Arachnomyxa cryptophaga Hess, 2017

Most likely ID: n.a.

Synonym: n.a.

Sampling location: Simmelried

Phylogenetic tree: *Arachnomyxa cryptophaga*

Diagnosis:

- cells variable in shape, often spherical, fan-shaped or fusiform
- numerous long filopodia
- diameter about 15–30 µm
- cytoplasma filled with orange or brick-red droplets
- invading volvocalean algae (e.g. *Eudorina* or *Volvox*)
- one nucleus (about 3 µm) with central nucleolus
- digestive cysts, yellowish, 13–38 µm

No drawings from previous authors available.

I found *Arachnomyxa cryptophaga* for the first time in 1999 in the Simmelried and was also able to document parts of its life cycle. After that I had regular records of Arachnomyxa cryptophaga in this area. However, I could not assign this amoeba and I have never been able to find *Arachnomyxa cryptophaga* in my other localities.

In 2017 Hess isolated *Arachnomyxa cryptophaga* from samples taken from the Simmelried and examined the amoeba in detail. Based on the life cycle and genetic analyses, it turned out to be a previously undescribed species, which was then given the name *Arachnomyxa cryptophaga*.

According to Hess' investigations, *Arachnomyxa cryptophaga* is a leptophryid

amoeba. These differ from other vampyrellid amoebae in that they do not perforate and suck out algal cells, but phagocytize the cells completely. *Arachnomyxa cryptophaga* specializes in planktonic, volvocalean algae such as *Eudorina*, *Volvox*, *Gonium* or *Pleodorina*.

In samples from the Simmelried, I have so far only been able to observe *Arachnomyxa cryptophaga* during phagocytosis of *Eudorina elegans*. At first *Arachnomyxa cryptophaga* docks onto the mucous sheath of *Eudorina elegans* and begins to extend fine filopodia that can penetrate the sheath (s. fig. 2 a-b). Before the amoeba penetrates the lumen of the colony, it first extracts one of the algal cells and phagocytizes it while it is still outside the colony, as Hess was able to demonstrate. Only then does *Arachnomyxa cryptophaga* enter the colony and begin to phagocytose further algal cells. A short time later, encystment begins to form digestive cysts. The phagocytosed algae cells in the digestive cysts turn yellowish in color. Within these digestive cysts, *Arachnomyxa cryptophaga* then divides into 2–4 daughter cells, which leave the cyst and then invade further colonies of *Eudorina elegans*. I have observed several very heavily infested colonies of *Eudorina elegans* in which all the algal cells were phagocytized by *Arachnomyxa cryptophaga*. These heavily infested colonies are then intensely orange and brown in color (s. figs. 3 and 4) . In old samples, in which *Arachnomyxa cryptophaga* can grow unhindered, practically all colonies of *Eudorina elegans* will be infested.

More images and information on *Arachnomyxa cryptophaga*: Prof. Sebastian Hess: Hunting for agile prey-trophic specialisation in leptophryid amoebae (Vampyrellida, Rhizaria) revealed by two novel predators of planktonic algae.

