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### ► To cite this version:

Pauline Eymar-Dauphin, David Renault, Manon Bounous, Kévin Le Falher, Clémence Pillard, et al.. Living together along an invasion gradient. The example of the plant communities at the Iles Kerguelen.. 64th IAVS Symposium, Jun 2022, Madrid, Spain. hal-04879287

**HAL Id: hal-04879287**

<https://univ-lyon1.hal.science/hal-04879287v1>

Submitted on 10 Jan 2025

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## Living together along an invasion gradient The example of the plant communities at the Iles Kerguelen

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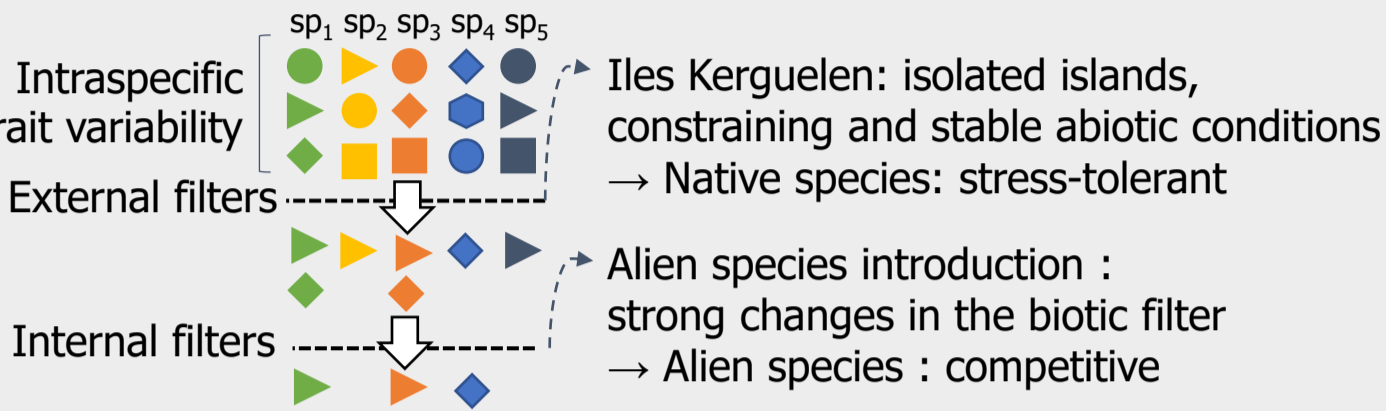
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### Introduction Community assembly rules



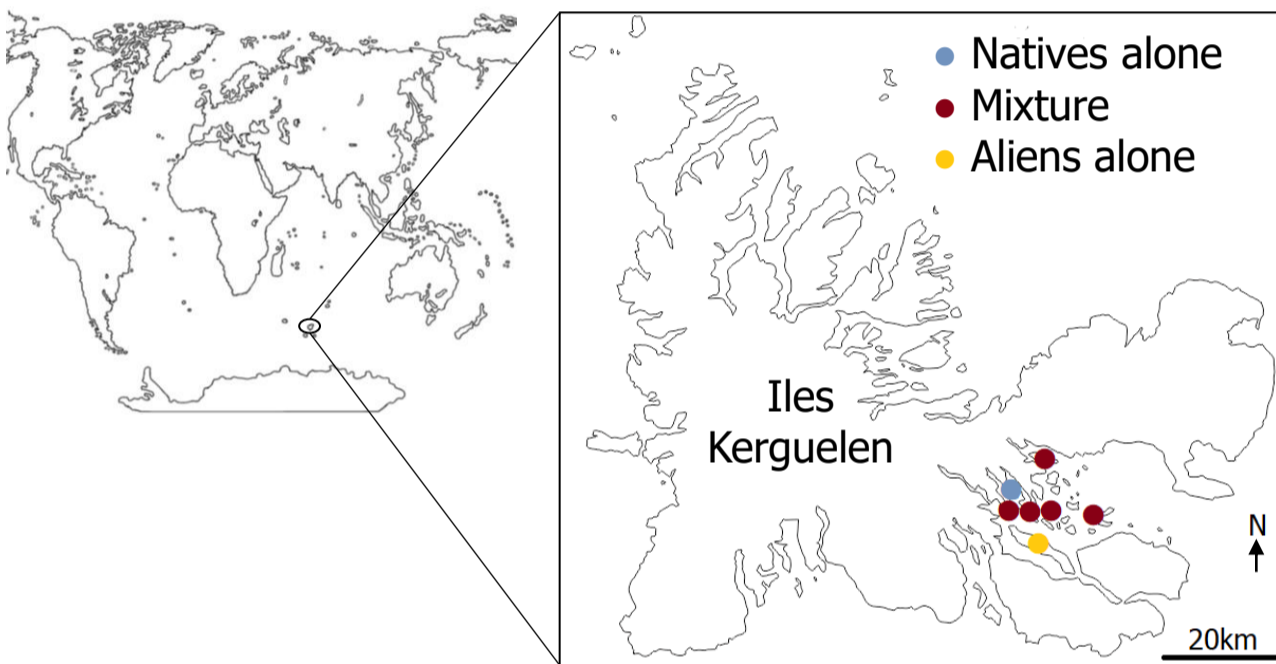
**H1:** Alien plant species exhibit more competitive trait value than native species

