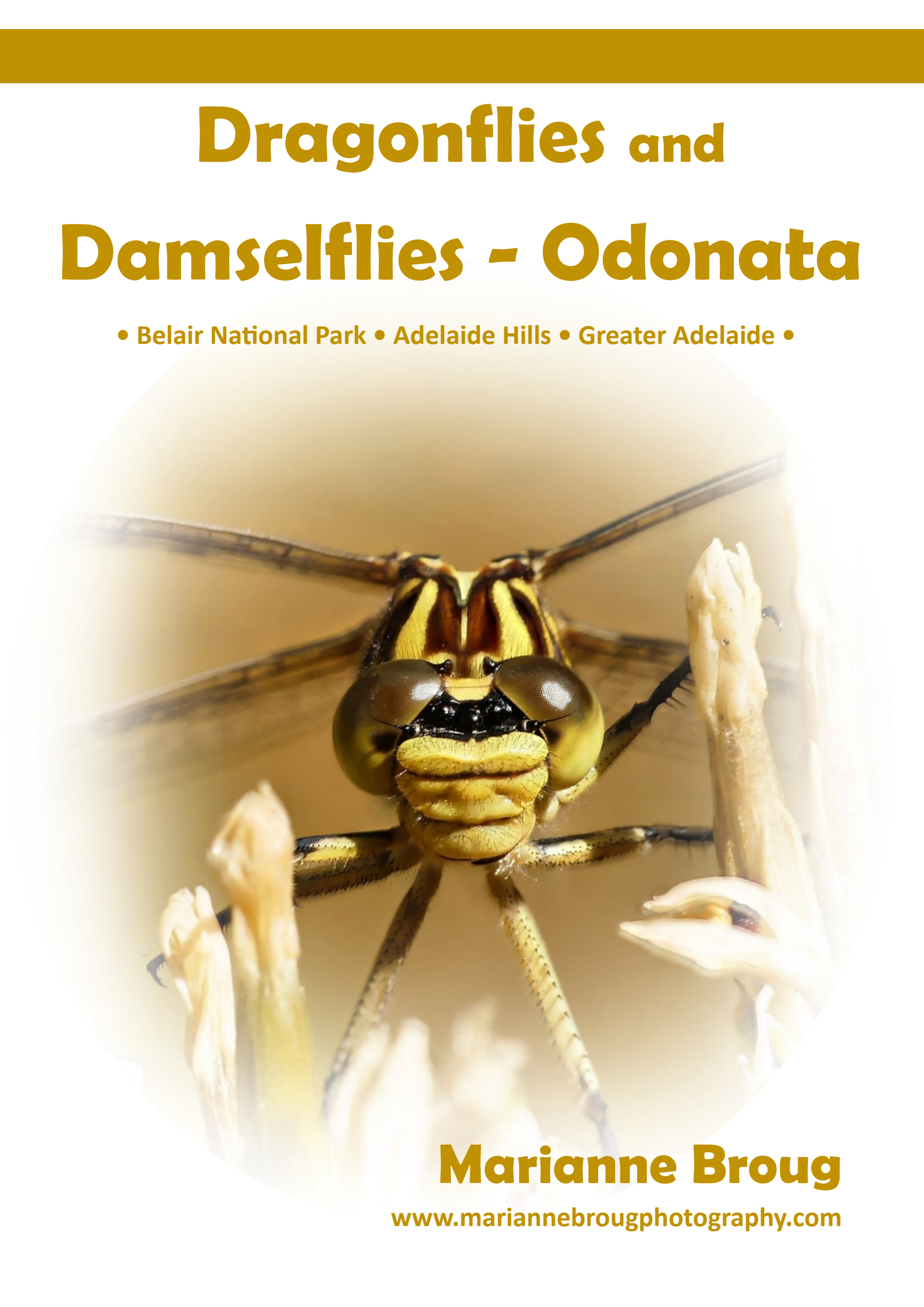
Dragonflies and Damselflies - Odonata

• Belair National Park • Adelaide Hills • Greater Adelaide •



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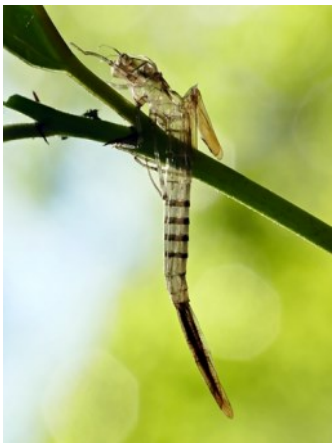
The word **Odonata** comes from the Ancient Greek 'odonto' and means 'tooth'. Many insects have toothed mandibles but in this case it is believed to refer to the fact that the adults of this order have particularly large strong serrated mandibles and are voracious predators.

Adults are highly mobile in flight and extraordinary to watch. Each of the four wings can move independently, allowing them to change direction, speed and elevation in an instant. They can also hover and fly backwards.

I see them characteristically near lakes and dams, but they also seem to inhabit grassy woodlands, open sunny tracks and denser stringybark bushland. At times I have even seen them in my garden.

Odonata go through **Incomplete Metamorphosis:** egg - nymphal stages - winged adult. Nymphs of **Odonata** are fully aquatic, and although I haven't seen the nymphs in action under the water, I have often seen their discarded exoskeletons (exuviae) on reeds, bushes or trees on the edges of permanent or semi-permanent water (see photos below).

Cast-off exoskeletons or exuviae (exuvia for singular) of dragonflies (left) and a damselfly (right).



The order **Odonata** is divided into two distinct suborders: **Anisoptera (Dragonflies)** and **Zygoptera (Damselflies)**. I will describe each suborder more fully in the text.

In this publication I have only included the dragonflies and damselflies I have seen and photographed myself. I know there are a couple more species in the area covered by this publication but they are rarely seen. The most common Odonata are discussed.

With their extraordinary eyesight and speed, both dragonflies and damselflies are notoriously difficult to photograph. I have had most success in the cool of the morning when they have yet to warm up, but in other cases a bit of luck or some stealth (very slow movement) has nabbed a photo or two. A few photos in this collection have been taken when one has suddenly landed right next to me or even *on* me!

Acknowledgements

Thanks to **Chris Burwell** of the Queensland Museum for his expert identifications of Odonata on iNaturalist.

Thanks to **Brett Smith** of Ellura Sanctuary, for his expertise and the extraordinary database he has put together of all critters great and small **www.ellura.info.** Additionally, his personal help and suggestions are always very much appreciated.