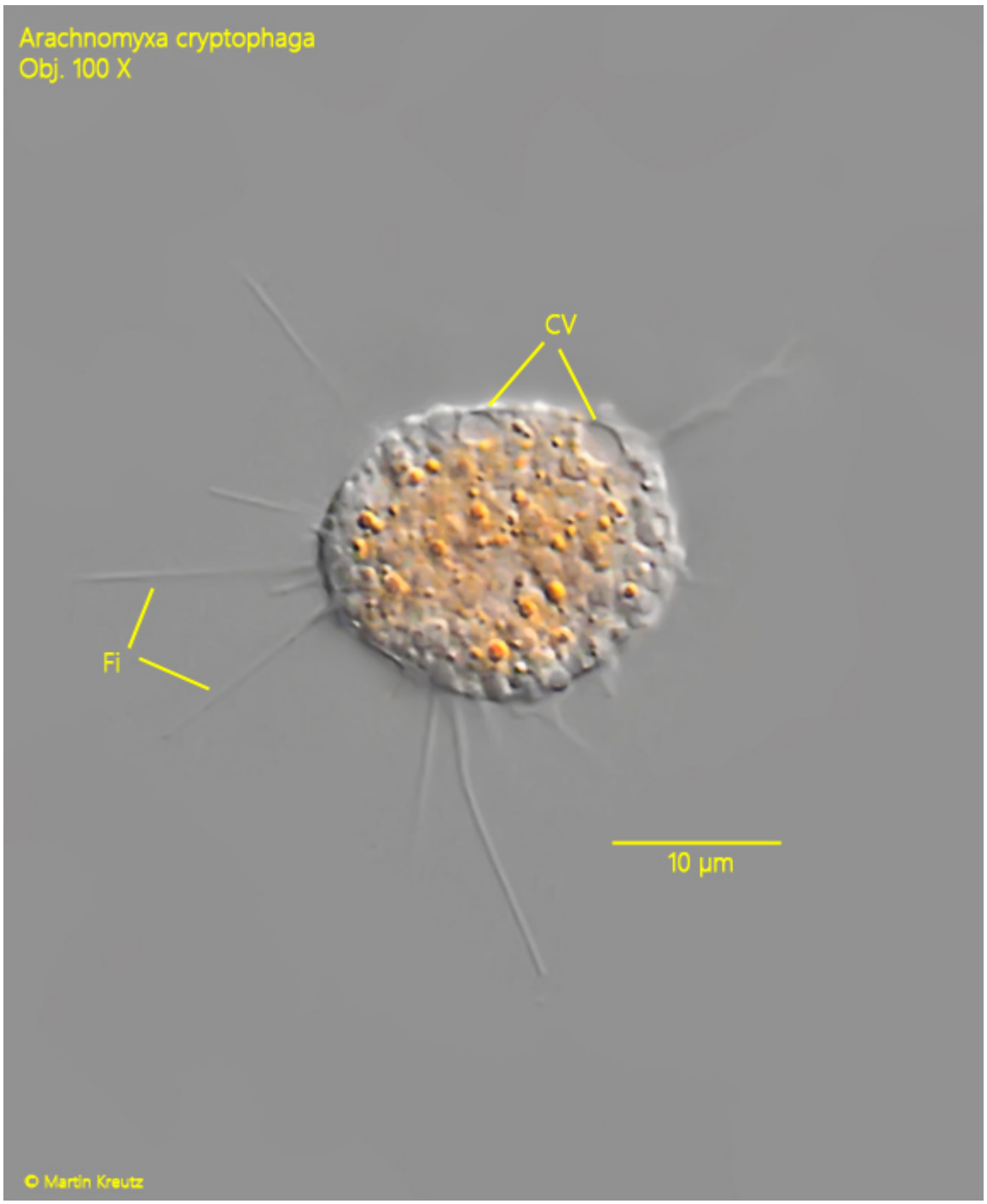


Fig. 1: *Arachnomyxa cryptophaga*. D = 21 µm (without filopodia). A freely moving specimen. CV = contractile vacuoles, Fi = filopodia. Obj. 100 X.

