

# Master Composting Program

OSU Extension

Lincoln County, Oregon

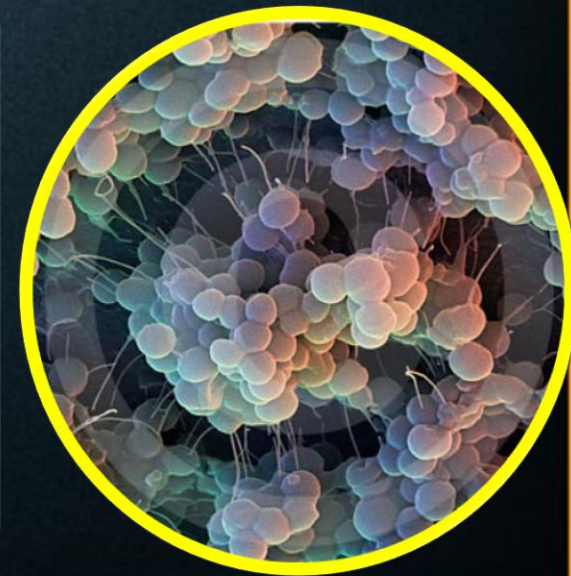
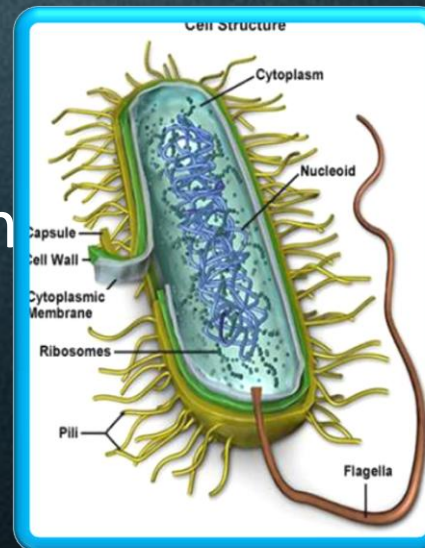


