ISEIA, a Belgian non-native species assessment protocol

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Belgian Forum on Invasive Species

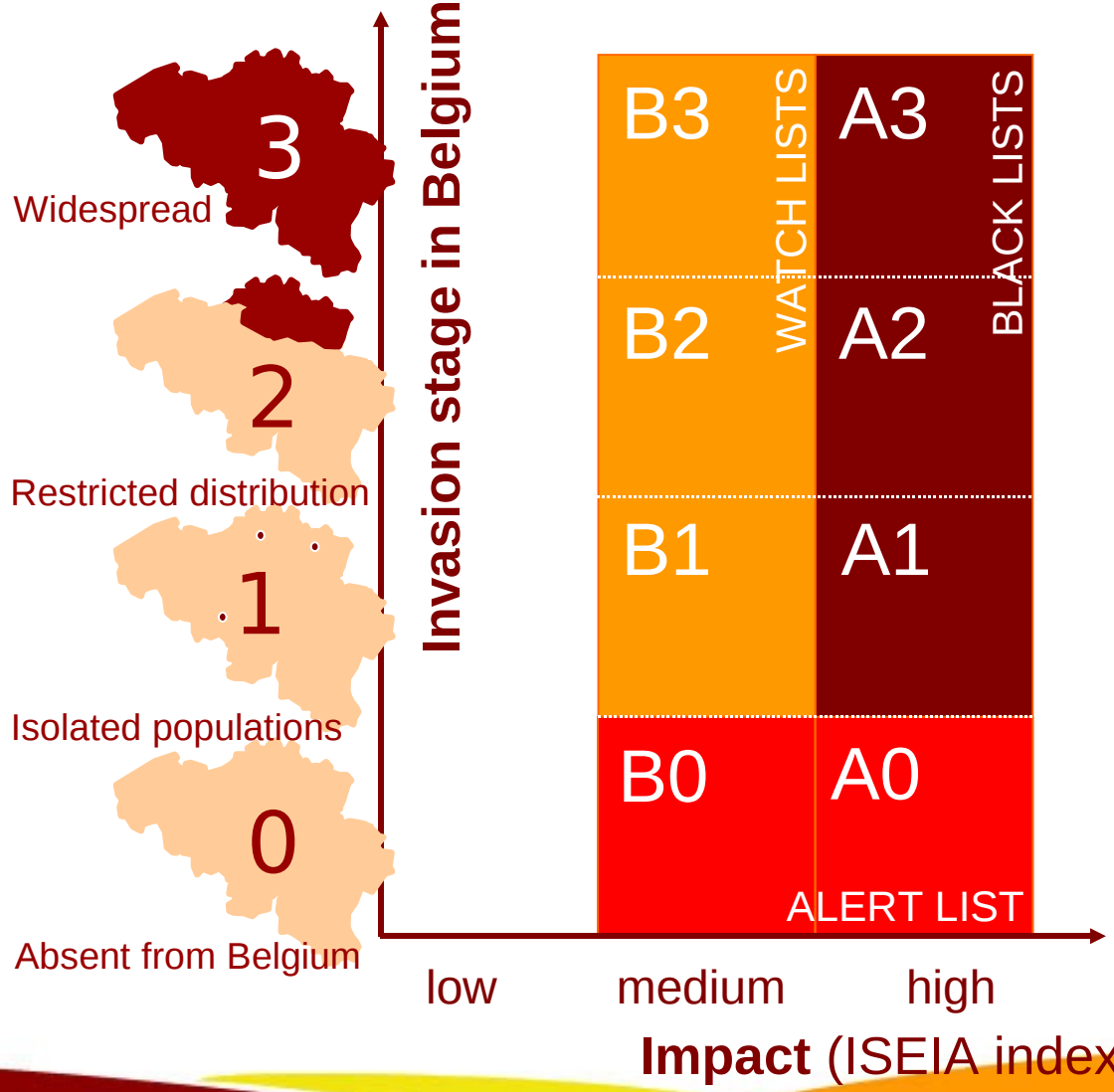
1. The ISEIA protocol

2. Assessments in the practice

3. Results & trends

4. From science to management

2 dimensions for species classification

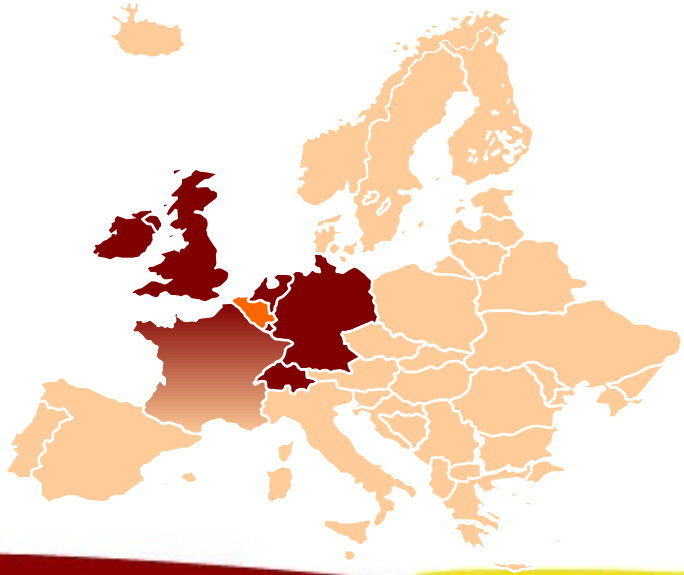


The ISEIA protocol: purpose

ISEIA = Invasive Species Environmental Impact Assessement.

The ISEIA protocol is a simple tool dedicated to the quantification of potential invasiveness of non-native species in Belgium, with a focus on their impact on biodiversity and ecosystem functions.

The ISEIA protocol is an aid to decision makers in developing legislation, policy and management strategies.



The ISEIA protocol: properties

- **Scientifically based**
  Use of published information and expert knowledge;
- **Standardised & objective**
  Minimum use of subjective opinions;
- **Transparent**
  Easy to see why a species is identified as detrimental;
- **Repeatable**
  Different assessors should reach similar conclusions;
- **Universal**
  Usable for organisms from different taxonomic groups and ecosystems.

The ISEIA index:
basic principles and scoring

Parameter	Score
[Establishment]	
Dispersion potential	1-3
Colonisation of natural habitats	1-3
Impact on native species	1-3
Impact on ecosystems	1-3
ISEIA index	**4-12**


black list: ISEIA index = 11-12


watch list: ISEIA index = 9-10

The ISEIA index:
scoring system and uncertainty

Impact on native species

Interspecific competition

High	3
Medium	2
Low	1
Likely	2
Unlikely	1
Data deficient	?

