REU meeting on **Forest Invasive Species in Europe and Central Asia** 6-7 September 2016, Minsk, Belarus

REGIONAL PERSPECTIVE OF INVASIVE PLANTS IN FORESTS

Food and Agriculture Organization of the United Nations

Ingolf Kühn, Professor for Macroecology,
Helmholtz Centre for Environmental Research – UFZ &
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(REGIONAL) PERSPECTIVE OF INVASIVE PLANTS (IN FORESTS)

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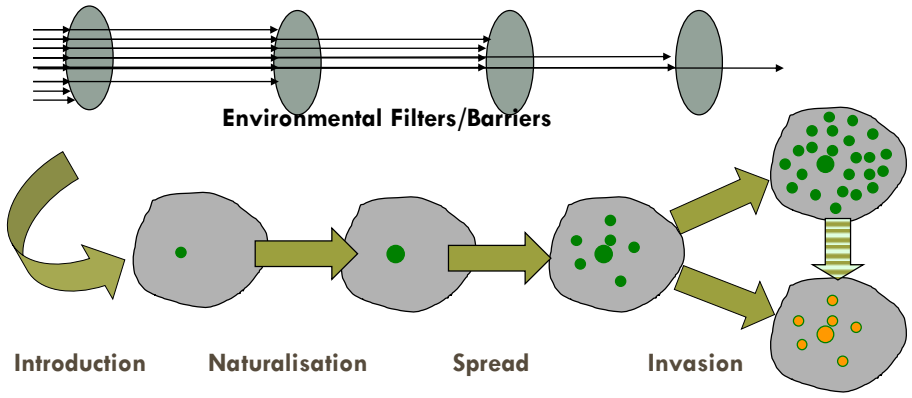
Steps of the invasion process



See Richardson et al. 2000, Heger 2001, Rahel 2002, Colautti & MacIsaac 2004, Hulme 2004, Pyšek et al. 2004

Where do they come from?

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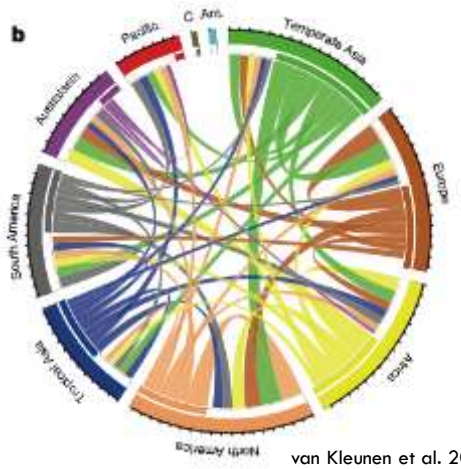
Flow of naturalized alien plant species



van Kleunen et al. 2015, Nature 525: 100–103.

How do they come?

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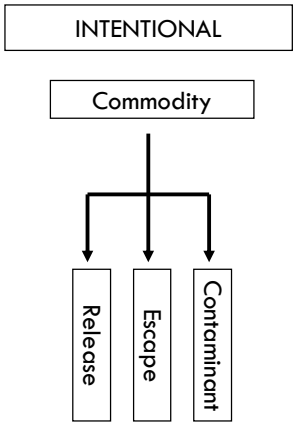
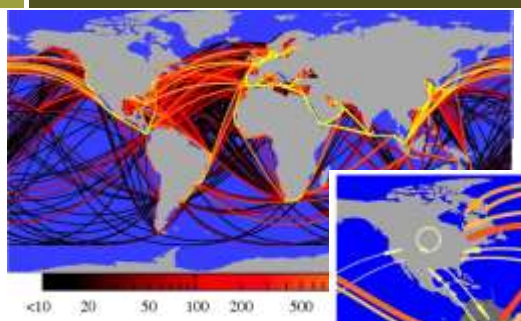
Pathways of Biological Invasions



Hulme et al. 2008, J. Appl. Ecol. 45: 403–414

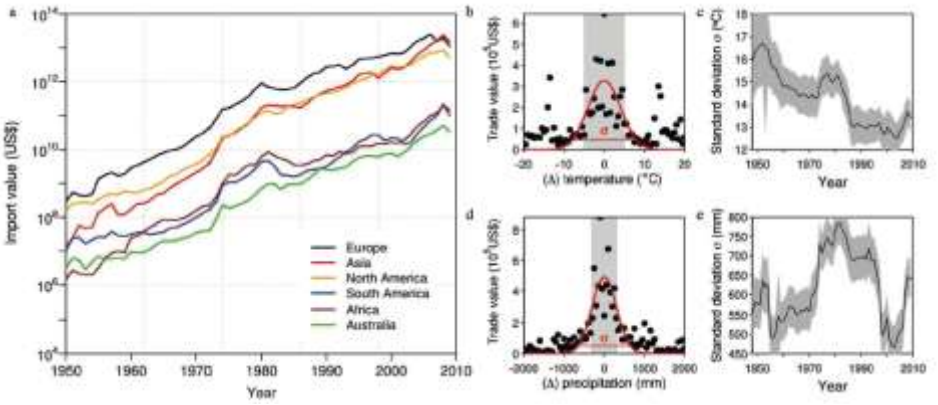
Important Pathways of Biological Invasions: Commodities



