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# Handbook to Additional Fungal Species of Special Concern in the Northwest Forest Plan

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and Tina Dreisbach



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## Cover

The mushroom genus *Gomphus* is represented by four species in the Pacific Northwest. *Gomphus* is placed in the family Gomphaceae and is typified by often gregarious to caespitose habit, gross scales on the cap surface, and wrinkled hymenium. *Gomphus bonarii* (Morse) Singer, a strategy 3 fungus species from table C-3 in the record of decision, is presented on the cover. Locally abundant and widespread throughout northern California, Oregon, and Washington. Photo courtesy of D. Arora.

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U.S. Department of Agriculture,  
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## Abstract

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This handbook is a companion to the *Handbook to Strategy 1 Fungal Species in the Northwest Forest Plan*, Gen. Tech. Rep. PNW-GTR-476, published in October 1999. It includes 73 record-of-decision (ROD)-listed fungal species not contained in the first handbook, as well as updated site, field, and collecting forms; an expanded set of artificial keys to all fungal species from both handbooks; and an updated, partially illustrated glossary. The main purpose of this handbook is to help facilitate the survey, collection, and handling of potential ROD-listed fungal species by USDA Forest Service and USDI Bureau of Land Management employees. Each species is represented by a condensed description, a set of distinguishing features, and information on substrate, habitat, and seasonality. We also present a list of known sites within the range of the northern spotted owl, a distribution map, and additional references to introduce the available literature on a particular species.

Keywords: Mycology, mushrooms, sequestrate fungi, truffles, biodiversity, monitoring, rare fungi, forest ecology.

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## Introduction

### Purpose of This Handbook

This handbook is a companion to the *Handbook to Strategy 1 Fungal Species in the Northwest Forest Plan* PNW-GTR-476 published in October 1999. It includes 73 record-of-decision (ROD)-listed fungal species not contained in the first handbook, as well as updated site, field, and collecting forms; an expanded set of artificial keys to all fungal species from both handbooks; and an updated partially illustrated glossary. The main purpose of this handbook is to help facilitate the survey, collection, and handling of potential ROD-listed fungal species by USDA Forest Service and USDI Bureau of Land Management employees.

### Important Revisions of the ROD That Pertain to Fungi

In January 2001, amendments to the “survey and manage,” protection buffer, and other mitigation measures, standards, and guidelines were published in which ROD species were placed in categories (A, B, C, D, E, and F) rather than in the original strategies. Table 1 lists the fungal species, their original ROD strategies, and their new categories. Following is a brief explanation of the categories, excerpted from the above-mentioned document:

**Category A.** Rare, predisturbance surveys practical

Species are included in category A when (1) there is a high concern for persistence, (2) the species occurs rarely or is sparsely distributed within the range of the Northwest Forest Plan, (3) all known sites or populations are likely to be necessary to provide reasonable assurance of persistence, and (4) predisturbance surveys are practical. Only one fungus species, *Bridgeoporus nobilissimus*, is placed in category A.

**Category B.** Rare, predisturbance surveys not practical

Species are included in category B when (1) there is a high concern for persistence, (2) the species occurs rarely or is sparsely distributed within the range of the Northwest Forest Plan, (3) all known sites or populations are likely to be necessary to provide reasonable assurance of persistence, and (4) predisturbance surveys are not practical. The majority of fungi are placed in category B.

**Category C.** Uncommon, predisturbance surveys practical

Species are included in category C when (1) there is not a high concern for persistence, (2) it is likely that not all known sites or populations throughout the species' range in the Northwest Forest Plan area are necessary for reasonable assurance of persistence, (3) the species is uncommon, as opposed to rare, and (4) predisturbance surveys are practical. No fungal species are placed in category C.

**Category D.** Uncommon, predisturbance surveys not practical or not necessary

Species are included in category D when (1) there is not a high concern for persistence, (2) it is likely that not all known sites or populations throughout the species' range in the Northwest Forest Plan area are necessary for reasonable assurance of persistence, (3) the species is uncommon, as opposed to rare, and (4) predisturbance surveys are not practical or necessary. Surveys of habitat across the landscape are likely to be more effective at finding sites needed for long-term persistence than focusing in areas proposed for projects. Ten species of fungi are placed in category D.

Category E. Rare, status undetermined

Species are included in category E when (1) the number of known sites indicates the species is rare, and (2) information is insufficient to determine whether survey and manage basic criteria are met, or to determine what management is needed for a reasonable assurance of the species' persistence. Three fungal species are placed in category E.

Category F. Uncommon or concern for persistence unknown, status undetermined

Species are included in category F when (1) the total number of known sites indicates the species is uncommon rather than rare, and (2) information is insufficient to determine whether survey and manage basic criteria are met, or to determine what management is needed for a reasonable assurance of the species' persistence. Six fungal species are placed in category F.

## Keys and Glossary

A revised key to all ROD fungal species is included in this handbook. The numbers in parentheses after species' names in the key designate the page number of each species' description; underlined numbers indicate that the species' description is included in the first handbook, and nonunderlined numbers refer to the page of our current handbook of the species' description. An updated glossary, including terminology used in describing the taxonomic features of fungi, is included.

## Collection Sheets

Updated collection sheets are included in appendix 2. Use the site and collection forms provided when submitting fungal collections to the survey and manage team.

**Table 1—Fungal species included in survey and manage standards and guidelines (January 2001)**

ROD species name	Preferred name	Original strategy	New category	Handbook volume
<i>Albatrellus avellaneus</i>	<i>Albatrellus avellaneus</i>	1,3	B	1
<i>Albatrellus caeruleoporus</i>	<i>Albatrellus caeruleoporus</i>	1,3	B	1
<i>Albatrellus ellisii</i>	<i>Albatrellus ellisii</i>	3	B	2
<i>Albatrellus flettii</i>	<i>Albatrellus flettii</i>	3	B	2
<i>Aleuria rhenana</i>	<i>Sowerbyella rhenana</i>	1,3	B	1
<i>Aleurodiscus farlowii</i>	<i>Acanthophysium farlowii</i>	1,3	B	1
<i>Alpova alexsmithii</i>	<i>Alpova alexsmithii</i>	1,3	B	1
<i>Alpova olivaceotinctus</i>	<i>Alpova olivaceotinctus</i>	1,3	B	1
<i>Alpova</i> sp. nov. #Trappe 1966	<i>Fevansia aurantiaca</i>	1,3	B	1
<i>Alpova</i> sp. nov. #Trappe 9730	<i>Rhizopogon ellipsosporus</i>	1,3	B	1
<i>Arcangeliella crassa</i>	<i>Arcangeliella crassa</i>	1,3	B	1
<i>Arcangeliella lactarioides</i>	<i>Arcangeliella lactarioides</i>	1,3	B	1
<i>Arcangeliella</i> sp. nov. #Trappe 12359 & 12382	<i>Arcangeliella camphorata</i>	1,3	B	1
<i>Asterophora lycoperdoides</i>	<i>Asterophora lycoperdoides</i>	3	B	2
<i>Asterophora parasitica</i>	<i>Asterophora parasitica</i>	3	B	2
<i>Baeospora myriadohylla</i>	<i>Baeospora myriadohylla</i>	3	B	2
<i>Balsamia nigrens</i>	<i>Balsamia nigrens</i>	1,3	B	1
<i>Boletus haematinus</i>	<i>Boletus haematinus</i>	1,3	B	1
<i>Boletus piperatus</i>	<i>Chalciporus piperatus</i>	3	D	2
<i>Boletus pulcherrimus</i>	<i>Boletus pulcherrimus</i>	1,3	B	1

Table 1—Fungal species included in survey and manage standards and guidelines (January 2001) (continued)

ROD species name	Preferred name	Original strategy	New category	Handbook volume
<i>Bondarzewia montana</i>	<i>Bondarzewia mesenterica</i>	1,2,3	B	1
<i>Bryoglossum gracile</i>	<i>Bryoglossum gracile</i> <sup>1</sup>	1,3	B	1
<i>Cantharellus cibarius</i>	<i>Cantharellus formosus</i> gp. <sup>1</sup>	1,3	B	1
<i>Cantharellus subalbidus</i>	<i>Cantharellus subalbidus</i>	3,4	D	2
<i>Cantharellus tubaeformis</i>	<i>Craterellus tubaeformis</i>	3,4	D	2
<i>Catathelasma ventricosa</i>	<i>Catathelasma ventricosa</i>	3	B	2
<i>Chamonixia pacifica</i> sp. nov. #Trappe 12768	<i>Chamonixia caespitosa</i>	1,3	B	1
<i>Choiromyces alveolatus</i>	<i>Choiromyces alveolatus</i>	1,3	B	1
<i>Choiromyces venosus</i>	<i>Choiromyces venosus</i>	1,3	B	1
<i>Chroogomphus loculatus</i>	<i>Chroogomphus loculatus</i>	1,3	B	1
<i>Chrysomphalina grossula</i>	<i>Chrysomphalina grossula</i>	3	B	2
<i>Clavariadelphus ligula</i>	<i>Clavariadelphus ligula</i>	3,4	B	2
<i>Clavariadelphus pistillaris</i>	<i>Clavariadelphus occidentalis</i>	3,4	B	2
<i>Clavariadelphus sachalinensis</i>	<i>Clavariadelphus sachalinensis</i>	3,4	B	2
<i>Clavariadelphus subfastigiatus</i>	<i>Clavariadelphus subfastigiatus</i>	3,4	B	2
<i>Clavariadelphus truncatus</i>	<i>Clavariadelphus truncatus</i>	3,4	B	2
<i>Clavulina ornatipes</i>	<i>Clavulina castaneopes</i> v. <i>lignicola</i>	3,4	B	2
<i>Clitocybe senilis</i>	<i>Clitocybe senilis</i>	1,3	B	1
<i>Clitocybe subditopoda</i>	<i>Clitocybe subditopoda</i>	1,3	B	1
<i>Collybia bakerensis</i>	<i>Collybia bakerensis</i>	1,3	B	1
<i>Collybia racemosa</i>	<i>Collybia racemosa</i>	3	B	2
<i>Cordyceps capitata</i>	<i>Cordyceps capitata</i>	3	B	2
<i>Cordyceps ophioglossoides</i>	<i>Cordyceps ophioglossoides</i>	3	B	2
<i>Cortinarius azureus</i>	<i>Cortinarius barlowensis</i>	3	B	2
<i>Cortinarius boulderensis</i>	<i>Cortinarius boulderensis</i>	1,3	B	1
<i>Cortinarius canabarda</i>	<i>Cortinarius umidicola</i>	1,3	B	1
<i>Cortinarius cyanites</i>	<i>Cortinarius cyanites</i>	3	B	2
<i>Cortinarius magnivelatus</i>	<i>Cortinarius magnivelatus</i>	1,3	B	1
<i>Cortinarius olympianus</i>	<i>Cortinarius olympianus</i>	1,3	B	1
<i>Cortinarius speciosissimus</i>	<i>Cortinarius rainierensis</i>	1,3	B	1
<i>Cortinarius spilomius</i>	<i>Cortinarius depauperatus</i>	3	B	2
<i>Cortinarius tabularis</i>	<i>Cortinarius tabularis</i> <sup>2</sup>	3	B	2
<i>Cortinarius valgus</i>	<i>Cortinarius valgus</i>	3	B	2
<i>Cortinarius variipes</i>	<i>Cortinarius variipes</i>	1,3	B	1
<i>Cortinarius verrucisporus</i>	<i>Cortinarius verrucisporus</i>	1,3	B	1
<i>Cortinarius wiebeae</i>	<i>Cortinarius wiebeae</i>	1,3	B	1
<i>Cudonia monticola</i>	<i>Cudonia monticola</i>	3	B	2
<i>Cyphellostereum laeve</i>	<i>Cyphellostereum laeve</i>	3	E	2
<i>Dermocybe humboldtensis</i>	<i>Dermocybe humboldtensis</i>	1,3	B	1
<i>Destuntzia fusca</i>	<i>Destuntzia fusca</i>	1,3	B	1
<i>Destuntzia rubra</i>	<i>Destuntzia rubra</i>	1,3	B	1
<i>Dichostereum granulosum</i>	<i>Dichostereum boreale</i>	1,3	B	1
<i>Elaphomyces anthracinus</i>	<i>Elaphomyces anthracinus</i>	1,3	B	1
<i>Elaphomyces</i> sp. nov. #Trappe 1038	<i>Cystangium maculatam</i> <sup>1</sup>	1,3	N/A	1
<i>Elaphomyces subviscidus</i>	<i>Elaphomyces subviscidus</i>	1,3	B	1
<i>Endogone acrogena</i>	<i>Endogone acrogena</i>	1,3	B	1
<i>Endogone oregonensis</i>	<i>Endogone oregonensis</i>	1,3	B	1
<i>Fayodia gracilipes</i>	<i>Fayodia bisphaerigera</i>	3	B	2
<i>Galerina atkinsoniana</i>	<i>Galerina atkinsoniana</i>	3	E	2

Table 1—Fungal species included in survey and manage standards and guidelines (January 2001) (continued)

ROD species name	Preferred name	Original strategy	New category	Handbook volume
<i>Galerina cerina</i>	<i>Galerina cerina</i>	3	E	2
<i>Galerina heterocystis</i>	<i>Galerina heterocystis</i>	3	E	2
<i>Galerina sphagnicola</i>	<i>Galerina sphagnicola</i>	3	E	2
<i>Galerina vittiformis</i>	<i>Galerina vittaeformis</i>	3	E	2
<i>Gastroboletus imbellus</i>	<i>Gastroboletus imbellus</i>	1,3	B	1
<i>Gastroboletus ruber</i>	<i>Gastroboletus ruber</i>	1,3	B	1
<i>Gastroboletus</i> sp. nov. #Trappe 2897, 7515	<i>Gastroboletus vividus</i>	1,3	B	1
<i>Gastroboletus subalpinus</i>	<i>Gastroboletus subalpinus</i>	1,3	B	1
<i>Gastroboletus turbinatus</i>	<i>Gastroboletus turbinatus</i>	3	B	2
<i>Gastrosuillus</i> sp. nov. #Trappe 9608	<i>Gastrosuillus amaranthii</i>	1,3	F	1
<i>Gastrosuillus</i> sp. nov. #Trappe 7516	<i>Gastrosuillus umbrinus</i>	1,3	B	1
<i>Gautieria magnicellaris</i>	<i>Gautieria magnicellaris</i>	1,3	B	1
<i>Gautieria otthii</i>	<i>Gautieria otthii</i>	1,3	B	1
<i>Gelatinodiscus flavidus</i>	<i>Gelatinodiscus flavidus</i>	1,3	B	1
<i>Glomus radiatum</i>	<i>Glomus radiatum</i>	1,3	B	1
<i>Gomphus bonarii</i>	<i>Gomphus bonarii</i>	3	B	2
<i>Gomphus clavatus</i>	<i>Gomphus clavatus</i>	3	F	2
<i>Gomphus floccosus</i>	<i>Gomphus floccosus</i> <sup>3</sup>	3	D	2
<i>Gomphus kauffmanii</i>	<i>Gomphus kauffmanii</i>	3	B	2
<i>Gymnomyces</i> sp. nov. #Trappe 1690,1706,1710, 4703, 5052, 5576, 7545; <i>Martellia</i> sp. nov. #Trappe 311, 1700, 5903	<i>Gymnomyces abietis</i>	1,3	B	1
<i>Gymnopilus punctifolius</i>	<i>Gymnopilus punctifolius</i>	1,3	B	1
<i>Gyromitra californica</i>	<i>Gyromitra californica</i>	3,4	E	2
<i>Gyromitra esculenta</i>	<i>Gyromitra esculenta</i>	3,4	F	2
<i>Gyromitra infula</i>	<i>Gyromitra infula</i>	3,4	E	2
<i>Gyromitra melaleucooides</i>	<i>Gyromitra melaleucooides</i>	3,4	E	2
<i>Gyromitra montana</i> (syn. <i>G. gigas</i> )	<i>Gyromitra montana</i>	3,4	F	2
<i>Hebeloma olympianum</i>	<i>Hebeloma olympianum</i>	1,3	B	1
<i>Helvella compressa</i>	<i>Helvella compressa</i> <sup>1</sup>	1,3	N/A	1
<i>Helvella crassitunicata</i>	<i>Helvella crassitunicata</i>	1,3	B	1
<i>Helvella elastica</i>	<i>Helvella elastica</i>	1,3	B	1
<i>Helvella maculata</i>	<i>Helvella maculata</i>	1,3	B	1
<i>Hydnotrya</i> sp. nov. #Trappe 787,792	<i>Hydnotrya inordinata</i>	1,3	B	1
<i>Hydnotrya subnix</i> sp. nov. #Trappe 1861	<i>Hydnotrya subnix</i>	1,3	B	1
<i>Hydnum repandum</i>	<i>Hydnum repandum</i> <sup>1</sup>	N/A	N/A	N/A
<i>Hydnum umbilicatum</i>	<i>Hydnum umbilicatum</i>	3	B	2
<i>Hygrophorus caeruleus</i>	<i>Hygrophorus caeruleus</i>	1,3	B	1
<i>Hygrophorus karstenii</i>	<i>Hygrophorus saxatilis</i>	3	B	2
<i>Hygrophorus vernalis</i>	<i>Hygrophorus vernalis</i>	1,3	B	1
<i>Hypomyces luteovirens</i>	<i>Hypomyces luteovirens</i>	3	B	2
<i>Leucogaster citrinus</i>	<i>Leucogaster citrinus</i>	1,3	B	1
<i>Leucogaster microsporus</i>	<i>Leucogaster microsporus</i>	1,3	B	1



Table 1—Fungal species included in survey and manage standards and guidelines (January 2001) (continued)

ROD species name	Preferred name	Original strategy	New category	Handbook volume
<i>Macowanites chlorinosmus</i>	<i>Macowanites chlorinosmus</i>	1,3	B	1
<i>Macowanites lymanensis</i>	<i>Cystangium lymanensis</i>	1,3	B	1
<i>Macowanites mollis</i>	<i>Macowanites mollis</i>	1,3	B	1
<i>Marasmius applanatipes</i>	<i>Marasmius applanatipes</i>	1,3	B	1
<i>Martellia fragrans</i>	<i>Martellia fragrans</i>	1,3	B	1
<i>Martellia idahoensis</i>	<i>Martellia idahoensis</i>	1,3	B	1
<i>Martellia monticola</i>	<i>Gymnomyces monticola</i> <sup>1</sup>	3	N/A	N/A
<i>Martellia</i> sp. nov. #Trappe 649	<i>Gymnomyces nondistincta</i>	1,3	B	1
<i>Mycena hudsoniana</i>	<i>Mycena hudsoniana</i>	1,3	B	1
<i>Mycena lilacifolia</i>	<i>Chromosera cyanophylla</i>	3	B	2
<i>Mycena marginella</i>	<i>Hydropus marginellus</i>	3	B	2
<i>Mycena monticola</i>	<i>Mycena monticola</i>	1,3	B	1
<i>Mycena overholtsii</i>	<i>Mycena overholtsii</i>	1,3	B	1
<i>Mycena quinaultensis</i>	<i>Mycena quinaultensis</i>	1,3	B	1
<i>Mycena tenax</i>	<i>Mycena tenax</i>	3	B	2
<i>Mythicomycetes corneipes</i>	<i>Mythicomycetes corneipes</i>	3	B	2
<i>Neolentinus adherens</i>	<i>Neolentinus adhaerens</i>	1,3	B	1
<i>Neolentinus kauffmanii</i>	<i>Neolentinus kauffmanii</i>	1,3	B	1
<i>Neournula pouchetii</i>	<i>Neournula pouchetii</i>	1,3	B	1
<i>Nivatogastrium nubigenum</i>	<i>Nivatogastrium nubigenum</i>	1,3	B	1
<i>Octavianina macrospora</i>	<i>Octavianina macrospora</i>	1,3	B	1
<i>Octavianina papyracea</i>	<i>Octavianina papyracea</i>	1,3	B	1
<i>Octavianina</i> sp. nov. #Trappe 7502	<i>Octavianina cyanescens</i>	1,3	B	1
<i>Otidea leporina</i>	<i>Otidea leporina</i>	3	B	1
<i>Otidea onotica</i>	<i>Otidea onotica</i>	3	F	1
<i>Otidea smithii</i>	<i>Otidea smithii</i>	1,3	B	1
<i>Oxyporus nobilissimus</i>	<i>Bridgeoporus nobilissimus</i>	1,2,3	A	1
<i>Phaeocollybia attenuata</i>	<i>Phaeocollybia attenuata</i>	3	D	2
<i>Phaeocollybia californica</i>	<i>Phaeocollybia californica</i>	1,3	B	1
<i>Phaeocollybia carmanahensis</i>	<i>Phaeocollybia oregonensis</i> <sup>1</sup>	1,3	N/A	N/A
<i>Phaeocollybia dissiliens</i>	<i>Phaeocollybia dissiliens</i>	1,3	B	1
<i>Phaeocollybia fallax</i>	<i>Phaeocollybia fallax</i>	3	D	2
<i>Phaeocollybia gregaria</i>	<i>Phaeocollybia gregaria</i>	1,3	B	1
<i>Phaeocollybia kauffmanii</i>	<i>Phaeocollybia kauffmanii</i>	1,3	D	1
<i>Phaeocollybia olivacea</i>	<i>Phaeocollybia olivacea</i>	3	B	2
<i>Phaeocollybia oregonensis</i>	<i>Phaeocollybia oregonensis</i>	1,3	B	1
<i>Phaeocollybia piceae</i>	<i>Phaeocollybia piceae</i>	1,3	B	1
<i>Phaeocollybia pseudofestiva</i>	<i>Phaeocollybia pseudofestiva</i>	3	B	2
<i>Phaeocollybia scatesiae</i>	<i>Phaeocollybia scatesiae</i>	1,3	B	1
<i>Phaeocollybia sipei</i>	<i>Phaeocollybia sipei</i>	1,3	B	1
<i>Phaeocollybia spadicea</i>	<i>Phaeocollybia spadicea</i>	3	B	2
<i>Phellodon atratum</i>	<i>Phellodon atratus</i>	3	B	2
<i>Phlogiotis helvelloides</i>	<i>Tremiscus helvelloides</i>	3,4	B	2
<i>Pholiota albivelata</i>	<i>Stropharia albivelata</i>	1,3	B	1
<i>Phytoconis ericetorum</i>	<i>Omphalina ericetorum</i> <sup>1</sup>	3,4	N/A	N/A
<i>Pithya vulgaris</i>	<i>Pithya vulgaris</i>	1,3	D	1
<i>Plectania latahensis</i>	<i>Sarcosoma latahense</i>	1,3	B	1
<i>Plectania melastoma</i>	<i>Plectania melastoma</i>	3	F	2
<i>Plectania milleri</i>	<i>Plectania milleri</i>	1,3	B	1

Table 1—Fungal species included in survey and manage standards and guidelines (January 2001) (continued)

ROD species name	Preferred name	Original strategy	New category	Handbook volume
<i>Podostroma alutaceum</i>	<i>Podostroma alutaceum</i>	3	B	2
<i>Polyozellus multiplex</i>	<i>Polyozellus multiplex</i>	1,3	B	1
<i>Pseudaleuria quinaultiana</i>	<i>Pseudaleuria quinaultiana</i>	1,3	B	1
<i>Ramaria abietina</i>	<i>Ramaria abietina</i>	3	B	2
<i>Ramaria amyloidea</i>	<i>Ramaria amyloidea</i>	1,3	B	1
<i>Ramaria araiospora</i>	<i>Ramaria araiospora</i>	1,3	B	1
<i>Ramaria aurantiisiccescens</i>	<i>Ramaria aurantiisiccescens</i>	1,3	B	1
<i>Ramaria botryis</i> var.				
<i>aurantiiramosa</i>	<i>Ramaria botryis</i> var. <i>aurantiiramosa</i>	1,3	B	1
<i>Ramaria celerivirescens</i>	<i>Ramaria celerivirescens</i>	1,3	B	1
<i>Ramaria claviramulata</i>	<i>Ramaria celerivirescens</i>	1,3	B	1
<i>Ramaria concolor</i> f. <i>marrii</i>	<i>Ramaria concolor</i> f. <i>marrii</i>	1,3	B	1
<i>Ramaria concolor</i> f. <i>tsugina</i>	<i>Ramaria concolor</i> f. <i>tsugina</i>	3	B	2
<i>Ramaria conjunctipes</i> var.				
<i>sparsiramosa</i>	<i>Ramaria fasciculata</i> var. <i>sparsiramosa</i>	1,3	B	1
<i>Ramaria coulterae</i>	<i>Ramaria coulterae</i>	3	B	2
<i>Ramaria cyaneigranosa</i>	<i>Ramaria cyaneigranosa</i>	1,3	B	1
<i>Ramaria gelatiniaurantia</i>	<i>Ramaria gelatiniaurantia</i>	1,3	B	1
<i>Ramaria gracilis</i>	<i>Ramaria gracilis</i>	1,3	B	1
<i>Ramaria hilaris</i> var. <i>olympiana</i>	<i>Ramaria hilaris</i> var. <i>olympiana</i>	1,3	B	1
<i>Ramaria largentii</i>	<i>Ramaria largentii</i>	1,3	B	1
<i>Ramaria lorithamnus</i>	<i>Ramaria lorithamnus</i>	1,3	B	1
<i>Ramaria maculatipes</i>	<i>Ramaria maculatipes</i>	1,3	B	1
<i>Ramaria rainierensis</i>	<i>Ramaria rainierensis</i>	1,3	B	1
<i>Ramaria rubella</i> var. <i>blanda</i>	<i>Ramaria rubella</i> var. <i>blanda</i>	1,3	B	1
<i>Ramaria rubribrunnescens</i>	<i>Ramaria rubribrunnescens</i>	1,3	B	1
<i>Ramaria rubrievanescens</i>	<i>Ramaria rubrievanescens</i>	1,3	B	1
<i>Ramaria rubripermanens</i>	<i>Ramaria rubripermanens</i>	1,3	B	1
<i>Ramaria spinulosa</i>	<i>Ramaria spinulosa</i> var. <i>diminutiva</i>	1,3	B	1
<i>Ramaria stuntzii</i>	<i>Ramaria stuntzii</i>	1,3	B	1
<i>Ramaria suecica</i>	<i>Ramaria suecica</i>	3	B	2
<i>Ramaria thiersii</i>	<i>Ramaria thiersii</i>	1,3	B	1
<i>Ramaria verlotensis</i>	<i>Ramaria verlotensis</i>	1,3	B	1
<i>Rhizopogon abietis</i>	<i>Rhizopogon abietis</i>	3	B	2
<i>Rhizopogon atrovioleaceus</i>	<i>Rhizopogon atrovioleaceus</i>	3	B	2
<i>Rhizopogon brunneiniger</i>	<i>Rhizopogon brunneiniger</i>	1,3	B	1
<i>Rhizopogon evadens</i> var.				
<i>subalpinus</i>	<i>Rhizopogon evadens</i> var. <i>subalpinus</i>	1,3	B	1
<i>Rhizopogon exiguus</i>	<i>Rhizopogon exiguus</i>	1,3	B	1
<i>Rhizopogon flavofibrillosus</i>	<i>Rhizopogon flavofibrillosus</i>	1,3	B	1
<i>Rhizopogon inquinatus</i>	<i>Rhizopogon inquinatus</i>	1,3	B	1
<i>Rhizopogon</i> sp. nov.				
#Trappe 9432	<i>Rhizopogon chamaleontinus</i>	1,3	B	1
<i>Rhizopogon</i> sp. nov.				
#Trappe 1692, 1698	<i>Rhizopogon parskii</i> <sup>l</sup>	1,3	N/A	1
<i>Rhizopogon truncatus</i>	<i>Rhizopogon truncatus</i>	3	D	2
<i>Rhodocybe nitida</i>	<i>Entoloma nitidum</i>	1,3	B	1
<i>Rhodocybe speciosa</i>	<i>Rhodocybe speciosa</i>	1,3	B	1
<i>Rickenella setipes</i>	<i>Rickenella swartzii</i>	3	B	2
<i>Russula mustelina</i>	<i>Russula mustelina</i>	3	B	2
<i>Sarcodon fuscoindicum</i>	<i>Sarcodon fuscoindicus</i>	3	B	2

Table 1—Fungal species included in survey and manage standards and guidelines (January 2001) (continued)

ROD species name	Preferred name	Original strategy	New category	Handbook volume
<i>Sarcodon imbricatum</i>	<i>Sarcodon imbricatus</i>	3	B	2
<i>Sarcosoma mexicana</i>	<i>Sarcosoma mexicana</i> <sup>4</sup>	3	F	1
<i>Sarcosphaera eximia</i>	<i>Sarcosphaera coronaria</i>	3	B	2
<i>Sedecula pulvinata</i>	<i>Sedecula pulvinata</i>	1,3	B	1
<i>Sparassis crispa</i>	<i>Sparassis crispa</i>	3	D	2
<i>Spathularia flavida</i>	<i>Spathularia flavida</i>	3	B	2
<i>Stagnicola perplexa</i>	<i>Stagnicola perplexa</i>	1,3	B	2
<i>Thaxterogaster pingue</i>	<i>Thaxterogaster pingue</i> <sup>1</sup>	3	N/A	N/A
<i>Thaxterogaster</i> sp. nov. #Trappe 4867, 6242, 7427, 7962, 8520	<i>Thaxtoerogaster pavelekii</i>	1,3	B	1
<i>Tricholoma venenatum</i>	<i>Tricholoma venenatum</i>	1,3	B	1
<i>Tricholomopsis fulvescens</i>	<i>Tricholomopsis fulvescens</i>	1,3	B	1
<i>Tuber</i> sp. nov. #Trappe 2302	<i>Tuber asa</i>	1,3	B	1
<i>Tuber</i> sp. nov. #Trappe 12493	<i>Tuber pacificum</i>	1,3	B	1
<i>Tylopilus pseudoscaber</i>	<i>Tylopilus porphyrosporus</i>	1,3	D	1

<sup>1</sup> Removed from list (January 2001)<sup>2</sup> Does not occur in North America<sup>3</sup> Removed from list in Oregon and Washington (January 2001)<sup>4</sup> Removed from list in Oregon, except for Curry and Josephine Counties (January 2001)

## Methodology

The methodology section from the first handbook is reproduced here to facilitate the collection and handling of fungal specimens. No new information is included.

### Voucher Specimens

Collection of voucher specimens of fungi is requisite to document species' occurrence. In general, specimens should be annotated with appropriate information on species' identity, location, date, habitat, and collector, and sent to a recognized herbarium for long-term storage (see app. H2 for forms). All collections of suspected or confirmed ROD-listed fungal species should be sent for verification to the regional mycologist (3200 SW Jefferson Way, Corvallis, OR 97331). Except in the case of multiple collections of extremely common species from the same locality in a narrow timeframe, all collections should have a voucher. The one exception is *Bridgeoporus nobilissimus*, which should have only a small portion of the sporocarp cut from the specimen for vouchering. Large collections of common species do not provide additional useful information, particularly for a location where collection has occurred previously. One to five representative specimens (depending on size) of each of the common species per collecting period are adequate to document presence over time. Most, if not all, specimens of rare or uncommon species should be carefully harvested, dried, and sent to a herbarium, as these may yield additional morphological information or represent incompletely known taxa. Remember, sporocarps are like apples from a tree; if you are careful not to disturb the substrate, then minimal damage will be done to the actual organism itself.

Some fungi can be reliably identified with few or no notes; others require at least some notes for identification to species. *For the novice collector and identifier, notes are critical.* Some of the important characters to record include the surface texture, fresh colors and odors, subsequent color after exposure and handling (after 10-20 minutes and again after 2-3 hours or the next day after storage in a refrigerator), color after drying, whether the specimens exude latex from a cut surface, or the cut surface of a specimen changes color. Use the appropriate field form (app. H2) to record fresh characters. The date, specific location, and notes on the plant community, particularly the large woody plants, are important in reporting on the ecology of these fungi. Note whether the specimens were found on the soil surface (epigeous), were emergent, or were completely below the surface of the ground (hypogeous). Note whether they were found solitary, in groups of two or more, or in clusters. See the field forms (app. H2) for location and ecological data that should be recorded. Until processed, fungal specimens are best kept in cool conditions in waxed paper sandwich bags or loosely rolled up in waxed paper or aluminum foil. Never use plastic wrap or closed "air-tight" containers, because they lead to anaerobic conditions that stimulate resident bacteria and other microorganisms that can quickly degrade the condition of the sporocarp(s).

Specimens should be described and then dried as soon as possible, preferably within 1 day from collection. If specimens of some species are in prime condition when collected, and if they are handled properly and stored correctly, they can be kept for several days before drying. Once begun, deterioration proceeds rapidly, and much of a specimen's value for later study is lost.

Rapid drying by using moving air at relatively low temperatures is the most successful process to preserve most fungi. A food dryer set at about 30 to 40 °C works well. Good air circulation is critical to rapidly dry specimens. Specimens can deteriorate quickly when heat alone is used. When electricity is not available, there are alternative methods to dry specimens. If specimens are not large (<2 cm wide), they should be thinly sliced, ±2 mm in thickness, and placed in a sealed, airtight container with predried silica gel (4 to 5 times as much gel as specimens by volume). Carefully pack the specimens closely in the silica gel. Specimens should not touch each other within the container.

Airspace within the container should be kept to a minimum to ensure the effectiveness of this method. No more than one collection should be put in a container because, when dried, species often can be difficult to identify by macroscopic characters. Specimens will dry sufficiently in 1 to 2 days if the volume of silica gel is adequate for the quantity of specimens. Use the indicator crystals to tell when the gel is wet. Specimens dried by silica gel should be transferred to a more conventional dryer at the first opportunity to ensure that they dry completely. You can redry the silica gel in the field in a frying pan over a low fire. Keep well-dried specimens in sealed plastic bags to prevent rehydrating until you get them to the herbarium.

In circumstances where silica gel is unavailable or impractical because of size or number of specimens, specimens can be strung together with waxed dental floss and a large needle and suspended over a campfire. Carefully space the thin slices to allow air movement between them and adjust to the right height above the heat to prevent cooking while encouraging drying. Alternatively, lightweight frames covered with a fine-mesh aluminum screen can be used. The screens can be suspended over the campfire or a fueled camp stove (set low) or exposed to a steady but not forceful breeze. Again, care is needed when using heat to prevent cooking while encouraging drying.

## Special Considerations

**Mushrooms**—Notes on fresh characteristics, particularly colors, are critical to aid identification. A spore print from mushrooms is also important to aid identification. Cut off the stem of a fresh specimen and place the cap with the gills or pores facing down on a piece of black and white striped paper (see app. H2) for 8-12 hours to capture a spore print on both dark and light surfaces. Wrap in aluminum foil or place in a container to prevent drying. Do not place specimens in the refrigerator or expose them to heat before setting up a portion of the collection to capture a spore print. For purposes other than obtaining a spore print, well-dried specimens are much easier to work with later than those preserved in liquid.

**Sequestrate specimens**—Information on colors is useful but usually not necessary for all species. When in doubt, take some notes on fresh characters. Each sporocarp should be cut at least in half to hasten drying; cut large specimens (those over 2-3 cm in diameter) into several vertical slabs of  $\pm 5$  mm thickness. Many sequestrate species have leathery, somewhat impermeable peridia (outer skins) that are slow drying. Other sequestrate species dry to the hardness of bone, and any attempt to break open the sporocarp to access spores results in disintegration of the sporocarp. A cut cross section can readily be rehydrated with water or potassium hydroxide (5 percent KOH) and sectioned with a razor blade. Many sequestrate species resemble one another on the surface but differ strikingly in the interior. Examining the interior reduces the chance of including more than one species in a single collection. Nearly all sequestrate fungi fruit below the litter, and some fruit well within the mineral soil layer.

## Collecting Protocols

It is difficult to recommend a specific protocol to collect fungi. Each protocol has strengths and weaknesses, and the appropriateness of any one protocol is determined by the constraints of the project.

Most forests contain diverse microhabitats. Even in “uniform” plantations, the microtopography varies with localized wet and dry soil conditions. Distribution of woody debris is also variable, and the debris can be patchy, buried, or exposed. Some fungi are associated with or found in rotten wood, e.g., some *Ramaria* spp., *Gymnopilus punctifolius*, *Radiigera* spp., and *Hydnotrya variiformis*. The patchiness of ground cover and shrub and herb layers also can dramatically affect the microclimate in restricted areas. Sites with heavy ground cover will be more difficult to search for specimens because of obstruction of view and difficulty in laying out plots. Slope and aspect will have an important effect on water relations and temperature. In the Pacific Northwest, south-facing, steep slopes tend to be the driest, and north-facing, gentle slopes the wettest. All these variables must be accounted for when designing sampling procedures for each sampling objective.

Fungal sporocarp production is relatively clustered (Fogel 1981, States and Gaud 1997). Fungi also differ in their sporocarp abundance and size. A major difficulty with using sporocarps to determine presence is the lack of data on the correlation between the presence of the thallus and sporocarp production. Some species produce sporocarps irregularly or infrequently.

Use of a relatively small number (with respect to the selected stand area) of random quadrants may not effectively sample the selected area. A large number of randomly distributed plots is necessary but impractical to achieve a well-dispersed sample pattern. Alternatively, systematic placement of fewer plots will achieve the best coverage for unit area sampled.

## Sampling Protocols

Methodology used in vegetation surveys is not completely adequate for use in fungal surveys because of the need for repeated sampling of often cryptic populations.

Protocol implementation should be supervised by personnel trained in its use and in fungal identification. Before sampling, personnel should familiarize themselves with the general biology, ecology, habitat associations, and specific morphological features of target species. This will aid identification in the field and use field search time most efficiently.

Fungi can fruit any time of the year depending on weather and substrate. Some species fruit in the middle of the drought season in or on buried rotten wood or near streams or standing water. For the most part, fungi should be sampled in the warm, rainy season, e.g., in lowland areas, mid-October through December and April through June. Some fungi are restricted in sporocarp formation to a particular season (see seasonality data in species descriptions). Freezing weather truncates or delays the maturation of sporocarps, and high temperatures may accelerate drying of substrate and specimen, thus curtailing fruiting. When sampling across an elevational gradient, one should visit low-elevation, south-facing slopes first in the spring but last in the autumn and high-elevation, north-facing slopes last in the spring and first in the autumn (Luoma 1988).

## Periodicity

Each area surveyed should be visited every 2 to 3 weeks during the fruiting season(s). Surveys should be conducted for a minimum of 3, and preferably 5, years to increase the likelihood of detection (Arnolds 1981, Fogel 1981, Lange 1978, Luoma 1991, Luoma and others 1991, O'Dell and others 1992, Richardson 1970). Three to 4 days of lab work should be anticipated for each successful day of field work.

In general, fungi form sporocarps during a restricted portion of the year, some only in the spring, some in winter, still others in the autumn. The cryptic nature of sequestrate fungus sporocarps makes them more difficult to detect than epigeous sporocarps.

## Survey Methods

The three survey methods of choice are line transects, randomized plots, or plotless transects. All can be implemented as permanent or temporary (moving) plots. Once a clear objective is identified and a full understanding of the resources available for sampling assessed, the best method can be selected to meet objectives with the available resources.

**Line transects**—This method has plots located along a line, which may or may not be straight. These plots should be widely dispersed in a stand and intercept a wider variety of microsites than a single circular plot of the same area (Luoma and others 1996). This method is particularly useful when the exact habitat requirements of the target species are unknown. One method uses twenty-five 4-m<sup>2</sup> plots that comprise the

sample. On slopes, the upper, mid, and lower slope strata contain transects of eight, nine, and eight plots, respectively. Plots may be placed every 6 m along the 50 m (Luoma and others 1996). A “collection” is defined as those sporocarps of the same species from a particular 4-m<sup>2</sup> plot. A total area of 100 m<sup>2</sup> per 5- to 15-ha stand in twenty-five 4-m<sup>2</sup> circular plots gives a reasonable sample for a particularly small stand. Plots are marked with a flag or stake to avoid resampling the same area in a future sampling period. Another approach is to space plots 25 m apart on transects in the horizontal direction (along contour) and space transects 75 to 150 m apart in the vertical direction (across contour). A statistician should be consulted before sampling. Of course, any time the target species is encountered outside the plots, it should be collected and recorded.

**Randomized plots**—Although statistically sound, this method is logistically difficult to implement owing to the inordinate amount of resources needed.

**Plotless transects (time-constrained search)**—Before conducting the search, plan the search route to give an extensive reconnaissance-level approach to the entire area of interest. The most likely habitats should be identified and located on the landscape. Likely habitat should be intensively searched, but other less likely habitat should not be ignored. Use moving rules to designate how much time will be spent in each designated area within the overall interest area.

Time of search applies only to time spent actively searching for sporocarps. When moving to a new site or collecting specimens that were found, the collector stops the timer. The time needed is unknown for any particular stand and will depend on size of the stand, accessibility, objectives, and available resources. Because of the uncertainty of fruiting, the site must be repeatedly sampled in any one year and over 3 to 5 years to be considered adequately assessed.

### Special Considerations for Sequestrate Species

In season, a good indicator of sequestrate fungus fruiting is the presence of fresh, small animal digs, 5 to 8 cm in diameter. Small animals, such as squirrels, mice, and voles, commonly unearth sequestrate fungi one at a time as they mature, leaving a small pit 2 to 8 cm deep. These small animal digs can sometimes be hard to distinguish from other types of holes such as diggings for seeds or insects or from hoof prints. Sometimes only a portion of the specimen has been eaten and a portion remains at the bottom of the small pit. Many sequestrate fungi fruit in clusters, so further exploration within a radius of 30 to 60 cm around a suspected fruiting spot often reveals additional specimens. It is best to rake into the soil to the depth of the nearby small animal dig. Needles, leaf fragments, and other debris or spider webs in a small animal dig indicate that it is not fresh. Further exploration, however, may yet reveal specimens, particularly if there are fresh digs scattered about in the habitat.

Plotless transects also can be useful in habitat with compacted soil or where the humus layer is thin. Under such circumstances, even small specimens form small humps at the soil surface that look detectable to the trained observer. Larger specimens oftentimes are emergent from these small humps. Campgrounds, abandoned roads, road banks, and used or abandoned walking trails are sites where this method is sometimes successful.

Some caution is needed in repeated sampling for sequestrate fungal species. The nature of the sampling procedure for sequestrate fungi is disruptive. The disturbance of the microhabitat may adversely impact the microhabitat and render it uninhabitable by the rare fungus that once was resident. This is particularly evident in habitat such as coarse woody debris that is dismantled in sampling. Woody debris thus sampled does not rapidly, if ever, return to its former structure. It is our experience in low-elevation forests in western Oregon that soil substrate and concomitant herbs and forbs return to predisturbance levels 1 to 2 years after sampling.

## Remarks About Using the Keys

The keys that follow contain all species currently listed in the 2001 ROD. The number following a species' name refers to the page number where that species' description is found within the handbooks. Species' information for numbers that are underlined is contained in the first handbook, whereas species' information for numbers without underlining is contained in this handbook. There are a few species of *Ramaria* keyed that are not included in either handbook. These are, for the most part, varieties of similar species, and it was thought that including them will help discriminate among varieties.

Arriving at a species' determination should serve only to direct the reader to the species' description within one of the handbooks. In particular, the reader's attention should then be directed to the distinguishing-features section for that species. If the characters of the specimen fit exactly the characters listed in the description, the specimen has a high likelihood of being that species. For the most part, verification of specimens should be done by an accomplished mycologist, as there often are non-ROD-listed species that are quite similar and difficult to distinguish.

Additional pictures of the species contained in this handbook can be found on the World Wide Web at: <http://www.fs.fed.us/pnw/mycology/survey>.



**Keys to taxa**

(see Glossary for terms)

- A. Sporocarp with a cap and (usually) a stem, the underside of the cap with radially arranged bladelike gills ..... **Gilled mushrooms**
- B. Sporocarp with a cap and stem, the underside of the cap with a layer of tubes often easily separated from cap, tube layer over 0.5 cm thick at maturity ..... **Boletes**
- C. Sporocarp crustlike, sheetlike or cushionlike, smooth or lacking a cap and stem smooth or poroid ..... **Resupinate polypores and fungal parasites**
- D. Sporocarp with a cap and a stem, spore-bearing tissue made up of repeatedly forking, blunt ridges ..... **Chanterelles**
- E. Sporocarp erect, unbranched (clubs) or branched corallike from a common base, cap lacking ..... **Corals and clubs**
- F. Sporocarp erect, unbranched, yellow with a differentiated flattened, rounded head ..... **Earth tongues and allies**
- G. Sporocarp cup, disc, or bowl shaped, stem present or absent ..... **Cups and allies**
- H. Sporocarp with cap and stem, the cap saddle shaped or irregularly lobed (brainlike) ..... **Elfin saddles and false morels**
- I. Sporocarp with the appearance of a distorted agaric or bolete or resembling a potato, interior solid, with gills, or irregular chambers, if gills present they are covered by a persistent veil ..... **Sequestrate fungi**
- J. Sporocarp with a cap and stem, tough or leathery, the underside of the cap with a layer of tubes, tube layer less than 0.5 cm thick at maturity ..... **Stalked polypores and toothed fungi**

**A. Key to gilled mushrooms**

1. Gills contorted and fused ..... **see sequestrate fungi**
1. Gills more or less radial and bladelike ..... **2**
2. Spores deposit white, yellow, or pink ..... **3**
2. Spores deposit red-brown, brown, or black ..... **30**
3. Gills decurrent and waxy, may fruit in spring or near melting snow ..... **4**
3. Gills decurrent and nonwaxy ..... **6**
4. Cap yellow-brown when young, becoming tinged with bright pale vinaceous colors in age, spores 11-15.5 x 5.5-7  $\mu\text{m}$  ..... **see *Hygrophorus vernalis* (61)**
4. Cap blue, pink-tan to pale tan, cream colored, spores <11  $\mu\text{m}$  long ..... **5**
5. Cap cream to blue, spores 7-9 x 4-5  $\mu\text{m}$  ..... **see *Hygrophorus caeruleus* (60)**
5. Cap pale pink-tan to pale tan, spores 7.0-10.4 x 5.2-5.9  $\mu\text{m}$  ..... **see *Hygrophorus saxatilis* (78)**
6. Sporocarps large, cap >70 (up to 380) mm in diameter, stem 25-60 mm in diameter, membranous partial veil present ..... **see *Catathelasma ventricosa* (41)**
6. Sporocarps smaller, caps always <110 mm in diameter, stem < 25 mm in diameter, partial veil absent ..... **7**
7. Cap and gills yellow to green-yellow, stem hollow ..... **see *Chrysomphalina grossula* (44)**
7. Cap and gills without green tones, stem not hollow ..... **8**

8. Gills serrate and spores inamyloid ..... 9
8. Gills not serrate, if gills serrate then spores amyloid ..... 10
9. Cap and stem with red-brown resinous coating ..... see *Neolentinus adhaerens* (75)
9. Cap dry, white to pale pink-yellow or vinaceous ..... see *Neolentinus kauffmanii* (76)
10. Stem with numerous side branches up to 5 mm long ..... see *Collybia racemosa* (51)
10. Stem without side branches ..... 11
11. Stem slender, fragile; cap conic to campanulate, margin striate ..... 12
11. Stem not slender, or if slender then more tough and wiry; margin usually not striate ..... 21
12. Cap dark blue to blue black ..... see *Rhodocybe nitida* (130)
12. Cap not blue ..... 13
13. Spores 2.7-4.2 x 2.0-3.0  $\mu\text{m}$ , cap with violet tones ..... see *Baeospora myriadophylla* (39)
13. Spores > 5 $\mu\text{m}$  long, cap with non-violet tones ..... 14
14. Cap pink to red, gill edges and faces white; cheilocystidia with long projections  
(over 3  $\mu\text{m}$ ) that occasionally branch ..... see *Mycena monticola* (72)
14. Cap some other color ..... 15
15. Cap gray, base of stem fuzzy, vernal fruiter, usually near melting snow ..... see *Mycena overholtsii* (73)
15. Cap not gray, or if gray fruiting in fall, base of stem not fuzzy ..... 16
16. Gills brown, pruinose, spores 6.0-7.5 x 3.0-4.5  $\mu\text{m}$  ..... see *Hydropus marginellus* (77)
16. Gills white, gray to pale lilac or yellow-brown, spores larger ..... 17
17. Spores globose 8-9  $\mu\text{m}$  in diameter ..... see *Fayodia bisphaerigera* (61)
17. Spores ellipsoid ..... 18
18. Cap pale yellow to yellow-brown or olive-tan, cystidia absent ..... see *Chromosera cyanophylla* (43)
18. Cap without yellow, cystidia present. .... 19
19. Cap brown-black, cheilocystidia and pleurocystidia long pedicellate without spines  
..... see *Mycena quinaultensis* (74)
19. Cap gray to black, cheilocystidia and pleurocystidia long pedicellate with or without spines ..... 20
20. Cap gray to black, margin pale gray to white, cheilocystidia and pleurocystidia clavate with short spines  
..... see *Mycena hudsoniana* (71)
20. Cap fuscous to dark gray, cheilocystidia with long diverticula, pleurocystidia without spines  
..... see *Mycena tenax* (80)
21. Cap white, often with pink tints, on conifer logs, cheilocystidia of two types: cylindric to broadly clavate and  
obtuse and irregularly cylindric to nodulose to lobed ..... see *Collybia bakerensis* (22)
21. Cap not white with pink, or cheilocystidia otherwise ..... 22
22. Cap 10-18 mm, brown to dark red-brown, and with garlic odor ..... see *Marasmius applanatipes* (67)
22. Cap with other characteristics and no garlic odor ..... 23

23. Cap tan to honey-brown, stem pale yellow to yellow-orange, fibrillose streaked, spores pink to pink-brown in deposit, angular, spores subglobose to obovoid, slightly angular ..... see *Rhodocybe speciosa* (131)
23. Cap not tan and scaly or spores not pink in deposit and not angular ..... 24
24. Cap white with gray to tan scales, gills sinuate, attached, white spore print  
..... see *Tricholoma venenatum* (137)
24. Cap some other color, gill attachment otherwise ..... 25
25. Cap orange-yellow to yellow-tan, with tawny fibrils near margin, gills adnate, spores broadly ellipsoid  
..... see *Tricholomopsis fulvescens* (138)
25. Cap some other color or gill attachment otherwise ..... 26
26. Spore print yellowish white, if spore print white, then gills decurrent ..... 27
26. Spore print yellow, brown, purple-brown, black, gills not decurrent ..... 30
27. Gills adnate to adnexed ..... see *Russula mustelina* (98)
27. Gills decurrent ..... 28
28. Cystidia absent ..... 29
28. Cystidia present on cap, stem, and gills ..... see *Rickenella swartzii* (97)
29. Cap, stem, and gills gray, cap fibrillose matted, stem with white basal rhizomorphs  
..... see *Clitocybe senilis* (20)
29. Cap, stem, and gills gray-brown to gray-buff, cap glabrous, rhizomorphs lacking  
..... see *Clitocybe subditopoda* (21)
30. Spores black, up to 30  $\mu\text{m}$  long, gill often contorted and fused, cap orange and fibrillose, partial veil present see  
..... *Chroogomphus loculatus* (19)
30. Spores brown, rusty brown to purple-brown ..... 31
31. Spore print purple-brown, spores 6-8.5 x 4-5.5  $\mu\text{m}$  ..... see *Mythicomycetes corneipes* (81)
31. Spore print brown ..... 32
32. Stem not deeply rooting ..... 33
32. Stem deeply rooting ..... 51
33. Stem <25 mm thick ..... 34
33. Stem >25 mm thick ..... 38
34. Clamps absent ..... see *Galerina heterocystis* (64)
34. Clamps present ..... 35
35. Pleurocystidia and pileocystidia present, spores 11-15 x 6-9 ..... see *Galerina atkinsoniana* (62)
35. Either pleurocystidia or pileocystidia absent; caulocystidia present, spores smaller ..... 36
36. Stem 50-120 mm long, spores 9-11 x 6-8  $\mu\text{m}$  ..... see *Galerina sphagnicola* (65)
36. Stem only up to 30 mm long ..... 37
37. Spores amygdaliform and noncalyptrate ..... see *Galerina vittaeformis* (66)
37. Spores calyptrate ..... see *Galerina cerina* (63)

38. Cap viscid, violet to pale lilac, becoming white with a yellow disc, stem with marginate base, KOH on cap turns pink to red immediately ..... see *Cortinarius olympianus* (25)
38. Cap or gill colors different, cap not reacting to KOH ..... 39
39. Spores 4.5-6 x 3-3.5  $\mu\text{m}$  ..... see *Stagnicola perplexa* (104)
39. Spores >6  $\mu\text{m}$  long ..... 40
40. Veil red or pink ..... 41
40. Veil lacking, but if present not red ..... 42
41. Cap dull to violaceous brown, spores ellipsoid, 7-8 x 4-5.5  $\mu\text{m}$  ..... see *Cortinarius boulderensis* (23)
41. Cap gray brown, spores subglobose to broadly ellipsoid, 7.4-8.9 x 5.6-7.0  $\mu\text{m}$   
..... see *Cortinarius depauperatus* (56)
42. Cap a variable blend of green, blue, and yellow, basal mycelium lavender, on well-rotted wood  
..... see *Gymnopilus punctifolius* (52)
42. Cap with other colors, basal mycelium lacking ..... 43
43. Cap dull cinnamon, viscid, veil faintly fibrillose ..... see *Hebeloma olympianum* (53)
43. Cap not dull cinnamon, or dry or lacking persistent veil ..... 44
44. Cap orange, with yellow veil remnants on stem and dark scales on cap  
..... see *Cortinarius rainierensis* (26)
44. Cap and veil different ..... 45
45. Cap with enrolled margin and gray gills ..... see *Cortinarius variipes* (28)
45. Cap with margin not enrolled or gills not gray ..... 46
46. Young gills olive-yellow, cap surface and flesh olive-yellow to dingy brown, cap surface turning purple-brown with application of KOH ..... see *Dermocybe humboldtensis* (31)
46. Young gills or cap some other color ..... 47
47. Spores 4-5.5  $\mu\text{m}$  in diameter with an apical pore, cap vinaceous brown, stem with membranous annulus, on litter  
..... see *Stropharia* (as *Pholiota*) *albivelata* (93)
47. Spores 5.5-7.0 (-7.8)  $\mu\text{m}$  in diameter lacking apical pore ..... 48
48. Sporocarp with violet to blue tones and strong red coloration of stem context ..... see *Cortinarius cyanites* (55)
48. Sporocarp without blue tones or no red reaction of stem context ..... 49
49. Gills violet to blue-violet ..... see *Cortinarius barlowensis* (54)
49. Gills non-violet to blue-violet ..... 50
50. Cap gray-brown with violaceous margin, spores ellipsoid 8-10 x 5.5-6  $\mu\text{m}$  ..... see *Cortinarius umidicola* (27)
50. Cap yellow-brown to brown with olive tones, spores ellipsoid to subglobose 7.4-8.9 x 5.6-6.7  $\mu\text{m}$   
..... see *Cortinarius valgus* (57)
51. Spores < 8  $\mu\text{m}$  long ..... 52
51. Spores > than 8  $\mu\text{m}$  long ..... 54
52. Clamp connections present ..... see *Phaeocollybia dissiliens* (86)

52. Clamp connections absent (or infrequent) ..... 53
53. Stem stuffed, cheilocystidia cylindric, 24-34 x 3-6  $\mu\text{m}$  ..... see *Phaeocollybia oregonensis* (89)
53. Stem hollow, cheilocystidia clavate, 30-40 x 7-9  $\mu\text{m}$ . ..... see *Phaeocollybia sipei* (92)
54. Caps with some green coloration ..... 55
54. Caps without green coloration ..... 57
55. Cheilocystidia clavate ..... 56
55. Cheilocystidia capitulate, lageniform to tibiiform ..... see *Phaeocollybia pseudofestiva* (85)
56. Stem hollow, cap up to 65 mm in diameter ..... see *Phaeocollybia fallax* (83)
56. Stem stuffed, cap 40-110 mm in diameter ..... see *Phaeocollybia olivacea* (84)
57. Cheilocystidia cylindrical to clavate ..... 58
57. Cheilocystidia lageniform to tibiiform ..... 61
58. Cap typically greater than 80 mm in diameter ..... see *Phaeocollybia kauffmanii* (88)
58. Cap less than 70 mm in diameter ..... 59
59. Spores 7-8.5 x 5-5.5  $\mu\text{m}$  ..... see *Phaeocollybia attenuata* (82)
59. Spores larger ..... 60
60. Cap bright orange to red-orange ..... see *Phaeocollybia piceae* (90)
60. Cap gray-brown ..... see *Phaeocollybia gregaria* (87)
61. Stem stuffed ..... see *Phaeocollybia spadicea* (86)
61. Stem hollow ..... 62
62. Sporocarps in loose bundles, cap yellow-brown to orange-brown  
..... see *Phaeocollybia californica* (85)
62. Sporocarps densely fasciculate, cap yellow-brown to brown-black  
..... see *Phaeocollybia scatesiae* (91)

#### B. Key to boletes

1. Sporocarps small, cap <70 mm in diameter, bright yellow mycelium at base, taste peppery to acrid  
..... see *Chalciporus piperatus* (42)
1. Sporocarps large, cap >70 mm in diameter, yellow mycelium absent from base, taste not peppery or acrid ..... 2
2. Tubes yellow in youth, becoming green-yellow to olive ..... see *Boletus haematinus* (10)
2. Tubes red to dark brown to black ..... 3
3. Tubes dark brown to black, tubes bruising blue ..... see *Tylopilus porphyrosporus* (141)
3. Tubes dark red to red-brown ..... see *Boletus pulcherrimus* (11)

#### C. Key to resupinate polypores and fungal parasites

1. On rotting mushrooms ..... 2
1. Not on rotting mushrooms, instead on dead wood or twigs ..... 4

2. Sporocarps a crustlike covering on Russulaceae mushrooms, yellow to yellow-green to green-black ..... see *Hypomyces luteovirens* (79)
2. Sporocarps fruiting from rooting Russulaceae mushrooms, with a stem and cap ..... 3
3. Chlamydospores smooth, fusoid, 12-17 x 9-11  $\mu\text{m}$  ..... see *Asterophora parasitica* (38)
3. Chlamydospores ornamented, globose, subglobose to ovoid, 11-20 x 10-18  $\mu\text{m}$  ..... see *Asterophora lycoperdoides* (37)
4. Sporocarps small (<5 mm) cushion to disc shaped, pale yellow-brown hymenial surface on twigs, spores smooth ..... see *Acanthophysium farlowii* (1)
4. Sporocarps resupinate with irregularly warty hymenial surface, ochraceous-buff hymenial surface, spores ornamented, on dead conifer wood ..... see *Dichostereum boreale* (34)

#### D. Key to chanterelles

1. Cap dark blue to black, hymenium concolorous, odor mildly pungent ..... see *Polyozellus multiplex* (96)
1. Cap white, yellow, orange-yellow, yellow-brown, brown or yellow-olive ..... 2
2. Cap white to off-white, handling yellow, spores 7-9 x 5-5.5  $\mu\text{m}$  ..... see *Cantharellus subalbidus* (40)
2. Cap yellow, orange-yellow, yellow-brown, brown or yellow-olive, spores longer ..... 3
3. Cap distinct, stem hollow and flabby, compressed or furrowed ..... see *Craterellus tubaeformis* (58)
3. Cap indistinct mostly an extension of the stem, stem solid, thick ..... 4
4. Cap brown to yellow-olive, hymenium violaceous ..... see *Gomphus clavatus* (69)
4. Cap orange to orange-yellow to orange-brown, hymenium white to brown ..... 5
5. Sporocarps in often caespitose clusters, spores 10-12 (-14) x 5-6  $\mu\text{m}$  ..... see *Gomphus bonarii* (68)
5. Sporocarps not in caespitose clusters, spores 11.9-17.5 x 5.7-7.8  $\mu\text{m}$  ..... see *Gomphus kauffmanii* (70)

#### E. Key to corals and clubs

1. Sporocarps clublike, sparsely branched or with ribbonlike or leafy lobes ..... 2
1. Sporocarps usually with numerous branches ..... see genus *Ramaria* key below
2. Sporocarps with some branches or ribbonlike or leafy lobes ..... 3
2. Sporocarps clublike ..... 4
3. Sporocarps with ribbonlike or leafy lobes ..... see *Sparassis crispa* (102)
3. Sporocarps with a distinct stem clothed with fascicles, spore-bearing tissue palmate with a few branches ..... see *Clavulina castaneopes* var. *lignicola* (50)
4. Spores 8-10 x 5-6  $\mu\text{m}$ , sporocarps tinged with red ..... see *Clavariadelphus subfastigiatus*
4. Spores larger, sporocarps without red ..... 5
5. Spores <17  $\mu\text{m}$  long ..... 6
5. Spores 18-24  $\mu\text{m}$  long ..... see *Clavariadelphus sachalinensis* (47)
6. Spores 3.5-4.5  $\mu\text{m}$  in diam ..... see *Clavariadelphus ligula* (45)

6. Spores >5.0 µm in diam ..... 7
7. Sporocarp with flattened apex, staining red with KOH, spore print white  
..... see *Clavariadelphus truncatus* (49)
7. Sporocarp clavate shaped, not with flattened apex, KOH negative, spore print white to pale yellow  
..... see *Clavariadelphus occidentalis* (46)

Owing to the difficulty in working with *Ramaria* species, we present both a traditional dichotomous key and a synoptic key. We suggest that the novice try both to build skills in working with this troublesome genus. These keys contain all the *Ramaria* species from the ROD including the strategy 3 species. We hope this helps in identifying the closely related species that are slightly more common than the strategy 1 species.

