History of the IPRRG: who are we and where are we going?

Richard Baker

Plant Health Risk & Horizon Scanning Team, Defra, UK

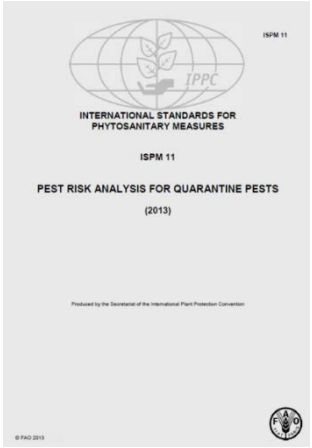
10th International Pest Risk Research Group Meeting,
Parma, Italy
23-26th August 2016

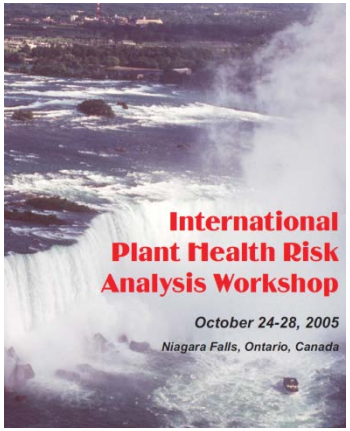
Summary of the Presentation

1. Why was the IPPRG formed?
2. How was the IPRRG created?
3. Who are we?
4. What have we achieved?
   - Meetings
   - Work Group activities
   - Publications
5. What are our current and future objectives?
6. How can I take part?

1. Why was the IPPRG formed?

- Formal Pest Risk Analysis (PRA) started in 1990 with the development of national and regional schemes, e.g. at EPPO.
- The principal International Standard for Phytosanitary Measures on PRA (ISPM 11) published in 2004 gives little detail on methods, e.g. "*Climatic modelling systems may be used to compare climatic data on the known distribution of a pest with that in the PRA area.*"
- An International Plant Health Risk Analysis Workshop (Niagara Falls, Canada) in 2005 concluded that there was no international forum for pest risk analysts worldwide to share best practice and enhance methods for analysing and communicating risk
- A particular need was identified in relation to pest risk modelling and mapping and convinced USDA-APHIS to host the first International Pest Risk Mapping Workshop (Fort Collins, Colorado, USA) in 2007 with 26 attendees from six countries and 3 continents



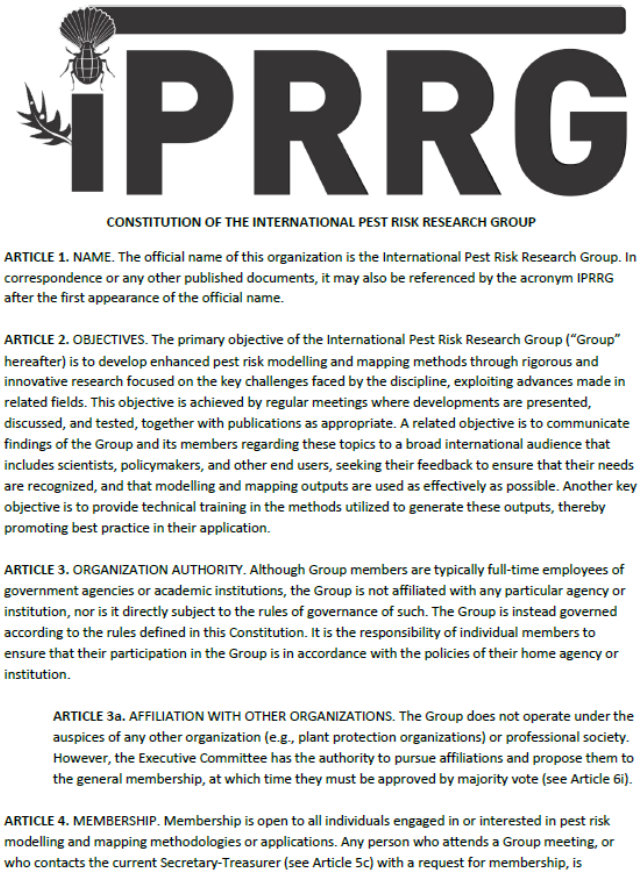


This is a report on the **APHIS-PPQ-CPHST Workshop on Pest Risk Mapping** held on June 5-7, 2007 in Fort Collins, Colorado.

