Asplanchna priodonta Gosse, 1850

Most likely ID: n.a.

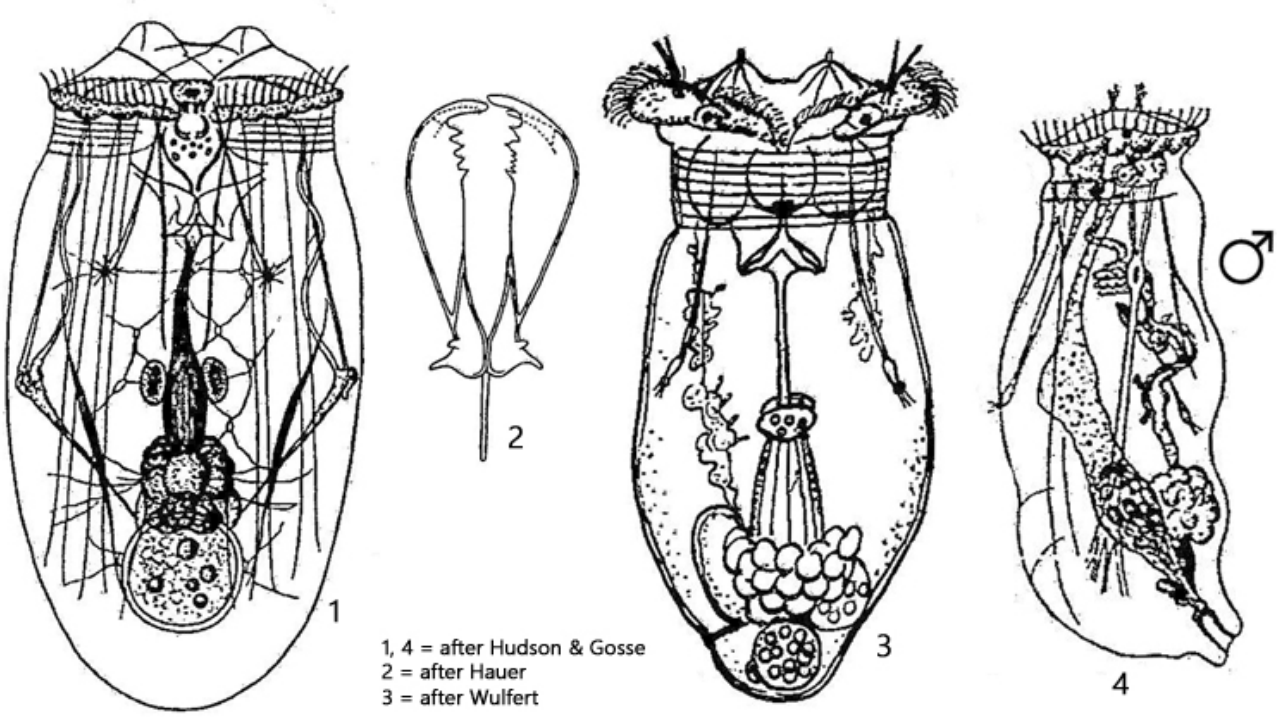
Synonym: n.a.

Sampling locations: Mühlhalden pond, Lake Constance, Pond of the waste disposal company Constance, Mühlweiher Litzelstetten, Hagstaffel pond

Phylogenetic tree: *Asplanchna priodonta*

Diagnosis:

- body sac-shaped, transparent and flexible
- well developed corona
- length 420–1500 µm
- vitellarium globular
- rami with 4–6 teeth at its anterior end
- one cerebral eyespot and two lateral eyespots
- foot absent
- intestine absent
- planktonic lifestyle



Asplanchna priodonta

Asplanchna priodonta is one of the most common planktonic rotifers and can be found in almost every lake or pond. Additionally, the species appears to be very adaptable regarding water quality.

