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Conference Abstract

Translating scientific evidence into decision-support tools for invasive plant management

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Abstract

The increasing concern of biological invasions and their multiple impacts have made the translation of scientific knowledge into practical action an urgent global priority. This need is explicitly recognized in Target 6 of the Kunming-Montreal Global Biodiversity

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Framework for 2030. Although a growing body of invasion science literature addresses a wide range of management methods for numerous invasive species, access to this knowledge remains limited for practitioners and decision-makers. This is largely because available information is often highly specialized, fragmented, taxonomically and geographically biased, and primarily targeted toward academic audiences. To overcome this barrier, it is essential to foster collaboration among researchers with diverse backgrounds to develop synthesis studies capable of analyzing large and complex datasets with the aim of identifying and prioritizing management strategies, and translating them into practical, user-friendly tools. We developed a reproducible workflow to:

1. conduct a collaborative, comprehensive review of the scientific literature on naturalized and invasive plant management in mountain ecosystems,
2. extract and analyze outcomes, systematically classifying management strategies according to their effectiveness, and
3. validate the results with experts, while making all the information accessible through a global online database tailored for stakeholders and written in clear, non-technical language.

The list of naturalized plants in mountain areas (n = 564) was obtained from the MIREN (Mountain Invasion Research Network) global database. The species with the highest number of articles related to management strategies were *Bromus tectorum*, *Lantana camara*, *Ailanthus altissima*, *Robinia pseudoacacia*, *Solidago canadensis*, *Cytisus scoparius* and *Impatiens glandulifera*. Of the total articles retrieved (n = 5425), 15% met our inclusion criteria and were selected for data extraction. So far, 438 articles were analyzed, evaluating a total of 930 treatments across 62 countries, with most studies conducted in the United States, followed by South Africa, Australia, and New Zealand. Overall, 82% of treatments corresponded to non-integrated approaches, while only 18% addressed integrated management strategies. Among the non-integrated treatments, chemical methods were the most common (42.4%), followed by biological (38%), mechanical (16.6%), and restoration-based approaches (3%). Chemical and biological treatments showed the highest effectiveness; however, chemical methods were also associated with higher levels of unintended effects. This ongoing project will result in a structured evidence database and a decision-support resource that facilitates the identification of effective management actions across contexts. It represents an important first step toward scaling up this approach to naturalized alien plants globally. Importantly, the researchers involved in this initiative come from different countries and diverse research backgrounds, strengthening evidence interpretation and helping to identify both the feasibility of management actions and gaps in management experiences across contexts. Likewise, the ultimate data validation will be carried out with experts from the field and experienced stakeholders, during interdisciplinary workshops. Together, these efforts aim to bridge the gap between science and practice and to enhance the effectiveness of plant invasion management at a global scale.

Keywords

Decision-support tools; Integrated management strategies; Evidence synthesis; Systematic review; Invasive and naturalized species

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Conflicts of interest

The authors have declared that no competing interests exist.