### Key to subgenera of *Ramaria*

(after Marr and Stuntz 1973)

1. Spores striate ornamented, flesh usually amyloid ..... **Subgenus *Ramaria***
1. Spores smooth, warted or spiny, not striate, flesh in most species inamyloid (except species of the *R. subbotrytis* complex) ..... 2
2. Sporocarps terricolous, spores smooth or warted, flesh and rhizomorphs monomitic  
..... **Subgenus *Laeticolora***
2. Sporocarps with one or more of the following characters: (1) lignicolous or duff habit, (2) spiny spores, (3) skeletal hyphae ..... 3
3. Spores echinulate or echinulate-verrucose, with duff habit; rhizomorphs extensively developed, monomitic  
..... **Subgenus *Echinoramaria***
3. Spores smooth or warted, not spiny, lignicolous or duff habit, rhizomorphs extensively developed, dimitic in most species (except *R. apiculata*) ..... **Subgenus *Lentoramaria***

### General descriptions of the subgenera in *Ramaria*

#### **Subgenus *Ramaria***

Sporocarps generally large, profusely branched, entirely white, pale yellow, alutaceous, or upper branches orange, red to violet; spores ornamented with cyanophilic striae sometimes subreticulate or subverruculose, flesh usually amyloid.

#### **Subgenus *Laeticolora***

Sporocarps generally large, profusely branched, terrestrial, often brightly colored in yellow, orange, and red shades, a few species cream, violaceous, or brown; spores of most species warted, ornamentation consisting of fine to coarse, irregularly shaped, cyanophilic raised areas, in a few spores smooth, flesh and rhizomorphs monomitic, hyphae with or without clamp connections.

#### **Subgenus *Echinoramaria***

Sporocarps generally small, in a few species of medium to large size, growing on twig litter, cones, needle duff, or leaf mold, rhizomorphic strands commonly conspicuous, and a well-developed felty basal tomentum or mycelial mat usually present; sporocarps cream, yellow, olive, green, or with brown shades, sometimes changing color where bruised; hyphae thin walled, monomitic, clamp connections frequently of the loop type or clamp cell vesiculate; spores echinulate or subechinulate, spines 0.2-3 µm tall.

#### **Subgenus *Lentoramaria***

Sporocarps generally small to medium sized, habitat lignicolous or sublignicolous (growing from twig and leaf litter), rhizomorphic strands commonly conspicuous, and a well-developed felty basal tomentum or mycelial mat sometimes present; sporocarps cream, yellow, green, or with brown shades, sometimes quickly changing color where bruised; hyphae thin or thick walled, monomitic or dimitic, clamp connections present; spores smooth or finely warted.

**Key to species of the subgenus *Ramaria***

1. Upper branches pale orange to brown, stem opaque white, bruising pale yellow to gray-orange, spores 12-16 x 4-6  $\mu\text{m}$  ..... see *R. botrytis* var. *aurantiiramosa* (101)
1. Upper branches with red tones ..... 2
2. Red color of terminal branches evanescent at maturity, upper branches' axils U-shaped, somewhat divergent, forked to multiforked near apices, stem milk-white discoloring yellow, bruising brown-violet, spores 11-13 x 4.5-5  $\mu\text{m}$ , striae closely spaced ..... see *R. rubrievanescens* (116)
2. Red color of terminal branches persists at maturity, upper branches with axils mostly acute to subacute, forked to multiforked near apices, stem milk-white to yellow-white and do not bruise red to violet brown, spores 8-13 x 3.5-4.5  $\mu\text{m}$ , striae oblique to longitudinal ..... see *R. rubripermanens* (117)

**Key to species of the subgenus *Laeticolora***

1. Basidia with clamp connections at base or clamp connections frequent in the subhymenium and flesh of the branches or both ..... 2
1. Basidia without clamp connections at base, true clamp connections rare in the subhymenium and flesh of the branches ..... 5
2. Stem flesh amyloid when fresh ..... 3
2. Stem flesh inamyloid when fresh ..... 4
3. Lower branches distinctively staining red, interior flesh does not react with 10 percent  $\text{Fe}_2(\text{SO}_4)_3$ , spores 9-11 x 4-5  $\mu\text{m}$  with warts in subspirals ..... see *R. maculatipes* (112)
3. Lower branches occasionally bruised violet-gray, interior flesh reacts instantly blue-green with 10-percent  $\text{Fe}_2(\text{SO}_4)_3$ , spores 7-10 x 3-4  $\mu\text{m}$  with fine warts in lines ..... see *R. amyloidea* (98)
4. Stem white bruising strongly red brown, branches white to pale yellow with pale green-yellow apices, spores 11.6-15.8 x 4-5  $\mu\text{m}$  with discrete low warts; spring fruiting ..... see *R. thiersii* (120)
4. Stem white to pale yellow not bruising red-brown, branches pale orange with intense orange apices, spores 11-15 x 3.5-5  $\mu\text{m}$  with distinctive, irregularly shaped warts in subspirals; autumn fruiting ..... see *R. largentii* (110)
5. Spores finely warted or smooth ..... 6
5. Spores distinctively warted ..... 7
6. Stem medium sized, single and slender, white to orange-white, stem and lower branches staining dark red, flesh fleshy-fibrous without a brown fan-shaped area when cut longitudinally, fall fruiting, spores 10-14 x 3.5-5  $\mu\text{m}$ , smooth to finely ornamented ..... see *R. rubribrunnescens* (115)
6. Stem large to massive, single white to off-white, slowly stains pale purple-gray where handled, flesh watery off-white, usually with brown band, spring fruiting, spores 8-13 x 3-4  $\mu\text{m}$ , smooth to a few ill-defined, small, low warts ..... see *R. coulterae* (92)
7. Flesh amyloid ..... 8
7. Flesh inamyloid ..... 9
8. Branches scarlet in youth, fading to pale orange-red when mature and with apices intensely colored, stem white to pale orange, interior flesh without a brown band and no reaction with 10-percent  $\text{Fe}_2(\text{SO}_4)_3$ , spores 7-10 x 3-5  $\mu\text{m}$  with small warts ..... see *R. stuntzii* (119)



8. Branches pale to pale orange with sunflower yellow apices, stem yellow-white covered with subareolate patches of brown to red-brown superficial hyphae, interior flesh with a brown band and reacts blue-green with 10-percent  $\text{Fe}_2(\text{SO}_4)_3$ , spores 8-11 x 4-6  $\mu\text{m}$  with coarse warts and prominent apiculus ..... see *R. celerivirescens* (102)
9. Sporocarps typically fasciculate or caespitose ..... 10
9. Sporocarps not fasciculate or caespitose ..... 13
10. Flesh gelatinous when fresh ..... 11
10. Flesh rubbery, fibrous, or cartilaginous ..... 12
11. Apices deep orange and not bruising dull violet, gleoplerous hyphae absent, spores 8-11 x 3.5-5  $\mu\text{m}$  ..... see *R. gelatiniaurantia* var. *gelatiniaurantia* (107)
11. Apices apricot-yellow, bruising dull violet, gleoplerous hyphae distinctive in stem, spores 8-11 x 3.5-5  $\mu\text{m}$  ..... *R. gelatiniaurantia* var. *violetingens* (not in handbooks)
12. Sporocarps white, branches salmon to peach with pale to maize-yellow branch tips, sometimes bruising pale violet in some areas, spores 6-10 x 4-6.5  $\mu\text{m}$  ..... see *R. fasciculata* var. *sparsiramosa* (106)
12. Sporocarps white with small surface spots of red present, branches pale yellow to yellow, not bruising violet, spores 7.9-9.4 x 4.7-5.8  $\mu\text{m}$  ..... see *R. lorithamnus* (111)
13. Flesh gelatinous when fresh ..... 14
13. Flesh fibrous ..... 15
14. Sporocarps stout, cauliflowerlike, broadly obovate to broadly pyriform in outline with abortive branchlets, branches pale yellow to pale orange, spores 9-11.2 x 4.5-6  $\mu\text{m}$  ..... see *R. verlotensis* (121)
14. Sporocarps broadly fusiform to broadly obconic in outline without abortive branchlets, branches bright yellow to pallid salmon, spores 9.4-11.2 x 4-5  $\mu\text{m}$  ..... see *R. hilaris* var. *olympiana* (109)
15. Sporocarps dark orange-brown to brown overall, branches brown to violaceous brown, apices violaceous brown when young, concolorous with branches at maturity, spores 7.2-10.1 x 4.7-6.1  $\mu\text{m}$  ..... see *R. spinulosa* var. *diminutiva* (118)
15. Sporocarps yellowish, brown-white, red to salmon, branches not showing violaceous tints ..... 16
16. Basidia with masses of cyanophilic granules ..... 17
16. Basidia without masses of cyanophilic granules ..... 19
17. Apices pale yellow to yellow ..... 18
17. Apices pale red, never yellow, spores 8-10 x 4-5  $\mu\text{m}$  ..... *R. cyaneigranosa* var. *elongata* (not in handbooks)
18. Branches intensely red; yellow apices, spores 8-15 x 4-6  $\mu\text{m}$  ..... see *R. cyaneigranosa* var. *cyaneigranosa* (105)
18. Branches peach or salmon with minutely yellow apices, spores 7-11 x 3.5-6  $\mu\text{m}$  ..... *R. cyaneigranosa* var. *persicina* (not in handbooks)
19. Branches and apices intensely yellow orange, spores 8.5-14 x 3-5  $\mu\text{m}$  ..... see *R. aurantiiscescens* (100)
19. Branches magenta, red, yellow-orange, brown-salmon ..... 20

20. Branches red in youth fading to pale red at maturity, apices maize-yellow or pale to deep orange when mature, spores 8-13 x 3-4.5  $\mu\text{m}$  ..... see *R. araiospora* var. *araiospora* (99)
20. Branches intensely magenta red with blue tones, fading to pale red, apices magenta in mature specimens, spores 8-14 x 3-5  $\mu\text{m}$  ..... *R. araiospora* var. *rubella* (not in handbooks)

**Key to species of the subgenus *Lentoramaria* and *Echinoramaria***

- 1 Spores distinctly spiny ..... see *R. abietina* (90)
1. Spores smooth or warted, not spiny ..... 2
2. Spores small, 5-6.5 x 3.5-4  $\mu\text{m}$ , skeletal hyphae strongly cyanophilic, resembles *Ramariopsis kunzei* ..... see *R. gracilis* (108)
2. Spores large, 6.5-11 x 3.5-6  $\mu\text{m}$ , skeletal hyphae not cyanophilic, does not resemble *Ramariopsis kunzei* ..... 3
3. Generative hyphae with inflated clamp connections, up to 13  $\mu\text{m}$  in diameter, coarsely ornamented, spores 7-11 x 4.4-6  $\mu\text{m}$ , cyanophilic warts in subspirals ..... see *R. rainierensis* (113)
3. Generative hyphae without ornamentation ..... 4
4. Sporocarps with pink-cinnamon coloration ..... 5
4. Sporocarps with brown coloration ..... 6
5. Rhizomorphs white, changing to bright pink in 10 percent KOH ..... *R. rubella* f. *rubella* (not in handbooks)
5. Rhizomorphs white, unchanging in 10 percent KOH ..... see *R. rubella* f. *blanda* (114)
6. Sporocarps up to 7 cm tall, stem indistinct to short often branched at the base, branches few and erect, pallid ochre to pink-brown, axils concolorous without green coloration ..... see *R. suecica* (93)
6. Sporocarps up to 14 cm tall, stem distinct, branches dull brown to orange-brown, axils concolorous or green ..... 7
7. Branches open and lax, curved ascending, axils without green coloration ..... see *R. concolor* f. *marrii* (104)
7. Branches crowded and erect, axils with green coloration ..... see *R. concolor* f. *tsugina* (91)

**Synoptic key to *Ramaria* species contained in the ROD**

- |   |  |
|---|--|
| 1. <i>R. abietina</i>                                       | 17. <i>R. hilaris</i> var. <i>olympiana</i>    |
| 2. <i>R. amyloidea</i>                                      | 18. <i>R. largentii</i>                        |
| 3. <i>R. araiospora</i> var. <i>araiospora</i>              | 19. <i>R. lorithamnus</i>                      |
| 4. <i>R. aurantiisiccescens</i>                             | 20. <i>R. maculatipes</i>                      |
| 5. <i>R. botrytis</i> var. <i>aurantiiramosa</i>            | 21. <i>R. ochraceovirens</i>                   |
| 6. <i>R. celerivirescens</i>                                | 22. <i>R. rainierensis</i>                     |
| 7. <i>R. concolor</i> f. <i>marrii</i>                      | 23. <i>R. rubella</i> f. <i>blanda</i>         |
| 8. <i>R. concolor</i> f. <i>tsugina</i>                     | 24. <i>R. rubribrunnescens</i>                 |
| 9. <i>R. fasciculata</i> var. <i>sparsiramosa</i>           | 25. <i>R. rubrievanescentes</i>                |
| 10. <i>R. coulterae</i>                                     | 26. <i>R. rubripermanens</i>                   |
| 11. <i>R. cyaneigranosa</i> var. <i>cyaneigranosa</i>       | 27. <i>R. spinulosa</i> var. <i>diminutiva</i> |
| 12. <i>R. cyaneigranosa</i> var. <i>elongata</i>            | 28. <i>R. stuntzii</i>                         |
| 13. <i>R. cyaneigranosa</i> var. <i>persicina</i>           | 29. <i>R. suecica</i>                          |
| 14. <i>R. gelatiniaurantia</i> var. <i>gelatiniaurantia</i> | 30. <i>R. thiersii</i>                         |
| 15. <i>R. gelatiniaurantia</i> var. <i>violettingens</i>    | 31. <i>R. verlotensis</i>                      |
| 16. <i>R. gracilis</i>                                      |  |

**Macroscopic characteristics**

(Underlined numbers from species list above indicate that species occurs within more than one character.)

**Stem color**

Yellow: 2, 3, 5, 13, 14, 16, 17, 21, 22, 24, 25, 30

Orange: 1, 15, 16, 19, 21, 22, 23, 27, 30

Pink tones: 22

Red to magenta: 20, 31

Olive tones: 31

White to cream: 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 23, 24, 25, 26, 27, 29, 30

Brown: 1, 2, 5, 6, 20, 22, 26

Red-brown: 28

Tan to gray-orange (this could be just tan): 7, 15, 21

**Branch color**

Green: 18, 20, 31

Yellow: 3, 7, 8, 12, 14, 15, 16, 18, 21, 22, 24, 29, 30, 31

Orange: 1, 3, 5, 8, 11, 12, 13, 14, 15, 16, 17, 19, 21, 22, 23, 24, 25, 27, 29, 30

Pink tones: 1, 2, 8, 9, 10, 11, 15, 18, 19, 22, 23, 24, 25, 28, 30

Red to magenta: 2, 27

Red-brown: 9, 28

White to cream: 4, 9, 15, 21, 24, 29

Gray to violet: 1, 7, 26

Brown: 6, 7, 11, 22, 23, 26

Tan-gray: 6, 15, 21

**Branch tip color**

Green: 20, 29

Yellow: 1, 2, 3, 5, 6, 8, 10, 12, 14, 15, 16, 18, 19, 21, 23, 29, 30, 31

Orange: 1, 2, 3, 4, 7, 11, 12, 13, 16, 17, 21, 23, 27, 30

Pink tones: 1, 2, 9, 10, 11, 24, 25, 28, 30

Red to magenta: 2, 19, 24, 25, 27

White to cream: 6, 7, 15, 21, 22, 24, 25, 28

Violet to gray: 1, 26

Brown: 1, 9, 26

Tan to gray-orange: 6, 15, 21

**Stem flesh**

White to cream: 1, 2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 17, 18, 19, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31

Yellow: 2, 3, 16, 22

Orange: 21, 22, 23, 27

Brown: 26

Green tones: 20

Tan to gray-orange: 5

**Stem flesh with brown band**

Present: 1, 5, 9

Absent: 2, 3, 4, 6, 7, 8, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31

**Branch flesh**

Yellow: 1, 2, 3, 5, 8, 10, 12, 13, 14, 16, 19, 23, 29, 30, 31

Orange: 1, 2, 3, 5, 8, 11, 12, 17, 19, 21, 23, 24, 27, 29, 30

Red to magenta: 2, 27

White to cream: 4, 6, 7, 9, 13, 15, 17, 18, 21, 22, 24, 25, 26, 27, 28, 29

Green tones: 20

Tan to gray-orange: 5

**Base of stem a rusty color**

Present: 1, 5, 9, 27

Absent: 2, 3, 4, 6, 7, 8, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 28, 29, 30, 31

**Yellow band on branch exterior**

Present: 3, 12, 13, 15, 30

Absent: 1, 2, 4, 5, 6, 7, 8, 9, 10, 11, 14, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 31

**Color of surface bruising**

Vinaceous: 7, 8, 9, 18

Red: 18, 19, 22, 23, 24

Violet: 1, 8, 9, 14, 24

Brown: 6, 7, 9, 18, 24, 26, 29

Yellow or orange or tan: 3, 4

Blue-green or green: 20, 31

Not bruising: 2, 5, 10, 11, 12, 13, 15, 16, 17, 21, 25, 27, 28, 30

**Context of stem**

Fleshy: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 31

Base gelatinous: 13, 14, 16, 30

**Context of branch**

Fleshy or non-gelatinous: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 31

Gelatinous: 13, 14, 16, 30

**Rhizomorphs**

Present: 6, 7, 15, 20, 21, 22, 28, 31

Absent: 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 23, 24, 25, 26, 27, 29, 30

**Habitat**

Terrestrial: 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, 21, 23, 24, 25, 26, 27, 28, 29, 30

Decayed wood: 6, 7, 15, 22, 31

**Season**

Spring: 9, 25, 29, 31

Autumn: 1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 27, 28, 30, 31

**Microscopic characteristics****Spore ornamentation**

Spiny: 20, 31

Striate: 4, 24, 25

Warts: 1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 23, 26, 27, 28, 29, 30

Smooth or nearly so: 8, 23

**Spore length**

Maximum spore length  $>7 \mu\text{m}$ ,  $\leq 10 \mu\text{m}$ : 1, 6, 7, 8, 9, 11, 15, 18, 20, 21, 22, 26, 27, 28, 30, 31

Maximum spore length  $>10 \mu\text{m}$ ,  $\leq 15 \mu\text{m}$ : 2, 3, 4, 5, 11, 10, 12, 13, 14, 16, 17, 19, 23, 24, 25, 27, 30

Maximum spore length  $>15 \mu\text{m}$ : 4, 29

**Spore width**

Spore width (maximum)  $\leq 4 \mu\text{m}$ : 1, 7, 9, 15, 28

Spore width (maximum)  $>4 \mu\text{m}$ ,  $=5 \mu\text{m}$ : 2, 3, 6, 7, 11, 13, 14, 15, 16, 17, 19, 20, 23, 24, 25, 26, 27, 28, 29, 30, 31

Spore width (maximum)  $>5 \mu\text{m}$ ,  $=6 \mu\text{m}$ : 4, 5, 10, 12, 18, 21, 22, 24, 26, 27, 28, 30

Spore width (maximum)  $>6 \mu\text{m}$ : 8, 30

**Cyanophilic granules in basidia**

Present: 1, 10, 11, 12, 21, 23, 24, 25, 27, 30

Absent: 2, 30, 31

Unknown: 3, 4, 5, 6, 7, 8, 9, 13, 14, 15, 16, 17, 18, 19, 20, 22, 26, 28, 29

**Clamps in basidia or trama**

Present: 1, 4, 6, 7, 15, 17, 19, 20, 21, 22, 24, 25, 28, 29, 31

Absent: 2, 3, 5, 8, 9, 10, 11, 12, 13, 14, 16, 18, 23, 26, 27, 30

**Gleoplerous hyphae**

Present: 1, 2, 3, 4, 5, 10, 11, 12, 13, 14, 17, 18, 19, 20, 22, 23, 24, 25, 27, 28, 29, 30

Absent: 2, 3, 5, 6, 7, 8, 9, 15, 16, 20, 21, 22, 23, 26, 31

**Macrochemical test on sporocarp flesh****Melzer's reagent**

Reactive turning flesh dark purple or blue-black: 1, 4, 5, 19, 24, 25, 27

Non-reactive or some shade of brown but not dark brown or purple: 2, 3, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 20, 21, 22, 23, 26, 28, 29, 30, 31

**Ferric sulfate**

Reactive turning flesh blue-green to green: 1, 5, 9, 31

Non-reactive: 2, 3, 4, 6, 7, 8, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30

### F. Key to earth tongues and allies

1. Basidia present, sporocarps small, white, spatulate, with mosses ..... see *Cyphellostereum laeve* (60)
1. Asci present ..... 2
2. Sporocarps attached to sequestrate (truffles) sporocarps with soil ..... 3
2. Sporocarps not attached to sequestrate (truffles) sporocarps ..... 4
3. Sporocarp capitate, partospores cylindrical to subfusoid ..... see *Cordyceps capitata* (52)
3. Sporocarp clavate, partospores truncate ..... see *Cordyceps ophioglossoides* (53)
4. Sporocarps cylindrical to clavate, spores obtusely fusoid, 2.5-4 x 4.5-5.5  $\mu\text{m}$   
..... see *Podostroma alutaceum* (89)
4. Sporocarps capitate ..... 5
5. Spore-bearing tissue pink-cinnamon, stem brown to gray-purple brown, spores globose 18-24  $\mu\text{m}$  in diam  
..... see *Cudonia monticola* (59)
5. Spore-bearing tissue bright orange to pale orange, stem creamy white, spores fusiform to cylindrical  
9-13 x 2-3  $\mu\text{m}$  ..... see *Bryoglossum gracile* (14)

### G. Key to cups and allies

1. Cup yellow, red, or orange ..... 2
1. Cup gray, dark brown to purple or black ..... 5
2. Cup with well-developed stem in youth, fruiting in fall ..... see *Sowerbyella rhenana* (135)
2. Cup without stem, or fruiting in spring ..... 3
3. Fruiting on twigs or foliage of *Chamaecyparis nootkatensis*, usually near melting snow  
..... see *Gelatinodiscus flavidus* (48)
3. Fruiting on some other substrate, cup bright orange ..... 4
4. Cups 5 to 35 mm diam., on soil ..... see *Pseudaleuria quinaultiana* (97)
4. Cups 1-1.5 mm diam., on twigs or foliage of *Abies* sp., usually near melting snow  
..... see *Pithya vulgaris* (94)
5. Interior of sporocarp gelatinized ..... 6
5. Interior of sporocarp not gelatinized ..... 7
6. Spores capsule shaped, sporocarp with olive tones, interior not highly gelatinized  
..... see *Sarcosoma latahense* (132)
6. Spores elliptical, interior highly gelatinized, sporocarp lacking olive tones  
..... see *Sarcosoma mexicana* (133)
7. Sporocarps flat or cup shaped, lacking a stem ..... 8
7. Sporocarp erect, ear shaped or stipitate and urnulate or enclosed when young ..... 10
8. Spores capsule shaped, spores 24-38 x 9-12  $\mu\text{m}$  ..... see *Sarcosoma latahense* (132)
8. Spores ellipsoid, spores shorter ..... 9
9. Spores 21-24 x 8-10  $\mu\text{m}$ ; sporocarps with orange granules ..... see *Plectania melastoma* (88)
9. Spores (24.4-) 26.3-27.6 (-28.9) x 10.5-12.5  $\mu\text{m}$  ..... see *Plectania milleri* (95)

- 10. Sporocarps with urnulate spore-bearing tissue ..... 11
- 10. Sporocarps erect and ear shaped ..... 12
- 11. Spores 23-32 x 8-10.5  $\mu\text{m}$ , with low ridges and warts ..... see *Neournula pouchetii* (77)
- 11. Spores 15-22 x 7-9  $\mu\text{m}$ , smooth to minutely verrucose ..... see *Sarcosphaera coronaria* (101)
- 12. Sporocarp sessile, brown to deep purple-brown ..... see *Otidea smithii* (84)
- 12. Sporocarp somewhat stipitate, yellow, pale brown-orange to brown-yellow ..... 13
- 13. Sporocarps pale yellow, pale brown-orange to dull yellow, with pink tinges on spore-bearing tissue  
..... see *Otidea onotica* (83)
- 13. Sporocarps yellow-brown to red-brown, without pink tinges on spore-bearing tissue  
..... see *Otidea leporina* (82)

#### H. Key to elfin saddles and false morels

- 1. Cap saddle shaped, lobed or cupshaped ..... 2
- 1. Cap irregularly convoluted or wrinkled ..... 5
- 2. Cap in youth with margins uplifted, abhymenial surface distinctly pubescent ..... 3
- 2. Cap margins never distinctly uplifted, abhymenial surface glabrous ..... 4
- 3. Stem round in cross section, hymenial surface dark gray-brown, even ..... see *Helvella compressa* (54)
- 3. Stem ridged, hymenial surface gray-brown, mottled ..... see *Helvella maculata* (57)
- 4. Cap saddle shaped, stem round in cross section ..... see *Helvella elastica* (56)
- 4. Cap cup shaped, stem with deep ribs, ribs rounded ..... see *Helvella crassitunicata* (55)
- 5. Spores 12-14  $\mu\text{m}$  long ..... see *Gyromitra melaleucooides* (74)
- 5. Spores >15  $\mu\text{m}$  long ..... 6
- 6. Stem ribbed, flushed with pink tinges, spores 16.1-20.3 x 8.4-10.7  $\mu\text{m}$  ..... see *Gyromitra californica* (71)
- 6. Stem not ribbed, pink tinge absent, occasionally pink-tan, spores  $\geq 20$   $\mu\text{m}$  long ..... 7
- 7. Spores large (21.4-) 24.3-35.8 (-37.5) x 10.7-15.8  $\mu\text{m}$  ..... see *Gyromitra montana* (75)
- 7. Spores smaller ..... 8
- 8. Spores (17-) 20-23 (-26) x 7-10  $\mu\text{m}$ , cap forked ..... see *Gyromitra infula* (73)
- 8. Spores 20-26 x 10-13  $\mu\text{m}$ , cap not forked ..... see *Gyromitra esculenta* (72)

#### I. Key to sequestrate fungi

- 1. Sporocarp surface more or less evenly covered with round to angular warts (use hand lens) ..... **Ascomycetes**
- 1. Sporocarp surface not warty ..... 2
- 2. Sporocarp solid in cross section (use hand lens) ..... 3
- 2. Sporocarp with one to many empty or spore-filled canals or chambers ..... 4
- 3. Sporocarp interior gelatinous or exuding a sticky fluid ..... **Basidiomycetes and Zygomycetes**
- 3. Sporocarp interior firm to crisp, not exuding a sticky fluid ..... **Ascomycetes**
- 4. Chambers single to many, >3 mm broad ..... **Ascomycetes**

- |    |  |                                       |
|----|--|---------------------------------------|
| 4. | Chambers or canals <3 mm broad .....   | 5                                     |
| 5. | Sporocarp with a stem or stemlike tissue in vertical cross section .....         | <b>Basidiomycetes</b>                 |
| 5. | Sporocarp lacking a stem or stemlike tissue in vertical cross section .....      | 6                                     |
| 6. | Sporocarp with rhizomorphs at base or appressed on surface .....                 | <b>Basidiomycetes</b>                 |
| 6. | Sporocarp lacking rhizomorphs .....  | 7                                     |
| 7. | Sporocarp interior with long, meandering canals .....                            | <b>Ascomycetes</b>                    |
| 7. | Sporocarp interior with rounded to slightly elongate or irregular chambers ..... | 8                                     |
| 8. | Sporocarp flesh soft, white to yellow or brown .....                             | <b>Basidiomycetes and Zygomycetes</b> |
| 8. | Sporocarp flesh firm to crisp, gray to brown or purple .....                     | <b>Ascomycetes</b>                    |

### II. Key to sequestrate Ascomycetes

(Spore measurements exclude ornamentation.)

- |    |  |   |
|----|--|---|
| 1. | Sporocarp with one to many empty or spore-filled chambers or canals .....              | 2                                       |
| 1. | Sporocarp solid, often marbled with veins .....  | 6                                       |
| 2. | Peridium >3 mm thick, chambers one or a few, often broader than 3 mm .....             | 3                                       |
| 2. | Peridium <2 mm thick, chambers or canals many, generally less than 3 mm broad .....    | 4                                       |
| 3. | Peridium smooth, pale colored, spores 14-23 $\mu\text{m}$ .....                        | see <i>Elaphomyces subviscidus</i> (36) |
| 3. | Peridium finely warty, nearly black, spores 21-25 $\mu\text{m}$ .....                  | see <i>Elaphomyces anthracinus</i> (35) |
| 4. | Sporocarp surface coarsely and sharply verrucose .....                                 | see <i>Balsamia nigrens</i> (9)         |
| 4. | Sporocarp surface not coarsely verrucose but may be minutely roughened .....           | 5                                       |
| 5. | Spores with crowded, flexuous tapered spines 2-3 (-4) $\mu\text{m}$ tall .....         | see <i>Hydnotrya inordinata</i> (58)    |
| 5. | Spores with crowded mucilage-embedded spines $\pm 1$ $\mu\text{m}$ tall .....          | see <i>Hydnotrya subnix</i> (59)        |
| 6. | Gleba brown to black brown marbled with narrow, white veins .....                      | 7                                       |
| 6. | Gleba white to pale yellow marbled with narrow, yellow-brown to brown veins .....      | 8                                       |
| 7. | Asci thin walled, mature gleba dark gray-brown marbled with off-white veins .....      | see <i>Tuber asa</i> (139)              |
| 7. | Asci thick walled, mature gleba brown to black-brown marbled with white veins<br>..... | see <i>Tuber pacificum</i> (140)        |
| 8. | Spores minutely pitted like a golf ball .....  | see <i>Choiromyces alveolatus</i> (17)  |
| 8. | Spores with irregular, spines and rods, 3-6 $\mu\text{m}$ tall .....                   | see <i>Choiromyces venosus</i> (18)     |

### II. Key to sequestrate Basidiomycetes and Zygomycetes

(Spore measurements exclude ornamentation.)

- |    |   |                                       |
|----|---|---------------------------------------|
| 1. | Spores ornamented .....   | 2                                     |
| 1. | Spores smooth .....   | 25                                    |
| 2. | Spore ornamentation of ridges .....                               | 3                                     |
| 2. | Spore ornamentation of cones, rods, warts, or reticulation .....  | 4                                     |
| 3. | Sporocarp staining blue, spores 13-22 x 10-16 $\mu\text{m}$ ..... | see <i>Chamonixia caespitosa</i> (16) |



3. Sporocarps not staining blue, spores 17-24 x 8-12  $\mu\text{m}$ , locules large ..... see *Gautieria magnicellaris* (46)
3. Sporocarps not staining blue, spores 13-18 x 5-7  $\mu\text{m}$ , locules small ..... see *Gautieria othii* (47)
4. Spores amyloid ..... 5
4. Spores inamyloid ..... 15
5. Sporocarp exuding latex from cut surface ..... 6
5. Sporocarp not exuding latex from cut surface ..... 8
6. Peridium orange-red, odor distinctly sweet of maple sugar ..... see *Arcangeliella camphorata* (6)
6. Peridium not orange-red, odor pleasant, not of maple sugar ..... 7
7. Peridium with nests of large sphaerocysts with thickened walls ..... see *Arcangeliella crassa* (7)
7. Peridium without sphaerocysts ..... see *Arcangeliella lactarioides* (8)
8. Sporocarp somewhat agaric in form or shape ..... 9
8. Sporocarp without distinct stem-columella, usually more or less potato shaped ..... 11
9. Spores globose 10-15  $\mu\text{m}$ , gleba white to tan ..... see *Macowanites mollis* (66)
9. Spores ellipsoid, gleba with orange tones ..... 10
10. Spores 8-9.5 x 6.5-7.5  $\mu\text{m}$ , gleba orange-brown, odor of chlorine ..... see *Macowanites chlorinosmus* (64)
10. Spores 7-13 x 7-12  $\mu\text{m}$ , no chlorine odor ..... see *Cystangium* (as *Macowanites*) *lymanensis* (65)
11. Spores globose, 7-9  $\mu\text{m}$  ..... see *Gymnomyces nondistincta* (51)
11. Spores ellipsoid ..... 12
12. Peridial epicutis an epithelium ..... see *Cystangium* (as *Martellia*) *maculata* (70)
12. Peridial epicutis not an epithelium ..... 13
13. Macrocytidia present ..... see *Cystangium* (as *Martellia*) *idahoensis* (69)
13. Macrocytidia absent ..... 14
14. Odor of vanilla, peridium with a turf of dermatocystidia ..... see *Gymnomyces* (as *Martellia*) *fragrans* (68)
14. Odor not distinctive, peridium without dermatocystidia ..... see *Gymnomyces abietis* (50)
15. Spores colorless in KOH ..... 16
15. Spores brown in KOH ..... 17
16. Sporocarps yellow, trama lacks inflated cells, spores 8-11 x 8-9  $\mu\text{m}$  ..... see *Leucogaster citrinus* (62)
16. Sporocarps white with yellow stains, spores 6-10 x 5-6  $\mu\text{m}$  ..... see *Leucogaster microsporus* (63)
17. Spores globose ..... 18
17. Spores ellipsoid ..... 19
18. Spores 13-18  $\mu\text{m}$ , with cones up to 5  $\mu\text{m}$  tall, peridium staining blue ..... see *Octavianina cyanescens* (79)
18. Spores 14-17  $\mu\text{m}$ , spines up to 3  $\mu\text{m}$  tall, peridium not staining ..... see *Octavianina papyracea* (81)
19. Spores 17-23 x 12-16  $\mu\text{m}$  with spines up to 1.5  $\mu\text{m}$  tall ..... see *Octavianina macrospora* (80)
19. Spores smaller, ornamentation up to 1  $\mu\text{m}$  tall ..... 20

20. Sporocarps agariclike, with a persistent veil ..... 21
20. Sporocarps potatolike, veil absent ..... 24
21. Spores large 14-18 x 9-10  $\mu\text{m}$  ..... see *Thaxterogaster pavelekii* (136)
21. Spores not longer than 13  $\mu\text{m}$  ..... 22
22. Sporocarp pale brown to yellow-brown, spores with coarse warts  
..... see *Cortinarius verrucisporus* (29)
22. Sporocarp white to tan, spore ornamentation not coarse ..... 23
23. Basidia small 17-22 x 5.5-7  $\mu\text{m}$  ..... see *Cortinarius wiebeae* (30)
23. Basidia large 27-40 x 7-10  $\mu\text{m}$  ..... see *Cortinarius magnivelatus* (24)
24. Sporocarps not staining pink, basidia four spored ..... see *Destuntzia fusca* (32)
24. Sporocarps staining pink, basidia one spored ..... see *Destuntzia rubra* (33)
25. Spores large >40  $\mu\text{m}$  in diameter or basidia absent ..... 26
25. Spores smaller <30  $\mu\text{m}$  in length or diameter or basidia present ..... 28
26. Spores 77-150 x 44-120  $\mu\text{m}$ , walls 5-7  $\mu\text{m}$  in diameter ..... see *Endogone oregonensis* (38)
26. Spores less than 100  $\mu\text{m}$  in diameter or length ..... 27
27. Spores 60-110 x 48-75  $\mu\text{m}$ , walls 4-8  $\mu\text{m}$  thick ..... see *Glomus radiatum* (49)
27. Spores 15 x 30-80 x 59  $\mu\text{m}$ , walls  $\leq 5$   $\mu\text{m}$  thick ..... see *Endogone acrogena* (37)
28. Spores honey-colored, smokey black or dark brown in KOH ..... 29
28. Spores colorless in KOH ..... 31
29. Spores 7.5-9 x 5.5-6.3  $\mu\text{m}$ , with a apical pore ..... see *Nivatogastrium nubigenum* (78)
29. Spores  $\geq 19$   $\mu\text{m}$  long, without a apical pore ..... 30
30. Gleba powdery, at maturity spores 23-26 x 13-16  $\mu\text{m}$  ..... see *Sedecula pulvinata* (134)
30. Gleba lamellate-loculate, not powdery, at maturity spores 19-30 x 6-9  $\mu\text{m}$   
..... see *Chroogomphus loculatus* (19)
31. Sporocarp boletelike with a distorted or reduced stem ..... 32
31. Sporocarp potatolike without a reduced stem but sometimes with a sterile base ..... 37
32. Peridium and stem pale buff to pale olive buff ..... see *Gastroboletus subalpinus* (42)
32. Peridium gray-yellow, rose to red-brown, bright yellow or dark sordid brown ..... 33
33. Stem with glandular dots, spores 7-10 x 3.5-4  $\mu\text{m}$  ..... see *Gastrosuillus umbrinus* (45)
33. Stem without glandular dots ..... 34
34. Sporocarps bright yellow and red, staining red, spores 13-18 x 6-7  $\mu\text{m}$  ..... see *Gastroboletus vividus* (43)
34. Sporocarps not bright yellow, if with red tones then staining blue ..... 35
35. Sporocarps gray-yellow with dark olive tints, spores 7-10 x  $\pm 2.5$   $\mu\text{m}$  ..... see *Gastroboletus imbellus* (40)
35. Sporocarps with shades of rose to red-brown, spores wider ..... 36

36. Spores 9-15 x 4-6  $\mu\text{m}$  ..... see *Gastroboletus ruber* (41)
36. Spores 13-18 x 6.5-9.5  $\mu\text{m}$  ..... see *Gastroboletus turbinatus* (67)
37. Spores amyloid ..... 38
37. Spores inamyloid but sometimes dextrinoid ..... 39
38. Spores 6-9 x 3-5  $\mu\text{m}$ , basidia 7-9  $\mu\text{m}$  in diameter, tamal hyphae 4-7  $\mu\text{m}$  in diameter  
..... see *Rhizopogon chamaleontinus* (123)
38. Spores 7-9 x 3-4  $\mu\text{m}$ , basidia 5-7  $\mu\text{m}$  in diameter, tramal hyphae 2-3  $\mu\text{m}$  in diameter  
..... see *Rhizopogon atroviolaceus* (95)
39. Gleba pink ..... 40
39. Gleba olive to brown or yellow-brown ..... 42
40. Sporocarps yellow to vivid yellow, spores 7-9 x 3-5  $\mu\text{m}$  ..... see *Rhizopogon truncatus* (96)
40. Sporocarps not vivid yellow, spores larger or smaller ..... 41
41. Spores 5-7 x 3-4  $\mu\text{m}$  ..... see *Alpova alexsmithii* (4)
41. Spores 10-13 x 4-5  $\mu\text{m}$  ..... see *Fevansia aurantiaca* (39)
42. Peridium staining red ..... 43
42. Peridium not staining red ..... 45
43. Peridium staining red then inky-fuscous, with amyloid globules in peridium, spores 3-3.5  $\mu\text{m}$  in diameter  
..... see *Rhizopogon inquinatus* (128)
43. Peridium without amyloid globules ..... 44
44. Peridium staining pink to vinaceous, spores 7.5-13 x 3-5  $\mu\text{m}$  ..... see *Rhizopogon abietis* (94)
44. Peridium staining ochraceous then red, spores 6.5-7.5 x 2  $\mu\text{m}$   
..... see *Rhizopogon evadens* var. *subalpinus* (125)
45. Peridium with yellow when fresh; a shade of red in KOH; spores 5.5-6.5 x 2.5-2.8  $\mu\text{m}$   
..... see *Rhizopogon flavofibrillosus* (127)
45. Peridium without yellow; not a shade of red in KOH; spores longer or broader ..... 46
46. Spores  $\geq 7$   $\mu\text{m}$  long ..... 47
46. Spores  $\leq 6.5$   $\mu\text{m}$  long ..... 48
47. Spores 7-8 x 5-5.5  $\mu\text{m}$  ..... see *Rhizopogon exiguus* (126)
47. Spores 8-10 x 3-4  $\mu\text{m}$  ..... see *Alpova olivaceotinctus* (5)
48. Spores 5-6.5 x 1.8-2.3  $\mu\text{m}$  ..... see *Rhizopogon brunneiniger* (122)
48. Spores 4.5-6 x 3-4  $\mu\text{m}$  ..... see *Rhizopogon ellipsosporus* (124)

#### J. Key to stalked polypores and toothed fungi

1. Sporocarps on wood ..... 2
1. Sporocarps on soil ..... 5
2. Sporocarps stipitate with spatulate spore-bearing tissue ..... see *Spathularia flavida* (103)
2. Sporocarps conklike or flabby or rubbery, with pink tinges ..... 3

3. Sporocarps flabby or rubbery, spore-bearing tissue smooth to slightly wrinkled, pink tinged ..... see *Tremiscus helvelloides* (105)
3. Sporocarp woody or tough fibrous, conklike ..... 4
4. Cap yellow-orange, purple-brown in age or on drying, amyloid spores with warts or ridges ..... see *Bondarzewia mesenterica* (12)
4. Cap often large (>50 cm), surface extremely shaggy, on or near dead *Abies* spp. .... see *Bridgeporus nobilissimus* (13)
5. Sporocarps with pores ..... 6
5. Sporocarps with spines ..... 9
6. Spores 8-11 x 5-8  $\mu\text{m}$  ..... see *Albatrellus ellisii* (35)
6. Spores <7  $\mu\text{m}$  long ..... 7
7. Spores 3.5-4 x 2.5-3  $\mu\text{m}$  ..... see *Albatrellus fletti* (36)
7. Spores larger and wider ..... 8
8. Cap purple-brown, becoming orange to tan with dark scales, spores 4.8-6 x 3.4-4.5  $\mu\text{m}$  ..... see *Albatrellus avellaneus* (2)
8. Cap surface and pores gray to blue, maturing to pale gray-brown, spores 4-6 x 3-5  $\mu\text{m}$  ..... see *Albatrellus caeruleoporus* (3)
9. Sporocarps blue-black to black, spores 3.8-4.2 x 3.3-3.8  $\mu\text{m}$  ..... see *Phelledon atratus* (87)
9. Sporocarps yellow, orange-yellow, tan, brown, red-brown or nearly black, if nearly black then spores >6  $\mu\text{m}$  long and >5  $\mu\text{m}$  wide ..... 10
10. Sporocarps pale yellow to orange, spores 9-10  $\mu\text{m}$  long ..... see *Hydnum umbilicatum* (76)
10. Sporocarps tan to red-brown to nearly black, spores <8  $\mu\text{m}$  long ..... 11
11. Sporocarps tan to red-brown ..... see *Sarcodon imbricatus* (100)
11. Sporocarps nearly black ..... see *Sarcodon fuscoindicum* (99)



## **Species Information**

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## English Equivalent

When you know:	Multiply by:	To find:
Micrometers ( $\mu\text{m}$ )	$3.9 \times 10^{-5}$	Inches
Millimeters (mm)	0.039	Inches
Centimeters (cm)	0.39	Inches
Meters (m)	3.281	Feet
Kilometers (km)	0.625	Miles
Celsius	1.8 and add 32	Fahrenheit
Liters	1.057	Quart

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## Appendix 1

### Helpful Hints to Working With the Synoptic Key to *Ramaria* Species

A synoptic key to the ROD-listed *Ramaria* species, in addition to a dichotomous key, is provided. Although learning to use a synoptic key requires patience and persistence, synoptic keys often are easier to use than dichotomous keys, particularly for the novice. Species identification with a synoptic key requires evaluating a sequence of characters to continually narrow the list of potential species, thereby allowing comparison of morphological similarities between species. Synoptic keys are easily expanded and less likely to lead the user astray than dichotomous keys (Castellano and others 1989).

Each species in a synoptic key is assigned a number and arranged in alphabetical order. In addition to ROD-listed *Ramaria* species, a few additional *Ramaria* species have been included in our key to facilitate accurate identification of those in the ROD. The key is divided into two sections: macroscopic and microscopic characters. Each section contains many categories of characters, such as stem, branch, and flesh colors. Each character is followed by a list of numbers corresponding to *Ramaria* species with that character. The number is underlined if the character is variable and thus is found under more than one character state. Multiple tallies per character indicate a range of characters, or a character and its modifier, or weak characters that may be present or absent.

*Ramaria* species identification requires precise microscopic examination. To observe the necessary features, it is necessary to mount a thin piece of sporocarp tissue in a drop of Melzer's reagent or KOH on a microscope slide. A mount too thick will result in frustration and unnecessary time spent focusing up and down through the material. A sharp razor blade is essential for producing thin mounts, especially with fresh or dried gelatinized material. The ability to distinguish between similar characters microscopically, such as slightly rounded versus rod-shaped spore ornamentation, initially is difficult and requires practice. Success with microscopy requires familiarity with a properly adjusted and calibrated microscope. An improperly adjusted microscope can distort the image of spores or tissue measurements by as much as 10 percent. Such imprecision could lead to the selection of an incorrect set of characters and result in incorrect species identification.

Categorizing color variation is subjective and therefore difficult. Because *Ramaria* spp. often change color with age, specimens may be described differently at different phenological stages. A minimal list of color headings, common to *Ramaria* species, is provided.

## Appendix 2

### Collection, Preservation, and Mailing: Tips, Suggestions, and Data Forms

#### Collecting Tips

It is important to collect the entire specimen. Some ROD species like *Phaeocollybia* have an extremely long, radicate stem that can extend more than 0.3 m into the soil. Others like *Cortinarius* have bulbous bases. And still others, such as *Ramaria*, can have multiple bases, mycelial mats, and rhizomorphs that can be important in identification. *Cordyceps* grow from a buried larvae or truffle, and the ROD-listed *Asterophora lycoperdoides* and *Collybia racemosa* grow on other rotting mushrooms.

It is best to use some sort of digging tool when excavating specimens to preserve integrity and fragile characters such as veil remnants and cortina.

Collect individuals of all ages when possible, particularly *Cortinarius* and *Ramaria* whose colors fade rapidly with maturation.

It is important to know the substrate: wood, litter-duff, moss, soil, rotten fungi. Along with color notes, this is best noted at the time of collection. Use the field tag provided.

It is critical to describe the colors present on ALL fresh specimens! Detailed notes are needed for *Ramaria* and all agarics, particularly *Phaeocollybia* and *Cortinarius*. Color guides can be helpful. Be as detailed as possible. Use other colors as modifiers; for example, red-brown, pale salmon with yellow tints, drab olive with violet tones, bright yellow, chalk white, slightly darker than ivory, dusty tan, etc.

Place specimens into heavyweight foil, wax bags, or plastic boxes. Some moisture must be preserved, but plastic bags will cause the fungus to rot quickly. We prefer using foil for larger fungi because when packaged loosely, it protects the specimen better than paper.

We have found that plastic tackle and craft boxes with movable dividers work well for collecting small fungi and also allow ready storage in the refrigerator.

Place individually wrapped specimens into a sturdy container such as a 5-gallon bucket or basket to avoid squashing them.

Do not mix collections when collecting and storing specimens. Regularly clean your collecting materials (stray spores can hinder identification).

Spores must be mature when measured for species determination. Sometimes spore maturation in ascomycetes can be induced by placing a damp paper towel in the container with the specimen in the refrigerator. Allow a few days or even a week or two, checking regularly for decay, for maturation to occur.

#### What to Send and How to Send It

The survey and manage interagency taxa expert should verify all collections made. We accept vouchers of any fungus species from table C-3 of the ROD. Because of the ephemeral nature of fungi and the unsettled nature of fungal taxonomy, we must have a physical specimen for it to be recorded as a known site.

Even professional mycologists make errors in determining fungi in the field. It is important to send us collections for verification.

