Paramecium chlorelligerum Kahl, 1935

Most likely ID: n.a.

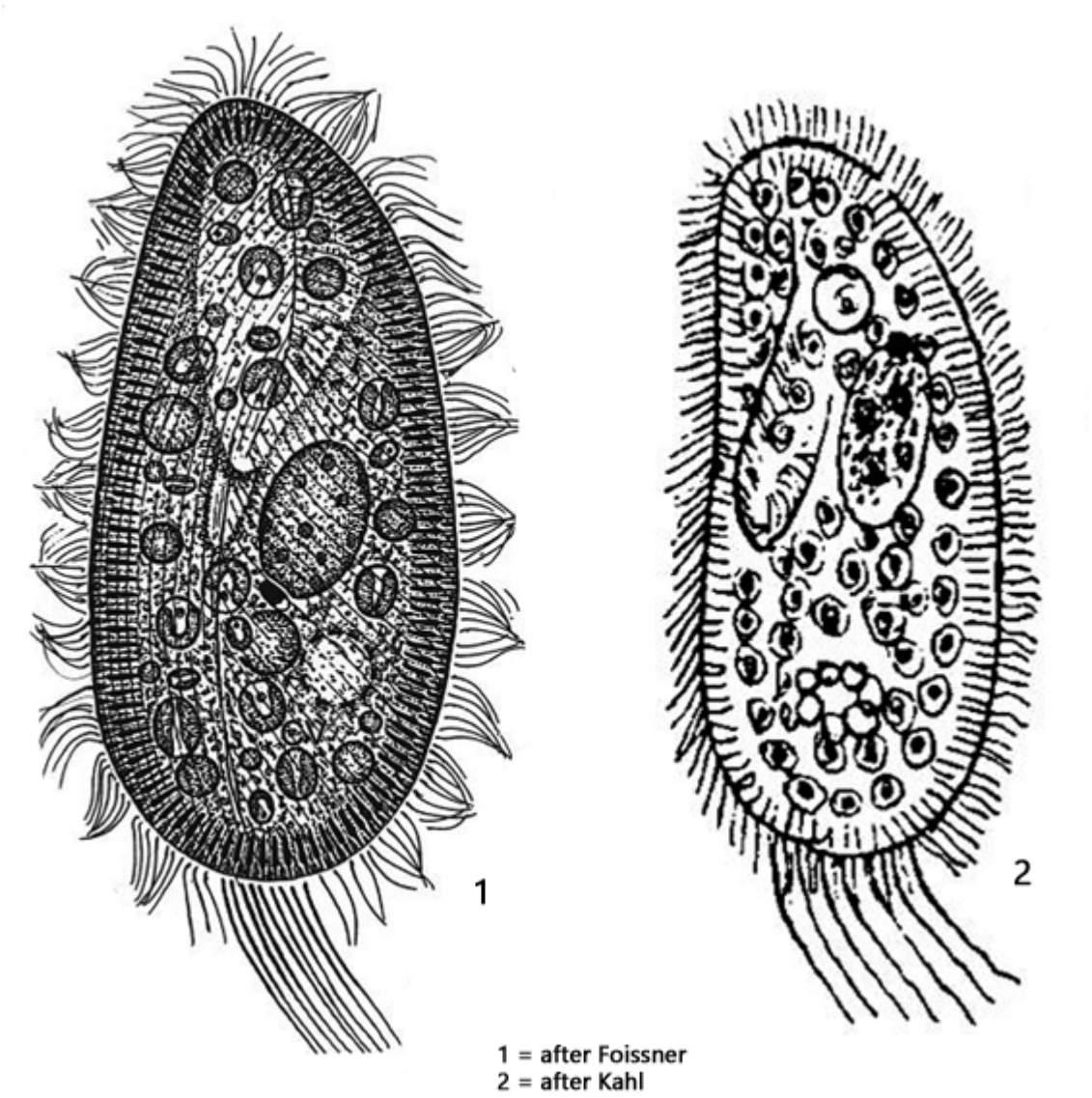
Synonym: n.a.

