

## Observations on

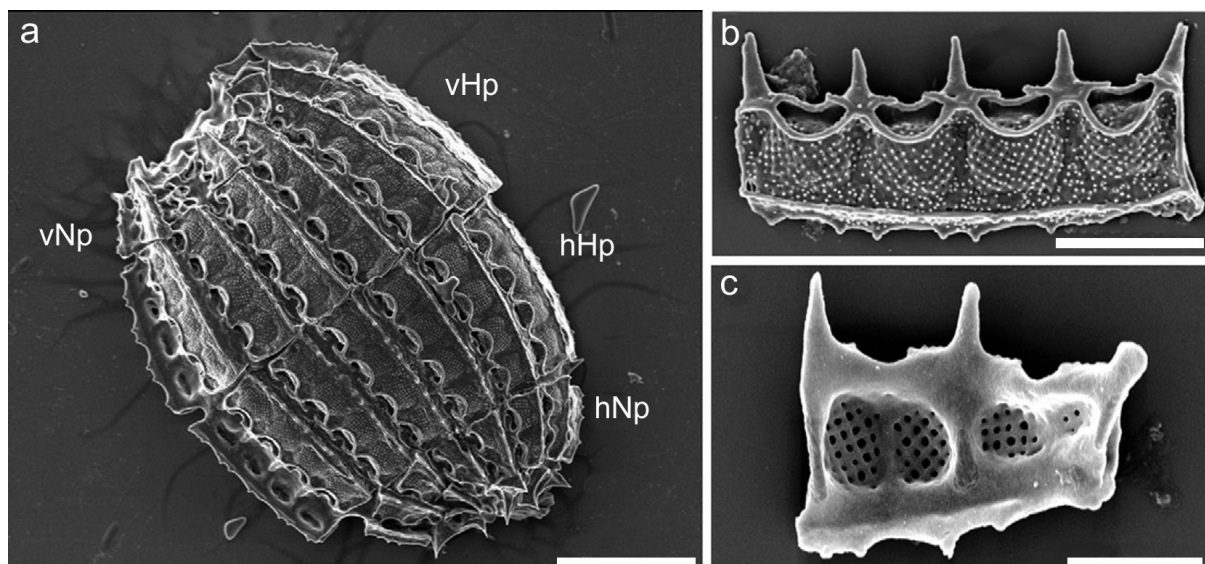
### *Coleps hirtus* (O. F. Müller 1786) Nitzsch 1827

