

Split Decisions: A Herbarium Specimen Conservation Project

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The origin of mixed sheets

Mixed sheets were created either “deliberately as past practice or accidentally because they have not previously been recognized as a mixture.”¹ Over a century ago, access to herbarium supplies were not readily available and very costly. Many botanists and institutions did not have funding to mount every specimen onto its own herbarium sheet. Compromises had to be made and multiple specimens were mounted onto one sheet to reduce cost and space. This was especially true in the 1930s during the great depression. The other scenario involves the collector unknowingly collecting different species from the same collection event and classifying it under one collection number. These are usually found when a researcher annotates the specimens many years later.

Making a case for splitting mixed sheets

Mixed sheets are often found in the US National Herbarium. The collection management staff are usually informed about these specimens when they are returned from being on loan. These sheets create the following curatorial problems for staff and researchers;

1. Filing a mixed sheet with different species is difficult. Staff have to decide which name to file the specimen under. If the specimen gets refiled it could potentially get filed under the other specimen name. If this happens the filed under name might not get updated in the database.
2. Data entry staff need to create two or more records for one sheet and then add cross-reference information in the notes field. When these specimens are imaged, one image is associated to two records. However, mixed sheets are often overlooked if they only have one label.
3. Researchers annotating specimens have to determine how to designate the different species on the sheet using letters or numbers next to the specimen and then attach a corresponding annotation label. Citing these specimens also poses interesting challenges because two or more specimens can correspond to one sheet number which can be confusing if not mentioned in the publication.

Before splitting-up, ask the following questions?

- Is this a Type specimen?
 - Depending upon each collection’s standards, these specimens require special curation by a higher level staff member.
- If the species are the same, but the labels are from different collecting events (ex. date and collection number different), should they be split?
 - Were they collected in the same country or state? Depending upon the time and resources available, these might not need to be split because they will eventually be filed together. It is up to the discretion of the Collection Manager or Curator to decide as these are considered a lower priority.
- How many mixed specimens are in the collection?
- Do I have the time and/or personnel to do this?

The splitting process:

1. Identify the specimens that need to be separated

- In this example the annotators used numbers (ex. 1,2 & 3) to indicate the different species, then used a pencil to draw an outline around each species.
- There is only one specimen label and one sheet number on the sheet for multiple species.

2. Detach the specimens from the sheet.

Tools: Scissors, tweezers, probe and flimsies.

- Straps and threads are cut off with tweezers or probes. US does not glue specimens to sheets.
- If specimens are glued to the sheet, use scissors to trim around the specimen.¹
- Try to do as little damage as possible to the specimen.

3. Place specimens in individual flimsy/newspaper sheet.

Keep all annotations, notes and labels with the appropriate specimen. Nest flimsies together to keep track of which specimens were previously mounted together.
Tip: write the original sheet number on each flimsy in case they get separated.

