

Macrofauna – Myriapoda

Morphology

Myriapods (centipedes, millipedes, pauropods and symphylans) are small- to large-sized arthropods (0.5–385 mm) with elongated segmented bodies and many legs (from eight pairs up to 750 pairs). Myriapods' bodies have a head and a more or less uniformly segmented trunk. Millipedes have fused pairs of segments (diplosegments) and, consequently, they have two pairs of legs per segment. Centipedes have forcipules, the first pair of modified walking legs on their trunk segment that contain venom glands to catch and immobilise prey. Pauropoda are very small and have branched antennae with segmented stalks. By contrast, Symphyla have a pair of conical cerci with spinning glands on the posterior part of their body. [64, 65]

Taxonomy

Myriapods (phylum Arthropoda, subphylum Myriapoda) are categorised into four classes: Diplopoda (millipedes, 16 orders, approximately 12 000 species), Chilopoda (centipedes, five orders, approximately 3 000 species), Pauropoda (two orders, approximately 800 species) and Symphyla (one order, approximately 200 species). The most diverse orders are: Polydesmida (flat-backed millipedes, 3 500 species) and Geophilomorpha (soil centipedes, 1 300 species).

Microhabitat

Generally, myriapods are soil dwellers. Larger species burrow, while smaller and thinner species use crevices and spaces in the soil. They can be found in both deep and shallow soil layers. They all thrive at high humidity, stable temperatures and low ultraviolet radiation levels; therefore, they are typically found under stones, logs and barks, and in litter, in tree hollows, stumps and caves. Some species of millipedes and centipedes can climb trees.

Diversity, abundance and biomass

Myriapods are found in almost all terrestrial habitats from deep soil layers and caves to above the timberline in mountains. Antarctica is the only continent with no myriapods. Myriapods are not exceptionally abundant in any habitats, with the exception of some millipede species. In temperate regions, the abundance of millipedes can reach up to tens to several hundred individuals per square metre (m²). In some temperate forest soils, millipedes can reach densities of over 1 000 m². Symphylans and pauropods are distributed more unevenly, and in lower abundance since they are very responsive to changes in soil properties (chemical as well as physical) and food availability. Different myriapod groups have different feeding preferences. Centipedes are generally predators and often regulate populations of smaller animals, although some feed on decaying plant matter. Symphylans are root-feeders, or saprophagous. Pauropods are fungal-feeders, although some species prey on small animals or suck liquids from rotting plant material. Millipedes are important decomposers of leaf litter. They are estimated to break down 10–15 % of the annual leaf fall, and their significance for litter processing is higher than that of earthworms in boreal forests.

Poisonous, luminous and singers

- Although centipedes are venomous and sting frequently, the United States National Center for Health Statistics reports only five 'possible' deaths attributable centipede stings in the US between 1991 and 2001.
- Almost all millipedes have defensive poisonous liquid secretion or produce prussic acid (hydrogen cyanide) gas.
- Some species of millipedes are bioluminescent, allowing them to be avoided by nocturnal predators. This luminescence may be the equivalent of colours used in other animal species to warn off potential predators (aposematic colours).
- A defense mechanism of some millipedes is to roll into a ball. Consequently, a male may find it hard to persuade a female to copulate.
- Although millipedes are deaf, males of the order Sphaerotheriida 'sing' to potential mates using vibrations in order to uncoil them.
- Some centipedes inhabit tidal zones, probably in search of food. In Brazil, there is a documented record of a sea anemone species feeding on a centipede belonging to the family Scolopendridae.
- The largest millipedes in the world are the African giant black millipedes (*Archispirostreptus gigas*) which may reach 30 cm. They have approximately 256 legs and a life expectancy of five to seven years.



• Diversity of Diplopoda and Chilopoda. (a) Some millipedes, like this *Castanotherium* sp. from Bornean rainforests, can coil into a tight ball in response to intruders. (b) *Gigantomorpha immanis* from Brunei. Flat-backed millipedes produce acid as a defence against predators. They also warn predators using intense colouration. (c) *Scolopendra cingulata* is a soil centipede that frequently stings humans in southern Europe. Sharp claws inject venom into prey. The venom of some species is ranked among the most painful toxins on Earth. (d) Stone centipedes inhabit stony debris, litter layers and caves, but some species, like this European *Lithobius melanops*, frequently enter into buildings. (IHT, FT)



• (a) Pauropoda and (b) Symphyla are the two groups of myriapods with less known species. Pauropoda possess unique forked antennae, whereas Symphyla have characteristic long and moniliform (i.e. resembling a string of beads) antennae. (AM)