

BOOK REVIEW

G. I. Ågren & F. O. Andersson: TERRESTRIAL ECOSYSTEM ECOLOGY. PRINCIPLES AND APPLICATION. – Cambridge University Press, 2012, 330 p., ISBN 978-1-107-6-4825-8.

The textbook is organized in four sections with fifteen chapters, and with a prologue and an epilogue. Declared structure follows „classical“ Odum’s school, approach and terminology, however, all the development of last decades in theory and practice is reflected. This allows better formulations of hypotheses and principles associated with ecosystems and their functioning. Also knowledge of direct or indirect threatening effects on ecosystems and, of course, connected human beings is presented (see also Naveh 2010). Finally, methodological tools important for interpretation of collected data, both descriptive and mathematically based, are added.

Prologue – „Environmental changes and ecosystem effects: Two historical examples“ shows the global problem with acid rain and global warming as the root of the phenomenon that environmental problems do not appear suddenly. Such problems necessarily attract many disciplines to delimitate research areas. Funding of such efforts are important for prevention of unexpectancy.

Section I starts with Chapter I and describes development of the discipline in the frame of „History of ecology“ by distinguishing of protoecology, early ecology, modern ecology, biome ecology, postbiome ecosystem research and later ecosystem research joined with landscape ecology, non-equilibrium ecology and concepts of sustainability and biodiversity. Chapter 2 „Ecology, ecosystem and ecosystem science“ illustrates chronosequences of tension between approaches or schools in ecology such as animal and plant ecology or reductionistic and holistic views. Chapter 3 „Ecosystem ecology: cornerstones and scientific methodology“ emphasizes key aspect of this discipline: a matter of elements and their movement in nature. Mentioned cornerstones mean mass balance, steady state, limiting nutrients and optimality.

Section II „Ecosystem structure and function“ is declared as the major section of the book. Chapter 4 „Ecosystem structure: site factors, soil and vegetation“ consists of treating of site factors and ecosystem layering. Chapter 5 „Energy and water“ gives into relationships solar energy and water balance which imply the soil-plant-atmosphere continuum concept. Chapter 6 „Plant production“ constructs the ecosystem effective functioning on the base photosynthesis and respiration operating on hierarchical levels. Chapter 7 „Soil organic matter dynamics“ brings a model of litter decomposition and lists the controlling factors of the process. Chapter 8 „Organisms and ecosystem processes“ presents discussions about different concepts of stability in relation to species diversity. Chapter 9 „Element cycles“ describes specifically the major nutrients and some other key elements in their pathways through the environment under different conditions including human influences. Chapter 10 „Principles“ summarizes rules evoked by previous chapters from „principles pertaining to boundary conditions“ to „principles pertaining to element cycles“.

Section III „Ecosystem dynamics at different time scales“ analyses driving forces operating in rates of change at different spatial and temporal levels. Chapter 11 „Tectonic to orbital changes“ combines in historical view physical and biological changes in long-term development of the biosphere. Chapter 12 „Millennial to centennial or postglacial changes“ covers the scale of the ecosystem development during the last 20 000 years with the effort to separate influences of climate and humans on the landscape. Chapter 13 „Centennial to annual changes“ concentrates to this time scale where the main purpose is to assess the role of wind, fire and herbivory in autogenic succession within ecosystems.

Section IV „Applications“ exemplifies the serious global environmental problems. Chapter 14 „Air pollution and forest ecosystems“ identifies the limits to which ecosystems can support the impact of air pollutants. Chapter 15 „Global change“ suggests a possible change in behavior of the Earth under new environmental conditions of accelerated land-use modifications, carbon economy trends and recent changes in physical climate.

Epilogue – „Society and terrestrial ecosystem ecology“ speaks about the challenge to use our knowledge of terrestrial ecosystem ecology as basic science for the good of society. Nature and its resources represent a fundamental condition for human existence. The concept of ecosystem services is essential and continuously developed (e.g., Kovář 2012a, b). Ecosystem changes in the last fifty years support higher attention devoted to linking society and the scientific community (e.g., Axelsson 2010).

Review summary: The book explains the structure and functioning of terrestrial ecosystems, using examples ranging from extremely cold polar areas to the tropics to demonstrate how they respond to variability of conditions. Recent field knowledge is developed into a set of principles that can start analyzing questions about ecosystem behavior. The extent and structure of the textbook is clearly optimal for university students of terrestrial ecology and their derivatives for practice.

Pavel Kovář*

REFERENCES

- AXELSSON, R., 2010:** Integrative research and transdisciplinary knowledge production: A review of barriers and bridges. – *Journal of Landscape Ecology*, 3(2): 14-40.
- KOVÁŘ, P. (2012A): R. E. Hester & R. M. Harrison (Eds.): ECOSYSTEM SERVICES.** – RSC Publishing, 2010, 176 p., ISBN 978-1-84973-018-1. - *Journal of Landscape Ecology*, 5(1): 73-74.
- KOVÁŘ P. (2012B): P. Kareiva, Talls H., Ricketts T. H., Daily G. C., Polasky S. (Eds.): NATURAL CAPITAL. THEORY AND PRACTICE OF MAPPING ECOSYSTEM SERVICES.** – Oxford University Press, Oxford – New York etc., Paperback, 2011, 365 p., ISBN 978-0-90-958900-5. – *Journal of Landscape Ecology*, 5(2): 98-99.
- NAVEH, Z., 2010:** Ecosystem and landscapes – a critical comparative appraisal. – *Journal of Landscape Ecology*, 3(1): 64-81.

* *Charles University in Prague, Faculty of Science, Benátská 2, 128 01 Prague 2, Czech Republic, e-mail: kovar@natur.cuni.cz*