

## What is going on in my system?

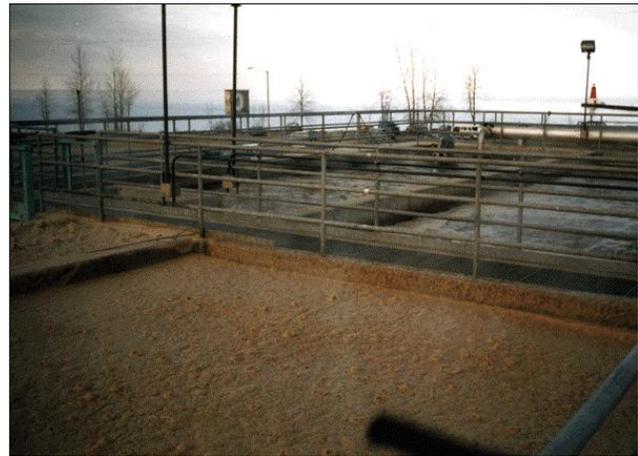
### There is all this slime in my clarifier and in my sludge dewatering system?

Viscous bulking can be a major operational problem in wastewater treatment systems. It is the result of excessive polysaccharide production by microorganisms, causing poor compaction and settling of biomass in secondary clarifiers, increased effluent BOD and poor sludge dewaterability with all of its associated problems.

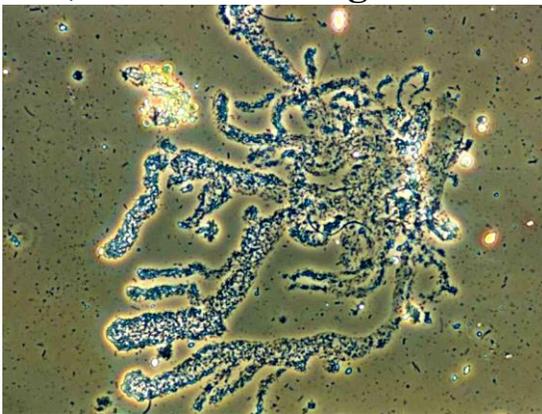
### Many times this can be caused either by polysaccharide bulking or Zooglear bulking.

This week's newsletter will cover Zooglear and next week's will cover polysaccharide coating- what is it, how to identify it, the causes and controls.

### A plant with Non-Filamentous Bulking caused by nutrient deficiency



### Ok, so what is Zooglear?



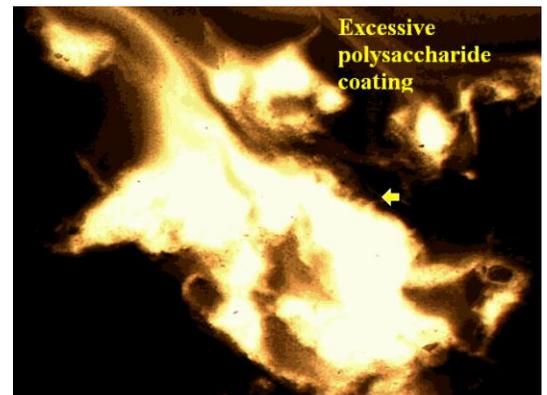
### *Zooglear ramigera*

#### Identification:

This type of bacteria can be extremely large, non-motile bacteria. The bacteria's staining is usually Gram negative and Neisser negative. There are usually no sulfur granules present. Zooglear can be "fingered or amorphous". Zooglear bacteria also have the ability to denitrify.

#### Similar types of Organisms:

Zooglear typically have the presence of excessive amounts of polysaccharide coating. They can grow usually as "amorphous" clumps or "fingered" like a tree. Normal floc forming bacteria can appear to look like zooglear bulking and cause excessive polysaccharide coating if they have been stressed or are nutrient deficient. Check the polysaccharide coating with India Ink stain under the microscope. The polysaccharide coating of zooglear bacteria is always high or excessive.



**Environment:**

This bacteria is usually found in environments where there is a high F/M ratio where the soluble organic compounds are readily bio-degradable. The pH is usually lower. Zooglea can often be present in selector systems in activated sludge. Zooglea can also be an indication of nutrient deficiency (Nitrogen or Phosphorus). Use of selectors may control the growth, but excessive anoxic retention has been known to encourage growth of *Z. ramigera*.

**Control:**

pH can be increased on the MLSS to above pH 6. Nutrient addition is usually recommended. Control of nutrient addition is critical. The type of nutrient used is also critical. If it takes the bacteria too long to access the nutrients in a high BOD loading environment or the nutrients are slug fed but not at a rate consistent with slug loadings and is not sufficient when needed by the bacteria, then zooglear bulking can occur. Many times, a plant uses excessive levels of polymer in the clarifier to try to settle the slimy, bulking sludge.

Dewatering of this type of sludge is very difficult also. Large amounts of polymer are required and poor water drainage results. The easiest fix is to adjust the "critical 5" in the plant. Addition of micronutrients or bacterial supplements can be added if high BOD loading is the cause.

**Rank:**

Zooglea is a cause of bulking and poor dewatering of biosolids.

