Frontonia leucas

(Ehrenberg 1834) Ehrenberg 1838

Most likely ID: n.a.

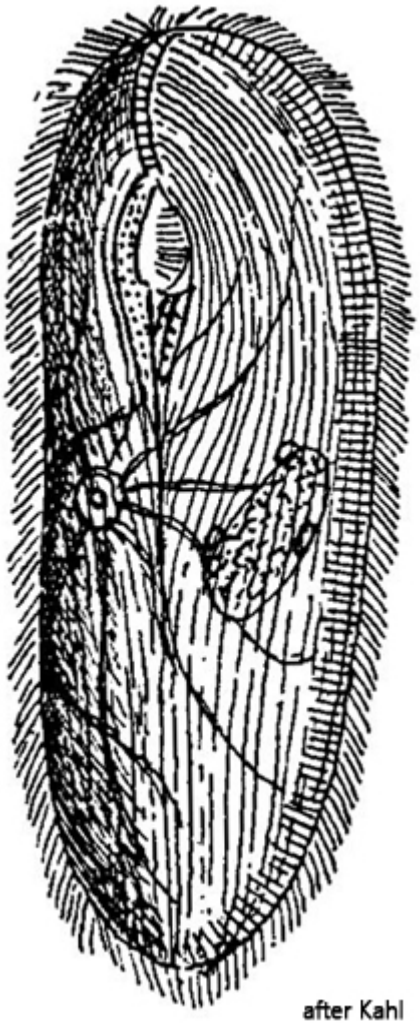
Synonym: n.a.

Sampling location: Simmelried, Purren pond, Mainau pond, Ulmisried, Bussenried

Phylogenetic tree: *Frontonia leucas*

Diagnosis:

- body ovoid, elliptical or sole-shaped
- cytoplasm colorless or green due to symbiotic algae
- length 120–600 µm, width 60–250 µm
- oral apparatus in anterior body quarter, small, ogival-shaped
- one contractile vacuole, dorsal near mid-body
- contractile vacuole with many auxiliary canals and one excretion pore
- macronucleus ellipsoid or ovoid with 2–9 spherical micronuclei
- fringe of spindle-shaped extrusomes, 6–10 µm long
- 110–120 longitudinal rows of cilia
- pellicle quadrangularly fielded



Frontonia leucas

Frontonia leucas is one of the most common ciliates in all my sites, which have a mud layer of dead plants and leaves. The specimens are found exclusively in the uppermost mud layer and collect in the sample containers at the bottom. In some cases I was able to observe mass developments with hundreds of specimens per milliliter.

Frontonia leucas is quite a large ciliate with an average length of 250 µm and is immediately noticeable in the samples. The ciliate is a fast swimmer. The cytoplasm is vacuolated and appears foamy. The specimens are often filled with dark-colored food vacuoles. These are usually phagocytized cyanobacteria, algae or euglenids (e.g. *Trachelomonas*).

The oral apparatus is located in the anterior quarter and appears quite small compared to the size of the ciliate. It has three adoral membranelles on the right side, with an undulating membrane on the left, as is typical for the genus *Frontonia* (s. fig. 5 a-c). Also typical for *Frontonia* is a preoral and a postoral suture (s. figs. 2 a and 4). The postoral suture extends

from the oral apparatus in an almost straight line to the posterior end (s. fig. 2 a).

The contractile vacuole of *Frontonia leucas* is located in the middle of the body on the dorsal side (s. figs. 1 a and 3 a-b). In order to drain the water from the large ciliate, the contractile vacuole forms many auxiliary canals that spread out in the cytoplasm in a radial pattern (s. fig. 3 b). They reach their maximum length and expansion during the systole. The contractile vacuole has only one excretory pore (s. fig. 3 a).

The macronucleus is located approximately in the middle of the cell. It is elliptical or ovoid and has 2–9 round micronuclei (s. fig. 6). In my population, however, I could not observe any specimen with more than 5 micronuclei.