Sampling location: Simmelried

Phylogenetic tree: *Paramecium chlorelligerum*

Diagnosis:

- resting shape ellipsoidial to elongated ellipsoidal with a ventral depression
- swimming shape cylindroidal, fast swimming
- length 80–140 µm, width 37–61 µm
- cytoplasm green due to symbiotic algae (about 500 cells)
- macronucleus ellipsoidal, 20 x 14 µm
- micronucleus compact, 2.4 x 5.7 µm with a hyaline cap
- two contractile vacuoles with collecting vesicles
- each contractile vacuole with one excretion porus
- oral opening near mid-body with pre-oral depression
- tuft of caudal cilia, 29 µm long on average



Paramecium chlorelligerum

In April 2010, I noticed a green *Paramecium* in samples from the Simmelried, which was very similar to *Paramecium bursaria*. However, there were a few peculiarities. The species swam extremely fast, taking on a cylindrical shape and had a tuft of unusually long caudal cilia. It turned out to be *Paramecium chlorelligerum*, which was first described by Kahl. He found *Paramecium chlorelligerum* at only one location, a small, clear bog pond with little detritus. He describes this species in just a few lines in the addendum to his monograph. Thereafter, no further finds or descriptions of this species are available. The population in the Simmelried now provided the opportunity for *Paramecium clorelligerum* to be described again in detail by Foissner, Stöck and myself (Kreutz et al., 2012, s. Literature).

I first found *Paramecium clorelligerum* in the mire outlet and later also in pond 2 of the Simmelried. In contrast to *Paramecium bursaria*, the specimens were mainly

found in the uppermost mud layer, especially between aggregates of algae.

The most remarkable characteristic of *Paramecium chlorelligerum* is certainly its ability to take on a resting shape and a swimming shape. The resting shape is ellipsoidal with a ventral indentation in front of the central mouth opening (s. figs. 6 a-c and 7 a-f). However, the resting shape is not as pronouncedly slipper-like shaped as in *Paramecium bursaria*. This resting shape can very quickly change into a cylindroidal swimming shape, which is somewhat thickened in the apical third and circular in transverse view (s. figs. 4 a-b and 5 a-b). The swimming speed is very high at about 1 mm/sec. *Paramecium chlorelligerum* is the only ciliate I know that can actively take two forms.

The conspicuous, long caudal cilia are on average 29 µm long (s. figs. 1 a-b, 2 a-b and 3 a-c). I have also observed specimens with caudal cilia 38 µm long (s. fig. 5 a), which corresponds to about one third of the body length. The two contractile vacuoles are surrounded by several collecting vesicles (s. fig. 11) and not by collecting ducts as in *Paramecium bursaria*. The excretory pores are located on the dorsal side. Each contractile vacuole has only one excretory pore (s. fig. 12). The macronucleus is oval with a small, highly refractive micronucleus, which has a hyaline cap (s. figs. 8 and 9). It sometimes appears wedge-shaped. The symbiotic algae, which fill the entire cell, are broad ellipsoidal (s. fig. 10). The cells are on average 7.7 X 5.5 µm in size and belong to the genus *Meyerella*. The closest related free-living species is *Meyerella planktonica* (99.1 % match of the 18S RNA gene sequence).

Fig. 1 a-b: *Paramecium chlorelligerum*. L = 123 µm. A freely swimming specimen from dorsal. Note the tuft of long caudal cilia (CC). Obj. 60 X.

Fig. 2 a-b: *Paramecium chlorelligerum*. L = 121 µm. A second, freely swimming specimen. The caudal cilia (CC) have a length of 35 µm. Obj. 60 X.

