



# Comprehensive treatment of plant invasions through a geographic lens

David R. Clements, Mahesh K. Upadhyaya, Srijana Joshi, and Anil Shrestha (Eds.): *Global plant invasions*. Springer, Cham, Switzerland, 2022, xii + 381 pp, \$279.99 (hardback), ISBN: 9783030896843

Montserrat Vilà 

Received: 12 August 2022 / Accepted: 22 August 2022  
© The Author(s), under exclusive licence to Springer Nature Switzerland AG 2022

There are many books on biological invasions and it is hard to conceive of a relevant topic for a new one. Many books have focused on particular regions or habitat types, such as Europe, New Zealand, marine or protected areas, among many others. The book *Global Plant Invasions* is comprehensive in its scope and specific on the taxa it treats. Plants are one of the most studied taxa of non-native species, because they are easy to identify and are sessile, allowing in situ field experiments to investigate the mechanisms governing their establishment, spread, and impacts. Indeed, invasive plants and invaded plant communities have been the setting for formulation and testing of many hypothesis on biological invasions (Enders et al. 2020). Moreover, because at national scales non-native plants are one of the largest groups of invasive species only exceeded in some instances by terrestrial invertebrates, writing about plant invasions can include much of what it is known about biological invasions in general.

The book *Global Plant Invasions* offers an updated view on general theories of biological invasions, on the dynamics of invasions through human history, on

the influence of environmental change on invasions, on the variety of their impacts, and on how they are currently managed. It does this by a series of chapters on these topics, and in addition, many of these topics are treated in chapters on different geographical areas. The core of the book is devoted to plant invasions at the continental scale: Asia, Australia, Europe, North America, South America, Continental Central America, and Africa. Most chapters describe the diversity, distribution, history, pathways, origins, impacts, management, and policies on plant invasions in each of these areas. The analysis is quantitative and comprehensive for the best-known regions, such as Europe, for which databases are available, but even for regions where information is sketchy (e.g., Central America or Africa), the authors have done an excellent effort to integrate data from different sources. These chapters provide very useful tables and figures comparing countries. However, I was a bit disappointed with the chapter on plant invasions in Australia which offers an overview of the history of plant invasions from prior European colonization until recent times. It describes the main invasive plants, some listed as of National Significance, but in light of the devastating effects invasions are having on the exceptional Australian biota, I was expecting some discussion of the most invaded ecosystems and correlates of the degree of invasion with current environmental and socio-economic factors.

The chapters that present the most global assessments of plant invasions are the ones on islands and

---

M. Vilà (✉)  
Department of Integrative Ecology, Estación Biológica de Doñana (EBD-CSIC), 41092 Sevilla, Spain  
e-mail: montse.vila@ebd.csic.es

M. Vilà  
Department of Plant Biology and Ecology, Universidad de Sevilla, 41012 Sevilla, Spain

mountains. Both chapters discuss the importance of considering introduction pressure, plant traits, biotic resistance, disturbance, and climate change to understand invasion patterns and dynamics of these two biogeographical entities. Both chapters stress that, owing to their isolation from donor areas (mainland areas for islands, lowlands for mountains), preventing the introduction of potential invasive species might be more feasible than in other habitats. Unfortunately, there is no chapter on plant invasions in aquatic ecosystems, although they host some of the most problematic plant invaders worldwide.

Invasion scientists have always been aware that plant invasions can increase our understanding at all levels of ecological complexity from autoecology to community ecology to landscape ecology. This book proves that, due to the global phenomena of plant invasions, biogeography is perhaps the discipline that is most affected and can serve as the best lens for a comprehensive treatment. Beyond basic research, the study of plant invasions is also highly applied. From its beginning, research on biological invasions has not remained on academic bookshelves but has served to elucidate their impacts on the conservation of biodiversity and ecosystems as well as on the economy and human well-being. Researchers on biological invasions often collaborate closely with practitioners, managers, and policy makers. This book treats many of these applied aspects of plant invasions. I found particularly interesting the chapters on management advances and global strategies that emphasize that management should tackle not only the species but also the pathways and the invaded ecosystems. These chapters present and compare tools on species detection such as remote sensing or environmental

DNA and promising new developments for the control of plant invasions such as gene drive technologies, new advances that do not come without risks (Emerson et al. 2017). The authors also highlight the human dimension of successful management such as the assessment of their impacts on peoples' activities (Bacher et al. 2017), the need for stakeholder engagement, and the role of citizen science. Finally, the book offers useful guidance on major global networks, repositories, international initiatives, and intergovernmental platforms on invasions.

Overall, the book presents a modern overview of the major components of plant invasions with emphasis on invaded territories. It offers a clear vision of the translational nature of plant invasion research. It is easy to read and provides excellent diagrams, tables, and figures of interest not only for scientists, but also for any professional concerned with the causes and consequences of biological invasions in general.

## References

- Bacher S, Blackburn TM, Essl F et al (2017) Socio-economic impact classification of alien taxa (SEICAT). *Methods Ecol Evol* 9:159–168
- Emerson C, James S, Littler K, Randazzo F (2017) Principles for gene drive research. *Science* 358:1135–1136
- Enders M, Havemann F, Ruland F et al (2020) A conceptual map of invasion biology: integrating hypotheses into a consensus network. *Glob Ecol Biogeogr* 29:978–991

**Publisher's Note** Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.