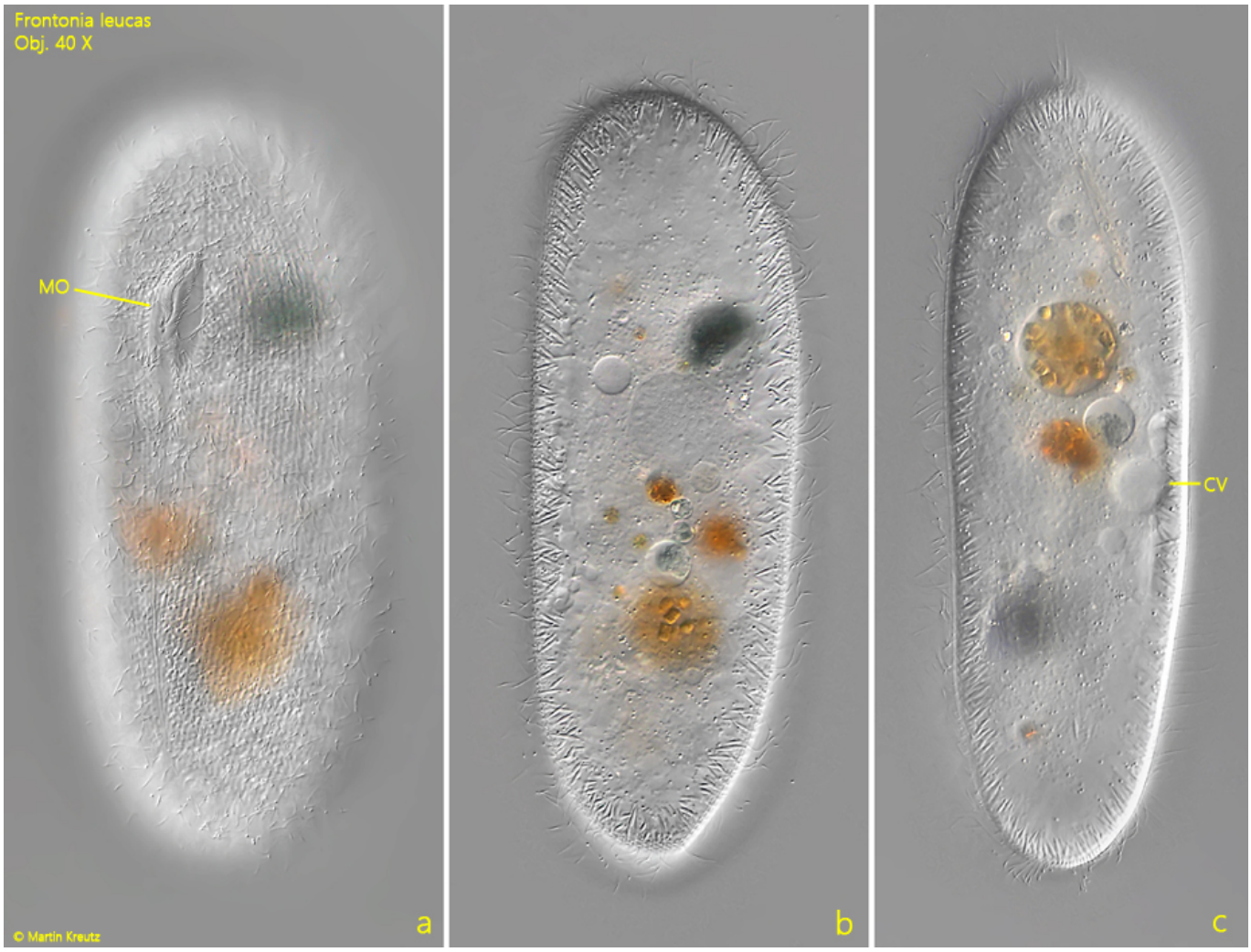


Fig. 1 a-c: *Frontonia leucas*. L = 235 µm. A freely swimming specimen from ventral (a, b) and from left. Note the small mouth opening (MO) and the contractile vacuole (CV) located dorsal in mid-body. Obj. 40 X.

Fig. 2 a-b: *Frontonia leucas*. L = 260 µm. Two focal planes of a slightly squashed specimen from ventral. Note the preoral (PrS) and postoral suture (PoS). CV = contractile vacuole, Ma = macronucleus. Obj. 40 X.

