

# Comparison of the life strategy of two invasive species

(*Centaurea maculosa* Lam. & *Senecio inaequidens* DC.)



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## Introduction

The ability of a species to invade, *i.e* its invasiveness, is the consequence of ecological and evolutionary processes.

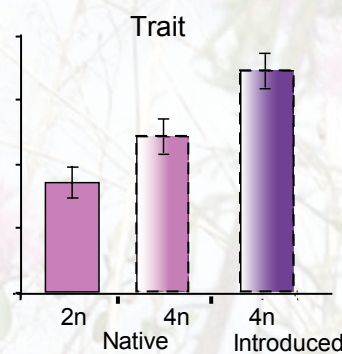
- Enemy release hypothesis
  - Novel weapon hypothesis
  - Propagule pressure
- } **Ecological processes**
- Evolutionary increase of competitive ability
  - Evolution reduced competitive ability
  - Hybridization to increase genetic variations
- } **Evolutionary processes**

➤ We studied growth and some functional traits of two worldwide invasive species (Asteraceae), *Centaurea maculosa* Lam. and *Senecio inaequidens* DC., to compare their strategies regarding evolutionary and ecological processes.

## Hypotheses

• According to evolutionary processes, polyploid genotypes (4n) perform better than diploid ones (2n)

• Following ecological processes, genotypes from introduced range (Int.) perform better than those from native one (Nat.)



## Experimental design

**2 species:**

- *C. maculosa* (native from Europe, invasive in North-America)
- *S. inaequidens* (native from South-Africa, invasive in Europe)

**3 pools :**

- Native diploid (Nat 2n)
- Native tetraploid (Nat 4n)
- Introduced tetraploid (Int 4n)

Replicates	Nat. 2n	Nat. 4n	Int. 4n
<i>C. maculosa</i>	72	18	90
<i>S. inaequidens</i>	45	45	90

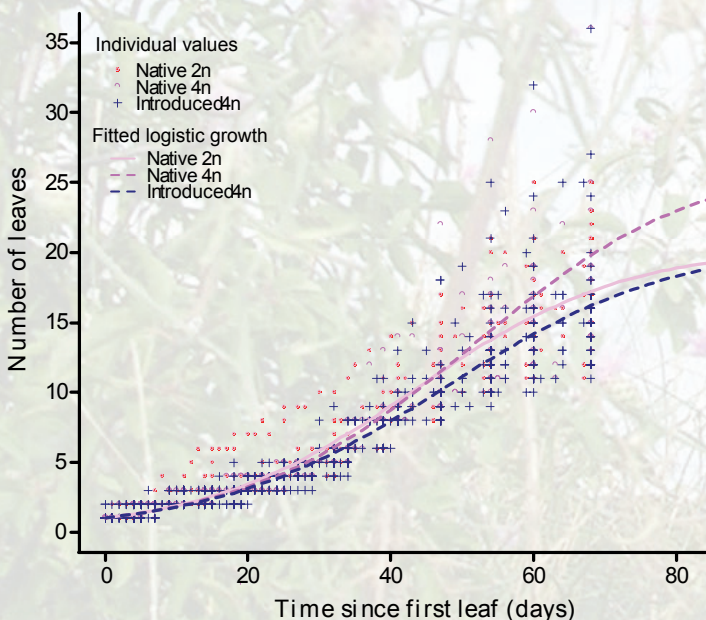
**Growing conditions:**

- Individual growth, pots in greenhouse (controlled conditions), water supply

## Comparison of the species

### Growth

*Centaurea maculosa*



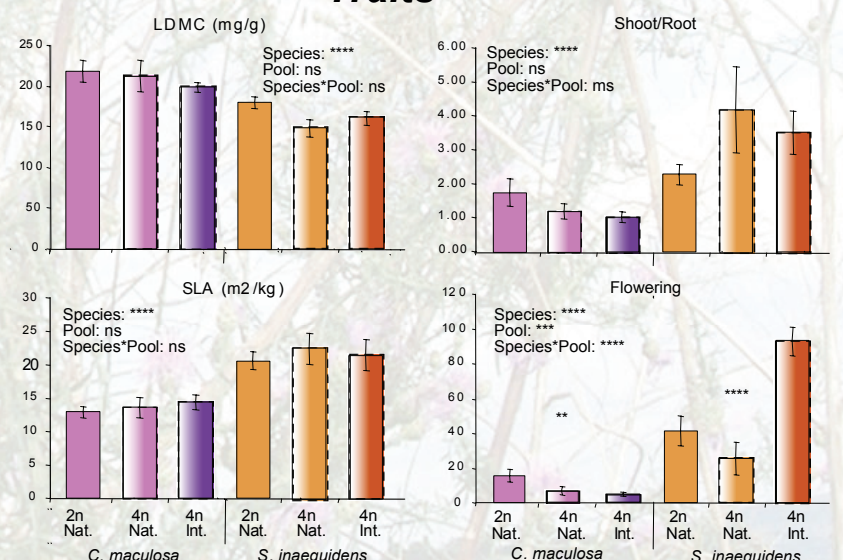
### *Centaurea maculosa*

Slow vegetative growth, low Specific Leaf Area (SLA) and high Leaf Dry Matter Content (LDMC) leading to unpalatable leaves. Resources preferentially allocated to roots

### *Senecio inaequidens*

Fast vegetative growth (not shown), low LDMC and high SLA. Resources allocated to shoots and reproductive effort (high flowering)

### Traits



SLA: Specific Leaf Area  
LDMC: Leaf Dry Matter Content  
P < .05\*; P < .01\*\*; P < .001\*\*\*; P < .0001\*\*\*\*; ms: .05 < P < .1; ns: non significant result

Comparison of some functional traits of diploid (2n) and tetraploid (4n) genotypes of native (Nat.) and non-native(Int.) seeds of *Centaurea maculosa* and *Senecio inaequidens*

## 2 invasive species, 2 invasion strategies (Comparison of the pools)

### *Centaurea maculosa*

- Increase in root allocation supports the theory of novel weapon hypothesis (Evolutionary process)
- Decrease in leaves palatability might be the consequence of the release from herbivores (Ecological process)

### *Senecio inaequidens*

- Fast vegetative growth and resource allocation to shoots seems to support the theory of an increase in competitive ability (Evolutionary process)
- High and early flowering leads to an important propagule pressure involved in invasion process (Ecological process)

➤ It seems that ecological **and** evolutionary processes are involved in species invasions. Nevertheless, except for flowering, we neither show significant differences between diploid and tetraploids genotypes, nor between native and introduced ones.