If possible, take a photo (preferably a slide) of the fungus before drying it. A photographic record can be extremely useful in making species determinations as well as for educational use. The optimal setup is to use a macro lens and ring flash with 64 ISO film (or 200 if nothing else is available) with a neutral gray background and something for scale.

**Specimens must be sent completely dried, unless prior arrangements are made.**

Use a food dehydrator that has a fan, at low to medium temperature (32.2-51.7 °C). Cut at least one specimen in half, particularly truffles. It is preferable to cut large specimens such as *Ramaria*, *Gomphus*, *Phaeocollybia*, *Bondarzewia*, etc., to facilitate dehydration and storage.

Package dried specimens individually, then package securely by using some sort of packing material, and mail in cardboard boxes. **Do not send fungi in unpadded envelopes.** Include your determination, the site form, maps, and descriptive notes on a field tag or one of the seven fungi description forms.

Each specimen should be accompanied by complete location data, habitat information, notes describing the specimen when fresh (color, texture, taste, odor), collection date, unique collection number, and person to contact. **Without this information specimens will be extremely difficult to identify, and it will be hard to relocate sites.**

Please try to make a preliminary determination. **When you make your determination, note on the field tag accompanying each specimen what characters led you to this conclusion.** Was it spore length or shape? Colored granules on the abhymenium? Cap color? Hairs on the hymenium? These notes help us with the verification process. They also help us track mistakes so we can be better teachers. If you have doubts or have a particularly rare species, please use one of the seven fungi description forms to describe it in greater depth.

Collections will be accessioned into the herbarium at Oregon State University. On request, a portion can be returned to you if you maintain an herbarium. An optimal collection would consist of multiple specimens both young and mature, properly dried with at least one specimen cut in half. Even if you have only one specimen, send it anyway.

**Completing the Site Form**

This form provides locality and habitat data for each collection site as well as documentation for ROD species found during your survey. Use this form similarly to a threatened and endangered species plant sighting form and any time specimens of potential interest are collected. **You need to fill out only one form per site; list all the fungi collected from that site.**

Fill out the form completely. Our team cannot personally visit every site, and we lack the expert knowledge that you have of the areas where you work.

Instructions are found on the back of the form. A “site” is (1) at least 100 m away or (2) from a different habitat/ecotype within a forested area (for example, a sale unit). Likewise, if you are confident with your field recognition, it is not absolutely necessary to collect a specimen every time it is encountered at a site; once or twice per site is adequate. Differences in habitat or substrate per species should be noted on the field tag.

**Completing the Field Tag**

Field tags are useful while foraging or surveying. They are designed to fit into our collection boxes. Complete one per collection.

The main function of the tag is to ensure that critical data such as location, substrate, and color notes are not lost in the bustle of a field day.

**The field tag is used in addition to the site form; it is not a substitute.**

The following are the fields on the field tag with an explanation of the information asked for.

**Taxon:** Tentative identification of fungus

**Date:** Collection date

**Collector:** Collector of the specimen

**Collection number:** Collection identification number (please be brief, like a license plate):  
Eblin 4756 or M.M2-12-98-a, etc.

**County and state where collection was made:**

**Land owner:** Name of federal agency and subunit: Siuslaw NF, Alsea RD, etc.

**Location and T.R.S.:** A geographical place name, road number, as specific as possible

**Substrate:** Circle appropriate category. If necessary, gently excavate the base of the specimen to determine the substrate.

**Habitat:** Dominant trees, herbs, and shrubs and related notes

**Notes:** Fresh specimen notes: color, taste, odor, shape, detail of habitat or substrate, or other site and specimen information. Use the back as necessary.

Field Tags (to be cut up)

Taxon: \_\_\_\_\_ Date: \_\_\_\_\_  
Collector(s): \_\_\_\_\_ Coll. # \_\_\_\_\_  
WA - OR - CA - County: \_\_\_\_ Land owner: \_\_\_\_\_  
Location and TRS: \_\_\_\_\_  
\_\_\_\_\_  
Wood - Moss - Litter - Soil - Fungus Habitat: \_\_\_\_\_  
\_\_\_\_\_  
Notes (color, taste, odor, shape, etc.): \_\_\_\_\_

Taxon: \_\_\_\_\_ Date: \_\_\_\_\_  
Collector(s): \_\_\_\_\_ Coll. # \_\_\_\_\_  
WA - OR - CA - County: \_\_\_\_ Land owner: \_\_\_\_\_  
Location and TRS: \_\_\_\_\_  
\_\_\_\_\_  
Wood - Moss - Litter - Soil - Fungus Habitat: \_\_\_\_\_  
\_\_\_\_\_  
Notes (color, taste, odor, shape, etc.): \_\_\_\_\_

Taxon: \_\_\_\_\_ Date: \_\_\_\_\_  
Collector(s): \_\_\_\_\_ Coll. # \_\_\_\_\_  
WA - OR - CA - County: \_\_\_\_ Land owner: \_\_\_\_\_  
Location and TRS: \_\_\_\_\_  
\_\_\_\_\_  
Wood - Moss - Litter - Soil - Fungus Habitat: \_\_\_\_\_  
\_\_\_\_\_  
Notes (color, taste, odor, shape, etc.): \_\_\_\_\_

Taxon: \_\_\_\_\_ Date: \_\_\_\_\_  
Collector(s): \_\_\_\_\_ Coll. # \_\_\_\_\_  
WA - OR - CA - County: \_\_\_\_ Land owner: \_\_\_\_\_  
Location and TRS: \_\_\_\_\_  
\_\_\_\_\_  
Wood - Moss - Litter - Soil - Fungus Habitat: \_\_\_\_\_  
\_\_\_\_\_  
Notes (color, taste, odor, shape, etc.): \_\_\_\_\_

Taxon: \_\_\_\_\_ Date: \_\_\_\_\_  
Collector(s): \_\_\_\_\_ Coll. # \_\_\_\_\_  
WA - OR - CA - County: \_\_\_\_ Land owner: \_\_\_\_\_  
Location and TRS: \_\_\_\_\_  
\_\_\_\_\_  
Wood - Moss - Litter - Soil - Fungus Habitat: \_\_\_\_\_  
\_\_\_\_\_  
Notes (color, taste, odor, shape, etc.): \_\_\_\_\_

Taxon: \_\_\_\_\_ Date: \_\_\_\_\_  
Collector(s): \_\_\_\_\_ Coll. # \_\_\_\_\_  
WA - OR - CA - County: \_\_\_\_ Land owner: \_\_\_\_\_  
Location and TRS: \_\_\_\_\_  
\_\_\_\_\_  
Wood - Moss - Litter - Soil - Fungus Habitat: \_\_\_\_\_  
\_\_\_\_\_  
Notes (color, taste, odor, shape, etc.): \_\_\_\_\_

Taxon: \_\_\_\_\_ Date: \_\_\_\_\_  
Collector(s): \_\_\_\_\_ Coll. # \_\_\_\_\_  
WA - OR - CA - County: \_\_\_\_ Land owner: \_\_\_\_\_  
Location and TRS: \_\_\_\_\_  
\_\_\_\_\_  
Wood - Moss - Litter - Soil - Fungus Habitat: \_\_\_\_\_  
\_\_\_\_\_  
Notes (color, taste, odor, shape, etc.): \_\_\_\_\_

Taxon: \_\_\_\_\_ Date: \_\_\_\_\_  
Collector(s): \_\_\_\_\_ Coll. # \_\_\_\_\_  
WA - OR - CA - County: \_\_\_\_ Land owner: \_\_\_\_\_  
Location and TRS: \_\_\_\_\_  
\_\_\_\_\_  
Wood - Moss - Litter - Soil - Fungus Habitat: \_\_\_\_\_  
\_\_\_\_\_  
Notes (color, taste, odor, shape, etc.): \_\_\_\_\_

## Completing the Fungal Lot Form

This form is used by the Corvallis survey and manage team to track specimens in a database. Some field users have found it useful for their own records as well.

Separate collections into taxa groups as follows. Use separate forms for each taxa group (electronic forms are available from the survey and manage team). Circle the appropriate taxa group at the top of the page. Please leave the “final determination” field blank; we will fill that in and return the form to you when identifications are complete. You can use one set of site forms per taxa group.

Collection date: Use the DAY-MONTH-YEAR format with month spelled out. Examples: 05APRIL2001; 10SEPT2000.

Collector’s name: Your name.

Collection number: Your tracking number for each specimen. Often formatted as a number and letter system using the collector’s name, initials, collection number, or date. Examples: Fondrick-232; JS04May98-1. HINT: Long collection numbers may lead to confusion and frustration. Be as brief as possible; “license-plate” format works well.

Substrate: Soil, wood, moss, or litter.

Tentative determination: Your determination of what the species is, or at least a general description of the specimen. Examples: *Ramaria* spp.; *Craterellus tubaeformis*; black cup with orange granules; or chunky orange-brown polypore with no stem.

### TAXA GROUPS:

#### Gilled Fungi

Mushrooms

Use separate form for *Cortinarius*

#### *Cortinarius*

Rusty spored with veil

#### Ascomycete Fungi

Elfin saddles (*Gyromitra*, *Helvella*)

Cup fungi

Earth tongues (*Spathularia*, *Cudonia*)

#### Nongilled Fungi

Clublike (*Clavariadelphus*)

Cantharellaceae (chanterelles)

Toothed (*Hydnum*, *Sarcodon*)

Jelly fungi (*Tremiscus*)

Boletes

Polypores (*Bondarzewia*, *Albatrellus*)

#### Coral Fungi

*Ramaria*

#### Sequestrate Fungi

Form underground fruiting body



### Directions for Survey and Manage Fungi Site Form

Fill out one site form per site (at least 100 m apart or different habitat)

**CVS plot number/site ID:** For field crews to complete.

**Collectors:** List collector(s).

**Date:** Date collection(s) were made.

**Land ownership:** Select: Bureau of Land Management (BLM), USDA Forest Service (USFS), state, or private.

**Land allocation:** Specify if this location is in a late-successional reserve, managed late-successional area, matrix, adaptive management area, area of critical environmental concern, research natural area, botanical special interest area, riparian reserve, wilderness, or describe others.

**Forest/district/resource area:** Specify which national forest and district or BLM district and resource area.

**State and county:** Specify, please do not abbreviate county.

**Quad name:** Write quad name and circle appropriate map scale. Please do not abbreviate.

**TRS:** Township, range, section, sixteenth of the quarter section, quarter.

**Meridian:** Found on USGS and forest map. Willamette is western Washington and Oregon, Humboldt is northwest California, Mount Diablo is northeast California; circle the appropriate one.

**Complete one of the following, either latitude and longitude or UTM:**

**Latitude and longitude:** Please record in decimal form. Please record to 4 decimal places.

**Universal Transverse Mercator (UTM):** Please use datum NAD27. Record UTM E (Easting), then UTM N (Northing).

**Location/directions to site:** Provide a **geographical place name** such as Icicle River campground, Salmon Berry wayside, Hart Mountain, Johnny Creek trail. Also provide clear, detailed directions sufficient for someone unfamiliar with the area to relocate site. Include road numbers, mileage from road junctions and distance and azimuth from road. Map the location on the appropriate topographic map and label with quad name, township, range, section, sixteenth, and quarter. Give approximate distance in miles from nearest municipality or ranger station.

**Elevation, slope, and aspect:** Please be as accurate as possible, specify units where appropriate.

**Topography:** Circle the appropriate categories or briefly describe area.

**Habitat:** List dominant overstory trees, indicator shrub and herb species. Use full species name (*Pinus ponderosa*), not acronym (PIPO). Note and describe plant association and successional stage if possible. Note general amount, size, and decay class of coarse woody debris. Describe any interesting or unusual observations of habitat. Note substrate if appropriate.

**List species collected:** List names of species collected at site; tentative determinations are OK.



**Survey and Manage Fungi Site Form**

Complete one site form per site.

CVS plot #/site ID number \_\_\_\_\_

Multiple specimens at the same site need only one site form.

Collector(s): \_\_\_\_\_ Date: \_\_\_\_\_

Land ownership: **BLM USFS State Private** Land allocation: \_\_\_\_\_

Forest/district/resource area: \_\_\_\_\_

State: \_\_\_\_\_ County: \_\_\_\_\_ Quad name: \_\_\_\_\_ 7.5 min/ 15 min

T: \_\_\_ R: \_\_\_ Sec. \_\_\_ 1/16 \_\_\_ 1/4 \_\_\_ Meridian: Willamette Mount Diablo Humboldt

Latitude (4 decimal places): \_\_\_\_\_ Longitude (4 decimal places): \_\_\_\_\_

UTM E

UTM N

Location/directions to site: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Elevation: \_\_\_\_\_ feet meters Slope: \_\_\_\_\_ Aspect: \_\_\_\_\_

Topography: ridge upper slope mid slope lower slope valley swale bench trail roadside

Describe: \_\_\_\_\_

Habitat: *dominant trees*: \_\_\_\_\_

\_\_\_\_\_

*shrubs*: \_\_\_\_\_

*herbs*: \_\_\_\_\_

\_\_\_\_\_

*stand structure*: \_\_\_\_\_

*coarse woody debris*: \_\_\_\_\_

List species collected with collection number: \_\_\_\_\_

## Completing the Fungus Description Forms

These forms (boletoid and polyporus fungi, coral fungi, *Cortinarius*, gilled fungi, nongilled fungi, and sequestrate fungi) are used to take notes on freshly collected specimens, particularly on rare species, or if you really have no idea where to begin. **It is extremely difficult to determine dried specimens without notes on fresh characters.**

Descriptive notes of fresh specimens are important for identifying fungi when they are dry. Notes on fresh color, texture, size, taste, and odor are crucial. **Detail is critical when describing the color variations of fungi.**

In general, those characters used in the keys for the group of fungi you are working with are the characters that you should give the most attention to describing or measuring.

If you have the capability, measure spore size and note spore shape, ornamentation under oil immersion at 1000x magnification. This is a microscopic character commonly used in specific descriptions.

If you have additional questions concerning these forms, please contact:

Tina Dreisbach: Survey and Manage Mycology Team, USDA Forest Service, PNW Forestry Sciences Lab, 3200 SW Jefferson Way, Corvallis, OR 97331. Telephone (541) 750-7404; FAX (541) 758-7760

Electronic communication: [tdreisbach@fs.fed.us](mailto:tdreisbach@fs.fed.us)

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### Survey and Manage Boletoid and Polyporous Fungi Description Form

Provide notes and circle as many of the characters from grouped character sets as appropriate.

Genus/species: \_\_\_\_\_ Mycology team collection number: \_\_\_\_\_

Other collector's number: \_\_\_\_\_ Date: \_\_\_\_\_

Collected by: \_\_\_\_\_

#### Ecology:

Dominant trees and shrubs: \_\_\_\_\_

Growth habit: single scattered caespitose grouped

Age of specimens: immature mature old mixed

Substrate (circle one):                      On duff: pine cone leaves needles twig litter

On soil: mineral humus

On wood: conifer hardwood Species: \_\_\_\_\_

#### General characters (write range of dimensions in mm for multiple specimens)

Sporocarp type: bolete polypore

Height of entire specimen: \_\_\_\_\_ Length of stem: \_\_\_\_\_

Width of cap: \_\_\_\_\_ Width of stem at apex: \_\_\_\_\_ Widest width of stem: \_\_\_\_\_

Taste (don't swallow): mild strong pleasant unpleasant peppery

Other: \_\_\_\_\_

#### Color (note color gradations, spots, streaks, bruising reactions, changes with age or drying)

Cap surface: \_\_\_\_\_ Bruising color: \_\_\_\_\_

Cap flesh: \_\_\_\_\_ Bruising color: \_\_\_\_\_

Pore layer: \_\_\_\_\_ Bruising color: \_\_\_\_\_

Stem surface: \_\_\_\_\_ Bruising color: \_\_\_\_\_

Stem flesh: \_\_\_\_\_ Bruising color: \_\_\_\_\_

Cap characters:

**Surface texture:** dry greasy sticky slimy

**Surface ornamentation:** smooth pubescent fibrillose cracked wrinkled scaly granular velvety

**Cap shape:** convex plane uplifted irregular centrally depressed *Other* \_\_\_\_\_

**Flesh consistency:** fleshy brittle spongy *Other* \_\_\_\_\_

Stem characters:

**Stem shape:** equal ventricose tapered at apex tapered at base clavate bulbous

**Surface texture:** viscid sticky dry polished glabrous fibrillose punctate

**Surface ornamentation:** glandular dotted pruinose (lightly powdered) scabrous scaly fibrillose  
finely reticulated (netted) coarsely reticulate

**Location of reticulum:** apex only top 1/2 of stem entire stem *Other:* \_\_\_\_\_

**Color of ornamentation:** \_\_\_\_\_

**Annulus present:** N Y **Annulus color:** \_\_\_\_\_

**Annulus structure:** membranous fibrillose cottony-cortina slimy

### Survey and Manage Cortinarioid Description Form

Use this form for specimens with rusty-colored spores and a veil or cortina.

Provide notes and circle as many of the characters from grouped character sets as appropriate.

Genus/species: \_\_\_\_\_ Mycology team collection number: \_\_\_\_\_

Other collector's number: \_\_\_\_\_ Date: \_\_\_\_\_

Collected by: \_\_\_\_\_ Photo number(s): \_\_\_\_\_

#### Ecology:

Dominant trees and shrubs: \_\_\_\_\_

Growth habit: single scattered caespitose gregarious grouped

Age of specimens: immature mature old mixed

Substrate (circle one):                      **On duff:** pine cone leaves needles twig litter

**On soil:** mineral humus

**On wood:** conifer hardwood Species: \_\_\_\_\_

#### General characters (write range of dimensions in mm for multiple specimens)

Color of spore print: \_\_\_\_\_

Height of entire specimen: \_\_\_\_\_ Length of stem: \_\_\_\_\_

Width of cap: \_\_\_\_\_ Height of cap at center: \_\_\_\_\_

Width of stem at apex: \_\_\_\_\_ Widest width of stem: \_\_\_\_\_

Cap flesh thickness \_\_\_\_\_

Odor: mild strong pleasant unpleasant *Other:* \_\_\_\_\_

Taste (don't swallow): mild strong bitter pleasant unpleasant peppery *Other:* \_\_\_\_\_

#### Color (note color gradations, spots, streaks, bruising reactions, changes with age or drying)

Cap surface (young): \_\_\_\_\_

Cap surface (mature): \_\_\_\_\_

Hygrophanous (watery appearance when wet; changes color when losing moisture): N Y

**First becomes hygrophanous near:** margin disc

**Cap flesh:** \_\_\_\_\_

**Gills (young):** \_\_\_\_\_

**Gills (mature):** \_\_\_\_\_

**Gill edge:** concolorous darker lighter

**Stem surface:** \_\_\_\_\_

**Stem flesh:** \_\_\_\_\_

**Partial veil/cortina:** \_\_\_\_\_

**Universal veil remnants (if present, can be hard to see):** \_\_\_\_\_

**Cap characters:**

**Surface texture:** dry viscid sticky glutinous *Other:* \_\_\_\_\_

**Surface ornamentation:** smooth silky fibrillose radially fibrillose scaly tomentose  
glittering veil remnants Describe: \_\_\_\_\_

**Shape:** convex conic plane depressed umbilicate funnel mammilate umbonate  
*Other:* \_\_\_\_\_

**Margin shape:** straight uplifted recurved inrolled incurved *Other:* \_\_\_\_\_

**Contours of margin:** striate even wavy irregular appendiculate *Other:* \_\_\_\_\_

**Flesh consistency:** fleshy brittle spongy tough chalky *Other:* \_\_\_\_\_

**Stem characters:**

**Stem shape:** equal ventricose tapered at apex tapered at base radicate (rooted) clavate  
bulbous twisted *Other:* \_\_\_\_\_

**Surface texture:** viscid sticky dry polished smooth fibrillose punctate

**Surface ornamentation:** smooth pruinose (powdered at apex) scaly fibrillose tomentose  
*Other:* \_\_\_\_\_

**Stem consistency:** cartilaginous fibrous chalky *Other:* \_\_\_\_\_

**Flesh texture:** solid stuffed hollow *Other:* \_\_\_\_\_

**Gill characters:**

**Attachment to stem:** free adnexed adnate sinuate decurrent *Other:* \_\_\_\_\_

**Edge shape:** entire scalloped wavy serrate eroded *Other:* \_\_\_\_\_

**Spacing of gills:** crowded close subdistant distant

**Number of short gills between complete gills:** \_\_\_\_\_

**Veil:**

**Any veil or veil remnants present:** N Y                      If yes, complete the following:

**Partial veil structure:** persistent sparse fibrillose slimy Describe: \_\_\_\_\_

**General position of annulus:** apical central basal Describe: \_\_\_\_\_

**Universal veil:** N Y    **Universal veil structure:** slimy thin cottony filmy

**Chemical characters:** (Important for the genus *Cortinarius*)

**KOH on cap surface** \_\_\_\_\_    **Melzer's reagent of cap surface** \_\_\_\_\_

**KOH on cap flesh** \_\_\_\_\_    **Melzer's reagent on cap flesh** \_\_\_\_\_

**KOH on partial veil** \_\_\_\_\_

**Notes/Sketch:**



### Survey and Manage Gilled Fungi Description Form

Provide notes and circle as many of the characters from grouped character sets as appropriate.

Genus/species: \_\_\_\_\_ Mycology team collection number: \_\_\_\_\_

Other collector's number: \_\_\_\_\_ Date: \_\_\_\_\_

Collected by: \_\_\_\_\_ Photo number(s): \_\_\_\_\_

#### Ecology:

**Dominant trees and shrubs:** \_\_\_\_\_

**Growth habit:** single scattered caespitose grouped

**Age of specimens:** immature mature old mixed

**Substrate (circle one):**

**On duff:** pine cone leaves needles twig litter

**On soil:** mineral humus

**On wood:** conifer hardwood Species: \_\_\_\_\_

**Other:** fungus insect

#### General characters (write range of dimensions in mm for multiple specimens)

**Color of spore print:** \_\_\_\_\_

**Height of entire specimen:** \_\_\_\_\_ **Length of stem:** \_\_\_\_\_

**Width of cap:** \_\_\_\_\_ **Height of cap at center:** \_\_\_\_\_

**Width of stem at apex:** \_\_\_\_\_ **Widest width of stem:** \_\_\_\_\_

**Odor:** mild strong pleasant unpleasant *Other:* \_\_\_\_\_

**Taste** (don't swallow): mild strong pleasant unpleasant peppery *Other:* \_\_\_\_\_

#### Color (note color gradations, spots, streaks, bruising reactions, changes with age or drying)

**Cap surface:** \_\_\_\_\_

**Hygrophanous** (watery appearance when wet; changes color when losing moisture): N Y

**Cap flesh:** \_\_\_\_\_

**Gills:** \_\_\_\_\_ **Gill edge:** concolorous darker lighter

**Stem surface:** \_\_\_\_\_

**Stem flesh:** \_\_\_\_\_

**Cap characters:**

**Latex:** N Y **Latex color:** \_\_\_\_\_

**Surface texture:** dry greasy sticky slimy

**Surface ornamentation:** smooth pubescent fibrillose cracked wrinkled scaly granular warty

**Shape:** convex conic bell-shaped plane depressed umbilicate funnel mammilate umbonate

**Other:** \_\_\_\_\_

**Margin shape:** straight uplifted recurved inrolled incurved

**Contours of margin:** striate even wavy irregular appendiculate **Other:** \_\_\_\_\_

**Flesh consistency:** fleshy brittle spongy tough chalky **Other:** \_\_\_\_\_

**Stem characters:**

**Stem shape:** equal ventricose tapered at apex tapered at base radicate (rooted) clavate bulbous twisted

**Other:** \_\_\_\_\_

**Surface texture:** viscid sticky dry polished smooth fibrillose punctate

**Surface ornamentation:** smooth pruinose (powdered at apex) scaly fibrillose tomentose

**Other:** \_\_\_\_\_

**Stem consistency:** cartilaginous fibrous chalky **Other:** \_\_\_\_\_

**Flesh texture:** solid stuffed hollow **Other:** \_\_\_\_\_

**Gill characters:**

**Attachment to stem:** free adnexed adnate sinuate decurrent **Other:** \_\_\_\_\_

**Edge shape:** entire scalloped wavy serrate eroded **Other:** \_\_\_\_\_

Veil:

**Any veil or veil remnants present:** N Y                      If yes, complete the following:

**Partial veil:** N Y    **Veil color:** \_\_\_\_\_

**Veil structure:** membranous   fibrillose   cortina   slimy

**Annulus:** N Y    **General position of annulus:** apical   central   basal

**Annulus type:** single   double    **Annulus color:** \_\_\_\_\_

**Universal veil:** N Y    **Volva shape:** saccate   collared   sheathing   concentric zones

**Volva color:** \_\_\_\_\_

**Remnants present on cap:** N Y    **Color of remnant:** \_\_\_\_\_

Chemical characters: (Important for the genus *Cortinarius*)

**KOH on cap surface** \_\_\_\_\_    **Melzer's reagent of cap surface** \_\_\_\_\_

**KOH on cap flesh** \_\_\_\_\_    **Melzer's reagent on cap flesh** \_\_\_\_\_

**KOH on partial veil** \_\_\_\_\_

Notes/Sketch:



**Survey and Manage Ascomycete Fungi Description Form Elfin Saddles and Cups**

Provide notes and circle as many of the characters from grouped character sets as appropriate.

Genus/species: \_\_\_\_\_ Mycology team collection number: \_\_\_\_\_

Other collector's number: \_\_\_\_\_ Date: \_\_\_\_\_

Collected by: \_\_\_\_\_ Photo number(s): \_\_\_\_\_

**Ecology:****Dominant trees and shrubs:** \_\_\_\_\_**Growth habit:** single scattered caespitose grouped**Age of specimens:** immature mature old mixed**Substrate (circle one):****On duff:** pine cone leaves needles twig litter**On soil:** mineral humus**On wood:** conifer hardwood Species: \_\_\_\_\_**General characters** (write range of dimensions in mm for multiple specimens)**Sporocarp type:** morel types elfin saddles cups**Height of entire specimen:** \_\_\_\_\_ **Length of stem:** \_\_\_\_\_**Width of cap:** \_\_\_\_\_ **Cap flesh thickness:** \_\_\_\_\_**Odor:** mild strong fragrant farinaceous *Other:* \_\_\_\_\_**Taste** (do not swallow): mild strong sweet bitter hot *Other:* \_\_\_\_\_**Sporocarp shape:** cup disk cushion rabbit-ear truncate club spatulate saddle-stipitatebrain-stipitate pitted-stipitate *Other:* \_\_\_\_\_**Flesh consistency** (in cross section): gelatinous fleshy brittle tough rubbery spongy**Flesh color and bruising:** \_\_\_\_\_**Hymenium color** (spore-bearing surface): \_\_\_\_\_**Abhymenium color** (opposite spore-bearing surface): \_\_\_\_\_**Abhymenium texture:** smooth pubescent scaly granular warty fibrillose greasy sticky dry

silky hygrophanous (changing color when losing moisture)

***Stem characters*** (if present, use cross-section for measurement):

**Stem present:** N Y (if yes, then continue)

**Length (mm):** \_\_\_\_\_ **Width at widest point (mm):** \_\_\_\_\_ **Width at base (mm):** \_\_\_\_\_

**Shape:** equal ventricose tapered at apex tapered at base compressed

*Other:* \_\_\_\_\_

**Stem flesh texture:** gelatinous firm solid stuffed hollow

**Flesh color:** \_\_\_\_\_ **Surface color:** \_\_\_\_\_

**Surface character:** dry moist viscid smooth tomentose ribbed scaly folded grooved

wrinkled fibrillose *Other:* \_\_\_\_\_



**Stem present:** N Y (if yes, then continue)

**Length (mm):** \_\_\_\_\_ **Width at widest point (mm):** \_\_\_\_\_ **Width at base (mm):** \_\_\_\_\_

**Shape:** equal ventricose tapered at apex tapered at base compressed

*Other:* \_\_\_\_\_

**Stem flesh texture:** gelatinous firm solid stuffed hollow

**Flesh color:** \_\_\_\_\_ **Surface color:** \_\_\_\_\_

**Surface character:** dry moist viscid smooth tomentose ribbed scaly folded grooved

wrinkled fibrillose *Other:* \_\_\_\_\_





**Color of flesh in cross section:****Tips:** \_\_\_\_\_**Branches:** \_\_\_\_\_**Stem:** \_\_\_\_\_**Rusty root present** (pale brown band in lower stem when cross-sectioned): N Y**Branch and stem characters:****Stem form:** massive chunky slender single fused fascicled**Stem flesh consistency** (one or more): solid hollow fleshy-fibrous brittle rubbery-cartilaginous firm-cartilaginous slimy-cartilaginous marbled-gelatinous *Other:* \_\_\_\_\_**Branch consistency:** fragile firm fleshy-fibrous cartilaginous brittle rubbery firmly-gelatinous slimy-gelatinous) *Notes:* \_\_\_\_\_**Rhizomorphs present** (white threads at base): N Y**Reaction of Melzer's reagent on interior stem flesh** (optional): amyloid dextrinoid none**Reaction of  $\text{Fe}_2(\text{SO}_4)_3$  on interior stem flesh** (optional): green none

### Survey and Manage Sequestrate Fungi Description Form

Provide notes and circle as many of the characters from grouped character sets as needed.

Genus/species: \_\_\_\_\_ Mycology team collection number: \_\_\_\_\_

Other collector's number: \_\_\_\_\_ Date: \_\_\_\_\_

Collected by: \_\_\_\_\_ Photo number(s): \_\_\_\_\_

#### Ecology:

**Dominant trees and shrubs:** \_\_\_\_\_

**Growth habit:** single scattered grouped

**Age of specimens:** immature mature old mixed

**Substrate (circle one):**                    **In duff:** pine cone leaves needles twig litter

**In soil:** mineral humus

**On wood:** conifer hardwood Species: \_\_\_\_\_

#### General characters (write range of dimensions in mm for multiple specimens)

**Height** (mm) \_\_\_\_\_ **Width** (mm): \_\_\_\_\_

**Shape:** globose subglobose irregular top-shaped

**Overall consistency:** tough crisp rubbery friable hard powdery inside

**Odor:** mild strong pleasant unpleasant *Describe:* \_\_\_\_\_

#### Peridium (outer surface):

**Color immediately upon collection:** \_\_\_\_\_

**Color changes or bruising:** \_\_\_\_\_

**Texture:** warty smooth tomentose wrinkled folded crusty

**Color change with KOH 5%** (when available): \_\_\_\_\_

**Separable from gleba** (inner portion): N Y **Thickness** (mm): \_\_\_\_\_

**Rhizomorphs present:** N Y If yes, attachment: at base along sides overall

**Rhizomorph color and changes:** \_\_\_\_\_

***Gleba*** (inner portion: describe when cut in half):

**Arrangement:** solid veined gilled convoluted chambered

**Texture:** powdery cottony marbled gelatinous waxy

**Color:** \_\_\_\_\_

**Color changes and bruising after 5 minutes:** \_\_\_\_\_

**Latex present:** N Y **Latex color:** \_\_\_\_\_

**Columella present** (sterile tissue): N Y If yes: single robust joins apex of peridium dendroid

**Columella color:** translucent opaque *Other:* \_\_\_\_\_

**Stem present:** N Y If yes, as: basal pad distinct stem

## Glossary

**abhymenial surface**—opposite the spore-bearing surface

**acanthophyses**—clavate or cylindrical hyphae with pinlike outgrowths near the apex

**acrid**—sharp

**acrogenous**—borne at the apex

**aculeate**—having narrow spines

**acute**—less than a right angle

**acyanophilic**—not staining blue when mounted in cotton blue

**adnate**—gills attached to the stem

**adnexed**—gills attached narrowly to the stipe

**agaricoid**—having the overall features of a gilled mushroom

**agglutinated**—stuck together as if with glue

**allantoid**—slightly curved with rounded ends

**alutaceous**—the color of buff leather

**alveolae**—honeycomblike hollows

**alveolate**—marked with honeycomblike hollows

**amorphous**—having no definite form

**ampulliform**—flasklike in form

**amygdaliform**—almond shaped

**amyloid**—staining blue or black with application of Melzer's reagent

**anastomose**—fusion between hyphae

**anise**—smell of licorice

**annulus**—a ringlike partial veil, around the stipe after expansion of the cap

**ANO**—aniline oil (1:1 aqueous mixture)

**ANW**—alpha naphthol (5-percent aqueous solution)

**apiculate**—having an apiculus

**apiculus**—a short projection at one end, also called a hilar appendage

**apobasidium**—a basidium with nonapiculate spores, borne symmetrically on the sterigmata and not forcibly discharged

**apothecium**—a cup or saucerlike sporocarp in which the hymenium is exposed at maturity

**appendiculate**—the edge of the expanded cap fringed with toothlike remains of the veil

**applanate**—flattened

**arcuate**—arclike

**areoles**—cracks or divisions

**Ascomycete(s)**—phylum level of classification for ascus-containing fungi

**ascus(i)**—saclike structure that contains ascospores

**aseptate**—lacking septa

**astringent**—bitter

**asymmetrical**—not symmetrical

**attenuation**—narrowing

**autolysis**—self-digestion of a cell

**avellaneous**—pale yellow brown

**bacilliform**—rodlike in form

**basal collar**—collar located at the base of the spore

**basal pad**—sterile tissue located at point of attachment

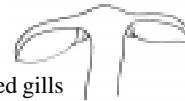
**basal scar**—scar located at point of attachment of spore to basidium



acanthophyses



adnate gills



adnexed gills



annulus



two shapes of asci

**basidium(a)**—cell that produces spores externally on sterigmata

**basidiole**—a sterile basidiumlike hymenial cell

**Basidiomycete(s)**—phylum level of classification for basidia containing fungi

**bifid**—forked

**biguttulate**—having two oillike drops within the spore

**boletoid**—resembling bolete in structure

**brachybasidole(s)**—short basidioles

**brunnescent**—becoming brown

**bryophilous**—fungi growing on mosses or liverworts

**bulbous**—bulblike; a stem with a swelling at the base

**caespitose**—in groups or tufts, gregarious

**calyptrate**—hooded

**campanulate**—bell shaped

**cap cuticle**—the outer layer of cells on a cap

**cap cuticle**—the outer layer of the pileus

**capillitium**—sterile, threadlike elements in among the spores

**capitate**—having a well-formed head

**cartilaginous**—firm and tough but readily bent

**caulocystidia**—cystidia found on the stipe

**centipetally**—toward the center

**cheilocystidia**—cystidia found on the edge of the lamella

**chlamyospore**—an asexual 1-celled spore

**chrysocystidia**—smooth, thin walled cystidia with highly staining contents

**circumferentially aligned**—aligned along the perimeter of a circle

**clamp connections**—a hyphal outgrowth that at cell division makes a connection between the resulting two cells by fusion

**clavate**—clublike; narrowing in the direction of the base

**claviform**—clublike; see clavate

**cleft**—partially split or divided

**coagulated**—congealed or clotted

**coalesced**—grown together

**columella**—a sterile central axis within a mature sequestrate sporocarp

**concave**—hollowed inward; similar to a bowl

**concolorous**—of one color

**confluent**—coming together

**conic**—shaped like a cone

**conidium(a)**—asexual spores

**connate**—born together

**context**—tramal tissue

**convex**—broadly obtuse

**copious**—abundant

**coral**—corallike fleshy fungi in the family Ramariaceae

**coriaceous**—leatherlike in texture

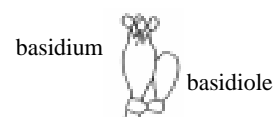
**corneous**—hornlike in texture

**cortex**—a more or less thick outer covering

**cortical tissue**—tissue from the cortex

**cortina**—a weblike partial veil covering the gills

**crenate**—having the edge toothed with rounded teeth



basidium

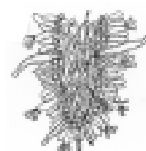
basidiole



bulbous stem base



campanulate cap



cheilocystidia



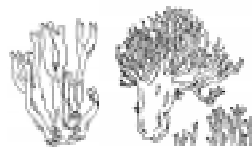
clavate cells



two types of columellae



conic cap



corallike sporocarps



cortina

**crenulate**—edged with delicate rounded teeth

**cristate**—crested

**crozier**—a hook of an ascogenous hypha before ascus development

**cruciate**—in the form of a cross

**crustose**—a hard surface layer

**crystalloid**—resembling crystals

**cup**—a Discomycete, particularly in the Pezizales or Leotiales

**cutis**—outer layer, consisting of compressed hyphae

**cyanophilic**—readily absorbing cotton blue

**cystidium(a)**—a sterile, distinctively shaped cell

**cystidoid**—cystidialike

**cytoplasm**—the protoplasm of a cell

**decurrent**—running down the stipe

**dendroid**—treelike in form

**denticulate**—toothed

**dermatopseudocystidia**—cystidialike structures on the edge of the pileus

**dextrinoid**—staining red or red-brown in Melzer's reagent

**dichophyses**—modified terminal hyphae in the hymenium

**dichotomous**—dividing into two parts

**dimitic**—having hyphae of two kinds

**disc**—the round, platelike or curved spore-producing part of an Ascomycete sporocarp

**discoïd**—resembling a disk

**distally**—situated away from the center of the sporocarp

**divaricate**—divergent at right angles

**diverticulum(a)**—a pocketlike side branch

**earth tongue**—sporocarps of the genus *Geoglossum*

**eccentric**—not circular

**echinate**—having sharply pointed spines

**ectal excipulum**—the outer layer such as in the peridium

**eguttulate**—without guttules

**ellipsoid**—shaped like an ellipse

**emergent**—rising out of

**encrusted**—overlain with a crust

**endophytic**—living within another

**enrolled margin**—rolled within

**ental excipulum**—the inner layer such as in the peridium

**ephemeral**—lasting a short time

**epicuticular**—outer layer of tissue

**epicutis**—outer layer of tissue

**epigeous**—growing aboveground

**epiphytic**—living on the surface of another

**epithelium**—the outer layer of tissue

**esulent**—of use as food, edible

**ETOH**—ethanol

**euhymenium**—containing a palisade of basidia

**evanescent**—having a short existence

**excrecence**—an abnormal outgrowth



crenulate gills



cup-shaped sporocarps

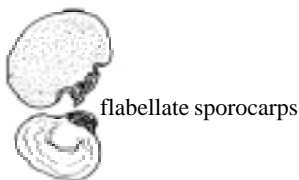


decurrent gills



enrolled margin

- extracellular**—outside the cell
- fabaceous**—resembling a bean
- farinaceous**—smells like cornmeal
- farinose**—like meal in form
- fascicle**—a little group or bundle
- fasciculate**—growing in fascicles
- fawn**—pale gray-brown
- FCL**—ferric chloride (10-percent aqueous solution)
- ferruginous**—resembling iron rust in color
- Fe<sub>2</sub>(SO<sub>4</sub>)<sub>3</sub>**—ferric sulfate (10-percent aqueous solution)
- fibrillose**—with fine hairs or fibers
- fibrils**—small fibers
- filamentose**—threadlike
- filiform**—threadlike
- fimbriate**—delicately toothed, fringed
- flabellate**—shaped like a fan
- flabelliform**—shaped like a fan
- flaccid**—limp or not stiff
- flexuous**—elastic
- floccose**—cottony
- flocculose**—delicately cottony
- friable**—easily crumbled
- FSW**—ferric sulfate 10-percent aqueous
- fulvous**—pale brown-yellow
- furcate**—forked
- furfuraceous**—covered with flaky particles
- fuscous**—brown-gray
- fusoid**—tapering towards each end
- gametangium(a)**—cell containing gametes or gametic nuclei
- gelatinized**—jellylike
- gelatinous**—jellylike
- generative hyphae**—hyphae that are branched, septate, with or without clamp connections, thin or thick walled, and of unlimited growth
- germ pore**—a differentiated, frequently apical area in a spore wall
- glabrescent**—smooth
- glabrous**—smooth
- glandular dot**—a dot due to the presence of a gland
- gleba**—spore-bearing tissue in sequestrate fungi
- gleocystidia**—thin walled, usually irregular cystidia with yellow or highly refractive contents
- gleoplerous hyphae**—hyphae with long cells, with many oil drops
- globose**—sphaerical
- gluten**—a substance that is sticky when wet
- glutinous**—covered with gluten
- granulated**—covered with small particles
- granule**—a small particle
- granulose**—roughened with granules
- gregarious**—in groups but not joined together



flabellate sporocarps



glandular dots on stem



**GUA**—tincture of guaiac (saturated solution of gum guaiac in 95-percent ethyl alcohol)

**guttules**—oillike drops

**hemispheric**—one of two half-spheres

**heteromerous**—having sphaerocyst nests among filamentose hyphae

**hirsute**—having long hairs

**hyaline**—colorless

**hygrophanous**—having a water-soaked appearance when wet

**hymenium**—the spore-bearing layer of tissue

**hyphae**—one of the filaments of a mycelium

**hyphoid**—like hyphae in form

**hypogeous**—growing belowground

**IKI**—Melzer's reagent

**imbricate**—scales partly covering one another like roof tiles



incurved margin

**inamyloid**—not reacting to Melzer's reagent

**incurved**—curved inward

**inoperculate**—opening by an irregular apical split to discharge spores



intervenose connections

**internodes**—the interval between nodes

**intervenose**—condition where veins are found in the spaces between gills

**isodiametric**—having equal diameters

**ixocutis**—a slimy cuticle

**ixotrichoderm(ium)**—a trichodermium composed of gelatinized hyphae

**KOH**—(as mounting medium): potassium hydroxide (2- to 5-percent aqueous solution)

**KOH**—(as macrochemical reagent): potassium hydroxide (10-percent aqueous solution)

**labyrinthine**—structure of complex paths

**lacerate**—to tear roughly

**lactiferous hyphae**—hyphae which secrete a milky juice

**lacunose**—having a hole or hollow

**lageniform**—swollen at the base and narrow at the tip

**lamella(ae)**—hymenium-covered vertical plates on the underside of the cap

**lamellar**—of lamellae

**lamellulae**—a small lamella

**lamine**—composed of layers

**latex**—a milklike juice

**lattice**—cross-barred; like a network



leptocystidia

**leptocystidia**—a thin-walled smooth cystidia

**lignicolous**—occurring on wood

**limoniform**—lemonlike in form

**loculate**—divided into locules

**locules**—a cavity

**lunate**—like a new moon

**macrocystidia**—cystidia that arise from deep within the hymenium

**macrofungi**—fungi with sporocarps large enough to be seen without a hand lens

**matrix**—the substrate in or on which an organism is living

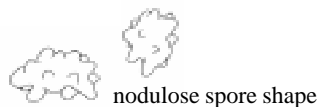
**mediostratum**—the middle layer

**medullary excipulum**—tissue below the generative layer in an apothecium

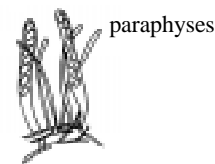
**Melzer's reagent**—an iodine reagent

**membranaceous**—like a thin skin

- metuloid**—an encrusted cystidium thick walled at maturity
- microfungi**—fungi with small sporocarps that are seen only with a hand lens
- moniliform**—having swellings at regular intervals
- monochromatic**—consisting of one color or hue
- monomitic**—consisting of a single kind of hyphae
- monosporus**—one spored
- mottled**—having patches of different colors or shades
- mottling**—to be mottled
- mucilage**—a gelatinous substance
- mucilaginous**—sticky or viscid
- mucronate**—an abrupt sharp terminal point
- multifid**—divided into a number of parts or lobes
- multiguttulate**—having more than two guttules
- mushroom**—an enlarged, epigeous, fleshy sporocarp of a fungus
- mycelium**—a mass of hyphae
- mycophilic**—lover of fungi
- mycorrhiza(e)**—a mutually beneficial symbiotic association of plant roots and fungi
- napiform**—turniplike in form
- naviculate**—boatlike in form
- nodulose**—having broad-based, blunt, wartlike structures
- NOH**—ammonium hydroxide (10-percent aqueous solution)
- obclavate**—inversely clavate
- obconic**—inversely conic
- oblique**—not at a 45-degree angle
- obovoid**—ovoid with the broad end towards the apex
- obpyramidal**—the reverse of pyramid shaped
- obpyriform**—the reverse of pear shaped
- obtuse**—rounded or blunt
- ochraceous**—somewhat ocherlike in color
- ochre**—a red-yellow color
- oleiferous**—containing a refractive substance
- olivaceous**—somewhat olive colored
- opaque**—unable to be seen through
- operculate**—opening by an apical lid to discharge spores
- orbicular**—circular
- ostioles**—the pore from which spores emerge
- palisade**—a layer of columnar cells
- pallid**—pale
- palmate**—having lobes extending from a common center
- papilla**—a small rounded process
- papillate**—having papilla
- paraphysis**—a sterile upward growing, basely attached hyphal element in an Ascomycete hymenium
- partial veil**—a layer of tissue, developed from the stem, that joins the stem to the cap edge during hymenium development
- part spores**—one of the 1-celled spores resulting from the breakup of a 2- or more-celled ascospore
- pedicellate**—having a small stalk
- pellucid-striate**—having a somewhat transparent top so that the gills can be seen from above



nodulose spore shape



paraphyses

**pendant**—hanging down

**percurrent**—extending throughout the entire length

**periclinal**—curved in the direction of the surface

**peridium**—the outer membrane of a sequestrate sporocarp

**perisporal sac**—a wall that forms a loose envelope around a spore

**perithecium(a)**—a subglobose or flasklike Ascomycete sporocarp

**PHN**—phenol (2-percent aqueous solution)

**pileate**—having a cap

**pileipellis**—the cellular cortical layers

**pileocystidia**—cystidia found on cap

**pileus**—the umbrella-shaped (cap) structure of a mushroom

**pip-shaped**—shaped like an apple seed

**plage**—a smooth, colorless spot on a surface

**plano-convex**—flat on one side and convex on the other

**pleurocystidia**—cystidia found on the side of the structure

**pluridigitate**—multidigitate; many fingerlike structures

**plurinodulose**—with multiple nodulose elements

**polychotomous**—having an apex dividing into more than two branches

**polypore**—a macrofungus with a pored hymenium

**pore**—a small opening

**pruinose**—having a frostlike or flourlike surface

**pseudocystidia**—cells that appear like cystidia but are not cystidia

**pseudoparenchymatous**—inflated cells in the peridium or trama of certain fungal groups

**pseudorhiza**—rootlike structure of the lower stem

**pseudosclerotium**—a compacted mass of intermixed substratum held together by mycelium

**pubescent**—having soft hairs

**puffball(s)**—species in the order Lycoperdales

**pulvinate**—cushionlike in form

**punctate**—marked with small spots

**pungent**—having a strong smell

**PYR**—pyrogallol (10-percent aqueous solution of pyrogallic acid)

**pyriform**—pearlike in form

**radicate**—spreading from a center

**raphanoid**—radishlike

**recalcitrant**—not easily changed

**recurved**—curved backward or inward

**refractive**—not translucent

**refractive hyphae**—hyphae with contents that are colored

**refringent**—not translucent

**reniform**—kidney shaped

**repand**—having a waved edge which is turned back

**repent**—prostrate

**resupinate**—found with the hymenium upward and little sterile tissue

**reticulum**—like a net

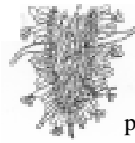
**rhizomorph(s)**—a rootlike aggregation of hyphae having a well-defined apical meristem

**rhizomorphic**—rhizomorphlike

**rimose**—having small cracks



pileocystidia on cap



pleurocystidia



resupinate sporocarp



reticulate ornamentation



rhizomorph attached at base

**rimose-rugulose**—having small cracks or delicately wrinkled

**rostrate**—beaked

**rugose**—wrinkled

**rugulose**—having small wrinkles

**saccate**—like a sack



saccate ascus

**salmon**—yellow-pink

**salmonaceous**—somewhat yellow-pink

**saprophyte**—living on dead material

**sarcodimitic**—long, thick-walled, inflated hyphae

**scabrous**—rough

**scurfy**—flakes or scales that adhere to the surface

**seceded**—withdrawn

**sepia**—brown-gray to dark olive-brown

**septum(a)**—a dividing wall in fungal cells

**sequestrate**—sporocarps that normally retain their spores within until they decay in place or are eaten

**sessile**—without a stem

**sheen**—shiny or glossy appearance

**silica gel**—colloidal silica

**sinuate**—notched

**skeletal hyphae**—hyphae that are thick walled, aseptate, of limited length, with thin-walled apices, usually unbranched

**sordid**—a dull or muddy color

**spathulate**—like a spoon in form

**sphaerocysts**—globose cells

**sphaeropedunculate**—

**spherical**—having the form of a sphere

**spinule**—a small spine

**sporiferous**—bearing spores

**sporocarp**—a general term for a spore-bearing organ

**squamule**—a small scale

**squamulose**—having small scales

**stalactiform**—having the general form of a stalactite

**sterigmal attachment**—the attachment point for the spore on the basidium

**sterigma**—the structure that attaches the spore to the basidium

**stipitate**—having a stem

**stipitipellis**—layer of tissue making up the stem

**stipitipith**—the tissue within the context of the stem

**stratum**—a layer of tissue

**striate**—marked by lines, grooves, or ridges

**striatulate**—marked by small lines, grooves, or ridges

**strigose**—rough with sharp-pointed hairs

**sub**—prefix for approximating

**subglobose**—not quite globose

**sublacrimiform**—like a tear drop

**sulcate**—grooved

**suprahilar**—the area above the sterigmal attachment

**suprapellis**—the topmost cortical layer



squamulose cap



sterigmata on basidium

**SYR**–syringaldazine in ethanol

**tawny**–brown-orange to pale brown

**terete**–cylindrical but narrowing at one end

**terrestrial**–growing on soil

**terricolous**–growing on the ground

**tibiiform**–shaped like a tibia bone

**tomentose**–a covering of soft, matted hairs

**tomentum**–a covering of tangled or matted wooly hairs

**tortuous**–with repeated twists, bends, or turns

**torulose**–cylindrical but with swellings at intervals

**trama**–the layer directly beneath the subhymenium

**trichodermium**–the outer layer composed of hairlike elements projecting from the surface

**truffle(s)**–sequestrate Ascomycota, Basidiomycota, and Zygomycota

**truncate**–ending abruptly

**tuberculate**–wartlike processes

**tubulose**–having the form of a tube

**turbinate**–in the shape of a top

**turf**–a distinct layer

**TYR**–l-tyrosine

**umbilicate**–have a small hollow; cap of a pileus having a hollow on the top above the stipe

**umbo**–a rounded elevation

**umbonate**–having a rounded elevation

**undulate**–rising and falling as in waves

**ungulate**–a hoofed animal

**uniseptate**–with a single septa

**uniseriate**–in a single series

**urnulate**–shaped like an urn

**veil**–a ringlike tissue on the stipe after sporocarp expansion

**velutinous**–covered with a silky pubescence

**venae externae**–veins of pale colored tissue that reach the outer surface within sequestrate ascomycota

**venae internae**–dark-colored, spore-bearing tissues that do not reach the outer surface within sequestrate ascomycota

**ventricose**–swelling in the middle or on one side

**verrucose**–small rounded warts

**versiform**–changing form with age

**vesicle**–a bladderlike sac

**vesicular**–vesiclelike

**vesiculose**–full of vesicles

**villose**–covered with long soft hairs

**vinaceous**–the color of wine

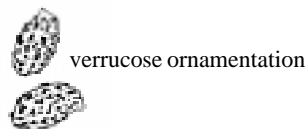
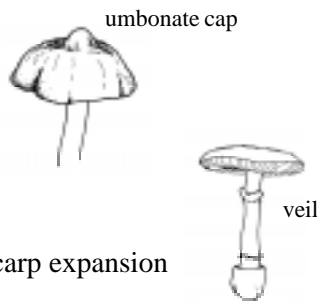
**violaceous**–the color violet

**viscid**–slimy, sticky, or viscous

**volva**–the cup-like lower part of the universal veil, around the stipe base

**Zygomycete(s)**–the class of fungi having zygospores

**zygospores**–the formation of spores by the fusion of gametangia



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## *Albatrellus ellisii* (Berk.) Pouzar

**ROD name** *Albatrellus ellisii*

**Family** Scutigeraeae

**Morphological Habit** polypore

**Description:** CAP 8-25 cm in diam., circular to lobed, flabelliform, convex becoming plane, wavy, depressed, greenish to sulfur-yellow or yellow-brown, sometimes with darker brown shades or stains with age. Surface dry, at first tomentose, hairs matted with age or grouped to form coarse scales. Margin wavy, at first enrolled. **PORE SURFACE** white to cream-colored, staining greenish or yellow-green when bruised or becoming yellowish to dingy greenish with age. **PORES** circular to angular, 0.5-2 mm in diam., 1-2 per mm. **TUBES** 2-6 mm long, often decurrent. **STEM** 3-12 cm long, 2-6 cm thick, central to lateral, solid, concolorous with cap. **HYPHAL STRUCTURE** monomitic, contextual hyphae thin to thick walled, interwoven with frequent branching. **CLAMP CONNECTIONS** present. **SPORES** ovoid to elliptical, 8-11 x 5-8  $\mu\text{m}$ , thin walled, smooth, apiculate, inamyloid.

**Distinguishing Features:** Characterized by a fleshy annual polypore, greenish to sulfur-yellow to yellow-brown cap and pore surface, and white spore print. *Albatrellus sylvestris* has smoky-olive, darker pore surface; *A. cristatus* is similar in color, but with less hairy cap and occurring with hardwoods in eastern North America. *Albatrellus pes-caprae* has a brown cap and stem, and inamyloid contextual hyphae.

**Distribution:** CALIFORNIA, Mendocino Co., Jackson State Forest, Aleuria Glen; Siskiyou Co., Klamath National Forest, Duck Lake area, near Callahan; OREGON, Douglas Co., Bureau of Land Management (BLM), above Olalla Creek, near jct. with Thompson Creek; Klamath Co., BLM, Klamath Falls Resource Area, 1.2 km south of Clover Lake; BLM, Klamath Falls Resource Area, Surveyor Mountain; Winema National Forest (WINF), 0.4 km north of Mountain Lakes organizational camp; WINF, 1.6 km southwest of Pelican Butte; WINF, 3.2 km northeast of Lake of the Woods; WINF, 2 km west of Harriman Spring; WINF, 4.8 km northeast of Sevenmile Marsh; WINF, off Dead Indian Memorial Rd.; Linn Co., Willamette National Forest, Lava Lake Snow Park; Wasco Co., Mount Hood National Forest, Pebbleford campground; WASHINGTON, Jefferson Co., Olympic National Park, West Twin Creek Research Natural Area; Kittitas Co., 8 km west of Ronald; Meany Ski Hut, Stampede Pass.

