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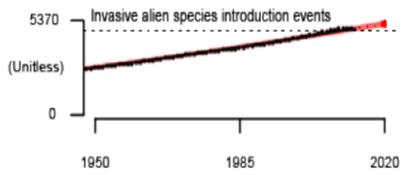
Health impacts of alien species in Europe

Introduction

Introductions of invasive alien species are (still) increasing:

CONSERVATION TARGETS

A mid-term analysis of progress toward international biodiversity targets

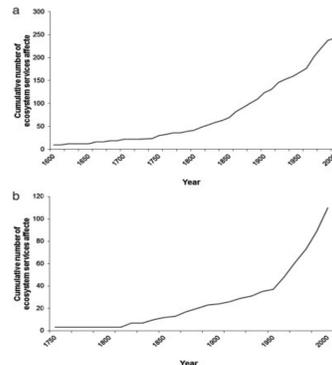


Tittensor et al. (2014)



CBD (2014)

Impacts of invasive alien species are (still) increasing:

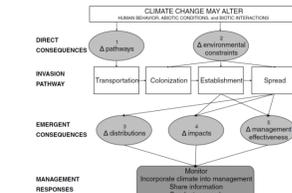


Rabitsch et al. (2015)

Climate change and invasive alien species:

5 nonexclusive consequences of climate change for invasive alien species:

- (1) altered transport and introduction pathways,
- (2) establishment of new invasive alien species,
- (3) altered distribution of existing invasive alien species,
- (4) altered impact of existing invasive alien species, and
- (5) altered effectiveness of control strategies.

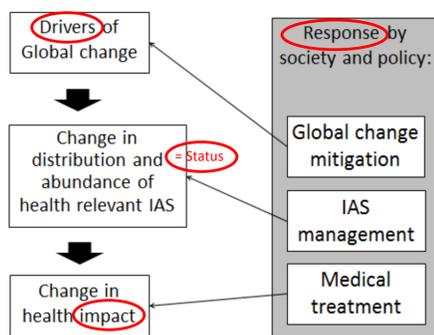


Relationship between the invasion pathway and the five consequences described for invasive alien species under climate change. Numbers refer to consequences described above.

Hellmann et al. (2008)

Project Aliens_Health (6th ACRP):

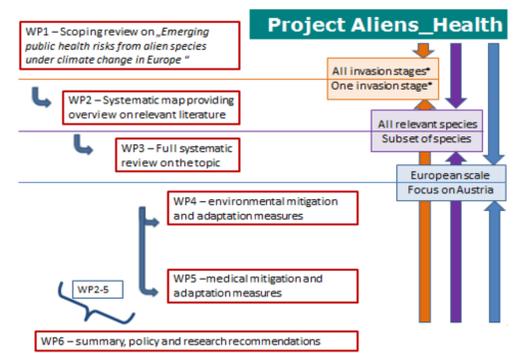
Conceptual framework (Bayliss et al. 2015)



Photos



Project structure



Scoping review (Schindler et al. 2015)

Aim: review of the state of knowledge and research gaps on alien species impacting human health in Europe

Explored literature databases: Web of Science

Results:

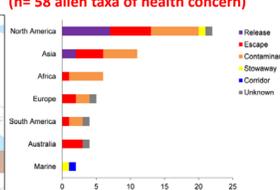
Taxonomic coverage

Taxonomic group	No of alien species	Original articles	Reviews	Total no of articles
Vascular plants (Tracheophytes)	28	27	4	31
Flies (Diptera)	6	17	8	25
Mammals (Mammalia)	2	3	1	4
Other arthropods (Arthropoda)	4	1	2	3
Mites and ticks (Acari)	7	2	1	2
Amphibians (Amphibia) and reptiles (Reptilia)	7	1	1	2
Birds (Aves)	53	1	1	2
Hymenoptera	1	1	1	1
Jellyfish (Cnidaria)	1	1	1	1
Multiple taxonomic group	n.a.	2	4	6

Geographical coverage and invasion stages (n=56 original research articles)



Introduction pathways and native range (n= 58 alien taxa of health concern)



Conclusions:

