South Australian Museum

Atlas of Living Australia Volunteer Digitisation Project 2011

Procedures Manual Supplement:

Macrophotography

(version 6: 28 May 2012)

Contents

1 Process for macrophotography workstation

1.1 Select a specimen and prepare it for photography

Choose a specimen. The macrophotography workstation should be used for specimens 18mm and larger.

Take care when lifting and lowering the glass lid, it isn't attached or hinged, and sudden movements can create gusts of air that can damage delicate specimens. We also don't want to break the glass.

Use the forceps to carefully remove the labels from the specimen, and lay them out on a spare foam pad.

Grip the labels as close to the pin as possible to do this, this reduces the risk of tearing the label, and stops it from coming off at an angle, which can damage the legs and lower parts of the specimen.

Remember the order of the labels, we want to re-attach them in the same order that they were removed.

Put the pad with the labels aside, making sure it cannot be knocked or blown around by your other movements as you take the photograph.

Pin the specimen close to the centre of the foam pad. You will see that there are already some pin holes there. If there are a lot of pin holes, especially if they are showing up in the photograph, replace the tracing paper cover. Check that the body or main part of the specimen is parallel with the foam pad, even if this means that the pin is at an angle.

Place the scale bar reference near the specimen, so that an edge of it will appear in the frame. Don't put it underneath an antenna or the specimen's abdomen or other extremities. This will make it difficult to remove in post-processing, and risks damage to the specimen as it is put in place and removed.
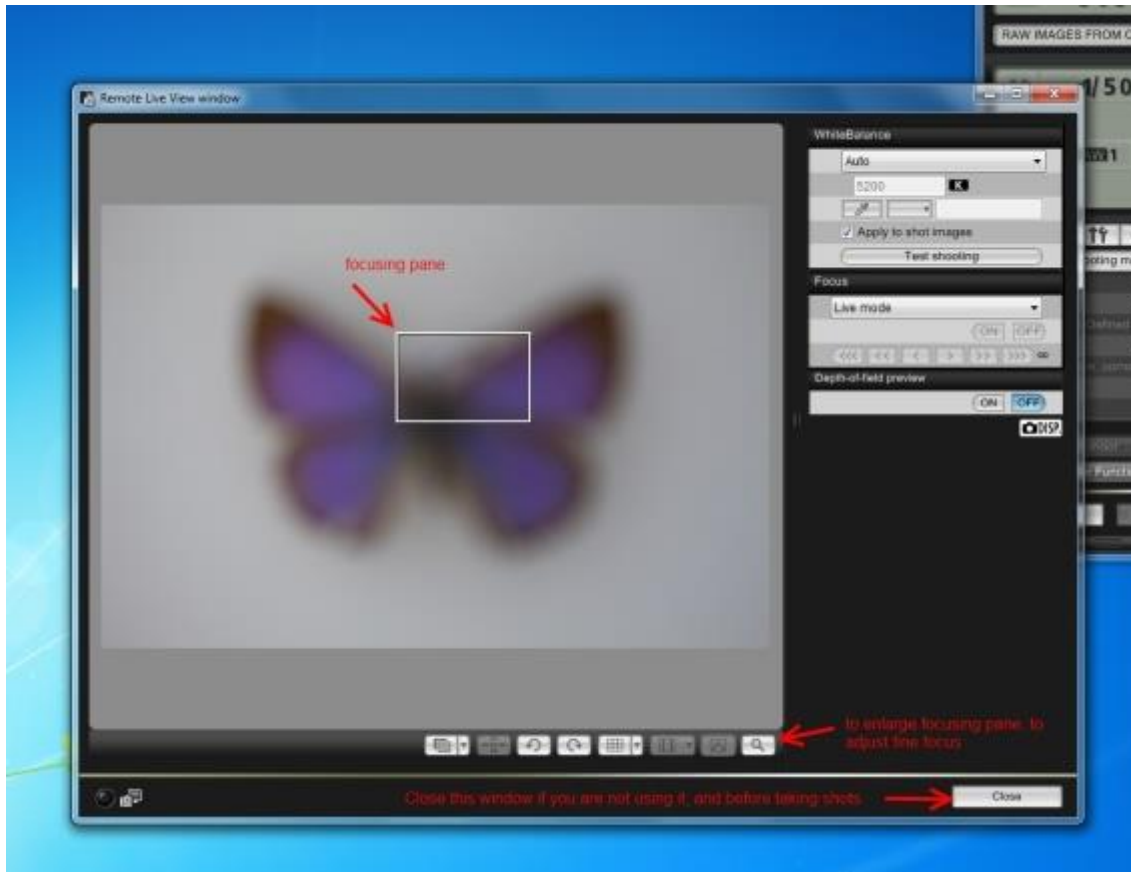
Open **EOS Utility**, click on **Camera settings/ Remote Shooting (**indicated in the picture at right)