# Week Three

## Microorganism that do the Composting Work

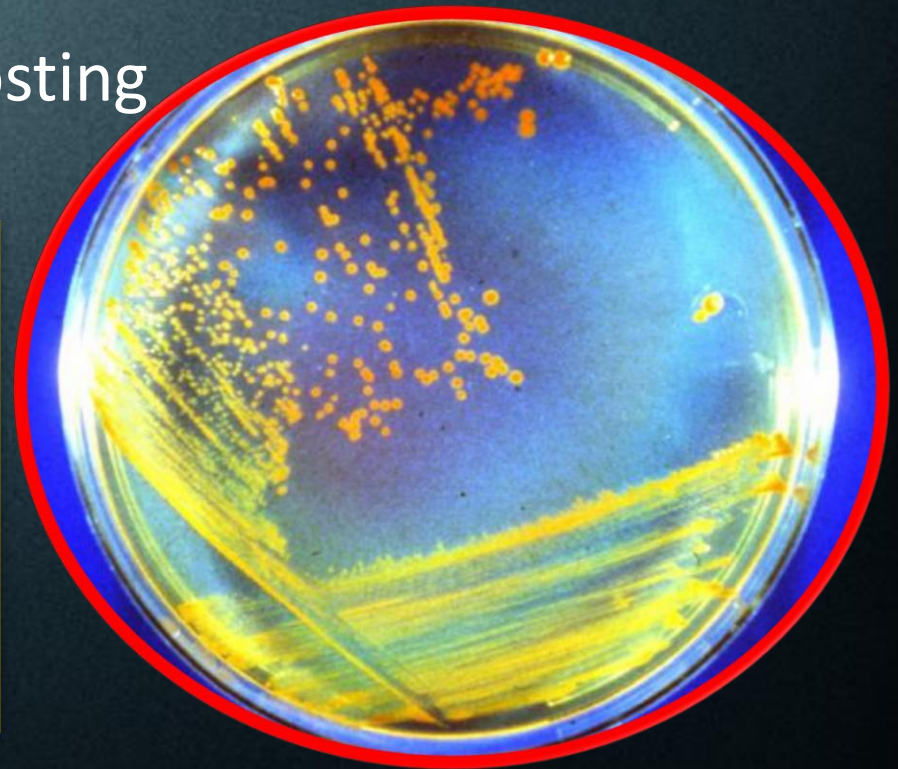
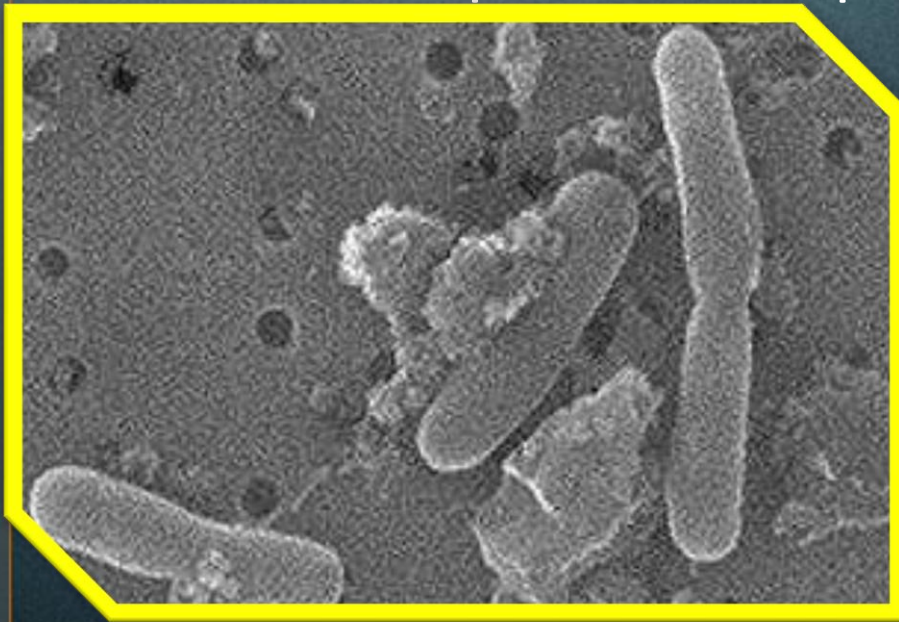
# Bacteria