Global Shipping Routes
Kaluza et al. J. R. Soc. Interface
doi:10.1098/rsif.2009.0495

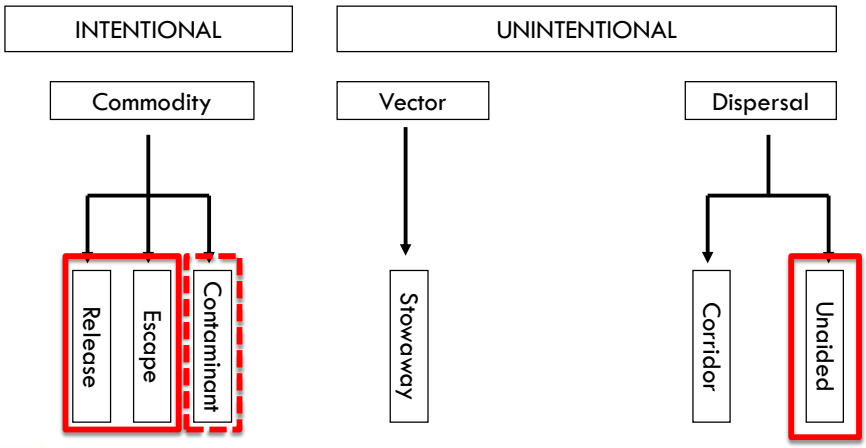
Network of Plant Invasions
Seebens et al. 2015, Global Change Biology 21: 4128–4140

The role of bilateral trade in explaining biological invasions



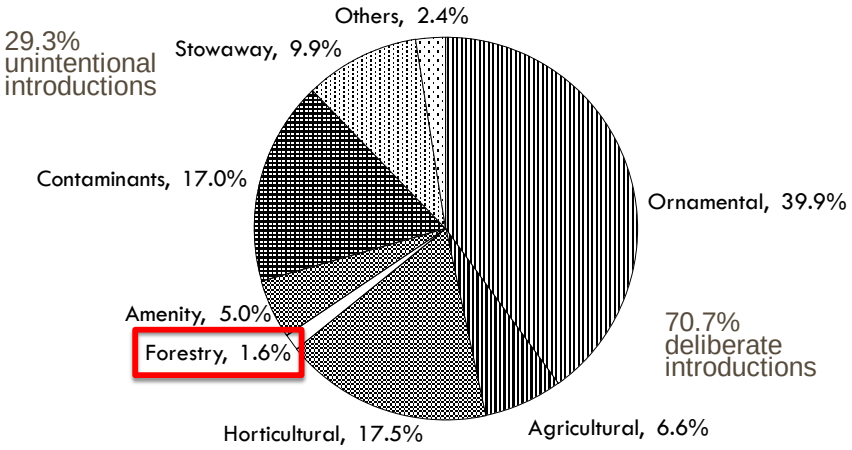
Essl et al., BioScience 65: 769-782

Pathways of Biological Invasions



Hulme et al. 2008, J. Appl. Ecol. 45: 403–414

Introduction pathways to Europe



after Pyšek et al. 2009, In DAISIE (eds.), 43-61. Springer, Dordrecht

Where are they now?

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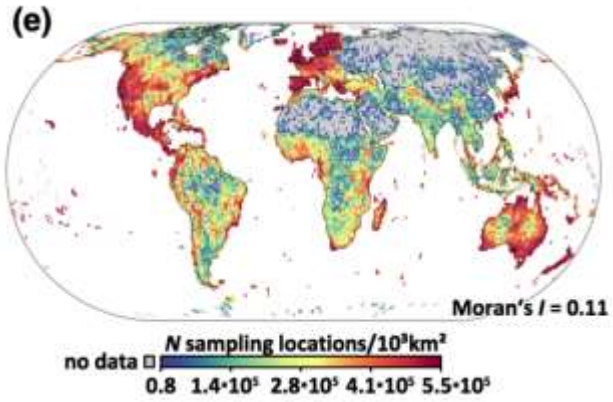
Distribution of naturalized species

- Naturalized vascular plant species covered by the GloNAF database.