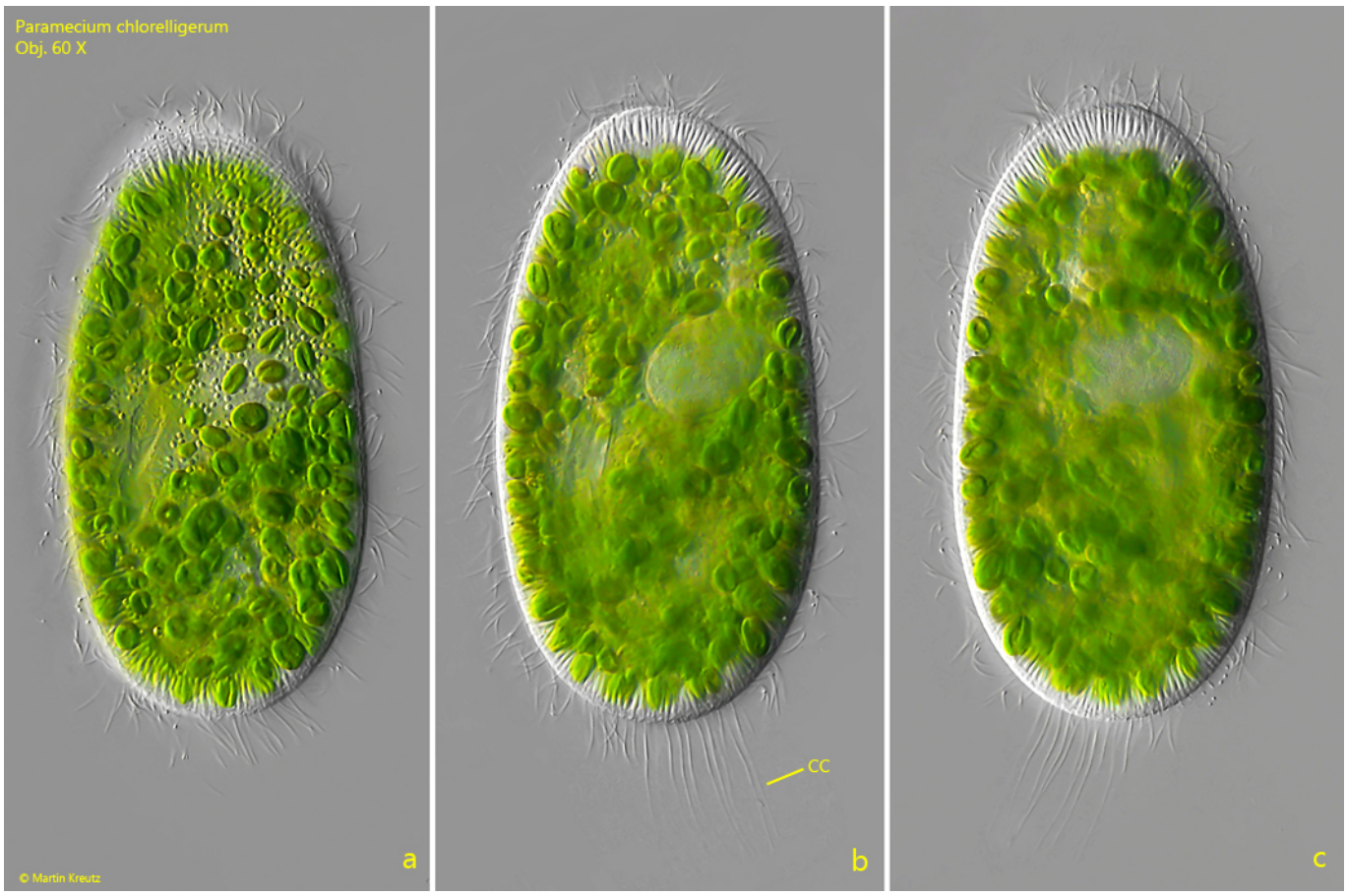


Fig. 3 a-c: *Paramecium chlorelligerum*. L = 113 µm. A third, freely swimming specimen from ventral. CC = tuft of caudal cilia. Obj. 60 X.

Fig. 4 a-b: *Paramecium chlorelligerum*. L = 135 µm. The cylindroidal swimming shape with a widened anterior third (a). In apical view (b) the swim-form is circular. Obj. 20 X.

Fig. 5 a-b: *Paramecium chlorelligerum*. L = 129 µm. Two different specimens that have take on the swimming shape. Obj. 20 X.

