

A: Back ground information on Lebanon's Dragonflies

There are few more enjoyable ways of spending a warm summer afternoon than in watching the activities of dragonflies as they perform their aerial acrobatics along the edge of a pond, stream or marsh. Unlike many animals, dragonflies are usually quite approachable and will continue to hunt, reproduce, and rest in close proximity to human observers. They may even show curiosity and come to investigate these strange creatures invading their home territory. Although they may appear somewhat formidable with their large bodies, powerful wings, and all-seeing eyes, dragonflies are actually harmless to humans and will not attack, bite, or sting. In fact, these amazing insects are actually beneficial to humans as result of their large appetites for some of the pests we like the least: flies, mosquitoes, and midges make up the majority of their prey.

Dragonflies, like so much the world's biodiversity, are threatened. Their unique life cycle, which includes an important extended period as aquatic larvae, ties them to stable and clean bodies of water. Pollution from sewage, factories and agricultural runoff, together with loss of habitats due to pumping of water and drainage of pools, are real threats to these species. Without serious efforts to reduce pollution and protection for important sites, the diversity and numbers of Lebanon's dragonflies are sure to decrease. We can all help protect dragonflies by urging our local politicians and any landowners we know who have ponds or streams that they must keep these habitats clean and full of water. We can also make our own dragonfly habitats by digging a pond and surrounding it with the right vegetation. Finally, you can join a local conservation group that is working to protect natural habitats in your area.

What is a Dragonfly?

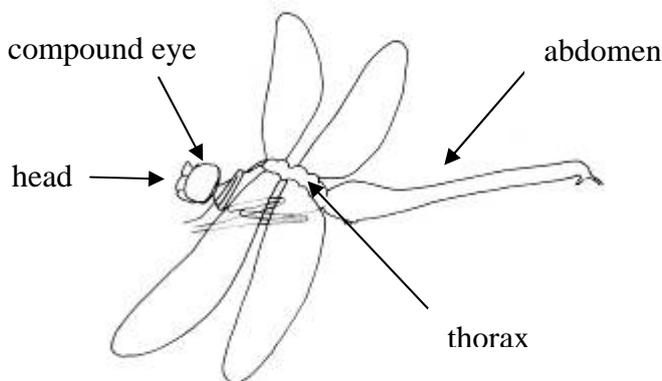


Fig. 1 Dragonfly body parts

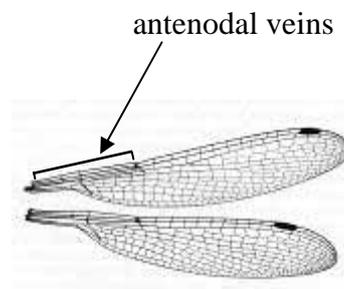


Fig. 2 Damselfly wing

Dragonflies are insects in the order Odonata, which means “toothed jaw”. The adults are characterized by two pairs of transparent veined wings and a pair of large bulbous “compound” eyes dominating the head. Dragonflies of the Aammiq area can be divided into two groups, the Zygoptera (damselflies) and the Anisoptera (the insects commonly referred to as dragonflies).

Adult damselflies are delicate and fragile looking insects, ranging from 2 to 4.5 cm in length. They have rectangular heads with spherical eyes on each side. The two pairs of wings are the same shape and in most species are kept folded over the insect's body when it is resting (Fig. 3). Unlike that of their larger relatives the dragonflies, damselfly flight often seems weak and fluttering, and they are likely to stay in or near thick vegetation by the water's edge. Dragonflies (group Anisoptera) can be identified by their relatively larger and stronger looking bodies (4 to 8 cm in length) and rounded heads almost completely covered by the large pair of eyes. The front and back pairs of wings are slightly different in shape, and they are held wide open while the insect is at rest (Fig. 4). Dragonflies are powerful and fast fliers, and they are more likely to be found further from water than damselflies are.



Fig. 3 Damselfly



Fig. 4 Dragonfly

Dragonflies are perfectly adapted to fill their roles as aerial predators. Two features are especially important and easy to observe without special knowledge or instruments: sight and flight. Due to the unique positioning of an enormous pair of compound eyes, they are able to see in front, to the side, and behind all at the same time. Compound eyes are made up of thousands of individual lenses which work in unison to increase sensitivity to light, color, and movement. Dragonflies also have three tiny eyes on the tops of their heads that play an important role in coordinating movement of the wings with the dragonflies' surroundings. Each wing can move either individually or with its pair, allowing the dragonflies to be some of the fastest and most maneuverable flying insects on earth. One species has been clocked flying at almost 40km/hr! Along with simple forward motion, dragonflies can also fly sideways and backwards and are able to hover and glide for extended periods of time. While hunting, dragonflies fly with their bristly legs extended forward to trap the unlucky prey, which they then eat either in the air or after landing on a suitable perch.