4. Fujitsu ScanSnap ix500 scanner

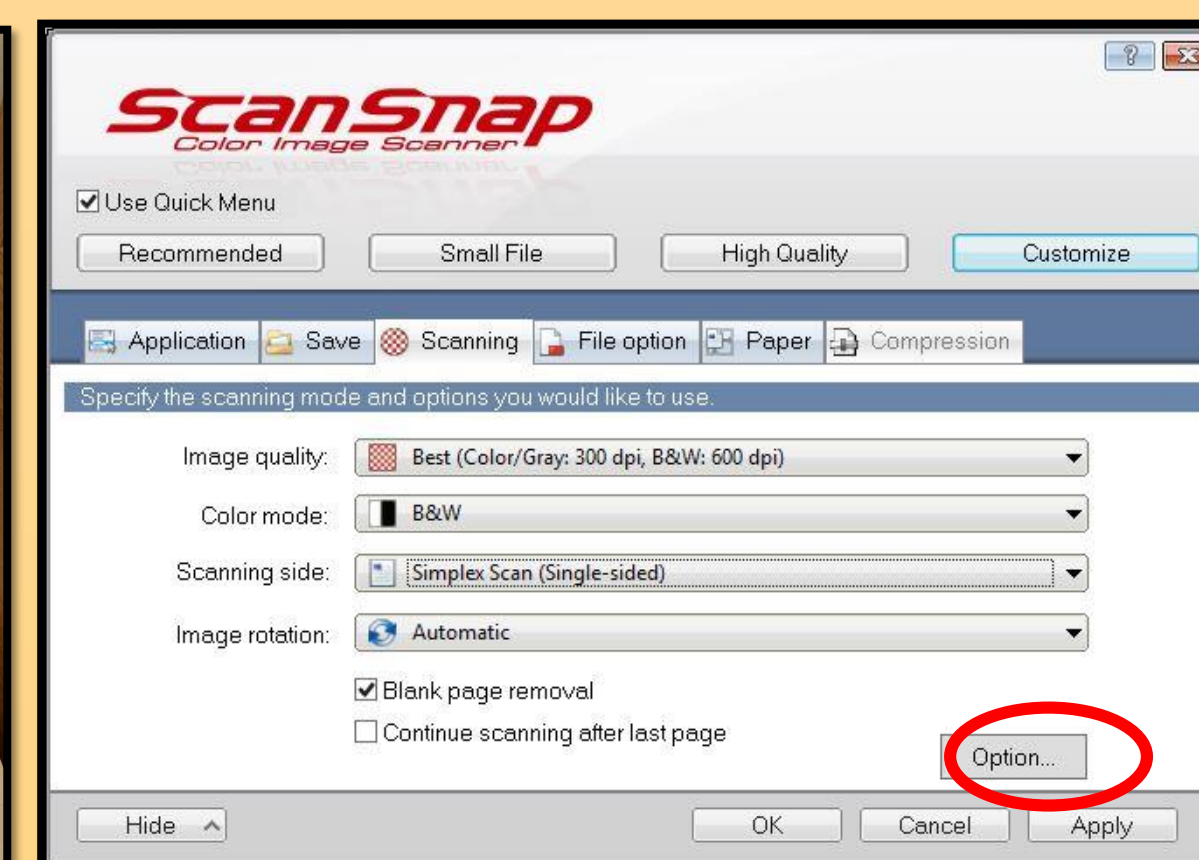
Configure ScanSnap settings to scan labels and annotations, especially paper damage and discolored from acid. Using the ScanSnap plastic sleeve, arrange the labels on a piece of paper (Tip: to scan multiple labels at once and to keep labels from sliding during the scanning process, place a tiny dab of glue on each label and adhere to blank piece of paper). Print on acid-free paper.

4a. Fujitsu ScanSnap settings window 1

Under Scanning tab select the following options

- Image quality: Best
- Color mode: B&W
- Scanning side: Simplex Scan (single sided)
- Image rotation: Automatic