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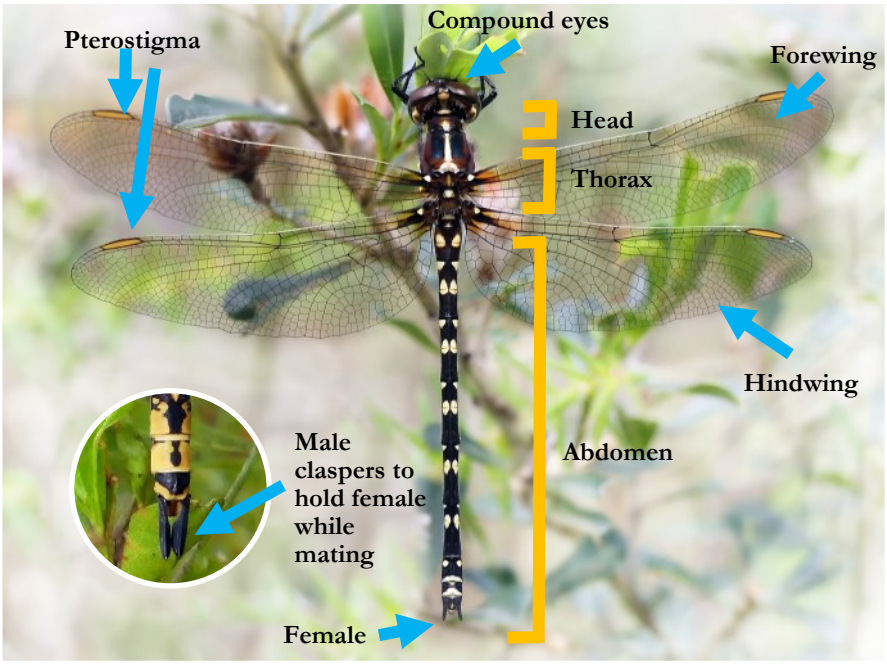
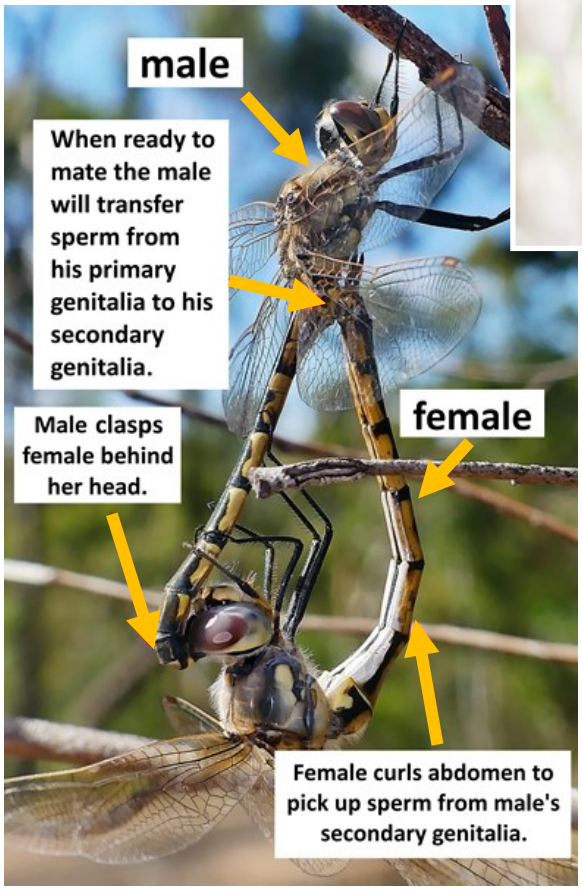
Front cover image: **Yellow-striped Hunter, *Austrogomphus guerini.*** (Further description and photos in text.)

