

# ALIEN IMPACT

## 2. Patterns of impact of HIPS on native vegetation in Belgium

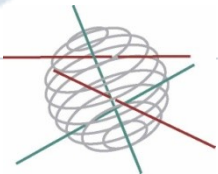
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Vrije  
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Brussel



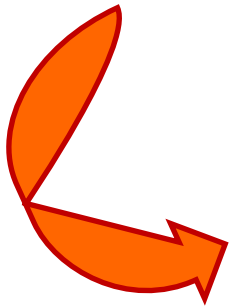
gembloux  
faculté universitaire  
des sciences agronomiques



# Introduction & Objectives

Within ALIEN IMPACT project:

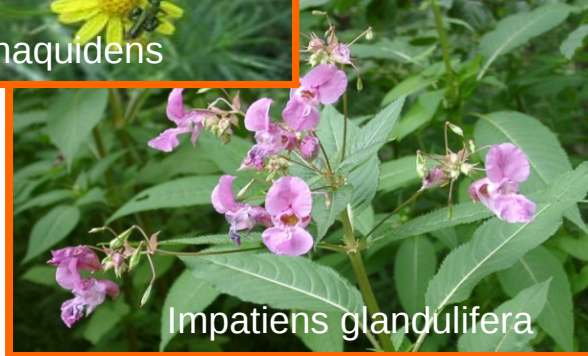
- Direct impact of HIPS on native vegetation in two ecosystems: terrestrial and aquatic



- Is there a difference in native vegetation richness and composition between invaded/uninvaded sites?
- If so, what is the direction and amplitude of impact? Is it HIPS/ecosystem specific?