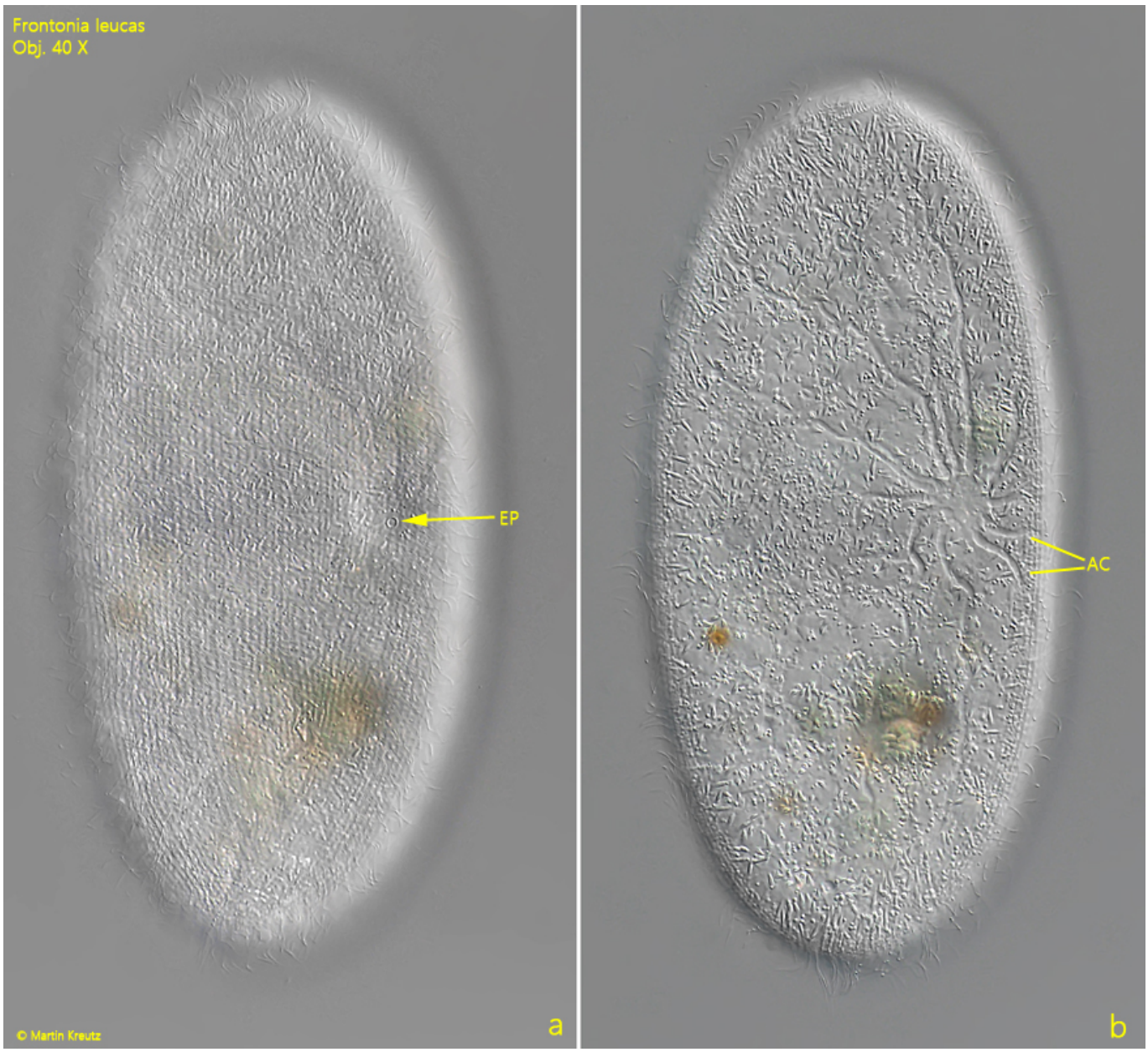


Fig. 3 a-b: *Frontonia leucas*. L = 255 µm. Two focal planes of a slightly squashed specimen from dorsal. Note the excretion pore (EP) and the auxiliary canals (AC) of the contractile vacuole. Obj. 40 X.

