PRATIQUE

Enhancements of Pest Risk Analysis Techniques

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SEVENTH FRAMEWORK
PROGRAMME

Summary of the presentation

- The context of PRATIQUE: Why did Pest Risk Analysis (PRA) need enhancing?
- How did PRATIQUE tackle the key challenges for PRA enhancement?
  - PRA is a young science
  - Lack of data to analyse the risks
  - Insufficient exploitation of important new scientific and technological developments
  - PRA procedures not user-friendly
- How to access the results of PRATIQUE

PRATIQUE

Why did PRA in Europe need enhancing?

1. PRA is a young science (first schemes developed only in 1990)
2. Lack of data to analyse the risks posed by pests to all member states of the EU or EPPO
3. Insufficient exploitation of important new scientific and technological developments to enhance the techniques used in PRA
4. PRA procedures are complex* for the risk analysts and the decision makers. They need to be fit for purpose and user-friendly

**EPPO PRA scheme: large number of questions, 5 level risk rating, 3 levels of uncertainty & comment box*

1. PRA is a young science

PRATIQUE

Enhancements of Pest Risk Analysis Techniques

March 2008 – May 2011

PRATIQUE: Permission granted to a ship or boat to use a port on satisfying the local quarantine regulations or on producing a clean bill of health

[*French, from Old French practique, from Medieval Latin prāctica, ultimately from Greek prāktikē, from feminine of prāktikos, practical*]

PRATIQUE: Partners

5 European universities (IBOT, Imperial, UNIFR, UPAD, WU)

6 European research institutes (CIRAD, Fera, INRA, JKI, LEI, PPI)

2 international organisations (CABI & EPPO)

2 partners from outside Europe (CRCNPB & Bio-Protection)

Food and Environment Research Agency

Plant Protection Institute

Institute of Botany, Academy of Sciences of the Czech Republic

European and Mediterranean Plant Protection Organization

Institut National de la Recherche Agronomique

Centre de Coopération Internationale en Recherche Agronomique pour le Développement (CIRAD)

Julius Kuhn-Institut

University of Padova, Environmental Agronomy

Agricultural Economics Research Institute

Wageningen University

University of Fribourg

CAB International

Imperial College London

Cooperative Research Centre for National Plant Biosecurity

Lincoln University, National Centre for Advanced Bio-Protection Technologies

PRATIQUE: Key partner skills

- Entomologists
- Plant pathologists
- Economists
- Ecologists
- Risk analysts
- Phytosanitary experts
- Plant protection managers
- Computer scientists

PRATIQUE: Observers

- EU DG Sanco
  - Harry Arjis
- EFSA
  - Elzbieta Ceglarska
- EU Plant Health Standing Committee
  - Jose Fernandez
  - Ernst Pfeilstetter
- Related EU-funded Projects
  - Véronique Decroocq (SHARCO)
  - Alan Inman (EUPHRESCO)
  - Konstadinos Mattas (TEAMPEST)
  - Alex Aebi (ENDURE)
- Norway (Bio-Forsk)
  - Trond Rafoss
- Canada (CFIA)
  - Lesley Cree
  - Louise Dumouchel
  - Andrea Sissons
- USA (USDA-APHIS)
  - Christina Devorshak
- UK (Forest Research)
  - Hugh Evans
- Belgium
  - Etienne Branquart (Belgian Biodiversity Platform)
- UK
  - Gordon Copp (CEFAS)

Also many links with other EU projects, e.g.
SEAMLESS
PEPEIRA
Q-Detect
ISEFOR

2. Lack of Data for PRA

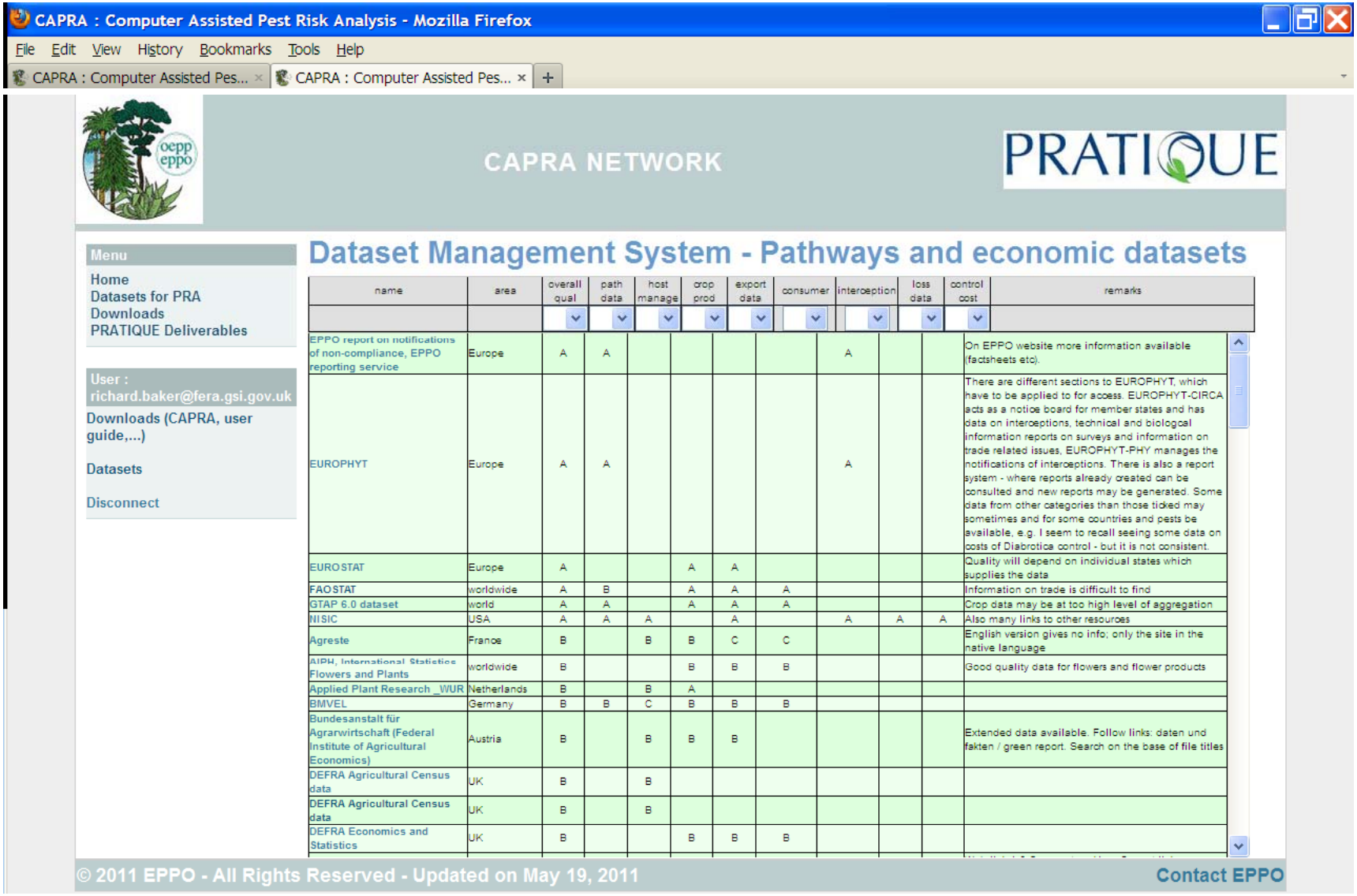
- PRA quality is highly dependent on data
- EU and EPPO need to produce PRAs relevant for all member states
  - Data from some member states difficult to obtain
  - Language barriers
- Specific pest-related information may be lacking but sources are relatively well-known
- Critical crop, pathway, and impacts-related data often very difficult to obtain