# Target species

Terrestrial



Aquatic

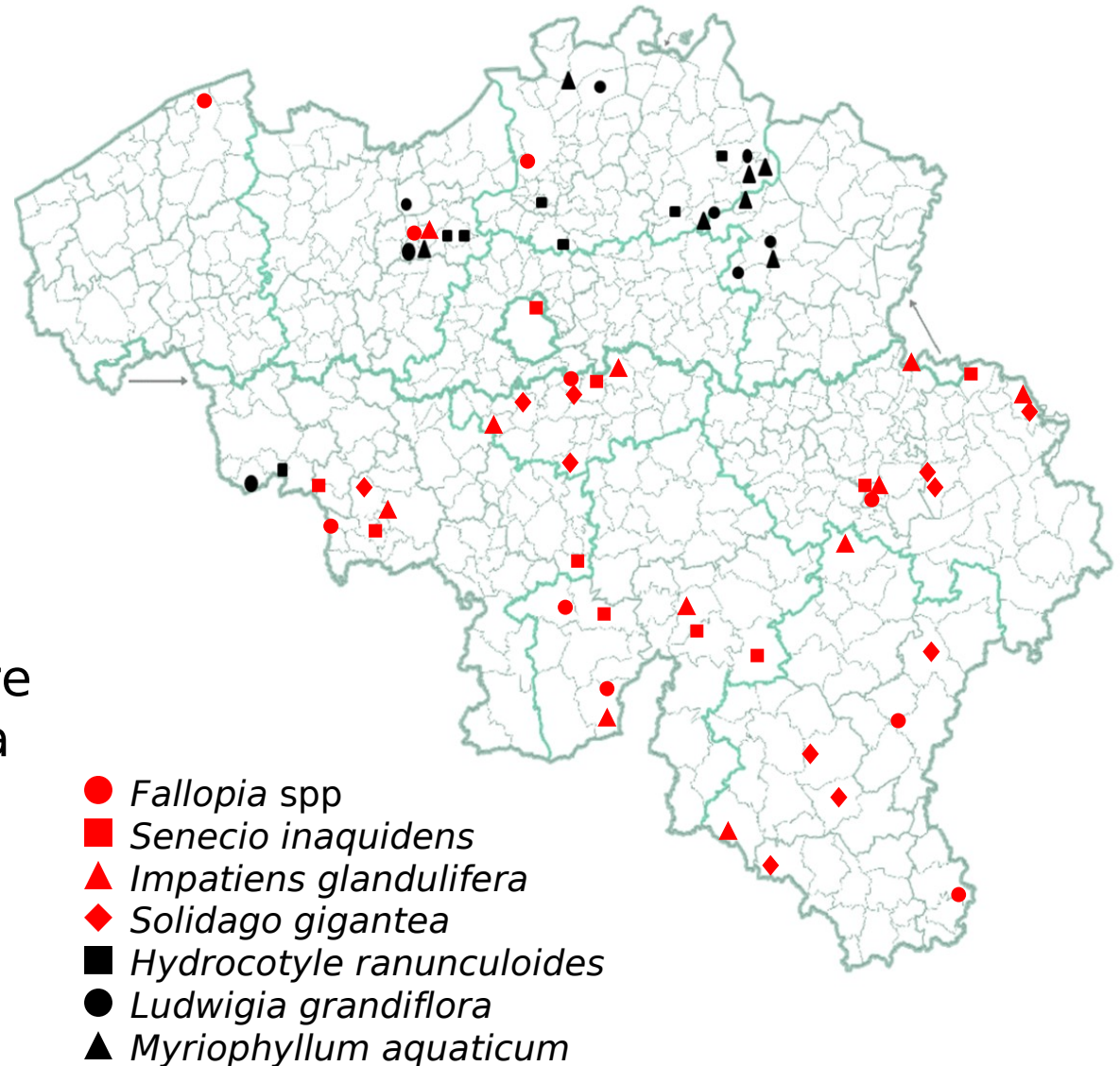


# Material & Methods

## Study sites

42 sites for terrestrial part  
32 ponds for aquatic part

Focus on sites of high biological value (nature reserves, SGIB, Natura 2000...)



# Material & Methods

Cover projection of all species present at plot level (terrestrial and aquatic) and at pond level (aquatic)

