer & fall, sometimes during winter**. Saprobic. Recorded: 11.11.2013.

Field features: **Pallid to peach, fan shaped to irregularly lobed cap** <2 cm across; **stem absent** or broad, **short and lateral** (to one side) when present; **gills near decurrent**.

Notes: *Panellus* translates as 'little tumor'; *longinquus* means 'long duration' or 'remote' and likely applies to the long fruiting period of the species.



A. Farr (note lateral stem)

Panellus serotinus Late oyster mushroom Tricholomataceae

Edibility: Edible but mediocre.

Habitat: **Scattered or in shelving groups** on **dead hardwood logs and branches** (sometimes conifers); usually appearing **late in season**. Saprobic. Recorded: 11.03.2013.

Field features: Greenish to **yellowish or violet** tinted kidney to fan-shaped cap (up to 10+ cm across); **pale yellow to orange gills**; short, stubby stem.

Notes: *Panellus* or 'little tumor' likely refers to the swelling that is seen as the mushroom first emerges from the trunk of a tree. The species is a cold weather fungus; its appearance foretells the end of mushroom season but for a few hardy species. *Serotinus* (in Latin) means 'late in bearing or ripening'.



C. Bunnell

Pleurocybella (Pleurotus) porrigens Angel wings Tricholomataceae

Edibility: Edibility varies; **some recent deaths** among older people.

Habitat: In **shelving groups** or **overlapping clusters** on **old rotting conifers**, especially hemlock in **summer and fall**. Saprobic (white rot). Recorded: 11.04.2013.

Field features: **Smooth white caps with shelf-like habit on conifer wood**, and narrow, **crowded, white or yellowish gills**.

Notes: *Pleurotus* is Latin for 'side ear', referring to the lateral attachment of the stem; *porrigens* means 'extending forward, projecting horizontally.'



C. Bunnell

4.2.2 Wee or frail gilled mushrooms (white or grey)

Mushrooms of the preceding group have eccentric or lateral stems that are off-centre. Stems of this group are central. Caps of mushrooms in this group are generally ≤ 3 cm across and white or grey; *Psathyrella longipes* is an exception in its height, but is definitely scrawny, if not frail.

Coprinopsis atramentaria Inky cap or Tippler's bane *Coprinaceae*

Edibility: Edible and **quite good** when young **BUT** reacts with alcohol to produce a peculiar form of poisoning.

Habitat: Scattered to densely gregarious in lawns & roadsides, sometimes in woods; spring through fall. Saprobic. Recorded: 10.25.2014.

Field features: Characterized by brownish, to lead-gray, radially lined, sub-conic cap that deliquesces, relatively thick stem, and often clustered growth. Cap 2-8 cm tall that soon deliquesces to inky black; gills free or nearly so, beginning white, but becoming inky; stem slender, white or with greyish fibrils below, basal ridge or ridged zone on stalk.

Notes: Once autodigestion has begun (to help release spores from tightly packed gills), these mushrooms are better for writing than for biting. Diluted with water, the black mess makes a passable ink. *Coprinopsis* indicates that members of this genus are similar to those in the genus *Coprinus*, meaning 'living on dung'; *atramentaria* from the Latin '*atramentum*' meaning 'a very dark or black substance, in particular a liquid, such as ink.'



Young: C. Bunnell Older: R. Hill

Coprinopsis lagopus Woolly inky-cap *Coprinaceae*

Edibility: Flesh insubstantial.

Habitat: Scattered to gregarious on decaying wood or other vegetable matter; late fall to mid-winter. Saprobic. Recorded: 9:20.2014. At Brooksdale, it appears restricted to wood chips imported for the new forest trail.

Field features: Size highly variable, common measures given. Cap 3-6 cm wide, conic, surface at first covered with soft white, silvery hairs (universal veil remnants) expanding to nearly plane, umbonate with margin recurved in age, typically weathering away at maturity to a ragged, striate, greyish cuticle; gills free, close, narrow, white soon greyish, becoming black and 'dissolving' into black ink; stem 5-10+ cm tall, 0.3-0.5 cm thick, fragile & hollow, white tomentose from universal veil remnants when young, smooth by maturity, veil usually absent.



C. Bunnell

Notes: The fragile attractive cap with recurved margin persists only a few hours before deteriorating. This fungus sometimes gives rise to very small, but fully functional, fruiting bodies, some less than one-hundredth the size of the larger ones. *Coprinopsis* means 'like *Coprinus*' (Greek meaning 'dung' or 'manure'). Many inky caps do live on dung. *Lagopus* from Greek *lagos* for 'hare' and *pous* or *pous* for 'foot', likely referring to the silvery, young specimens. It is called the Haresfoot ink cap in Britain; *Hassenpfote* or 'Hares paw' in Germany.

Cystolepiota seminuda 'Frosted cap' Tricholomataceae

Edibility: Unknown; not big enough to try.

Habitat: Singly, scattered, or in groups in **humus or soil** under conifers or hardwoods in **summer & fall**. Saprobic. Recorded: 10.24.2013.

Field features: **Cap powdery white or fuzzy**, 1-3 cm across, often distinct umbo; gills close & white; **stem thin, fragile, white, finely mealy**. Apparently not mycorrhizal (humicolous = thriving on humus).

Notes: There is no North American common name. Some European common names include the word 'frost' referring to the white fuzziness of young caps. Origin of the name is unclear, but the fuzzy covering of the cap does leave it only semi-nude.



A. Farr

Hemimycena delectabilis no common name Tricholomataceae

Edibility: Too small to try

Habitat: Scattered to gregarious on **needle beds** especially under heaps of dead branches or fallen treetops, **primarily in fall**. Saprobic. Recorded: 11.3.2013

Field features: Characterized by **small size, white colour**, obtuse cap, **nitrous odor**. Cap ≤ 2 cm across, conic or bell-shaped, watery white at first; **gills arcuate** (higher in the middle); **stem thin & threadlike**, ≤ 0.2 cm thick.

Notes: Has been reported as saprobic on decayed debris of bracken fern (*Pteridium aquilinum*). *Mycena* comes from ancient Greek meaning 'mushroom'. *Delectabilis* is from Latin meaning 'enjoyable or agreeable'. It is a friendly little creature.



A. Farr

Lepiota atrodisca Black-eyed parasol Agaricaceae

Edibility: Unknown, unwise to experiment; some small *Lepiotas* are **deadly**.

Habitat: **Single, scattered or in small groups on ground or rotting wood** under both hardwoods and conifers, **fall and winter**. Saprobic. Recorded: 10.17.2013.

Field features: **Small size, unusual grayish-black scales on white scaly cap; free, close, white or creamy gills; white, smooth dry stem, membranous ring**. Cap 1.5-4.0 cm broad, convex, expanding to nearly flat, often slightly umbonate, dry, tomentose at the disc, dark-grey to blackish, cuticle cracking with expansion to form a covering of fine blackish scales, less dense toward the margin, revealing a pallid ground colour; gills free, white, close, edges slightly fringed under hand lens; stem 2.0-8.5 cm x 1-4 mm, slender, surface white, nearly bald at apex, patchy fibrillose below, veil membranous, thin, with white upper surface and brownish underside often with black edge.

Notes: *Lepiota* from the Greek *lepis*, meaning 'scale', and *ot*, meaning 'ear'; *atrodisca* from Latin indicating 'with a black disc'. Only the 'ear' part is unclear.



C. Bunnell

Marasmius (Gymnopus) androsaceus Horsehair fungus Marasmiaceae

Edibility: Unknown; too small to find out.

Habitat: Scattered or in troops on needles, twigs, or leaves, especially in moist sites; after fall rains into mid-winter. Saprobiic. Recorded: 10.18.2013.

Field features: Cap 3-8 mm across, pale brown to flesh coloured, when dry radially wrinkled or striate; gills well-spaced, narrow and pallid becoming flesh-coloured or brownish; stem 2-7 cm long and ≤1 mm thick, hair-like, tough, stiff; entirely black or black with a brown to reddish brown top, numerous hair-like, black rhizomorphs interspersed with fruiting bodies.

Notes: Despite their tiny size, many *Marasmius* species are tough. In dry conditions *Marasmius* simply shrivel up and wait for the next rain, when they spring back to life. You can find them 'resting' if you drop to the ground and carefully sift through the leaves or needles, searching for hair-thin stems with tiny, dried-out mushroom caps attached. Pop them in water and they perk up. The name *Marasmius* comes from the Greek word *marasmos*, meaning 'drying out'. *Androsaceus* can be interpreted as 'looking very much like a tiny plant'. Mushrooms were considered tiny plants when Carl Linnaeus named this species.



F. Bunnell

Mycena atroalboides Black & white Mycena Tricholomataceae

Edibility: Unknown; too small to fret about.

Habitat: Densely gregarious on needle & leaf beds under conifers or in sphagnum bogs in late summer or fall, on the Pacific coast sporadic but often very abundant under Douglas-fir and spruce. Saprobiic. Recorded: 11.20.2013.

Field features: Cap small (≤2 cm across), dark brown to pale grey, striate, with umbo; gills white, becoming gray; stem ≤4 cm tall and ≤0.2 cm wide, coloured like the cap.

Notes: The species starts out dark brown to black & becomes paler. There are about 500 species of *Mycena* and no complete key. Arora notes that they are an analog to the SBBs of birders (small, brown bird) that he calls YAMs (yet another *Mycena*). *Mycena* from ancient Greek *mykenai* meaning 'mushroom'; *atroalboides* adding 'like *Mycena atroalba*' whose cap is a lusterless black (*atro*) with whitish bloom (*alba*).



C. Bunnell

Mycena flavoalba Ivory bonnet Mycenaceae

Edibility: Reports are split on edibility, but some *Mycena* contain toxins and they are notoriously difficult to identify; **avoid**.

Habitat: Scattered to grouped on needle beds, humus or twigs under coniferous and hardwood forests, usually summer through fall. Saprobiic. Recorded: 3.26.2014 (warm spring).

Field features: Cap small (1-2 cm), conic when young, becoming bell-shaped, hygrophanous, yellow to buff with paler, near white margins, becoming more dingy with age; gills white to creamy white, even edges, generally close, arcuate often with a wee tooth rising at stem, 2 tiers of subgills; stem 3-8 cm, not fragile, base with white fibrils or matted white mycelium.

Notes: *Mycena* from ancient Greek *mykenai* meaning 'mushroom'; *flavoalba* from *flavo* meaning 'yellow' and *alba* meaning 'white' referring to the cap colour.



C. Bunnell

Mycena galericulata Toque Mycena Tricholomataceae

Edibility: Better avoided.

Habitat: **Small groups**, more rarely single, at the base of old stumps, on fallen branches; generally on **decaying wood of both hardwoods and conifers**, in **spring & fall** (over winter when warmer). Saprobic causing brown rot of heartwood. Recorded:3.26.2014.

Field features: **Cap** 1-6 cm, **brown to grayish brown, conical to toque-shaped** when young, flattening with age, more or less **umbonate, translucent striate**; **gills narrowly attached** to the stem; subdistant,

often **cross-veins when mature**; whitish; **stem 5-9 cm**, bald, or with a few tiny fibers; whitish above, tan to brownish downwards.

Notes: *Mycena* from ancient Greek *mykenai* meaning 'mushroom'. *Galericulata* is from the Latin *galer* which means 'with a small hat'. Despite its long stems, the species often has a relatively small cap.



A. Farr

Mycena galopus Milky Mycena Tricholomataceae

Edibility: Who knows? Who cares?

Habitat: **Scattered to gregarious** on **ground and humus** in forest; **summer & fall**. Saprobic. Recorded 10.24.2013.

Field features: Much like many other *Mycena*, with umbo, but exudes a **droplet of milk** when stem is squeezed or broken below the cap. Margin may curl up with age.

