

NatureNotes



Rupert Evershed's monthly diary of the natural world
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Dragonflies and drones

One of my favourite summer activities as a child was pond-dipping. I was fortunate enough to grow up in a house with a fairly large pond in the garden and so my pond-dipping activities often extended over days and weren't as much dipping as a thorough exploration of the life in the pond.

Using a net and numerous containers of various sizes I would sift through the murky waters, peeling layers of rotting leaves apart, to see what might be hiding there. Invariably anything alive would wiggle vigorously on exiting the pond so I would lay the contents of my scoops out and watch for movement. Anything of interest would be plopped into one of my containers for closer inspection.

I was fascinated by the tiny bouncing daphnia or 'water fleas' that I would sometimes extract for even closer examination under a microscope. Water beetles also scurried away seeking any corner they could find but best of all were the newts. These tiny lizard-like creatures always delighted and were big enough to hold in the hand and examine close-up.

Just occasionally, another creature would appear amongst the siftings – a menacing-looking larva with six legs and bulging eyes. Inhabitants of the dark recesses of the pond, these creatures, 3 or 4 cm in length, seemed to be from an alien world. They were in fact dragonfly nymphs, biding their time at the bottom of the pond, eating voraciously and devouring whatever small creature crossed their path, from snails and tadpoles, to water fleas and worms.

Fearsome predators, at least for much of the tiny pond life, I always handled these nymphs with nervous respect just incase (in my child's mind's eye) they nipped my finger. Of course, dragonfly nymphs are prey themselves to larger aquatic life such as fish and birds but nevertheless, moulting up to fifteen times during their life in the pond, they can afford to lose a leg or two before their final form.

And that final form are the beautiful winged insects that we know and love, that having climbed heavenwards from the



A Southern Hawker dragonfly (*Aeshna cyanea*), one of about 3,000 species worldwide. Picture: STEVE ROUND (WWW.STEVENROUND-BIRDPHOTOGRAPHY.COM)

depths of the pond as full-grown nymphs, emerge in late spring and summer to whizz around bejeweling rivers and ponds with their sparkly metallic and iridescent colours. Yet, in reality, we see only a brief few weeks of the dragonfly's life for up to two years of its life is spent as a nymph growing in the shadows.

Every summer I would examine the tall flag irises at the pond's edge to find the dried-out exoskeletons of the nymphs still clinging to the stems, a fading memory of a life spent in the dark underworld of the pond. It is perhaps this murky past that has often given the dragonfly a sinister reputation in folklore. Certainly, their huge, bulging, high-performance eyes give a sense of the alien and the discovery of their prehistoric ancestors with wingspans of up to two feet fuels the notion that these insects are from another world.

With the help of a number of fantasy movies it is not hard to imagine dragonflies and their nymphs being cast in some futuristic role to terrify us and threaten human extinction, but the future, as far as dragonflies are concerned, could be even stranger than science fiction. Research engineers at Draper, a US research laboratory, have been working on a project called DragonflyEye that blurs the lines between insect and machine. By genetically modifying a dragonfly's nerve

system the engineers are able to fit a tiny backpack to the dragonfly that 'plugs-in' to the insect's nerve cord and allows engineers to steer the dragonfly remotely. The result is a new kind of hybrid drone that combines miniaturized navigation, synthetic biology and neurotechnology to guide the dragonfly.

The ability to control such a small flying insect opens up incredible possibilities in many fields: for instance, it has been suggested that honeybees, whose population has collapsed by half in the last 25 years, could one day be equipped with Draper's technology to assist with pollination. I must admit that I personally find these developments far more scary than any fantasy film but recognise the significance of such pioneering work.

The technology is still being developed and we are hopefully a long way off seeing dragonflies with mini-backpacks on! If there's one thing that the research engineers agree on in trying to harness the dragonfly's steering mechanism it is that the dragonfly itself cannot be improved on.

So let's enjoy the real thing this summer – there's nearly 60 species (including damselflies) to look for in the UK – and why not have a closer look at the reedy margins of ponds and rivers to see if you can find their empty nymph cases still clinging to the stems.