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Conference Abstract

# Contributions to the knowledge of the alien flora of the Pyrenees: cataloguing, characterization, and degree of invasion

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## Abstract

Biological invasions represent a growing threat to biodiversity and ecosystems worldwide. The vulnerability of mountain systems—traditionally considered more resistant—has increased due to human activity and climate change, which facilitate the spread of non-native plants to higher elevations. Therefore, understanding these invasions is essential for their prevention and control. The Pyrenees constitute a particularly relevant case, as they are characterized by an exceptional floristic richness resulting from a high diversity of climatic, topographic, geological, and ecological conditions.

The Atlas of the Pyrenean Flora (https://atlasflorapyrenaea.eu/), developed within the framework of the cross-border projects FLORAPYR AVANCE and FLORAPYR 3D (funded by the INTERREG POCTEFA program), includes more than 3,600 native taxa with confirmed presence in the mountain range since 1960. In that version of the atlas, alien taxa were also considered (with 462 species), although a more exhaustive curation effort was needed. In this work, a revised, unified, comprehensive, and up-to-date list of alien flora has been compiled; it currently includes more than 700 taxa and will soon be made

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available to managers and researchers working in the field of biological invasions. Starting from the taxa identified as alien in the aforementioned Atlas of the Pyrenean Flora, this list has incorporated new taxa from multiple sources:

1. recent publications on alien flora in regions encompassing the Pyrenees, such as the checklist of Catalonia published by Aymerich & Sáez in 2019, the technical list produced by Cottaz and collaborators in 2021 for Occitania, and the catalogue of invasive exotic plants compiled by Prud'homme and collaborators in 2021 for the Pyrénées and Midi-Pyrénées region;
2. herbarium data containing material from the Pyrenees;
3. online databases such as the Biodiversity Data Bank of Catalonia (*Banc de Dades de Biodiversitat de Catalunya*; http://biodiver.bio.ub.es/biocat); and
4. data from the citizen science platform iNaturalist.

In this contribution, in addition to presenting a comprehensive list of alien plants in the Pyrenees, a series of ecological and biological aspects have been analyzed, and the main patterns of geographic and temporal distribution have been established (based on localities and recording dates). A decision tree tailored to the Pyrenean context is further applied to classify taxa according to their invasion status, distinguishing between casual, naturalized, and invasive species.

The initial results, in addition to indicating that the Pyrenees can be considered a hotspot of alien flora within the context of European mountain systems, highlight the need to implement prevention, detection, and control measures to avoid the spread and introduction of alien plants across the Pyrenean territory and to reduce their potential impact on native species and ecosystems. Future work (to be completed by 2027) will focus on modelling the invasion potential of alien species under projected climate change scenarios and quantifying the impacts of the most concerning taxa on native species and ecosystems using standardized assessment frameworks (e.g., EICAT).

## Keywords

citizen science, invasion degree, management, naturalization, non-native species

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## Conflicts of interest

The authors have declared that no competing interests exist.