A panel will open on the right side of the screen.

Click **Live view shoot** (indicated in the picture at left).

This will open a window showing exactly what is under the camera's lens.

Check the orientation of the specimen, and move it around by sliding the foam pad.

Be careful to watch the specimen as you do this (rather than the screen) so that it isn't in danger of being bumped by cables that hang over the staging area.

Make the best use of the frame. The specimen should have its longest side along the longest side of the frame. Move it so that it is centred, the main part of its body appears straight and fills approximately 80% of the frame. If it's a small specimen, make it as big as you can.

Use the focus ring on the barrel of the lens to bring the specimen roughly into focus (the ring with ridges on it). During this process the size of the specimen in the frame might change.

1.2   Capturing images using the Stackshot device

Look at the screen of the **Stackshot controller**.

It should display **Mode: Auto-Step** in the top row of text. (If it doesn't, press **Select** until the small arrow on the left of screen is next to the **Mode:** row, and press **Up** until it changes to show **Auto-Step**). This setting will automatically take the camera through the number of specified steps between the highest and lowest points of focus that you select.

On the **Stackshot** controller, press **Select** until the arrow is next to the **#Steps** row. This should usually be set to 10 or 15. 10 steps will be enough for most specimens, but if you have a specimen that is greater than ≈2.5cm deep, you will need to increase the number of steps to 15 or more.

On the **Stackshot** controller, press **Select** until the arrow is next to the words **Select start pos**.

Look at the specimen. Where is its highest point? Look at the computer screen.

You will see a single rectangle around the centre of the Live View window. This is the **focussing pane**. Click on the magnifying glass symbol and it will open a window at the actual size of the image you are creating, so that you can do fine focussing on that high point.

Use the **Fwd** and **Back** buttons on the **Stackshot** controller to move the camera up and down until the highest point of the specimen is in focus.

When you are satisfied that it is, press **Up** on the **Stackshot** to set the start position.

The display will change to read **Select End Pos**.

Repeat the previous steps to identify and select the lowest point on the specimen that will be visible in the photograph you are taking. Press **Up** on the **Stackshot** to set the end position.

The display will now read **Up/Down to start** and **Change Settings.**

Carefully place the diffuser ring around the specimen. Look to the computer screen and check that the ring is not visible in the frame. This ring of tracing paper diffuses the light coming from the flashes, and helps us minimise shadows.

Put the flash units in place. They are reasonably easy to use, and don't require a lot of precision.

TIP: Try not to put them behind the scale bar indicator, it will cast a shadow on the specimen. If the flashes are approximately opposite each other, but not quite in a straight line pointing at each other, you will usually get a good result.

If you are ready to start, **close the 'Live View'** window, and press **Up** on the Stackshot controller to start taking photos. If you would like to change settings before you take any photos, use the **Select** button to move the arrow to **Change settings**, and return to the beginning of this step to start again.

TIP: If the Stackshot is moving but the shutter isn't firing, it means that you still have the Liveview window open. Hit **Up/down** to stop the process, close the Liveview window and hit **Up/down** to start the process again using the same settings.

