



WORKSHOP

Assessment of current and future
Invasive Alien plant Species (IAS)
in European coastal dune
ecosystems

19-20(-21) May 2022

De Westhoek, De Panne, Belgium



AGENTSCHAP
NATUUR & BOS

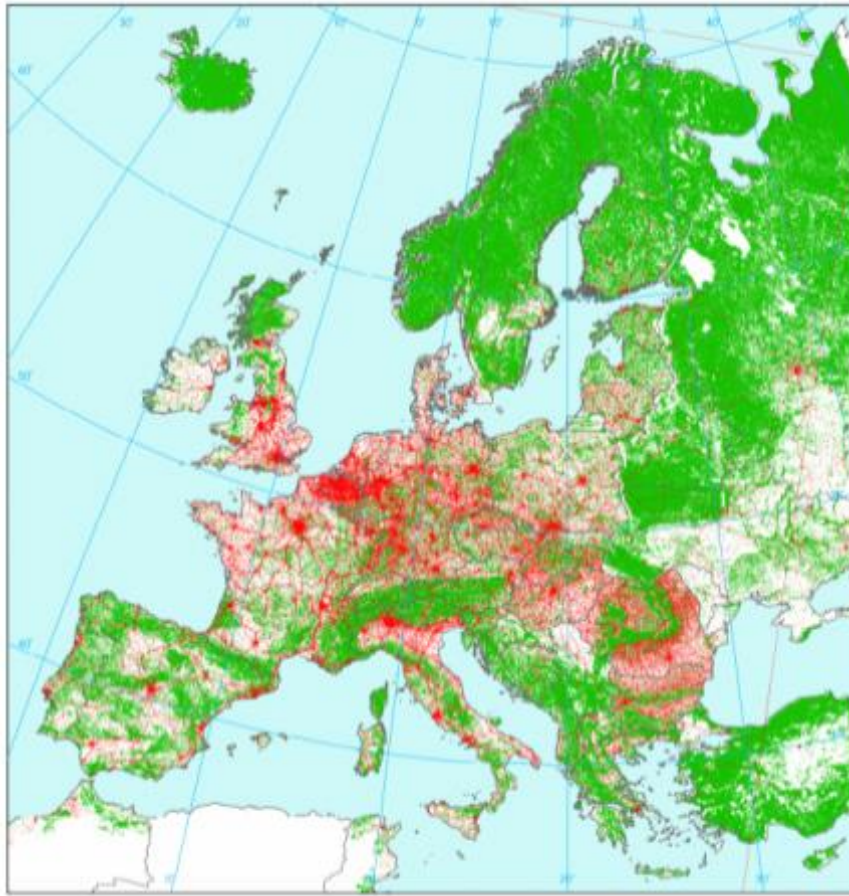


Bram D'hondt, Sam Provoost, Reinhardt Strubbe, Debby Deconinck & Tim Adriaens



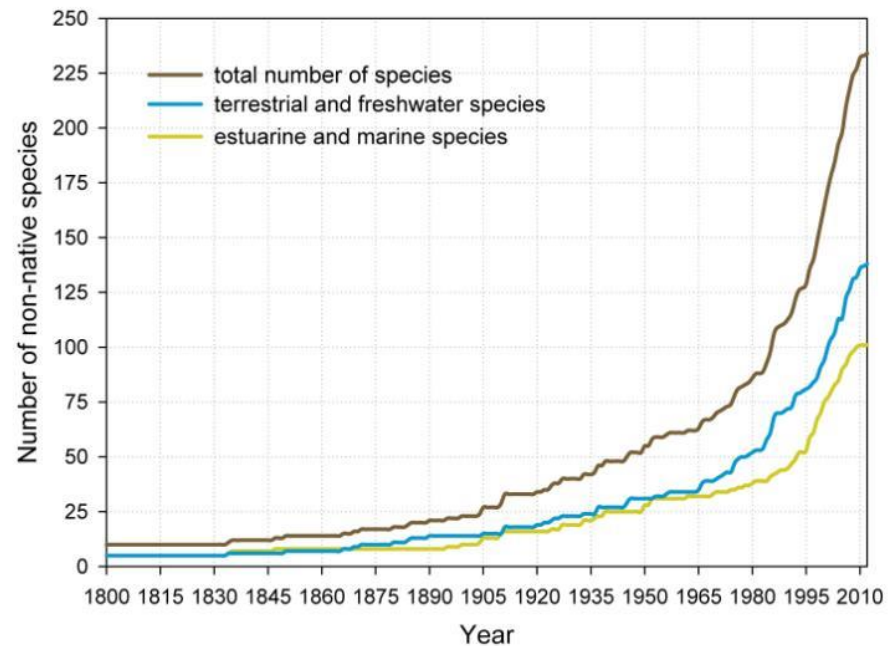
