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Diego R. Perez-Salicrup

Centro de Investigaciones en Ecosistemas

Stefan A. Schnitzer

Marquette University, stefan.schnitzer@marquette.edu

Francis E. Putz

University of Florida - Gainesville

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Community ecology and management of lianas

Diego R. Pérez-Salicrup

Centro de Investigaciones en Ecosistemas, Universidad Nacional Autónoma de México, Antigua Carretera a Pátzcuaro 8701, Morelia, Michoacán CP 58190, Mexico

Stefan Schnitzer

Department of Biological Sciences, University of Wisconsin-Milwaukee, P.O. Box 413, Milwaukee, WI

Francis E. Putz

Department of Botany, University of Florida, Gainesville, FL

Looping through the understory and cloaking the canopy in a tangle of leaves and flowers, lianas are among the most distinctive physiognomic features of tropical forests. The importance of lianas in tropical forests was recognized by such early naturalists as Darwin, Schenk, and Spruce; nonetheless, through the years, studies of the ecology of lianas have been relatively rare, especially when compared to research on trees. Over the last two decades, however, there has been an increasing interest in the study of lianas and their ecology, particularly in the tropics, with the recognition that lianas are an integral part of forest communities and contribute to many aspects of forest dynamics. This volume on the community ecology and management of lianas is timely, since the last substantial and comprehensive summary on this topic (*The Biology of Vines*, edited by Putz and Mooney) was published more than a decade ago (1991) and has been out of print for several years.

Lianas are common in most tropical forests, where they often compose around one quarter of the woody individuals and species. They compete intensely with trees for both above- and below-ground resources, decreasing the growth rates and fecundity of adult trees, retarding regeneration of tree seedlings and saplings, girdling tree stems and branches, and increasing the number of trees damaged and killed in treefalls. Lianas can have decidedly positive effects on forests as well, adding considerably to species and structural diversity as well as providing valuable food resources, habitat, and connections among tree canopies that are used as pathways by arboreal animals. Consequently, understanding the ecology of lianas and their interactions with other plant and animals is crucial not only for our knowledge about the functioning of tropical forests, but also for the successful management of tropical forests for timber. Indeed, some researchers have argued that the rate of deforestation in the tropics would increase considerably without sustained timber management as an incentive to maintain these forests (Grauel and Putz, this issue) and that lianas may be one of the most serious obstacles to effective timber management.

The contributed papers in this volume are a testament to the recent increase in research on the ecology and management of lianas in tropical forests. Included are articles from research conducted in a variety of locations around the world, including Central America (Costa Rica, Panama), South America (Bolivia, Brazil, Ecuador), the Caribbean Island of Puerto Rico, Western Africa (Cameroon), and sub-continental Asia (peninsular India). The articles focus on a variety of topics concerning the ecology and management of lianas. For example, the first four papers present in-depth analyses on the abundance, diversity, and demography of lianas in a number of very different forests around the globe (Mascaro et al., Parthasarathy et al., Rice et al., and Burnham). These studies provide the foundation for more in-depth future ecological and applied studies on the role of lianas in these forests. In the fifth article of this volume, Gerwing takes a closer look at the broad definition of lianas as a group by examining their various life-history traits and demonstrating that although lianas are considered to be a specialized functional group, there is still considerable variation among species. The next three articles examine the response of lianas to timber harvest and the response of trees to liana management. Alvira et al. and Schnitzer et al. quantify the response of lianas to logging with and without liana-cutting, presenting data on how quickly lianas recruit into gaps following tree harvest as well as providing information on the silvicultural benefit of pre-felling liana-cutting. By experimentally removing lianas, Grauel and Putz demonstrate the significant impact that lianas have on trees, both for the growth of adult individuals and recruitment of seedlings. The final paper, by Restom and Nepstad, deals with the physiology and growth of lianas. These authors examine above-ground growth and rooting depth of seedlings of the liana *Davilla kunthii*, describing the extremely deep root-system of this liana and how it relates to above-ground growth.

The manuscripts that comprise this volume focus on the community ecology and management of lianas in tropical forests, and were presented in a symposium on this topic held at the 2002 annual meeting of the Association for Tropical Biology and Conservation in Panama. We could not include all aspects of liana ecology (e.g., physiology, demography, genetic structure) but chose to concentrate on the rapidly moving areas of community ecology and management. Similarly, we could not include all geographic regions, simply because of the paucity of studies on lianas in many parts of the world. However, the collection of papers in this volume represent new, important and timely information on the ecology of lianas, and clearly demonstrate the impact of lianas in forest dynamics, forest

management and forest conservation. It is our hope that the information in this volume will also motivate new research in the ecology of lianas.