Datasets collected, scored for quality and usefulness and gaps identified

Dataset categories	Total evaluated	General Scores					Total retained
		A	B	C	D	U	
Pests in the current area of distribution (task 1.1)	236	50	61	53	70	2	166
Pathways and economic datasets (task 1.2)	118	5	37	38	16	22	96
Area under consideration for the PRA (task 1.3)	266	30	105	91	27	13	239
Pest management (task 1.4)	155	24	66	28	8	29	147

Score	Definition
A	Essential, high quality and widely applicable
B	Good quality but applicable to specific regions
C	Narrow or very limited usefulness or overlap with categories A or B.
D	Unreliable, contain too many errors or are generally irrelevant
U	Cannot currently be assessed due to a language barrier

Access to datasets provided via a dedicated website



http://capra.eppo.org/dataset/

3. To exploit new scientific developments:

- PRATIQUE conducted multi-disciplinary research to enhance the techniques used in PRA for:
  - the assessment of economic, environmental and social impacts
  - Ensuring consistency, mapping and summarising risk
  - pathway analysis and systems approaches
  - guiding actions during pest outbreaks

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Qualitative Impact Assessment Methods: (i) Review Consistency Methods

- Review current best practice in 43 schemes and guidelines:
  - Biosecurity and plant health standards
  - PRA schemes
  - Weed risk analysis schemes
  - Animal health
  - Human health
- Consistency in risk rating enhanced by:
  - using a clear and structured framework
  - obtaining responses from groups of assessors
  - providing risk rating examples, e.g. CFIA
  - asking unambiguous questions

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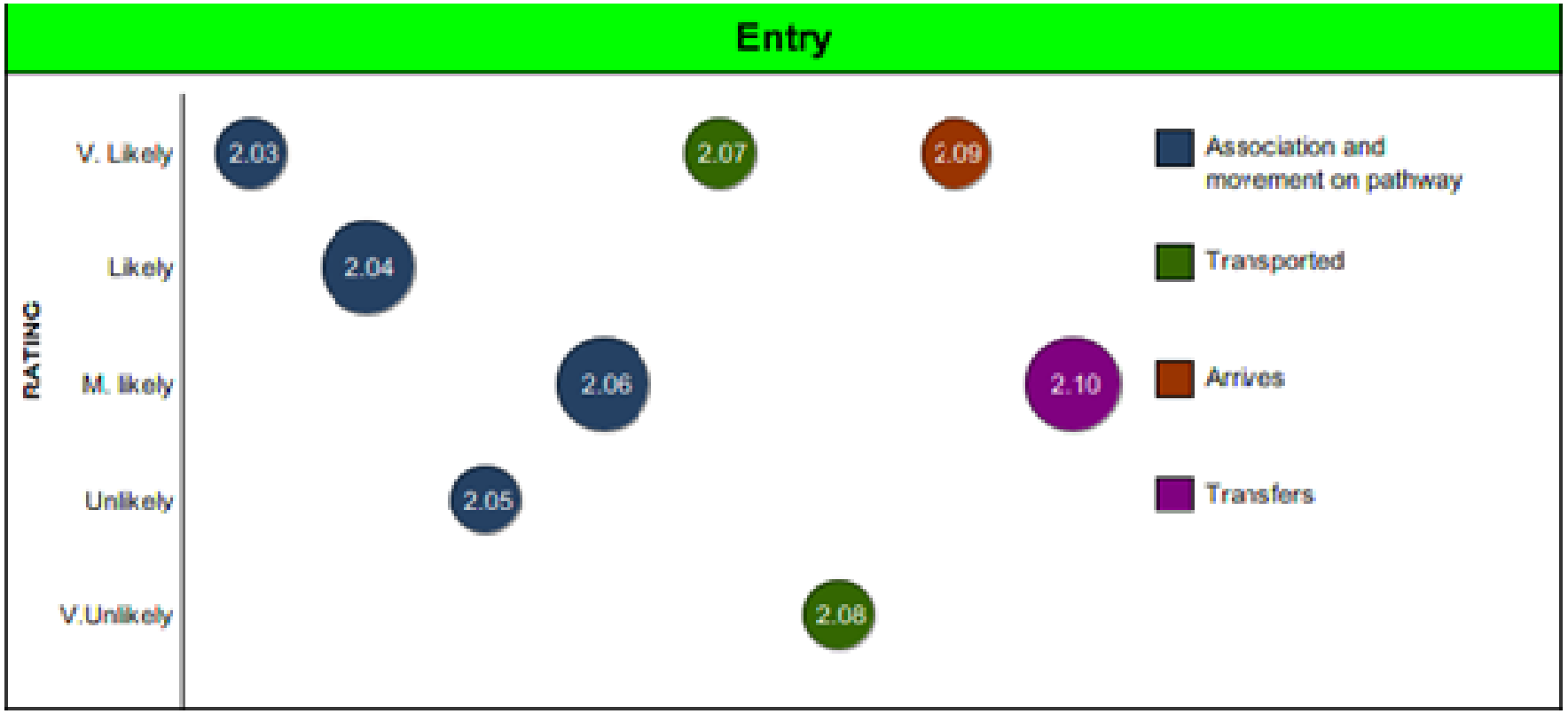
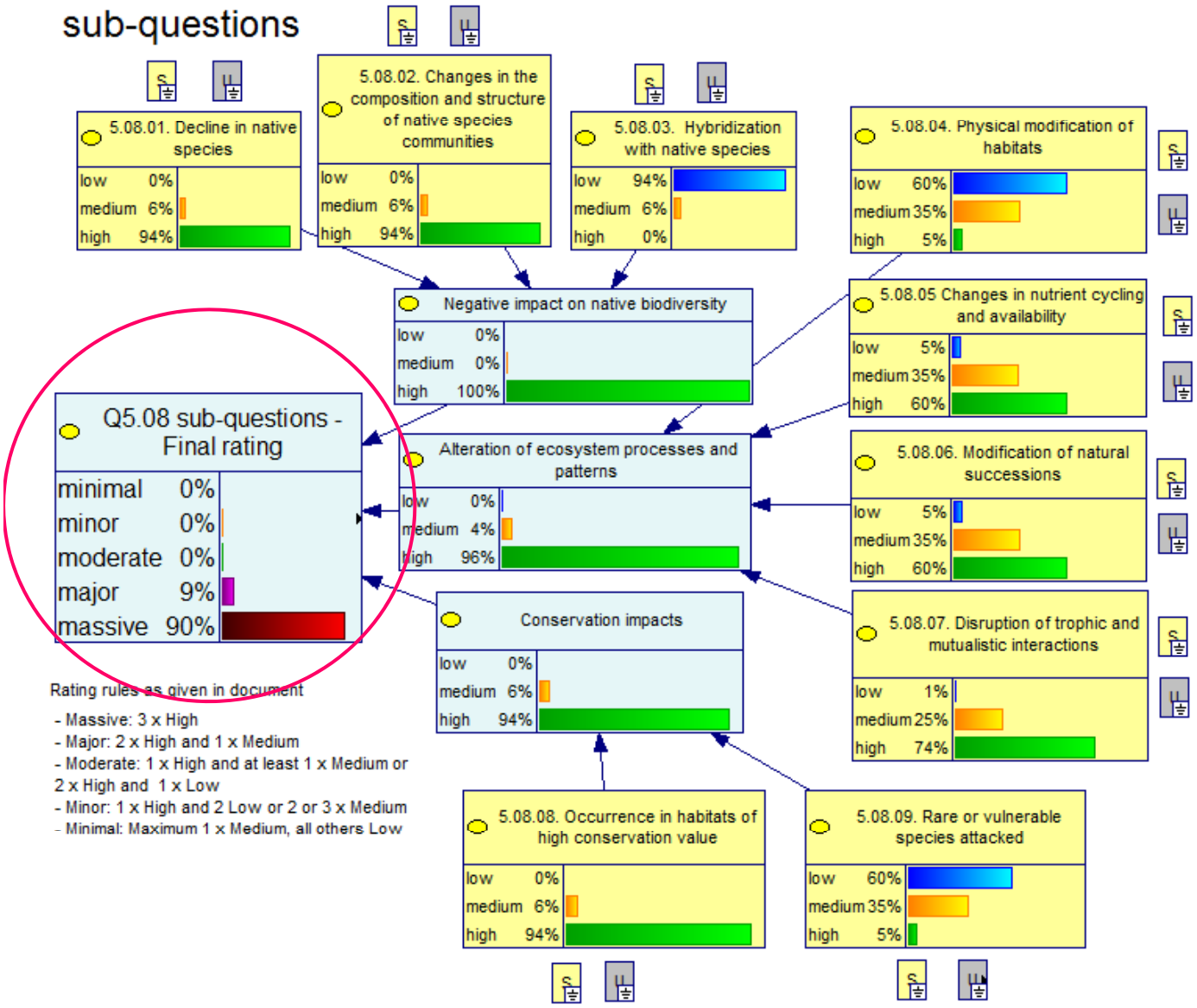
Qualitative Impact Assessment Methods: (ii) revision of the EPPO scheme questions