Notes: *Mycena* from ancient Greek *mykenai* meaning 'mushroom'. *Galopus* derived from Latin 'milk' and 'foot', referring to the milk droplet. The Bleeding mycena also occurs in the region, but its cap is reddish and its juice is a dark blood red (*Mycena haematopus*).



The seemingly frilly cap is the whitish gills peeking out; margin is sometimes upturned (A. Farr).

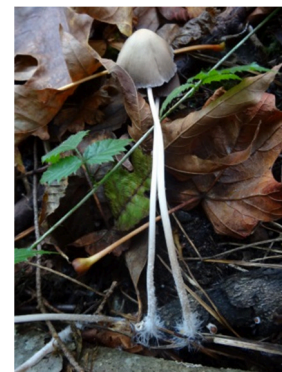
Psathyrella longipes no English common name Psathyrellaceae

Edibility: Unknown, better simply admired.

Habitat: **Solitary to scattered** in **leaf litter and well decayed woody debris**, under both hardwoods and conifers; **after fall rains into winter**. Saprobic. Recorded: 10.24.2013.

Field features: This species is **frail**, rather than 'wee'. **Some become so tall they droop and fall over**. **Cap** 2.5-4.5 cm across, **conic**, margin **striate**, decorated with evanescent **white veil fragments**; brown fading to whitish at maturity, hygrophanous (changes colour markedly with drying); gills close, adnate, narrow, pallid at first, dark-brown to black with age; stem 6-12 (15) cm long, 3-6 mm thick, fragile, hollow, straight, equal with **pubescent mycelium at the base**.

Notes: This species has rarely been recorded from BC. Among the drab *Psathyrella*, *P. longipes* is an attractive, fragile exception. The relatively large, broadly conic, hygrophanous cap with a **'fringed' margin** and **'leggy' stalk** help separate this species from most related *Psathyrellas*. *P. candolleana* is also appendiculate, but has a convex cap at maturity, and is more robust in stature. *P. hydrophila* differs in its clustered habit, usually at the base of hardwood stumps, and has a convex cap. One of the most common *Psathyrella*, *P. gracilis*, is smaller (one specimen of *P. longipes* we collected had a 15 cm stem), and young caps are not normally appendiculate. *Psathyrella* begins with the Greek word *psathuros* meaning 'straw-like, fragile or friable'. 15 cm is 'long' for something this frail.



C. Bunnell

Strobilurus trullisatus Douglas-fir cone mushroom Physalacriaceae

Edibility: Unknown. Too small to be of culinary value.

Habitat: Solitary to grouped on Douglas-fir cones (rarely cones of other species); late summer to late winter when mild. Saprobiic. Recorded: 9.20.2014.

Field features: Cap 0.4-1.7 cm broad, convex, expanding to nearly plane, pinkish-buff, smooth to wrinkled, margin striate; gills adnate to adnexed, close, white to pinkish tan; Stem 1.5-4.5 cm tall, 0.1-0.2 cm wide, white & downy above, yellowish brown and pubescent below; orange-brown mycelium at base, no veil.

Notes: *Strobilos* is Greek for pinecone; *trulla* is Latin for shaped like a cupola or dome while *atus* is Latin for 'looks like' or 'like a'. Together yielding a 'wee cupola on a cone'. Fair enough.



A. Farr

4.2.3 Wee or frail gilled mushrooms (coloured)

Like mushrooms of the group above, caps are generally ≤ 3 cm across, but extensively coloured when mature (red, yellow, brown, purple). Some mushrooms in the group above have colours other than grey or white when young (e.g., *Coprinopsis atramentaria*) or a smattering of colour when older (e.g., *Mycena flavoalba*). This rather arbitrary group generally bears uniform colours other than white or grey when mature.

Chrysomphalina chrysophylla v chrysophylla Golden-gilled Gerronema Tricholomataceae

Edibility: Not known.

Habitat: Scattered to clustered on well-decayed conifer logs & moss, summer through October in PNW. Saprobiic. Recorded: 10.24.2013.

Field features: Small size, yellow decurrent gills, depressed cap, cap and stem yellow to orange brown. Cap in var *chrysophylla* has a minutely scaly coating like dandruff, just visible as 'white dust' in the photo (scurfy).

Notes: There are close look-alikes, such as *Xeromphalina campanella*; the scurfy cap helps discriminate. *Chrysomphalina aurantiaca* is uniform, bright orange in colour. *Chrys* means 'gold' or 'golden' referring to the orange-yellowish gills. *Omphalina* means 'small belly button' from the Greek *omphalos*, referring to the caps.



C. Bunnell

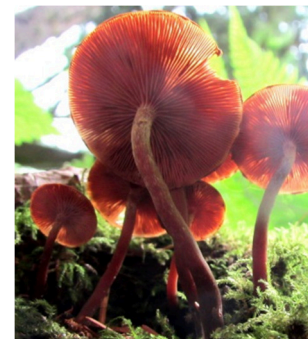
Gymnopilus picreus Rustgill Strophariaceae

Edibility: Avoid. Most *Gymnopilus* are bitter tasting; some folk allergic.

Habitat: Single or groups on conifer wood (sometimes hardwood) in summer & fall. Saprobiic. Recorded: 5.15.2014 (warm spring).

Field features: Cap 1-2 cm, convex or bell-shaped, becoming flattened, rufous to red-brown, drying to yellow, margin striate, bald or scurfy (finely scaly); gills yellow becoming reddish brown, decurrent, crowded & narrow; stem 4-8 cm long, 0.1-0.3 cm wide, reddish brown, white powdery when young becoming bald.

Notes: *Gymnopilus* from Greek *gymnos* meaning 'naked or unclad' and *pilus* meaning 'hair' which may simply reflect that it is not hairy [it can be scurfy]; *picreus* from Greek *picros* meaning 'bitter or pungent'.



C. Bunnell

Leptonia parva Blue-black Leptonia Entolomataceae

Educibility: Unknown.

Habitat: Scattered or small groups in forest humus, fall. Saprobiic. Recorded: 10.27.2013.

Field features: Small size, blue-black cap with fine scales, gills without wee teeth or blue-black edges. Cap 0.5-2.5 cm, convex, bluish black, tomentose when young, becoming finely scaly; gills adnate, white, relatively broad and subdistant, edges same colour as face; stem 1.2-8.5 cm x 0.15-0.4 cm, round in cross-section; dark bluish-gray to blackish blue, bald, no ring.

Notes: Much like *Leptonia serrulatum*, but gill edges not coloured or serrate. *Lepton* is from Greek *leptos* meaning 'small, fine, thin' and is emphasized by the Latin *parva* meaning 'little or few'. Simply, a small, attractive mushroom. Rarely reported in BC.



A. Farr

Mycena acicula Orange bonnet / Coral spring Mycena Tricholomataceae

Educibility: Unknown; a great many would be needed per mouthful.

Habitat: Solitary, scattered or in small groups on leaves and debris in woods, especially along streams and in other wet places; early summer to late fall (early winter near coast). Saprobiic. Recorded: 10.12.2013.

Field features: Cap tiny (≤ 1 cm across) beginning red, becoming orange red or yellow; gills pale orange to whitish, stem yellow and threadlike, 4 to 6 cm tall.

Notes: Well worth getting down on your knees – delightful to find with its brilliant cap and delicate thread-like stem amidst the dull decaying leaves and humus. *Mycena* from ancient Greek *mykenai* meaning 'mushroom'; *acicula* is derived from Latin ('small needle'). It is worthwhile finding this wee needle in the 'haystack' of leaves.



C. Bunnell Note size relative to maple samara.

Mycena adonis Scarlet bonnet Tricholomataceae

Educibility: Unknown; too small to fret about.

Habitat: Scattered to gregarious on fallen bark, twigs or needle beds under spruce and hemlock in coastal conifer forest, also under hardwoods; spring and fall. Saprobiic. Recorded: 11.04.2013.

Field features: Cap small (≤ 2 cm across), scarlet to bright salmon pink, smooth, slippery; gills pink fading to white, not close; stem ≤ 4 cm tall, watery pink to orange, hollow.

Notes: Cap can change colour rapidly as it dries (e.g. is picked), becoming orange or yellowish orange. Greek *mykenai* meaning 'mushroom'; *adonis* can be translated as "extremely good looking", which is apt.



A. Farr – that is a finger

Mycena elegantula no English common name Tricholomataceae

Edibility: Unknown, too small to fret about.

Habitat: Single to clustered on decaying conifer wood & litter in spring and fall. Saprobic. Recorded: 5.15.2014.

Field features: Cap small (0.5-2.5 cm), umbonate, conic to bell-shaped, dark wine-brown center, lighter brown at margins, bald, becoming striate at margin; gills bluntly adnate or hooked, close to subdistant, whitish to grayish with pale pink to reddish edges; stem 2-6 cm tall x 0.1-0.3 cm wide, colour variable but usually like cap, usually bald, base white-strigose.

Notes: *Mycena* from ancient Greek *mykenai* meaning 'mushroom'; *elegantula* from Latin *elegantulus* meaning 'very graceful, elegant'. There is little unanimity on the degree of separation among *M. californiensis*, *M. elegantula* and *M. purpureofusca*.



C. Bunnell
The moss is *Neckera douglasii*.

Mycena oregonensis no English common name Tricholomataceae

Edibility: Unknown, too small to fret about.

Habitat: Solitary to gregarious on rotting conifer needles & leaves of hardwoods, usually fall. Saprobic. Recorded: 5.15.2014.

Field features: Tiny, striate, bright yellow cap, yellow stem with yellowish down, growth on individual conifer needles.

Cap 0.2-0.5 cm (up to 1 cm), bright yellow, conic to convex, translucent striate; gills adnate to subdecurrent with tooth, pale yellow or white, edge bright yellow, narrow, distant but may appear close because of subgills; stem 1-2.5 cm long, <1 mm thick, fragile, translucent yellow, soft yellowish down, coarser at base, no ring.

Notes: Only look-alike is the orange bonnet (*Mycena acicula*) with an orange to orange-red cap. Tiny, but well worth scuffling for in the needles. *Mycena* is from ancient Greek meaning 'mushroom'; *oregonensis* means 'from Oregon'.



Photographer unrecorded

Mycena pura Lilac mycena Tricholomataceae

Edibility: **Avoid.** Some reports suggest edible, one reports muscarine present (toxic).

Habitat: Single or groups on leaf humus & moss under conifers or hardwoods in spring, summer & fall. Saprobic. Recorded: 3.26.2014 (warm spring).

Field features: Cap 2-5 cm, convex or bell-shaped, becoming flattened, margin striate, bald, typically lilac to purple when young, but often fading or developing other shades (including whitish, yellowish, pinkish brown or reddish); gills whitish or tinged colour of cap, attached to stem with a short 'tooth' (uncinate), smooth or can be wrinkled; stem 4-10 cm long, 0.1-0.3 cm wide, pale grey to reddish brown, smooth or tiny hairs, base often with long, wooly fibrils.

Notes: *Mycena* from ancient Greek *mykenai* meaning 'mushroom'; *pura* from Latin *purum* meaning 'pure' or 'clean'.



A. Farr

Mycena purpureofusca Purple edge bonnet Tricholomataceae

Edibility: Unknown, too small to fret.

Habitat: Single to tufts on conifer wood and debris, late summer through winter. Saprobic. Recorded: 3.26.2014.

Field features: Purple-brown, bell-shaped cap, gill edges wine purple and non-bleeding stem. Cap 0.7-3 cm broad, conic to bell-shaped, dark purplish fading to purplish grey, paler at margin, translucent-striate when moist and mature; gills adnate, somewhat broad, close, pallid white to pale grey with wine-purple edges; stem 3-10 cm x 0.1-0.2 cm, hollow, round in cross section, tough, coloured like cap, smooth with age, base with white hairs often prolonged and root-like.

Notes: *M. elegantula* gills have coloured edges, but cap colour is wine brown. *Mycena* comes from ancient Greek meaning 'mushroom'; *purpureofusca* describes the brownish purple colouration.