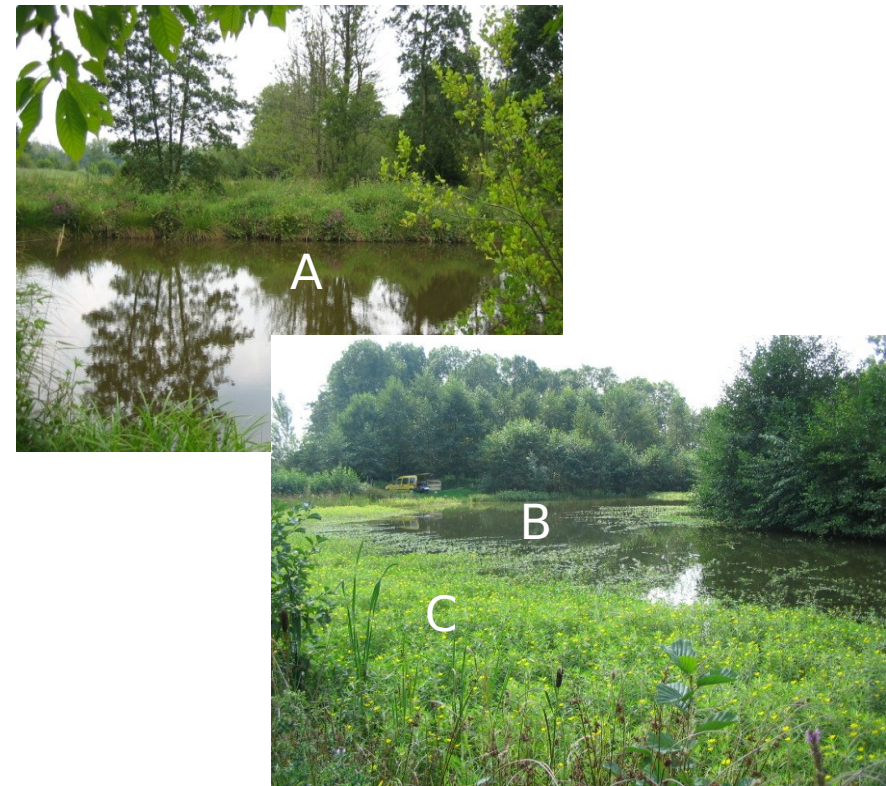
Terrestrial

Uninvaded/invaded sites



Aquatic

Uninvaded/semi-invaded/heavily invaded sites



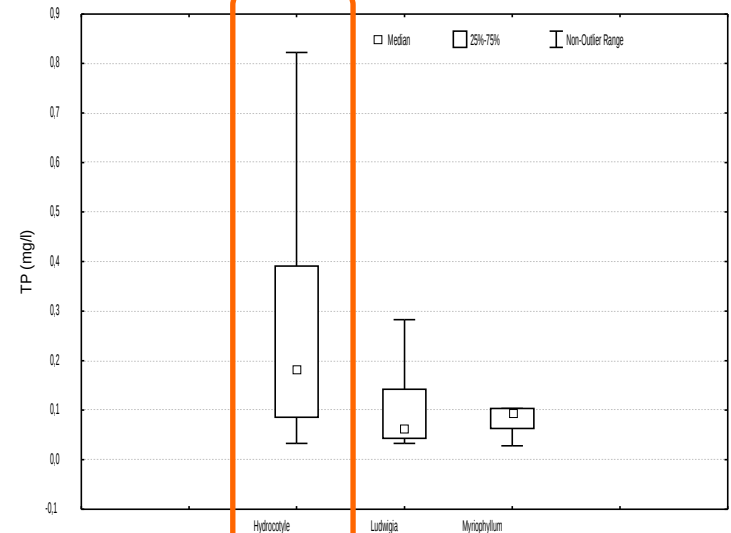
# Results

## ENVIRONMENT characteristics

Terrestrial

riparian forest, sand pit,  
meadow, road side, river  
bank, railway, quarry,  
dump, rocky cliff, coal tip,  
humid zones

Aquatic



*Hydrocotyle* at higher  
eutrophication levels

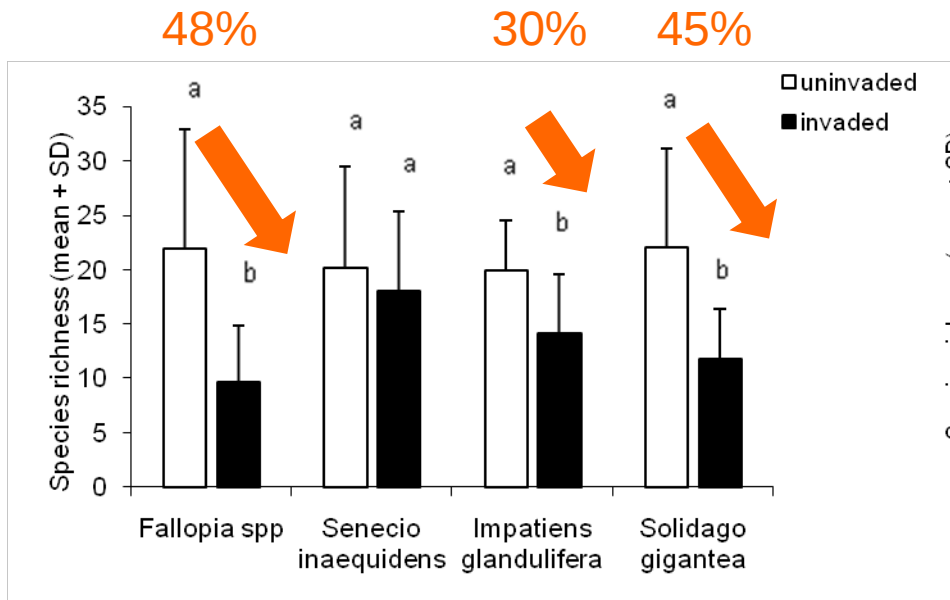
Habitat heterogeneity (terrestrial) and wide range of nutrient levels (aquatic)