- Minute single celled organisms
  - 25,000 laid end to end cover one inch length
- 0.035 oz can become 1 pound (16 oz) in just 3 hours
- Mass size of the earth in 1 ½ days
- Three types of bacteria



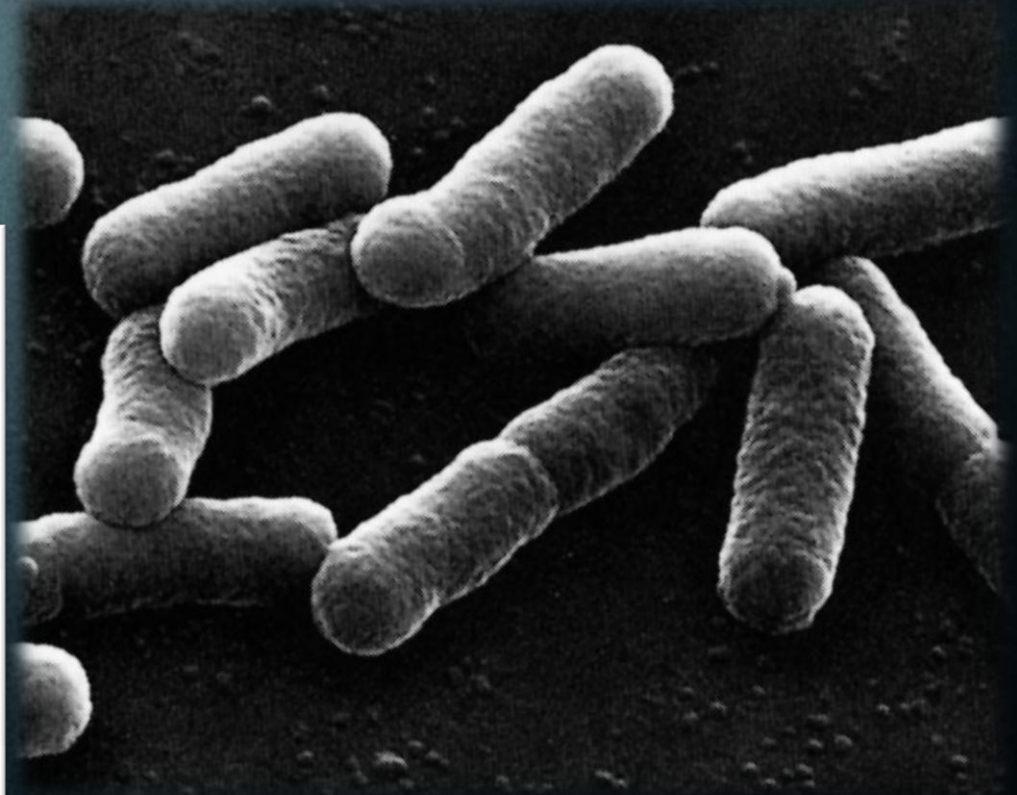
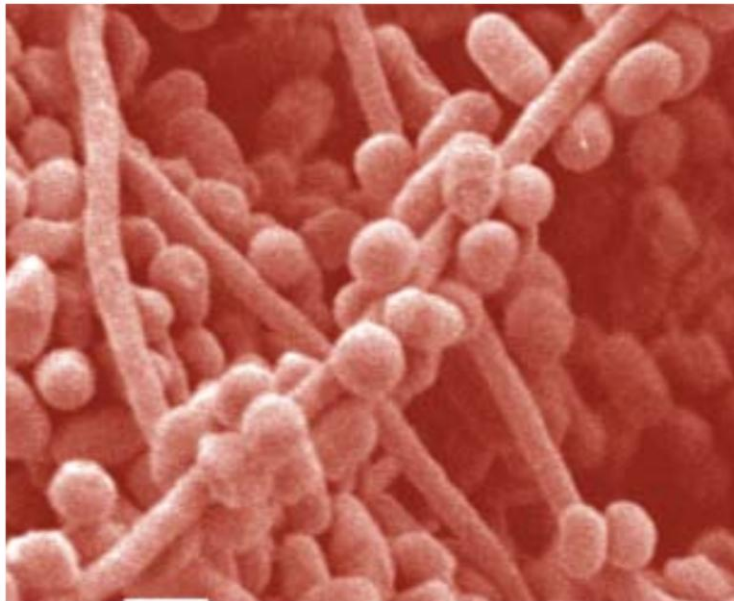
# Psychrophilic Bacteria

- Do best at 0- 55°F
- Little heat produced
- Involved in passive composting



# Mesophilic Bacteria

- 70-90°F
- But survive from 40-110°F



# Mesophilic Stage

- First real stage of composting
- when air, water and C:N Ratios are correct
  - Lasts 1-2 days
- Mesophilic microorganisms break down sugars, fats, starches and proteins releasing heat
- Makes the pile become active
- Utilize readily available short chained C-pool
- Resistant or long carbon chains not affected

# Thermophilic Bacteria

- Work very fast at 104-200°F in 3-5 days
- Turn green, gold, and tan organic materials into uniform deep brown
- Turning the pile re-starts this action
- Works best at correct C:N ratios