A. Farr

4.2.4 Robust, moderate to large mushrooms with gills

Caps of these gilled mushrooms are >3 cm and stems are robust.

Agaricus praeclaresquamosus Flat-top agaricus Agaricaceae

Edibility **Poisonous** to many, with vomiting and diarrhea.

Habitat: Single or groups on ground in woods or under trees (usually hardwoods) along roads and paths, late fall to mid-winter. Saprobic. Recorded: 10.25.2014.

Field features: Large size; minute blackish-brown scales on cap; free, close pallid gills, bald stem, thick rubbery ring & and phenolic odor. Cap 5-25 cm, convex becoming flat, whitish background with inky-grey to grey-brown, fibrillose scales; gills free, close, pallid becoming dark brown; stem 7-18 cm x 1-3(4) cm, white, discolouring to dingy brown, veil membranous, white, thick, felt-like, somewhat rubbery, often splitting, becoming skirt-like.

Notes: Large & attractive, but unfortunately toxic.

Agaricus from Greek *agarikon* (a fungus growing near Agaria); *praeclare* Latin for 'clearly, obviously'; the Latin *squamosus* for 'squamose or having scales'. Combined: an obviously scaly agaric. Some people eat this with impunity, but there is only one way to find out if you are one of them.



C. Bunnell

Amanita gemmata Gemmed Amanita and/or *Amanita pantherina* Panther Amanita Pluteaceae

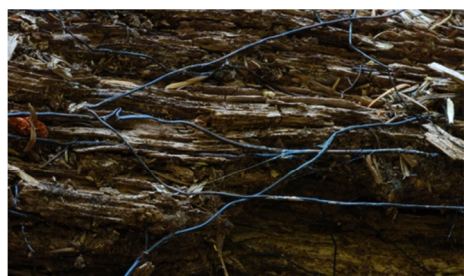
These hybridize. This genus is responsible for about 95% of the fatalities resulting from mushroom poisoning, with the death cap (*Amanita phalloides*) accounting for about 50% on its own. The problem is that some *Amanita* are edible or cleverly disguised as something edible. *Amanita* are characterized by their (usually) pale gills, which are free from the stem, presence of a universal veil that often creates a volva or other distinctive features on the stem, and their more or less dry caps. Many have warts or patches on their caps and a ring on the stem. Some individual species are easy to identify, some much more difficult. It can help to note which tree species they are near (because they are mycorrhizal), and to carefully excavate the base of the stem (which varies among species). *A. gemmata* and *A. pantherina* are particularly difficult to discern without microscopic features and appear to hybridize; some workers suggest they embrace several species.

Edibility: Both **poisonous** to us. Other animals (e.g., squirrels) eat them without harm to themselves.
Habitat: Both **on ground, single, scattered or in groups** in woods, especially **under conifers**; *gemmata* also along forested paths; **summer & fall**. Recorded 11.11.2013 and 10.17.2013, respectively.
Field features: Both have a **cap with whitish warts**, and **free rim or collar at the top of the basal bulb. Often tall** – 15 to 20 cm. The cap of *gemmata* is characterized as creamy to pale yellow, **golden yellow**; *pantherina* as dark **brown to tan** or dull yellowish – they intergrade. The panther tends to fruit in the spring, but also at other times of the year.
Notes: *Gemmata* means ‘gemmed’; *pantherina* means ‘little panther’. *Pantherina* contains the same toxins as fly Amanita (*Amanita muscaria*) but in much higher concentrations. They cause the pantherine syndrome (within 4 hours: nausea, clumsiness, confusion; later, sleep or coma, altered perception, muscle twitching); deaths are relatively rare, but permanent.



Two on left *Amanita gemmata* (Gemmed Amanita, A. Farr) Two on right *Amanita pantherina* (A. Farr & C. Bunnell). Note that both have been eaten by squirrels.

Armillaria mellea group About 20 years ago there were 2 North American “honey mushrooms” – *Armillaria mellea* and *Armillaria tabescens*. Forest pathologists considered the one in BC (*A. mellea*) one of the most common and destructive facultative parasites in the province. A facultative parasite can invade living tissue as a parasite, but use a stump or other dead tissue as a food source during its saprobic phase. Honey mushrooms produce rhizomorphs (red-brown to black strands, 1-2 mm in diameter) which grow freely through the soil and can burrow through bark on roots of living trees. It is reported from about 50 host species, including all commercially important conifers and hardwoods in BC. Once we refined means of mating *Armillaria* in petri dishes, we discovered that some honey mushrooms would take to one another, while others refused to pair up. Under the “biological species concept” (if they can’t mate they belong to separate species), we have defined 9 or 10 species of *Armillaria* in North America. Among the findings: 1) the classic honey mushroom, *Armillaria mellea*, turns out to be limited to the eastern half of North America, 2) some of these ‘species’ don’t look different, and must be “mated” to be identified with certainty. For the approach to sex and gender among fungi, see **Why are there so many fungi?** in *Identifying slime molds and fungal species – broad groups* (Bunnell et al. 2013). Older ‘fungiphiles’ in the west see the honey mushroom, *Armillaria mellea*, while younger ones ponder, just which new species of *Armillaria* is that?



Armillaria rhizomorphs

Rhizomorphs are characteristic of the *Armillaria mellea* group. They serve as a wiring system that is robust enough to penetrate living roots and allow the species to cover large areas. Honey mushrooms can be so large they challenge our concept of an individual organism. The largest may be a single fungus spread through a forested area of about 10 km² or 2,000 football fields, measured in Oregon. Individuals are not supposed to be so big or live so long (up to 8,500 years). Other *Armillaria* are a close second. Researchers determine individuals by testing for the mating systems the fungus itself uses to determine compatibility.

Armillaria is from Latin for 'ring-shaped veil' referring to the ring of veil remnants (see photo of *A. sinapina*); *mellea* means 'of honey' and refers to the colour, not the taste, which is far from sweet.

Armillaria sinapina Honey mushroom Marasmiaceae

Edibility: Edible, **but** undercooking causes some people grief.

Habitat: **Singly or in small groups of 2 to 5 on dead stumps and healthy roots and trees** (hardwoods or conifers); **late summer & fall**. Parasitic. Recorded: 10.24.2013.

Field features: Cap 2-6 cm across, generally **brownish colour, thin delicate ring** (annulus), growth on trees, **cylindric rhizomorphs**, gills subdecurrent to strongly decurrent, **veil golden to mustard yellow**.

Notes: *Sinapina* is derived from the Latin *sinapis* for 'mustard'. Note the 'ring-shaped veil' or *armillaria*.



Young & mature *A. sinapina* (A. Farr & C. Bunnell)

Armillaria solidipes (formerly *ostoyae*) Honey mushroom Marasmiaceae

Edibility: Choice when thoroughly cooked.

Habitat: Typically **large clusters on or about conifer stumps or trees**; hardwoods in infected conifer stands can be attacked & killed; also dead roots, healthy roots and other woody debris in **summer & fall**. Parasitic. Recorded: 11.11.2013.

Field features: Much like *A. sinapina* but in larger clusters with dark to **very dark brown cap** 5-10 cm across with **dense dark scales** (scaliest of *Armillaria*), **thick, membranous**, white and brown **veil** and flattened, **belt-like rhizomorphs** with dichotomous branching.

Notes: *Solidipes* is from Latin *solidus* or 'solid' plus *pes* 'leg or foot' or 'solid stem'. It is this species of *Armillaria* that appears to be the world's largest and oldest organism. Far larger than a sperm whale, far older than the oldest tree.



A. Farr

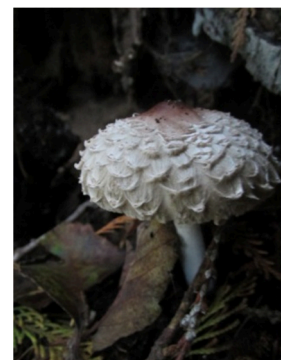
Chlorophyllum olivieri (*Lepiota rachodes*) Shaggy parasol Agaricaceae

Edibility: Choice when well cooked, but **some people** are **severely allergic**. Also, readily confused with *Chlorophyllum molybdites* which has olive-green gills, green spores and is poisonous. Appear identical when young.

Habitat: **Groups or fairy rings on ground under conifers** or in grass or roadsides but near conifers, **spring & early fall**. Saprobic. Recorded: 10.24.2013.

Field features: **Large size** (cap 5-20 cm), initially smooth & brownish, soon breaking up into **large, brownish, coarse shaggy scales or tatters** revealing a white to dingy duff background; **raised collar-like ring, no pattern** on stem. **Flesh** turning **pinkish orange** to maroon **when sliced**, especially near apex of stem (true of related species as well).

Notes: *Rachodes* is a misspelling of the Greek *rhacodes* for 'ragged' or 'tattered', presumably referring to the rather tattered cloth-like appearance of the scales during part of its life. *Chlorophyllum* means 'with green gills' but that's another species. **Be careful** when picking – spore print is very important and it is best to avoid look-alikes growing in grassy areas. The green-gilled *C. molybdites* causes the most mushroom poisonings in North America annually.



A. Farr

Clitocybe gibba (see **Notes** below) Funnel cap Tricholomataceae

Edibility: Excellent, but difficult to identify (inedible look-alikes).

Habitat: Alone, scattered or gregarious under conifers on moss or needles; spring through fall. Saprobic. Recorded: 11.03.2013.

Field features: Cap 3-8 cm across, pale pinkish tan, funnel-shaped at maturity; gills decurrent, crowded and whitish; stem pallid and slender, base often with copious tomentum which adheres to surrounding leaves and humus.

Notes: This is one of the mushrooms that releases hydrogen cyanide gas into the atmosphere, but not enough to harm us. The taxonomy of what was *Clitocybe* is in some turmoil. A new genus

Infundibulicybe was recently established to reflect the fact that DNA studies have placed this mushroom and closely related species distant from other *Clitocybe* species. Some would now consider this species as *Infundibulicybe squamulosa*, represented by two varieties in the PNW. Funnel cap will do.



A. Farr

Clitocybe nebularis Cloudy Clitocybe or Clouded funnel Tricholomataceae

Edibility: **Not** worth the effort, some people allergic.

Habitat: Scattered to gregarious under trees, may form rings, generally late fall and winter. Saprobic. Recorded: 10.25.2014.

Field features: Large size, grayish brown cap often with a hoary bloom or watery spots and rancid, disagreeable odor.

Cap 6 to 25+ cm across, grey to grey-brown, convex becoming flat or depressed, often wavy or lobed when old, may have watery spots, streaks or hoary bloom; gills adnate, becoming decurrent, close, broad in middle, whitish becoming dingy yellowish, forked; stem 6-15 cm x 1.5-4 cm, base often widened, firm but easily broken; whitish or with dingy brownish fibrils.

Notes: One more large mushroom that is better avoided. *Clitocybe* means 'sloping head' while *nebula* is Latin for 'mist' the stuff of clouds, reflecting the cloud-like colouring.



A. Farr

Clitocybula atrialba Black and white *Clitocybula* Marasmiaceae

Edibility: Unknown.

Habitat: Single, scattered on buried hardwood (e.g. alder, maple) or rich humus, less commonly on hardwood above ground, any season.

Saprobic. Recorded: 11.11.2013.

Field features: Cap 2.5-8 cm, convex to vase-shaped, smoky to blackish brown, paler on disc; gills distant, decurrent, broad, white to gray; stem 6-10+ cm x 0.3-1.5 cm, brownish, paler when old, somewhat scaly & fibrous streaked. The specimen to the right is mature and curling inward.

Notes: The etymology is somewhat puzzling. *Clitocybe* is a combination of Latin and Greek meaning 'sloping head', *gula* is Latin for 'throat'. *Atrialba* confers 'black and white' to the throat on the sloping head – perhaps it works.



A. Farr

Cortinarius alboviolaceus Silvery-violet Cortinarius or Pearly webcap Cortinariaceae

Edibility: Reports vary from “unknown” to “yes, but not recommended”. No personal experience.

