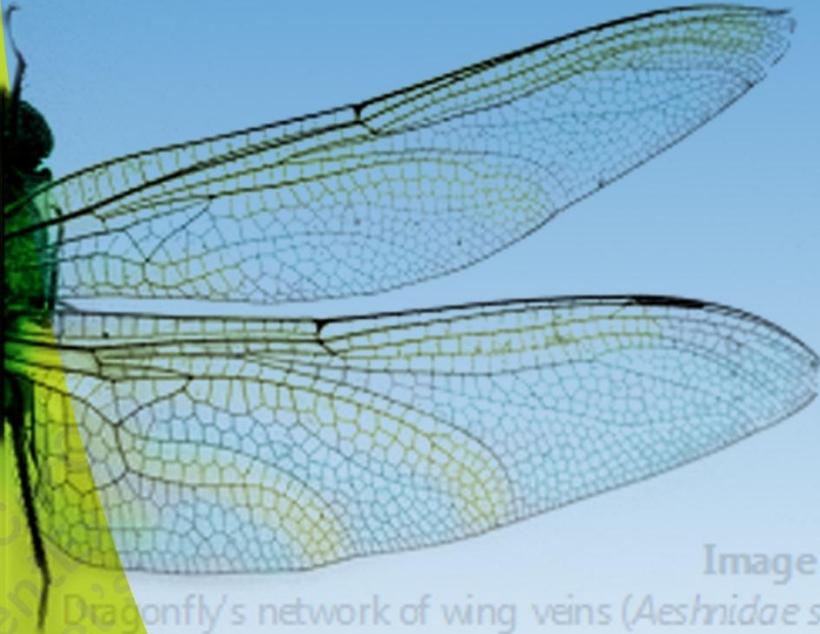


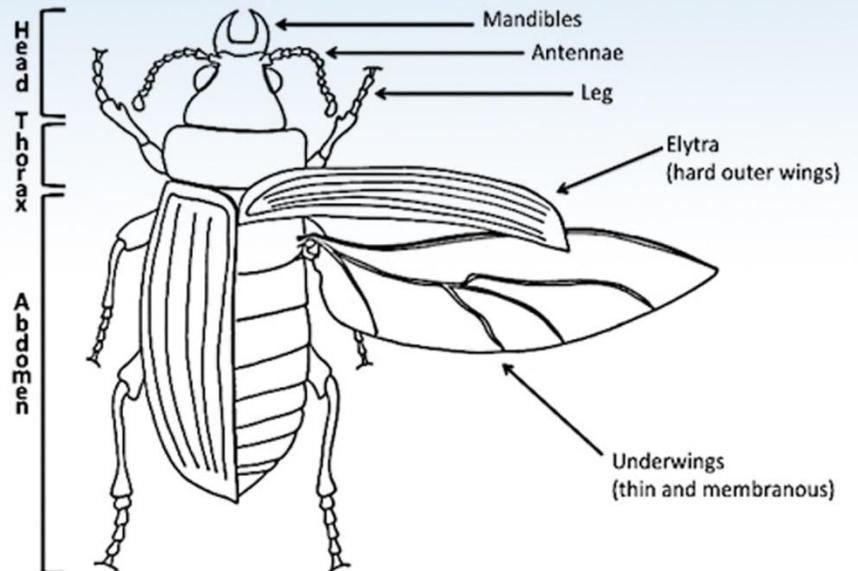
Sustainability Agriculture &



Entomology

Image 2.

Dragonfly's network of wing veins (*Aeshnidae* sp)



Reference Book



Saskatchewan

Taking to the Sky – Insects in Flight

Perhaps the most noticeable insects are the ones you see in flight. Undoubtedly you have experienced, maybe even more than once, the buzz as a dragonfly whizzes by your head, or the serenity that comes with watching a butterfly flutter amongst flowers in a flowerbed. It is even more certain that you have at least once swatted a fly from your meal or a mosquito from your arm. But have you ever stopped to think how they are capable of such patterns of flight? Or why they have even evolved such an adaptation? We saw in our previous unit that some species of beetles have the power of flight as well, but their periods of flight are brief and they do not stay in the air for very long. Surely, it must be exhausting to be a dragonfly, seemingly always in motion. Let's take a closer look at the body structures that allow insects to fly long distances, and how that remarkable adaptation has allowed them to reach new heights in regards to survival.

