



Department
for Environment
Food & Rural Affairs

The UK Plant Health Risk Register

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Environment
Agency

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Background

- Key recommendation of the Tree Health and Plant Biosecurity Expert Taskforce
 - To provide a systematic framework that ranks plant pests and pathogens thereby identifying those that pose the greatest threat to UK crops, trees, gardens and ecosystems and to suggest appropriate actions
 - To provide an agreed, evidence based framework for decisions on priorities for actions by government and plant health stakeholders
- Developed over 4 months in 2013 in response to an urgent need to identify gaps in risk mitigations
- Workshops held with stakeholders early in the process
- 668 pests initially added
 - EC listed pests
 - EPPO listed pests
 - UK PRAs completed
- Published online January 2014



A tool for prioritising actions

- The Risk Register assists with the prioritisation of actions against pests of plant health importance in response to:

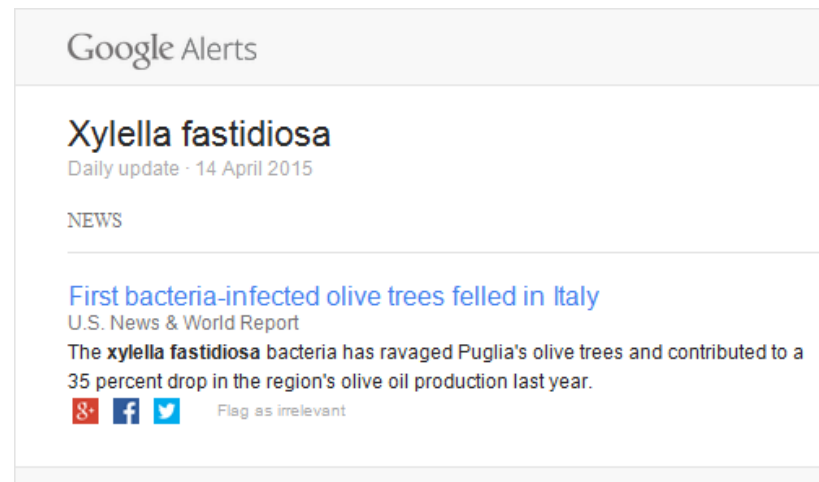
Interceptions

Horizon scanning

Outbreaks

Stakeholder feedback

- This covers adding new pests, but also reviewing pests currently on the Risk Register as the situation changes
- As of 30th September 2016 we have 914 pests on the Risk Register



Context within which the Risk Register operates

- Risk Register entries are prepared by the PRA sub-team
- Each proposed RR entry is supported by a template with the following information:
 - Reason for consideration
 - Background information on the pest (distribution, hosts, impacts)
 - Rationale for ratings
 - Key uncertainties
- The templates are presented to a monthly meeting (the Plant Health Risk Group) where ratings are approved and appropriate actions decided on

How does it work?

- The Risk Register uses rules to rate the likelihood of a scenario (1-5), and the impacts of that scenario happening (1-5)
- Risk is initially scored without mitigations, and then again assessed with current mitigations in place
- There are two principal scenarios:
 - **Pest is introduced to the UK**
 - **Pest spreads to maximum extent in the UK**



Reference: Baker, R.H.A., Anderson, H., Bishop, S., MacLeod, A., Parkinson, N & Tuffen, M. 2014. The UK Plant Health Risk Register: a tool for prioritizing actions. EPPO Bulletin 44: 187-194

Likelihood of Introduction

- Introduction of a pest requires both **entry** and **establishment**
- Entry and Establishment are both rated on a scale on 1 – 5
- Lower of the two scores becomes the likelihood of introduction, as this is deemed to be the limiting factor

Entry

- The entry calculation is based on rating of the **pathways** the pest can enter on and the **volume of trade** on that pathway

TRADE

- Where available, Eurostat data is used for volume of trade
- Not all trades have an associated commodity code and then we use a combination of inspection and industry data and expert judgement

PATHWAYS

- Different pathways have different levels of risk



Emerald ash borer - entry

Commodity Volume Rating	Pathways	Inherent Pathway Risk Rating	Experience of risk mitigation	Is it very difficult to detect at entry?	Entry Score
5	Plants for planting; Wood; Wood packaging material; Non squared wood, squared wood, bark	4	UK: no outbreaks; EU/EPPO: outbreak management measures	Y	5

