



## OPEN ACCESS

## EDITED AND REVIEWED BY

Purabi Saikia,  
Central University of Jharkhand, India

## \*CORRESPONDENCE

Thomas Campagnaro,  
✉ thomas.campagnaro@unipd.it

## SPECIALTY SECTION

This article was submitted to  
Conservation and Restoration Ecology,  
a section of the journal  
Frontiers in Environmental Science

RECEIVED 10 March 2023

ACCEPTED 20 March 2023

PUBLISHED 29 March 2023

## CITATION

Campagnaro T, Badalamenti E,  
Castro-Díez P and Freitas H (2023),  
Editorial: Non-native tree species:  
Impacts and management.  
*Front. Environ. Sci.* 11:1183804.  
doi: 10.3389/fenvs.2023.1183804

## COPYRIGHT

© 2023 Campagnaro, Badalamenti,  
Castro-Díez and Freitas. This is an open-  
access article distributed under the terms  
of the [Creative Commons Attribution  
License \(CC BY\)](#). The use, distribution or  
reproduction in other forums is  
permitted, provided the original author(s)  
and the copyright owner(s) are credited  
and that the original publication in this  
journal is cited, in accordance with  
accepted academic practice. No use,  
distribution or reproduction is permitted  
which does not comply with these terms.

# Editorial: Non-native tree species: Impacts and management

Thomas Campagnaro<sup>1,2\*</sup>, Emilio Badalamenti<sup>3</sup>, Pilar Castro-Díez<sup>4</sup>  
and Helena Freitas<sup>5</sup>

<sup>1</sup>Department of Land, Environment Agriculture and Forestry (TESAF), Università Degli Studi di Padova, Legnaro, Italy, <sup>2</sup>National Biodiversity Future Center (NBFC), Palermo, Italy, <sup>3</sup>Department of Agricultural, Food and Forest Sciences, Università Degli Studi di Palermo, Palermo, Italy, <sup>4</sup>Biological Invasions Research Group, Department of Life Sciences, University of Alcalá, Alcalá de Henares, Spain, <sup>5</sup>University of Coimbra, Department of Life Sciences, Centre for Functional Ecology, Coimbra, Portugal

## KEYWORDS

exotic, alien, forest management, silviculture, biodiversity, tree invasions

## Editorial on the Research Topic

### Non-native tree species: Impacts and management

Non-native tree species are an important component of many forests around the world. These species were introduced for various reasons: the provision of wood and non-timber forest products, soil protection or rehabilitation, ornamental purposes, etc. In fact, they are important for sectoral economies, especially locally and in rural landscapes. However, there are multiple contexts in which some of these trees may have undesired negative effects, such as declines of biodiversity, increases of disturbance frequency, or disruptions of ecological balance of the native forests, greatly affecting the provision of ecosystem services. Non-native tree species can be found in different landscapes and affect different ecosystems and habitats: from protected areas to cultural landscapes, from forests to open grasslands. Therefore, regional, national, and supranational (e.g., European) sectoral policies are now paying attention to these aspects. Different examples can be found at the international level. For example, the EU 2030 Forest Strategy reports that monitoring should focus on non-native species causing negative impacts, among other aspects. Recently, several scientists forwarded a global guideline for the use of non-native trees, with the objective of minimizing the impacts caused by non-native tree species (Brundu et al., 2020).

Increasing attention to the Research Topic of non-native trees is fully justified, as its potential -either positive or negative- impacts are not yet fully appreciated, and expansion of these species in many cases proves difficult or even impossible to control above a certain level of spread. The last decades have witness an exponential increase of the scientific information regarding the distribution and impact of non-native plants at different scales and levels (e.g., at the national scale: Campagnaro et al., 2022; Sanz Elorza et al., 2004). Even so, the available information is largely uneven across species, with some species (e.g., *Robinia pseudoacacia* L., *Ailanthus altissima* (Mill.) Swingle, or several species of the genus *Acacia*) having been much further studied than others. Therefore, the scientific community is called to contribute at capacity development in the field of non-native tree species and, in particular, on their management and impacts, two aspects of focus in this Research Topic.

