**Herbarium Barcode Workflow Guide**

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## Fetching the Specimens

*Safety:*

*\* Please note that there are ladders and stepping stools located within the collection. Be sure to observe safety precautions when working in unwieldy situations. Use a ladder to pull specimens from boxes at a height and with a partner, if necessary.*

Bring the ‘Barcoding’ cart to the first box or cabinet in the collection to be entered into the app. The last box or cabinet fully digitized will be indicated by a yellow ‘DaSSCo Digitized’ sticker.

Transfer the stacks of folders from the boxes or cabinets from the Herbarium to the numbered pigeonholes in the cart, taking care to maintain the same order by

* placing the contents of each box or cabinet in the numbered pigeonholes in order from 1-12
* at Herbarium C, keeping the plastic bag with box number associated with the stack in the pigeonhole
* at Aarhus Herbarium, placing a laminated ‘Box #’ card at the top of the stack of folders in each pigeonhole onto which you have written the corresponding number

There is no need to fill the cart completely. Fill it with as many stacks as you can comfortably digitize in a session. Wheel the cart back to the Barcoding Workstation.

Take the first stack of folders from the first pigeonhole and bring it to the workstation. If at Herbarium C, remove the folders from their bags. If the inner bag is vacuum sealed, carefully cut it open. Keep the bags nearby.

If at Aarhus Herbarium place the laminated ‘Box #’ card nearby.

Make sure not to lose association of what box number you are barcoding.

You can now start adding information into the app.

## Opening and Logging into the App

Turn on the computer at the workstation. At NHMD, log in using the shared DaSSCo account:

Computer login:

Username: **SUA-SNM-DaSSCo01**

Password: **zaq12Wsxcf=03**

Open the DaSSCo Mass Digitizer program on the desktop by double clicking the icon:

A computer screen with a yellow bird

Description automatically generated

Select your institution from the drop-down menu and log in using your Specify account. Choose the relevant collection.

Graphical user interface, text, application

Description automatically generated

Enter the data of the first folder into the green area of the app. Remember to update the app when you start a new folder, especially the taxonomic name and when you start a new box/stack.

A screenshot of a computer application

Description automatically generated

Once you have added the folder data to the green area of the app, you can add specimen specific data to the blue area, e.g. the barcode number. This is also where you can indicate the state of the specimen, e.g. ‘damaged’, ‘obscured’ etc.

See the next section for more details or check the ‘Mass Digitisation Guide’ for in depth information, especially regarding ‘Taxonomic name’.

## Assigning Barcodes to Specimens

*Gloves:*

*\* Please note that gloves and lab coats are available to protect you from mercury chloride and to protect the specimens from fingerprints. Masks are also available, but airborne particles are below The Danish Working Environment Authority’s 8-hour threshold.*

Workflow:

* Select the top folder of the stack and enter the folder data into the app.
* Open the folder and move the stack of herbarium sheets to one side. Select the top specimen and place it in front of you.
* Enter specimen specific data into the app and place a barcode label on the upper left corner of the herbarium sheet, or as close to it as possible. Do not obscure any text or watermark on the sheet and do not place the barcode on any part of the specimen.
* Scan the barcode and place the sheet back in the empty folder.
* Select the next sheet and repeat.
* Place barcoded sheets on top of each other. Never place sheets with specimens facing down.
* When you start a new folder, update the app accordingly.
* When you start a new box/stack, update the app accordingly.
* Remember to take short breaks to stretch, move and/or hydrate. If you do not use gloves, wash your hands before eating, drinking or using the restroom.

The number of barcodes applied to a sheet depends on the number of specimens on the sheet.

A specimen is associated with a distinct set of data:

A close-up of a white background

Description automatically generated

This set of data is usually written on one label, and so the number of labels usually corresponds to the number of specimens. However, this does not always apply, so carefully check for the number of distinct sets of data on the sheet.

Most sheets will be a **Single Specimen sheet:** a sheet with only one distinct set of data. There may be several plants or plant parts on the sheet, but they are all from the same collection event; they were collected from the same location, on the same date by the same collector.

Apply one barcode to these sheets.

If the sheets from the folder are Single Specimen Sheets, digitization is simply a question of applying a barcode and saving the record in the app by scanning it. However, there are a number of exceptional cases.