Habitat: **Singly to groups in humus** under hardwoods and conifers. The genus is mycorrhizal, but with which tree species is unclear: in Europe primarily under beech and oak; in North America it appears to be birch (but see notes; likely a species group); **summer & fall**. Recorded:10.17.2013.

Field features: **Cap** 2-9 cm, **silvery bluish white** when young **to silvery violet** or lilac white, **covered with whitish veil** material; **gills** pale violet to reddish brown, **covered by white cortina** when young; stem covered with **white silky sheath**; rusty spores may be trapped.

Notes: *Cortinarius* is the largest mushroom genus in the world (>2000 described species) and named for the *cortina* or cobweb-like partial veil over young gills. This ‘species’ was first described in Europe, but has since been widely reported in North America. *Aboviolaceus* comes from the prefix *albo* ‘white’ and *violaceus* ‘tinged or flushed with violet’. Wonderfully appropriate.

Variability among bluish to purple *Cortinarius* suggests genetic studies will reveal other species ‘hidden’ within this name.



L: C. Bunnell; R: A. Farr
Prettier than it looks here.

Cystoderma amianthinum* var. *rugosoreticulatum Unspotted Cystoderma or Earthy powdercap
Tricholomataceae

Edibility: May be edible; **not recommended** because easy to confuse with poisonous species.

Habitat: **Alone, scattered, or gregarious**, usually in **moss under conifers**; **late summer and fall** (may overwinter). Saprobic. Recorded: 11.03.2013.

Field features: **Cap** 2-5 cm across, **white, yellowish to yellowish brown, dense coating of granules** on the cap and stem, fragile and **ephemeral ring, pungent odor**.

Notes: *Cystoderma* means ‘blistered skin’ – powdercaps usually have granular cap surfaces; *amianthinum* means ‘pure or unsullied’ from *amiantus* (Latin) or *amiantos* (Greek). Taxonomists have not yet sorted out the various named varieties.



Fine granules on cap, larger on stem, (A. Farr)

Gymnopus dryophilus Common Collybia Tricholomataceae

Edibility: Yes, but some people are sensitive; discard the stems.

Habitat: **Scattered to clustered on humus or well-decayed wood** in conifer-hardwood forests from **spring through fall**. Saprobic on litter. Recorded: 5.15.2014 (warm spring).

Field features: **Cap** 1-5+ cm, **convex** with **incurved margin** becoming flat or depressed with uplifted margin, **smooth, reddish brown to buff brown with lighter margin**, fading with age; **gills** **white to cream, adnexed to nearly free** (notched), crowded, **edges entire**; **stem** 2-7 cm long, 0.2-0.5 cm wide, same colour as gills, **no veil**, base sometimes flared, pliant and fibrous, **bald, soon hollow**, often with white mycelium at base.

Notes: *Gymnopus* from the Greek *gymnos* meaning ‘naked or unclad’ and *pus* (or *pous*) meaning ‘foot’ (here a bald stem); *dryophilus* from Greek meaning ‘lover of oak leaves’. In parts of its range (Europe and California), it is found most often in leaf litter under oaks.



C. Bunnell

Gymnopus peronatus Wood woolyfoot Tricholomataceae

Edibility: Considered **inedible** due to its acrid, peppery taste.

Habitat: **Single to gregarious on clumps of hardwood leaves or needles, early summer to fall.** Saprobic. Recorded: 10.29.2014.

Field features: Distinctive features are **yellow gills when young, peppery taste, reddish brown to buff cap & stem base with abundant yellowish mycelium.** Cap 2-6 cm across, convex to flat, yellowish to pale reddish brown, scurfy, may retain umbo, old caps often shrunken & very wrinkled; gills yellow when young, becoming colour of cap, free, distant, broad, several subgills between gill pairs; stem 4-8 cm x 0.4-0.6 cm, generally paler & more yellow than cap, lower half covered with small pale (yellowish) hairs.

Notes: *Gymnopus* from *gymn* 'naked or bare' and *pus* meaning foot or stem for a mushroom; *peronatus* from Latin for 'booted' referring to the wooly-booted appearance of the stem base.



Tim Sage

Hygrocybe coccinea Righteous red waxy-cap or Scarlet hood Tricholomataceae

Edibility: Listed as edible in most books but **poisonous** to at least some people!

Habitat: **Solitary, scattered or small groups in woods (hardwoods, conifers or mixed) and other damp places, late summer to early winter.** Mycorrhizal. Recorded: 11.03.2013.

Field features: Exquisite, **bright, scarlet red waxy cap 1.5-6 cm across, gills orange to peachy; stem red to reddish-orange with yellowish base.** *Hygrocybe punicea* is similar but is usually more robust, with viscid cap (when moist), most often has a yellow to orange, fibrillose-striate stem with a whitish base.

Notes: *Hygrocybe* means 'watery head' – mushrooms in this group are very moist. Like the food colouring cochineal, *coccinea* means 'bright red'. Fresh young mushrooms always justify their name.



C. Bunnell

Hygrophoropsis aurantiaca False chanterelle Hygrophoropsidaceae

Edibility: **Avoid it**, some find it edible, but it doesn't merit trying even though some report it as hallucinogenic; others report it as poisonous.

Habitat: **Solitary, groups or tufts in humus and rotten wood, usually under conifers, late summer & through warmer winters.** Saprobic (wiki gives it as mycorrhizal without a citation). Recorded 10.17.2013.

Field features: Cap 2-8 cm across, **orange to brown as is stem; gills decurrent, orange, finely tomentose, dichotomously forked.**

Notes: *Hygrophoropsis* means resembling *Hygrophorus* (*opsis* comes from Greek and means "similar to"). False chanterelle is similar in shape, but lacks the broad, waxy gills of *Hygrophorus*. Like true chanterelles (*Cantharellus*), but less robust, cap browner, less waxy or frilled, flesh flimsier, gills thinner, more crowded and blade-like at maturity and usually more orange.



A. Farr

Hypholoma fasciculare Sulfur tuft Strophariaceae

Edibility: **Poisonous**, gastrointestinal upset in North America, several deaths in Europe and Asia.

Habitat: Gregarious, usually in **tufts or dense clusters on decaying wood of both hardwoods & conifers**, but sometimes growing from buried wood or roots and thus appearing terrestrial. May be **packed so tightly the caps are deformed**. From **April through to the first heavy frosts**. Saprobic, producing white rot. Recorded: 10.17.2013.

Field features: **Clustered growth habit, cap 2-7 cm wide, orange-yellow to orange brown**, gills yellow to greenish-yellow, **bitter** taste, **stem** often develops **rusty or brown stains**.

Notes: *Hypholoma* means 'mushrooms with threads' perhaps referring to the thread-like partial veil that connects the cap rim to the stem of young fruiting bodies, or perhaps referring to thread-like rhizomorphs that radiate from the stem base. *Fasciculare* from the Latin *fascies*, a bundle of rods bound around an axe-head as a symbol of authority and power in ancient Rome. Likely referring to the dense clustering. The common name, Sulphur tuft, refers to the bright sulphur-yellow colour of the caps and their habit of growing in tightly bunched tufts. Clustered caps in older clumps often assume a greyish or purple-brown tinge from a coating of spores from mushrooms above.



Two views of a cluster or tuft (A. Farr)

Laccaria laccata Lackcluster Laccaria (also waxy Laccaria or the deceiver) Hydnangiaceae

Edibility: Edible but not worthwhile.

Habitat: **Single to groups or troops in forest or near trees**, especially in **poorer soil** – sandy to boggy areas, **summer through fall**. Mycorrhizal on hardwoods & conifers. Recorded: 10.24.2013.

Field features: **Cap 1.5 to 6 cm across, often wavy or irregularly lobed** when old, **flesh coloured to brownish cinnamon**; gills well-spaced, thick, somewhat waxy; pale pinkish to flesh-coloured or reddish tan; stem same colour as cap, tough and fibrous, **white basal mycelium**.

Notes: The common name 'the deceiver' derives from its variable appearance – the size and cap colour change quite significantly with age, with the weather and perhaps whimsy. *Laccaria* translates as 'lacquer' (shiny paint), and *laccata* as 'varnished or coated with lacquer', emphasizing the point, but it is not particularly shiny. Difficult to identify without microscopy.



A. Farr

Lactarius pseudomucidus Slimy milk-cap Russulaceae

Edibility: Eastern forms inedible; unknown for western forms.

Habitat: **Single, scattered to gregarious in duff, under conifers, summer through fall**. Mycorrhizal on conifers (western hemlock). Recorded: 11.03.2013.

Field features: **Cap 3-8 cm across, dark grayish brown** under a **thick layer of slime**; **gills quickly bleed creamy white latex** when cut; **stem** often paler but still **slimy**.

Notes: *Lactarius* is Latin for 'milk producing' and all members of the genus *Lactarius* produce a milky fluid when cut, though not always white. There is nothing *pseudo* or false about the slimy, mucous-like covering of the cap and stem. Perhaps the *pseudo* reflects that this is not the kind of mucous you find in your nose.



Note slime (A. Farr)

Lactarius rubidus Candy cap Russulaceae

Edibility: One of the best. When chopped and dried their flavor becomes sweet. Unfortunately, there are inedible look-alikes.

Habitat: Scattered to gregarious on ground in woods, sometimes on wood, along trails, fall into winter. Generally mycorrhizal, but may become saprobic on rotten wood. Recorded: 10.17.2013.

Field features: Cap 1.5-4.5 cm across, rusty brown, inrolled margin and sometimes small umbo when young; gills pale orange, bleed a watery, whey-like latex when cut; stem smooth & brittle, coloured like cap, fuzzy at base. Fresh specimens have a faint 'sweet' brown sugar or butterscotch odor, much stronger when dried.

Notes: Avoid look-alikes with white latex. Tasting is an important step in identifying milk-cap mushrooms (*Lactarius*). For reddish species, only a wee taste should be risked. May taste slightly bitter when fresh, but becomes sweet. *Rubidus* is from the Latin 'red' or 'ruddy' referring to the colour.



Young specimen (A. Farr)

Lactarius rufus Red hot milk-cap Russulaceae

Edibility: Not recommended (canned in Scandinavia, but North American variants not tested and some believe them poisonous or allergenic). Generally best to avoid *Lactarius* with white latex (the watery whey of *L. rubidus* is an exception).

Habitat: Scattered to gregarious or in troops under conifers (and red alder), depending on weather mid-summer to fall. Mycorrhizal. Recorded: 10.17.2013.

Field features: Told from other brownish reddish *Lactarius* species by very peppery (strong, acrid) taste & unchanging, unstaining white milk, habitat under conifers.

Notes: The milk (latex) is very acrid, making this one of the hottest of all mushrooms. *Rufus* is a Latin adjective translating as 'rufous' meaning a foxy, red-brown colour often referring to red-haired. Taste tests can be informative and exciting, but should be avoided for some, including *Amanita* (p. 15).



C. Bunnell

Melanoleuca melaleuca group Dark Melanoleuca Tricholomataceae

Edibility: Yes, but not recommended because not easy to identify.

Habitat: Single to groups in pastures, along trails, and under both hardwoods and conifers in summer & fall. Likely saprobic, but cannot rule out that it is also mycorrhizal. Recorded: 11.20.2013.

Field features: Cap smooth, dark brown to gray-brown; gills sinuate (bendy), crowded, narrow, whitish to cream; stem slender, straight, whitish, longitudinally lined with 'hairs', often minutely scurfy at top and slightly off-centre.

Notes: The name translates as "black and white". Within the genus, the *Melanoleuca melaleuca* group includes the dark-capped *Melanoleucas* which are difficult to identify to species. Taxonomy is confused. The species name appears in North American field guides, but descriptions do vary and the North American concept of this species is incoherent. The name for a particular boring, medium-sized, brown *Melanoleuca* could be "Boring, Medium-Sized, Brown *Melanoleuca*" without departing much from our current understanding; if that's too long, "Charlie" might work just as well.



