SOIL BIOTA, NUTRIENT CYCLING, and FARMING SYSTEMS

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PREFACE

Agroecosystems and human-affected environments in general comprise the vast majority of terrestrial environments. It is not clear, however, how living biota such as microorganisms, invertebrates, and plants influence these systems. The recent shift toward sustainable agriculture has focused on biota as the central core of soil fertility, plant dynamics, and crop production. Chapter 1 deals with general aspects of the interaction of microbial and invertebrate biomass, soil tillage conditions, and pesticide residue use. The functioning of humic fractions as possible factors of plant growth (Chapter 2) is a basic field of research together with organic matter management and use (Chapter 3). Recycling of biorganic waste is appreciated in sustainable farming systems and the rate of plant pathogen survival in the composted material is crucial (Chapter 4).

Pesticide residues in soil are a consistent black box for most living organisms (Chapters 5, 6, 7, and 8). However, the incredible biodiversity of soil is little described and understood, especially in the tropics (Chapter 9). Much work is needed as well in order to better use soil invertebrates as bioindicators of soil use (Chapters 10 and 11). Nutrients and soil contaminants are cycled into the human food web and need to be monitored for environmental and human health problems (Chapter 12) and agroecosystem functioning (Chapter 13).

The efficiency of energy and material fluxes in agroecosystems is essential and needs an approach that takes into account traditional farming systems, which have been little studied (Chapter 14), or a particular use of agroforestry strategies (Chapters 15, 16, and 17). Increasing organic materials on the soil surface is a basic way of helping agroecosystems to be sustainable both in the tropics (Chapter 18) and in temperate areas (Chapters 19 and 20).

In transforming the conventional high input agricultural landscape into a sustainable one, problems previously unknown could occur (Chapters 21, 22, and 23). In addition, traditional operations, such as burning select weeds, can affect soil organic matter (Chapter 24).

Many plant species previously unused can be adopted for ornamental purposes (Chapter 25) as well as for useful chemicals (Chapter 26).

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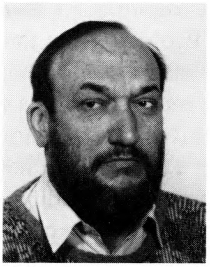

Wilhelm Foissner studied zoology and botany at the University of Salzburg, where he is now full professor of Zoology, especially soil protists and their impact on agroecosystems. Professor Foissner has received numerous grants and awards (e.g., the Sandoz Prize for Biology) for his works and was vice president of the International Society of Protozoologists in 1992.

Professor Foissner has written or co-authored three books on protozoa and approximately 250 papers in scientific journals (e.g., the *Archiv für Protistenunde* and *Biology and Fertility of Soils*).