Science Facing Aliens
Brussels, May 11th 2009
1. What have we learnt today?

2. A Belgian research perspective
Session 1: pathways and dispersion

Initial introduction into a region

- Commodity
  - Release
  - Escape
  - Contaminant

- Vector
  - Stowaway

- Dispersal
  - Corridor
  - Unaided

Pathways

Presentations

- T. Rafalowicz (Acer)
- M. Vanhellemont (Prunus)
- T. Adriaens (Harmonia)
- Q. Groom (garden plants)
- K. Van Den Berge (carnivores)
- V. Versteirt (mosquitos)
- I. Hoste (plant containers)
- P. Boets (macro-crustaceans)
- A. Monty (Senecio)
Session 1: site invasibility

The characteristics of the recipient ecosystem determine invasion success and dynamics:

1. Habitat degradation and landscape urbanisation

Landscape alteration by human activities and eutrophication may increase the rate of biological invasions (Adriaens et al., Boets et al. Branquart et al., Martin et al., Packet et al., Saad et al., Stiers et al.).

But undisturbed habitats like forest ecosystems or oligotrophic water bodies are not immune to invasion (Rafalowicz et al., Stevens et al., Stiers et al., Vanhellemont et al.).
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Landscape alteration by human activities and eutrophication may increase the rate of biological invasions (Adriaens et al., Boets et al. Branquart et al., Martin et al., Packet et al., Saad et al., Stiers et al.). But undisturbed habitats like forest ecosystems or oligotrophic water bodies are not immune to invasion (Rafalowicz et al., Stevens et al., Stiers et al., Vanhellemont et al.).

2. Other drivers may facilitate invasions
- game herbivory (Vanhellemont et al.)
- fish stocking & aquaculture (Martin et al., Packet et al.)

3. Brackish waters are prone to invasions (Piesschaert et al.)
Session 1: invasions & climate change

In competition experiments, simulated climate warming modifies current competitive interactions between native and invasive terrestrial plants (Nijs et al.).

Predictions for tomorrow:
> Some current strong invaders may fade out, others may be stimulated;
> New invaders may emerge from the pool of currently non-invasive aliens;
> We need to prepare for a situation that we do not know today.
Session 1: detection & early warning

Several monitoring programmes may help in detecting new invasions:

- Numerous field survey by INBO scientists (vascular plants, aquatic invertebrates, fish, birds, mammals, etc.),

- Mosquito monitoring (MODIRISK BelSPO project).
Session 2: impacts on species

- **Competition** interactions often lead to a reduction in native species abundance and may even cause local species extinction on the long term (Saad et al., Stiers et al., Strubbe et al.);

- **Intraguild predators** may greatly affect the structure of invertebrate communities (Boets et al., Adriaens et al., Hautier et al.);

- **Hybridisation** with invasive species and **pathogen pollution** may quickly drive species to extinction (Branquart et al., Percsy & Percsy, Spanoghe et al.)
Session 2: impacts on ecosystems

- Invasive plants can enhance nutrient uptake and productivity of the ecosystem (Dassonville et al.);

- Invasive plants may also impact plant-dependent organisms (e.g. detritivorous and phytophagous invertebrates) and may alter food webs (Dassonville et al., Domken et al., Stiers et al., Vanparys et al.)
Session 3: risk assessment

- Results from different risk analysis tools provide similar results (Verreycken et al., Weiserbs);

- Risk assessments are strongly limited by the availability of data about species’ impacts on native biodiversity and ecosystem functioning (Branquart et al., Verreycken et al., Weiserbs). See e.g. watch list species;

- Scientists have the responsibility to document new invasion histories (Adriaens et al., Rafalowicz et al., Stuyck et al.)
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WoS publications on invasions

Number of publications

- International
- Belgium

Web of Science
Topic = “invasive species” OR “biological invasion”
Accessed on 29 April 2009

[Graph showing the increase in WoS publications on invasions from 1990 to 2008, with a significant rise in the late 1990s and early 2000s.]
WoS publications on invasions

- NO
- FI
- UK
- CZ
- FR
- SE
- BE
- IE
- ES
- DE
- NL
- PT
- AU
- LT
- IT
- HU
- GR
- PL

Countries

# publications / mios of inhab.
Belgian research projects on invasions
Early detection & rapid response

1. Detection

Alert network
Alert network: Early detection of suspected new invaders

Species diagnostic
Identification & vouchering

2. Assessment

Invasion description & reporting
Local distribution, population density, trends...

Rapid risk analysis
Establishment, spread, & impacts

3. Response

Rapid response management
Eradication, containment, mitigation, no action

General appraisal
Monitoring of treatment success and costs

POLLICY FORUM

ECOLOGY

Will Threat of Biological Invasions Unite the European Union?

Philip E. Holme,1,2* Per Pyšek,2 Wolfgang Nentwig,1 Montserrat Vilà3

Europe is home to many of the world’s most notorious alien species, including the garlic vine (Platycodon grandiflorus), Norway maple (Acer platanoides), Spanish slug (Arion vulgaris), German slug (Arion hortensis), and English stork (Ciconia ciconia). However, the perspective of the world rather than of regions is insufficient for understanding the extent of the alien invasion species inventories for Europe (DAISIE project, www.europe-aliens.org). This continent-wide assessment of the scale and impact of invasive alien species reveals that Europe’s marine and land biota have been invaded by >11,000 alien species. Over half of those terrestrial plants, aquatic and terrestrial invertebrates account for >20% of species, whereas only ~5% are vertebrates. Compared with estimates from 1963 more than a century ago, the new data on alien species identifies more than five times as many plants, animals, and vertebrates as many plants and animals in Europe (1). Europe is home to numerous species from other continents such as the invasive cane toad (Bufo marinus), the American bullfrog (Lithobates catesbeianus), the Argentine ant (Linepithema humile), the Egyptian Goose (Alopochen aegyptiaca), the Indian starling (Sturnus cineraceus), the Chinese mitten crab (Eriocheir sinensis), the Japanese oyster (Crassostrea gigas), and New Zealand flax (Arundo donax). As a result, biodiversity, forested and grassland ecosystems, and alien ecosystems (4). To date, the European Union’s (EU) response to the invasion of alien species has been driven by commitments to international agreements such as the World Trade Organization’s-Montréal Protocol on the Prohibition of the Import of Alien Plants into the United States (WTO). Yet these commitments have not always been supported by adequate funding. Under the COP7, the EU memorandum is to implement the Action Plan for the Reduction of the Impact of Alien Species on the Environment. The EU memorandum is to implement the Action Plan for the Reduction of the Impact of Alien Species on the Environment. The EU memorandum is to implement the Action Plan for the Reduction of the Impact of Alien Species on the Environment. The EU memorandum is to implement the Action Plan for the Reduction of the Impact of Alien Species on the Environment. The EU memorandum is to implement the Action Plan for the Reduction of the Impact of Alien Species on the Environment.