October, 15, 2007

2. How was the IPRRG created?

- Initially called the International Pest Risk Mapping Workgroup (IPRMW)
  - An informal, but government agency supported, network of pest risk analysts that met annually to share developments in pest risk mapping and modelling, to address the key challenges and to provide guidance in using the most appropriate techniques
- By meeting 7 (2013), it was agreed that we needed a professional body with a constitution to:
  - Give us a clear identity when promoting our work and engaging with national, regional and international bodies
  - Provide funds to support the website, the annual meetings and other activities
- At meeting 9 (2015):
  - the Constitution was agreed, with the group registered as an unincorporated not-for-profit association in Australia
  - the Executive Committee was elected
  - It was decided to change the name to the International Pest Risk Research Group (IPRRG) to reflect the fact that all pest risk related research is covered by the group.



IPRRG

CONSTITUTION OF THE INTERNATIONAL PEST RISK RESEARCH GROUP

ARTICLE 1. NAME. The official name of this organization is the International Pest Risk Research Group. In correspondence or any other published documents, it may also be referenced by the acronym IPRRG after the first appearance of the official name.

ARTICLE 2. OBJECTIVES. The primary objective of the International Pest Risk Research Group ("Group" hereafter) is to develop enhanced pest risk modelling and mapping methods through rigorous and innovative research focused on the key challenges faced by the discipline, exploiting advances made in related fields. This objective is achieved by regular meetings where developments are presented, discussed, and tested, together with publications as appropriate. A related objective is to communicate findings of the Group and its members regarding these topics to a broad international audience that includes scientists, policymakers, and other end users, seeking their feedback to ensure that their needs are recognized, and that modelling and mapping outputs are used as effectively as possible. Another key objective is to provide technical training in the methods utilized to generate these outputs, thereby promoting best practice in their application.

ARTICLE 3. ORGANIZATION AUTHORITY. Although Group members are typically full-time employees of government agencies or academic institutions, the Group is not affiliated with any particular agency or institution, nor is it directly subject to the rules of governance of such. The Group is instead governed according to the rules defined in this Constitution. It is the responsibility of individual members to ensure that their participation in the Group is in accordance with the policies of their home agency or institution.

ARTICLE 3a. AFFILIATION WITH OTHER ORGANIZATIONS. The Group does not operate under the auspices of any other organization (e.g., plant protection organizations) or professional society. However, the Executive Committee has the authority to pursue affiliations and propose them to the general membership, at which time they must be approved by majority vote (see Article 6i).

ARTICLE 4. MEMBERSHIP. Membership is open to all individuals engaged in or interested in pest risk modelling and mapping methodologies or applications. Any person who attends a Group meeting, or who contacts the current Secretary-Treasurer (see Article 5c) with a request for membership, is

3. Who are we?

Members:

- 154 members
- 34 countries

Affiliations:

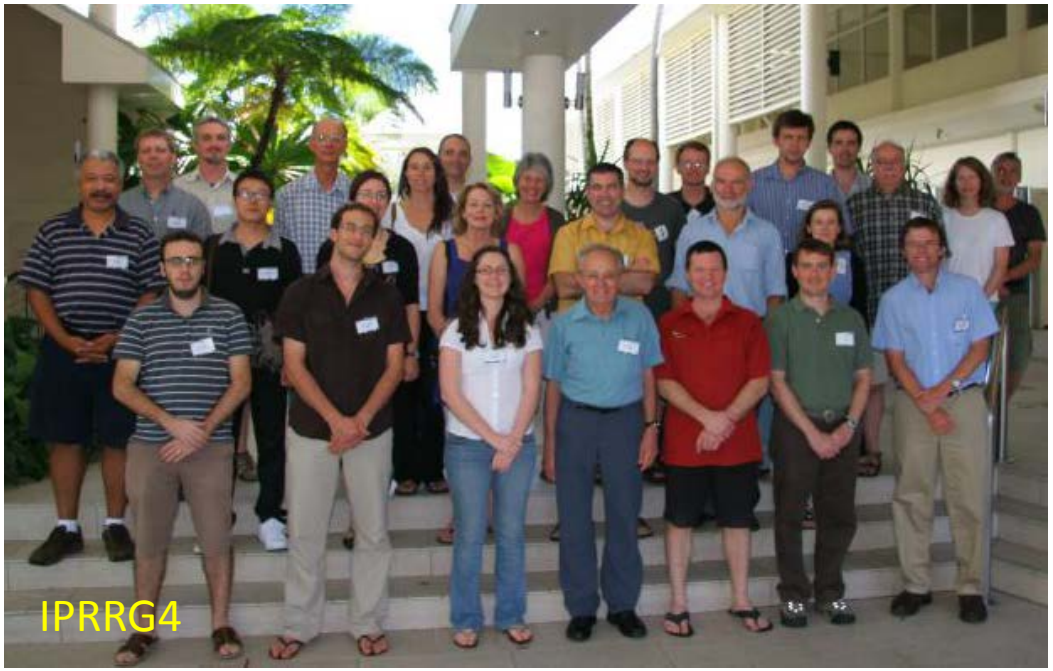
- Students and professionals from academic institutions, national and international agencies
- Interdisciplinary background e.g. pest risk analysts, modellers, entomologists, plant pathologists , ecologists, economists, risk managers, etc

