Morphology

Tardigrades are microscopic animals 0.1 - 1.7 mm that are strongly dependent on the availability of water to permit gas exchange and avoid desiccation. This led to their original name 'little water bears', which was given to them by the German pastor J.A.E. Goeze, who first described them in 1773. Their bodies are short, slightly segmented and equipped with eight poorly articulated legs ending in four to eight claws. They move very slowly, in a manner similar to that of a bear. All tardigrades possess an eversible buccal tube and two stylets to pierce animal or plant cells, and a pumping pharynx to suck out their internal fluids, although some species are carnivorous and consume rotifers. The morphology of the claws, cuticle (outer covering) and the buccal apparatus (mouth) is used to identify the different species.

Taxonomy

Their scientific name Tardigrada was suggested by the Italian biologist Lazzaro Spallanzani in 1776 meaning 'slow walker'. A number of morphological and molecular studies have tried to resolve their systematic status, and recent analyses indicate that they are probably basal arthropods. The phylum Tardigrada includes 3 classes and over 110 genera, and is continuously updated with newly discovered species. The class Mesotardigrada includes only one species: Thermozodium esakii which was recorded in 1937 from a hot spring near Nagasaki, Japan.

Microhabitat

Tardigrades are common in both marine and freshwater systems but also in the water films surrounding soil particles. They are also found in mosses, which are the plants that have the most developed capacity to absorb and retain water, thus giving them their second common name 'moss piglets'.

Diversity, abundance and biomass

Approximately 1,150 species of tardigrades have been described and can be found in almost every type of habitat around the world, from above 6,000 m in the Himalayas to the deep sea below 4 000 m and from the polar regions to the Equator. Many of these environments experience dramatic environmental changes throughout the year, and tardigrades survive thanks to their extraordinary ability to enter into 'cryptobiosis', a suspended animation (deathlike) state in which their metabolism drops to 0.01 % of normal and the water content of the body decreases to less than 1 %. In this cryptobiotic state, known as a 'tun', they can live for a long time - up to 200 years! and can survive extremes of temperature, toxicity, dehydration, salinity and oxygen tension. Revival typically takes a few hours but depends on how long the tardigrade has been in the cryobiotic state. Although their ecological role has not yet been fully evaluated, recent studies suggest **they could have a regulatory function for plant-parasitic nematode populations when predatory nematodes have disappeared, due to predation pressure and/or unfavourable environmental conditions.**

Recent studies have shown that only 82.5 % of the tardigrade's DNA is pure, the remainder originating in plants, bacteria and fungi. These fragments of foreign DNA are incorporated during repairing processes of DNA damaged during exposure to hostile environments.

Farming Secrets says: Another Reason For Retaining Moisture in Your Soil

Ref: A Global Atlas of Soil Biodiversity p 46