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# Standard Operating Procedures

## Canon 350D Digital Camera

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### **Camera Storage**

The camera and associated equipment are stored in a camera bag. Ensure that each item is returned to the correct location so the next person using the camera can find it.

### **Camera Bag layout:**

Top pouch	<ul style="list-style-type: none"><li>• camera battery charger &amp; power cord</li><li>• spare batteries for camera &amp; flash</li></ul>		
Main pouch	<ul style="list-style-type: none"><li>• 18-55 mm lens with uv filter &amp; lens cap</li><li>• body cap</li><li>• rear lens cap</li></ul>	<ul style="list-style-type: none"><li>• camera body</li><li>• macro lens with uv filter, twinflash ring and lens cap</li></ul>	<ul style="list-style-type: none"><li>• twinflash (in own bag, with "A" an "B" flashes in individual pouches – check for kinks in flash cables before closing the bag)</li></ul>
Front pouch	<ul style="list-style-type: none"><li>• USB cable</li><li>• spare memory card</li><li>• instruction manuals</li></ul>		

### **Preparation**

Be sure to prepare the batteries for the camera and the flash on the night before. Carry lots of spare alkali batteries (in your trouser pockets so they stay warm) with you for the flash. This is important especially for night photography as more power is used to run the flash at night.

### **Camera settings**

- Set the camera to manual by putting the dial at "M" because you need to control the focusing yourself. For macro photography, auto-focus is hopeless and with aperture priority (AV) the shutter speed will be too slow to capture the action that the flash reveals.
- Manually set the aperture to F22 during the day and F16 at night.

- On a sunny day set the shutter speed to 1/125, on a cloudy day set it to 1/60 and at night set it to 1/125 (when the aperture is more open at F16). Slowing down the shutter speed will give a better background, but if the shutter speed is too slow you will get a blurry image due to movement. At F16 the depth of field will be big but you will need the flash to get enough light.  
*The depth of field is longer behind the focal point, about 2/3 behind that point and only 1/3 in front. Focus on the insect eyes to handle this.*
- Metering mode in the camera menu should be set at “program”. This will read from the image and balance the metering for you using the camera’s program.

## Flash settings

- When you assemble the twin flash onto the mounting ring, put the “A” flash unit at 11:00 o’clock as the “sun” position and the “B” flash unit at around 3:00 o’clock to “fill” in the shadows. Ensure the flashes are clipped in place.
- The main flash unit slides into the mount on the top of the camera body. Turning the plastic ring at the base of the flash unit secures it in place.
- You can set the A and B flash units at a 1:1 ratio, or a 2:1 ratio, which gives you twice as much light from the “sun” position than the “fill” position. However, if there is a big leaf in the way then you can turn the whole set up on the ring or move the flashes individually to get the light in a better position.
- Adjust the tilting angle of the flash depending on how far away your camera is to the subject in order to take the photo with the flower and the insect filling the screen. For a big insect you will be farther away so tilt them less. For a small insect you will be closer so tilt them more.
- Set the flash on ETTL = electronic through the lens.

## Taking photos

- Stand with one leg forward and one leg back so you have a triangle for steadiness.
- Keep your elbows loosely to your sides for support. Not too tight because your heartbeat and breathing will move the camera, but not so relaxed that you do not get any support or stability.
- Do a coarse focus by turning the lens, then rock back and forth to do the fine focus. *Don’t try to adjust the fine focus by turning the lens. Instead, move in and out by rocking back and forth until you see the insect come into focus.*
- If you are unable to focus and find that you have lost the focus area then take the lens down to a lower magnification, focus and move back up.
- Take several shots from several angles so that we get all the pollinator “fit” information. For example, how does their tongue fit in the flower, what part of their body brushes the anthers? What part touches the stigma?
- Shoot all the photos in digital RAW using an ISO of 200. If you use an ISO of 300 to 400 it gets too grainy.
- Be sure to have a UV light filter on the lens to protect it from damage as macro lenses are very delicate.

## ***Goals / Reasons for photos***

- We need the photos to document how the insect “fits” and “behaves” in the flower.
- We want to have action shots from all different angles so that we can assess how likely it is that the insect will be picking up and depositing pollen.
- Use the plant list and the plant tags to record the Transect Plant ID number and nickname when you take the photograph.
- See the data sheet for Photo vouchers for further information.
- The goal is to obtain a good macro photograph of each and every type of insect in each plant species. A reasonable result is 10 good images for every 100 photos taken. **Keep every photo**, even the “bad” ones, when you download your images to the computer.
- Follow the instructions on the camera (rubbish bin symbol) or the manual to clear the memory only when you are sure you have saved the images onto the appropriate drive on the computer network.