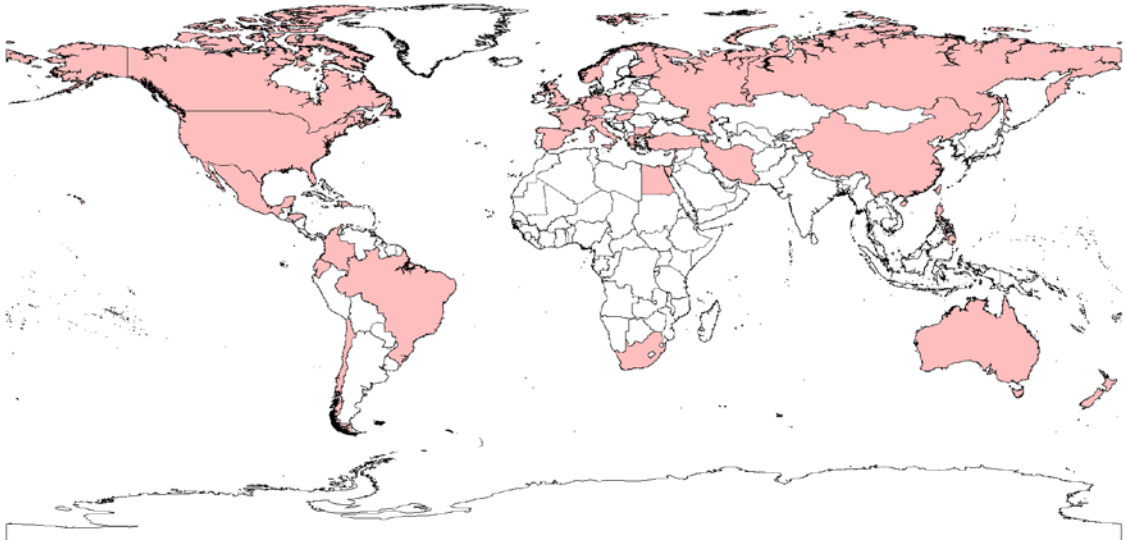
Executive Committee:

- Richard Baker (Chair)
- Frank Koch (Communications Officer)
- Darren Kriticos (Secretary-Treasurer)
- Amy Morey (Student Rep.)
- Rob Venette (Vice-Chair)

Scientific Committee:

