MICROORGANISMOS EN SUS HABITATS NATURALES: AIRE, AGUA Y SUELO

Referencia: Capítulo 9, **Microbial Ecology**. Atlas & Bartha.

ECOesfera (bioESFERA), constituye la totalidad de los seres vivientes en el planeta y su ambiente (atmo-, hidro-, y lito-ecoesfera).

✓HABITAT: influencia sobre crecimiento, actividad, interacciones, sobrevivencia

ATMO-ecoesfera

✓ Características y estratificación atmosférica
- tropoesfera [vida]
- Estratoesfera
- ionoesfera

✓ Temperatura, radiación, oxígeno, agua, nutrientes

✓ Hábitat y medio de dispersión microbiana (ej. aerosoles)

✓ Microorganismos en la atmósfera

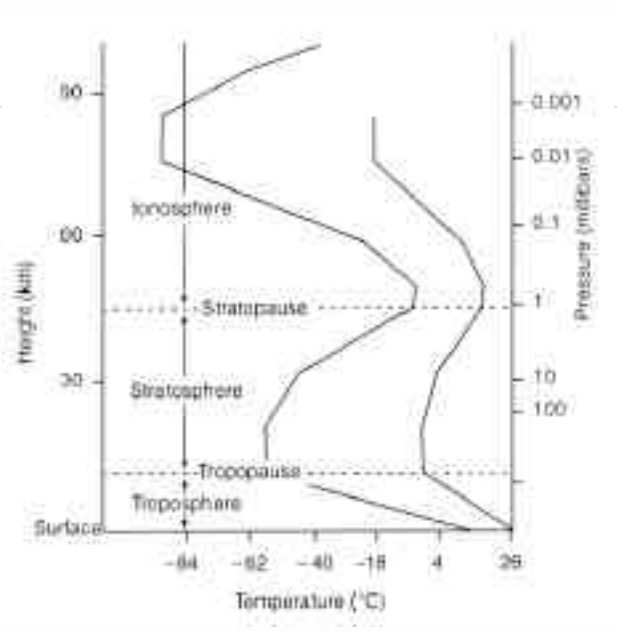


Table 9.3
Quantitative estimates of microorganisms (/g) in the troposphere

Microorganism	N. Canada (7 m	N. Canada 3000 m	Quebec 3000 m
Bacteria			
Gram-positive pleomorphic rods	46	24	20
Gram-negative rods	20	19	4
Spore formers	10	30	13
Gram-positive cocci	15	23	11
Other bacteria	1	0	2
Fungi			
Cladosporium	—	73	42
Alternaria	—	7	8
Penicillium	—	3	2

Source: Gregory 1973.

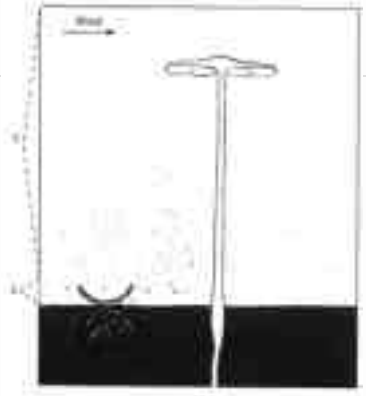


Figure 9.3

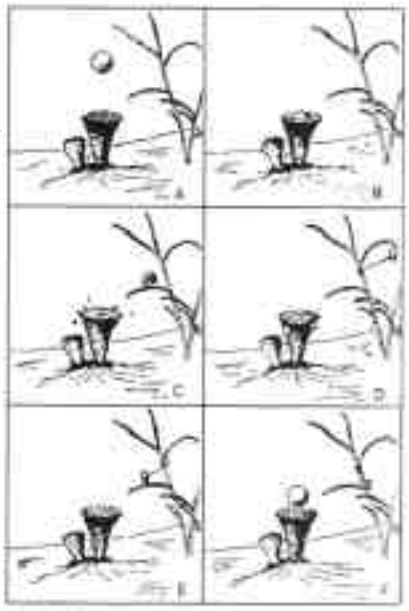


Figure 9.4

Table 9.1
Estimated distance traveled by several fungi, calculated from terminal velocities assuming nonturbulent wind moving at 1 m per second

Fungus	Assumed liberation height	Distance (m)
Helminthosporium	1 m	50
Puccinia	1 m	80
Agaricus	5 cm	40
Lycoperdon	5 cm	100

Source: Gregory 1973.