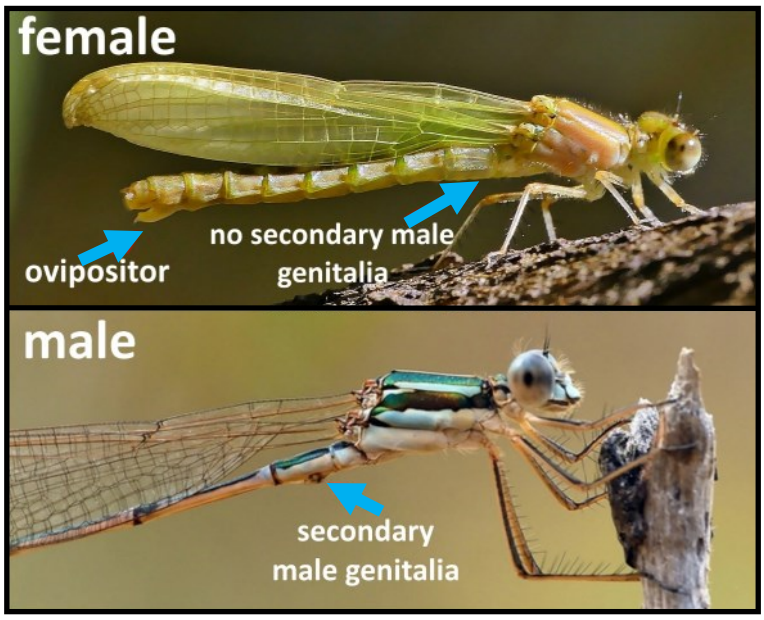
Anatomy



The 'heart' or 'wheel' of mating

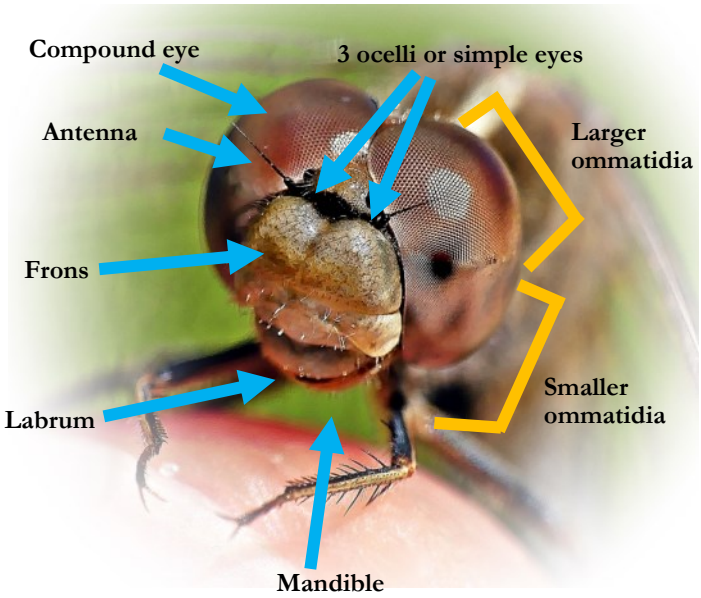
Odonata mate in a unique, often heart-shaped, configuration known as a copulation wheel or mating heart.





Visual System

Dragonflies have one of the most sophisticated visual systems in the animal kingdom and can see virtually 360 degrees. Each compound eye is made up of ommatidia which are hexagonal visual units consisting of a lens system and a group of light sensitive cells. A large dragonfly may have up to 30,000 ommatidia in each eye. As can be seen in the photo on the right, the ommatidia on the upper surface are bigger and those on the lower surface are smaller. The upper ones scan the sky above and are adapted to rapidly detect movement eg. from predators. The lower facets are smaller, providing higher spatial resolution (a more detailed image), making it easier for the dragonfly to detect prey.



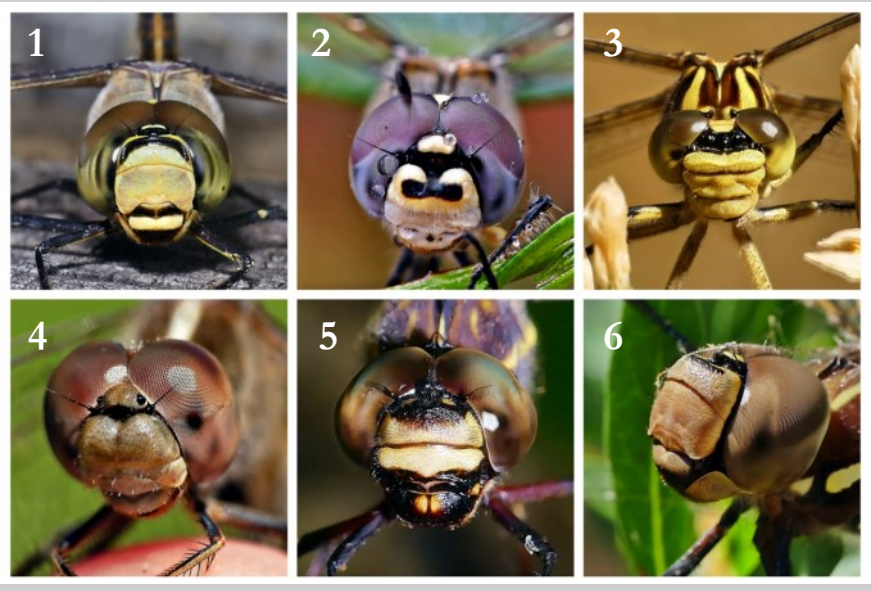
Dragonflies - Anisoptera

The word **Anisoptera** comes from the Greek words 'anisos' meaning 'uneven' or 'unequal', and 'pteron' meaning 'wing', hence 'unequal wings'. This refers to the fact that the forewings and hindwings of dragonflies are shaped differently from one another. The hindwings are also wider than the forewings.

In comparison to damselflies, dragonflies are more robust, their eyes are larger and usually meet in the centre, and their wings are spread out flat when at rest. For quick reference, left is a collage of the nine species of dragonfly I have seen. Each of these species will be discussed more fully in the text that follows.

