

Chapter 4

Soil Food Web Microorganisms

Lecture 20 - Protozoa

Protozoa:

Flagellates

Amoebae

Ciliates

Protozoan Functions Chart

Protozoan Functions	Explanation
Reproduction	Protozoa are single-celled microbes, which reproduce by binary fission. A reproductive cycle can be as short as 8 hours. In less than optimal conditions, reproduction will take much longer.
Consumption of Prey	Protozoa eat bacteria and release excess soluble nutrients into the soil solution. Classic predator-prey cycles can be demonstrated with bacteria and protozoa. As bacteria begin to exponentially increase, protozoa will begin to reproduce as well, given the increase in their prey group. Eventually, protozoan predation will outstrip bacterial reproduction rates, resulting in diminishing bacterial biomass. As bacterial numbers fall below the level where the protozoan population can be maintained, protozoa will typically encyst. As protozoan numbers reach a minimum level, bacterial numbers will begin to increase again as predation by protozoa no longer impacts the bacterial numbers. The cycle will repeat until, given a long enough time, a stable equilibrium of bacterial and protozoan populations will occur. Reducing disturbance is, therefore, an important factor in being able to predict the amount of nutrient cycling that will provide plants with needed soluble nutrients.

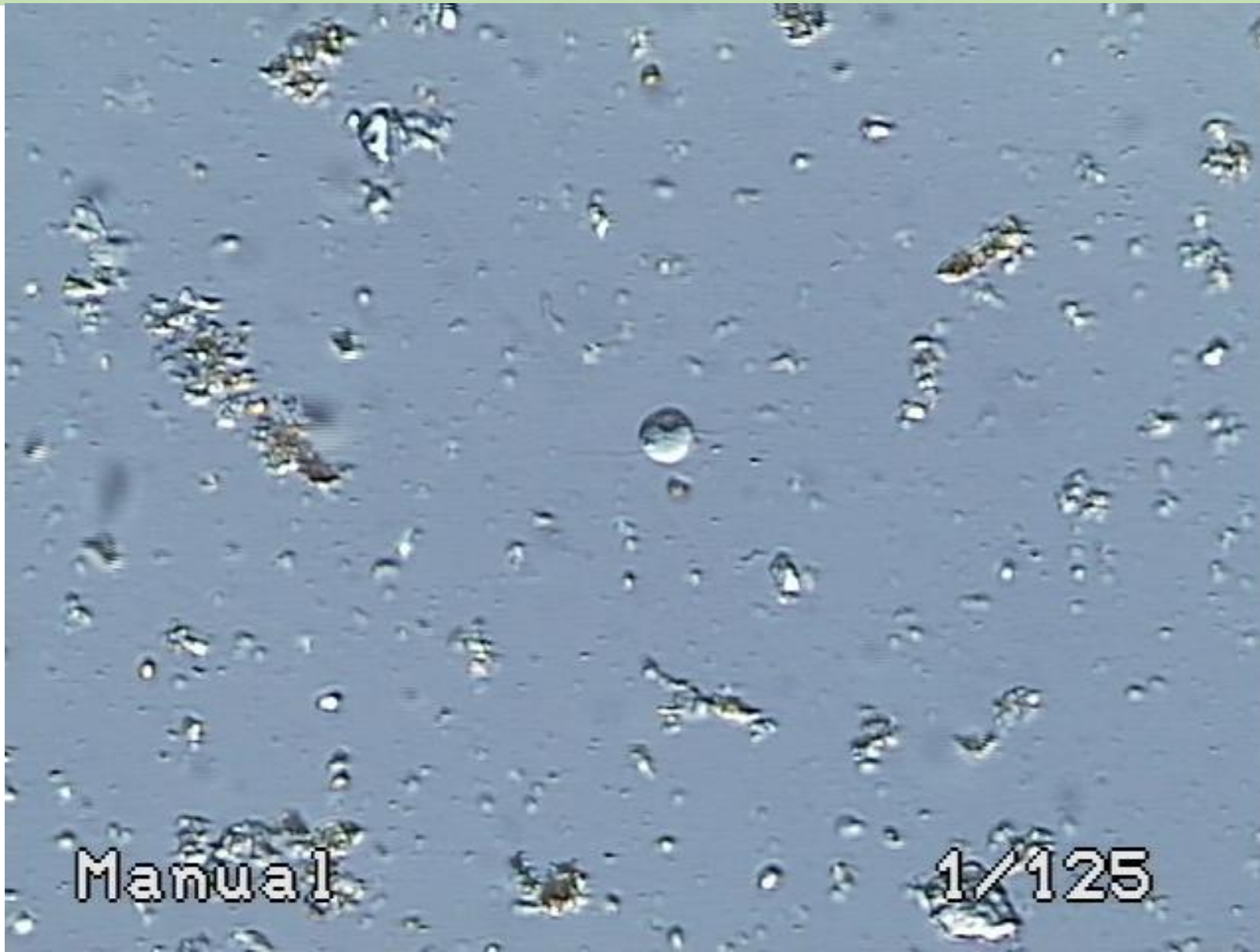
Protozoan Functions Chart

Protozoan Functions	Explanation
C:N	Protozoa have a C:N around 30:1. Thus most bacteria contain more nutrients, of all types, than the protozoa needs and the protozoan will release these nutrients in a soluble, inorganic form.
Predation	Protozoa are eaten by micro- and macro-arthropods, earthworms and possibly bacterial-feeding nematodes or other large predators in the terrestrial system. Protozoa have preferred prey items, and predators of protozoa show preferences as well. The importance of these preferences have not been determined.
Dormancy	Protozoa form cysts to escape harmful conditions. Flagellates tend to form cysts the same size as the active cell, and generally have a single wall with no ornamentation. Amoeba cysts are usually slightly larger than flagellates cysts, and have a double wall, often with the outer wall showing ornamentation. Ciliate cysts are typically larger, have a single wall, with no ornamentation. Protozoan cysts don't appear to be as robust as fungal or bacterial spores presumably because the cyst walls aren't structurally as thick as spore walls. Thus, protozoan cysts do not survive long in soil, perhaps only 3 to 9 months at best.

Protozoa

Flagellates

Flagellates, soil bacteria – 400X Total mag.



