

DIGITIZATION PROTOCOL

Targeted Odonata Wing Digitization Project

PREPARING THE SCANNER

1. Print the scanning frame on a printer that allows double-sided printing. Be sure to select *Actual size* in the print settings window (Fig. 1).
2. Use a craft knife or scissors to cut out the six windows indicated on the printed frame. If the upper and lower sides of the printed frame are not aligned, cut the windows using the guides on the lower side of the frame.
3. Print the microscale, again selecting *Actual size* in the print window. Cut a 2-cm section of a ruler from halfway down the page (the rulers that include hashing above them) so that the section looks like that in Fig. 5.
4. Acquire the color and gray standards (Tiffen Q-13 Color Separation Guide, small, available at B&H Foto & Electronics, item # [TICSGS](#)). Cut the RGB and WGK circles of the Tiffen Gray Scale card as indicated in Fig. 2 to look like those in Fig. 5.
5. Affix the microscale and standards to the section of the frame labeled "Place color standard & scale here", arranging them to look like Fig. 5.
6. Use a craft knife to cut a piece of white 3/16" (or thicker) foam core poster board to make a border to go around the "full body" window of the frame as shown in Fig. 3.
7. Open the lid of the Epson flatbed scanner. Remove the scanner cover by releasing it at the clips indicated in Fig. 4. Set it aside for later use.
8. Use a KimWipe or lint-free cloth to wipe the scanner glass and now-removed scanner cover clean of any smudges, dirt and dust.
9. Place the now-prepared scanner frame on the scanner glass so that the "face down" side is touching the glass, and with the arrow on the corner of the frame pointing toward the corresponding arrow on the scanner (Fig. 5). Place the foam board over the full body window so that the sides of its inner border are flush with the sides of the window; this will prevent the full body from being crushed during scanning. The frame and scanner are now ready for digitizing specimens.

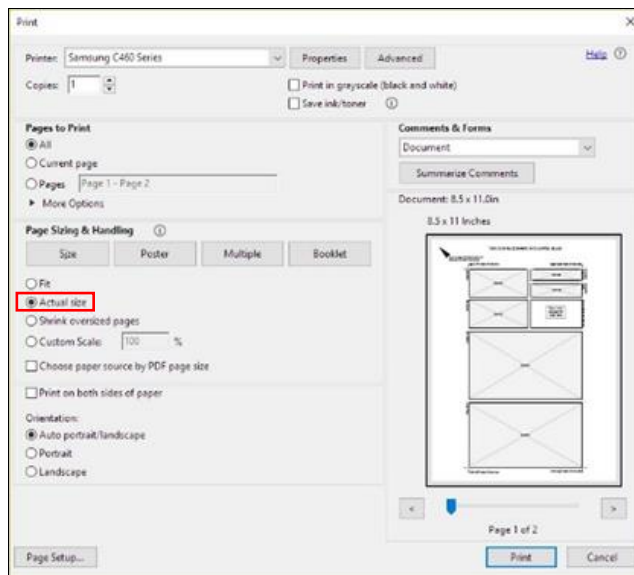


Figure 1. Print settings window.

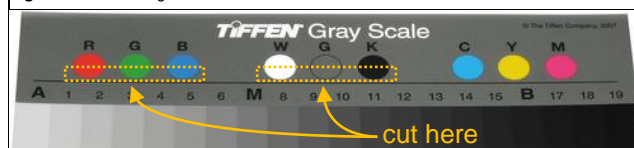


Figure 2. Cutting guide for color & gray standards.

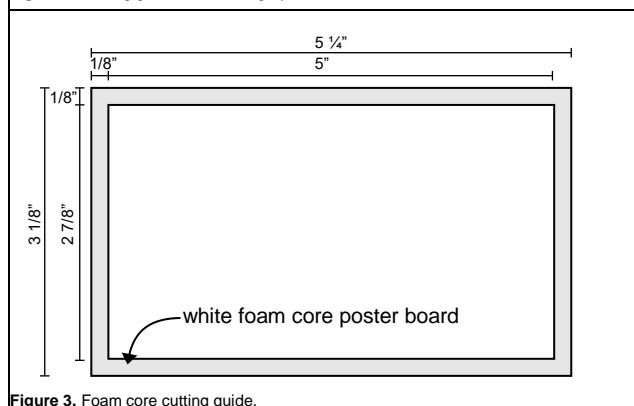


Figure 3. Foam core cutting guide.