- Exec Committee & local organisers

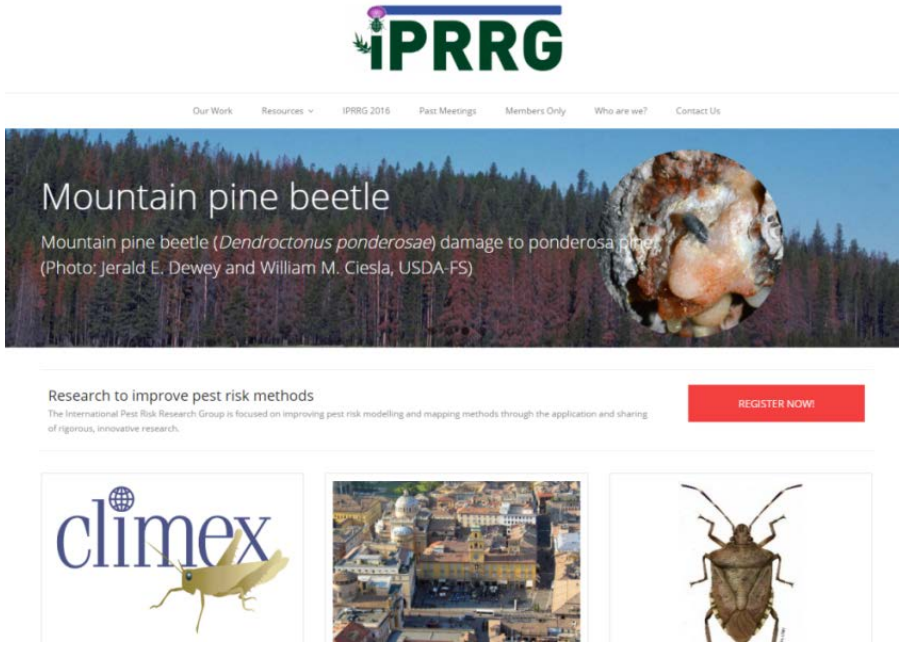


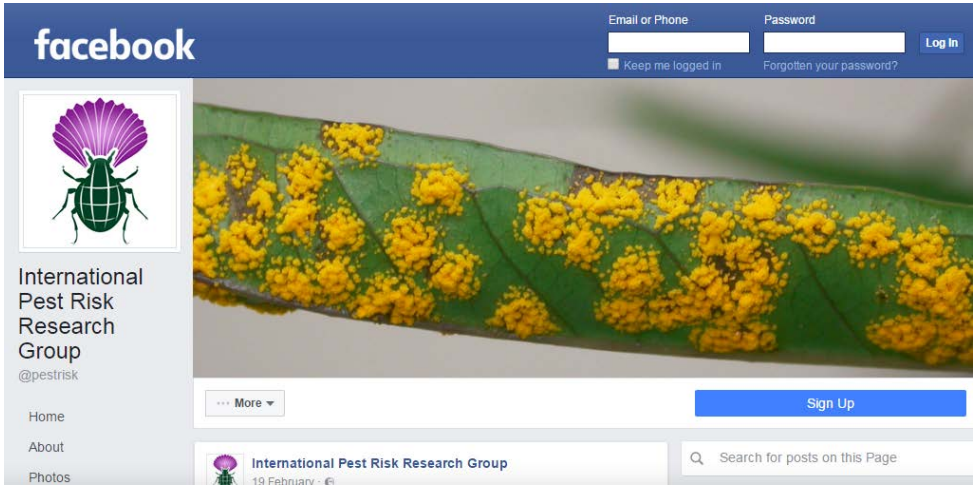


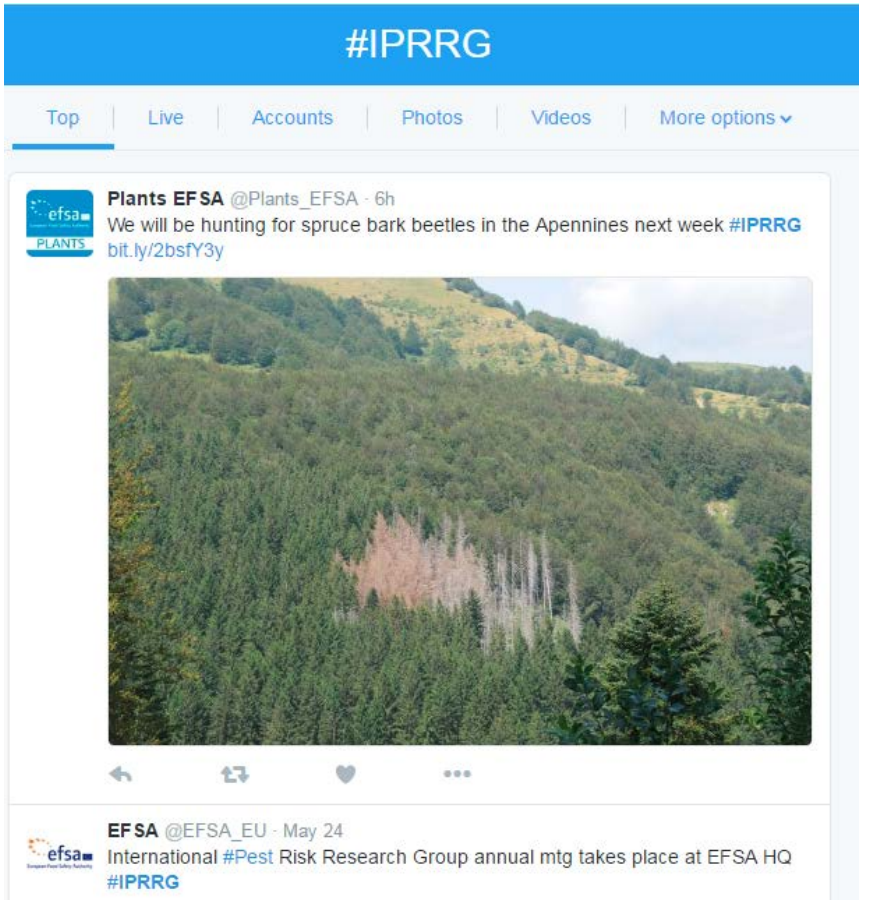
3. Who are we? Website, Facebook and Twitter

