

Life History of the Orange-tip Butterfly: Photo Techniques

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By searching the flower heads of Garlic Mustard (*Alliaria petiolata*) in a hedgerow near Daglingworth on 19th April 2011 it was quite easy to find an orange tip egg. I decided to take this home and attempt to photograph its development under "studio" conditions. Over the next few days the egg became progressively darker as the embryonic caterpillar developed and the visibility of its dark hairs through the translucent eggshell showed that hatching was imminent - 24th April. (Photo 1)



On 27th April the little caterpillar carried out its first skin moult, crawling forwards out and finally casting that of its head separately. (Photo 2 on website)

As the caterpillar progressed through a further 3 skin changes (instars) by the fourth instar it had taken on a predominantly green colour - 4th May (Photo 3 on website).

For the final, fifth, skin moult a silk girdle was spun and the chrysalis emerged which is at first "bent". (19th May Photo 4 on website). After 24 hours the chrysalis had assumed a "thorn" shape. It was still bright green but after about a week it had become the straw colour which it retained throughout its hibernation.

This pupal stage lasted over 10 months and was over-wintered in a cool garage but with access to daylight as I was not sure whether temperature or day length would prompt its awakening.

On 7th April 2012 the imago had emerged (alas I missed the actual event), it was a female, so no orange, but the docile insect provided a fine opportunity to photograph the undersides of its wings in pristine condition (Photo 5 on website). A close up shows how the apparent green mottling is actually made of combinations of white, yellow and black scales (Photo 6 on website).

The butterfly was then released near its birthplace almost a year from the day of its birth.

Summary of Photographic Equipment and Techniques Used

Firstly the equipment components will be listed and then general procedures will be described:

Camera - Canon EOS 7D Digital Single Lens Reflex

This camera has two facilities for this type of macro work where precise focusing is particularly critical. Firstly it has a "live view" screen which previews the actual image to be recorded by the sensor which is easier to use than that provided by the visual viewfinder. Secondly the camera has a mirror lock-up facility which avoids the camera shake that might otherwise occur when the mirror is raised, this is particularly important when high magnifications are being used. Also to prevent camera shake the camera is invariably used with a cable release.

Lens 1 - Canon 100mm macro

This lens is used for magnification up to life-size so it is used for the larger stages, mature larvae, pupae and adults. Indeed this is my favourite lens in the field.

Lens 2 - Canon 65mm macro (show in set up picture)

This special lens is used for magnification in the range 1 to 5 times life-size and is used for smaller detail such as eggs, scales on butterfly wings etc.

Flash - Canon Macro Twin Lite MT24-EX

This provides flash lighting from either side of the lens thus avoiding shadows yet providing some modelling depth. If needed, the brightness ratio of the two sources can be varied. As some subjects can be shiny, diffusers were placed over the lamps.

Support - Opticron Hide Mount

I have found this, primarily aimed at birdwatchers in hides, provides a convenient and steady G-clamp support for the camera which can be affixed to the edge of the work table.

General Procedure Notes

Obviously the main concern is to obtain reasonably sharp images. Having obviated camera shake it is then important to obtain focus and sufficient depth of focus. At high magnifications this latter can become very small, it can however be increased by reducing aperture but not to the extent that lighting and image resolution is compromised. The use of flash help in providing controlled lighting. In general the optimal exposures were found by trial and error by taking a series of shots - digital photography at least has the advantage of providing instant feedback. Another practical consideration is to provide suitably placed neutral background, matt coloured card was found suitable for this purpose - again a subject for experiment.

Although I take images both in RAW and JPEG, I find the quality of the latter is sufficient for most purposes. I use Photoshop for minor image manipulation such as cropping and brushing out any unwanted items (which are annoyingly common at high magnifications!). Sometimes I have used Helicon extended focus software which enables images to be stacked to obtain a greater depth of field.

In conclusion, it should be emphasised that this type of photography is a continuing learning process - there is always a better way!