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Conclusions

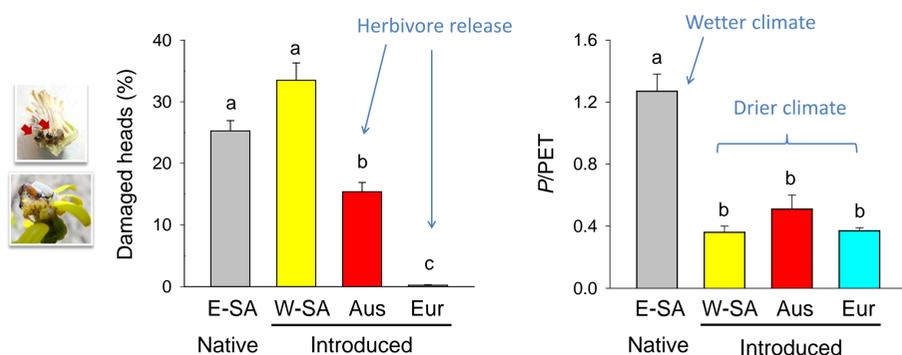
- *Senecio pterophorus* has changed after invasion
- Plants from the introduced populations are smaller and produce less seeds compared with the native populations
- Trait plasticity is similar in native and non-native plants
- Climate, but not herbivory, explain the differences in plant traits across regions
- Our results are contrary to the role of herbivores as a selective factor (reject EICA hypothesis) and highlight the importance of climate driving rapid evolution of exotic plants

Introduction

Exotic plants are great model systems to study rapid evolution. Current hypotheses predict a divergence in plant traits after invasion and an increased in trait plasticity in response to changes in the herbivore consumption pressure (e.g. enemy release, Evolution of Increased Competitive Ability -EICA- hypotheses) or to novel climatic conditions.

Senecio pterophorus (Asteraceae) is a shrub native from Eastern South Africa (grey), and recently introduced into Western South Africa (yellow) (>100 y), Australia (red) (>70 y) and Europe (cyan) (>30 y).

A biogeographic survey showed that plants from the two cross-continental introductions had lower herbivory compared with the native region, as expected by the enemy release hypothesis¹. Also, all non-native populations were growing under drier climatic conditions compared with the natives (they had a lower precipitation over potential evapotranspiration or P/PET).



Here we have evaluated, simultaneously, the role of herbivore consumption and climate on the rapid geographical divergence in plant traits and trait plasticity of the exotic plant *S. pterophorus*.

Objectives

We aim to answer:

- Do native and exotic populations differ in their traits and trait plasticity in response to water availability?
- Are herbivores and/or climate causing a rapid geographical divergence?

¹Castells E *et al.* (2013) Reduced seed predation after invasion supports enemy release in a broad biogeographical survey. *Oecologia* 173: 1397-1409

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Common garden experiment

- **1 species:** *Senecio pterophorus* (Asteraceae)
- **4 regions** → 1 NATIVE: Eastern South Africa
→ 3 INTRODUCED: Western South Africa, Australia, Europe
- **47 populations, 6 individuals/population**
- **2 treatments:** non-watered, watered



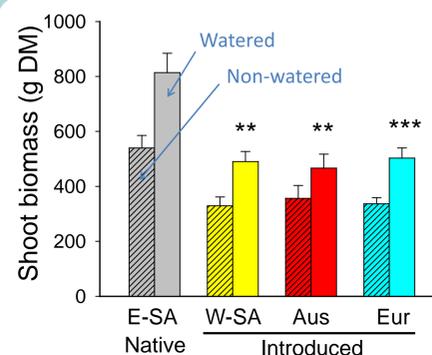
Traits measured:

- Shoot biomass
- Total leaf area
- Seed production

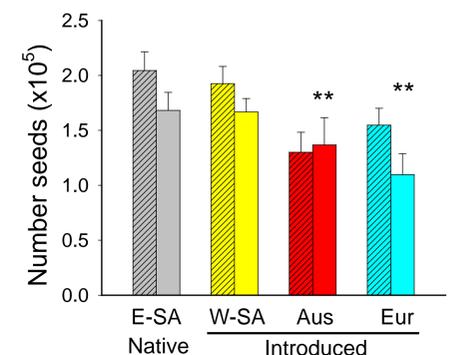
... and their plasticity in response to water availability

The common garden was run at Autonomous University of Barcelona (UAB) during 7 months (April to October)

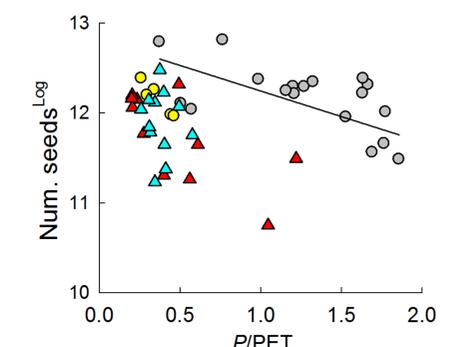
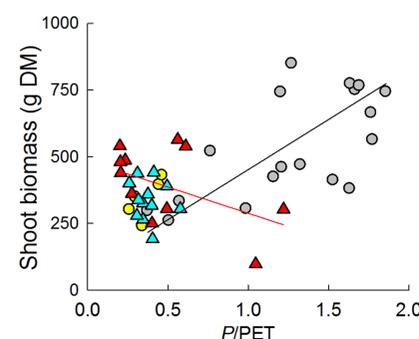
Results



Biomass and total leaf area (not shown) was lower in plants from the introduced populations compared with plants from the native region. No differences were found in plasticity across regions



Seed production was lower in plants from Australia and Europe, compared with the native region. No differences in plasticity were found across regions



Drought index (P/PET) was correlated with biomass, leaf area and seed production at the native region. Differences across regions in biomass, leaf area and seed production were no longer significant when P/PET was incorporated into the statistical model. No correlation nor effect of herbivory was found for any trait even though introduced populations had lower predation compared with the native populations. The similar response of all non-native regions and the convergence of vegetative traits between non-native and native populations under similar climatic conditions are consistent with the role of climate as a driver for post-invasive evolution.

Working in South Africa or Australia? Interested in plant evolution and biological invasions? I am looking for collaborators
Get in touch with me!

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