

The management of invasive non-native trees in the Mediterranean protected areas: Sicily as a case study

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Introduction

Invasive non-native trees (INNTs) are increasingly recognized to have negative effects on biodiversity and ecosystem services in protected areas, where the management of INNTs is one of the major challenges to preserving native species and ecosystems. Moreover, the combined effect of climate change and increasing disturbance factors (e.g. wildfires) is likely to aid the spread of many INNTs in the Mediterranean protected areas, as well as favouring their competitive relationships with native species. However, the effective implementation of control measures is far from being fully achieved.

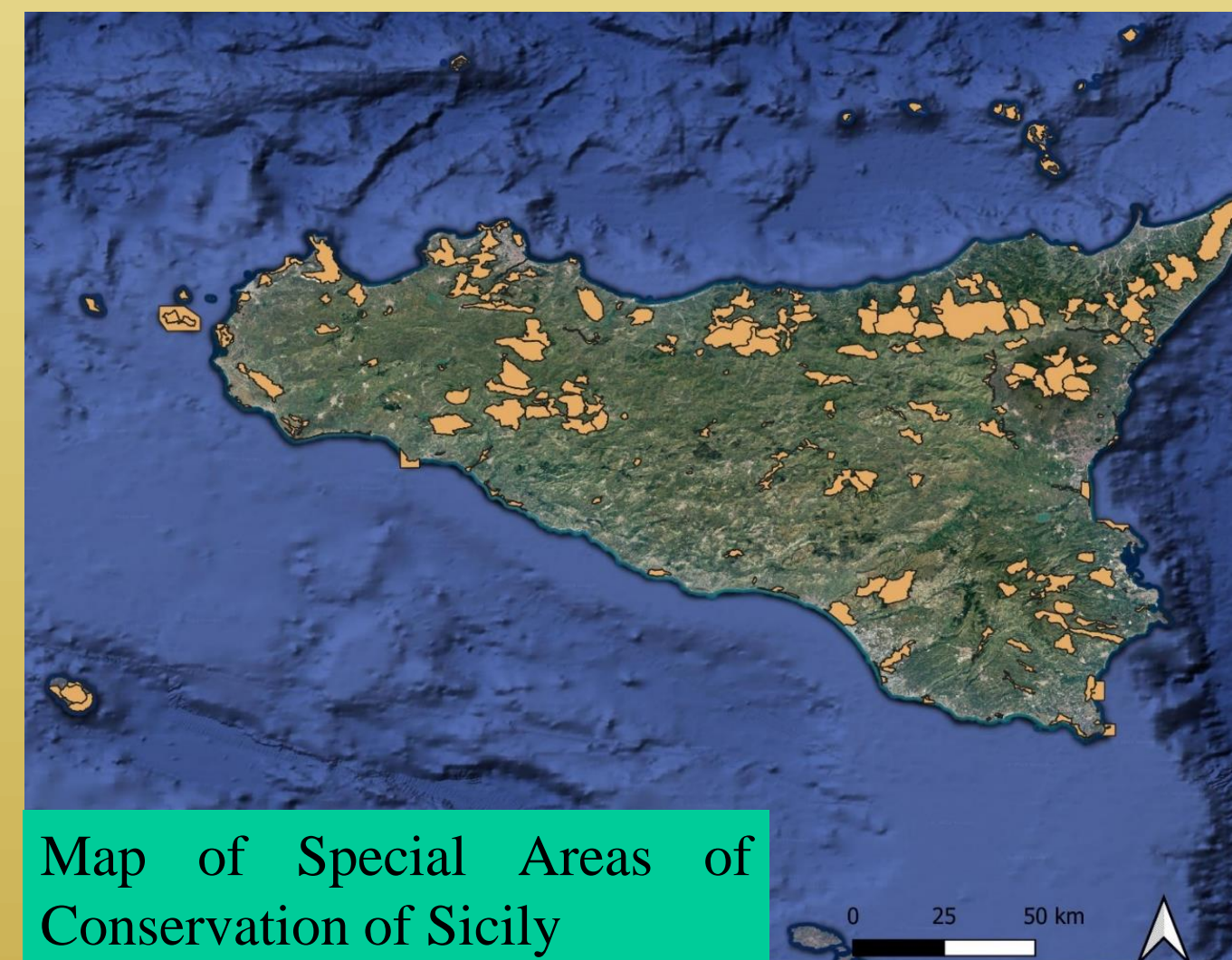
Methods

I assessed how the problem of INNTs is currently addressed in Sicily (Mediterranean Italy). The research was carried out in a selection of Special Areas of Conservation (SACs) (Natura2000 sites) (about 35% of all sites), designed according to the Habitats Directive (92/43/EEC). In particular, I checked the management plans (available at https://arta.regione.sicilia.it/old_site/web/natura2000/index.html), searching for information about the occurrence (A), abundance (B) and invasiveness (C) of non-native plant species.