AGENTSCHAP
NATUUR & BOS

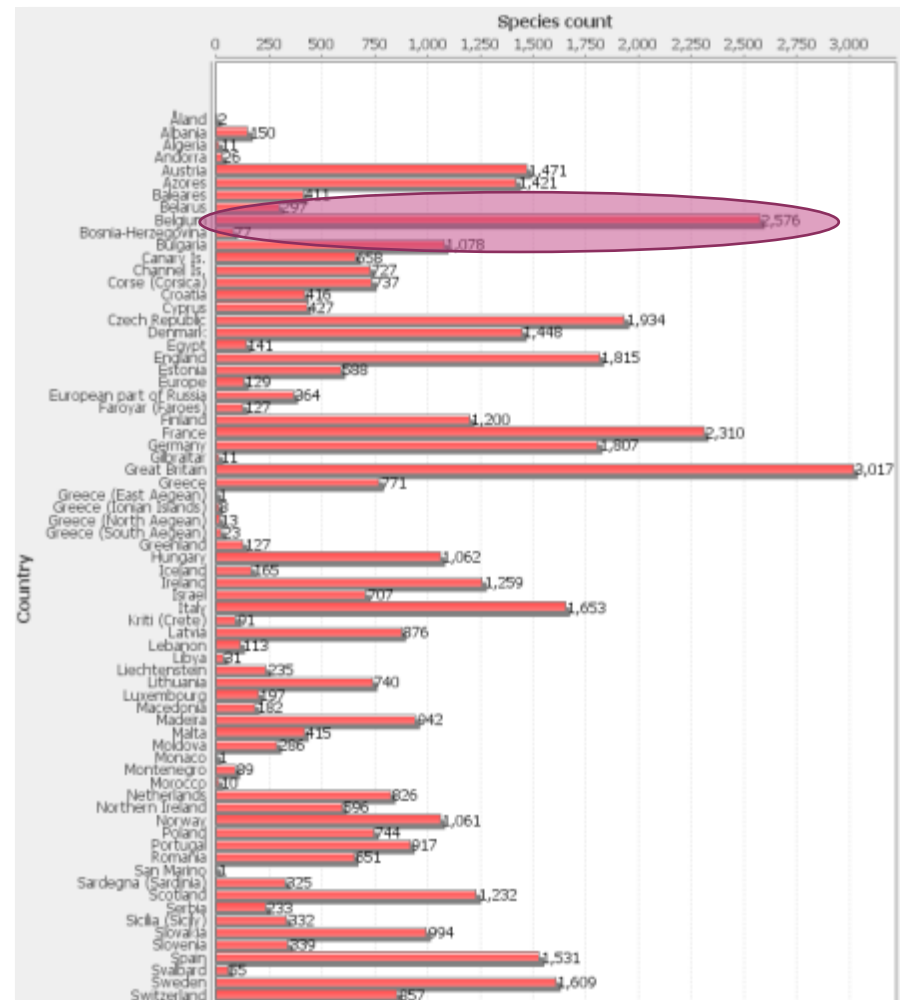
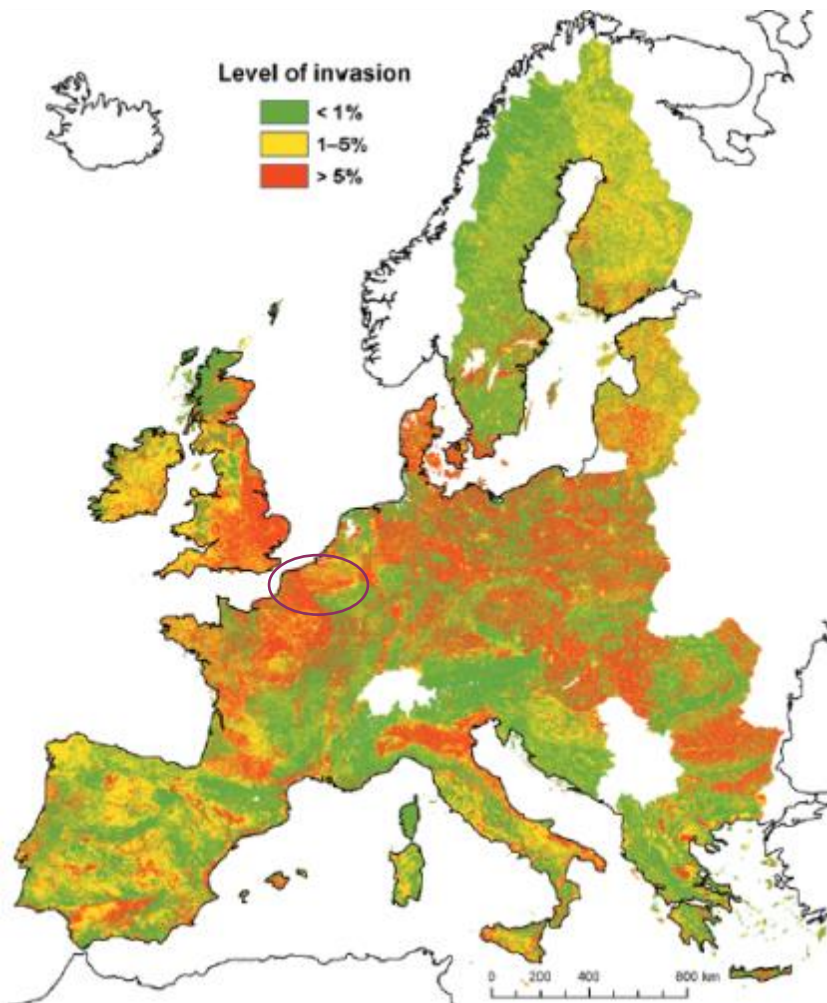
RESEARCH INSTITUTE
NATURE AND FOREST



EEA 2002

- ▶ Flanders = urban sprawl
- ▶ Near “absence” of spatial planning
- ▶ 26 % built-up land
- ▶ High pressures on open space
- ▶ 525 inhabnts/km²
- ▶ Logistical hub
- ▶ Natural areas small and vulnerable



