
Soil biology is rapidly emerging as one of the glamour fields of the 1990s. Our improved understanding of the complex webs of soil microorganisms and the conditions that moderate their ecological function is likely to inform much of agricultural management into the next century. For those scientists whose reading frontiers may not often extend beyond U.S. borders, Soil Ecology is a current look at this exciting research area in Europe and elsewhere in the world. Editors Brussard and Ferrara-Cerrato bring together reports from authors working in Netherlands, Chile, France, New Zealand, Indonesia, Mexico, and several countries of Africa. Beyond the usual taxonomy of soil organisms, several chapters explore the ecological functioning of soil biota and how this relates to system management. Therein we find the value of this review.

A long-term comparison of conventional versus integrated management in Netherlands (Chapter 1) revealed higher earthworm numbers, greater porosity, less compaction, and higher water content in the latter system, although there was no difference in number of “workable days in the field” nor crop yields. In Chapter 2 the authors found the expected greater pore space and increased carbon mineralization in clay soils compared to loams or sands, and also that organic carbon and microorganisms are protected by the clay fraction even in sandy soils. There are different rates of bacterial grazing by nematodes among soil types, for example, and available carbon—not soil structure or texture—dictates the total activity of soil microbes.

Chapter 3 reports New Zealand experience with alternative tillage systems and their impact on balance of soil organism populations. Bacteria have higher turnover rate, while fungi with their mycelial growth are more conservative of energy and nutrients, and thus function better in storing soil organic matter. No-till favors fungal-based food webs, while conventional tillage favors small organism size, faster turnover, rapid dispersal, and generalist feeding—all characteristics of soil bacteria. There are also higher earthworm numbers in no-till. When better understood, these mechanisms should influence tillage management, factors that we have not considered except as we observe their gross impact on observable soil structure and ease of tillage.

Roots are both sinks and sources of carbon and nutrients, according to mechanisms described in Chapter 4. They are mainly sinks during crop growth, and sources for succeeding crops, although the interactions with the soil solution are more complex than this. Roots are a carbon source through respiration, exudates, insoluble compounds and structural carbon after root death. How these processes can be managed to make carbon and nutrients available at appropriate times of crop development is a complex question, but one that is essentially the potential efficiency of inorganic inputs in East Africa. Author Mike Swift reports that although typical high-input, green revolution technology has been maintained indefinitely due to other constraints, he describes how soil organisms function to decompose soil organic matter, and how biota influence soil structure and water regimes. He describes the influence of tillage, pesticides, and long-term practices on the soil organic matter. Swift’s long experience and elsewhere in East Africa lend credibility to his conclusions.

For most of us who still imagine the soil biota as a vitally important but poorly understood segment of the total cropping system, this book is a useful current work on soil biology. Several of the chapters best be characterized as narrow research reports on specific experiments. Others provide a good overview and synthesis of the literature. Overall, Soil Ecology in Sustainable Agricultural Systems is a well balanced presentation of recent data that can be used as a reference for graduate coursework in soil biology, agroecology, or soil fertility management. As an edited volumes, it would be less useful as a tool for access to European authors and other reports from Africa and elsewhere add to the value of the book.


The title of John Perkins’ book, Geopolitics and the Green Revolution, properly indicates its emphasis on the political aspects of agricultural change, but not the wealth of historical detail he has assembled on its scientific background. The subtitle Wheat, Genes, and the Insecticide Crisis presents the historical and philosophical background of the public debate about the impact of scientific solutions to the food crisis in developing countries. To his credit, he has chosen to title the book Geopolitics and the Green Revolution rather than Wheat, Genes, and the Insecticide Crisis, understanding that the public debate about the impact of scientific solutions to the food crisis in developing countries has been part of a much larger political debate about the impact of international trade and foreign aid on the developing world. In this respect, the book begins with an excellent preface outlining the author’s purpose, which is to establish a clear conceptual framework for understanding the political and economic implications of agricultural research and policy. He argues that the Green Revolution was not just a technological success story, but also a political triumph for the United States, as it helped to stabilize the political and economic systems of developing countries and affirmed the power of science and technology to solve global problems.

The book is divided into three parts: the first part provides a historical overview of the Green Revolution, the second part examines the political and economic consequences of the revolution, and the third part discusses the future of agricultural research and policy in the developing world. Each chapter is well written and well documented, with a wealth of data and evidence to support the author’s arguments. The book is also well organized, with a clear and logical flow of ideas. It is a must-read for anyone interested in the politics and economics of agricultural research and policy in the developing world.