



Review: Tropical Rain Forest Dynamics

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TROPICAL RAIN FOREST DYNAMICS

Gómez-Pompa, Arturo, and Silvia del Amo R. (eds.). 1985. **Investigaciones sobre la regeneración de selvas altas en Veracruz, México.** Volume II. Instituto Nacional de Investigaciones Sobre Recursos Bioticos. Editorial Alhambra Mexicana, S.A. de C.V. xiv + 421 p. No price given.

Among studies of successional phenomena, an important organizing question has been how interactions among species and between species and their environments result in an orderly pattern of species replacements. The answer for tropical rain forest habitats has been elusive. In the introduction to *Regeneración de selvas*, Gómez-Pompa and Vázquez-Yanes note with some perplexity that certain patterns in the composition and physiognomy of species seem to be apparent in the rain forests of Mexico and in other tropical regions as well, although identification of indicator species of successional stages and prediction of floristic-ecological patterns are difficult.

Beyond pioneer species and early stages of succession, patterns and processes of tropical forest successions are not well established. Moreover, as focus shifts from large-scale successions typical of land slides or abandoned agricultural fields to the smaller clearings created by single tree falls, patterns are difficult to discern. The question has become one of whether species interactions and adaptations on the one hand, or chance on the other, determine the occupation of space and consequently of forest structure. This question, or a variant of it, has been a focus of study at the Smithsonian Tropical Research Institute (Panama), the La Selva Biological Station (Costa Rica) and the Estación de Biología Tropical Los Tuxtlas (Veracruz, Mexico). As rain forest is inexorably reduced to isolated patches, comparisons of forest dynamics and species demographics among these three research reserves will be of considerable importance for our understanding of regeneration processes and the design of management strategies for rain forests.

At Los Tuxtlas (a field station of the Universidad Nacional Autónoma de México) in the northernmost extension of New World tropical rain forest, researchers have visualized succession as a series of linked processes. In its organization and focus on research on these processes, this volume bears a close resemblance to the first (A. Gómez-Pompa, C. Vázquez-Yanes, S. del Amo R., and A. Butanda (eds.). 1976. *Investigaciones sobre la regeneración de selvas altas en Veracruz, México*, Compañía Editorial Continental, S.A., México. Reviewed in *Ecology* 59:862). The twenty chapters include an introduction and perspective by Gómez-Pompa and Vázquez-Yanes and a description of the forest and facilities at Los Tuxtlas by Estrada, Coates-Estrada, and Martínez-Ramos. Recent studies at Los Tuxtlas of phenology, physiological ecology, de-

mography and plant growth, seed germination and viability, phytochemistry, herbivory, and frugivory comprise other chapters. All have English language summaries.

Research is concisely described and, in general, results are clearly presented. In contrast to the first volume, proper statistical evaluation of data is usual and presentation of undigested data has been eliminated. Unfortunately, the real utility of many of these studies is limited by lack of adequate sample sizes, sufficiently long periods of study, and/or diversity of species studied. Chapters on pioneer and long-lived species are about evenly divided. No explicit distinction is made between processes described from treefall gaps and larger-scaled old field successions.

Two chapters are primarily literature reviews. Córdova-Casillas does an excellent job of summarizing current research on tropical tree demography, particularly that in Mexico. Life-history studies of tropical trees have been frustrated by the lack of a reliable technique for determining ages, by their generally low population densities, and often by the scarcity of plants in young age classes. Studies of tropical tree demography at Los Tuxtlas have played a prominent role in stimulating much-needed research on this topic.

The chapter on succession in treefall clearings by Martínez-Ramos is a generally complete overview of current thoughts on the subject, but it confounds the issues by redefining old categories of tree life-history strategies and by perpetuating unsubstantiated generalizations about successional processes. With the exception of pioneer species, we have few data with which to categorize tropical trees by regeneration type. There is as yet no documentation for an increase in nutrient availability in treefall clearings.

Gómez-Pompa and Vázquez-Yanes make an early disclaimer that this book is not an attempt to develop a general theory of tropical forest dynamics, but is a contribution to a detailed description of forest regeneration as it occurs at Los Tuxtlas. In the final analysis, this lack of an overview is particularly disappointing in a second volume. Well-focused studies on single ecosystems are in a unique position to provide the necessary perspective to integrate small- and large-scale phenomena. For researchers interested in tropical forest dynamics, this book will join its predecessor as a source of information on the unique rain forest at Los Tuxtlas. However, large-scale and long-term studies of tropical tree regeneration patterns and a critical evaluation of our current assumptions will be necessary to determine whether indeed rain forest structure is a product of something other than chance.

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