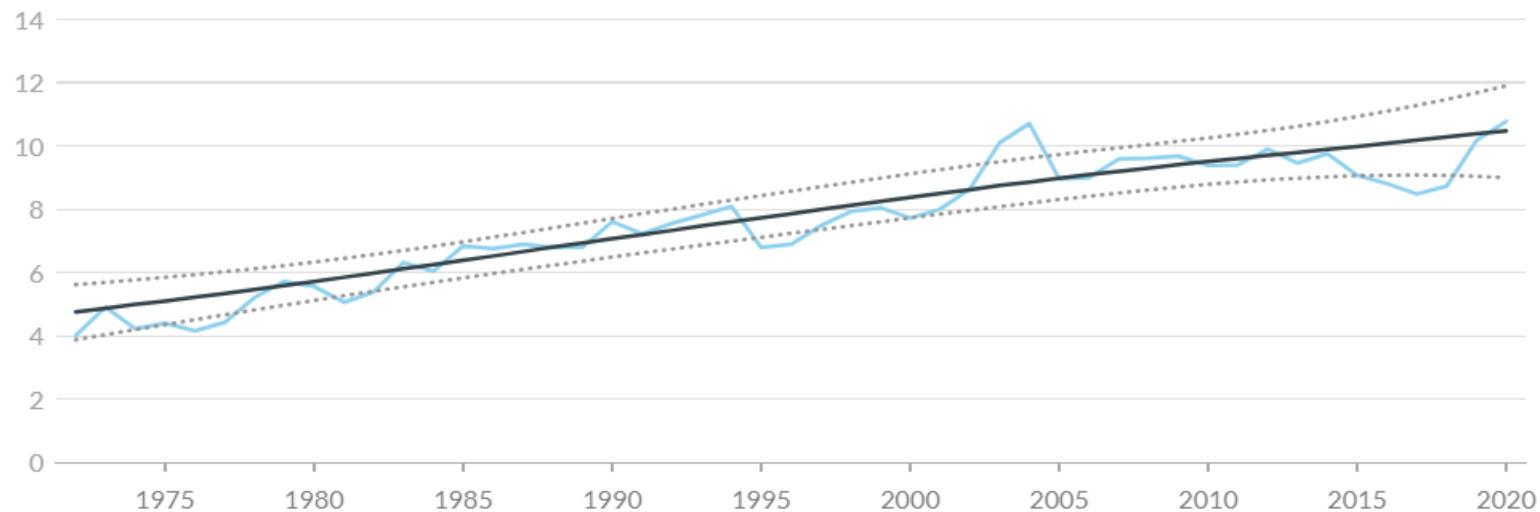


Chytrý et al. 2009 *Div Dist*, DAISIE

Share of alien plant species

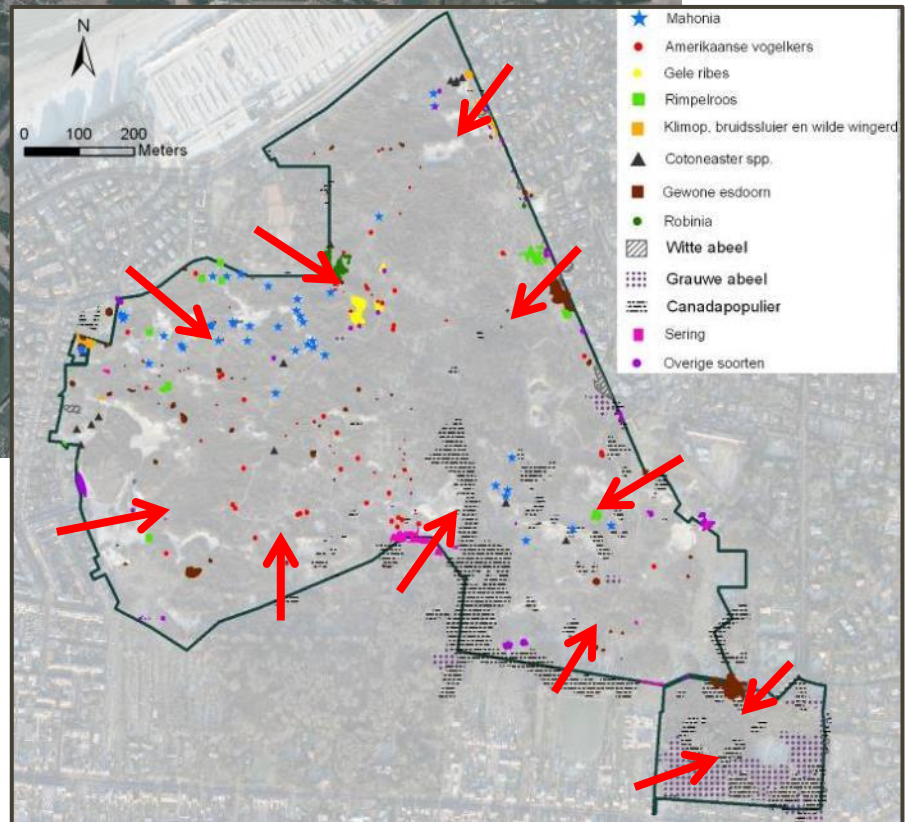
Flemish Region, 1972 -2020, in %

— Observations — Trend Lower limit 90% reliability interval Upper limit 90% reliability interval



Source: INBO

Van Landuyt, Florabank



Highly fragmented landscape
Provoost et al. (PINK & BEK data)

Alien plants in Belgian coastal dunes

- ▶ Alien flora: 5 → 20% past century
- ▶ New plant species >1972: 60% aliens
- ▶ New aliens: mainly garden escapes
- ▶ Invasive problem species
- ▶ Late acknowledgement as problem



Species	Growth form	ISEIA	Surface area (m ²)	% dune areas
<i>Rosa rugosa</i>	Shrub	B3	56757	63
<i>Berberis aquifolium</i>	Shrub	A2	34035	50
<i>Prunus serotina</i>	Tree	A3	5461	52
<i>Syringa vulgaris</i>	Shrub	–	4544	30
<i>Ribes odoratum</i>	Shrub	–	2986	11
<i>Symphoricarpos</i> spp.	Shrub	–	2874	26
<i>Robinia pseudoacacia</i>	Tree	–	1458	4
<i>Cotoneaster</i> spp.	Shrub	–	1392	41
<i>Lycium barbarum</i>	Shrub	–	420	15
<i>Ailanthus altissima</i>	Tree	A2	209	9
<i>Tamarix</i> spp.	Shrub	–	169	9
<i>Elaeagnus</i> spp.	Shrub	–	108	11
<i>Lonicera</i> spp.	Liana	–	106	13
<i>Prunus</i> spp.	Tree	–	88	13
<i>Parthenocissus</i> spp.	Liana	B3	83	4
<i>Ligustrum ovalifolium</i>	Shrub	–	72	9
<i>Ribes sanguineum</i>	Shrub	–	58	26
<i>Amelanchier</i> spp.	Shrub	–	44	9
<i>Yucca</i> spp.	Tree-like succulent	–	25	15



<i>Cornus</i> spp.	Shrub	–	15	24
<i>Baccharis halimifolia</i>	Shrub	A1	13	11
<i>Buddleja davidii</i>	Shrub	B3	7	7
<i>Euonymus japonica</i>	Shrub	–	5	2
<i>Pseudosasa japonica</i>	Shrub	–	4	2
<i>Rosa</i> spp.	Shrub	A3	4	4
<i>Quercus</i> spp.	Tree	–	3	4
<i>Sorbus</i> spp.	Tree	–	2	4
<i>Viburnum</i> spp.	Shrub	–	1	2







Management costs





EUROPEAN COMMISSION

LIFE Public Database

European Commission > CINEA > LIFE Programme > LIFE Public Database



LIFE DUNIAS on LIFE Public Database



DUNe restoration by tackling Invasive Alien Species

Reference: LIFE20 NAT/BE/001442 | Acronym: LIFE DUNIAS

PROJECT DESCRIPTION

BACKGROUND

Coastal dunes and Atlantic salt marshes are unique ecosystems and home to a large number of red list species. Typical habitat types such as annual pioneer vegetation on mud and sand areas, Atlantic salt meadows, embryonic dunes, shifting white or fixed grey dunes, Atlantic decalcified fixed dunes, dunes with sea buckthorn, dunes with creeping willow, wooded dunes and dune slacks are high conservation value habitats of EU importance.