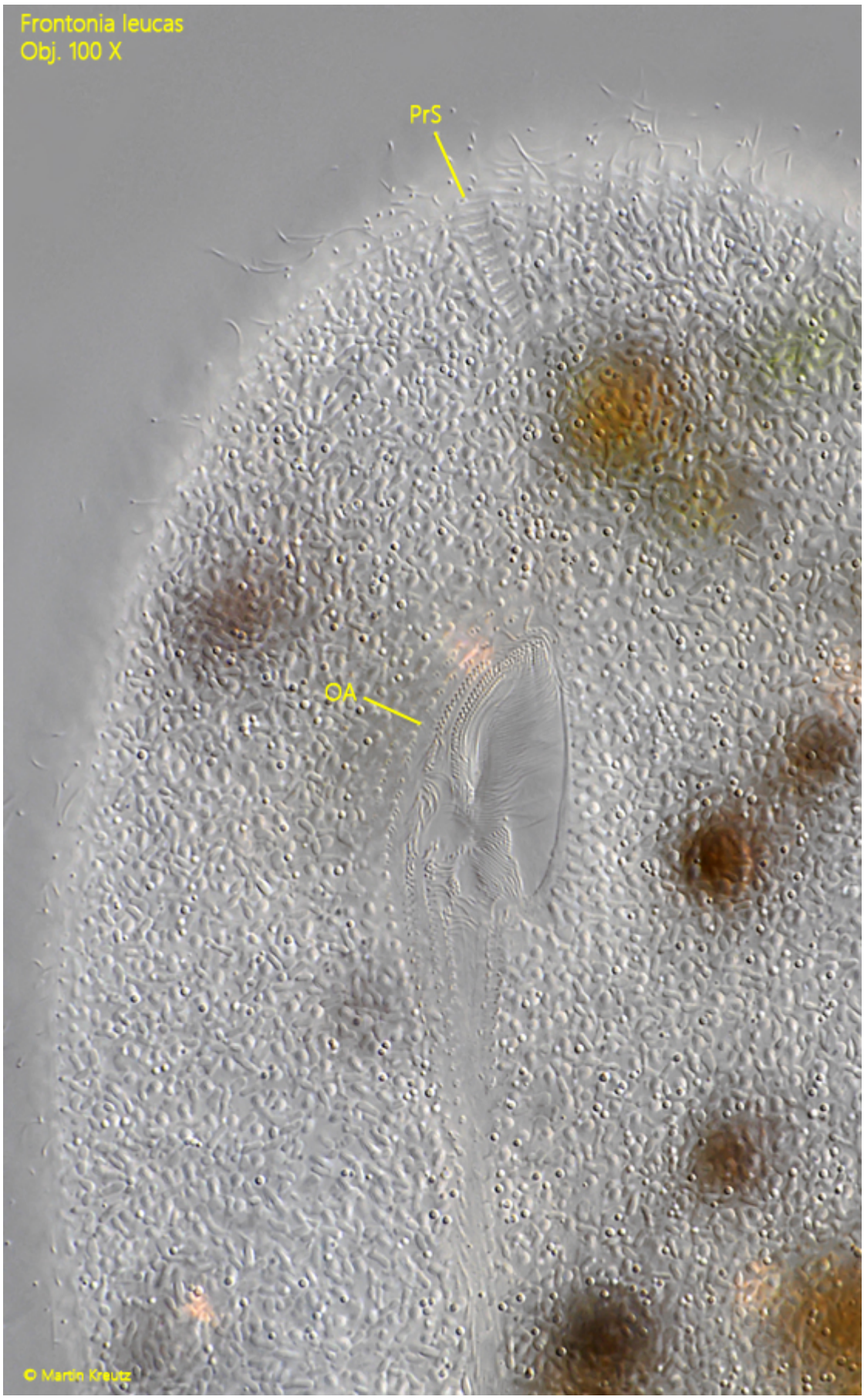


Fig. 4: *Frontonia leucas*. The oral apparatus and the preoral suture in a slightly squashed specimen. Obj. 100 X.