Once started you can stop the process instantly by pressing any button on the **Stackshot**. The device will remember the start and end positions, so you can re-start just by pressing **Up** or **Down** again.

1.3 Converting the images to TIFF

The images will be displayed in **Digital Photo Professional**. These images are in 'RAW' format direct from the camera. We need to convert these images to TIFF files before they can be processed by the focus stacking program.
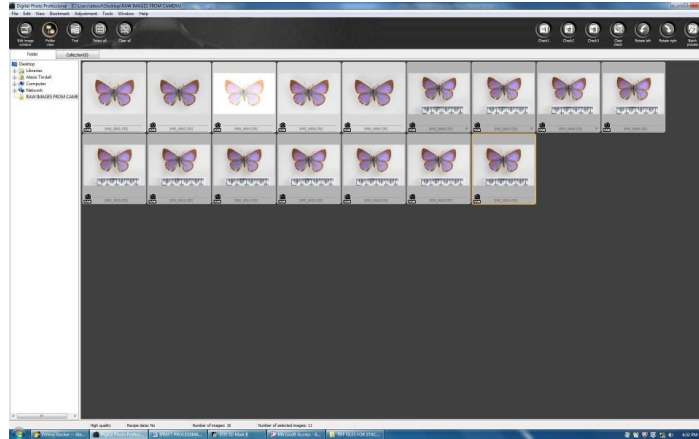
Click on the first image. Hold the shift key and click on the last image to select the set

TIP: The total number of shots will be one greater than the number of steps that are displayed on the Stackshot controller (e.g. **# Steps: 10** produces **11** photos).

Click on **File** and select **Batch process**. It is pre-set to save the TIFF files you are creating to the right location.

Click **Execute**. It will take a minute or so as these are very large files.

These images will be saved to the **TIFF Files** folder on your desktop.

1.4   Processing images using Zerene Stacker

Open **Zerene Stacker** and the **TIFF Files** folder from the desktop.

Select the group of TIFF files that you want to focus stack by clicking the first file and holding shift while you click the last file. Drag them into the box headed **Input files**.

Click **Stack** and select the first option: **Align & stack all (PMax)**. This will take a minute or more.
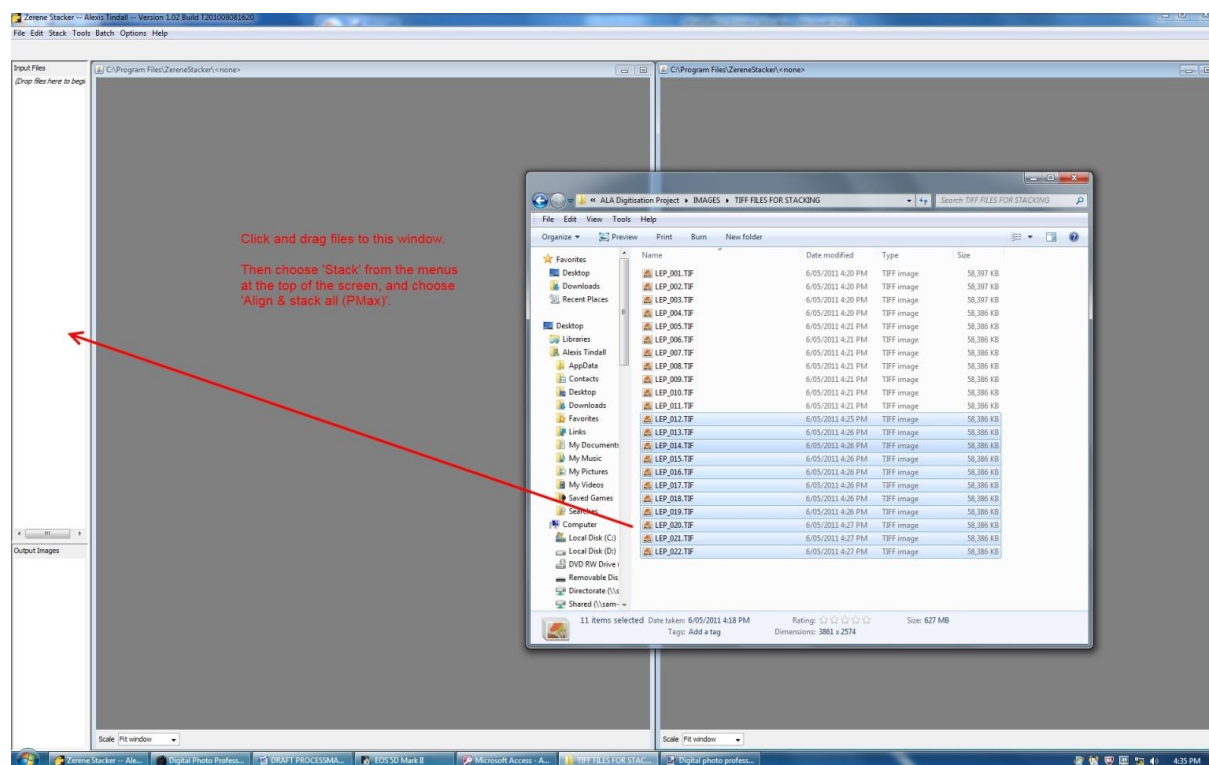
Click on **File**, then **Save output image(s)** and enter the appropriate file name.