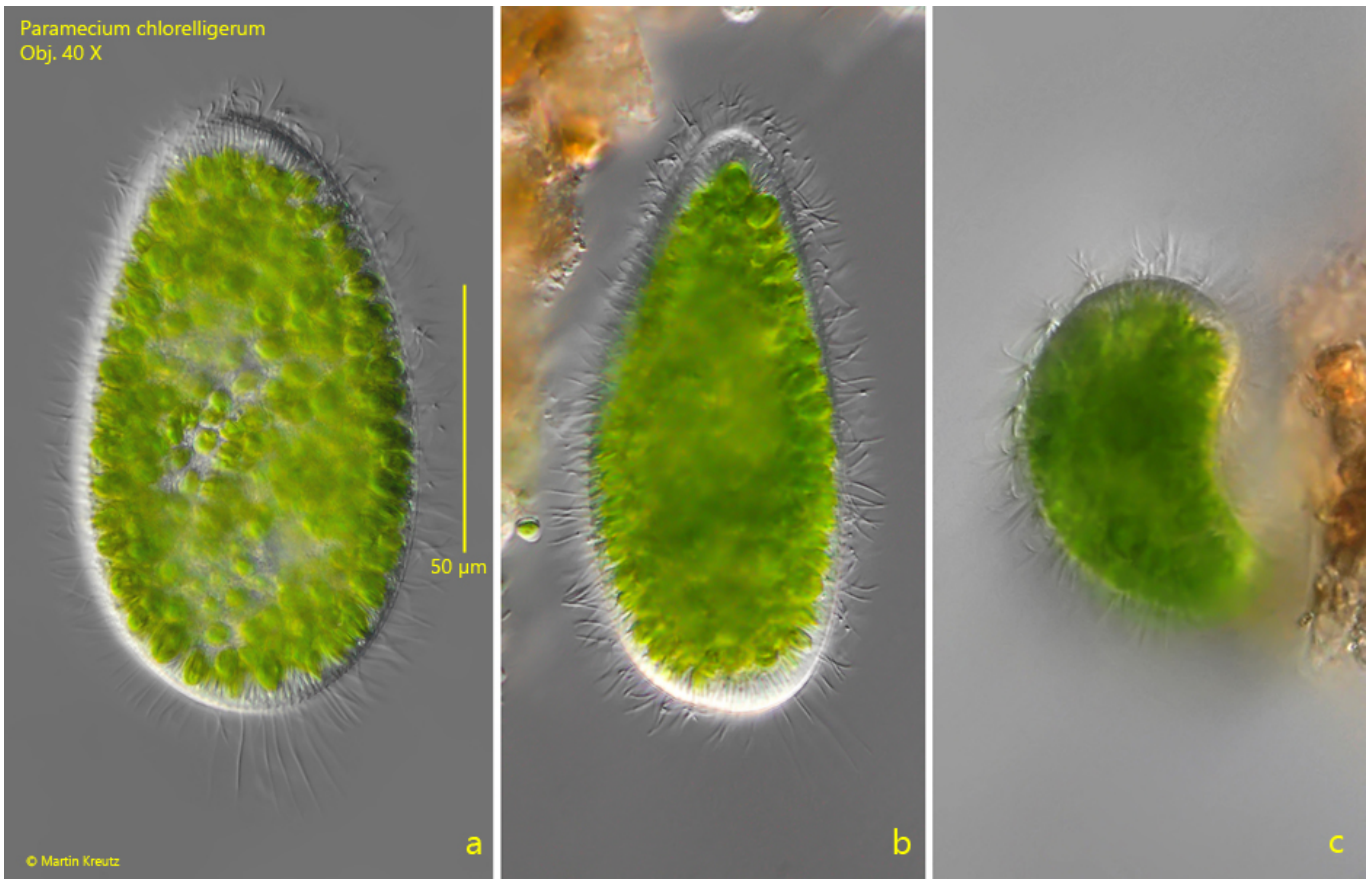


Fig. 6 a-c: *Paramecium chlorelligerum*. L = 113 µm. The broader, ellipsoidal resting shape from ventral (a), lateral (b) and apical (c). Note the ventral depression of the resting shape (c). Obj. 40 X.

