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Making Scientific Vouchers of North American Macrofungi: How Documenting the Fungi You Encounter Contributes to the Mycoflora of North America

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This article summarizes the content presented at a workshop that was held at the 2012 NAMA foray at Scotts Valley, California on how to prepare scientific macrofungi specimens that will add meaningfully to our nationwide resource of specimens and will therefore contribute to the effort to create a Mycoflora of North America. The workshop included demonstrations and discussions, as well as a number of documents that go into great detail about the various activities that are involved in making scientific collections. All of these documents are available for review and download through the MycoPortal website (<http://mycoportal.org/portal/misc/links.php>). A list of supplies and equipment mentioned in the following account are provided in a list at the end of this article.

Because we can only detect fungi when they have produced a conspicuous spore-bearing structure, which we recognize as a mushroom, puffball, conk, or cup fungus and because these structures are often ephemeral, despite 150 years of collecting efforts, we still do not have a comprehensive resource that can tell us which fungi grow where on a continental or even a regional scale. At a July 2012 workshop, a large group of professional and citizen mycologists (<http://northamericanmycoflora.org/group.html>) met to discuss the need for a North American Mycoflora (<http://northamericanmycoflora.org/>) and how the project might be implemented. The Mycoflora would contain descriptions of all known macrofungi. It would provide online identification tools and downloadable content, distribution maps, links to macroscopic and microscopic images, and links to nucleotide sequences as well as phylogenetic trees. However, completing it will require both more field and lab-based research, and will require participation by professional researchers as well as citizen mycologists. A critical element in creating a Mycoflora is establishing well-documented voucher collections from throughout North America.

The North American Mycoflora must be based on verifiable information, which means that occurrences of fungi must be documented by voucher specimens and whenever possible by DNA samples. Several factors suggest that now is the right time for such an effort. Citizen mycologists are strongly networked, and either individually or through their club organizations, regularly survey their areas for new and unusual macrofungi, and share their findings through checklist projects and social media applications such as Mushroom Observer (<http://mushroomobserver.org>). Gene sequencing has revolutionized our understanding of how macrofungi are related to one another, and has become routine and consequently far less expensive than when the technology first emerged. In 2012, the National Science Foundation funded a project that will allow 35 U.S. institutions to digitize and share data from their dried fungal collections, through a data portal called the Mycology Collections Portal (<http://mycoportal.org>) (or MycoPortal (<http://mycoportal.org>)) through which users can search among about 1.2 million specimen records, images of living fungi, field notes, and checklists from

particular regions, and even keys to species, in some cases. Although considerable resources already exist for the Mycoflora, areas of North America are still rather poorly collected, and even in well-collected areas, our knowledge of the fungal diversity is constantly changing. Thus, we continually need additional information about those unusual or surprising fungi that you encounter. One way to contribute to this is to make well-documented collections, and then share the information from these collections with the mycological community.

The Citizen Mycology community already has a strong tradition of making scientifically valuable collections. For example, the Sam Mitchel Herbarium of Fungi of the Denver Botanic Gardens (<http://www.botanicgardens.org/research-conservation/sam-mitchel-herbarium-fungi>) was built largely through the efforts of Dr. Sam Mitchel, a Denver physician, who devoted his leisure time over many years to the study of fungi in the Rocky Mountain region, and amassed one of the most thoughtfully and thoroughly curated mycological herbaria in the country. NAMA has an herbarium too — it is housed at the Field Museum, and is actively managed by Dr. Patrick Leacock. The foundation of the herbarium of the College of the Atlantic in Bar Harbor, ME is the collections of Walter Litten. Mr. Litten, a former physicist and technical writer for Eastman Kodak, was a self-taught mycologist, a member of the North American Mycological Association, and editor of *Mcllvainea*, in the 1980s. The Rutgers University Mycological Herbarium (<http://www.rci.rutgers.edu/~white/herbarium/>) is the repository for collections made by the New Jersey Mycological Club (<http://www.njmyco.org/>), and members of that club actively contribute to and manage that collection. All four of these collections are funded as part of The Macrofungi Collections Consortium (<http://www.themacrofungiproject.com/>) (MaCC project (<http://www.themacrofungiproject.com/>)) to digitize their specimens and share their data through the MycoPortal.