**H2:** Mechanisms of species coexistence should shift along invasion gradient from niche stabilization under low invasive species abundances to competitive hierarchy at the opposite end of the gradient

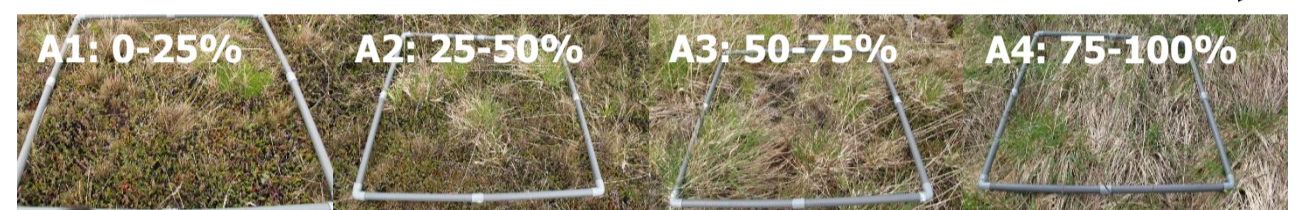
**H3:** Environmental conditions should lead to the existence of optimum for trait values, especially for height, and thus limit the competitive hierarchy (Mathakutha et al., 2019; van Kleunen et al., 2010; Violle et al., 2012)

### Materials & methods

- Field sampling along invasion gradients of alien plant species: 5 sites in mixture x 2 gradients x 4 areas (100m<sup>2</sup> each)
- 2 sites in allopatry (natives or aliens alone) x 2 areas (100m<sup>2</sup> each)



- Areas of increasing proportions of alien plant species



- 8 quadrats / area → Plant species cover (%)
  - Natives: *Acaena magellanica*, *Azorella selago*, *Blechnum penna-maritima* & *Festuca contracta*
  - Aliens: *Cerastium fontanum*, *Dactylis glomerata*, *Poa pratensis*, *Taraxacum erythrospermum* & *Taraxacum officinale*