This Research Topic includes articles focusing on different aspects of relevance in the management of non-native tree species, ranging from identifying knowledge gaps and future implications, investigating the future use of non-native trees, providing governance approaches, assessment of impacts, and applying novel monitoring approaches.

Dimitrova et al. give an overview of non-native trees in Europe. Based on replies to questionnaires by experts involved in the COST Action “Pan-European Network for Climate Adaptive Forest Restoration and Reforestation,” a literature review and available databases, the authors summarise the diversity of non-native trees in Europe and point out important knowledge gaps. Finally, they advocate special caution about the hybridization potential and highlight the possible interaction of non-native trees with future climate change.

The article of Sprague et al. proves the crucial role of stakeholder engagement in the development of a non-native tree management strategy based on updated scientific information. Authors argue that good governance, as well as adaptive management, are crucial to successfully tackle/address the Research Topic of invasive non-native trees.

Lévesque et al. investigate the potential of using non-native *Fraxinus* species to offset the decline of common ash (*Fraxinus excelsior* L.) in Europe due to the spread of two pathogens. Although they identify some potential candidate species, compatible with the niche of the common ash and resistant to pests, the authors also warn about their potential risk of invasion and hybridization, and suggest the use of experimental plantations to better understand the risks of non-native ash species prior to their utilization in natural forests.

Duarte et al. compare the efficiency of different methods to control *Acacia longifolia* (Andrews) Willd. in coastal dunes of Portugal. Controlling the spread and impact of invasive species is a hard task and this study highlights the need for follow-up treatments for a successful long-term control of non-native trees.

Marzialietti et al. highlight the utility of remote sensing tools to early detect and monitor the spread of invasive species. Specifically, the authors show that the use of unmanned aerial vehicle (UAV) images may fill the gap between occurrence field data and information from satellite images, using the case study of *Acacia saligna* (Labill.) H.L.Wendl. invading Mediterranean coastal dunes.

The articles in this Research Topic show that new approaches, such as the use of images taken by UAV or the involvement of stakeholders in management strategies, along with adaptive management, based on follow-up controls and evaluations, are

necessary to address the Research Topic of non-native trees and mitigate their detrimental impacts on native ecosystems and ecosystem services. Finally, we would like to thank the reviewers and all authors for their contributions to this Research Topic. We hope the reader will enjoy reading the contributions to this Research Topic.

## Author contributions

TC: Conceptualisation, writing—original draft, review, and editing. EB, PC-D, and HF: Conceptualisation, writing, review, and editing.

## Funding

TC acknowledges the support of the NBFC to the University of Padova, funded by the Italian Ministry of University and Research, PNRR, Missione 4 Componente2, “Dalla ricerca all’impresa”, Investimento 1.4, Project CN00000033.

## Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

## Publisher’s note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

## References

- Brundu, G., Pauchard, A., Pyšek, P., Pergl, J., Bindewald, A. M., Brunori, A., et al. (2020). Global guidelines for the sustainable use of non-native trees to prevent tree invasions and mitigate their negative impacts. *NeoBiota* 61, 65–116. doi:10.3897/neobiota.61.58380
- Campagnaro, T., Brundu, G., Burrascano, S., Celesti-Grappo, L., La Mantia, T., Sitzia, T., et al. (2022). Tree invasions in Italian forests. *For. Ecol. Manag.* 521, 120382. doi:10.1016/j.foreco.2022.120382
- Sanz Elorza, M., Dana Sánchez, E. D., and Sobrino Vesperinas, E. (2004). *Atlas de las plantas alóctonas invasoras en España*. Madrid: Dirección General para la Biodiversidad. Ministerio de Medio Ambiente.