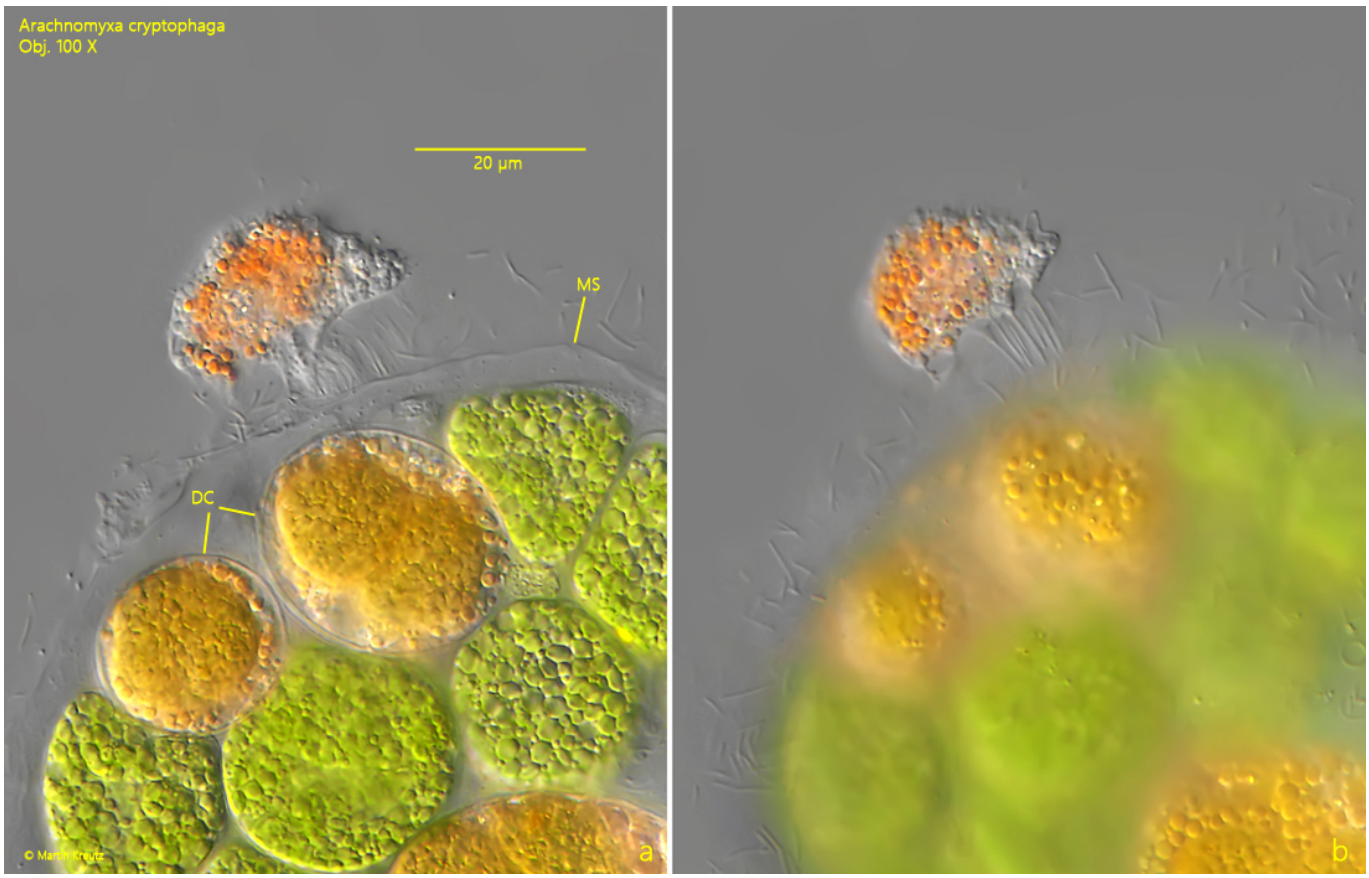


Fig. 2 a-b: *Arachnomyxa cryptophaga*. D = 27 µm (without filopodia). A specimen on the outer mucous sheath (MS) of *Eudorina elegans* tries to invade the colony. Note the yellowish colored digestive cysts (DC) of specimens that have previously invaded and encyst after phagocytosis of algae cells. Obj. 100 X.



Fig. 3: *Arachnomyxa cryptophaga*. A colony of *Eudorina elegans* in which all cells have been phagocytized and digestive cysts have formed (1) in direct comparison with an uninfested colony (2). Obj. 100 X.



Fig. 4: *Arachnomyxa cryptophaga*. A colony of *Eudorina elegans* under attack of several specimens. Several yellowish colored digestive cysts have already been formed. Obj. 100 X.

