Margaret H. Fulford Herbarium (CINC)
University of Cincinnati

Digitization Manual

The purpose of this document is to outline the digitization process used for specimens in the Margaret H. Fulford Herbarium (CINC) collection at the University of Cincinnati. The guidelines detailed here are provided as a guide or reference tool for entering or editing records in any of the four databases that include CINC specimens. These databases are supported by Symbiota. Symbiota is a software platform that supports the creation of online databases used to catalog the vast amounts of biodiversity data stored within natural history collections.

Contributors

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Introduction to Digitization

- What is digitization?
- What are the objectives/goals of digitization?
- What are some ways digitized information may be used?
- Where does CINC digitize its materials? (See next page)
- What is currently being digitized?
- When do we anticipate completing digitization?

What is Digitization?

"Digitization" describes the practice of imaging specimens and transcribing all related data elements to an online database ("portal"). Our herbarium utilizes web portals supported by the Symbiota software platform to maintain our electronic collections.

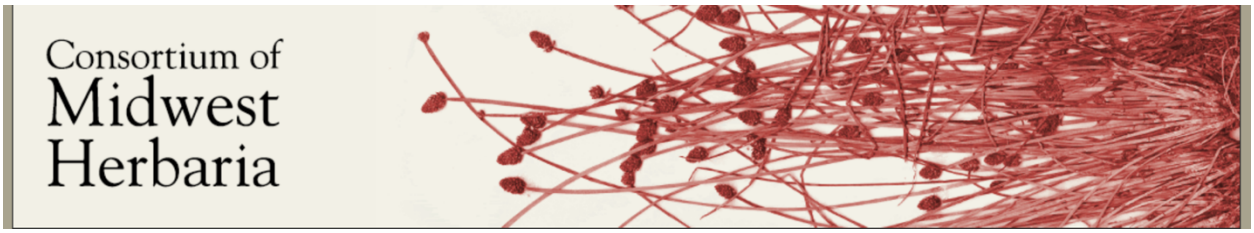
What are the Objectives/Goals of Digitization?

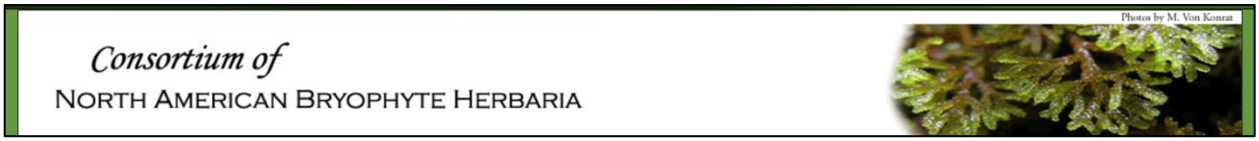
The purpose of digitization is to make all of our specimen data available for use electronically. Prior to the establishment of the internet, most herbaria made their collection materials available for research and education either through in-person appointment or by loaning materials from one institution to another. Although the open exchange of information has always been a pillar of modern science, there are understandable hurdles to the sharing of physical materials (from the practical to the legal) that may have previously hindered individuals from accessing herbarium data.

Digitization not only allows a single herbarium to digitize their collection, but we can easily access millions of specimens' record data from herbaria all over the world! This allows for entirely new modes of utilizing the information held within our collection.

What are some of the ways digitized information may be used?

Where does CINC Digitize its Collections?







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Section 1 – Navigating Data Portals

The following section broadly outlines how to navigate Symbiota-supported web portals and how to access records for entering and editing data. The Bryophyte portal is used as the example throughout (other portal examples may be found in the Appendix A).

Prior to beginning work, you will need to create a new account for the portal in which you will be working. UC student workers and volunteers, please use your 6+2 username as your portal login. Check with Dr. Tepe or Amy Harmon after creating your account to be sure you are granted the correct editing permissions. Make sure to keep track of your account login and password!

When you first log in to the portal, you will see this (or a similar) homepage:



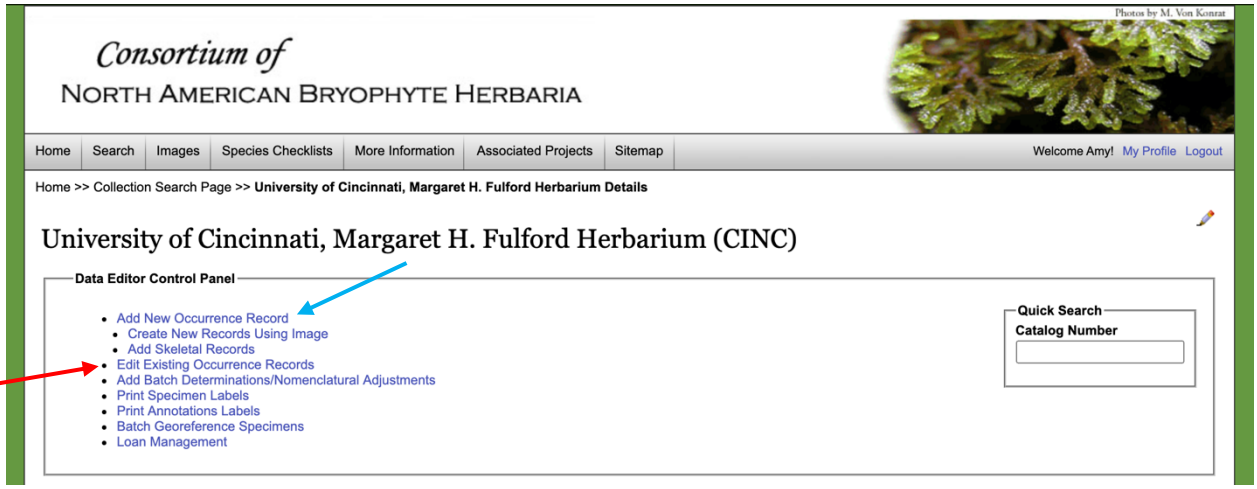
Click on "My Profile" in the upper right corner of the page (circled in red above). This will take you to the following page:



On this page, click on the "Specimen Management" tab (circled in red). Clicking here will bring up the following page:

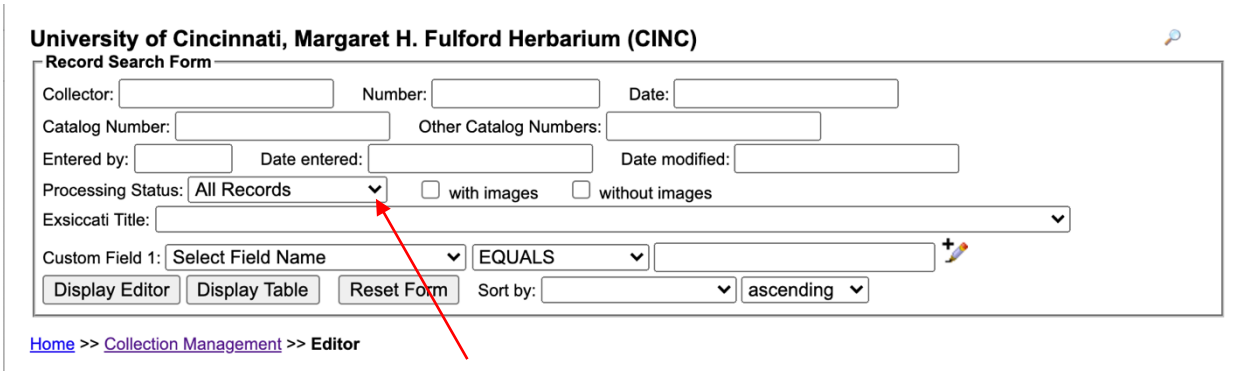


When you click on "University of Cincinnati, Margaret H. Fulford Herbarium (CINC)" (circled in red in the image above), you will be taken to the Data Editor Control Panel. From this point, you will be able to access, add, and edit records within our collection.



If you are adding a new specimen record to the database, click on the "Add New Occurrence Record" link (indicated by the blue arrow above). This will open a blank record page where you can enter label data and upload images. Further information about the barcode and imaging process can be found in the Imaging Workflow document.

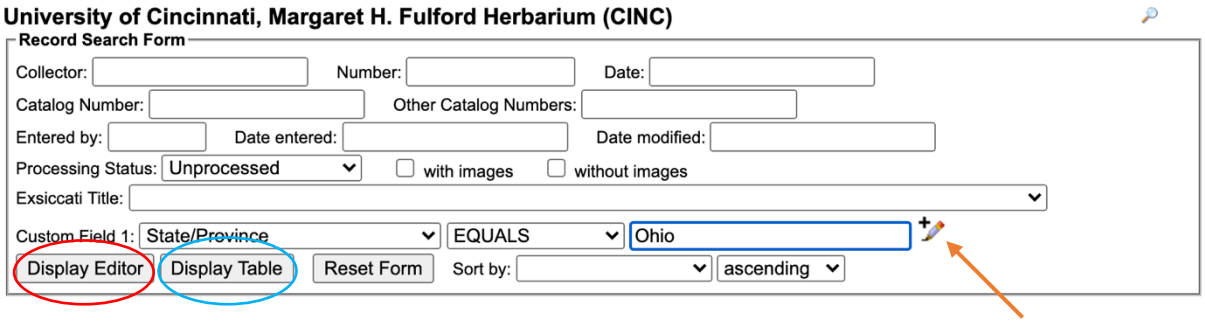
A large number of our specimens have been imaged; these images have already been uploaded into the portals, thereby creating skeleton records that need to be completed. To access these records, click on the "Edit Existing Occurrence Records" link (indicated by the red arrow above). Clicking there will bring up the following page:



This editor allows you to search for records using one or more specific search parameters. Records that have an image but no accompanying data are marked by the

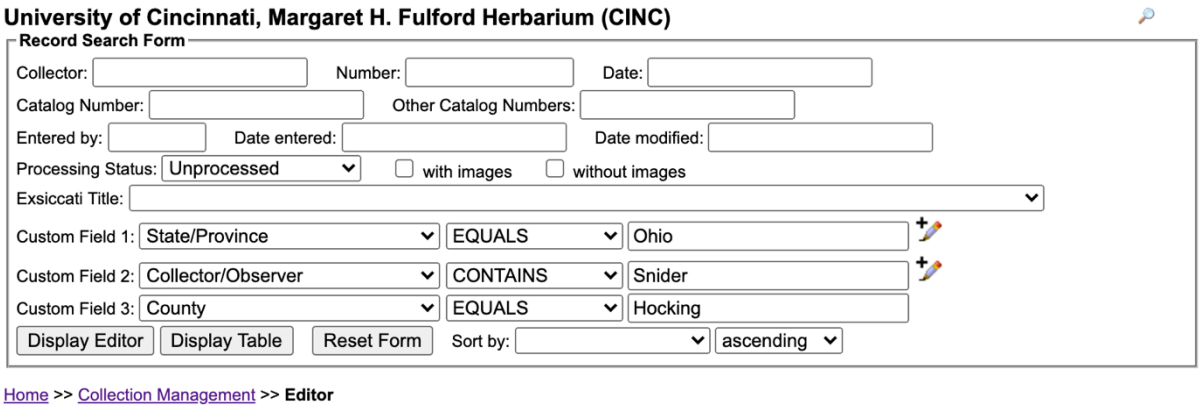
Processing Status "Unprocessed." Select "Unprocessed" from the dropdown menu marked by the red arrow above.

The "Custom Field 1" dropdown menu allows you to sort Unprocessed records in many ways that may be useful to your workflow. For instance, if you are interested in looking at all of the Unprocessed records from Ohio, first select "Unprocessed" as the Processing Status, then use the Custom Field dropdown menu to select "State/Province." Make sure the dropdown menu in the middle is set to EQUALS, then type "Ohio" into the textbox. In this example, the Record Search form should look like this:

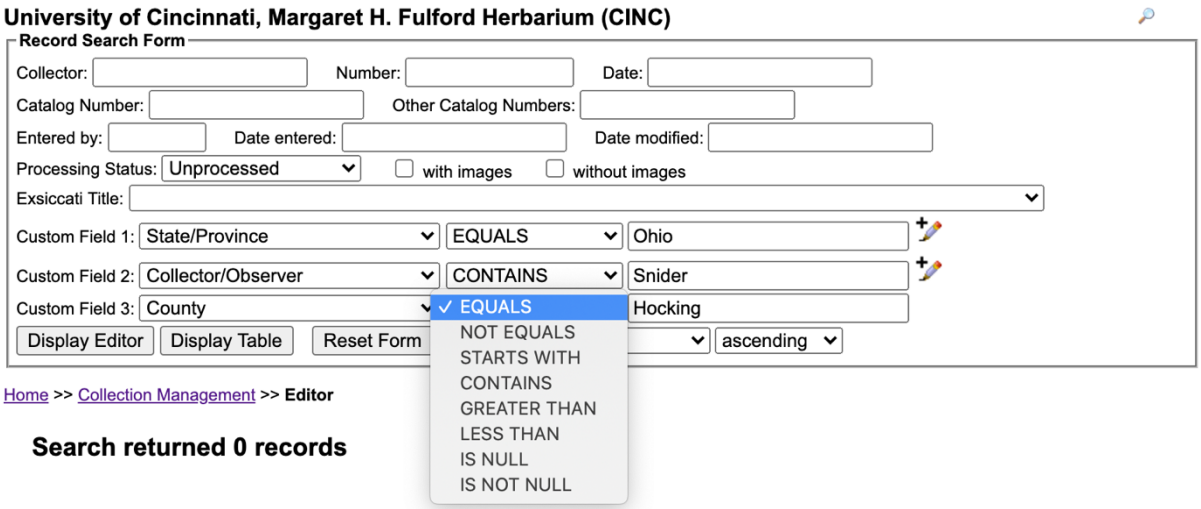


With these search parameters entered, you may choose to view the records in table form by clicking on Display Table (circled in blue above), or individually by clicking on Display Editor (circled in red).

Additional Custom Fields can be added by clicking the "+ pencil" (indicated by the orange arrow in the image above). These additional fields can be used to further narrow your search to only include records with specific parameters. For example, if you are searching for specimens collected by a Mr. Snider in Hocking County, Ohio, you may create two additional Custom Fields to narrow your search.



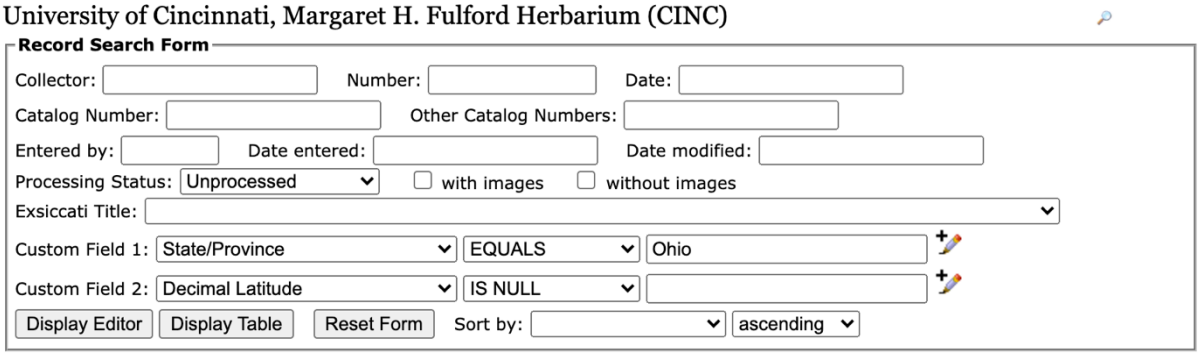
The dropdown menus in the between the Custom Field selection box on the left and the text box on the right allow you to further customize your search.



