

Blue Mountain National Forests Rare Fungi Information Gathering and Surveys Interagency Special Status Species Program (ISSSP) Project Report

October 14, 2009, Paula J. Brooks

Introduction

There has been very little formal inventory or documentation of fungi on the Blue Mountain National Forests (Malheur, Umatilla, and Wallowa-Whitman National Forests). The few studies that have been done mostly involve morel ecology. The Interior Columbia Basin Ecosystem Management Project (ICBEMP) science reports, and other sources, identified potentially rare mushroom species that may occur in the Blue Mountains. This project used available references to create a list of potentially rare mushrooms that may occur in the Blue Mountain area. Herbarium data on collections for the area were then recorded, and identification aides and photographs were compiled. Ecological information and habitat requirements for potentially rare fungi were also recorded. Initial baseline field surveys were conducted to identify fungi of the Blue Mountain area.

Background

Personnel working on National Forests and Bureau of Land Management lands in the range of the spotted owl have been conducting fungal surveys under the Survey and Management program for the Northwest Forest Plan for many years. Since this plan does not apply to the Blue Mountain National Forests, there has been no Forest Service mandate to document fungal species. The Region Six Sensitive and Strategic rare species list currently includes few fungi for areas east of the Northwest Forest Plan range. Very few academics or amateur mushroom enthusiasts have collected specimens from this area, either. Consequently, little is known about common or potentially rare fungi that occur in the Blue Mountain area.

Methods

This project gathered information on potentially rare mushroom species in the Blue Mountains. It included three main components:

Develop a list of potentially rare mushrooms for the Blue Mountain Area.

Existing reports and information were consulted to develop a list of potentially rare fungi for the Blue Mountain area. Sources consulted include:

Castellano, Michael A. Report on Fungi: Interior Columbia Basin Ecosystem Management Project. USDA Forest Service. 1995. Dr. Castellano compiled several contract reports that were prepared for the ICBEMP.

Fogel, Robert. Fungi from the Columbia River Basin deposited in the University of Michigan Herbarium. Contract report for ICBEMP, USFS, Walla Walla, WA. 1994. This information was summarized and included in the Castellano report.

Weber, Nancy S. Report on Pezizales (Eumycota, Ascomycotina) of the portion of the Columbia River Basin in the United States. Contract report for ICBEMP, Walla, Walla, WA. 1994. This information was summarized and included in the Castellano report.

Oregon Natural Heritage Information Center. Rare, Threatened, and Endangered Species of Oregon. Status list. Portland, OR, March 2007.

Species listed as rare in the ICBEMP reports (defined as having fewer than 12 collections in the Columbia Basin area) with information that they do, or may, occur in the Blue Mountain area were included on the list of potentially rare fungi for the Blue Mountains. All species listed by the Oregon Natural Heritage program on List 1-Rare throughout their range, List 2-Rare in Oregon, and List 3-Review list (species for which there is too little information to make a determination) that are documented in the Blue Mountain area were included on the list of potentially rare fungi for the Blue Mountains.

Gather identification, ecological requirements, and occurrence information for species identified as potentially rare fungal species of the Blue Mountain area.

A web and literature search was conducted to collect information on the potentially rare species identification, photographs, and habitat information. Individual species reports were downloaded from the U.S. Forest Service ISSSP website for some species. Not surprisingly, very little information is available on most of these species.

The author contacted personnel at Boise State University and Washington State University herbaria to document collections of any of the species identified as potentially rare in the Blue Mountain area. In addition, the online herbarium search engine PNW herbaria portal was used to check for specimens from Oregon State University, University of Washington, and the New York Botanical Gardens. The collection information at the University of Idaho currently is not available in a digital form. The U of I staff are in the middle of moving their herbarium, so a visit to search the collection was not feasible at this time.

All collections of the species identified as potentially rare from the following counties were recorded:

OREGON: Baker, Grant, Morrow, Umatilla, Union, and Wallowa.