The file names include the catalogue number, the scientific name, and a description of the 'view' captured, to make them easier to sort and find.

Dorsal is the view of the whole animal from above; **Lateral** is the view of the whole animal from one side, and **Ventral** is the whole animal from below (uncommon). Use the genus and species name from the typed label in the red box (the names on the labels attached to the pin might be out of date).

The folder for saving it is:
R(Digital assets):/ALA Digitisation Project/ IMAGES/ HOLOTYPES

Use this format for naming the file: **99-99999_Genus_species_dorsal.tif**

Within that folder are folders for different orders. The Project Manager will provide guidance about which order we are currently working in.

1.5   Check the photo

Open the image to check it. Zoom in somewhere that might be a risk for imperfections in your image. This might be the highest and lowest points of the specimen that you chose.

If you aren't happy with the photo the quickest and easiest fix is to re-take the image right away.

Remember that the more we get right when we capture the image, the less work we need to do further down the track. Pointing the specimen in the right direction, and filling the frame appropriately saves us post-processing time, making us more efficient.

1.6   Capture a lateral view of the specimen

Repeat steps 1.2 to 1.5 to capture the lateral view, with the specimen mounted on its side in the cork (as below).

1.7   Photograph the labels
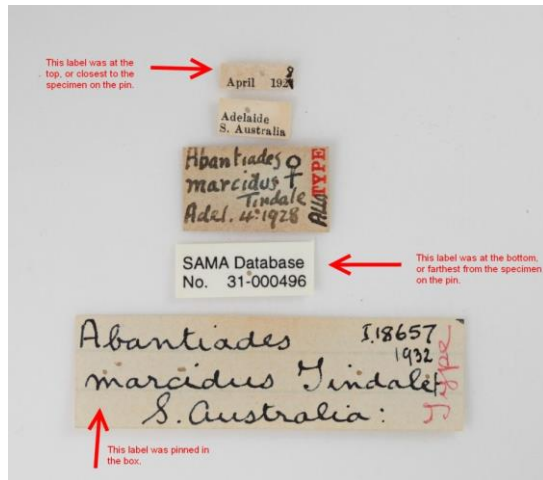
We need a single shot of the labels.

Position them in order the order that they were removed from the pin. This will help you get them back on the pin in the same order. Check if there is a label pinned into the box. Put this at the bottom of the array of labels before photographing.

Return to EOS Utility, and open the Live View window. Bring the labels into focus using the ring around the barrel of the lens or moving the camera forward and back using the buttons on the Stackshot controller.

