Rapid evolution of *Senecio pterophorus* in response to climate but not to herbivore release

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Divergence in plant traits and trait plasticity after invasion has been proposed as an important mechanism favouring invasion success. Current hypotheses predict a rapid evolution in response to changes in the herbivore consumption pressure caused by a decrease in the enemies associated at the area of origin (e.g. evolution of increased competitive ability –EICA– hypothesis), or in the abiotic conditions after invasion.

Senecio pterophorus (Asteraceae) is a perennial shrub native from Eastern South Africa and a recent invader in Western South Africa (~100 years ago), Australia (>70-100 years ago) and Europe (>30 years ago). A biogeographic survey covering the entire distributional area of *S. pterophorus* confirmed that plants from the introduced areas were subject to a lower herbivore consumption compared with plants from the native area[1], as expected by the enemy release hypothesis. The four distributional regions also differed in their summer drought stress. 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*.

We performed a common garden experiment with plants sampled throughout the entire known distributional area of *S. pterophorus* in the native and non-native ranges to test geographical differences in individual-level traits, leaf-level traits and reproductive-level traits, and their plastic response to water availability.

Native and non-native populations of *S. pterophorus* differed in plant traits, but not in trait plasticity, in response to their local climatic conditions. Our results are contrary to the role of herbivory as a selective factor after invasion and highlight the importance of climate driving rapid evolution of exotic plants.

1 Castells E, Morante M, Blanco-Moreno JM, Sans FX, Vilatersana R, Blasco-Moreno A 2013. Reduced seed predation after invasión supports enemy release in a broad biogeographical survey. ***Oecologia*** 173: 1397-1409.