Ceratium hirundinella

(O.F.Müller) Dujardin, 1841

Most likely ID: n.a.

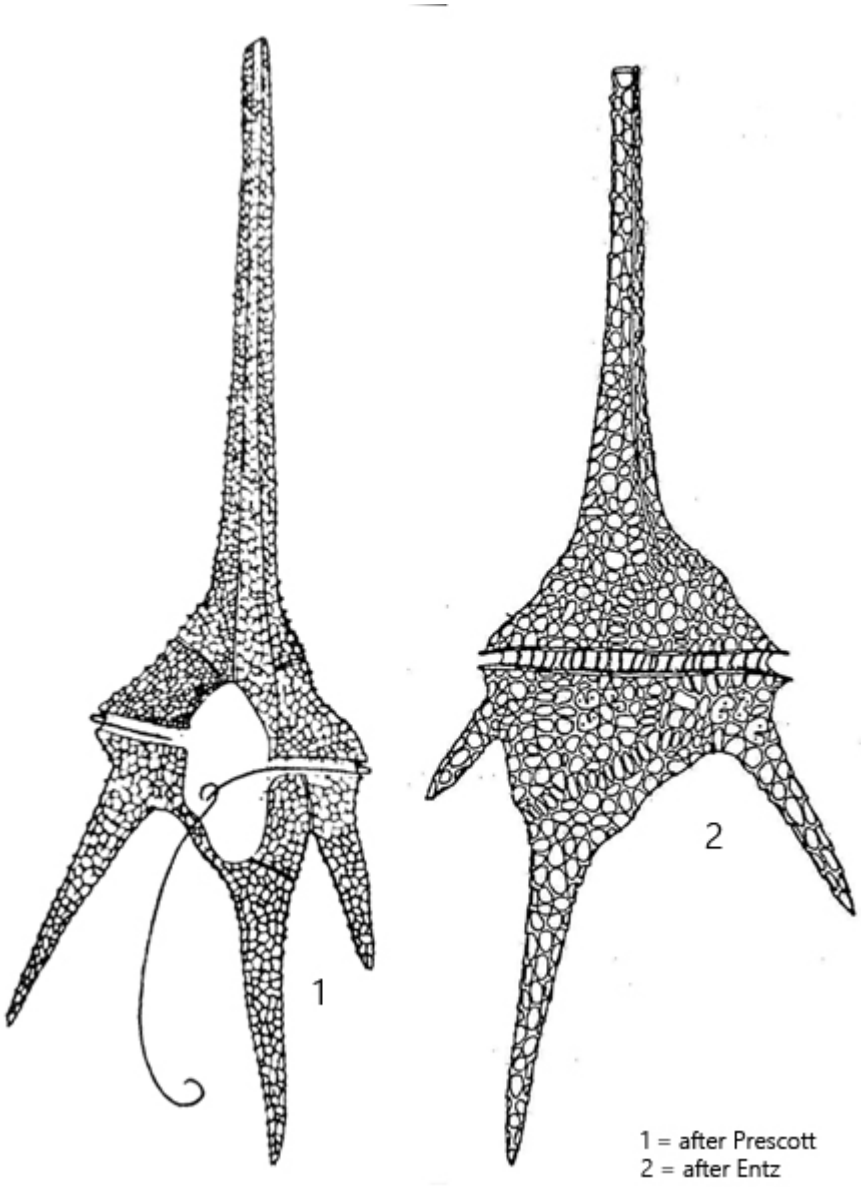
Synonyms: *Bursaria hirundinella*, *Ceratium tetraceras*, *Ceratium macroceras*, *Ceratium longicorne*, *Glenodinium longicorne*, *Ceratium kumaonense*, *Ceratium leptoceras*, *Ceratium brevicorne*, *Ceratium pumilum*, *Ceratium handelii*

Sampling location: Lake Constance

Phylogenetic tree: *Ceratium hirundinella*

Diagnosis:

- cells pyramidal with 3–4 divergent horns
- cells dorso-ventrally flattened
- length 90–450 µm, width 28–55 µm
- apical horn long ans slender
- 2–3 antapical horns
- epitheca with distinct shoulder
- cingulum narrow
- theca arranged of several plates with reticulate ornamentation
- numerous disc-shaped chloroplasts, yellowish-brown
- oval nucleus located in epitheca



Ceratium hirundinella

I find *Ceratium hirundinella* exclusively in the plankton of Lake Constance. In contrast, at my other sampling sites—which are smaller bodies of water—only the similar species *Ceratium furcoides* was present.

The specimens of *Ceratium hirundinella* in my population were mostly between 170 and 210 µm in length. Unlike *Ceratium furcoides*, *Ceratium hirundinella* exhibits a pronounced shoulder formation at the transition from the epitheca to the hypotheca (s. fig. 1 a-b). In addition, the antapical horns of the hypotheca are more widely spread than in *Ceratium furcoides*.