**Most likely ID:** n. a.

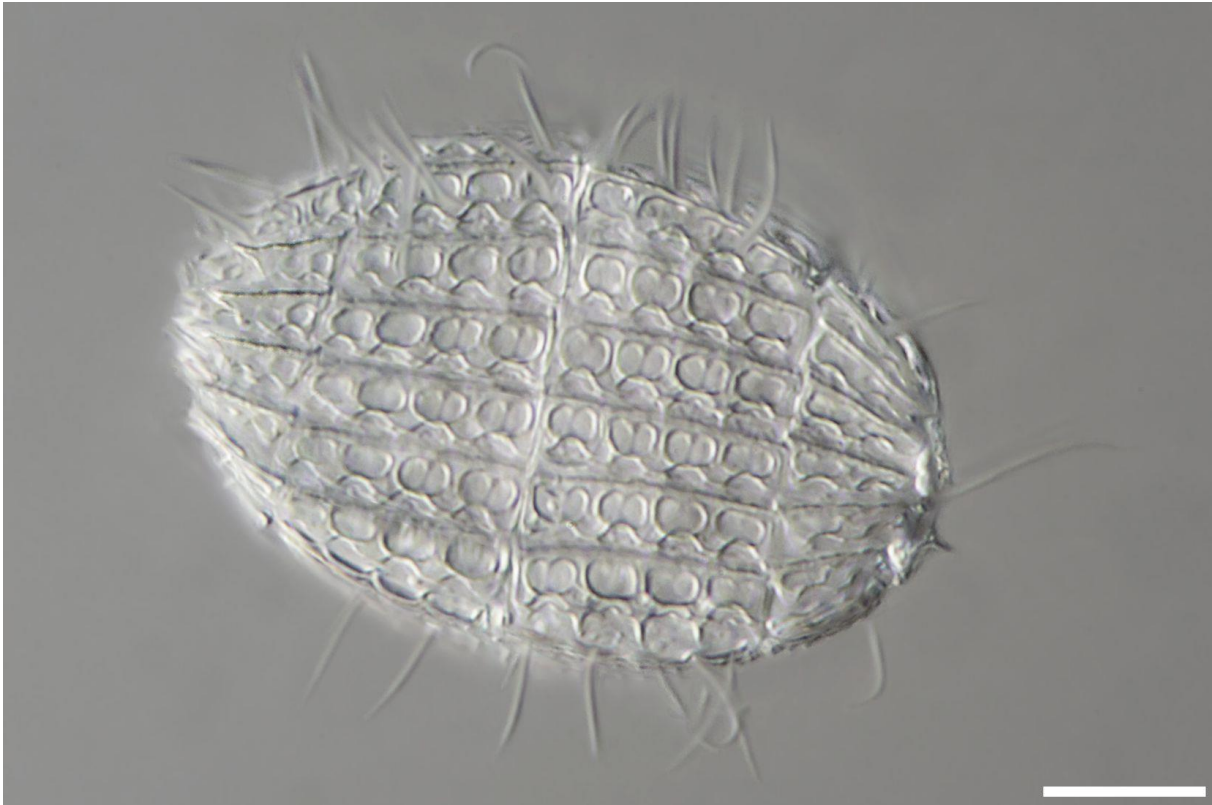
**Synonyms:** n. a.

EOL Phylogenetic tree: [Coleps hirtus](#)

The anatomy of this ciliate is remarkable, namely it wears a carapace. In membrane sacs below the cell membrane, the so-called alveoli (all ciliates belong to the Alveolata), there are plates whose basic substance consists of polysaccharides and proteins, which are reinforced with amorphous calcium carbonate. Similar to the architecture of the shells of centric diatoms, larger window structures are also found in these alveolar plates, which are easily visible under the light microscope. More detailed observations under the scanning electron microscope (SEM) show that the plates have many reinforcing edges and are structured like a sieve (Fig. 1). Scientific studies have shown that, unlike in various species of diatoms, the polysaccharide part of the framework of the armor plates does not consist of chitin (Lemloh et al., 2013).



**Fig. 1:** SEM images of the alveolar plates of *Coleps hirtus*. The fine structure of the plates resembles the silicate structures of diatoms, e.g. of *Coscinodiscus* valves. **a** Overview showing the front secondary plates (vNp), front main plates (vHp), rear main plates (hHp) and the rear secondary plates (hNp). Circumoral plates surround the area of the mouth. **b** main plate, view from the outside, **c** Secondary plate, view from the inside. Scale bars indicate 10  $\mu$ m (at 3a), 4  $\mu$ m (at 3b) and 2  $\mu$ m (at 3c). After Lemloh et al., 2013.