Manual

1/125

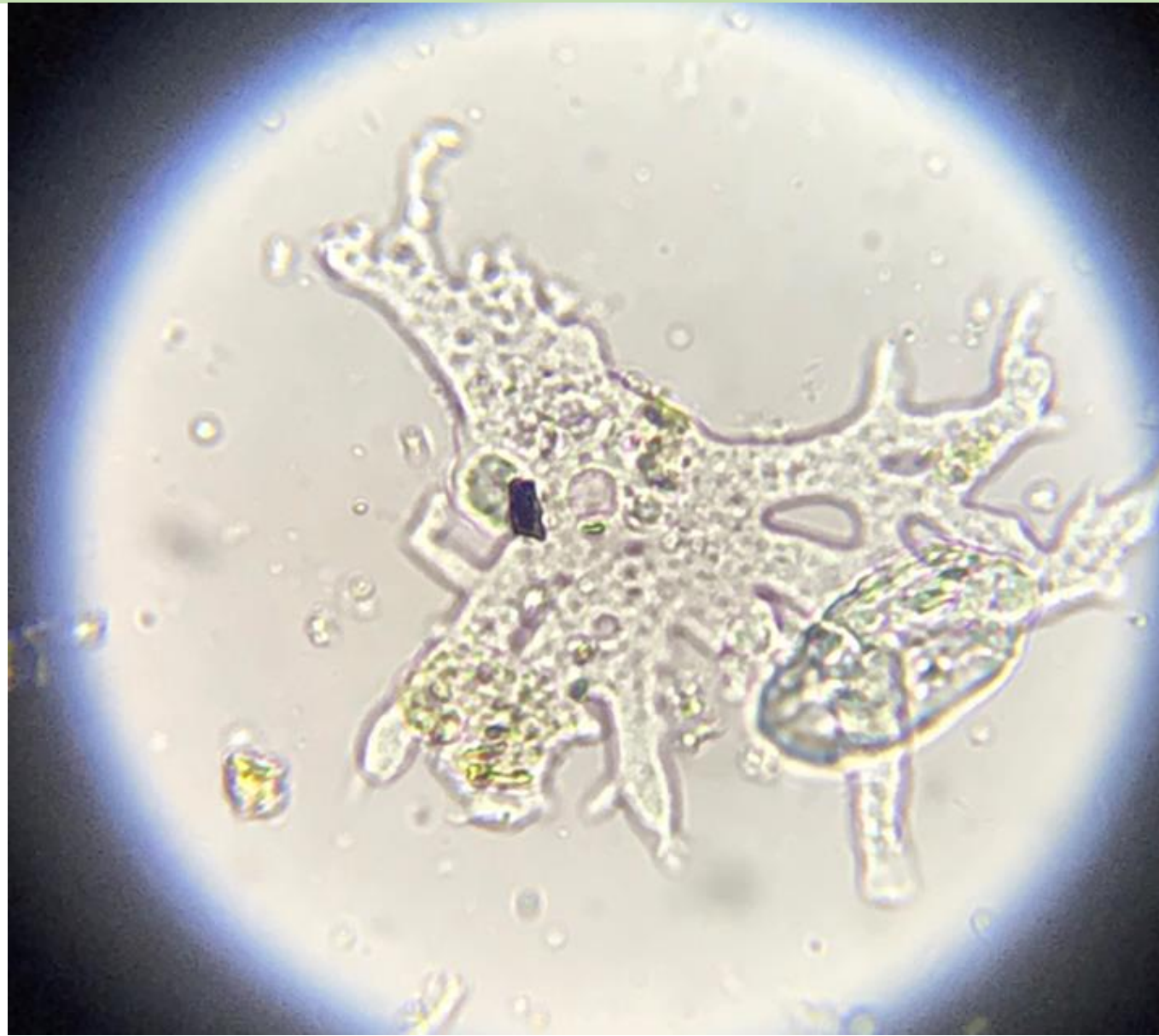
Flagellate