- Questions revised and restructured
- Guidance given on:
  - Risk ratings
  - Time and spatial elements
  - When quantitative analysis is appropriate
- Examples provided to assist with rating risk
- A visualiser developed to review questions
- Matrix models provided to summarise risk and uncertainty from many questions and sub-questions

Qualitative Impact Assessment Methods: (iii) Visualiser to review response to questions



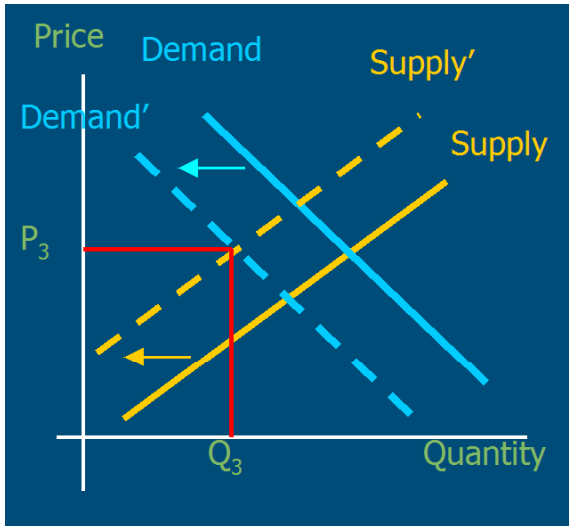
Qualitative Impact Assessment Methods: (iv) Matrix Models to summarise risk and uncertainty



Impact analysis: (iii) Review of Quantitative Economic Assessment Methods

Only two methods generally needed:

1. Partial budgeting/cost-benefit Analysis
2. Partial equilibrium [If price effects likely]
3. Input-output analysis*
4. Computable general equilibrium*



* Only use if spill-over effects to other sectors of the economy are likely

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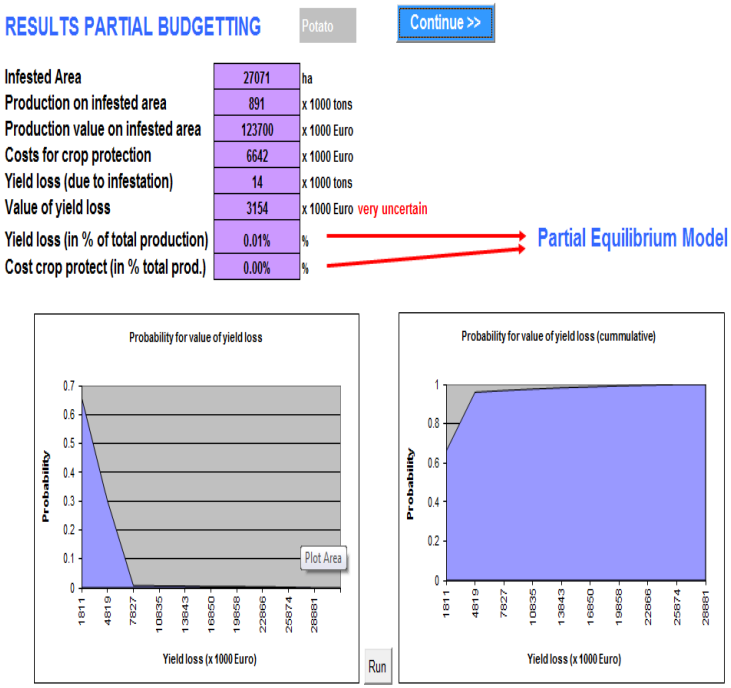
Impact analysis: (iv) Quantitative Impact assessments with Partial Budgeting and Partial Equilibrium analyses



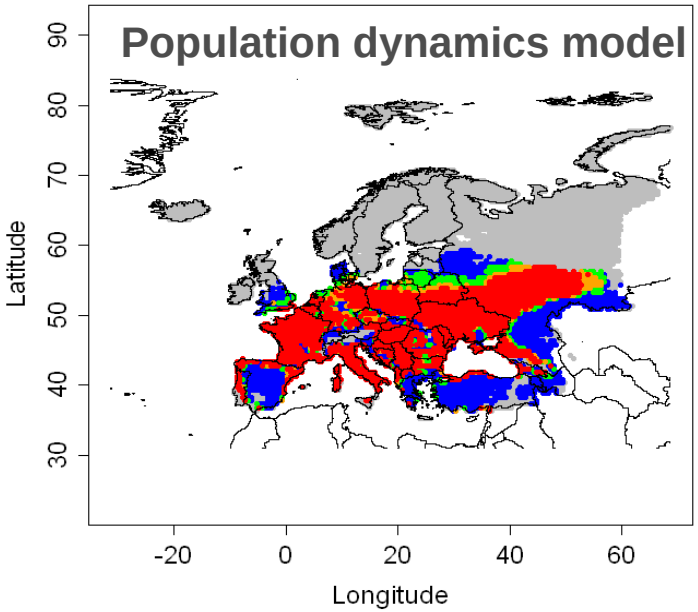
Partial budgeting for Potato Stem Tuber Viroid – Annual direct impact (1000 €)

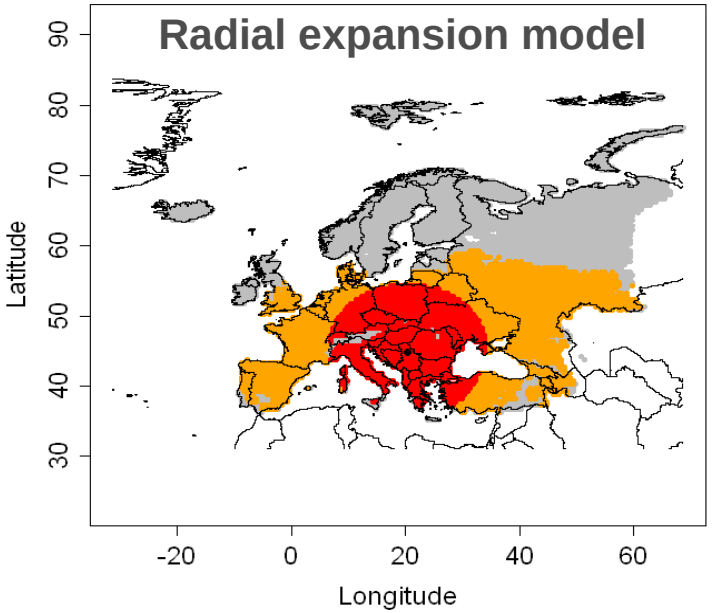
Host / Impact	Potato		Tomato	
	ware	seed	sheltered	unsheltered
Yield loss	2,552	739	4,304	5,867
Protection cost	0	69	23	47
Total	2,552	808	4,328	5,914

