

Arthropod

There are four main categories of arthropods we are going to be discussing in this fact sheet and it will cover all the creepy crawlies you will find in your garden.

- Crustacea (paraphyletic)
 - Branchiopoda – brine shrimp etc.
 - Remipedia – blind crustaceans
 - Cephalocarida – horseshoe shrimp
 - Maxillopoda – barnacles, copepods, fish lice, etc.
 - Ostracoda – seed shrimp
 - Malacostraca – lobsters, crabs, shrimp, etc.
- Hexapod
 - Entognatha – springtails, etc.
 - Insecta – insects
 - Incertae sedis
- Myriapoda
 - Chilopoda – centipedes
 - Diplopoda – millipedes
 - Pauropoda – sister group to millipedes
 - Symphyla – resemble centipedes
- Chelicerata
 - Euchelicerata – arachnids, xiphosurans, scorpion, harvestmen, ticks and mites.
 - Pycnogonida – sea spiders

Hexapod - Insects

Insects are all around us, they make up more than half of all living things on the planet. There are more than a million known insect species and there are probably many more waiting to be discovered. True insects are those that are classified in the Class 'Insecta'. They are a major group of arthropods (a type of invertebrate, animals that lack a backbone), and the most diverse group of animals on the Earth. Insects rank among the most successful animals on our planet. The study of insects is called 'entomology'.

Insects may be found in nearly all environments on the planet, although only a small number of species are found in the oceans where crustaceans, such as crabs and shrimp, tend to predominate instead.

Insects live in almost every habitat on land. Some live in extremely cold environments like those who survive in the peaks of the Himalayas and produce a kind of anti-freezing substance that prevent

their body fluids from freezing and those who reside in the Sahara Desert in extremely hot temperatures of over 50 degrees Celsius (122 degrees Fahrenheit).

There are approximately 5,000 dragonfly species, 2,000 praying mantis, 20,000 grasshoppers, 170,000 butterflies and moths, 120,000 fly, 82,000 true bugs, 360,000 beetles and 110,000 bee, wasp and ant species described to date. Estimates of the total number of current species, including those not yet known to science, range from two million to fifty million.

All insects have a hard exoskeleton (external skeleton) and a 3 part segmented body inclusive of a head, thorax and abdomen. They have 3 pairs of jointed legs, compound eyes and 2 antennae. The legs (and wings, if applicable) are attached to the thorax. Insects breathe through holes called spiracles.

Insects are also characterized by the following characteristics:

They have six legs (the term 'Hexapoda' means: 'hexa'-six and 'poda'-feet).

Most insects have wings and form the largest part of the subphylum 'hexapoda'.

Their life cycles generally consists of these stages: egg, larva and adult, known as 'metamorphosis'.

More advanced insects go through a further stage called the 'pupa' stage whereby a re-organisation of body parts takes place between the larval and adult stages.

Myriapoda

Myriapods (Myriapoda) are a group of arthropods that includes millipedes, centipedes, pauropods, and symphylans. About 15,000 species of myriapods are alive today. As their name implies, myriapods (from the Greek myriads, a myriad, plus photos, foot) are noted for having many legs, though the number varies widely from species to species. Some species have fewer than a dozen legs, while others have many hundreds of legs. The Illacme pipes, a millipede that inhabits central California, is the current record holder for myriapod leg count: This species has 750 legs, the most of all known myriapods.

- Many pairs of legs
- Two body sections (head and trunk)
- One pair of antennae on the head
- Simple eyes
- Mandibles (lower jaw) and maxillae (upper jaw)
- Respiratory exchange occurring through a tracheal system

Myriapods' bodies are divided into two tagmata, or body sections—a head and a trunk. The trunk is further divided into multiple segments, each having a pair of appendages, or legs. Myriapods have a pair of antennae on their head and a pair of mandibles and two pairs of maxillae (millipedes only have one pair of maxillae).