Documenting Collections of Macrofungi

The steps outlined below all relate to the two most important aspects of making scientifically valuable collections, namely recording information about the mushroom that will be lost after the specimen is dried, and documenting the place where the collection was made so that others who are interested can either re-find the site to collect additional material, or use the information you provide to help build a profile of the types of condition that this type of mushroom favors for growth.

Gathering the Fungus

For a detailed description of the collecting process, see the document titled, "Recommendations for Collecting Mushrooms for Scientific Study (http://sweetgum.nybg.org/boletineae/collecting_illustrated.pdf)," hereafter referred to as the Halling Guide (http://sweetgum.nybg.org/boletineae/collecting_illustrated.pdf). It is important to gather all the parts of the fungus that are important for determination, even though some of those parts may be underground, e.g., the volva of an *Amanita*, or the radicating stipe of a *Phaeocollybia*. It is also important to collect a range of developmental stages, ideally including buttons, young specimens and mature ones. If possible, capture an image of fungus before you remove it from the substrate, or before you remove it from the habitat. The Halling Guide (http://sweetgum.nybg.org/boletineae/collecting_illustrated.pdf) provides information on how to photograph fungi, and there are many other sources for information on nature photography in general, and photography workshops for beginners are often offered at mushroom forays. For ease in re-finding digital photographs of a particular specimen, it is worth deciding on a scheme for naming the image files (e.g., with your collection number) and storing them (including maintaining a backup file of all images). An image management application like Adobe© Lightroom allows you to store metadata about the images (e.g., name of the fungus, when and where it was collected) that will make it easier to re-find particular images. You will want to make sure you include a reference to any photographs you may have taken with the collection information, in your field book, or on the specimen label (see below).

Documenting the Collection

Describing the collection site. Before you leave the collecting site, be sure to record a description of the physical location as well as the specific habitats of the fungi you collected. Old-time mycologists scorned taking notes in the field, preferring to rely on their memories. However, with a smartphone one can easily capture images or a text or spoken description of a site. The description of the physical location should include the names of the political units that include your site (e.g., state, county, town/township, park or reserve) as well as route numbers and distance from the nearest named place. Whenever possible include the geocoordinates (latitude and longitude) as well. Geocoordinates can be obtained from GPS devices, some cameras, and using online tools such as Google maps. Introduction to Georeferencing (http://mycoportal.org/portal/documents/Georeferencing_manual_for_NAMA.pdf), posted on the MycoPortal site, documents the standard methods for georeferencing biological collections.

Describing the habitat and substrate. It is helpful if you can characterize the type of forest, soil, topography for the collection site, based either on your own knowledge of the area, or by reference to vegetation maps, which can probably be found for the area you are in through a Google search. It is crucial to note the substrate upon which each fungus gathered is growing, e.g., soil, leaf litter,

wood. It is also helpful to note the growth form (solitary, clustered, etc.). The Halling Guide (http://sweetgum.nybg.org/boletineae/collecting_illustrated.pdf) gives the standard terminology for describing habitats and growth forms.

Documenting your collecting trip in a field book. Ultimately all of the information about the fungi you collect and the sites you visit, including collection habitat and locality information, should be recorded in a field book. Although we all create electronic documents whenever possible for the sake of convenience and ease of update, keeping a hardcopy record of your collecting activities, as well as an electronic version is a good idea. The collector's field book is a permanent record that can be used without electricity or Internet connection, and is not subject to loss due to computer failure or software incompatibility. The data in a hardcopy field book cannot easily be deleted or accidentally written over. In essence, the field book is the field mycologist's equivalent to the chemist's lab notebook. Field books of historical collectors have been used to clear up discrepancies or inaccuracies on specimen labels, and to get an insight in to how field biologists conducted research in an earlier age.

Most field mycologists choose a book with a hard cover (not spiral bound, or with pages that are perforated, hole-punched, or removable in any way). Most prefer that the book have lined paper. It is possible to purchase such a book in many places. The Herbarium Supply Co. sells a book specially designed to be used as a field book, featuring a waterproof cover and acid-free paper. However, there are many other possible sources for a suitable product, available at stationery or office supply stores.

Field mycologists usually take their field book on a field trip with them, but often leave it in their work area, along with their dryer, microscope, etc. While actually out in the field, they will write down localities, notes about habit or habitat, on a temporary notepad (often of a small size that can fit in a pocket).

