

Types of Microbes

Introductory Microbiology (BSH-114)

Instructor
Dr. A. K. Sachan
Professor



Presented By
Dr. Anurag Dhankar
Teaching Associate

Department of Soil Science and Agricultural Chemistry C.S.A
UNIVERSITY OF AGRICULTURE AND TECHNOLOGY KANPUR(U.P.)
208002

Types of Soil Microorganisms

- 1. Microalgae**
- 2. Bacteria**
- 3. Microfungi**
- 4. Protozoa**
- 5. Actinomycetes**

A. Bacteria

Most abundant microorganisms

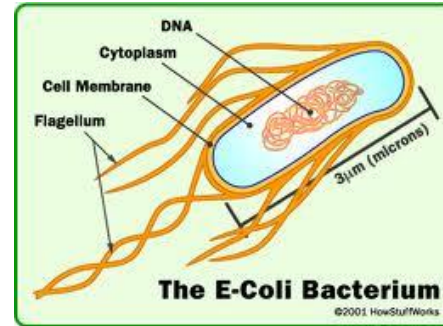
Constitutes **half of the total** microbial biomass (10⁹ per g soil)

Number **decreases** with the depth of the soil.

Three forms (cocci, bacilli, spirillum)

Common bacteria: Pseudomonas, Arthrobacter, Achromobacter, Bacillus, Clostridium, Micrococcus, Flavobacterium, Chromobacterium and Mycobacterium

Escherichia bacteria found in sewage contamination



Cellulolytic bacteria : Cytophaga and Sporocytophaga

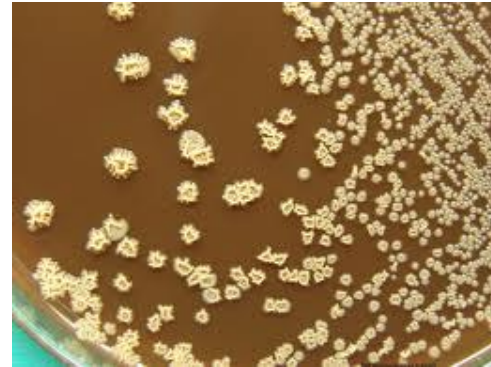


Chemosynthetic autotrophic bacteria are Thiobacillus, Ferrobacillus, Nitrosomonas and Nitrobacter.

B. Actinomycetes

Abundant in the soil rich in decomposed organic materials

Common species of **Streptomyces**, **Micromonospora** and **Nocardia**



Responsible musty or earthy smell of a freshly ploughed field.

Capable of degrading many complex chemical substances

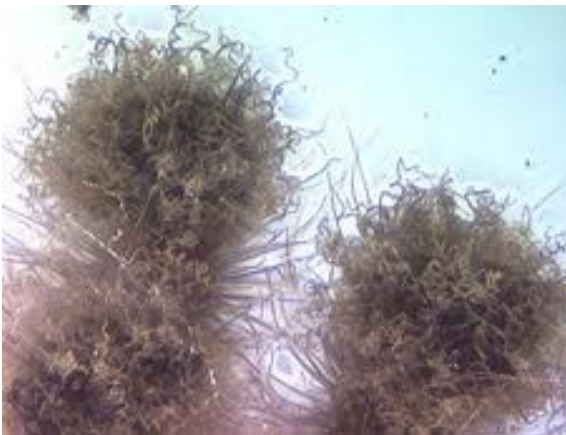
C. Microfungi

Several microfungi in soils

Improves soil nutrients in neutral and alkaline soils.

Organic materials present in the soil have a direct effect on the fungal population of the soil.

Favoured by acidic and aerobic conditions

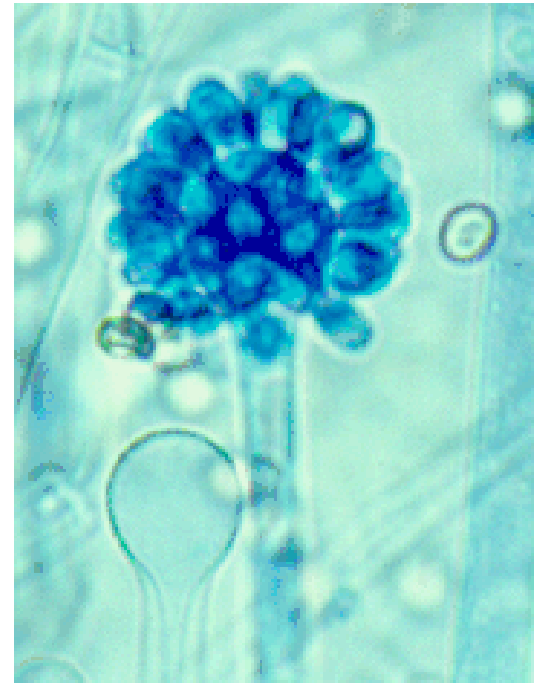


Microfungi

Aspergillus, Botrytis, Cephalosporium, Penicillium, Alternaria, Monilia, Fusarium, Verticillium, Mucor, Rhizopus, Pythium, Cunninghamamella, Chaetomium Rhizoctonica.

Cunninghamamella – Soil fertility evaluation

Mehlich et al. 1933 – Available P status



D. Microalgae

Occur on the surface of moist soils, where sufficient light is available.

Helpful for soil conservation and in improving soil structure

In paddy fields, blue-green algae play a significant role in nitrogen fixation.

Species of Chlorella, Chlorococcum, Protosiphon, Aphanocapsa, Anabaena, Chroococcus, Nostoc and Scytonema are some common microalgae present in the soil.

E. Protozoa

Great number in the upper layer of the soil and their number have a direct effect on bacterial population, since they ingest bacteria.

Organic manures increase protozoan population.

Several types of protozoa are found in the soil, but flagellates and amoebae usually out-number the ciliates.

Helpful in maintaining equilibrium of the microbial flora in the soil.

Some important protozoans are Allantion, Biomyxa, Nuclearia, Trinema, Balantiophorus, Colpoda, Gastrostyla, Oxytricha, Pleurotricha and Vorticella

F. Virsues

Viruses are present in the least number in the soil.

Bacteriophages ingest bacteria and actinomycetes and some viruses infect the fungi present in the soil.