The dragonfly life cycle

Dragonflies are a primitive group of insects that lack the four-stage “complete metamorphosis” found in groups like butterflies. Instead, dragonflies undergo a three-stage life cycle. The first stage is the **egg**, from which hatches a small **nymph** or **larva** (plural **larvae**). The larvae of damselflies (Zygoptera) are quite slender, whereas those of true dragonflies (Anisoptera) are stout (see Figs. 5, 6). The larva stage in almost all dragonflies lives underwater (you can find them among aquatic plants or on the muddy bottom) and breathes by gills. Damselfly gills look like three leaf-like tails at the rear end of the body (Fig. 5). The true dragonflies have their gills in a small chamber in their rectum, and breathe by pumping water in and out of this chamber (Fig. 6). Dragonfly larvae are predators, feeding on other small aquatic invertebrates, and even small tadpoles and fish! To help them catch their prey, they have an extendible spoon-shaped lower jaw.

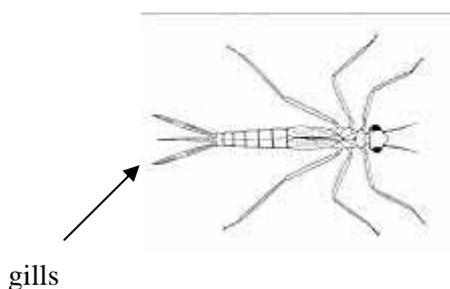


Fig. 5 Damselfly larva

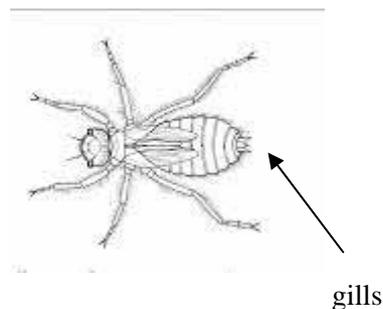


Fig. 6 Dragonfly larva

As the larva feeds, it grows too big for its rigid skin, so somewhere between 8 and 15 times during its life it will climb out of its skin and grow another one. This is called **moulting**. Each new skin is slightly larger than the last, and has slightly larger wing pads. So you can tell how old a dragonfly larva is by its size and the length of its wing pads. In the final moult, a fully-developed, winged **adult** (or **imago**) emerges from the larval skin. In order to complete this last moult, the larva leaves the water and crawls onto a plant, a mud bank or a stone. Its skin splits down the back, and the adult crawls out, leaving the skin behind. If you look carefully around the banks of streams, lakes or wetlands during the summer, you will be able to find many old skins of dragonflies that have emerged as adults (see Fig. 7). When they first emerge, the adults are very weak, and need to spend a few hours drying their wings and body before they can fly. During this time, a strong wind can blow them into the water, or a frog or bird can easily eat them. Sometimes you will find many drowned adults on the side of a lake or wetland. It is sad to see, but dragonflies always produce many young so that enough of them will survive to become adults.



Fig. 7

The last stage of the life cycle is **mating**, and dragonflies have a unique way of doing this. The male dragonfly grasps the female then curves the end of her body around so that it touches the underside of the male just behind its wings (Fig. 8). In this position, the male can fertilise the eggs inside the female. Amazingly, the pair can keep flying while they are held together like this! That is why you will often see a pair of dragonflies flying together in a sort of heart-shape. If you watch the mating couple for longer, you might notice that afterwards, the female dips the rear end of her body several times in the water or muddy bank while the male flies off or hovers nearby to guard her. She is laying her eggs (Fig. 8), getting ready for the next turn of the life cycle to begin.

The dragonfly life cycle (below)