The collage (right) shows a comparison of the eyes and heads of dragonflies, revealing their remarkable variation.

From left top: 1. **Australian Emperor**,
2. **Tau Emerald**,
3.**Yellow-striped Hunter**,
4. **Wandering Percher**,
5. **Swamp Darner**,
6. **Blue-spotted Hawker**.

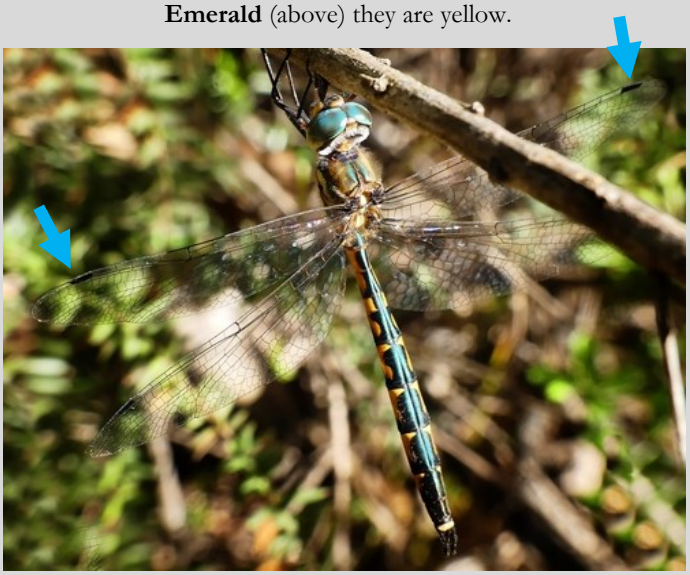


Emerald Dragonflies - Corduliidae

Emerald Dragonflies are named because their black mid-dorsal stripe shines an emerald colour in the sun. The taxonomic name **Corduliidae** comes from the Greek word 'kordyle' meaning 'club' or 'knob' and refers to the club-like abdomen tip seen in some species.

The three surrounding photos show **Tau Emerald, *Hemicordulia tau*.** It is by far the most common species I see, both near water and in the bush. Of note in the photo below are its abundant hairs and the complicated hinges and articulations between the wings and the body.

Australian Emerald, *Hemicordulia australiae* showing its glistening emerald dorsal stripe and its striking emerald eyes. Its pterostigmata are black (arrowed), whereas on the **Tau Emerald** (above) they are yellow.



Darners - Aeshnidae

The family **Aeshnidae** includes both **Darners** and **Hawkers**. **Aeshnidae** are some of the larger and more robust dragonflies. The etymology of the name **Aeshnidae** is apparently muddied by misspelling, but was intended to mean 'spear-like ones' and refers to their long slender bodies.

The **Swamp Darner, *Austroaeschna parvistigma*** (top three photos) is a fairly frequent sighting, often in more densely vegetated and higher parts of the Hills. It is quite a dark dragonfly and can be exceptionally well camouflaged on tree trunks and branches.

Blue-spotted Hawker, *Adversaeschna brevistyla*. I see this dragonfly occasionally, once rescuing one from insect netting (above). Males have blue eyes and females have brown. Its characteristic blue spots are not evident in either of my photos. It is a large dragonfly as can be seen by the size reference of the tip of my thumb in the photo above.

Australian Emperor, *Anax papuensis* is a larger size dragonfly up to 70mm. After the **Tau Emerald** it is probably the species I see most often. On hot days, it is mesmerising to watch them skimming and swooping over water.

In some species of dragonfly the male guards the female after insemination by hovering above her, in others, as this **Australian Emperor** couple (left), he will continue to grasp her while she lays her eggs just under the surface of the water. This behaviour may perhaps help the female to lay without falling into the water, as well as guarding her from the attention of other males.

Clubtails - Gomphidae

Gomphidae are named for the club-shaped widening ('gomphus' is Greek for 'peg' or 'bolt') towards the end of their abdomen. However, females (shown in my photos) can have very little widening or none at all.