Check the box: Blank page removal
Then click **Option...**

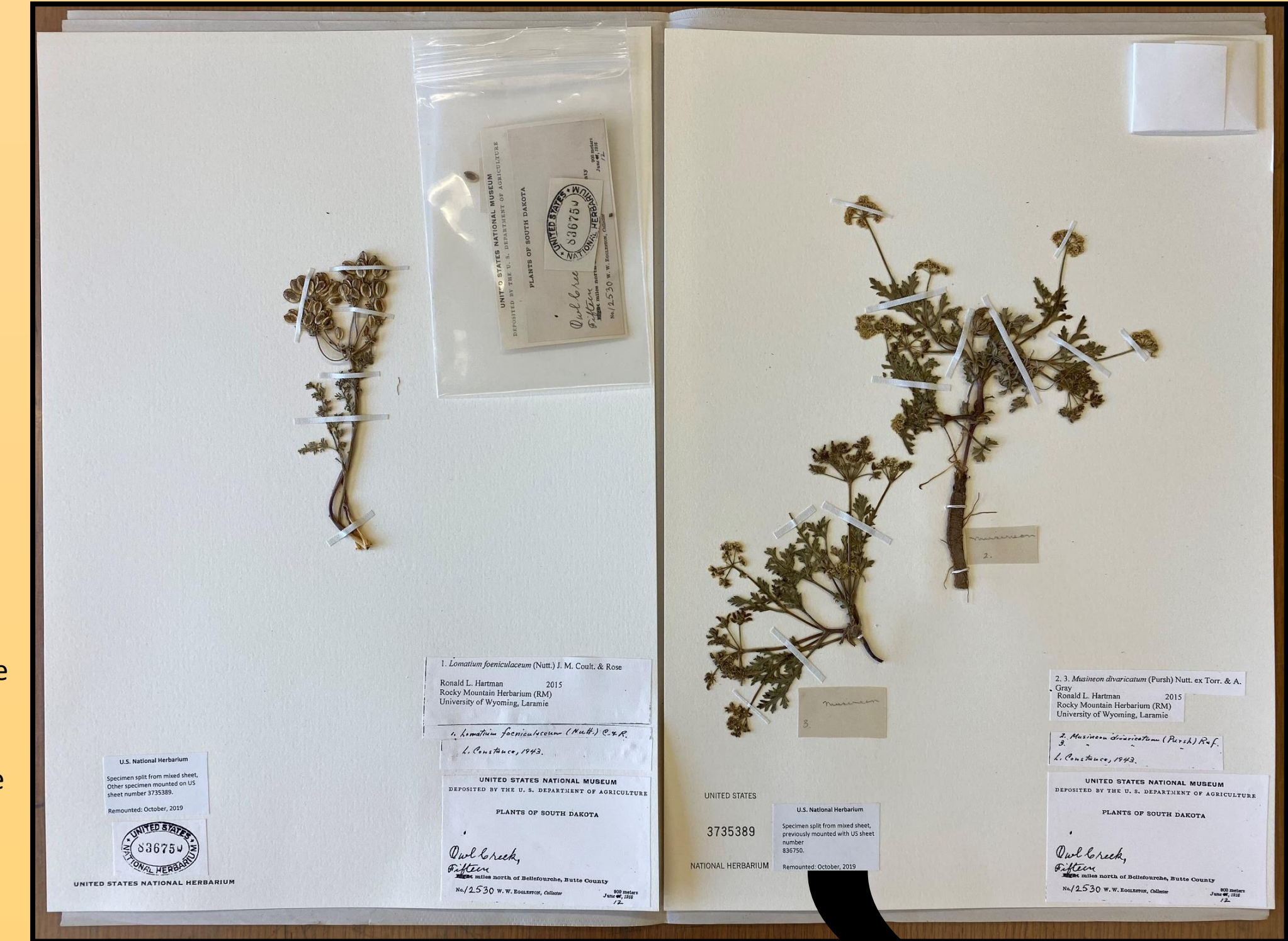


4b. Fujitsu ScanSnap settings window 2

- Check the box: Reduce bleed-through
 - Check the box: Brightness (black & white only)
 - Slide the bar towards light or dark depending upon the discoloration of the paper
 - Check the box: Increase text contrast
 - Click Ok
- The previous window will be open.
Click Apply.