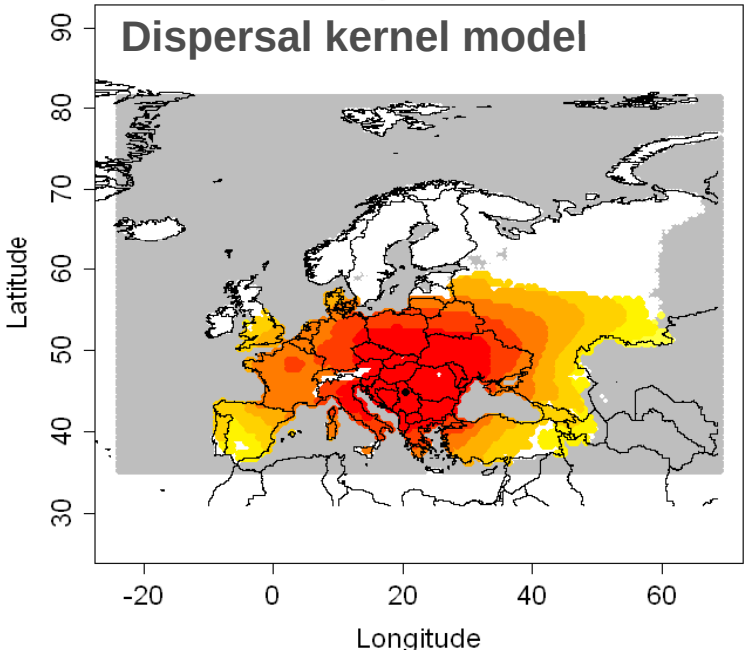
Impact on producer welfare under different export ban scenarios (M €)

crop	seed potato	ware potato	tomato
No ban	-2.3	0.007	-5.7
50% ban	-135	-13.2	NA
full ban	-262	-26.7	NA

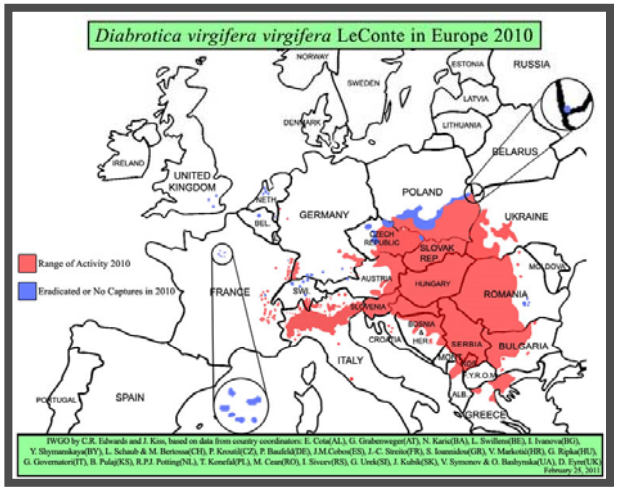
Impact analysis: (v) A suite of five pest generic spread models created







Diabrotica v. virgifera spread 2010

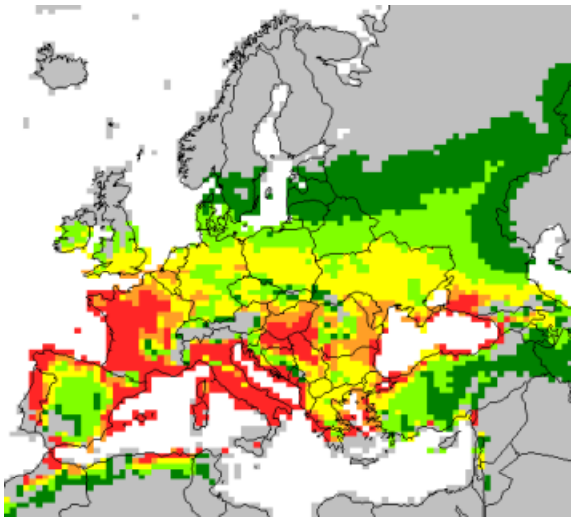


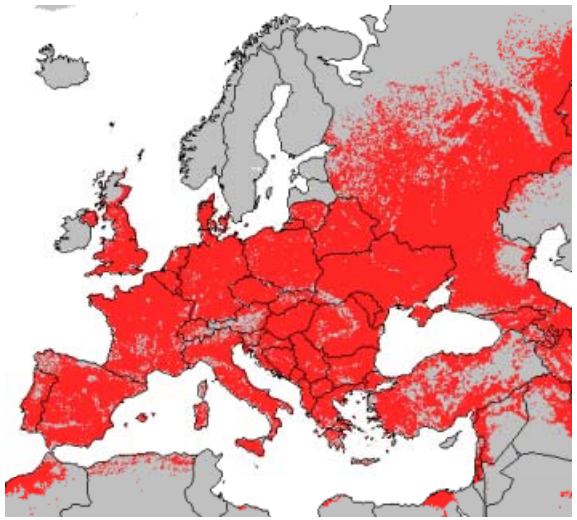
Mapping endangered areas

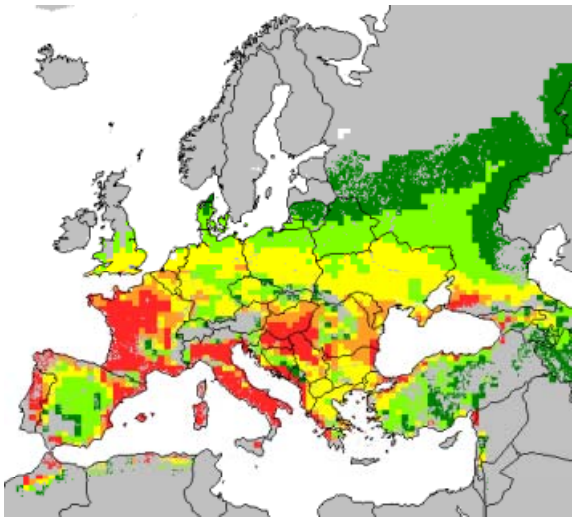
1. Guidance provided on when to map (rather than just describe) endangered areas
2. Decision support schemes provided for mapping:
   - climatic suitability:
     - based on the information available on its climatic responses, the location data and how well each climatic mapping method is likely to perform
   - area of potential establishment
     - based on climate, hosts, soils etc
   - endangered areas (and the area at highest risk)
     - Based on the area of potential establishment, crop production and value, environmental impacts etc

