



Garden Predators¹

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Although there are fewer individual predators in gardens than herbivores or detritivores, they are much more diverse than these groups, and include some impressive and charismatic animals.

Vertebrates

The great majority of garden vertebrates are predators, including frogs, toads, grass snakes, slow worms, hedgehogs, bats, foxes, moles and – at least some of the time – most birds. Birds that normally are herbivores (eating seeds and berries) as adults, have to provide insect food for their young so that they can put on weight and mature into independent juveniles as quickly as possible. The amphibians, reptiles and smaller mammals such as shrews are very helpful to gardeners by eating pests. If your garden supports thriving populations of some or all of these vertebrates, this is a sure sign that the rest of the garden ecosystem is functioning smoothly.

Predatory bugs

As usual, it's among the insects that the real diversity lies. The needle-like mouth parts of bugs are, of course, just as good for sucking the juices out of animals as plants, and many bugs are predators, including the wonderfully named assassin-bugs. Don't be fooled by a name though; damsel bugs are also predators and one damsel bug, the common flower bug (*Anthocoris nemorum*), is the most abundant predatory bug in most gardens. It's a great consumer of aphids and spider mites, and it will stab you too if handled. Terrestrial bugs are easily missed, but not aquatic ones: pond skaters patrol the water surface, attacking anything careless enough to fall into the water, while backswimmers (or water boatmen) are fearless predators below the surface, attacking anything up to the size of small fish. Some gardeners are surprised how quickly both of these bugs turn up in a new pond, but there is no mystery about this since both fly well.

Pond predators

Ponds are often one of the most fertile and productive parts of the garden, which is reflected in the abundance of large predators that can often be found in even a small pond. Some, such as the bugs and water beetles, are more or less permanent residents, but others, such as dragonfly nymphs, are present only as juveniles. Adult dragonflies actively hunt other flying insects and are one of the most charismatic garden visitors, but the adult phase is relatively short-lived and most of the life cycle is spent as an aquatic nymph.

Beetles and centipedes

Great diving beetles, both as adults and larvae, will attempt to eat anything that moves, including frogs and newts. On land, their relatives the carabid beetles patrol the soil surface at night, eating any soft-bodied animal they come across, including slugs. They will also climb plant stems and take aphids and caterpillars, so these are definitely animals that are on your side. Other common predatory beetles are the staphylinids or rove beetles, which are

particularly abundant in compost heaps. The largest, including the devil's coach horse, certainly look dangerous, and they are indeed voracious predators.

Perhaps the most familiar of all garden beetles are the ladybirds. As with the herbivores, it's the larvae of beetles and other predators that do most of the growing and therefore quite often most of the eating too. Every gardener should learn to recognise and welcome the larvae of common garden predators such as ladybirds, hoverflies and lacewings, if only to make sure you don't mistake them for pests.

Also out at night are centipedes, hunting insects, spiders and worms. A quick poke around in the compost heap will quickly turn up the fast-moving common brown centipede, *Lithobius forficatus*, with 15 pairs of legs. Large ones will bite humans, but unlike some tropical centipedes the bite isn't dangerous. *Haplophilus* and *Geophilus*, longer and more sinuous than *Lithobius*, are common in soil.

Wasps

Another huge group of largely predatory insects are the wasps. Like their close relatives the bees, wasps come in social and solitary varieties, and also like bees, it's the larger, social species we mainly notice, although there are far more species of solitary wasps. Many gardeners regard social wasps as an annoying accompaniment to a barbecue, but they really are important predators, particularly of other insects. Some of the larger solitary wasps are quite similar to social wasps in appearance, but the majority are smaller and less brightly coloured. Most adult wasps eat little besides some pollen and a sip of nectar, but they catch other invertebrates to feed to their young. Social wasps will catch anything, but different solitary wasps tend to specialise on caterpillars, beetles, moths, flies, aphids, spiders, bugs or even other wasps. Nests are made in very much the same places as solitary bees (hollow plant stems, dead wood or in the ground), stocked with paralysed prey and then an egg laid on top. Some wasps are *kleptoparasites* (literally, parasites by theft) and lay their eggs in the nests of other solitary bees or wasps. The young parasite eats the rightful owner and then, to add insult to injury, usually its stored food as well. In the BUGS study, as well as solitary bees and wasps, artificial nests were colonised by parasitic ruby-tailed wasps; these brilliantly metallic green and red insects are not uncommon in gardens.