WASHINGTON: Columbia, Garfield, Walla Walla; also Ferry and Stevens (info for the Colville NF).

IDAHO: Adams, Idaho

Conduct initial baseline fungal surveys in the project area

Fungal surveys were conducted for two days in the Anthony Lakes area of the Elkhorn Mountains in September of 2009. This area was selected for its variety of habitats, elevations, and the availability of the Anthony Lakes Guard Station for a base. Dr. Jack Murphy, a professional mycologist, was contracted to lead this survey effort. Twelve members of the Southern Idaho Mycological Association (SIMA) conducted the surveys. Ms. Genille Steiner (president of SIMA) coordinated logistics for the SIMA volunteers. Paula Brooks and Jerry Hustafa (botanists from the Wallowa Mountain Office of the Wallowa-Whitman National Forest) organized and assisted with the field surveys. In addition, Mark Darrach (botanist from the Umatilla National Forest), Jennifer Ferriell, (associate ecologist for the Blue Mountain Area), and Roger Ferriell (botanist from the Baker District of the BLM) also volunteered their expertise and assistance. The surveyors were sent to pre-determined areas. They were instructed to collect and document all species of mushrooms that they found in their assigned area.

Results

Develop a list of potentially rare mushrooms for the Blue Mountain Area.

The ICBEMP reports and the Oregon Natural Heritage Program data highlight species that have been collected and deposited very infrequently in herbaria. Potentially rare species identified by these sources as either documented or potentially occurring in the Blue Mountain area were compiled and entered into an Access database. Thirty nine species were identified during this process. Of these 39 species, 16 species are *Rhizopogons* (commonly known as truffles). These species grow underground, and are consequently hard to find. See Appendix 1 for the list of potentially rare fungi developed for the Blue Mountain area.

Gather identification, ecological requirements, and occurrence information for species identified as potentially rare fungal species of the Blue Mountain area.

Records for documented collections of all of the 39 potentially rare species in the Blue Mountain area were entered into an Access database. Very few collections for these species are documented for this area.

All of the web and literature information gathered pertaining to identification, photographs, and ecological requirements was printed and saved in notebooks. Pertinent information on habitat, season of fruiting, and other notes were entered into an Access database. All information on documented collections for the Blue Mountain area from the herbaria mentioned above, as well documented sites listed in the references consulted, was entered into the access database. Hard copies of all of this information are being sent to all three Blue Mountain Forests. The Access database will also be forwarded.

Conduct initial baseline fungal surveys in the project area

Baseline surveys were conducted over the weekend of September 25-27th 2009. The surveyors visited a total of 13 sites; they inventoried 150 acres. The sites were selected to include various elevations, and forest communities. All species found at each site were collected; habitat information for each collection was recorded. These species were then identified by the volunteers and Dr. Murphy, with verification by Dr. Murphy.

Even though the weather had been very dry, 178 mushroom collections were identified during the field survey. One collection of each species (107 in total) was then photographed and dried. Location and habitat information about these specimens was entered into an Access data table. The specimens and associated information were then sent to University of Washington herbarium for permanent curation.

Each species found at each site was also recorded in a data table in the Access database. See Appendix 2 for a list of all the species identified. All areas surveyed were entered into the Forest Service Natural Resources Inventory System (NRIS).

Only one species from the list of potentially rare species was collected during this survey. It is the blue chanterelle (*Polyozellus multiplex*). This collection is the first documentation of this species in Grant County. Although this species has been identified as potentially rare, it has been seen by the author three times on the Wallowa-Whitman National Forest (in Baker, Union, and Wallowa Counties). It may be that this species is not actually rare, but instead it is simply rarely sent off to herbariums for curation. The fact that it is a delicious edible may also account for the fact that people have not sent it off for documentation.