For the identification of *Asplanchna priodonta*, the shape of the vitellarium and the precise shape of the pincer-shaped rami are important. The vitellarium is spherical and contains very large nuclei with a central nucleolus (s. figs. 4 and 5). The rami are very large, about 50 µm in length, and have distinct teeth on the inner margin (s. fig. 8). They serve to hold the prey and pull it into the pharynx. The similar species *Asplanchna girodi* has a horseshoe-shaped vitellarium, and the rami lack teeth on the inner side.

Due to its size and abundance, *Asplanchna priodonta* is very suitable for the study of the internal structure of rotifers. The organs in the body cavity are clearly separated from each other and can thus be more easily identified (s. fig. 4). In contrast to many other rotifers, however, *Asplanchna priodonta* lacks an intestine. Therefore, food digested in the stomach is expelled again through the esophagus and mouth opening, as there is no anus.

Asplanchna priodonta has a high reproduction rate, allowing habitats to be quickly

colonized and occupied. In asexual reproduction (parthenogenesis), unfertilized eggs from the ovary (hardly visible, attached to vitellarium) are supplied with nutrients by the vitellarium and released into the oviduct. There, the development into an embryo takes place through cell division and differentiation. In *Asplanchna priodonta*, several embryos are usually found in the oviduct, exhibiting different developmental stages (s. fig. 4). The closer they are to the vitellarium, the earlier and less mature the stage. Thus, embryonic development can be tracked like a string of pearls.

In some embryos at an early, few-celled developmental stage, I was able to observe condensed chromosomes that were about to be separated by the spindle apparatus (s. figs. 5. 6 and 7). In all cases, the cells in which this process occurred were very large. Whether this represents a meiotic reduction division to form haploid eggs during embryonic development or a mitotic cell division, I could not determine.

In rare cases, male specimens of *Asplanchna priodonta* are also found (s. fig. 9). These are about half the size of the female specimens and possess a greatly reduced set of organs. The entire digestive system is absent, and essentially only the seminal vesicle, penis, and urinary bladder are present. The male specimens do not consume any food during their lifetime.

More images and information on *Asplanchna priodonta*: Michael Plewka-Freshwater life-*Asplanchna priodonta*

