

Insect specimens

Simon Meredith

Scientist and Artist, Simon Meredith discusses his technique for capturing stunning entomology images. He explains his microscope and camera set up and the preparations required for each specimen, as well as the image manipulation adjustments that he utilises.



My professional career initially involved toxicology and biotransformation, this was followed by several years in pharmaceutical R&D. Both roles involved many instruments and analytical techniques including microscopy. Some projects involved experiments that required the use of a microscope and on occasion the mundane sample slides I viewed were everything but - stunning compositions of form, structure, and colour hiding on boring sample slides like particulates and impurities. This got me thinking about the possibility of imaging the slides with the best compositions and presenting this to the wider world as fine art prints. 'Sci-Art for the Wall' was the idea. The opportunity to buy a Vickers compound microscope at a very good price came along and so began over 15 years of interest in microscopy.

I recently launched SciMondo.com, a website to exhibit and sell some of my micrographs. The website concentrates on my two main microscopical interests - Entomology and Chemistry.

Entomology - the anatomy, form, exoskeleton etc, examples of several insect can be found in and around the garden or local pond and often make me think 'that's a nice looking bug....even nicer on a slide!'

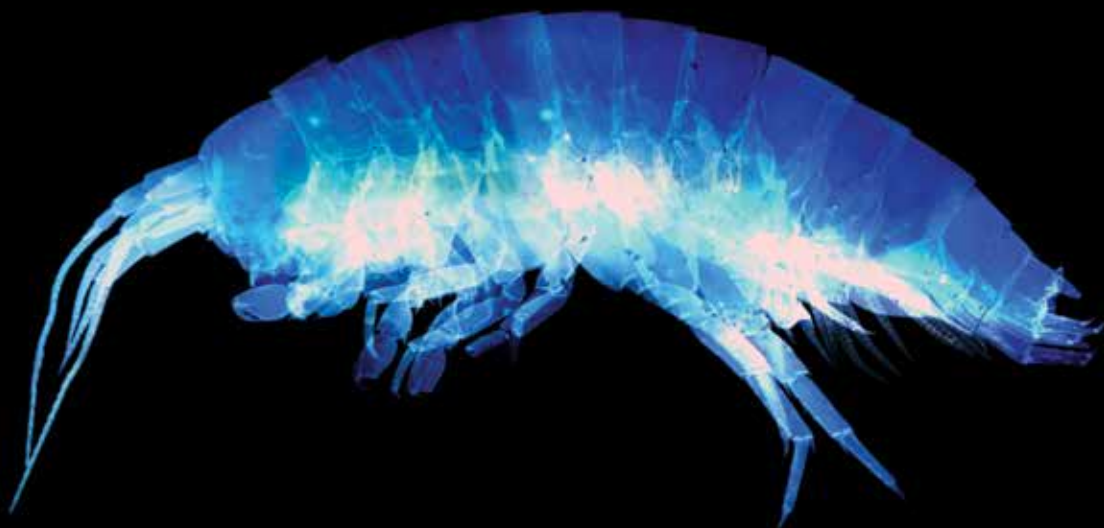
Chemistry - chemical compound combinations and the many interactions they can have. Some I read about, others I think up based around the compounds I have in my chemistry set and the aesthetic possibilities in combining them. *[It is worth remembering to express caution unless you are familiar with the chemistry of the compounds you intend to combine]*

Here are some examples from my Entomology collection, and an explanation of how the images were achieved.

Equipment

Vickers early M series, binocular compound microscope with condenser, mechanical stage, incident light source (now a LED light). Objectives 10x, 20x, 40x. Eyepieces 6x, 8x, 10x.

Palaemonetus 'Fresh Water Shrimp', original dimensions of insect on its mount: w 12mm, h 6.5mm



Talitrus 'Sand Hopper', original dimensions of insect on its mount: w 11.5mm, h 4.5mm

Polarising filters-1mm disks and flexible thin film, light splitters made from optical disks, two fibre optic LED inspection lights for oblique lighting options.

Camera and Set-up

Canon 600 DSLR - DEP-control, Partial-metering, Exposure compensation -3 (+/-) 2 stops.

Canon imaging software, Laptop with additional 23' HD flat screen, Real-time adjustment and imaging via Camera/Computer direct link cable.

Microscope set-up

Two Techniques-Lenses / Magnification: Eyepiece 8x x Objective 10x = 80x

Light field

Imaging against a diffuse white background made up of 1-2 layers of tracing paper, Polarising disk placed over the incident light source and polarising film between the slide and objective lens held in place

over the slide with a small frame I made, Polarising film adapted to the oblique LED lights, Polarisers partially crossed to improve sample detail and to control glare.

Dark field

Adaptation of the microscope I used. Light stops prepared to leave only a thin ring of peripheral light from the incident light source, Repeated for the condenser using the filter holder. Trimmed, tweaked, and adjusted to get the desired lighting along with the additional oblique LED lights, Diffused with polarising film and again partially crossed to get the desired illumination, detail, and glare control.

Insect preparation

5% NaOH for clearing, purified Water wash, Methylene Blue or Brilliant Green solutions used for stain, additional purified Water wash, IsoPropanol wash, manipulated and allowed to air dry, Mounted with a little Nujol in Xylene

Image manipulation

Images were captured sequentially across (X) and down (Y) the specimens. Photoshop 7 was used to merge the micrographs for each insect, there was then a little contrast, brightness, and saturation adjustment to the finished micrographs.

No of images/exposures

Centipede: 13

Water Boatman: 7

Fresh Water Shrimp: 12

Sand Hopper: 19



Notonecta "Water Boatman", original dimensions of insect on its mount: w 3.2mm, h 4.5mm

Centipeda 'Centipede', original dimensions of insect on its mount: w 8mm, h 24.5mm