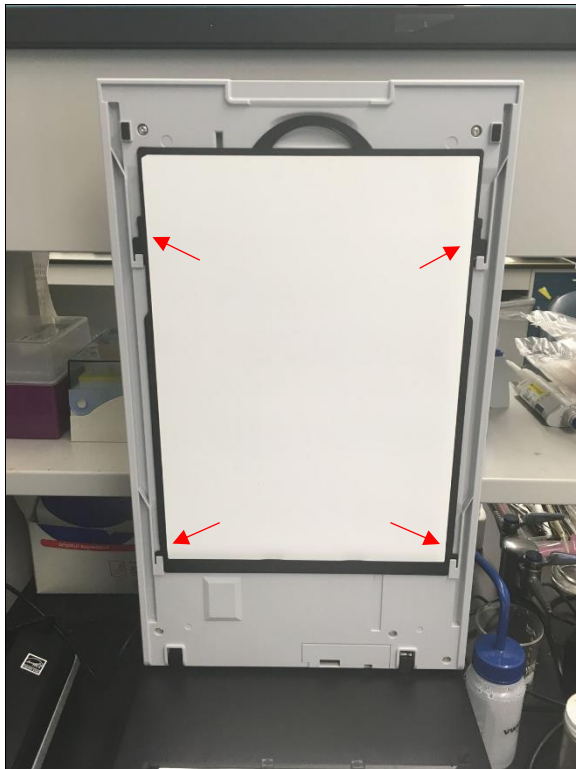


Figure 4. Remove white cover of scanner lid using tabs indicates by red arrows.

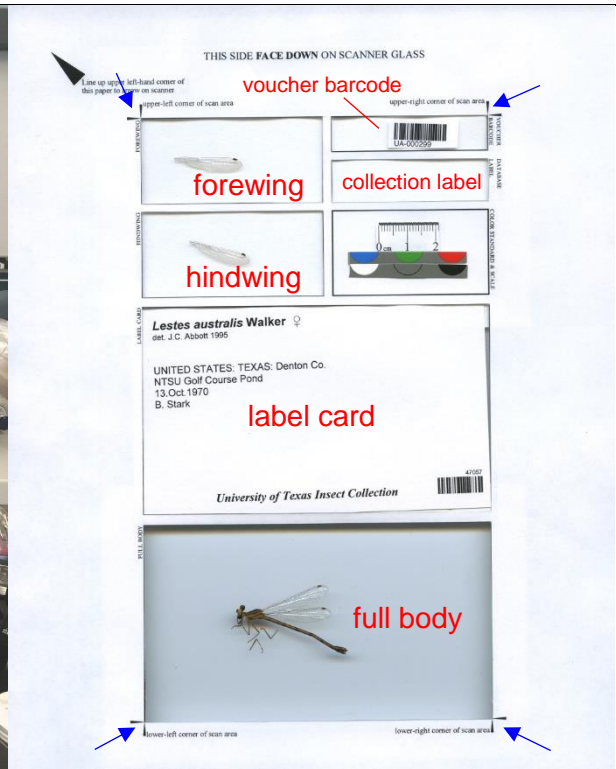


Figure 5. Underside of scanner frame as seen through the scanner glass. Blue arrows indicate corners of scanning area.