However, many of the dune areas along the Belgian coast are small and fragmented, making them very susceptible to external influences. Moreover, dunes are open and dynamic systems, making it easier for invasive alien species (IAS) to settle. Also, the microclimate of dunes makes the habitat vulnerable to the settlement of southern IAS. In Belgian coastal dunes, invasive alien plant species such as *Rosa rugosa*, *Mahonia aquifolium* and species of Union concern (specifically targeted by the EU IAS Regulation) *Baccharis halimifolia* and *Ailanthus altissima* are infesting the abovementioned European habitat types. Dunes become degraded

ADMINISTRATIVE DATA

- ★ Reference: LIFE20 NAT/BE/001442
- ★ Acronym: LIFE DUNIAS
- 🕒 Start Date: 01/10/2021
- 🕒 End Date: 01/10/2026
- 💶 Total Budget: 7,087,215 €
- 🇪🇺 EU Contribution: 4,252,329 €
- 📍 Project Location:

Aims of the workshop

▶ Prioritized list of (potential) IAS

→ **EDRR**



→ **Surveillance**

→ **Prevention**

× **Garden centers**



× **Codes of conduct**

× **Pathway action plans**

× **Awareness raising**



▶ Policy applications

→ **Candidates for risk assessment**

→ **Candidates for Union Listing**

→ **Inform national/regional listings**

→ **Better integration of environmental legislative regimes**

▶ Knowledge exchange on problem species across the region (*climate proofing*)

▶ Knowledge exchange on management practices

→ **Good, bad and best practices**



→ **Management priorities**

→ **Feasibility**



▶ Networking

→ **Strengthen dune IAS network across the Atlantic region**



Horizon scanning

- ▶ Forecasting methodology
- ▶ Evidence based identification of future threats and opportunities
- ▶ Recurrent activity

Biol Invasions (2016) 18:17–30
DOI 10.1007/s10530-015-0986-0

CrossMark

ORIGINAL PAPER

Trans-national horizon scanning for invasive non-native species: a case study in western Europe

Belinda Gallardo · Alexandra Zieritz · Céline Bellard · Pieter Boets · J. Robert Johan L. C. H. van Valkenburg · David

WILEY Global Change Biology

PRIMARY RESEARCH ARTICLE

Developing a list of invasive alien species likely to threaten biodiversity and ecosystems in the European Union

Helen E. Roy¹ | Sven Bacher² | Franz Essi^{3,4} | Tim Adriaens⁵ | David C. Aldridge⁶ | John D. D. Bishop⁷ | Tim M. Blackburn^{8,9} | Etienne Branquart¹⁰ | Juliet Brodie¹¹ | Carles Carboneras¹² | Elizabeth J. Cottier-Cook¹³ | Gordon H. Copp^{14,15} | Hannah J. Dean¹ | Jürgen Eilenberg¹⁶ | Belinda Gallardo¹⁷ |

Biol Invasions (2019) 21:2107–2125
https://doi.org/10.1007/s10530-019-01961-7

ORIGINAL PAPER

Horizon scanning for invasive alien species with the potential to threaten biodiversity and human health on a Mediterranean island

Jodey Peyton · Angeliki F. Martinou · Oliver L. Pescott · Tim Adriaens · Margarita Arianoutsou · Ioannis Bazas · Colin W. Olaf Booy · Marc Botham · J. Robert Britton · Javier Lobon Cervi

frontiers in Ecology and Evolution

ORIGINAL RESEARCH
published: 21 October 2020
doi: 10.3389/fecol.2020.569291

Horizon Scanning to Predict and Prioritize Invasive Alien Species With the Potential to Threaten Human Health and Economies on Cyprus

OPEN ACCESS
Jodey M. Peyton^{1*}, Angeliki F. Martinou^{1,2*}, Tim Adriaens^{3*}, Niki Chartasia⁴, Paraskevi K. Karachle⁵, Wolfgang Rabitsch⁶, Elena Tricarico⁶,

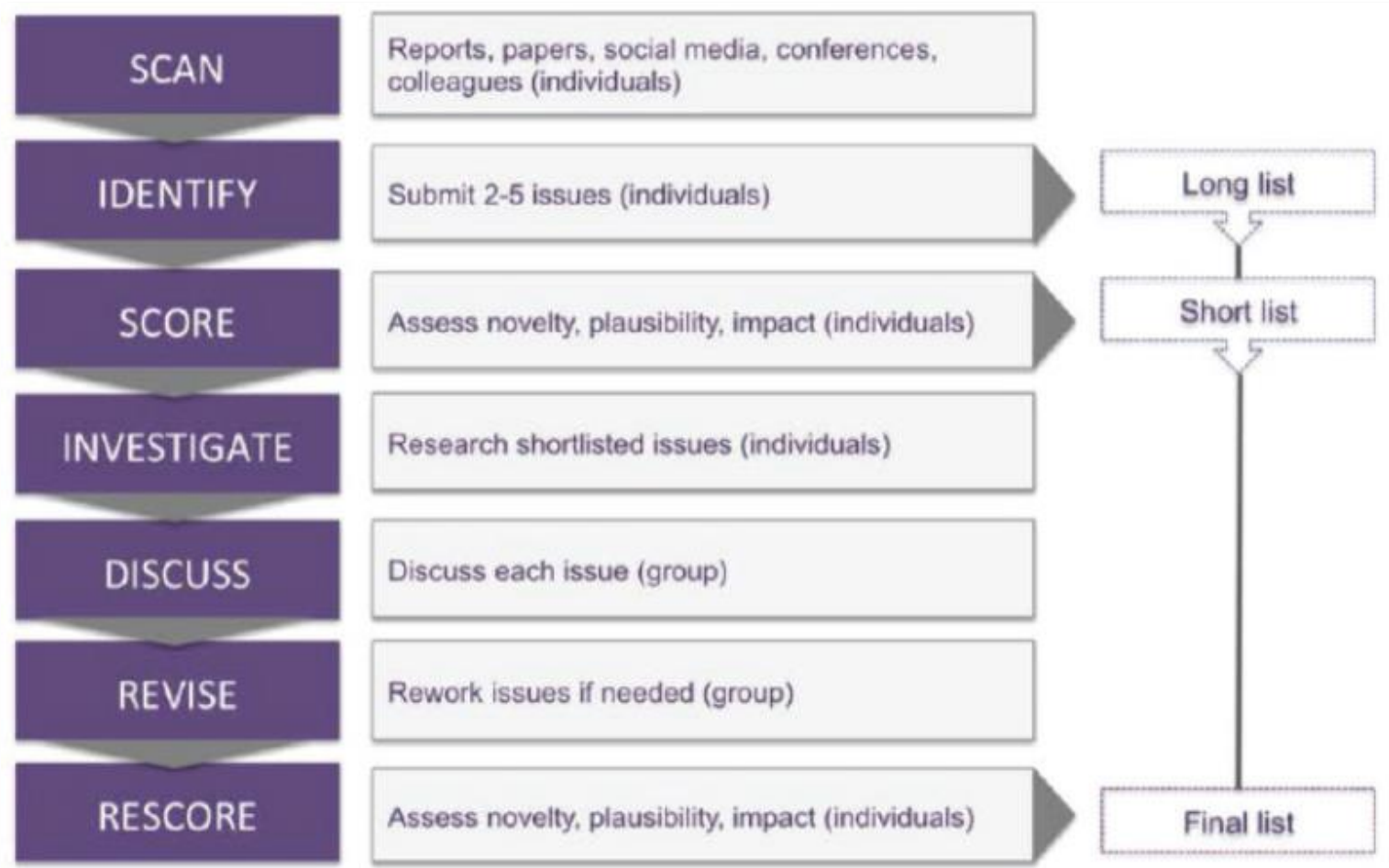
CABI Horizon Scanning Tool
Prioritizing invasive species threats