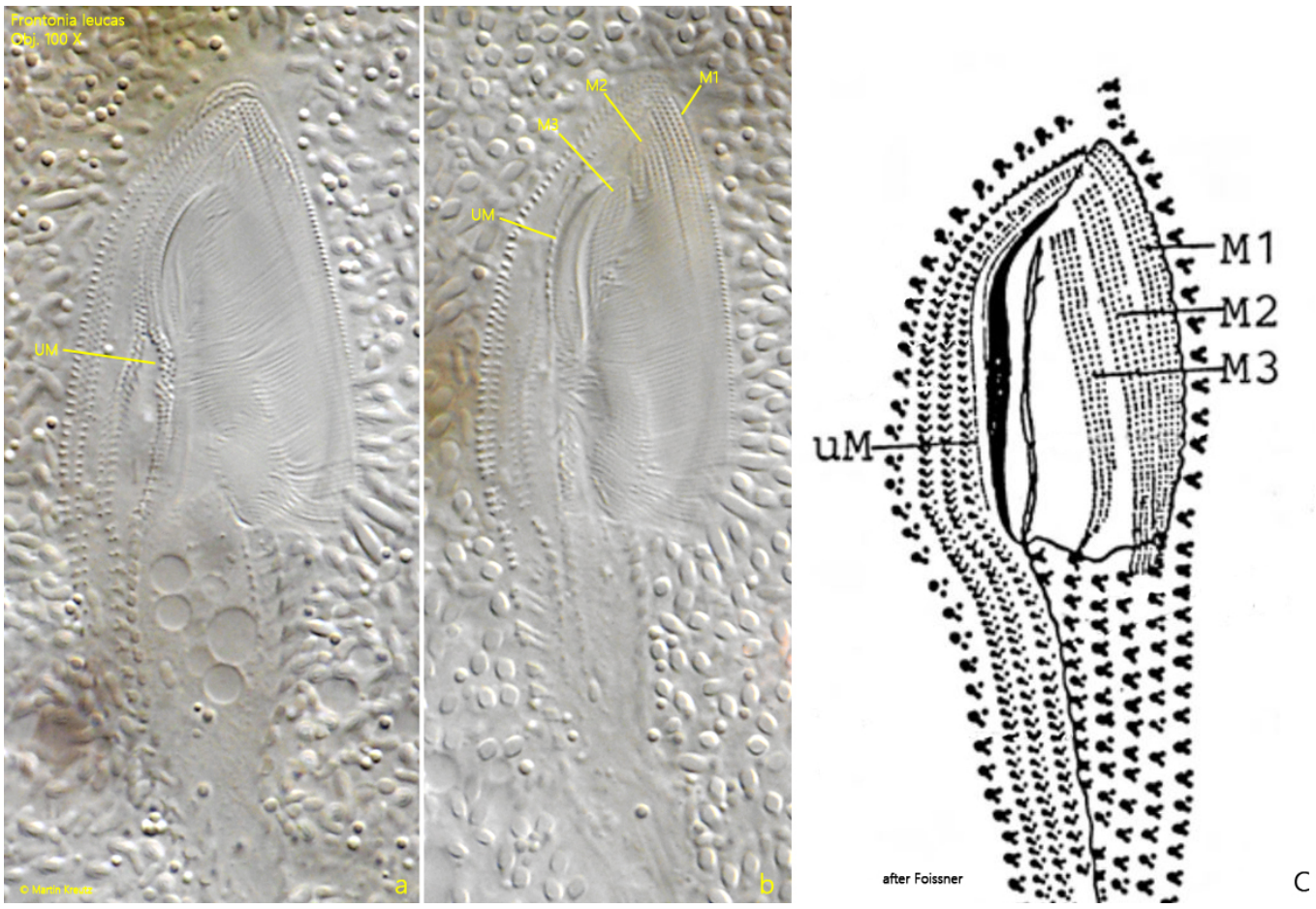


Fig. 5 a-c: *Frontonia leucas*. Two focal planes of the oral apparatus in a squashed specimen (a, b) and a schematic drawing of it for comparison (c). Note the three adoral membranelles (M1–M3) and the undulating membrane (UM). Obj. 100 X.