A. Farr

Pholiota aurivella group 'Golden Pholiota' Strophariaceae

Edibility: **Not** recommended. Some books list these mushrooms as edible, but many people suffer severe stomach upsets after eating a member of this group.

Habitat: **Tufted or clustered on living or dead hardwoods and conifers** (if we recognized them better, individual species might show greater specificity). **Summer & fall.** Facultative parasite (becomes saprobic when its host dies). Recorded: 10.17.2013.

Field features: **Cap** 4-15 cm across, sticky to slippery/slimy; **yellow** to yellow-orange, **large**, flattened, **wine-red scales** (may be recurved); **gills yellowish becoming rusty-brown**; **stem** coloured like the cap or paler; **scaly below the ring, whitish above the ring.**

Notes: *Pholiota* means scaly from the Greek *pholis*, meaning 'scale'; *aure* means 'gold' or 'golden' and *vell* means 'fleece'; *aurivella* translates as 'golden fleece.' Thus, we have a scaly, golden fleece. Who says naming mushrooms can't be fun? Field features cannot separate members of this group. *Pholiota aurivella* and *Pholiota limonella* (lemon-yellow Pholiota) can share all observable macroscopic and microscopic features except spore size (*limonella* has smaller spores).



A. Farr

Pholiota squarrosa or *P. squarrosoides* Scaly Pholiota / Shaggy scalycap OR Bristly Pholiota Strophariaceae

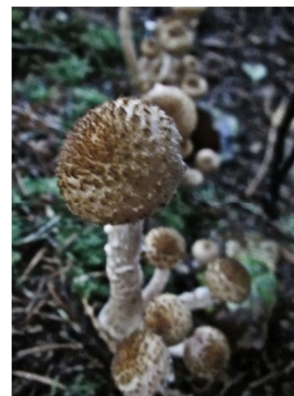
Edibility: **Not** recommended, some individuals get severe stomach upsets.

Habitat: In **tufts or dense clusters on wood**, usually at the **bases of conifer and hardwood trees**, but also on tree boles during **summer & fall**. Saprobic, possibly weakly parasitic. Recorded: 10.24.2013.

Field features: **Cap** 4-12 cm across, **pale yellow** with conspicuous erect or recurved scales; **gills crowded**, pale **yellowish becoming cinnamon** as spores develop; **stem** dry with scales similar to cap below ring area & **smooth above.**

Michael Kuo notes: "Theoretically, *P. squarrosoides* can be separated from the very similar *P. squarrosa* without the use of a microscope, since its gills go from whitish to rusty brown *without* passing through a greenish stage, and its cap is often slightly sticky underneath the scales (as opposed to the always-dry cap of *squarrosa*). Additionally, *Pholiota squarrosoides* never develops the garlicky odor that *some* collections of *Pholiota squarrosa* develop." However, weather conditions influence the stickiness of the cap; if you collect mature specimens there is no way of knowing whether the gills passed through a greenish stage; and the garlicky odor is not a consistent feature of *P. squarrosa*. Microscopy is necessary to distinguish the species so both are collected under this field description.

Notes: *Pholiota* means 'scaly'; *squarrosa* adds detail because it means 'with upright scales'; *squarrosoides* helpfully notes that it is like *squarrosa*. Both of these species are readily confused with the *Armillaria mellea* group when young. A spore print clarifies: all *Pholiota* have brown spores: *Armillaria* produce white spores.



A. Farr

Pluteus cervinus Deer-mushroom Pluteaceae

Edibility: Edible and quite good when firm & fresh, otherwise mediocre.

Habitat: Solitary or in small groups on or around decaying deciduous and conifer wood, spring through late fall. Saprobic. Recorded: 11.24.2013.

Field features: Cap largish (3-12+ cm), brown, smooth, usually bald, often umbonate; gills free & close, white becoming pink (spores are pink); stem dingy white usually streaked with fine brownish fibres; no veil, growth on wood.

Notes: *Pluteus* comes from Latin meaning 'a protective fence or screen' – like a shield. The cap is shield-like (the Brits call this the Deer shield). *Cervinus* is from Latin 'a deer', not for its colour but for the 2 to 4 tiny antler- or horn-like projections at the tip of cells covering the gill surfaces (visible microscopically). Some workers recognize different varieties, some associated with the covering of the stem. More than one species may be collected within this name.



A. Farr

Rhodocollybia butyracea Buttery Collybia or Butter cup Marasmiaceae

Edibility: Yes, but mediocre even when tough stems discarded; needs care in identification.

Habitat: Scattered to gregarious in conifer & hardwood forest on needle and leaf litter, from late summer & fall (may overwinter in mild winters). Saprobic. Recorded: 10.24.2013.

Field features: Cap 3-8+ cm across, reddish brown to dull brown, convex, sometimes umbonate, smooth & greasy or slippery and hygrophanous (changes colour as it dries); gills narrowly attached to stem (nearly free), often finely jagged; stem cap-coloured when old, buff when young, hollow at maturity, often club-shaped and broader at bottom, base often white tomentose.

Notes: *Rhod* is Latin for 'pink'; *collybia* is Latin for 'small coin' suggesting Pink penny as a name, but we go with 'butter', the *butyracea* part. That has much more to do with the greasy texture of caps, rather than a buttery flavor. There are far tastier mushrooms.



C. Bunnell

Russula bicolor Bicoloured Russula Russulaceae

Edibility: Some sources say yes, haven't tried. **You need to be confident;** somewhat similar looking mushrooms prove most unpleasant when eaten (e.g., 'the sickener', *Russula emetica*).

Habitat: In soil or rotten wood, mixed woods, often under deciduous cover, summer & early fall. Mycorrhizal in North America, but British and European versions also saprobic. Recorded: 10.26.2013.

Field features: Cap 4-8 cm across, convex, then flattened, multi-coloured cap, usually yellowish at centre and blotched with yellow, orange or red towards margins, viscid when wet, margin striate with age, peppery taste; gills white; stem white becoming hollow.

Notes: The generic name is derived from the Latin word *russus*, meaning 'red'; many mushrooms in the genus have a reddish cap. *Bicolor* refers to the typically 2 or more coloured cap.



L: C. Bunnell
R: A. Farr

Russula brevipes Short-stemmed Russula Russulaceae

Edibility: Yes, but mediocre; substantially improved when parasitized by *Hypomyces lactifluorum*.

Habitat: Scattered to groups on ground in woods, most common in late fall. Mycorrhizal on several tree species. Recorded: 10.25.2014.

Field features: Recognized by large size, dull white, centrally depressed cap, short, stout stem & flesh that does not change colour when bruised. Cap 4-20+ cm broad, white, often with brown stains, convex, becoming centrally depressed or funnel-shaped, bald; gills attached, decurrent with age, close, white becoming yellowish; stem 2-5(10) cm long, thick, dull white or stained brownish with age.

Notes: *Russula* from Latin *russus* meaning 'red' (many *Russula* have a red cap); *brevipes* from Latin *brevis* meaning 'short', referring to the short, stout stem. One of the most common *Russula* on the coast. Sometimes parasitized by the orange-red lobster mushroom *Hypomyces lactifluorum*.



C. Bunnell

Russula cremoricolor Creamy Russula Russulaceae

Edibility: Too peppery.

Habitat: Single to groups, on ground, favouring conifer forests in fall to early spring. Mycorrhizal. Recorded: 10.25.2014.

Field features: Small to medium size, cream-coloured dry cap, short white stem, peppery taste. Cap 6-10 cm across, creamy yellow to near white, convex becoming flat, margin usually somewhat striate when older; gills attached to stem, white becoming pale creamy, fairly close; stem often short, 2-10 cm x 1-2.5 cm, white, dry, smooth or with striae.

Notes: The only thing clear is that it is an attractive winter *Russula*. It appears to be conspecific with *Russula silvicola*; they appear in mixed patches. *Russula* from Latin *russus* 'red' (because many *Russula* have a red cap); *cremor* is Latin for 'cream', thus *cremoricolor* means 'cream colored'.



C. Bunnell

Russula silvicola Red cap Russulaceae

Edibility: **Poisonous**, at least when raw.

Habitat: Solitary to gregarious on humus & rotten wood in hardwood and mixedwood forests, summer through fall (early winter farther south). Mycorrhizal. Recorded: 11.10.2013.

Field features: Cap 4-9+ cm, solid bright red to rose pink fading to almost white, peppery taste; gills white, attached; stem thick (1-3 cm), usually equal over length but can be broader at either top or bottom, white, becoming hollow with age.

Notes: *Russula* from Latin *russus* or 'red'. The Latin *silvicola* means 'inhabiting woods' from *silva* 'forest' and *cola* ('inhabitant'). The species looks much like 'the sickener' or *Russula emetica*, but that's all right because you don't want to eat either. The sickener is often in swampy forests with *Sphagnum*.



A. Farr

Stropharia ambigua Questionable Stropharia Strophariaceae

Edibility: Considered edible, but reviews range from very mediocre to succulent morsel; not personally sampled.

Habitat: Solitary to gregarious, usually in **deep humus under conifers**, but also under alder, along streams and **other damp shaded areas**, from **late summer through fall** (some years through spring). Saprobic. Recorded: 10.17.2013.

Field Features: Cap 4-14 cm broad, **nearly conic when young**, becoming convex to plane, occasionally slightly umbonate; **pale yellow** to orange-yellow, **viscid when moist**; bald, **margin with adhering white veil fragments** (appendiculate), disappearing with age; **gills** adnate, crowded, **grayish** when young aging to purplish-black; **stem** 7-17 cm tall, 1-2 cm thick, becoming hollow with age, white, **cottony or silky** at apex, **floccose scales** towards the base, smoother with age.

Notes: *Strophos* is from Greek meaning 'belt', perhaps relating to belt of veil fragments around the cap; *ambigua* means 'doubtful', possibly recognizing it isn't a belt and can disappear with age. The species looks broadly like the poisonous *Amanita gemmata* that also has a yellow cap, free gills and bulbous base, but lacks the appendiculate or fringed margin.



Early and later stages (A. Farr)

4.3 'Mushrooms' with pores (Agaricales)

This group looks like a 'mushroom' should, with cap and stipe, but has pores instead of gills on the undersurface. It includes many tasty and recognizable species. Only a handful of species in this group are poisonous. Poisonous *Boletus* species have red or deep orange pores. As well as a few toxic species, some boletes are bitter or inedible. A wee nibble or taste test is not dangerous with this group providing you avoid reddish pores (but they may not taste good).

Boletus chrysenteron Red-cracked boletus OR ***Boletus truncatus*** Boletaceae

Edibility: Both *B. chrysenteron* and *B. truncatus* are edible but not choice and closely resemble other cracked-cap species with uncertain edibility.

Habitat: **solitary or gregarious under trees** and in **wooded areas** near trails from **summer through fall**, doesn't fruit every season. Mycorrhizal. Recorded: 10.17.2013.

Field features: Cap 3-8 cm, **convex, brown** to olive-brown, **conspicuously fissured** with **pinkish tinged cracks** plus **yellow pores that usually bruise blue**. The two species cannot be separated without a microscope to examine spore characteristics.

Notes: *Boletus* from the Greek *bolos* meaning 'lump' or 'clod' referring to the convex cap; *chrysenteron* means 'golden inside', referring to the bright yellow flesh of the mushroom; *truncatus* reflects truncate spores; those of *chrysenteron* have rounded ends. Taxonomists are not agreed on whether the generic name of these two should become *Xerocomellus*.



Left: C Bunnell Centre: A. Farr (note pores rather than gills) Right : A. Farr

Boletus zelleri Zeller's bolete Boletaceae

Edibility: Edible, but not one of the best Boletes; watch for fly larva.

