Soil is undoubtedly the most complex of all microbial habitats. Primarily because of this complexity, there is insufficient information on how and where most microbial events occur in soil in situ and which microbes are the major and, physiologically, the most important participants in these events. Soil differs from most other microbial habitats in that it is dominated by a solid phase consisting of particulates of different sizes and which is surrounded by aqueous and gaseous phases that fluctuate markedly in time and space. The solid phase is a tripartite system composed of finely divided minerals (both primary and secondary); plant, animal, and microbial residues in various stages of decay; and a living and metabolizing microbiota. These particulates exist as both independent entities and mixed conglomerates. The aqueous phase surrounding the particulates is normally discontinuous, except when soil is saturated, and this restricts the movement of microbes, especially of bacteria and other nonfilamentous forms, and results in local accumulations of nutrients and toxicants, escape of cells from grazing predators, a low probability for genetic transfer, etc. These particulate-aqueous associations constitute the “microhabitats” wherein microbes reside and function in soil.

The abiotic components of soil have been relatively well defined, both qualitatively and quantitatively. However, the microgeographic distribution and the geometric relations of abiotic components to each other—and to the microbiotic components—and the interactions among and between the abiotic and microbiotic components are not clearly defined. Most of what is known about the composition of the abiotic components has been obtained by dispersing soil—either chemically or phys-