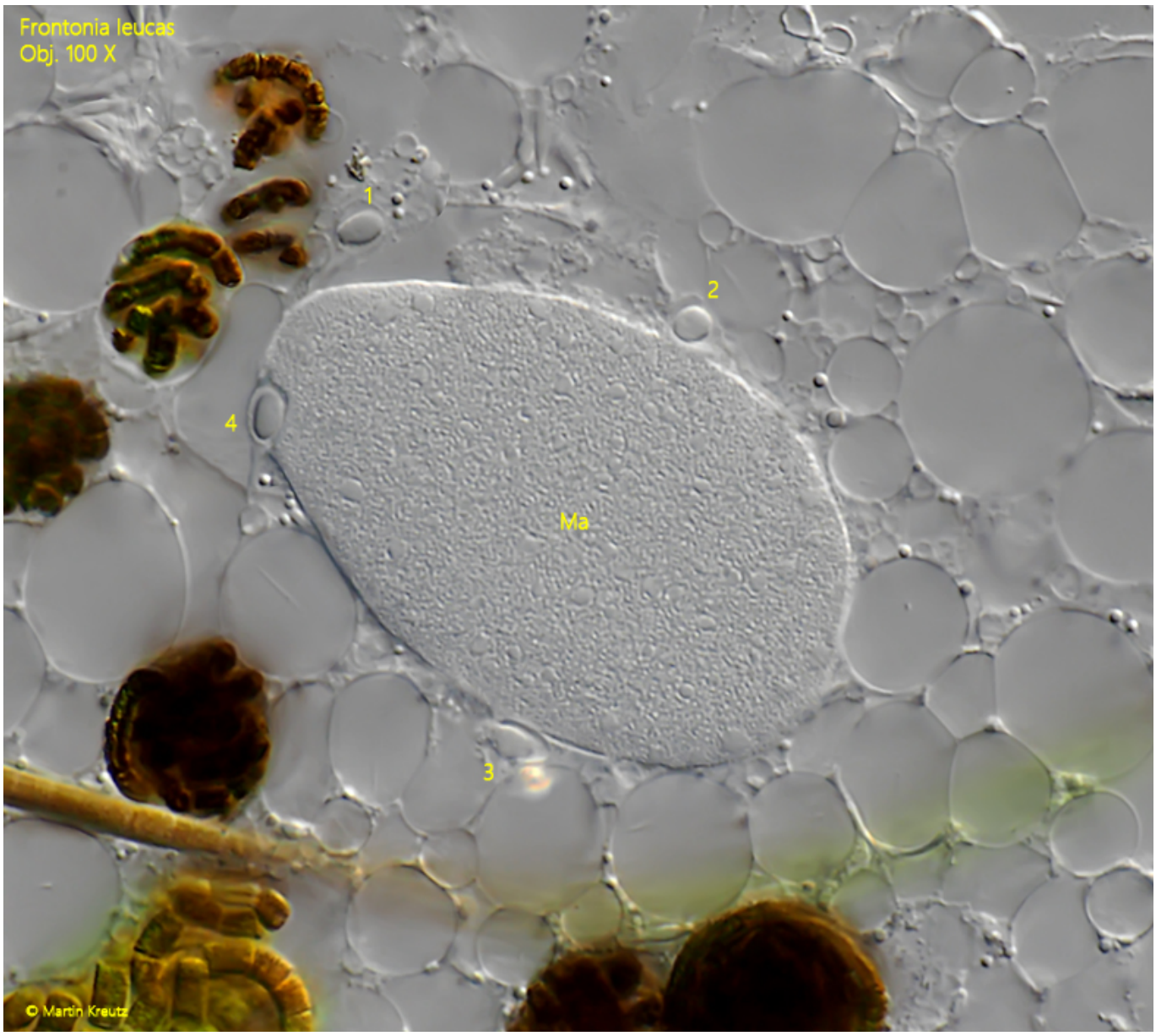


Fig. 6: *Frontonia leucas*. The macronucleus (Ma) with 4 adjacent micronuclei (1–4) in a squashed specimen. Obj. 100 X.

Parallel to the colorless variant of *Frontonia leucas*, I also very often find the green form, which has symbiotic algae. I find both forms very often in the same sample. They therefore seem to have similar habitat requirements. As far as I know, it is not known whether the two forms can interbreed. Without having made an exact count, the green form seems to occur more frequently in my sampling sites. The symbiotic algae are very dense in the cytoplasm, so that the specimens sometimes appear almost black. The symbiotic algae have a diameter of 4.3–6.0 µm, have their own nucleus and a cup-shaped chloroplast. They are therefore of the *Chlorella* type (s. fig. 9).