HIDRO-ecoesfera

- ✓Ambientes acuáticos
  - Ríos
  - Lagos
  - Lagunas
  - Otros
- ✓Ambientes marinos
- ✓Estuarios

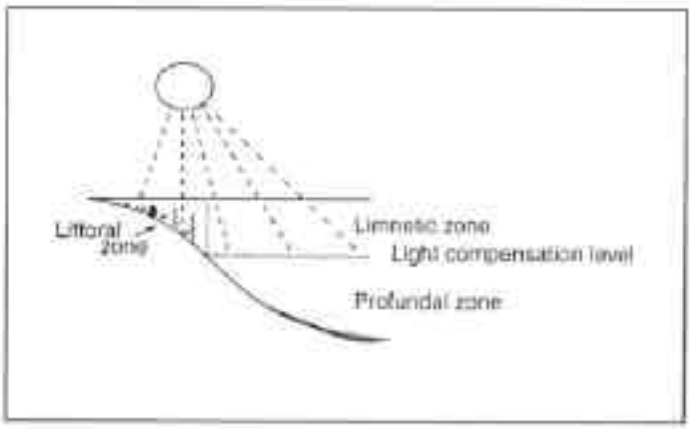


Figure 9.12
Zonation of a lake habitat based on light penetration. (Source: Odum 1971. Reprinted by permission, copyright W. B. Saunders Co., Philadelphia.)

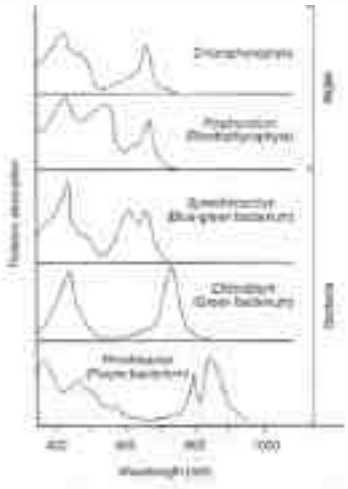


Figure 9.13
Absorption spectra of representative photosynthetic microorganisms. Note that *Chlorobium* and *Rhodobacter* can absorb light in the far red part of the spectrum, which is not utilized by algae. Because these bacteria live below the algal layer, this ability offers ecological advantage. (Source: Stanier and Cohen-Bazire 1977. Reprinted by permission, copyright Cambridge University Press.)

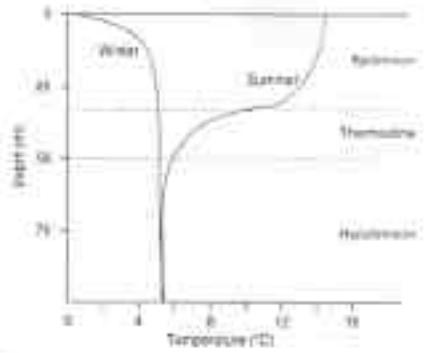


Figure 9.14
Typical stratification of a lake in the temperate climate zone during the summer and winter periods, showing the profile of the temperature with depth. During spring and fall, stratification breaks down, resulting in complete mixing (turnover) of the lake water.

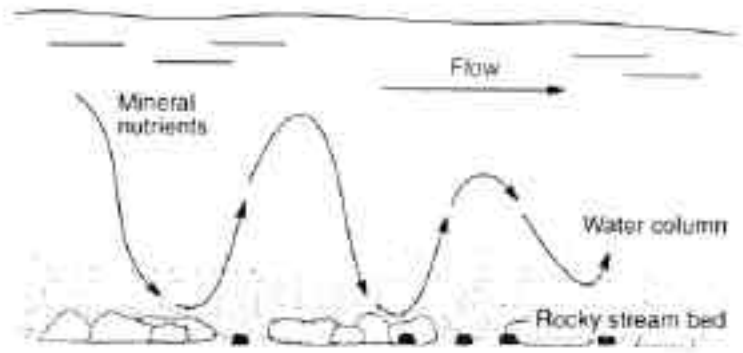


Figure 9.16

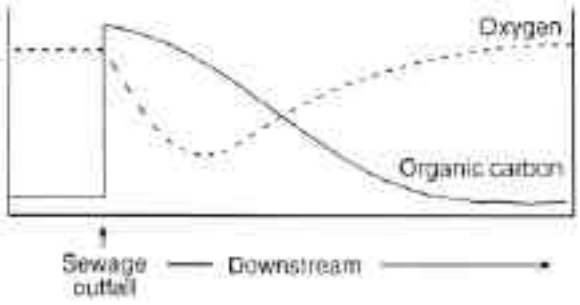


Figure 9.17
Relationship of organic carbon and dissolved oxygen in a river above and below a sewage outfall.