5. Remount specimens on separate sheets with unique sheet numbers.

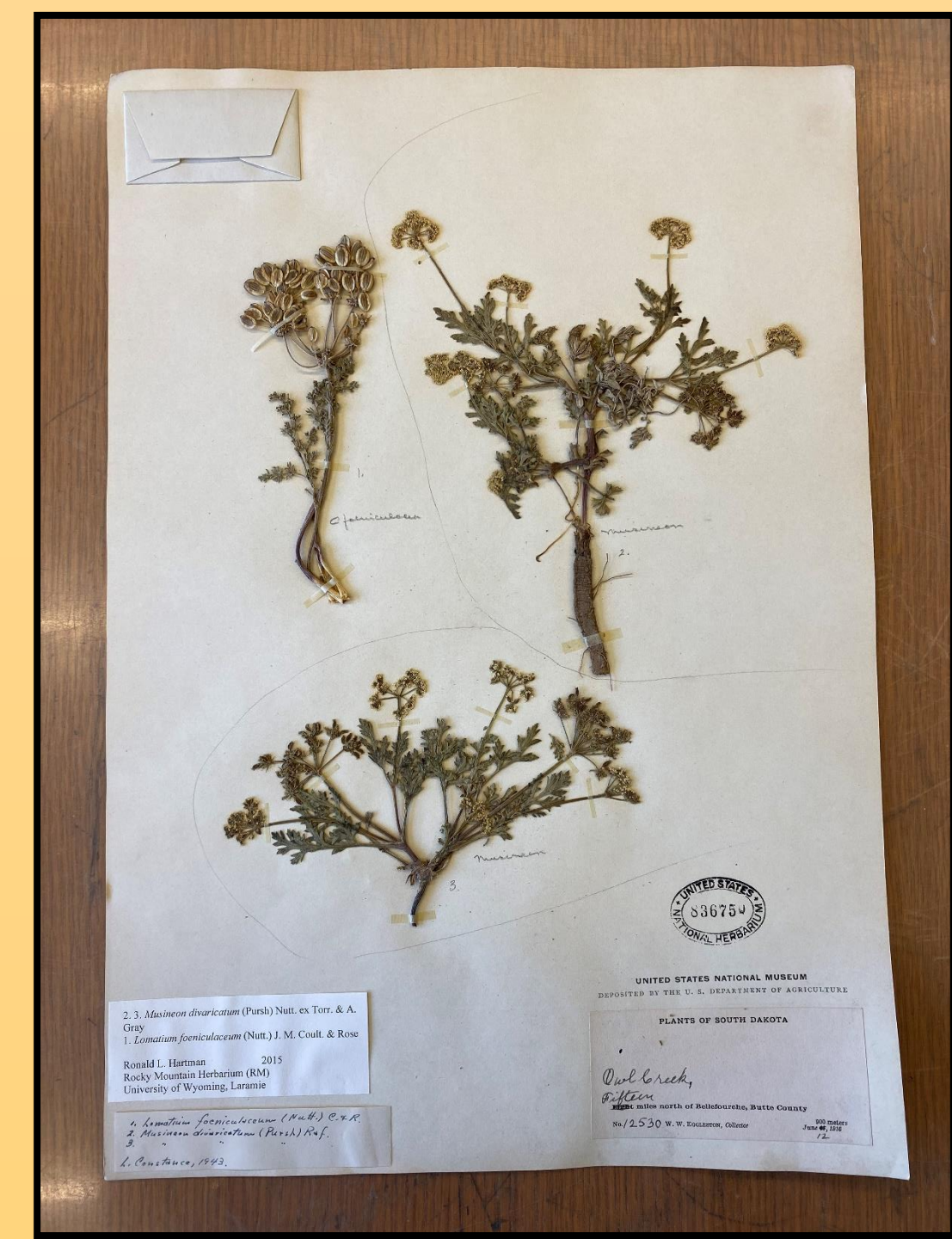
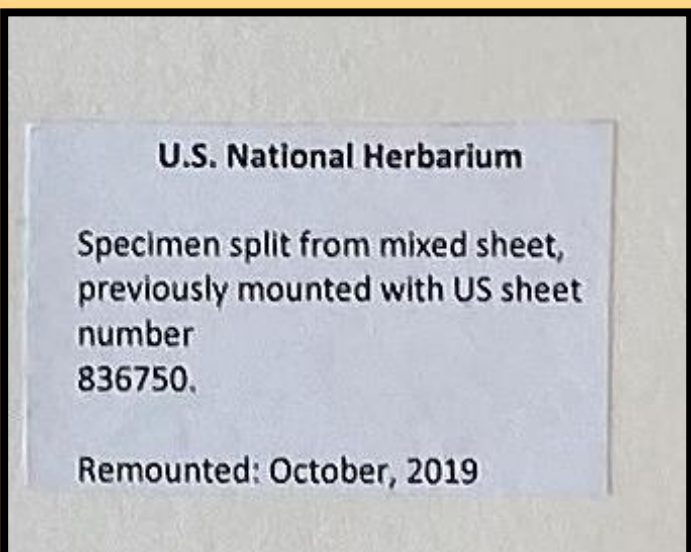
- If there was only one sheet number, decide which specimen will retain the original number and which specimen will receive a new sheet number.
- If there was only one specimen label, print a duplicate of the label for the other specimen.
- Before mounting, configure specimens to show the best characters.
- Attach newly printed labels, annotations and notes to appropriate sheets.
- Keep the original label and annotations with one of the specimens in a separate packet.
- All sheets should be given a cross-reference annotation label mentioning specimen was previously part of a mixed sheet¹. Cross reference the other sheet number on the new annotation label.