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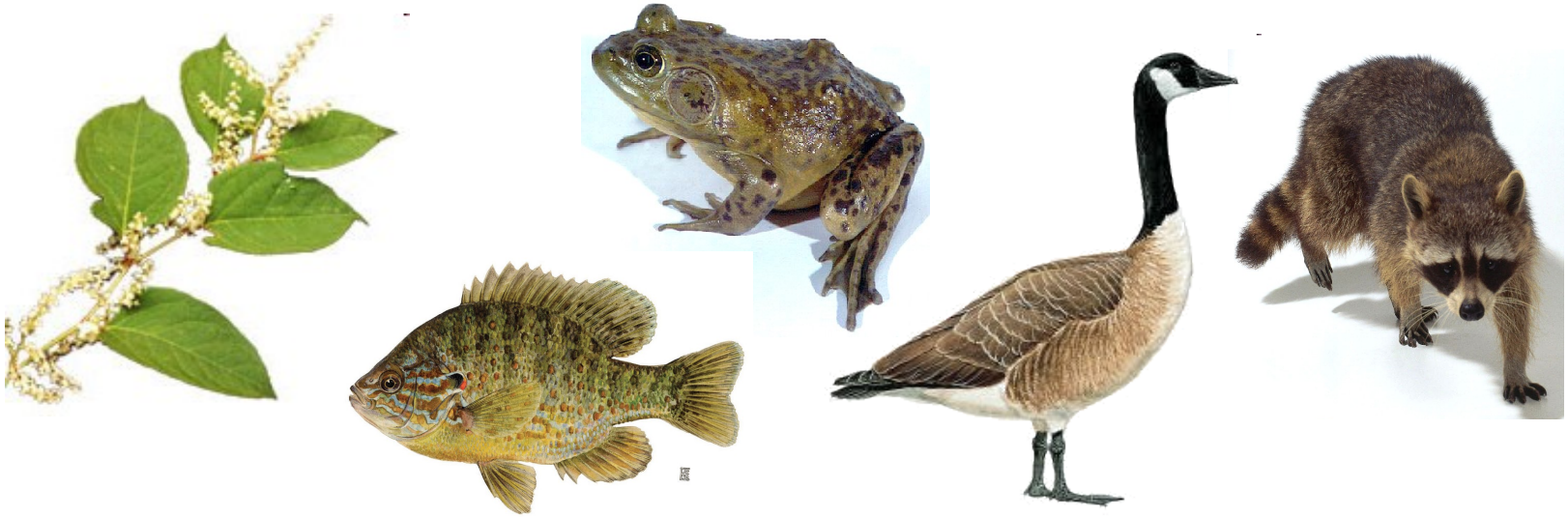
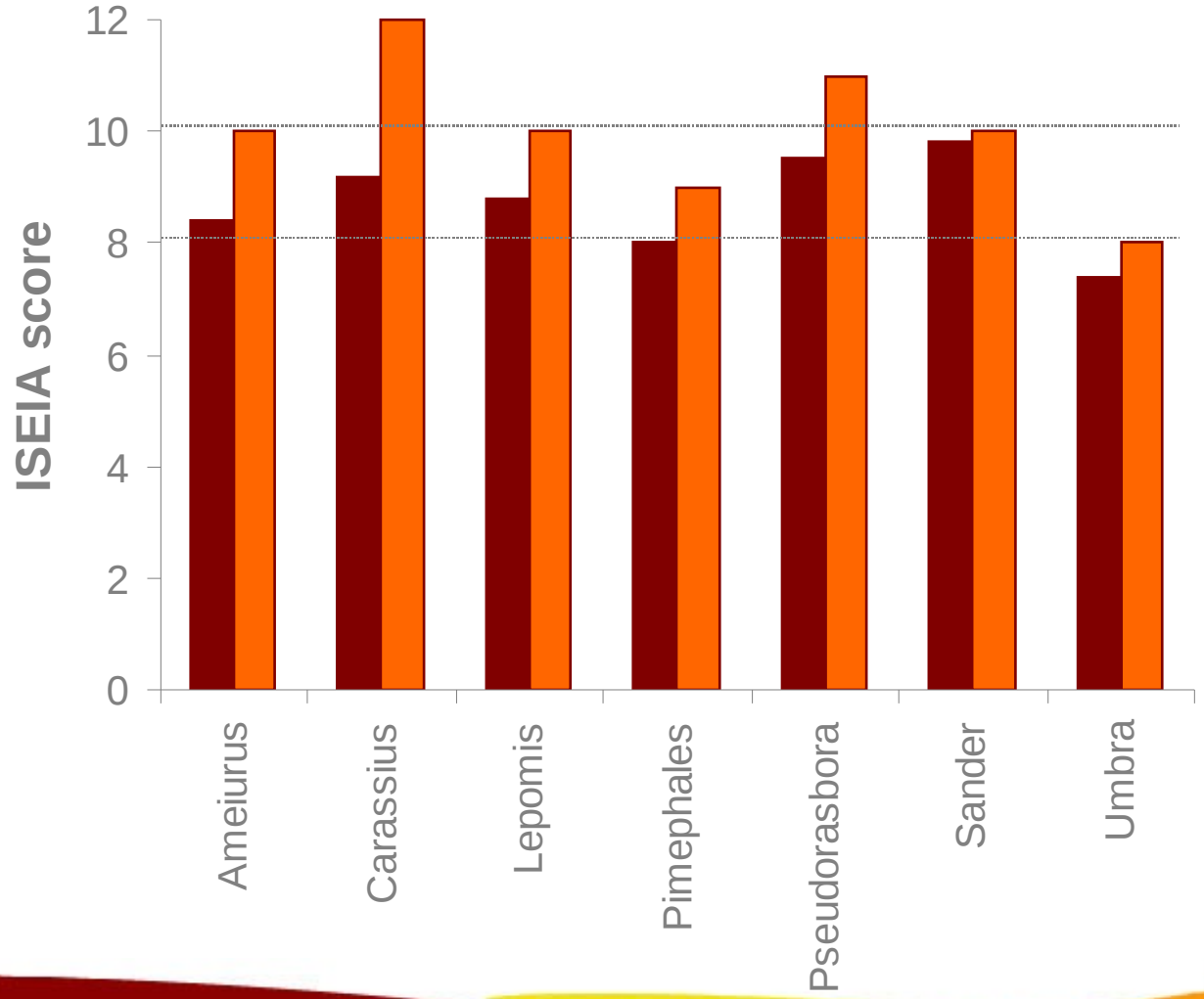
Assessment working groups



Assessment working groups

(…)

Average *vs* consensus values

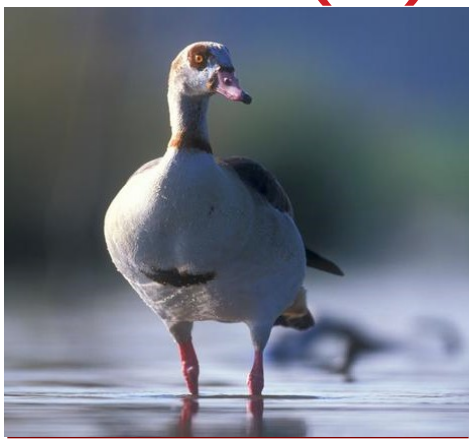


average value

consensus value

Black list species (A)