Habitat: **Single**, scattered, **or in groups** on **ground or decaying wood** in **mixed conifer forest**, in **late summer & fall**. Mycorrhizal with alder, poplar and other hardwoods. Recorded: 11.03.2013.

Field features: Think **black, yellow and red**. **Cap** 5-10 cm, convex to flat, **blackish brown to black**, may have **lighter ring** around it; **pores yellow**, staining blue when bruised; **stem** solid, continuous **red or densely dotted red** over yellowish background, longitudinal **striae**; no veil or ring.

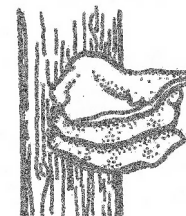
Notes: Many of the fungal species found at Brooksdale are also found in Europe. This species is limited to western North America. *Boletus* from the Greek *bolos* meaning 'lump' or 'clod' referring to the convex cap; *zelleri* was chosen to honor Professor Sanford Zeller, mycologist at Oregon State University who was part of the expedition (near Seattle about 1912) that discovered the first specimens.



A. Farr

4.4 Conks and bracket fungi (some of the polypores)

What we call conks have fruiting bodies that are medium sized to very large, tough, woody or punky (usually perennial, often thick, growing on dead or dying trees). They usually have no stalk. We tend to ignore them mostly because they are not enticing to eat. They are important not simply because some can kill trees, but also because they are critical in the decomposition of trees – slowly releasing nutrients back to the environment. During identification it can be helpful to know whether they are brown or white rots. Wood is composed mostly of two substances – cellulose (white) and lignin (brown). Brown rot fungi can degrade only the white cellulose, leaving the brown lignin behind. In their simplest form, white rot fungi degrade the lignin and leave the white cellulose behind.



Brown rot and white rot F. Bunnell

You can tell the difference blindfolded. Brown rots degrade the primary cell walls leaving secondary lignin walls behind – a blocky texture that crumbles to dust between your fingers (no primary wall structure). White rot leaves the stringy structure of the primary walls behind. Nature is rarely neatly classified. The 'simultaneous white rotters' degrade both cellulose & lignin, but at different rates (using up the lignin first).

There are often 'sister' genera in the polypores that appear identical, but one creates brown rot and the other white rot.

Fomes fomentarius Tinder fungus or hoof fungus Polyporaceae

Edibility: Not edible.

Habitat: Perennial, single or shelving on dead or living hardwood trees, including alder, birch, maple and poplar; continues to fruit on dead and dying trees. Parasitic & saprobic. Recorded: 10.17.2013.

Field features: Growing hoof-like on dead or living hardwoods – alder, birch, maple, poplar. If the tree is living, then often in wounds.

Notes: In Europe, before matches were invented, this fungus was ground to a powder and used in tinderboxes; it has also been used for cauterizing wounds. This is one of the bracket fungi found among the possessions of Otzi the Iceman, a 5000-year old man whose body was preserved in a glacier in the Ötztal Alps on the border between Austria and Italy. Otzi likely was carrying this material to help light a fire at day's end. *Fomes* comes from Latin and means 'tinder'; *fomentarius* translates to 'used for tinder'.



A. Farr

Ganoderma applanatum Artist's conk Ganodermataceae

Edibility: Possible, if you also eat wood; sturdy specimens can be made into stools.

Habitat: Perennial, dead standing trees, stumps, and living trees of numerous hardwood genera, also common on conifers in Pacific Northwest but rarely on conifers elsewhere. Parasitic & saprobic. Recorded: 10.17.2013.

Field features: Hard, unvarnished and lumpy brown to grayish black upper surface, underside of fine whitish pores that turn instantly brown when scratched.

Notes: Because the brown staining is permanent, it provides a surface for leaving long-lasting messages in the woods – perhaps not the best place for graffiti. A large conk can produce 5 trillion spores annually, which can colour the nearby area cocoa brown, including the top of any cap below. Creates white rot.



Upper surface with a dusting of 'cocoa' spores; underside with fine brown scratch marks
(A. Farr)

Fruiting bodies are usually 12-15 cm across, but the species' long life and quiet determination can yield a breadth of 75 cm. The literal translation of *Ganoderma* is shining skin, from the Greek *Ganos* 'brightness' or 'shining' and *derma* meaning 'skin'. Not all *Ganoderma* fungi have particularly bright, shiny surfaces. *Applanatum* means of a 'flattened (planar) shape'.

Ganoderma brownii No common name Ganodermataceae

Edibility: As with artist's conk, not tempting.

Habitat: Perennial on dead standing trees, stumps & living hardwood trees (red alder at Brookswood). Parasitic & saprobic, causing white rot. Recorded: 9.20.2014.



C. Bunnell

Field features: Similar to artist's conk, but **finely tomentose & yellowish at the growing margin** (overgrown with algae in photo), shows greater **vertical development**, shallow to deeply **grooved, reddish to grayish brown above, pore surface yellow** and does not seem to achieve the size of the larger artist's conks. Up to 20 cm x 10 cm x 5 cm, stemless, flattened horizontally to hoof-shaped. The

most consistent difference is larger spores than *Ganoderma applanatum*.

Notes: Stains like *G. applanatum*. The literal translation of *Ganoderma* is 'shining skin', from the Greek *ganos* 'brightness' or 'shining' and *derma* meaning 'skin'; the species is named after V.S. Brown.

Trametes versicolor Turkey-tail fungus Polyporaceae

Edibility: Not edible.

Habitat: Not perennial, but **can overwinter**. In groups, **rows, tiers, shelving masses, or overlapping clusters on logs, stumps and fallen branches of dead hardwoods**; sometimes also in wounds on living trees, **rarely on conifers**. Saprobic, sometimes a weak parasite. Recorded: 3.11.2014.

Field features: **Thin leathery bracket-like or shelf-like clustered caps that are strongly zoned with narrow concentric bands of contrasting colours**, hairy zones usually alternating with silky-smooth ones; common on hardwood logs, stumps and branches. False turkey tails and other *Stereum* species do *not* have pores.



Turkey tail upper side with algae and lower side showing pores (A. Farr)

Notes: White rot. *Trametes* comes from the prefix *tram* which means 'thin', referring to how thin the fruiting bodies are in cross section. *Versicolor* means 'of several colours', and is perfectly apt given the variability of colouring from specimen to specimen and the presence of several colour bands on the upper surface of a single fruiting body. Older specimens, such as that shown, can have zones with green algae growing on them, forming a green band and adding to the spectrum of colour. Close look-alike, false turkey-tail (p. 31) has no pores.

Tyromyces chioneus White cheese polypore Polyporaceae

Edibility: No, I wonder who tried.

Habitat: Annual, single or 2 to 3 specimens together, on **dead wood of hardwoods**; summer to fall. **Saprobic** causing white rot. Recorded: 8.26.2014.

Field features: Decidedly boring – **greyish white cap** and rather **soggy when fresh** (drips when squeezed). Cap up to 12 cm across and 8 cm deep, convex, **semicircular to kidney-shaped**; **very finely velvety at first, becoming bald** and, in old age, developing a crusty surface that becomes wrinkled or shriveled; pore surface similar in colour, does not bruise easily; **stem absent**. **Slightly fragrant odor when fresh.**

Notes: *Tyromyces* from the Greek *tyro* meaning 'cheese' and *myces* meaning 'fungus'; *chioneus* means 'snow white' referring to its colour.



C. Bunnell

4.5 Crust and parchment fungi (Stearaceae & friends)

The common feature of this diverse group is an unspecialized spore-bearing surface – smooth, wrinkled, veined or warty, but lacking a layer of tubes or pores. Often closely appressed to a woody surface or resupinate.

Peniophora aurantiaca no English common name Peniophoraceae

Edibility: Unknown, not worth trying.

Habitat: Singly to mats on **dead wood**; dead stems, branches and small twigs; associated with white rot; primarily on **alder and willow, generally perennial**. Saprobic. Recorded: 11.10.2013.

Field features: **Resupinate growth on alder and willow**, orange-red to pale **orange fruiting body**, **distinct gray-whitish border** that is fibrillose in young specimens.

Notes: Stumped about the etymology: *penio* from Latin meaning 'tail' and *phora* meaning 'bearing'; *aurantiaca* means 'orange' so makes more sense. One of the fungi moved about by mountain pine beetle, also one of the species parasitized by *Tremella mesenterica*.



M. Beug

Phlebia radiata Wrinkled crust or Radiating Phlebia Meruliaceae

Edibility: Inedible.

Habitat: **Begins singly, aggregating to mats** on **dead hardwood**, more rarely conifer wood, usually on the bark, on standing or fallen trunks and branches or stumps in **spring, summer, fall, often winter**. Saprobic, producing white rot. Recorded: 10.24.2013.

Field features: **Orange to pink crust** fungus on the **dead wood** of hardwoods and conifers. Wrinkled surface in which the **wrinkles radiate outward**, more or less, from a central location. Begin as circular bodies 1-3 cm sometimes with **hairy margins**, but aggregate into mats 10 cm or more across.

Notes: Does not develop pores, cap structure or even (usually) a folded-over edge. *Phlebia* is from the Latin meaning 'a vein', and the veins or wrinkles do, indeed, radiate from the centre.



A. Farr

Phlebia tremellosa Gelatinous woodcrust or Jelly rot Meruliaceae

Edibility: Inedible.

Habitat: **Alone to gregarious**, sometimes in overlapping clusters primarily on the **dead wood of hardwoods** but **also conifer wood**, causing **white rot**. **Annual; late spring, summer and fall** (can over winter in warmer climates). Saprobic. Recorded: 10.24.2013.

Field features: A **flat crust fungus** with just enough cap-making oomph to fold over a **whitish, hairy upper edge**. 3-10 cm across, **irregularly shaped, no stem**; ~5 mm thick. **Pore-bearing surface** translucent, **gelatinous, orangish to pinkish** with a **network of radiating folds, ridges, and crossveins**.

Notes: *Phlebia* means 'veins'; *tremellosa* means 'trembling'. The network of radiating and cross-veined folds and ridges on the fertile surface of *Phlebia* species is not a tube layer as in the true polypores. In polypores, basidia cover just the lining of the tubes; in *Phlebia*, basidia cover the entire surface of the pore-like layer.



Upper surface & pore-bearing surface (A. Farr)

Stereopsis humphreyi no English common name Podoscyphaceae

Edibility: Unknown (relatively rare; also unappealing).

Habitat: **Alone to gregarious** on mossy **needle beds, cones, twigs**, fern fronds and mosses in **coniferous forest** during **fall**. Saprobic. Recorded: 11.20.2013.

Field features: Cap 1-3 cm across, **white**, dry, **kidney- to funnel-shaped**, often with **wavy margins**; **underside** or spore-bearing surface **smooth to wrinkled, creamy white**; **stem upright & lateral**, velvety.

Notes: Considered a rare species and largely limited to 'hyper-maritime' conditions. *Stereopsis* is from the Greek *stereo* meaning 'solid' and *opsis* meaning 'appearance', or impression of depth. Unclear what inspired the name. *Humphreyi* is likely after Dr. Clarence John Humphrey (1882-1970), a mycologist specializing in wood-destroying fungi.



C. Bunnell

Stereum hirsutum Hairy parchment or Hairy curtain crust Stearaceae

Edibility: Tough, leathery and tasteless.

Habitat: **Annual or short-lived perennial** (mycelia live longer); fruiting bodies may be **visible in any month** in **tiers and overlapping shelves** on **dead hardwood** stems, stumps, branches, **less often** on **conifer wood**. Saprobic, producing white rot. Recorded: 10.24.2013.

Field Features: No stalk. Resupinate (crust-like) when young, forming thin, **leathery, overlapping shelves** at maturity that **may fuse together, wavy, upper surface hairy** (smoother with age), **variably banded** orange-brown to yellow-brown to greyish-brown; **lower fertile surface smooth, orange-buff to pale-buff**, usually without distinct zones.