EPPO Pathway Classification	Risk score
Plants for planting:	
Plants for planting (except seeds, bulbs and tubers)	5
Bulbs or tubers	5
Seeds (True)	2
Plant parts and plant products:	
Cut flowers or branches	2
Fruits or vegetables	1
Grain	1
Pollen	1
Stored plant products	1
Wood and wood products:	
Non-squared wood	4
Squared wood	2
Bark	4
Wood packaging material (ISPM labelled)	3
Chips, firewood, waste wood etc	4
Natural spread	3
Other possible pathways:	
Other packaging material	2
Soil/growing medium	3
Agricultural machinery	2
Passengers	2
Hitchhiking	2
Plant waste	2
Manufactured plant products	1
Intentional introduction, e.g. for scientific purposes	1



Volume of imports (100kg)	Rating
> 1,000,000	5
100k – 1,000,000	4
10k – 100k	3
1k – 10k	2
< 1k	1

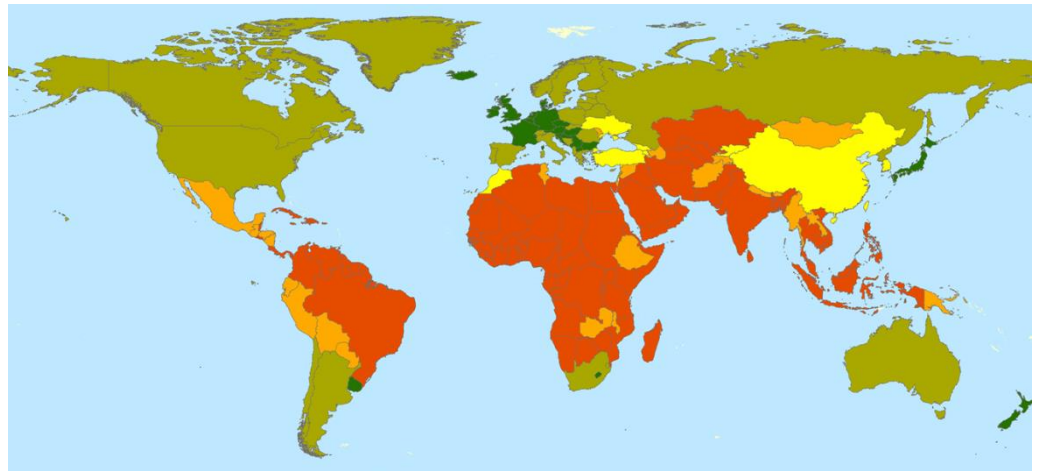
Commodity Volume rating

5	3	4	4	5	5
4	2	3	4	4	5
3	2	2	3	4	4
2	1	2	2	3	4
1	1	1	1	3	3
1	2	3	4	5	
Inherent Pathway Risk Rating					



Establishment

- What are its hosts? Are they widely distributed in the UK, or only rarely grown?
- Where is the pest? How suitable will the climate of the UK be?



5

4

3

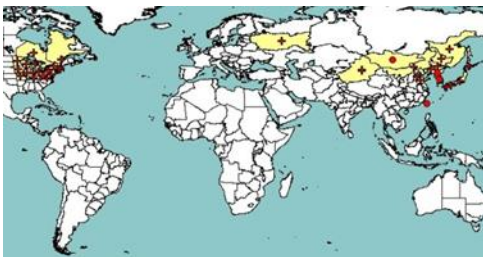
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1

Emerald ash borer - establishment

Is it very poorly controlled by plant protection products	Has it developed subspecies, biotypes or pathotypes?	Does it have a very short life cycle?	Can it reproduce asexually?	Host distribution score	Climate suitability score	Establishment rating
Y	N	N	N	5	4	5

Risk	Host Distribution
1	The hosts cover a very small proportion of the area
2	The hosts cover a small proportion of the area
3	The hosts cover a moderate proportion of the area
4	The hosts cover a large proportion of the area and show a clumped distribution
5	The hosts cover a large proportion of the area and are evenly distributed



Host Distribution	5	2	3	5	5	5
	4	1	2	4	5	5
	3	1	1	3	4	5
	2	1	1	2	3	4
	1	1	1	1	2	3
	1	2	3	4	5	
Climate suitability						



Likelihood of Pest Spreading to Maximum Extent

- Likelihood, on a scale of 1 to 5, of this event occurring in the next 5 years
- Takes into account the natural spread capacity of the pest and its ability to move in trade

1	Very low rate of spread	Less than 10m per year	e.g. nematode
2	Low rate of spread	10 m to 1 km per year	e.g. <i>Anoplophora glabripennis</i>
3	Moderate rate of spread	1 km to 10 km per year	e.g. leafhopper transmitted pathogens
4	High rate of spread	10 km to 50 km per year	e.g. a pathogen spread by water courses
5	Very high rate of spread	more than 50 km per year	e.g. <i>Spodoptera litura</i>