As soon as possible upon returning from the field, record each collection locality visited that day, in chronological order, wherever possible. Use permanent ink when writing in your fieldbook. Record the geographic locality (country, state, county, municipality, if relevant, specific location) and then any vegetation or other habitat data. Number each specimen, taking care not to duplicate numbers used before, by writing a number on each line. Next to the number you will record the name of the fungus (if you know it already), substrate or habit data, and possibly other information, such as an indication of whether or not a photo was taken. You

should then record any macro or microscopic notes and include any related drawings. The collection number is then also copied on to a slip of paper that goes with the specimen to the dryer. It is very easy to duplicate numbers – everyone does this eventually! When this happens, most people will add a suffix, such as "a", "b" or "c".

As you identify your collections record the full name of the fungus in your field book. Add the genus, species and authority, if possible, as well as the name of the determiner and the date of determination, if someone else determined it. Be sure to update your field book with re-determinations if you re-identify your specimen. If one of your specimens becomes a type for a new species, or is used as a voucher in any way, it is useful to note this in your field book next to the entry for that specimen.

You should periodically make photocopies of your field books, or maintain a digital copy that can be printed out in case your field book should be lost. If you donate your collections to an established herbarium, the curator will appreciate a copy of your field book as well. Such items are commonly added to library archives, so please deposit your field book there, if not with an herbarium. Do not throw your field book away if your collections still exist.

Taking notes on specimens. Take notes on the characters that get lost on drying. See the Halling Guide (http://sweetgum.nybg.org/boletineae/collecting_illustrated.pdf) for a detailed explanation of what features to note and how. Ideally these notes are taken electronically, but it is acceptable to write notes by hand, as long as they are legible. Some people find it useful to record information on a form that is pre-printed with the characters to be noted, in order to save time, ensure that characters are not forgotten, and that they are recorded uniformly. Currently the Mushroom Observer only provides a free form notes field, but there are plans to support the forms for recording detailed characters in the near future.

Photographic portrait(s) of the living specimen. These images are generally taken after the field trip, at the time that the notes on the fresh condition are compiled, in order to document those features. See the Halling Guide (http://sweetgum.nybg.org/boletineae/collecting_illustrated.pdf) for tips on specimen portraits.

Preparing Specimens of Macrofungi for Long-Term Storage

Dry the specimen. See the Halling Guide (http://sweetgum.nybg.org/boletineae/collecting_illustrated.pdf) for information on the types of equipment one can use to dry specimens. Be sure to place a small label with each specimen on the dryer that indicates the collector's name and number, and be careful not allow the contents of the drying tray to shift, which might disassociate a specimen

from its dryer label. The dryer label is a temporary item, so there are no stipulations about the type of paper used. The dryer label should be large enough to write the collector name and number legibly, but not so large that it interferes with airflow on the dryer. You may want to freeze your specimens after drying to reduce the chances of insect damage. Freeze drying can be done to help preserve their shape and color, but note that freeze dried fungi are more brittle than air or heat dried specimens, and are more prone to reabsorb moisture.

Make a label for the specimen. The label ideally is printed on acid-free paper, and contains the name of the fungus, where, when and by whom it was collected, including the collector's number. The label might also give a photograph number or the number of a DNA sample that was extracted from it. We recommend using an online tool such as the MycoPortal for generating specimen labels. Mushroom Observer will soon have this capability as well. The data elements needed for the specimen label are:

Name of the fungus. This includes the genus, species, and the authority for the species, e.g.: *Boletus edulis* Fr. Note that neither MycoPortal nor Mushroom Observer require entering the authority — this information is automatically provided upon entry of a recognized genus + species combination.

Name of the determiner of the collection and the date. Some collections are determined right away, others may sit for years awaiting determination; in the latter case, this information cannot be entered right away. Leave space for future determinations and annotations to be added to the label.

Collection locality information. This includes a list of the geographic units of the collection site, in ascending or descending order of size (e.g., country, state, county, municipal unit, road, and offset, or distance from a named place or landmark). Scientific journals usually stipulate that the units be cited in descending order, but Mushroom Observer uses ascending order as the default (registered users can select their preference). If it was not possible to record the geocoordinates and elevation in the field using a GPS device, these values can be obtained from Google maps (see separate document about georeferencing collection localities, posted on the MycoPortal).

Collector name, number and date. This information is critical for re-locating a particular specimen (since the collector and collector combination should be a unique identifier for a specimen), and the collection date is important for documenting when fungi produce mushrooms, which is important for understanding their life cycles, and how climate change may affect life cycles and ultimately fungal health.