Take a single photo by pressing the Shutter button in EOS Utility. This is the round button that looks like the shutter button on the camera (marked at right).

The photo will appear in **Digital Photo Professional**.

Click **File** then **Convert and save**. Save it in the same folder as the image of the specimen
(**R(Digital assets):/ALA Digitisation Project/ IMAGES/ HOLOTYPES**)

Is anything written or typed on the other side of the labels? If so, we need to photograph it. To do this, turn all the labels over except for the SAMA Database label, and photograph the obverse side. Save it in the same location.

1.8   Clear your files

When you have finished for the day, delete **all** files from the **RAW files** and **TIFF Files** folder on your desktop. Then right click on your **Recycle Bin** and click on **Empty recycle bin**. This makes sure that the computer's hard drive doesn't fill up with big image files.

2   Troubleshooting

2.1   I've broken the specimen.

Stop what you're doing immediately. It is imperative that we do not cause any further damage. If the Project Manager is available, draw it to her attention immediately.

If the Project Manager is not present, collect all parts, return them to the unit tray, and return the unit tray to the glass covered drawer. Make a note of the incident to bring to the Project Manager's attention as soon as possible.

We will need to return the specimen and *all* of its parts to the Entomology Collections Manager for inspection. He might re-attach the broken part, or re-organise the parts in the unit tray to prevent any further damage. Be aware that there may be multiple small parts that have broken off and should be collected (e.g. look for tiny antennal or foot segments as well as the main part of the broken antenna or leg. The number or forms of certain segments are diagnostic characteristics of certain species.)

2.2 How do I turn everything on?

You need to switch the camera, flash transmitter, two flash units and the Stackshot controller on. The Stackshot controller needs to be switched on at the powerpoint. The relevant plug is labelled.

Switches are marked on the pictures below. You need to switch the camera to ON, the transmitter to the centre position which looks like a line, and the flashes to ON:

2.3 Why is the camera moving but not taking any photographs when I press up or down on the Stackshot controller?

Check that the **Live View window** is closed on the computer screen. The camera doesn't like to be receiving instructions from the computer and the Stackshot controller at the same time.

2.4 The photographs are coming out completely black or very very dark?

Check that you have removed the lens cap. If it is off, this means that the flash units are not firing. Look at their display and check if their batteries are flat. If they are, replace them with the Sanyo Eneloop rechargeable AA batteries, and place the expired ones on the white battery recharger. Please replace all batteries at the same time, even if only one unit has stopped working.

 It might also mean that the Speedlite Transmitter (mounted on the top of the camera) has run out of batteries and isn't sending a signal to the flash. Look at the back of it, there should be dim red lights beneath the letters ETTL and one of the numbers. If there are no lights, it means that the battery has run out. Replace it with one of the Lithium CRV2 batteries. If you use the last one, please inform the Project Manager.

After you have replaced the batteries you might need to re-establish the link between the transmitter and the flash units. If they are talking to each other, their display will look like this:


If that link has been broken, the display will look as below. Re-establish the link by holding the **ZOOM** button (marked with the red arrow) down for about 20 seconds. The flash will automatically find the transmitter and establish the relationship.

If the transmitter and flashes are still not working, check that they are on the same channel. The numbers indicated in red on the images below should match (they will always be '1').
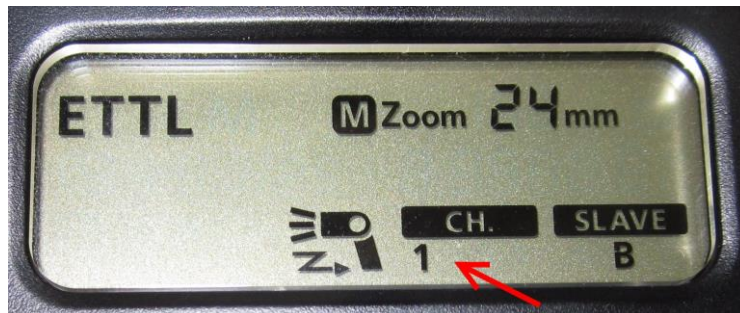
If they don't match, hold the ZOOM button until the CH. Bar blinks. Then use the large + or – buttons to change the channel until they match (all buttons and indicators marked in red below).


