

EGU21-11167

EGU General Assembly 2021

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Biological invasions as natural hazards: towards building a strategy to cope with invasive alien plants

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Biological invasions can be compared to natural hazards as besides their environmental effect can also produce rapid and damaging socioeconomic impacts. Additionally, their causes and consequences are generally well understood yet difficult to predict, and their incidence is almost unfeasible to control. For both phenomena, it is their random and uncontrollable nature that demand planning for the worst. Therefore, biological invasions and natural hazards require similar management strategies and commitments.

The aim of this study was to support decision makers and stakeholders in Lesvos Island Greece in prioritizing high impact alien plant species. We applied an integrated framework that combined a literature review and a systematic roadside survey of alien plants presence, along with their distribution, abundances, habitat preferences and impacts. Relied on this solid base we structured a prioritization scheme that would identify and rank aliens according to their invasiveness and produce alert lists of the most invasive ones. Two Risk Assessment protocols were implemented: the European and Mediterranean Plant Protection Organization (EPPO) prioritization scheme, and the Australian Weed Risk Assessment (A-WRA). Each screening method delivered assessment lists that classified aliens as *invasive*, *possibly invasive*, and *non-invasive*. With the aim of benchmarking the performances of the two methods we compared their results with a third invasiveness estimation performed by a panel of experts at national level.

In total, 151 alien plants from 53 different families were found. The most abundant families were Asteraceae (10%), Amaranthaceae and Poaceae (9%), and Fabaceae (8%). A subset of 87 species, which excluded urban, ornamental, or cultivated plants with rare occurrences and no documented impacts, was assessed. According to the EPPO scheme, 8% of species categorized as invasive, 57% as possibly invasive and 34% as non-invasive. The A-WRA method was stricter, classifying 80% of species as invasive, 14% as possibly invasive and only 6% as non-invasive. Compared to expert's opinion, EPPO scheme indicated a 10% match for invasive and a 43% for non-invasive species, whereas A-WRA an 83% and 14% respectively.

Main ranking differences between the two methods are due to the diverse input information each one requires, and to differences in the relevant importance of that information to the final ranking. A-WRA is a precautionary method that rejects even minor invaders, whereas EPPO method is a rapid prioritization tool that provides information for a subsequent appropriate Pest Risk Analysis. Our framework delivers critical information and can improve the development of early-warning systems that would promote successful preventative management strategies for

biological invasions.

Acknowledgements: *This research is co-financed by Greece and the European Union (European Social Fund- ESF) through the Operational Programme "Human Resources Development, Education and Lifelong Learning 2014-2020" in the context of the project "An Integrative Framework for the Study of Alien Flora" (MIS 5049419).*