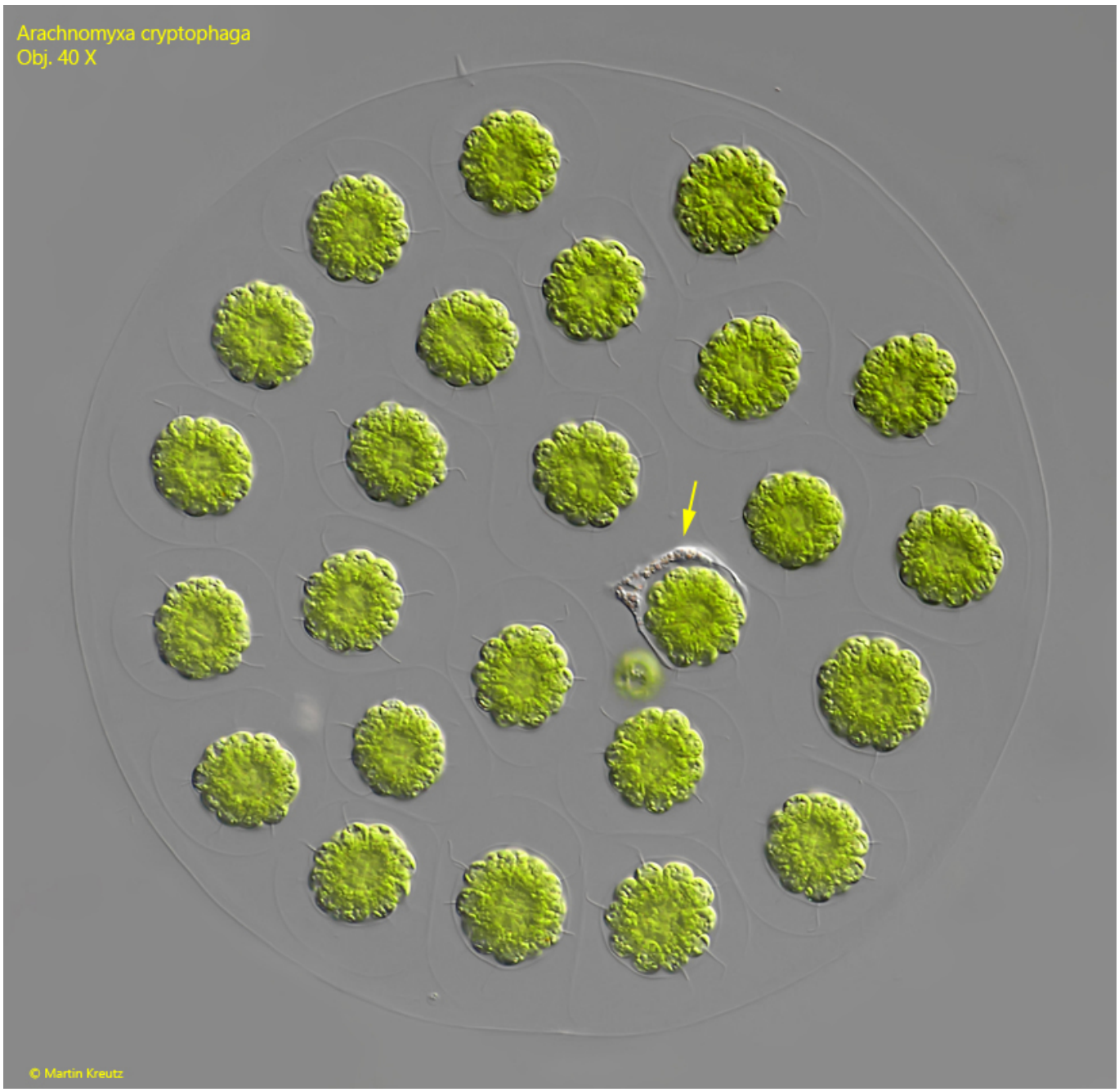


Fig. 5: *Arachnomyxa cryptophaga*. A specimen has entered a colony of *Eudorina elegans* a try to ingest one of the daughter colonies (arrow). Obj. 40 X.