Area of potential establishment for *Diabrotica virgifera virgifera*

Climatic suitability x **Hosts** = **Area of potential establishment**

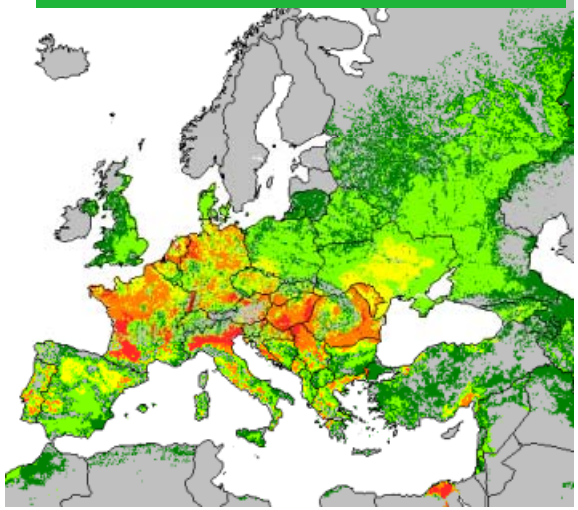






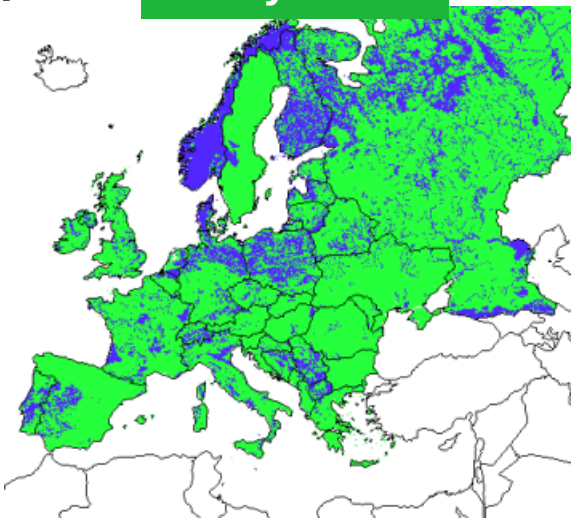
Area of highest risk for *Diabrotica virgifera virgifera*

Total maize output



x

Sandy soils



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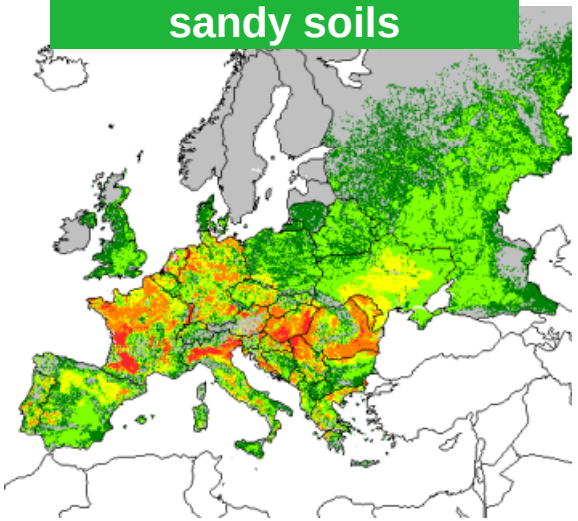
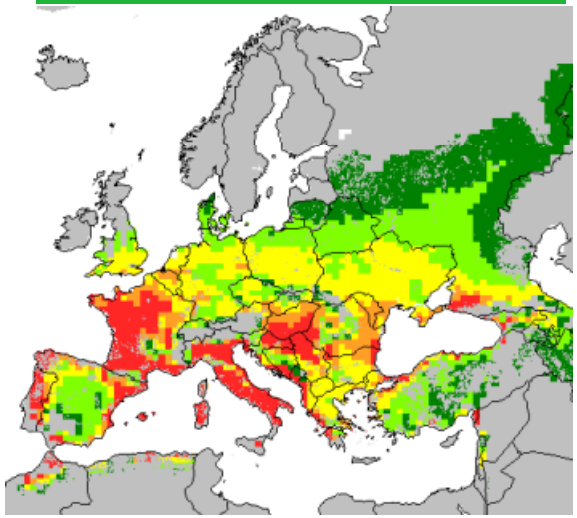
Maize output not on sandy soils

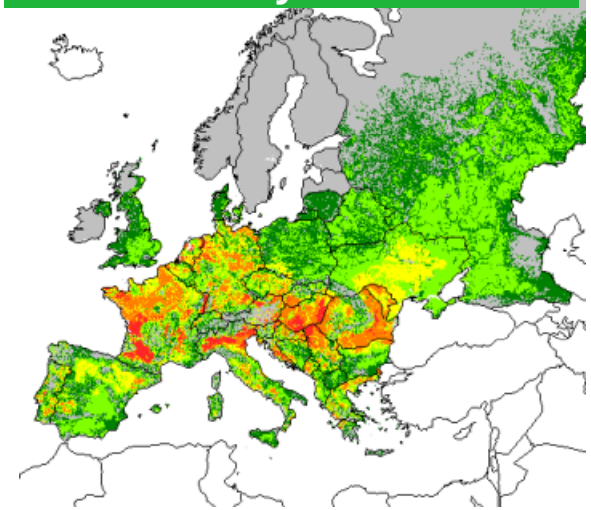


Climate suitability



x

Maize output not on sandy soils



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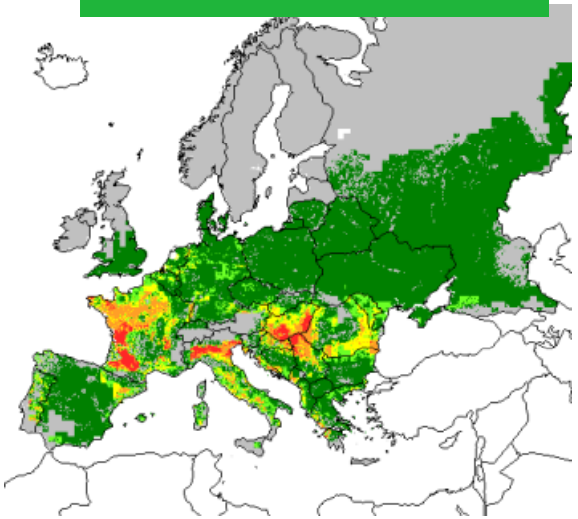
Area at highest risk



Enhancing techniques for pathway analysis and systems approaches

- Global review of current approaches to pathway analysis and systems approaches in PRA
  - Varying interpretations of ISPM 14 - no clear example of best practice
  - Each region or country has its own methodology, relating to its political realities and administrative strengths
- Development of a pathway risk analysis systems approach module for the PRA scheme
- Linking risk assessment responses and analysis of risk management options