Area at risk: Belgium I am only interested in plant pests

Refine by: Results: 1853 species found Save and share scan Current search:

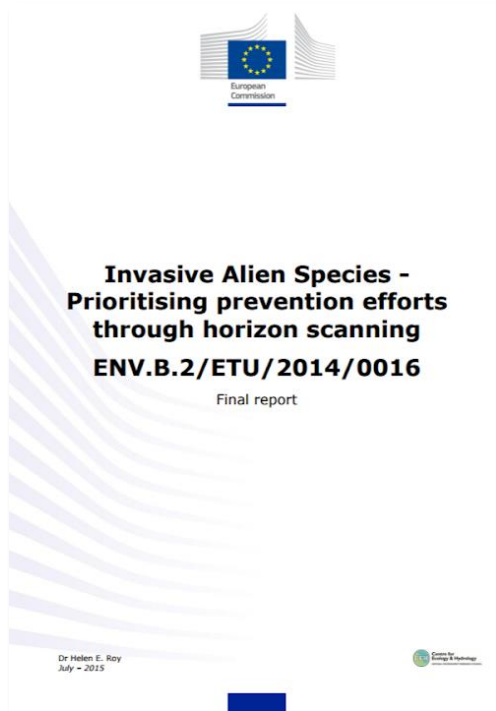
Source areas	Preferred scientific name	International common name	Taxonomic group	View datasheet	Neighbouring Geographic Areas
Pathways					France ✕ Germany ✕ Luxembourg ✕ Netherlands ✕
Plant hosts	Abelmoschus moschatus	musk mallow	Plants	CPC (Full) ISC (Full)	Pathways Container or bulk ✕ Containers and packaging -non-wood ✕ Containers and packaging -wood ✕ Debris and waste associated with human activities ✕
Plant parts in trade	Abraxas pantaria	light magpie	Invertebrates	CPC (Basic)?	Floating vegetation and debris ✕ Hitchhikers in or on plane ✕ Hitchhikers on land vehicles ✕ Hitchhikers on ship or boat ✕ Machinery and equipment ✕ Mail ✕
Habitats	Abution theophrasti	velvet leaf	Plants	CPC (Full) ISC (Full)	Mulch, straw, baskets and sod ✕ People and their luggage/equipment ✕ Ship bilge water ✕ Ship ballast water and sediment ✕ Ship hull fouling ✕ Soil, sand, gravel ✕ Contaminated aquaculture stock ✕ Contaminated bait ✕
Taxonomic group	Acacia dealbata	acacia bernier	Plants	CPC (Full) ISC (Full)?	
	Acacia decurrens	green wattle	Plants	CPC (Full) ISC (Full)?	
	Acacia farnesiana	huisache	Plants	CPC (Full) ISC (Full)?	
	Acacia karroo	sweet thorn	Plants	CPC (Full) ISC (Full)?	
	Acacia longifolia	golden wattle	Plants	CPC (Full) ISC (Full)?	
	Acacia mearnsii	black wattle	Plants	CPC (Full) ISC (Full)?	
	Acacia saligna	Port Jackson wattle	Plants	ISC (Full)	
	Acanthophius helianthi	fly, capsule	Invertebrates	CPC (Full)?	

Method



Sutherland et al., 2011 *Meth Ecol Evol*; Wintle et al., 2017 *eLIFE*

Horizon scanning

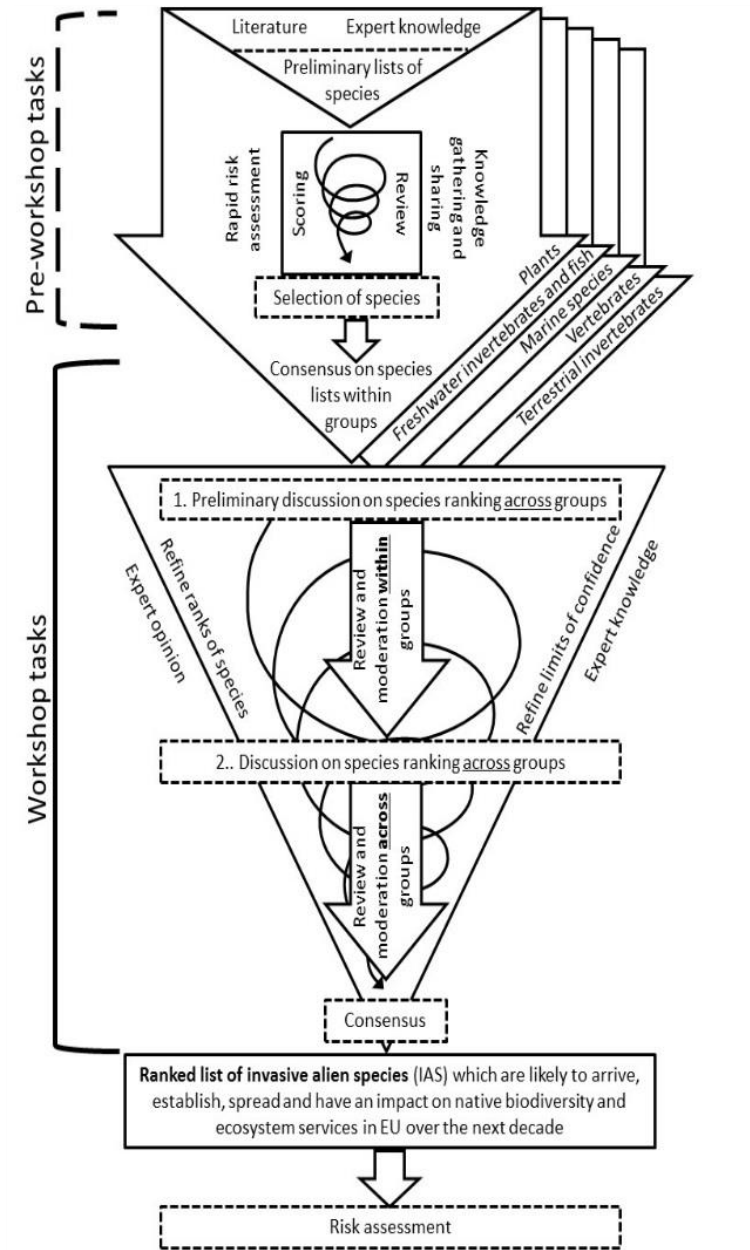


Global Change Biology

Global Change Biology (2014) 20, 3859–3871, doi: 10.1111/gcb.12603

Horizon scanning for invasive alien species with the potential to threaten biodiversity in Great Britain

