Dynamics of Soil Microbial Diversity in the Context of Land Use and Hydrothermal Changes

This study examines the characteristics of microbial communities, their sensitivity to abiotic factors, and the impact of anthropogenic changes on the functioning of soil biocenoses.

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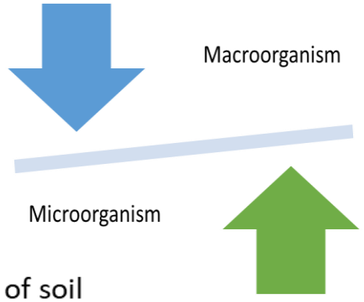
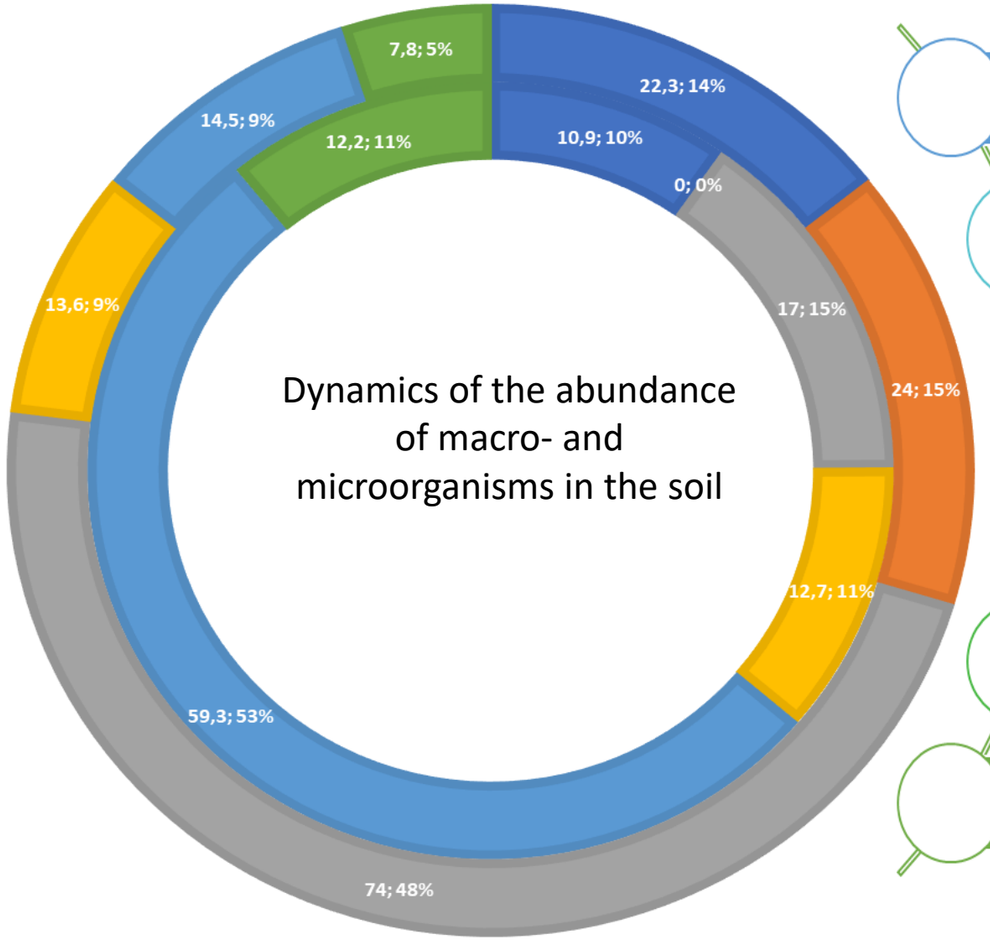
Abundance of Microflora in Different Land Use Types



- Moisture, %
- Abundance of Lumbricina, individuals/m²
- Diversity of soil micromycetes, CFU/g of soil
- Soil temperature, ºC
- Diversity of soil bacteria, CFU/g of soil
- Soil biological activity, %



- Climate Change and Its Consequences (Temperature and Moisture Variations)
- Soil Biota Functionality (Macro- and Microorganisms)
- Land Use Practices and Anthropogenic Impact
- Hydrothermal Regime (Soil Moisture and Temperature Interactions)
- Soil Respiration and Nutrient Cycling
- Indicators of Soil Health (Earthworms as Bioindicators)