# Results

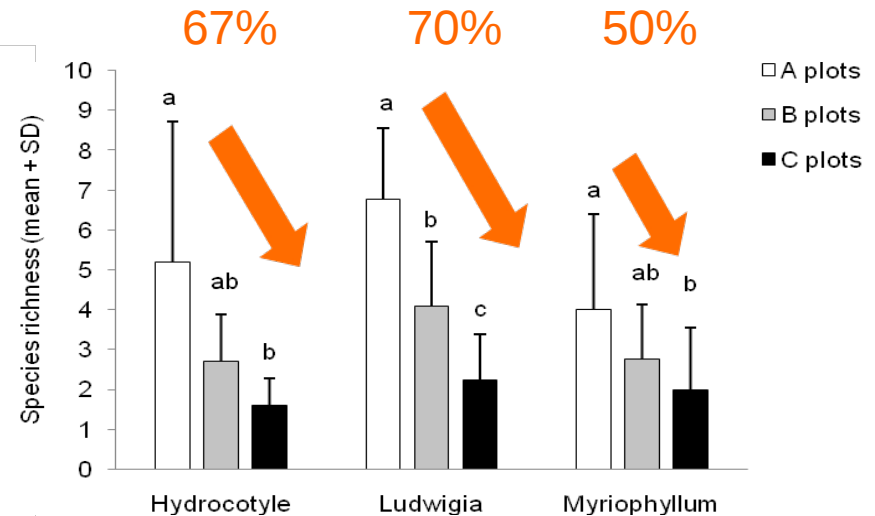
## IMPACT invasion

Terrestrial

Aquatic

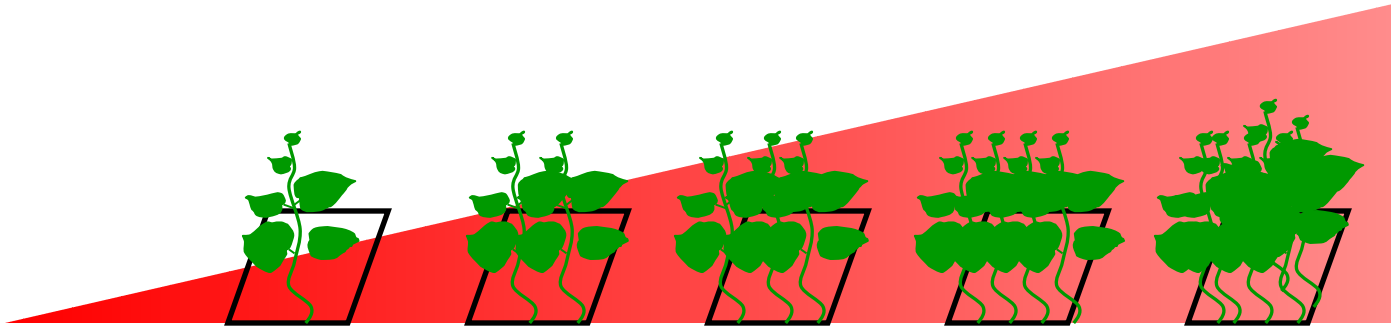


$P < 0.05$



$P < 0.05$

Reduction in native species richness with invasion except for *Senecio*



**Terrestrial:** native plant species were assessed in quadrats along a gradient of increasing HIPS density

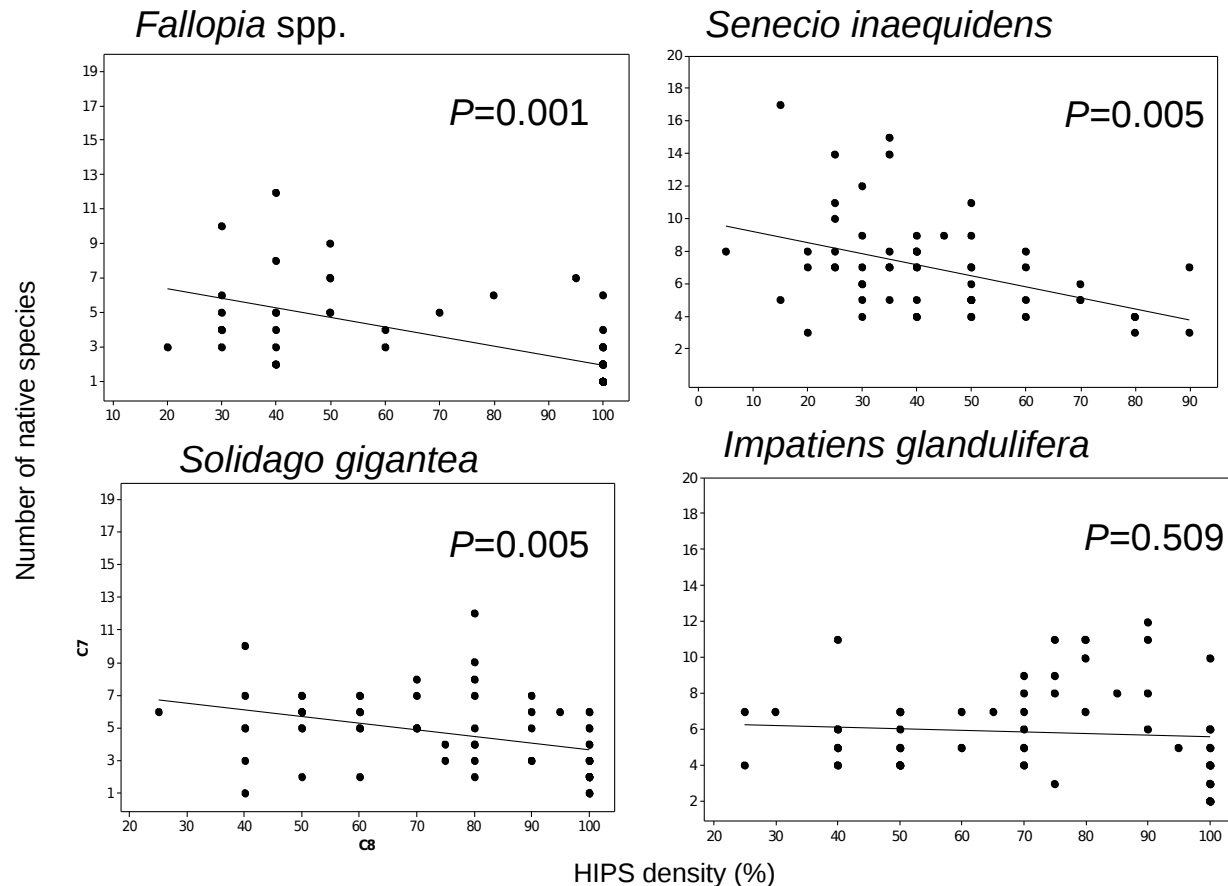
**Aquatic:** native plant cover (different growth forms) was assessed at pond level with a gradient of increasing HIPS density