If you are confident in the full text of a given parameter that you are searching for (i.e. you know the collector's full name), it is appropriate to select EQUALS from this dropdown menu. If you only know a portion of the full text, (such as the collector's last name), select CONTAINS from this menu. Spelling and spacing matter here!

The options IS NULL and IS NOT NULL are useful if you are searching for records that may be blank in the particular data field you are working to fill in. For example, records that have already been georeferenced can be easily found by choosing "Decimal Latitude" in the second Custom Field, followed by IS NOT NULL.

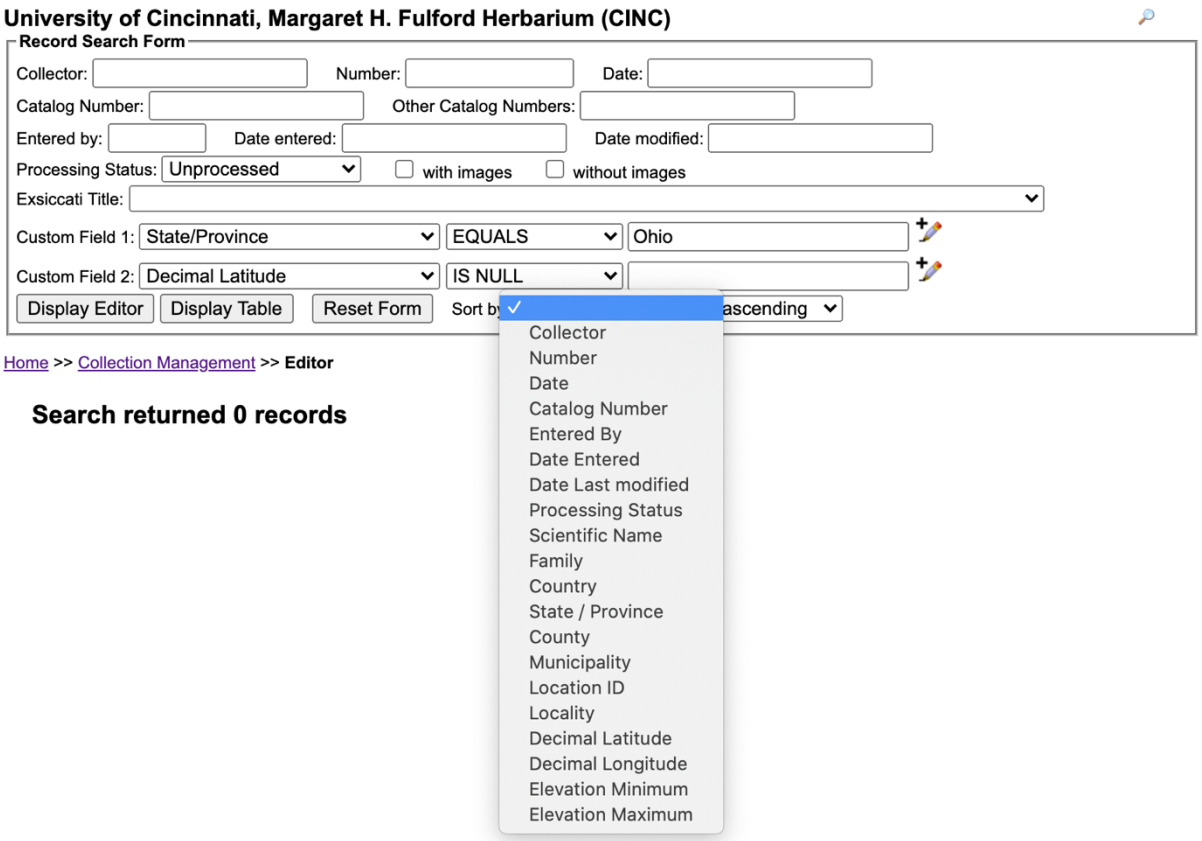
Alternatively, records that have *not* been georeferenced can be found by choosing IS NULL.



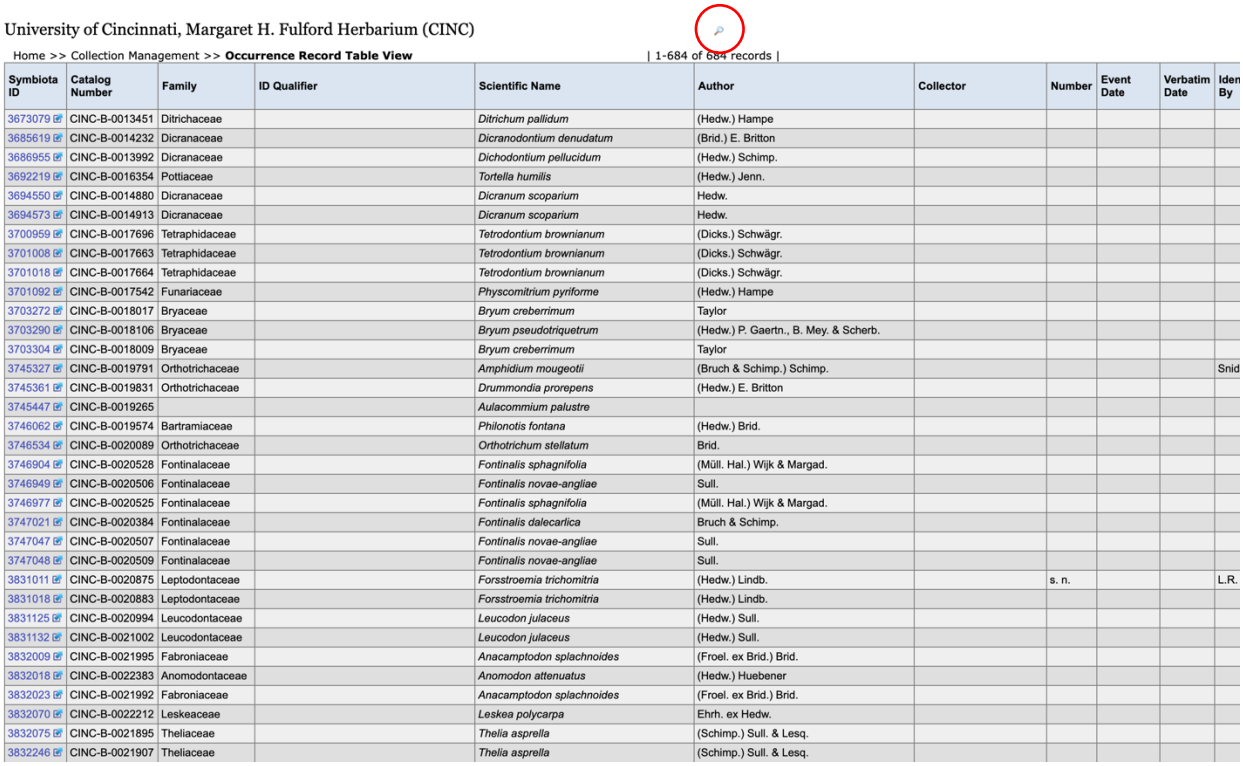
Although you cannot directly edit records within the Occurrence Record Table View, it may be useful for visualizing groups of records or for finding a record that you were otherwise unable to locate using the Record Search Form.

You can sort records in the table in a number of useful ways by using the "Sort by:" feature at the bottom of the Record Search Form. The "Sort by:" feature provides a dropdown menu of possible variables around which you can sort and view the records in your search. For example, when searching for records within a State, it may be helpful to sort the records by County. In the adjacent box, you may select "ascending" or "descending" to view the Counties in ascending or descending alphabetical order.

The "Sort by:" feature will sort the records you are searching for in both the Occurrence Record Editor View and the Occurrence Record Table View.



To access an individual record within the Occurrence Record Table View, click on one of the Symbiota ID numbers (blue hyperlinks) in the far-left column.



University of Cincinnati, Margaret H. Fulford Herbarium (CINC)

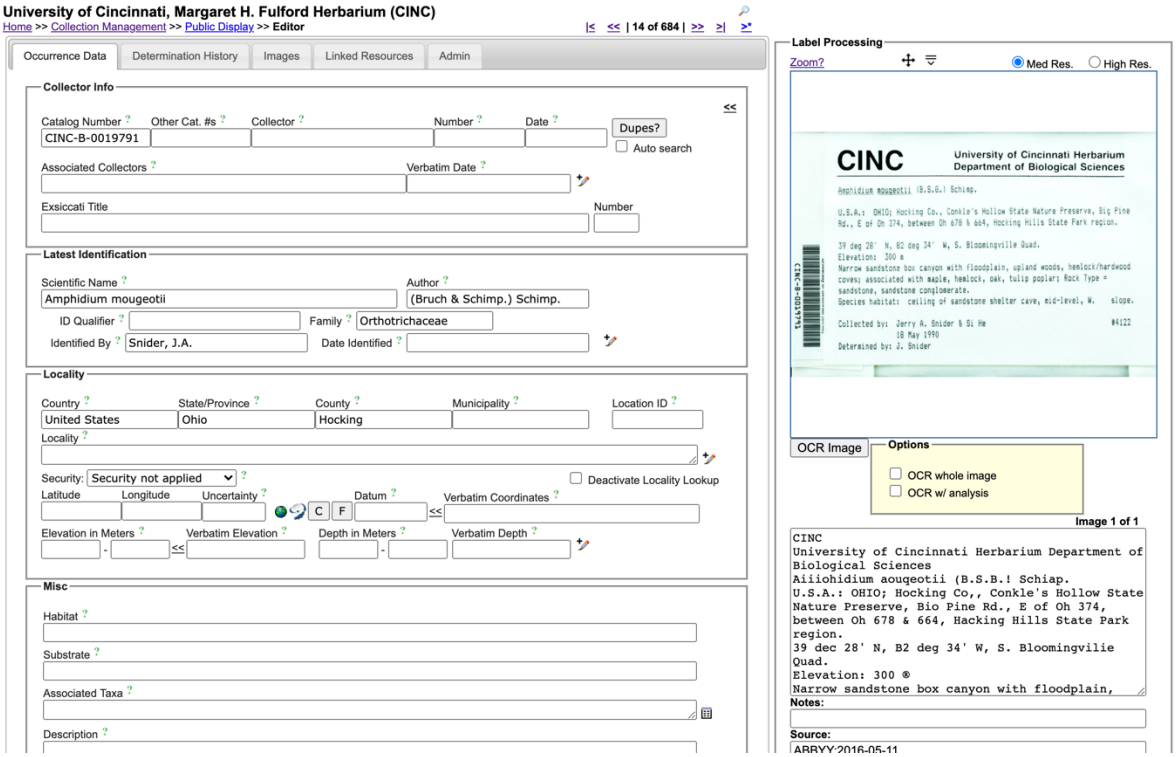
Home >> Collection Management >> **Occurrence Record Table View** | 1-684 of 684 records |

Symbiota ID	Catalog Number	Family	ID Qualifier	Scientific Name	Author	Collector	Number	Event Date	Verbatim Date	Iden By
3673079	CINC-B-0013451	Ditrichaceae		*Ditrichum pallidum*	(Hedw.) Hampe					
3685619	CINC-B-0014232	Dicranaceae		*Dicranodontium denudatum*	(Brid.) E. Britton					
3686955	CINC-B-0013992	Dicranaceae		*Dichodontium pellucidum*	(Hedw.) Schimp.					
3692219	CINC-B-0016354	Pottiaceae		*Tortella humilis*	(Hedw.) Jenn.					
3694550	CINC-B-0014880	Dicranaceae		*Dicranum scoparium*	Hedw.					
3694573	CINC-B-0014913	Dicranaceae		*Dicranum scoparium*	Hedw.					
3700959	CINC-B-0017696	Tetraphidaceae		*Tetrodontium brownianum*	(Dicks.) Schwägr.					
3701008	CINC-B-0017663	Tetraphidaceae		*Tetrodontium brownianum*	(Dicks.) Schwägr.					
3701018	CINC-B-0017664	Tetraphidaceae		*Tetrodontium brownianum*	(Dicks.) Schwägr.					
3701092	CINC-B-0017542	Funariaceae		*Physcomitrium pyriforme*	(Hedw.) Hampe					
3703272	CINC-B-0018017	Bryaceae		*Bryum creberrimum*	Taylor					
3703290	CINC-B-0018106	Bryaceae		*Bryum pseudotriquetrum*	(Hedw.) P. Gaertn., B. Mey. & Scherb.					
3703304	CINC-B-0018009	Bryaceae		*Bryum creberrimum*	Taylor					
3745327	CINC-B-0019791	Orthotrichaceae		*Amphidium mougeotii*	(Bruch & Schimp.) Schimp.					Snid
3745361	CINC-B-0019831	Orthotrichaceae		*Drummondia prorepens*	(Hedw.) E. Britton					
3745447	CINC-B-0019265			*Aulacommium palustre*						
3746062	CINC-B-0019574	Bartramiaceae		*Philonotis fontana*	(Hedw.) Brid.					
3746534	CINC-B-0020089	Orthotrichaceae		*Orthotrichum stellatum*	Brid.					
3746904	CINC-B-0020528	Fontinalaceae		*Fontinalis sphagnifolia*	(Müll. Hal.) Wijk & Margad.					
3746949	CINC-B-0020506	Fontinalaceae		*Fontinalis novae-angliae*	Sull.					
3746977	CINC-B-0020525	Fontinalaceae		*Fontinalis sphagnifolia*	(Müll. Hal.) Wijk & Margad.					
3747021	CINC-B-0020384	Fontinalaceae		*Fontinalis dalecarlica*	Bruch & Schimp.					
3747047	CINC-B-0020507	Fontinalaceae		*Fontinalis novae-angliae*	Sull.					
3747048	CINC-B-0020509	Fontinalaceae		*Fontinalis novae-angliae*	Sull.					
3831011	CINC-B-0020875	Leptodontaceae		*Forsstroemia trichomitria*	(Hedw.) Lindb.		s. n.			L.R.
3831018	CINC-B-0020883	Leptodontaceae		*Forsstroemia trichomitria*	(Hedw.) Lindb.					
3831125	CINC-B-0020994	Leucodontaceae		*Leucodon julaceus*	(Hedw.) Sull.					
3831132	CINC-B-0021002	Leucodontaceae		*Leucodon julaceus*	(Hedw.) Sull.					
3832009	CINC-B-0021995	Fabroniaceae		*Anacamptodon splachnoides*	(Froel. ex Brid.) Brid.					
3832018	CINC-B-0022383	Anomodontaceae		*Anomodon attenuatus*	(Hedw.) Huebener					
3832023	CINC-B-0021992	Fabroniaceae		*Anacamptodon splachnoides*	(Froel. ex Brid.) Brid.					
3832070	CINC-B-0022212	Leskeaceae		*Leskea polycarpa*	Ehrh. ex Hedw.					
3832075	CINC-B-0021895	Theliaceae		*Thelia asprella*	(Schimp.) Sull. & Lesq.					
3832246	CINC-B-0021907	Theliaceae		*Thelia asprella*	(Schimp.) Sull. & Lesq.					

