Trachelomonas hispida

(Perty) Stein, 1878

Most likely ID: n.a.

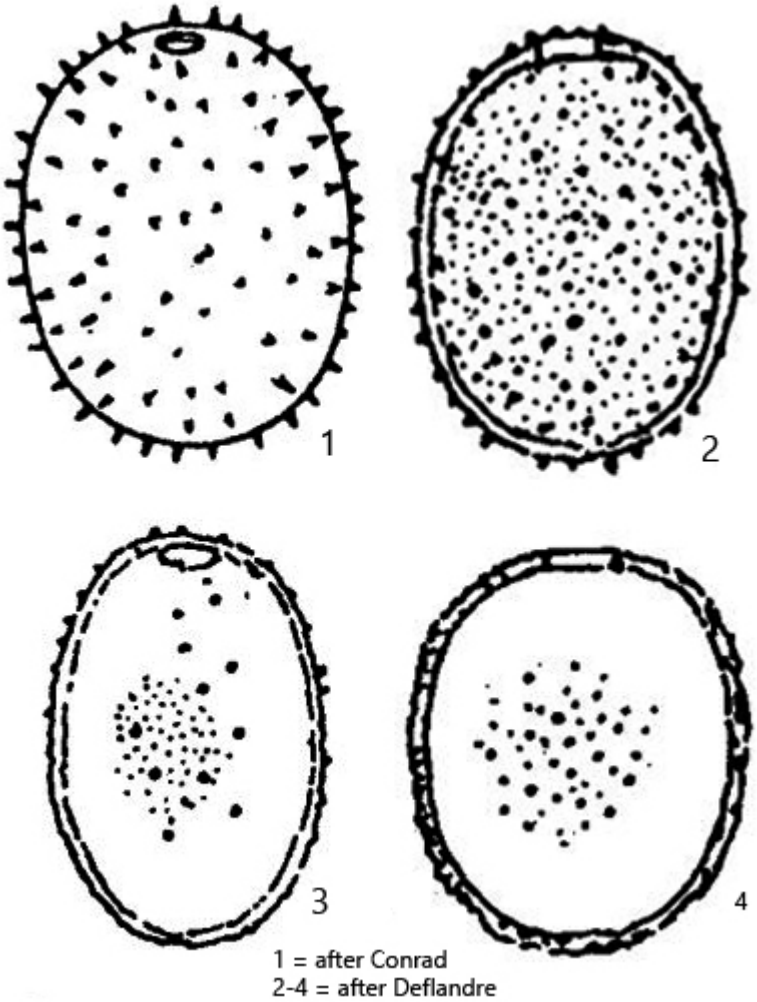
Synonym: n.a.

Sampling location: Simmelried

Phylogenetic tree: *Trachelomonas hispida*

Diagnosis:

- lorica ellipsoidal, rounded apices
- length 20–42 µm, width 15–26 µm
- apical pore without or very short collar
- lorica completely covered with short, sharp spines, sometimes punctuated
- lorica brownish or orange
- eyespot large
- chloroplasts (8–10) disc-shaped, each with a pyrenoid
- flagellum about twice body length



Trachelomonas hispida

Although *Trachelomonas hispida* is described as a very common species, I only rarely find specimens and then only from the Simmelried. The specimens then collect on the bottom of the sample containers on the side facing the light.

Trachelomonas hispida can easily be confused with the similar species *Trachelomonas superba*. However, the latter has much coarser spines, which can also vary in length and thickness. In addition, they are often unevenly distributed over the lorica. In *Trachelomonas hispida*, however, the spines are short, needle-pointed and evenly distributed over the lorical. Sometimes there are also variants that completely lack spines and only have a punctuated lorica.