Yellow-striped Hunter, *Austrogomphus guerini* (also see main chapter image) is a smallish brown and yellow dragonfly that I had seen a number of times but because of its speed had never photographed. Then one day as I was walking in the bush I saw this dragonfly clinging onto a plant and unable to fly because of the windy conditions. The wind certainly presented me with a photographic challenge but there were enough momentary lulls for me to snap a few photos!

Tigertails - Synthemistidae

Tigertails are generally smaller in size and have a very narrow abdomen. In taxonomic naming, 'synthemis' is generally understood to mean 'set together' or 'arranged together', which refers to the orderly wing venation and body proportions compared with other Australian species.

I have only seen a **Swamp Tigertail, *Synthemis eustalacta*** (below) irregularly. Like the **Swamp Darner** they seem to prefer the more densely vegetated areas of the Hills.

Skimmers - Libellulidae

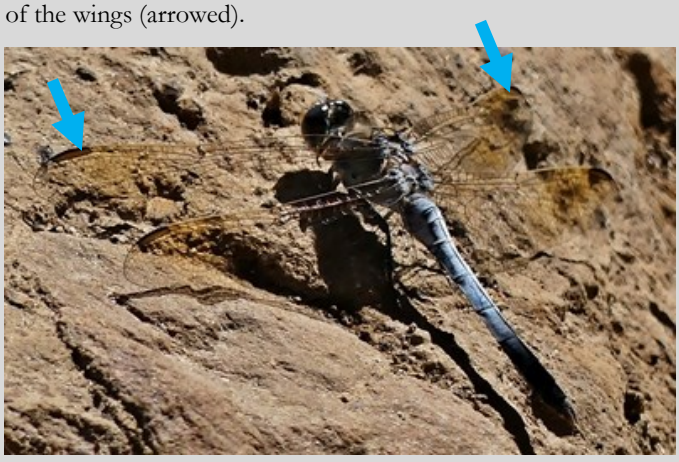
Libellulidae is the largest family of dragonflies. The name **Libellulidae** comes from the Latin 'libella', meaning 'little balance' or 'small level' and likely refers to the outstretched wings.

All photos: **Wandering Percher, *Diplacodes bipunctata*** is a small and reasonably common dragonfly. It is a good species to illustrate sexual dimorphism, the mature male being bright red and the female tan/yellow. (Immature males can be a duller reddish). Left below is a side-by-side graphic of a male and female. Of note is also the difference in their claspers. The photos of a female on my finger show just how small they actually are. I had rescued her from insect netting.

red pterostigma

The pterostigma of **Wandering Perchers** is red in both sexes.

Blue Skimmer, *Orthetrum caledonicum*. Although many dragonflies travel some distance from permanent water, the **Blue Skimmer** does not. Only mature males have the distinctive and easily-recognisable pale blue colour. The females and immature males are yellow and black and can look a little like a **Tau Emerald**. Of note is the yellowing towards the end of the wings (arrowed).



Damselflies - Zygoptera

The word **Zygoptera** means 'equal wings' and refers to the fact the forewings and hindwings of damselflies are basically the same shape and size as each other. In comparison to dragonflies, damselflies (as their name would suggest) are much more delicate and slender. Additionally, their wings are almost always held upright when at rest, and their eyes are smaller and do not touch in the centre. They are extremely quick and have extraordinary eyesight. I have always found them extremely difficult to photograph.

Below is a sequence of photos showing a damselfly that had freshly emerged from its nymphal exuvia or shell (see first photo). It was pure luck that I happened to see the process unfolding and it was extraordinary to witness. The process documented here took about ten minutes after which the damselfly slowly moved up the tree and out of sight. It is not so obvious from the photos, but not only the wings grew in size, the whole body also grew substantially. This damselfly is a female, with ovipositor evident (arrowed) and no secondary male genitalia. It is impossible at this stage of development to tell what species she is.

Ringtails and Allies - Lestidae

The family name **Lestidae** comes from the Greek word 'lestes' meaning 'robber', 'pirate' or 'plunderer'. This reflects the rapacious hunting behaviour of these damselflies, which capture small flying insects with their spiny legs. In comparison to other families of damselfly, the pterostigma in **Ringtails** is more elongated.