**Substrate and Habitat:** Solitary, scattered, gregarious, or in fused clusters on ground in forests.

**Season:** Late summer and autumn.

**Reference:** Arora, D. 1986. Mushrooms demystified. Berkeley, CA: Ten Speed Press. 959 p.

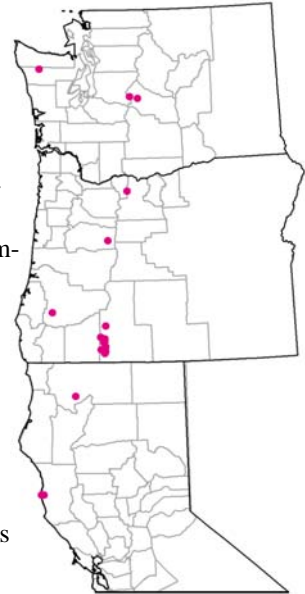


Photo courtesy of Eugene Butler

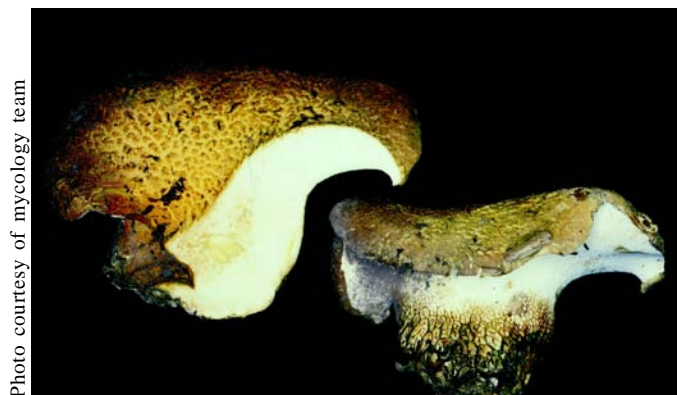


Photo courtesy of mycology team

*Albatrellus fletti* (Morse) PouzarROD name *Albatrellus fletti*

Family Scutigeraeae

Morphological Habit polypore

**Description:** CAP 5-20 cm in diam., circular to kidneylike, convex becoming plane or centrally depressed, blue to blue-gray or blue-green; developing ochraceous, salmon, or rusty stains in age, becoming salmon pink to brick red on drying; glabrous to minutely tomentose. Margin at first enrolled, often lobed or wavy; concolorous or paler. **PORE SURFACE** white, developing salmon or ochraceous stains in age. **PORES** circular to angular, 1-4 per mm. **TUBES** 1-7 mm long, decurrent. **STEM** 5-15 cm long, 1.5-4 cm thick, solid, central to lateral, simple or branching at base, concolorous with cap. **HYPHAL STRUCTURE** monomitic. **CLAMP CONNECTIONS** present. **SPORES** ellipsoid to ovoid, 3.5-4 x 2.5-3  $\mu\text{m}$ , thin walled, smooth, weakly amyloid.

**Distinguishing Features:** Characterized by a fleshy, annual, blue to blue-gray or blue-green polypore developing ochraceous, salmon, or rusty stains in age, becoming salmon pink to red on drying. *Albatrellus confluens* is similar, but the cap is not as blue. *Albatrellus caeruleoporus* is also found in western North America, but the cap and pores are entirely indigo-blue to blue-gray.

**Distribution:** CALIFORNIA, Del Norte Co., Redwood National Park, Alder Camp Rd. at Rugg Grove; Mendocino Co., Jackson State Forest, Aleuria Glen; Siskiyou Co., Klamath National Forest, Duck Lake area, near Callahan; Tehama Co., Lassen National Forest, Gurnsey Creek campground, Hwy. 89; OREGON, Clackamas Co., Mount Hood National Forest (MHNF), east fork of Salmon River; MHNF, Little Crater Lake; MHNF, trail 700 between Hideaway and Shellrock Lakes; MHNF, Wapinita Summit; Deschutes Co., Deschutes National Forest (DNF), Three Sisters Wilderness Area, on trail below Lake Winopee; DNF, southeast shore of Cultus Lake; DNF, Six Lakes trail; Douglas Co., Umpqua National Forest (UNF), 3.2 km south of Warm Springs Butte; UNF, 4 km east of Windigo Pass; UNF, Clearwater River; Hwy. 138; UNF, Watson Falls; UNF, Whitehorse Falls campground; Jackson Co., Bureau of Land Management, Camp Creek; Rogue River National Forest, Union Creek campground; Jefferson Co., MHNF, Skyline Road, Ollalie Lake; Klamath Co., Winema National Forest, 4.8 km northeast of Sevenmile Marsh; Willamette National Forest (WNF), Trapper Creek, near trailhead; Lane Co., WNF, 1.6 km southeast of Wolf Mountain; WNF, Gold Lakes trailhead; WNF, Salt Creek Falls; WNF, near Waldo Lake Wilderness Area, Waldo Lake; Linn Co., WNF, Lost Prairie campground; Marion Co., MHNF, Breitenbush River, west of Cub Creek; Wasco Co., MHNF, Post Camp; WASHINGTON, King Co., Wenatchee National Forest, Snoqualmie Pass; Kitsap Co., 4.8 km west of Green Mountain; Bremerton; Okanogan Co., Okanogan National Forest (ONF), Pasayten Wilderness, east fork of trail, by shelter; ONF, Pasayten Wilderness, south of head of Big Hidden Lake; ONF, Pasayten Wilderness, Stub Creek trail; Pierce Co., Mount Rainier National Park (MRNP), Crystal Mountain Resort Road; MRNP, Dalles campground; MRNP, Upper Tahoma; Skagit Co., Mount Baker-Snoqualmie National Forest (MBSNF), Easy Pass trail; Skamania Co., Gifford Pinchot National Forest (GPNF), Mount Adams, 2.4 km southeast of Steamboat Mountain; GPNF, Forlorn Lakes; GPNF, roadside near South Prairie cranberry bog; GPNF, Thomas Lake area; Yakima Co., MRNP, 11.3 km east of Chinook Pass, Hwy. 410; MBSNF, Blankenship, Meadows trail; MBSNF, Soda Springs.

**Substrate and Habitat:** Scattered to gregarious or in fused clusters.

**Season:** Autumn and winter.

**Reference:** Arora, D. 1986. Mushrooms demystified. Berkeley, CA: Ten Speed Press. 959 p.

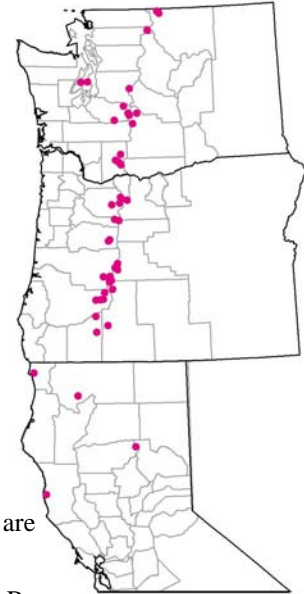


Photo courtesy of David Arora

## *Asterophora lycoperdoides* (Bull.) Ditmar ex S. F. Gray

**ROD name** *Asterophora lycoperdoides*

**Family** Tricholomataceae      **Morphological Habit** fungal parasite

**Description:** CAP 10-20 (-30) mm in diam., globose with an enrolled margin when young, expanding with age to hemispherical or broadly convex; surface at first white to buff and fibrillose to farinose, soon becoming areolate and the fibrillose covering remaining only in patches on the cap and remaining intact along the margin, but disappearing entirely in age, revealing a cinnamon to dull brown powdery mass; in age, entire surface covered with a powdery mass of chlamydospores. **ODOR AND TASTE** farinaceous. **GILLS** often poorly developed, absent in some sporocarps, when present adnate, distant, narrow, thick, seldom forked, white to pale grey with obtuse, concolorous edges. **STEM** 10-30 x 3-10 mm, central, equal to clavate, often curved, stuffed to hollow, dull, appressed-fibrillose to downy, white overall. **PILEIPELLIS** a cutis of loosely interwoven, hyaline hyphae 3-6  $\mu\text{m}$  in diam. **CLAMP CONNECTIONS** present. **SPORES** ellipsoid, (3.5) 4-7 x 2-4  $\mu\text{m}$ , smooth, hyaline, inamyloid, cyanophilic, thin walled, not formed in many sporocarps. **CHLAMYDOSPORES** globose to subglobose or ovoid, bluntly spinose or with long, cylindrical to irregular verrucae, 11-20 x 10-18  $\mu\text{m}$ , thick walled, brown.

**Distinguishing Features:** The small, white, parasitic sporocarps with a fibrillose cap surface that soon converts to a cinnamon-brown powdery mass of chlamydospores are diagnostic for the species.

**Distribution:** Widespread but locally uncommon in the Northern Hemisphere. **CALIFORNIA**, Del Norte Co., Jedediah Smith Redwoods State Park, 48.3 km north of Eureka; **OREGON**, Lane Co., Willamette National Forest, Lookout Point Reservoir; **Kitsap** Co., Seabeck, Hood Canal; **Mason** Co., Olympic National Forest, Olympic Mountains, Lake Cushman.

**Substrate and Habitat:** In gregarious clusters on rotting sporocarps of *Russula* spp. (especially the *R. dissimulans*—*R. nigricans* complex) and *Lactarius* spp. in forests.

**Season:** Autumn.

**References:** Breitenbach, J.; Kränzlin, F. 1991. Fungi of Switzerland. Lucerne, Switzerland: Mycological Society of Lucerne. 361 p. Vol. 3. Phillips, R. 1981. Mushrooms and other fungi of Great Britain and Europe. London, United Kingdom: Pan Books, Ltd. 288 p.



Photo courtesy of E. Danell

## *Asterophora parasitica* (Bull.: Fr.) Singer

**ROD name** *Asterophora parasitica*

**Family** Tricholomataceae      **Morphological Habit** fungal parasite

**Description:** CAP 8-20 (-30) mm in diam., hemispherical or obtusely conic when young, expanding with age to plano-convex or plano-campanulate with an undulating to cleft, decurved to uplifted margin; surface dull, dry, silky-fibrillose, white to pale gray when young, becoming gray-brown from the margin inward in age. **GILLS** broadly adnate to subdecurrent, distant, ventricose, broad (1-2 mm), sometimes intervenose in age, thick, white to pale gray-brown or brown. **STEM** 10-30 x 2-3 mm, central, terete, equal, dull, dry, silky fibrillose with a tomentose base, stuffed to solid, white over pale gray-brown background. **ODOR AND TASTE** unpleasant, farinaceous. **PILEIPELLIS** a cutis of repent, radially arranged hyphae 4-15 µm in diam., cylindrical or with clavate terminal cells, hyaline, inamyloid. **CLAMP CONNECTIONS** present. **SPORES** ellipsoid, 5-7 x 3-4 µm, smooth, hyaline, inamyloid, cyanophilic, thin walled. **CHLAMYDOSPORES** developed on gill edges and faces at maturity, 12-17 x 9-11 µm, fusoid, smooth, hyaline to pale yellow-white.

**Distinguishing Features:** *Asterophora parasitica* can be distinguished from *A. lycoperdoides* by the formation of smooth, fusoid chlamydo spores in the sporocarps and more rarely on the lower tramal hyphae of the cap compared with spinose, brown chlamydo spores formed on the cap surface in *A. lycoperdoides*.

**Distribution:** Widespread but locally rare in the Northern Hemisphere. **CALIFORNIA**, Humboldt Co., Prairie Creek State Park, Davison Rd.; Orick; **OREGON**, Coos Co., Winchester Forest; Tillamook Co., Cape Lookout State Park.

**Substrate and Habitat:** Gregarious to subcaespitose on rotting sporocarps of *Russula* spp. (especially the *R. dissimulans*-*R. nigricans* complex) and rarely on *Lactarius* spp. (*L. piperatus* complex) in forests.

**Season:** Autumn.

**References:** Breitenbach, J.; Kränzlin, F. 1991. Fungi of Switzerland. Vol. 3. Lucerne, Switzerland: Mycological Society of Lucerne. 361 p. Phillips, R. 1981. Mushrooms and other fungi of Great Britain and Europe. London, United Kingdom: Pan Books, Ltd. 288 p.



Photo courtesy of Steve Trudell

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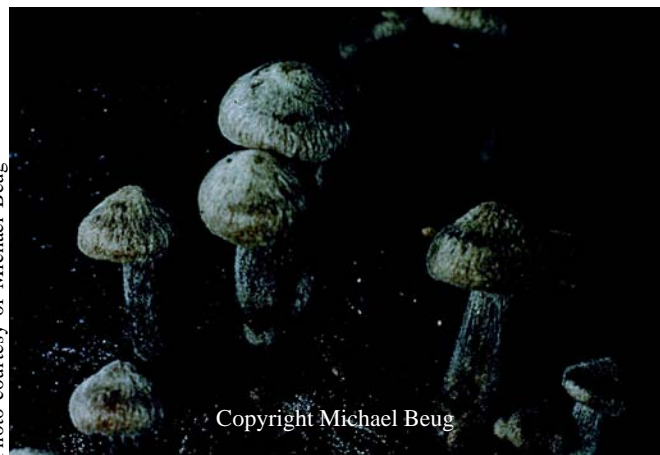


Photo courtesy of Michael Beug

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## *Baeospora myriadophylla* (Peck) Singer

**ROD name** *Baeospora myriadophylla*

**Family** Tricholomataceae      **Morphological Habit** mushroom

**Description:** **CAP** 10-25 mm in diam., plano-convex or plane with a shallow central depression, glabrous, hygrophorous, smooth, gray-purple to dull violet when young, gray-brown to violet-brown in age, with even incurved pale gray margin when young becoming plane, wavy, or lobed. **GILLS** attached, extremely crowded, narrow, gray-purple or dull violet when young becoming paler in age or brick to dark purple. **STEM** 30-55 mm long, 1.5-4 mm across the apex, terete or compressed and cleft, equal, hollow, apex minutely pruinose, pale red-gray when young, glabrescent and gray-purple in age, base pubescent or tomentose, gray-purple or dull violet when young, gray-brown or brown in age, tomentum white or pale lavender. **ODOR** strongly fungal. **TASTE** mild. **PILEPELLIS** with a 10 mm thick suprapellis of nongelatinized, inamyloid hyphae above a nondifferentiated subpellis. **CHEILOCYSTIDIA** abundant, broadly clavate or ventricose, up to 7 mm wide and projecting up to 13 mm above the hymenium, hyaline or pale yellow, inamyloid, thin walled. **PLEUROCYSTIDIA** abundant near the gill edge and scattered elsewhere, similar to the cheilocystidia. **CAULOCYSTIDIA** abundant, clustered, similar to the cheilocystidia with smooth or roughened hyaline, ochraceous or brown inamyloid walls up to 1 mm thick in the basal portion and typically thin walled at the apex. **SPORES** subglobose or ellipsoid, 2.7-4.2 x 2-3 µm, thin walled, weakly amyloid.



**Distinguishing Features:** *Baeospora myriadophylla* slightly resembles some of the larger lignicolous *Mycena* species (such as *Mycena overholtsii*, *M. radicatella*, or *M. galericulata*). However, the vivid purple colors and crowded, narrow gills readily distinguish *B. myriadophylla* from those species. Faded specimens that have lost most of the violaceous color from the cap might be confused with another white-spored lignicolous mushroom with lilac gills, *Chromosera cyanophylla*. However, *C. cyanophylla* is easily distinguished in the field by its viscid, yellow cap and stem, and widely spaced, decurrent gills.

**Distribution:** Widely distributed but rare to uncommon in North America and Europe. **WASHINGTON**, **Grays Harbor** Co., Olympic National Forest (ONF), Lake Quinault; **Jefferson** Co., ONF, Bogachiel River trail about 0.4 km west of park boundary; Olympic National Park (ONP), bottom, Clearwater River; ONP, Clearwater River; ONP, Enchanted Valley; ONP, Hoh Recreation area; **King** Co., Carnation; City of Redmond, Watermain Woods, Redmond; **Lewis** Co., Mount Baker-Snoqualmie National Forest (MBSNF), south of Alder Lake; **Pierce** Co., Mount Rainier National Park (MRNP), Green Lake; MRNP, Lower Tahoma Creek; Puyallup River, near McMillin; **Snohomish** Co., MBSNF, Barclay Lake trail; MBSNF, Barlow Pass along Sauk River; near Darrington at French Creek; MBSNF, Verlot campground; Wallace Falls.

**Substrate and Habitat:** Lignicolous, scattered to densely gregarious on decayed *Abies* spp. logs, sometimes buried deep within the logs, at higher elevations in mixed coniferous forests.

**Season:** Spring or autumn.

**Reference:** Phillips, R. 1991. *Mushrooms of North America*. Boston, MA: Little, Brown and Co. 319 p.



Photo courtesy of Steve Trudell

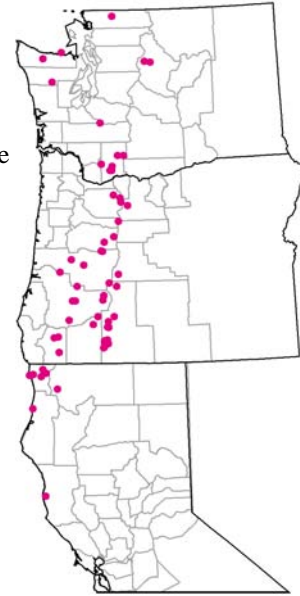
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*Cantharellus subalbidus* Smith & Morse

**ROD name** *Cantharellus subalbidus*

**Family** Cantharellaceae      **Morphological Habit** chanterelle

**Description:** **CAP** 5-10 (-14) cm broad, at first plane or with a decurved margin, soon the margin elevated to somewhat recurved and becoming irregularly lobed or wavy, in age broadly depressed to almost funnel shaped and quite irregular in shape, surface felty-fibrillose to subtomentose, smooth or in age areolate-scaly, typically dry and unpolished, white to off-white over all, becoming pale buff when water soaked and sordid yellow where handled. **GILLS** close and narrow, decurrent almost to base, variously forked or anastomosing and strongly veined, white to gray-white but becoming cream colored and staining yellow to orange when bruised, edges obtuse and even. **STEM** 2-4 (-5) cm long, 1-3 cm at base, flaring upward and indistinct from cap, solid, white and fibrous within, surface white and unpolished but staining yellow to orange when bruised, finally discoloring to sordid brown. **ODOR AND TASTE** not distinct. **PILEIPELLIS** of compactly interwoven cells. **BASIDIA** 62-80 x 8.5-10 µm, narrowly clavate, hyaline, 4 to 6 spored. **CYSTIDIA** absent. **CLAMP CONNECTIONS** absent. **SPORES** ellipsoid to broadly ellipsoid, 7-9 x 5-5.5 µm, smooth, hyaline, spore print white.



**Distinguishing Features:** Microscopic characteristics of *C. cibarius*, *C. formosus*, *C. subalbidus* differ little. Spores, basidia and tramal hyphae are all virtually identical. *Cantharellus subalbidus* can be distinguished in dried herbarium material by its pale cap surface and thick cap and stem context, but virtually no separating characters exist to reliably separate *C. formosus* from other possible taxa in the Pacific Northwest.

**Distribution:** Common and widely distributed in northwestern North America including northern Idaho. Known for many locations throughout the range of the Northwest Forest Plan.

**Substrate and Habitat:** Single or gregarious in coniferous forests.

**Season:** Autumn through winter.

**Reference:** Smith, A.H.; Morse, E.E. 1947. The genus *Cantharellus* in the Western United States. *Mycologia*. 39: 497-534.



Photo courtesy of Steve Trudell



Photo courtesy of Eugene Butler

## *Catathelasma ventricosa* (Peck) Singer

**ROD name** *Catathelasma ventricosa*

**Family** Tricholomataceae      **Morphological Habit** mushroom

**Description:** CAP 70-200 (-380) mm in diam., convex to broadly convex with enrolled to incurved margin; surface dull, dry, glabrous, subareolate in age; white or dirty pale gray, often in age with gray-brown patches but not scaly. **GILLS** decurrent, crowded, white to pale tan. **STEM** 50-150 x 25-60 mm, central, equal above a tapered base, rooting, glabrous to appressed-fibrillose, dull, dry, solid, hard, white to yellow-brown, annulate; partial veil superior, persistent, two layered, membranous, somewhat elastic, white, leaving a narrow annulus and often an appendiculate margin; volva absent. **ODOR** not distinct or slightly farinaceous. **TASTE** mild to unpleasant-farinaceous. **PILEPELLIS** of subgelatinous, hyaline (often with gray-brown contents) hyphae 4-6  $\mu$ m in diam. **BASIDIA** 34-44 x 6-8  $\mu$ m, clavate, (2-3) 4 spored. **CYSTIDIA** absent. **CLAMP CONNECTIONS** absent. **SPORES** ellipsoid, 8-12 (-14) x 4-4.5 (-5.5)  $\mu$ m, smooth, hyaline, amyloid, spore print white.

**Distinguishing Features:** *Catathelasma ventricosa* is characterized by large fruiting bodies with broadly convex, dry, white to pale grey caps, decurrent gills hidden by a membranous partial veil until maturity, a large, thick, hard, white stem rooting deep into the soil, a superior ragged membranous annulus, and association with conifers. It is most closely allied with the often sympatric *C. imperialis*, which differs in forming a dark brown to yellow-brown, subviscid cap, and longer spores (11-14  $\mu$ m long). *Catathelasma ventricosa* may be confused in the field with *Tricholoma magnivelare*; however, the latter species is easily distinguished by its strong spicy-sweet odor, less tough mushrooms, and inamyloid spores.

**Distribution:** Pacific Northwest southward to northern California and in the Rocky Mountains and Southwestern mountains. **CALIFORNIA**, Del Norte Co., Redwood National Park, Alder Camp Rd. at Rugg Grove; Fort Dick, near Lake Earl State Wildlife Area; Six Rivers National Forest, Wilson Creek Rd., about 8 km north of Klamath off Hwy. 101; Crescent City; Smith River; **Humboldt Co.**, Big Lagoon County Park; Patrick's Point State Park; **OREGON**, Coos Co., South Slough Estuarine Research Reserve; Winchester Forest; **Linn Co.**, Willamette National Forest (WNF), Lost Prairie campground; WNF, Three Pyramids; **Tillamook Co.**, Oswald West State Park; **WASHINGTON**, Clallam Co., Olympic National Park, Lake Angeles; **Pierce Co.**, Mount Rainier National Park, Upper Tahoma Creek; **Skamania Co.**, Gifford Pinchot National Forest, Takhlakh Lake campground.

**Substrate and Habitat:** Solitary, scattered, rooting in deep humus under conifers (primarily *Abies* and *Picea*).

**Season:** Autumn.

**References:** Arora, D. 1991. All that the rain promises and more. Berkeley, CA: Ten Speed Press. 262 p. Phillips, R. 1991. Mushrooms of North America. Boston, MA: Little, Brown and Co. 319 p.



Photo courtesy of Michael Beug



Photo courtesy of Steve Trudell



*Chalciporus piperatus* (Bull.: Fr.) BatailleROD name *Boletus piperatus*

Family Strobilomycetaceae Morphological Habit bolete

**Description:** CAP 30-70 mm diam., convex to broadly convex to plano-convex; margin entire; surface subviscid in age, glabrous to obscurely appressed-fibrillose, ranging from clay color to cinnamon-brown, or ochraceous tawny. CONTEXT 5-15 mm thick, yellow, changing to pale vinaceous or pink; unchanging when exposed or bruised. PORES angular, relatively large (1-2 mm diam), cinnamon to red or red-brown, not staining. TUBES 5-10 mm long, becoming depressed around the stem in age, becoming red-brown in age. STEM 20-40 (-100) x 4-10 mm, central, terete, equal or tapering to a narrower base, solid, dry, glabrous to slightly appressed-fibrillose, concolorous with cap surface; base with copious bright yellow mycelium; context bright yellow in stem base, unchanging. PILEIPELLIS a tangled trichodermium of broad (10-17  $\mu$ m) hyphae with fusoid to cylindrical terminal cells, nongelatinous, hyaline to brown in KOH. BASIDIA 24-30 x 7-10  $\mu$ m, clavate, 4 spored. CYSTIDIA abundant, 40-70 x 8-13 (-15)  $\mu$ m, subclavate, fusoid or fusoid-ventricose, obtuse, hyaline, thin walled. CLAMP CONNECTIONS absent. SPORES subfusoid to subellipsoid, 8.5-12 x 3-4 (-5)  $\mu$ m, smooth, subhyaline to dingy ochraceous, spore print cinnamon brown.

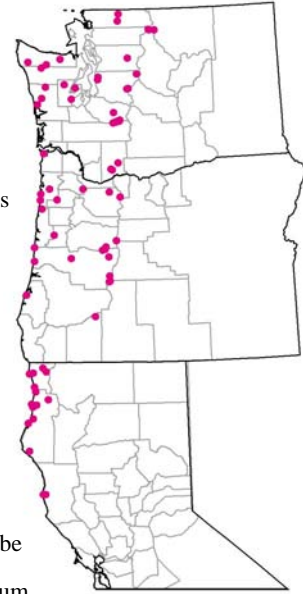
**Distinguishing Features:** Characterized by its small size, brown-cinnamon colors of the cap, gills and stem surfaces, bright yellow at stem base, peppery to acrid taste. It is most likely to be confused with *C. piperatoides*, which is sympatric. *Chalciporus piperatoides* shows a strong blue staining reaction when the pores and context are bruised; *C. piperatus* does not stain. Dried herbarium specimens of *C. piperatus* can be distinguished from those of *C. piperatoides* by the absence of an amyloid reaction when the tube tramal hyphae are mounted in Melzer's reagent.

**Distribution:** Widespread but locally uncommon in the Northern Hemisphere. **CALIFORNIA**, Del Norte Co., Redwood National Park, Alder Camp Rd. at Rugg Grove; Six Rivers National Forest (SRNF), Smith River National Recreation Area, jct. of Rd. 16N02 and Smith River Rd.; SRNF, Smith River National Recreation Area, Shelly Creek Rd.; Crescent City; Jedediah Smith Redwoods State Park; **Humboldt Co.**, King Range National Conservation Area, Shelter Cove; Trinidad, Spruce Grove; SRNF, Smith River National Recreation Area, trail to Blue Lake; Arcata; Big Lagoon County Park; Eureka, Samoa Peninsula; Patrick's Point State Park; Prairie Creek State Park; **Mendocino Co.**, Jackson State Forest, 3.2 km east of Mendocino; Jackson State Forest, Hwy. 408, Bean's Orchard; **OREGON**, **Benton Co.**, Siuslaw National Forest (SNF), Mary's Peak summit; **Clackamas Co.**, Mount Hood National Forest (MHNF), east fork of Salmon River; MHNF, Salmon River, Wapinita Hwy.; **Clatsop Co.**, Fort Clatsop National Monument; **Coos Co.**, South Slough Estuarine Research Reserve; **Jackson Co.**, Rogue River National Forest, above Union Creek; **Klamath Co.**, Willamette National Forest (WNF), Trapper Creek camp; WNF, Willamette Pass; **Lane Co.**, WNF, 3.2 km west of Lookout Creek; Neptune State Park; WNF, Potholes; WNF, Salt Creek Falls; west of Florence; **Lincoln Co.**, SNF, Cascade Head Experimental Forest; **Linn Co.**, WNF, H.J. Andrews Experimental Forest, Carpenter Mountain; WNF, Santiam Pass; **Tillamook Co.**, Bureau of Land Management, Tillamook Resource Area, 3.2 km southwest of Stony Mountain; Camp Meriweather; Pacific City; Tillamook; **Washington Co.**, Tigard; **WASHINGTON**, **Clallam Co.**, Olympic National Park (ONP), Lake Angeles; ONP, Sol Duc Hot Springs; Forks; **Grays Harbor Co.**, north of Copalis, Copalis Crossing; Olympic National Forest (ONF), Humptulips; ONF, Lake Quinault Road; **Jefferson Co.**, ONP, end of Hoh River Road; **King Co.**, Mount Baker-Snoqualmie National Forest (MBSNF), Deception Creek, Stevens Pass Hwy.; Seattle, Nihzo Street woods; MBSNF, Tye Creek, Stevens Pass; University of Washington campus; **Kittitas Co.**, MBSNF, Denny Creek; **Lewis Co.**, Mount Rainier National Park (MRNP), Narada Falls; MRNP, Reflection Lakes; **Mason Co.**, Olympic National Park, Staircase; Dennis Hall, Mason Lake, Shelton Area; Mason Lake; Shelton; **Okanogan Co.**, Okanogan National Forest, Lone Fir campground; **Pierce Co.**, MRNP, Carbon River; MRNP, Longmire; MRNP, Lower Tahoma Creek; Rampart Ridge trail; MRNP, upper meadow of Meadow Creek; **Skagit Co.**, MBSNF, Easy Pass trailhead; **Skamania Co.**, Gifford Pinchot National Forest (GPNF), Forlorn Lakes; GPNF, west of Trout Creek; GPNF, T.T. Munger Research Natural Area, near beaver pond; **Snohomish Co.**, MBSNF, Barlow Pass; **Whatcom Co.**, MBSNF, Marten Lake trail; MBSNF, Shuksan Inn.

**Substrate and Habitat:** Solitary, scattered in humus in mixed woods, more prevalent in coastal forests.

**Season:** Autumn.

**References:** Arora, D. 1986. Mushrooms demystified. Berkeley, CA: Ten Speed Press. 959 p. Phillips, R. 1991. Mushrooms of North America. Boston, MA: Little, Brown and Co. 319 p.



## *Chromosera cyanophylla* (Fr.) Redhead, Ammirati & Norvell

**ROD name** *Mycena lilacifolia*

**Family** Tricholomataceae      **Morphological Habit** mushroom

**Description:** CAP 3-25 mm diam., plano-convex-depressed, pellucid-striate, viscid to lubricous, glabrous, shiny to dull, dull lavender overall when young and fresh, soon becoming pale yellow, yellow-brown, olive-tan or bright yellow with a paler margin, fading to pale yellow or almost white in age when exposed. **GILLS** arcuate decurrent, narrow, pale vinaceous to pale lilac. **STEM** 10-30 (-45) x 1.0-2.5 mm, central, equal or with a slightly swollen base, cartilaginous-fragile, fistulose, glabrous, yellow-brown with gray-red to vinaceous tones on the apex, base vinaceous to lilac, fading overall in age but retaining lilac basal mycelium. **ODOR AND TASTE** not distinct. **PILEIPELLIS** a thin, collapsed ixotrichodermium of thin-walled hyphae 3-5  $\mu\text{m}$  diam., embedded in a gelatinous matrix; hyphae are covered with small, globose, yellow, refractive globules. **SUBPELLIS** poorly differentiated from the pileipellis. **BASIDIA** 20-25 (-29) x 4-6.5  $\mu\text{m}$ , clavate, 4 spored. **CYSTIDIA** absent. **CLAMP CONNECTIONS** present. **SPORES** amygdaliform to ellipsoid, 6-9 (-11) x 3.5-4.5  $\mu\text{m}$ , smooth, thin walled, hyaline, inamyloid, acyanophilic, spore print white.

**Distinguishing Features:** *Chromosera cyanophylla* is reminiscent of *Xeromphalina* spp., but the latter lack lilac pigmentation, lack viscid tissues, and have distinctly different micromorphology.

**Distribution:** Relatively common in North America and Europe. Known from many dozens of locations in Oregon, Washington, and California.

**Substrate and Habitat:** Solitary to scattered or caespitose on exposed white-rotted coniferous wood (*Abies* spp., *Pinus* spp.).

**Season:** Spring and autumn.

**References:** Arora, D. 1986. *Mushrooms demystified*. Berkeley, CA: Ten Speed Press. 959 p. Redhead, S.A.; Ammirati, J.F.; Norvell, L.L. 1995. *Omphalina sensu lato* in North America 3: *Chromosera* gen. nov. *Beih. Sydowia*. 10: 155-167.

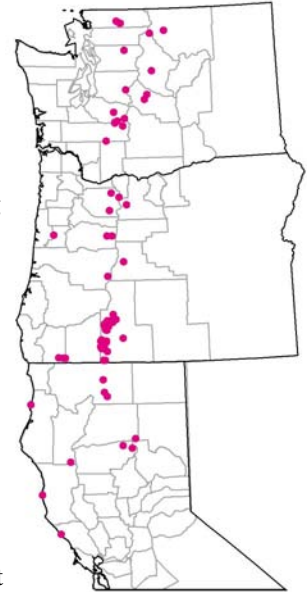


Photo courtesy of Steve Trudell



Photo courtesy of Survey and manage mycology team

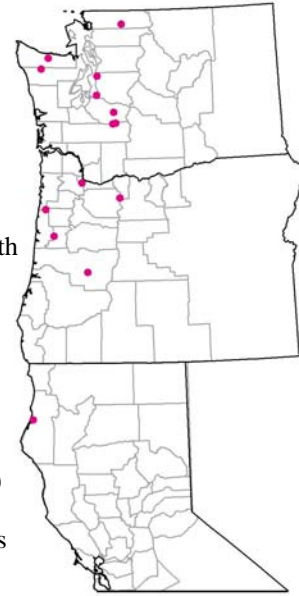


## *Chrysomphalina grossula* (Pers.) Norvell, Redhead & Ammirati

**ROD name** *Chrysomphalina grossula*

**Family** Tricholomataceae      **Morphological Habit** mushroom

**Description:** **CAP** 2-35 (-60) mm broad, convex to plano-convex with incurved margin when young, becoming convex-umbilicate to uplifted with age, moist, hygrophanous, striate, smooth, initially yellow to brown or green-yellow, becoming pale green-yellow with age or even off-white, color of margin yellow to green-yellow; with age the entire cap almost white. **GILLS** strongly decurrent, initially ending at the same point on the stem apex, arcuate, thickened in age and often intervenous, edges even, yellow to green-yellow becoming slightly paler to off-white on exposure or with age. **STEM** central, 5-40 (-55) mm long, more or less equal 1.5-7 mm at apex, usually hollow in mature specimens, more or less smooth but may appear minutely pubescent, yellow or green-yellow. **ODOR AND TASTE** not distinct. **PILEIPellis** of thin-walled, smooth, nongelatinized, compactly parallel to subparallel hyphae. **BASIDIA** 33-48 x 5-8  $\mu$ m, cylindrical to narrowly clavate, (2-) 4 spored. **STERIGMATA** 3-7.4 (10)  $\mu$ m long. **CYSTIDIA** absent. **CLAMP CONNECTIONS** absent. **SPORES** ellipsoid to subellipsoid 6-9.5 x 3.7-5.5 (-6)  $\mu$ m, with conspicuous obtuse apiculus and rounded apex, hyaline, smooth, thin walled, inamyloid, spore print white.



**Distinguishing Features:** *Chrysomphalina grossula* is a small, green-yellow mushroom with brown or green-yellow, moist, initially convex then uplifted-umbilicate caps, with yellow to green-yellow, strongly decurrent, widely separated thickened gills, and slightly paler hollow stems. *Chrysomphalina grossula* is similar in size and habit to *Omphalina ericetorum*. Older faded forms of both species can be microscopically differentiated by the hyphae in the cap and gill trama of *C. grossula* that are markedly inflated (reaching up to 22 mm in diam.) and constricted at the septa, whereas those of *O. ericetorum* are narrower (4-10 mm) and not normally swollen at the septa. More importantly, *O. ericetorum* is lichenized with the mushrooms surrounded by a dark green thallus composed of small spherules; it also develops a fairly conspicuous pubescence on its stem not found in *C. grossula*.

**Distribution:** Relatively uncommon in North America and restricted to the *Tsuga heterophylla*/*Pseudotsuga menziesii* zone in Washington, Idaho, Oregon, and northern California. Also in Great Britain, Europe, and Japan. **CALIFORNIA**, Humboldt Co., Arcata; **OREGON**, Benton Co., Siuslaw National Forest, Mary's Peak Scenic Botanical Area, Mary's Peak; Clackamas Co., Mount Hood National Forest, Salmon River, east fork; Lane Co., Willamette National Forest, Hardesty Mountain trail; Multnomah Co., Portland; Tillamook Co., Van Duzer Wayside Corridor; **WASHINGTON**, Clallam Co., Olympic National Park (ONP), Lake Crescent; Jefferson Co., ONP, Hoh West Twin Creek Research Natural Area; King Co., Federal Way, near Mirror Lake; City of Seattle, Seattle Park; Pierce Co., Mount Rainier National Park (MRNP), Green Lake; MRNP, Longmire campground; MRNP, Tahoma Creek; Whatcom Co., Mount Baker-Snoqualmie National Forest, lower Noisy Creek trail.

**Substrate and Habitat:** Gregarious to caespitose on water-soaked coniferous wood, bark chips, debris (occasionally found on hardwood mixed with colonized coniferous wood) in mixed forests or parks.

**Season:** Autumn.

**Reference:** Norvell, L.L.; Redhead, S.A.; Ammirati, J.F. 1994. *Omphalina sensu lato* in North America. 1-2. 1. *Omphalina wynniae* and the genus *Chrysomphalina*. 2. *Omphalina sensu* Bigelow. Mycotaxon. 50: 379-407.



Photo courtesy of Lorelei Norvell



Photo courtesy of mycology team

## *Clavariadelphus ligula* (Schaeffer: Fries) Donk

**ROD name** *Clavariadelphus ligula*

**Family** Clavariaceae

**Morphological Habit** club

**Description:** **SPOROCARPS** 20-100 mm tall, 2-8 mm in diam. basally, enlarged upward to 5-12 (-22) mm in diam., simple, initially subcylindrical, then narrowly clavate to clavate, occasionally fan shaped, irregular, base terete, pruinose to pubescent, initially pale yellow, pale orange, pale tan, pale pink-tan, then brown-orange to pale brown, to pink-brown. **SPORE-BEARING TISSUE** smooth, becoming longitudinally rugose, apex subacute, obtuse or broadly rounded, often lobed or contorted at maturity, infrequently bifid, smooth, becoming rugose, green to dark green after a frost or at maturity, staining slowly, irregularly brown-orange to brown-gray, to pink-brown where cut or bruised. **CONTEXT** soft and spongy upward as the apex enlarges, white to pallid, on exposure staining slowly, irregularly brown-orange to brown-gray to pink-brown. **ODOR** not distinct. **TASTE** not distinct or slightly sweet. **MACROCHEMICALS** PYR, GUA, PHN, ANO, SYR all positive; KOH, TYR negative. **TRAMA** of loosely interwoven, thin to thick walled, smooth, hyaline to pale yellow hyphae 4-8 (-12)  $\mu$ m in diam. **GLOEOPLEUROUS HYPHAE** 2.5-5 (-10.5)  $\mu$ m in diam., arising from generative hyphae at clamp connections, scattered throughout the trama, more abundant near base, thin walled, smooth, pale yellow, cyanophilic. **LEPTOCYSTIDIA** 40-75 x 2.5-5  $\mu$ m, scattered among and scarcely projecting beyond the basidia, cylindrical to narrowly clavate, at times apically or subapically branched, walls thin, smooth, hyaline to pale yellow. **BASIDIA** 45-85 x 8-11  $\mu$ m, clavate, inflated apically at maturity, thin walled or irregularly thickened, pale yellow, acyanophilic, (2-) 4 spored. **STERIGMATA** 5-8  $\mu$ m long, incurved. **CLAMP CONNECTIONS** present. **SPORES** narrowly ellipsoid, boletoid or sway-backed in profile, 12-16.5 x 3.5-4.5  $\mu$ m, thin walled, smooth, hyaline to pale yellow, inamyloid, spore print pale yellow, yellow-white, pale orange or orange-white.



**Distinguishing Features:** The size of the basidia and spores separate *Clavariadelphus ligula* from the macroscopically similar *C. sachalinensis*.

**Distribution:** Widespread in Europe and North America. **CALIFORNIA**, Mendocino Co., Jackson State Forest; **OREGON**, Benton Co., Oregon State University (OSU), Peavy Arboretum; **Clackamas Co.**, Mount Hood National Forest (MHNF), Salmon River Meadows; **Deschutes Co.**, Deschutes National Forest, east of McKenzie Pass; **Douglas Co.**, Umpqua National Forest, 1.6 km south of OK Butte; Bureau of Land Management, southwest of Yellow Creek Mountain; **Hood River Co.**, MHNF, Tamanawas Falls, on trail 645, Elk Meadows trail; **Jackson Co.**, Rogue River National Forest (RRNF), 9.7 km north of Prospect Ranger Station; RRNF, Hwy. 62, past Prospect Ranger Station; **Klamath Co.**, Deschutes National Forest, Odell Lake; **Lane Co.**, Willamette National Forest (WNF), Belknap Springs; **Linn Co.**, WNF, Clear Lake Road; WNF, South Santiam Pass; Marion Co., MHNF, along Rd. 4672-250; **Wasco Co.**, MHNF, Beaver Creek; **WASHINGTON**, **Clallam Co.**, Olympic National Park, Heart of the Hills, Lake Angeles trail; **Kitsap Co.**, Bremerton; Hood Canal; **Kittitas Co.**, Wenatchee National Forest, Lake Kachess trail; **Lewis Co.**, Gifford Pinchot National Forest, Camp Creek Falls trail; Cispus River; **Okanogan Co.**, Okanogan National Forest (OKNF), Lone Fir campground; OKNF, Methow River trail bench; **Pierce Co.**, Mount Rainier National Park, Longmire campground.

**Substrate and Habitat:** Scattered to gregarious on soil or duff, under mixed conifers.

**Season:** July through October.

**Reference:** Methven, A.S. 1990. The genus *Clavariadelphus* in North America. Berlin: Cramer. 192 p.



Photo courtesy of Eugene Butler



Photo courtesy of Steve Trudell

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## *Clavariadelphus occidentalis* Methven

**ROD name** *Clavariadelphus pistillaris*

**Family** Clavariaceae

**Morphological Habit** club

**Description:** **SPOROCARPS** 50-250 mm tall, 7-15 mm in diam. basally, enlarged upward to 10-35 mm in diam., simple, subcylindric to capitate-clavate, base terete, smooth, white to yellow-white to orange-white, pale tan, or yellow. **SPORE-BEARING TISSUE** smooth, becoming longitudinally rugose to rugulose, cream pale orange to brown, apex subacute, obtuse or broadly rounded, smooth, becoming rugose or rugulose, concolorous with the hymenium; surface staining slowly, irregularly brown, where cut or bruised, staining more conspicuously downward. **CONTEXT** initially solid, white to pallid, on exposure staining slowly, irregularly brown. **ODOR** not distinct. **TASTE** not distinct or bitter. **MACROCHEMICAL REACTIONS:** PYR, PHN, ANO, GUA, SYR all positive; KOH, TYR negative. **TRAMAL HYPHAE** 3-12 µm in diam., more or less parallel to longitudinally interwoven, inflated (-12 µm) or broadly undulate, branched, clamped; walls thin or irregularly thickened to 1 µm, smooth; clamps uninflated or inflated (-15 µm), sometimes ampulliform; contents amorphous, hyaline to pale yellow in KOH. **GLEOPLEUROUS HYPHAE** 3-8 (-12) µm in diam., arising from generative hyphae at clamp connections, scattered throughout the trama, thin walled, smooth, cyanophilic. **LEPTOCYSTIDIA** 45-80 x 2.5-5 µm, cylindric to narrowly clavate, at times apically or subapically branched, thin walled, smooth. **BASIDIA** 70-125 x 8-12 µm, clavate, inflated apically at maturity, thin walled or irregularly thickened, pale yellow, acyanophilic, (2-) 4 spored. **STERIGMATA** 6.5-12 µm long, incurved. **CLAMP CONNECTIONS** present. **SPORES** broadly ellipsoid, broadly ovate or amygdaliform, 10.5-14 x 6-7.5 µm, thin walled, smooth, hyaline to pale yellow, acyanophilic, inamyloid, spore print white to pale yellow.



**Distinguishing Features:** Erronously identified as *Clavariadelphus pistillaris* in the past.

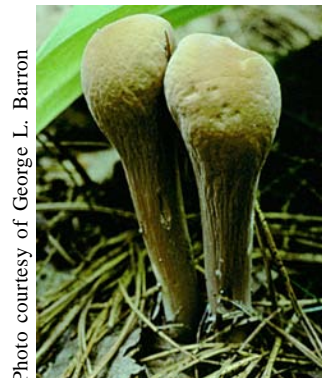
*Clavariadelphus occidentalis* is more yellow and darkens to a gray-orange as it ages, and it has smaller spores than *C. pistillaris*. *Clavariadelphus pistillaris* is known only from eastern North America and Europe.

**Distribution:** Across western North America. **CALIFORNIA, Del Norte Co.**, Jedediah Smith Redwoods State Park, Crescent City, Smith Grove; Panther Creek campground; **Mendocino Co.**, Jackson State Forest, Aleuria Glen; Booneville, Faulkner Park; Jackson State Forest, near Mendocino; **Shasta Co.**, Hwy. 44 near Viola; **Siskiyou Co.**, Klamath National Forest (KNF), Marble Mountain Wilderness, Haypress trail; Siskiyou Co., KNF, Marble Mountain Wilderness Area, Stanishaw trail near jct. with Ten Bears trail; **Trinity Co.**, Six Rivers National Forest SRNF, Gray Fall's campground, Hwy. 299; east of Salyer; **OREGON, Benton Co.**, Bureau of Land Management (BLM), Mary's Peak Resource Area, Reese Creek; Corvallis, Avery's Woods; north of Corvallis; **Clackamas Co.**, BLM, Cascades Resource Area, Pine Rockcut on Molalla River corridor; **Douglas Co.**, BLM, Swiftwater Resource Area, 0.8 km southeast of Wards Butte; BLM, Swiftwater Resource Area, 4.8 km west of Cottage Grove Lake; BLM, Irwin Rocks Research Natural Area; BLM, south of Rd. 20-6-26.0; Umpqua National Forest (UNF), 1.2 km northeast of Taft Mountain; UNF, 1.6 km south of OK Butte; UNF, 24.1 km southeast of Tiller, off Rd. 3220; UNF, 3.2 km west of Foster Butte; UNF, Andraieff Meadows; UNF, Lookout Mountain; **Josephine Co.**, BLM, Grants Pass Resource Area, 4.8 km southwest of Mooney Mountain; BLM, Grants Pass Resource Area, Draper Creek; Grants Pass; Cave Junction; near Grants Pass; **Lane Co.**, Willamette National Forest (WNF), H.J. Andrews Experimental Forest, 3.2 km east of Mona Camp; UNF, Wyatt Creek; UNF, 6.4 km southeast of June Mountain; WNF, Blue Pool; WNF, Blue River Ranger District, H.J. Andrews Experimental Forest near plot L401; WNF, H.J. Andrews Experimental Forest, watershed no. 2, lower trail; Eugene; near Eugene; WNF, H.J. Andrews Experimental Forest, stand 29; **Linn Co.**, Cascadia State Park; WNF, Moose Creek; Brownsville, Reservoir Hill; **Wasco Co.**, Mount Hood National Forest, Bear Springs; **WASHINGTON, Clallam Co.**, Olympic National Park, Soleduc Falls; **Pierce Co.**, Mount Rainier National Park, Lower Tahoma Creek.

**Substrate and Habitat:** Solitary to gregarious or in caespitose clusters of two or three sporocarps; on soil or duff under mixed deciduous-coniferous forests or deciduous forests.

**Season:** Mostly September through February but also in May.

**Reference:** Methven, A.S. 1990. The genus *Clavariadelphus* in North America. Berlin: Cramer. 192 p.



## *Clavariadelphus sachalinensis* (Imai) Corner

**ROD name** *Clavariadelphus sachalinensis*

**Family** Clavariaceae

**Morphological Habit** club

**Description:** **SPOROCARPS** 20-70 mm tall, 1-4 mm in diam. basally, enlarged upward to 3-18 mm in diam., simple, initially cylindrical to subcylindric, then narrowly clavate to clavate, pubescent to tomentose, initially yellow-white to orange-white then gray-orange, finally pale brown. **SPORE-BEARING TISSUE** smooth, becoming longitudinally rugose to rugulose, apex subacute, obtuse or broadly rounded, at times forked or lobed at maturity, some nearly turbinate, smooth, becoming rugose, forest green to dark green following a frost, irregularly brown or dark brown where cut or bruised, staining more conspicuously near base. **CONTEXT** white to pale, slowly brown-orange when exposed. **ODOR AND TASTE** not distinct. **MACROCHEMICAL REACTIONS:** PHN, ANO, PYR, GUA, SYR all positive; KOH, PGR, TYR all negative. **TRAMA** of pale yellow, thin to thick walled, interwoven hyphae 3-12  $\mu\text{m}$  in diam. **GLEOPLEROUS HYPHAE** 3-9.5 (-14)  $\mu\text{m}$  diam., arising from generative hyphae at clamp connections, scattered, branched, thin walled, smooth, pale yellow, cyanophilic. **LEPTOCYSTIDIA** 50-70 x 2.5-5  $\mu\text{m}$ , scattered among and scarcely projecting beyond the basidia, cylindrical to narrowly clavate, at times apically or subapically branched, thin walled, smooth, pale yellow. **BASIDIA** 65-105 x 8-12.5  $\mu\text{m}$ , clavate, inflated apically at maturity, thin walled, smooth, pale yellow, acyanophilic, (2-) 4 spored. **STERIGMATA** 8-9.5  $\mu\text{m}$  long, incurved. **CLAMP CONNECTIONS** present. **SPORES** narrowly ellipsoid, boletoid or sway-backed in profile, 18-24 x 4-6  $\mu\text{m}$ , thin walled, smooth, pale yellow, acyanophilic, inamyloid, spore print yellow-white to pale orange.



**Distinguishing Features:** The size of the basidia and spores separate *Clavariadelphus sachalinensis* from the macroscopically similar *C. ligula*.

**Distribution:** Widespread in Asia, Europe, and northern North America. **CALIFORNIA, Mendocino Co.**, Jackson State Forest, Aleuria Glen; **OREGON, Jackson Co.**, Bureau of Land Management (BLM), Butte Falls Resource Area, Big Butte Creek; BLM, Butte Falls Resource Area, Gray Creek; Rogue River National Forest, Natural Bridge; BLM, Butte Falls Resource Area, Sugar Pine Flat; **Klamath Co.**, BLM, Klamath Falls Resource Area, 4.8 km southwest of Hamaker Mountain; **WASHINGTON, Kittitas Co.**, Crystal Springs; Wenatchee National Forest, Lake Kachess; Stampede Pass; **Lewis Co.**, Soda Springs campground; **Okanogan Co.**, Okanogan National Forest, Pasayten Wilderness, Tatoosh trail jct.; **San Juan Co.**, Friday Harbor Biological Station, Bear Springs area.

**Substrate and Habitat:** Scattered to gregarious on soil or duff, under mixed conifers.

**Season:** June through October.

**Reference:** Methven, A.S. 1990. The genus *Clavariadelphus* in North America. Berlin: Cramer. 192 p.

No photograph available

## *Clavariadelphus subfastigiatus* Wells & Kempton

**ROD name** *Clavariadelphus subfastigiatus*

**Family** Clavariaceae      **Morphological Habit** club

**Description:** **SPOROCARPS** up to 105 mm tall, 6-12 mm in diam. basally, enlarged upward to 20 mm diam., simple, subcylindric, clavate or broadly clavate, smooth, becoming longitudinally rugose to rugulose, initially gray-red, dull red fading to salmon, gray-orange, apex obtuse or broadly rounded, often irregularly so, smooth, slowly pale brown to brown when bruised. **CONTEXT** white to pallid, initially solid, becoming soft and spongy near apex, staining slowly, irregularly pale brown or brown on exposure. **ODOR** not distinct. **TASTE** bitter. **MACROCHEMICAL REACTIONS:** KOH, PHN, GUA, ANO, PYR all positive. **TRAMAL HYPHAE** 3-12 (-16)  $\mu\text{m}$  diam., more or less parallel to interwoven, branched, thin walled or irregularly thickened to 1  $\mu\text{m}$ , pale yellow. **GLEOPLEROUS HYPHAE** 2.5-8 (-12)  $\mu\text{m}$  in diam., arising from generative hyphae at clamp connections, scattered throughout the trama, branched, thin walled, pale yellow, cyanophilic. **LEPTOCYSTIDIA** 30-65 x 2.5-5  $\mu\text{m}$ , scattered among and scarcely projecting beyond the basidia, cylindrical to narrowly clavate, at times apically or subapically branched, thin walled, smooth, pale yellow. **BASIDIA** 60-95 x 8-11  $\mu\text{m}$ , clavate, inflated apically at maturity, thin walled or irregularly thickened, smooth, pale yellow, (2-) 4 spored. **STERIGMATA** 6-9.5  $\mu\text{m}$  long, incurved. **CLAMP CONNECTIONS** present. **SPORES** broadly ellipsoid, broadly ovate or amygdaliform, 8-10 x 5-6  $\mu\text{m}$ , thin walled, smooth, pale yellow, acyanophilic, inamyloid, spore print white.



**Distinguishing Features:** *Clavariadelphus subfastigiatus* is similar to *C. pistillaris* but has red tones to the sporocarp and smaller spores.

**Distribution:** Western North America. **CALIFORNIA**, Humboldt Co., Seely-McIntosh Road; **Marin Co.**, vicinity of Alpine Lake; **San Mateo Co.**, Huddart Park; **OREGON**, Clackamas Co., Mount Hood National Forest; **Douglas Co.**, Bureau of Land Management, North Myrtle Creek Research Natural Area; **WASHINGTON**, Kittitas Co., Snoqualmie Pass.