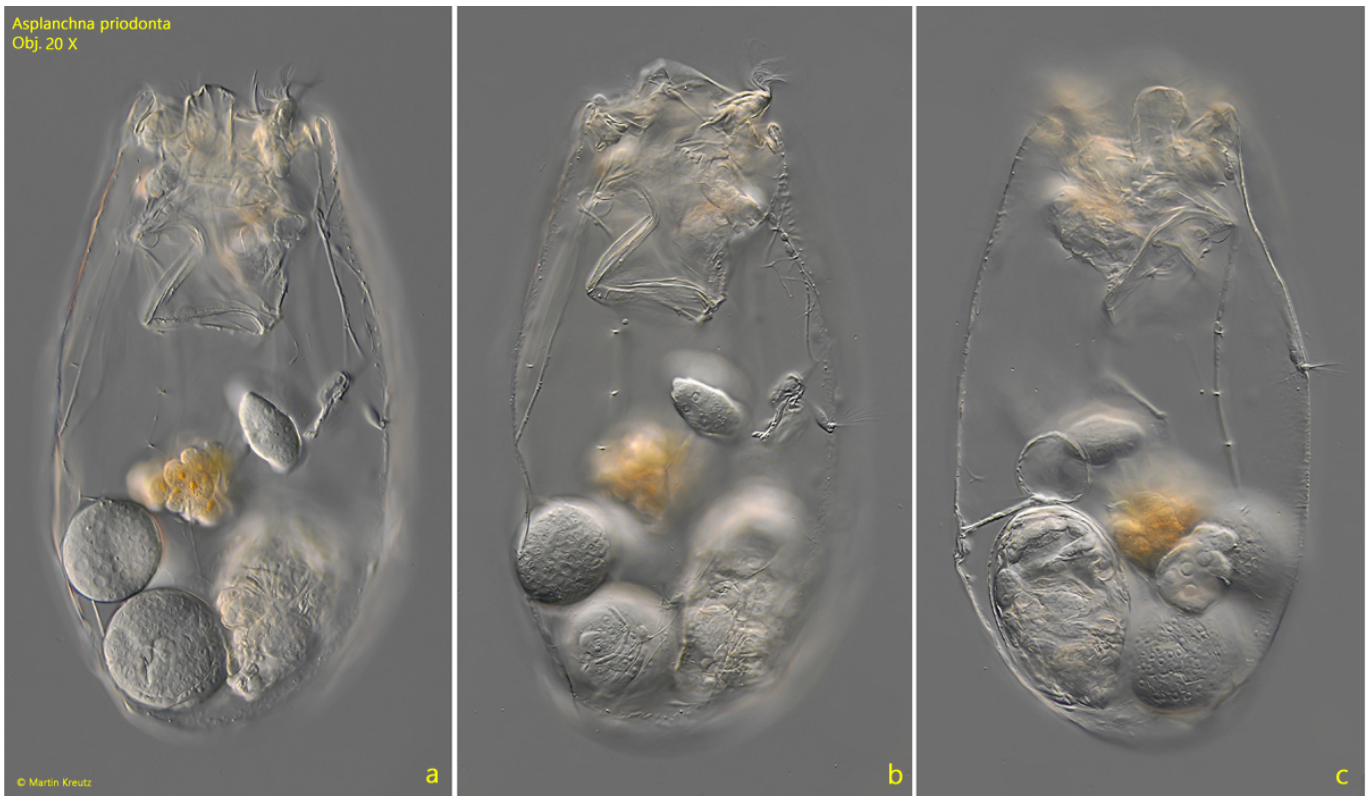


Fig. 1 a-b: *Asplanchna priodonta*. L = 595 µm. Different focal planes of a freely swimming specimen. Obj. 20 X.