If you wish to check or edit your search parameters, click on the small magnifying glass icon above the center of the table (circled in red above). This will display the Record Search Form above the table and allow you to make any necessary alterations to the search parameters.

The magnifying glass icon can also be found above the individual Occurrence Editor view. By clicking on it there, you may navigate back to the Table View (by clicking "Display Table") or edit your search parameters as needed.

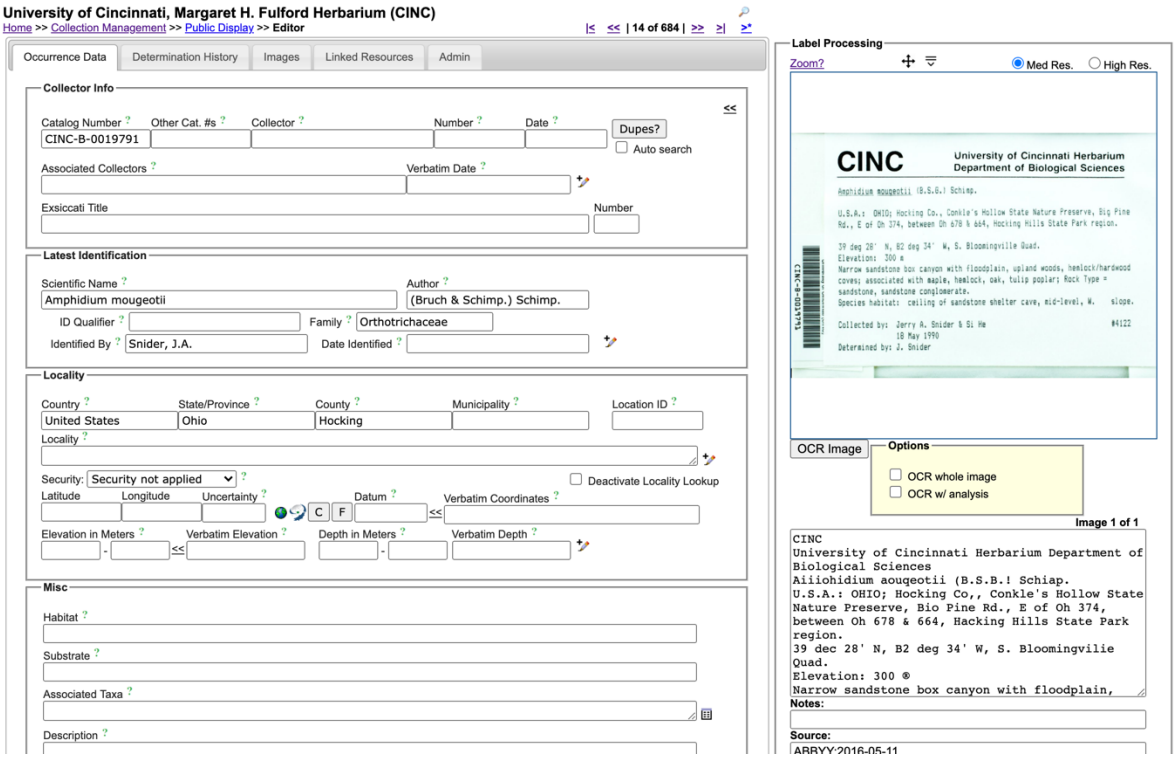
The individual Occurrence Editor, shown below, is where data entry and editing takes place. Section 2 of this document details how to use the label image provided to complete the record.



Section 2 – Data Entry Steps and Standards

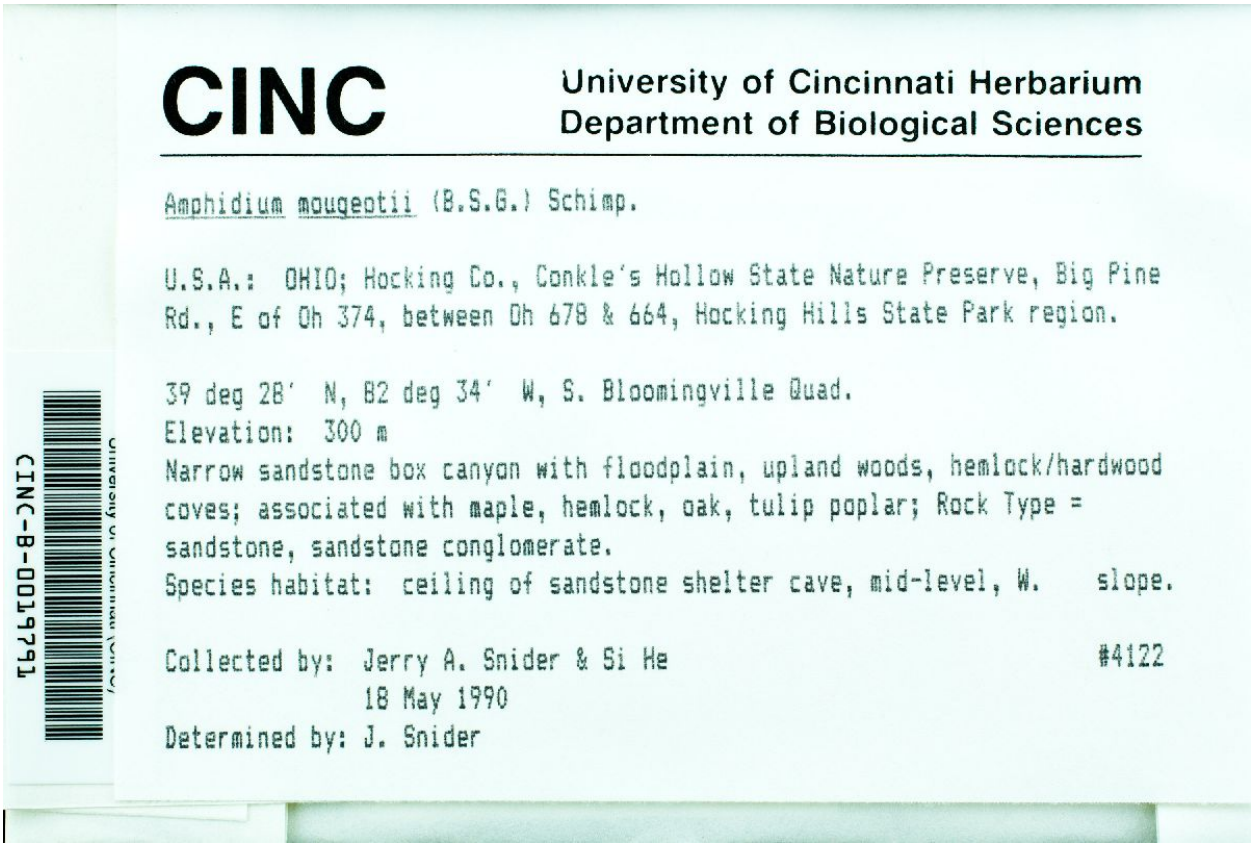
This section broadly outlines the process of reading a specimen label and entering its information into the database. For the purposes of this guide, the following label will be used as an example. Note that this label is unusually rich in information – not all labels will contain this much data! Please see Appendix A of this document for further examples and explanations of common label types you may encounter when working with our collection.

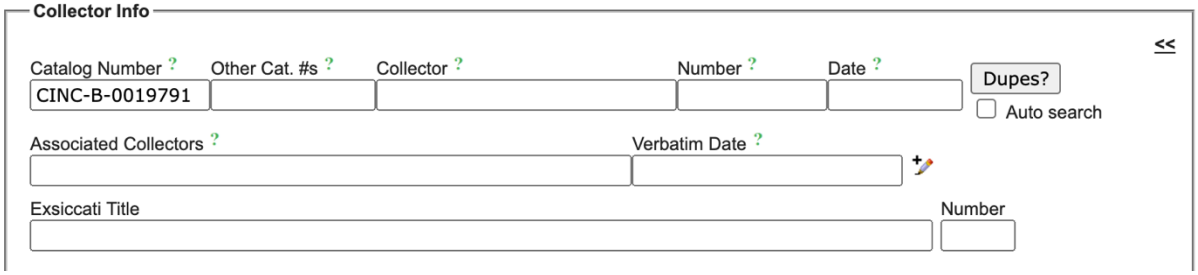
When working with records that already have images uploaded, there may already be some information filled in. Always double check to be sure everything that is already filled in is correct and corresponds with the label information.



If the image is too small to read, use the Zoom feature. Hold down the control button and click on the image to quick zoom into specific location, or hold down the shift button and hold a left-click while moving the mouse up or down for a more controlled zoom action. Click and drag bottom right corner of image to resize display panel.

Part 1 – Collector Information





1. **Catalog Number:** This specimen has already been given a barcode sticker (CINC-B-0019791) and has a mostly empty Occurrence record in the Bryophyte portal. Unless a record is being created from scratch, Unprocessed records in the database should have, at a minimum, the barcode, scientific name, and country. Unless there was an error in the image transcription, the barcode field and scientific name field should not be altered. If you have any questions, please ask!

Always be sure to use the correct barcode format for the specimen! The barcode string consists of the official acronym for the herbarium (CINC), followed by a code letter that indicates a particular group of specimens (see below), followed by a number. These numbers are sequential and start with 0000001, and they are how we keep track of how many specimens we have in the collection.

If you are in a position where you are working with the barcode stickers, please be careful! They are incredibly sticky and can easily stick to themselves or something else. Try to avoid this, but if it does happen – don't worry and DON'T throw it away! Save it and give it to one of the herbarium personnel so it can be replaced.

Vascular Plants – CINC-V-0000001
Bryophytes – CINC-B-0000001
Lichen – CINC-L-0000001
Fungi – CINC-F-0000001

2. Other Cat. #s: Prior to the age of barcodes, some herbaria used "sheet numbers" to keep track of the size of their collection. CINC has never used this system, so it is unlikely that you will need to this field. Leave it blank.

3. Collector: Enter the collector's name from the specimen label as completely as possible. Use the format: "Last Name, First Name, Middle Name"

   When there are two or more collectors, list the first name given on the label in this text box. Jerry A. Snider is listed first on this label, so here you will fill in "Snider, Jerry A."

   If only initials are given, pay close attention to your punctuation and spacing, and use the format "Last Name, First Initial.Middle Initial." – for example, if the name on the label is "E. L. Braun," type "Braun, E.L." into the box. Pay attention to spacing!

   If no obvious collector name is present, type "s.c." in the Collector box. This is an abbreviation for the Latin *sine collectore*, which means "without collector."

4. Number: Enter the collection number given on the specimen label. If no number is given, type "s.n." into this box. This is an abbreviation for the Latin *sine numerus*, or "without a [collection] number."

Collection numbers are frequently listed next to the collector's name, but they might be somewhere else on the label (often in the upper left corner). In this example, it is printed on the same line as the names of the collectors – 4122.

5. **Date:** Use the format Year-Month-Day.

   In this example, the collection date is May 18, 1990 (typed as 18 May 1990 on the label), so you will type "1990-05-18" into the Date box.

   If a range of dates is given, enter the earliest date into this box. If a season and year are given, only enter the year. For example, if the label says "Spring 1990" type "1990-00-00" into the Date box.

   If no collection date is given, type "s.d."(*sine diem*, or "without a date") into this box.

   Pay close attention to dates on labels from collectors outside of the United States, as many other countries frequently give the date in the Day-Month-Year format (as opposed to Month-Day-Year as is convention in the US).

   Sometimes the date written on the label may be ambiguous (e.g. 5/6/20). If you are working with a specimen from the United States, it is safe to assume it is in the Month-Day-Year format; similarly, if you are working with a specimen from Europe, it is likely in the Day-Month-Year format. Some older European specimens use Roman numerals to indicate the month; this may help you discern the date if you are unsure.

   Try to use context clues from the label to decipher the year if you are confused. The majority of typed labels will be from the 20th or 21st centuries, and very old hand-written labels (in cursive) with year's in the 80s or 90s are likely from the 1880s/1890s. If you are confused about the year, please use the Notes section.

6. **Dupes?**: This button will bring up a separate box containing a list of possible duplicates of this specimen already entered by this or another herbarium into the portal. If you are *100% positive* that you are working with a duplicate specimen, you may use the "Transfer Empty Fields" function to quickly fill in all specimen information. After you transfer empty fields, make sure to closely check that everything is formatted correctly (e.g. Collector Name, Date) before

submitting the record. Avoid using the option to "Transfer All Fields," as this may overwrite and incorrectly reformat data.

Some transcribers like to use the Dupes feature regularly, but others feel like it slows them down and they prefer to transcribe each label from scratch. Try both to see what works best for you.

There are no exact duplicates of this record, so do not transfer any fields.

7. **Associated Collectors:** Use the same format as used for the Collector (Last, First, Middle). This example label lists two collectors: Jerry A. Snider and Si He. Type "He, Si" into the Associated Collectors box.

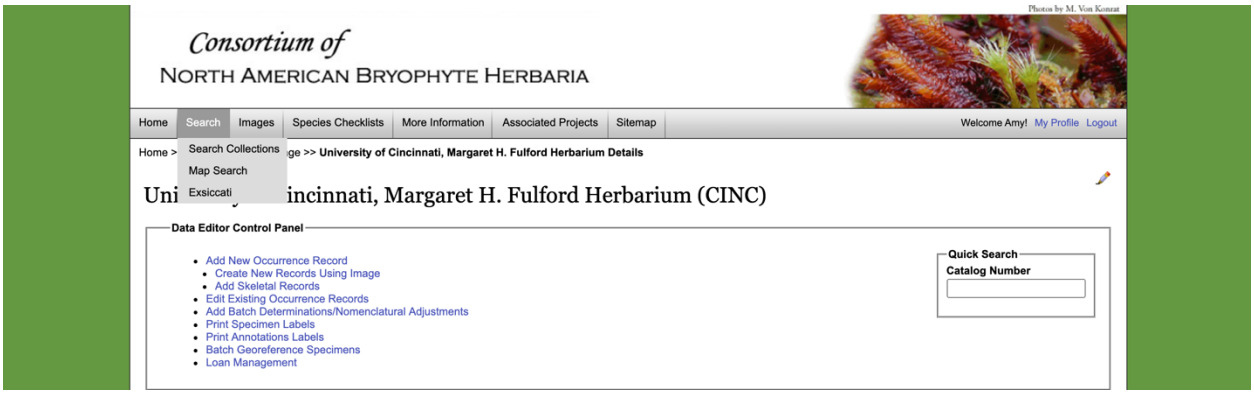
8. **Verbatim Date:** Type the full date out in the format "Month Day, Year." In this example, the Date is 1990-05-18, so type "May 18, 1990" here.