Impact of Hydrothermal Conditions on Bacterial Abundance

Verrucomicrobia
на 197,2%

Firmicutes
на 60,9%

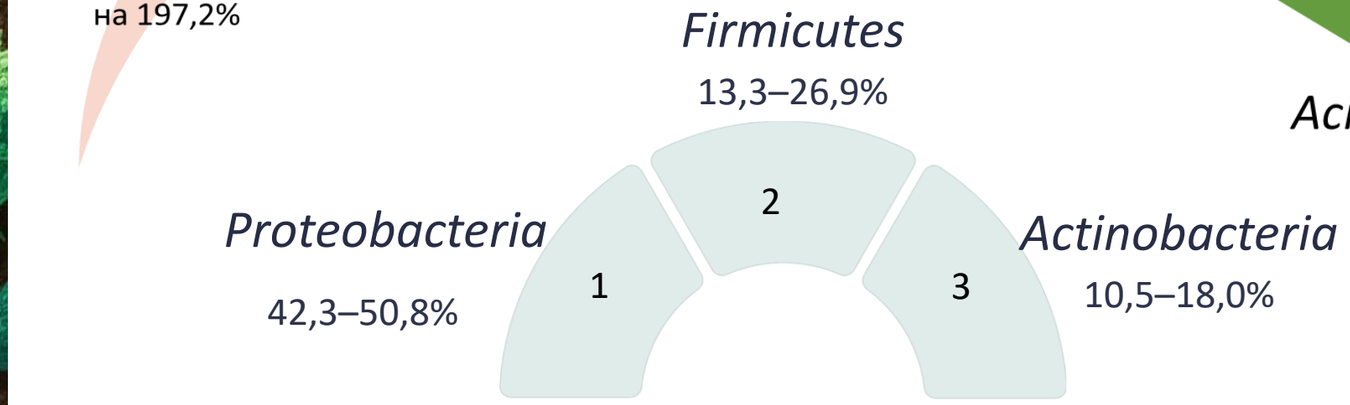
Proteobacteria
на 15,1%

Gemmatimonadetes
на 33,5%

Chloroflexi
на 57,7%

Actinobacteria
на 41,5%

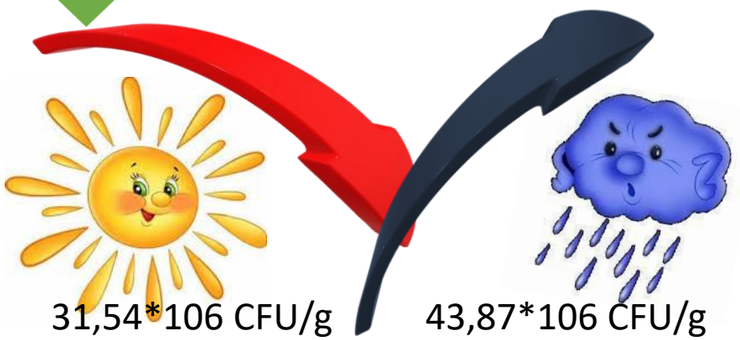
Acidobacteria
на 74,3%



Dominance of Bacterial Groups

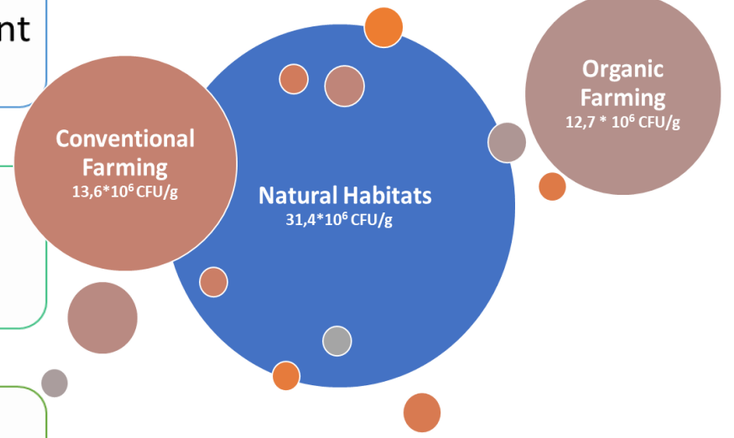
Sensitivity of Microbial Communities to Temperature and Moisture

1. • Temperature
   • Impacts the growth and development of microbial communities
2. • Moisture
   • Regulates the availability of oxygen, nutrients, and gas exchange.
3. • Successional Dynamics
   • Driven by changes in the structure of microbial communities.

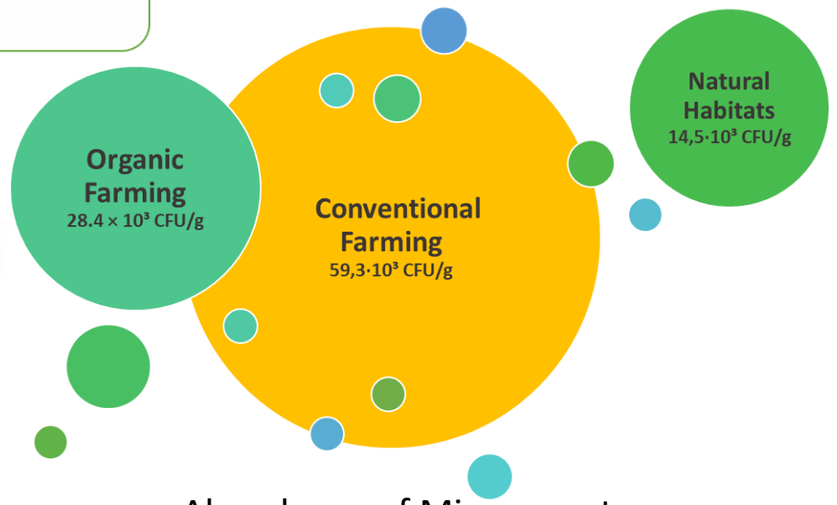


31,54*106 CFU/g 43,87*106 CFU/g

Ammonifying Bacteria



Abundance of Ammonifying Bacteria



Abundance of Micromycetes

Direction of Microbiological Processes in Soil

Impact of hydrothermal factors on soil carbon dioxide emissions, mg CO_2 / kg soil / day

Variant	Oligotrophy Coefficient	Mineralization-Immobilization Coefficient	Pedotrophy Coefficient
High Moisture, Natural Habitats	0,31	0,84	0,40
Drought, Conventional Farming	0,52	1,07	0,75
Warming, Organic Farming	0,83	1,25	1,63