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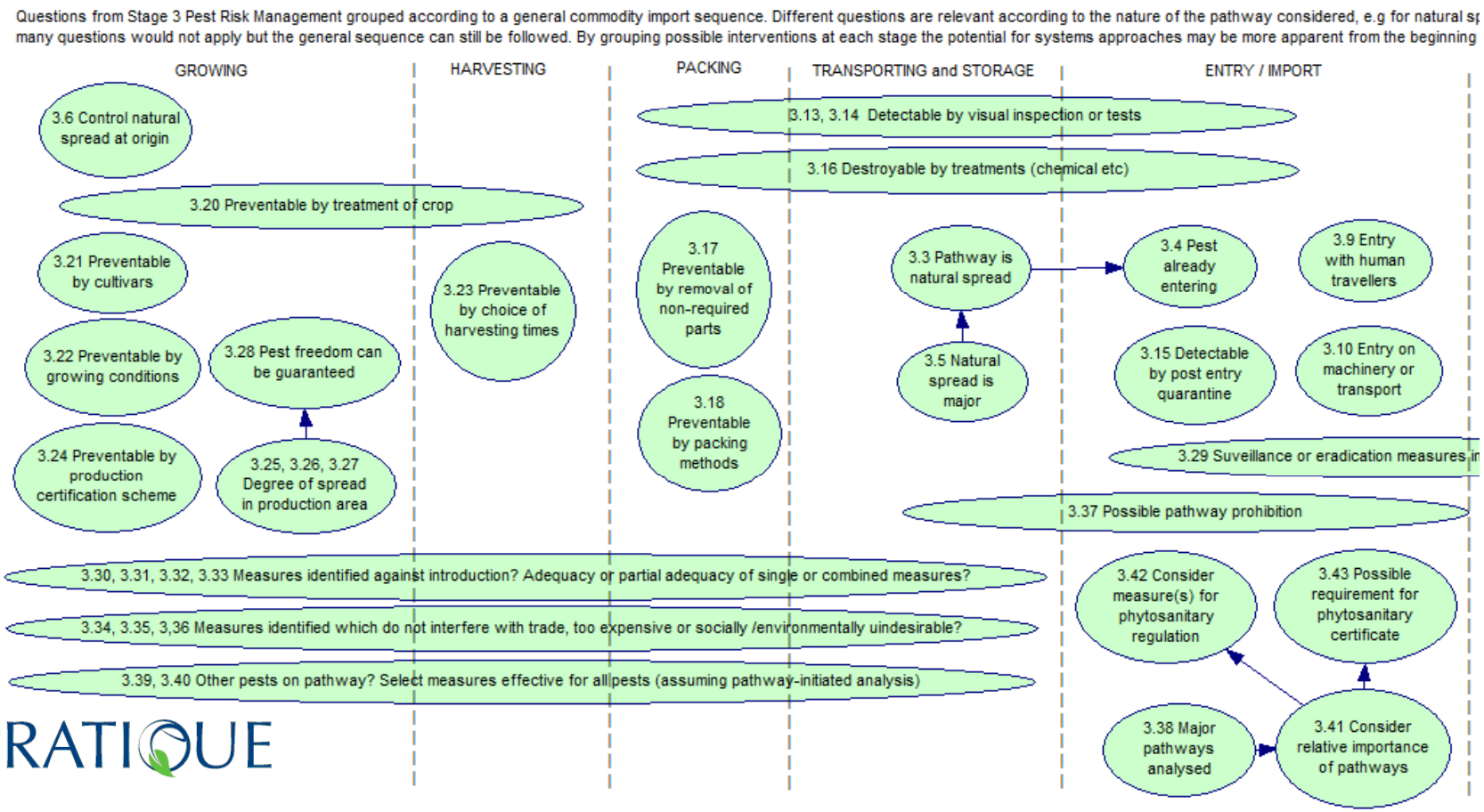
Enhancing the Analysis of Risk Management options

- Restructuring the questions for wider application to species, pathway and the systems approach



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Ranking of proposed measures

Risk reduction measures (control points) & relevant guidance	Responsible party and time frame	Efficacy	Validation (indicator)	Accuracy (level of confidence)	Criteria (rank in terms of negative to positive: xx, x, 0, +, ++)						
					acceptable to importer	feasibility	cost/benefit	trade impact	environment	social	Other (e.g. Acceptable to most exporters?)
A list of some possible measures appear in the schematic. Note if there is an ISPM for the measure or other guidance is used for implementation.	*Describe who will carry out action and when/where it will be done. (Or same for those already being implemented.) When/where would be at production site, in packing shed, during transport, etc. Time frame might be at a single point or ongoing over a period of the chain (e.g. cold treatment post harvest and during transport). Verification is discussed in more detail to right. Any concerns with the parties implementing this measure go here.*	*Describe with as much detail as possible and note what factors affect efficacy. Include parameters used (e.g. mortality) and source of estimate. Comment on the expert/group's certainty about own judgement.*	*If it is possible to validate the efficacy/ impact of the measure, describe what the indicator will be and, if verified at a different time, when/where and by whom.*	*Explain the level of accuracy (confidence) in the estimates of efficacy and/or validation process. What will effect this? Can additional measures enhance this, or would they be redundant?*							

4. PRA process not user-friendly (i)

- For the analyst
  - Many questions
  - Some seem repetitive
  - Difficult interface
  - Difficult to make consistent judgements
  - Difficult to summarise
- For the decision maker
  - Lengthy documents produced
  - Difficult to focus on key elements

**EPPO PRA scheme: large number of questions, 5 level risk rating, 3 levels of uncertainty & comment box*

4. PRA process not user-friendly (ii)

- Validate PRATIQUE outputs:
  - independent experts, e.g. EPPO Panels
  - a wide range of pests and pathways
- Create a computerised EPPO PRA scheme incorporating PRATIQUE outputs
- Consolidate and disseminate project outputs by providing:
  - a manual
  - examples of best practice
  - the computerised PRA scheme

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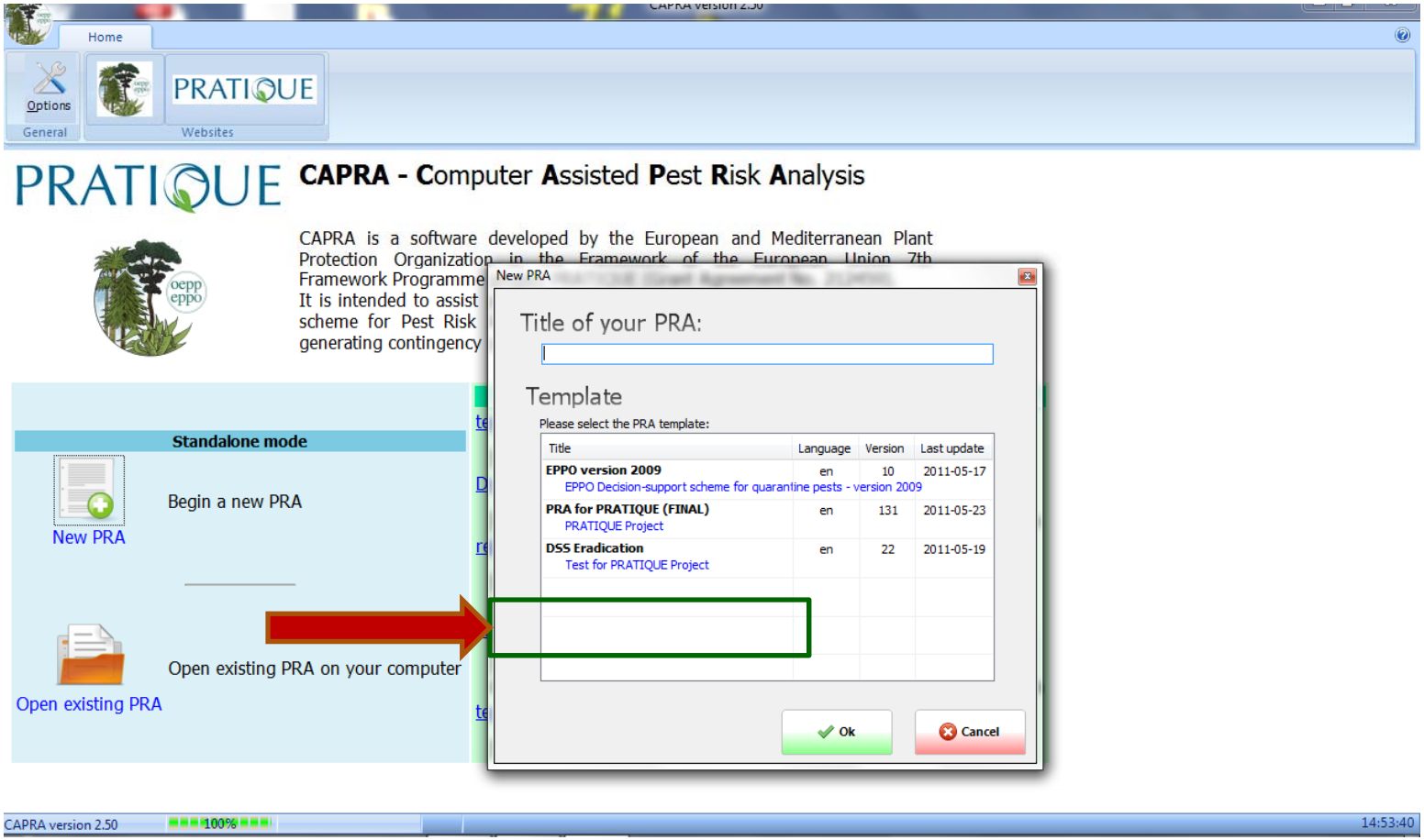
Testing PRATIQUE Outputs