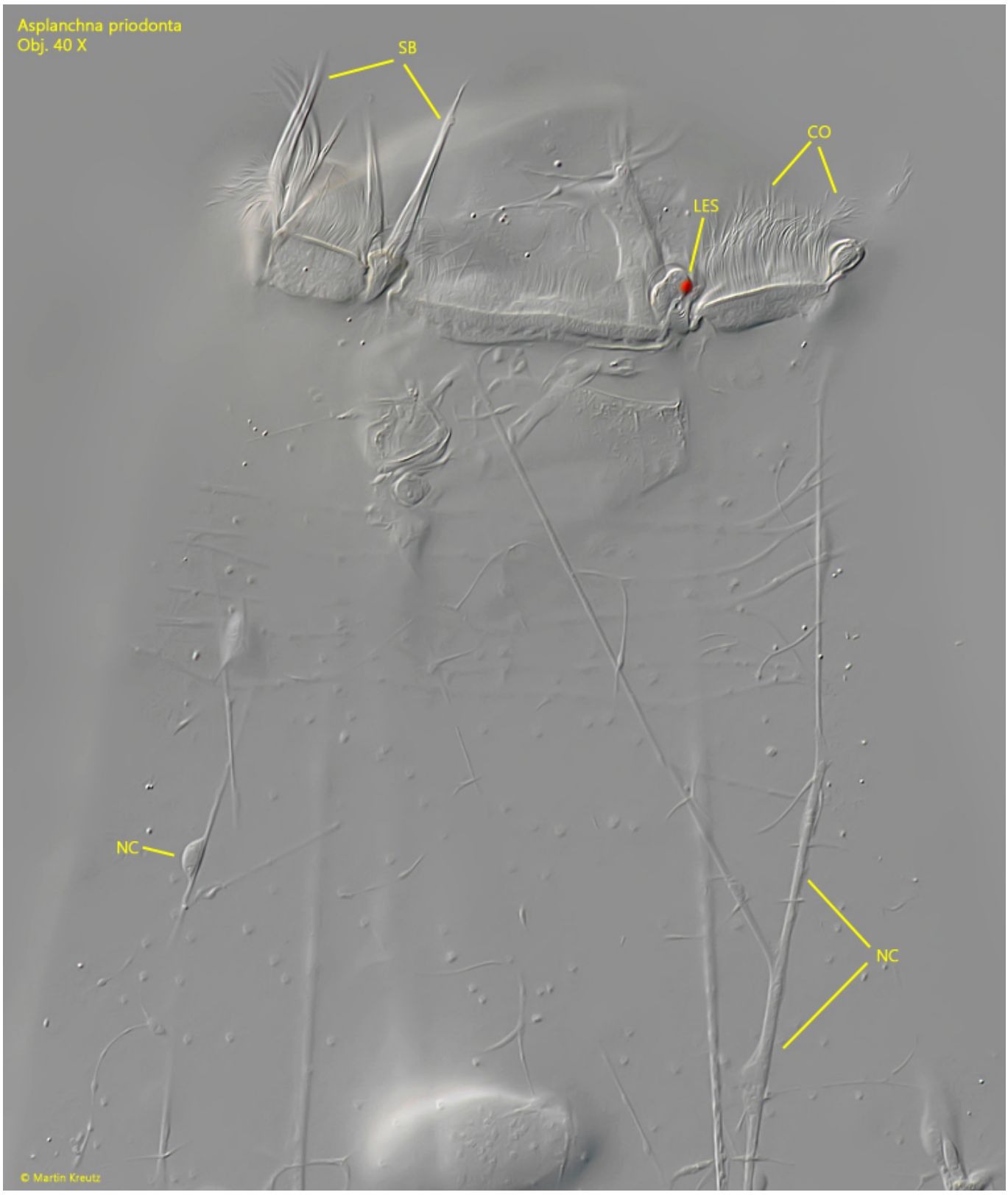


Fig. 2: *Asplanchna priodonta*. L = 595 µm. Detail of the circular corona (CO) with sensory bristles (SB). One of the two lateral eyespots (LES) is visible. Some nervecells (NC) are visible through the transparent cuticle. Obj. 40 X.