   If only a season was indicated, type that here ("Spring 1990"). Again, pay close attention to labels for specimens from outside the United States, as the date may be given in a format you are unaccustomed to.

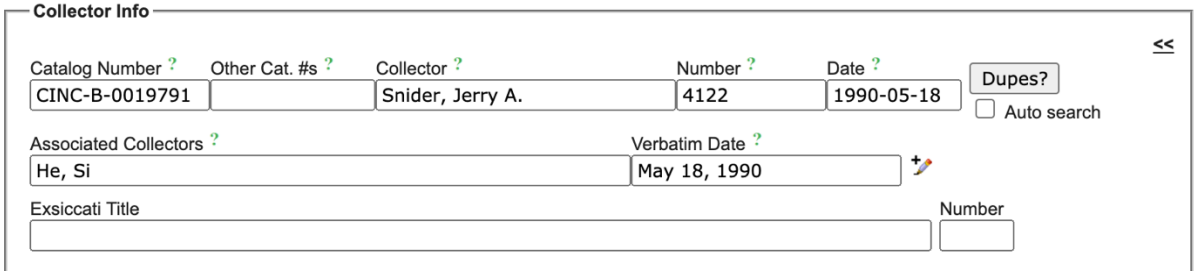
9. **Exsiccati Title:** Exiccatae are special collections of specimens that were sold as sets under a specific title. Each species was given a number, which is the Exsiccati number. This number is different than the collection number (pay close attention – some specimens have both). The Exsiccati Title is typically given at the top of a label, and the specimen's **Exsiccati Number** is typically provided just before the specimen's scientific name. The Exsiccati Title is an autofill field, so you only need to type in the first few letters of the name, then pick the correct one.

   The Snider 4122 specimen is not part of an Exsiccati, so these fields should be left blank.

Each portal provides a list of recognized Exsiccati; this list may be found by going to the home page, clicking on “Search” and clicking on “Exsiccati.”

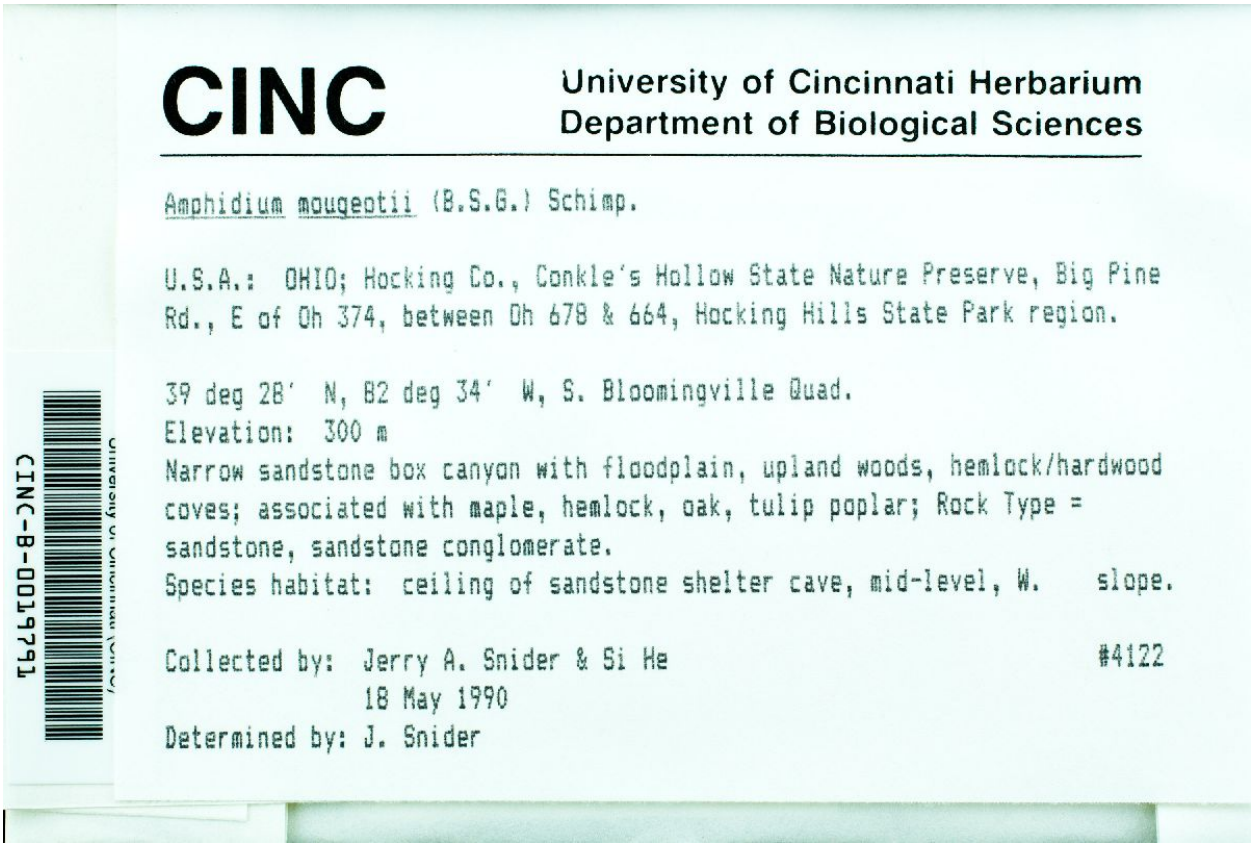


Completed Collector Info for this label example should look like this:



Part 2 – Latest Identification

The scientific name of most specimens is included on the label. Other specimens in the collection have not yet been identified ("determined"), while others have two or more identifications. In cases where a specimen has been re-identified (usually by a specialist in that particular group of plants), the specimen bears an "annotation label." Annotations are typically dated, and the most recent determination is the one that should be used in the database.





1. **Scientific Name:** Enter the full scientific name as it is written on the label. When you begin to type, you will notice that a dropdown list appears, allowing you to quickly select the correct name. Selecting the name will automatically fill in the

Author and Family boxes in this section. If the name does not appear, type the name as written on the label, but make sure to select "Expert Required" from the Processing Status dropdown menu. Please note the discrepancy in the Notes section.

Unprocessed records with images that are already in the database should already have the correct Scientific Name, Author, and Family entered into this section. In these cases, the scientific name should not be changed. If you notice any problem, mark the record as "Expert Required" and put an explanation in the Notes.

2. ID Qualifier: Some labels include notes with the identification such as "c.f." (reference…) or "aff." (has an affinity to) to indicate that the specimen doesn't fit exactly within a species. Those, or any other commentary on the determination, may go here. Not many specimens have these qualifiers, but they do pop up from time to time and should be watched for.

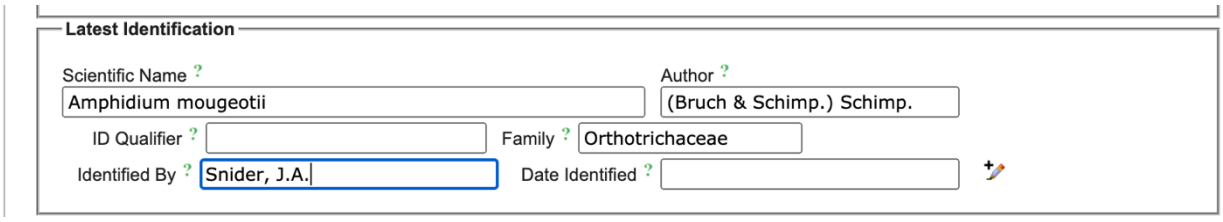
   There is no qualifier listed on this example label, so this box should be left blank.

3. Identified By: If the specimen label clearly states who determined the correct identification, enter their name in this box. The person who provides this identification may be the specimen's collector, or correct ID may be provided by another individual.

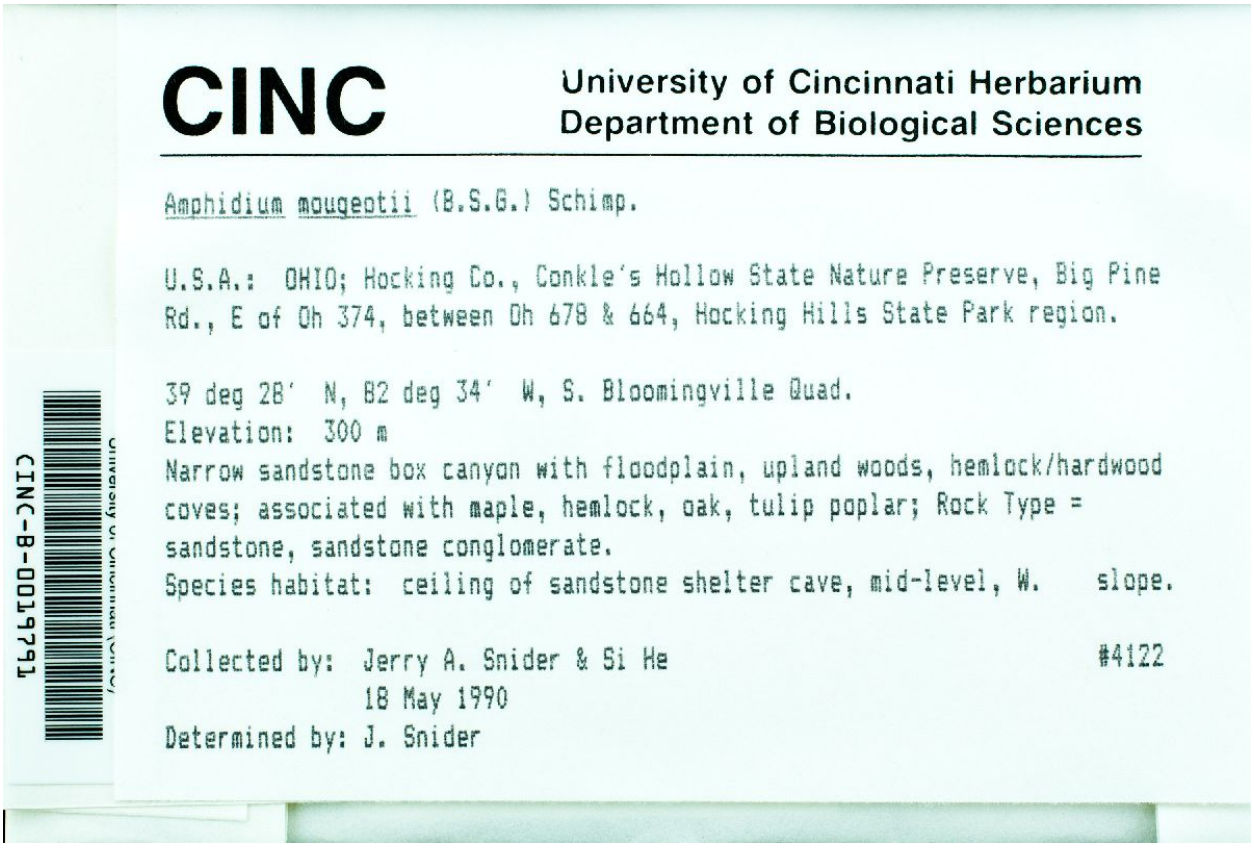
   If no determiner is specified, assume it was identified by the collector and leave this field blank. It is not necessary to include a name here if the determiner is the same as the collector, but only do so if it's clearly stated on the label.

4. Date Identified: Annotation notes or labels typically include the date when the correct determination was made. Enter that date into this box. If no date of identification is given, leave this field blank.

The completed Latest Identification section for this example should look like this:



Part 3 - Locality



CINC

University of Cincinnati Herbarium
Department of Biological Sciences

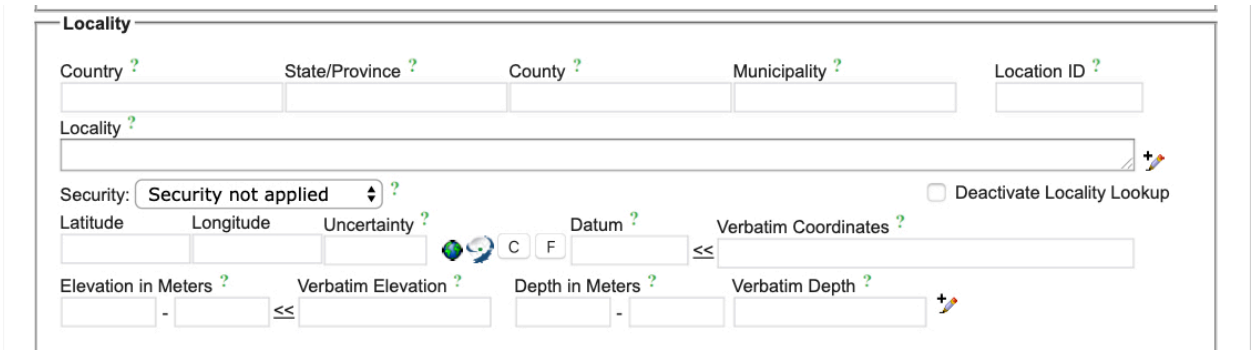
Amphidium mougeotii (B.S.G.) Schimp.

U.S.A.: OHIO; Hocking Co., Conkle's Hollow State Nature Preserve, Big Pine Rd., E of Oh 374, between Oh 678 & 664, Hocking Hills State Park region.

39 deg 28' N, 82 deg 34' W, S. Bloomingville Quad.
Elevation: 300 m
Narrow sandstone box canyon with floodplain, upland woods, hemlock/hardwood coves; associated with maple, hemlock, oak, tulip poplar; Rock Type = sandstone, sandstone conglomerate.
Species habitat: ceiling of sandstone shelter cave, mid-level, W. slope.

Collected by: Jerry A. Snider & Si He #4122
18 May 1990
Determined by: J. Snider

CINC-B-0019791



1. **Country, State/Province, County, Municipality:** The Country, State/Province, and County boxes all provide a dropdown list feature similar to the Scientific Name field. As you begin to type, the dropdown list will appear, and you may select the correct location. Pay close attention to spelling and make sure you click on the correct name before moving on. For instance, if you begin typing "United" for "United States" …UAE and UK will pop up above US.

The Municipality box does not provide a dropdown list. Some labels may not contain Municipality information; for example, many specimens are collected in state or national parks outside of a specific town. It is okay to leave the Municipality box blank if you are unsure, or if no city or town is given on the label.

Not all labels will overtly list the country, state, or even county of a location – some may only list a state and city, with the expectation that anyone working with their specimens could infer the rest of the information. If you are uncertain, leave these fields blank and type exactly what is written on the label into the Locality field. If you are feeling confident (e.g. the label says "Cincinnati, Ohio"), you can use a search engine to look up the correct county to fill in.

