

Introduction to Pest Risk Assessments (PRA)

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Falkland Islands, 29th September 2016





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Outline

- Brief introduction to Pest Risk Assessments (PRA)
- Users of PRA and outcomes required
- Overview of PRA available
- Weaknesses in the PRA available and approaches to avoid them



Our tools to fight pests



- Monitoring
- Regulation
- Inspection
- Risk Assessments
- Awareness

Control



Pest Risk Assessments – Invasive species





Pest Risk Assessments – Invasive species







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Evaluate / Recommend





Evaluate / Recommend

Is the species safe to import?

Can we release the biocontrol agent?





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Pest Risk Assessments – Options available























PRAs - Modelling

Habitat suitability (SDM)

Num. species

0

Method: MaxEnt

- Climate
- Land use
- Human influence index
- Distance to road / harbours
- Human density

23 aquatic species from Caspian sea in England and Wales

Figure 11 Heat map showing the cumulative probability of presence of 23 alert Ponto-Caspian species. The estuaries and lower reaches of the Thames, Great Ouse, Broadland and Severn rivers are prone to the invasion of up to 20 different invasive Ponto-Caspian species and for this reason are considered potential hot-spots of invasion.

Gallardo, Aldridge 201



PRAs - Modelling

Expansion (network)

"Killer shrimp" Dikerogammarus villosusin

- Spread 40-461 km/year
- Three expansion scenario







Weed Risk Assessment (WRA)

Prioritisation

Fast screening

Quarantine

49 questions about the biogeography/ecology of the species

	Pre-entry weed risk assessment							
	F	Protect Ge		Species	Help	Print	Outcome:	Reject
		Dun	Store	Undate	Save	report	Score:	12
	_	Kuli	31016	Opuate	Save	ropon	Acaci	<mark>a mearnsii</mark>
	A. Biogeography/					Acacia		
	historical				NUR			
С	1 Domestication/ 1.01 Is the species highly domesticated?			у				
С	cultivation		on 1.02	.02 Has the species become naturalised where grown?			у	
С			1.03	Does the spec	ies have weed	ly races?		n
-	2 Climate and 2.01 Species suited to Australian climates (0-low; 1-intermediate; 2-high)				0			
-	Distribution 2.02 Quality of climate match data (0-low; 1-intermediate; 2-high)					2		
С	2.03 Broad climate suitability (environmental versatility)			n				
c				2.04 Native or naturalised in regions with extended dry periods				n
-			2.05	05 Does the species have a history of repeated introductions outside				n
	its natural range?							

Pheloung et al 1999



Weed Risk Assessment (WRA)

Phase 1: Species status

- present in Australia and not under official control or
- listed on the import conditions database (ICON) and/or
- listed on the permitted seeds list



Phase 3: Post-entry evaluation

Pheloung et al 1999 http://www.agriculture.gov.au/biosecurity/risk-analysis/reviews/weeds/system







GABLIS – Austrian RA for Invasive Alien Species



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CABI



as the highest impact on their own.





1. Initiation



Include uncertainty and extensive justification of responses



Other Risk Assessments

	Main Purpose
GB NAPRA	Full RA
Harmonia+ (Belgium)	Full RA
GABLIS (Austria/Germany)	Black list
ISEIA Protocol (Belgium)	Black list
Norwegian alien species impact assessment	Black list
FISK and related (Copp and colleagues)	Invasion RA
WRA (Pheloung et al 1999)	Invasion RA
EPPO – Envir. Impact (Kenis et al 2012)	Part of full RA
EPPO - Prioritization (Brunel et al 2012)	Prioritization
EFSA, Environmental risk assessment	Full RA
GISS (Nentwig and coll.)	Black list, prioritization
EICAT-UICN (Blackburn et al. 2014)	Black list
BINPAS (Olenin and coll.)	Prioritization, black list



Other Risk Assessments

	Taxa and habitat
GB NAPRA	All
Harmonia+ (Belgium)	All
GABLIS (Austria/Germany)	All
ISEIA Protocol (Belgium)	All
Norwegian alien species impact assessment	All
FISK and related (Copp and colleagues)	Freshwater
WRA (Pheloung et al 1999)	Plants
EPPO – Envir. Impact (Kenis et al 2012)	Plant pests and plants
EPPO - Prioritization (Brunel et al 2012)	Plants
EFSA, Environmental risk assessment	Plant pests and plants (later all)
GISS (Nentwig and coll.)	All
EICAT-UICN (Blackburn et al. 2014)	All
BINPAS (Olenin and coll.)	Mainly aquatic