- 10 individuals / dominant species / area → Plant trait measurements

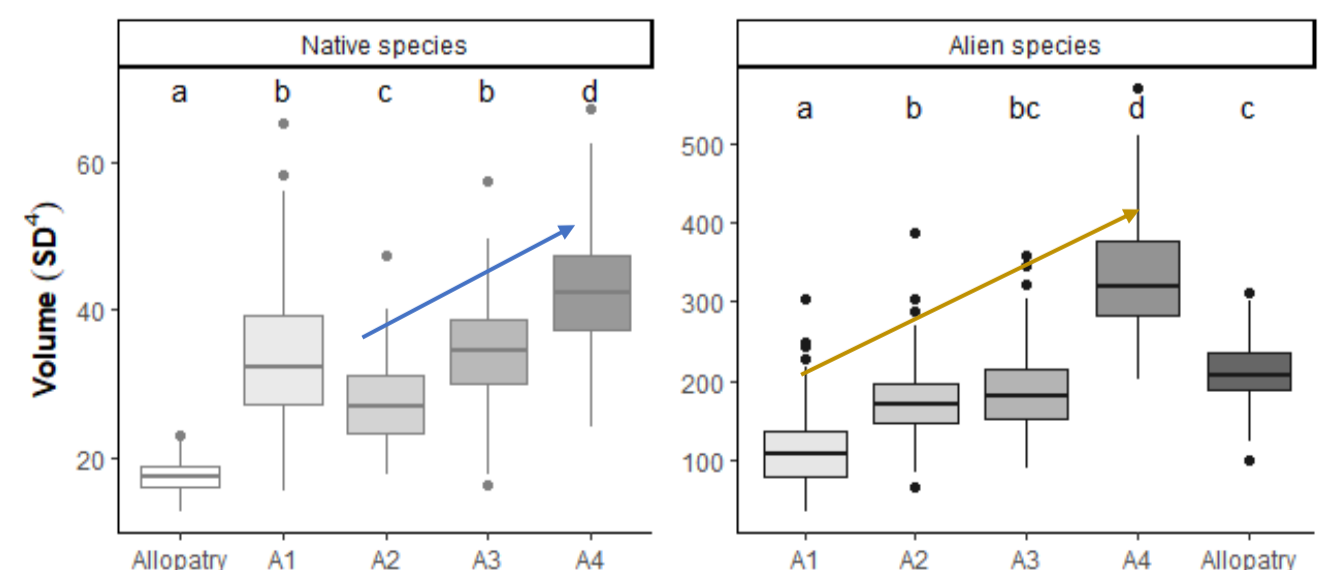
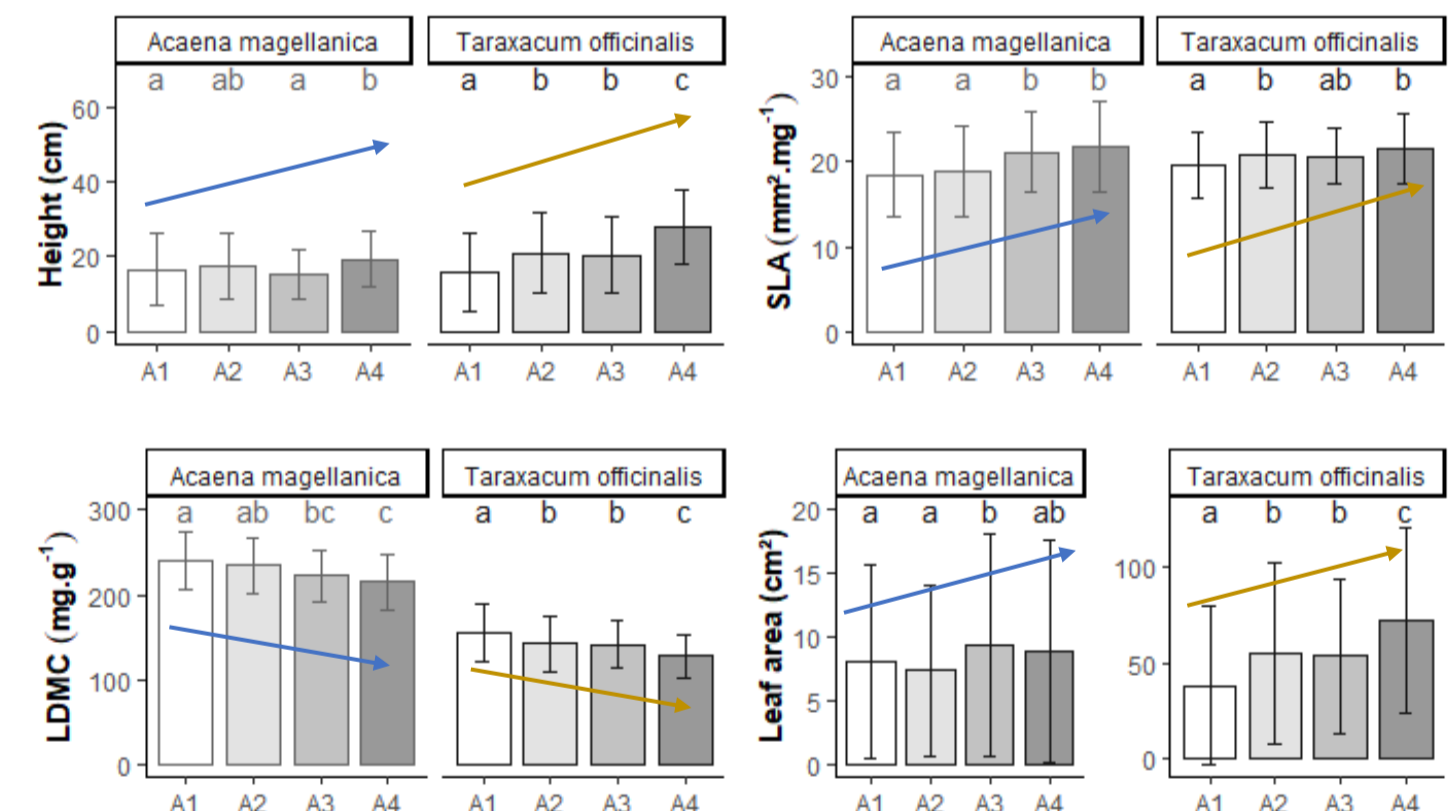
Trait	Associated functions	
	Persistence and tolerance to environmental stress	Competitiveness, resource acquisition
Height (H)	X	X
Specific Leaf Area (SLA)		X
Leaf Dry Matter Content (LDMC)	X	
Leaf Area (LA)	X	