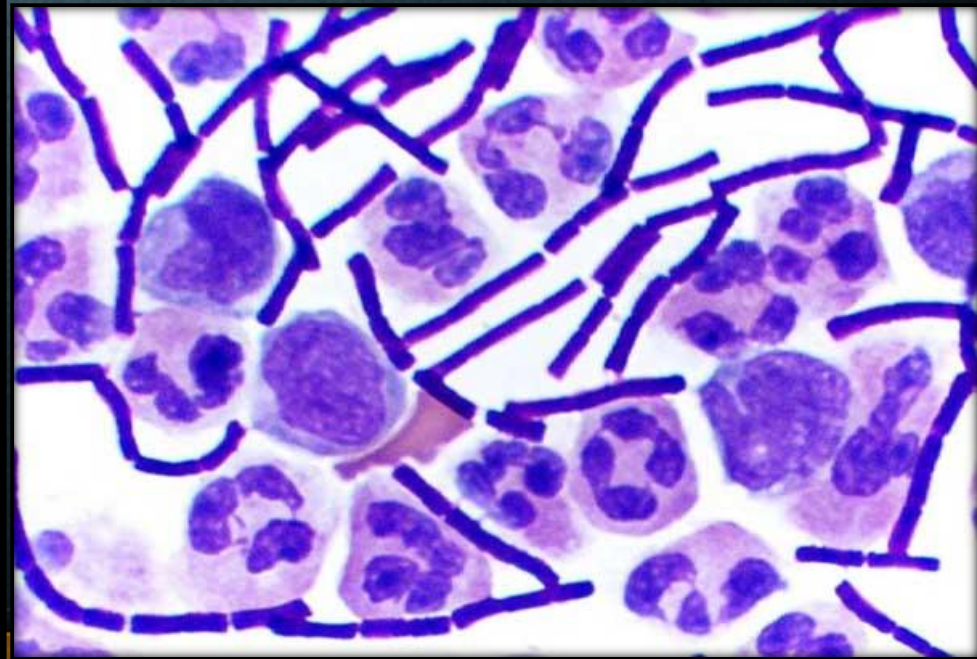


# Thermophilic Stage

- May last several weeks if pile is turned
- Temps climb to 120-150 oF
- Heat loving (thermophilic) bacteria degrade organic materials
- As long as you have oxygen and “*digestible organic matter*” this stage will remain at 140°F
- Particle size reduces,
  - Pathogens are destroyed above 131 °F,
  - Fly larvae and weed seeds destroyed at 145°F

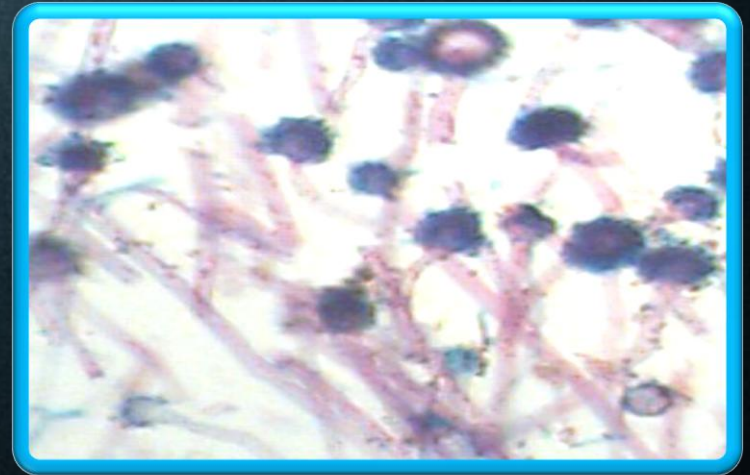
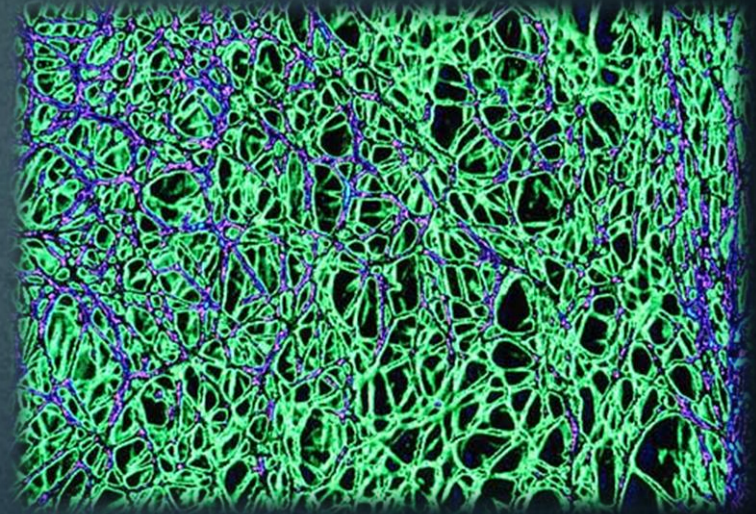
# Anaerobic Bacteria

- If pile not turned results in increase in anaerobic bacteria
- Less Nitrogen is used but more organic acids (smelly stuff) result



