

Mesofauna – Collembola

Morphology

Collembola are small (0.12–17 mm) wingless hexapods (with six legs – see page 31) commonly known as ‘springtails’. The scientific name, Collembola, derives from the Greek words *kolla* (meaning ‘glue’) and *embolon* (meaning ‘piston’) and was initially proposed in reference to the ventral tube (collophore), which plays an important role in their fluid and electrolyte balance and may also serve as a ‘glue piston’ for adhering to smooth surfaces or for grooming. Another characteristic, albeit not always present, gives them their common name: the forked springing organ or ‘furca’. This is held by a special catch mechanism on the ventral side of their abdomen which, when released, acts as a spring that can propel them, within seconds, several times the length of their body. [53, 54]

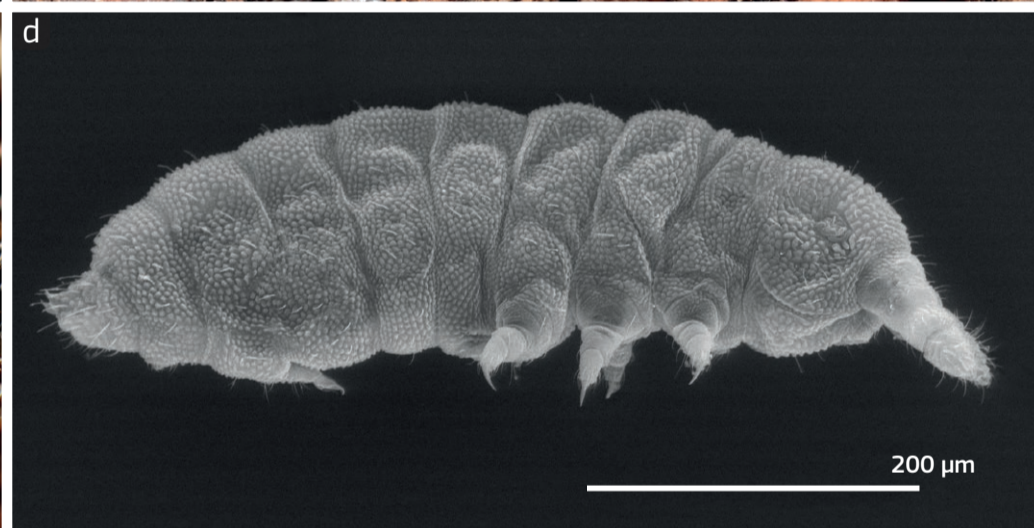
Microhabitat

Collembola vary in their habitat preferences. Entomobryomorpha and Symphypleona are mainly epiedaphic, living in surface litter and emergent vegetation, and are fast movers and good jumpers, whereas the slow-moving Poduromorpha and Neelipleona are mainly within-soil dwellers (euedaphic). Most Collembola feed on fungal hyphae and spores (see box, page 39), bacteria (see pages 33–35) and decaying plant material. However, some species are predators, feeding on nematodes (see pages 46–47) or on other Collembola and their eggs. Ecologically, they are not as important as earthworms in decomposition processes, but are still responsible for up to 30% of total soil invertebrate respiration, depending on the habitat.

Diversity, abundance and biomass

There are around 8500 described species, which are found in a great variety of habitats, from Antarctica and the Subantarctic Islands to rainforests, warm beaches and deserts. As well as being widespread, they are the most abundant hexapods in the world, and an average square metre of soil in a temperate grassland or a woodland can yield as many as 40000 individuals.

Generally, habitats may support anything from two to 30 different collembolan species. However, in the tropics, up to 150 species can be found, if species present in epiphytes (plants living in trees) are taken into account.



Order Entomobryomorpha: (a) scanning electron microphotograph showing the elongated shape, the distinctive abdominal segmentation, the long antennae and the well-developed furca; (b) live specimen of *Orchesella villosa* from the UK. (AM, NC, JM, MJIB)

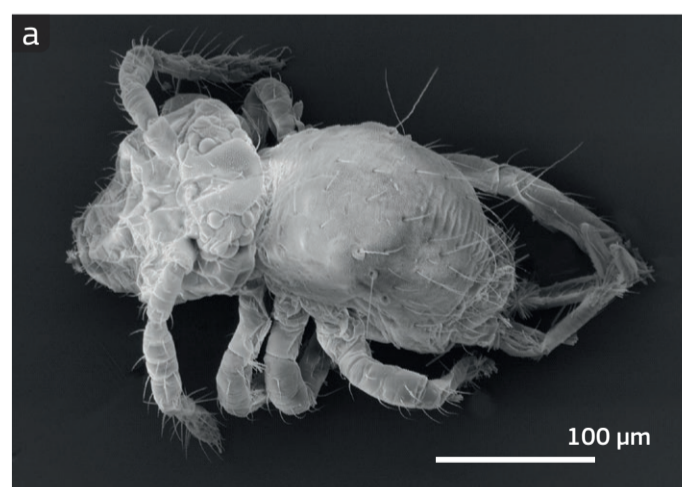
Order Poduromorpha: (c) live specimen of *Monobella grassei* from the UK; (d) scanning electron microphotograph showing the elongated shape, the distinctive abdominal segmentation, the short antennae and the less well developed furca. (AM, NC, JM, MJIB)

Order Symphypleona: (a) scanning electron microphotograph showing the rounded body shape and the antennae as long as or longer than the head; (b) live specimen of *Katiannina macgillivrayi* from the USA. (NC, JM, SJS, MJIB)

Order Neelipleona: (c) live specimen of *Neelus murinus* from the UK; (d) scanning electron microphotograph showing the rounded body shape and the antennae that are shorter than the head. (AM, NC, JM, MJIB)

Taxonomy

Collembola belong to the phylum Arthropoda. They are part of the class Entognatha that, together with the class Insecta, form the subphylum Hexapoda (see page 31). They are classified into four orders: the Entomobryomorpha and Poduromorpha, with a more or less elongated body shape, and Symphypleona and Neelipleona, which are spherical in shape.



The frozen and colourful collembola

- Collembola can withstand freezing conditions by using anti-freeze compounds in their body tissues.
- *Cryptopygus antarcticus*, native to Antarctica and Australia, is the only Collembola species to have appeared on a postage stamp.
- Collembola can have multi-coloured stripes: *Paralobella orousetii* from the Philippines has a yellow head and first two thoracic segments, the third thorax segment and the first three abdominal segments are red and the remaining abdominal segments are white.