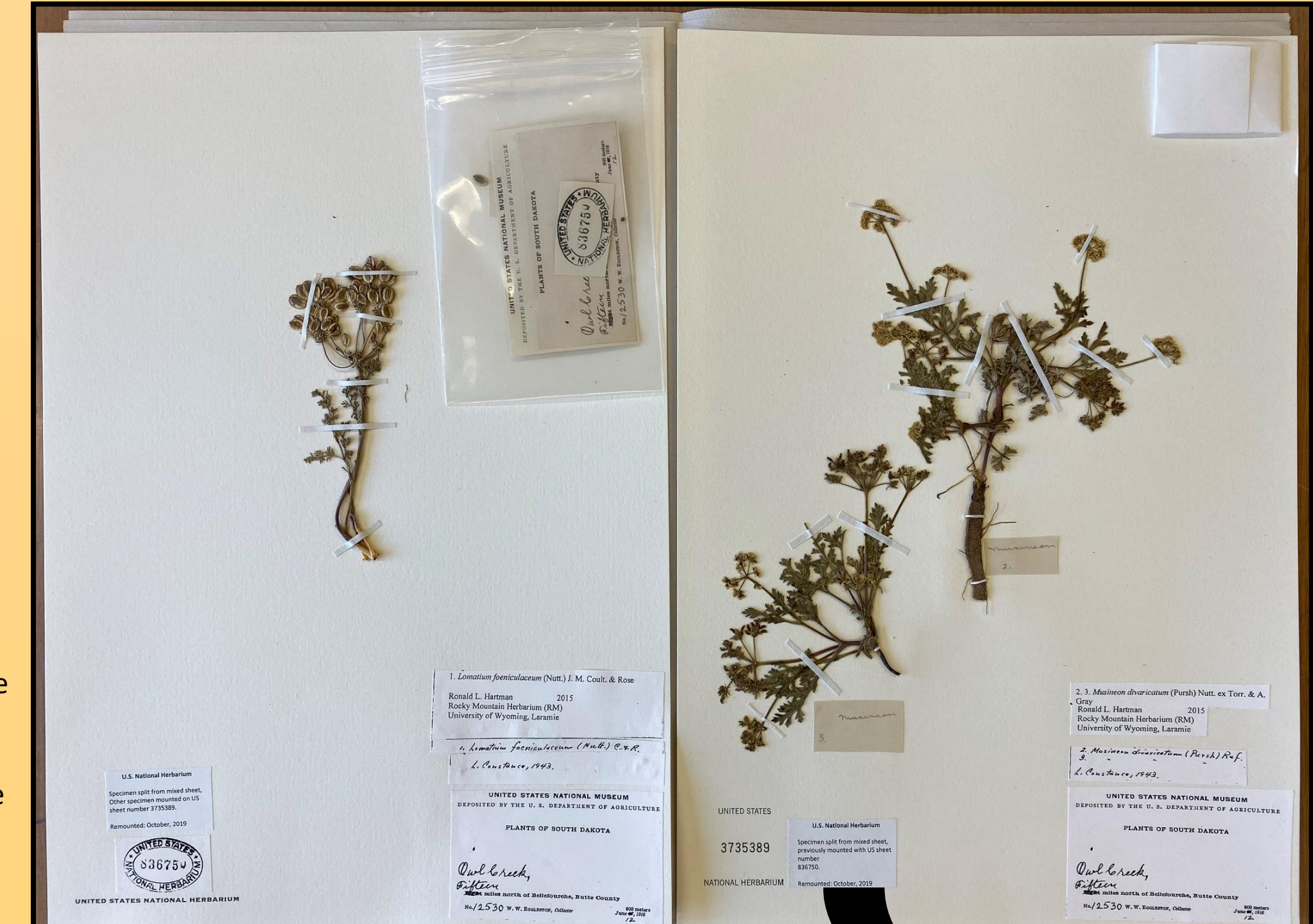