The research was focused on the most troublesome INNTs occurring in Sicily: *Ailanthus altissima*, *Acacia saligna* and *Robinia pseudoacacia*, along with taxa characterized by a recent spread such as *Parkinsonia aculeata* and *Vachellia karroo*.

Results

- A) *Ailanthus altissima* is by far the most widespread invader, followed by *Robinia pseudoacacia* and *Vachellia karroo*. *Acacia saligna* is showing a limited spread due to its peculiar autoecology, whilst *Parkinsonia aculeata* is at the very beginning of its invasive process.
- B) However, *Robinia* is found in abundant populations in more than half of protected sites, followed by *Acacia* and *Ailanthus*. This latter is most frequently found in Abundance of invasive population.
- C) All the target species were considered invasive in at least 50% of the affected SCAs. *Vachellia* is the most frequently classified as invasive, followed by *Ailanthus* and *Robinia*.

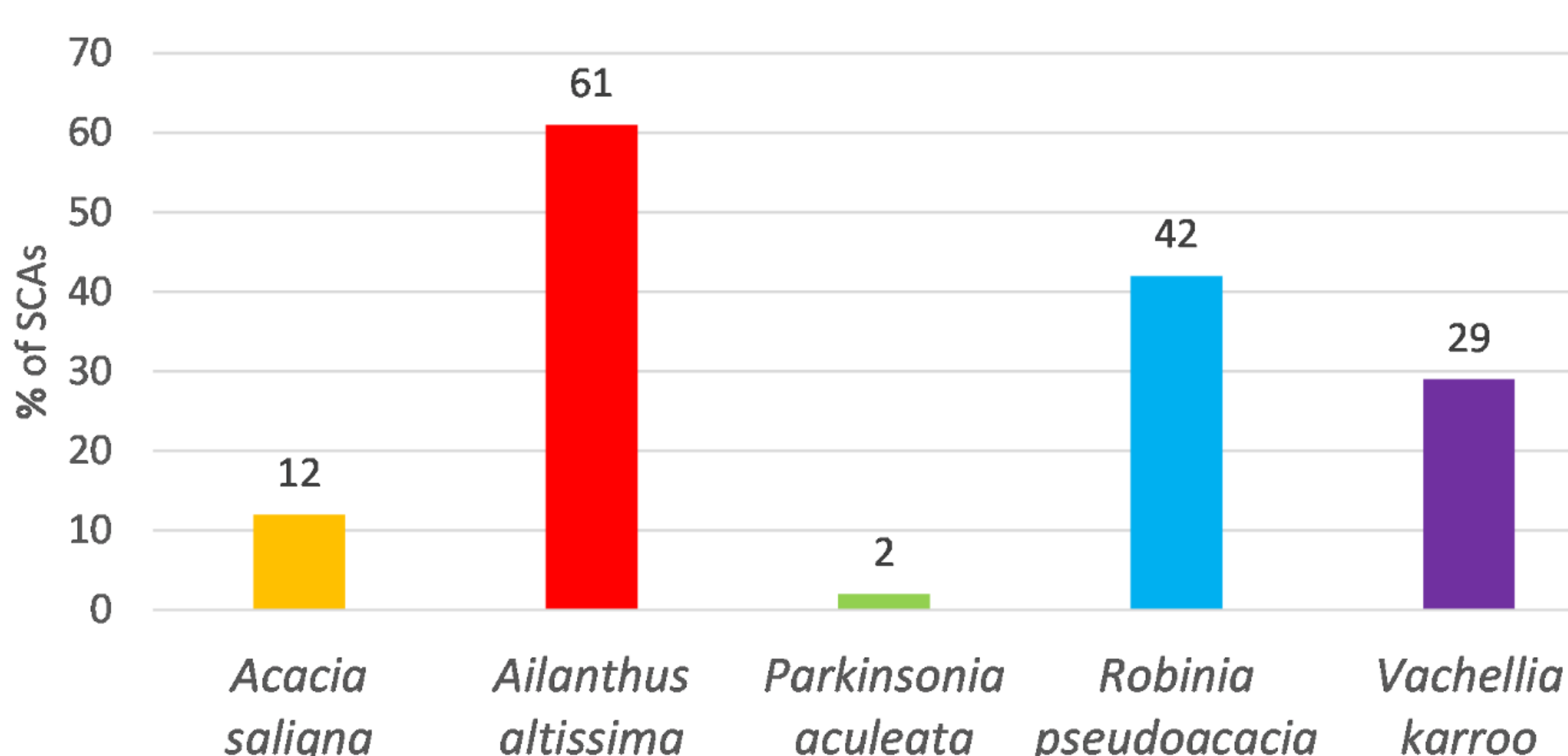


Acacia saligna seriously hinders the natural regeneration by native woody species in Mediterranean pine stands.