# Results

## IMPACT density

### Plot level - Terrestrial

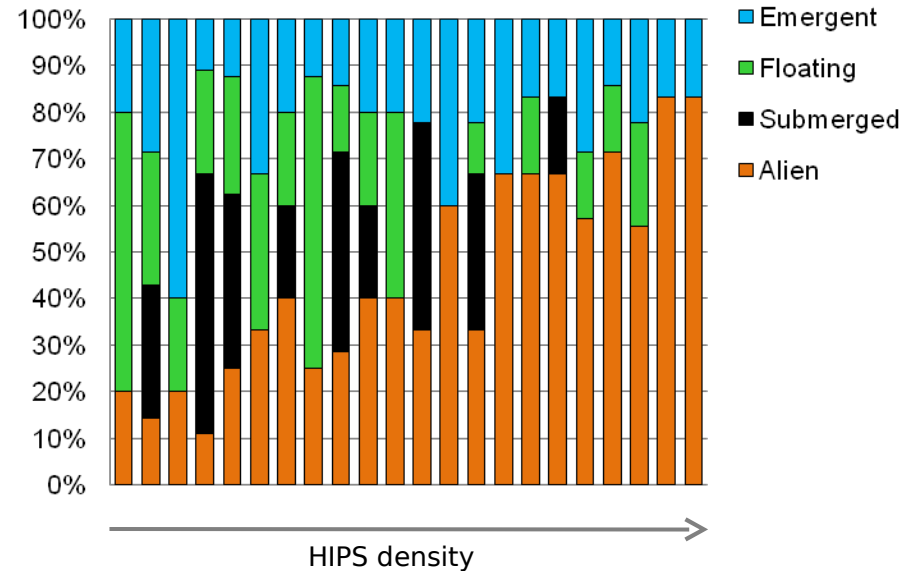
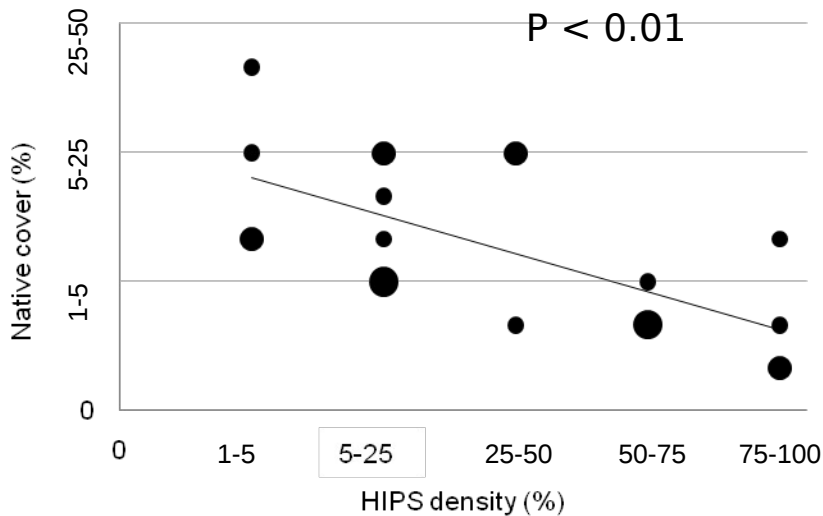