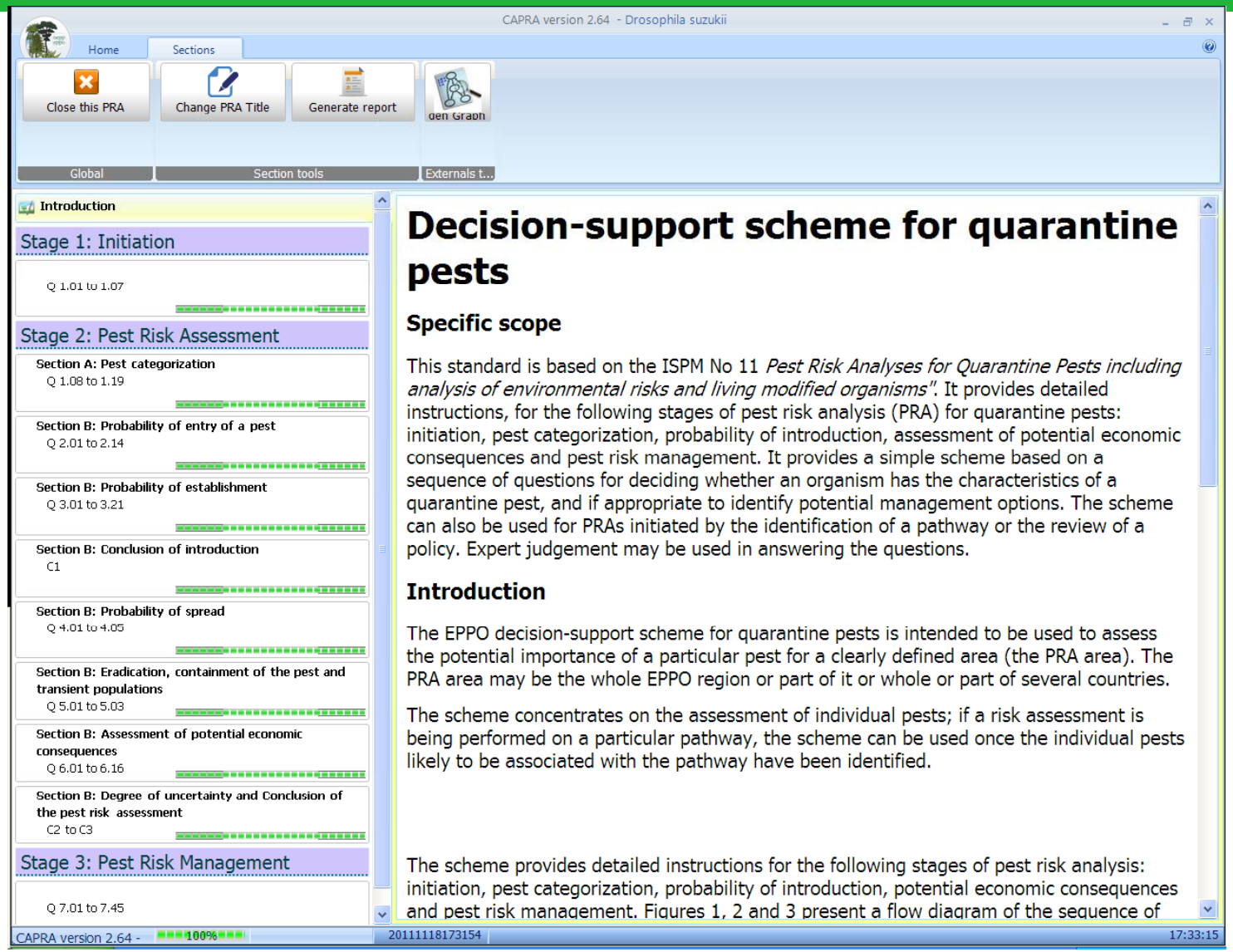
- Workshops with pest risk analysts and pest risk managers
- EPPO Panel meetings on PRA, phytosanitary measures and invasive alien species