Another difference, though more difficult to discern, concerns the structure of the epitheca. In both species, the epitheca is composed of four plates. In *Ceratium hirundinella*, all four plates extend to the tip of the apical horn. In *Ceratium*

furcoides, however, only three plates extend to the tip. However, this characteristic is very difficult to discern in living specimens. Therefore, the number of horns and the body shape are decisive. In *Ceratium hirundinella*, the hypotheca has three horns that form a wide angle with one another, whereas *Ceratium furcoides* has only two horns, with the longer one extending almost straight backward. Only rarely does a rudimentary, very small third horn develop in *Ceratium furcoides*. As a result, *Ceratium furcoides* has a slender, elongated body shape, while *Ceratium hirundinella* appears much more expansive and stocky.

The epitheca and the hypotheca are separated by a transverse groove called the cingulum. The transverse flagellum runs through this groove, where it performs a wave-like motion. In free-swimming specimens, it is difficult to see. A second, much longer trailing flagellum originates from the longitudinal sulcus, which has a complex structure in *Ceratium hirundinella*. This longitudinal trailing flagellum extends beyond the posterior horn and provides propulsion.

The theca of *Ceratium hirundinella* consists of cellulose and is composed of 16 plates. The plates exhibit a net-like pattern of depressions. In the region of the sulcus, there is an area where the two flagella emerge from a gap between the plates (s. fig. 5).