Notes: The specific name *hirsutum* means hairy. The common name Hairy curtain crust reflects the rippled form of edges of the fruiting bodies, which look like partly-drawn curtains when closely packed. *S. hirsutum* is a pathogen or parasite that is itself parasitized by *Tremella aurantia*, a jelly fungus.



Stereum hirsutum parasitized by jelly fungus (C. Bunnell)

Stereum ostrea False turkey-tail or Golden curtain crust Stearaceae

Edibility: Too thin & tough to be edible.

Habitat: Annual, but persistent over winter. **Groups, rows, fused masses or dense overlapping clusters on** sticks, branches, logs and stumps of **hardwoods**, occasionally conifers. Often on the same piece of wood as the jelly fungus *Tremella*. Pathogenic and saprobic once the tree is dead. Recorded: 11.03.2013.

Field features: A **bracket fungus without pores**. Thin, leathery and pliant when moist; rigid when dry. **Oyster-shaped cap** can fuse laterally into rows, surface **zoned concentrically with whitish to brownish or grayish matted hairs** (smooth near margins & wearing away to reveal a brown cap cuticle). Creates white rot.

Notes: *Stereum* from the Greek *stereos* meaning 'hard or stiff'; *ostrea* from Latin for 'oyster' describing its shape. The common name Golden curtain rust comes from the older stages when in rows and the hairs have worn away to reveal a golden- to chestnut-brown cuticle. Taxonomy of *Stereum* is complicated by interbreeding between morphological species.



Upper side (A. Khitsun)
Under side shows no pores (A. Farr)



4.6 Coral and club fungi (Clavariaceae)

Coral fungi are usually shaped like oceanic coral, but can also be shaped like forks, worms or clubs. They are rubbery and sometimes are brightly coloured. The upper part of the "clubs", or tips of the branches, bears the spores. They are delightful to see and wondrous frustrating to identify.

Clavicornia pyxidata Crown-tipped coral Clavariaceae

Edibility: **Uncertain.** Some say edible, others report *Clavicornia* as having a "cathartic" effect, causing diarrhea and mild vomiting in some sensitive people.

Habitat: **Clumps on decaying logs** (mostly hardwoods, but also conifers), **summer into fall**. Saprobic. Recorded: 10.17.2013.

Field features: A **crown or cuplike depression surrounded by a circle of points at branch ends, branches often candelabra-like in structure**. 3-6 cm wide, 3-12 cm tall, short stem **usually white, cream or yellowish**, darkening to tan or becoming pinkish with age.

Notes: Latin terms comprising the name are *clava* meaning 'club', *corona* meaning 'wreath or crown' referring to the branch ends; that is emphasized by *pyxidata* meaning 'small vases'. One of the few coral fungi to grow on wood. *Artomyces pyxidatus* is a synonym.



A. Farr

Clavulina castaneopes Bristly coral Clavulinaceae

Edibility: Unknown; most coral fungi are edible, but not worth it.

Habitat: **Often singly, on bark, wood or ligneous duff** under forest cover (var. *lignicola*) in **fall**. Mycorrhizal. Recorded: 11.11.2013.

Field features: 2 to 7 cm tall. **Base of stem covered with brown to reddish brown, upward pointing bristles; branches relatively few**, often palmate and **grooved or ridged** ('wrinkled'), pale when fresh becoming more dull tan or leaden grey with drying.

Notes: *Clavulina* is from the Latin *clava* meaning 'club'; the Latin *castaneus* means 'chestnut coloured' referring to the bristles on the stem base. NatureServe reports 22 records in the PNW; ranked as T3 (vulnerable): 4 out of 22 occurrences in protected sites; outside protected areas susceptible to logging activities, such as soil compaction. Rarely reported from BC.



A. Farr

Clavulina cinerea Ashy coral mushroom or Gray coral Clavulinaceae

Edibility: Edible, some consider it insipid, haven't tried.

Habitat: Single to groups on ground in mixed woods or under conifers.

Summer to fall. Recorded: 10.17.23.

Field features: Differs slightly from crested coral by usually being darker and more profusely branched from a short base, appearing tangled. 2-11 cm wide, 2-11 cm tall.

Notes: *Clavulina* is from the Latin *clava* meaning 'club'; Latin *ciner* or *cinis* meaning 'ashes'. It and *C. cristata* are often parasitized from the base upwards by *Helminthosphaeria clavariarum* (another fungus), rendering both gray to black. Some fungus to the right is gray, apparently from the base up. The conundrum: is it a parasitized crested coral or an ashy coral mushroom? Usually only the microscope knows for sure, though tiny black fruiting bodies of the parasitizing mushroom can be seen with a hand lens.



A. Farr

Clavulina cristata Crested coral Clavulinaceae

Edibility: Much like escargot, many edible coral fungi taste like what you cook them in; some folks rate them highly, others do not.

Habitat: Single or scattered on ground in fields or under hardwoods and conifers in summer & fall (overwinters some years). Most workers argue for mycorrhizal, a few for saprobic. Recorded: 10.17.2013.

Field features: Highly variable: 2.5-8 cm high, form ranges from no, to few, to irregularly and densely branched tufts with jagged, fringed, or crested tips; colour usually white but sometimes tinged, grey, buff, yellowish or pinkish.

Notes: *Clavulina* is from the Latin *clava* meaning 'club'; *cristata* means crested referring to the sharply crested tips. Both *C. cristata* and *C. cinerea* are so variable that they can be impossible to identify without a microscope and suffer the conundrum noted under *C. cinerea*.



A. Farr

The variability within *Clavulina* suggests a complex of species of similar appearance, so it is simplest to name the near white, pointy corals as the *Clavulina cristata* group.



Variety within the *Clavulina cristata* group (all A. Farr)

Ramaria are much like *Clavulina* and its allies after 3 or 4 cups of coffee – the branching is typically more frenetic and they happily adapt more colours.

Ramaria concolor forma concolor no common name Gomphaceae (Ramariaceae)

Edibility: Unknown, **best avoided**. Several *Ramaria* cause stomach upsets.

Habitat: Single to tufts on rotting wood (both hardwood and conifer).

Summer to early **fall**. Mycorrhizal & saprobic. Recorded: 10.12.2013.

Field features: 14 cm high (10 cm wide), often branched from base, upper branches erect, rounded in cross section, single or bifid near tips, pale brownish salmon to tan, often tinged violet. Arising from a small, white, tomentose to felty basal mycelial mat, usually quickly becoming involved in a copious tangle of stout white, ropy rhizomorphic strands.

Notes: *Ramaria* is from Latin *ramus* meaning 'branch'; *concolor* means 'of the same colour', reflecting even colour over most of the fungus. Most *Ramaria* are assumed to be mycorrhizal and fond of western hemlock; the rhizomorphs suggest this species can burrow into dead wood that may be buried.



C. Bunnell

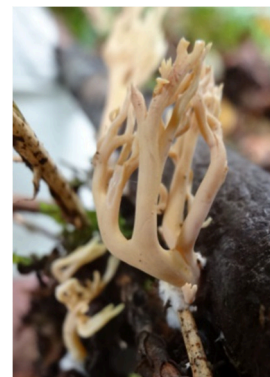
Ramaria cystidiophora var citronella Lemon fuzzy-foot Gomphaceae (Ramariaceae)

Edibility: **Probably** edible; not tried.

Habitat: Under fallen **conifers** or in **deep humus** in **fall**. Saprobic on humus and **well-rotted wood**. Recorded: 10.12.2013.

Field features: 5-17+ cm (taller than broad, **base single or semifused** from several stems; **branch axils** narrowly **U-shaped** and usually **dichotomous**; branches **yellowish white**, paler near tips; forked or crested tips; **base** covered with a well-defined **white tomentum**; smell of lemon blossoms.

Notes: *Ramaria* is from Latin *ramus* meaning 'branch'; *citronella* means 'like citrus'. Teasing apart *cystidiophora* yields 'carrying private bladders', but we aren't brave enough to guess why. The Beany fuzzy-foot (*Ramaria cystidiophora* var *fabiolens*) smells like string beans.



C. Bunnell

Ramaria rubella no English common name Gomphaceae (Ramariaceae)

Edibility: **Uncertain**. No *Ramaria* are dangerously poisonous, but only the larger fleshy ones are potentially worth collecting. Even the 'edible' forms have a **laxative** effect on some individuals.

Habitat: Growing from **wood of conifers or hardwoods** in **summer & fall**. Saprobic. Recorded: 10.17.2013.

Field features: Up to 10 cm tall, **stem short** or absent, branches **numerous, erect to somewhat lax** yielding irregular height; ruddy, **rose** to purple rose.

Notes: *Ramaria* is from Latin *ramus* meaning 'branch'; *rubella* is derived from Latin, meaning 'little red'. The forms of *Ramaria rubella* are indistinguishable without chemical tests or microscopic examination.



A. Farr

4.7 Jelly fungi (Tremellales and friends)

Jelly fungi are small to medium sized fungi with gelatinous walls that are rubbery when fresh. Various shaped, but most often lobed, convoluted or blob like. Like the coral fungi, they display a startling array of colours. They are called jelly fungus because their often irregularly shaped fruiting body is, or appears to be, the consistency of jelly. Actually, most are somewhat rubbery and gelatinous. When dried, they become hard and shriveled; when exposed to water, they return to their original form.

Calocera cornea Club-like tuning fork or Small stag horn Dacrymycetaceae

Edibility: Unknown, but who would try?

Habitat: On both **dead conifer and hardwoods**, often on branches **without bark**, often **after heavy rains in summer or fall**. Saprobic, producing brown rot. Recorded: 10.12.2013.

Field features: **Tiny** (1-1.5 cm tall, 1 mm thick at base), **yellow** to yellow-orange, **upright** fruiting bodies that are **cylindric to awl-shaped**, single or several fused to a common base and **rarely forking**, despite the common name; viscid when moist, **stiff-gelatinous**.

Notes: As a prefix, *Calo* means 'beautiful', while *cera* is from ancient Greek meaning 'like wax' – yielding 'beautiful and waxy', which is apt. *Cornea* is derived from Latin and means 'horn'. It is the microscopic basidia, however, that are forked, and antler- or horn-like. Can be confused with several club fungi, but is much less brittle.



A. Farr

Dacrymyces stillatus Common jellyspot Dacrymycetaceae

Edibility: Not palatable and too small to be of culinary value.

Habitat: **Gregarious or in large groups on conifer wood** (sometimes hardwood), with or without bark, fruiting **whenever moisture is available**. Saprobic, yielding brown rot. Recorded: 10.12.2013.

Field features: Common name says it all – **small spots of yellow 'jelly'** only **1-8 mm broad**, several **may fuse, cushion shaped**, slightly flattened, the surface knobby, **but not truly lobed**, gelatinous; colour variable, **yellow or orange** when fresh, browning or becoming translucent with age. Dries to a rusty-brown, inconspicuous crust on the surface but revives with moisture.

Notes: *Dacry* means 'a tear (as in weeping)' and *myces* means 'fungus' while *stillatus* means 'poured or dripped'; thus we get teardrop-like fungi looking as though they have been dripped on the substrate. Frequent on human construction – fence posts, rails, decking, garden furniture.



C. Bunnell

The more amorphous Tremellaceae are near impossible to distinguish confidently without a microscope. There are some very compelling clues however (**bold** below). All *Tremella* appear to parasitize other fungi and are sometimes choosy about which other species. You often can identify them by noting what they are feeding on.

Tremella aurantia group Witch's butter or Golden ear Tremellaceae

Edibility: Edible, but without flavor.

Habitat: A parasite of fruiting bodies of the bracket fungus *Stereum hirsutum* group; reported on **red alder** and less commonly conifer wood. Inconspicuous when a dry crust, fruiting much of the year when wet. Recorded: 10.24.2013.

Field features: Gelatinous fruiting bodies 2-10 cm broad, consisting of **clustered convoluted folds with blunt margins; yellow to yellowish-orange**, shiny when wet, otherwise dull; drying to a stiff, hard crust, reviving after periods of moisture; odor and taste not distinctive.