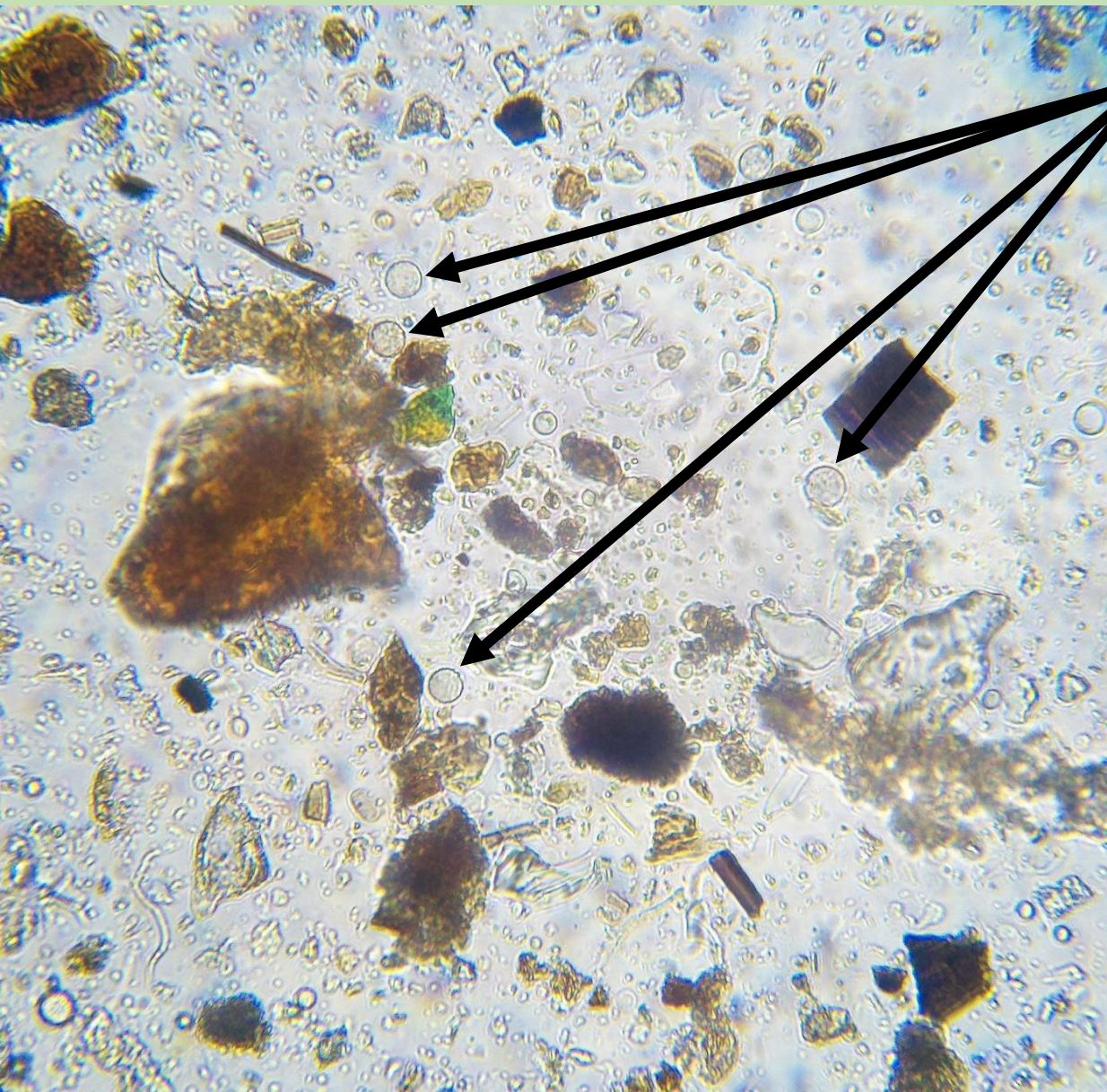
Protozoa

Amoebae

Amoeba



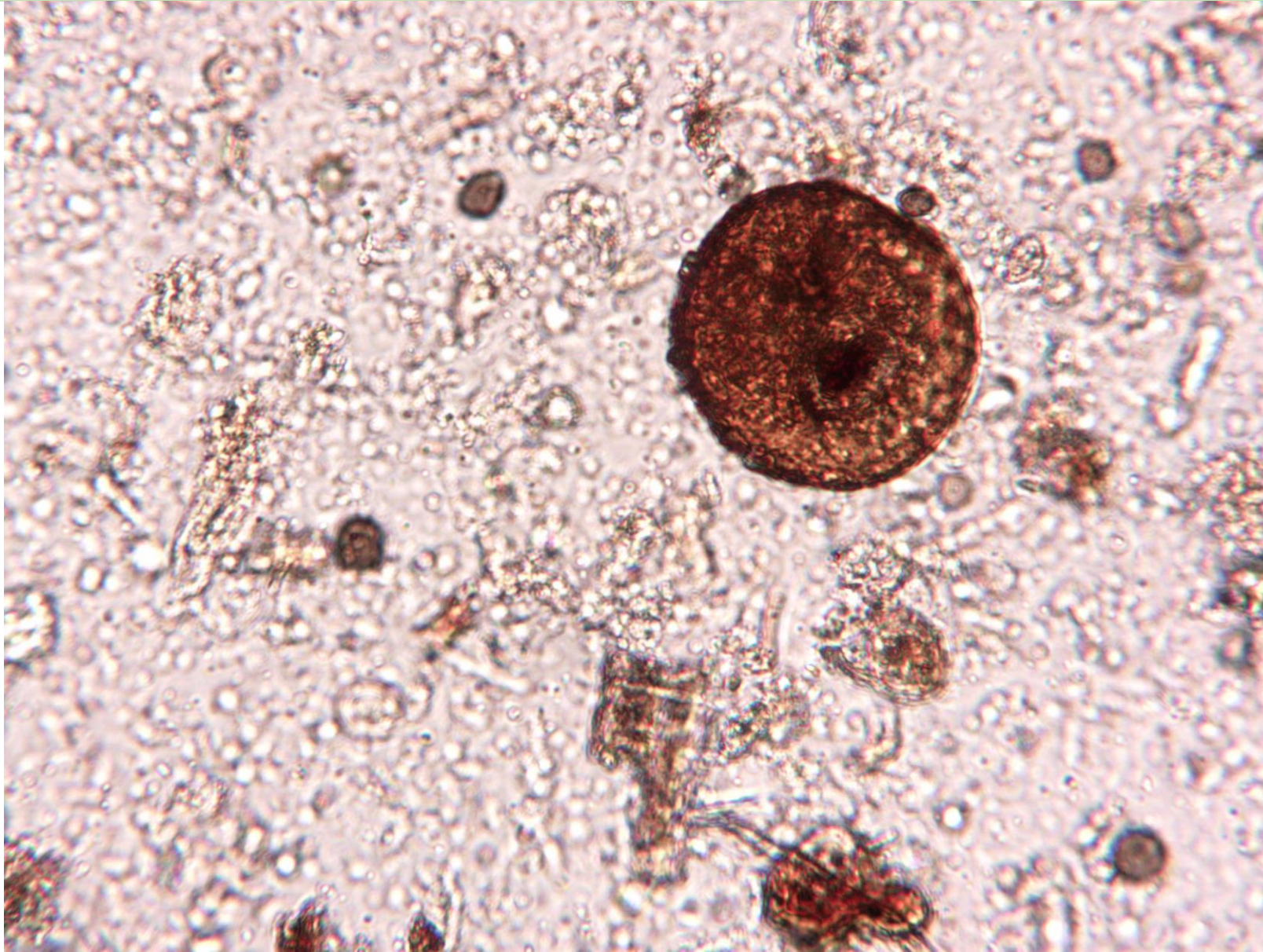