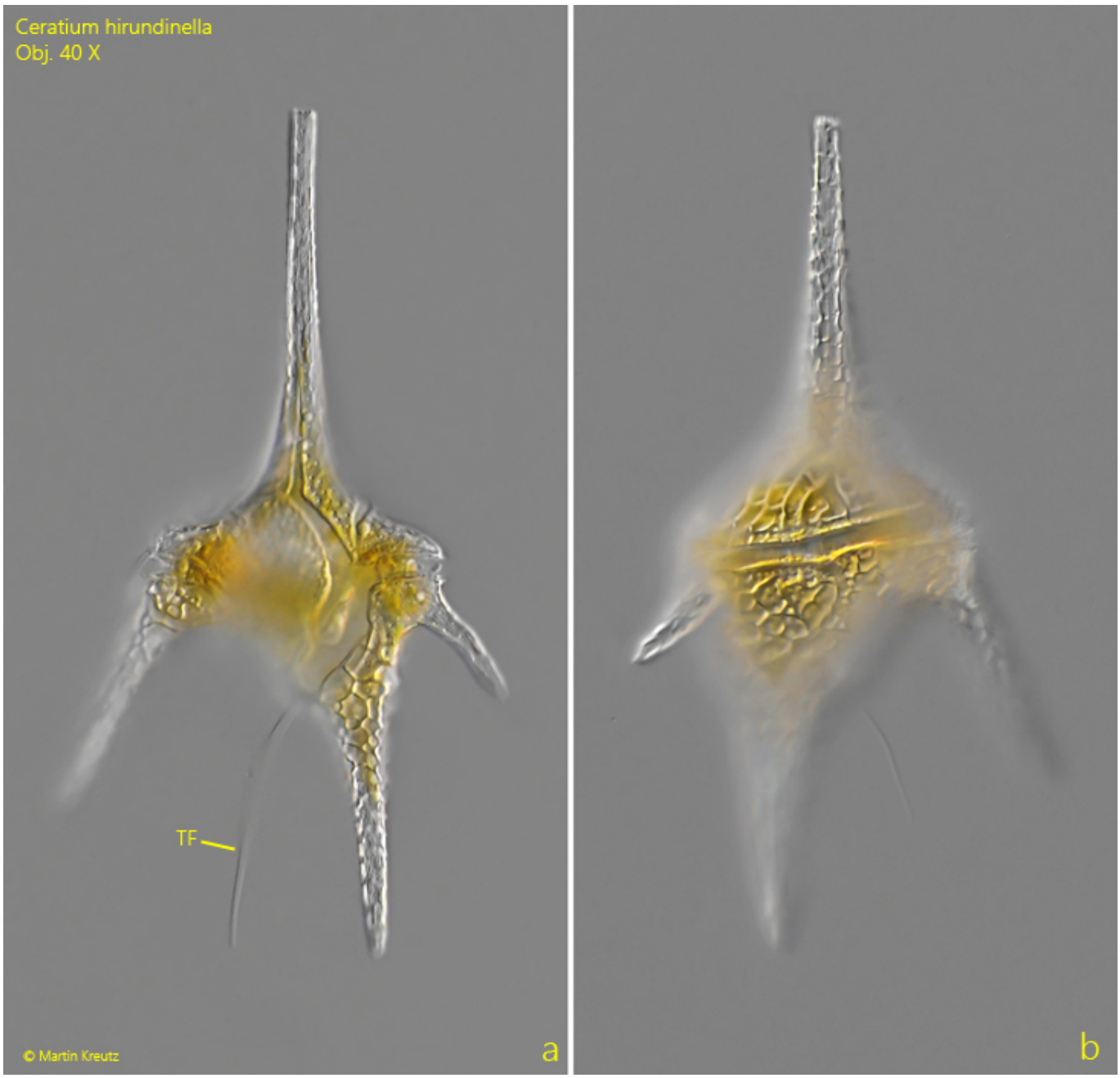


Fig. 1 a-b: *Ceratium hirundinella*. L = 194 µm. A freely swimming specimen from ventral (a) and dorsal (b). TF = trailing flagellum. Obj. 40 X.



Fig. 2: *Ceratium hirundinella*. L = 194 µm. The same specimen as shown in fig. 1 a-b at higher magnification from ventral. Obj. 60 X.

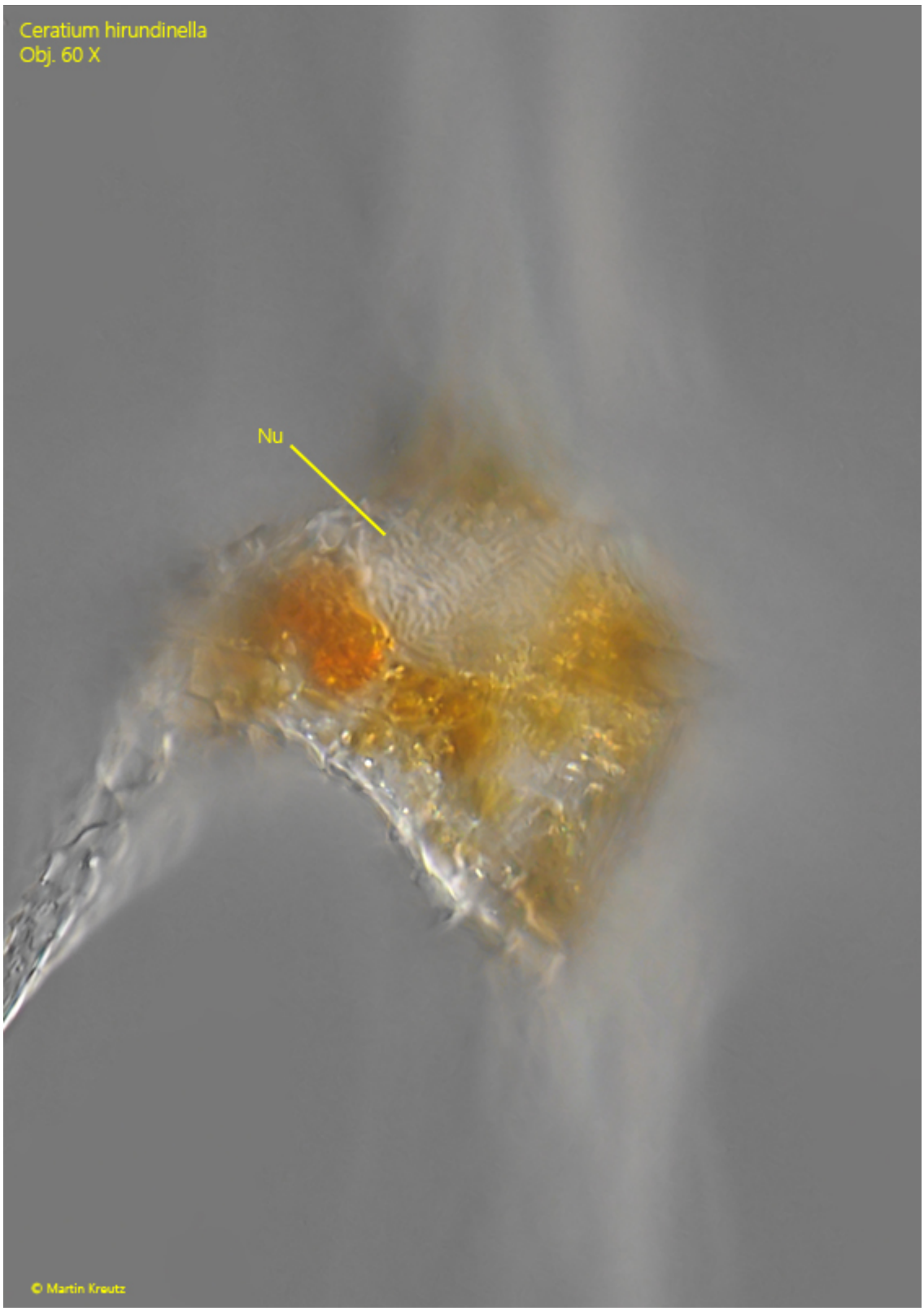


Fig. 3: *Ceratium hirundinella*. The large nucleus (Nu) is located beneath the apical horn. Obj. 60 X.