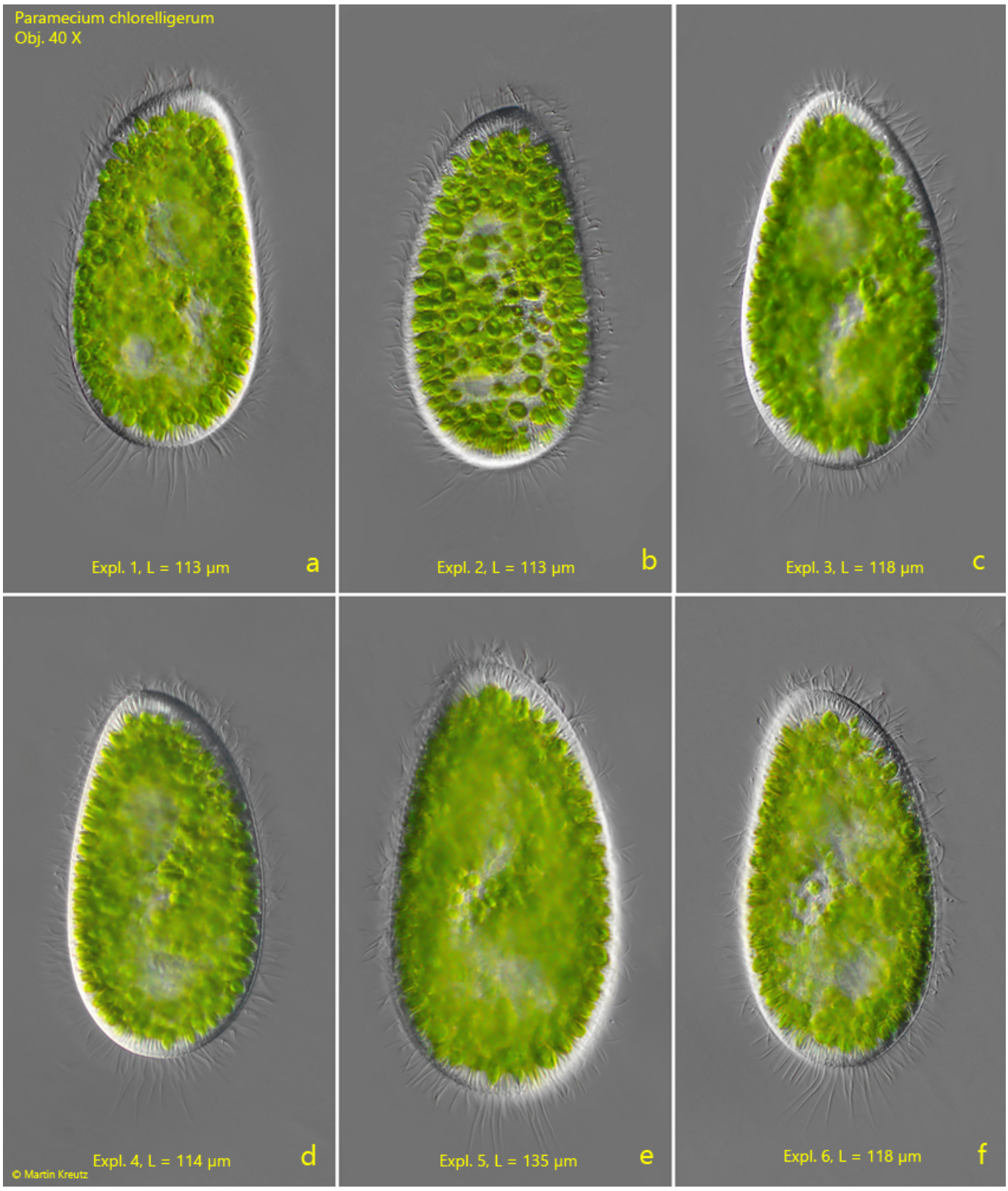


Fig. 7 a-f: *Paramecium chlorelligerum*. Six different specimens in the resting-form. Obj. 40 X.

Fig. 8: *Paramecium chlorelligerum*. The macronucleus (Ma) and the adjacent micronucleus (Mi) in a strongly squashed specimen. Note the hyaline cap (HC) of the micronucleus. Obj. 100 X.