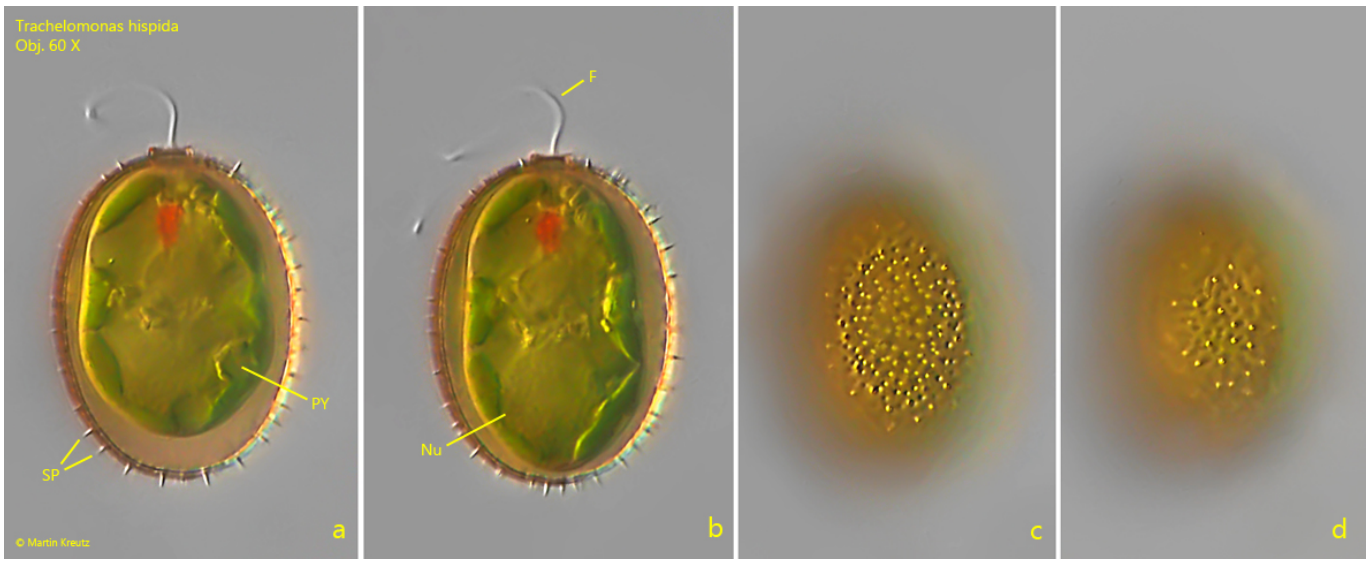


Fig. 1 a-d: *Trachelomonas hispida*. L = 41 µm. Different focal planes of a freely swimming specimen. Note the short and sharp spines that cover the lorica evenly. Obj. 60 X.