Store the specimen. There are two basic strategies for storing your specimens — creating your own personal herbarium or depositing your specimens in an established herbarium. Personal herbaria are more convenient, but can be expensive and difficult to maintain.

In either case, you should store the specimen with the specimen label as well as any spore prints or additional notes you have. If you are creating a personal herbarium, you have some choices to make about how to store the specimens. Traditionally, cardboard boxes are used to store specimens of macrofungi. Usually the specimen label is folded and placed inside the box, along with spore prints, and sometimes hand-written notes. Often the name of the fungus and the collector name, number and some locality information is included on a small label that is glued to the box top. Sources for such boxes are given in the document entitled "Herbarium Supplies, Equipment and Sources (http://mycoportal.org/portal/documents/Herbarium_Supplies_and_Equipment_Sources.pdf)" posted on MycoPortal. Other alternatives are plastic boxes (although if air tight may encourage development of mold, in humid environments), or plastic bags that are zip-locked, or better, heat-sealed, with the label inside.

Most herbaria store sets of specimens (generally grouped taxonomically) into boxes or trays that are sized to fit in the cubbyhole of a herbarium cabinet. Herbaria use special steel cabinets that are specially made for this purpose — they have a seal or gasket to keep bugs and moisture out of the cabinet, and the interior of the cabinet is divided into 20–26 cubbyholes, in which the trays or cubbyhole-sized boxes are placed. Usually the cubbyhole box bears a label that describes the contents, and the herbarium case also bears a label indicating the contents.

Unfortunately, macrofungal specimens are highly susceptible to infestation by the cigar or cigarette beetle (*Lasioderma serricorne*). These can completely destroy all the fungi in a box, and they can move from box to box to eat an entire cubbyhole's worth of specimens. Controlling these pests requires diligence. Freezing is the best and safest way to control infestations. A chest freezer that reaches a temperature of -20F is ideal. Specimens should be frozen for a week, if possible, but at least three days. Specimens should always be frozen before being added to an existing herbarium and any time the specimens are removed from the herbarium for more than a few minutes. Collections should be checked regularly for evidence of beetles, such as damaged specimens, live beetles, or beetle frass. If evidence of insect presence is found, you should freeze the contents of the entire cabinet. To aid in the detection of an infestation, you can buy pheromone traps to monitor the presence of insect pests in a collection – see the Supplies list posted in the MycoPortal.

In humid environments, dried fungi will absorb water and can mold, which will ruin the specimen. It is very important to keep herbarium specimens in a dry area — at the New York Botanical Garden, we keep our fungus herbarium at a relative humidity of about 50%. A room dehydrator will help keep the area dry. Inexpensive humidity monitors are available, and sources are listed in the "Herbarium Supplies and Equipment" list below.

Depositing Specimens in an Established Herbarium. If you don't want to maintain a private herbarium, or when you no longer want to maintain one, it is possible that an established herbarium may be interested in incorporating your collections. Even if you decide to send specimens to an established herbarium, you might want to consider splitting your collections so you can keep some material for comparison with other collections you make. Whether or not an herbarium is interested in taking your herbarium will depend on a number of factors, so when approaching the herbarium, be prepared to provide information about:

1. The size, taxonomic and geographical emphasis of your herbarium.
2. State of curation of your herbarium – do specimens have labels? Are most identified to at least genus? Will you also be depositing copies of notes and images? Are the contents of your herbarium recorded in a database or written catalog?
3. Does the herbarium contain vouchers for newly described species (types) or other studies you or your collaborators have published?
4. Do you want to deposit the herbarium all at once, or over a period of time?
5. Were all of your specimens collected with appropriate permits, where required, and do you have copies of these permits?
6. Do you plan to put any particular conditions on your specimens, e.g., do they have to be kept together, and are there any restrictions on the use of these specimens? [Most herbaria will be reluctant to take herbaria with a lot of conditions, because it is hard to ensure that these can be maintained indefinitely]. If you intend to continue to consult your specimens after you deposit them, be sure to mention this, in order to be sure you will be able to access the collections when you wish.

Sharing Results

There are a variety of ways in which to share the results of your scientific vouchering efforts.

