

SOME FLY MACROS

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Introduction & Equipment

I have an Olympus BH2-BHS trinocular microscope. With a 4x objective and a 2.5x NFK projection lens in the phototube the maximum-length subject I can capture on my digital single-lens-reflex camera (DSLR) is 2.4 mm. As an entomologist with an interest in flies, 2.4 mm is far too small a field-of-view. I also have a so-called macro lens which connects directly to the DSLR and will give me up to a 1:1 image on the camera's sensor which translates to a 24 mm long subject filling the frame. As most flies are larger than 2.4 mm and smaller than 24 mm in length, 'pure' microscopy and what can be termed 'standard 1:1 magnification-macro' are severe limitations to obtaining high resolution images. The desired magnification range is between 1x and 10x, a range which Johan J Ingles-Le Nobel includes in his term "Extreme-Macro".

Filling this magnification gap, *i.e.*, 1x-10x, can be accomplished with a lens, or lenses, attached to a camera either directly or with the addition of extension tubes or bellows (no microscope involved). There are several ways to achieve such magnifications; see J Ingles-Le Nobel's: <http://extreme-macro.co.uk/> for an excellent comprehensive account covering 'everything' you need to know.

At magnifications of 1:1 and greater, depth of field is very shallow, never enough to get the entire fly in focus. This calls for a technique called "stacking" where several images, each at a different level of focus, are combined to give one fully-focussed image. Nobel's extreme-macro site also covers this subject.

The Flies

Animal species are grouped together based on similarities. The grouping is hierarchical. Thus animals with exoskeletons and jointed limbs and placed in the Phylum: Arthropoda. Within the arthropods the animals are further divided into Classes; *e.g.*, crabs and lobsters are in the Class: Crustacea and bugs in the Class: Insecta. Within the insects similar species are grouped into Orders; *e.g.*, butterflies and moths are obviously different from flies, the former are placed in the Order: Lepidoptera and the latter in the Order: Diptera. Again, within the Orders species are grouped into Families. In North America there are 113 families of flies with many of these occurring locally here in New Brunswick, Canada.

Viewed at greater than life-size, flies can be attractive and as such make ideal subjects for macrophotography. I present here some images of the more attractive, and one atypical, flies found in New Brunswick, arranged by families.

1] **The Crane Flies or Daddy-long-legs. Family: Tipulidae**

Most of these are rather dull coloured but one species, *Nephrotoma ferruginea*, is golden-yellow with large eyes, protruding mouthparts and black antennae (Fig. 1).



Fig.1.Crane Fly

2] The Moth Flies or Owl Midges. Family: Psychodidae

These little flies would fall into the category of 'atypical' owing to their very hairy bodies including the wings (Fig. 2). Often found in houses as the larvae (maggots) live in drains and the adults emerge and collect on windows.



Fig. 2. Moth Fly

3] The Phantom Crane Flies. Family: Ptychopteridae.

One local species, *Bittacomorpha claviceps* (Fig. 3), presents a striking image in flight. They tend to fly with the legs held in a vertical plane and so appear as a 6-spoked black-and-white wheel moving towards you.



Fig. 3. Phantom Crane Fly

4] The Horse Flies and Deer Flies. Family: Tabanidae

A favourite group for photographers thanks to their spectacular eye colours in life.
Horse Flies', *Tabanus* and *Hybomitra* spp., eyes are often vividly striped (Fig. 4).....