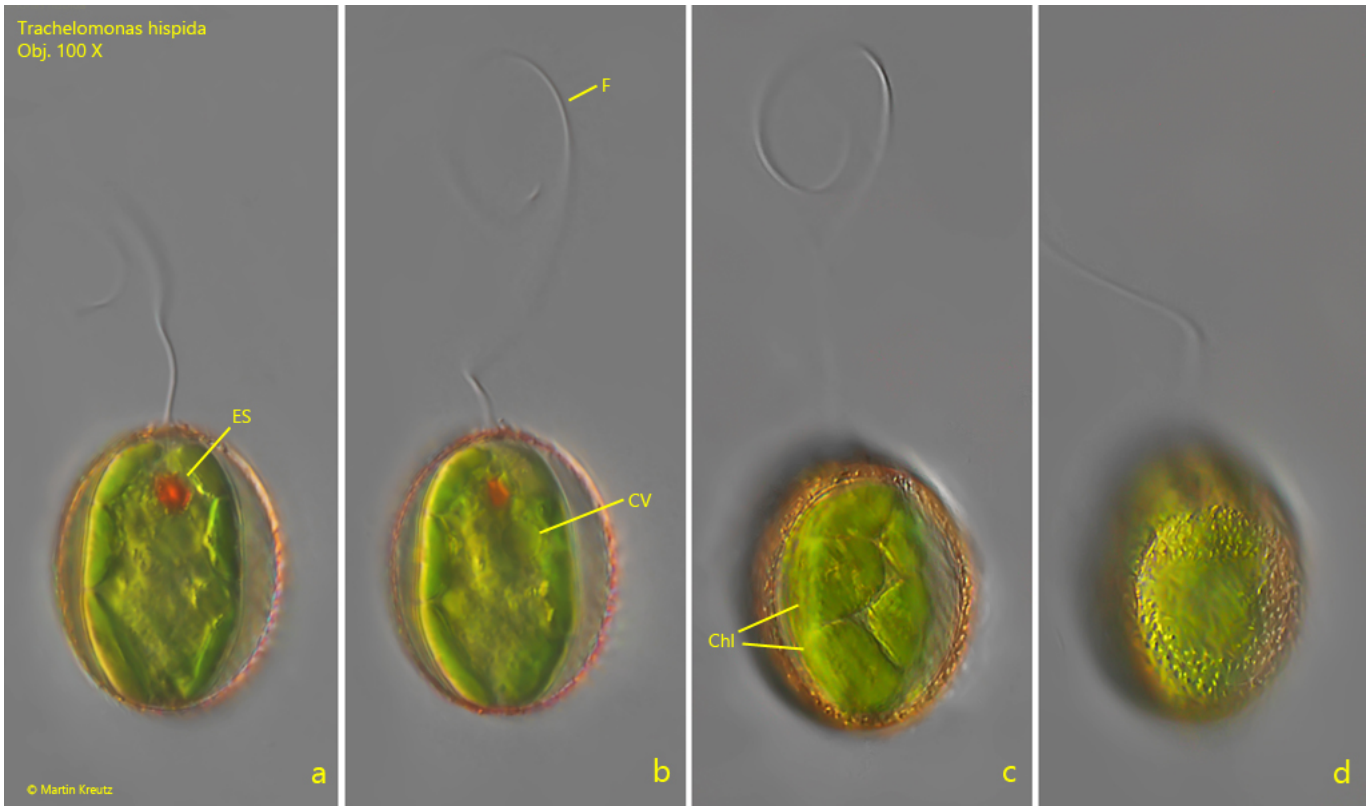


Fig. 2 a-d: *Trachelomonas hispida*. L = 38 µm. Different focal planes of a second freely swimming specimen which lack spines. The lorica is finely punctuated. Obj. 100 X.

In February 2014, I was able to observe a heavy infestation of *Trachelomonas hispida* with a parasitic fungus in an old sample. I was able to detect one or two fungal cells in about 80 % of the specimens in the sample (s fig. a-c). Due to the large number of infected specimens, I was able to observe several stages of the reproductive cycle of the parasitic fungus. Remarkably, the fungal cell seems to force the host cell out of the lorica as it continues to

grow (s. fig. 4 a-e). through the densely packed paramylon grains I could not recognize whether the host cell, which is forced to leave the lorica, was infected with further spores. However, after leaving of the host cell the fungal cell remains in the lorica and continues to mature (s. fig. 4 e). I could not see the release of the motile spores, but later the empty fungal cell remains in the lorica (s. fig. 5).

This interesting process was already described and drawn by Stein in *Trachelomonas hispida* as early as 1878 (s. fig. 6 a-h). However, he interpreted the parasitic infection with a fungal cell as sexual reproduction of *Trachelomonas hispida*, which does not exist. The stages he drew are identical to my observations, but in his population no fungal cell remained in the lorica after the host cell had left it. According to his drawings and descriptions, small, motile spores form in the host cell instead, which then leave the lorica together with the host cell (s. fig. 6 g). Only after leaving the lorica does the host cell burst and release the spores (s. fig. 6 h). In this respect, Stein's observations differ from my own observations. However, I cannot exclude the possibility that there were also stages within my infested population which corresponded to the process described by Stein. I could not determine which species the parasitic fungus is.

Below I have reproduced the original drawings of Stein with his original captions (s. fig. 6 a-h), with an attempt at an adequate translation.

