

Large red damselflies are among the first damselflies to appear.



Return of swifts – listen for their screams on warm, still afternoons.



Pipistrelles feast on clouds of tiny insects after dark.



A single host can provide an enormous amount of food for some tiny parasitoid wasps.

Seven-spot ladybird being attacked by *Dinocampus coccinellae*, a parasitoid wasp.



### TINY & WILD ROSS PIPER

## Hidden assassins

Enter the lair of the parasitoid wasps – deadly marvels of the insect world.

Parasitoid wasps are among the most diverse and fascinating insects. In essence, they are miniature predators, consuming and growing within or on a single host during their larval development. No insects or spiders are safe. Indeed, every stage in the life cycle of the hosts can be attacked by one or more species of these diminutive assassins. Even the parasitoids themselves can be victims, hosts to the excellently named hyperparasitoids.

Their lives are largely unseen and unknown. You might catch a glimpse of an ichneumonid wasp scampering across a leaf, or a flaccid caterpillar hollowed out by parasitoid wasp larvae, but that's about it. They're often fiendishly difficult to identify and many are incredibly tiny. In terrestrial habitats they're everywhere. Sweeping a net through a meadow for a few minutes will capture thousands.

The small size of many parasitoid wasps has enabled them to exploit niches that are inaccessible to larger animals.

To complete their life cycle, female parasitoid wasps must find the correct host. They have evolved all sorts of cunning means to do this, such as tapping into the chemical 'distress' messages of plants to locate plant-munching insects, drumming on a dead tree with their antennae to echolocate concealed hosts and reaching these same hosts with a long, flexible egg-laying tube that doubles up as a drill-bit.

Those species that develop inside the host have to deal with its immune system. Cells inside the host can encapsulate and kill parasitoid eggs and larvae, so to get around this problem certain parasitoids use bioweapons; viruses integrated into their genome that are injected with the eggs. These viruses damage

the host's immune system so that the parasitoids can develop unhindered.

Many parasitoid wasps are also body-snatchers, controlling their host. Some wasps that attack spiders make their host spin a special protective web before it inevitably succumbs. A mature larva of *Dinocampus coccinellae* emerges from its ladybird host and spins a cocoon beneath it. The beetle stays astride the cocoon, occasionally twitching, giving the pupating parasitoid some defence from predators.

Grab an insect net and hand-lens or microscope and go in search of a tiny, mesmerising world.



**Dr Ross Piper** is an entomologist, zoologist and explorer. His book *Animal Earth* is a cutting-edge introduction to animal diversity. Find out more at [rosspiper.net](http://rosspiper.net)



### THE MULTIWASP

Some of these insects are so tiny that they are only able to lay a few eggs. Rather than hatching into a single larva, these eggs go through a remarkable sequence that gives rise to lots of clone larvae, sometimes thousands. Most of these are 'normal' and will go on to ravage the host, pupate and escape as new wasps. A minority (about 10% in the species that have been studied) become soldiers that wander through the host to dispatch the eggs and larvae of other parasitoids, even other clones of the same species. These soldier larvae don't pupate.