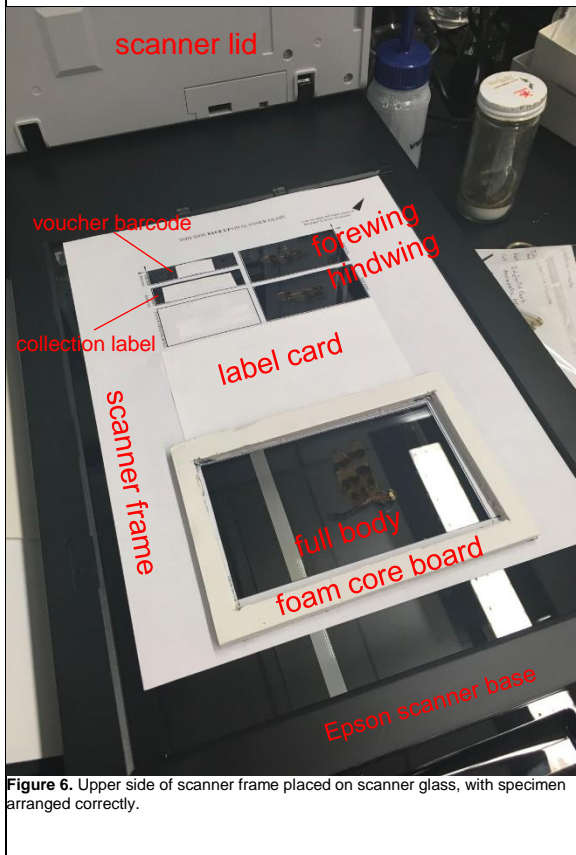


Figure 6. Upper side of scanner frame placed on scanner glass, with specimen arranged correctly.

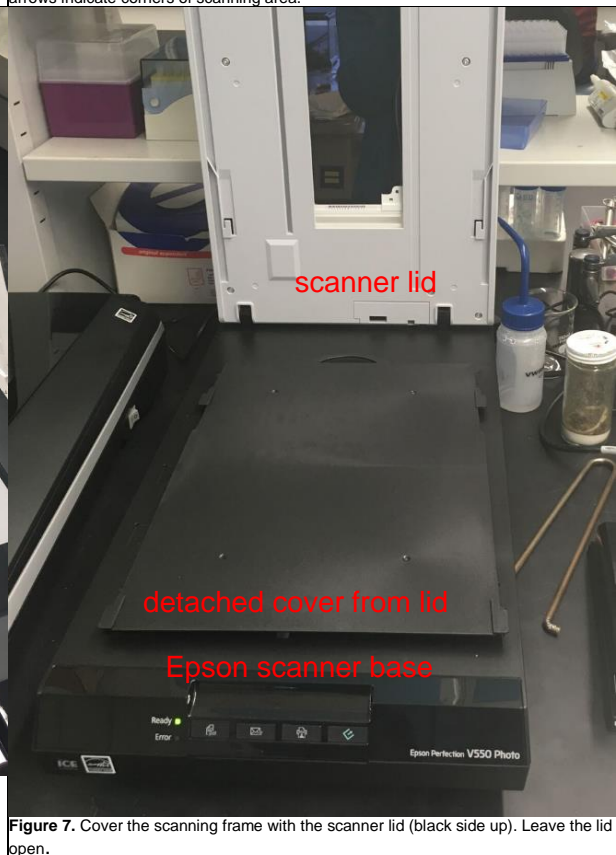


Figure 7. Cover the scanning frame with the scanner lid (black side up). Leave the lid open.