Impact

- Impact is split into economic, environmental and social
- Each is rated on a scale of 1 – 5
- The largest of the three scores becomes the overall impact score
- Rules in place to calculate economic impact
- Environmental and Social are expert judgments

Economic Impact

- Multiple factors taken into account:
 1. Populations growth and spread, including:
 - Climate suitability
 - Natural spread of the pest
 - Type of reproduction and length of lifecycle
 - Ease of control with plant protection products and ability of organism to adapt biologically.
 2. Ability to cause harm to host plants
 - Ability to cause host mortality or major economic impacts
 - Ability to vector other pests
- Information feeds into calculations that give an overall economic impact score (1-5)

Social and Environmental Impact

Rating	Environmental	Social
5	Widespread, long-term population loss or extinction, affecting several species with serious ecosystem effects	Long-term social change, significant loss of employment, migration from area
4	Long-term irreversible ecosystem change, spreading beyond local area	Some permanent change of activity locally, concern over wider area
3	Measurable long-term damage to populations and ecosystem, but little spread, no extinction	Temporary changes to normal activities at local level
2	Some ecosystem impact, reversible changes, localised	Significant concern expressed at local level
1	Local, short-term population loss, no significant ecosystem effect	No social disruption

Likelihood x Impact

- Gives an indication of the threat to the sector

Impact

5	5	10	15	20	25	
4	4	8	12	16	20	
3	3	6	9	12	15	
2	2	4	6	8	10	
1	1	2	3	4	5	
	1	2	3	4	5	

Likelihood

Value at Risk

- To provide an indication of the threat to the UK
- Use data from Defra Basic Hort Stats – sum of production over 5 yr

	Range	Field crop	Fruit	Ornamentals	Forestry
5	> £1,000 million	Potatoes	Strawberries	Total Hardy ornamental nursery stock	Pine
4	£500 - £1,000 million	Carrots	Apples		Douglas fir
3	£50 – £500 million	Leeks	Pears	Poinsettias	Poplar
2	£5 - £50 million	Celery	Cherries	<i>Alstroemeria</i> cut flowers	
1	< £ 5 million	Sunflowers	Blueberries	Minor single species of ornamental	

Unmitigated and Mitigated Risks

- Multiply the likelihood x impact (sector risk) by the value at risk
- Unmitigated risk rating is the risk without any co-ordinated actions in place – to either pest or host. It does take into account possible industry applications of treatments for other pests which may have an effect.
- E.g Emerald ash borer

Unmitigated risk

Entry	Establishment	Likelihood	Spread	Impact - economic	Impact - environmental	Impact - social	Impact	Likelihood x Impact	Value at Risk	Value at risk as an integer	UK Relative Risk Rating
5	5	5	4	5	5	4	5	25	A	5	125

Unmitigated and Mitigated Risk

- Risk Mitigations include regulation (of pests and pathways), targeted surveys, industry management, contingency plans, publicity and research projects
- These mitigations are assessed to determine whether they lower the unmitigated risk scores, to provide a different mitigated risk rating
- E.g. Emerald ash borer

Mitigations

Regulation	Surveillance	Industry Scheme	Contingency plan	Awareness	Research
EU Annex I			General plan available	UK national awareness	Targeted UK projects