Watch list species (B)



.be Invasive species in Belgium

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Rana catesbeiana - American bullfrog

ISSG DAISIE

Synonym:	*Lithobates catesbeianus*	**Group:**	Amphibians and reptiles
French name:	Grenouille taureau	**Origin:**	North America
Dutch name:	Stierkikker	**Habitat:**	freshwater
Family:	Ranidae	**Introduction:**	aquariums and ponds

A1 species

ISEIA Score : **12**

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Naturalization in Belgium

First observation in the wild:	1996
Invasion stage:	spread
Spatial distribution:	isolated

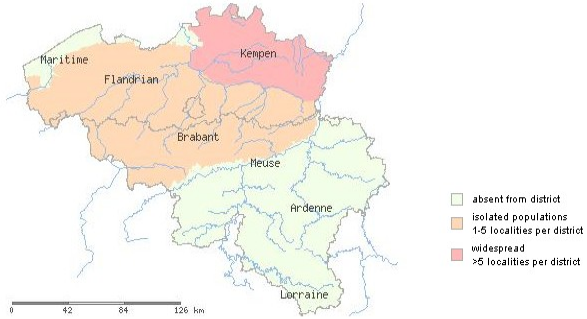
Invasiveness

Reproduction in the wild:	yes
Dispersion potential:	high
Natural habitats:	high

Habitat preferences: Slow running waters, ponds and ditches with dense vegetation.

Distribution in Belgium

Biogeographic areas where established populations occur are represented on the map hereafter :



Impacts on Species

Predation / Herbivory:	high
Competition:	high
Disease transmission:	high
Genetic effects:	low

Impacts on Ecosystems

Nutrient cycling:	low
Physical alteration:	low
Natural successions:	unknown
Food web alteration:	high

More on impacts: Introduction of the bullfrog outside its native range makes a global threat to amphibian populations in the world. It negatively affects native amphibians through competition and predation (namely green frog populations), especially where wetlands are fragmented and degraded (disparition of large, shallow, ephemeral ponds). It also feeds on many other prey, including arthropods, molluscs, fishes and young water birds. Bullfrog is moreover frequently reported to be a healthy carrier of the fungus Batrachochytrium dendrobatidis, an emergent infectious disease that is highly virulent, has low host specificity and has been implicated in numerous species extinctions and global amphibian declines (including Alytes obstetricans, Bufo bufo and Salamandra salamandra in Europe). The bullfrog is included in the appendix to the recommendation no 77 of the Council of Europe as a species which has proved to be a threat to biological diversity and for which eradication is strongly recommended.