Cercozoa



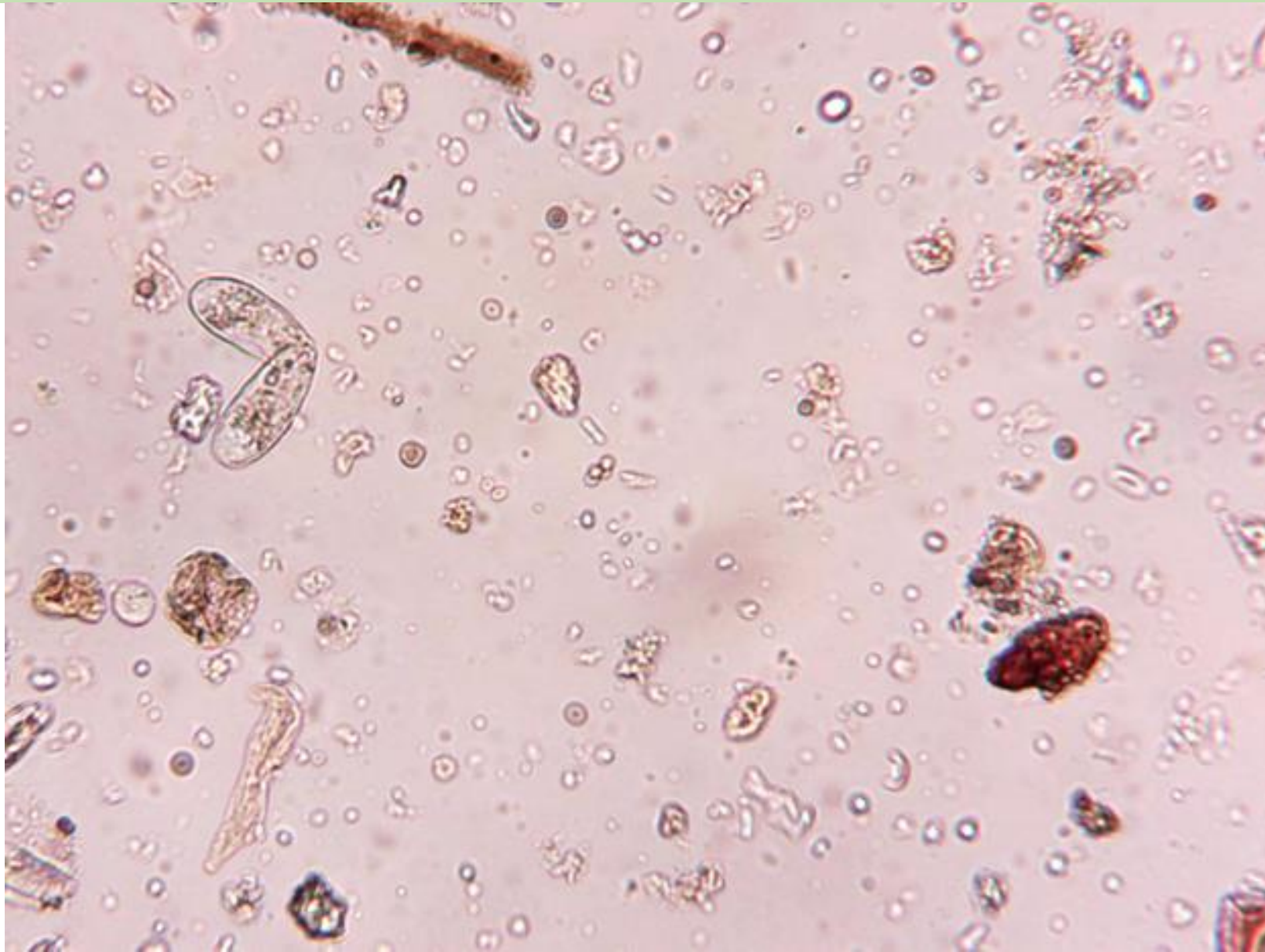
Cercozoa – A type of amoeba, with pseudopods that slowly, slowly extend, but no more than 1 – 2 micrometers from the body.

