

Wastewater Microbiology Workshop

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Presented at the 28th Annual Mississippi Gulf Coast Short Course

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Learning Objectives

- Understanding of the role of bacteria and higher life forms
- Develop ability to recognize key life forms and floc characteristics under the microscope
- Understanding of filamentous organisms



Section 1: The Basics

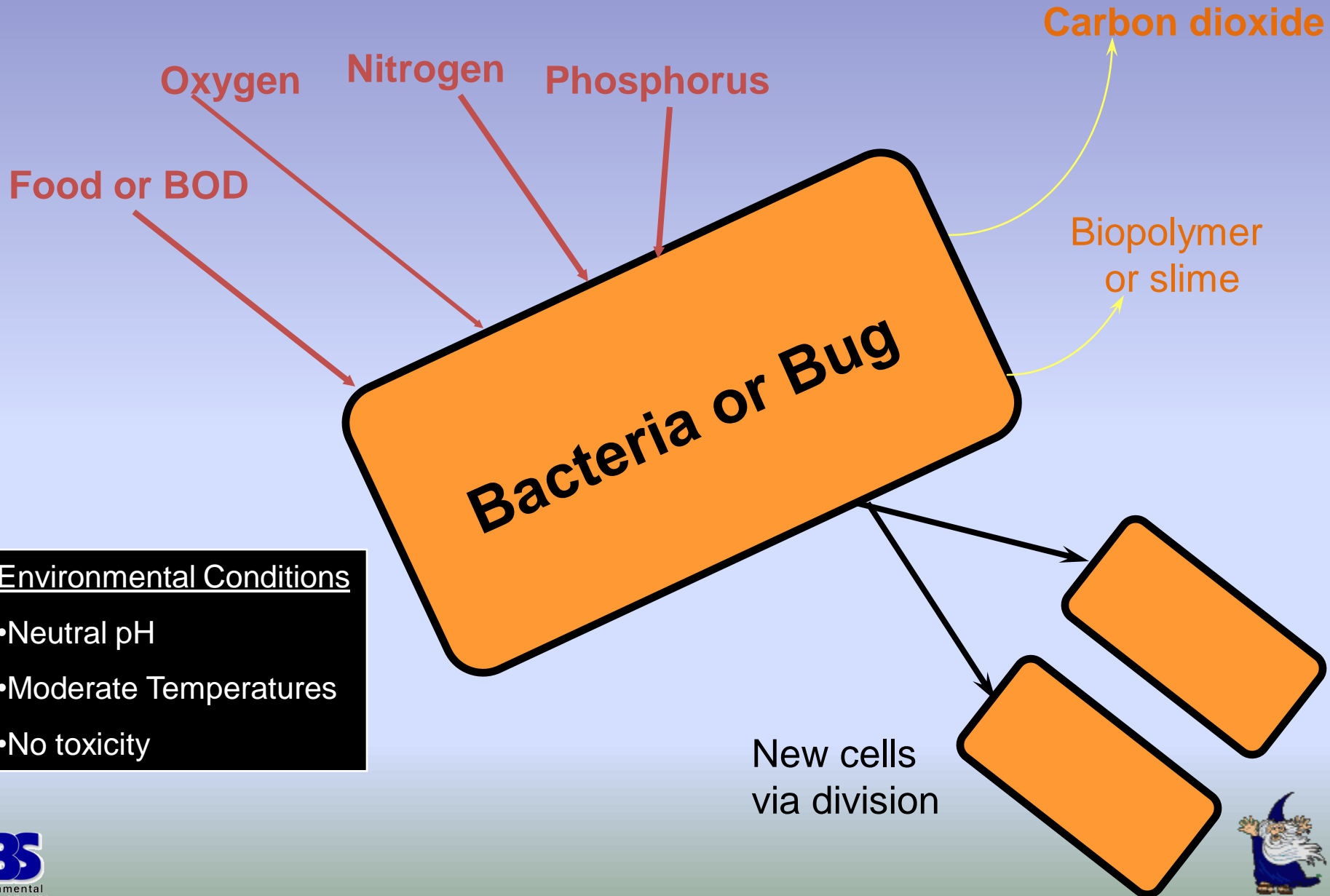


Secondary Wastewater Treatment

- Secondary treatment will refer to aerobic (with oxygen) biological processes
- The biological reactor is referred to as an aeration tank or aeration basin
- Bacteria use the soluble organic pollutants as food



The Bacterial Cell



Section 2: The Microorganisms



What are “Bugs”?