PREPARING A SPECIMEN

1. Select a specimen to scan from the collection you have been assigned. Carefully remove the specimen from the envelope using soft forceps (not fingers).
2. Check the condition of the dragon/damselfly's right wings. If they are mostly intact (not tattered or broken), use the dissecting scissors to carefully make a cut at the base of the right fore- and hindwings (Fig. 8) to remove them from the body. (Note: for small specimens (especially damselflies) it's often easier to do this under a dissecting microscope.) You now have a free forewing (FW), hindwing (HW), and the intact rest of the body ("full body", hereafter; Fig. 9). Note: if the right wings are in poor condition and the left wings are intact, use the left wings instead, but remember to update the annotations in BisQue, accordingly (see step 4b of "Upload images to BisQue").
3. Cut the appropriate next voucher barcode from the sheet of codes for your (e.g. RUN-000100, see Fig. 10).
4. Check the scanner glass that's visible in the open frame windows for dust and smudges, which can build up if doing multiple scans. Carefully wipe this clean if necessary with a KimWipe or lint-free cloth. Take up the scanner frame to do this, if necessary, but be careful to replace it exactly as it was.
5. Place the following items in the proper window of the scanning frame (see Fig. 6).
 - a. The excised FW and HW should be placed each with the dorsal side facing the scanner glass so that the wing base faces right (on the scan it'll face left; reverse this for left-side wings). Place the wings as horizontally as possible and center them in the opening of the window.
 - b. Place the voucher barcode that you have just cut face-down in the appropriate window.
 - c. If the specimen envelope contains a collection-specific label (i.e. a unique label other than the voucher barcode), place it face-down in the appropriate window.
 - d. Place the 3x5" label card face-down in the correct window, after brushing off any insect bits.
 - e. Place the full body with the ventral side of the still-intact wings facing down on the glass (if the right-side wings were removed, the specimen's left side should face the glass, here). If part of the body is broken, place it next to the intact part of the body (as in Fig. 11).
6. Now place a clean white index card over the top section of the frame (including the FW, HW, voucher barcode, and collection label). Do this *slowly* and *carefully* to prevent the wings from being blown away.
7. Finally, *carefully* and *slowly* cover the whole scanner frame with the detached cover from the lid of the scanner, making sure that the white side faces down (Fig. 7). Scan the specimen following the instructions below *without closing the lid* of the scanner.

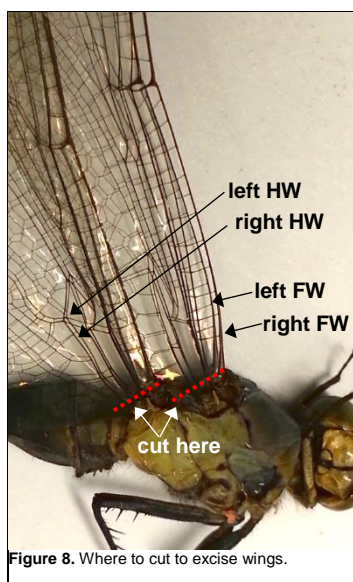


Figure 8. Where to cut to excise wings.

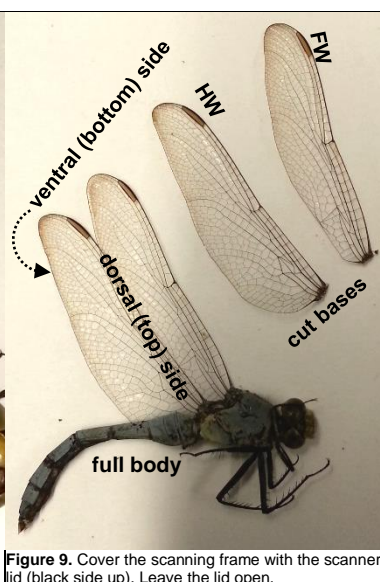


Figure 9. Cover the scanning frame with the scanner lid (black side up). Leave the lid open.



Figure 10. Voucher barcodes.



Figure 11. If body is broken, place pieces "in place", as possible, for scanning.