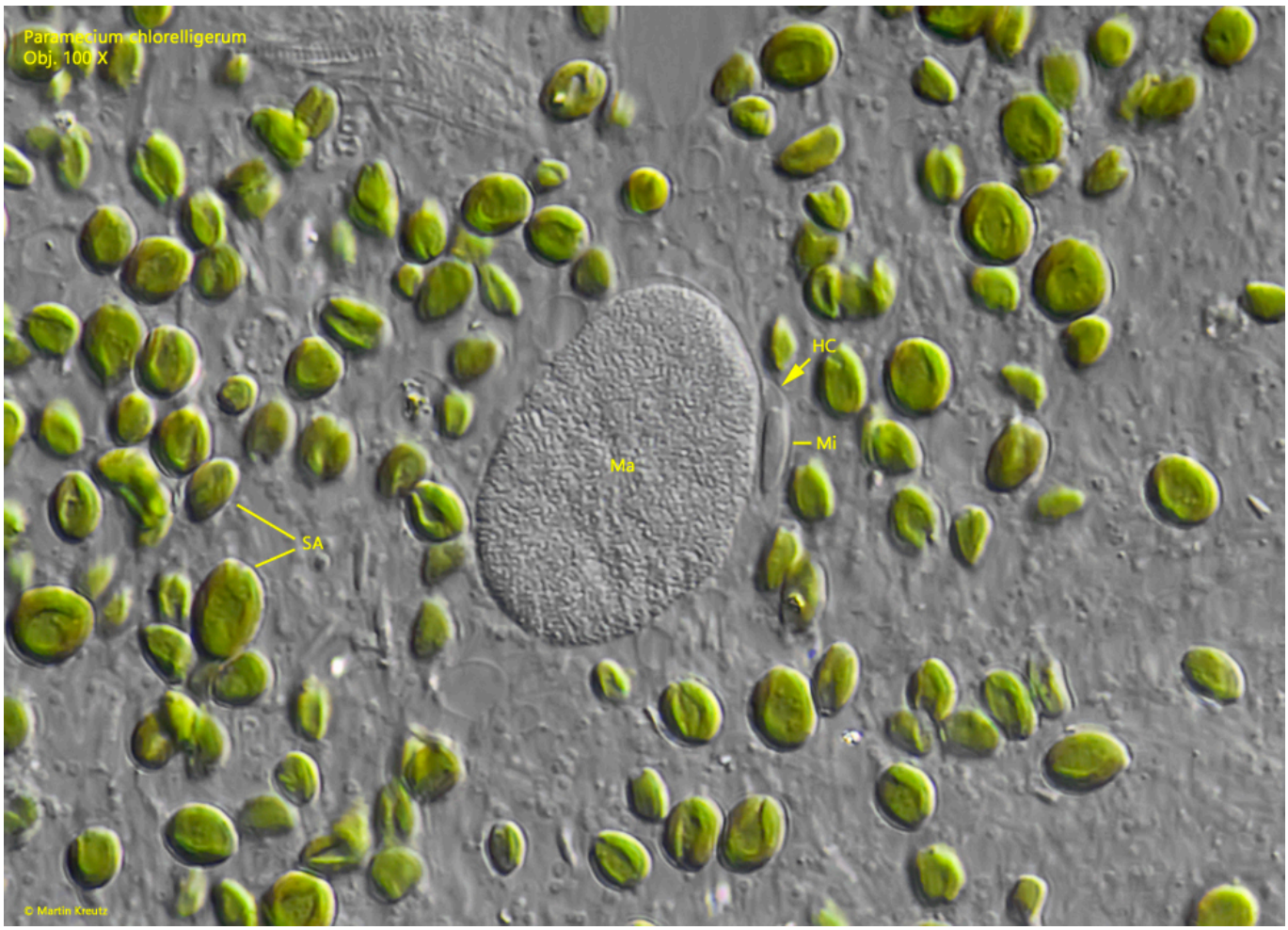


Fig. 9: *Paramecium chlorelligerum*. The macronucleus (Ma) and the micronucleus (Mi) in a second squashed specimen. HC = hyaline cap of the micronucleus, SA = symbiotic algae. Obj. 100 X.