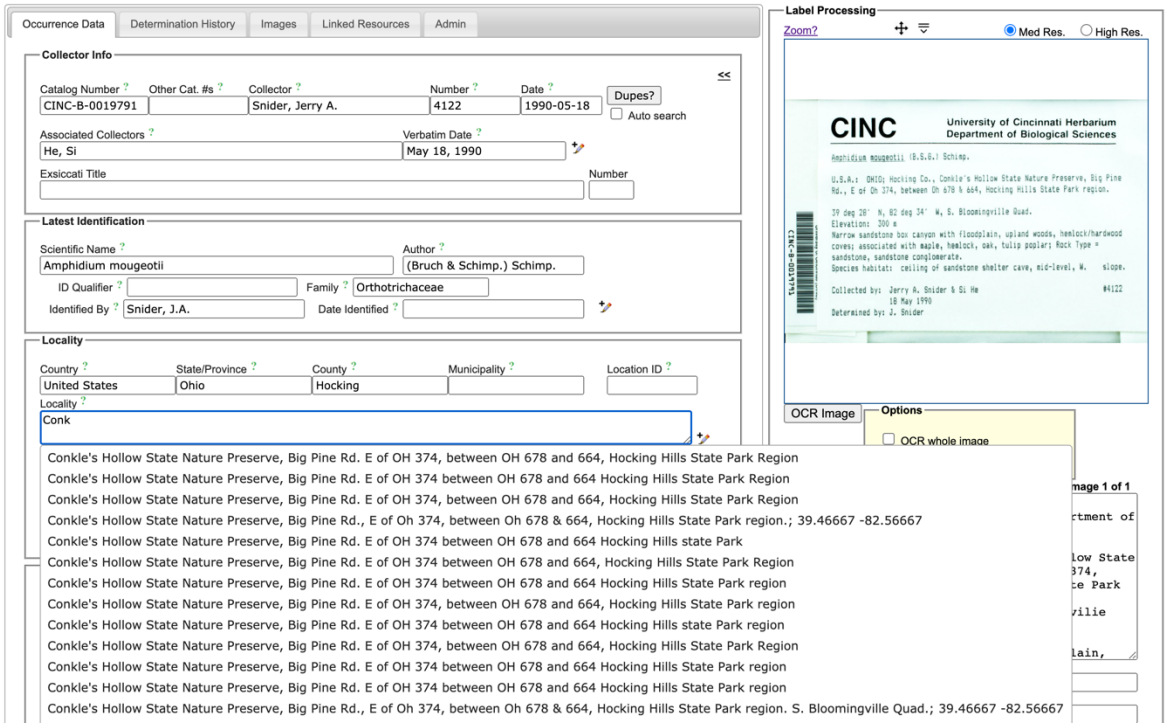
In the example we are following, the label provides clear Country, State/Province, and County information: United States, Ohio, Hocking County. No specific Municipality is given, so leave that field blank.

2. Locality: The information you enter into the Locality box is crucial for georeferencing. The" locality" refers to the geographic location where the specimen was collected: where it can be found on a map.

   Enter the collection location given on the label as specifically as possible, as this will make it easier to georeference (i.e. to map). Be aware that labels may contain spelling errors or outdated names. To the best of your ability, utilize search engines and relevant label information to determine the best information to enter into the Locality box. If the label only states the collection location to the county level, it is appropriate to enter the county (with state) name into the Locality box. For more information about appropriate ways to enter locality info, please refer to the Georeferencing Guide.

   In this example, the label gives a lot of detailed information about where this specimen was found. Enter the following into the Locality field: "Conkle's Hollow State Nature Preserve, Big Pine Road east of OH 374, between OH 678 and OH 664, Hocking Hills State Park region." Although the label abbreviates some terms, it can be very useful for georeferencing purposes to flesh out the information. However, only do so if you are totally confident in what the label says. If you are unsure, type EXACTLY what is written on the label.

As you type the locality in, you may notice a dropdown menu appear below the Locality field listing the same or very similar localities. In this example, the following list appears as you begin to type:



This list is generated based on other records in the database that appear to match the locality information given thus far. **Do not select one of these**, as it may not accurately reflect the location given for this specific record. Furthermore, if you accidentally choose one of these, it may fill in other fields in the form incorrectly.

Instead of choosing one of these when uncertain, always type what you read from the label. In this case, if you came across the label and you were unsure about something, type what is written on the label even though it may be exactly the same as one of the options from this dropdown list.

3. **Security –** N/A. Leave this field blank.

4. **Latitude, Longitude, Uncertainty, Datum –** For further information about these fields, see the **Georeferencing Guide**.

5. **Verbatim Coordinates –** If the label provides exact coordinates where the specimen was collected, enter them here. This label provides the coordinates in

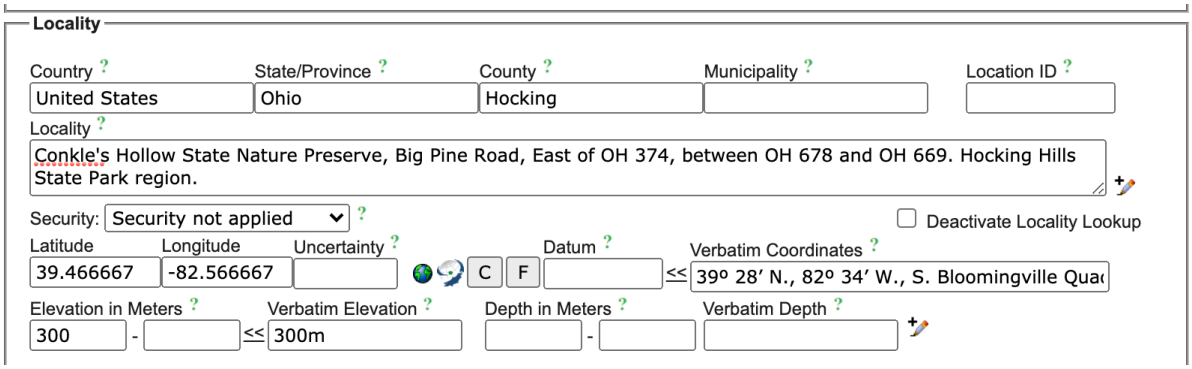
the following manner: “39° 28’ N., 82° 34’ W., S. Bloomingville Quad.” When you type this in, you will notice that the Latitude and Longitude boxes are automatically filled in. This will be useful during georeferencing.

6. **Verbatim Elevation –** If the label provides an exact elevation at which the specimen was collected, enter it here. Be sure to enter the measurements the elevation is given in; measurements in feet will be automatically converted into meters in the low range box to the left labeled Elevation in Meters. If an elevation range is given, enter it here and it will be converted into the boxes on the left.

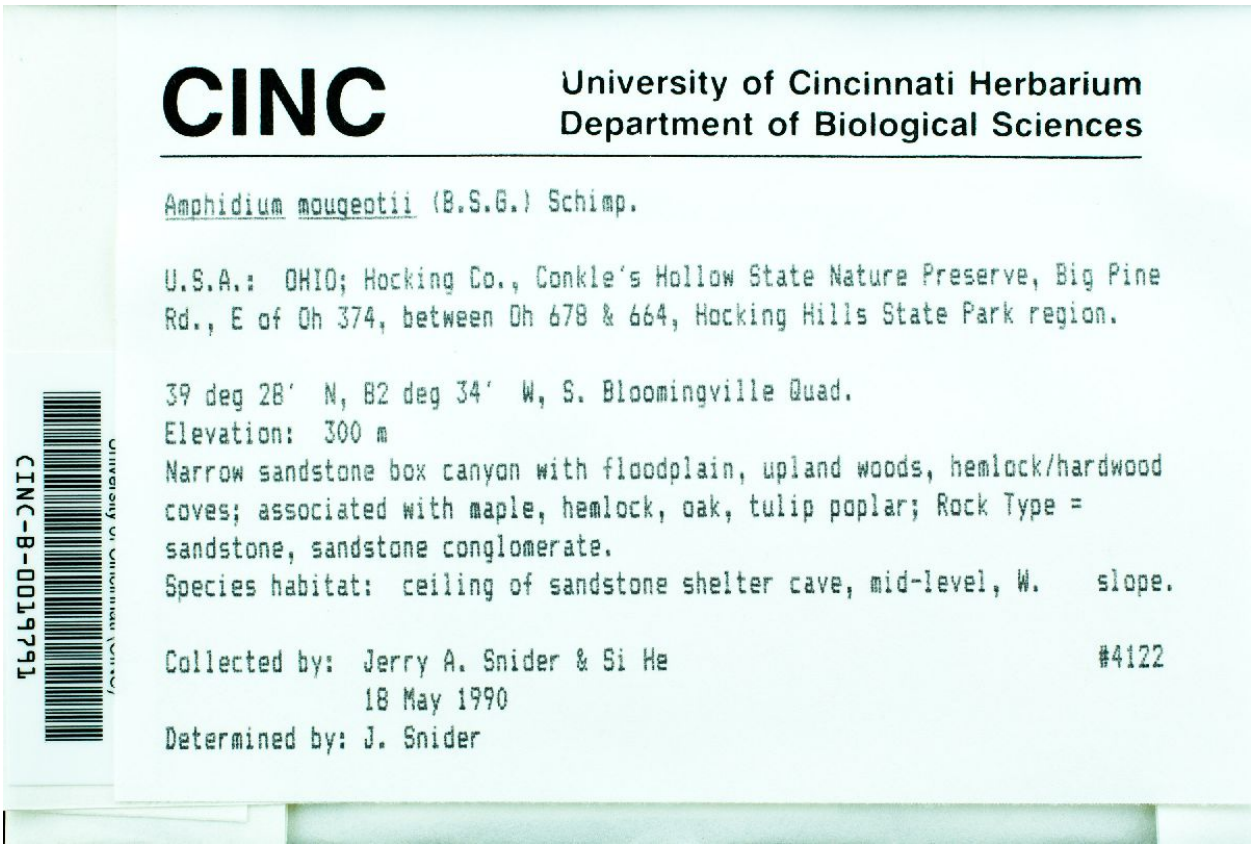
   This label does provide an exact elevation. Enter “300m” into the Verbatim Elevation field. This will automatically fill in the lower range box of the “Elevation in Meters” field to the left.

7. **Verbatim Depth –** If the label provides an exact depth in water at which the specimen was collected, enter it here. We have yet to encounter a record with this kind of data, but maybe we’ll see it one day on aquatic or marine plants that we have yet to digitize.

Prior to georeferencing, the completed Locality section for this example should look like this:



Part 4 – Miscellaneous



CINC

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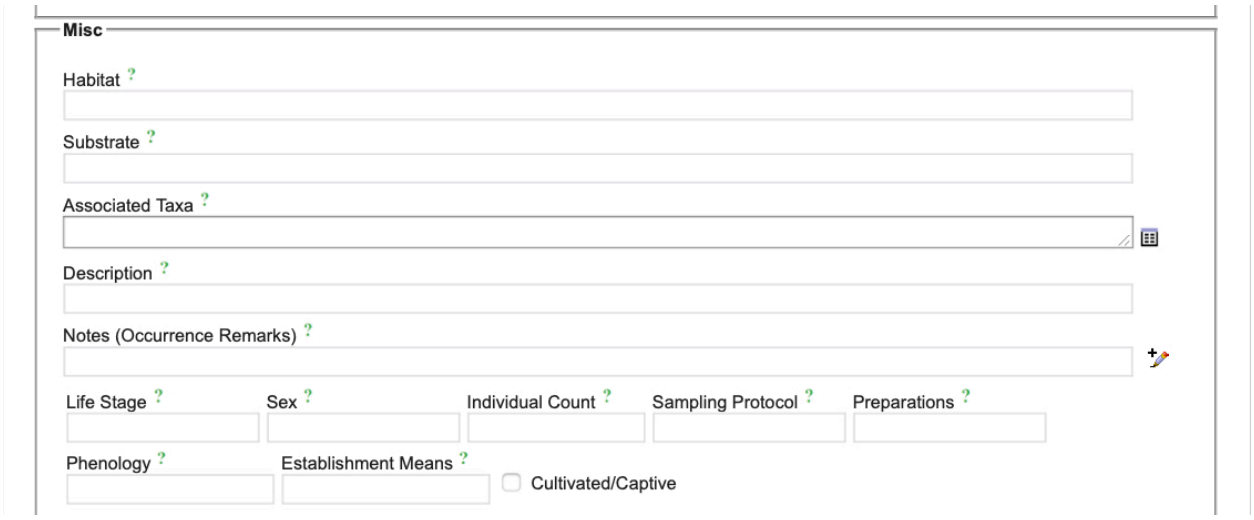
U.S.A.: OHIO; Hocking Co., Conkle's Hollow State Nature Preserve, Big Pine Rd., E of Oh 374, between Oh 678 & 664, Hocking Hills State Park region.

39 deg 28' N, 82 deg 34' W, S. Bloomingville Quad.
Elevation: 300 m
Narrow sandstone box canyon with floodplain, upland woods, hemlock/hardwood coves; associated with maple, hemlock, oak, tulip poplar; Rock Type = sandstone, sandstone conglomerate.
Species habitat: ceiling of sandstone shelter cave, mid-level, W. slope.

Collected by: Jerry A. Snider & Si He #4122
18 May 1990
Determined by: J. Snider

CINC-B-0019791



1. **Habitat:** Does the label provide any specific information about the environment where the specimen was found? Examples may include "woods"…"on top of hill"…"mixed mesophytic forest"…"Thuja swamp"…"Alpine zone"…"dry creek bed." Only enter what is given on the label.

This label provides a bounty of habitat information – more than you will usually find on most labels. It is also slightly confusing – and a bit subjective in this case – because some of the habitat information given on this label may be interpreted as **Substrate** information. Use your best judgement to decide what should go where.

"Narrow sandstone box canyon with floodplain, upland woods, hemlock/hardwood coves; associated with maple, hemlock, oak, tulip poplar. Rock Type = sandstone, sandstone conglomerate. Sandstone shelter cave, west slope."

2. **Substrate:** Was the specimen found growing on a particular substrate? "Substrate" describes exactly what the specimen was growing on; the substrate is not the same as the habitat (the environment in which the specimen was growing). Some labels may simply list "ground" or "soil" or "earth" – those are all appropriate to enter here. Other labels may provide more detailed information, such as "growing on rotten hardwood stump." Please enter the label information as thoroughly as possible.

   In this example, there are many ways one could enter the substrate data. "Mid-level on ceiling of sandstone shelter cave" does a thorough job of detailing the substrate data provided by this label. Given that Snider gave so much detail in the Habitat description, it could also be appropriate to simply enter "sandstone" in this field. Use your best judgement! Do not include anything that isn't listed on the label.

3. **Associated Taxa:** Associated Taxa refers to other identified species collected with the primary specimen. This field provides another dropdown list of scientific names that can be easily selected. If multiple other species are present, use a comma after selecting the first name; this will allow you to use the dropdown list for the second/third/etc. name.

   On this label, other types of plants are listed in the habitat information. They are not considered Associate Taxa, therefore this field should remain blank.

4. **Description:** Use this field to enter any physical information provided by the label. This may include notes about color, size, chemical stains/reactions, or quality of the material.