SCANNING A SPECIMEN

1. Open the image manipulation software, GIMP2 (available for download at gimp.org).
2. Go to *File > Create > Camera/Scanner* (or *Alt+F*, then *T, S, Enter*). Then select the appropriate scanner that you are using (e.g. EPSON v500 or EPSON v550).
3. The Epson Scan scanning utility will open (Fig. 12). Make sure that *Mode* is set to “Professional Mode” and check that the following settings are selected: *Document type* = “Reflective”, *Document Source* = “Document Table”, *Auto exposure* = “Photo”, *Image Type* = “16-bit-color”, and *Resolution* = “1200” dpi. Now click *Preview*.
4. Check that all the items within the frame are positioned correctly; if not, rearrange the items on the scanner glass and repeat the preview process until the image is satisfactory. Using the selecting tool of the Preview window, select the scan area demarcated within the tics printed on the scanning frame (Figs. 5 & 13, blue arrow & line). Adjust the sides of the resulting dashed box if necessary so that its area only includes the scan area. Click *Scan*. The scanning process will take approximately 5–6 min.
5. Once scanning is complete, the new image should appear in the main GIMP window. Double-check that all items are in their proper place and that the image includes only the scan area; repeat steps 4 and 5, if necessary. Once you are satisfied with the image, go to *File > Export As* (or *Ctrl+Shift+E*). In the resulting save window, type the specimens voucher barcode number in the *Name* field and add “.tif” at the end (e.g. “RUN-000100.tif”). This will save the image as a TIFF file. Select the appropriate project folder (e.g. “Desktop/NAOWS”). Click *Export* (or just hit the *Enter* key). Select “LZW” under *Compression* in the *Export Image as TIFF* window that pops up, then click *Export* (or *Enter*) again. Check the project folder to make sure that the image was saved there. If so, close the image by clicking *File > Close View* (or *Ctrl+W*) and clicking “Discard Changes” in the pop-up window. Leave GIMP open if you have additional specimens to scan, otherwise “X” the window out to close the program.
6. Using the soft forceps, carefully replace the specimen in the envelope (Fig. 14). First, place the full body on top of the label card and slowly slide it inside the collection envelope. Place the dissected wings in a glassine envelope (for damselflies, make sure you label the FW and HW before placing them in the envelope as they are difficult to distinguish; Fig. 14B) and slide the wing envelope behind the label card in the specimen envelope (Fig. 14C). Finally, place all labels *including the voucher barcode* in the specimen envelope.
7. Repeat the specimen preparation and scanning procedures on the next specimen until you are finished with the specimens assigned to you, then continue to the “Uploading images to BisQue” section below.

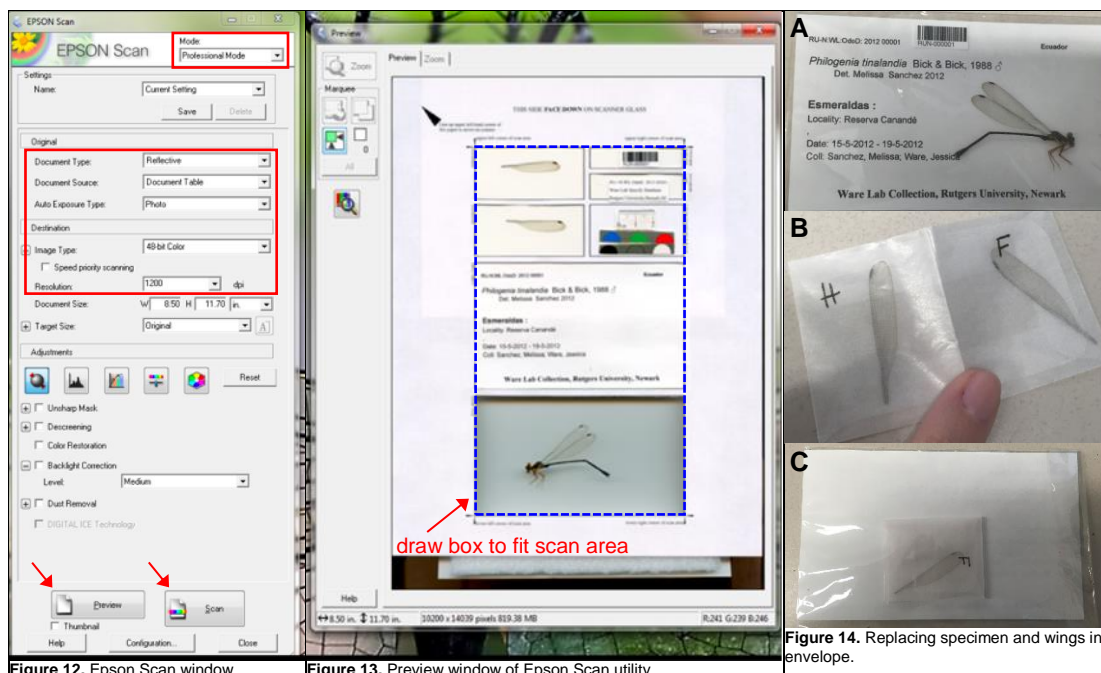




Figure 12. Epson Scan window.