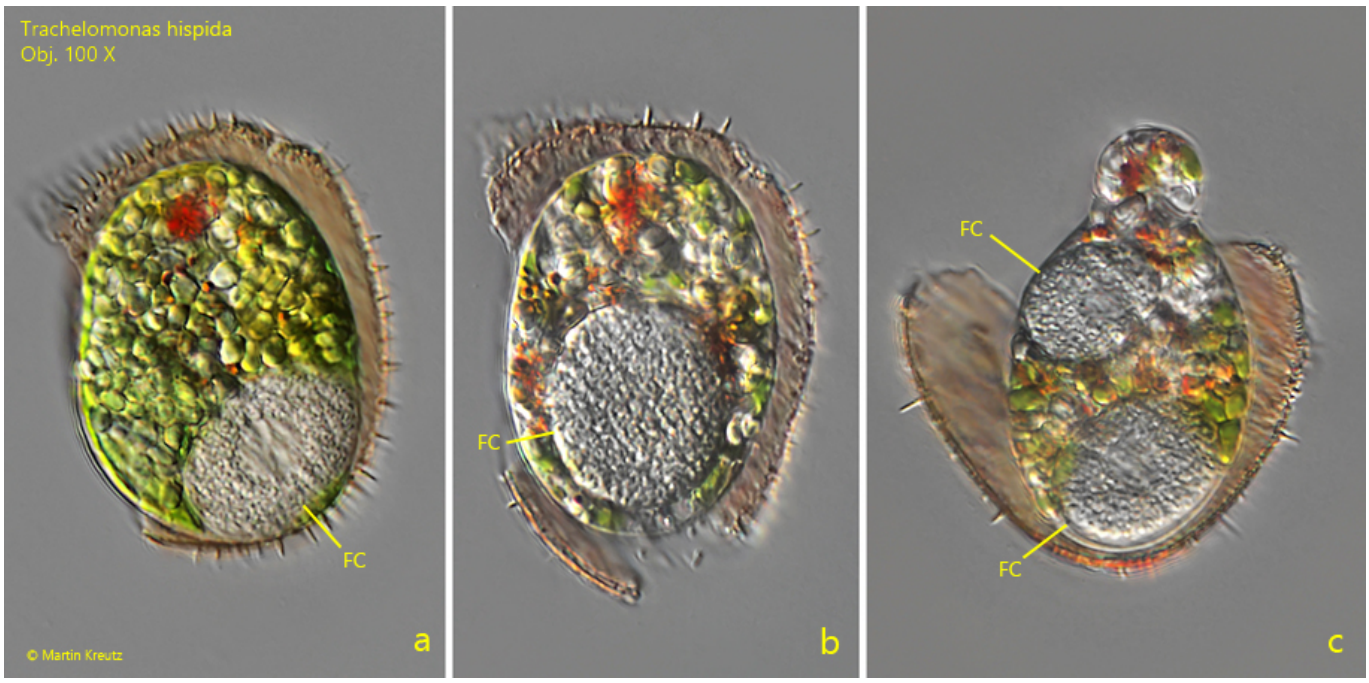


Fig. 3 a-c: *Trachelomonas hispida*. Different, squashed specimens which are infested by fungal cells (FC). Sometimes the specimens were infested by two fungal cells (c). Obj. 100 X.

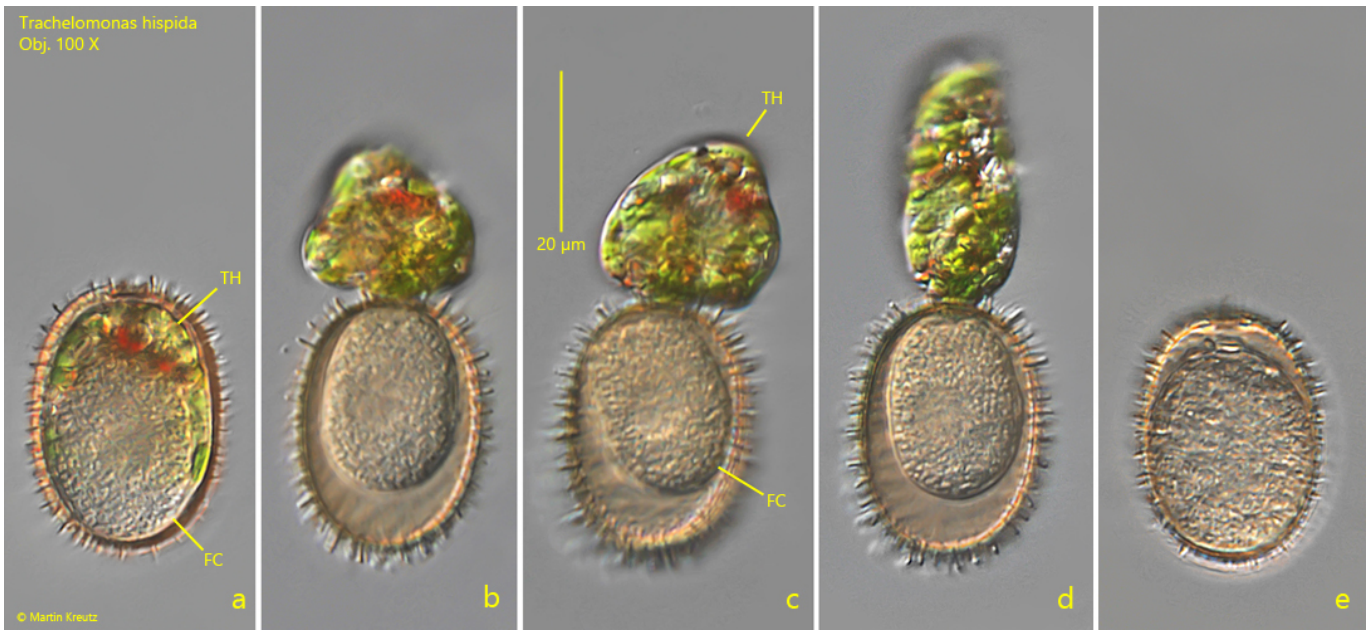


Fig. 4 a-e: *Trachelomonas hispida*. The growing fungal cell (FC) forces the host cell (TH) to leave the lorica through the aperture. Obj. 100 X.