**Substrate and Habitat:** Scattered to gregarious on soil or duff, under mixed conifers.

**Season:** October through January.

**Reference:** Methven, A.S. 1990. The genus *Clavariadelphus* in North America. Berlin: Cramer. 192 p.



Photo courtesy of Lorelei Norvell

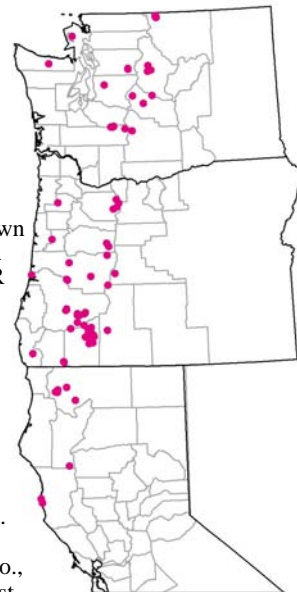
## *Clavariadelphus truncatus* Donk

**ROD name** *Clavariadelphus truncatus*

**Family** Clavariaceae

**Morphological Habit** club

**Description:** **SPOROCARPS** up to 150 mm tall, up to 15 mm in diam. at base, enlarged upward to 35 mm in diam., simple, clavate to broadly clavate, then turbinate or cantharelloid, base terete, smooth, white to pale orange. **SPORE-BEARING TISSUE** smooth, becoming longitudinally rugose to rugulose, yellow to brown, apex truncate, smooth, becoming rugose or rugulose, yellow to red-brown when bruised. **CONTEXT** solid, white to pale, slowly pale brown, to red-brown when bruised. **ODOR** not distinct. **TASTE** not distinct. **MACROCHEMICAL REACTIONS:** KOH, PYR, GUA, PHN, ANO, SYR all positive, TYR negative. **TRAMAL HYPHAE** 3-12 (-16)  $\mu\text{m}$  in diam., more or less parallel to interwoven, branched, thin walled or irregularly thickened to 1  $\mu\text{m}$ , smooth, pale yellow. **GLEOPLEUROUS HYPHAE** 2.5-5 (-8)  $\mu\text{m}$  in diam., branched, thin walled, smooth, pale yellow, cyanophilic. **LEPTOCYSTIDIA** 40-70 x 2.5-5  $\mu\text{m}$ , cylindrical to narrowly clavate, thin walled, pale yellow. **BASIDIA** 80-110 x 8-12  $\mu\text{m}$ , clavate, thin walled, pale yellow, acyanophilic, 2-4 spored. **STERIGMATA** 6.5-9.5  $\mu\text{m}$  long, incurved. **CLAMP CONNECTIONS** present. **SPORES** broadly ellipsoid, broadly ovate or amygdaliform, 9.5-13.5 x 5.5-7  $\mu\text{m}$ ; thin walled, smooth, pale yellow, acyanophilic, inamyloid, spore print white.



**Distinguishing Features:** The spore size and shape and color of the sporocarp are distinct.

**Distribution:** Widespread in Asia, Europe, and North America. **CALIFORNIA, Mendocino Co.**, Jackson State Forest, Aleuria Glen; Van Damme State Park; **Siskiyou Co.**, Klamath National Forest (KNF), Marble Mountain Wilderness Area, Canyon Creek trail; KNF, Cub Creek, west of Marble Mountain Wilderness; KNF, Duck Lake trailhead; KNF, Haypress Meadows; KNF, Stanshaw trailhead, west of Marble Mountain Wilderness; **Trinity Co.**, Mendocino National Forest, George's Valley; **OREGON, Benton Co.**, Siuslaw National Forest, Mary's Peak; **Clackamas Co.**, Mount Hood National Forest (MHNF), Clackamas River Ranger District, Buck Creek; MHNF, Little Crater Lake; MHNF, Still Creek campground; **Curry Co.**, Mule Prairie; **Deschutes Co.**, Deschutes National Forest, southeast shore of Cultus Lake; **Douglas Co.**, Umpqua National Forest (UNF), 1.6 km south of Threehorn Camp; Bureau of Land Management (BLM), Swiftwater Resource Area, 2.4 km south of Wards Butte; UNF, 18 km southeast of Tiller; off Rd. 3220; UNF, 3.2 km south of Clayton Point; UNF, Andraieff Meadows; BLM, Myrtle Creek Research Natural Area; UNF, South Umpqua Falls; Lake Tahkenitch; **Jackson Co.**, BLM, 1.6 km north of Round Top; BLM, 1.6 km northwest of Northern Glades; Rogue River National Forest, 2.4 km east of Prospect Ranger Station; BLM, 3.2 km east of Flounce Rock; BLM, 3.2 km south of Medco Pond; BLM, 3.2 km west of Fredenburg Butte; BLM, 4.8 km west of Santiam Peak; BLM, Big Butte Creek; BLM, Dog Creek; BLM, McNeil Creek; BLM, near Gardner Butte; BLM, near riparian area off of road 34-2E-29; BLM, Prospect Ranger Station; BLM, Sugar Pine Flat; BLM, southwest of road 34-2E-9.07; Rogue River National Forest (RRNF), Thousand Springs; Rogue River National Forest, Willow Lake campground; **Josephine Co.**, RRNF, Jacksonville, 3.2 km southeast of Larkspur Spring; **Klamath Co.**, Winema National Forest (WINF), 3.2 km northeast of Blue Springs; WINF, Crater Lake south entrance; Willamette National Forest (WNF), Willamette Pass; **Lane Co.**, UNF, Wyatt Creek, 0.8 km north of Rose Hill; WNF, Belknap Springs; WNF, south of Buckhead Mountain; near Fern Ridge Dam, north of Eugene; WNF, 3.2 km northeast of Lost Prairie campground; **Linn Co.**, WNF, Clear Lake area; WNF, Maude Creek; **Umatilla Co.**, Meacham; **Wasco Co.**, MHNF, Wapinita Summit, Frog Lake; **Yamhill Co.**, BLM, Tillamook Resource Area, north of East Creek; **WASHINGTON, Chelan Co.**, Wenatchee National Forest (WENF), Chiwawa River; WENF, off road 6300 spur 151; WENF, Old Blewett Pass; WENF, Rock Creek Guard Station, Lake Wenatchee; near Lake Wenatchee; **Kittitas Co.**, Cle Elum; WENF, Lake Kachess trail; **Lewis Co.**, Mount Rainier National Park, Longmire campground; Soda Springs; **Okanogan Co.**, Okanogan National Forest (OKNF), Pasayten Wilderness, 1.6 km east of wilderness shelter; OKNF, Pasayten Wilderness, head of Dry Lake; OKNF, Pasayten Wilderness, Hidden Lakes cabin; OKNF, Pasayten Wilderness, south of head of Big Hidden Lake; OKNF, Pasayten Wilderness, Stub Creek trail; **Pierce Co.**, Mount Rainier National Park (MRNP), Longmire campgrounds; MRNP, southwest entrance; **San Juan Co.**, Friday Harbor Biological Station, Bear Springs area; **Snohomish Co.**, Stevens Pass Rd., San Juan campground; **Yakima Co.**, Indian Creek near Trenton Reservoir.

### Substrate and Habitat:

Scattered to gregarious on soil or duff, under mixed conifers.

**Season:** July through November.

### Reference:

Methven, A.S. 1990. The genus *Clavariadelphus* in North America. Berlin: Cramer. 192 p.





*Clavulina castaneopes* var. *lignicola* Petersen

**ROD name** *Clavulina ornatipes*

**Family** Clavariaceae

**Morphological Habit** club

**Description:** **SPOROCARPS** up to 70 mm tall, composed of a distinct stemlike portion and a flattened spore-bearing area, usually branched but occasionally simple, especially in young or small plants. **STEM** 15-60 mm long, 4-8 mm broad, some shade of tan or brown, clothed with fascicles of hyphae, which give the appearance of being strigose, fibrillose; fascicles usually extending up the stem to the base of the branches; branches often longitudinally ridged or grooved, especially in the upper portions. **SPORE-BEARING TISSUE** occasionally simple, then flattened, somewhat palmate and longitudinally grooved, but usually divided into few to several branches, some shade of dull tan to gray. **MEDULLARY HYPHAE** of the stem composed of long cells, 20-150 x 4-10  $\mu\text{m}$ , often slightly inflated (-20  $\mu\text{m}$ ), rarely highly inflated (-35  $\mu\text{m}$ ), hyaline, thin walled, rather tightly packed, often curving or zigzag throughout much of their length, sparsely branched. **CORTICAL HYPHAE** linear, composed of uninflated, rarely slightly swollen, long cells, with pale brown walls slightly thickened, branching and anastomosing throughout their length. **FASCICLES** of hyphae on the stem composed of the cortical cell type with some swollen cells in the center depending on the size of the fascicle. **BASIDIA** 28-40 x 8.5-11.5  $\mu\text{m}$ , subclavate to subcylindrical, hyaline, 2 spored. **STERIGMATA** stout, 4-8  $\mu\text{m}$  long. **CLAMP CONNECTIONS** present. **SPORES** globose, subglobose, suboval to pip shaped, 9.6-10.4 x 8.8-9.6  $\mu\text{m}$ , smooth, thick walled.



**Distinguishing Features:** Characterized by the fascicles on the stem.

**Distribution:** **CALIFORNIA**, Humboldt Co., Murray Road; Prairie Creek State Park, off Hwy. 101; Big Lagoon County Park; **OREGON**, Lane Co., Siuslaw National Forest (SNF), Cummins Creek Wilderness Area, Cummins Creek trailhead; SNF, Siltcoos River; **Tillamook Co.**, SNF, Cascade Experimental Forest, Cascade Head; **Yamhill Co.**, SNF, 4.8 km east of Green Top; **WASHINGTON**, **King Co.**, Mount Baker-Snoqualmie National Forest (MBSNF), Denny Creek, west of Snoqualmie Pass, just off Hwy. 10; Seattle; Upper Snoqualmie Falls; **Lewis Co.**, near Randle; **Mason Co.**, Olympic National Forest, Olympic Mountains, Lake Cushman; **Pierce Co.**, Mount Rainier National Park, Lower Tahoma Creek; **Whatcom Co.**, MBSNF, Cascade Creek Rd. near jct. with Deadhorse Rd.; MBSNF, O'Keefe Creek.

**Substrate and Habitat:** Usually on wood or bark.

**Season:** Autumn.

**References:** Petersen, R.H. 1964. Notes on clavarioid fungi. I. The *Clavulina castaneopes* complex. Mycologia. 56: 20-28. Petersen, R.H. 1967. Type studies in the clavarioid fungi. I. The taxa described by Charles Horton Peck. Mycologia. 59: 767-802.



Photo Courtesy of Michael Beug

Copyright Michael Beug

## *Collybia racemosa* (Pers.: Fr.) Quélet

**ROD name** *Collybia racemosa*

**Family** Tricholomataceae      **Morphological Habit** mushroom

**Description:** CAP 2-8 (-10) mm in diam., plano-convex with a distinct broad papilla or umbo, margin decurved, sometimes splitting, and slightly crenate at maturity, subhygrophanous, innately silky, even or finely rugulose, pale gray to gray-brown overall or brown. **GILLS** adnate to adnexed, close to crowded, narrow, gray-brown, edges even. **STEM** 20-60 x 0.2-1.0 mm, central, terete, flaccid, sometimes prostrate, finely longitudinally striate at the apex, pruinose, dull, dry, gray-brown to dark brown; with numerous side branches (racemose) up to 5 mm long projecting at right angles and topped by a small, globose head of conidia. **ODOR AND TASTE** not distinct. **PILEIPELLIS** of non-gelatinous, radially arranged hyphae 2-4  $\mu\text{m}$  in diam., weakly incrustated with gray pigments. **BASIDIA** 16-22 x 3.5-4.5  $\mu\text{m}$ , narrowly clavate, 4 spored. **CYSTIDIA** absent. **CLAMP CONNECTIONS** present. **SPORES** ovoid to subellipsoid, 4-6 (-6.5) x 2-3  $\mu\text{m}$ , smooth, hyaline, inamyloid, acyanophilic, thin walled. **CONIDIA** 7-13 x 3.0-5.5  $\mu\text{m}$ , elongate-ellipsoid to cylindrical or subtriangular, often curved and with a rounded projection at the base, hyaline.

**Distinguishing Features:** *Collybia racemosa* is the only known mushroom that forms conidia on side branches of the stem. Such structures are so distinctive on this small gray mycenoid agaric that the species is easily recognized in the field and not likely to be confused with any other taxa.

**Distribution:** Widespread in the Northern Hemisphere but always locally rare. **CALIFORNIA**, **Del Norte Co.**, Six Rivers National Forest (SRNF), Patrick Creek; Crescent City; Jedediah Smith Redwoods State Park; **Humboldt Co.**, Redwood National Park, Lady Bird Johnson Grove; **Marin Co.**, Mount Tamalpais Watershed, Lake Lagunitas; Corte Madera, Deer Run Rd.; **Mendocino Co.**, Northern California Coast Preserve, 14.5 km west of Brandscombe; Jackson State Forest, near Dunlap campground; Van Damme State Park, Pygmy Forest; Northern California Coast Preserve; **Napa Co.**, Clearly reserve; **Siskiyou Co.**, Klamath National Forest, Duck Lake trailhead; **Trinity Co.**, SRNF, Gray Falls campground; Shasta-Trinity National Forest, near Weaverville; **OREGON**, **Clackamas Co.**, Mount Hood National Forest, Zigzag; **Douglas Co.**, Lake Tahkenitch; **Jackson Co.**, Rogue River National Forest, Sturgis Fork; **Josephine Co.**, Taklima; Grants Pass; **Lane Co.**, Willamette National Forest (WNF), Blue River; WNF, McKenzie Bridge; **WASHINGTON**, **Clallam Co.**, Olympic National Park (ONP), Heart of the Hills campground; ONP, Olympic Hot Springs; **Jefferson Co.**, ONP, Hoh River trail, Hoh rain forest; **King Co.**, Annette Lake trailhead, Snog Pass; **Okanogan Co.**, Okanogan National Forest, Wolf Creek, Eliulia Valley; **Pierce Co.**, Mount Rainier National Park, Lower Tehoma Creek; **Snohomish Co.**, Mount Baker-Snoqualmie National Forest, Verlot campground; **Thurston Co.**, Tenino Mounds.

**Substrate and Habitat:** Gregarious, on rotting or mummified remnants of agarics or seldom in nutrient-rich leaf mulch, in forests.

**Season:** Autumn.

**References:** Noordeloos, M.E. 1995. *Collybia*. In: Bas, C.; Kuyper, Th.W.; Noordeloos, M.E.; Vellinga, E.C., eds. Flora Agaricina Neerlandica. Rotterdam, The Netherlands: A.A. Balkema: 106-123. Vol. 3.

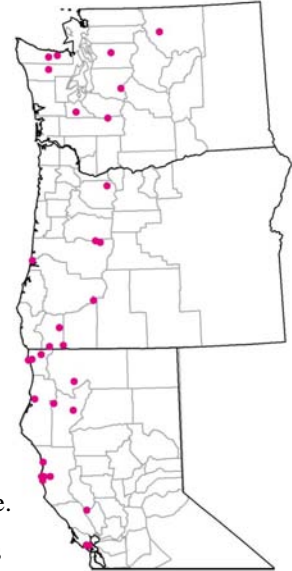


Photo courtesy of George L. Barron

## *Cordyceps capitata* (Fr.) Link

**ROD name** *Cordyceps capitata*

**Family** Clavicipitaceae      **Morphological Habit** earth tongue

**Description:** **SPOROCARP** capitate, 2-12 cm tall, spore bearing region conspicuously enlarged from stem, typically ovoid to spherical heads, 5-20 x 5-15 mm, brown to olive to olive-black, punctate to rough, cortex of brown pseudoparenchymatous hyphae. **STEM** 2-10 mm x 2-10 cm, brown-yellow to olive-tan to olive-gray to olive-black, often furfuraceous. **SPORE-BEARING STRUCTURES** ovoid, 650-950 x 250-450 μm, entirely embedded. **ASCI** cylindrical, 350-550 x 10-14 μm, gradually narrowing below with a pronounced hemispherical apical cap possessing a pore. **SPORES** filiform, multiseptate, breaking up into single-celled, cylindrical to slightly fusiform part spores 8-30 x 2.5-3 μm, hyaline.

**Distinguishing Features:** *Cordyceps canadensis*, *C. valliformis*, and *C. fracta* are all similar to *C. capitata* in that they all possess ovoidlike caps and fruit from *Elaphomyces* species. These taxa are characterized by part spore dimensions and the presence or absence of clava possessing an ectal layer differentiated by palisadelike hyphae. *Cordyceps canadensis* is the most similar to *C. capitata*. The former possesses a differentiated ectal layer on the cap, whereas the latter does not.

**Distribution:** Widespread but locally rare in the Northern Hemisphere. **CALIFORNIA**, Del Norte Co., Yurok Experimental Forest, on hillside of forest road; **Humboldt Co.**, Patrick's Point State Park; Prairie Creek State Park, along Prairie Creek trail; Redwood Forest; **Marin Co.**, Golden Gate National Recreation Area, Inverness; **Mendocino Co.**, Jackson State Forest, Aleuria Glen; **Sonoma Co.**, Salt Point State Park, off Hwy. 1; **OREGON**, **Clackamas Co.**, Bureau of Land Management, Cascades Resource Area, north fork of Eagle Creek; Mount Hood National Forest, Still Creek; **Clatsop Co.**, Ecola State Park, Cannon Beach; **Coos Co.**, 11.3 km south of Bandon; **Lane Co.**, Siuslaw National Forest (SNF), Siltcoos River; **Lincoln Co.**, SNF, Cascade Head Experimental Forest; **Linn Co.**, Roaring River State Fish Hatchery; **Tillamook Co.**, SNF, Cascade Experimental Forest, Cascade Head; **Yamhill Co.**, SNF, 4.8 km south of Green Top; **WASHINGTON**, **Clallam Co.**, Olympic National Park (ONP), Olympic Hot Springs; ONP, Sol Duc Hot Springs; Olympic National Forest (ONF), Soleduc Falls; **Grays Harbor Co.**, Olympic State Wildlife Recreation Area, Humptulips; ONF, Lake Quinault; **Mason Co.**, ONF, Olympic Mountains, Lake Cushman; **Pierce Co.**, Mount Rainier National Park (MRNP), Longmire; MRNP, Lower Kautz Creek; MRNP, Lower Tahoma Creek; MRNP, Nisqually River; **Skamania Co.**, Gifford Pinchot National Forest, Pacific Crest Trail; **Snohomish Co.**, Mount Baker-Snoqualmie National Forest, Barlow Pass; Troublesome Creek.

**Substrate and Habitat:** Parasitic on various *Elaphomyces* species.

**Season:** Autumn.

**Reference:** Arora, D. 1986. Mushrooms demystified. Berkeley, CA: Ten Speed Press. 959 p.

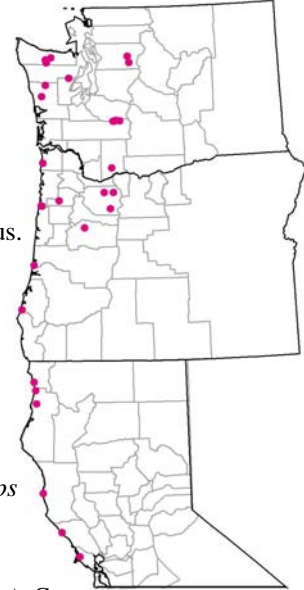


Photo courtesy of George L. Barron



Photo courtesy of Michael Castellano

## *Cordyceps ophioglossoides* (Fr.) Link

**ROD name** *Cordyceps ophioglossoides*

**Family** Clavicipitaceae      **Morphological Habit** earth tongue

**Description:** **SPOROCARPS** clavate, simple or rarely branched, 2-8 cm long, attached to host via rhizomorphs. Spore-bearing region not conspicuously enlarged from stem, typically an elongated clavate head, one-third to one-half entire length of sporocarp, 3-8 mm in diam., red-brown to olive-brown to olive-black, punctate cortex of pseudoparenchymatous hyphae. **STEM** 2-8 mm x 1-6 cm, brown-yellow to olive to dark brown. **SPORE-BEARING TISSUE** ovoid, 600-800 x 250-500  $\mu\text{m}$ . **ASCI** cylindrical, 400-450 x 5-8  $\mu\text{m}$ , gradually narrowing below with a pronounced hemispherical apical cap possessing a pore. **SPORES** filiform, multiseptate, breaking up into single-celled, cylindrical, truncate part spores 2-5 x 1.5-2  $\mu\text{m}$ , hyaline.

**Distinguishing Features:** Other *Cordyceps* species that fruit on *Elaphomyces* species, which are morphologically similar to *C. ophioglossoides*; i.e., they possess clavate heads and usually form rhizomorphs, include *C. tenuispora* and *C. japonica*. These taxa possess larger part spores than *C. ophioglossoides*.

**Distribution:** Widespread but locally uncommon in the Northern Hemisphere.

**CALIFORNIA**, Humboldt Co., Patricks Point State Park; Big Lagoon County Park; **OREGON**, Clackamas Co., Mount Hood National Forest (MHNF), Still Creek; MHNF, Middle Fork Salmon River; Lane Co., Florence, Ada Park; Lincoln Co., Siuslaw National Forest, Cascade Head Experimental Forest; **WASHINGTON**, Clallam Co., Olympic National Park (ONP), Soleduc Hot Springs trail; Jefferson Co., ONP, Twin Creek at Hoh River Rd.; Pierce Co., Mount Rainier National Park (MRNP), Green Lake trail; MRNP, Lower Tahoma Creek; Skagit Co., North Cascades National Park, Cascade Pass trailhead; Snohomish Co., Mount Baker-Snoqualmie National Forest, south fork of Sauk River.

**Substrate and Habitat:** Parasitic on various *Elaphomyces* species, including *E. cervinus*, *E. granulatus*, *E. muricatus*, and *E. variegatus*.

**Season:** Autumn.

**Reference:** Phillips, R. 1991. Mushrooms of North America. Boston, MA: Little, Brown and Co. 319 p.



Photo courtesy of George L. Barron

*Cortinarius barlowensis* Ammirati and Moser sp. nov., ined.ROD name *Cortinarius azureus*

Family Cortinariaceae      Morphological Habit mushroom

**Description:** CAP 21-40 mm in diam., conic to obtuse then convex with a slight umbo or sometimes umbonate then convex-depressed, margin incurved to decurved, edge enrolled, surface with fine pale to ochraceous buff veil fibrils overall, sometimes a slight fibrillose fringe on edge, color at first vinaceous gray to dark vinaceous gray or more violaceous or blue-violet, then gray or brown, dark gray-brown or purple-gray-brown, disc gradually developing brown tones in age or on drying. **GILLS** to 9-10 mm long, to 3-4 mm wide, adnexed to emarginate, violet to blue-violet to gray, developing brown areas on faces, then pale rust brown from spores. **STEM** 62-87 mm long, apex 4-6.5 mm, thick, clavate to clavate bulbous or bulbous, base 6-15 mm thick, above blue-lavender to white or gray with some blue-lavender at base. **CORTINA** (inner veil) silver-white, surface thinly streaked with white to silver fibrils, universal veil leaving fairly distinct pale tan, yellow-tan to tan bands and patches at first, veil fibrils remaining distinctly colored or becoming brown in age. **ODOR** fungoid. **TASTE** mild. **PILEIPELLIS** with a thin surface layer of interwoven hyphae, 3.7-11.1 µm wide, somewhat thick walled, hyaline to pale yellow, terminal elements sometimes cystidioid; surface layer subtended by distinct layer of hyaline to pale yellow, inflated cells, 8.1-37 µm wide. **BASIDIA** 33-41 x 7-8.9 µm, more or less clavate, hyaline or pale yellow, 4 spored. **CYSTIDIA** absent. **CLAMP CONNECTIONS** present. **SPORES** ellipsoid to broadly ellipsoid, occasionally subglobose, 8.7-11.8 (-13.0) x (5.6-) 5.9-7.0 (-7.8) µm, verrucose, brown.



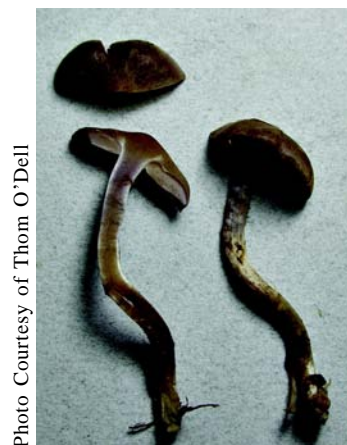
**Distinguishing Features:** *Cortinarius barlowensis* is similar in general appearance to *C. azureus*, except that the spores of *C. azureus* are more subglobose and smaller, and the pileipellis has a less distinctly formed cellular layer beneath the surface hyphae. *Cortinarius paranomalus* is also similar to *C. barlowensis* but has a browner cap and a somewhat different pileipellis structure. *Cortinarius barlowensis* has larger spores. Some forms of *C. anomalus* are similar in appearance to *C. barlowensis*, but the latter has more or less subglobose spores. Similarity in appearance has led to the misidentification of *C. barlowensis* as *C. anomalus* in the field.

**Distribution:** Widely distributed in western Washington and Oregon. **OREGON**, Clackamas Co., Mount Hood National Forest (MHNF), east fork Salmon River; MHNF, middle fork Salmon River; **Douglas Co.**, Lake Tahkenitch; **WASHINGTON**, Clallam Co., Olympic National Park (ONP), Lake Angeles trail; **Grays Harbor Co.**, Olympic National Forest, Quinault Research Natural Area; Wilby Creek; **Jefferson Co.**, ONP, Hoh River; **Snohomish Co.**, Mount Baker-Snoqualmie National Forest, Barlow Pass.

**Substrate and Habitat:** Solitary to gregarious in coastal to montane conifer forests up to at least 1200 m elevation.

**Season:** Autumn.

**Reference:** Bidaud, A.; Henry, R.; Moëgne-Loccoz, P.; Reumaux, P. 1992. Atlas des *Cortinaires*, Part IV. Annecy, France: Ed. Fédér. Mycol. Dauph.-Savoie. [Pages unknown].



## *Cortinarius cyanites* Fries

**ROD name** *Cortinarius cyanites*

**Family** Cortinariaceae      **Morphological Habit** mushroom

**Description:** CAP 70-150 mm diam., broadly convex-umbonate to nearly plane or with a low umbo, surface dry to subviscid, gray, or gray with brown tones where veil covers surface, sometimes with olive tones, edge often dull lilac, generally with brown blotches and streaks of appressed brown fibrils or fibrillose scales. **GILLS** blue violet to gray with slight blue cast, finally brown, dark gray or olive-brown, with some vinaceous to red stains developing, adnate to adnexed. Universal veil pale brown, forming a band on the bulb and sometimes brown patches over the inner veil, which are more pale. **STEM** 70-150 mm long, up to 23 mm thick at apex, up to 44 mm thick at base, base sometimes massive, bulbous to clavate, rounded to tapered below, red discoloration of the base context.

**ODOR** not distinct to somewhat sweet. **TASTE** mild or slightly bitter. **PILEIPELLIS** with a deep surface layer of more or less cylindrical interwoven to radially arranged, hyaline to yellow-brown hyphae, mainly 4-11 µm in diam., some hyphae encrusted, surface hyphae somewhat refractive or agglutinated but not imbedded in a gelatinous matrix, no differentiated subpellis. Oleiferous hyphae refractive, hyaline to yellow-brown. **BASIDIA** (25-) 35-50 x 8-11(-13) µm, clavate to broadly clavate or somewhat ventricose, hyaline to yellow-brown, 4 spored. **CLAMP CONNECTIONS** present. **SPORES** ellipsoid to more or less amygdaliform or broadly ellipsoid, (8.5-) 8.9-11.3 (-11.8) x (4.8-) 5.4-7.0 (-7.4) µm, distinctly verrucose, ornamentation dark brown.



**Distinguishing Features:** *Cortinarius cyanites* is similar to *C. purpurascens* Fr. or other species in the *Purpurascens* (purple staining species of subgenus *Phlegmacium*). Superficially there is some resemblance to the *C. varicolor* complex, but these species give a yellow reaction with KOH and only slowly discolor red-brown if at all. All three of these groups can co-occur in conifer or mixed forests in the West. *Cortinarius cyanites* is relatively easy to recognize macroscopically because of the general violaceous to blue color of the sporocarps and the strong red discoloration of the context, especially in the stem base, soon after cutting or breaking.

**Distribution:** Widely distributed in the Northern Hemisphere in conifer, hardwood, and mixed forests. **CALIFORNIA**, Humboldt Co., Trinidad; **Mendocino** Co., Jackson State Forest, near Mendocino; **WASHINGTON**, Chelan Co., Wenatchee National Forest, Smithbrook, north of Stevens Pass; **Clallam** Co., Olympic National Park, Ericsons Bay, Lake Ozette; **Kitsap** Co., Seabeck, Stavis Bay Road; **Pierce** Co., Mount Rainier National Park (MRNP), Green Lake trail at Carbon River entrance; MRNP, Longmire; MRNP, Lower Tahoma Creek; MRNP, Round Pass.

**Substrate and Habitat:** On soil, solitary to gregarious or in widely scattered groups in conifer forests.

**Season:** August and September in montane areas, January along northern Californian coast.

**Reference:** Phillips, R. 1991. Mushrooms of North America. Boston, MA: Little, Brown and Co. 319 p.



Photo courtesy of Joe Ammirati



Photo courtesy of Joe Ammirati

***Cortinarius depauperatus* (J. E. Lange) K. Scoop.**ROD name *Cortinarius spilomeus*

Family Cortinariaceae

Morphological Habit mushroom

**Description:** CAP 18-70 mm in diam., convex then somewhat obtuse to plano-convex or plane, red-brown or red-tan, brown to occasionally slightly gray-brown, usually with a slight umbo, margin opaque, decurved to plane or slightly recurved, edge of margin white silky fibrillose and with small patches or fibrils. **GILLS** adnexed, gray or pale gray-brown at first then gradually more brown. **STEM** 60-90 mm long, apex 4-11 mm thick, base 6-13 mm thick, more or less clavate, apex somewhat violaceous at first, surface in general more or less silky white fibrillose over a brown ground color, appearing longitudinally streaked, brown, in a few places with red-tan areas, sometimes pale pink-tan in places, particularly on the veil. **ODOR** fungoid. **TASTE** mild. **PILEIPELLIS** with a well-developed surface layer of more or less radially arranged, interwoven hyphae, hyaline to pale yellow, 3-11 (-16)  $\mu\text{m}$  in diam., walls sometimes slightly encrusted, surface layer grading into a more or less hyaline layer of cylindrical to inflated hyphae, usually not strongly cellular, up to 18 (-22)  $\mu\text{m}$  in diam., this layer subtended by a zone of brown to brown-orange hyphae with some oleiferous hyphae mixed in, finally grading into the trama; hyphae in deeper layers sometimes becoming more inflated to cellular. **BASIDIA** 31.8-37 x 7.4-9.6  $\mu\text{m}$ , more or less clavate, hyaline or with ochraceous, orange ochraceous or brown ochraceous contents, 4 spored. **CYSTIDIA** absent. **CLAMP CONNECTIONS** present. **SPORE** subglobose to broadly ellipsoid, (6.3-7.0-) 7.4-8.9 (-9.6) x 5.6-7.0  $\mu\text{m}$ , pale brown with somewhat coarse to moderate brown ornamentation, verrucose.



**Distinguishing Features:** *Cortinarius depauperatus* is similar to *C. spilomeus*, the name we first used in the ROD. It has some of the aspects of *C. anomalus* and its relatives; however, these species do not have a red universal veil.

**Distribution:** Infrequent in northern California, Oregon, and Washington, also in Europe. **CALIFORNIA**, Humboldt Co., Patrick's Point State Park; **OREGON**, Lincoln Co., Fogerty Creek State Park; **Tillamook Co.**, Camp Meriweather; **WASHINGTON**, Grays Harbor Co., Olympic National Forest, Quinault Research Natural Area; **Pierce Co.**, Mount Rainier National Park, Lower Tahoma Creek.

**Substrate and Habitat:** Caespitose or gregarious in moist to wet habitats with conifers, including *Picea sitchensis*, *Thuja plicata*, and *Tsuga heterophylla*.

**Season:** Mid-August to early December.

**Reference:** Moser, M.; Jülich, W. 1990. Colour atlas of Basidiomycetes III, *Cortinarius* 45 (*C. spilomeus*). Stuttgart, Germany; New York: Gustav Fischer Verlag. [Pages unknown].



Photo courtesy of Joe Ammirati

## *Cortinarius valgus* Fries

**ROD name** *Cortinarius valgus*

**Family** Cortinariaceae    **Morphological Habit** mushroom

**Description:** **CAP** 12-75 mm in diam., broadly campanulate to convex-umbonate or more plano-convex, umbo usually strongly developed, but sometimes subumbonate, sometimes with a small papilla around which there may be a slight depression, surface nonstriate, at times radially streaked, with a coating of brown fibrils, veil fibrils more or less persistent on margin, pale yellow-brown to brown with olive tones. **GILLS** pale gray-brown with paler edges. **STEM** 33-110 mm long, apex 3-15 mm, usually clavate or base somewhat enlarged, occasionally nearly equal (base 4-20 mm wide), more or less tapered at base, apex slightly off-white to pale brown, shiny silky fibrillose, with some watery streaks, below brown from the fibrillose veil; with age, brown above and more or less shiny; areas beneath veil paler colored in some places, below color in general pale brown-yellow, basal mycelium off-white. **ODOR** strongly fungoid to somewhat raphanoid. **TASTE** fungoid to somewhat raphanoid. **PILEIPELLIS** with a surface layer of more or less cylindrical to somewhat inflated, radially arranged to interwoven, hyaline to pale yellow hyphae, 7.2-14.5  $\mu\text{m}$  in diam., walls more or less refractive, sometimes evenly to irregularly thickened, terminal elements sometimes irregularly shaped and apically tapered; subpellis a layer of broadly cylindrical to inflated, more or less radially oriented to interwoven, hyaline to pale yellow hyphae, (6-) 16.2-34.5  $\mu\text{m}$  in diam., grading into trama; trama typically with pale yellow to yellow masses of pigment between hyphae. Oleiferous hyphae rarely seen, pale yellow. **BASIDIA** 29-37 x 7.4-8.1  $\mu\text{m}$ , more or less clavate to somewhat ventricose, hyaline to slightly brown or yellow, 4 spored. **CYSTIDIA** absent. **CLAMP CONNECTIONS** present. **SPORES** ellipsoid to subglobose, (7-) 7.4-8.9 (-9.6) x (5.2-) 5.6-6.7 (-7.4)  $\mu\text{m}$ , verrucose, ornamentation coarser towards distal end, brown to yellow-brown.



**Distinguishing Features:** *Cortinarius valgus* and its relatives are not easy to identify. Other species in the subgenus *Leprocybes* with subglobose to broadly ellipsoid spores are differently colored or some part of the mushroom has yellow UV fluorescence. Similar spores are also found in other species of *Cortinarius*, for example, subgenus *Sericeocybe*, section *Anomali*, and species of *Telamonia*. Many collectors will confuse *C. valgus* with one or more *Telamonia* or *Dermocybe* species. *Cortinarius raphanoides* and *C. ochrophyllus* are similar looking species that are not easily distinguished from *C. valgus*.

**Distribution:** Occurs in west-side forests of Oregon and Washington. Also known from the Rocky Mountains and in Europe. **WASHINGTON**, Mason Co., Olympic National Forest, Lake Cushman; **Snohomish** Co., Mount Baker-Snoqualmie National Forest, Barclay Creek.

**Substrate and Habitat:** Solitary, scattered, gregarious or cespitose; sometimes locally abundant under *Abies amabilis*, *Picea sitchensis*, *Pseudotsuga menziesii*, and *Tsuga heterophylla*.

**Season:** Autumn.

**Reference:** Phillips, R. 1991. *Mushrooms of North America*. Boston, MA: Little, Brown, and Co. 319 p.



Photo courtesy of Joe Ammirati



Photo courtesy of Joe Ammirati



***Craterellus tubaeformis* (Fries) Quélet**ROD name *Cantharellus tubaeformis*Family Cantharellaceae      **Morphological Habit** chanterelle

**Description:** CAP 1-3 (5) cm broad, convex to plane or broadly depressed, with an arched incurved margin at first, margin finally spreading or uplifted and becoming crenate to variously lobed, occasionally somewhat funnel shaped in age, usually not perforated in the disc at first but frequently becoming so in age, surface moist and more or less uneven, dark sordid yellow-brown. **CONTEXT** membranous, fragile, yellow-brown to gray-brown.

**ODOR AND TASTE** not distinctive. **GILLS** decurrent, narrow and foldlike, dichotomously forked, yellow-gray to gray-brown. **STEM** 30-60 mm long, 3-7 mm thick, stuffed but becoming hollow and flabby, subequal, often compressed or furrowed, glabrous, dark to pale gray-brown above, usually off-white at base. **PILEPELLIS** of hyaline, interwoven hyphae 6-12 µm in diam., the hyphae on the surface yellow-brown but otherwise not differentiated from the context. **BASIDIA** 64-82 x 9-11 µm, clavate, hyaline, flexuous toward the base, 2-4 spored. **CYSTIDIA** absent. **CLAMP CONNECTIONS** abundant. **SPORES** ellipsoid to ovoid, (8) 9-11 x 5.5-7 µm, smooth, hyaline, inamyloid, spore print white to creamy white.

**Distinguishing Features:** The chanterellelike sporocarp with hollow stipe separates *Craterellus tubaeformis* from all other mushrooms.

**Distribution:** Common and widely distributed in northwestern North America including northern Idaho; also eastern North America, including Appalachian Mountains and Canadian maritime provinces; also across northern Europe. Known from many dozens of locations throughout the range of the Northwest Forest Plan.

**Substrate and Habitat:** On wet soil, often along streams or near springs or in bogs under conifers; also juxtaposed to rotten logs.

**Season:** Autumn through winter.

**Reference:** Smith, A.H.; Morse, E.E. 1947. The genus *Cantharellus* in the Western United States. *Mycologia*. 39: 497-534. Dahlman, M.; Danell, E.; Spatafora, J.W. 2000. Molecular systematics of *Craterellus*: cladistic analysis of nuclear LSU rDNA sequence data. *Mycological Research*. 104: 388-394.

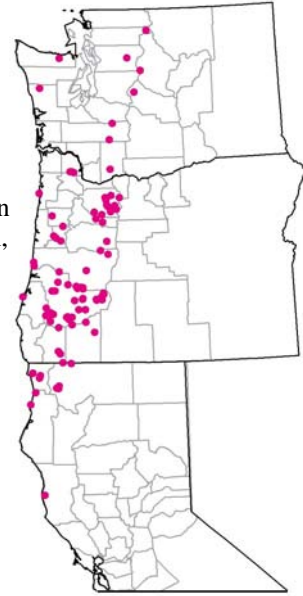


Photo courtesy of Catherine Ardrey



Photo courtesy of David Pilz



## *Cudonia monticola* Mains

**ROD name** *Cudonia monticola*

**Family** Geoglossaceae **Morphological Habit** earth tongue

**Description:** **SPOROCARPS** stipitate, up to 10 cm tall, apotheciate, nongelatinous, cream to tan, gray or gray-brown. **SPORE BEARING TISSUE** pink-cinnamon, pink-tan or gray-brown capitate to flattened or irregularly globose, strongly curved down and toward the stem. **STEM** is more rounded than ribbed, brown to gray-purple-brown. **ASCI** inoperculate. **SPORES** globose (15-)18-24 (-28)  $\mu\text{m}$ , aseptate.

**Distinguishing Features:** Although *Cudonia* resembles *Helvella*, the solid, fibrous stem and capitate spore-bearing tissue with strongly gathered and tucked-under margins separate it from *Helvella*. In *Helvella* the stem breaks cleanly and crisply and the spore-bearing tissue is obviously lobed with usually a fairly straight margin. Furthermore, the asci in *Helvella* are operculate, and those in *Cudonia* are inoperculate. *Cudonia grisea* has a dark gray spore-bearing tissue, a fuscous stem, and is smaller than *C. monticola*. *Cudonia monticola* has pink-cinnamon to pink-tan spore-bearing tissue and a brown stem.

**Distribution:** Endemic to western North America. **OREGON**, Coos Co., Bureau of Land Management (BLM), southeast of Park Creek campground; Douglas Co., Umpqua National Forest (UNF), 2.4 km south of Mosquito Lake; BLM, 3.2 km south of Beals Mountain; BLM, above Little Wolf Creek, near Umpqua River main stem; BLM, Canton Creek, 24-1-26 Rd.; Hood River Co., northeast of Blue Lake; Lane Co., UNF, 3.2 km southwest of Mount June; Marion Co., BLM, Cascades Resource Area, Fawn Creek; **WASHINGTON**, Chelan Co., Wenatchee National Forest, Rainy Creek; Whatcom Co., Okanogan National Forest, East Creek trail, 4.8 km from Hwy. 20.

**Substrate and Habitat:** On *Picea* spp. needles and coniferous debris.

**Season:** Late summer and autumn.

**References:** Tylutki, E.E. 1993. Mushrooms of Idaho and the Pacific Northwest, Discomycetes. Moscow, ID: University Press of Idaho. 133 p.

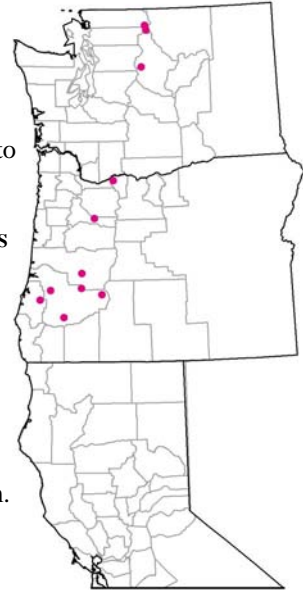


Photo courtesy of Michael Beug

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*Cyphellostereum laeve* (Fr.) D. Reid

**ROD name** *Cyphellostereum laeve*

**Family** Podoscyphaceae      **Morphological Habit** earth tongue

**Description:** CAP 2-6 mm in diam., spatulate, sessile and dorsally attached or laterally attached, or short-stipitate, pendant or erect, silky to minutely tomentose, becoming glabrous, white. **SPORE-BEARING TISSUE** smooth to rugose, white, drying pale pink-tan. **STEM** when present lateral, 1-5 x 0.5 mm, glabrous, white. **ODOR AND TASTE** not distinctive. **BASIDIA** 16-22 x 4-5 µm, clavate, 4 spored. **CYSTIDIA** 32-48 x 4-8 µm, cylindrical to subfusiform, seldom subcapitate, hyaline, thin walled. **PILEIPELLIS** of hyaline, inamyloid, nongelatinous hyphae. **CLAMP CONNECTIONS** absent. **SPORES** ovoid to ellipsoid, 3.5-5.0 x 2-3 µm, smooth, hyaline, inamyloid, slightly cyanophilic, spore print white.

**Distinguishing Features:** *Cyphellostereum laeve* is a tiny species that forms white, spatulate sporocarps with a smooth to rugulose spore-bearing tissue and grows on mosses. *Cyphellostereum laeve* is distinct because of the lack of pigments, noninflated hyphae, absence of clamp connections, conspicuous cystidia, and small sporocarps. It is most likely to be confused with another unclamped moss-associated fungal species, *Arrhenia retiruga*. The latter species differs, however, in forming sporocarps that are paler gray to brown-gray when fresh, having larger spores (6-9 x 3.2-5.0 µm), and lacking cystidia.

**Distribution:** Widespread but locally uncommon in the Northern Hemisphere. **WASHINGTON**, Clallam Co., Olympic National Park (ONP), Soleduc Valley, North Fork; **Grays Harbor** Co., Olympic National Forest, Lake Quinalt; **Jefferson** Co., ONP, Twin Creek at Hoh River Rd.

**Substrate and Habitat:** Scattered with various mosses (*Polytrichum*, *Dicranella*) in forests.

**Season:** Autumn.

**References:** Breitenbach, J.; Kränzlin, F. 1986. Fungi of Switzerland. Lucerne, Switzerland: Mycological Society of Lucerne. 412 p. Vol. 2. Redhead, S.A. 1973. Epistolae mycologicae I. Some cyphelloid Basidiomycetes from British Columbia. Sysis. 6: 221-227.



Photo courtesy of George L. Barron



## *Fayodia bisphaerigera* (Lange) Singer

**ROD name** *Fayodia gracilipes*

**Family** Tricholomataceae      **Morphological Habit** mushroom

**Description:** CAP up to 25 mm in diam., strongly convex, slightly umbilicate, translucently striate, pale brown to olive-brown or gray-brown. **GILLS** broadly adnate with a slightly decurrent tooth, arcuate-plane, rather broad, rather distant, pale gray to pale yellow-brown with almost even concolorous edge. **STEM** central, straight and rather tall, (20-35) 50 x 2-3.5 mm, cartilaginous, pallid. **ODOR AND TASTE** not distinct. **PILEIPELLIS** a dry cutis consisting of parallel hyphae 4-10 µm wide, with minutely encrusting pigment. **BASIDIA** 30-40 x 8-10 µm, (1-) 2 spored. **PLEUROCYSTIDIA** absent. **CHEILOCYSTIDIA** 10-20 µm broad, cylindrical-vesiculose or fusiform-ventricose; 40-75 x 9-20 µm, cylindrical to narrowly clavate, partly with a filiform appendage, thin walled. **CLAMP CONNECTIONS** present. **SPORES** globose, 8-9 (-10.5) µm in diam., minutely warty-punctate.

**Distinguishing Features:** Characterized by the smoky drab, translucently striate, convex to slightly umbilicate caps, pale gray, broadly adnate to decurrent gills, pale slender stems. There are many long-stemmed, gray drab to pale gray capped mycenoid agarics that can be confused with this species, although the convex shape of the cap, the striations, and the distinctively long stem seem to be helpful. It seems that spore characters are the most important —globose and two-layered with the two walls behaving slightly differently in Meltzer's reagent. *Mycena rainierensis* is similar to *F. bisphaerigera*, but differs on the basis of the paler coloration and greatly elongated cheilocystidia found in the former.

**Distribution:** Western North America, also in Denmark. **CALIFORNIA**, Humboldt Co., Orick; **OREGON**, Douglas Co., Lake Tahkenitch; **Hood River Co.**, Mount Hood National Forest (MHNF), Tilly Jane campground; **Wasco Co.**, MHNF, Camp Creek, Clay Banks Forest Camp; **WASHINGTON**, **Clallam Co.**, Olympic National Park (ONP), La Push; ONP, Lake Crescent; Cape Flattery; **Grays Harbor Co.**, Olympic National Forest, 1.6 km south of Lake Quinault; **Jefferson Co.**, ONP, Hoh nature trail; **Pierce Co.**, Mount Rainier National Park (MRNP), Carbon River at Ranger Creek; MRNP, Castle Peak; MRNP, Green Lake; MRNP, Longmire, Upper Meadow; MRNP, St. Andrews Creek.

**Substrate and Habitat:** Among sticks and debris under hardwoods and conifers.

**Season:** Late summer and autumn.

**References:** KUYPER, Th.W. 1995. *Fayodia*. In: Bas, C.; Kuyper, Th.W.; Nordeloos, M.E.; Vellinga, E.C., eds. Flora Agaricina Neerlandica. Rotterdam, The Netherlands: [Publisher unknown]. [Pages unknown]. Vol 3.

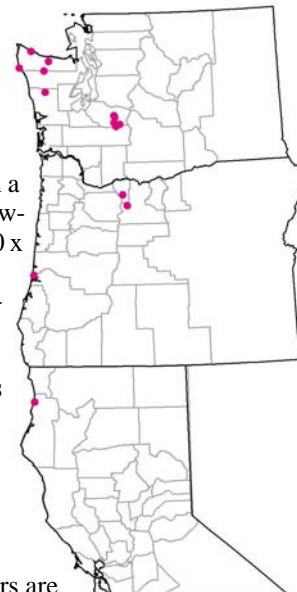


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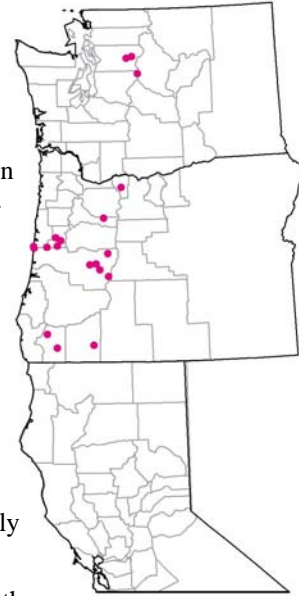
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## *Galerina atkinsoniana* Smith

**ROD name** *Galerina atkinsoniana*

**Family** Cortinariaceae      **Morphological Habit** mushroom

**Description:** **CAP** 3-12 mm x 3-6 mm, obtusely conic, aging to campanulate to convex, margin saw-toothed, apex blunt, surface densely pruinose, pale red to red-brown with even darker central disc and striations the full length of cap, fading to pale yellow when drying. **GILLS** pale ochre, darkening to sienna or tawny in age, edges eroded or saw-toothed and white encrusted with cystidia. **STEM** 20-45 mm long x 1-2 mm thick, equal, fragile, almost brittle, pale fulvous or cinnamon when young, aging to dark fulvous or rusty-tawny, covered with caulocystidia giving it a distinct pruinose or spiny appearance; no veil visible even in young buttons. **ODOR AND TASTE** not distinct. **BASIDIA** 27-34 x 7-8  $\mu\text{m}$ , 2 spored. **PLEUROCYSTIDIA** scattered, 38-70 x 10-15  $\mu\text{m}$ , fusoid-ventricose, thin walled, hyaline, but some may be pale brown. **CHELOCYSTIDIA** abundant, 28-40 (-60) x (8-) 9-18  $\mu\text{m}$ , fusoid-ventricose, but varying from narrow to fat. **PILEOCYSTIDIA** abundant, similar to pleurocystidia but larger, 50-90 x 7.5-15 (-20)  $\mu\text{m}$ . **CAULOCYSTIDIA** abundant, (40-) 60-120 x 8.2-18 (-20)  $\mu\text{m}$ , hyaline, but bases may be darkened, long fusoid-ventricose. **CLAMP CONNECTIONS** present. **SPORES** ovate, (10.5) 11-15 (-16.5) x 6-9  $\mu\text{m}$ , rugulose to slightly warty, pale red-brown to dark red-brown.



**Distinguishing Features:** *Galerina atkinsoniana* varies somewhat in spore size and the amount of cystidia on its various parts, but it is generally fairly recognizable. Its dark russet, tiny, fragile aspect along with the overall pruinose appearance make it one of the easiest *Galerina* species to identify. The only close look-alike might be *G. perplexa*. The cap surface appears pruinose under a hand lens at first, later naked. The odor is pungent and unpleasant, and the taste is similar to raw *Gyromitra esculenta*, whereas *G. atkinsoniana* has neither odor nor taste. *Galerina perplexa* spores are much smaller, and the cystidia have much sharper apices, especially the pileocystidia, which are almost sharp-pointed.

**Distribution:** Widely distributed in the Northern Hemisphere. **OREGON**, Benton Co., Siuslaw National Forest (SNF), Buck Creek; SNF, Mary's Peak; Bureau of Land Management (BLM), Mary's Peak Resource Area, Hull Spring; BLM, Mary's Peak Resource Area, near Alsea Falls recreation camp; **Hood River Co.**, Mount Hood National Forest, southwest of the headwaters of the east fork of Bear Creek; **Jackson Co.**, Rogue River National Forest, trail south 0.8 km of Camp Latgawa; **Josephine Co.**, BLM, north fork of Deer Creek; Josephine Co., BLM, west of Silver Creek; **Lane Co.**, SNF, Cummins Creek Wilderness Area, Cummins Creek trailhead; Willamette National Forest (WNF), Delp Creek; WNF, Fall Creek Reservoir; WNF, McKenzie River area; WNF, Rigdon; WNF, near Waldo Lake Wilderness Area, Waldo Lake; **Lincoln Co.**, SNF, Cape Perpetua lookout; **Marion Co.**, WNF, 1.6 km southwest of Silver King Mountain; **WASHINGTON**, **King Co.**, Mount Baker-Snoqualmie National Forest (MBSNF), Tunnel Creek; **Snohomish Co.**, MBSNF, Barlow Pass; MBSNF, Sloan Creek campground.

**Substrate and Habitat:** Single to gregarious, found with moss attached to the dead roots, stems, and leaves of mosses, saprobic or possibly parasitic, in *Picea* spp. and *Pseudotsuga menziesii* forests.

**Season:** Summer and autumn.

**Reference:** Smith, A.H.; Singer, R. 1964. A monograph of the genus *Galerina* Earle. New York: Hafner Publishing Co. 384 p.



Photo courtesy of mycology team



Photo courtesy of Scott Redhead

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## *Galerina cerina* Smith & Singer

**ROD name** *Galerina cerina*

**Family** Cortinariaceae

**Morphological Habit** mushroom

**Description:** CAP 5-15 mm in diam., broadly conic to convex, glabrous, rich tawny with paler margin, fading to tan, margin striate with slightly fibrillose edge when young. **GILLS** adnate, pale tan, becoming tawny in age, edges even. **STEM** 20-30 mm x 2-3 mm, equal, fragile, tubular, undulating, apex concolorous with gills, tawny over lower portion, apex pruinose, lower part with off-white veil fragments scattered, but disappear in age. **ODOR AND TASTE** not distinct. **BASIDIA** 27-35 x 8-10  $\mu\text{m}$ , 4 spored. **PLEUROCYSTIDIA AND PILEOCYSTIDIA** absent. **CHEILOCYSTIDIA** both fusoid-ventricose and ventricose-subcapitate, 30-40 (-50) x 7  $\mu\text{m}$  overall, 12 x 3-5  $\mu\text{m}$  at neck. **CLAMP CONNECTIONS** present. **SPORES** broadly ovoid, 8.7-12 x 5.5-7  $\mu\text{m}$ , smooth, calyptrate, forming a ragged border, many spores show large blisters or bumpy areas where the perispore separates near the apiculus, making them appear to have a sacklike outer area, pale brown.

**Distinguishing Features:** The presence of a veil and the calyptrate spores is distinct for the species.

**Distribution:** Widely distributed in the Northern Hemisphere. **CALIFORNIA**, Humboldt Co., near Trinidad; **OREGON**, Clackamas Co., Multnomah Co., Mount Hood National Forest (MHNF), Larch Mountain; MHNF, Camp Creek; **WASHINGTON**, Jefferson Co., Olympic National Park, Hoh River trail; Lewis Co., Mount Rainier National Park (MRNP), Bench Lake; Pierce Co., MRNP, Longmire campground.

**Substrate and Habitat:** Gregarious on mosses in sphagnum bogs. Also sometimes found on the mucky humus in sphagnum bogs or on colonizing mosses in burned areas.

**Season:** Spring and early summer.

**Reference:** Smith, A.H.; Singer, R. 1964. A monograph of the genus *Galerina* Earle. New York: Hafner Publishing Co. 384 p.