Figure 13. Preview window of Epson Scan utility.

Figure 14. Replacing specimen and wings in envelope.

UPLOADING IMAGES TO BISQUE

I. Set up Cyverse account (do this only once):

1. Register with Cyverse by following the instructions at cyverse.org/learning-center/create-account and request access to BisQue at cyverse.org/learning-center/manage-account#AddAppsServices.
2. Email your BisQue username to Will (will.kuhn@rutgers.edu) so he can share items with you on BisQue.
3. Go to BisQue (bisque.iplantcollaborative.org/client_service/) and click *Sign in* at the top right of the page and log in with your Cyverse username and password. (Note: Cyverse used to be called “iPlant,” and the login page still shows the old name.)
4. You should be presented with BisQue’s online interface. Select  > *dataset* at the top of the page and look for the dataset called “Targeted Ode Wing Digitization” (Fig. 15); this is where all our scanned images are deposited. (Once you’ve worked in this dataset, it’ll show up in the *My recent stuff* section of this page.). Click on the dataset and take a look. Now check that you have access to the metadata template by selecting  > *template*. You should see “TOWD user metadata template”. If the dataset and/or the template are not visible to you, contact Will to check that they’ve been shared with you.

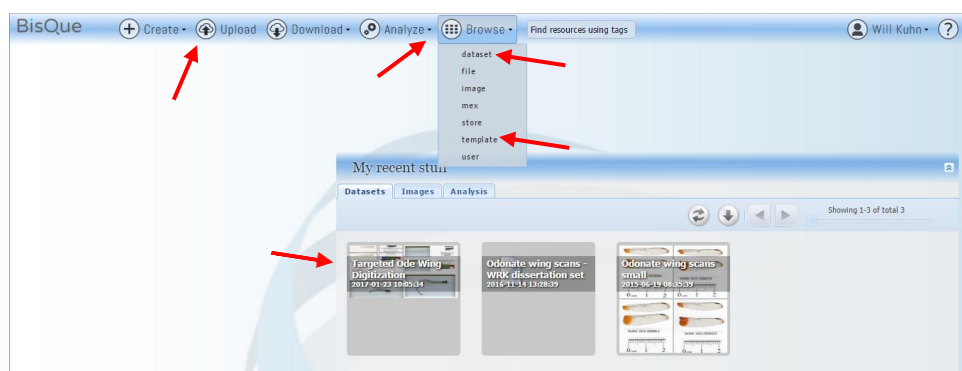

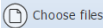
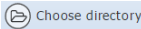


Figure 15. BisQue’s main interface (after sign in); arrows highlight important elements.

II. Upload images to BisQue:

1. Do the following after you have scanned several specimens using the “Scanning a specimen” protocol above. For each upload session, make sure that all images have been scanned by a single user (you), are from a single collection (e.g. Rutgers), and were made on the same scanning device. Also, if (rarely) some of your images contain specimens that have had their left-side wings scanned instead of the right-side wings, upload those images separately (i.e. do a separate upload session for any left-side wing images).
2. Go to BisQue (bisque.iplantcollaborative.org/client_service/) and sign in.
3. Click  and do one of the following to select files for upload (Fig. 15). As you select or drag in files, they’ll be displayed in the upload window. If this is your first time to upload images to BisQue, start with a small batch of 1–5 images.
 - To upload one or multiple images from your project folder, click , navigate to your project directory, and select the image(s) that you wish to upload (hold down the *Shift*, *Ctrl*, or *Command* keys to select multiple files).
 - To upload all the images in your project folder, click  and navigate to your project folder.
 - Drag-and-drop files from your project folder into the “Drop files here” section of the upload window.