Mushroom Observer (<http://mushroomobserver.org>). The Mushroom Observer website (<http://mushroomobserver.org>) provides an easy way to upload images and notes about what you see. It also has an active community of other mushroom enthusiasts who will answer questions you have and discuss possible ids for collections you have difficulty putting names on. The site currently has a

searchable database of over 300,000 images based on over 100,000 observations. You can indicate if an observation has a herbarium specimen including which herbarium it is in and a unique identification for that herbarium. These identifications are typically a combination of a unique collector identification and the specimen number for that collection. If you have questions about the site please send a comment using the 'Send a Comment' link on any page or by going directly to the 'Email Question of Comment (http://mushroomobserver.org/observer/ask_webmaster_question)' page. The site is entirely open source and written in Ruby on Rails. New developers are very welcome and should contact the webmasters as described above.

The MycoPortal (<http://mycoportal.org/portal/index.php>). To contribute your searchable database of all the collections you have made, you can establish a node in the MycoPortal. The MycoPortal (<http://mycoportal.org>) is the central database for the MaCC project (<http://www.themacrofungiproject.com/>). Eventually it will hold data from about 1.6 million specimens from all the major mycological herbaria in the country, including those that emphasize Citizen Mycologists' collections. The MycoPortal also has features that allow users to create and manage their own herbarium database, including printing specimen labels, and to create on-line publications including checklists, keys and descriptions. Anyone is welcome to use the MycoPortal for their projects. The underlying software that supports data management, manipulation, searching etc. on the portal is called Symbiota (<https://sourceforge.net/projects/symbiota/>). Symbiota is currently in use for a variety of collaborative projects: SEINet Home - Southwest Biodiversity Consortium (swbiodiversity.org/seinet/index.php); Consortium of North American Lichen Herbaria (lichenportal.org/portal); Consortium of North American Bryophyte Herbaria (bryophyteportal.org/portal); and the Consortium of Northeast Herbaria (<http://neherbaria.org/>). Symbiota software (<https://sourceforge.net/projects/symbiota/>) is web-based, free, and open source.

Publish a paper in a scientific journal. If you have a lot of new findings to report, you should definitely consider publishing a paper about them. Journals vary widely in their policy on citing specimens – be sure to check their instructions to contributors to find out the format, and whether specimen citations will be part of the actual paper, or part of supplemental material that will be posted to a website. Descriptions of new species must always be accompanied by a citation of the collection information, in decreasing order of the size of geographical units, as described above. To indicate where the specimens are deposited, you must site the standard abbreviation for the herbarium. Most journals will require that the specimen vouchers for a publication be deposited in a recognized herbarium, that is, one that will preserve the specimens indefinitely and will allow consultation of specimens by those interested. For ease of reference, each established herbarium has been assigned a code through the Index Herbariorum project. You can find the code for such collections through the Index Herbariorum website (<http://sweetgum.nybg.org/ih/>). If the specimen is maintained in a private herbarium, give the name of the person responsible for the herbarium, e.g., “B. Jones, private herbarium.”

Herbarium Supplies and Equipment

Specimen Preparation Supplies

Specimen Boxes. Typically these are cardboard boxes with separate lids. Plastic boxes can also be used, as long as the fungi can be kept completely dry. It is helpful to have a selection of boxes of different sizes. The New York Botanical Garden purchases boxes from The American Package Company (American Package Co. No website. 226 FRANKLIN ST, Brooklyn, New York 11222 USA. Phone: (718) 389-4444).

Labels. For labels and annotations, acid-free stock should be used. One option is International Paper Hammermill Great White© copy paper, which is acid free (although you might want to retest each new batch using an acid detection pen (see suppliers below)). You might opt for paper with 25% cotton rag content, because paper containing cotton fiber is stronger than just cellulose. For printing on label stock, make certain your ink is waterproof. Ink jet printers tend not to use waterproof ink, so a laser printer may be the better choice.

Glue. At the New York Botanical Garden, we use basic white glue for attaching labels and annotations to packets, using a thin strip along the top of the label, in case the specimen needs to be repackaged later on (rarely, but more often with lichens, packets get torn when sent out on loan). Labels to boxes are glued more completely. Most Elmer's is fine. The chemical name for water soluble glue is polyvinyl acetate, PVA adhesive. Glue sticks (e.g., U-HU brand) are also a more expensive, but sometimes neater, alternative.