HELEN E. ROY¹, JODEY PEYTON¹, DAVID C. ALDRIDGE², TRISTAN BANTOCK³, TIM M. BLACKBURN^{4,5}, ROBERT BRITTON⁶, PAUL CLARK⁷, ELIZABETH COOK⁸, KATHARINA DEHNEN-SCHMUTZ⁹, TREVOR DINES¹⁰, MICHAEL DOBSON¹¹, FRANÇOIS EDWARDS¹, COLIN HARROWER¹, MARTIN C. HARVEY¹², DAN MINCHIN¹³, DAVID G. NOBLE¹⁴, DAVE PARROTT¹⁵, MICHAEL J. O. POCOCK¹, CHRIS D. PRESTON¹, SUGOTO ROY¹⁵, ANDREW SALISBURY¹⁶, KARSTEN SCHONROGGE¹, JACK SEWELL¹⁷, RICHARD H. SHAW¹⁸, PAUL STEBBING¹⁹, ALAN J. A. STEWART²⁰ and KEVIN J. WALKER²¹



Horizon scanning

...prioritising species for risk assessment



L 189/4

EN

Official Journal of the European Union

14.7.2016

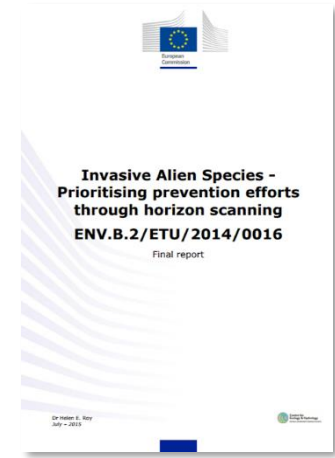
COMMISSION IMPLEMENTING REGULATION (EU) 2016/1141

of 13 July 2016

adopting a list of invasive alien species of Union concern pursuant to Regulation (EU) No 1143/2014 of the European Parliament and of the Council



...implementing surveillance, monitoring and action



Geographic scope



Invasive Alien Species

Pathway Analysis and Horizon Scanning for Countries in Northern Europe



2014

Horizonscanning for new invasive non-native species in the Netherlands



J. Matthews, R. Beringen, R. Creemers, H. Hollander, N. van Kessel, H. van Kleef, S. van de Koppel, A.J.J. Lemaire, B. Ode, G. van der Velde, L.N.H. Verbruggé & R.S.E.W. Leuven

Impact domain scope

Biol Invasions (2019) 21:2107–2125
https://doi.org/10.1007/s10530-019-01961-7



ORIGINAL PAPER

Horizon scanning for invasive alien species with the potential to threaten biodiversity and human health on a Mediterranean island

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 **frontiers**
in Ecology and Evolution

ORIGINAL RESEARCH
published: 21 October 2020
doi: 10.3389/fevo.2020.566281



Horizon Scanning to Predict and Prioritize Invasive Alien Species With the Potential to Threaten Human Health and Economies on Cyprus

OPEN ACCESS

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Taxonomic scope

Natural England Commissioned Report NECR009

Horizon scanning for new invasive non-native animal species in England

First published 22 May 2009

www.naturalengland.org.uk



NeoBiota 62: 31–54 (2020)
doi: 10.3897/neobiota.62.52934
<http://neobiota.pensoft.net>

RESEARCH ARTICLE

A peer-reviewed open-access journal
 NeoBiota
Advancing research on alien species and biological invasions

A framework for prioritising present and potentially invasive mammal species for a national list

Sandro Bertolino¹, Leonardo Ancillotto², Paola Bartolommei³, Giulia Benassi⁴, Dario Capizzi⁵, Stefania Gasperini³, Marco Lucchesi⁶, Emiliano Mori⁷, Laura Scillitani⁸, Giulia Sozio⁹, Mattia Falaschi¹⁰, Gentile Francesco Ficetola^{10,11}, Jacopo Cerri¹, Piero Genovesi¹², Lucilla Carnevali¹², Anna Loy¹³, Andrea Monaco^{5,12}

African Journal of Marine Science 2019, 41(2): 125–135
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AFRICAN JOURNAL OF
MARINE SCIENCE
ISSN 1814-232X EISSN 1814-2338
<https://doi.org/10.2989/1814232X.2019.1630782>

Horizon scanning for alien predatory crabs: insights from South Africa

C Swart¹ and TB Robinson^{1,2*} 

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Due to the presence of few dominant predators on South African rocky shores, this coastline could be vulnerable to invasion by predatory crabs. This study applied horizon scanning to create an ordered watch list of alien crab species that could establish along this coastline under present-day and future temperature scenarios. This was done by: (i) identifying the species with both an invasion history and a possible pathway to South Africa; (ii) comparing the temperature ranges of the species' native and introduced distributions to those of each of the four South African ecoregions; and (iii) ranking the species based on their potential ecological impacts. Of the 56 alien predatory crab species known worldwide, 28 species have pathways to South Africa. Incompatible temperature ranges excluded only two species from each ecoregion. Negative ecological impacts in their invaded ranges placed Japanese shore crab *Hemigrapsus sanguineus*, brush-clawed shore crab *H. takanoi* and Chinese mitten crab *Eriocheir sinensis* at the top of the watch list. This study highlights that many alien crab species have the potential to reach South Africa, with most likely to survive. This watch list should be used to support targeted monitoring and so facilitate early detection of these species, should they reach South Africa.

This horizon scanning

- ▶ Europe (excl. Norway & European Russia)
- ▶ Atlantic coastal dunes
- ▶ Protected areas
- ▶ NATURA2000 (Annex 1 Habitat Directive)
 - Conservation Status assessments
 - Art 17 reporting
- ▶ Data driven
 - Openly available data
 - GRIIS checklists
 - GBIF data
- ▶ Focus on what is there already
 - Not so distant horizon
 - Reduce uncertainty (arrival, establishment)
 - Identify sleeper weeds
 - Species that could jump the garden/ruderal fence