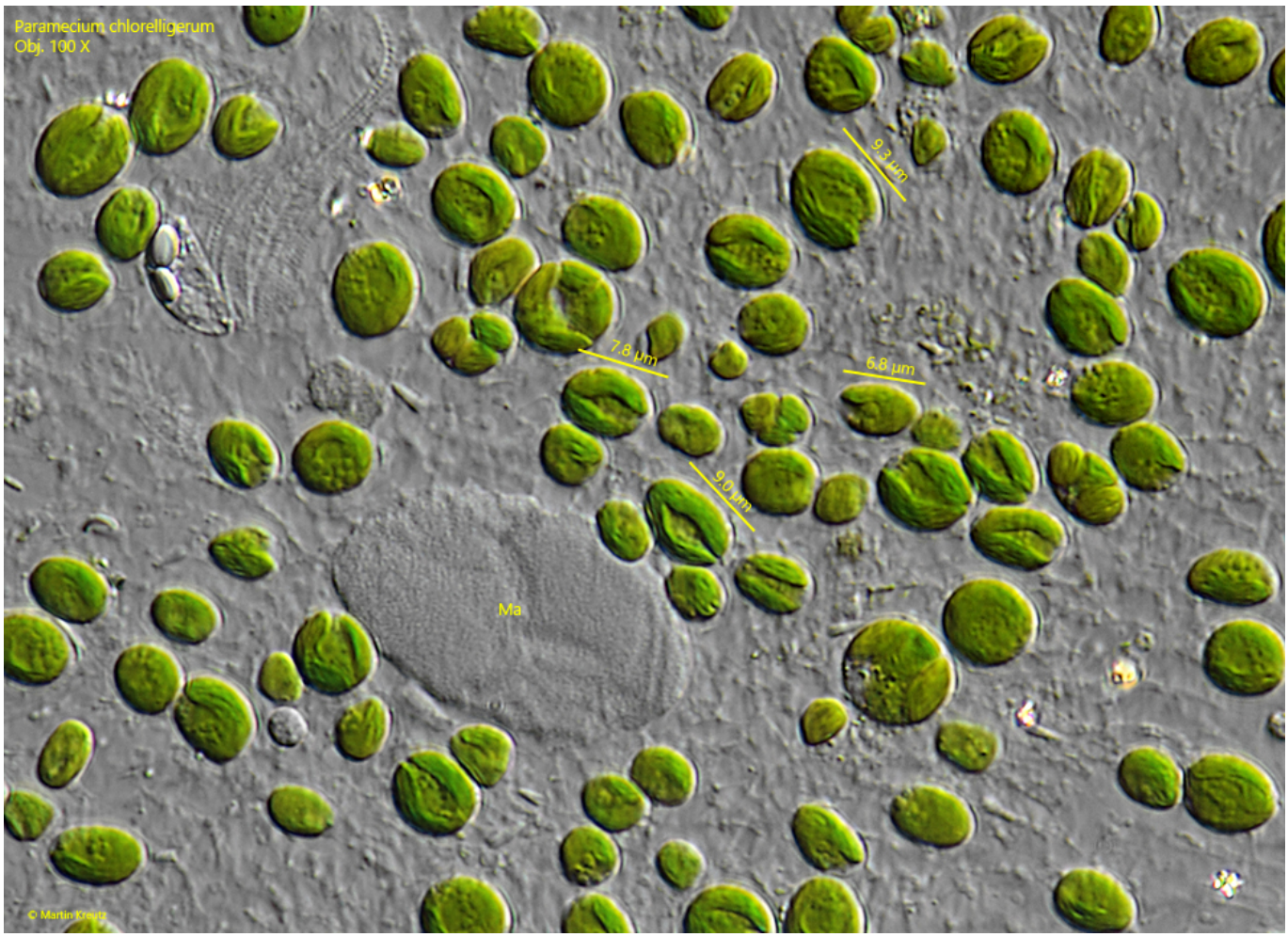


Fig. 10: *Paramecium chlorelligerum*. The symbiotic algae are broad ellipsoidal with a length of 4.8–9.6 µm. They are members of the genus *Meyerella*. Obj. 100 X.

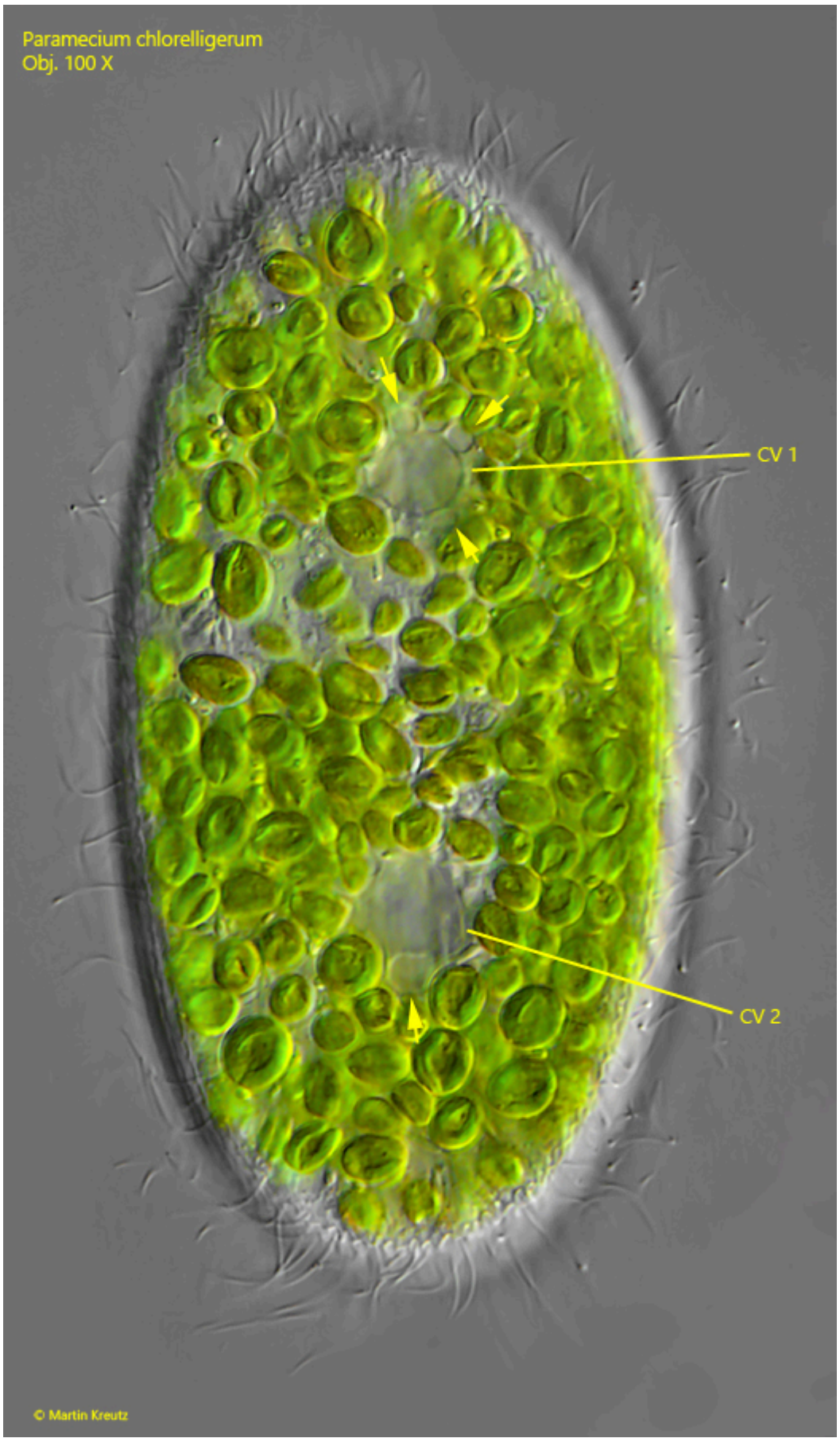


Fig. 11: *Paramecium chlorelligerum*. The two contractile vacuoles (CV 1, CV 2) are located dorsally. They are surrounded by several collecting vesicles (arrows). Obj.