### Results

Mean trait comparisons between pairs of alien and native species in allopatry. Trait names are colored according to the group of species that had significantly higher mean trait.

Species	Native species		Alien species	
	Height	SLA	Height	SLA
<i>Acaena magellanica</i>	Height	SLA	Height	SLA
<i>Azorella selago</i>	Height	SLA	Height	SLA
<i>Blechnum penna-marina</i>	Height	SLA	Height	SLA
<i>Festuca contracta</i>	Height	SLA	Height	SLA
<i>Dactylis glomerata</i>	Height	SLA	Height	SLA
<i>Poa pratensis</i>	Height	SLA	Height	SLA
<i>Taraxacum officinale</i>	Height	SLA	Height	SLA

Comparing all native to all alien species, alien species had significantly higher height, SLA and LA than native.



Volume of hypervolumes built with all native or all alien individuals within each areas.

Mean trait comparisons between areas of increasing proportion of alien plant species. Results are presented for only one native and one alien plant species but similar trends were observed for all species.

- H1, validated** ✓ alien plant species show more competitive trait value than native species
- H2, partially rejected** ✓ X alien and native species do exhibit an increase in trait mean toward more competitive trait value, but the variability of strategies also increase along the invasion gradient
- H3, rejected** X environmental conditions do not appear to limit the increase in trait values for the studied sites

**All species, native and alien, seem to be involved in the arms race, but some are falling behind**

**Acknowledgements:** This research was supported by the Institut Polaire Français Paul-Emile Victor (project IPEV 136 "SUBANTECO"), by the BiodivERSA 'ASICS' (ANR-20-EBI5-0004, BiodivClim call 2019-2020) project and the long-term research network on biodiversity in Antarctic and sub-Antarctic ecosystems (Zone Atelier InEE-CNRS Antarctique et Terres Australes).

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