Fig. 4: *Ceratium hirundinella*. The disc-shaped chloroplasts (Chl) in a slightly squashed specimen. Obj. 60 X.



Fig. 5: *Ceratium hirundinella*. The transverse flagellum (TRF) in the cingulum (CIN) as well as the trailing flagellum (TF) arise from a ventral slit between two plates. Obj. 60 X.

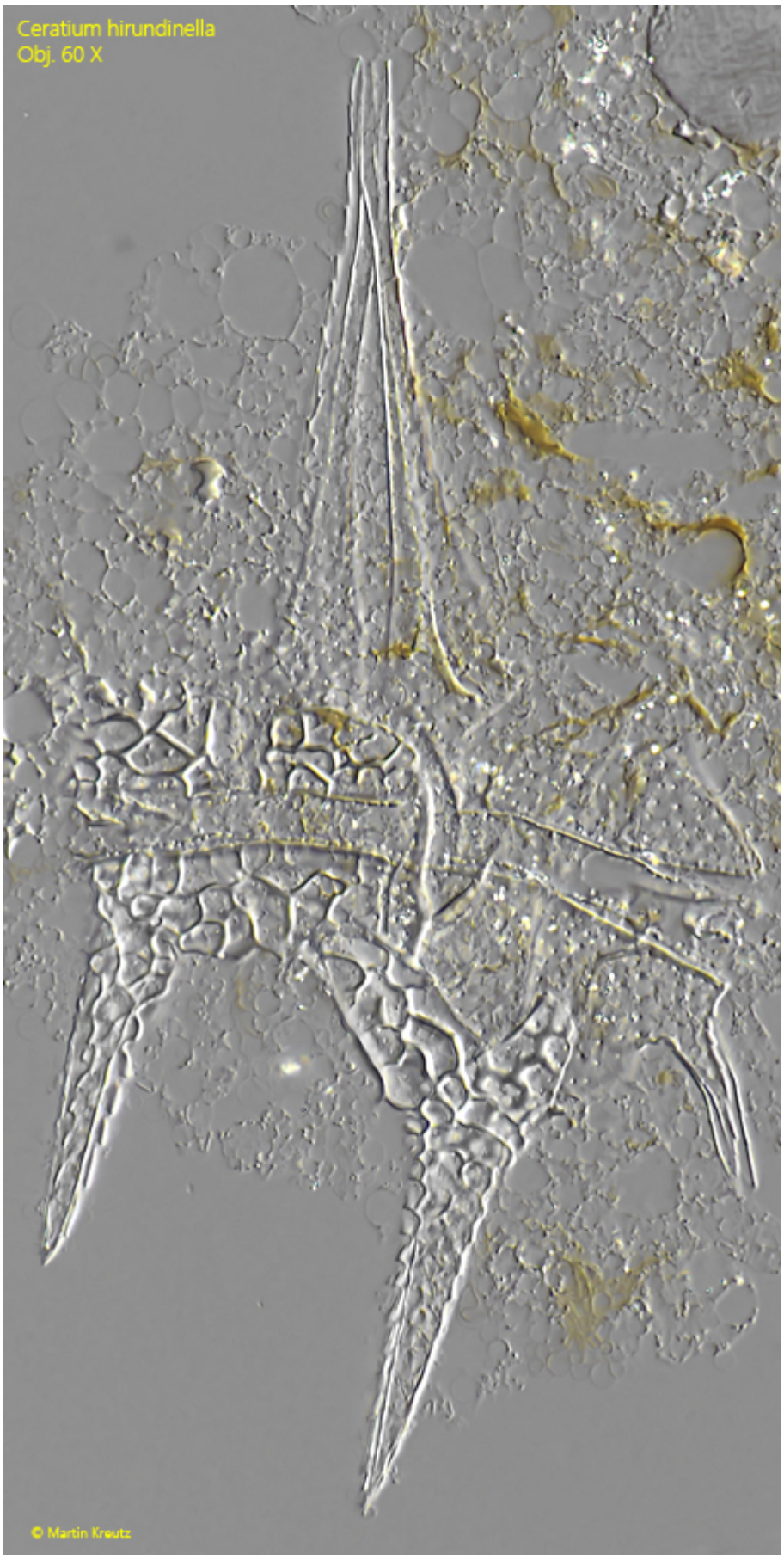


Fig. 6: *Ceratium hirundinella*. The reticulate pattern of the theca covering the body in a strongly squashed specimen. Obj. 60 X.