Photo courtesy of mycology team

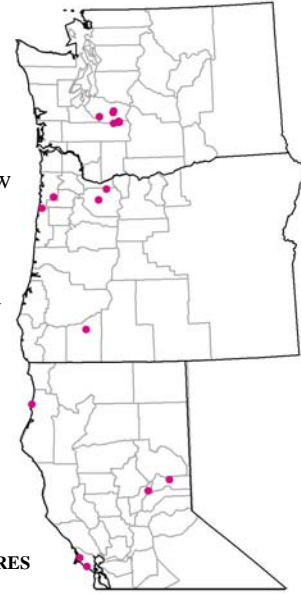


## *Galerina heterocystis* (Atk.) Smith & Singer

**ROD name** *Galerina heterocystis*

**Family** Cortinariaceae      **Morphological Habit** mushroom

**Description:** CAP 2-15 (-25) mm in diam., obtusely conic with a straight margin, expanding to somewhat campanulate, sometimes with a small umbo; glabrous, pale yellow to red-brown, hygrophanous and then fading to pale tan, translucent-striate, with striae more brown. **GILLS** ascending adnate to adnexed in aged or expanded caps, pale yellow when young, aging to fulvous, with smooth edges. **STEM** 12-80 mm long, 0.5-3 mm thick, equal, tubular, fragile, pale to pale yellow, with slight darkening in age, apex pruinose and faint off-white fibrils from evanescent veil near base, or these may be lacking in some, veil fragments usually visible only when young, and some specimens may not show signs of having a veil. **ODOR** not distinct. **TASTE** mild. **BASIDIA** (18-) 24-35 (-43) x (7-) 8-10 (-12)  $\mu\text{m}$ , 1-4 spored. **CHEILOCYSTIDIA** bottle shaped, variable in size, 30-44 x 6-9  $\mu\text{m}$ , 18-26 x 6-9  $\mu\text{m}$ , or 30-60 x 7-12  $\mu\text{m}$ , with the head 5-7  $\mu\text{m}$  in diam., hyaline to pale yellow. **PILEOCYSTIDIA** absent or only at margin. **CAULOCYSTIDIA** 30-70 x 7-25  $\mu\text{m}$ , ventricose-capitate, numerous at apex of stem, and numerous the full length at first but soon readily collapsed, which leaves the lower portion smooth and naked. **PLEUROCYSTIDIA** absent or only near the gill edge and similar to the cheilocystidia. **CLAMP CONNECTIONS** absent. **SPORES** oblong, 11-17 x 6.5-8.5  $\mu\text{m}$ , nearly smooth to distinctly roughened, pale cinnamon.



**Distinguishing Features:** *Galerina heterocystis* can be highly variable macro- and microscopically. The number of spores per basidia ranges from 1 to 4, which influences spore size. The veil is quite reduced and can be easily overlooked or may not even be present in some collections. *Galerina dimorphocystis* is somewhat similar in general appearance, but the cap is pubescent. The overall height of this species, as well as the lighter colors plus the presence in disturbed habitat, helps set it apart from other species in the group without clamp connections.

**Distribution:** Widely distributed in the Northern Hemisphere. **CALIFORNIA**, Humboldt Co., Redwood National Park, near park boundary; Marin Co., Picher Canyon; Sierra Co., Tahoe National Forest, north of Deadman Peak; Yuba Co., near New Ballard's Bar Reservoir; **OREGON**, Clackamas Co., Mount Hood National Forest, Bull Run watershed; Estacada; Jackson Co., Rogue National Forest area; Tillamook Co., Siuslaw National Forest, Cascade Head Experimental Forest, Bible Creek; **WASHINGTON**, Lewis Co., Mount Rainier National Park (MRNP), Reflection Lake; MRNP Castle Peak; MRNP, Cliff Lake; MRNP, Snow Lake; Pierce Co., Gifford Pinchot National Forest, Eatonville; MRNP, Green Lake; MRNP, St. Andrews Creek; MRNP, Sunshine Point campground; MRNP, Mowich Lake Rd.

**Substrate and Habitat:** Single to gregarious, attached to the base of the mosses and lower dead stems and roots; also in the soils close by *Ranunculus* spp. Various grasses mixed with mosses seem to be its preferred neighbors.

**Season:** Summer and autumn.

**Reference:** Smith, A.H.; Singer, R. 1964. A monograph of the genus *Galerina* Earle. New York: Hafner Publishing Co. 384 p.



Photo courtesy of Steve Trudell

Copyright Steve Trudell

***Galerina sphagnicola* (Atk.) Smith & Singer****ROD name** *Galerina sphagnicola***Family** Cortinariaceae**Morphological Habit** mushroom

**Description:** CAP 10-25 mm in diam., at first obtusely conic then spreading widely, nearly plain but with a broad umbo, faintly to noticeably striate, glabrous, sometimes with a few white fibrils near the margin from the veil, especially when young and fresh, tan to pink-tan drying pale red-brown. **ODOR AND TASTE** indistinct. **GILLS** broadly adnate to toothed, nearly decurrent, cinnamon to red-brown, with edges smooth but encrusted with cystidia. **STEM** 50-120 mm long x 1-3 mm wide, equal, fragile, hollow, mostly glabrous except for pruinose apex and a few scattered veil fragments over lower half, pale brown. **BASIDIA** 25-30 x 6-11  $\mu$ m, cylindric to clavate, 4 spored. **PLEUROCYSTIDIA AND PILEOCYSTIDIA** absent.

**CHEILOCYSTIDIA** variably shaped, but ventricose with subacute to subcapitate apex, some with a flexuous neck, 30-50 x 6-11  $\mu$ m, hyaline. **CAULOCYSTIDIA** frequent at apex but absent at base, variable in shape, 30-70 x 4-12  $\mu$ m. **CLAMP CONNECTIONS** present. **SPORES** broadly ovate, 9-11 x 6-8  $\mu$ m, calyprate, deep red-brown.

**Distinguishing Features:** The calyprate spores of this species are fairly distinctive. *Galerina sphagnorum* also inhabits sphagnum bogs and has an elongated stem to reach above the mosses but has nearly smooth spores, a sharply pointed small umbo on the cap, and longer necked cheilocystidia. Mixed field collections of *G. sphagnicola* and *G. sphagnorum* are possible, so careful observation and inspection are necessary. *Galerina farinacea* is another similar bog inhabitant, but its spores are slightly smaller, and the cheilocystidia are much smaller.

**Distribution:** Widely distributed in the Northern Hemisphere but not known from Washington, Oregon, or California.

**Substrate and Habitat:** Scattered to gregarious, apparently exclusively found in sphagnum bogs, at low to moderately high elevations.

**Season:** Early autumn.

**Reference:** Smith, A.H.; Singer, R. 1964. A monograph of the genus *Galerina* Earle. New York: Hafner Publishing Co. 384 p.



No photograph available



*Galerina vittaeformis* (Fr.) Singer

**ROD name** *Galerina vittaeformis*

**Family** Cortinariaceae

**Morphological Habit** mushroom

**Description:** **CAP** 5-12 mm diam., broadly conic, campanulate to nearly plane, broad umbo, distinctly striate, sulcate, crenulate margin, moist but strongly hygrophanous, not fibrillose but appearing almost cellular; tan with red-brown tones. Occasional veil fragments adhering to edge of cap in younger specimens. **GILLS** adnate to toothed-decurrent, moderately broad, tan to yellow-brown, with serrate edges. **STEM** 20-30 mm long x 1 mm in diam., equal, flexuous, pruinose from caulocystidia along its full length when young, but only along upper half as it ages. **ODOR AND TASTE** not distinct to mildly farinaceous. **BASIDIA** 22-36 x 8-9.5  $\mu$ m, 4 spored. **CHEILOCYSTIDIA** fusoid-ventricose with rounded, subcapitate apex, some branched near apex, 36-80 x 6-17  $\mu$ m, 2.5-5  $\mu$ m in diam at apex, hyaline, with some darkening in age. **PLEUROCYSTIDIA** scattered, same or longer length, more slender necks and undulating. **CAULOCYSTIDIA** similar to cheilocystidia. **PILEOCYSTIDIA** absent. **CLAMP CONNECTIONS** present. **SPORES** amygdaliform, 8-10.5 x 5.5-7.5  $\mu$ m, ornamentation finely punctate, pale brown.

**Distinguishing Features:** *Galerina vittaeformis* can be distinguished from all other species by the abundant cystidia on the stem and gills and the small spores.

**Distribution:** Widely distributed in the Northern Hemisphere. Known from many dozens of locations throughout the range of the Northwest Forest Plan.

**Substrate and Habitat:** Single to gregarious, can be found with a variety of mosses, mostly on soil, but also on moss-covered logs.

**Season:** Summer and autumn.

**Reference:** Smith, A.H.; Singer, R. 1964. A monograph of the genus *Galerina* Earle. New York: Hafner Publishing Co. 384p.

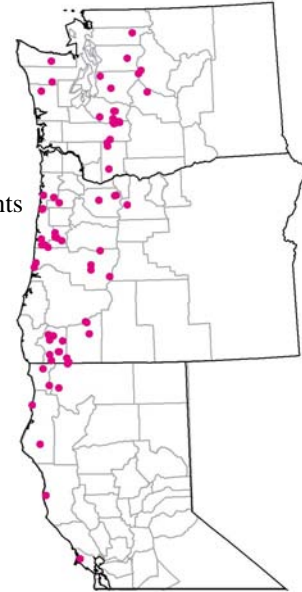


Photo courtesy of Catherine Ardrey



Photo courtesy of mycology team

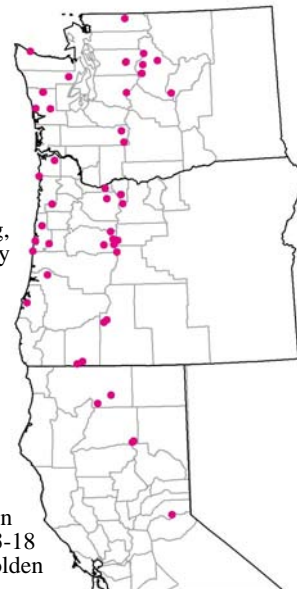
## *Gastroboletus turbinatus* (Snell) A.H. Smith & Singer

**ROD name** *Gastroboletus turbinatus*

**Family** Boletaceae

**Morphological Habit** truffle

**Description:** **SPOROCARP** 20-55 (-80) x 20-50 (-7) mm, cap margins strongly upturned at maturity, yellow to various shades of brown, often with red areas or red blushed overall. **CONTEXT** pale yellow, staining blue where exposed, later becoming red to brown. **TUBES** adnate-seceding, at maturity angled from below horizontal to nearly vertically upward, often contorted, 10-40 mm long, in youth yellow, later olive, staining blue, initially yellow but soon becoming olive and often slightly to strongly red at maturity. **STEM** centrally or sometimes laterally attached, nearly always percurrent, 10-20 (-70) x 8-20 mm, equal to downward tapered, often not projecting much below the tubes, solid, yellow at apex, often more orange-yellow to red or red-brown below, quickly bluing where bruised. **CONTEXT** yellow, often developing pink areas near the apex to becoming deep red throughout, bluing slightly to strongly when exposed. **ODOR AND TASTE** not distinct. **PILEIPELLIS** of hyaline to yellow, thin-walled hyphae 3-5.5 (-9)  $\mu$ m in diam., the cells mostly slightly inflated, releasing a golden yellow pigment in KOH mounts, in youth forming a palisade of cystidiumlike hyphal ends that these soon collapsing. **STIPIPELLIS** with a basal, subhymeniumlike layer giving rise to a patchy palisade of fertile basidia and brachybasidioles 15-27 x 9-14  $\mu$ m and ventricose to mucronate, yellow caulocystidia 30-42 x 8-11  $\mu$ m. **BASIDIA** clavate, hyaline to yellow, 30-40 x 9-14  $\mu$ m; 4-spored. **CYSTIDIA** 35-60 x 9.5-17  $\mu$ m, ventricose-mucronate to pedicellate-ampullaceous, often with a long, thin neck, the apex mostly obtuse. **CLAMP CONNECTIONS** absent. **SPORES** fusoid, (9.5-) 13-18 (-20) x (5.5-) 6.5-9.5  $\mu$ m, symmetrical, smooth, the walls 0.5  $\mu$ m thick, the apex obtuse to acute, golden yellow singly and bright brown-yellow in mass, inamyloid.



**Distinguishing Features:** *Gastroboletus turbinatus* is closely related to *G. ruber*, but the latter has a dendroid columella and lacks a well-defined stem or cap. *Gastroboletus vividus* may occur in the same habitats as *G. turbinatus*, but the former has much brighter colors than the latter and does not turn blue where bruised.

**Distribution:** Washington, Oregon, northern California, Idaho, Missouri, and Mexico. **CALIFORNIA**, Shasta Co., Lassen National Park (LNP), Summit Lake; LNP, Shadow Lake trail; Shasta-Trinity National Forest (STNF), Bear Springs; STNF, Mount Shasta; **Siskiyou** Co., head of the south fork of Salmon River; **OREGON**, Benton Co., Bureau of Land Management, Mary's Peak Resource Area, Grass Mountain; Siuslaw National Forest, Mary's Peak summit; **Clatsop** Co., Fort Clatsop National Monument; **Coos** Co., near South Slough Estuaries Sanctuary headquarters south of Coos Bay; **Douglas** Co., Tahkenitch Lake campground; **Hood River** Co., Mount Hood National Forest (MHNF), Tilly Jane campground; **Jackson** Co., 1.6 km east of Dutchman Peak; Dutchman Peak; west slope of McDonald Peak; Rogue River National Forest, MacDonald Basin; **Jefferson** Co., Willamette National Forest (WNF), Canyon Creek basin; **Klamath** Co., Crater Lake National Park (CLNP), Cleatwood Picnic area; CLNP, Mazama Creek; CLNP, Annie Springs; **Lane** Co., WNF, West Lava campground; **Lincoln** Co., SNF, Cape Perpetua, Gwynn Creek; Depoe Bay; Rocky Creek State Park; Whale Cove State Park; **Linn** Co., WNF, Iron Mountain; WNF, Lost Prairie; WNF, Mount Jefferson Wilderness Area, Pamela Creek; **Multnomah** Co., MHNF, Larch Mountain; **Tillamook** Co., Cape Lookout; Oswald West State Park; **Wasco** Co., Devil's Half Acre; **WASHINGTON**, **Chelan** Co., Lyman Lake; north fork of Entiat River; Phelps Creek at wilderness boundary; Wenatchee National Forest (WENF), Nason Ridge; WENF, southwest of Rock Mountain; WENF, White River Rd.; WENF, Valhalla Mountain; **Clallam** Co., Clallam Bay Demonstration Forest; **Grays Harbor** Co., 1.6 km north of Copalis beach on Hwy. 109; Copalis; Olympic National Forest (ONF), 1.6 km south of Lake Quinault; ONF, north of Falls Creek on trail; **Jefferson** Co., Olympic National Park, Hoh park entrance; **King** Co., Denny Creek trail to Malakwa Lake above the second bridge; **Pierce** Co., Mount Rainier National Park, (MRNP) Lower Tahoma; MRNP, Ohanepecos; **Snohomish** Co., Mount Baker-Snoqualmie National Forest, Barlow Pass; **Whatcom** Co., U.S. Cabin, Chilliwack River.

**Substrate and Habitat:** Hypogeous to emergent, scattered to grouped in lowland forests of *Picea sitchensis*-*Tsuga heterophylla* and *Pseudotsuga menziesii* to montane and subalpine *Abies*, *Picea*, and *Pinus* spp.

**Season:** July through November.

**References:** Smith, A.H.; Singer, R. 1959.

Studies on secotiaceae fungi – IV.

*Gastroboletus*, *Truncocolumella* and *Chamonixia*.

Brittonia. 11: 205-223. Thiers, H.D.; J.M. Trappe. 1969.

Studies in the genus *Gastroboletus*. Brittonia. 21: 244-254.

Photo courtesy of Michael Castellano



## *Gomphus bonarii* (Morse) Singer

**ROD name** *Gomphus bonarii*

**Family** Gomphaceae

**Morphological Habit** chanterelle

**Description:** **SPOROCARP** 3-7 cm broad, fleshy, margin spreading and undulating or lobed, depressed at the center, surface broken into thick floccose more or less erect scales that fill the central depression, scales orange at the tips blending to yellow at the base and giving the entire cap an orange-yellow color, fading to near pink-tan in drying; flesh white, firm, tapering to margin, relatively thin. **SPORE-BEARING TISSUE** obtuse, narrow, in the form of radially disposed decurrent folds or interconnected veins, primary folds sometimes decurrent half the length of the stem, color white when fresh, pale tan to brown when dried. **STEM** 20-40 mm long, 10-15 mm thick, solid, glabrous, white, enlarged upward into the cap, mostly fused with other stems (up to 13 from a common base), the entire cluster 5-7 cm tall, many undeveloped fruiting bodies sometimes present in the large clusters. **ODOR** indistinctive. **TASTE** not recorded. **BASIDIA** 44-70 x 7-8  $\mu$ m, narrowly clavate, hyaline, 2-6 spored. **CYSTIDIA** absent. **SPORES** subellipsoid, 10-12 (-14) x 5-6  $\mu$ m, smooth to slightly roughened, apiculate, hyaline to pale yellow, inamyloid.

**Distinguishing Features:** *Gomphus bonarii* is similar to *G. floccosus* but has less warty spores, and it forms closely caespitose clusters.

**Distribution:** **CALIFORNIA**, Mendocino Co., Jackson State Forest, Aleuria Glen; Mendocino National Forest (MNF), O'Neil Place Rd.; MNF, Well's Cabin campground; **Plumas Co.**, Lassen Volcanic National Park (LVNP), Devil's Kitchen trail; LVNP, Upper Warner Valley campground; **Siskiyou Co.**, Klamath National Forest (KNF), Duck Lake area; KNF, Marble Mountain Wilderness, Haypress trail; Shasta-Trinity National Forest (STNF), Military Pass Rd; STNF, Red Fir Flat; STNF, Sand Flats; KNF, Sugar Lake trail; STNF, Timber Hills Mountain; **Tehama Co.**, LVNP, Broke-Off Mountain trail; MNF, Doll Basin; near Mineral; **OREGON**, **Douglas Co.**, Bureau of Land Management (BLM), Swiftwater Resource Area, 2.4 km south of Wards Butte; BLM, near Jim Creek; Umpqua National Forest (UNF), about 0.8 km due east of Umpqua Hot Springs; UNF, edge of Drews Lake; **Klamath Co.**, Winema National Forest (WINF), south entrance to Crater Lake; WINF, 4.8 km north of Blue Springs; WINF, 4.8 km northeast of Sevenmile Marsh; WINF, Scott Creek campground; WINF, Upper Scott Creek; **WASHINGTON**, **Chelan Co.**, Wenatchee National Forest (WENF), Pole Ridge; WENF, Riverbend campground; WENF, Snow Creek trail #1531; **Kittitas Co.**, Diamond Lake, Union Creek; **San Juan Co.**, Matia Island; **Snohomish Co.**, Mount Baker-Snoqualmie National Forest, Sloan Creek campground.

**Substrate and Habitat:** Closely gregarious to caespitose, partly hidden in deep humus under *Pinus* and *Abies* spp.

**Season:** Spring and autumn.

**Reference:** Singer, R. 1945. New genera of fungi. Lloydia. 8: 139-144.

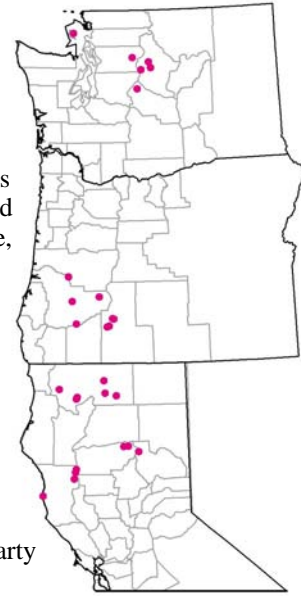


Photo courtesy of mycology team



Photo courtesy of David Arora

*Gomphus clavatus* (Persoon:Fries) S.F. Gray**ROD name** *Gomphus clavatus***Family** Gomphaceae**Morphological Habit** chanterelle

**Description:** **SPOROCARP** up to 15 cm tall. **CAP** surface flat, somewhat wavy, depressed to concave, crenate at margin, macroscopically smooth, covered with minute anastomosing patches of brownish hyphae separate and distinct toward the margin, but becoming a solid felty tomentum over the top, brown to yellow-olive. **SPORE-BEARING TISSUE** undulate-rugose to rugose, with or without discrete folds or pits, bright violaceous at the margin and junction with stem, and all over when immature, becoming covered with spores and duller in color. **STEM** solid, white at base and where protected, smooth above and there blending to pale dull violaceous, often bruising pale brown where handled. **ODOR** faintly earthy or none. **TASTE** musty. **CAP** surface a turf of pileocystidia 3.0-4.5  $\mu\text{m}$  in diam., thin walled, densely scattered to fasciculate, protruding 50-120  $\mu\text{m}$  from the surface, simple to commonly axially branched. **BASIDIA** 60-90 x 8.5-11.5  $\mu\text{m}$ , elongate-clavate, hyaline, (2) 4 spored. **STERIGMATA** up to 8  $\mu\text{m}$  long. **CYSTIDIA** absent. **CLAMP CONNECTIONS** present. **SPORES** ellipsoid to narrowly ovoid, (9.8-) 10.3-15.5 (-16.8) x 4.3-7.0 (-7.5)  $\mu\text{m}$ , near dark olive-tan, somewhat thick walled, inamyloid, ornamentation of scattered warts.

**Distinguishing Features:** Characterized by a combination of olive and violet tones, flat cap surface, not concave to infundibuliform, and its solid flesh.

**Distribution:** Widely distributed across northern temperate forests in North America and Europe.

**CALIFORNIA.** **Del Norte Co.**, Crescent City; Jedediah Smith Redwoods State Park, Crescent City; **Mendocino Co.**, Jackson State Forest, Aleuria Glen; **Siskiyou Co.**, Klamath National Forest (KNF), Cub Creek, near Marble Mountain Wilderness; KNF, Marble Mountain Wilderness, Haypress trail; **OREGON, Benton Co.**, Siuslaw National Forest (SNF), Mary's Peak Scenic Botanical Area, Mary's Peak, Chintimini Creek; BLM, Marys Peak Resource Area, end of Hairy Mountain Rd.; **Clackamas Co.**, Mount Hood National Forest (MHNF), Clackamas River Ranger District, south fork of Eagle Creek; MHNF, Buck Creek; MHNF, east fork of Salmon River; MHNF, Still Creek; Wemme; **Columbia Co.**, Bureau of Land Management (BLM), Tillamook Resource Area, west of Scappose Creek; **Coos Co.**, South Slough Estuarine Research Reserve; **Curry Co.**, 1.6 km west of Quail Prairie Mountain; **Douglas Co.**, Umpqua National Forest (UNF), 4.8 km west of Clayton Point; UNF, near Umpqua Hot Springs; UNF, east of Willow Flats; UNF, north of Emile Shelter; UNF, northwest of Snowbird Shelter; BLM, South River Resource Area, Wolf Creek; BLM, Swiftwater Resource Area, Gallagher Canyon; **Jackson Co.**, BLM, Butte Falls Resource Area, 1.6 km northwest of Blue Goose Spring; BLM, Butte Falls Resource Area, Blue Goose Spring; **Klamath Co.**, BLM, Klamath Falls Resource Area, 2 km southwest of Aspen Butte; Winema National Forest, near Yellow Jacket Spring; **Lane Co.**, Willamette National Forest (WNF), 3.2 km southeast of Indigo Springs; WNF, Belknap Springs; WNF, Horse Creek Camp; WNF, Mill Creek; WNF, Lookout Point Reservoir; SNF, Woahink Lake trail; UNF, Wyatt Creek; UNF, 4 km southwest of Mount June; UNF, Dinner Ridge, 3.2 km east of Rose Hill; **Lincoln Co.**, Newport; **Linn Co.**, WNF, 2.4 km southeast of Potato Hill; BLM, Cascades Resource Area, 4.8 km northwest of Snow Peak; WNF, Lost Prairie campground; WNF, near Lava Lake Sno-Park; **Yamhill Co.**, BLM, Tillamook Resource Area, 0.8 km north of Stoney Mountain; BLM, Tillamook Resource Area, 1.2 km south of Bald Mountain; **WASHINGTON, Clallam Co.**, Olympic National Park (ONP), Lake Crescent; ONP, Mount Angeles; Morse Creek Camp; **Jefferson Co.**, ONP, Hoh River trail, Hoh rain forest on mossy ground; **King Co.**, Enumclaw, Greenwater River area near state park, about 32.2 km east of Enumclaw; Green River area; **Lewis Co.**, Mount Rainier National Park (MRNP), 4 km south of Stevens Canyon entrance; **Mason Co.**, Olympic National Forest, Olympic Mountains, Lake Cushman; **Pierce Co.**, MRNP, Longmire; MRNP, Lower Tahoma Creek; MRNP, Nisqually River; **Skamania Co.**, Gifford Pinchot National Forest (GPNF), Pacific Crest Trail west of Trout Creek; GPNF, Trapper Creek Wilderness trailhead, Rock Creek; GPNF, T.T. Munger Research Natural Area, Trout Creek Hill; **Snohomish Co.**, Mount Baker-Snoqualmie National Forest, Sloan Creek trail; **Yakima Co.**, MRNP, Bumping Lake.

**Substrate and Habitat:** Closely gregarious to caespitose, partially hidden in deep humus in coniferous forests.

**Season:** Autumn.

**References:** Petersen, R.H. 1971. The genera *Gomphus* and *Gloeocantharellus* in North America. Vaduz, Germany: J. Cramer Verlag. 114 p. Arora, D. 1986. Mushrooms demystified. Berkeley, CA: Ten Speed Press. 959 p.

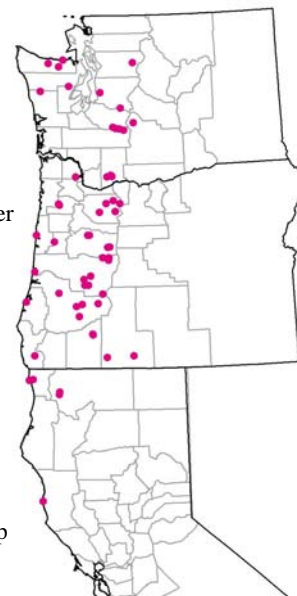


Photo courtesy of Steve Trudell

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## *Gomphus kauffmanii* (Smith) Petersen

**ROD name** *Gomphus kauffmanii*

**Family** Gomphaceae

**Morphological Habit** chanterelle

**Description:** **SPOROCARP** cylindrical-truncate, infundibuliform, cavernous, and finally excavate; up to 30 cm tall, up to 25 cm wide, margin smooth to somewhat undulate, often reflexed to varying degrees. **CAP** up to 25 cm wide; surface differentiated into large, subpyramidal scales becoming incurved so that in immature sporocarps the lower scales often block the cap cavity, creamy to dull tan, scales paler toward margin, darker below. **SPORE-BEARING TISSUE** of longitudinal, anastomosing ridges or somewhat subporoid, dull tan to pale cinnamon, sometimes bruising dull red-brown. **STEM** up to 3.5 cm thick at base of the hymenium, tapered, rounded at base, sometimes somewhat rooting, white mycelium, smooth but not glabrous, hollow, sometimes obscurely longitudinally streaked with brown tones, dull brown when bruised. **ODOR** mild, often faintly to obviously aromatic. **TASTE** mild, sometimes slightly acrid, but usually insignificantly so. **Basidia** 90-115 x 10-13  $\mu\text{m}$ , elongate-clavate to cylindrical with somewhat bulbous apex, hyaline, thin walled. **Sterigmata** 2-4, (-8.5)  $\mu\text{m}$  long, apically slender, coronate, straight, not divergent. **CYSTIDIA** absent. **CLAMP CONNECTIONS** absent. **Spores** ovoid, 11.9-17.5 x 5.7-7.8  $\mu\text{m}$ , pale yellow in mass, thin walled, ornamentation strongly cyanophilic, composed of small, scattered, separate to somewhat anastomosed, low warts, or ridges.

**Distinguishing Features:** *Gomphus kauffmanii* is characterized by its tan to cinnamon-tan sporocarps lacking bright red or orange tints, the gross scales on the cap surface, and the absence of clamp connections.

**Distribution:** Endemic to western North America. **CALIFORNIA**, **Del Norte Co.**, Crescent City; Jedediah Smith Redwoods State Park (JSRSP), Crescent City; JSRSP, John Stout Grove; **Humboldt Co.**, Big Lagoon County Park; **Mendocino Co.**, Jackson State Forest, Aleuria Glen; **Siskiyou Co.**, Klamath National Forest (KNF), Carter Meadow; KNF, Marble Mountain Wilderness Area, jct. of Haypress and Stanishaw trails; **OREGON**, **Benton Co.**, Siuslaw National Forest, Mary's Peak Scenic Botanical Area, Mary's Peak; Paul Dunn Forest, off Berry Creek; Bureau of Land Management (BLM), Starr Creek District; **Clackamas Co.**, Mount Hood National Forest (MHNF), 1.6 km west of Last Chance Mountain; MHNF, east fork of Salmon River; MHNF, Salmon River; MHNF, Still Creek; **Coos Co.**, South Slough Estuarine Research Reserve; **Douglas Co.**, BLM, Swiftwater Resource Area, Gallagher Canyon; **Jackson Co.**, BLM, Butte Falls Resource Area, Round Mountain; **Lane Co.**, Willamette National Forest (WNF), English Mountain; WNF, Lamb Butte; WNF, Lamb Butte, Pothole Creek; WNF, Olallie Ridge Research Natural Area, Pasture Creek; WNF, Potholes; **Linn Co.**, WNF, Lost Prairie campground; WNF, Three Pyramids; **Wasco Co.**, MHNF, Frog Lake; MHNF, Skyline Rd.; MHNF, Warm Springs Rd.; **WASHINGTON**, **Chelan Co.**, Wenatchee National Forest, Stevens Pass; **Clallam Co.**, Olympic National Park, Lake Angeles; **Grays Harbor Co.**, Olympic National Forest, 1.6 km south of Lake Quinault; Quinault, Lake Quinault; Montesano, Sylvia State Park, Hwy. 410; **King Co.**, Mount Baker-Snoqualmie National Forest (MBSNF), Arnette Lake trail; **Kittitas Co.**, MBSNF, Hyak Ski area; **Pierce Co.**, Mount Rainier National Park (MRNP), Carbon River; MRNP, Gobler's Knob; MRNP, Green Lake trail from Carbon River; MRNP, Longmire; MRNP, Lower Tahoma Creek area; MRNP, Mowich Lake, trail to Talmie; **Skagit Co.**, MBSNF, Swamp Creek, on roadside; **Skamania Co.**, Gifford Pinchot National Forest (GPNF), Pacific Crest Trail, north of Trout Creek and Rd. 43; GPNF, T.T. Munger Research Natural Area at canopy crane site; GPNF, Wind River Experimental Forest, Trout Creek Division; Mount St. Helens National Volcanic Monument, Table Creek; **Whatcom Co.**, MBSNF, Ermine Stream; MBSNF, Shuksan Inn.

**Substrate and Habitat:** Closely gregarious to caespitose, partially hidden in deep humus under *Pinus* and *Abies* spp.

**Season:** Autumn.

**Reference:** Smith, A.H.; Morse, E.E. 1947. The genus *Cantharellus* in the Western United States. *Mycologia*. 39: 497-534.



Photo courtesy of mycology team

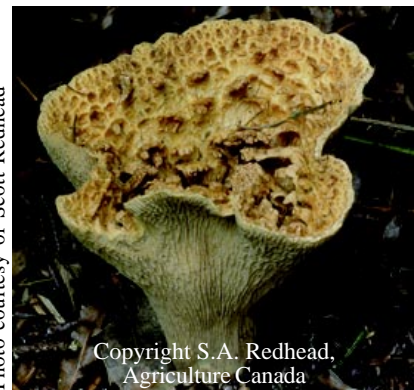


Photo courtesy of Scott Redhead

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## *Gyromitra californica* (W. Phillips) Raitviir

**ROD name** *Gyromitra californica*

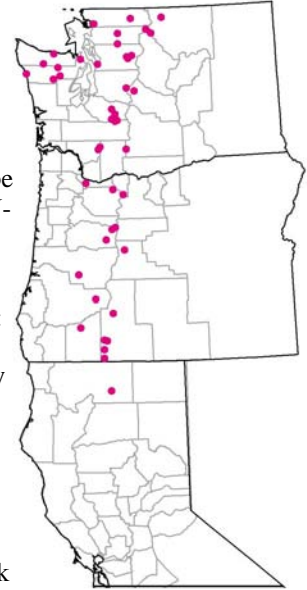
**Family** Discinaceae

**Morphological Habit** cup

**Description:** **SPORE-BEARING TISSUE** convex with numerous undulations and irregularities, brown-gray to gray-brown. **STEM** deeply fluted not forming lacunae, stem base may be flushed with tints of pink to pink-tan while the upper part is cream-colored to white. **Asci** J-negative, operculate. **SPORES** ellipsoid, (14-) 16.1-20.3 x (7.5-) 8.4-10.7  $\mu\text{m}$ , smooth.

**Distinguishing Features:** Both *G. californica* and *G. sphaerospora* occur in western North America. Spore shape is the primary character used to distinguish between species: globose in *G. sphaerospora*, ellipsoid in *G. californica*. In *G. melaleucoides*, the spore-bearing tissue is similar in color to *G. californica*, but the apothecium is discoid to broadly bowl shaped or minimally recurved, and the stipe, when present, is not composed of sharp-edged ribs; in addition, the spores are ornamented instead of smooth.

**Distribution:** Endemic to western North America from British Columbia, Canada, to northern California, east to Colorado, Montana, and Nevada. **CALIFORNIA**, Shasta Co., Squaw Valley Creek; **OREGON**, Clackamas Co., Mount Hood National Forest, Cast Creek; **Deschutes Co.**, Black Pine campground; **Douglas Co.**, Umpqua National Forest, Fish Creek Flats; **Hood River Co.**, Robin Hood forest camp; **Jackson Co.**, Lake Creek, Grayback Mountain area; **Klamath Co.**, Bureau of Land Management (BLM), Klamath Falls Resource Area, 0.8 km east of Surveyor Peak; BLM, Klamath Falls Resource Area, Hayden Creek; Winema National Forest (WINF), 2 km southwest of Odessa; WINF, 4 km northeast of Lake of the Woods; WINF, Pothole Butte; WINF, Bear Bluff; **Linn Co.**, Willamette National Forest (WNF), Marion Creek; WNF, Hackelman Creek; WNF, Heart Lake; Mount Jefferson Wilderness Area, Pamela Lake; **WASHINGTON**, **Chelan Co.**, Wenatchee National Forest (WENF), Rainy Pass trail to Lake Ann; **Clallam Co.**, Olympic National Park (ONP), Jackson Guard Station; ONP, Elwha River; **Cowlitz Co.**, Mount St. Helens National Volcanic Monument, Goat Marsh; **Jefferson Co.**, ONP, Hoh River, ONP, north fork of the Quinault River; Olympic National Forest, Graves Creek; **Kittitas Co.**, WENF, Lake Kachess campground; Denny Creek; **Lewis Co.**, Mount Rainier National Park (MRNP), Narada Falls; Longmire; **Okanogan Co.**, Okanogan National Forest, Pasayten Wilderness, trail to Hidden Lakes; Pierce Co., MRNP, Round Pass; MRNP, Carbon River; MRNP, Eagle Peak; **Skagit Co.**, Mount Baker-Snoqualmie National Forest (MBSNF), Easy Pass trail; MBSNF, Big Fir, near Nooksack River; **Snohomish Co.**, Meadowdale; MBSNF, Barlow Pass study area; MBSNF, Sloan Creek campground along trail; MBSNF, Whitehorse Mountain; **Whatcom Co.**, Boulder Creek trail; North Cascades National Park, upper Baker trail; **Yakima Co.**, Yakama Indian Reservation, Mount Adams area.



**Substrate and Habitat:** Found fruiting on or adjacent to well-rotted stumps or logs of coniferous trees or on soil rich in brown rotted wood.

**Season:** June.

**Reference:** Tylutki, E.E. 1993. Mushrooms of Idaho and the Pacific Northwest, Discomycetes. Moscow, ID: University Press of Idaho. 133 p.



Photo courtesy of Michelle Seidl



Photo courtesy of Steve Trudell

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***Gyromitra esculenta* (Persoon:Fries) Fries**ROD name *Gyromitra esculenta*

Family Discinaceae      Morphological Habit cup

**Description:** SPORE-BEARING TISSUE convoluted, brainlike, red-brown to dark brown. **Stem** somewhat tan, up to 5 cm tall, 2.5 cm wide, hollow. **Asci** J-negative, operculate. **Spores** ellipsoid to broadly subfusoid, 20-26 x 10-13 µm, smooth.

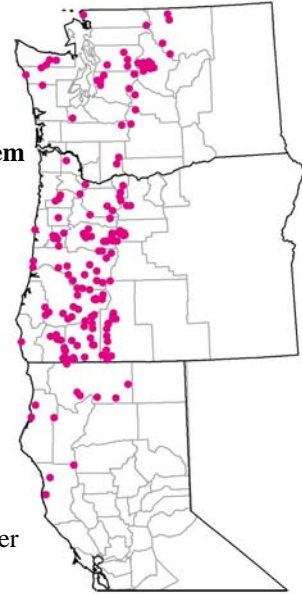
**Distinguishing Features:** *Gyromitra esculenta* is at the center of a species complex that includes species with a spore-bearing tissue that is prominently lobed rather than irregularly recurved at maturity and that is relatively even to only slightly wrinkled, rarely strongly wrinkled. *Gyromitra esculenta* is most often confused with *G. infula*. The spores of *G. esculenta* tend to be relatively wider.

**Distribution:** Known from northern temperate forests in North America and Europe. Known from many dozens of locations throughout the range of the Northwest Forest Plan.

**Substrate and Habitat:** Fruits on the ground in disturbed or undisturbed mixed conifer and hardwood forests and occasionally in urban lawns.

**Season:** Spring.

**References:** Phillips, R. 1991. *Mushrooms of North America*. Boston, MA: Little, Brown and Co. 319 p.  
Tylutki, E.E. 1993. *Mushrooms of Idaho and the Pacific Northwest, Discomycetes*. Moscow, ID: University Press of Idaho. 133 p.



## *Gyromitra infula* (Schaeffer : Fries) Quélet

**ROD name** *Gyromitra infula*

**Family** Discinaceae

**Morphological Habit** cup

**Description:** **SPORE-BEARING TISSUE** convex (saddle-shaped) with undulations and irregularities, dull rusty red to red-brown or red-orange. **STEM** dull tan to pink-tan or dusky purple, roughly circular to compressed in cross section. **ASCI** are J-negative, operculate. **SPORES** ellipsoid, (17-) 20-23 (-26) x 7-10 µm, smooth.

**Distinguishing Features:** *Gyromitra infula* is at the center of a species complex that includes species with a spore-bearing tissue that is prominently lobed rather than irregularly recurved at maturity and that is relatively even to only slightly wrinkled, rarely strongly wrinkled. *Gyromitra infula* is most often confused with *G. esculenta*. The spores of *G. infula* tend to be relatively narrower.

**Distribution:** Found in western North America, including Alaska, also in Michigan and northern Europe. Known from many dozens of locations throughout the range of the Northwest Forest Plan.

**Substrate and Habitat:** Fruits in mixed conifer and hardwood forests in disturbed or undisturbed areas, particularly those with charred or uncharred woody debris.

**Season:** Spring and autumn.

**References:** Phillips, R. 1991. *Mushrooms of North America*. Boston, MA: Little, Brown and Co. 319 p. Tylutki, E.E. 1993. *Mushrooms of Idaho and the Pacific Northwest, Discomycetes*. Moscow, ID: University Press of Idaho. 133 p.



Photo courtesy of George L. Barron



Photo courtesy of Eugene Butler





***Gyromitra melaleucoides* (Seaver) Pfister**ROD name *Gyromitra melaleucoides*

Family Discinaceae

Morphological Habit cup

**Description:** **SPORE-BEARING TISSUE** broadly and shallowly bowl shaped to repand or slightly undulate but not truly strongly lobed, brown-gray to gray-brown varying to nearly black when old or partially dried and is even in young specimens but often becomes undulate to irregular in age. **STEM** sometimes absent to reduced (in age), varying to short-stipitate or indistinctly stipitate. **ASCI** J-negative, operculate. **SPORES** ellipsoid, 12-14 x 7-10  $\mu\text{m}$ , finely warted. Sections of fresh spore-bearing tissue mounted in KOH release a yellow pigment.

**Distinguishing Features:** *Gyromitra melaleucoides* may be separated from most species of *Discina* *ss. stricto* by the combination of a gray-tan to brown-gray or dark brown spore-bearing tissue and a glabrous, more or less ivory to off-white underside surface that lacks prominent ribs (but may have broad folds). In *Discina* *ss. stricto*, the colors of the spore-bearing tissue are in the dingy yellow to red-brown range, while the underside surface is concolorous with, or paler than, the spore-bearing tissue.

**Distribution:** Endemic to western North America from British Columbia, Canada to northern California, east to Colorado. Known from many dozens of locations throughout the range of the Northwest Forest Plan.

**Substrate and Habitat:** On or adjacent to well-decayed (brown cubical-rotted) wood in moist coniferous forests.

**Season:** Spring.

**Reference:** Tylutki, E.E. 1993. Mushrooms of Idaho and the Pacific Northwest, Discomycetes. Moscow, ID: University Press of Idaho. 133 p.

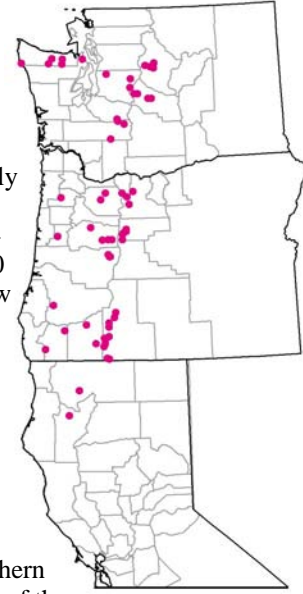


Photo courtesy of mycology team

## *Gyromitra montana* Harmaja

**ROD name** *Gyromitra montana* (syn. *G. gigas*)

**Family** Discinaceae      **Morphological Habit** cup

**Description:** **SPORE-BEARING TISSUE** convoluted, brainlike, yellow-brown to dull red-brown. **Stem** off-white to tan, 3-5 cm wide x 2-4 cm tall. **Asci** J-negative, operculate. **Spores** ellipsoid, (21.4-) 24.3-35.8 (-37.5) x (9-) 10.7-15.8  $\mu\text{m}$ , smooth to minutely verrucose.

**Distinguishing Features:** *Gyromitra montana* is characterized by its distinct compact brainlike form with short, stout stem and large spores.

**Distribution:** Known from many dozens of locations throughout the range of the Northwest Forest Plan.

**Substrate and Habitat:** Found near or on edge of snowbanks in montane, coniferous forests.

**Season:** Spring.

**References:** Phillips, R. 1991. Mushrooms of North America. Boston, MA: Little, Brown and Co. 319 p. Tylutki, E.E. 1993. Mushrooms of Idaho and the Pacific Northwest, Discomycetes. Moscow, ID: University Press of Idaho. 133 p.

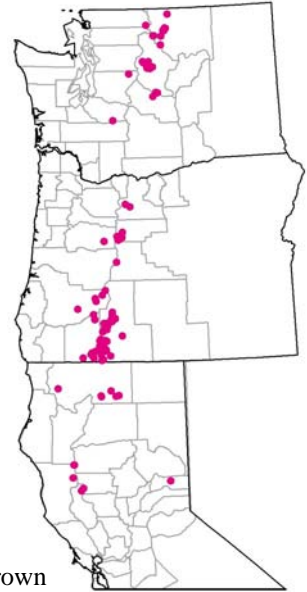


Photo courtesy of Michele Seidl



Photo courtesy of Eugene Butler



## *Hydnum umbilicatum* Peck

**ROD name** *Hydnum umbilicatum*

**Family** Hydnaceae

**Morphological Habit** tooth fungus

**Description:** **CAP** 28-45 mm broad, irregular and wavy, convex to plane with central depression, umbilicate, margin undulate, surface slightly felted or unpolished, glabrous or furfuraceous, pale yellow to pale orange-yellow, becoming deep orange, slowly bruising orange. **CONTEXT** yellow-white, bruising orange. **SPINES** 2-4 per mm<sup>2</sup>, up to 6 mm long, yellow-white, bruising pale orange, not decurrent. **STEM** up to 70 mm long, mostly under 10 mm thick, 4.5-7 mm thick near apex, slightly tapered toward base, nearly central to eccentric, concolorous, bruising orange. **BASIDIA** 45-50 x 4.7-6.7 μm, clavate, 3-4 spored. **CYSTIDIA** absent. **SPORES** subglobose, 9.0-10.0 μm, smooth, apiculate, inamyloid, acyanophilic, spore print white.

**Distinguishing Features:** *Hydnum repandum* lacks the deep orange pigment, has a shorter stem and larger cap, and smaller spores. *Hydnum washingtonianum* has larger spores and pink tones to the cap.

**Distribution:** Widespread across northern temperate forests. Known from many dozens of locations throughout the range of the Northwest Forest Plan.

**Substrate and Habitat:** Solitary or gregarious, on ground in duff of coniferous forests.

**Season:** Throughout the year, mostly October through April.

**Reference:** Phillips, R. 1991. *Mushrooms of North America*. Boston, MA: Little, Brown and Co. 319 p.

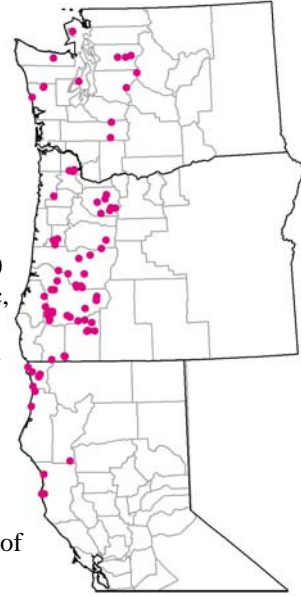


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## *Hydropus marginellus* (Pers.: Fr.) Singer

**ROD name** *Mycena marginella*

**Family** Tricholomataceae      **Morphological Habit** mushroom

**Description:** **CAP** 6-20 mm in diam., broadly convex, plano-umbonate or plano-depressed, pellucid-striate to striate, sometimes crenulate, often splitting, smooth, finely pruinose to minutely velutinous, fuscous to brown, gray-brown or yellow-brown.

**CONTEXT** thin, exuding a thin watery liquid when cut. **GILLS** broadly adnate to arcuate-subdecurrent, close to crowded, narrow to moderately broad, sometimes intervenose, white, edges pruinose, brown. **STEM** 10-25 (-30) x 1-2 mm, central, cylindrical, equal or with slightly enlarged base, brittle-cartilaginous, pruinose overall, hollow, dark gray to black-brown overall when young, becoming gray-brown to almost hyaline-gray in age.

**ODOR AND TASTE** not distinct. **PILEIPELLIS** of saccate to broadly clavate or fusoid-ventricose thin walled, brown cells 25-50 x 10-20 (-30)  $\mu\text{m}$ . **CAP TRAMA** sarcodimitic, some hyphae inflated, 15-30  $\mu\text{m}$  in diam., other hyphae cylindrical, 3-8  $\mu\text{m}$  in diam., hyaline, inamyloid. **STIPTIPPELLIS** with a cutis of cylindrical hyphae 3-7  $\mu\text{m}$  diam. **CAULOCYSTIDIA** 25-60 x 8-15  $\mu\text{m}$ , subcylindrical to clavate, scattered or clustered, thin walled, brown.

**CHEILOCYSTIDIA** abundant, of two types: (1) 35-50 x 15-20  $\mu\text{m}$ , saccate to broadly clavate; and (2) 40-60 x 8-12  $\mu\text{m}$ , fusoid-ventricose, obtuse; both types with brown contents.

**PLEUROCYSTIDIA** absent or a few similar to the cheilocystidia near the gill edge. **BASIDIA** 18-27 x 5.5-7.0  $\mu\text{m}$ , clavate, 4 spored. **CLAMP CONNECTIONS** absent or rare in tramal tissues, present at base of basidia.

**SPORES** ellipsoid, 6.0-7.5 x 3.0-4.5  $\mu\text{m}$ , smooth, hyaline, weakly amyloid, thin walled, spore print white.



**Distinguishing Features:** *Hydropus marginellus* is characterized by a fuscous to gray-brown cap, white, close gills with brown edges, a dark gray-brown, pruinose stem, growth on conifer wood, and sarcodimitic, inamyloid tramal tissues. There are many *Mycena* species that are macromorphologically similar to *H. marginellus*, but all these differ in lacking brown-marginate gills and subhymeniform pileipellis with plasmatic pigments

**Distribution:** Widespread in the Northern Hemisphere but uncommon in the Pacific Northwest. **CALIFORNIA**, Del Norte Co., Jedediah Smith Redwoods State Park; **Humboldt** Co., Trinidad, Spruce Grove; **OREGON**, Clackamas Co., Cherryville; Marion Co., Bureau of Land Management, Cascades Resource Area, Fawn Creek; **Tillamook** Co., Siuslaw National Forest, Cascade Head Experimental Forest, George E. Vogal group area; **WASHINGTON**, Clallam Co., Olympic National Park (ONP), Deep Creek; ONP, Elwha River Ranger Station; ONP, Lake Crescent; Clallam Bay; ONP, Hoh River trail; **Pierce** Co., Mount Rainier National Park (MRNP), Green Lake; MRNP, Tahoma Creek; **Skagit** Co., Mount Baker-Snoqualmie National Forest (MBSNF), Marble Creek; **Whatcom** Co., MBSNF, Baker Lake.

**Substrate and Habitat:** Scattered to gregarious on wood of conifers (*Abies*, *Pinus*) in forests.

**Season:** Spring and autumn.

**References:** Baroni, T.J.; Halling, R.E. 1989. New York State agarics. I. Memoirs of the New York Botanical Garden. 49: 173-180. Breitenbach, J.; Kränzlin, F. 1991. Fungi of Switzerland. Lucerne, Switzerland: Mycological Society of Lucerne. 361 p. Vol. 3. Smith, A.H. 1947. North American species of *Mycena*. Ann Arbor, MI: University of Michigan Press. 521 p.



Photo courtesy of Joe Ammirati

*Hygrophorus saxatilis* A.H. Smith & HeslerROD name *Hygrophorus karstenii*

Family Hygrophoraceae      Morphological Habit mushroom

**Description:** CAP 30-80 (-100) mm in diam., plane or with a low umbo with margin decurved, off-white to pale tan developing a pale pink-tan tinge, viscid to sticky when young and fresh but becoming moist to dry, glabrous, or when dry, appearing appressed fibrillose. CONTEXT solid, pale pink-tan, unchanging. GILLS decurrent, bright when young, becoming duller in age, more or less pink-red-tan. STEM 60-80 (-120) mm long, 10-15 (-20) mm thick at apex, surface white to off-white or concolorous with cap, equal or narrowed slightly toward base, thinly appressed fibrillose to fibrillose-pruinose at apex, sometimes appearing more or less longitudinally striate. ODOR faintly fragrant or of dried peaches. TASTE mild. PILEIPELLIS only slightly gelatinous, with surface layer of more or less parallel, hyaline hyphae 2-3  $\mu\text{m}$  in diam., lacking a distinct cellular layer beneath surface layer. BASIDIA 46-60 (-70) x 6-9  $\mu\text{m}$ , 2-4 spored. CYSTIDIA absent. CLAMP CONNECTIONS present. SPORES ellipsoid to subellipsoid 7.0-10.4 x 5.2-5.9 (-7.0)  $\mu\text{m}$ , smooth, hyaline, inamyloid.

**Distinguishing Features:** *Hygrophorus saxatilis* is characterized by the viscid to dry cap that is sometimes off-white but typically pale tan with a red-brown tinge or with orange colors, developing watery spots and streaks. The gills are ochraceous salmon to pink-tan, becoming more ochraceous in age, and finally developing orange-brown or pink-tan colors in age. The stem is off-white or concolorous with the cap, dry, and fibrillose. The odor of dried peaches is distinctive but sometimes difficult to detect with just a few specimens and apparently cannot be detected in all collections.

**Distribution:** Endemic to western North America from Oregon and Washington north into British Columbia. It also occurs in Idaho, not known from California. **OREGON**, Clackamas Co., Mount Hood National Forest (MHNH), 6.4 km up Paradise Park trail; MHNH, east fork of Salmon River; MHNH, Still Creek; MHNH, Twin Bridges; **WASHINGTON**, Clallam Co., Olympic National Park, Olympic Hot Springs; **Pierce Co.**, Mount Rainier National Park (MRNP), Carbon River; MRNP, Cougar Rock campground; MRNP, Kautz Creek; MRNP, Longmire; MRNP, Lower Tahoma; MRNP, Rampart Ridge; Mount Baker-Snoqualmie National Forest (MBSNF), Silver Springs campground; MRNP, Tumtum Peak; MRNP, Upper Tahoma; **Skagit Co.**, MBSNF, Easy Pass trailhead; **Whatcom Co.**, MBSNF, Thunder Creek, Diablo Dam.

**Substrate and Habitat:** Gregarious, often fruits on soil or exposed or rocky areas, with a mixture of conifer species.

**Season:** August through October.

**References:** Breitenbach, J.; Kränzlin, F. 1991. Fungi of Switzerland. Lucerne, Switzerland: Mycological Society of Lucerne. 361 p. Vol. 3. Hesler, L.R.; Smith, A.H. 1963. North American species of *Hygrophorus*. Kingsport, TN: University of Tennessee Press: 315-317.



Photo courtesy of Joe Ammirati

## *Hypomyces luteovirens* (Fr.:Fr.) L.-R. Tulasne

**ROD name** *Hypomyces luteovirens*

**Family** Hypocreaceae

**Morphological Habit** crust on mushrooms

**Description:** CRUSTLIKE FRUITING STRUCTURE at first yellow, then yellow-green to green, finally black-green, covering deformed gills, sometimes forming on the stem and cap of the host. SUBICULAR HYPHAE branched, septate, entangled, KOH negative. PERITHECIA ovate to pyriform, 380-485 x 180-290  $\mu\text{m}$ , yellow when fresh, turning olivaceous to black when dried, typically darker than surrounding crust, embedded in crust with protruding papilla, apex comprising moniliform chains of cells extending from surface of papilla. PAPPILLA truncate, KOHnegative. ASCI filiform to long cylindrical, 160-200 x 5-8  $\mu\text{m}$ , apex thickened and with a pore. SPORES fusiform to naviculate, 32-35 x 4.5-5.5  $\mu\text{m}$ , single-celled, smooth to verrucose and apiculate, ornamentation  $\pm 1$   $\mu\text{m}$  tall, apiculus 2.4-7.3  $\mu\text{m}$  long, straight or curved, sometimes hooked.