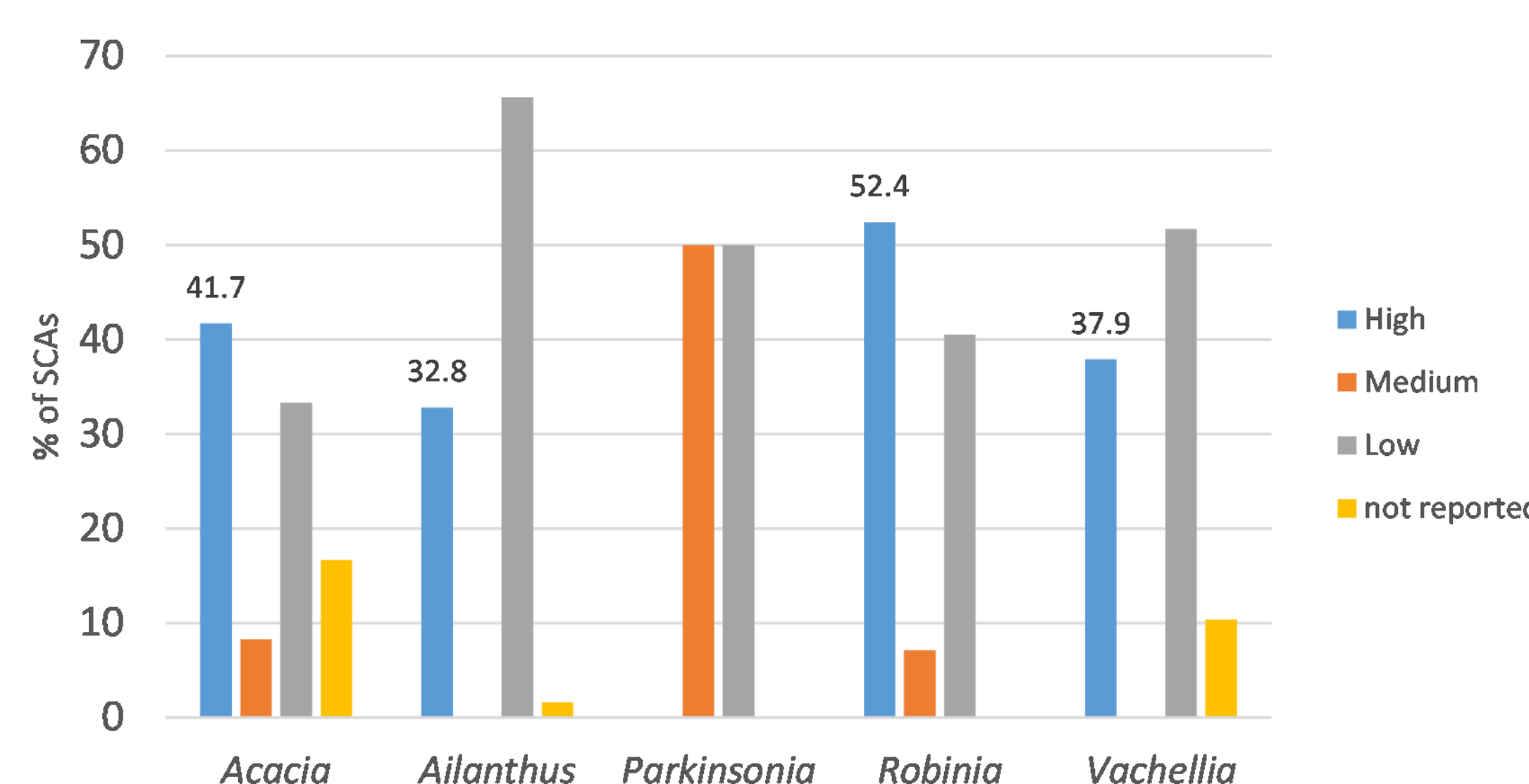


Ailanthus is widely spread in SCAs in Sicily, where it also threatens abandoned chestnut coppices (A), riparian stands (B) and thermophilous downy oak stands (C and D).