One very odd mushroom species was collected on buried conifer wood. Dr. Murphy identified it as *Daldinia grandis*, commonly called cramp balls. He stated that he had only seen this on the east coast. The author has never seen such a mushroom in this area. A specimen was sent to Dr. Jack Rogers, at Washington State University, for confirmation. He is a respected expert in this group. Dr. Rogers confirmed that this is indeed *Daldinia grandis*. He also states that he has usually only seen this on the east coast, and usually only on hardwood wood. Dr. Rogers feels that we should add this species to our list of potentially rare mushrooms for the Blue Mountains.

Only two species of truffles were documented in this survey (neither one on the potentially rare list). Little effort was focused on searching for these cryptic underground species. Most of the people conducting the surveys do not routinely look for these species.

Discussion and Future Opportunities

It is important to note that just because a species has been rarely collected, it is not necessarily rare. The list of 39 potentially rare fungal species in the Blue Mountains provides a starting point for scientists and managers. The identification aides and ecological information gathered as part of this project will be shared with botanists and ecologists throughout the Blue Mountains. Forest Service personnel, and mycologists, can now better document these potentially rare mushroom species in the Blue Mountain area. Information gathered about these species can be used in the future to determine the true rarity of these species.

The surveys conducted with this project provide a start of documentation of the species of fungi in the Blue Mountains. Deposition of the specimens at the University of Washington herbarium will allow future researchers access to the material to conduct genetic analyses and provide better documentation of species distribution and abundance.

The discovery of *Daldinia grandis* highlights the importance of doing basic baseline inventories. If we had only looked for the species listed as potentially rare, this unusual and potentially rare mushroom may have been overlooked. As a result of the complete inventory method, we now can add another potentially rare species to our list from the Blue Mountains.

The surveys conducted for this project were a general baseline survey; they did not exactly follow the protocol used by Forest Service workers in the range of the northern spotted owl. Due to time and funding restraints, only one visit was made to each site. Ideally, each site would have been visited once in the spring or early summer, again in early fall, and a third time in late fall. The areas surveyed have been well documented; it would be possible to revisit the same areas for follow up surveys.

An interesting note is that several of the collections of potentially rare mushrooms are from the Seven Devils area of the Hells Canyon National Recreation Area, in Idaho. This appears to be due to the fact that scientists collected several species of fungi that they described as new species from that area. No additional collections of

many of those species have ever been made. One potential opportunity for future projects would be to attempt to relocate some of the type localities in the Seven Devils Mountains. Several of the species published from the Seven Devils area are truffles. Truffle experts could be recruited to survey the areas where these species were initially collected.

There is widespread concern about how global warming, insects, and disease may be contributing to the decline of white bark pine at high elevations. The white bark pine habitat surveyed for this project was quite dry this year, very few species were found in this habitat. Very little inventory has been done in this high elevation habitat for fungi. Future surveys could focus on these imperiled forests.

Appendix 1: Potentially Rare Mushrooms of the Blue Mountains

Scientific Name

Amanita armillariformis
Amanita prairiicola
Arrhenia lobata
Byssonectria cartilaginea
Cortinarius ponderosus
Galerina diabolissima
Galerina pubescentipes
Gamundia leucophylla
Hebeloma alpinicola
Hebeloma mesophaeum var. subobscurum
Hebeloma vinaceogriseum
Helvella maculata
Hydnotrya michaelis
Leucophleps levispora
Martellia monticola
Morchella semilibera
Pholiota gruberi
Pholiota nigripes
Pholiota obscura
Pholiota subrubrica
Picoa carthusiana
Plectania milleri
Polyozellus multiplex

Scientific Name

Psathyrella sublongipes
Pseudorhizina californica
Rhizopogon abietis
Rhizopogon bacillisporus
Rhizopogon butyraceus
Rhizopogon colossus var. colossus
Rhizopogon deceptivus
Rhizopogon evadens var. subalpinus
Rhizopogon fallax
Rhizopogon kauffmanii
Rhizopogon luteoalboides
Rhizopogon molligleba
Rhizopogon ochraceobrunnescens
Rhizopogon rogersii
Rhizopogon semireticulatus
Rhizopogon subclavitisporus
Rhizopogon subpurpurescens
Rhizopogon subsalmonius var. roseitinctus
Rhizopogon variabilisporus
Sclerotinia veratri
Wynnella silvicola