EPPO Computerised PRA Scheme (CAPRA): introductory page

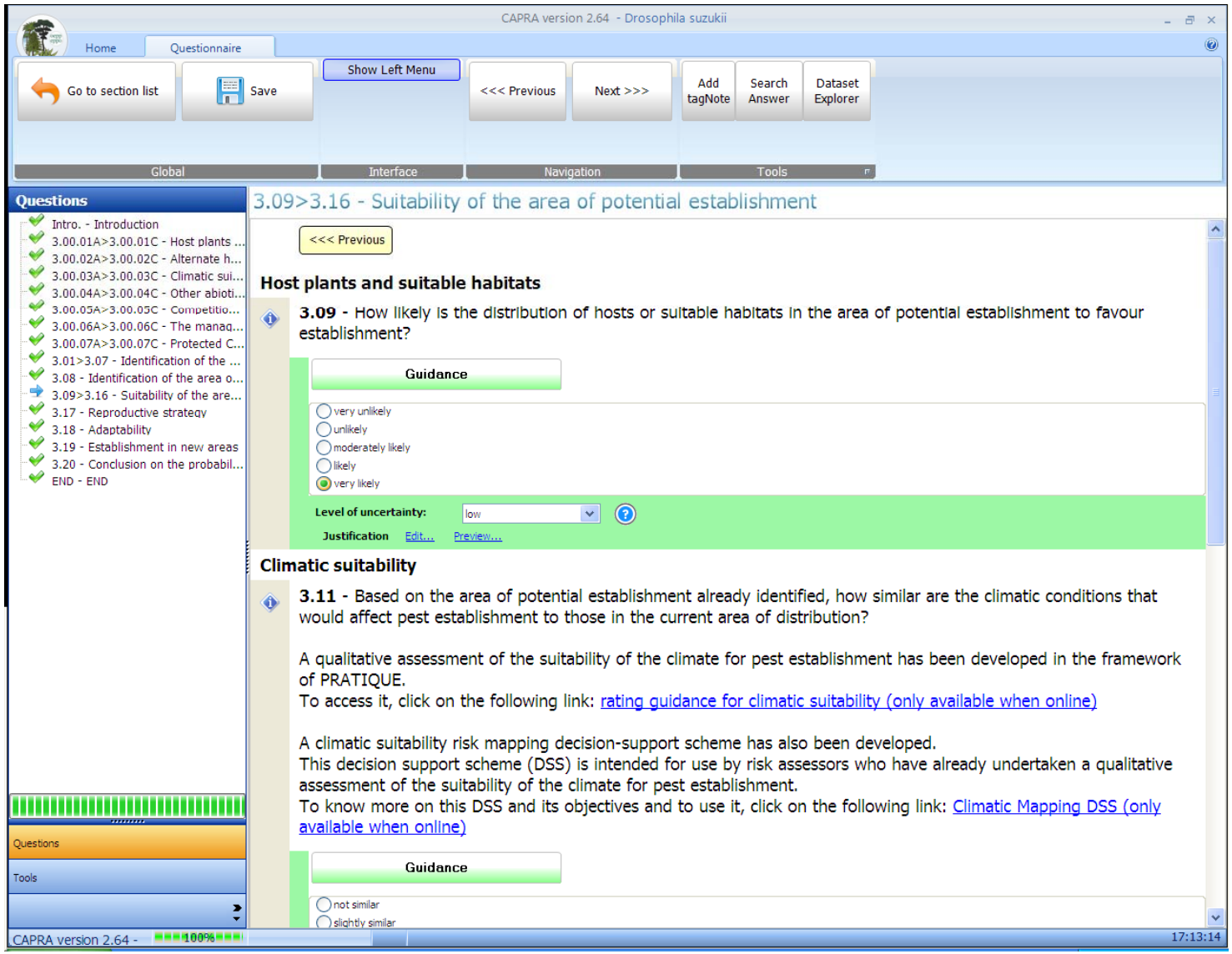


Available here: http://capra.eppo.org/download.php

EPPO Computerised PRA Scheme (CAPRA): main menu



EPPO Computerised PRA Scheme (CAPRA): question template



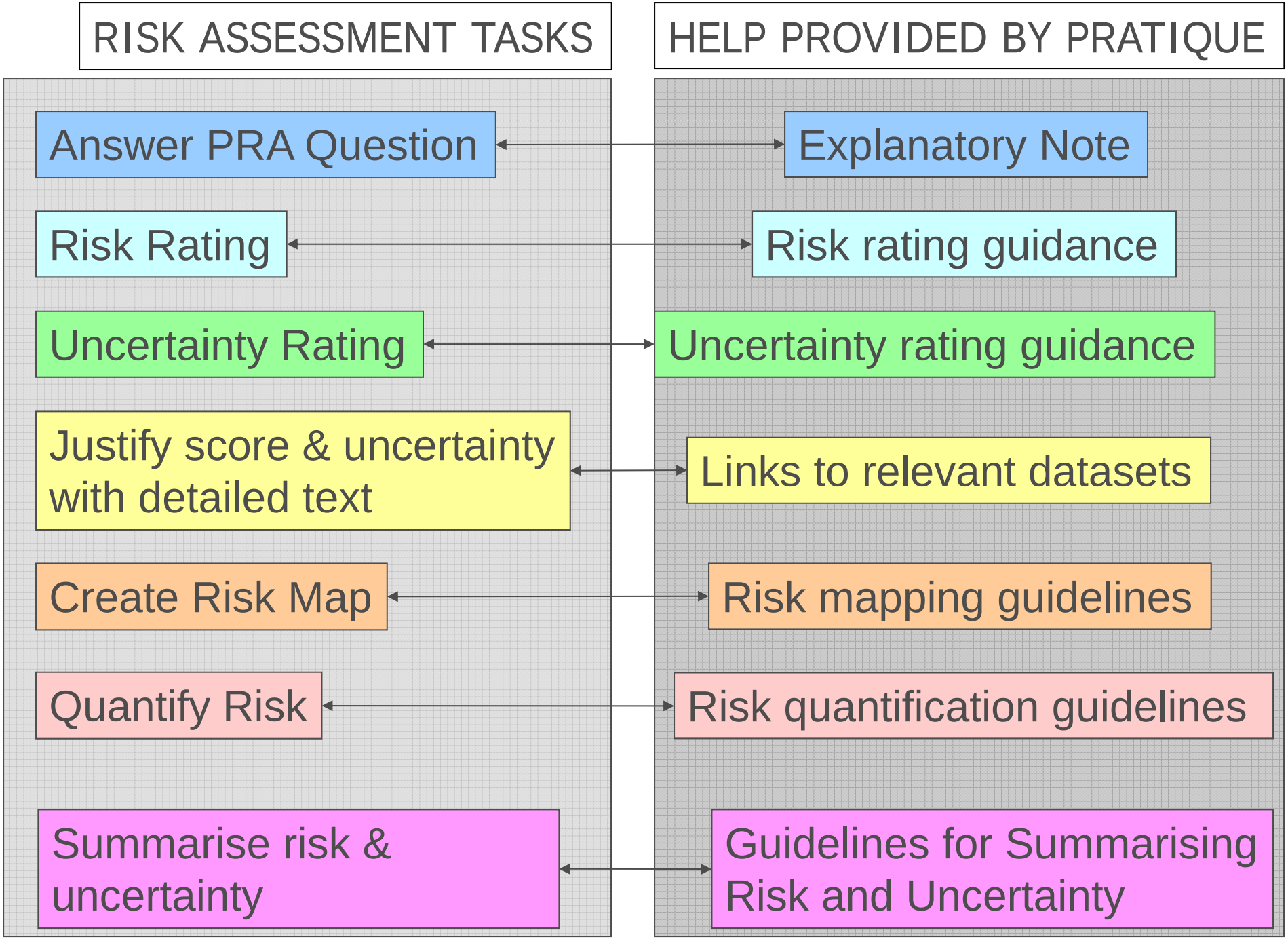
The decision support system for the eradication and containment of pest outbreaks: Computerised system in Capra

B1.9 - Scoring matrix for comparison of candidate measures

Measures available	Objective	Efficacy			Costs		Acceptability and safety	
		B1.1 - What is the likelihood that the measures will be successful?	B1.2 - How long will this management measure take to be successful?	B1.3 - How difficult will it be to apply this measure taking into account enforcement, resources and operational factors?	B1.4 - How high are the direct costs of the management measure?	B1.5 - How high are the indirect costs of the management measure?	B1.6 - How high are the environmental impacts?	B1.7 - How acceptable is the measure likely to be to the public?
selective crop destruction	Eradication	very likely	less than one month	Easy	Moderate	Moderate	Minor	Minor opposition
imported seed lots control	Eradication	likely	less than one month	Easy	Moderate	Moderate	Minor	Minor opposition

Legend

greater likelyhood of success/lower cost/fewer confounding issues				lower likelyhood of success/high cost/many confounding issues


RISK ASSESSMENT TASKS
HELP PROVIDED BY PRATIQUE
Answer PRA Question
Explanatory Note
Risk Rating
Risk rating guidance
Uncertainty Rating
Uncertainty rating guidance
Justify score & uncertainty with detailed text
Links to relevant datasets
Create Risk Map
Risk mapping guidelines
Quantify Risk
Risk quantification guidelines
Summarise risk & uncertainty
Guidelines for Summarising Risk and Uncertainty

PRATIQUE: Progress beyond state of the art

- Organised inventory of relevant datasets for PRA
- Reviews of best PRA practice worldwide
- Enhanced and validated methods for:
  - Assessing spread and impacts
  - Ensuring consistency, managing uncertainty, summarising risk and mapping endangered areas
  - Screening species in pathway analysis and developing systems approaches
  - Eradicating, containing and surveying pests
- User-friendly PRA scheme

Accessing PRATIQUE Outputs

1. **Summary of the Project Objectives**
   Baker RHA, Battisti A, Bremmer J, Kenis M, Mumford J, Petter F, Schrader G, Bacher S, De Barro P, Hulme PE, Karadjova O, Lansink AO, Pruvost O, Pysek P, Roques A, Baranchikov Y & Sun JH (2009) PRATIQUE: a research project to enhance pest risk analysis techniques in the European Union. *EPPO Bulletin* **39**, 87–93
2. **Deliverables**
   All deliverables will soon be freely available here:
   http://capra.eppo.org/deliverables
   www.pratiqueproject.eu
3. **Capra Computerised Scheme**
   http://capra.eppo.org/download.php
4. **Publications**
   15 papers in a special PRATIQUE issue of the EPPO Bulletin will be published in April 2012
   Other papers are appearing in the scientific literature

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Enhancements of Pest Risk Analysis Techniques

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fera
The Food and Environment Research Agency