M van Kleunen *et al.* (2015) *Nature* **525**: 100–103

Global Biodiversity Information Facility (GBIF) data coverage



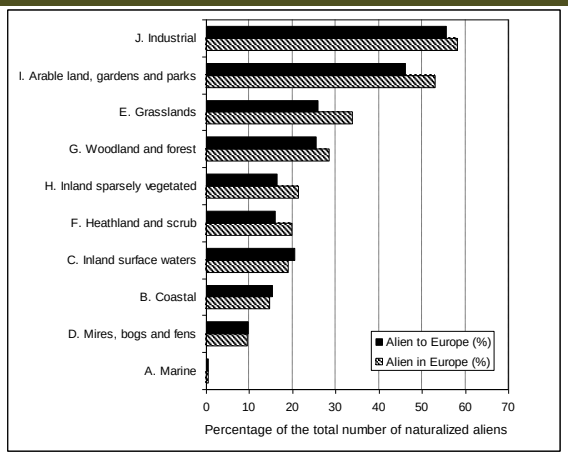
Meyer et al. (2016) Multidimensional biases, gaps and uncertainties in global plant occurrence information. Ecol Lett 19: 992-1006.

Alien plant species in Europe

Country/region	Total	Natura-lized	Casual	Unspeci-fied	Crypto-genic
Alien *in* Europe (total)	5789	3749	1507	504	29
European origin (total)	2671	1864	541	247	19
Alien *to* Europe (total)	2843	1780	872	183	8

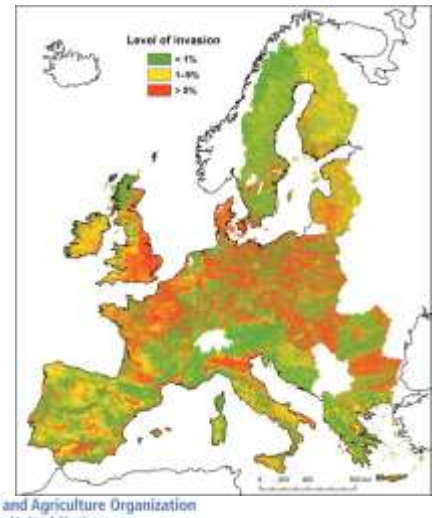
Lambdon et al. (2008) *Preslia* **80**: 101-149

Distribution of European naturalized aliens in EUNIS habitats



Lambdon et al. (2008) *Preslia* **80**: 101-149

Level of plant invasibility across Europe



Map of plant invasions in Europe based on invasibility of EUNIS habitats (translated to CORINE land-cover) in three biogeographical regions.

Based on vegetation plot data from Chytrý et al. (2008) J. Appl. Ecol.

Chytrý et al. 2009, Diversity & Distributions 15: 98-107

Alien Plants and Forests

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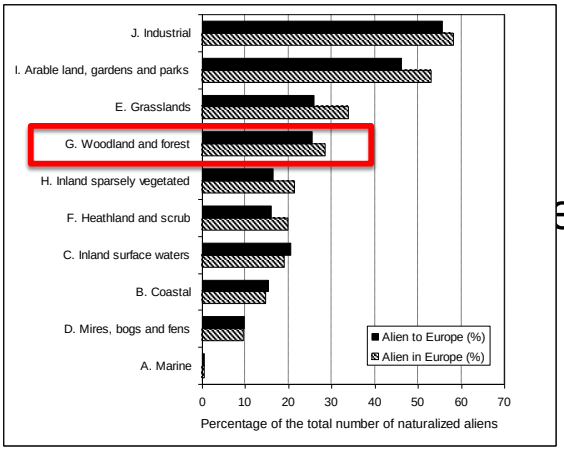
Distribution of European naturalized aliens in EUNIS habitats



es

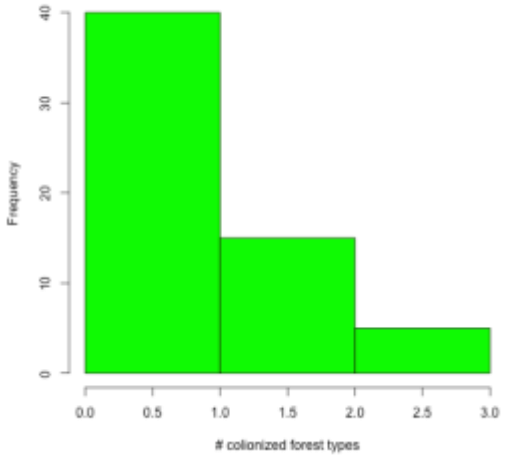
Lambdon et al. (2008) *Preslia* **80**: 101-149

Alien Plant Species and Forests

- Introduced by Forestry
  - Alien *to* Europe 38
  - European origin 39
  - Alien *in* Europe (total) 80
- Naturalized in forests
  - Alien *to* Europe 310
  - European origin 357
  - Alien *in* Europe (total) 668