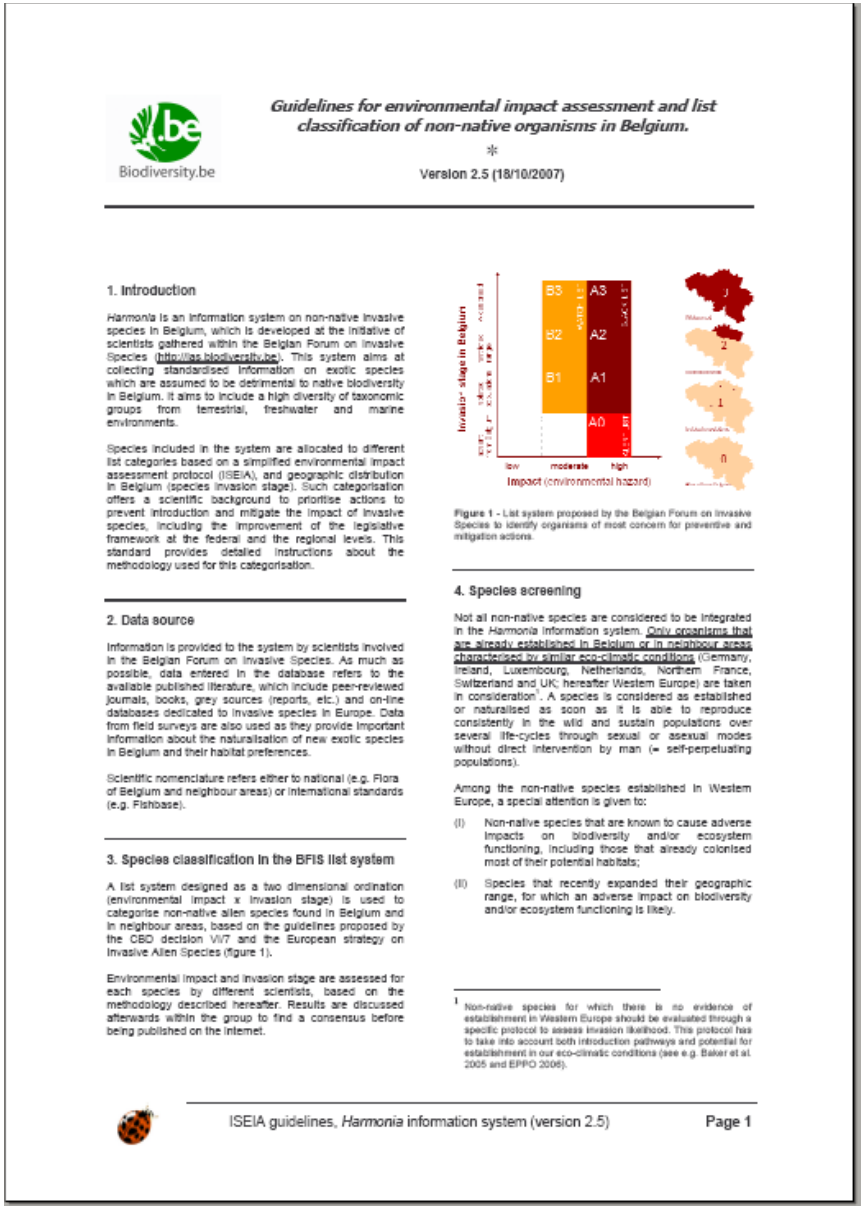
Data Source & References

Authors: Branquart Etienne, Percsy Christiane
Published on: 19 September 2007
References:

Beebee T.J. & Griffiths R.A. (2005)
The amphibian decline crisis: a watershed for conservation biology?
Biological Conservation 125: 271-285.

Bosch J & Martínez-Solano I. (2006)
Chytrid fungus infection related to unusual mortalities of Salamandra salamandra and Bufo bufo in the Peñalara Natural Park (Central Spain).
Oryx 40: 84-89.

Bosch J, Martínez-Solano I & García-París M. (2001)
Evidence of a chytrid fungus infection involved in the decline of the common midwife toad (Alytes obstetricans) in protected areas of central Spain.



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Guidelines for environmental impact assessment and list classification of non-native organisms in Belgium.

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Version 2.5 (18/10/2007)

1. Introduction

Harmonia is an information system on non-native invasive species in Belgium, which is developed at the initiative of scientists gathered within the Belgian Forum on Invasive Species (http://ias.biodiversity.be). This system aims at collecting standardised information on exotic species which are assumed to be detrimental to native biodiversity in Belgium. It aims to include a high diversity of taxonomic groups from terrestrial, freshwater and marine environments.

Species included in the system are allocated to different list categories based on a simplified environmental impact assessment protocol (ISEIA), and geographic distribution in Belgium (species invasion stage). Such categorisation offers a scientific background to prioritise actions to prevent introduction and mitigate the impact of invasive species, including the improvement of the legislative framework at the federal and the regional levels. This standard provides detailed instructions about the methodology used for this categorisation.

2. Data source

Information is provided to the system by scientists involved in the Belgian Forum on Invasive Species. As much as possible, data entered in the database refers to the available published literature, which include peer-reviewed journals, books, grey sources (reports, etc.) and on-line databases dedicated to invasive species in Europe. Data from field surveys are also used as they provide important information about the naturalisation of new exotic species in Belgium and their habitat preferences.

Scientific nomenclature refers either to national (e.g. Flora of Belgium and neighbour areas) or international standards (e.g. Fishbase).

3. Species classification in the BFIS list system

A list system designed as a two dimensional ordination (environmental impact x invasion stage) is used to categorise non-native alien species found in Belgium and in neighbour areas, based on the guidelines proposed by the CBD decision VI/7 and the European strategy on Invasive Alien Species (figure 1).

Environmental impact and invasion stage are assessed for each species by different scientists, based on the methodology described hereafter. Results are discussed afterwards within the group to find a consensus before being published on the internet.

Figure 1 - List system proposed by the Belgian Forum on Invasive Species to identify organisms of most concern for preventive and mitigation actions.

4. Species screening

Not all non-native species are considered to be integrated in the *Harmonia* information system. Only organisms that are already established in Belgium or in neighbour areas characterised by similar eco-climatic conditions (Germany, Ireland, Luxembourg, Netherlands, Northern France, Switzerland and UK; hereafter Western Europe) are taken in consideration[1]. A species is considered as established or naturalised as soon as it is able to reproduce consistently in the wild and sustain populations over several life-cycles through sexual or asexual modes without direct intervention by man (= self-perpetuating populations).