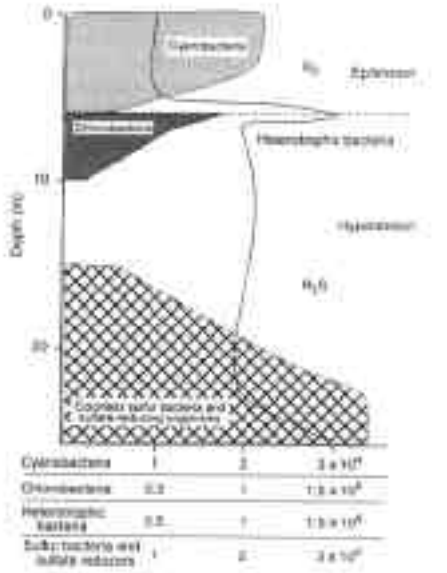


Figure 9.18

Lake[1]	Turnover T_1 (hours)	Secondary productivity (mg C/m³/day)
Oligotrophic Lawrence, Mich.	4–300	1–80
Mesotrophic Crooked, Ind.	80–470	63–110
Eutrophic Little Crooked, Ind.	36–232	190–205
Lötsjön, Sweden		
Summer	0.4–5	<100
Winter	20–300	<20

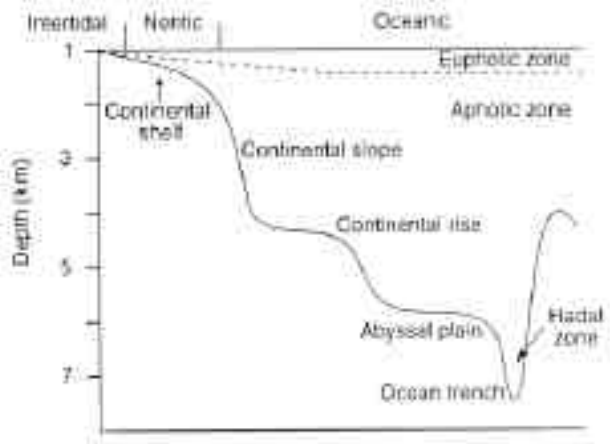
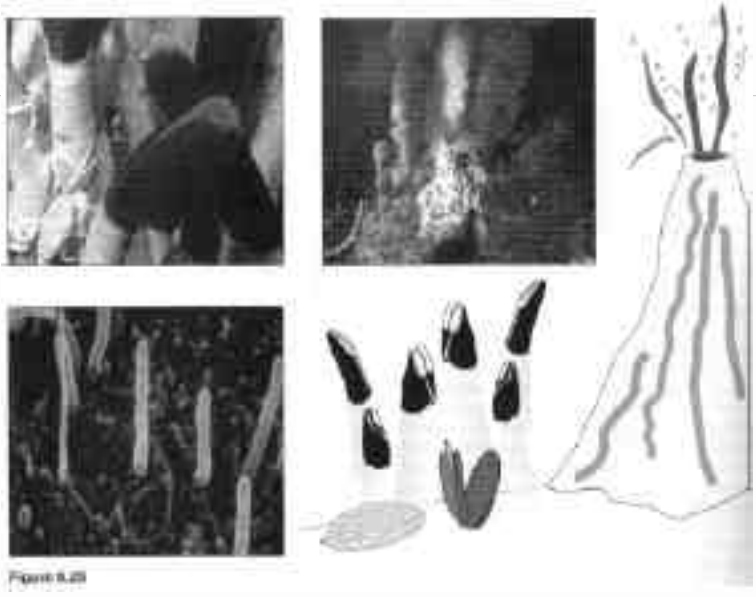


Figure 9.23
Major horizontal zonation in an ocean profile. (Source: Odum 1971. Reprinted by permission, copyright W. B. Saunders, Philadelphia.)