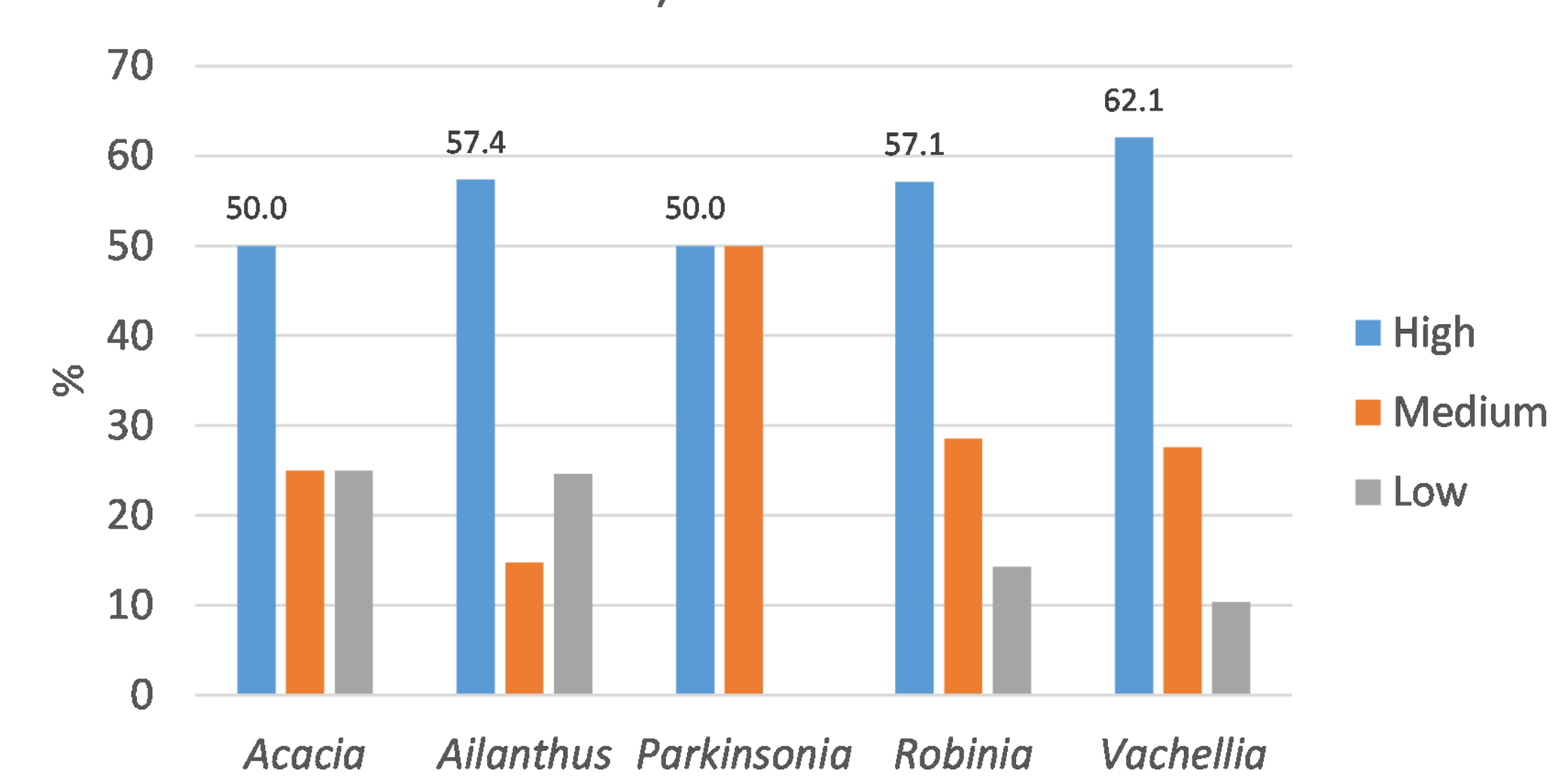
A) Occurrence



B) Abundance



C) Invasiveness



Conclusions

I found large differences in the occurrence and abundance of the target INNTs in SCAs of Sicily. *Ailanthus altissima* is by far the most widespread. However, it is considered with a low abundance in more than 60% of selected sites, thus suggesting a likely future spread. More worrying, even considering tree taxa with recognized invasiveness worldwide, is that in more than half of affected SCAs, they are not considered as invasive, except for *Robinia* (in 52% of all sites).

This evidence highlights an undervaluation of the strong impact of non-native tree species on biodiversity conservation and the structure and functioning of forest ecosystems in the Mediterranean protected areas. Further confirming this trend, only in a few cases, effective control strategies are ongoing or have been successfully implemented in SCAs in Sicily. Under climate change effects and increasing disturbance frequency, the influence of non-native trees on natural ecosystems is bound to increase over time. Hence, tailored strategies are strongly needed if we are to limit the spread of INNTs where they represent an ecological threat whilst promoting their sustainable use where they can meet some ecological requirements.

Acknowledgments

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Vachellia karroo actively spreading after a large wildfire in Mount Pellegrino (Palermo) (left), where physical treatments (girdling and clear-cutting) are ongoing (right) to reduce its invasive potential.