2.5 The EOS Utility window has disappeared and I can't click on the 'Camera settings/Remote shooting' instruction to open it again?

If the camera is unused for a certain period of time it turns the power off automatically to conserve battery energy. The simplest way to wake it up again is to gently touch the shutter button on the camera itself, and push it half way down as though you are starting to take a photo. It will switch itself back on, and the Option to click 'Camera settings/Remote shooting' will become available again. Click on that to open the EOS Utility panel.

2.6 The Live View Window looks different – it has two overlapping white rectangles instead of one?

The focusing pane should be a single rectangle, in the centre of the window
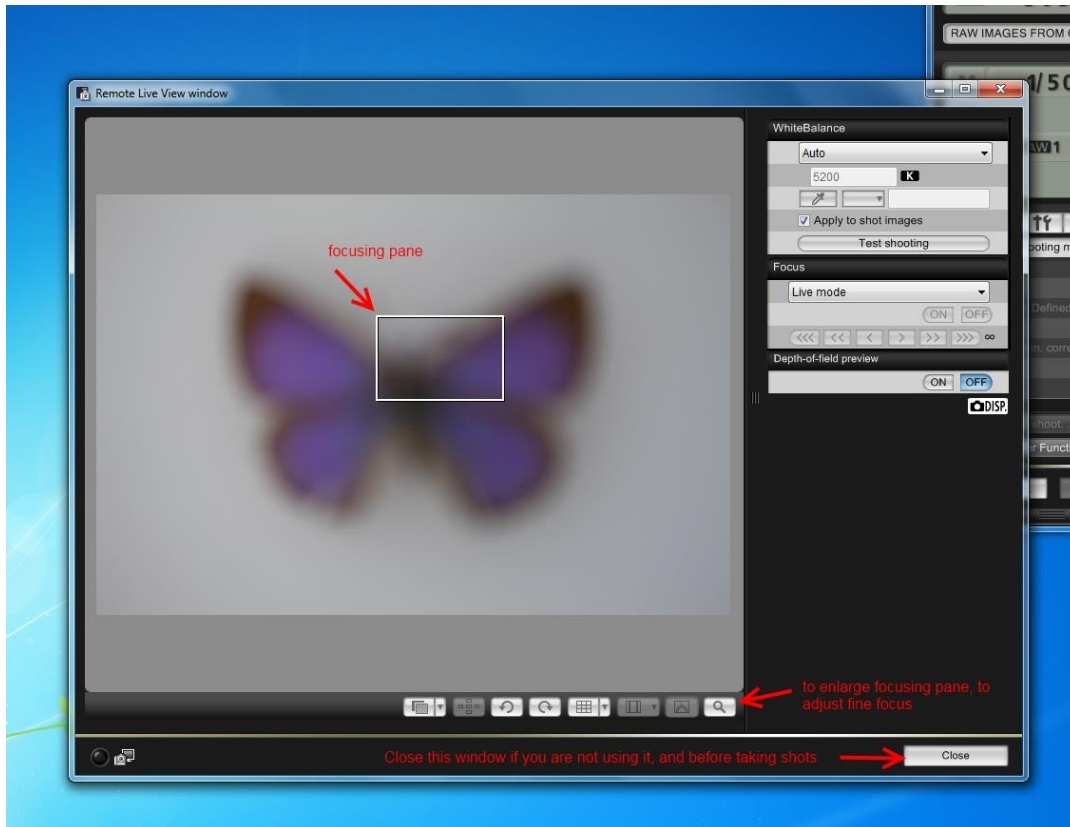
If it is two overlapping rectangles, the camera is set on automatic focus.