Appendix 2: Blue Mountain Mushroom Survey 2009
All Species Documented in Survey Areas

<u>Scientific Name</u>	<u>Scientific Name</u>
Agaricus arvensis	Hydnellum aurantiacum
Albatrellus ellisii	Hydnellum suaveolens
Albatrellus flettii	Hydnum repandum
Albatrellus ovinus	Hygrocybe conica
Amanita muscaria	Hygrocybe miniata
Amanita muscaria var. alba	Hygrophorus cf. borealis
Amanita muscaria var. formosa	Hygrophorus chrysodon
Armillaria ostoyae	Hygrophorus erubescens
Bankera fuligineo-alba	Hygrophorus hypothejus
Bankera sp.	Hygrophorus inocybiformis
Boletus edulis	Hygrophorus olivaceoalbus
Catathelasma imperialis	Hygrophorus pudorinus
Catathelasma ventricosa	Hygrophorus purpurascens
Chroogomphus ochraceus	Hygrophorus sp. 1
Chrysomphalina chrysophylla	Hygrophorus sp. 2
Clavariadelphus pistillaris	Hypholoma capnoides
Clavulinopsis fusiformis	Hypholoma fasciculare
Conocybe tenera	Hypomyces lateritius
Coprinus micaceus	Inocybe geophylla
Cortinarius cf. violaceus	Inocybe sororia
Cortinarius semisanguineus	Inonotus tomentosus
Cortinarius sp. 1	Laccaria laccata
Cortinarius sp. 2	Laccaria proxima
Cortinarius traganus	Laccaria pumila
Daldinia grandis	Lactarius deliciosus
Fomitopsis pinicola	Lactarius resimus
Fuscoboletinus ochraceoroseus	Lactarius rufus
Galerina heterocystis	Leccinum scabrum
Gleophyllum sepiarium	Lentinus ponderosus
Gomphidius glutinosus	Lycoperdon foetidum
Gomphidius subroseus	Lyophyllum decastes
Gyromitra infula	Mycena rosella
Helvella elastica	Neolentinus ponderosus
Helvella lacunosa	Oligoporus leucospongia
Hemimycena sp.	Paxillus panuoides

Appendix 2: Mushroom Species collected in Anthony Lakes Surveys 2009

Scientific Name

Phlogiotis helvelloides
Pholiota astragalina
Pholiota squarrosa
Pluteus cervinus
Polyozellus multiplex
Polyporus badius
Psathyrella spadicea
Psilocybe squamosa
Ramaria sp.
Rhizopogon albidus
Rhizopogon ochraceobrunnescens
Rozites caperata
Russula adusta
Russula albonigra
Russula brevipes
Russula densifolia
Russula emetica
Russula fragrantissima

Scientific Name

Russula rosacea
Russula xerampelina
Sarcodon imbricatus
Scutellinia scutellata
Stropharia hornemannii
Stropharia squamosa
Suillus brevipes
Suillus cavipes
Suillus flavidus
Suillus tomentosus
Tricholoma aurantium
Tricholoma cf. saponaceum
Tricholoma flavovirens
Tricholoma focale
Tricholoma pardinum
Tricholoma vaccinum
Tricholoma virgatum
Tricholomopsis cf. decora
Xeromphalina campanella

Appendix 3: Photos from Anthony Lakes Surveys 2009



Figure 1: Anthony Lakes September 2009 survey crew



Figure 2: Identifying fungal collections

Appendix 3: Photos from Anthony Lakes Surveys 2009



Figure 3: Every collection was photographed



Figure 4: Every collection was dried for future curation



Figure 5: Keeping the 178 collections organized



Figure 6: Collection of *Daldinia grandis*



Figure 7: Collection of *Polyozellus multiplex*