Higher impact with increasing HIPS density except for *Impatiens*

# Results

## IMPACT density

### Pond level - Aquatic



HIPS density ↑ →

Submerged  $P < 0.01$  \*\*  
↓  
Floating ↓  $P < 0.05$  \*  
Emergent -  $P > 0.05$

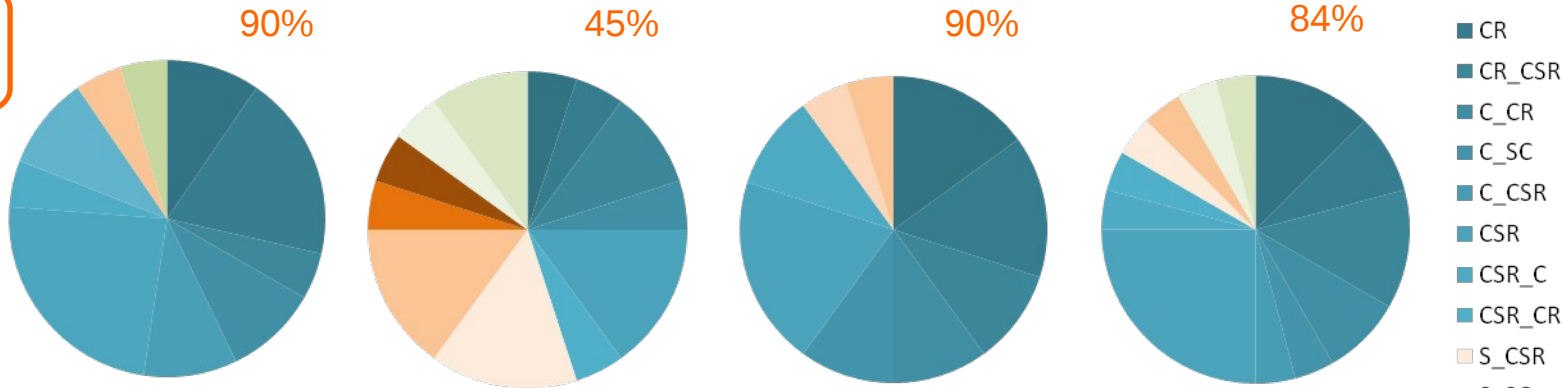
Higher impact with increasing HIPS density with submerged vegetation most vulnerable to invasion

