INPLANT

PLANT OPTICAL TYPES TO PREDICT ECOSYSTEM IMPACTS OF PLANT INVASIONS

Ben Somers, Olivier Honnay, Hannes Feilhauer, Elisa Van Cleemput, Laura Vanierschot
Invasives are a major problem: Currently 13,000 plant species (3.9% of the extant flora) have become naturalized somewhere as a result of human activity.

Van Kleunen et al. (2015) Nature
Invasive plant species also strongly affect the *functioning of ecosystems*.

Mean effect size (*Hedges d*) of impacts of invasive species:

- Microbial activity (5, 0, 9)
- N available (15, 0, 32)
- P pools (17, 2, 31)
- Soil OM (10, 1, 15)
- N mineralization (10, 1, 15)
- C pools (26, 2, 35)
- N pools (36, 2, 65)
- Salinity (10, 0, 9)
- Soil moisture (14, 1, 15)
- pH (55, 2, 5)
- Litter decomposition (7, 0, 6)
- C/N (18, 0, 21)

Vila et al. (2011) *Ecol. Letters*
Predicting the effects of new exotic species on ecosystem functions would allow to set up an *early warning system*

- Predictions have been not successful so far;

- The typical approach among plant ecologists is based on the framework of the **plant traits** (or plant characteristics).

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[Plant Trait Database]

The **LEDA** Traitbase

‘STEREO III’ CALL 2015 - INPLANT
Processes/Functions

Drivers

Plant Functional Types

Functional Traits

Research Topic

‘STEREO III’ CALL 2015 - INPLANT
Research Topic

Processes/Functions

drivers

Plant Functional Types

Functional Traits

Gradient

'STEREO III' Call 2015 - Inplant
Research Topic

Processes/Functions

drivers

Plant Functional Types

Functional Traits

growth form
life form
nutrients
biomass
leaf size/shape
rooting depth
seed mass
vegetation height

Plant Trait Database

The LEDA Traitbase

‘STEREO III’ CALL 2015 - INPLANT
Research Topic

Processes/Functions

Drivers

Plant Functional Types

Functional Traits

Functional Traits
- growth form
- life form
- nutrients
- biomass
- leaf size/shape
- rooting depth
- seed mass
- vegetation height

Plant Functional Types

'STEREO III' CALL 2015 - INPLANT
Reinforcement: Heterogeneity - Heterogeneity

Processes/Functions

Drivers

Plant Functional Types

Functional Traits

Plant Functional Types

Processes/Functions

'Stereo III' Call 2015 - Inplant
PLANT FUNCTIONAL TYPES

PLANT OPTICAL TYPES TO PREDICT ECOSYSTEM IMPACTS OF PLANT INVASIONS

'STEREO III' CALL 2015 - INPLANT
Processes/Functions

Drivers

Plant Functional Types

Functional Traits

growth form
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Research Topic

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SPECTRAL INFORMATION?

**Light Capture & growth**
(pigments, nutrients, leaf mass)

**Foliar defense & longevity**
(cellulose, lignin, phenols, tannins)
SPECTRAL INFORMATION?
To develop novel ‘plant optical types’-based approaches to evaluate and to predict the impact of invasive plant species on ecosystem functioning
**Impatiens glandulifera**
(annual; river banks)

**Solidago gigantea**
(perennial rhizomatous geophyte, roadsides, disturbed grasslands)
FIELDWORK – DATA COLLECTION