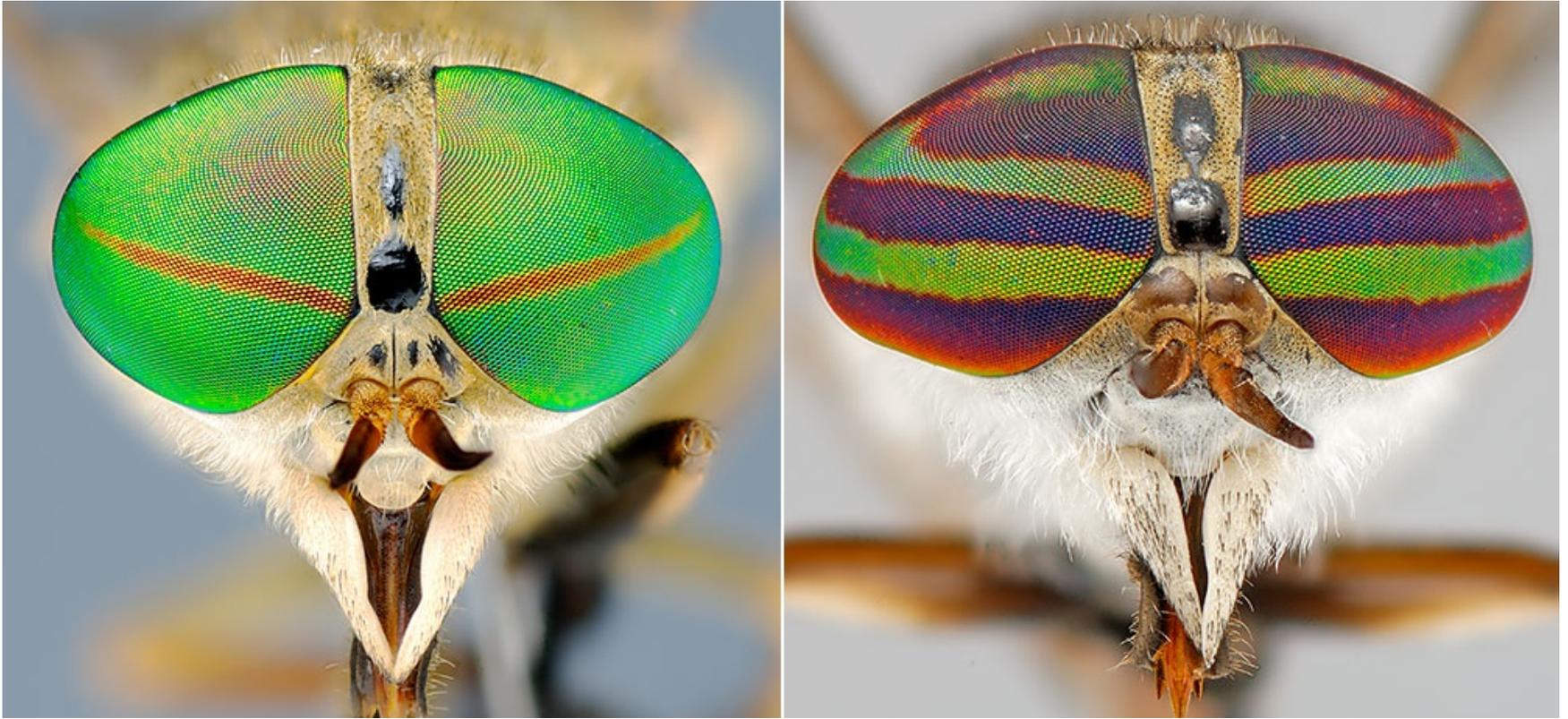


Fig. 4. Horse Fly faces

..... whereas those of Deer Flies, *Chrysops* spp., (next page) defy description (Fig.5, female left, male right)

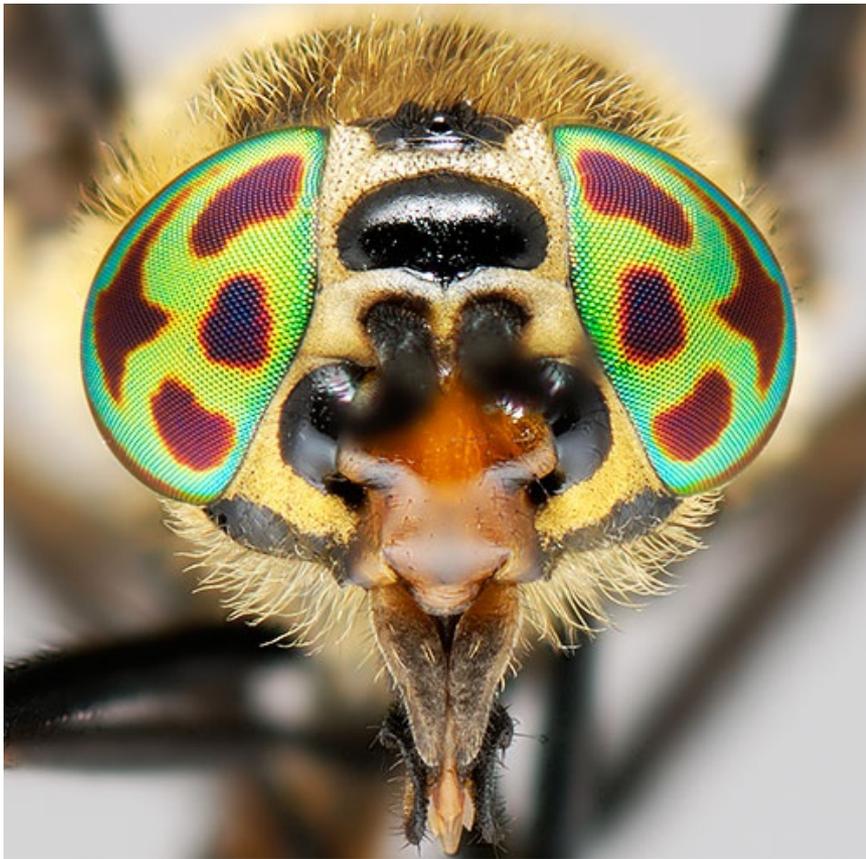


Fig. 5. Deer Fly faces, female left, male right

5] The Robber Flies. Family: Asilidae

These flies have piercing mouthparts and catch and feed on other insects. Some have brightly coloured hairs, a black and yellow beard, yellow hairs on thorax and dark orange tufts on the abdominal segments (Fig. 6).



Fig. 6. Robber Fly

6] **The Long-legged Flies. Family: Dolichopodidae.**

Small metallic flies which, as adults, feed on other insects (Fig. 7)



Fig. 7. Long-legged Fly

7] The Hover Flies. Family: Syrphidae

Strikingly-coloured flies which can be seen everywhere in summer hovering and feeding on flowers.

Whereas black-and-yellow is the commonest colour combination some species in the genus *Chalcophorus* have beautiful red/purple bodies (Fig. 8)



Fig. 8. Hover Fly

8] The Pictured-winged Flies. Family: Otitidae & Family: Tephritidae

Small flies with varying patterned wings; Otitidae (Fig. 9), Tephritidae(Fig. 10)



Fig. 9. Otitidae.



Fig. 10. Tephritidae

9] **Bluebottle, Greenbottle, and some House Flies.** Family: **Calliphoridae** (Blow Flies), Family: **Muscidae** (House Flies).

Many of these flies are metallic and can be blue, green, or coppery; sometimes depending on how the light is reflected (Fig. 11)



Fig. 11. Blow Flies & House Flies

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