- “Bugs” -- industry slang for the microorganisms in a wastewater system
- Includes:
 - *Bacteria* *0.1 to 15 μ m*
 - Fungi and Yeast *2 μ m to >1cm*
 - Algae *1 μ m to >1cm*
 - *Protozoa* *2 μ m to 200 μ m*
 - *Metazoa* *50 μ m to 500 μ m*

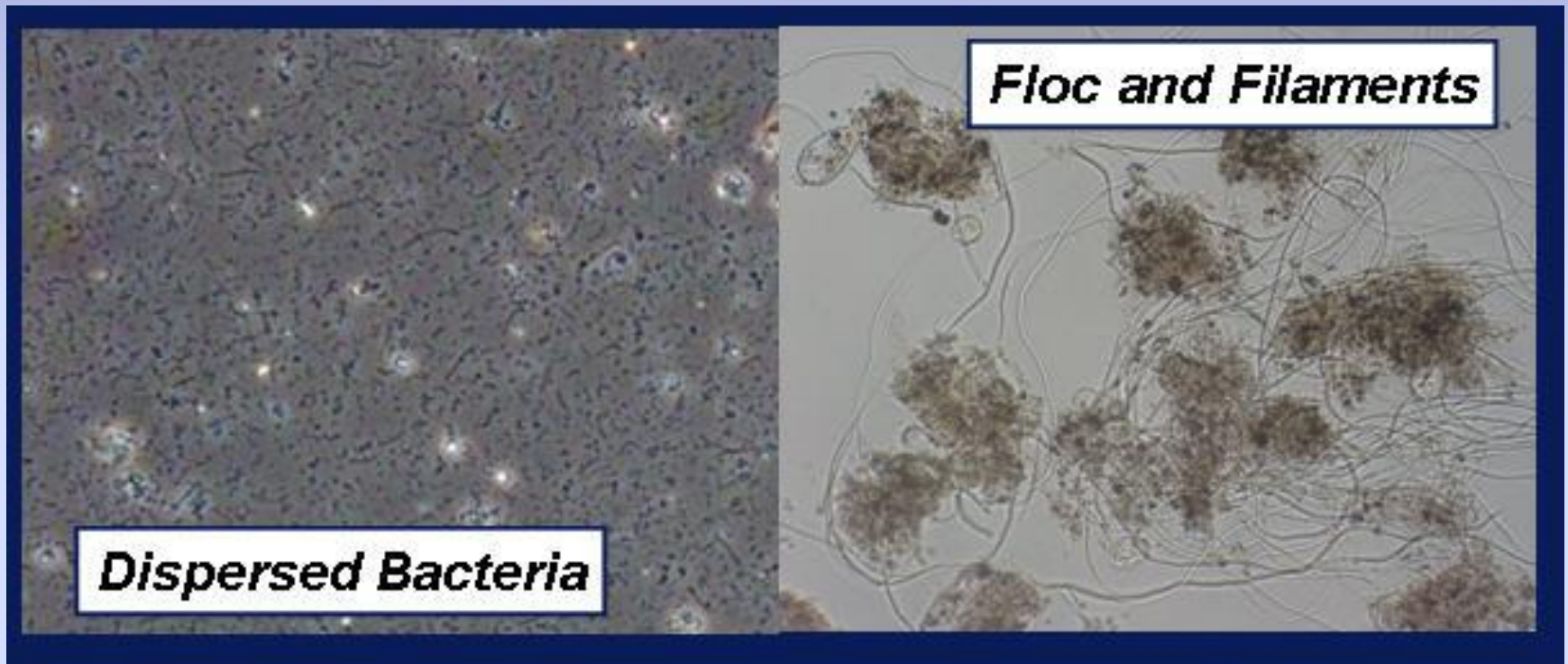


What do the “Bugs” do?

- *Bacteria* do the majority of the organic degradation and produce floc
- *Protozoa and Metazoa* prey on the bacteria, reducing suspended solids and contributing to formation and health of bacterial flocs



Major Categories of Bacteria (Wastewater perspective)



Section 3: Higher Life Forms

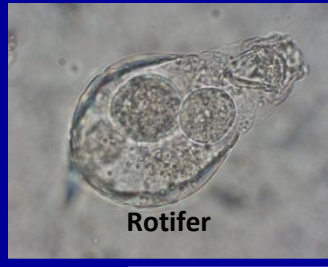
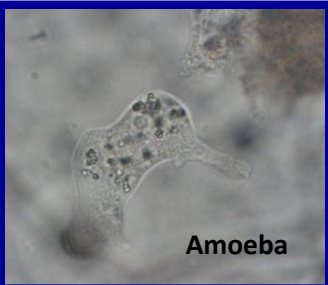


Higher Life Forms

- Consist of several groups of microorganisms
 - Protozoans
 - Rotifers
 - Nematodes
- Feed off of free swimming bacteria and bacterial floc
- Reduce effluent total suspended solids
- Provide information regarding health and stability of the system
- Number and distribution is dictated by available food source and environmental factors, such as dissolved oxygen, temperature and toxicity



Higher Life Forms



Section 3: Microscopic Examination



Microscopic Examination

- Basic skills
 - Floc structure and size
 - Water clarity among floc
 - Presence and abundance of filaments
 - Higher life forms
- More advanced skills
 - India ink stain
 - Zooglea
 - Filamentous identification



Summary of Wastewater Microbiology

- The bacteria are the primary BOD degraders in a biological treatment system
- The number and species of higher life forms indicate the type and amount of available food in the system
- By monitoring the “biological ecosystem,” one can learn a great deal about the health and quality of the biomass



This presentation is an abridged version of one of our many wastewater training presentations. For more information about EBS wastewater training programs for operators, technicians, engineers, and managers, contact Marie Tranchina at tranchina@ebsbiowizard.com or (985) 674-0900