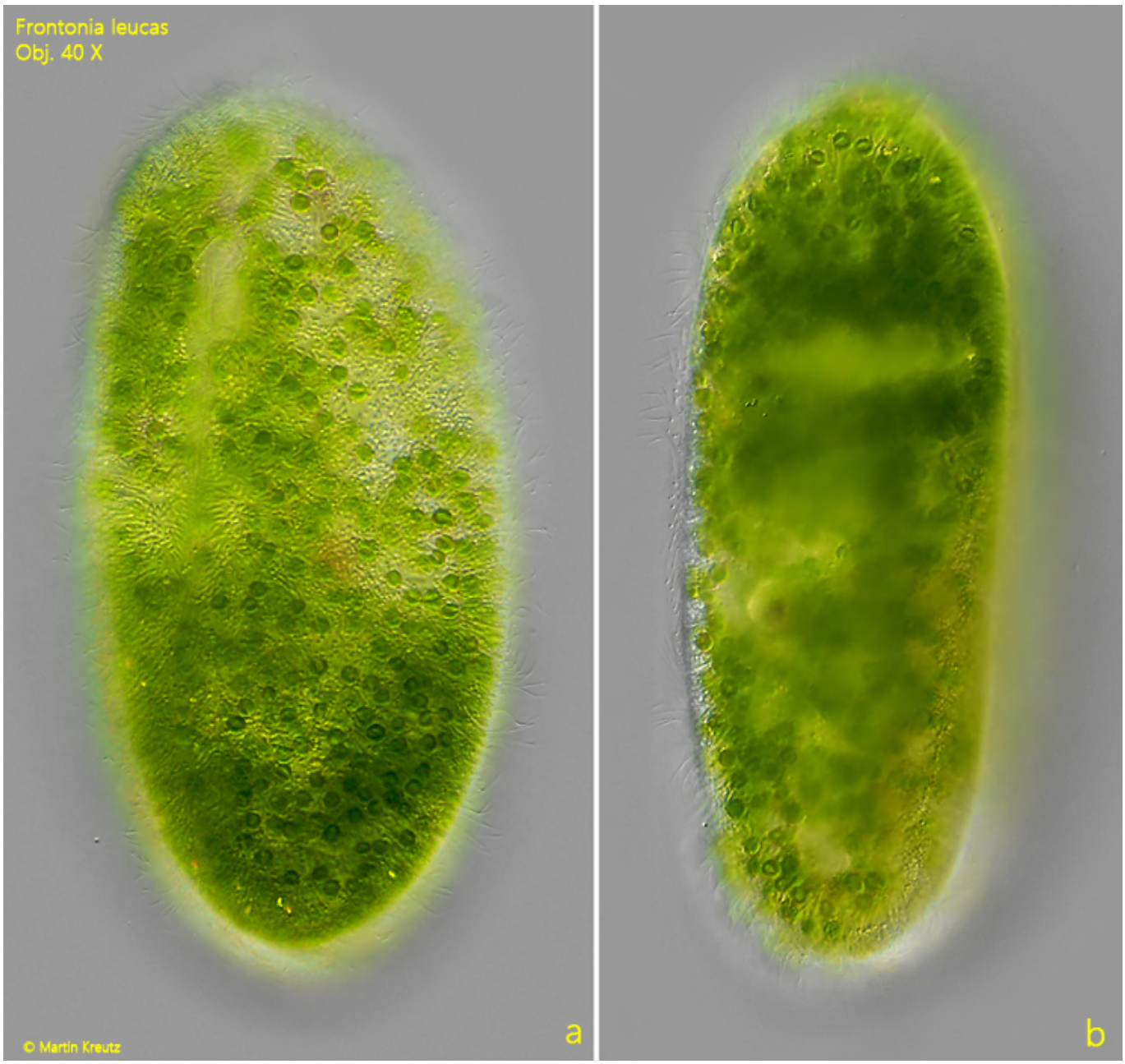


Fig. 7: *Frontonia leucas*. Ventral (a) and lateral view (b) of a specimen with symbiotic algae. Obj. 40 X.


Frontonia leucas
Obj. 60 X
© Martin Kreutz

Fig. 8: *Frontonia leucas*. Ventral view of a slightly squashed specimen. Obj. 60 X.