This label does not provide any description of the specimen material, therefore this field should remain blank.

5. Notes: The Notes section is used to add any remarks about the specimen that don't fall under other categories provided. For instance, some specimens are part of specific collections or from a particular institution that our herbarium is interested in tracking. Many labels have headers or footers that can be ignored, but examples of important collections that we do want to document include the following:

    - From the herbarium of Curtis Gates Lloyd (this is most frequently indicated by a rubber stamp in the lower left of the sheet).
    - From the herbarium of the Cincinnati Society of Natural History (this is indicated by either a stamp or a printed label).
    - Herbarium of Dr. Muegel.
    - Recorded for Flora of Ohio, T. S. Cooperrider, 1983-1984.

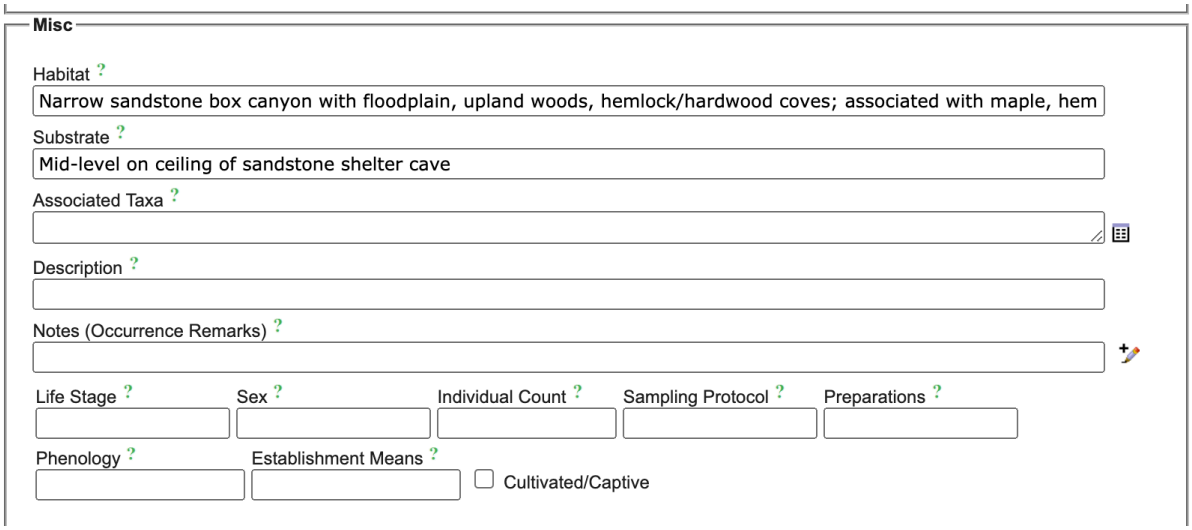
    The Notes section is also used to indicate if you have any trouble completing a record. Some problems you may encounter include difficult-to-read handwriting, misspellings, or ambiguous localities. If you are unsure about something, remember to mark the record's Processing Status as "Expert Required" and then briefly explain the issue in the Notes box. PLEASE INDICATE ANY PROBLEMS USING ALL CAPS AND CONCISE EXPLANATIONS!

6. Life Stage, Sex, Individual Count, Sampling Protocol, Preparations, Phenology, Establishment Means, Cultivated/Captive: This information does not pertain to many specimens in our collection, and labels typically will not provide this information. If you are working with Vascular plants, labels may indicate if the specimen was collected from a cultivated plant. The Phenology box may be important for some specimens (typically vascular plants), but only enter the appropriate abbreviation describing the Phenology (the reproductive condition) of the specimen. The abbreviations used by CINC are as follows:
    - Fr – the specimen shows clear examples of fruits, fruiting bodies
    - Fl – the specimen shows clear examples of flowers
    - St – Sterile, the specimen contains no reproductive structures
    - Sp – Spores present

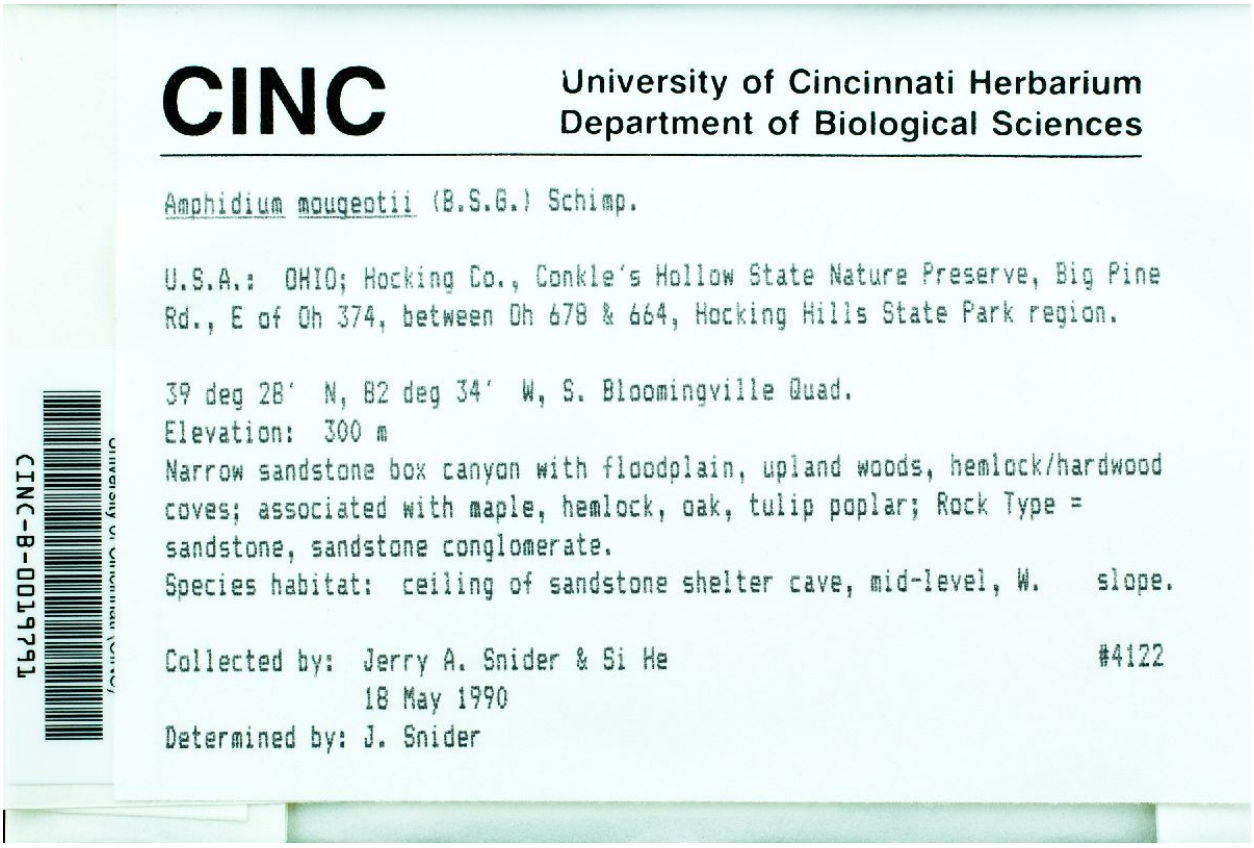
If you are working with vascular plant specimens and you are unsure about what to enter for the Phenology field, please make note of that in the Notes section and mark the record as Expert Required. A large number of specimens (particularly lichens, bryophytes, and fungi) may not contain any note about the reproductive condition on the label, and it may not be obvious from the specimen itself. In these situations, it is appropriate to leave the Phenology field blank. If you are working with lichens, bryophytes, or fungi, only fill this in if you are certain (i.e. the label states that spores are present).

Because there is no mention of the reproductive structures of this specimen, the Phenology field should remain blank.

The completed Miscellaneous section for this example should look like this:



Part 5 - Curation



CINC

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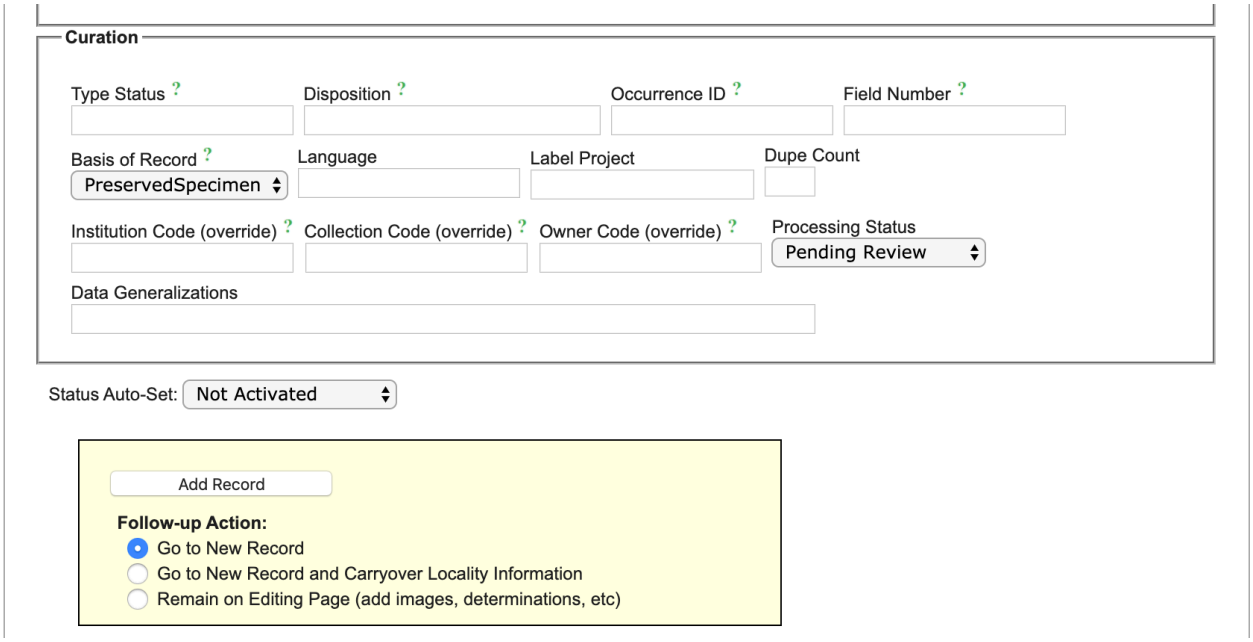
Species habitat: ceiling of sandstone shelter cave, mid-level, W. slope.

Collected by: Jerry A. Snider & Si He #4122
18 May 1990
Determined by: J. Snider

CINC-B-0019791

University of Cincinnati (CINC)



Curation

Type Status ? | Disposition ? | Occurrence ID ? | Field Number ?

Basis of Record ? PreservedSpecimen | Language | Label Project | Dupe Count

Institution Code (override) ? | Collection Code (override) ? | Owner Code (override) ? | Processing Status: Pending Review

Data Generalizations

Status Auto-Set: Not Activated

Add Record

Follow-up Action:
- (•) Go to New Record
- ( ) Go to New Record and Carryover Locality Information
- ( ) Remain on Editing Page (add images, determinations, etc)

Most of the fields in this box do not need to be filled in (or will be filled in by experts at a later time). In general, pay closest attention to **Type Status** and **Processing Status**.

1. **Type Status –** If the label shows that the specimen was a Type, indicate that here. If you are unsure or no information is given, leave blank. Type specimens are the individual or set of specimens used to name and describe a new species. Possible terms you may see on labels (and to add here) include: Type, *Typus*, Holotype, Isotype, etc.

   This is not a type specimen, so the field should remain blank.

2. **Disposition –** N/A

3. **Occurrence ID –** N/A

4. **Field Number –** N/A

5. **Basis of Record –** "Preserved Specimen" (Don't change)

6. **Language –** Was the label written in a language other than English? If it's in English, leave this field blank. If you know what language it's written in, type that here. If you are unsure what language the label is written in (or unsure how to interpret the language) – indicate that in the Notes section and mark the record's Processing Status as "Expert Required."

7. **Label Project –** N/A

8. **Dupe Count –** N/A

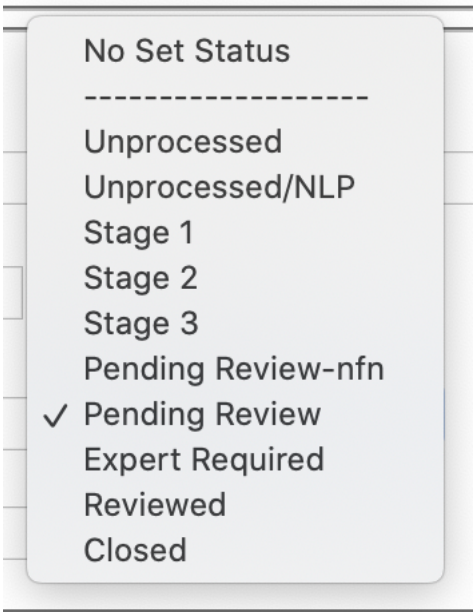
9. **Institution Code, Collection Code, Owner Code –** N/A

10. **Processing Status –** See Part 6.

Part 6 - Processing Status

The following guidelines for setting a record's Proccessing Status apply to Vascular plants, Lichens, and Bryophytes – NOT Fungi. Mycoportal uses its own Processing Status; brief information about Mycoportal Processing Status standards may be found in Appendix B.

In the past, many students and volunteers at the herbarium set the records they were editing to Stage 2. As you work through the collection, you may come across some of these records. If you are concerned that you will be confused by the following Processing Status designations and want to save some time, you may use the "Status Auto-Set" feature located at the bottom of the Occurrence Record Editor page. Selecting Stage 2 from the Status Auto-Set dropdown menu will automatically convert the Unprocessed records you are editing to Stage 2 when you click "Save Edits."



Unprocessed

- Specimen barcode has been scanned into system, some label information may be present, but everything needs to be checked.

Stage 1 – Databased, NO Georeferencing, NO Image

- Databased
    - Collector Info box completed as much as possible

    - Latest Identification box completed as much as possible
    - Locality box completed as much as possible
        - NOT georeferenced
    - Miscellaneous section completed as much as possible
- NOT Imaged

Stage 2 – Databased, Imaged, NO Georeferencing

- Databased
- Imaged
- NOT Georeferenced

Stage 3 – Databased, Imaged, Georeferenced

- Databased
- Imaged
- Georeferenced
- Phenology section completed if possible for the specimen
- In Notes section of Misc box: Are any of these listed:
    - From the herbarium of Curtis Gates Lloyd.
    - From the herbarium of the Cincinnati Society of Natural History.
    - Recorded for Flora of Ohio, T. S. Cooperrider, 1983-1984.

Pending Review ---- Not typically used.