Among the non-native species established in Western Europe, a special attention is given to:

(I) Non-native species that are known to cause adverse impacts on biodiversity and/or ecosystem functioning, including those that already colonised most of their potential habitats;

(II) Species that recently expanded their geographic range, for which an adverse impact on biodiversity and/or ecosystem functioning is likely.

[1] Non-native species for which there is no evidence of establishment in Western Europe should be evaluated through a specific protocol to assess invasion likelihood. This protocol has to take into account both introduction pathways and potential for establishment in our eco-climatic conditions (see e.g. Baker et al. 2005 and EPPO 2006).

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Overview of the first assessments

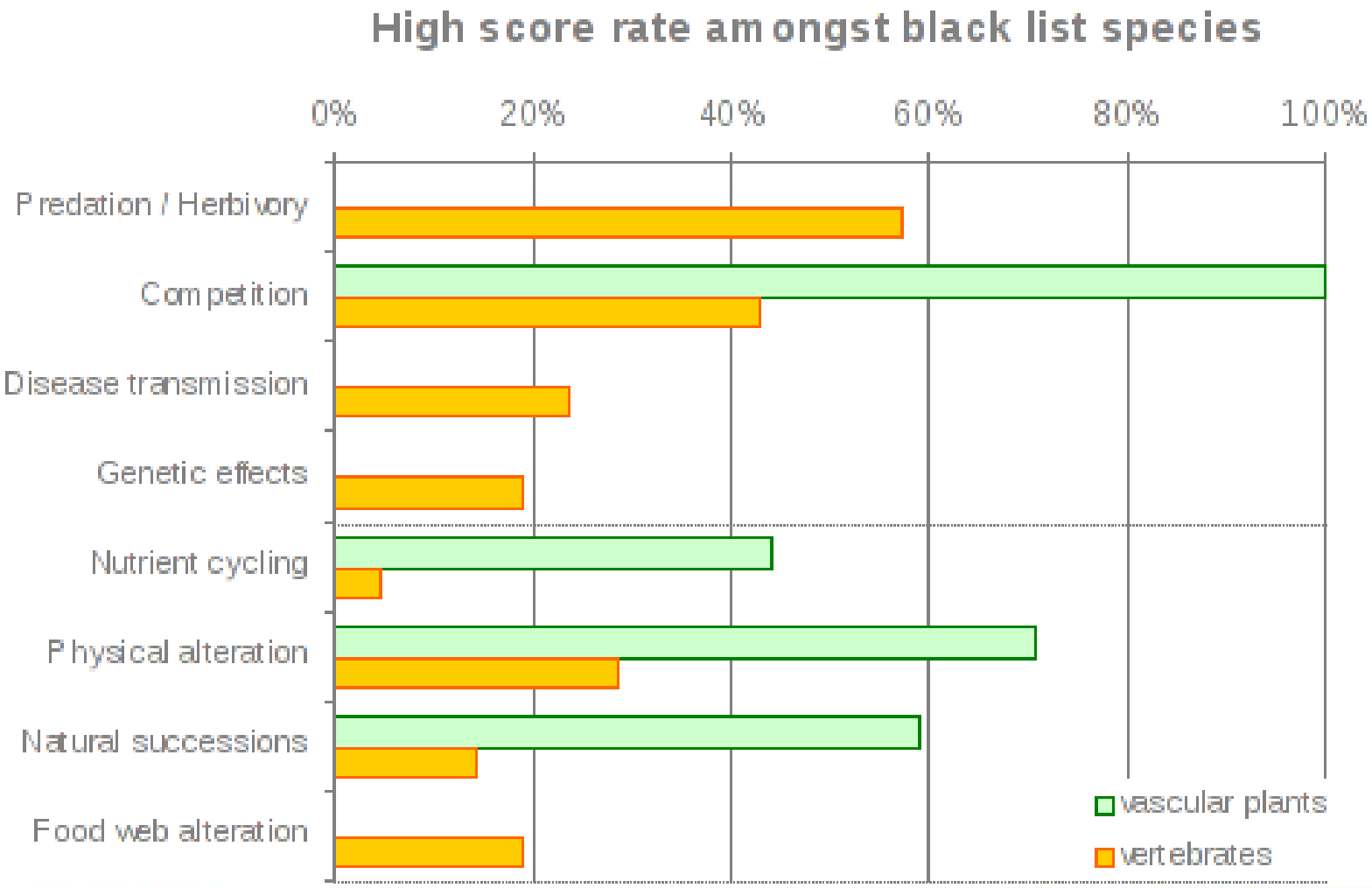
Naturalised in Be

	Plants	Vertebrates
Total	356	33
Assessed species	51 (= 14%)	21 (= 64%)
Black list species (A1-A3)	28	10
Watch list species (B1-B3)	21	10