Centipedes have a round, flat head with one pair of antennae, a pair of maxillae, and a pair of large mandibles. Centipedes have limited vision; some species have no eyes at all. Those that have eyes can perceive differences in light and dark but lack true vision.

Millipedes have a rounded head that, unlike centipedes, is flat only on the bottom. Millipedes have a pair of large mandibles, a pair of antennae, and (like centipedes) limited vision. The body of millipedes is cylindrical. Millipedes are detritivores, feeding on detritus such as decomposing

vegetation, organic material, and feces, and are prey for a variety of animals including amphibians, reptiles, mammals, birds, and other invertebrates.

Millipedes lack the venomous claws of centipedes, so they must curl into a tight coil to protect themselves. Millipedes generally have 25 to 100 segments. Each thoracic segment has a pair of legs, while the abdominal segments bear two pairs of legs each.

Chelicerata – Arachnids

Arachnids (Arachnida) are a group of arthropods that include spiders, ticks, mites, scorpions and harvestmen. Scientists estimate that there are more than 100,000 species of arachnids alive today.

Arachnids have two main body segments (the cephalothorax and the abdomen) and four pairs of jointed legs. By contrast, insects have three main body segments and three pairs of legs—making them easily distinguishable from arachnids. Arachnids also differ from insects in that they lack wings and antennae. It should be noted that in some groups of arachnids such as mites and hooded tickspiders, the larval stages have only three pairs of legs and fourth leg pair appears after they develop into nymphs. Arachnids have an exoskeleton that must be shed periodically for the animal to grow. Arachnids also have an internal structure called an endosternite that is composed of a cartilage-like material and provides a structure for muscle attachment.

In addition to their four pairs of legs, arachnids also have two additional pairs of appendages that they use for a variety of purposes such as feeding, defense, locomotion, reproduction or sensory perception. These pairs of appendages include the chelicerae and the pedipalps.

Most species of arachnids are terrestrial although some groups (especially ticks and mites) live in aquatic freshwater or marine environments. Arachnids have numerous adaptations for a terrestrial lifestyle. Their respiratory system is advanced although it varies among the different arachnid groups. Generally, it consists of tracheae, book lung and vascular lamellae that enable efficient gas exchange. Arachnids reproduce via internal fertilization (another adaptation to life on land) and have very efficient excretory systems that enable them to conserve water.

Arachnids have various types of blood depending on their particular method of respiration. Some arachnids have blood that contains hemocyanin (similar in function to the hemoglobin molecule of vertebrates, but copper-based instead of iron-based). Arachnids have a stomach and numerous diverticula that enable them to absorb nutrients from their food. A nitrogenous waste (called guanine) is excreted from the anus at the back of the abdomen.

Most arachnids feed on insects and other small invertebrates. Arachnids kill their prey using their chelicerae and pedipalps (some species of arachnids are venomous as well, and subdue their prey by injecting them with venom). Since arachnids have small mouths, they saturate their prey in digestive enzymes, and when the prey liquifies, the arachnid drinks its prey.

Arachnids are classified into about a dozen subgroups, some of which are not widely known. Some of the better-known arachnid groups include:

True spiders (Araneae): There are about 40,000 species of true spiders alive today, making the Araneae the most species-rich of all arachnid groups. Spiders are known for their ability to produce silk from spinneret glands located at the base of their abdomen.

Harvestmen or daddy-long-legs (Opiliones): There are about 6,300 species of harvestmen (also known as daddy-long-legs) alive today. Members of this group have very long legs, and their abdomen and cephalothorax are almost completely fused.

Ticks and mites (Acarina): There are about 30,000 species of ticks and mites alive today. Most members of this group are very small, although a few species can grow to as much as 20mm in length.

Scorpions (Scorpiones): There are about 2000 species of scorpions alive today. Members of this group are easily recognized by their segmented tail that bears a venom-filled telson (sting) at the end.