Notes: *Tremella* means 'trembling' – a reference to the wobbly-jelly-like structure of fungi within this group; *aurantia* means 'orange' – referring to the colour of the fruiting body. *Tremella aurantia* incorporate hyphae of *Stereum* into their own bodies (visible microscopically). Near impossible to distinguish from *T. encephala* without electrophoresis unless its host is identified. *T. encephala* feeds on *Stereum sanguinolentum*.



Tremella aurantia feeding on *Stereum hirsutum* (A. Farr)

Tremella mesenterica Witch's butter or Yellow brain fungus Tremellaceae

Edibility: Harmless, but mostly water; sometimes used in soups, tastes like what you cook with it.

Habitat: **Solitary or several** on **dead hardwood sticks and branches attacked by** the crust fungus *Peniophora*, but sometimes on conifers. Parasitic on *Peniophora*. Recorded: 11.04.2013.

Field features: **Convoluted jelly-like fruiting body**; clear **yellow** to golden-yellow becoming **paler under prolonged rain**, usually with **Peniophora crust on hardwoods**. Brain-like when fresh, young, and moist, later with irregular clustered folds consisting of several distorted lobes.



On red alder branches (A. Farr)

Notes: Colour ranges widely from almost colourless to white to light yellow, yellow, yellow-orange, or orange. Shrinks dramatically with drying to an inconspicuous reddish-orange to reddish-brown film on the substrate. Without microscopy, told from *T. aurantia* only by which fungus they are feeding on. Very little or none of the *Peniophora* may be visible if *Tremella mesenterica* has fully colonized all of the infected surface of the wood; it may look as though Yellow Brain is feeding directly on the host wood. *Mesenterica* is derived from two ancient Greek words, *meso* meaning 'middle' and *enteron* meaning 'intestine', suggesting that this fungus sometimes looks more like a middle intestine than a brain.

4.8 Puffballs and earthstars (former Lycoperdales)

This is a morphological grouping of any fungus that looks like a ball and tends to disperse its spores as a puff. Earthstars have an additional 'layer of skin' surrounding the 'ball' that splits into a star-like form and permits a talent most fungi lack – they can move.

Lycoperdon perlatum Gem-studded puffball Lycoperdaceae

Edibility: Yes, but taste like what you fry them in. **Avoid** once flesh begins to turn yellow or cap turns brownish.

Habitat: Growing **alone to clustered** on **soil or decayed wood in woods** under hardwoods or conifers, but also common along **roadsides** and in **urban lawns, summer through fall**. Saprobic. Recorded: 10.17.2013.

Field features: Shaped like an **inverted pear** or top, 2.5-7 cm wide, **whitish** fruiting body **with** slender, short, cone-shaped **warts** interspersed with smaller **spines or granules** which fall off with age, leaving scars in a mesh-like pattern. Develops a central perforation through which spores are liberated by rain or wind.

Notes: *Lycoperdon* translates as 'wolf farts'. No idea who the expert on wolf flatulence was; for most of us, it is not a particularly helpful diagnostic feature. *Perlatum* means 'widespread' likely referring to its range in habitat. It is more helpful to think of it as referring to the pearly pimples of young puffballs. The lead-coloured puffball (*Bovista plumbea*) is common nearby, but has a smooth covering.



Young & mature example about 2 weeks later (A. Farr).

4.9 Cup fungi (Pezizales and look-alikes)

The cup fungi collect together diverse species shaped like a cup, saucer or goblet. Spores are formed on the inner surface of the fruiting body. The cup shape serves to focus raindrops into splashing spores out of the cup, or enable wind currents to blow the spores out. Their variety is startling, from tiny white 'daisies' to a bit of discarded orange peel and the startling green elfcup.

Chlorociboria aeruginosa Green elfcup in Britain Helotiaceae

Edibility: Much too small to fret about.

Habitat: **Single to gregarious** on **decayed, bark-free dead hardwood**; **most common in fall**, but also spring through early winter. **Saprobic**. Recorded: 9:10.2012.

Field features: **Tiny**, up to 1 cm across; **cup-shaped** at first, may become flattened or disc-shaped, edges rolled inwards; **stem tiny**, <1 cm tall, **central** or somewhat off-center; smooth or slightly wrinkled; **uniformly blue to blue-green**. The blue-green stained wood is visible all year round; fruiting bodies are irregular.

Notes: Stained wood can command a higher price, particularly for use in furniture. *Chloro* means green, *ciboria* is Latin for 'drinking cups'; *aeruginosa* is Latin for verdigris – the blue-green stain on oxidized copper.



A. Farr

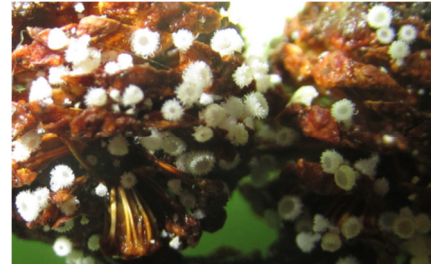
Lachnum virgineum Stalked hairy fairy cup or White daisy cup Hyaloscyphaceae

Edibility: Apparently not, but too small to try.

Habitat: Scattered or in large groups on dead wood, twigs, and plant stems (blackberry canes), alder cones. Fruit throughout the year, but especially in the spring. Saprobic. Recorded: 3.07.2014.

Field features: Minute white cup & tiny stem both thickly set on exterior and margin with white hairs; on dead branches, twigs, canes, wood, cones and plant stems.

Notes: Easy to overlook, but decidedly 'cute' or 'pretty' through a hand lens. Etymology unknown.



On red alder cones (A. Farr)

4.10 Flask fungi (Pyrenomycetes)

Pyrenomycetes have perithecial ascomata (flask-shaped fruiting bodies) but the name appears to derive from Greek meaning 'the stone of a fruit', referring to the usually somewhat tough texture of their tissue. They are economically and ecologically important because they contain the 'fruit flies' or 'genetic assistants' of the fungal world as well as some destructive pathogens (e.g., Dutch elm disease and chestnut blight).

Xylaria hypoxylon Candlesnuff fungus Xylariaceae

Edibility: Unknown, but too tough to be of value.

Habitat: Scattered to densely gregarious or clustered on rotting wood (logs, stumps, buried sticks). Fruiting throughout the year in southern BC. Saprobic producing white rot. Recorded: 10.17.2013.

Field features: Growing on wood. Erect, black, tough strap-like or antler-like fruiting body, some dusted with white powder in upper part. When found in the spring, the entire ascocarp may be white to grayish and powdery as a result of the formation of asexual spores. Later in the season, mature forms are blackish and minutely pimply. The small bumps are the locations of sexual spore-producing structures, the 'flasks', called perithecia. These are embedded in a tough white flesh called the stroma.



Asexual spores on left, pimply sexually reproducing form on the right (A. Farr)



Notes: All fungi can reproduce asexually through fragmentation of hyphae. Many build sexual spores through meiosis. This is one of the species producing both sexual spores and asexual spores through mitosis, thus cloning itself. Well before genetics allowed us to peek inside, these two forms were designated as separate species. *Xylaria* is from Greek meaning 'almost ligneous or wooden' because of the texture; *hypoxylon* translates as 'under wood'. Broadly similar to dead man's fingers which is much thicker with a blunt tip on the fruiting body. The 'species' is extremely variable and is likely several species masquerading as one.

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6 Glossary

There are almost as many terms describing fungi as there are fungi. We have limited our descriptions to the more common ones.

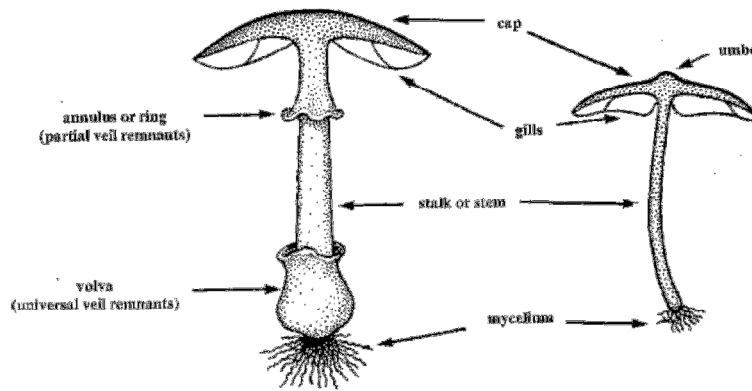


Figure 5 Common terms for the 'mushroom' shape. The figure on page 5 provides more detail.

Annulus: ring or collar or tissue on the stalk formed by a ruptured veil (Figure 5 above)

Appendiculate: margin of the cap is fringed or adorned with veil remnants of other tissue.

Basal bulb: base of the stalk is swollen into a bulb (see *Amanita*)

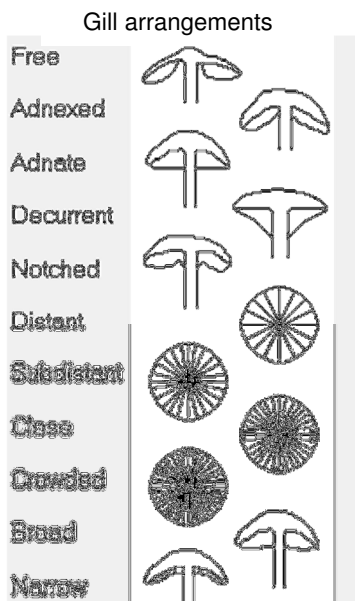
Cortina: a partial veil with a silky or cobwebby texture

Dichotomous: forking or dividing into pairs

Floccose: woolly or cottony; dry or loosely arranged

Fibrillose: covered with delicate, hair-like fibres

Gills:



Cortina of silvery-violet Cortinarius (C. Bunnell)



Hygrocybe have arcuate or bowed gills – higher in the centre than either edge (Righteous red waxy cap; A. Farr)



Decurrent, dichotomously forked gills (False chanterelle, A. Farr)

Hygrophanous: cap changes colour markedly as it loses moisture (is picked)
Pubescent: minutely hairy or downy
Resupinate: lying flat on the surface (without a stalk or well-defined cap)
Rhizomorphs: a rootlike aggregation of hyphae in some fungi (e.g., *Armillaria mellea* group)
Ring: see annulus (Figure 5 above)
Scurfy: having a loose scaly crust
Striae: fine lines
Striate: marked by fine lines
Tomentose: covered with soft hairs
Tomentum: a covering of fine, soft hairs or short, soft pubescence
Umbo: a knob or bump at the center of the cap (Figure 5)
Umbonate: having an umbo



Many *Mycena* have a striate cap with umbo (A. Farr)

Veil: a protective tissue; partial veils extend from the stem to cap edge and may give rise to a stem ring or fragments attached to the stem or cap edge; a universal veil is a temporary membranous tissue that fully envelops immature fruiting bodies of some gilled mushrooms. These remnants include the volva, or cup-like structure at the base of the stalk or stipe, and patches or "warts" on top of the cap.



Stropharia (2 on left) have a partial veil from the stem to the margin of the cap. It breaks up leaving floccose fragments on the stem and an appendiculate cap of fringed fragments. *Amanita* (right) have a universal veil which leaves fragments on the stem, including a volva, and the entire surface of the cap (left to right: Mushroom Observer, A. Farr, A. Farr)

Viscid: slimy or sticky to the touch, at least when wet
Volva: remnants of a universal veil (Figure 5)

Back cover illustrations:

Top: Righteous red waxy cap (*Hygrocybe coccinea*) Middle: Rough-skinned newt (*Taricha granulosa*) sneaking past a candlesnuff fungus (*Xylaria hypoxylon*) Bottom: Witch's butter (*Tremella aurantia*) parasitizing *Stereum*. Waxy cap and candlesnuff photos by Corey Bunnell. Witch's butter by Anthea Farr. All at Brooksdale.