- **Knowledge** on human health impacts of alien species in Europe is still **scattered**.
- Detected **review articles** usually cover particular (groups of) species (but see Hulme 2014).
- Detected **original research articles** mainly covered **vascular plants** and **dipterans**. They mainly dealt with **spread** of species.
- **Knowledge gaps** prevail for early invasion stages, severity and trends of impacts, interactions with climate change, and socioeconomic costs.
- **Multi-/interdisciplinary studies** combining invasion ecology and medical research on alien species are still **scarce**
- **Comprehensive surveillance and monitoring** for alien species of health concern is very often recommended

Systematic review (Schindler et al. submitted)

Aim: to comprehensively review and synthesize available evidence on the effectiveness of management for common ragweed *Ambrosia artemisiifolia*

Explored literature databases:

- Web of Science
- SCOPUS
- MEDLINE
- CAB Direct
- AGRICOLA
- ProQuest Theses
- OpenGrey

Systematic review components:

Population: Any population of *A. artemisiifolia* at any habitat including populations in agricultural settings and such used for experimental research (e.g. in greenhouses) at any geographic location
Intervention: Any physical (e.g. hand pulling, mowing, tillage), chemical (e.g. herbicide application), biological or combined weed management action
Comparator: Studies applying Before-After-Control-Impact (BACI), before/after or treatment/control designs as well as studies that compare differing intensities of management or different application frequencies and timings
Outcome parameters: Impacts measured by ecological, biological and phytosociological parameters of *A. artemisiifolia* will be considered, e.g. coverage, abundance, survival, reoccurrence, growth rate, height, leaf area, biomass accumulation, as well as pollen and seed production.

Results and conclusions: not any results available yet

Systematic map (Bayliss et al. 2015; Bayliss et al. in prep)

Aim: evidence map of changing human health impacts due to exposure to invasive alien species in Europe (since 1990).

Explored literature databases:

- Web of Science
- MEDLINE
- CAB Direct
- CINAHL
- EMBASE
- SCOPUS
- TOXNET

Additional file 2: DRAFT LIST OF ALIEN SPECIES (n=193) WITH HUMAN HEALTH IMPACTS PRESENT IN EUROPE

Type	Species	Hulme 2014	Maaza et al. 2014	Schindler et al. 2015	GISD search	Other (added by authors)
Plant	<i>Acacia</i> spp.		X	X		
Plant	<i>Acer</i> spp.		X			
Vertebrate	<i>Acridotheres tristis</i>				X	
Invertebrate	<i>Aedes aegypti</i>	X	X	X	X	
Invertebrate	<i>Delias niphonensis</i>	X	X	X	X	

Results:

- Less than 30 original articles (out of 13304 detected ones) directly related changes in occurrence, frequency or severity of human health impacts due to exposure to invasive alien species in Europe. They often presented changes in sensitization levels, e.g. to *Ambrosia artemisiifolia*, or first reports of illness or injury resulting from exposure to alien species such as:
- Autochthonous transmission of exotic diseases (Chikungunya virus and Dengue fever) by alien mosquitoes *Aedes albopictus* and *Ae. aegypti*.
- Significant health impacts along Mediterranean coasts due to blooms of alien unicellular algae such as *Ostreopsis* spp.
- Dermatitis associated e.g. with contact to the oak processionary moth *Thaumetopoeia processionea*.

Conclusions: surprisingly little studies directly related or even confirmed changes in health impacts to alien species in Europe

Questionnaire on concerns and mitigation measures

Aim: to assess knowledge, concerns and opinions of Austrian stakeholders (of the environment and health sector) on health relevant alien species and their management

Methods:

Online questionnaire for stakeholders of environment and health sector (closed questions)

Main questions [original German version]:

- Sind gesundheitsrelevante Neobiota ein Thema in Ihrem Wirkungs-/Zuständigkeitsbereich?
- Welche gesundheitsrelevanten Neobiota halten Sie für die wichtigsten?
- Welche Folgen von Neobiota auf die Gesundheit erachten Sie als wichtig?
- Wurden in Ihrer Institution (Ihrem Wirkungs-/Zuständigkeitsbereich) bereits Maßnahmen gegen gesundheitsrelevante Neobiota diskutiert oder erwogen?
- Wurden in Ihrer Institution (Ihrem Wirkungs-/Zuständigkeitsbereich) bereits Maßnahmen gegen gesundheitsrelevante Neobiota umgesetzt?
- Welche Maßnahmen können Sie für zukünftige Umsetzung empfehlen?

Results and conclusions: not any results available yet

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