**INTERPRETATION
MANUAL
OF
EUROPEAN UNION
HABITATS**

EUR 28
April 2013

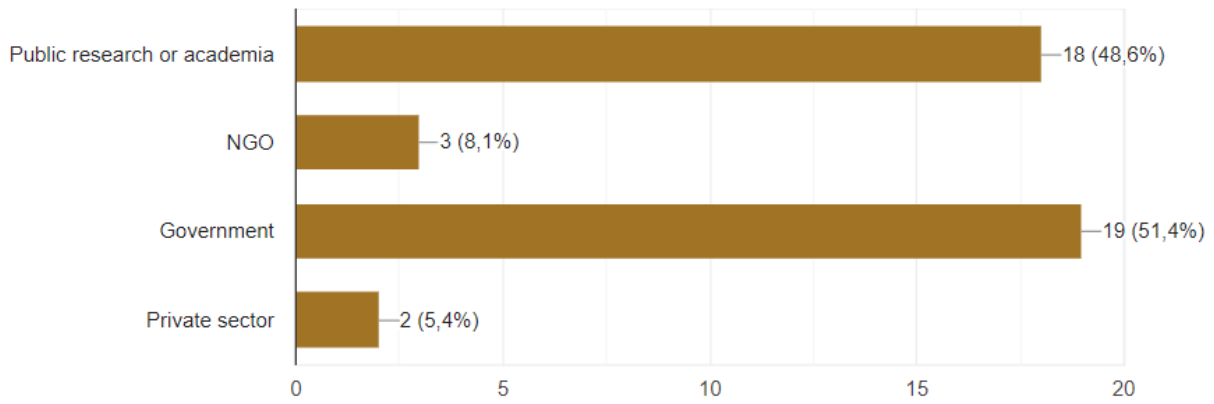
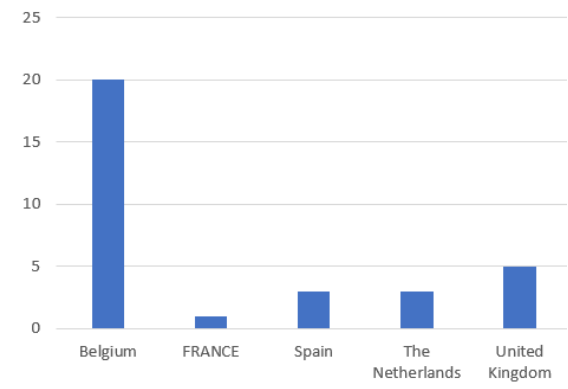


EUROPEAN COMMISSION
DG ENVIRONMENT
Nature ENV B.3

GRIIS
GLOBAL REGISTER OF
INTRODUCED AND INVASIVE SPECIES

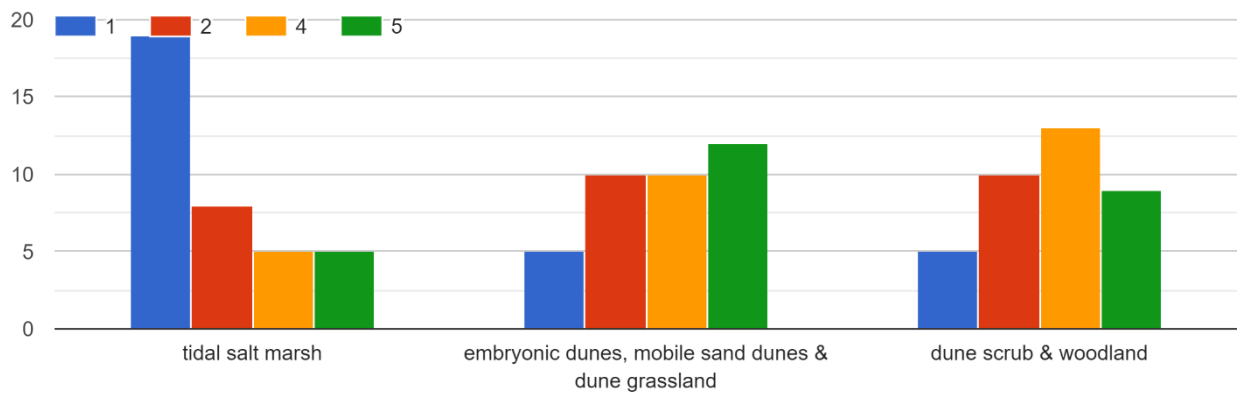


Who's here



- ▶ No one from Ireland
- ▶ France underrepresented
- ▶ Belgium very well represented
- ▶ Less affinity with tidal and salt marsh

Familiarity with dune ecoseries (1 = I have only little experience, 5 = I know this habitat very well)





ain't no party like a

spreadsheet
party

Species list

- ▶ An endless pool of *potentially* introduced and invasive species
- ▶ Many lists to start from, each with their own scope

- ▶ As objective as possible
- ▶ A set of filters
- ▶ A feasible number of species to end with

- ▶ Choices had to be made...

- ▶ Taxonomy: **tracheophytes, bryophytes** and **marchantiophytes**
- ▶ Rank: **species, subspecies** or **varieties**

- ▶ **Alien to Europe**

Species list

► Sources

→ Global Register of Introduced and Invasive Species (GRIIS)

- [GRIIS Denmark](#)
- [GRIIS Germany](#)
- [GRIIS Belgium](#)
- [GRIIS France](#)
- [GRIIS Spain](#)
- [GRIIS Portugal](#)
- [GRIIS United Kingdom](#)
- [GRIIS Ireland](#)

5309 unique plant taxa

3165 alien to Europe

+ 21 taxa

→ Giulio et al. (2020) [Alien flora across European coastal dunes](#). Appl Veg Sci

→ list of suggested species from Centre For Ecology & Hydrology (UK)

+ 57 taxa

► Excluding synonyms (accepted names only)

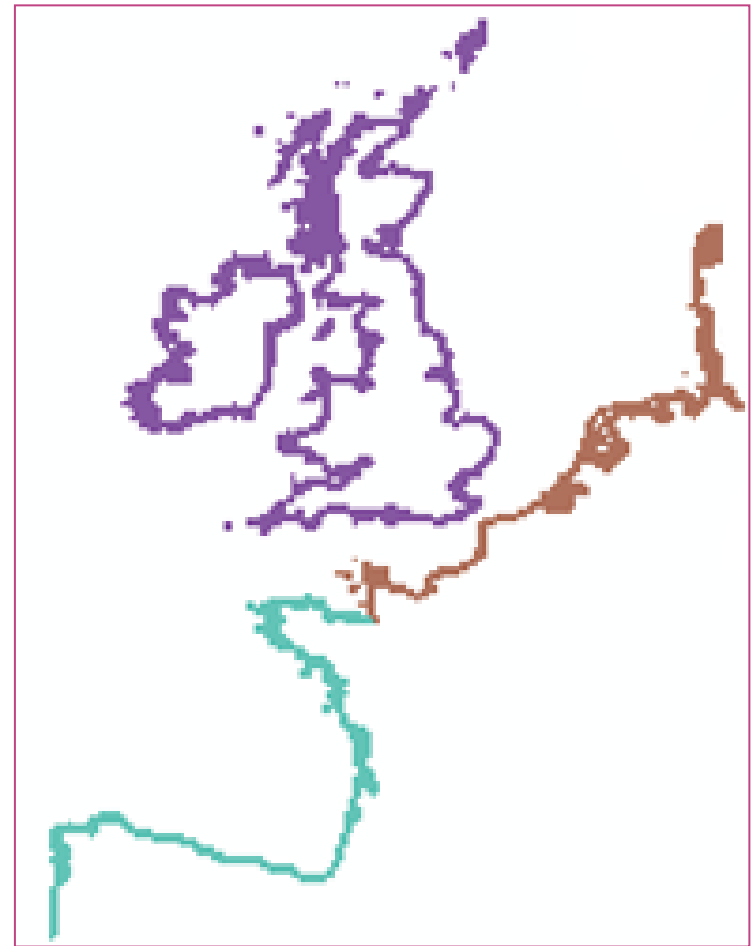
2561 taxa

- 682

Species list

- ▶ Any occurrence within the Atlantic coastal zone
 - GBIF occurrences
 - $(10 \text{ km})^2$ grid map
 - since 1950