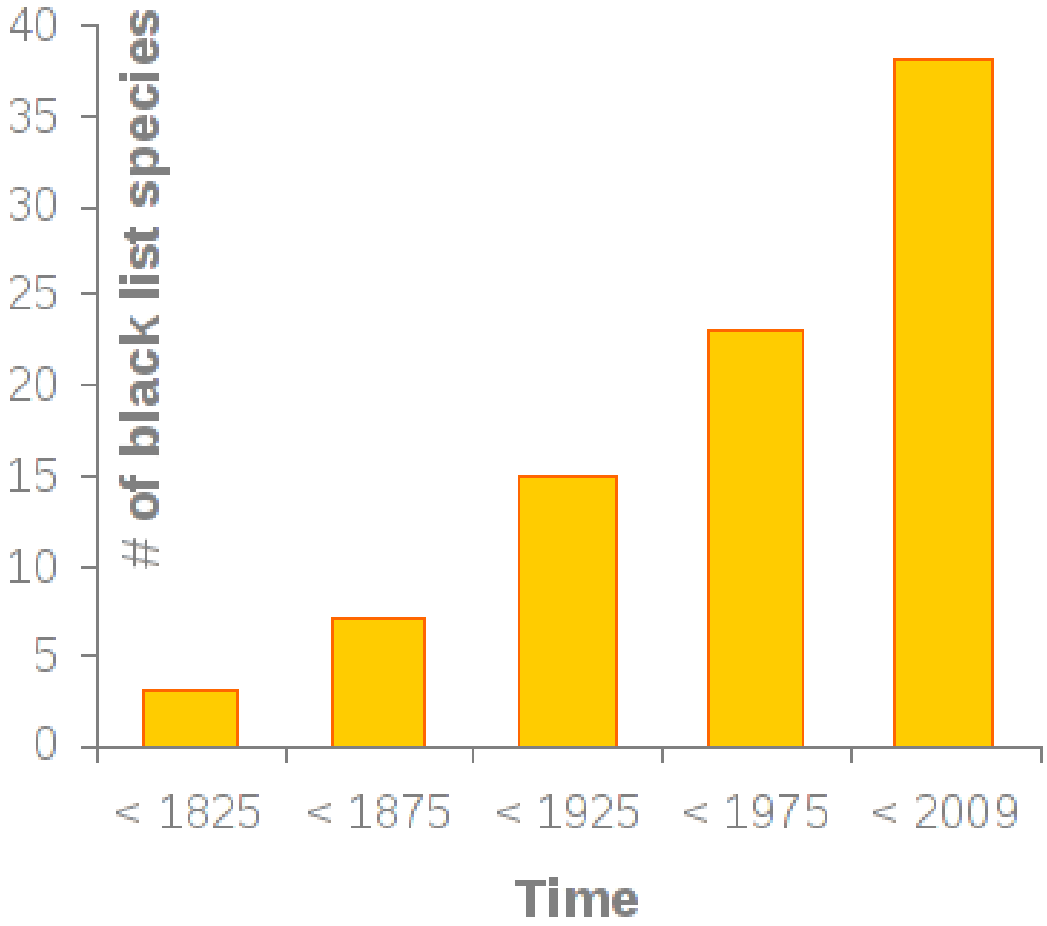
Not (yet) naturalised in Be

	Plants	Vertebrates
Alert list species (A0 & B0)	6	11

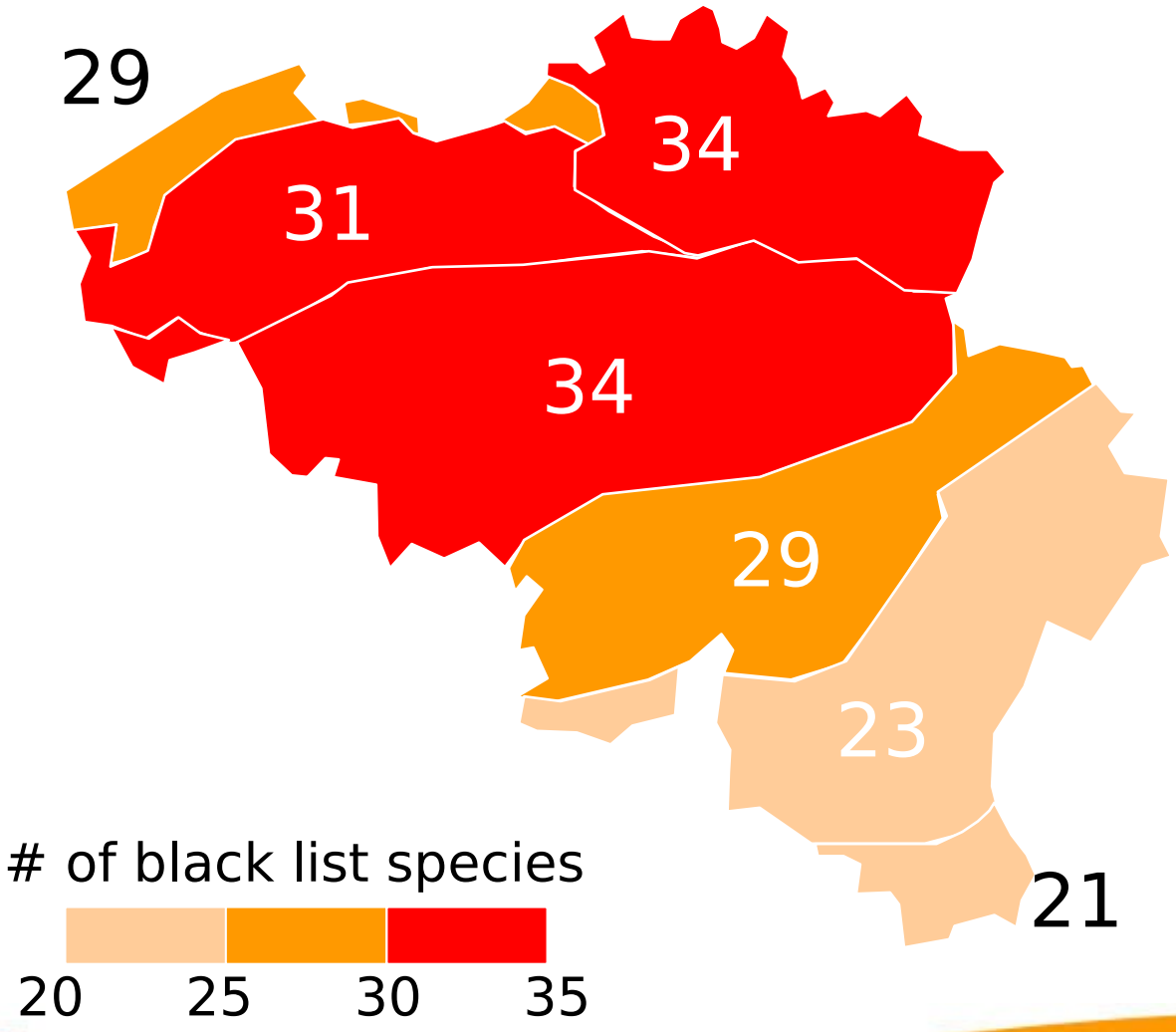
Impact types are group sensitive



Growth in the number of black list species established in the wild



Spatial distribution of black list sp.



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Recommendations based on list membership

Prevention	A0	A1	A2	A3	Bi
Importation/trade limitation	X	X			
Sectorial codes of conduct			X	X	(x)
Intentional release	X	X	X	X	X

Population control	A0	A1	A2	A3	Bi
Early eradication		X			
Containment/mitigation			X	X	(x)

New regulations instruments

- [BE] Royal decree concerning the importation, the exportation and the possession of non-native invasive species [↘ A0-A1] ;
- [BE] Life+ InvHorti project: development of codes of conduct with the horticultural sector in Belgium [↘ A2-A3] ;
- [Brussels] Nature conservation regional decree, prohibiting the sale, the purchase and the intentional release in the wild of non-native invasive species [↘ A & B] ;
- [Wallonia] Guidelines to limit the use of invasive plants via public tenders [↘ A0-A3] ;
- [EC] Council regulation 708/2007 concerning the use of alien species in aquaculture;
- [Flanders] Nature conservation regional decree, prohibiting the the intentional release in the wild of non-native species and regulating management in case of economical/ecological impact.

Conclusions & perspectives

- The work of the Belgian forum on invasive species is today widely recognised by federal and regional authorities in Belgium;
- This work has been presented at EEA, EPPO and NOBANIS meetings. The Belgian system is currently considered as a model in many European countries (AU, DE, DK, IT, NL, SE...);
- The next steps for the future are to update regularly information, to include species from other taxonomic groups and, possibly, to enlarge the protocol to consider impacts on economy and public health.