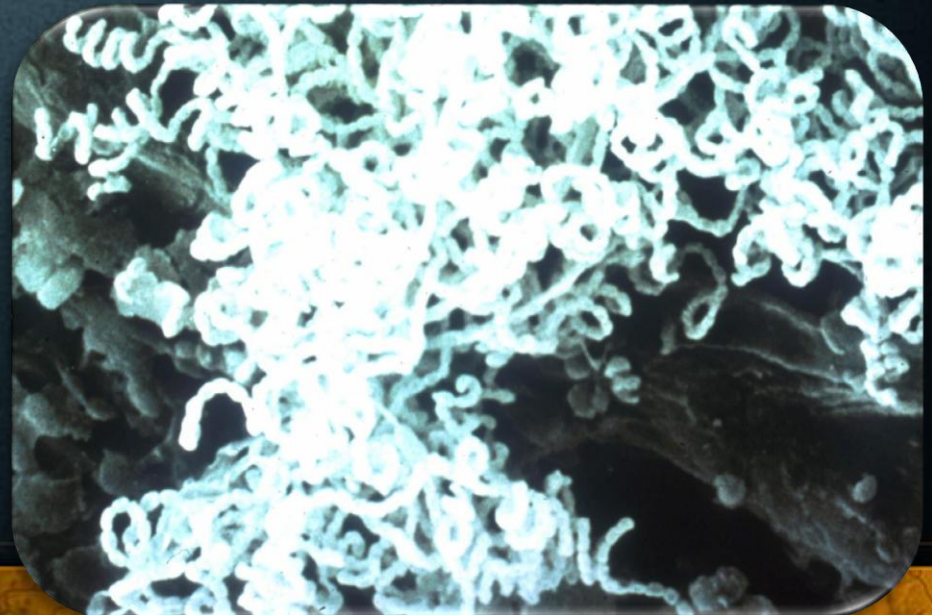
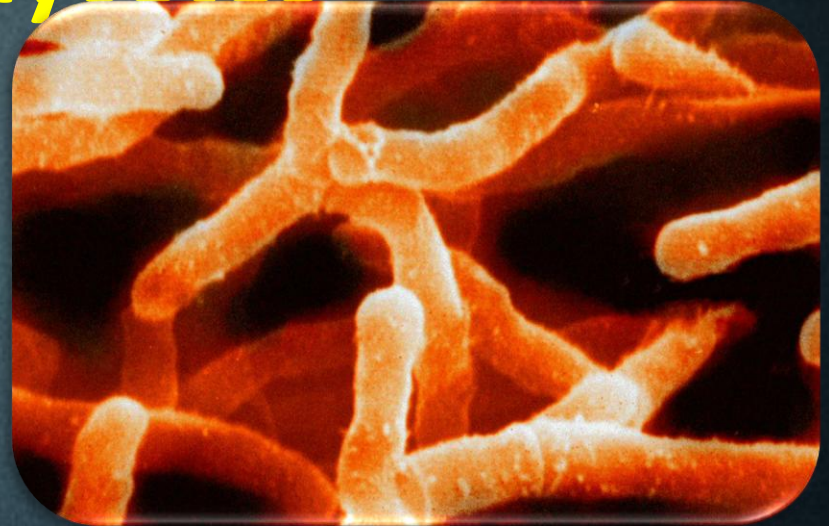
# Fungi

- Most fungi are saprophytes – live on dead or decaying matter
- Usually active when compost has cooled using more easily digestible materials



# Actinomycetes

- Described as “half fungal and half bacteria”
- Give compost a pleasant earthy smell
- Important in formation of humus
- Make nutrients available to plants
- Are aerobic



# Macroorganisms

- Nematodes
  - Roundworms
- Fermentation mites
- Spring tails
- Centipedes, millipedes, wolf spiders, sowbugs, beetles, earthworms
- Watch video **Worm Bin Creatures**

# Temperature is critical

- Decreasing temp indicates low oxygen or moisture
- Turn pile to add oxygen
- Higher temperatures more than 150-160 kills thermophilic bacteria
- Spontaneous combustion can occur at these temperature ranges if pile becomes hot and dries out

# Moisture is critical

- At higher temps of 160°F evaporation occurs rapidly
- Re-wet the pile frequently so that moisture content is above 40%
- Moisture > 70% reduces oxygen pore space

# End of Week Three