Looks a great deal like a flagellate cyst, except there is clearly cytoplasm actively moving inside the cell. There are several flagellate cysts in the picture too

Arcella Amoeba



Testate Amoebae

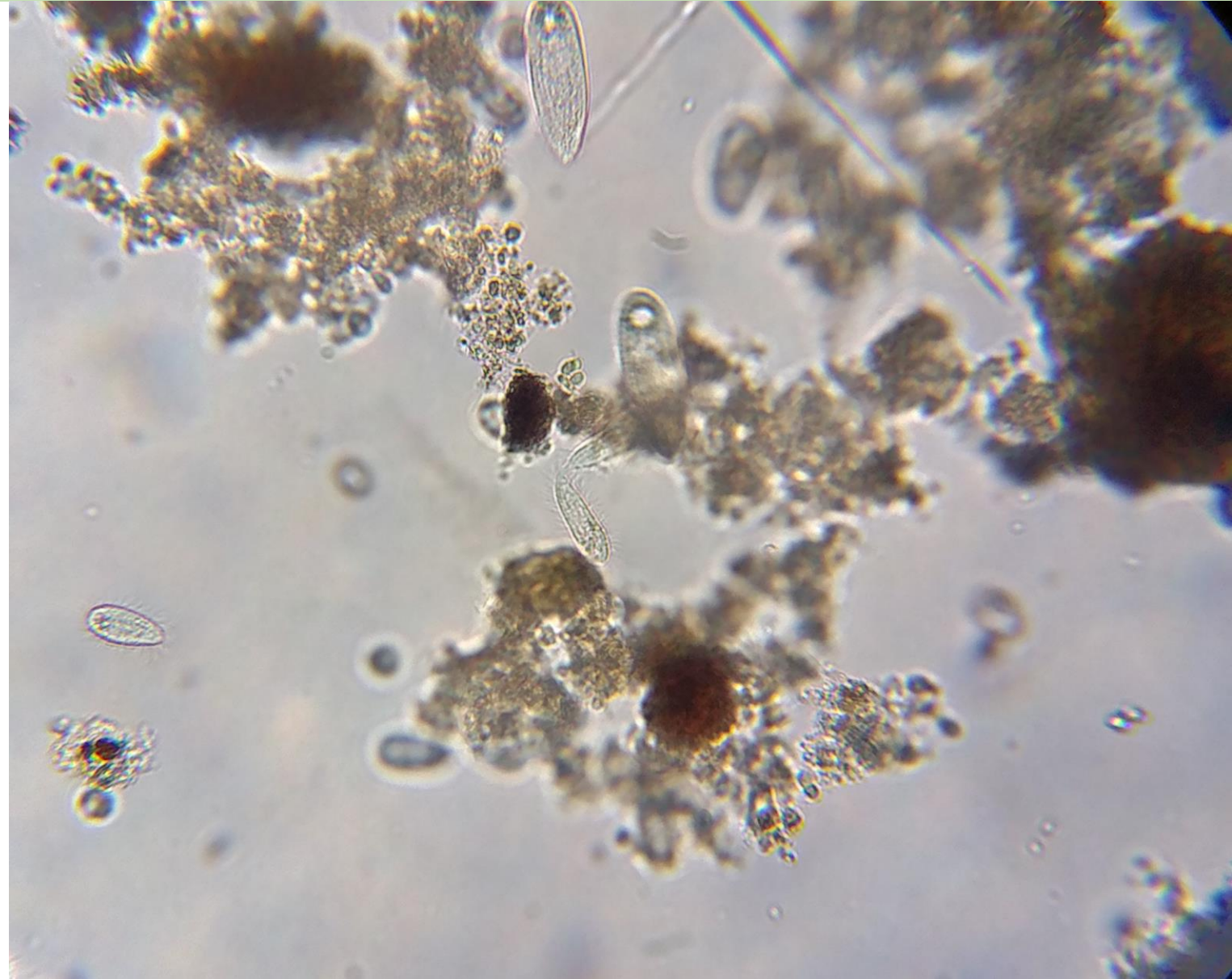


Protozoa

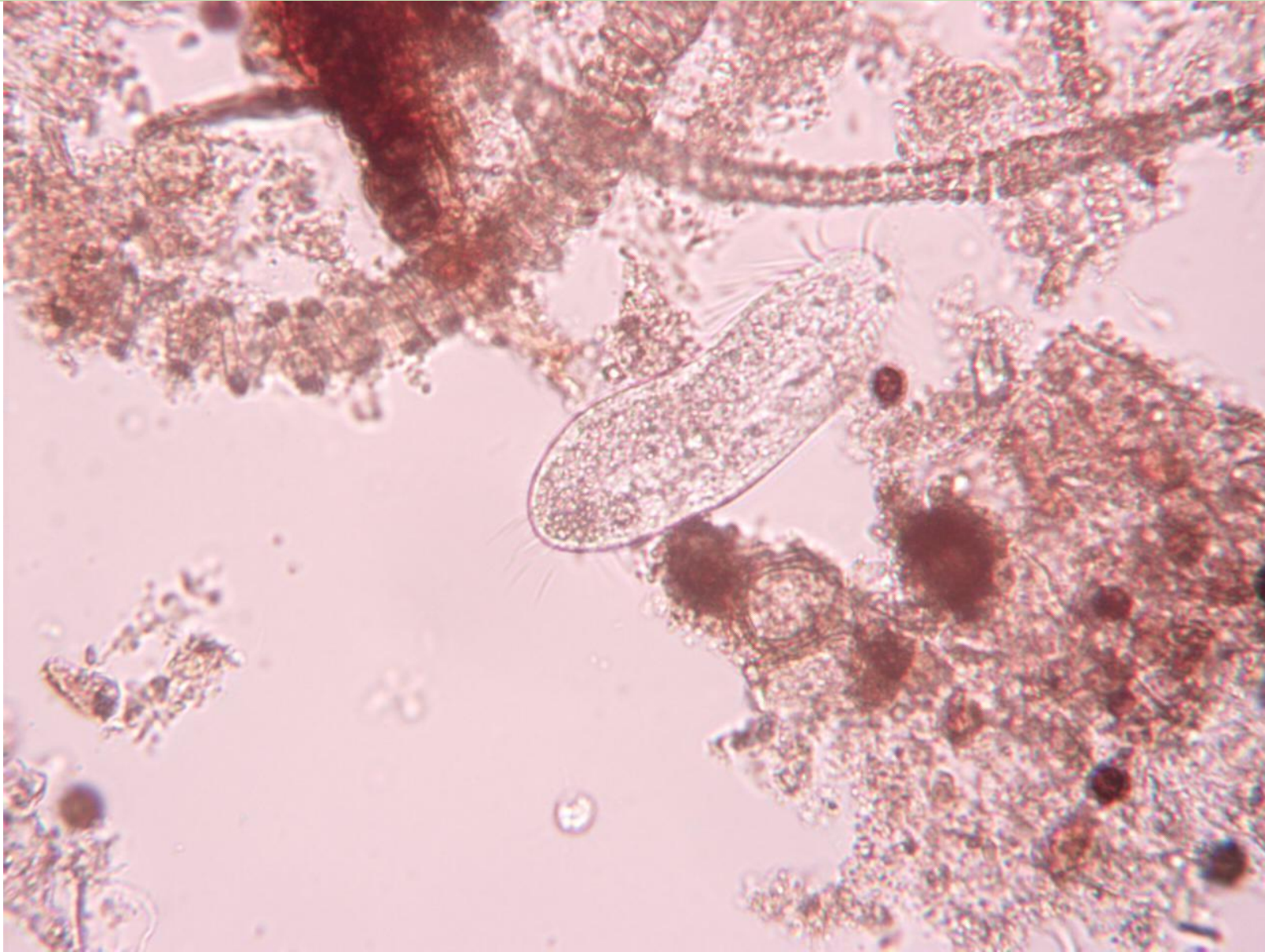
Ciliates

Ciliates