Lambdon et al. (2008) *Preslia* **80**: 101-149

Most species colonise few forest types



Most "versatile" invasive tree species in Central Europe

- *Acer negundo* (ashleaf maple) planted as ornamental tree
- *Prunus serotina* (black cherry) planted as a forest and park tree
- *Sorbus latifolia* (broad-leaved whitebeam) planted as ornamental tree in C, N and NW Europe

Most “versatile” herb species in Central European forests

- *Impatiens glandulifera* (Himalayan balsam) planted as ornamental herb
- *Impatiens parviflora* (small-flowered touch-me-not) spread from Botanic Gardens

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Species of the „EU list“ in forests

- *Persicaria perfoliata* (mile-a-minute weed) → Russia, Turkey
- Pueraria montana (kudzu) → Switzerland, Italy, Russia, Ukraine

Images: en.wikipedia.org

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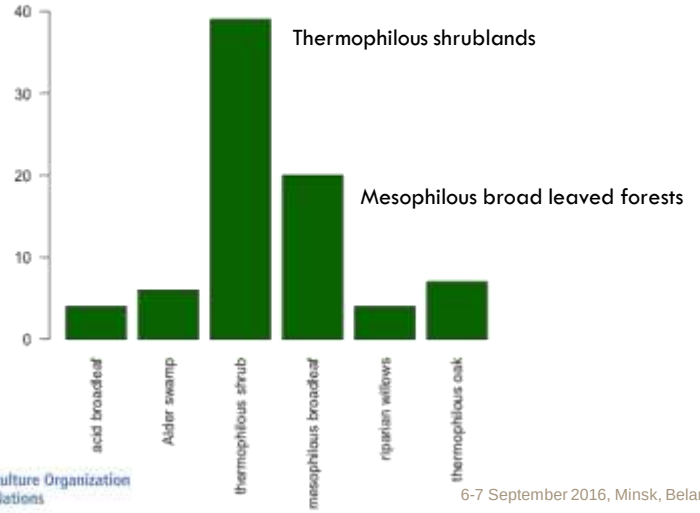
Few forest types have many alien species



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Classifying invasive species

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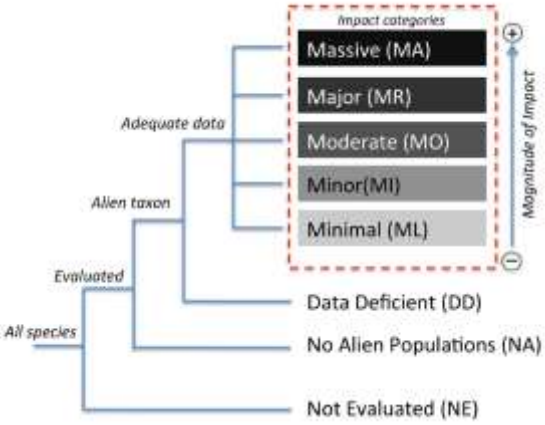
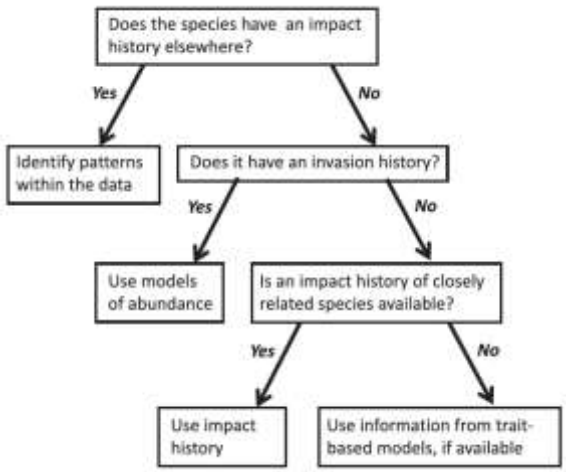
A proposed IUCN Environmental Impact Classification for Alien Taxa (EICAT)



Blackburn et al. 2014, Plos Biology 12: e1001850
Hawkins et al. 2015, Diversity and Distributions 21: 1360–1363

Forecasting invasive species



Kumschick et al. 2015, BioScience 65: 55-63

Summary

- Forestry contributes less to plant invasions than other sectors
- Levels of forests invasions are intermediate (compared to other habitat types)
- Despite much local knowledge...
- ...litte synthesized knowledge on
  - regional level (Eastern Europe & West-Asia!)
  - regional forest invasions
  - invaded forest types

Acknowledgements

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- EU-Project DAISIE: Delivering Alien Invasive Species Inventories for Europe http://www.europe-aliens.org, coordinators: P. Hulme, D. Roy
- Cost Action TD 1209 *Alien Challenge* http://www.brc.ac.uk/alien-challenge, coordinator: H. Roy
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Thank you for your attention!

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