Primary Succession and Ecosystem Rehabilitation
Monica G Turner
Bioscience; Nov 2003; 53, 11; Research Library Core
pg. 1129

Current Understanding of Succession

Primary Succession and Ecosystem Rehabilitation. Lawrence R. Walker and Roger del Moral. Cambridge University Press, Cambridge, United Kingdom, 2003. 456 pp., illus. $130.00 (ISBN 0521800765 cloth).

Natural and anthropogenic disturbances to ecosystems are ubiquitous, and disturbance and succession are inextricably linked. The spatial and temporal dynamics of vegetation following disturbance have long been of interest in ecology. In *Primary Succession and Ecosystem Rehabilitation*, Walker and del Moral provide a comprehensive review of succession theory and the current state of research in this important area. The authors note that succession (defined as species change over time, or turnover) is at once an easily observable phenomenon and an unpredictable puzzle. The goal of this new book, aimed at anyone interested in the consequences of disturbance, is to provide a comprehensive understanding of the mechanisms of primary succession that will facilitate the search for more efficient resource use and habitat rehabilitation.

The sequence of topics covered in the book's nine chapters is logical, and the writing is understandable and easy to read. An introductory chapter provides a nice foundation of viewpoints, definitions, methods, and unknowns. Here, the authors acknowledge their view of succession as a process of change that is not always linear and rarely reaches equilibrium. Creation of a barren substrate (i.e., disturbance) is treated next, followed by a chapter on successional theory. The chapter on theory presents a succinct historical review that identifies milestones in the development of the succession concept, which will be quite helpful to students. Chapters discussing several basic mechanisms that drive successional change move from consideration of soil development to the life histories of early colonists to species interactions. A chapter on successional patterns then focuses on different types of trajectory, temporal dynamics, and environmental feedbacks. The last two chapters address applications of succession theory for rehabilitation and future research directions. Each chapter ends with a section that summarizes the chapter's content and places it in context with the rest of the book. Students will find the glossary quite helpful as well.

Elements of
AAAS Science & Technology Policy Fellowships 2004:05
for Bioscientists

Co
contribute your expertise to national policy-making in Washington, DC

Wo
work for a year in Congress or an executive branch agency

Sc **Scientists** and engineers are invited to apply for one-year science and technology policy fellowships in Washington, DC. Fellows contribute scientific and technical information and external perspectives to federal decision-making, while learning how government works. The AAAS programs provide a unique participatory public policy learning experience for scientists and engineers, through one-year assignments involving domestic and international science policy issues in the Congress and several executive branch agencies. Stipends begin at $60,000.

Fe The **fellowship** year begins September 1, 2004. Fellows are placed in the Congress, the Department of Homeland Security, the National Science Foundation, the National Institutes of Health, the Department of State, the Department of Defense, the Agency for International Development, the Environmental Protection Agency, the Department of Agriculture, the Food and Drug Administration and other federal offices. Application deadline is January 10, 2004.

Ap **Applicants** must have a PhD or an equivalent doctoral-level degree from any physical, biological or social science, any field of engineering or any relevant interdisciplinary field. Individuals with a master's degree in engineering and at least three years of post-degree professional experience may apply. U.S. citizenship is required. Federal employees are not eligible. Approximately 50 fellowships are awarded in 10 different programs. Underrepresented minorities and persons with disabilities are encouraged to apply.

In For application **instructions** and further information:
AAAS Science and Technology Policy Fellowship Programs
1200 New York Avenue, NW
Washington, DC 20005
Phone: 202.326.6700
E-mail: fellowships@aaas.org
www.fellowships.aaas.org

AAAS
Advancing science • Serving society

www.fellowships.aaas.org

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.

Points made throughout the book are richly illustrated by an impressive array of examples from around the world. The synthesis of studies done in many places is a key strength of the book. Of course, it also includes many examples of succession (on Mount St. Helens in Washington and along the floodplain of the Tanana River in Alaska) that are derived from the authors' personal experiences. However, I found it especially valuable to read about studies with which I was not previously familiar. Among the chapters, I found the one on applications of theory for rehabilitation to be least satisfying. The discussion of concepts used in restoration ecology may be a helpful introduction to this area for students, but the chapter focuses more on the conceptual framework and potential pitfalls than on achieving restoration. However, that too may largely reflect the state of the science.

The book is up-to-date on current topics in succession research, covering such issues as the influence of plants on soils, the importance of landscape context for succession, the need to understand how processes interact at various spatial scales, the question of whether assembly order influences the course of succession, and the identification of conditions that may promote divergence, or multiple stable states, over convergence. The authors nicely summarize some key unknowns in successional understanding. For example, they rightly note that too few studies exist for robust generalizations to be made about successional trends in the heterogeneity of soils. In the final chapter, on future directions, Walker and del Moral state their expectation that successional theory will develop through modeling, experimentation, and the search for generalities. They identify important research directions, such as understanding the role of animals as herbivores and seed predators during early succession; investigating the predictability of the development of a primary sere; and studying the mechanisms, spatial variability, and effects of soil organisms in regulating species turnover. The successional implications of how plants alter soils are also identified as an exciting research area. The authors suggest that significant gains in understanding will be made by linking processes such as biomass accumulation, nutrient turnover, and biotic interactions to the control of species turnover.

Despite the title's focus on primary succession, this book will be a good read and a useful reference both for students and for practicing scientists interested in the larger field of vegetation dynamics. The authors note in the first chapter that primary and secondary succession are points on a continuum and are not always clearly distinguishable from each other. All of the chapters contain information and examples derived from secondary as well as primary succession. For example, disturbances considered in the book include animals, patch dynamics, fire, and hurricanes, all of which initiate secondary succession, along with volcanoes, glacial retreat, and other earth movements that initiate primary succession. Thus, the synthesis of literature and concepts presented applies widely to studies of vegetation dynamics. Walker and del Moral have done a superb job of summarizing current understanding of succession, and I recommend this book to all who are interested in the patterns and causes of vegetation change following disturbance.

MONICA G. TURNER
Department of Zoology
University of Wisconsin
Madison, WI 53706

COS Funding Opportunities™

Individual members of AIBS enjoy
FREE FUNDING INFORMATION
online via
Community of Science Funding Opportunities
tracking more than 20,000 public and private sources worldwide for research, education, and training.
Updated daily.

AIBS

FARMERS AND SCIENTISTS WORKING TOGETHER TO IMPROVE CROPS

Farmers, Scientists, and Plant Breeding: Integrating Knowledge and Practice. David A. Cleveland and Daniela Soleri, eds. CABI Publishing, Wallingford, United Kingdom, 2002. 368 pp. $100.00 (ISBN 0851995853 cloth).

By examining crop improvement issues from the perspectives of the farmer and scientist, David Cleveland and Daniela Soleri, both from the University of California–Santa Barbara, render a considerable service to the field of plant breeding, especially to that subfield directed toward crop improvement in developing countries. There is no question that conventional plant breeding has made enormous contributions to global food security. In developing countries, yields of improved rice, wheat, and, to a lesser extent, maize varieties have increased dramatically in favorable growing environments over the last 30 years as a result of plant breeding. However, the performance of these varieties under less favorable conditions has been

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.