100 X.


Paramecium chlorelligerum
Obj. 100 X
EP 1
EP 2
© Martin Kreutz

Fig. 12: *Paramecium chlorelligerum*. Each contractile vacuole has a single excretion pore (EP 1, EP 2). Obj. 100 X.

Fig. 13: *Paramecium chlorelligerum*. A resting extrusome with a length of 7 µm. Obj. 100 X.

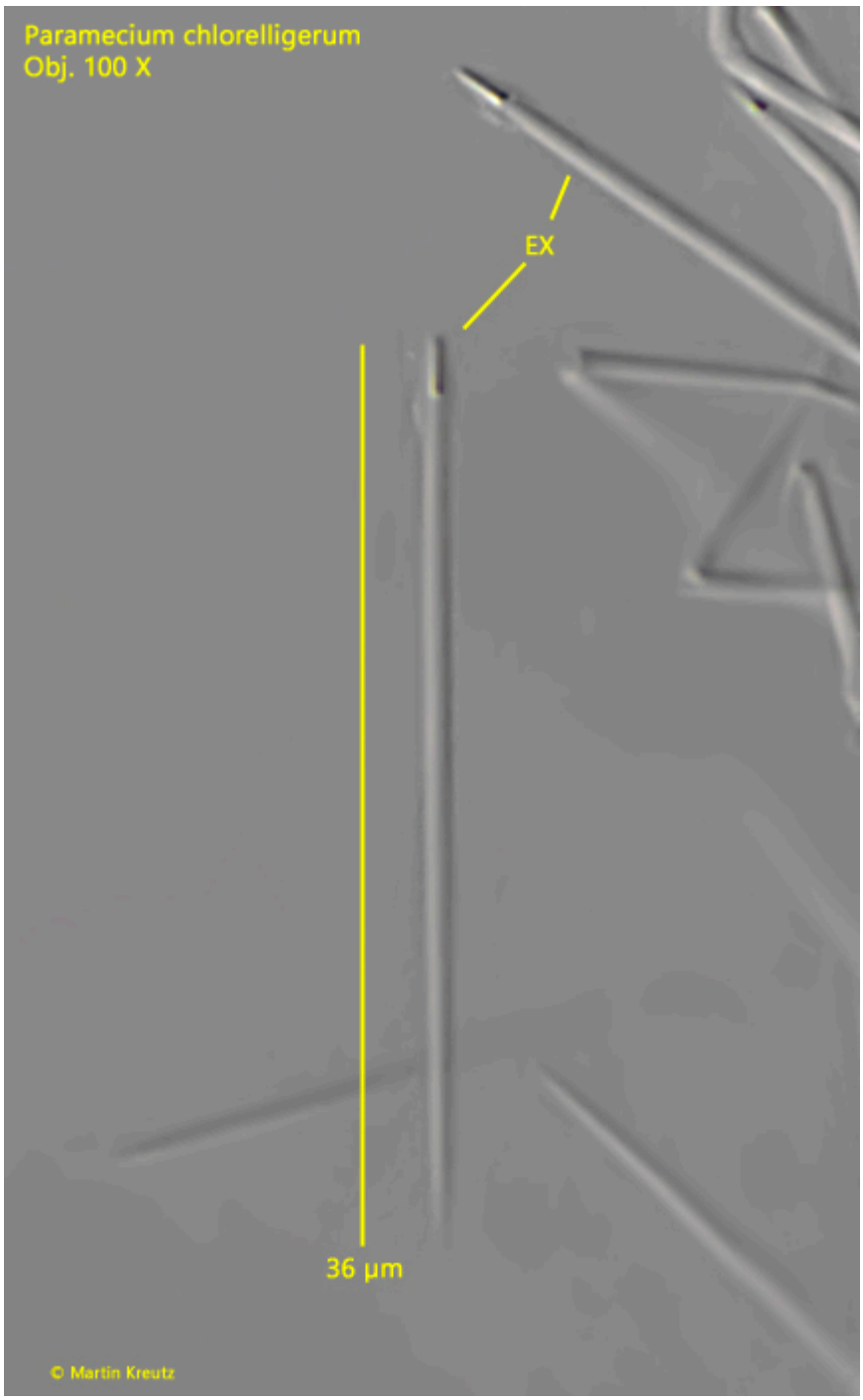


Fig. 14: *Paramecium chlorelligerum*. Exploded extrusomes (EX) with a length of 36 µm. Obj. 100 X.