Reviewed

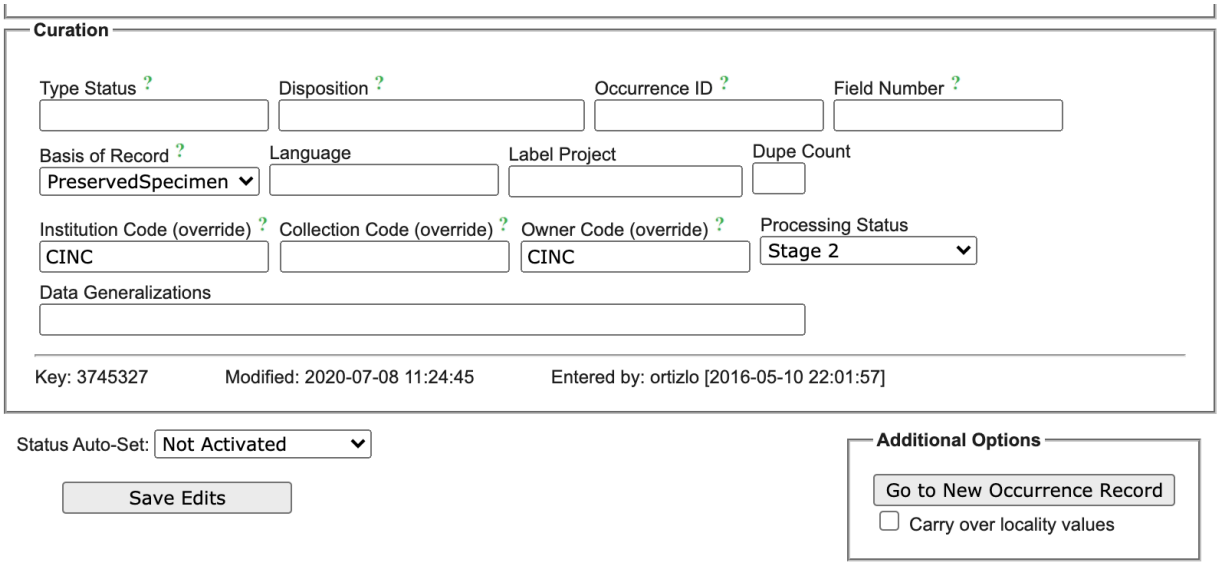
- Databased
- Imaged
- Georeferenced
- Checked over thoroughly by Eric and/or Amy

Expert Required

- The label is too difficult to read
- Very little or no information provided to fill out Collector Info box
    - No Collector name
    - No Collection number
    - No Date
- Very little or no information to fill out Latest Identification box
    - No scientific name given
- Very little or no information to fill out the Locality box

When selecting Expert Required, please let us know what the difficulty was in the Notes section using a concise explanation and ALL CAPS.

The completed Curation section for this example should look like this:



The Processing Status for the Snider 4122 specimen is set to Stage 2 because the record's data has been fully transcribed and the image is uploaded. Although the Latitude and Longitude fields were filled in when you entered the Verbatim Coordinates, this does not mean that georeferencing is complete. Further information about georeferencing can be found in the Georeferencing Guide.

When finished with all sections, click "Add Record" or "Save Edits" (or press Enter). Don't worry if you forget to fill something out – it is easy to return to a record's editing page to make any additions or changes.

Resources

Global Biodiversity Information Facility (GBIF) – Internationally funded open data infrastructure that focuses on making scientific data on biodiversity available online – http://www.gbif.org/

GBIF's Guide to Best Practices for Georeferencing - http://mb.gbif.org/documents/doc-georeferencing-best-practices/en/

Integrated Digitized Biocollections (iDigBio) – The National Resource for Advancing Digitization of Biodiversity Collections (ADBC) funded by the National Science Foundation (NSF) – http://www.idigbio.org/

Symbiota – A library of webtools to aid biologists in establishing specimen-based virtual floras and faunas – http://symbiota.org

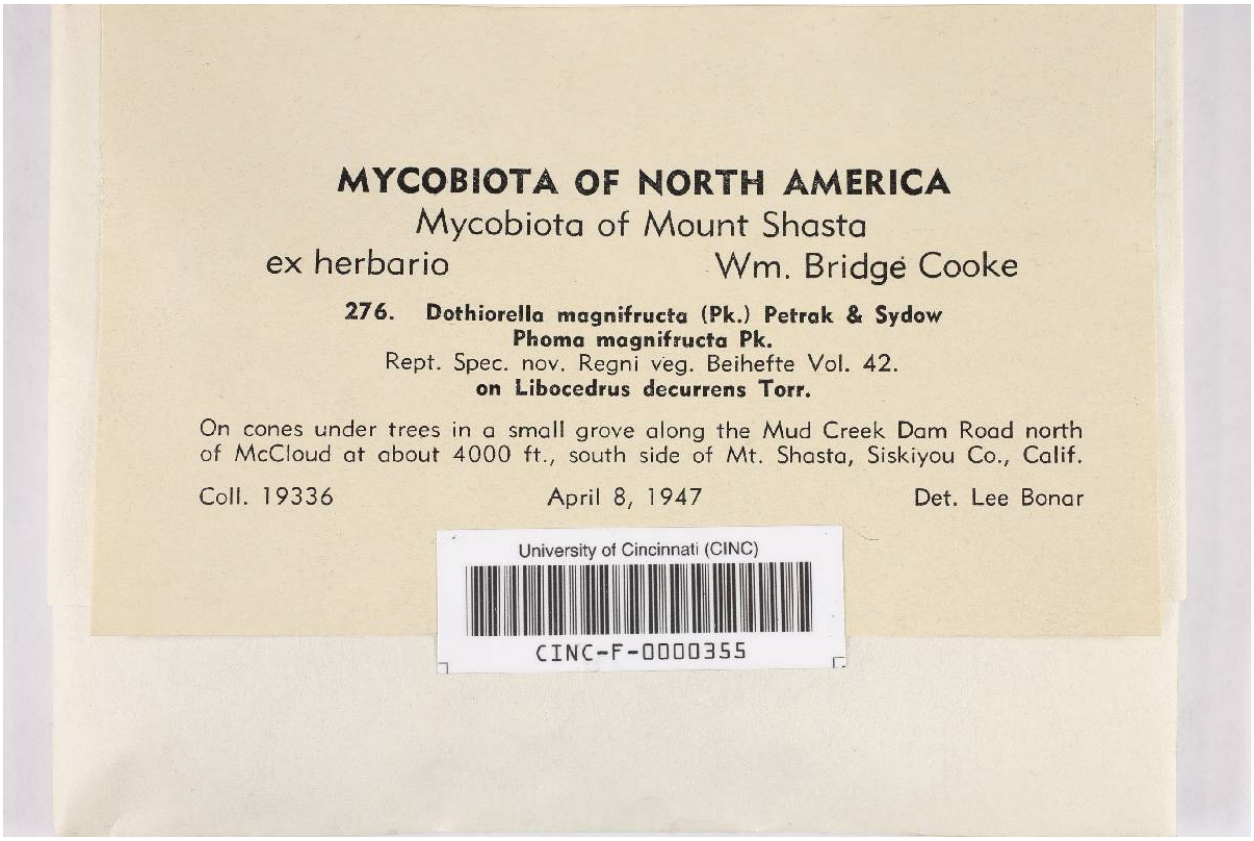
Tropicos – Online botanical database containing taxonomic information on plants – http://www.tropicos.org/

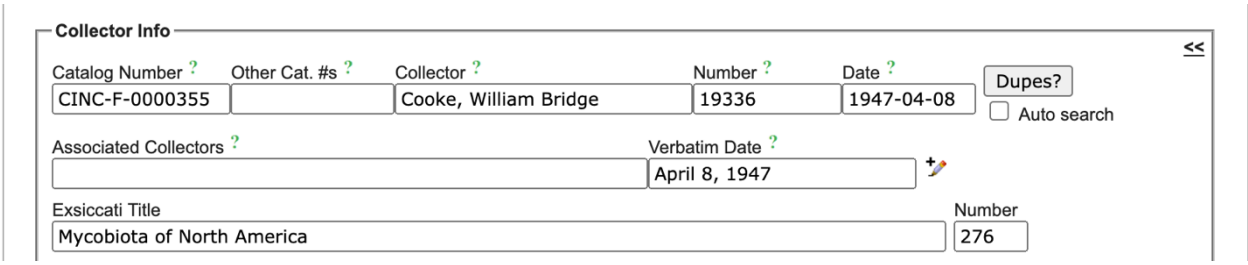
Appendix A – Label Examples

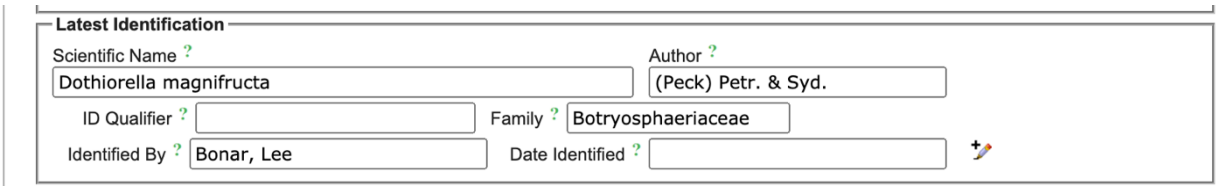
Learning to accurately read labels can take time, as each collector has their own idiosyncrasies in terms of what they chose to record and how they recorded it. This section will attempt to aid in label interpretation by providing examples of common label formats, with a breakdown of how to understand and transcribe the information correctly during digitization. Please remember that if you ever have a question about a particular label, reach out to Dr. Eric Tepe or Amy Harmon.

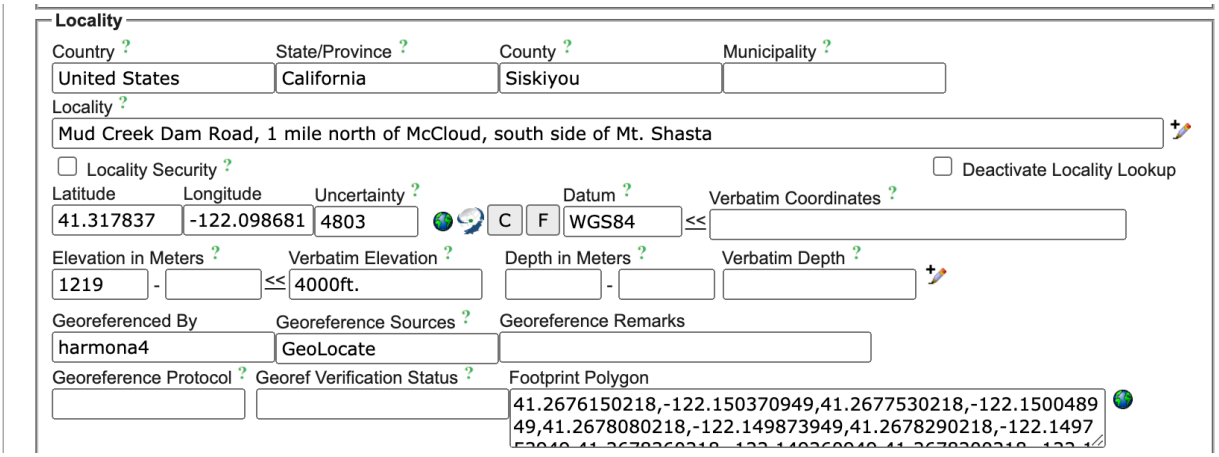
Example 1: Exsiccati Label

This label was chosen to illustrate the layout commonly seen on labels of specimens from exsiccati. This specimen collected by William Bridge Cooke is Number 276 in the exsiccatae titled "Mycobiota of North America." Cooke also provides his unique collection number (19336) located in the lower left side of the label. Be sure you understand the difference between these two numbers.

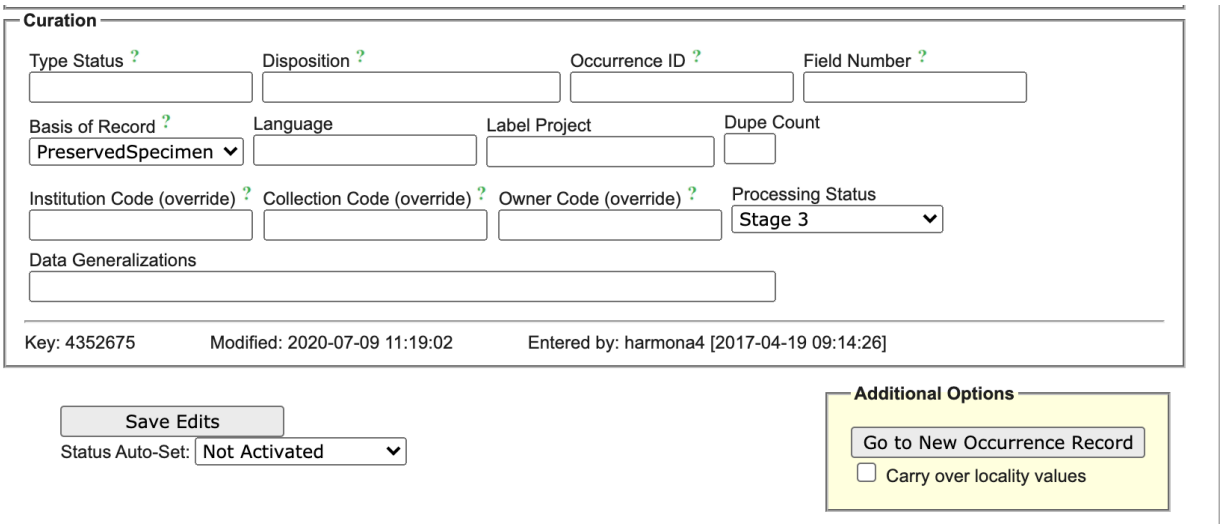





Latest Identification
Scientific Name
Dothiorella magnifructa
Author
(Peck) Petr. & Syd.
ID Qualifier
Family
Botryosphaeriaceae
Identified By
Bonar, Lee
Date Identified


Locality
Country
United States
State/Province
California
County
Siskiyou
Municipality
Locality
Mud Creek Dam Road, 1 mile north of McCloud, south side of Mt. Shasta
Locality Security
Deactivate Locality Lookup
Latitude
41.317837
Longitude
-122.098681
Uncertainty
4803
C
F
Datum
WGS84
Verbatim Coordinates
Elevation in Meters
1219
Verbatim Elevation
4000ft.
Depth in Meters
Verbatim Depth
Georeferenced By
harmona4
Georeference Sources
GeoLocate
Georeference Remarks
Georeference Protocol
Georef Verification Status
Footprint Polygon
41.2676150218,-122.150370949,41.2677530218,-122.150048949,41.2678080218,-122.149873949,41.2678290218,-122.1497


Misc
Habitat
on cones under trees in small grove
Substrate
on Libocedrus decurrens
Host
Associated Taxa
Phoma magnifructa
Description
Occurrence Remarks
Field Notes
Life Stage
Sex
Individual Count
Sampling Protocol
Preparations
Phenology
Establishment Means
Cultivated