**Distinguishing Features:** *Hypomyces luteovirens* is one of the most distinctive species of *Hypomyces* occurring on agarics. There are several *Hypomyces* species that parasitize members of the Russulaceae, and they can all be easily distinguished from *H. luteovirens* by the color when mature; however, many taxa are somewhat yellow when immature. These taxa and their color when mature include *H. banningiae* (white to pale tan), *H. lactiflorum* (orange), *H. lateritius* (ochraceous to brick red to red-black), *H. lithuanicus* (cream-ochre to cinnamon), *H. macrosporus* (white to pale tan), and *H. petchii* (apricot).

**Distribution:** Widely distributed across North America. CALIFORNIA, Del Norte Co., Jedediah Smith Redwoods State Park; Mendocino Co., Jackson State Forest, Aleuria Glen; OREGON, Clackamas Co., Mount Hood National Forest, Bull Run watershed; WASHINGTON, King Co., Hamlin Park, Seattle; Kittitas Co., Mount Baker-Snoqualmie National Forest, Stampede Pass; Pierce Co., Mount Rainier National Park, Longmire; San Juan Co., Friday Harbor Biological Station, San Juan Island National Historical Park; Skamania Co., Gifford Pinchot National Forest, Takhlahk campground.

**Substrate and Habitat:** Obligate parasite of species in the Russulaceae. Forms a yellow to green to black perithecioid crustlike fruiting structure primarily on the gills of sporocarps.

**Season:** July through November.

**Reference:** Phillips, R. 1991. Mushrooms of North America. Boston, MA: Little, Brown and Co. 319 p.



Photo courtesy of Steve Trudell



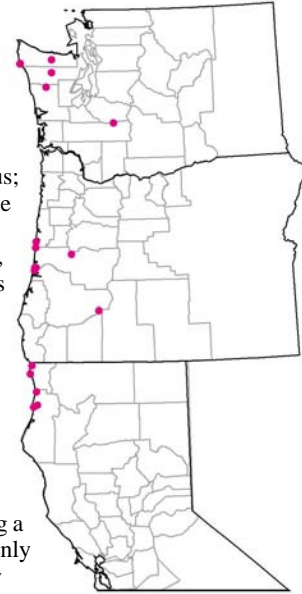
Photo courtesy of Michael Castellano

***Mycena tenax* A.H. Smith**ROD name *Mycena tenax*

Family Tricholomataceae      Morphological Habit mushroom

**Description:** CAP 10-30 mm diam., convex to campanulate when young, remaining so in age or expanding to plano-convex, pellucid-striate to shallowly sulcate, surface lubricous to viscid, glabrous; fuscous overall when young, fading in age and with moisture loss to pale fuscous or dark gray on the disc and pale gray on the margin. CONTEXT thin, pliant-tough, pallid. GILLS ascending, adnate to broadly adnate with a subdecurrent tooth, white becoming pale gray. STEM 50-75 x 2-3 mm, central, equal or slightly broadened at the base, fistulose, viscid, pruinose to pubescent at the apex, glabrous below, concolorous with the cap or paler, the base covered with long, coarse, flexuous, white toned fibrils. ODOR AND TASTE strong, rancid farinaceous or like cucumber. PILEIPELLIS an ixocutis; hyphae 1.5-3.5 µm in diam., cylindrical, embedded in a gelatinous matrix, smooth for the greater part, the uppermost ones with a few scattered diverticula 1.5-4.5 x 1.5 µm, hyaline to pale gray-brown. CAP TRAMA interwoven; hyphae narrow, gelatinous, dextrinoid. STIPITPELLIS similar to the pileipellis, with cylindrical, smooth to weakly diverticulate hyphae 1.5-3.0 µm in diam., embedded in a gelatinous matrix, giving rise to terminal caulocystidia. CAULOCYSTIDIA 10-20 x 3-8 µm, densely diverticulate, variously shaped and branched. BASIDIA 27-34 x (5-) 6-7 µm, clavate, 4 spored.

CHEILOCYSTIDIA 9-20 x 4.5-10.0 µm, arising from a compact layer of interwoven hyphae and forming a sterile band, embedded in a gelatinous matrix, clavate, covered with a few to fairly numerous, unevenly spaced diverticula; diverticula 5-18 x 1.5-4.5 µm, irregularly cylindrical to irregular, often intricately branched, hyaline. PLEUROCYSTIDIA 27-105 x 9-16 µm, fusiform, acute, smooth, hyaline. CLAMP CONNECTIONS present. SPORES 6.5-8.0 X 3.5-4.5 µm, narrowly ellipsoid, smooth, hyaline, amyloid, thin walled, spore print white.



**Distinguishing Features:** *Mycena tenax* is characterized by a dark gray-brown, viscid cap, close, adnate, gray-white gills, a viscid, gray-brown stem, a strong farinaceous or cucumberlike odor and taste, and gelatinized pileipellis, pileus trama, gill edge and stipitipellis. It might be confused with several other gray-brown *Mycena* species with viscid stems, such as *M. rorida*, *M. vulgaris*, and *M. quinaultensis*. *Mycena rorida* differs in having a dry cap with a pileipellis composed of a hymeniform layer of sphaeropedunculate cells, a mild odor and taste, a thickly gelatinous stem surface, smooth, fusoid-ventricose cheilocystidia, and lacking pleurocystidia. *Mycena vulgaris* differs only subtly in lacking a strong farinaceous to cucumery odor, in lacking pleurocystidia, and in forming more dendroid and finely diverticulate cheilocystidia and caulocystidia. *Mycena quinaultensis* differs in lacking a strong farinaceous to cucumery odor, and in forming a pileipellis with nondiverticulate hyphae, larger spores (8-9.5 x 4.5-5.0 µm), fusoid to sublageniform, obtuse, smooth cheilocystidia and pleurocystidia, and nondiverticulate, subclavate to sinuous caulocystidia. In the field, probably the easiest way to distinguish *M. tenax* from look-alike taxa is by its combination of viscid gray-brown cap and stem and strong odor.

**Distribution:** Known from Washington, Oregon, and California in the Pacific Northwest, and from Ontario, Nova Scotia, and New York. CALIFORNIA, Del Norte Co., Crescent City; Smith River; Humboldt Co., Patrick's Point State Park; Prairie Creek State Park; Trinidad; OREGON, Douglas Co., Lake Tahkenitch; Lost Creek; Lane Co., Ada Station; south fork of McKenzie River; Siltcoos Lake; Siuslaw National Forest (SNF), Cummins Creek; Lincoln Co., SNF, Big Creek; WASHINGTON, Clallam Co., Olympic National Park (ONP) near Mora; ONP, Hot Springs; ONP, La Push; Grays Harbor Co., Olympic National Forest, Lake Quinault; Jefferson Co., ONP, Hoh River Trail, Hoh rain forest; Pierce Co., Mount Rainier National Park, Tahoma Creek.

**Substrate and Habitat:** Densely gregarious in duff under *Abies*, *Pseudotsuga*, *Picea*, and *Sequoia*.

**Season:** Spring and autumn.

**References:** Maas Geesteranus, R. 1989. Conspectus of the *Mycenas* of the Northern Hemisphere—12. Sections *Fuliginellae*, *Insignes*, *Ingratae*, *Euspeireae*, and *Caesпитosae*. Proceedings C: 92(3): 331-365. Smith, A.H. 1947. North American species of *Mycena*. Ann Arbor, MI: University of Michigan Press. 521 p.

No photograph available

## *Mythicomycetes corneipes* (Fries) Redhead & Smith

**ROD name** *Mythicomycetes corneipes*

**Family** Cortinariaceae

**Morphological Habit** mushroom

**Description:** CAP 10-30 mm in diam., campanulate or broadly convex with or without an obtuse to conic umbo, moist, marginally translucent-striate, hygrophanous, smooth, initially orange to bright orange-brown, becoming overall ochraceous tawny. **GILLS** rounded, attached to adnexed and soon seceding, close, broad, pale to off-white becoming somewhat green in age. **STEM** central, 30-57 mm long, 1-2 mm wide at the apex, equal or slightly enlarged above usually strict lower portion, apex faintly pruinose, base sometimes strigose with pale tan to dark brown hairs, otherwise glabrous and cartilaginous to corneous, terete, yellow or pale orange to tan at the apex, darkening to dark red-brown below and gradually blackening upwards from the base, which is always surrounded by a tawny basal mycelium. **ODOR** not distinctive to faintly of *Pelargonium*. **TASTE** not distinctive to faintly bitter **PILEIPELLIS** a thin gelatinized ixocutis consisting of a suprapellis of hyphae 1-4 µm in diam. over a dark cinnamon subpellis composed of enlarged 8-15 µm wide barrel-shaped cells with slightly thickened walls. **BASIDIA** 24-26 x 6-8.5 µm, clavate, 4 spored. **PLEUROCYSTIDIA** abundant, 43-86 x 10-24 µm, walls up to 3 mm thick, fusoid ventricose with obtuse apices that are sometimes encrusted with prominent amyloid crystals. **CHEILOCYSTIDIA** similar but shorter, 37-46 x 10.5-14 µm. **OLEIFEROUS HYPHAE** absent. **CLAMP CONNECTIONS** present. **SPORES** ovoid to subellipsoid, 6-8.5 x 4-5.5 µm, walls slightly thickened, slightly cyanophilic, punctate with short ridges and projections, pale gray-brown with a vinaceous tinge, dextrinoid, spore print pale purple-brown.



**Distinguishing Features:** In the field, *Mythicomycetes corneipes* can be confused with the extremely similar *Stagnicola perplexa* with which it shares similar stature, two-toned stems, coloration, and tawny basal mycelium. It can, with difficulty, be differentiated in the field by the bitter taste, more faded coloration, and brown spore print lacking purple tones. Microscopically the smooth spores and absence of metuloids easily distinguish *S. perplexa*. *Mythicomycetes corneipes* might also be mistaken for *Phaeocollybia attenuata*, which has a similarly colored campanulate cap and which also frequently grows amidst mosses. *Phaeocollybia attenuata* can easily be differentiated in the field by the long wirelike pseudorhiza extending below the substrate, and in the lab by the much more heavily ornamented limoniform-globose spores and absence of pleurocystidia. In color and stature, *M. corneipes* might also be mistaken for *Hypholoma udum* or *H. elongatum*, both of which have smooth spores, yellow chrysocystidia, and no metuloids.

**Distribution:** Widespread across western North America and northern Europe. **OREGON**, Clackamas Co., Mount Hood National Forest, Upper Salmon River; Lane Co., Willamette National Forest, Belknap Springs; **WASHINGTON**, Chelan Co., Wenatchee National Forest, Smithbrook, north of Stevens Pass; **Clallam** Co., Olympic National Park (ONP), Badger Valley; ONP, Olympic Hot Springs; ONP, Sol Duc campground; **Pierce** Co., Mount Rainier National Park, Ipsut Creek along Carbon Glacier trail; **Skagit** Co., Mount Baker-Snoqualmie National Forest (MBSNF), Marble Creek forest camp; MBSNF, North Cascade Hwy. at Easy Pass trailhead.

**Substrate and Habitat:** Solitary to gregarious, along margins of bogs among mosses or on wet soil under conifers and *Alnus* spp.

**Season:** Autumn.

**Reference:** Redhead, S.A.; Smith, A.H. 1986. Two new genera of agarics based on *Psilocybe corneipes* and *Phaeocollybia perplexa*. Canadian Journal of Botany. 64: 643-647.

No photograph available



*Phaeocollybia attenuata* (A.H. Smith) Singer

**ROD name** *Phaeocollybia attenuata*

**Family** Cortinariaceae

**Morphological Habit** mushroom

**Description:** CAP 15-50 mm in diam., obtusely conic to broadly campanulate, lubricous, glabrous, hygrophanous, edge rarely striatulate, orange-brown to tawny. **GILLS** attached by a decurrent tooth nearly free in age, initially pale pink-tan, occasionally faintly blue to violaceous tinged. **STEM** up to 200 mm long, narrow and only up to 5 mm in diam. at apex, more or less equal, cartilaginous, glabrous, stuffed at first with compact fibrillose pith but soon becoming hollow. **PSEUDORHIZA** long, thin, wirelike, black-brown. **PILEIPELLIS** subgelatinized radially arranged hyphae, dingy ochraceous, lacking an extensive hyaline, gelatinous matrix. **BASIDIA** 4 spored. **CHEILOCYSTIDIA** thin walled, broadly clavate and packed in a dense gelatinous barrier at the gill edge. **CLAMP CONNECTIONS** absent. **SPORES** limoniform-globose with a pronounced apical beak, 7-8.5 x 5-5.5 µm, coarsely ornamented, spore print black-brown.

**Distinguishing Features:** *Phaeocollybia attenuata* belongs to a complex of closely related species including *P. neosimilis* and *P. similis*, both extralimital taxa found only in Mexico and China, respectively. Among Pacific Northwest mushrooms, *P. attenuata* could possibly be confused with *Mythicomyces corneipes* (which lacks a pseudorhiza, has smooth spores, and metuloid cheilocystidia) and an array of similarly tawny-colored, similarly sized *Galerina* species, all of which lack pseudorhizas and the stiff cartilaginous stems.

**Distribution:** Endemic to western North America from British Columbia south to Marin County, California. **CALIFORNIA, Del Norte Co.**, Six Rivers National Forest, Smith River National Recreation Area, Dry Lake; Crescent City; Jedediah Smith Redwoods State Park, Stout Grove; Redwood National Park, Rugg Grove; **Humboldt Co.**, north fork of Mad River; Orick; Prairie Creek State Park; **Marin Co.**, Audubon Canyon Ranch, Volunteer Canyon; Bolinas Ridge trail; **Mendocino Co.**, Jackson State Forest (JSF), Aleuria Glen; JSF, Dunlap campground; JSF, Little Lake Rd., 4 km east of Hwy. 1; JSF, Woodland campground; Russian Gulch State Park, Aleuria Glen; Van Damme State Park, Pygmy Forest; **OREGON, Benton Co.**, Bureau of Land Management (BLM), Green Peak; BLM, Mary's Peak Resource Area, Rickard Creek; McDonald State Forest; Siuslaw National Forest (SNF), Mary's Peak Scenic Botanical Area, Mary's Peak campground loop trail; **Coos Co.**, BLM, Big Creek; BLM, 1.2 km south of Brewster Rock; BLM, 4.8 km northeast of Anderson Mountain; BLM, southwest of jct. of Rds. 28-10-15.0 and 29-10-2.1; Winchester State Forest; **Douglas Co.**, BLM, Cedar Creek; **Josephine Co.**, BLM, Grants Pass Resource Area, 4.8 km southeast of Holcomb Peak; **Lane Co.**, BLM, Bunker Hill; near Thurston; SNF, Five Rivers; SNF, Indian Creek; **Lincoln Co.**, Van Duzer Corridor Wayside, 0.8 km southeast of wayside at confluence of Deer Creek and Salmon River; Fogarty Creek State Park; SNF, Cascade Head Experimental Forest, 35 m south of county line; **Linn Co.**, Willamette National Forest (WNF), 4.8 km west of Soda Falls; McKenzie Pass area; WNF, north of Moose Creek; WNF, Moose Creek; **Marion Co.**, BLM, Cascades Resource Area, Abiqua Creek; **Multnomah Co.**, Portland, Hoyt Arboretum; Mount Hood National Forest, Larch Mountain; **Tillamook Co.**, SNF, Cascade Head Experimental Forest, 2.4 km northwest of Green Point; Cape Meares State Park; Oswald West State Park; SNF, Cascade Head Experimental Forest, Cascade Head, halfway up the road to north viewpoint; SNF, coastal area between Manzanita and Cascade Head; SNF, Cascade Head Experimental Forest, north of forest Rd. 1861, 0.8 km west of Hwy. 12; SNF, Cascade Head Experimental Forest, north of forest Rd. 1861, 0.8 km west of Hwy. 13; **WASHINGTON, Clallam Co.**, Olympic National Forest (ONF), Klahanie, Sol Duc Road; Cape Flattery; Olympic National Park (ONP), La Push; ONP, Rugged Ridge trail near Calawah River; **Grays Harbor Co.**, Copalis Crossing; **Jefferson Co.**, ONF, east of Hwy. 101, north of Hoh Valley Rd.; ONP, Twin Creek at Hoh River.

**Substrate and Habitat:** Scattered in humus soil and with mosses under conifers such as *Picea sitchensis*.

**Season:** Mid to late autumn.

**Reference:** Norvell, L.L. 1998. The biology and taxonomy of Pacific Northwest species of *Phaeocollybia* Heim (Agaricales, Cortinariaceae). Seattle, WA: University of Washington. 391 p. Ph.D. dissertation.

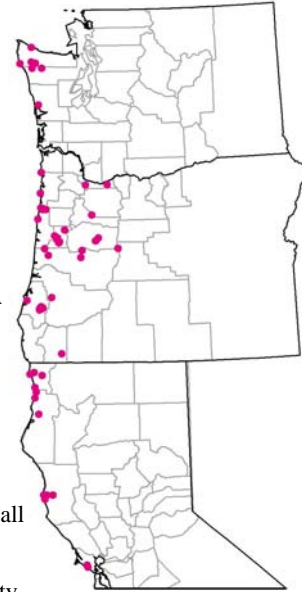


Photo courtesy of Lorelei Norvell

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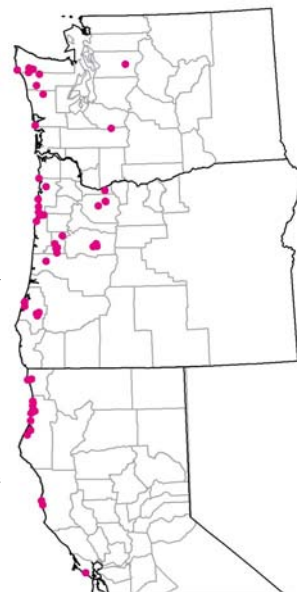
## *Phaeocollybia fallax* A.H. Smith

**ROD name** *Phaeocollybia fallax*

**Family** Cortinariaceae

**Morphological Habit** mushroom

**Description:** **CAP** (10) 20-65 mm in diam., broadly campanulate with low to prominent conic umbo, plane margin and incurved edge, glabrous, viscid to glutinous, usually some shade of pale to dark olive green. **GILLS** narrowly attached, blue-violet when young but soon becoming dull pink-brown. **STEM** up to 275 mm long overall, with aerial portion up to 60-80 mm long, 3-8 (-12) mm in diam. at apex, equal or tapering, usually hollow surrounded by a cartilaginous rind, smooth except for occasional fibrillose patches at the apex, dull olive to somewhat gray at the apex, becoming orange to orange-brown from ground upwards. **PSEUDORHIZA** gradually narrowing to origin well below ground level. **ODOR** slightly floral to reminiscent of burnt hair. **TASTE** somewhat of radish, occasionally bitter. **PILEIPELLIS** a two-layered ixocutis with a hyaline, highly gelatinized top layer and a bright orange to brown-orange bottom layer. **CHEILOCYSTIDIA** thin walled, broadly clavate intermixed with slightly capitate elements, hyaline and frequently encrusted with hyaline gelatinous secretions, packed into a dense gelatinous barrier on the gill edge. **CLAMP CONNECTIONS** absent. **SPORES** limoniform-fusoid with moderate apical beak and distinct apiculus, 7.5-10.5 x 4-6  $\mu\text{m}$ , finely to moderately ornamented.



**Distinguishing Features:** *Phaeocollybia fallax* forms a complex with *P. festiva* and *P.*

*lilacifolia*. *Phaeocollybia festiva* has not yet been confirmed in North America. *Phaeocollybia lilacifolia* has a larger, dark brown cap and stem, slightly smaller rounder spores, fewer subcapitate cheilocystidia, and a washed out brown to brown-orange subpellis in mounts of KOH.

**Distribution:** Endemic to western North America. Restricted to localized areas in mature to old-growth forests in coastal, inland, and montane regions in British Columbia, Washington, Idaho, Oregon, and California. **CALIFORNIA**, Del Norte Co., Crescent City; Jedediah Smith Redwoods State Park, west of Smith River bridge on Hwy. 199; **Humboldt** Co., Murray Rd. near McKinleyville; College of the Redwoods; Freshwater Forest Park; Patrick's Point State Park, Indian Rock; Prairie Creek State Park, Davison Rd.; Redwood National Park, Skunk Cabbage trail; Trinidad, Spruce Grove; **Marin** Co., Audubon Canyon Ranch, Volunteer Canyon; **Mendocino** Co., Jackson State Forest, Aleuria Glen; Van Damme State Park, Pygmy Forest; **OREGON**, **Benton** Co., Bureau of Land Management (BLM), 3.2 km south of Glenbrook; BLM, Mary's Peak Resource Area, Rickard Creek; BLM, Green Peak; McDonald State Forest; Siuslaw National Forest (SNF), near Mary's Peak summit; **Clackamas** Co., Mount Hood National Forest (MHNF), Wildcat Mountain; MHNF, Douglas trail; near Estacada; **Coos** Co., BLM, Big Creek; BLM, Bronson Creek; South Slough Estuarine Research Reserve; Winchester State Forest; **Lane** Co., SNF, Indian Creek; **Lincoln** Co., SNF, Drift Creek; SNF, Cascade Head Experimental Forest, east of Hwy. 12; **Linn** Co., Willamette National Forest (WNF), north of Moose Creek; WNF, south of Moose Creek; WNF, Moose Creek; **Multnomah** Co., MHNF, Larch Mountain; **Tillamook** Co., Cape Meares State Park; Camp Clark, near Sand Lake, south of Tillamook; Rockaway, near Camp McGruder, Neskowin Creek; Oswald West State Park; Pacific City; SNF, Cascade Head Experimental Forest, George E. Vogal group area; Van Duzer State Wayside; **Yamhill** Co., SNF, 4.8 km east of Green Top; **WASHINGTON**, **Clallam** Co., Olympic National Forest (ONF), Klahanie, Sol Duc Rd.; Olympic National Park (ONP), La Push area along the Quillayute River; ONP, Rugged Ridge; **Grays Harbor** Co., Grayland; ONF, 1.6 km south of Lake Quinault; **Jefferson** Co., ONF, Bogachiel River; ONP, Queets Ranger Station; ONP, Twin Creek at Hoh River; **Pierce** Co., Mount Rainier National Park, Upper Tahoma Creek; **Snohomish** Co., Mount Baker-Snoqualmie National Forest, Barlow Pass along Sauk River.

**Substrate and Habitat:** Scattered to gregarious in highly humus soil in mixed coniferous forests associated with *Abies*, *Picea*, *Pseudotsuga*, and *Tsuga*.

**Season:** Autumn and early winter.

**Reference:** Norvell, L.L. 1998. The biology and taxonomy of Pacific Northwest species of *Phaeocollybia* Heim (Agaricales, Cortinariaceae) Seattle, WA: University of Washington. 391 p. Ph.D. dissertation.



Photo courtesy of Lorelei Norvell

*Phaeocollybia olivacea* A.H. Smith

**ROD name** *Phaeocollybia olivacea*

**Family** Cortinariaceae      **Morphological Habit** mushroom

**Description:** CAP 40-110 mm in diam., umbonate, viscid to glutinous, uniformly dark olive overall when young but later becoming pale brown to olive-brown. **GILLS** nearly free, pale tan when young but soon becoming rusty brown with wavy to eroded edges. **STEM** up to 200 mm long over all with aerial portion up to 80 mm, 10-20 mm in diam. at apex, equal or enlarged down to the ground where it can reach 40 mm across, stuffed with an off-white conspicuous fibrillose pith. **PSEUDORHIZA** tapered, long, origin well below ground level. **ODOR** of raw cucumbers, soon fading. **TASTE** not distinct. **PILEIPELLIS** a two-layered ixocutis with a thick, gelatinous, hyaline top layer and a bottom layer containing inflated floccose hyphae with brown walls in KOH. **CHEILOCYSTIDIA** thin walled, clavate. **CLAMP CONNECTIONS** absent. **SPORES** ovate with an abrupt projecting snout in face view, 8-11 x 5-6.5 µm, walls warty-rugulose roughened except over smooth apical beak and suprahilar plage.

**Distinguishing Features:** *Phaeocollybia pseudofestiva* also produces green-capped sporocarps, but they are smaller, usually hollow-stemmed, producing much shorter, rounder spores, and have refractive, capitulate cheilocystidia with thick-walled, narrow necks.

**Distribution:** Endemic to western United States from central Oregon coast south to Santa Cruz Co., California. **CALIFORNIA, Del Norte Co.**, Crescent City; Jedediah Smith Redwoods State Park, west of Smith River bridge on Hwy. 199; **Humboldt Co.**, north fork of Mad River; Prairie Creek State Park, Davison Rd.; **Marin Co.**, 16 km east of Fairfax; Audubon Canyon Ranch, Volunteer Canyon; **Mendocino Co.**, Jackson State Forest, Aleuria Glen; Jackson State Forest, Woodland campground; Mendocino; Van Damme State Park, end of Fern Canyon loop; **Shasta Co.**, Castle Crags State Park, Castella; **Siskiyou Co.**, Rogue River National Forest, trail 954, Red Buttes Wilderness; Six Rivers National Forest, Klamath Mountains, 4.8 km up road to Haypress; **Sonoma Co.**, Kruse Rhododendron State Reserve; **Yuba Co.**, Bullard's Bar Recreation Area, Hornswoggle group campground; **OREGON, Benton Co.**, about 0.8 km on Oregon State University Rd. 761; on trail; Bureau of Land Management (BLM), 4.8 km south of Glenbrook; BLM, Mary's Peak; BLM, Mary's Peak Resource Area, Rickard Creek; Corvallis; McDonald State Forest; Paul Dunn Forest, 4.8 to 6.4 km from Hwy. 99W; Philomath; Siuslaw National Forest (SNF), Mary's Peak; **Clackamas Co.**, near Estacada; Mount Hood National Forest, Douglas trail; **Coos Co.**, BLM, Bronson Creek; BLM, Big Creek; BLM, Sandy Creek off Rd. 29-10-14.2 at jct. of Rd. 29-10-2.1; **Douglas Co.**, BLM, South River Resource Area, near jct. of Rds. 29-8-9.5 and 29-9-9.0; BLM, near Jim Creek; BLM, Swiftwater Resource Area, south of Yellow Creek Mountain; **Josephine Co.**, BLM, Grants Pass Resource Area, 4.8 km southeast of Holcomb Peak; Grants Pass; **Lane Co.**, BLM, 1.6 km north of Castle Rock; BLM, near BLM Rd. 19-2-13; BLM, near Middle Creek, off BLM Rd. 19-1-33; **Lincoln Co.**, SNF, Cascade Head Experimental Forest; **Tillamook Co.**, Pacific City; SNF, Cascade Head Experimental Forest, Cascade Head; **WASHINGTON, Jefferson Co.**, Olympic National Park, Twin Creek at Hoh River.

**Substrate and Habitat:** Scattered or in arcs in mixed forests containing Fagaceae or Pinaceae in coastal lowlands.

**Season:** Autumn.

**Reference:** Norvell, L.L. 1998. The biology and taxonomy of Pacific Northwest species of *Phaeocollybia* Heim (Agaricales, Cortinariaceae). Seattle, WA: University of Washington. 391 p. Ph.D. dissertation.

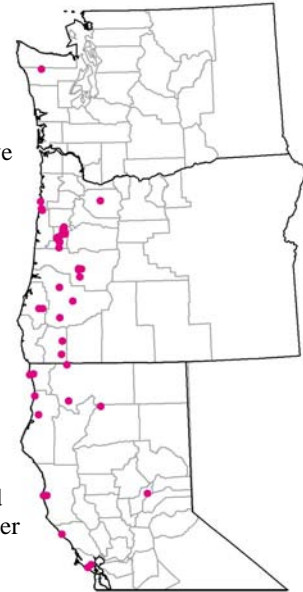


Photo courtesy of Michael Beug

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*Phaeocollybia pseudofestiva* A.H. Smith

**ROD name** *Phaeocollybia pseudofestiva*

**Family** Cortinariaceae

**Morphological Habit** mushroom

**Description:** CAP 20-50 mm in diam., obtusely-umbonate to broadly campanulate, glutinous, dark to olive green fading to olive-tan, margin pale and faintly striate when mature. **GILLS** nearly free, broad at maturity with uneven edges, initially pale maturing to pale cinnamon-brown. **STEM** up to 150 mm long overall with aerial portion up to 40-50 mm, 5-8 (10) mm in diam. at apex, more or less equal, hollow, pale olive above becoming rusty red from the ground upwards. **PSEUDORHIZA** tapered, long, unbranched, rusty red. **ODOR** fleetingly pungent. **TASTE** not distinct. **CHEILOCYSTIDIA** refractive, capitulate, lageniform to tibiiform elements with thick walled narrow necks. **CLAMP CONNECTIONS** absent. **SPORES** ovate with an abrupt apical beak in face view, 7-9 x 5-6  $\mu\text{m}$ , moderately coarsely ornamented except over the smooth apical beak.

**Distinguishing Features:** In the field *P. pseudofestiva* is similar to *P. fallax* (which, when young, has brilliant violet gills) and *P. olivacea* (which is larger and has a stuffed stem), both species producing mushrooms with green caps. They both possess thin-walled (never refractive or thick-walled) clavate cheilocystidia and have smaller spores than *P. pseudofestiva*.

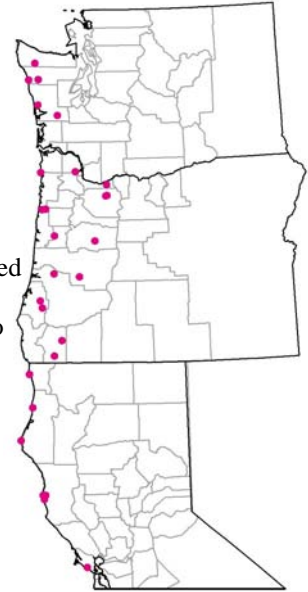
**Distribution:** Endemic to western North America occurring from British Columbia, Canada, south to California.

**CALIFORNIA.** **Del Norte Co.**, Crescent City; **Humboldt Co.**, Cape Mendocino, 8 km south of Camp Wailaki; Trinidad, Spruce Grove; **Marin Co.**, Audubon Canyon Ranch, Volunteer Canyon; **Mendocino Co.**, Jackson State Forest, Aleuria Glen; Van Damme State Park, Fern Canyon trail, north of north trail loop; **OREGON,** **Benton Co.**, Siuslaw National Forest (SNF), Mary's Peak Scenic Botanical Area, Mary's Peak campground; **Clackamas Co.**, Mount Hood National Forest (MHNF), Wildcat Mountain; MHNF, Douglas trail; **Columbia Co.**, Bureau of Land Management (BLM), Tillamook Resource Area, 3.2 km southwest of Bonnie Falls; **Coos Co.**, BLM, Cherry Creek; BLM, southwest of jct. of Rds. 28-10-15.0 and 29-10-2.1; **Douglas Co.**, BLM, Johnson Creek; **Josephine Co.**, BLM, near Sucker Creek; Grants Pass; **Lane Co.**, BLM, 1.6 km southwest of Hawley Butte; **Lincoln Co.**, SNF, Cascade Head Experimental Forest; **Linn Co.**, Willamette National Forest, Moose Creek; **Multnomah Co.**, MHNF, Larch Mountain; **Tillamook Co.**, Van Duzer State Wayside; Oswald West State Park; **WASHINGTON,** **Clallam Co.**, Olympic National Park (ONP), Rugged Ridge; **Grays Harbor Co.**, Ocean Pines-Copalis area, 0.8 km southwest of Copalis Crossing; Lake Sylvia State Park; **Jefferson Co.**, ONP, Kalaloch campground; ONP, Queets River.

**Substrate and Habitat:** Scattered to caespitose under mature mixed conifers and hardwoods.

**Season:** October through December.

**Reference:** Norvell, L.L. 1998. The biology and taxonomy of Pacific Northwest species of *Phaeocollybia* Heim (Agaricales, Cortinariaceae). Seattle, WA: University of Washington. 391 p. Ph.D. dissertation.



No photograph available

*Phaeocollybia spadicea* A.H. Smith

**ROD name** *Phaeocollybia spadicea*

**Family** Cortinariaceae      **Morphological Habit** mushroom

**Description:** **CAP** 40-120 mm in diam., broadly campanulate with an obtuse umbo, glabrous to glutinous, dark brown. **GILLS** free or scarcely attached by a narrow tooth, initially pale, in age becoming brown with serrate to eroded pale edges. **STEM** up to 200 mm overall, aerial portion up to 80 mm, 10-20 mm in diam. at apex, slightly swollen below, stuffed fairly thick and cartilaginous, pale red-purple-brown near the apex and dull red-brown below. **PSEUDORHIZA** gradually narrowing to relatively thick origin well below ground level. **ODOR** pungent farinaceous to mild. **TASTE** slightly bitter. **PILEIPELLIS** a two layered ixocutis with a hyaline, gelatinized top layer and lower layer with wider, inflated hyphae with rusty-brown walls. **CHEILOCYSTIDIA** refractive capitulate, lageniform to tibiiform with narrow, thick-walled necks, with or without apical droplets. **CLAMP CONNECTIONS** absent. **SPORES** limoniform with distinct apical beak, 7-9 x 4.5-5.5 µm, warty-roughened.

**Distinguishing Features:** *Phaeocollybia spadicea* could possibly be confused with *P. scatesiae*, which also has a dark black-brown cap and tibiiform cheilocystidia but is generally smaller, has a completely hollow stem, fruits in dense fasciculate mounds arising from a single thread-like pseudorhiza, and has longer, more ornamented basidiospores.

*Phaeocollybia spadicea* might also be confused with the slightly more robust *P. kauffmanii* and allies, all of which have thin-walled, clavate cheilocystidia and rounder, larger spores. *Cortinarius vanduzerensis* Smith and other glutinous dark-brown-capped representatives of *Cortinarius* might also be mistaken for *P. spadicea*; these species do not possess pseudorhiza.

**Distribution:** Endemic to western North America from Washington south to California. **CALIFORNIA**, Del Norte Co., Crescent City; **Humboldt** Co., Prairie Creek State Park, north of Davison Rd. at campground; **Marin** Co., Audubon Canyon Ranch, Volunteer Canyon; Muir Woods National Monument; **Mendocino** Co., Jackson State Forest, Aleuria Glen; Van Damme State Park, Lower Pygmy Forest; **Shasta** Co., Castle Crags State Park; **OREGON**, **Benton** Co., Bureau of Land Management (BLM), Mary's Peak Resource Area, Rickard Creek; Siuslaw National Forest (SNF), Buck Creek; **Coos** Co., BLM, Mrytlewood Resource Area, Bronson Creek; BLM, Big Creek; Winchester State Forest; **Douglas** Co., Booth; **Lane** Co., BLM, 1.6 km north of Castle Rock; Eugene; **Lincoln** Co., Fogarty Creek State Park; SNF, Cascade Head Experimental Forest, Tillamook/Lincoln County line; **Linn** Co., 1.6 km west of McCully Mountain; **Tillamook** Co., Cape Meares State Park; Cape Lookout; Oswald West State Park; SNF, Cascade Head Experimental Forest, 3.2 km northwest of Green Point; Van Duzer Corridor State Wayside, south of Hwy. 18, southwest of restrooms; **WASHINGTON**, **Clallam** Co., Mora-Quillayute River; Olympic National Park (ONP), Rugged Ridge; **Jefferson** Co., ONP, Twin Creek.

**Substrate and Habitat:** Solitary to scattered to closely gregarious in mature *Picea sitchensis* stands in coastal lowland regions.

**Season:** October and November.

**Reference:** Norvell, L.L. 1998. The biology and taxonomy of Pacific Northwest species of *Phaeocollybia* Heim (Agaricales, Cortinariaceae). Seattle, WA: University of Washington. 391 p. Ph.D. dissertation.

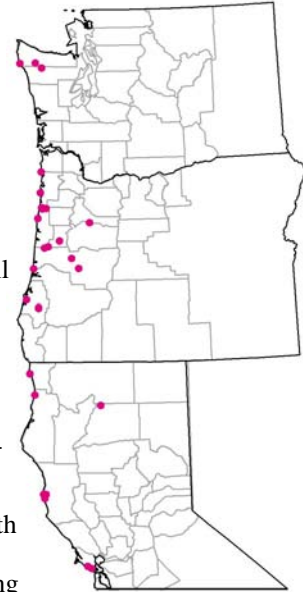


Photo Courtesy of Lorelei Norvell

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## *Phellodon atratus* K. Harrison

**ROD name** *Phellodon atratus*

**Family** Bankeraceae

**Morphological Habit** tooth fungus

**Description:** **CAP** 10-50 mm in diam., often fused with others, plane to depressed or irregular, subtomentose, faintly zoned concentrically, blue-black to purple-black or black, margin slightly paler or purpler. **CONTEXT** in both cap and stem purple-black to blue-black, thin, tough, fibrous, pliant, sometimes with thin outer or upper spongy layer. **SPINES** short, 1-2 mm, irregularly decurrent, gray to dark purple-gray-brown, darker where bruised. **STEM** 20-50 mm long, 30-50 mm thick, usually central, sometimes compound or branched, tapering downward, usually thickened at ground level by felty mycelial layer. **ODOR** mild or faintly fragrant. **TASTE** mild. **BASIDIA** 33-38 x 4-7  $\mu\text{m}$ , clavate. **CYSTIDIA** absent. **SPORES** globose to subglobose, 3.8-4.2 x 3.3-3.8  $\mu\text{m}$ , echinulate, apiculate, inamyloid, acyanophilic, spore print white.

**Distinguishing Features:** *Sarcodon fuscoindicum* is similar in color, but larger and brittle, rather than pliant and tough. *Phellodon melaleucus* has a dark brown to purple-gray cap with pallid margin, spines off-white to gray, and the stem is thin, dark brown to black, deeply rooted. *Phellodon niger* occurs in eastern North America, is larger and thicker, with a white to brown, gray or black cap and black context. *Hydnellum nigellum* also occurs in eastern North America and is small, gray to black with brown spores.

**Distribution:** Endemic to Western United States. **CALIFORNIA**, Del Norte Co., Six Rivers National Forest, Siskiyou Fork, Smith River; Crescent City; **Humboldt Co.**, Patrick's Point State Park, Indian Rock; Big Lagoon County Park, north of Patrick's Point State Park; Prairie Creek State Park, on Davison Rd. near beach; Orick; Samoa Peninsula, Arcata; **Marin Co.**, Audubon Canyon Ranch, Volunteer Canyon; **Mendocino Co.**, Jackson State Forest, Aleuria Glen; **OREGON**, Coos Co., Coos County Forest; Shore Acres State Park; **Douglas Co.**, Reedsport area; Tahkenitch Lake; **Lane Co.**, Siuslaw National Forest, Siltcoos Lake; **Tillamook Co.**, Camp Meriweather; Cape Kiwanda State Park; **WASHINGTON**, **Clallam Co.**, Olympic National Park (ONP), Mount Angeles; ONP, Olympic Hot Springs; **Island Co.**, Columbia Beach, Whidbey Island; Langley, Whidbey Island; Useless Bay, Whidbey Island; **Jefferson Co.**, ONP, 2.4 km south of Mount Carrie; Chimacum; **Mason Co.**, Mason Lake; **Pierce Co.**, Mount Rainier National Park, Longmire.

**Substrate and Habitat:** Scattered to gregarious, often forming fused clusters; on ground under conifers.

**Season:** Autumn and winter.

**Reference:** Arora, D. 1986. Mushrooms demystified. Berkeley, CA: Ten Speed Press. 959 p.



Photo courtesy of Michael Beug



Photo courtesy of David Arora

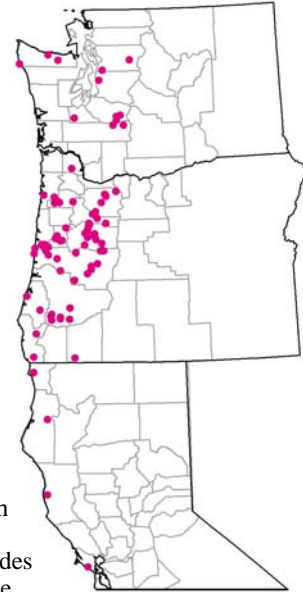
*Plectania melastoma* (Sowerby: Fries) FuckelROD name *Plectania melastoma*

Family Sarcosomataceae      Morphological Habit cup

**Description:** SPOROCARP cupulate, sessile to subsessile, black or nearly black, up to 3 cm in diam., relatively thick fleshed but interior not gelatinous. Young specimens may or may not have orange to rust-colored granules around the rim of the cup. ASCI relatively thick walled, long, narrow, curving bases, operculate, inamyloid. PARAPHYSES up to 4 µm wide, branched, anastomosing around asci. SPORES ellipsoid, 21-24 x 8-10 µm, smooth.

**Distinguishing Features:** The inamyloid asci, ellipsoid spores, and nongelatinous interior separate this species from all other fungal species in the region.

**Distribution:** Across North America and Europe. **CALIFORNIA**, Del Norte Co., Crescent City; **Marin** Co., Audubon Canyon Ranch, Volunteer Canyon; **Mendocino** Co., Jackson State Forest, Mendocino Woodlands; **OREGON**, **Benton** Co., Bureau of Land Management (BLM), Mary's Peak Resource Area, Cabin Creek; BLM, 1.6 km southeast of Old Butte Mountain; BLM, northwest of Hull Spring; Siuslaw National Forest (SNF), north side of Mary's Peak, Woods Creek Rd.; SNF, jct. of Hwy. 34 and Mary's Peak Rd.; Bunker Hill; Paul Dunn Forest, south of Tampico Rd., along Rd. 320; **Clackamas** Co., BLM Cascades Resource Area, north of Butte Creek; BLM, upper Eagle Creek; BLM, 1.6 km south of Hope Lake; BLM, 1.6 km northwest of Table Rock Wilderness; Mount Hood National Forest (MHNF), Cast Creek; MHNF, 4 km northeast of Goat Mountain; **Columbia** Co., BLM, west of Scaponia campground; **Coos** Co., BLM, southeast of Big Creek; Coos County Forest; Beaver Hill Forest; **Curry** Co., Siskiyou National Forest (SINF), Wheeler Creek; SINF, 1.6 km east of Agness; **Douglas** Co., BLM, near Olalla Creek; BLM, near Chipmunk Ridge; BLM, near Catching Creek; BLM, Dutchman Creek; BLM, Beaver Creek; BLM, Shively Creek; BLM, North Myrtle Creek Research Natural Area; BLM, Irwin Rocks Research Natural Area; Jackson Co., Rogue River National Forest (RRNF), Haskins Creek; **Lane** Co., BLM, Jasper Creek; BLM, south of Badger Mountain; BLM, upper McGowan Creek; SNF, 1.6 km southwest of Fisher; SNF, headwaters of Five Rivers; SNF, Cummins Creek trailhead; SNF, China Creek trail; Umpqua National Forest, Patterson Creek; Willamette National Forest (WNF), south shore Fall Creek Reservoir; WNF, H.J. Andrews Experimental Forest, 3.2 km east of Mona campground; WNF, 1.6 km west of Mona campground; **Lincoln** Co., SNF, Cape Perpetua State Park; SNF, Yachats Ridge; SNF, Cascade Creek area; **Linn** Co., near Holley; Tadmor Baptist camp, McDowell Creek; BLM, Trout Creek; BLM, near Green Peter Reservoir; BLM, near McCully Mountain Rd.; BLM 1.6 km south of Fords Mill; BLM, 3.2 km southeast of McCully Mountain; BLM, 1.6 km northeast of Hammond Camp; BLM, 1.6 km south of Camp Morrison; WNF, Moose Creek; WNF, Gordon Lakes; **Marion** Co., BLM, near Fawn Creek; WNF, near Detroit; **Yamhill** Co., BLM, south side of Burton Ridge; BLM 3.2 km south of Bell Mountain; **WASHINGTON**, **Clallam** Co., Olympic National Park (ONP), Mount Angeles; ONP, Lake Crescent; ONP, Lake Ozette; ONP, west of Ozette Ranger Station; **Lewis** Co., Gifford Pinchot National Forest, La Wis Wis forest camp; Mount Rainier National Park (MRNP), Longmire; **Pierce** Co., MRNP, lower Tahoma Creek; MRNP, Sumer land trail; **Snohomish** Co., Canyon Park in Bothell; Mount Baker-Snoqualmie National Forest, Monte Cristo campground; **Thurston** Co., Capitol Forest.



**Substrate and Habitat:** Usually associated with decaying woody debris of relatively small diameter (often less than 7.50-10 cm diam.).

**Season:** Spring.

**Reference:** Tylutki, E.E. 1993. Mushrooms of Idaho and the Pacific Northwest, Discomycetes. Moscow, ID: University Press of Idaho. 133 p.

Photo courtesy of mycology team



## *Podostroma alutaceum* (Pers.) Atkinson

**ROD name** *Podostroma alutaceum*

**Family** Hypocreaceae      **Morphological Habit** club

**Description:** **SPOROCARPS** stipitate, cylindrical to clavate, 5-10 mm x 20-40 mm, off-white when immature becoming yellow-orange at maturity. **SPORE-BEARING TISSUE** comprising the upper three-fourths of the stroma, ostioles of immersed perithecia imparting a brown color. **STEM** less pigmented to almost white. **PERITHECIA** ovoid, 400-525 x 200-325 µm. **ASCI** cylindrical, 80-90 x 5 µm, gradually narrowing below, truncate above, 8 spored. **SPORES** obtusely fusiform, 2.5-4 x 4.5-5.5 µm, hyaline, uniseriate, single septum, disarticulating along septum into 16 single-celled irregular globose part spores, smooth to slightly punctate.

**Distinguishing Features:** *Podostroma zeylanicum* and *P. truncatum* are most similar to *P. alutaceum*; the former differs from *P. alutaceum* in lacking a stem and possessing slightly warted spores, and the latter differs from *P. alutaceum* only in possessing a more truncate stroma with a depressed apex.

**Distribution:** Across northern North America. **CALIFORNIA**, Del Norte Co., Crescent City; **Humboldt Co.**, Patrick's Point State Park, Indian Rock; Trinidad, Spruce Grove; **Mendocino Co.**, Jackson State Forest, Aleuria Glen; **Sonoma Co.**, Salt Point State Park, near Stump Beach; **OREGON**, **Clackamas Co.**, Mount Hood National Forest; **Lane Co.**, Siuslaw National Forest, Siltcoos River; **WASHINGTON**, **Clallam Co.**, Olympic National Park, Lake Crescent; **Pierce Co.**, Mount Rainier National Park, Lower Tahoma Creek; **Whatcom Co.**, Mount Baker-Snoqualmie National Forest, Baker River trail.

**Substrate and Habitat:** Solitary to clustered, occurring primarily in coniferous forests in the litter, in association with dead wood and possibly with the roots of trees.

**Season:** Autumn.

**Reference:** Arora, D. 1986. Mushrooms demystified. Berkeley, CA: Ten Speed Press. 959 p.

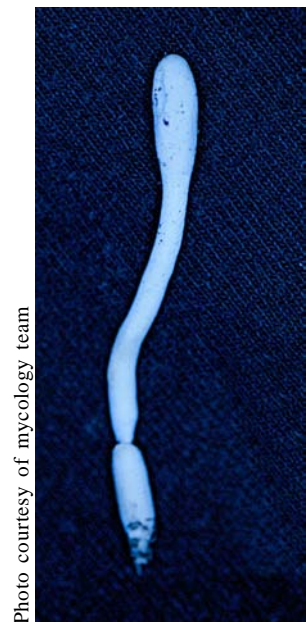


Photo courtesy of mycology team



*Ramaria abietina* (Pers.:Fr.) QuéletROD name *Ramaria abietina*

Family Ramariaceae

Morphological Habit coral

**Description:** **SPOROCARPS** up to 7.5 x 3.5 cm, obconical to spherical in general outline, arising from white rhizomorphs, this white appearance remaining on drying. **STEM** variable, sometimes slender and distinct, often nearly lacking with branches arising at or below substrate level, upward olive-ochraceous to pale gold or sometimes olive, quickly turning blue-green when bruised. **BRANCHES** yellow-gold to dull gold when fresh or somewhat green-gold, quickly bruising blue-green, but often with some small branchlets blue-green when fresh. **APICES** somewhat more yellow than branches when fresh, usually not bruising. **ODOR** mild, of anise. **TASTE** sometimes mildly bitter. **FLESH** of stem positive for FSW,  $\text{Fe}_2(\text{SO}_4)_3$ , GUA, KOH, ANO; negative for ANW, PYR, IKI. **HYPHAE OF BASAL TOMENTUM** 1.4-2.6  $\mu\text{m}$  diam., hyaline, thin walled, ampulliform clamps abundant, up to 14  $\mu\text{m}$  diam., slightly thick walled. **HYPHAE OF BRANCH TRAMA** 2.6-14  $\mu\text{m}$  in diam., hyaline, thin walled, ampulliform clamps occasional, up to 15  $\mu\text{m}$  broad, thin walled, medallion clamps common, gleoerous hyphal segments occasional. **SUBHYMENIUM** of thin walled, hyaline hyphae 1.5-2.4  $\mu\text{m}$  in diam. **BASIDIA** 40-46 x 6-6.5  $\mu\text{m}$ , clavate, 2-4 spored. **CLAMP CONNECTIONS** present. **SPORES** sublacrimiform to broadly ovoid with curved apicular end, (5.5-) 7.0-9.0 (-11) x (3.3-) 3.7-4.5 (-4.8)  $\mu\text{m}$ , ochraceous, cyanophilic, thin walled, ornamentation of numerous, scattered, warts or rounded spines less than 1  $\mu\text{m}$  long.



**Distinguishing Features:** The blue-green bruising reaction and the large spores distinguish it from all other *Ramaria* species.

**Distribution:** Widespread across North America and Europe. **CALIFORNIA**, Humboldt Co., Patrick's Point State Park, Beech Creek campground trail; **Mendocino** Co., Jackson State Forest, near Mendocino; **OREGON**, Josephine Co., Oregon Caves Rd.; Bureau of Land Management, 3.2 km southeast of Grants Pass Peak; **WASHINGTON**, Clallam Co., Port Angeles; **Pierce** Co., Mount Rainier National Park, Lower Tahoma Creek.

**Substrate and Habitat:** On conifer debris, rare but scattered through coniferous forests.

**Season:** May, and September through November.

**Reference:** Petersen, R.H. 1981. *Ramaria* subgenus *Echinoramaria*. Vaduz, Germany: Bibliotheca Mycologica Cramer. 261 p.



***Ramaria concolor* f. *tsugina*** (Peck) Petersen**ROD name** *Ramaria concolor* f. *tsugina***Family** Ramariaceae**Morphological Habit** coral

**Description:** **SPOROCARPS** up to 80 mm tall, up to 50 mm in diam., arising from a small basal tomentum with a small tangle of slender rhizomorphs. **STEM** 6-7 mm thick, distinct, up to 1.2 cm long, major branches few, stout, vinaceous cinnamon or red-brown, axils green, strongly bruno-vinescent when bruised. **APICES** up to 4 mm long, tips creamy yellow. **RHIZOMORPHS** dimitic with skeletal hyphae, generative hyphae 2.4-4.5  $\mu\text{m}$  in diam., thin walled, hyaline, densely interwoven, skeletal hyphae 1.3-2.2 (-3.0)  $\mu\text{m}$  in diam., somewhat thick walled, straight but flexible, hyaline. **CLAMP CONNECTIONS** present. **SPORES** ellipsoid to subcylindrical, 7.0-9.3 x 3.5-4.2  $\mu\text{m}$ , thin walled, cyanophilic, ornamentation of scattered, low warts.

**Distinguishing Features:** *Ramaria concolor* f. *tsugina* is characterized by its habit on coniferous wood, its dimitic hyphal construction of rhizomorphs, and its green colors of axils and branch apices. *Ramaria apiculata*, which is also green colored, has monomitic hyphal system.

**Distribution:** Known only from Washington and New York. **WASHINGTON, Grays Harbor Co., Lake Quinalt.**



**Substrate and Habitat:** Solitary to gregarious, along margins of bogs among mosses or on wet soil under conifers and *Alnus* spp.

**Season:** September and October.

**References:** Petersen, R. 1975. *Ramaria* subgenus *Lentoramaria* with emphasis on North American taxa. Vaduz, Germany: Bibliotheca Mycologica Cramer. 161 p. Marr, C.D.; Stuntz, D.E. 1973. *Ramaria* of western Washington. Vaduz, Germany: Bibliotheca Mycologica Cramer. 232 p.

No photograph available

*Ramaria coulterae* ScatesROD name *Ramaria coulterae*

Family Ramariaceae

**Morphological Habit** coral

**Description:** **SPOROCARPS** up to 120 x 100 mm, broadly obpyriform to subcircular in outline. **STEM** up to 80 x 60 mm, large to massive, single, white to off-white, slowly brunnescent to pale purple-gray when bruised. **BRANCHES** off-white, pale yellow to pale pink-tan, darkening to pink-tan to tan-pink in age. **APICES** cauliflowerlike, pale red to fleshy pink-tan when young, quickly fading to pink, in age concolorous with major branches, extreme tips brown to dark brown. **CONTEXT** off-white, usually with brown fan-shaped area where cut longitudinally. **ODOR** indistinct. **TASTE** mildly nutty. **FLESH** of stem weakly positive for  $\text{Fe}_2(\text{SO}_4)_3$ , negative for ANO, ANW, PYR, PHN, GUA, KOH, NOH, IKI. **STEM HYPHAE** 4-13  $\mu\text{m}$  in diam., hyaline, thick walled, tightly interwoven, ampulliform inflations up to 15  $\mu\text{m}$  broad, with extensive and coarse ornamentation. **GLEOPLEROUS HYPHAE** occasional, 4-15  $\mu\text{m}$  in diam., thin walled, yellow. **TRAMAL HYPHAE** of upper branches 4-14  $\mu\text{m}$  diam., hyaline, clampless, thin walled, parallel, free to adherent; ampulliform inflations and gleoplerous hyphae not observed. **BASIDIA** 50-70 x 7-9  $\mu\text{m}$ , clavate, 4 spored. **STERIGMATA** stout, straight. **CLAMP CONNECTIONS** absent. **SPORES** narrowly ellipsoid to cylindrical, 8.3-12.6 x 2.9-4.0  $\mu\text{m}$ , thin walled, ornamentation none or a few ill-defined small, low warts.



**Distinguishing Features:** Characterized by the combination of lack of clamp connections, smooth spores, somewhat red branch apices, and by fruiting in spring and summer.

**Distribution:** Endemic to Idaho, northeastern California, and eastern Oregon. **OREGON**, Jackson Co., Bureau of Land Management (BLM), 1.6 km north Esmond Mountain; BLM, Doubleday Creek; Jefferson Co., Deschutes National Forest (DNF), east of Metolius Research Natural Area; DNF, head of Jack Creek; Klamath Co., Winema National Forest, 4.8 km northeast of Sevenmile Marsh.