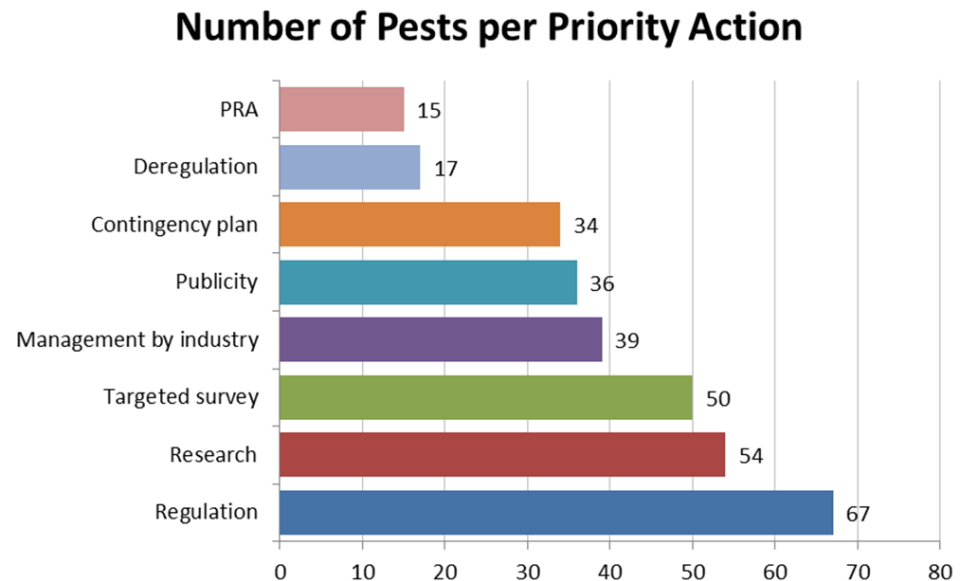
Mitigated Risk

Entry	Establishment	Likelihood	Spread	Impact - economic	Impact - environmental	Impact - social	Impact	Likelihood x Impact	UK Relative Risk Rating
3	5	3	4	5	5	4	5	15	75

Proposed actions to further reduce risk

Determine priorities for additional actions including:

- Regulation
- Deregulation or reduced regulation
- Management by industry
- Targeted survey
- **PRA**
- Contingency plan
- Publicity
- Research



Most actions given for high risk pests

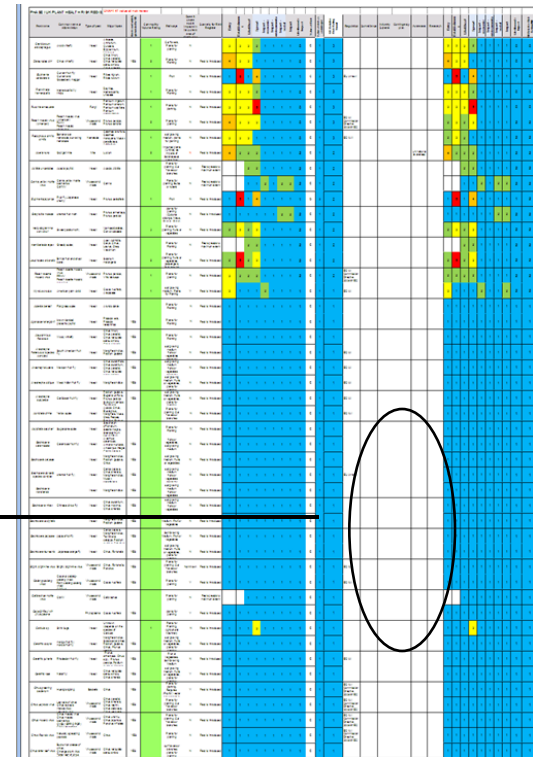
Ordered by mitigated risk - Top

- Bottom



Many actions identified

Few actions identified



Advantages of the Risk Register

Challenges	Solution
Many threats	Risk Register can cover many pests quickly and identify priority actions (668 pests initially added to the register)
Limited resources (inc. budget)	Screen out minor pests to concentrate PRA activities and other resources on complex and important issues.
Stakeholder engagement	Allows better stakeholder engagement in decision making
Comparability with other sectors (e.g. animal health)	Working with all sectors to present information on threats (to Ministers and others) in a consistent format

Risk Register and PRA

Topic	Risk Register	Pest Risk Analysis
Role of the risk ratings	To inform prioritisations and actions in Plant Health for all pest threats	To identify and justify phytosanitary decisions for selected pests
Methods used	Simple rules to rate scenarios based on key information about the pest	Structure based on international standards with a thorough evaluation of the evidence
Precautionary approach	Rules aim to be precautionary and are designed to highlight the most important pests	Risks assessed as accurately as possible
Risks assessed	Unmitigated and mitigated risks to the sector and to the UK	Unmitigated risks to the sector and the identification of risk management options

Future Work

- Communicating uncertainty
- Regionalisation
 - e.g. developing a Plant Health Risk Register for Wales
- Developing a pathway risk register – to compare risks posed by different pathways to prioritise those requiring additional actions and ensure effective mitigation
- Developing a receptor risk register – to look at risks to particular hosts and sectors
- Looking at other ways to express the economic values

Conclusions

- The Risk Register is now an integral part of UK Plant Health decision making
- It is used to rapidly screen pests for their potential risks to the UK, with new pests being added every month and entries being reviewed in response to new information
- Priorities for action can be decided to mitigate the risk or resolve key uncertainties – including a more detailed assessment based on PRA
- The Risk Register is publically available online
- The UK has just launched a UK Plant health portal and the Risk Register is included as part of this “one stop” accessible site for plant health information: <https://planthealthportal.defra.gov.uk/>