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Frontiers of Biogeography

Title

The burning bush

Permalink

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Journal

Frontiers of Biogeography, 5(3)

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Publication Date

2013

DOI

10.21425/F5FBG19502

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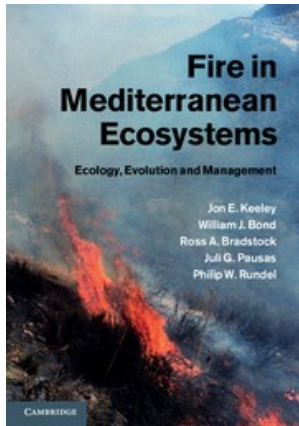
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Peer reviewed

The burning bush

Fire in Mediterranean Ecosystems: Ecology, Evolution and Management. Jon E. Keeley, William J. Bond, Ross A. Bradstock, Juli G. Pausas & Philip W. Rundel, 2011, Cambridge University Press. 522 pp. US\$120 (hardback). ISBN: 978-1-139-15321-8. <http://www.cambridge.org>



This book examines the role that fire plays in the five Mediterranean-type climate (MTC) regions of the world: California, central Chile, the Mediterranean Basin, the south-western portions of the Western Cape Province of South Africa, and south-western Western Aus-

tralia and portions of South Australia. These regions are characterized by winter rains and summer drought and all have vast areas subject to high fire risk. Although the book is focused on the MTC regions, this text is of more general interest: the authors have succeeded in producing an insightful study of fire as an important determinant of ecosystem assembly and distribution. The authors use the MTC regions as a way to explore the interactions among vegetation, fire regime, climate and geology.

The sclerophyllous shrublands within the MTC regions (the Mediterranean-type vegetation) have received a great deal of attention from plant ecologists and evolutionary biologists and have served as some of the textbook examples of convergent evolution (e.g. Mooney 1977). Such work necessarily emphasized the broad similarities in climate across these five regions and often assumed that climate was the major cause of trait evolution and community composition. One strength of this book is the authors' use of the dissimilarities in environmental factors across these regions to tease apart the potential drivers of vegetation distribution. The authors consider the full range of plant communities found in these regions and also discuss the occurrence of Mediterranean-type vegetation outside of areas strictly defined by a Mediterranean-type climate. This comparative perspective allows the authors to

form some conclusions regarding when winter rain or summer drought are likely to be the important climate drivers of vegetation and allows them to examine the feedback interaction between fire and plant communities that can create sharp vegetation shifts within a climate region.

The book is structured into three sections. The first section provides an overview of ecosystem convergence and indicates the major similarities and differences in both vegetation and fire across these regions. The chapters on fire regime and on fire-related plant traits in this section provide an excellent, stand-alone, brief introduction to the ecology of plants and fire.

The second section includes a chapter on each of the five MTC regions. Another strength of this book is in having the detailed chapters on each region explicitly compare similarities and differences. Some minor stylistic inconsistencies across chapters betray the multiple authored nature of the book (with authors based in four of the five MTC regions), but the chapters on individual regions are quite good and each covers the major vegetation types, the floristic composition and evolutionary history of the lineages that comprise the vegetation types, and detailed information on the historical and current role of fire.

The final section covers trait evolution, community diversity and fire management. These chapters synthesize and build upon the information thus far presented. The authors make the strong argument for fire playing a key role in plant evolution and provide a good review of the accumulating experimental and comparative evidence for fire adaptations. A chapter on origins of Mediterranean-type vegetation is especially useful because it not only covers the paleoclimatic and paleobotanical information available, but also rigorously examines the assumptions inherent in many previous investigations of convergent evolution. As they do throughout the book, the authors here attempt to determine which elements of climate

and fire regime drive trait evolution and community composition. Much Mediterranean-type vegetation has a much earlier origin than the climates currently associated with it and the authors point to fire as a neglected but important selective force on the origin and evolution of many of the relevant traits. The authors argue that the development of current MTCs in the Miocene did not provide completely novel niches, but, by coupling high temperatures with drought, expanded the fire-prone landscapes and led to the geographical expansion of previously more narrowly restricted traits and life histories.

A chapter on community dynamics in Mediterranean-type vegetation examines the debate over fire's role as a driver of diversity as well as the potential feedback effect of flammability in influencing fire regimes. Finally, the authors examine the challenging task of fire management in crown-fire-prone Mediterranean-type vegetation. This is an area of much-needed discussion. Prescription burning is used in many forest ecosystems to reduce fire hazard, yet prescription burning has had only limited success in MTC regions, and, in some cases, has led to dramatic negative effects on native vegetation.

In conclusion, this text has three outstanding characteristics: 1) a rigorous and critical review of the interaction between climate and

fire, 2) a historical and evolutionary perspective on the MTC regions and their floras, and 3) up-to-date synthesis of current ecological understanding of vegetation and fire interactions in the MTC regions but applicable to other fire-prone ecosystems. Although the book will be of primary interest to researchers working in MTC regions, it also serves as an excellent general resource on plants and fire. The first and second sections provide an excellent introduction for a researcher new to these regions or to fire ecology while the final section, by not shying away from big issues and debates, provides plenty of thought-provoking grist for experienced specialists in the biogeography of these regions.

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Reference

Mooney, H.A. (ed.) (1977) Convergent evolution of Chile and California Mediterranean climate ecosystems. Dowden, Hutchinson and Ross, Stroudsburg, Pennsylvania.

Edited by Markus Eichhorn