

COLLEMBOLA

Springtails

The name Collembola, derived from the Greek "*coll*" meaning glue and "*embol*" meaning a wedge, refers to a peg-shaped structure, the collophore, on the underside of the first abdominal segment. The collophore was once thought to function as an adhesive organ.



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Life History & Ecology:

The springtails are among the most abundant of all soil-dwelling arthropods. They live in a variety of habitats where they feed as scavengers on decaying vegetation and soil fungi. Most species are small (less than 6 mm in length) and quite susceptible to desiccation unless they remain in a moist environment. A unique, tube-like structure, the **collophore** is located ventrally on the first abdominal segment of most species. The exact function of this organ is unknown, but it probably helps maintain water balance by absorbing moisture from the environment.

Springtails are named for a forked jumping organ (the **furcula**) found on the fourth abdominal segment. The furcula is retracted against the ventral wall of the abdomen and held there, in cocked position, by a special catch (the **tenaculum**) on the third abdominal segment. Releasing the tenaculum causes the furcula to snap down against the substrate and flip the organism some distance through the air. This device, present in all but a few genera, seems to be an effective adaptation for avoiding predation.

Immature collembola are similar in appearance to adults. They usually molt 4-5 times before reaching sexual maturity, and continue to molt periodically throughout the rest of their life. Unlike most other arthropods, springtails appear to have evolved in a cool climate. Their relative abundance in the soil tends to increase as the mean annual temperature decreases and their development is most rapid under cool, humid conditions.

Distribution:

Common in grassy or wooded habitats worldwide.

	North America	Worldwide
Number of Families	7	20
Number of Species	677	>6000

Classification:

Ametabola

lacking metamorphosis

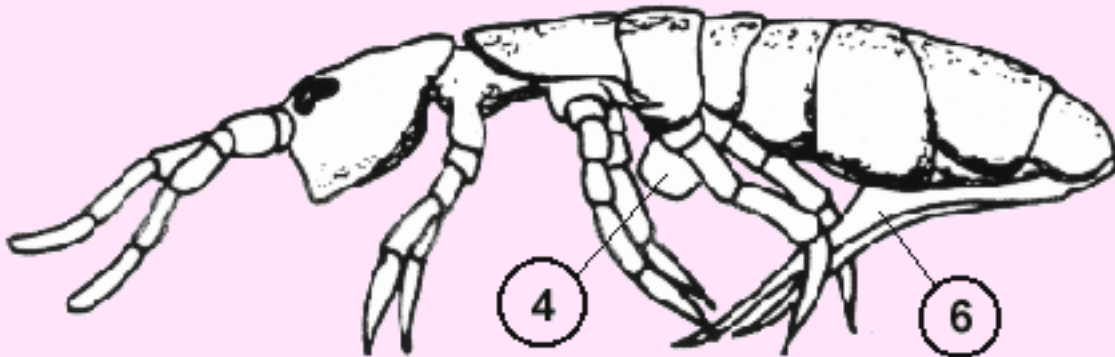
eggs hatch into young which are smaller than adults, but similar in appearance.

Apterygota

primitively wingless

Physical Features:

Adults and Immatures



1. Compound eyes absent or reduced to a cluster of not more than 8 ommatidia
2. Antennae 4- to 6-segmented
3. Abdomen 6-segmented
4. Ventral tube (collophore) present on first abdominal segment

5. Tenaculum located ventrally on third abdominal segment
6. Furcula (springtail) attached ventrally to fourth abdominal segment
7. Genital opening on fifth abdominal segment
8. Body frequently clothed with scales

Economic Importance:

Springtails are part of the community of decomposers that break down and recycle organic wastes. A few species feed on living plants and are occasionally regarded as pests: *Bourletiella hortensis* (the garden springtail) may damage seedlings in early spring, *Sminthurus viridis* (the lucerne flea) is a pest of alfalfa

in Australia, and *Hypogastrura armata* has been a frequent pest of commercial mushrooms.

Major Families:

- **Hypogastruridae** -- the largest family in the order. These are small, plump hexapods that may lack compound eyes or a springtail (furcula). Includes the snowflea, *Hypogastrura nivicola*.
- **Isotomidae** -- second largest family in the order. These hexapods are elongate and lack scales on the upper surface of the body.
- **Entomobryidae** -- common soil-dwellers. The fourth abdominal segment is significantly longer than the others.
- **Sminthuridae** -- body globular in shape. The family includes the garden springtail (*Bourletiella hortensis*) which occasionally damages plant seedlings.

Fact File:

- Springtails may be extremely abundant in certain habitats. Population densities exceeding 750 million individuals per hectare (300 million per acre) have been found in some grassland communities.
- Springtails "hop" by snapping their furcula against the substrate. In this manner, they may propel themselves up to 20 cm in the air -- a distance 50-100 times their own body length!
- Unlike most other arthropods, springtails appear to have evolved in cool climates. Their relative abundance in the soil tends to increase as the mean annual temperature decreases.
- The snowflea, *Hypogastrura nivicola*, is a dark blue collembolan that is often found on the surface of melting

snow in late winter or early spring. Other cold-loving species are found on the surface of glacial ice in the far North.

- Females of some Sminthuridae cover their eggs with a glaze of freshly eaten soil and fecal material. This mixture evidently protects the eggs from dehydration and fungal attack.
- Like other non-insect hexapods, Collembola continue to molt after they reach sexual maturity. But unlike other taxa, reproductive activity occurs only during alternate instars: each reproductive stage is followed by a molt, a short period of feeding, and another molt.
- Some springtails live in caves or in the burrows of small mammals. A few species, including all members of the family Cyphoderidae, live in the nests of social insects.
- Springtails come in a wide variety of decorator colors, including white, pink, yellow, green, orange, red, blue, and indigo.

Hot links and Illustrations:

- [Hypogastrurid Springtail -- NCSU's Insect of the Week](#)
- [Checklist of the Collembola of the World](#)
- [Gordon Ramel's Collembola Page](#)
- [Ecowatch Collembola Page](#)
- [Tree of Life Web Project - Collembola](#)

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