The dragonfly life cycle

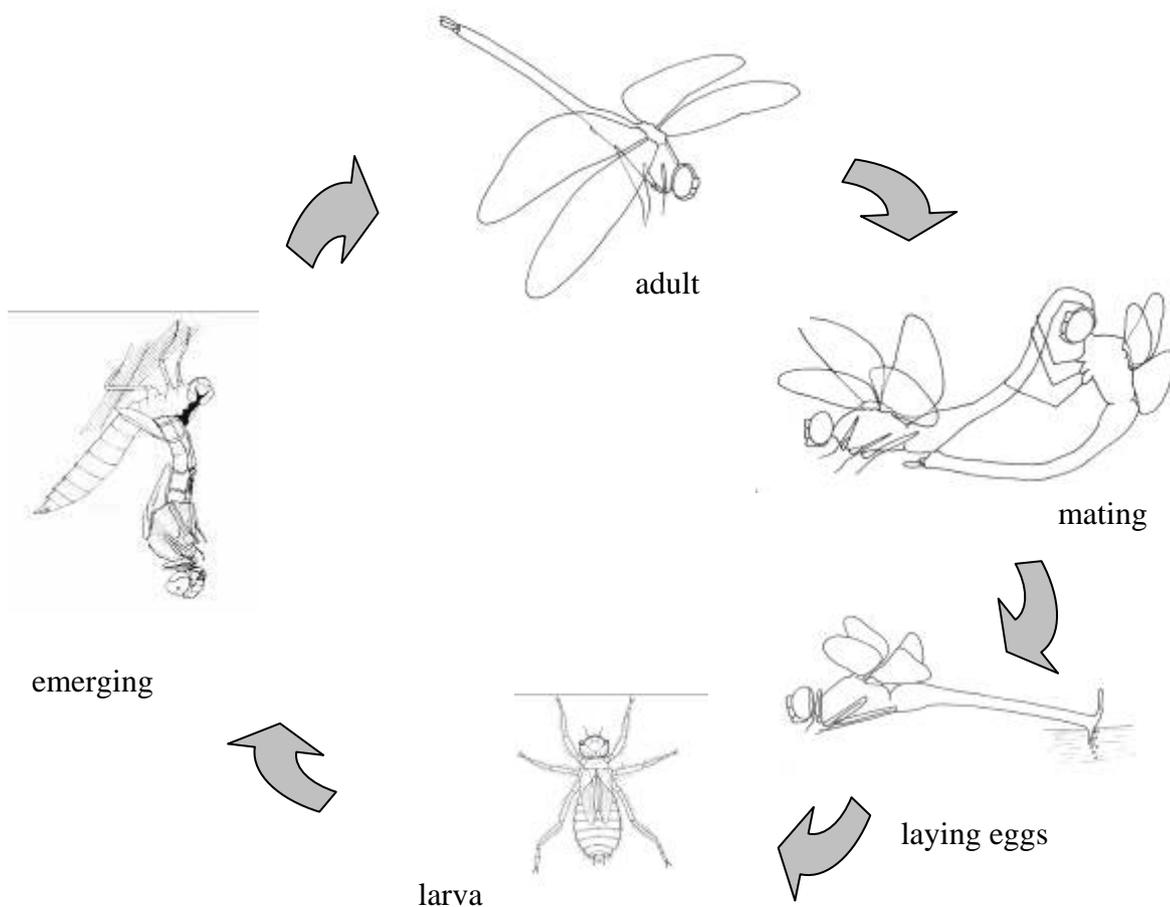


Fig. 8

Observing dragonflies in the field

Adult dragonflies are very agile fliers, and not easily caught, but there is really no need to catch them anyway. With a good pair of close-focusing binoculars you can usually see enough detail to identify them. However, to get a good view, you might have to wait for them to land on a plant, which requires a lot of patience, as some species spend most of their time in flight. Dragonflies rely mostly on their sense of sight, so to increase your chances of getting close, wear camouflaged clothes that match your surroundings, and keep your shadow pointing away from the water. Early morning, just after sunrise, can be a good time to get close, as they are slower when the temperature is cold. But many larger dragonflies tend to spend the night hidden, so you won't see these ones until they are already flying.

To see larvae, take a kitchen sieve down to the water, and sweep it gently through the aquatic plants by the water's edge. Gently lift any larvae out of the sieve with your fingers (they won't bite!) and transfer them to a white plastic dish or tray so you can see them easily. A hand lens or magnifying glass will help you to see the details of the body. Don't forget afterwards to return the larvae carefully to where you found them!

Telling males from females:

Males and females of some species may have different coloration, in some dragonflies belonging to the family Libellulidae; the males have a blue powdery covering over their bodies (e.g. compare Figs. 17 and 18). In species without a colour difference, the males will have a slight bulge on the underside, just behind the legs. They may also have a prominent pair of claws or leaf-like appendages at the tip of their abdomen on the upper side, which are used for grasping the female. Females have a slight bulge beneath the tip of their abdomen. This is the organ they use for laying eggs.

What to record:

If you want to keep a journal of your dragonfly observations, you need to know what information to write down. If you collect the right information, you will have a very good scientific record that might be helpful to other dragonfly scientists. Make sure you record:

- the name of the species. If you are unsure record the genus, or write down the colour and any other distinguishing features.
- the location, including altitude (e.g. Aammig wetland by river, 900 m above sea level). If you have GPS coordinates even better
- the habitat (e.g. long grass beneath tress)
- the number of individuals
- male or female
- whether they appear newly emerged (newly emerged individuals can be pale in colour, and may even be a little transparent), and if you see any empty skin cases.
- What they are doing, e.g. mating, laying eggs, patrolling.