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

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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
- Fallopia spp
- Solidago gigantea
- Senecio inaquidens
- Impatiens glandulifera

Aquatic
- Hydrocotyle ranunculoides
- Ludwigia grandiflora
- Myriophyllum aquaticum
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

- *Fallopia* spp
- *Senecio inaquidens*
- *Impatiens glandulifera*
- *Solidago gigantea*
- *Hydrocotyle ranunculoides*
- *Ludwigia grandiflora*
- *Myriophyllum aquaticum*
Cover projection of all species present at plot level (terrestrial and aquatic) and at pond level (aquatic)

**Material & Methods**

Uninvaded/invaded sites

Uninvaded/semi-invaded/heavily invaded sites

**Terrestrial**

**Aquatic**

Uninvaded

invaded
**Results**

**ENVIRONMENT characteristics**

**Terrestrial**

- riparian forest, sand pit, meadow, roadside, 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

48%  30%  45%

67%  70%  50%

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**

*Fallopia spp.*

$P=0.001$

*Senecio inaequidens*

$P=0.005$

*Solidago gigantea*

$P=0.005$

*Impatiens glandulifera*

$P=0.509$

Higher impact with increasing HIPS density except for *Impatiens*
Higher impact with increasing HIPS density with submerged vegetation most vulnerable to invasion.
Species associated to HIPS are all competitors except for *Senecio*
Results

IMPACT composition → CSR model

Aquatic

Uninvaded

Invaded

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…

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