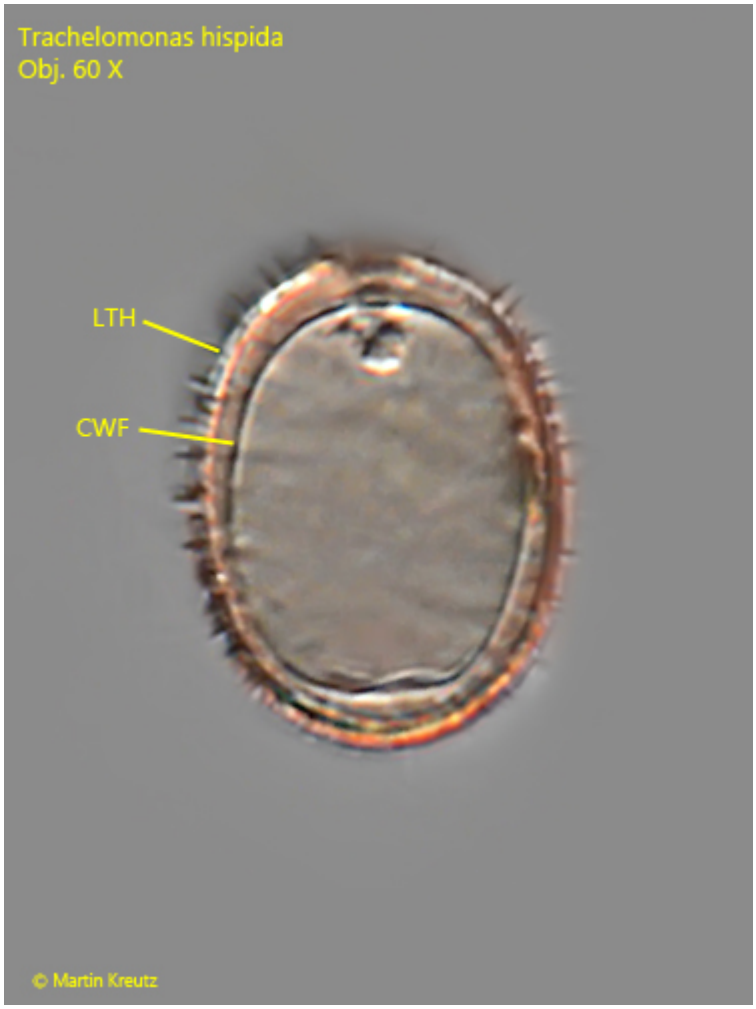


Fig. 5: *Trachelomonas hispida*. The fungal cell remains in the lorica after release of the spores. In the empty lorica (LTH) the cell wall of the (empty) fungal cell (CWF) is visible.

Obj. 60 X.

Fig. 6 a-h: *Trachelomonas hispida*. The drawings by Stein (1878), who was also able to observe an infestation with fungal cells in which the host cell leaves the lorica. However, he interpreted this process as sexual reproduction and the fungal cell as a „Keimkugel“ (= germ ball). According to his drawings, the host cell leaves the lorica without leaving a fungal cell and then releases spores, which he described as „Embryonen“ (= embryos). The original captions of his drawings by Stein from 1878 are the following: fig. a: „Geschlechtlicher Generation“ (=sexual generation), fig. b: „Ein geisselloses Individuum mit einer Keimkugel“ (= a flagellated specimen with a germ ball), fig. c: “ Ein Individuum mit einer Keimkugel und einem reifen Keimsack“ (=a specimen with a germ ball and a mature germ sac), fig. d: „Ein Individuum mit zwei Keimkugeln“ (= a specimen with two germ balls), fig. e–h: „Verschiedene, schon weit aus ihren Hülsen hervorgetretene Thiere mit einem reifen Keimsack“ (= different specimens with a mature germ sac that have already emerged far from their loricae), fig. g: “ Thier mit einem reifen Keimsack, der geplatzt ist, so dass die Embryonen sich frei im Leibe umherbewegen“ (specimen with a ripe germ sac

that has burst, so that the embryos move around freely in the body), fig. h: “ Ein nur noch mit einem kleinen Rest in der Hülse steckendes, so eben geplatztes Thier, aus dem die Embryonen ausschwärmen“ (=a specimen with only a small remnant still stuck in the lorica, just burst, from which the embryos swarm out).