LITO-ecoesfera

- ✓Suelos y sus propiedades físicas, químicas y biológicas
  - – SOLIDO (materiales inorgánicos, área superficial)
  - – GAS (difusión de aire; deshidratación)
  - – LIQUIDO (difusión solutos, migración de microorganismos, etc.)
- ✓Formación de suelo: material parental, clima, topografía, actividad biológica, tiempo

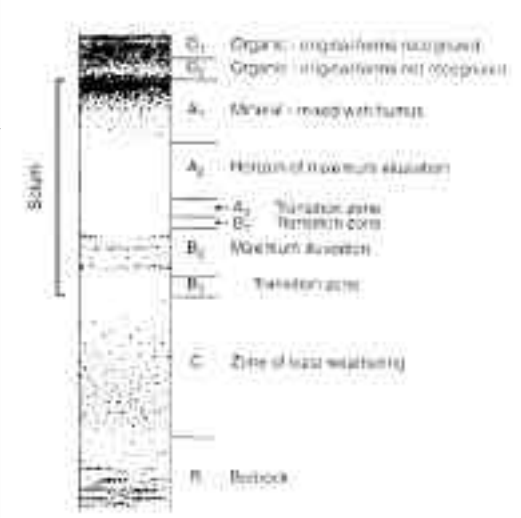


Figure 9.31
Vertical soil profile showing soil horizons. (Source: Buckman and Brady 1969. Reprinted by permission; copyright Macmillan Publishing Co.)

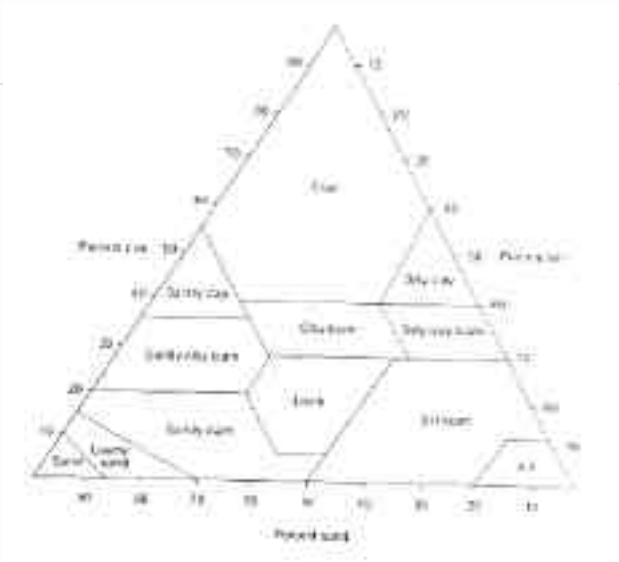


Table 9.8
Comparison of size range, particle number, and surface area per gram of sand, silt, and clay. The calculations assume spherical particles with the maximum diameter within the size range.

Soil component	Diameter (mm)	No. of particles/g	Surface area (cm^2/g)
Sand	2.00–0.05	90	11
Silt	0.05–0.002	5.78×10^6	454
Clay	0.002	9.03×10^{18}	8,000,000

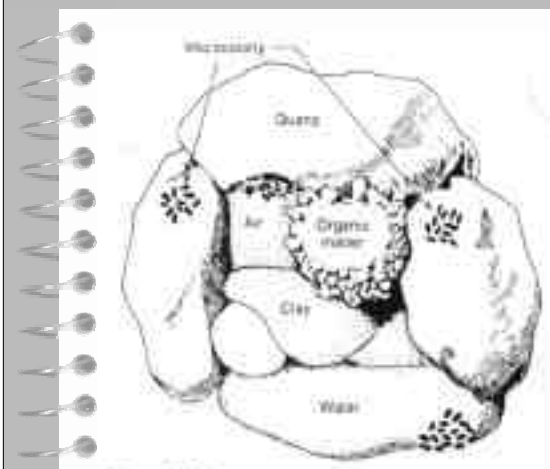


Figure 9.34
Soil aggregate showing microhabitats and patchy distribution of bacterial microcolonies. The section also shows the occurrence of water and air within pore spaces. (Source: Brock 1979. Reprinted by permission of Prentice-Hall, Englewood Cliffs, NJ.)

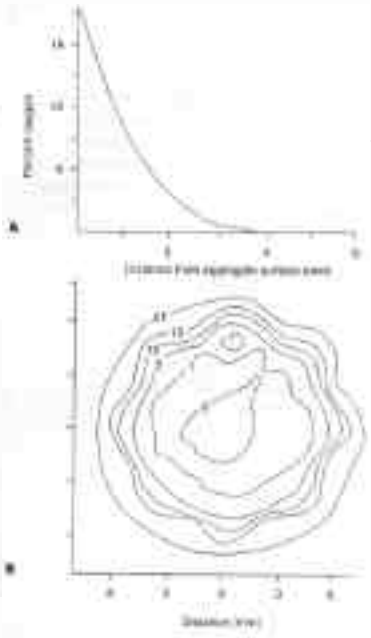


Figure 9.33