The **Slender Ringtail, *Austrolestes analis*** is distinguished from other Ringtails by its very slender abdomen. This damselfly clearly shows the secondary genitalia of a male (arrowed left).

The **Blue Ringtail, *Austrolestes annulosus*** is named because the mature male is a striking blue colour. Females and less mature males are duller blue in colour. The **Blue Ringtail** can be easily distinguished from other species by the downward -sloping triangular markings on its abdomen one of which is arrowed left.

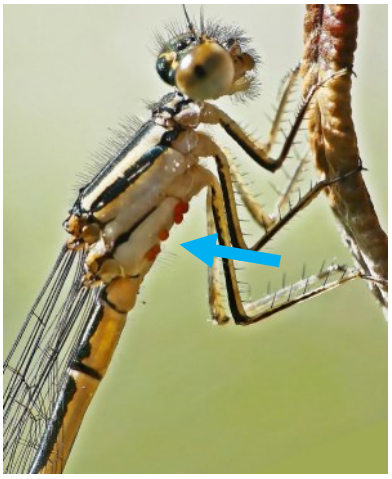
The mature male of the **Wandering Ringtail, *Austrolestes leda*** is very bright blue in colour. The female is a duller blue or brown, and the immature male is a pale blue. **Wandering Ringtails** can be distinguished by the blue rings on the abdomen. The secondary genitalia of a male are clearly evident in these photos (arrowed below). Additionally it can be seen that the claspers are strongly curved (arrowed right below). It is these that give **Ringtails** their name.

Narrow-winged Damselflies - Coenagrionidae

Coenagrionidae is the largest family of damselflies. The name **Coenagrionidae** comes from the Greek word 'koinos' meaning 'common' and 'agrios' meaning 'wild' or 'field. So the rough meaning is 'common field' damselflies. Despite their delicate appearance they are efficient and ruthless predators of smaller insects like mosquitoes.

All photos on this page are of the **Red and Blue Damsel, *Xanthagrion erythroneurum***. I have seen this species in many areas near water but also in the bush. It is immediately identifiable by its red head and the blue rings around the tail. Both male and female are similarly coloured although the female is duller than the male. Below left is a female. The other photos are of males, the lighter coloured ones being juveniles.

All photos on this page are the **Eastern Billabongfly, *Austroagrion watsoni*.** It is a very small damselfly, barely 25mm (1 inch) in length. It can be easily identified by the blue line on the back of its head, between the two eyes (arrowed below) and the two lime green stripes on the top of the thorax (also arrowed). In the mating photo (below left) the difference between male and female colouring can be clearly seen. For details about mating see the **Odonata** anatomy page.



Above: An interesting observation of a female **Eastern Billabongfly** with **Dragonfly Mites, *Arrenurus* sp**. on her abdomen (arrowed). They are aquatic mites.

Right and below: I found this **Aurora Bluetail,** ***Ischnura aurora*** (male) caught in the sticky glands of a ***Drosera***. I ordinarily leave nature alone to do its 'thing' but I thought in this instance it was a good opportunity to have a closer look.

The thorax and eyes are a very striking apple green with black. The abdomen is reddish yellow fading to black. The tail is blue-tipped.

The photo with my finger gives a good indication of how small and delicate it is. Along with the **Eastern Billabongfly** on the previous page it is probably the smallest damselfly I have seen.

Left and above: Two **Aurora Bluetail,** ***Ischnura aurora*** females on reeds next to a lake. These females have a certain amount of pruinescence (dusty or frosty-looking coating) on their bodies which indicates they are mature individuals. If the females lacked any colour, then they would be considered teneral (newly moulted).

Above and right: I have seen the **Common Bluetail, Ischnura heterosticta** near various water sources. It is larger than the **Aurora Bluetail** shown on the previous page. The female can present in different colourings, one of which is very similar to the male, as is the case in the mating photo (right). The species has a blue head, thorax and blue-ringed tail. The abdomen is mostly black.

Above: Face to face with a recently-emerged female **Coenagrionidae** (too early to tell species). The three ocelli on the top of her head are clearly visible. The colours were like pastel jewels. An utter thrill to witness such beauty. It is one of my favourite photos.