Spiders

The terrestrial invertebrate world is run, like it or not, by insects. A few other groups, such as crustaceans and molluscs (in the form of woodlice and slugs and snails), have made only half-hearted attempts to become fully terrestrial animals. Only one other group has come even close to being as successful as the insects. That group is the spiders.

Spiders (along with their close relatives, the harvestmen) are among the most diverse and numerous predators in every garden. Indeed their abundance is one more sign of just how much there is to eat in the average garden, especially once you've perfected the art of catching flying insects. Jennifer Owen found 91 species of spiders and harvestmen², and BUGS found 81 species³. However, we really have no idea how many individual spiders there might be in a typical garden. Despite catching quite a few in pitfall traps and litter samples, and a few in Malaise traps (a trap that looks a bit like a tent with no sides, designed to catch flying insects), BUGS sampled spiders very inefficiently, for the simple reason that most garden spiders aren't ground dwellers, and of course none of them fly. For example, BUGS didn't even record the common garden spider, *Araneus diadematus*, in most gardens studied, even though it's very common everywhere. The most abundant spiders in gardens are the lynphids (money spiders), most of which build horizontal sheet webs (often with a

scaffold of threads above it) in shrubs or grass. Look at your garden on a misty autumn morning to appreciate just how plentiful these spiders really are.

Common everywhere on sunny walls and fences are zebra spiders, with their banks of enormous forward-facing eyes like floodlights. Another spider that southern gardeners should look out for is the flower crab spider, which lurks in flowers, waiting to pounce on unwary visiting bees, flies and butterflies. As its name suggests, it has a strongly crab-like appearance, but its most remarkable feature is the ability to change colour to match the flower it lives in – anything from blue to orange, yellow or pink.

Something else you're likely to find in the compost heap or hiding under a stone is *Dysdera crocata*, the woodlouse spider, its huge jaws specialised for skewering its favourite prey. It's one of very few British spiders that can deliver a painful bite. Sometimes very abundant on the soil surface are lycosids or wolf spiders. Some chase down their prey, others lurk in silken tubes and pounce on passing insects.

Parasitoids

Normal predators kill their prey (obviously), and a single predator usually kills several prey during its lifetime. Parasites, on the other hand, rarely kill their hosts, and a single host may support many parasites. For example, nematode worm parasites (roundworms) infect many animals (including humans), and although they may make them ill, they don't normally kill them. Insect *parasitoids* have adopted a lifestyle that combines elements of both predators and parasites. Parasitoids usually develop inside their hosts (like a parasite), but the host is always killed (like a predator). Adult parasitoids search for their prey, often the eggs, larvae or pupae of other insects, then lay one or more eggs on, or more often in, the host. The young parasitoid develops inside the host, consuming it entirely apart from the skin, then pupates and eventually emerges as a new adult. This may sound simple (if gruesome), but some of the biology involved is far from simple. Hosts have all kinds of mechanisms to defend themselves against parasitoids, and there is a constant evolutionary arms race between hosts and their parasitoids. Amazingly, there are even hyper-parasitoids, attacking other parasitoids.

Most parasitoids are wasps, although quite a few are flies. The great majority are small and rather inconspicuous; in fact, the smallest of all insects are parasitoids. A few are large insects, and those that attack hosts hidden deep inside plant stems may have fearsome-looking egg-laying ovipositors, but all are quite harmless to humans. Most gardeners never notice parasitoids at all, but parasitoid wasps were by far the most abundant flying insects caught during the BUGS project (many more than all other bees and wasps combined).

¹ Reviewed by Steve Head

² Wildlife of a garden: a thirty-year study. Jennifer Owen 2010 published by RHS Media

³ Smith, R M., Warren, P H, Thompson, K and Gaston, K J. (2006) Urban domestic gardens VI: environmental correlates of invertebrate species richness. *Biodiversity and Conservation* **15**, 2415-2438.