

UNIVERSITY OF CENTRAL OKLAHOMA

NATURAL HISTORY MUSEUM

(UCONHM)



DEPARTMENT OF
Biology
UNIVERSITY OF
CENTRAL OKLAHOMA

FUNGI SPECIMEN PRESERVATION & PREPARATION POLICIES & GUIDELINES

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PROCEDURES FOR COLLECTION/PRESERVATION OF MUSHROOM-TYPE FUNGI

The commentary which follows on the collection and preservation of fleshy fungi pertains to mushroom-type fungi, bracket fungi and other fleshy Basidiomycota and fleshy Ascomycota. Procedures for collecting and preserving other groups of fungi can be found in Wu et al., 2004.

1. Equipment and collecting

Starting or maintaining a fungus herbarium begins with field work – the collection of specimens in nature. Proper collection and care of specimens while in the field is requisite for having specimens that are suitable for research and long-term storage. A few recommendations are given for collecting specimens.

Before collecting mushrooms, obtain permission to collect on the property. This is particularly true for private property, city, state and national parks or other governmental properties such as national forests. State or federal permits may need to be obtained ahead of time. No species of wild fleshy fungi are endangered so collecting in that sense is not restricted. Over-harvesting for consumption is a concern in some parts of the county but is not usually an issue when collecting for research.

Once collected, specimens need to be transported in a way that minimizes damage. A picnic-style basket is useful for carrying specimens. A cardboard box will work except when it rains. Canvas or synthetic shopping bags work well and are easy to pack for traveling. Backpacks are not suitable except in an emergency because the specimens tend to weight each other down and they may get crushed. Clear plastic tackle boxes that are divided into small compartments are also good for holding smaller specimens. Another option is to use Tupperware®-like containers in which to place specimens. Other materials needed include wax paper or heavy duty aluminum foil, a knife, hand lens; GPS unit and/or compass, and whistle. Most serious mushroom collecting is done in forested areas where there is a chance of getting lost or

separated from others. A compass and whistle or useful in this case.

Most mushrooms occur on the soil, but they may also occur on wood, leaf litter, dung, compost or bark. When collecting a mushroom-type fungus, be sure to get the entire base. Dig down in the soil with a finger or knife in order to extract the mushroom with base intact. Some genera of fungi have a volva or other basal features and just pulling on the mushroom to remove it may result in the loss of these features. Any soil or other debris clinging to the base can be removed. For fungi occurring on wood, use a knife to remove the fruiting bodies. Wood does not have to remain attached to the specimen; however, a little wood packed with the specimen is a reminder of the substrate.

Collect numerous fruiting bodies especially if the specimens are small. It is important to obtain all stages of development because morphological features may change with maturity. Wrap them in wax paper, aluminum foil or use a small container and place them in the collection basket. Note the substrate where the fungus occurred - on wood, sticks, soil, leaf litter, etc. It might be wise to write down on a slip of paper the substrate and include it with the collection. Photographs taken *in situ* will be helpful for later identification. In addition to substrate, information on habitat is important to note. At the very least, the general forest type should be noted, e.g., mixed hardwoods, mixed oak/hickory forest, pine forest. Most helpful is to note all of the tree species in the forest area. Even for mushrooms collected on lawns, there may be important mycorrhizal tree species nearby. During hot weather, specimens should not be left in a hot car because this will hasten decomposition. A cooler with ice will help keep the specimens fresh when travelling long distances.

Processing fresh collections.

Fungi are preserved by drying which alters the overall appearance of the mushrooms such as their shape, color and surface features. For this reason, it is necessary to record the morphological data immediately upon returning to the laboratory. See the appendix for guidance on how to take notes and

most field guides provide a summary of the morphological features that are of taxonomic value. Use notebook paper or index cards to record the data or the information can be placed on the field label. The morphological data can be kept with the collection or stored separately.

It is customary to assign a catalogue number to each collection. This is a personal collection number or one assigned using the institutional cataloguing system. In a log book, the collection number is assigned along with the binomial (if known), locality data and the date. Each collection also has a field label made of a small piece of paper. Each label includes the collection number, genus and/or species (if known), location – state, county, town, street, if rural be as specific as possible; GPS coordinates if available; growth habit; substrate; date and collector.

Once the morphological notes are recorded and additional photos are taken, the mushrooms are dried for preservation and storage. Specimens are dried over warm circulating air (40-50 C) such as on the racks of a typical herbarium plant dryer. Large fruiting bodies need to be sliced or quartered to allow for complete drying. Failure to do this will cause the mushroom to rot within before it has dried. The field label should accompany the specimens on the dryer. Food dehydrators work quite well for drying and are especially useful because of their portability when travelling. The length of time need for drying depends upon the size of the specimens and the temperature, but overnight is usually sufficient. The specimens should be dry and crisp. If they feel a little spongy they are not yet dry. Silica gel can be used for drying smaller specimens. Once dry, the specimens can be placed in herbarium boxes or for temporary storage in zip-lock bags. Prior to storing in the herbarium the specimens are frozen at – 40 C, 72 h for pest control.

Fungus collections are kept in the same metal cabinets which house vascular plants. Fleshy fungi, however, are not pressed, rather they are stored in various sized boxes. Boxes constructed of acid-free paper are recommended. A final specimen label is made on acid-free paper and is included in the box along with the field label and notes. The final label includes all of the collection information on the field label as well as the binomial, authority and determiner. A label is also placed on the box cover but does

not necessarily repeat all of the information of the internal label. The small boxes are placed in a larger bin box that is the exact size of the cabinet's compartments.

Specimens are arranged in cabinets based on the current accepted classification scheme of the particular groups, and classifications seem to be constantly changing as a result of the molecular work. For fleshy fungi, a good reference for classification is the Dictionary of Fungi (Kirk et al., 2008). The cabinets and bin boxes within are arranged and labeled based on the hierarchy of the classification system.

Databasing

Collections deposited in the herbarium should be entered into a database such as Excel. All information on the collection label should be entered for both determined and indetermined collections. Access to this database is limited to the herbarium staff. Determined collections are also entered into a database program that can display records online. The release of records for online access is done at the discretion of the curators.

Loans

Herbarium collections are a potential resource for scientists world-wide. A loan form is used for documenting the collections that are sent. Two copies are included with the loan being sent and one is signed and returned by the borrower; a third copy is kept in a three-ring notebook as a record of the shipment. The specimens within each individual box are wrapped in tissue to prevent fragmentation during shipping. The borrower should obtain permission for destructive sampling such as the use of tissue for molecular sequencing. When returned, each collection should be annotated by the borrower. Collections that UCO receives on loan should be safely stored in a herbarium cabinet and the loan form kept with the collections or in a three-ring notebook.

Personnel involved

Fungus collections will be added to the herbarium through field work carried out by faculty, undergraduate and graduate students, and from collections received as gifts. Curation of collections will be done by the Collections Manager and student assistants.

Visitors

Visitors to the Museum will sign a guest book.

Annual report

Each year a report will be generated over the activities of the mycological herbarium and be submitted to the Museum Collections Manager.

References

Kirk, PM, Cannon, PF, Minter, DW, Stalpers, JA. 2008. Ainsworth & Bisby's dictionary of fungi. 10th ed. Wallingford (UK): CAB International. 771 p.

Wu Q, Thiers BM, Pfister, DM. 2004. Preparation, preservation, and use of fungal specimens in herbaria. In: Mueller, GM, Bills, GF, Foster, MF, eds. Biodiversity of fungi: inventory and monitoring methods. London: Elsevier Academic Press. p. 23-36.