Other Risk Assessments

	Impacts considered
GB NAPRA	Envir. and socio-economic
Harmonia+ (Belgium)	Envir. and socio-economic
GABLIS (Austria/Germany)	Environmental
ISEIA Protocol (Belgium)	Environmental
Norwegian alien species impact assessment	Environmental
FISK and related (Copp and colleagues)	Envir. and socio-economic
WRA (Pheloung et al 1999)	Environmental
EPPO – Envir. Impact (Kenis et al 2012)	Environmental
EPPO - Prioritization (Brunel et al 2012)	Envir. and socio-economic
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BINPAS (Olenin and coll.)	Environmental



PRA tailored for biological control

- Very few specific! First developed in UK in 2010 for Aphalara itadori
- Focus on host range testing and avoid non-target effect
- In common PRA establishment (e.g. climate suitability) is not desired. For biological control is essential!
- Important focus on positive impacts





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Consistency of impact assessments of alien invasive species









COST is supported by the EU RTD Framework Programme





Overview of the project

<u>Objective:</u> Assess the consistency of protocols assessing the impact of invasive alien species

- How large is the variability in species scoring across assessors?
- •What influences this variability?
- Do the risk protocols provide the same species ranking?



Protocols considered

Protocol	Types of impact	Groups
GB NAPRA	Envir. + Socioec.	All
Harmonia+ (Belgium)	Envir. + Socioec.	All
FISK and related	Envir. + Socioec.	Freshwater
EPPO - Prioritization (Brunel et al 2012)	Envir. + Socioec.	Plants
GISS (Nentwig and coll.)	Envir. + Socioec.	All
GABLIS (Austria/Germany)	Environmental	All
ISEIA Protocol (Belgium)	Environmental	All
Norwegian	Environmental	All
EPPO – Envir. Impact (Kenis et al 2012)	Environmental	Plant pests and plants
EFSA, Environmental risk assessment	Environmental	Plant pests and plants (later all)
EICAT (Blackburn et al. 2014)	Environmental	All
BINPAS (Olenin and coll.)	Environmental	Mainly aquatic



Species assessed

54 species (78 original) Various levels of impact Various types of impact Various invasion history and distribution

Minimum 5 assessments per species!



90 Assessors!!





Methods





Methods – similarity across assessors

• What explains similarity across assessors?

Species				
Taxa: plants, invertebrates, vertebrates, pathogens				
Habitat type: freshwater, marine, terrestrial				
Knowledge				
Information: WoS records				
Mean expertise				
SD expertise				
Protocol				
Outcome type: continuous/categorical				
Impact type: environ/socio-economic				
Number of questions				
Number of fields				
Including spread: yes/no				

Methods – similarity across assessors

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Differences in coefficient of variation within species and protocol





Species characteristics explaining variability

Taxon group

Habitat type





Methods – Consistency among protocols rankings

- Do different impact risk protocols provide the same species ranking?
- Species ranking based on the mean score per species and protocol

	GABLIS	GB	EICAT
AQPL01	9.0	36.0	39.0
AQPL02	19.0	14.0	25.0
AQPL03	30.0	25.0	33.0
AQPL04	15.0	42.0	36.0
AQPL05	1.0	2.0	3.0
FISH01	43.5	13.0	21.0
FISH02	43.5	15.0	45.0



Consistency among protocols rankings



All (0.33)



1

Consistency among protocols rankings



+Socioeconomic



Summary of weaknesses and recommendations

- There is a large variability in the scoring across assessors, thus decisions **should be collective** even for well-known species.
- More empirical studies are needed to increase the level of knowledge (and increase consistency).
- Species prioritisation are highly dependent on the type of impacts and assumptions considered
- Despite trying to be as rigorous as possible... There is subjectivity on the interpretation of the scientific information.



Thanks to our collaborators



And thanks to our sponsor







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