*Exceptional Cases*

* If you encounter a **Multi Specimen sheet**: a sheet with multiple specimens with either different locations, collection dates or collectors. Specimens are usually differed with numbers or letters with corresponding labels. 
  1. assign each specimen its own barcode
  2. next to the barcode, write in pencil the number or letter of the label or specimen that the barcode is assigned to
  3. activate the ‘Multiple specimens on one object’ button (MSO) and scan all the barcodes with the same specific container ID
  4. if the next sheet is also an MSO, click the MSO button again to get a new container ID. If not, activate the ‘Single specimen object’ button (SSO).
* If you encounter a **Multi Object Specimen:** a specimen that stretches over multiple sheets, often clamped/clipped together. These can be recognized by only having one label or multiple labels with duplicate data.
  1. remove the clamp/clip
  2. assign a barcode to every connected sheet
  3. in the upper-right corner note “sheet number/sheets in total” (e.g. 1/3, 2/3, 3/3) in pencil
  4. activate the ‘One specimen on multiple objects’ button (MOS) and scan all associated barcodes
  5. do not clamp the sheets back together
  6. Remember to deactivate the MOS button by reactivating the SSO button. If the next sheet is also a MOS, simply click the MOS button again to get a new container ID.
* If you encounter **damaged or loose specimens** 
  1. exercise caution and handle very carefully
  2. tick the ‘Damaged specimen’ check box
  3. apply and scan the appropriate number of barcodes
* If you encounter a **specimen with loose fragments**
  1. please put the fragments in the container on the sheet. If the sheet does not have a fragment folder, please take care to maintain association of the fragment with the specimen.
  2. tick the ‘Damaged specimen’ check box
  3. apply and scan the appropriate number of barcodes
* If you encounter **active (living) pests**
  1. please flag the sheet
  2. return it to the folder and seal the stack of folders in a plastic bag
  3. Inform a Collections Manager immediately
* If you encounter a **folded sheet containing multiple specimens with labels with different distinct sets of data**
  1. this is a Multi Specimen sheet
  2. assign a barcode to each specimen
  3. if any specimens or labels are obscured, check the relevant specimen flag.
  4. activate the MSO button and scan each barcode
  5. reactivate the SSO button
* If you encounter a **folded sheet containing multiple plants but with only one label or labels with duplicate data**

1. this is a single specimen sheet
2. if any part of the specimen or label is obscured, check the relevant specimen flag
3. assign one barcode

* If you encounter a **sheet with** **no label or information** 
  1. check that the sheet is not an MOS with a previous or later sheet
  2. if not, note “No label” in the notes field
  3. assign one barcode

* If you encounter a **specimen that already has a barcode from another project**
  1. apply and scan a barcode as usual unless the specimen is a type at Herbarium C
* If you encounter a **type specimen in a red folder at Herbarium C**
  1. Skip the folder, do not apply a barcode
* If you encounter **any kind (lecto-, iso-, para-, holo- etc.) of** **type specimen in a general folder at Herbarium C**
  1. skip, do not barcode
  2. Note down the box number, folder name and number of types
  3. notify Collection Managers
* If you encounter a **type specimen at Herbarium AAU**
  1. apply a barcode as usual

These are just the most common exceptional cases. Please see the Herbarium Issues Protocol for further guidance on unusual herbarium sheets or consult other digitizers.

## Maintaining Order of Specimens While Barcoding

Place barcoded, scanned specimens to one side of the workspace right-side-up and continue stacking sheets on top of one another. This will place the sheets in reverse order, which will enable them to be placed in correct order during the process of imaging.

Ensure that all herbarium sheets are returned to their folder. Folders should also be stacked in reverse order. Empty folders should be skipped.

If a stack of folders is too precarious, they may be returned to their designated pigeonhole in the cart, taking care to maintain association of the stack with its box number.

Continue digitizing until you have entered information and barcoded sheets for all folders in the stack.

Return the stack and its box number to the corresponding pigeonhole in the ‘Barcoding’ cart.

At Herbarium C, place the stack back in its bags before returning it to the cart. If the stack does not have an outer zip lock bag, add one before returning it.

Mark your progress by placing the ‘Barcoded’ sign under the stack. Once a stack has been barcoded, it is ready to be imaged (see the ‘Herbarium Imaging Guide’).

## Shutting Down the Workstation

When you have finished barcoding, export the data from the Mass Digi App to a csv file. See the ‘Mass Digitisation Guide’ for this.

Once the data has been safely exported, add your input in the ‘Digitisation statistics’, turn off the computer and use the hand vacuum to clean the workstation of any dust and debris.

Return any un-barcoded specimens back to the Herbarium. At the end of a session, there should only be barcoded specimens in the ‘Barcoding’ cart.