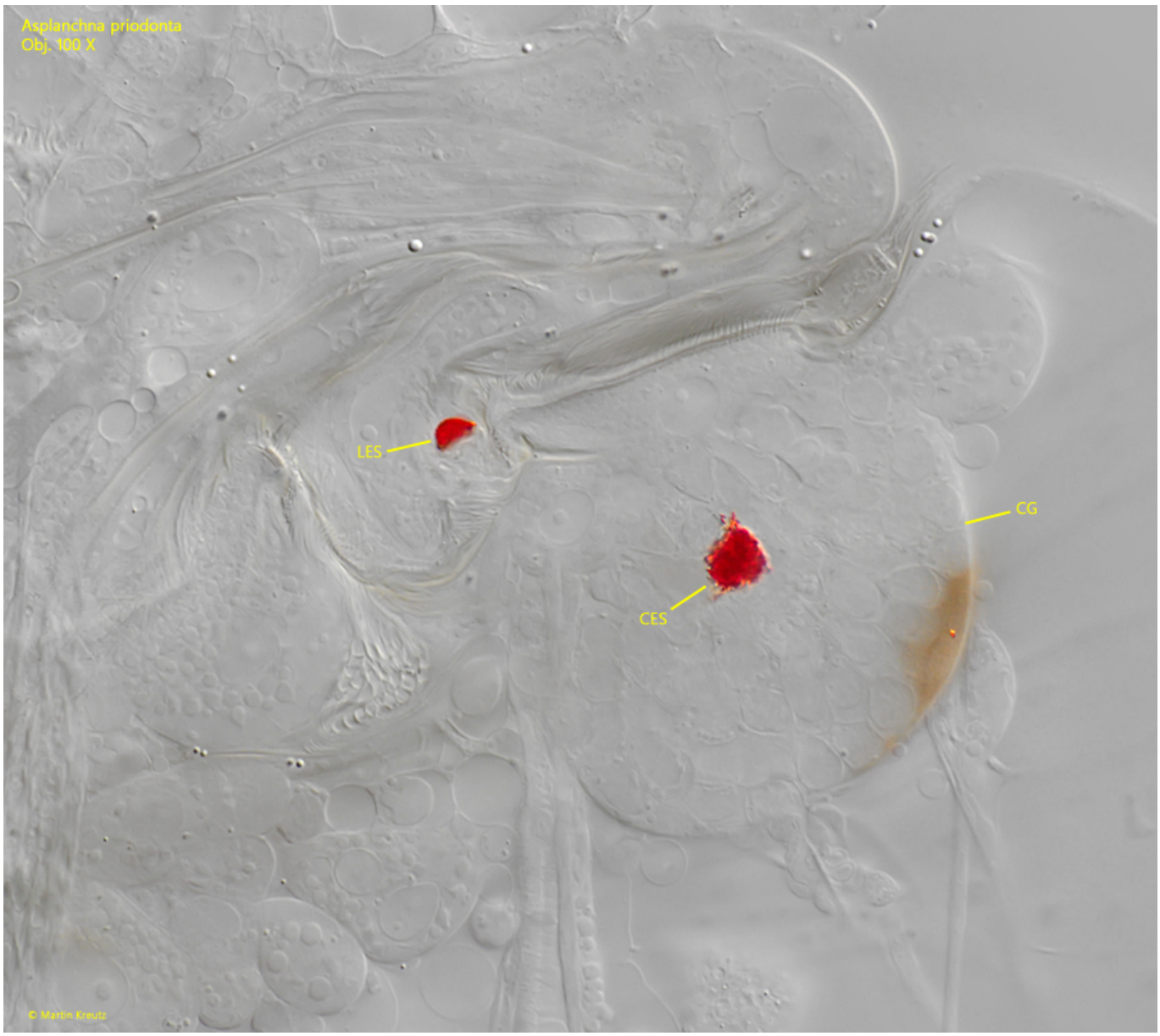


Fig. 3: *Asplanchna priodonta*. In a squashed specimen the cerebral eyespot (CES) is visible as part of the cerebral ganglion (CG). One of the two, smaller lateral eyespots (LES) is also visible. Obj. 100 X.

Fig. 4: *Asplanchna priodonta*. The internal organs are clearly separated from each

other and can thus be easily identified. The stomach (ST) has a pair gastric glands (GG), one of which is visible. The vitellarium (Vit) is globular and has very large cell nuclei with a central nucleolus. Below it, three embryos (EM 1–EM 3) at different developmental stages can be seen. The birth of the differentiated embryos takes place through the cloaca (CLO), where the urinary bladder (BL) is also located. ES = esophagus. Obj. 40 X.

Fig. 5: *Asplanchna priodonta*. In some embryos, condensed chromosomes can often be observed in the early stages of development, which are separated by the spindle apparatus (arrow). It is unclear whether this is a mitotic or meiotic cell division. Obj. 100 X.

Fig. 6: *Asplanchna priodonta*. A second embryo with condensed chromosomes. Obj. 40 X.

Fig. 7: *Asplanchna priodonta*. A third embryo with two cell divisions in progress (arrows). Obj. 100 X.