Fairy Tales in Flight – Dragonflies and Damselflies

Have you ever stopped to count the wings on a dragonfly or damselfly? See if you can spot the two frontal wings and the two hind wings the next time you spot one perching. These four wings give dragonflies and damselflies an incredible range of motion. They can fly up, down and side to side very quickly. Let's examine these wings and see what makes them so unique and capable of such incredible feats of flight.

Dragonfly wings, like most of the insect body parts, are made from a very thin extension of the exoskeleton. If you look very closely at a dragonfly when it is sitting on a branch, or perching, you may see that the wings are indeed incredibly thin! Now notice the spider-web like lines running across the wings. The patterns these lines form, called **venation**, are important for strengthening the wing. You may notice that the veins at the front are particularly thick. These have an exceptionally important role in wing strength, and help prevent the wings from tearing as the dragonflies and damselflies fly through the air and vegetation.

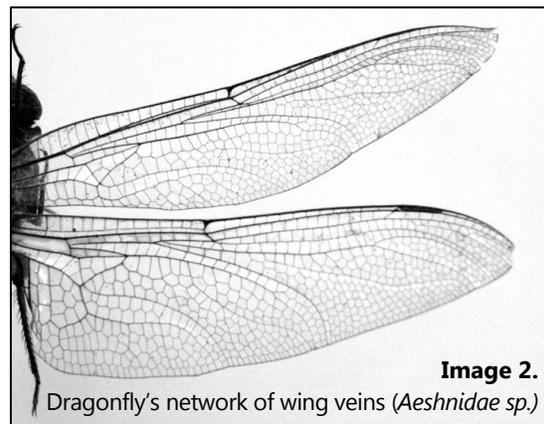


Image 2.
Dragonfly's network of wing veins (*Aeshnidae* sp.)

Identifying dragonflies and damselflies can be tricky business! Remember the insect key we used in the first unit to tell different kind of insects apart? Read through the following key (we will just use one step here – focus on the details between the two descriptions) to help you understand the differences between a dragonfly and a damselfly:

Step One:

- a) The specimen has a thick, strong and usually shortened body with wide, broad wings. The eyes are very close together on the head – they may even touch at the centre. When perching, the wings are always held outstretched, never folded over top of the body. – Your specimen is a **Dragonfly**.
- b) The specimen has a long, slender body that looks very delicate and thin. The wings are also very long, or *elongated*, and in many species are folded over the body when resting. The eyes are also spaced very widely apart. – Your specimen is a **Damselfly**.

If you have trouble remembering these differences, think of their names. *Dragonflies* are bigger and fiercer, like the mythical dragons. They are brave, fierce hunters, catching prey in midair and so must fly very quickly! *Damselflies* are thinner and more delicate, like a *damsel* – damsel is a word you can use to describe a young girl. Of course, young girls are also very brave and fierce. But, they are much smaller and more delicate when compared to a dragon. So they also depend on ambushing their prey, and catching prey that is a smaller size than what dragonflies catch. Thinking about meanings of the names of different insects can help you remember what they look like.

Once entomologists have identified whether they are looking at a damselfly or a dragonfly, they can use the wing venation as a method of identifying what species of dragonfly or damselfly they are observing. Besides adding strength, wing venation is like the fingerprint of each particular dragonfly and damselfly species. Each species has a unique pattern of veins on their wings, and close examination of this pattern can help you decide what species you are observing.

Some common species of dragonflies for example, have a characteristic 'boot-shaped' wing venation on the bottom part of their hind wings (see Image 3). So if you examine the hind wings of a dragonfly and see a boot shape, right away you know some more information about what kind of dragonfly that specimen is! Looking closer at the shape of the "boot", and some other important wing venation characteristics, can tell you exactly what species you are examining.