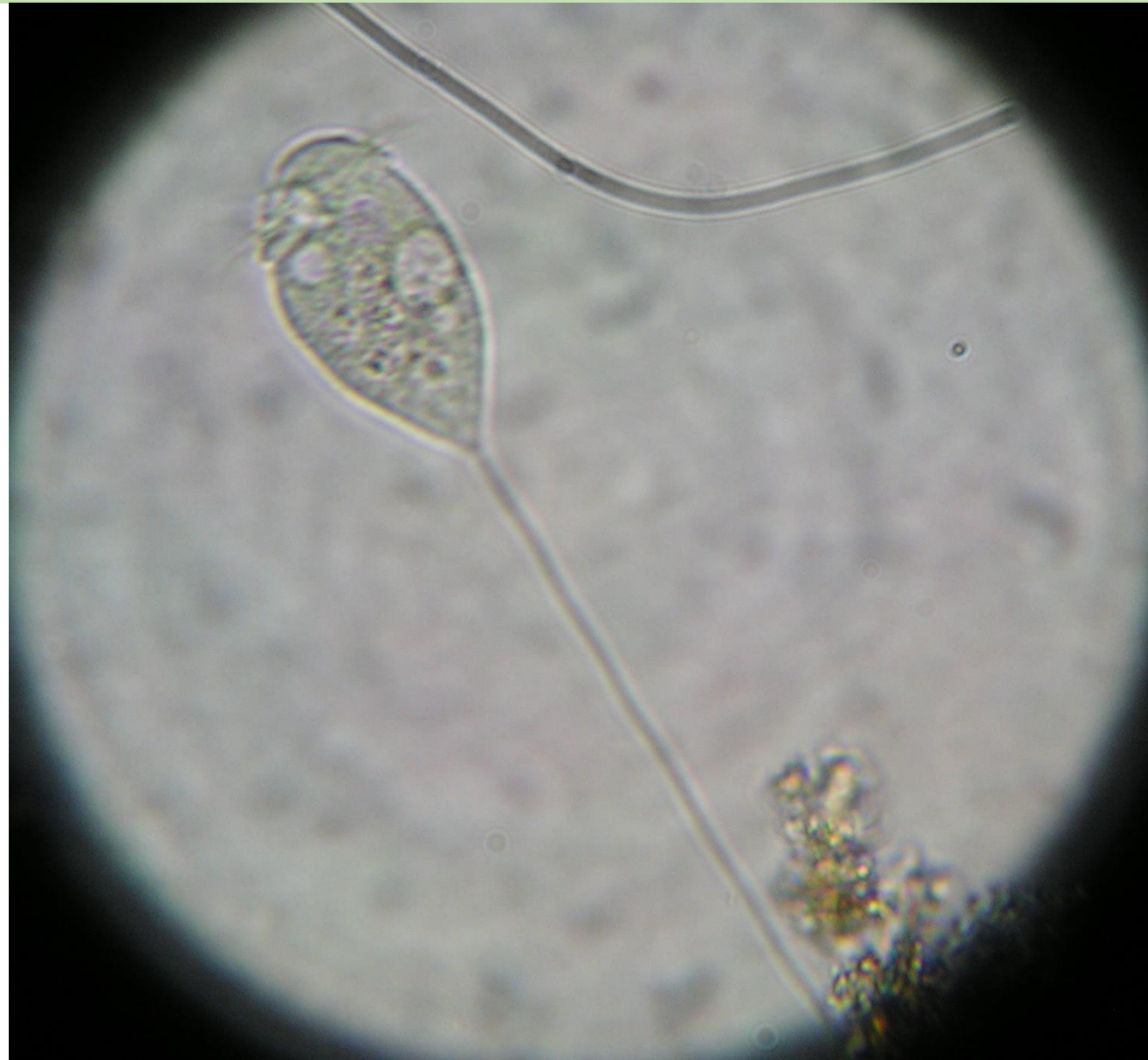
Ciliates of several species,
but they all indicate the same
thing.....



Ciliates



Stalked Ciliate



Stalked Ciliate