# Results

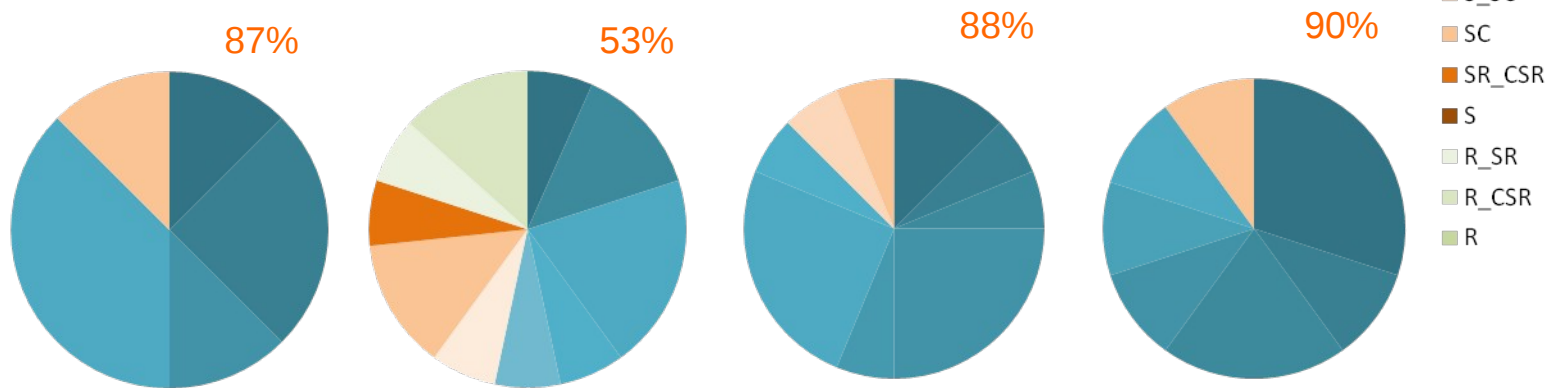
## IMPACT composition → CSR model

Terrestrial

Uninvaded



Invaded



*Fallovia* spp

*Senecio inaequidens*

*Impatiens glandulifera*

*Solidago gigantea*



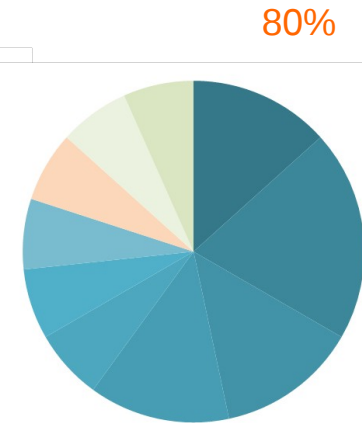
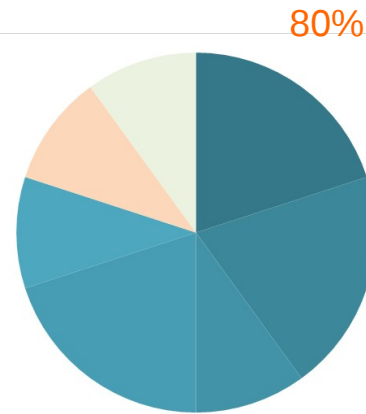
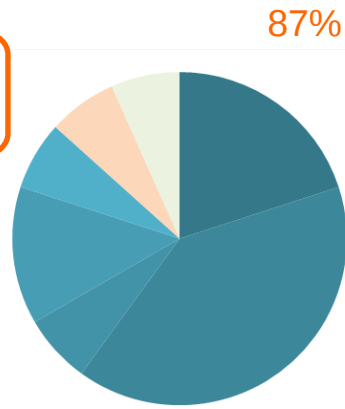
Species associated to HIPS are all competitors except for *Senecio*

# Results

## IMPACT composition → CSR model

Aquatic

Uninvaded

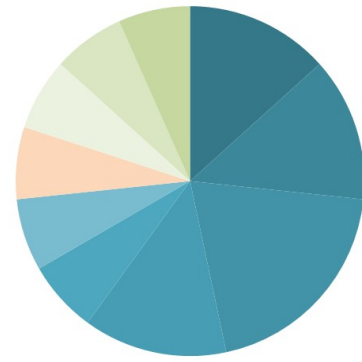
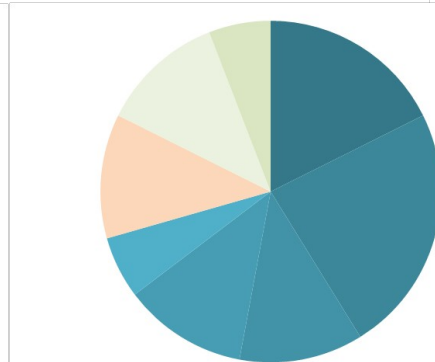
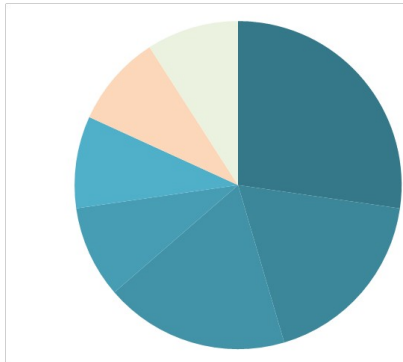


83%

70%

72%

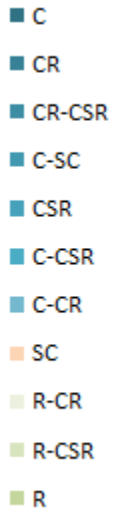
Invaded



*Hydrocotyle ranunculoides*

*Ludwigia grandiflora*

*Myriophyllum aquaticum*



Species associated to HIPS are all competitors

# General conclusions

- HIPS invade a wide range of habitats (terrestrial) or nutrient levels (aquatic)
- Invasion induces reduction in native species richness both in terrestrial and aquatic communities
- Effect of HIPS density:
  - on native plant richness in terrestrial ecosystems
  - on native plant cover in aquatic communities
- Higher impact on submerged species in aquatic ecosystems
- Communities with a prevalent competitive strategy in terrestrial and aquatic ecosystems

# Thank you for your attention...

## Acknowledgements