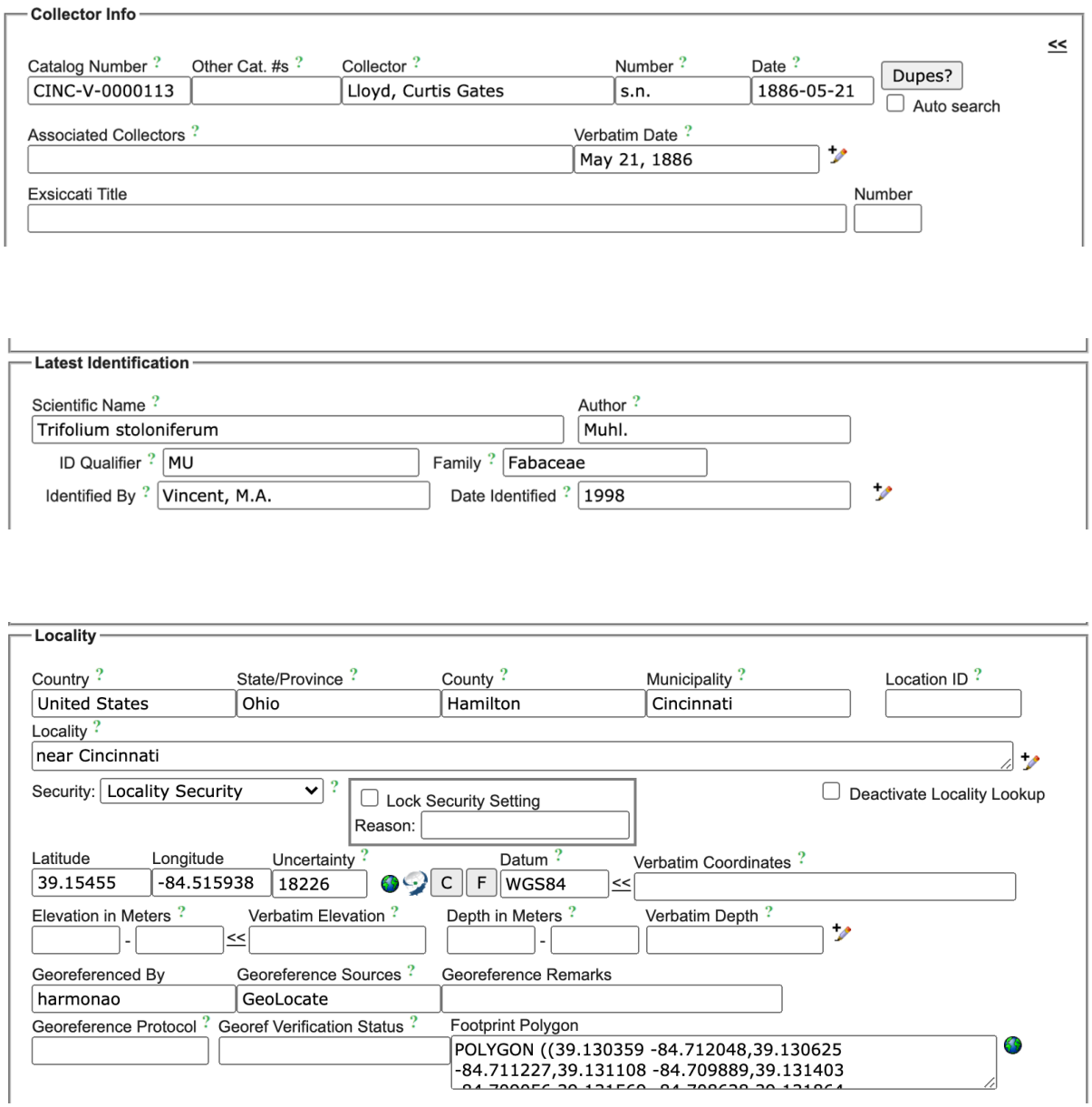
Things to look out for on this label:

- Exsiccati Title and Number (different from Collection Number!)
- There are two fungi named in this specimen/associated with this collection: *Dothiorella magnifructa* and *Phoma magnifructa*. *Phoma magnifructa* is a synonym for *Dothiorella magnifructa* – they are the same species. However, you may not know this if you aren't a mycologist or if you don't know where to find reputable information online. It is appropriate to put this name in the Associated Taxa box in this situation.
- Notice how the label gives the elevation in feet. Once typed into the Verbatim Elevation box, this measurement is automatically converted into meters in the box to the left.
- This specimen has been set to Stage 3 for the Processing Status because it has been imaged, data from the label has been entered fully, and the locality has been georeferenced.
    - NOTE: This specimen is in Mycoportal, and they use slightly different Processing Status standards than we do!

Example 2: Annotation Examples



This specimen was chosen to illustrate how annotations may appear on some labels. It was also chosen to show the rubber stamp indicating a specimen from the herbarium of Curtis Gates Lloyd – this is information our herbarium is interested in tracking in the Notes section of the database.

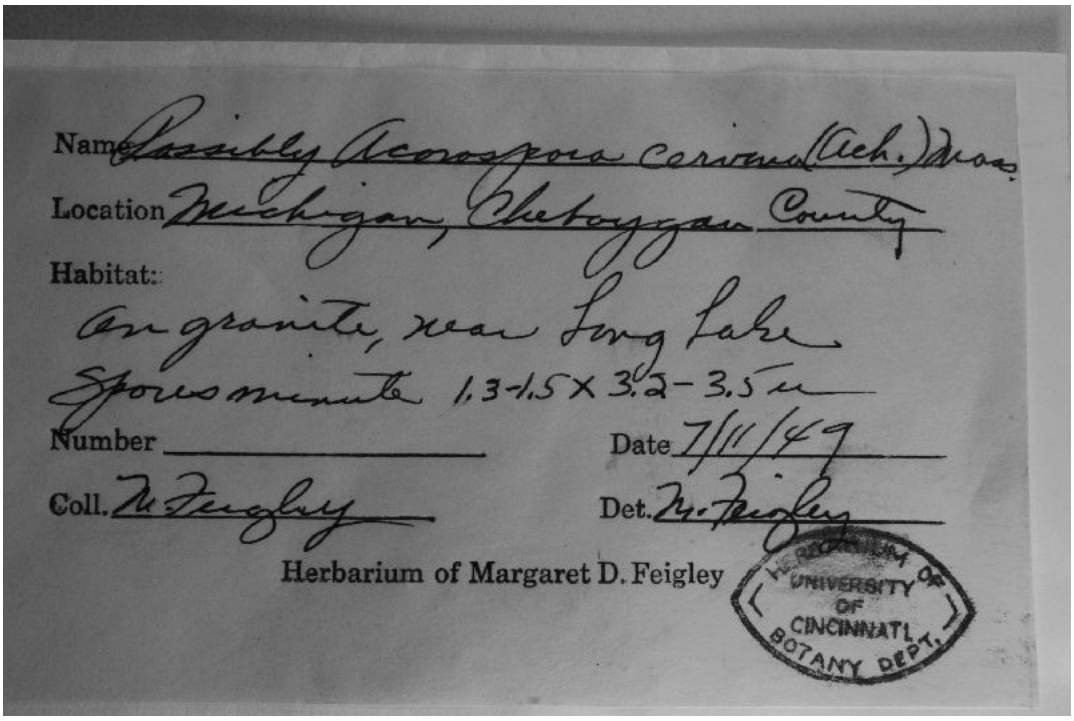




Things to look out for on this label:

- This label contains multiple annotations, but each one is a confirmation of the original identification. These were likely added by botanists using this particular specimen in a detailed study of this species. Enter the most recent determination.
- This specimen sheet was stamped to indicate that it came from the herbarium of Curtis Gates Lloyd. This stamp is typically placed in the lower left corner of the specimen sheet (for mounted vascular plants); occasionally it may be slightly obscured by the label on smaller specimen packets.
- The handwritten number on the original label (7304) is not considered the Collection Number. As it is not an official catalog number or Exsiccati Number, it doesn't need to be entered anywhere in the database.

Example 3: Handwritten Label (with ID Qualifier!)



Collector Info

Catalog Number	Other Cat. #s	Collector	Number	Date
CINC-L-0000002		Feigley, Margaret D.	s.n.	1949-07-11

Dupes? Auto search

Associated Collectors	Verbatim Date
	July 11, 1949

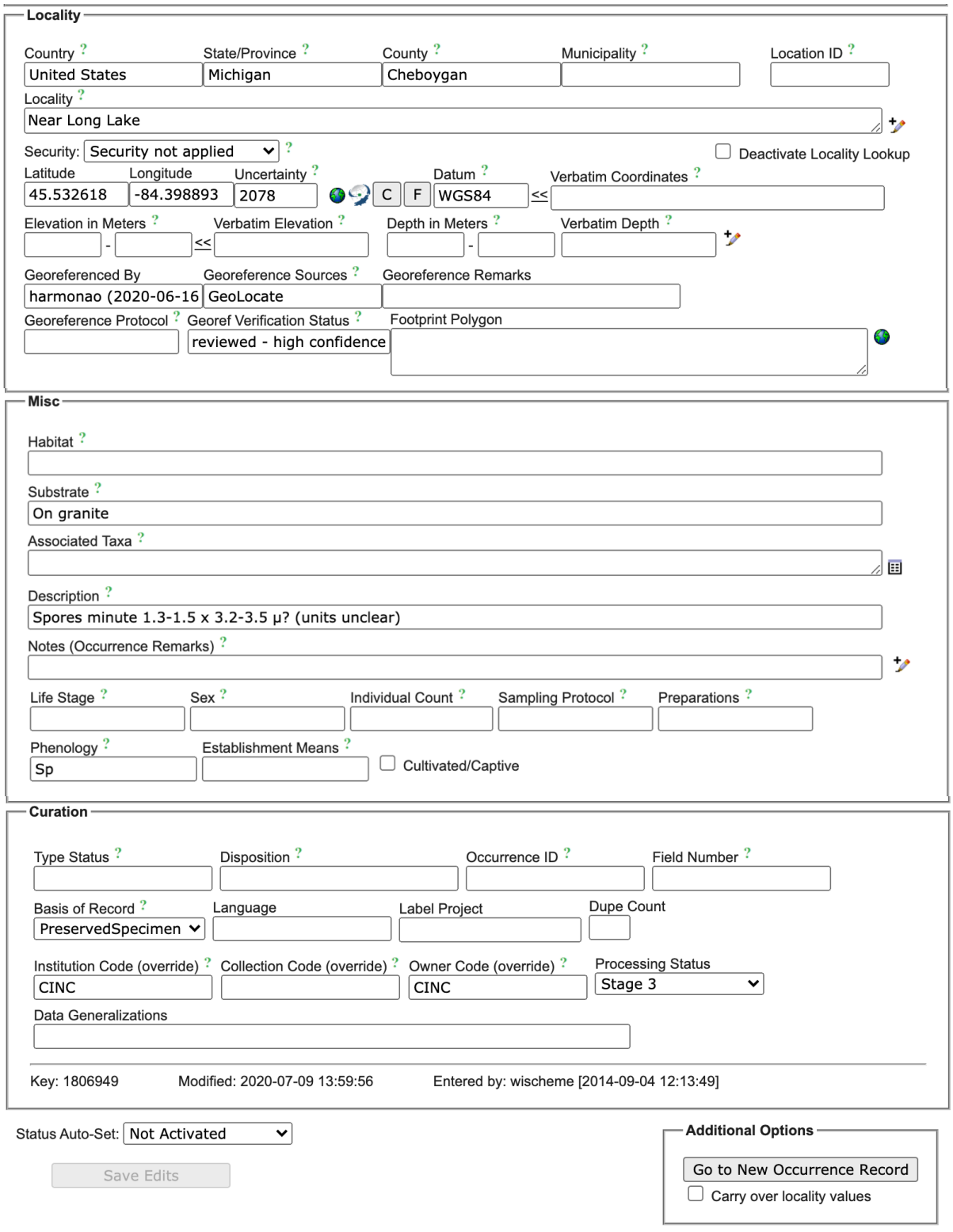
Exsiccati Title	Number

Latest Identification

Scientific Name	Author
Acarospora cervina	A. Massal.

ID Qualifier	Family
"Possibly"	Acarosporaceae

Identified By	Date Identified
Feigley, M.D.	1949-07-11



Locality

Country: United States | State/Province: Michigan | County: Cheboygan | Municipality: | Location ID:

Locality: Near Long Lake

Security: Security not applied | Deactivate Locality Lookup

Latitude: 45.532618 | Longitude: -84.398893 | Uncertainty: 2078 | C | F | Datum: WGS84 | Verbatim Coordinates:

Elevation in Meters: - | Verbatim Elevation: | Depth in Meters: - | Verbatim Depth:

Georeferenced By: harmonao (2020-06-16 | Georeference Sources: GeoLocate | Georeference Remarks:

Georeference Protocol: | Georef Verification Status: reviewed - high confidence | Footprint Polygon:

Misc

Habitat:

Substrate: On granite

Associated Taxa:

Description: Spores minute 1.3-1.5 x 3.2-3.5 µ? (units unclear)

Notes (Occurrence Remarks):

Life Stage: | Sex: | Individual Count: | Sampling Protocol: | Preparations:

Phenology: Sp | Establishment Means: | Cultivated/Captive

Curation

Type Status: | Disposition: | Occurrence ID: | Field Number:

Basis of Record: PreservedSpecimen | Language: | Label Project: | Dupe Count:

Institution Code (override): CINC | Collection Code (override): | Owner Code (override): CINC | Processing Status: Stage 3

Data Generalizations:

Key: 1806949 Modified: 2020-07-09 13:59:56 Entered by: wischeme [2014-09-04 12:13:49]

Status Auto-Set: Not Activated

Save Edits

Additional Options

Go to New Occurrence Record

Carry over locality values

Things to look out for on this label:

- Hand-written labels can be the most difficult labels to decipher, especially if you are not familiar with cursive. Pre-printed labels like this often offer helpful context clues that may aid in your deciphering of the handwriting.
    - For example, the bottom of the label contains the print "Herbarium of Margaret D. Feigley." On the printed line next to "Coll:" (Collector), we read/infer that this specimen was collected by M. Feigley. The label provides us with her full name (printed), so that can confidently be entered into the Collector field in the database. Furthermore, her handwritten name shows us how she writes those letters in cursive (capital M, capital F, and lowercase e, i, g, l and y), allowing us to interpret other potentially confusing written portions of the label.
- When this label's data was entered, the student worker did not know that it is unnecessary to include that Margaret made the identification of the specimen on the date she recorded the collection. That's okay…as long as the information is correct!
- If you look next to the scientific name written on the label, you can see the word "Possibly" written first, indicating that the identification given isn't 100% certain.

Appendix B: Processing Status for Mycoportal

Mycoportal – the database used to catalog our fungi collection – uses its own unique system of assigning Processing Status to records.

Stage 1 = skeletal record with image

Stage 2 = record is fully transcribed

Stage 3 = record is georeferenced and fully complete (our goal!)

We also use Pending Review for our transcriptions in which the public helps us until our Collections Manager can review these and change them to Stage 2.

Expert Required is used when there is an issue that our students cannot figure out (foreign language, handwritten label, etc.), which alerts our Collections Manager to look at these records.