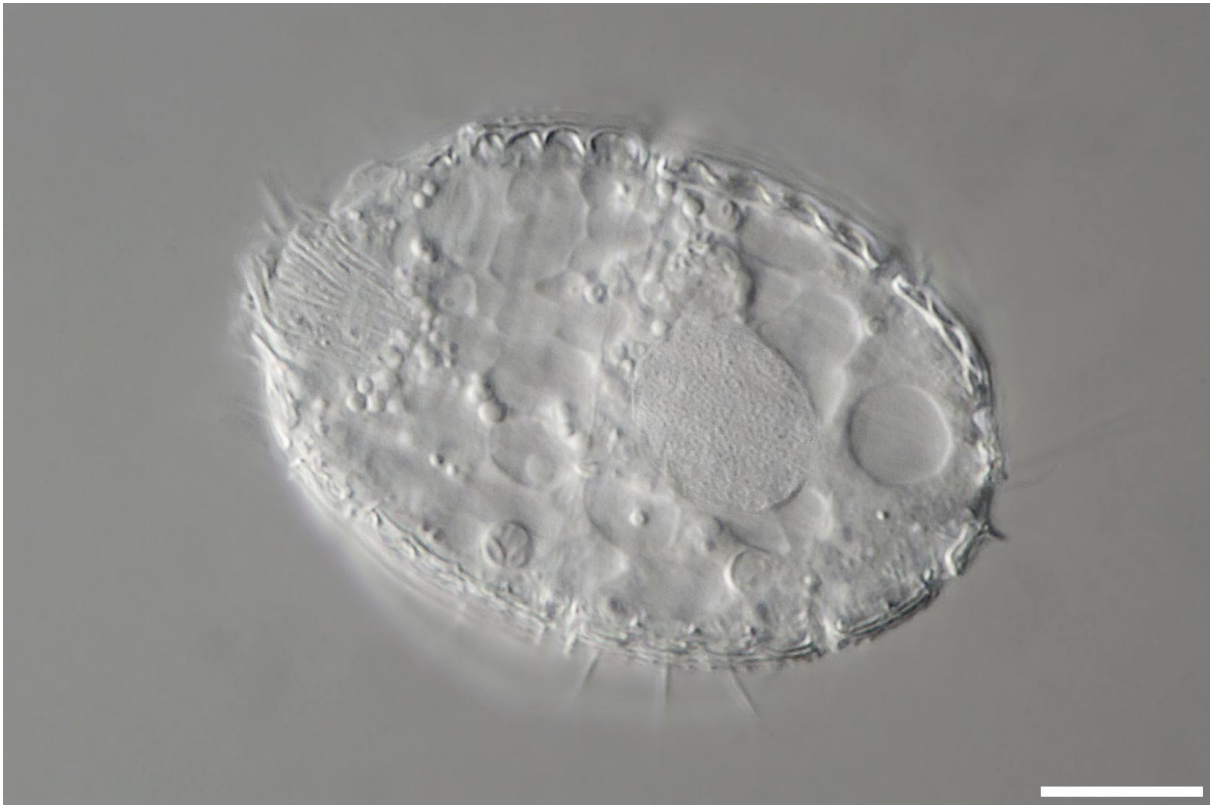


**Fig. 2:** *Coleps hirtus* in his chainmail. The true body shape is slightly more elongated than shown. In order to be able to photograph the cell in high resolution, it had to be fixed by slight pressure from the cover slip. Scale bar indicates 10  $\mu\text{m}$ .

Figures 2 and 3 show light micrographs of this member of the ciliate class of the Prostomatea.

In Fig. 2 you can see the carapace reinforced with small calcareous plates. The sieve-like construction (see Fig. 1 b and c), which is also found in the shells of the centric diatoms, helps to achieve rigidity while at the same time minimizing weight. The cilia-ture of the body is evenly almost everywhere, at the posterior pole you can see a long rudder cilium. Around the mouth area located at the anterior pole, the carapace forms a ring working like a saw blade with the front secondary plates and the circumoral plates (see Foissner et al. 1994 and Hausmann et al. 2003). The beating of the body cilia creates propulsion, which also induces a rotation of the cell at medium speed around its longitudinal axis. If you happen to have a dead multicellular organism in the Petri dish alongside *Coleps*, you can observe an unusual way of feeding in ciliates. If a cell encounters a piece of tissue that could serve as food, it rotates its body like a spinning top on the tissue site, the calcified spikes at the anterior pole loosen the tissue and tear out particles that are taken up with the front, funnel-shaped cell mouth (cytostome).

Figure 3 shows an optical longitudinal section. We can see the strong cilia around the cytostome located at the anterior pole (on the left side of the image), the macronucleus located almost centrally and the contractile vacuole at the posterior end (on the right).



**Fig. 3:** Optical cross-section through the cell showing the cytostome, the nucleus and the contractile vacuole. The cell plasma appears largely vacuolized. Scale bar indicates 10  $\mu\text{m}$ .

## References

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