It should be manual focus, so adjust the switch on the barrel of the lens from 'AF' to 'MF'.

2.7 I opened Zerene Stacker and the last image that we worked on is still open, what should I do?

You need to close this project. Go to **File**, then choose **Close Project**. The program will ask you "Do you really want to close this modified project?". If you're sure that the output image has already been saved, click on the button that says "Yes, discard any unsaved work".

2.8 When I tried to save the final image that we processed through Zerene Stacker it created a folder instead of a TIFF file?

This means that you have tried to "Save Project" instead of "Save Output Image(s)". The program is trying to create a saved version of all of the input images and the process, which is unnecessary. Go to **File** and click on **Save Output Image(s)** and the program will save your finished image as a TIFF file.

2.9   What should the settings be on the camera?

These settings should not change, but if there are persistent problems with your images, and they are not coming out the way you are expecting, this might be the cause of the problem. Or you might have noticed that something is different.

If you feel that adjusting any of these settings would improve the quality of the images (for a particular specimen, or for all specimens), please discuss it with the Project Manager.

F-Stop (aperture size): F11

ISO ("film speed" or equivalent sensitivity in digital imaging): 100

Shutter speed: 1/100

Image quality: RAW

White Balance: Auto OR Custom (consult with Project Manager if you think that the colour doesn't look right in the images).

Flash Exposure Compensation: +1.0 (You need to access the flash functions to change this – check with the Project Manager if you think that your images are too dark or are getting flares of over-exposure)
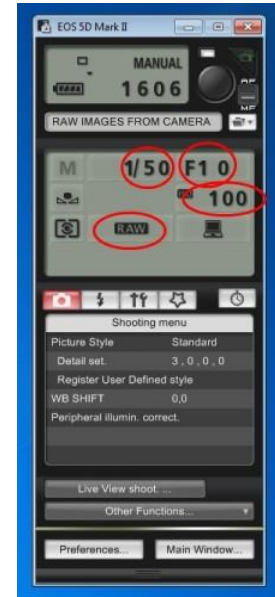
2.10   Where are my files?

- **RAW files** from the camera – before being converted to TIFFs:

C:\Users\alexist\Desktop\RAW FILES
(*Please insert your username where it says "alexist" in this file path*).

- **TIFF Files** – after they have been converted using Digital Photo Professional, but before being stacked by Zerene Stacker

C:\Users\alexist\Desktop\TIFF FILES
(*Please insert your username where it says "alexist" in this file path*).

- **Final Images** – after they have been stacked by Zerene Stacker

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Inside that folder will be folders for the relevant orders that we are presently working on, and for the families of insects that we are working on.

2.11   Are the batteries fully charged?

Canon 430EX Speedlites (flashes) AA Sanyo Eneloop Rechargeable Batteries (x8)– When they are expired, place them on the white 8 slot recharger. The small lights next to each battery will initially be red, and will become green when the battery is charged. This is quicker than the camera battery. If you notice that the batteries are fully charged, remove them from the charger and put them in the designated plastic container.

After you have replaced the batteries, you need to re-establish the connection with the transmitter.

Look at the back of the flash unit. Hold the **Zoom** button (marked on the picture below) down until the display changes.

When connected, the display should look like this:

(We now use an AC Adapter, so this might not be needed, but in case you are using the Canon EOS 5D Mk II LPE6 Battery – the charger goes through several stages before the battery is fully charged. It blinks orange and changes speed as it gains charge. When it is fully charged it will display a constant green light. The full recharge takes approximately 2.5 hours. Thus it's important that a flat battery goes straight on the charger when it is removed from the camera.)

2.12 Our problem isn't covered in this 'Troubleshooting' document, what can we do?

In the first instance, chat with the Project Manager. If that person isn't around, or can't resolve the issue, the manuals for the camera, speedlites, speedlite transmitter and Stackshot are all available on the bookshelves. Feel free to peruse these documents to resolve your problem, or to expand your understanding of our equipment if you're interested.