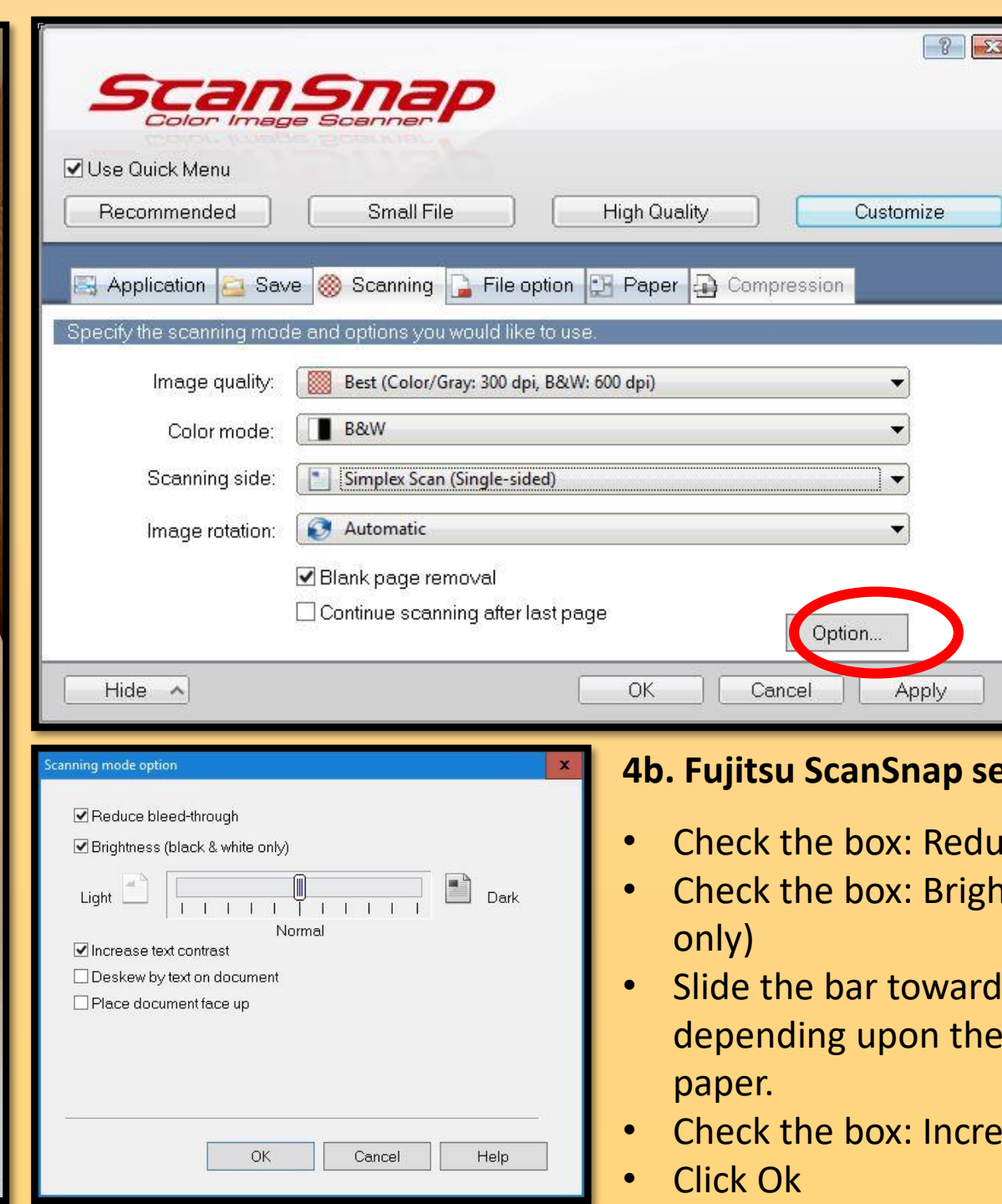
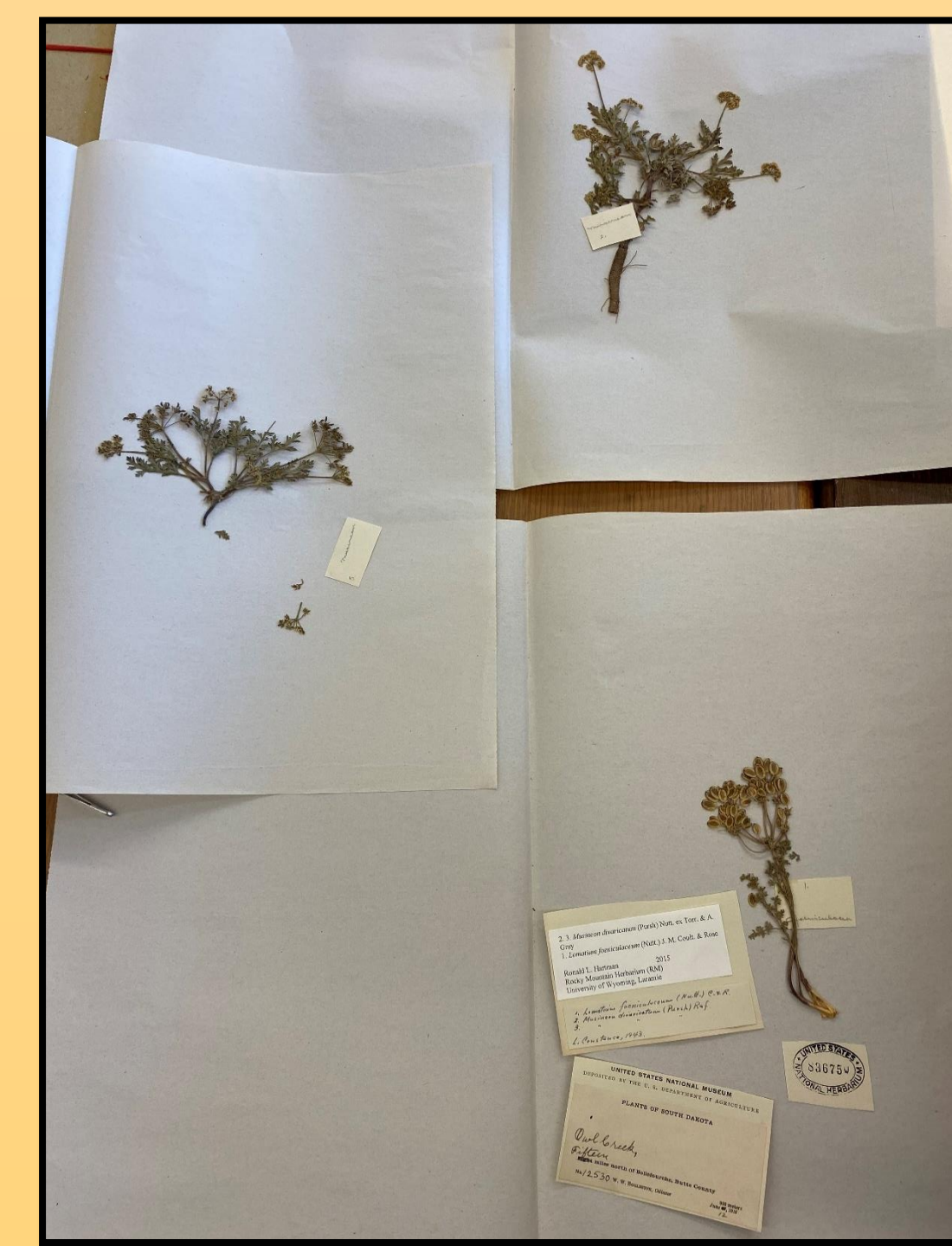
Ex. Cross-reference label to be included on each sheet.