Acid testing pens. These can be used to test the acid level of paper or boxes that is going to come in contact with specimens. Highly acid storage materials may alter the chemistry of the specimen, and may degrade faster. Often acid free paper is not or only slightly more expensive than, non-archival materials, so it is worth both testing and investing in acid free paper whenever possible. The Conservation Online website (<http://cool.conservation-us.org/byorg/abbey/ap/ap03/ap03-5/ap03-508.html>) gives a detailed comparison of acid testing pens. Note that the cheapest model tested (the pH Testing Pen from Light Impressions @ \$2.95) is also one of the best.

Insect traps. These can be placed with specimens in storage to easily monitor insect activity. There are a number of different types. These can be purchased from Herbarium Supply Co. or Insects, Ltd.

Humidity test strips. These can be used to test the humidity in the specimen cabinets – relevant for storage in non-traditional herbarium cabinets. High humidity can lead to the development of mold on specimens. We are not aware of any information on the exact humidity levels that are acceptable for specimens, but certainly the lower the better. At NYBG, we set the relative humidity at 50%. These are available from Herbarium Supply Company (<http://herbariumsupply.com/>).

Specimen Storage Supplies

Cubbyhole boxes or trays. These are used to hold a shelf-full of individual specimen boxes so that they can easily be removed from the cabinet. The New York Botanical Garden uses a cardboard box that comes flat, and is pre-scored to fold into a box with a finger hole. These boxes come from Crown Products Company in Yonkers NY. They are item no. SP004386, 175 lb. test plain tray, 17 3/16" x 12 1/8" x 5 1/4". Herbarium Supply Company (<http://herbariumsupply.com/>) also sells a cubbyhole box. Shoeboxes or appropriately-sized box lids (e.g., those from photocopier paper boxes) may also work well. Arranging specimens within cubbyhole boxes: Space will dictate how you do this, but if possible, we recommend arranging your specimens alphabetically by family or genus, and then alphabetically by species. If you have more than one box full of a particular species, consider grouping your collections by geography. Often one wants to locate just those specimens from a particular area, so segregating them by state or region can be helpful. This organization may reduce the time it takes to look through a cubbyhole box for a particular specimen.

Equipment

Fieldbook. Any blank book with lined, bound pages will do. Ideally the book has acid free paper. The Herbarium Supply Company (<http://herbariumsupply.com/>) sells a specially designed field book with acid free, waterproof pages.

Dryer. Many different types of food dehydrators (http://www.bayareamushrooms.org/education/mushroom_dehydrators.html) have been used as specimen dryers. A current product that fits the need for mushroom drying is the Nesco Garden Master Pro (<http://www.nesco.com/products/Dehydrators/Dehydrators/FD-1010/>). Features to look for are a fan that forces the air through the collections, and a thermostat so that you can regulate the temperature.

Freezer. Freezing is the safest means of pest control for herbarium beetles. Any freezer will work, assuming it reaches a temperature of -20 °C. A chest-type freezer is ideal. Once filled with specimens, the freezer should not be opened for 2—5 days. The larger the specimens, the longer the freezing regimen should be.

Herbarium Cabinets. Herbarium cabinets represent an investment in terms of funds and space. Cabinets come in a variety of sizes. One with 13 cubbyholes is referred to as a half- or counter height cabinet. A cabinet with 26 cubbyholes has two columns of cabinets, is about eight feet tall, and has a single door. A double-wide cabinet has 52 cubbyholes (four columns of 13 cubbyholes). A single cubbyhole will contain an average of 30 dried specimens – of course the actual number depends greatly on the size of the boxes in which the specimens are stored. There are less expensive storage options than a herbarium cabinet, but what makes the herbarium cabinet ideal is that the specimens are protected from water and pests. A metal storage cabinet with adjustable shelves can substitute, and is much cheaper (maybe \$200) but will require constant management for pests and humidity. There are several companies that sell herbarium cabinets, e.g., Delta Designs Ltd (<http://www.deltadesignsltd.com/>). and Lane Science Equipment (http://www.lanescience.com/herbarium_and_botany_cabinets_lane_science.htm).

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Making Scientific Vouchers of NA Macrofungi - North American Mycological Association

The North American Mycological Association (NAMA) is a 501(c)(3) nonprofit organization.

NAMA is committed to the promotion of scientific and educational activities related to fungi. NAMA supports the protection of natural areas and their biological integrity. We advocate the sustainable use of mushrooms as a resource and endorse responsible mushroom collecting that does not harm the fungi or their habitats.



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