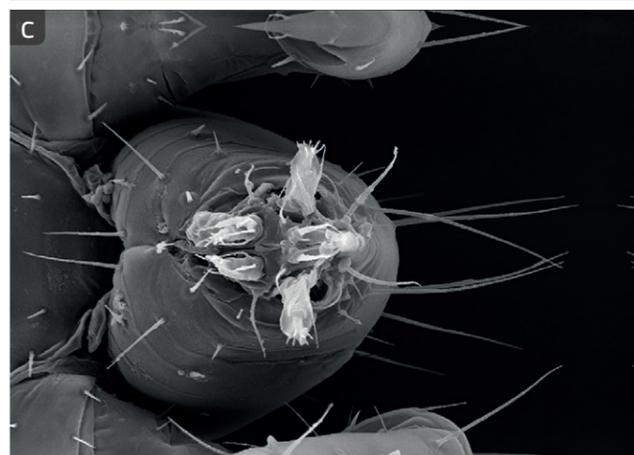
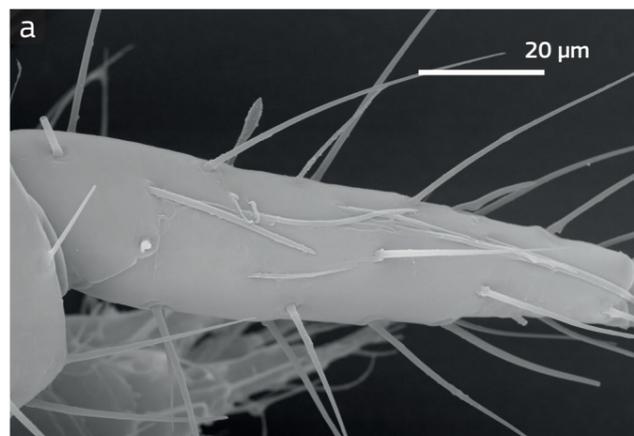


## Mesofauna – Protura

### Morphology

Proturans are small soil-inhabiting primitive hexapods (ranging in size from 0.5 and 2.5 mm – see page 31) with no antennae and no eyes. The forelegs are used as sensory organs; they have many sensory organs ('sensilla') covering their posterior segments (tarsi). On the dorsal side of the head there are a pair of other important sensory organs (pseudoculi) whose functions are not well understood. Their bodies are cylindrical, pointed at both ends and generally unpigmented, pale or yellowish. Similar to the Collembola, they are wingless arthropods and their mouthparts are entognathous, meaning that they are retracted within the head capsule: the mandibles and maxillae are slender and their maxillary palps (mouthparts) are long, with setae and sensilla. They are born with nine abdominal segments and grow by successive moultings during which they add new distal segments. The adult has 12 abdominal segments. They have small pairs of lateral-ventral appendages on the first three abdominal segments. They lack cerci, the paired appendages on the rear-most segment of the body present in many other hexapods. Reproduction occurs with indirect fertilisation: the males deposit packets of sperm (spermatophores) and the females collect the spermatophores. [55, 56]



⋯ Morphological structures of the proturan *Acerentomon italicum*: (a) the sensory organs, sensilla and setae, on the exterior side of the legs; (b) pseudoculi, the eye-like structures that are not actually eyes, on the dorsal side of the head; (c) the mouthparts are entognathous, meaning that they are retracted within the head. (LGA)

### Taxonomy

The class Protura (phylum Arthropoda, subphylum Hexapoda) includes three orders: Acerentomata (families Hesperentomidae, Protentomidae and Acerentomidae), Sinentomata (families Fujientomidae and Sinentomidae) and Eosentomata (families Eosentomidae and Antelientomidae).

#### The 'young' proturans

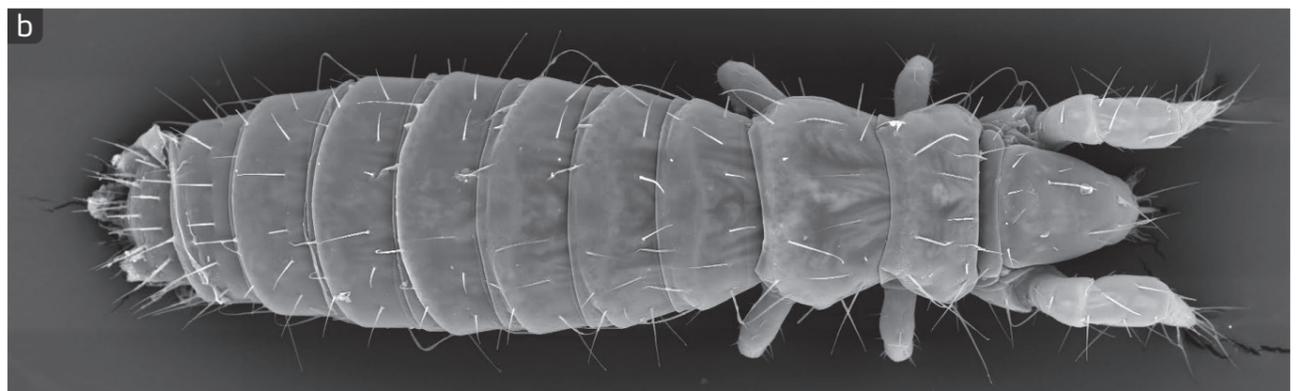
- Among hexapods (see page 31), Protura was the last class to be described. The first description of these minute soil arthropods was given in 1907.
- Filippo Silvestri and Antonio Berlese, two Italian entomologists, discovered proturans independently.
- The first species to be described was *Acerentomon doderoi*, found in soil near Syracuse, New York, USA.
- When disturbed, proturans seem to raise the end of the abdomen in a defensive posture similar to that adopted by scorpions.

### Microhabitat

Protura are found in moist soils, leaf litter, humus, moss and decaying wood in woodland, grassland and agricultural soils. They do not thrive in very acid soils (e.g. coniferous woodlands). Usually, they are part of the decomposer community and help break down organic matter in soil and litter. In particular, proturans feed mainly on fungal hyphae (see box, page 39), but they are also important prey for small predators, such as spiders, mites (see page 49) and pseudoscorpions (see page 53).

### Diversity, abundance and biomass

Proturans are found all over the world, with the exception of the polar regions. There are more than 700 described species. Their density is variable in relation to the characteristics of the soil and the content of organic matter. In disturbed and degraded soils they can be completely absent, while in undisturbed habitats, such as natural grasslands, there can be as many as 85 000 individuals per square metre.



⋯ (a) and (c) Proturans in their natural environment in New Zealand and the UK, respectively. Proturans live mainly in soil, mosses and leaf litter in moist temperate forests. (b) Scanning electron microphotograph shows the dorsal part of the species *Acerentomon italicum*. (AM, LGA)