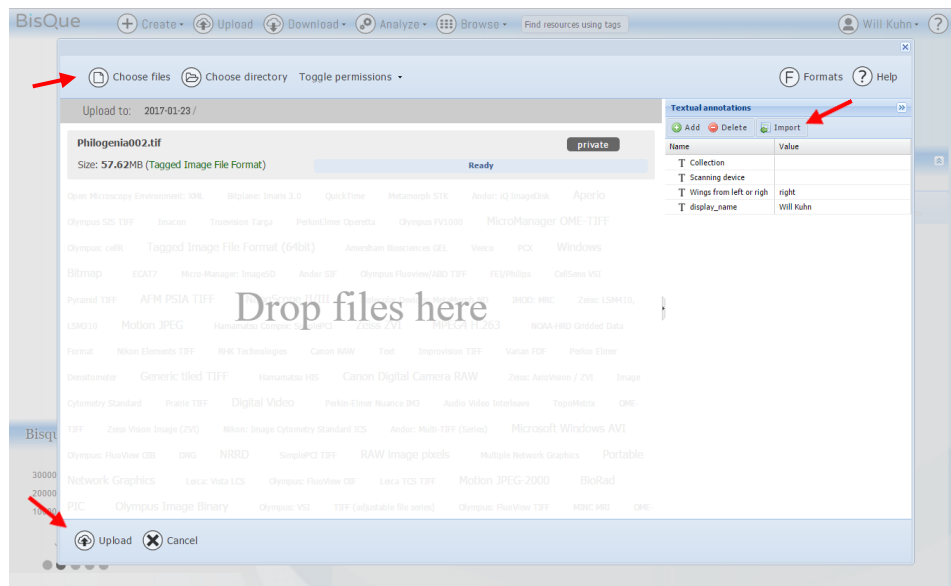


Figure 16. BisQue's upload window.

4. After you've selected all of the images you wish to upload, add annotations to these files using the *Textual annotations* section on the right side of the upload window by doing the following.
 - a. Click **Import** and *from user*, then click the box containing your name in the window that pops up. You should now see "display_name" listed in the *Name* column and your name in the *Value* column.
 - b. Click **Import** again and *from template*, and click on "TOWD user metadata template". New items will now appear in the *Name* column (Fig. 17). Double-click in the empty *Value* cell beside "Collection", then click on the down arrow that shows up. Now select the collection from which your specimens have been scanned (e.g. Rutgers University-Newark) and click **Update**. Repeat for the empty cell beside "Scanning device" to select the scanner that you've used to make these images. If you batch of images contains specimens where the right-side wings were separated from the body (typical), you can leave the "Wings from left or right side?" field as the default "right"; otherwise, click the cell next to "Wings from left or right side?" and select "left" to indicate that all images in this batch contain left-side wings. Make sure that all cells under "Value" are filled with the correct values.
5. Very important: Click **Toggle permissions** > *Set as published* (Fig. 16) at the top of the window.
6. Click on **Upload** at the bottom of the window (Fig. 16) and the images will start to upload, one at a time. This process may take a while as the files are quite large; go have a coffee! When they're all done, a message will appear saying that the upload was successful. Note: often, a few images fail to upload successfully, in which case **Re-upload failed** will appear beside **Cancel**. Click it to retry the failed uploads. Also, if the upload hangs for several minutes, you can click **Cancel** then **Re-upload failed**. **All images must upload successfully in order to complete Step 7.**
7. **Very important:** Your images are now in the BisQue cloud but not yet associated with our image dataset (**we won't be able to see them yet!**). Click on **Add to existing dataset** which will appear on the bottom of the window after a successful upload, then click on the "Targeted Ode Wing Digitization" dataset and click *Select*. Wait until you see a yellow box confirming that these images have been saved to the dataset. Only now is it safe to "X" out of the upload window. You're done! Thanks!

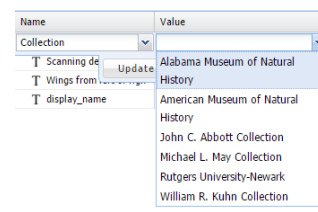


Figure 17. Drop-down menu that appears next to "Collection" in *Textual annotations*.