**Substrate and Habitat:** On coniferous debris, rare but scattered through coniferous forests.

**Season:** Spring and early summer.

**Reference:** Petersen, R.H.; Scates, C. 1988. Vernal fruiting taxa of *Ramaria* from the Pacific Northwest. Mycotaxon. 33: 101-144.



Photo courtesy of Michael Beug

Copyright Michael Beug

## *Ramaria suecica* (Fries) Donk

**ROD name** *Ramaria suecica*

**Family** Ramariaceae

**Morphological Habit** coral

**Description:** **SPOROCARPS** up to 70 mm tall, usually more or less stipitate but often branched from the base, generally fusiform in outline. **RHIZOMORPHS** white, slender, fragile, when dried turning pale lemon-yellow with KOH. **STEM** up to 20 mm long, up to 8 mm in diam., dull pale ochraceous when young, darker when mature. **BRANCHES** pallid ochre to pink ochre when fresh. **APICES** somewhat stout, acute, white when young to pale pink-tan when mature. **ODOR** faintly spicy or fragrant. **TASTE** mildly acrid or bitter. **FLESH** of stem positive for ETOH, KOH, GUA, ANO, negative for ANW, PHL, FSW. **HYPHAE OF RHIZOMORPHS** monomitic, 1.5-3.7  $\mu\text{m}$  in diam., thin walled, hyaline, usually encrusted with crystalline material, inflated clamp connections up to 15  $\mu\text{m}$  broad, broadly ovoid to onion shaped, somewhat thick walled, unornamented to rarely and sparsely ornamented. **BASIDIA** 45-70 x 7.6-8.7  $\mu\text{m}$ , clavate, 4 spored. **STERIGMATA** long, slender, incurved. **CLAMP CONNECTIONS** present. **SPORES** narrowly rhomboidal to cylindrical, 8.1-10.4 x 3.7-5.2  $\mu\text{m}$ , thin walled, ornamentation of coarse, cyanophilic, meandering ridges and scattered warts.

**Distinguishing Features:** Characterized by the combination of having a litter-binding basal mat, monomitic hyphae, pink-tan color, and a short to absent stem.

**Distribution:** Cool coniferous northern temperate forests, including the Pacific Northwest. Also known from eastern Oregon. **OREGON**, Douglas Co., Bureau of Land Management (BLM), North Myrtle Creek, Lee Creek. Josephine Co., BLM, Yew Wood Gulch.

**Substrate and Habitat:** On litter.

**Season:** August through October.

**References:** Petersen, R. 1975. *Ramaria* subgenus *Lentoramaria* with emphasis on North American taxa. Vaduz, Germany: Bibliotheca Mycologica Cramer. 161 p. Marr, C.D.; Stuntz, D.E. 1973. *Ramaria* of western Washington. Vaduz, Germany: Bibliotheca Mycologica Cramer. 131 p.



Photo courtesy of Currie Marr

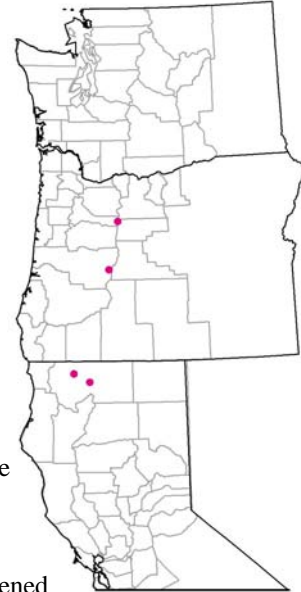


Photo courtesy of Michael Castellano

***Rhizopogon abietis*** A.H. Smith**ROD name** *Rhizopogon abietis***Family** Rhizopogonaceae      **Morphological Habit** truffle

**Description:** **SPOROCARPS** 10-40 mm in diam., subglobose to irregular, tinged yellow to brown-yellow, and spotted or flushed pink to vinaceous where bruised, at maturity sometimes scaly and dark olive to brown with yellow to red-brown areas, becoming pink in cross section where cut, with a basal rhizomorph at the point of attachment and usually with a few rhizomorphs appressed near the base, drying to olive with blackened areas.

**GLEBA** initially soft and white, becoming dark olive to olive-brown and rubbery at maturity. **COLUMELLA** lacking. **ODOR** and **TASTE** not distinctive. **KOH** pale orange to red or red-brown on peridium;  $\text{Fe}_2(\text{SO}_4)_3$  slightly olive, with **ETOH** quickly black; **ETOH** nonreactive. **PERIDIUM** up to 1 mm thick, of appressed-interwoven, hyaline to pale yellow, thin-walled hyphae 5-10  $\mu\text{m}$  in diam., many cells inflated to 15 (-25)  $\mu\text{m}$ , the surface in youth often a turf with scattered to abundant clavate terminal cells up to 14  $\mu\text{m}$  in diam., these soon collapsing as specimens mature, the outer layer olivaceous stained in **KOH**, the inner layer with abundant, extracellular deposits of amorphous red-orange to rusty brown pigment present in **KOH**, in Melzer's reagent the pigment forming pink to orange-brown globules. **TRAMA** of hyaline hyphae 2-7  $\mu\text{m}$  in diam., at maturity with gelatinous-thickened, glassy-appearing walls. **SUBHYMENIUM** of isodiametric cells 4-6  $\mu\text{m}$  in diam., the walls thickened at maturity. **BASIDIA** thin walled, hyaline, clavate, 12-24 x 4-10  $\mu\text{m}$ . **BRACHYBASIDIOLES** ellipsoid to clavate, hyaline, the end cells 4-10 x 4-8  $\mu\text{m}$  with walls gelatinous-thickened at maturity. **CLAMP CONNECTIONS** absent. **SPORES** fusoid to subcylindric or occasionally ellipsoid, ovoid, narrowly clavate or slightly allantoid, 7.5-13 x 3-5 (-6)  $\mu\text{m}$ , smooth, thin walled, sterigmatal attachment  $\pm$  1  $\mu\text{m}$  broad, hyaline singly, olive in mass, inamyloid.



**Distinguishing Features:** In spore size *R. abietis* is between the closely related *R. rubescens* (8-10 x 3.2-4.2  $\mu\text{m}$ ) and *R. ventricisporus* (9-13 (-22) x 6-8  $\mu\text{m}$ ). All three species stain pink when bruised.

**Distribution:** Klamath Mountains in California and Oregon, north to the Cascade Mountains of Oregon and east to central Idaho and Wyoming; in the Eastern United States from Tennessee and Virginia, north to Ontario.

**CALIFORNIA**, Siskiyou Co., Deadfall Meadows west of Gazelle; west of Hilt; **OREGON**, Lane Co., Willamette National Forest (WNF), 1.6 km north of Waldo Lake on Taylor Burns Rd.; Jefferson Co., WNF, Breitenbush Lake.

**Substrate and Habitat:** Hypogeous to emergent, scattered to grouped, associated with *Abies*, *Tsuga*, *Picea*, and *Pinus* spp.

**Season:** July through December.

**References:** Miller, S.L. 1986. Hypogeous fungi from the Southeastern United States. I. The genus *Rhizopogon*. Mycotaxon. 27: 193-218. Smith, A.H.; Zeller, S.M. 1966. A preliminary account of the North American species of *Rhizopogon*. Memoirs of the New York Botanical Garden. 14(2): 1-177.

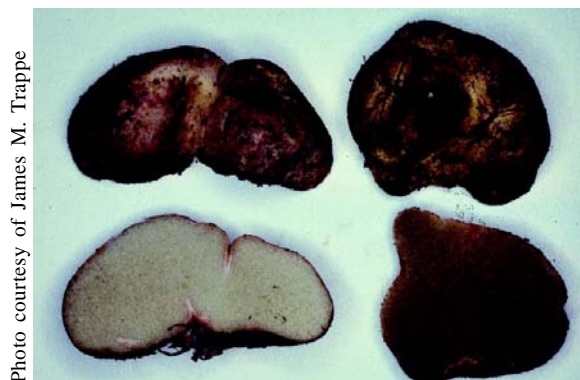


Photo courtesy of James M. Trappe

## *Rhizopogon atroviolaceus* A.H. Smith

**ROD name** *Rhizopogon atroviolaceus*

**Family** Rhizopogonaceae      **Morphological Habit** truffle

**Description:** **SPOROCARPS** 15 to 30 mm in diam., subglobose to pyriform or lobed, in youth white and coarsely fibrillose, usually slowly staining faintly to moderately pink to vinaceous or violet where bruised or cut; at maturity the surface fibrils brown, sometimes with scattered, appressed, concolorous rhizomorphs; when dried brown-black overall. **GLEBA** minutely loculate, soft and white in youth, becoming rubbery and gray-olive to green-olive. **COLUMELLA** lacking. **ODOR** and **TASTE** fungoid, pleasant. **KOH** on peridium lilac, soon lilaceous brown to black;  $\text{Fe}_2(\text{SO}_4)_3$  on peridium olive to blue, soon black; Melzer's reagent negative on peridium, purplish black on gleba. **PERIDIUM** 300-500  $\mu\text{m}$  thick, composed of interwoven, cablelike strands of hyphae with nongelatinous walls and obscured by pink to orange, red or brown, amorphous pigment masses in KOH, the pigment forming pink to orange-brown globules in Melzer's reagent. **TRAMA** of interwoven, hyaline hyphae 2-3  $\mu\text{m}$  in diam., at maturity with gelatinous-thickened, glassy-appearing walls. **BASIDIA** hyaline, thin walled, subcylindric, 17-20 x 5-7  $\mu\text{m}$ , 4, 6, or 8 spored, with interspersed brachybasidioles. **CLAMP CONNECTIONS** absent. **SPORES** ellipsoid to clavate 6-8 x 2-4  $\mu\text{m}$  and as well as subangular 7-9 (-10) x 3-4 (-6)  $\mu\text{m}$ , smooth to punctate-roughened, the walls somewhat thickened, sterigmal attachment inconspicuous, hyaline singly, brown-yellow in mass, distinctly amyloid.



**Distinguishing Features:** *Rhizopogon atroviolaceus* has the peridium of interwoven rhizomorphic strands typical of section *Amylopogon*. It is the only species in which all the spores are deeply amyloid, as opposed to other species of the section in which none or only part of the spores are deeply amyloid. *Rhizopogon subpurpurascens*, with only part of its spores amyloid, further differs in having a subhymenium of isodiametric cells and a peridium that does not stain when bruised. *Rhizopogon kauffmanii* has deep purple pigment globules when mounted in Melzer's reagent, and *R. fallax* has large inflated cells in the peridium.

**Distribution:** Siskiyou Mountains and Cascade Range of Oregon, east to central and northern Idaho. **OREGON**, **Douglas Co.**, Willamette National Forest (WNF), Indigo Lake trail; **Clackamas Co.**, east of Timothy Lake Rd. 4280-250; **Deschutes Co.**, Deschutes National Forest, Three Sisters Wilderness, Green Lakes area; **Klamath Co.**, Crater Lake National Park, Mount Scott; WNF, Diamond Peak Wilderness Area, Yoran Lake; **Lane Co.**, WNF, Ruth Lake; WNF, H.J. Andrews Experimental Forest stand 29; **Linn Co.**, Santiam Pass airstrip burn.

**Substrate and Habitat:** Hypogeous to emergent, scattered to grouped, associated with species of *Abies*, *Picea*, *Pinus*, *Pseudotsuga*, and *Tsuga*.

**Season:** May through December.

**Reference:** Smith, A.H.; Zeller, S.M. 1966. A preliminary account of the North American species of *Rhizopogon*. *Memoirs of the New York Botanical Garden*. 14(2): 1-177.

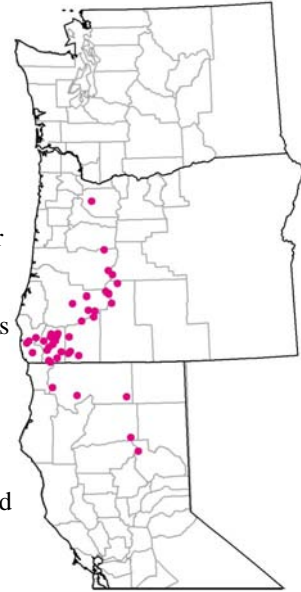


Photo courtesy of James M. Trappe

*Rhizopogon truncatus* LinderROD name *Rhizopogon truncatus*

Family Rhizopogonaceae      Morphological Habit truffle

**Description:** **SPOROCARPS** 10-30 mm in diam., globose to subglobose or ovoid, yellow to vivid yellow at all stages, becoming gray-yellow to olive-yellow where bruised, with scattered, appressed, concolorous rhizomorphs, when dried dull yellow to yellow. **GLEBA** minutely loculate, dark yellow-brown. **COLUMELLA** lacking. **ODOR** and **TASTE** slightly oily or not distinctive. **KOH**,  $\text{Fe}_2(\text{SO}_4)_3$ , and Melzer's reagent negative on peridium and gleba. **PERIDIUM** 100-220  $\mu\text{m}$  thick, of cylindrical to occasionally inflated, thin-walled hyphae 4-7  $\mu\text{m}$  in diam., pale yellow in **KOH** and the pigment diffusing into the medium, in Melzer's reagent the pigment lightly encrusting the hyphae and not diffusing. **TRAMA** of interwoven, cylindrical to slightly inflated, hyaline hyphae 2-5  $\mu\text{m}$  in diam., in youth thin walled, at maturity with gelatinous-thickened, glassy-appearing walls. **BASIDIA** hyaline, thick walled, clavate, 11-14 x 4.5-5.5  $\mu\text{m}$ , 6 or 8 spored. **BRACHYBASIDIOLES** hyaline, subglobose to obovate, 7-10 x 6-8  $\mu\text{m}$ . **CLAMP CONNECTIONS** absent. **SPORES** ellipsoid-truncate to oblong-truncate, (5.5-) 7-9 (-11) x 3-5  $\mu\text{m}$ , sterigmal attachment conspicuous and up to 2  $\mu\text{m}$  broad, the walls up to 0.75  $\mu\text{m}$  thick, hyaline to yellow-brown singly, yellow-brown in mass, inamyloid but sometimes dextrinoid.



**Distinguishing Features:** *Rhizopogon truncatus* differs from all other species in the genus with its bright yellow peridium and strikingly truncate spores.

**Distribution:** Sierra, Siskiyou, and Cascade mountains of northern California into the central Oregon Cascades, also from North Carolina to Nova Scotia. **CALIFORNIA**, Del Norte Co., Smith River, Panther Flat forest camp; Shasta Co., near Mount Lassen.; Siskiyou Co., Little Duck Lake; Klamath National Forest, Duck Lake Creek; Tehama Co., Lassen National Forest, Hwy. 89; **OREGON**, Clackamas Co., Mount Hood National Forest, southeast of Timothy Lake on Rd. 5750; Curry Co., Chief-Indigo Creeks; Siskiyou National Forest (SINF), Panther Lake; State Creek; SINF, Rd. 3680-200; Douglas Co., south Umpqua Coyote Creek; Umpqua National Forest (UNF), Steamboat Creek; UNF, Windigo Pass; Bureau of Land Management (BLM), Red Ponds Research Natural Area; BLM, Tater Hill Research Natural Area; Limpy Rock Research Natural Area; Willamette National Forest (WNF), Indigo Lake trail; Jackson Co., Rogue River National Forest, 8 km east of Union Creek on Crater Lake Hwy.; Glade Creek Wrangle forest camp; Josephine Co., Burned Timber Creek; China Hat; SINF, Dutcher Creek, 16 km west of Grants Pass; SINF, Eight Dollar Rd., milepost 7; Flat Top; Horse Mountain; lower Quartz Creek, near Merlin; Missouri Flats, Amaranthus ranch; Quartz Creek reforestation systems study site; upper Quartz Creek, north of Merlin; Waldo Hill; Waters Creek; Siskiyou National Forest, Limpy Creek; Klamath Co., WNF, Diamond Peak Wilderness Area, Yoran Lake; Creek, Miller Lake; Lane Co., WNF, 1.6 km north of Waldo Lake; WNF, H.J. Andrews Experimental Forest stand 29; WNF, Waldo Lake.

**Substrate and Habitat:** Hypogeous to emergent, scattered to grouped associated with Pinaceae species particularly *Pinus* spp.

**Season:** April through November.

**References:** Miller, S.L. 1986. Hypogeous fungi from the Southeastern United States. I. The genus *Rhizopogon*. Mycotaxon. 27: 193-218. Smith, A.H.; Zeller, S.M. 1966. A preliminary account of the North American species of *Rhizopogon*. Memoirs of the New York Botanical Garden. 14(2): 1-177.

Photo courtesy of Michael Castellano

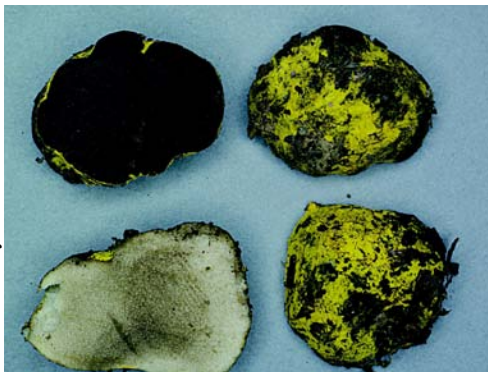
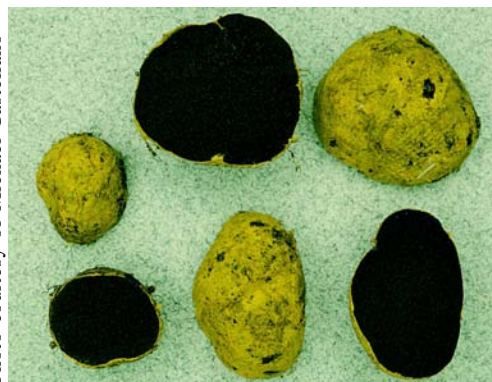


Photo courtesy of Michael Castellano



## *Rickenella swartzii* (Fr.) Kuyper

**ROD name** *Rickenella setipes*

**Family** Tricholomataceae      **Morphological Habit** mushroom

**Description:** CAP 5-15 mm in diam., plano-convex, plano-umbilicate to deeply depressed, pellucid-striate to subsulcate, surface hygrophanous, moist, pruinose overall, dark violet-brown to dark sepia and margin vinaceous cinnamon, yellow-brown, becoming paler with moisture loss to deep brown-drab, violet gray or violet-brown on the disc, and margin pink-cinnamon, avellaneous or yellow-tan. **GILLS** deeply decurrent, in age becoming anastomosed, rugose or veined, white to pale cream, pruinose, edges concolorous, fimbriate. **STEM** 20-50 (-70) x 0.5-2 mm, central, cartilaginous, pruinose to pubescent overall or with base white-fibrillose, apex dark violet-brown, black-sepia or sordid violet-gray, base yellow-brown to pink-cinnamon. **BASIDIA** 15-22 x 4-5 µm, clavate, 4 spored. **CHEILOCYSTIDIA** scattered to abundant, 35-66 x 8-14 (-18) µm, ventricose-subcapitate to fusiform-subcapitate, hyaline. **PLEUROCYSTIDIA** scattered, similar to the cheilocystidia. **PILEIPPELLIS** a cutis with numerous projecting pileocystidia. **PILEOCYSTIDIA** 50-90 x 8-18 µm, similar to the cheilocystidia. **CAULOCYSTIDIA** numerous, similar to cheilocystidia. **CLAMP CONNECTIONS** present. **SPORES** ellipsoid, (4-) 5-7 x 2-3 (-3.5) µm, smooth, hyaline, inamyloid, thin walled.

**Distinguishing Features:** In the field it may look slightly similar to *Omphalina pyxidata* and *Phytoconis ericetorum*, but these species differ in lacking a violaceous cap disc and stem apex, and in lacking conspicuous cystidia on cap, gills, and stem.

**Distribution:** Widespread across northern temperate forests. **CALIFORNIA**, Del Norte Co., Crescent City; **OREGON**, Lane Co., Siuslaw National Forest (SNF), Siltcoos River; **Lincoln Co.**, SNF, Canal Creek; SNF, Five Rivers; **WASHINGTON**, **King Co.**, University of Washington campus; **Pierce Co.**, Mount Rainier National Park (MRNP), Longmire; MRNP, Tahoma Creek; **Snohomish Co.**, Mount Baker-Snoqualmie National Forest, Barlow Pass; Meadowdale.

**Substrate and Habitat:** Locally abundant in small troops on or among mosses under hardwoods.

**Season:** Late summer and autumn.

**References:** Breitenbach, J.; Kränzlin, F. 1991. Fungi of Switzerland. Lucerne, Switzerland: Mycological Society of Lucerne. 361 p. Vol. 3. Kuyper, T. W. 1995. *Rickinella*. In: Bas, C.: Kuyper, T.W.; Nordeloos, M.E.; Vellinga, E.C., eds. Flora Agaricina Neerlandica. Rotterdam, The Netherlands: A. A. Balkema: 157-158. Vol. 3.

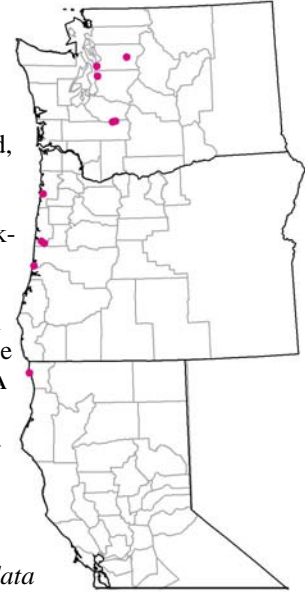


Photo courtesy of Joe Ammirati





*Russula mustelina* Fries

**ROD name** *Russula mustelina*

**Family** Russulaceae      **Morphological Habit** mushroom

**Description:** CAP 8-12 mm in diam., obtusely convex to plano-convex then broadly depressed, often highly irregular, margin undulating, surface smooth to slightly striate or sulcate, varying from yellow to pale brown-yellow to mottled red and yellow or varying shades of brown, sometimes with green tones, not bruising. **GILLS** adnate to adnexed, free with age, not forked, white at first, then yellow with age. **STEM** 40-95 mm tall x 20-30 mm wide, equal to clavate, glabrous, solid, compact, white, sometimes bruising pale brown when handled. **ODOR** mild to not distinct. **TASTE** mild to not distinct. **PILEPELLIS** two layered, epicutis a tangled to interwoven layer of hyphae, subcutis of interwoven gelatinous hyphae. **PILEOCYSTIDIA** present although sometimes rare. **CYSTIDIA** rare to numerous, 51-107 x 7-14 µm, fusoid to cylindric with obtuse apices or a narrow, elongated, terminal appendage. **SPORES** subglobose to subvoid to subellipsoid, 7-6-10.5 x 6.5-9 µm, ornamentation of low isolated warts, heavy ridges and fine lines, sometimes forming a broken reticulum, thin walled, spore print creamy to yellow.

**Distinguishing Features:** *Russula mustelina* is characterized by the compact almost hard stem, yellow-brown cap that can often have red, yellow, or green tones.

**Distribution:** Endemic to western North America. **CALIFORNIA**, Siskiyou Co., Shasta-Trinity National Forest (STNF), Mount Shasta Recreation Area, Sand Flat; STNF, Carter Meadows, near Callahan; **Trinity Co.**, Klamath National Forest, Gray Falls campground.

**Substrate and Habitat:** Scattered to gregarious in montane coniferous forests, particularly with *Abies* spp.

**Season:** Early autumn.

**Reference:** Thiers, H.D. 1997. The Agaricales (gilled fungi) of California. 9. Russulaceae I. Eureka, CA: Mad River Press. 158 p.

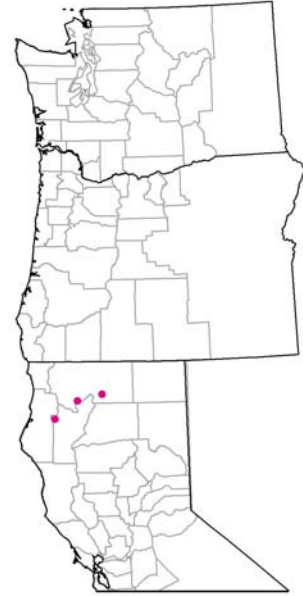


Photo courtesy of Eugene Butler

## *Sarcodon fuscoindicum* (K. Harr.) K. Harrison

**ROD name** *Sarcodon fuscoindicum*

**Family** Hydnaceae

**Morphological Habit** tooth fungus

**Description:** CAP 40-180 mm in diam., convex to plane or centrally depressed, at first smooth, cracking to form scales in age, violet-black to blue-black, or black, margin wavy, somewhat paler or more purple. **CONTEXT** firm but brittle, deep slate-purple or violet.

**SPINES** 2-6 (15) mm long, usually decurrent, deep violet to deep blue-violet to deep lavender, tips usually paler or lilac. **STEM** 20-100 mm long, 10-20 mm thick, equal or tapered below, central or off-center, concolorous with spines. **ODOR** mild to somewhat farinaceous or cinnamonlike. **TASTE** indistinct. **BASIDIA** 40-45 x 4-7  $\mu$ m, clavate, 4 spored. **CYSTIDIA** absent.

**SPORES** subglobose to ellipsoid, angular-nodulose, coronate, 6.3-7.5 x 5.3-6.3  $\mu$ m, inamyloid, acyanophilic, spore print brown.

**Distinguishing Features:** *Phellodon atratus* is blue-black, much smaller and tougher. *Hydnum cyanellum* has similarly colored cap, but paler context, cinnamon-brown spines with white tips, and a bitter taste. *Sarcodon fulgineo-violaceum* has a vinaceous-brown cap, brown or cinnamon-brown spines, gray context in stem base, and an acrid taste. *Sarcodon rimosus* has vinaceous-brown to vinaceous-tan cap rather than deep purple.

**Distribution:** Endemic to western North America. **CALIFORNIA**, Del Norte Co., Six Rivers National Forest, Smith River National Recreation Area, Dry Lake trail; Crescent City; **Mendocino** Co., 8 km east of Fort Bragg; **Napa** Co., near Calistoga; **OREGON**, **Clackamas** Co., Mount Hood National Forest (MHNF), Little Crater Lake; MHNF, Mile Bridge; Bureau of Land Management (BLM), Cascades Resource Area, Pine Rockcut on Molalla River corridor; MHNF, Salmon River, Wapinita Hwy.; MHNF, Still Creek; MHNF, Douglas trail; **Douglas** Co., BLM, north Myrtle Creek; Reedsport area; **Hood River** Co., MHNF, Hood River Ranger Station; **Josephine** Co., Takilma; **Lane** Co., Willamette National Forest (WNF), Lost Creek; **Linn** Co., WNF, 3.2 km northwest of Crescent Mountain; WNF, Hensley Creek; WNF, Moose Creek; **WASHINGTON**, **Chelan** Co., Wenatchee National Forest (WENF), Swauk Pass; **Clallam** Co., Olympic National Park (ONP), Elwha River; ONP, Mount Angeles; Olympic National Forest, Mount Storm King; ONP, Olympic Hot Springs; **Island** Co., Langley, Whidbey Island; Useless Bay, Whidbey Island; **King** Co., Mount Baker-Snoqualmie National Forest (MBSNF), Stampede Pass; **Kitsap** Co., Bremerton; **Lewis** Co., Gifford Pinchot National Forest (GPNF), La Wis Wis campground; Mount Rainier National Park (MRNP), Ohanapecosh entrance; **Mason** Co., Mason Lake, Shelton area; south of Oak Patch Lake; **Pierce** Co., MRNP, Lower Tahoma; **Skagit** Co., MBSNF, Easy Pass trail; **Skamania** Co., GPNF, Pacific Crest Trail; Mount St. Helens National Volcanic Monument, Spirit Lake; **Yakima** Co., WENF, Rimrock Lake.

**Substrate and Habitat:** Scattered to gregarious on soil.

**Season:** Autumn and winter.

**Reference:** Arora, D. 1986. Mushrooms demystified. Berkeley, CA: Ten Speed Press. 959 p.

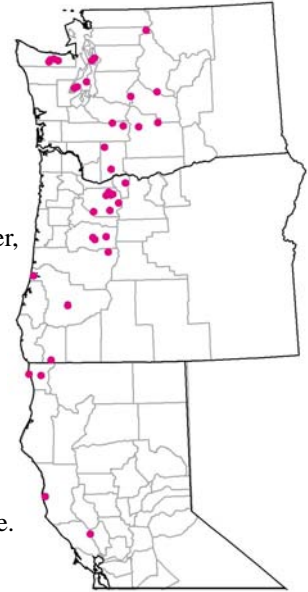


Photo courtesy of David Arora

*Sarcodon imbricatus* (L.) Karst.

**ROD name** *Sarcodon imbricatus*

**Family** Hydnaceae

**Morphological Habit** tooth fungus

**Description:** CAP 50-200 mm in diam., convex to plane or centrally depressed, tan to pale brown or dull red-brown, covered with large, coarse, broad, raised, or shinglelike darker brown to nearly black scales, often upturned in age. **CONTEXT** pale to gray, tan, or brown. **SPINES** 2-15 mm long, slightly decurrent, pale brown or gray becoming dark brown in age. **STEM** 40-100 mm long, 15-35 mm in diam., often enlarged below, often hollow near apex particularly with age, central or off-center, some shade of brown. **ODOR** mild, when dry somewhat smoky or chocolate-like. **TASTE** mild to bitter. **BASIDIA** 50-55 x 6.7-8 µm, clavate, 4 spored. **CYSTIDIA** absent. **CLAMP CONNECTIONS** absent. **SPORES** ellipsoid to subglobose, tuberculate, apiculate, 6.0-7.2 x 4.7-6.7 µm, inamyloid, acyanophilic, spore print brown.

**Distinguishing Features:** *Sarcodon imbricatus* is similar to *Sarcodon scabrosum*, but the latter has an olive-black stem and less scaly cap.

**Distribution:** Widely distributed. **CALIFORNIA**, Del Norte Co., Crescent City; **Mendocino** Co., Jackson State Forest, Aleuria Glen; **Shasta** Co., Lassen Volcanic National Park; **Siskiyou** Co., Klamath National Forest, Duck Lake trailhead; **Tehama** Co., Lassen National Forest (LNF), Gurnsey Creek campground, Hwy. 89; LNF, Mineral Ranger Station, Mineral area; Mineral; **OREGON**, **Benton** Co., Siuslaw National Forest (SNF), Mary's Peak, Woods Creek Rd.; **Clackamas** Co., Mount Hood National Forest (MHNF), east fork of Salmon River; MHNF, Mile Bridge; MHNF, Still Creek; MHNF, Twin Bridges; MHNF, west of Wapinita Summit, Cascades; **Curry** Co., Siskiyou National Forest, 2 km northeast of Wildhorse Lookout; **Deschutes** Co., Deschutes National Forest (DNF), southeast shore of Cultus Lake; DNF, Six Lakes trail; **Douglas** Co., Umpqua National Forest, Clearwater River; **Hood River** Co., MHNF, Hood River Ranger Station; **Jackson** Co., Rogue River National Forest, Union Creek campground; **Jefferson** Co., Breitenbush Lake; **Josephine** Co., Takilma; Grants Pass; **Klamath** Co., Bureau of Land Management (BLM), Klamath Falls Resource Area, 1.6 km west of Surveyor Peak; Winema National Forest (WINF), 3.2 km north of Blue Springs; WINF, 4.8 km northeast of Sevenmile Marsh; WINF, about 0.8 km east of Odessa campground; WINF, Clover Creek; WINF, Crater Lake south entrance; WINF, Four Mile Creek; WINF, Pothole Butte; WINF, Spenser Creek; BLM, Klamath Falls Resource Area, east Miner's Creek; **Lane** Co., Willamette National Forest (WNF), Mule Prairie area, Willamette Hwy.; SNF, Siltcoos Lake; WNF, Waldo Lake; WNF, McKenzie Pass; SNF, Woahink Lake; near Florence; north of Florence; **Linn** Co., WNF, 1.6 km east of Lava camp; **Marion** Co., WNF, 1.6 km south of Whetstone Mountain; **Multnomah** Co., MHNF, Mount Wilson, Multnomah Falls; **Tillamook** Co., Camp Meriweather; BLM, Tillamook Resource Area, north of Sand Lake; BLM, Tillamook Resource Area, Sand Lake; Cape Lookout, Sandlake dunes; Pacific City sand dunes; **Wasco** Co., MHNF, Frog Lake; **WASHINGTON**, **Clallam** Co., Olympic National Park (ONP), North Fork trailhead; ONP, Olympic Hot Springs; **Grays Harbor** Co., Ocean City State Park, Copalis Crossing; **Kittitas** Co., Cooper Lake; Easton Knoll; Wenatchee National Forest, Swauk campground; **Lewis** Co., Mount Rainier National Park (MRNP), 2.6 km from Stevens Canyon entrance; **Okanogan** Co., Okanogan National Forest (OKNF), Cow Creek; OKNF, Pasayten Wilderness, east fork of trail, by shelter; OKNF, Pasayten Wilderness, Pasayten River trail; OKNF, Pasayten Wilderness, south of Big Hidden Lake; OKNF, Pasayten Wilderness, Stub Creek trail; **Pierce** Co., MRNP, Emmons terminal moraines; **Skagit** Co., Mount Baker-Snoqualmie National Forest, Easy Pass trailhead; **Skamania** Co., Gifford Pinchot National Forest (GPNF), 3.2 km east of Middle Butte; GPNF, Forlorn Lakes; GPNF, Takhlakh campground.

**Substrate and Habitat:** Solitary to gregarious on ground in woods.

**Season:** Late spring through winter.

**Reference:** Arora, D. 1986.

Mushrooms demystified.

Berkeley, CA: Ten Speed Press. 959 p.

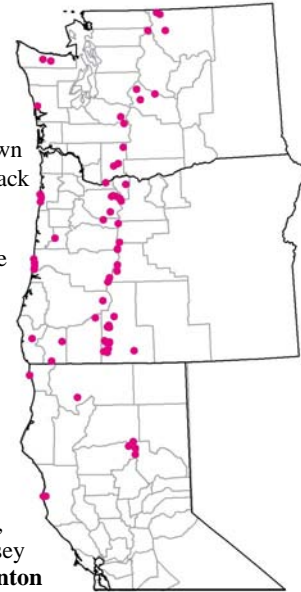


Photo courtesy of David Pilz



Photo courtesy of Steve Trudell

## *Sarcosphaera coronaria* (Jacquin) Richon

**ROD name** *Sarcosphaera crassa*

**Family** Pezizaceae

**Morphological Habit** cup

**Description:** **SPOROCARPS** cupulate, usually exceeding 30 mm in diam. at maturity and are often up to 180 mm, young sporocarps are closed or nearly so, pale gray, glabrous, hollow spheres with a small whiter, softer area on the upper side that develops into an opening. **STEM** short, broad. **SPORE-BEARING SURFACE** pale gray to slightly lavender or purple gray, and the exterior is gray-white and unornamented. **ASCI** amyloid. **SPORES** ellipsoid, 15-22 x 7-9  $\mu\text{m}$ , hyaline, smooth to minutely verrucose.

**Distinguishing Features:** The amyloid asci, smooth to minutely verrucose spores, and pale gray to purple gray sporocarps are distinct.

**Distribution:** Widespread across northern temperate forests in North America and Europe. Known from many dozens of locations throughout the range of the Northwest Forest Plan.

**Substrate and Habitat:** Solitary to clustered, on ground in duff or beneath the surface of the ground in soil under coniferous forests.

**Season:** Spring through autumn.

**Reference:** Tylutki, E.E. 1979. Mushrooms of Idaho and the Pacific Northwest, Discomycetes. Moscow, ID: University Press of Idaho. 133 p.

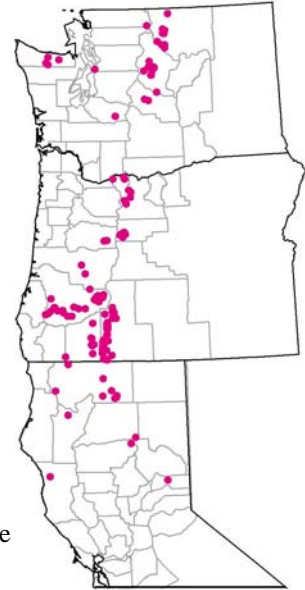


Photo courtesy of Survey and  
manage mycology team



*Sparassis crispa* Wulfen:Fries

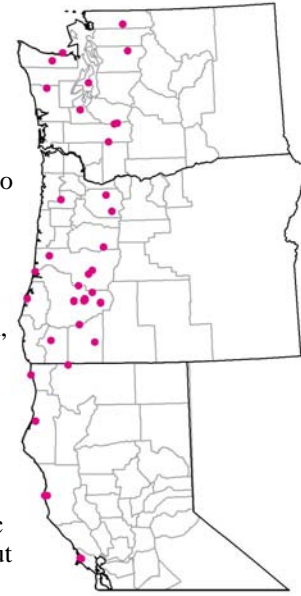
**ROD name** *Sparassis crispa*

**Family** Sparassidaceae

**Morphological Habit** cauliflower

**Description:** **SPOROCARPS** annual, arising from a perennial, elongated, hypogeous pseudosclerotium as a rounded mass of many anastomosing and subdivided, horizontal to vertical petaloid branches with thin, wavy margins, 100-300 mm in diam. x 100-200 mm tall, cream yellow to yellow-brown overall, base darker brown. **PSEUDOSCLEROTIUM** a mass of soil and humus held together by white mycelium, 200-700 x 50-100 mm, attached to roots of living or dead conifers, rarely lacking a pseudosclerotium and then attached to dead wood. **ODOR** strong, somewhat disagreeable or like smoked bacon. **BASIDIA** 40-60 x 4-8  $\mu$ m, clavate, 4 spored. **CYSTIDIA** absent. **CLAMP CONNECTIONS** present. **SPORES** ellipsoid, 5-7 x 3-5  $\mu$ m, smooth, hyaline, inamyloid, spore print white.

**Distinguishing Features:** Because of its large size, conspicuous morphology and esculent properties, *Sparassis crispa* is a well-known species and one that has been illustrated in nearly every North American field guide published to date. Many of these reports list the species as *S. radicata*. It is encountered nearly every season in the Pacific Northwest but usually is represented by a single sporocarp; the species is widespread but locally rare. *Sparassis crispa* is characterized by the large cauliflowerlike sporocarps with clustered, flattened, curly, cream to yellow-brown, erect branches arising from a long, buried "stem." It is the only species of *Sparassis* that occurs in the Pacific Northwest.



**Distribution:** Widespread in North America and Europe. **CALIFORNIA**, Del Norte Co., Crescent City; **Humboldt Co.**, Wallace Appleton Property, Bayside; **Marin Co.**, Golden Gate National Recreation Area, Inverness; Tomales Bay State Park; **Mendocino Co.**, Jackson State Forest (JSF), Aleuria Glen; JSF, Jug Handle Creek Farm; **Siskiyou Co.**, Rogue River National Forest, Red Buttes Wilderness, trail 954; **OREGON**, **Clackamas Co.**, Bureau of Land Management (BLM), Cascades Resource Area, north fork of Eagle Creek; Mount Hood National Forest; **Coos Co.**, Coos Bay, south of Coos Bay; **Douglas Co.**, Umpqua National Forest (UNF), 1.6 km southeast of Cougar Bluffs; UNF, Lookout Mountain; UNF, near Emile Shelter; UNF, 0.8 km southwest of Reynolds Butte; BLM, 1.6 km west of Burnt Mountain; UNF, 2.4 km northwest of Dog Prairie; BLM, near Jim Creek; UNF, Threehorn Mountain; Lake Tahkenitch; **Jackson Co.**, BLM, Butte Falls, 1.2 km southwest of Buck Point; **Josephine Co.**, Siskiyou National Forest, Big Pine campground; **Lane Co.**, UNF, 4.8 km southeast of June Mountain; Siuslaw National Forest, Indian Creek; Willamette National Forest (WNF), Lookout Point Reservoir; **Linn Co.**, WNF, H.J. Andrews Experimental Forest, 2.4 km northeast of Quentin Knob; **Yamhill Co.**, BLM, Tillamook Resource Area, 0.8 km north of Stoney Mountain; **WASHINGTON**, **Clallam Co.**, Olympic National Park (ONP), Elwa drainage, near Boulder Creek; ONP, Olympic Hot Springs; **Grays Harbor Co.**, Olympic National Forest, Lake Quinault; **Kitsap Co.**, Bremerton; **Lewis Co.**, Quartz Creek, Big Tree area; **Pierce Co.**, Mount Rainier National Park (MRNP), Longmire; MRNP, Lower Tahoma Creek; **Snohomish Co.**, Mount Baker-Snoqualmie National Forest (MBSNF), 3.2 km southwest of White Chuck Mountain; **Thurston Co.**, Olympia; **Whatcom Co.**, MBSNF, Noisy Creek trail near Baker Lake.

**Substrate and Habitat:** Solitary, typically within 2 m of the base of a living coniferous tree (*Pseudotsuga*, *Pinus*).

**Season:** Autumn.

**References:** Breitenbach, J.; Kränzlin, F. 1986. Fungi of Switzerland. Lucerne, Switzerland: Mycological Society of Lucerne. 412 p. Vol. 2. Miller, O.K., Jr. 1972. Mushrooms of North America. New York: E. P. Dutton and Co. 360 p.



## *Spathularia flavida* Persoon

**ROD name** *Spathularia flavida*

**Family** Geoglossaceae      **Morphological Habit** club

**Description:** **SPOROCARP** fleshy, erect, stipitate, 20-80 mm tall, divided into fertile fan-shaped head and distinct stem. **SPORE-BEARING TISSUE** spathulate, compressed, fan-shaped, irregularly furrowed, decurrent on both sides of stem, one-half to two-thirds the height of the sporocarp, yellow-tan to bright yellow. **STEM** tapering towards the base, white, smooth to slightly furfuraceous. **ASCI** 100-125 x 11.5-14  $\mu$ m, inamyloid, clavate, 8 spored. **PARAPHYSES** slender, compound, tips spiralled and bent. **SPORES** narrowly clavate to broadly filiform, 35-65 x 2-3  $\mu$ m, hyaline, multiseptate with scattered oil droplets, arranged parallel within asci.

**Distinguishing Features:** *Spathularia velutipes* is distinct from *S. flavida* in possessing spore-bearing tissue that is slightly duller in color and a stem that is brown and velvety. *Spathularia rufa* is more similar to *S. flavida* but reportedly differs by possessing a flat, pale yellow-brown spore-bearing tissue and smaller spores (49-52 x 1.5  $\mu$ m).

**Distribution:** Widespread in northern temperate forests. **CALIFORNIA**, Del Norte Co., Crescent City; **Glenn Co.**, Mendocino National Forest (MNF), 1.6 km north of Dixon Orchard; Lake Co., MNF, 1.6 km northeast of Horse Mountain; **Marin Co.**, Bolinas Ridge; **Trinity Co.**, Shasta-Trinity National Forest, near Weaverville; **OREGON**, **Benton Co.**, Siuslaw National Forest, Mary's Peak, Woods Creek Road; Oregon State University, Peavy Arboretum; Denison Farm; **Douglas Co.**, Umpqua National Forest (UNF), Mountain Meadow; Bureau of Land Management (BLM), south of Ruby Creek; Hood River Co., southwest end of Lava Beds Geological Area; Jackson Co., BLM, 1.6 km northwest of Thompson Ranch; **Josephine Co.**, Siskiyou National Forest, 25 Rd. jct.; BLM, 1.6 km southwest of Little Grayback Lookout; Takilma; **Klamath Co.**, BLM, Klamath Resource Area, 1.6 km southeast of Big Bend; Winema National Forest (WINF), Fourmile Lake; WINF, 3.2 km south of Odessa campground; WINF, 3.2 km east of Great Meadow Sno-Park; **Lane Co.**, UNF, 2.4 km south of June Mountain; UNF, Dinner Ridge; **Wasco Co.**, Mount Hood National Forest, Bear Springs; **Washington Co.**, Gales Creek Forest Camp, 56 km east of Tillamook; **WASHINGTON**, **Clallam Co.**, Joyce; Olympic National Park, Mount Angeles; **King Co.**, Mount Baker-Snoqualmie National Forest, Stevens Pass; **Kitsap Co.**, Bremerton; **Kittitas Co.**, Wenatchee National Forest, Blewitt Pass; **Lewis Co.**, Cispus Environmental Center; **Pierce Co.**, Mount Rainier National Park, Lower Tahoma Creek; **San Juan Co.**, Friday Harbor Biological Station, San Juan Island National Historical Park; **Snohomish Co.**, Lee Forest, near Maltby; **Thurston Co.**, Tenino Mounds.

**Substrate and Habitat:** In clusters or fairy rings on litter or woody debris of conifer and hardwood forests.

**Season:** Summer and autumn.

**Reference:** Arora, D. 1986. Mushrooms demystified. Berkeley, CA: Ten Speed Press. 959 p.

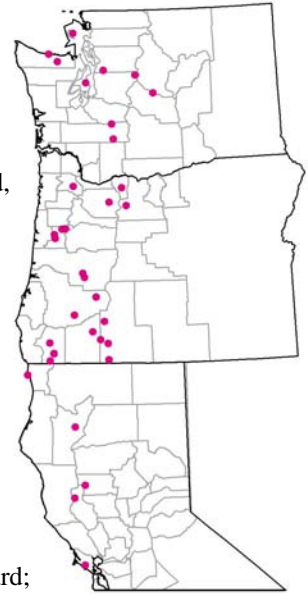


Photo courtesy of Michael Castellano

## *Stagnicola perplexa* (Orton) Redhead & Smith

**ROD name** *Stagnicola perplexa*

**Family** Cortinariaceae      **Morphological Habit** mushroom

**Description:** **CAP** 4-25 mm in diam., campanulate to convex with small broad umbo, marginally translucent-striate when moist, silky when dry, smooth, darker tawny over the disc paling to yellow-brown on the margins. **ODOR** not distinct. **TASTE** slightly to intensely bitter. **GILLS** narrowly attached to seceding, close to crowded, even to minutely eroded edges, yellow-olive, pale olive gray to dull amber, cinnamon brown in age. **STEM** central to slightly eccentric, 15-45 mm long, 0.5-2 mm wide at apex, smooth, pale yellow-brown at apex, darkening to red-brown to black at base, with yellow-brown mycelial tomentum at base. **PILEPELLIS** with brown encrusting pigments, a thin, gelatinized ixocutis consisting of a suprapellis of hyphae, 2-5  $\mu\text{m}$  in diam. over a subpellis of broader layer of yellow-brown, inflated hyphae. **BASIDIA** 15-21 x 5  $\mu\text{m}$ , clavate, hyaline to pale yellow, 4 spored. **PLEUROCYSTIDIA** absent. **CHEILOCYSTIDIA** 25-54 x 5-7  $\mu\text{m}$ , abundant, cylindrical to narrowly fusoid, sometimes forked or once-septate, thin walled, hyaline. **OLEIFEROUS HYPHAE** absent. **CLAMP CONNECTIONS** present. **SPORES** ellipsoid to slightly reniform, 4.5-6 (-6.5) x 3-3.5 (-4)  $\mu\text{m}$ , smooth, subhyaline to pale yellow, inamyloid, slightly thick walled, cyanophilic, spore print brown.



**Distinguishing Features:** *Stagnicola perplexa* is extremely similar in the field to the slightly taller *Mythicomycetes corneipes*, which produces a purple-brown spore print and is easily distinguished microscopically by its lightly roughened spores with an apical beak and the absence of clamp connections. It is also possible that *S. perplexa* could be confused with the larger *Phaeocollybia attenuata*, which has a long, wirelike pseudorhiza, larger, heavily ornamented, limoniform-subglobose spores or *Psilocybe physaloides*, which has an apically enlarged fibrillose stem, dark purple-brown, large spores with a germ pore, and fusoid to lageniform short-necked cheilocystidia.

**Distribution:** Widely distributed across northern temperate forests. **OREGON**, Clackamas Co., Mount Hood National Forest, middle fork of the Salmon River; **Klamath Co.**, Rogue River National Forest, north fork of the Rogue River; **WASHINGTON**, **Chelan Co.**, Mount Baker-Snoqualmie National Forest, Marble Creek forest camp; Wenatchee National Forest, Smith Brook, north of Stevens Pass; **Lewis Co.**, Gifford Pinchot National Forest, Butter Creek; **Pierce Co.**, Mount Rainier National Park (MRNP), Ipsut Creek trail; MRNP, Longmire campground.

**Substrate and Habitat:** Gregarious on rotten wood, occasionally buried deeply enough to appear “rooting” in wet or recently dried-up depressions in coniferous forests.

**Season:** Autumn.

**Reference:** Redhead, S.A.; Smith, A.H. 1986. Two new genera of agarics based on *Psilocybe corneipes* and *Phaeocollybia perplexa*. Canadian Journal of Botany. 64: 643-647.



Photo courtesy of Scott Redhead

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*Tremiscus helvelloides* (DC:Pers.) Donk

**ROD name** *Phlogiotis helvelloides*

**Family** Hydnaceae

**Morphological Habit** stalked polypore

**Description:** CAP 20-80 mm tall x 40-60 mm in diam., flabby to rubbery or firm-gelatinous, spathulate to funnel-shaped or unilateral, erect, substipitate to stipitate, translucent, glabrous, smooth; pale to deep rosy pink, red-orange, apricot or salmon. **SPORE-BEARING TISSUE** smooth or slightly wrinkled, concolorous with or slightly paler than the upper surface. **STEM** 10-60 mm tall, lateral, smooth, glabrous, concolorous. **ODOR AND TASTE** not distinct. **BASIDIA** 14-21 x 10-12  $\mu\text{m}$ , ovoid to oblong, becoming longitudinally septate (cruciate) at maturity, 2-4 spored. **CLAMP CONNECTIONS** present. **SPORES** oblong to elongate-ellipsoid, 10-12 x 4-5 (-6.5)  $\mu\text{m}$ , hyaline, inamyloid, spore print white.

**Distinguishing Features:** *Phlogiotis helvelloides* is an easily identified species because of its deep pink to red-orange, spathulate sporocarps with smooth, concolorous spore-bearing tissue, lateral concolorous stem, rubbery gelatinous texture and cruciate basidia. No other species in the Pacific Northwest is morphologically similar.

**Distribution:** Widely distributed in Northern Hemisphere. **CALIFORNIA**, Del Norte Co., Jedediah Smith Redwoods State Park; **Humboldt Co.**, Humboldt Redwoods State Park; Patrick's Point State Park; Richardson Grove State Park; **Mendocino Co.**, Northern California Coast Preserve, 14.5 km west of Brandscombe; Jackson State Forest, Hwy. 20, Dunlap campground; Hendy Woods State Park; **Siskiyou Co.**, Klamath National Forest (KNF), Carter Meadow near Callahan; KNF, Duck Lake trailhead; KNF, Marble Mount Wilderness, Haypress trail; **OREGON**, **Benton Co.**, Bureau of Land Management (BLM), Mary's Peak Resource Area, South Creek, south of Beaver Creek seed orchard; Oregon State University, Peavy Arboretum; Beldon Creek drainage; Corvallis; Denison's Belden Creek; **Clackamas Co.**, Mount Hood National Forest, Salmon River; **Coos Co.**, BLM, Watertank Creek; **Douglas Co.**, BLM, Swiftwater Resource Area, south of Yellow Creek Mountain; BLM, South River Resource Area, north of Lane Mountain; BLM, South River Resource Area, 3.2 km west of Chimney Rock; BLM, Swiftwater Resource Area, 8 km east of Green Mountain; BLM, Boulder Creek; BLM, Buck Creek; BLM, Buck Spring; BLM, Elk Creek; BLM, north Myrtle Creek; Umpqua National Forest, 18 km southeast of Tiller; off Rd. 3220; **Jackson Co.**, BLM, Butte Falls Resource Area, 3.2 km south of Medco Pond; BLM, Butte Falls Resource Area, 4.8 km northwest of Round Mountain; BLM, past Butte Falls Rd. to 213 Rd.; BLM, Butte Falls Resource Area, Sugar Pine Flat; **Josephine Co.**, BLM, Glendale Resource Area, King Mountain, Board Creek; Josephine Co., Taklima; **Klamath Co.**, BLM, Klamath Falls Resource Area, 6.4 km southwest of Mud Spring; **Lane Co.**, BLM, 3.2 km south of Mount Zion; **Marion Co.**, BLM, Cascades Resource Area, Scotts Mills; **Wasco Co.**, Mount Hood National Forest, Frog Lake; **WASHINGTON**, **Clallam Co.**, Olympic National Park, Boulder Creek; Clallam Co., Joyce; **Grays Harbor Co.**, Olympic National Forest (ONF), Lake Quinault; **King Co.**, Mount Baker-Snoqualmie National Forest (MBSNF), Stampede Pass; **Kittitas Co.**, Wenatchee National Forest (WENF), 3.2 km northeast of Teanaway Butte; WENF, Teanaway Butte; **Lewis Co.**, Gifford Pinchot National Forest, 2.4 km north of Tower Rock camp; **Mason Co.**, ONF, Olympic Mountains, Lake Cushman; **Pierce Co.**, Mount Rainier National Park (MRNP), Longmire; MRNP, Lower Tahoma Creek; **Snohomish Co.**, MBSNF, Barlow Pass; MBSNF, Sloan Creek campground; **Whatcom Co.**, MBSNF, Mosquito Lake, near Maple Falls; **Yakima Co.**, Wenatchee National Forest, D.W. Douglas Wilderness, 1.2 km southeast of Deep Creek campground; WENF, Rimrock Lake.

**Substrate and Habitat:** Solitary or more commonly crowded-caespitose in duff, soil, and rotten wood under conifers.

**Season:** Late summer and autumn, rarely spring.

**Reference:** Arora, D. 1986. Mushrooms demystified. Berkeley, CA: Ten Speed Press. 959 p.

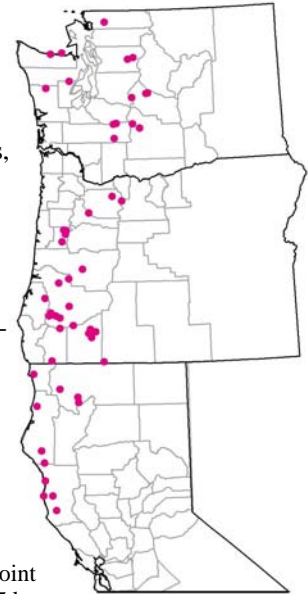


Photo courtesy of George L. Barron