At US we are working towards a completely digitized collection and soon sheet numbers can be used for searching the online catalog.

Other potential cross-referencing information to include: Collector’s name and number, species name, country if necessary¹



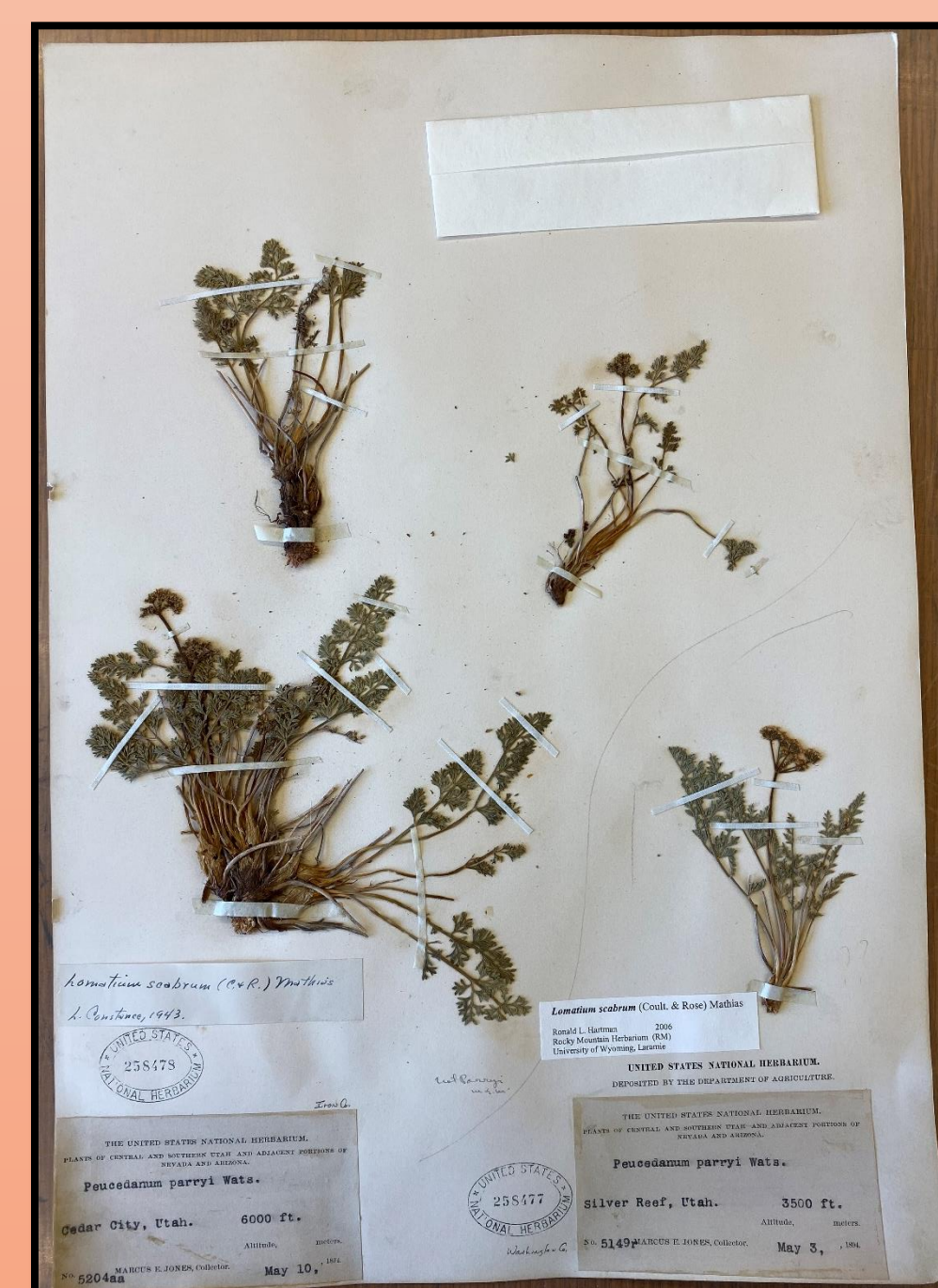
Before



After

Ex. Multiple labels & sheet numbers on one sheet

- In this example two collections are mounted on one sheet. Each collection has a unique collection number, date and location information. However the species are the same.
- Splitting this mixed sheet is straight forward, as long as the person who is dismantling the specimen knows exactly which specimen goes to which label and sheet number.
- The end product: each specimen contains their original label and all accompanying annotations and notes.
- Both specimens will receive a cross reference annotation label, referencing the other sheet number.
- Sometimes this is not necessary, especially if the collection is from a similar location (ex. same state) and identified as the same species.



Before



After

The Challenges:

- If there is only one fragment packet on the sheet for multiple species and the researcher did not indicate which specimen corresponds to the fragments;
 - Get an expert opinion.
 - If nobody can identify the fragments to the correct plant, place the fragments in a separate packet on one sheet and indicate on the packet that it is not clear which specimen it belongs to. Cross-reference the other sheet and species name on the packet.
- If the annotation designates multiple species but the plant material is not clearly designated which species is which, ask an expert to help identify the specimens.
- For researchers citing specimens in publications.
- Data entry technicians will need to continue entering cross-reference annotations in a notes field.
- Severely discolored labels not scanning to quality standards.
 - Adjust the brightness on the scanner to remove shadows and artifacts
 - If the settings do not correct the shadows, then transcribed the label into a label generating program either in a database or in Word.
- This is a major time commitment!
 - One must keep in mind that dismantling specimens takes just as much time as mounting and that one specimen is being split into two or more specimens and each specimen takes time to mount. The work is actually tripled or more.

Words of Advice:

- Follow through with the entire process from beginning to end. Do not dismantle specimens and leave them for someone in the future.
- Try to split and remount a few specimens at a time.
 - One specimen will eventually be two or more specimens, take into consideration how much time is needed if you are splitting 10 specimens, which is going to turn into 20+ specimens.
- Scanning, cutting and matching labels also takes a considerable amount of time and a lot of concentration. Write on the back of the labels the sheet number that each label corresponds with, in order to keep the labels from getting swapped or lost.
- It is much easier to get a fair amount of these specimens completely conserved if two people work together on this project.
 - One person dismantles and remounts specimens leaving room on the sheet for the labels, while the other scans and cuts labels and then remounts the labels to the sheets.

Citation:
¹ Forman, L. & Bridson, D. 1989. The Herbarium Handbook. Royal Botanic Gardens, Kew

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