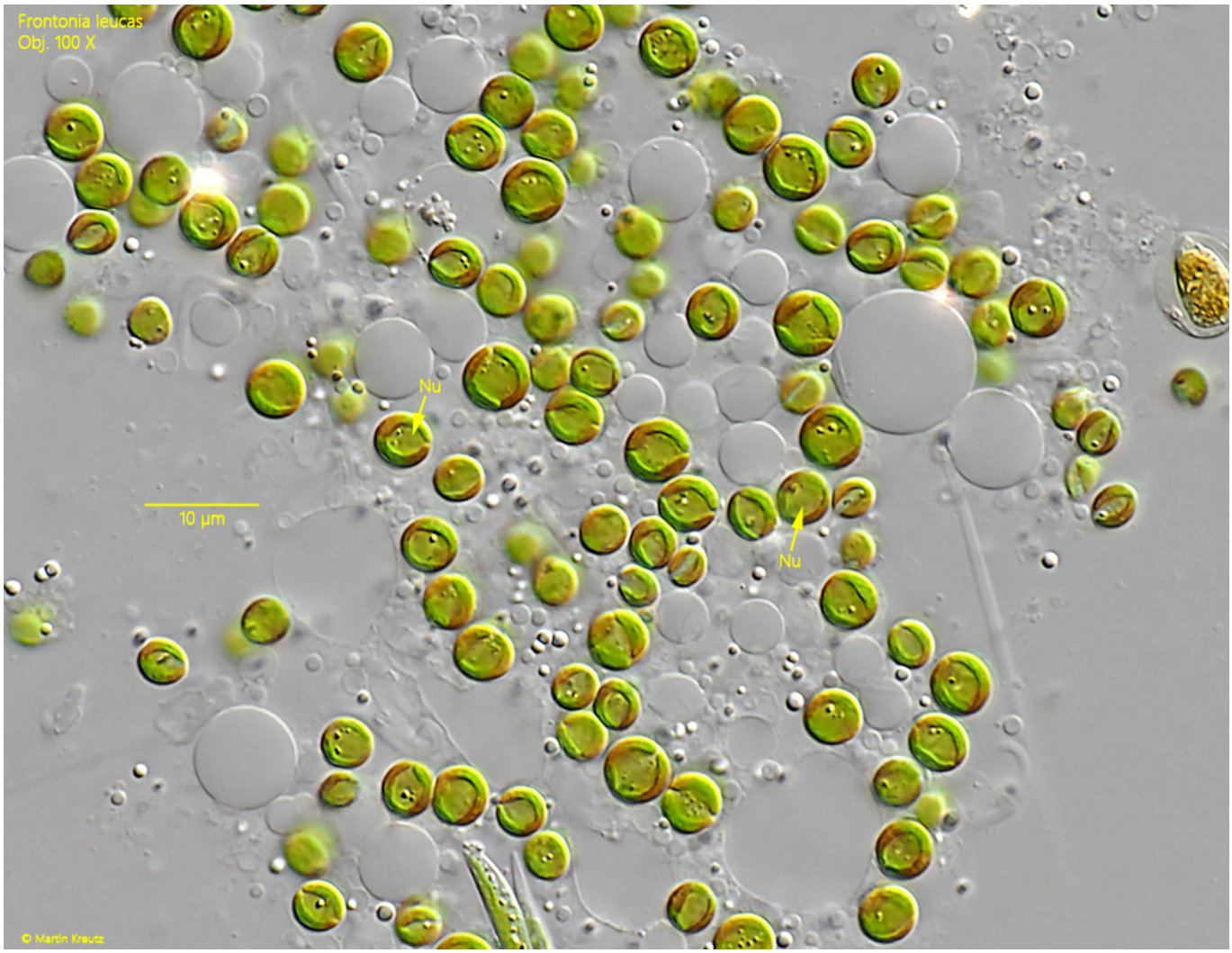


Fig. 9: *Frontonia leucas*. The symbiotic algae in a strongly squashed specimen are of the *Chlorella* type. They have a diameter of 4.3–6.0 µm and their own nucles (Nu). Obj. 100 X.

Fig. 10: *Frontonia leucas*. The spindle-shaped extrusomes (EX) of the green form are about 7–8 µm long. Obj. 100 X.