Crawling ciliates are small oval or pear-shaped protozoa that contain a variety of hair-like protrusions (called cilia or cirri) distributed over their bodies. The term ‘ciliate’ comes from the Latin word for eyelash.

Ciliates have a tough and flexible outer shell called a pellicle, which helps to keep their shape. The cilia protrude through this structure in a variety of patterns depending on the species. Some ciliates have specialised cilia (cirri) that function like legs and allow the bacteria to ‘crawl’ over the floc and kick the surrounding bacteria towards their mouth cavities. The mouth cavity or cytosome of a crawling ciliate also often surrounded by a different type of cilia that beats the surrounding water and allow the bacteria to be sucked into the cytosome.

For crawling ciliates to be dominant they generally require large floc structures that impede predator movement (free swimming ciliates and flagellates) and allow the ciliate a surface to ‘crawl’ across. Typically this is characteristic of low F:M ratio conditions where floc bacteria have started to form dense clusters. Crawling ciliates generally also prefer higher concentrations of dissolved oxygen in the mixed liquor. As such, they can be very good indicators of adequate oxygen content in the system.

Crawling ciliates are very common in activated sludge systems with numbers ranging from 1,000 to 100,000 organisms per millilitre when conditions are right.

Crawling ciliates generally feed on bacteria and single celled organisms. Much like the rotifer, they are a grazing protozoa and function to reduce the TSS and turbidity levels of the effluent by consuming loose bacteria.

They are quite sensitive creatures and typically a sudden reduction in their numbers can indicate toxic shock or over-loading of the system. Despite this, some crawling ciliates can be quite resilient and present in poor treatment system. So just looking at the presence of “crawling ciliates” generally cannot be easily used to judge final effluent quality.

However the type of crawling ciliate present can give an indication of the type of treatment expected. The most commonly encountered ciliate, *Aspidisca costata* (Figure 1), generally indicates stable operation but is partial to high loads and is quite tolerant of low oxygen conditions. *Aspidisca lynceus* and *Aspidisca turrita* indicate stable and persistent nitrification leading to high quality final effluent. *Euplotes* (Figure 2) is typical of low to average loading rates, very high oxygen concentrations and typically indicates complete carbon removal but only partial nitrification.

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*What do you call a ciliate that's lost a leg? A ciliate with a cirri-ous injury.*