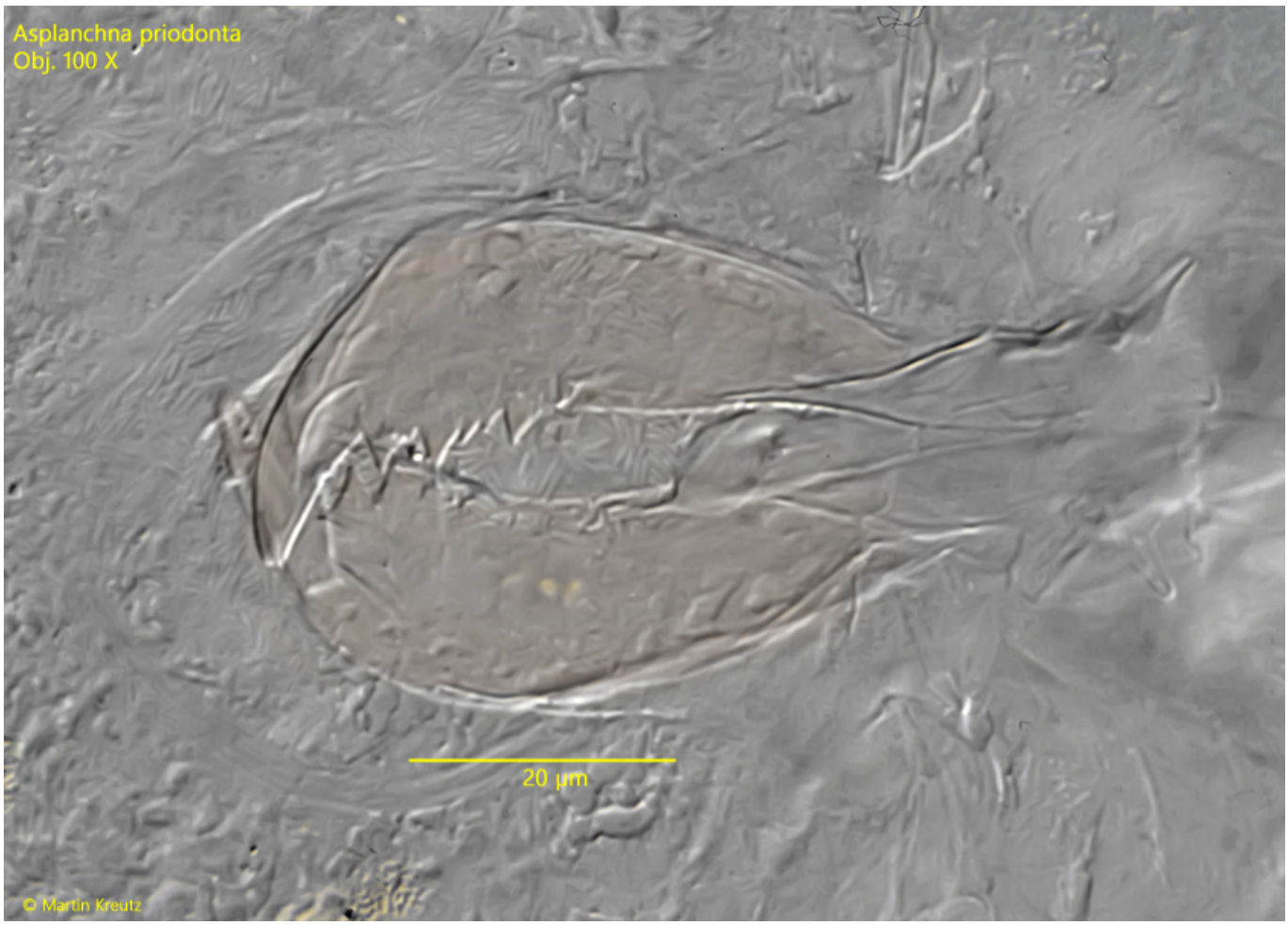


Fig. 8: *Asplanchna priodonta*. The two pincer-shaped rami with teeth on the inner margin. Obj. 100 X.

Fig. 9: *Asplanchna priodonta*. L = 335 µm. A male specimen. Note that the male specimens lack all internal organs except for the seminal vesicle and urinary bladder. They do not take in any food during their lifetime. Obj. 20 X.