2561 taxa → 1316 taxa



Southern-Atlantic, Atlantic-central, Atlantic-British Isles

Species list

- ▶ Technical cleaning (issue with varieties and hybrids)

└── -20 -3 ─┘

- ▶ Alien to Europe was felt necessary to downsize list...
- ▶ ... but excluded some taxa of project interest (obligation!)
- ▶ Added manually → +24



**1317 taxa included in
scoring sheet**

The homework list

LIFE DUNIAS (LIFE20 NAT/BE/001442)			
Horizon Scan - draft scoring sheet - version 2022-04-28			
In preparation of the workshop: consider the columns marked with an arrow.			
Taxon			
Phylum	Family	Taxon Name	Taxon rank
Native to Europe			
Occurrence in Atlantic coastal zone			
Law			
Relevance for scoring			
Habitat susceptibility			
Impact mechanisms			
Risk scoring			
		Species, subspecies or varieties	
		If native to Europe flag with an X. See remark for details.	Number of occupied (10km) ² -grid cells within the Atlantic coastal zone
Tracheophyta	Aizoaceae	<i>Carpobrotus acinaciformis</i>	SPECIES
Tracheophyta	Aizoaceae	<i>Carpobrotus edulis</i>	SPECIES
Tracheophyta	Aizoaceae	<i>Carpobrotus edulis edulis</i>	SUBSPECIES
Tracheophyta	Aizoaceae	<i>Delosperma cooperi</i>	SPECIES
Tracheophyta	Aizoaceae	<i>Dischisma crassifolium</i>	SPECIES
Tracheophyta	Aizoaceae	<i>Drosanthemum floribundum</i>	SPECIES
Tracheophyta	Aizoaceae	<i>Lamproanthus multiradiatus</i>	SPECIES
Tracheophyta	Aizoaceae	<i>Mesembryanthemum cordifolium</i>	SPECIES
Tracheophyta	Aizoaceae	<i>Ruschia caroli</i>	SPECIES
Tracheophyta	Aizoaceae	<i>Sesuvium portulacastrum</i>	SPECIES
Tracheophyta	Aizoaceae	<i>Tetragonia tetragonioides</i>	SPECIES
Tracheophyta	Alismataceae	<i>Sagittaria latifolia</i>	SPECIES
Tracheophyta	Alismataceae	<i>Sagittaria rigida</i>	SPECIES
Tracheophyta	Altingiaceae	<i>Liquidambar styraciflua</i>	SPECIES
Tracheophyta	Amaranthaceae	<i>Alternanthera philoverides</i>	SPECIES
Tracheophyta	Amaranthaceae	<i>Alternanthera sessilis</i>	SPECIES
Tracheophyta	Amaranthaceae	<i>Amaranthus albus</i>	SPECIES

The taxa

(10 km)² grid cells within the Atl. coastal zone, per country

Your homework

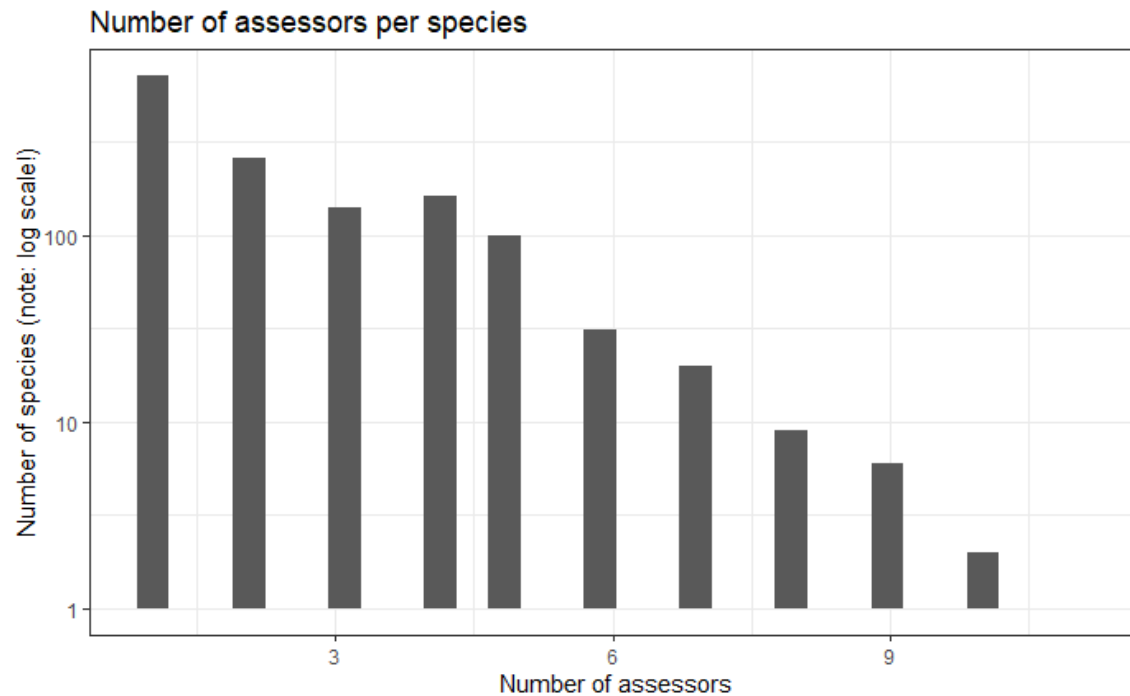
Focus of the workshop

As data on nativeness proved incomplete (GRIIS BE, GBIF taxon details), some European natives have slipped the filter ☹️

Union list (Regulation nr. 1143/2014)

Your homework

- ▶ > 3300 line contributions !
 - rows (taxa) modified
 - rows (taxa) added
- ▶ Thanks !



Thank you !