Web site: http://www.pestrisk.org/ **Twitter**: #IPRRG

Facebook: https://www.facebook.com/pestrisk/







4. What have we achieved? (i) Annual Meetings

- 10 annual meetings on three continents
- Over 230 papers presented, many topics discussed and new developments presented for feedback, e.g. NAPPFAST, CLIMEX & PRATIQUE
- Sponsorship of the 2012 meeting by the OECD Cooperative Research Program on Biological Resource Management for Sustainable Agricultural Systems

No	Year	Location	Papers presented
1	2007	Fort Collins, Colorado, USA	18
2	2008	Bloomington, Minnesota, USA	14
3	2009	Pescadero, California, USA	26
4	2010	Port Douglas, Queensland, Australia	32
5	2011	Fort Collins, Colorado, USA	30
6	2012	Tromsø, Norway	29
7	2013	Raleigh, North Carolina, USA	17
8	2014	Canberra, Australia	19
9	2015	Fort Collins, Colorado, USA	17
10	2016	Parma, Italy	32
		TOTAL	**234**

Summary of the International Pest Risk Mapping Workgroup meeting sponsored by the Cooperative Research Program on Biological Resource Management for Sustainable Agricultural Systems

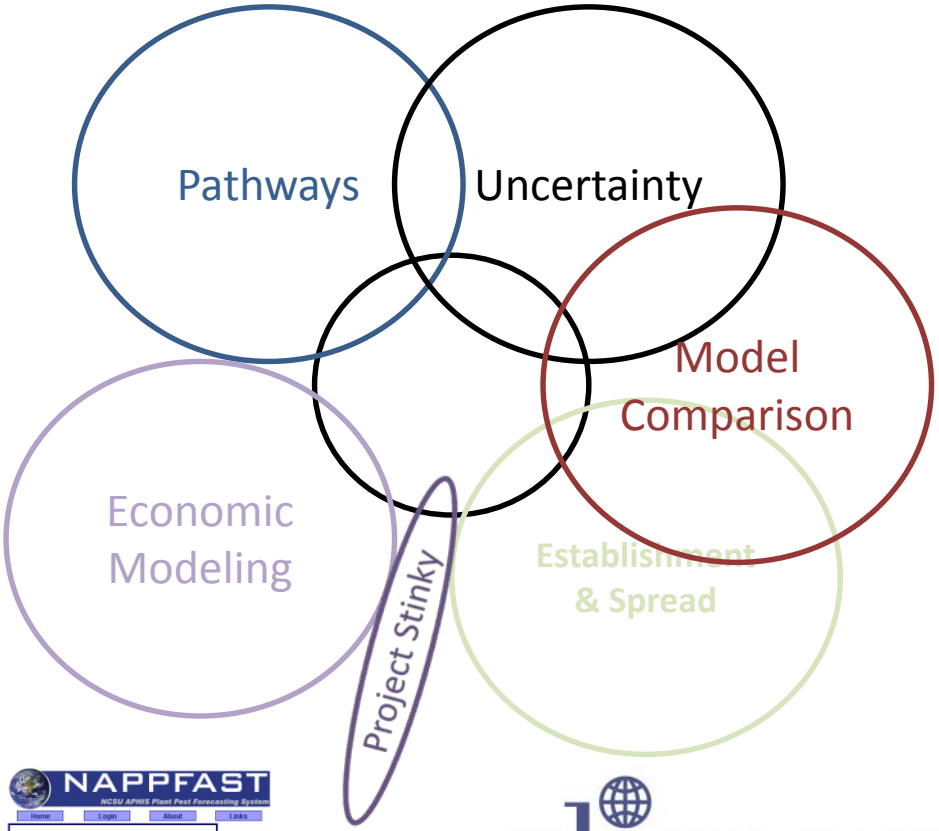
R.C. Venette, D.J. Kriticos, F.H. Koch, T. Rafoss, W. van der Werf, and R. Baker

The conference succeeded in stimulating new ideas about how to incorporate climate change, economics, and uncertainty into pest risk models and maps for invasive alien species and how to communicate these improved results to biosecurity policymakers. The full proceedings of the meeting will appear in an upcoming issue of the journal NeoBiota.

4. What have we achieved? (ii) Work group activities

Work Group activities have:

- Led to publications
- Provided invaluable feedback on new endeavours, e.g NAPPFAST (NCSU-APHIS Plant Pest Forecasting System), the PRATIQUE EU Project and CLIMEX pest risk modelling software v. 4
- Enabled comparisons to be made between different approaches and models
- Provided a general forum for discussion on particularly challenging topics



PRATIQUE

4. What have we achieved? (iii) Three key publications

i. Pest risk maps for invasive alien species: a roadmap for improvement (Venette RC et al; 2010; *Bioscience*)

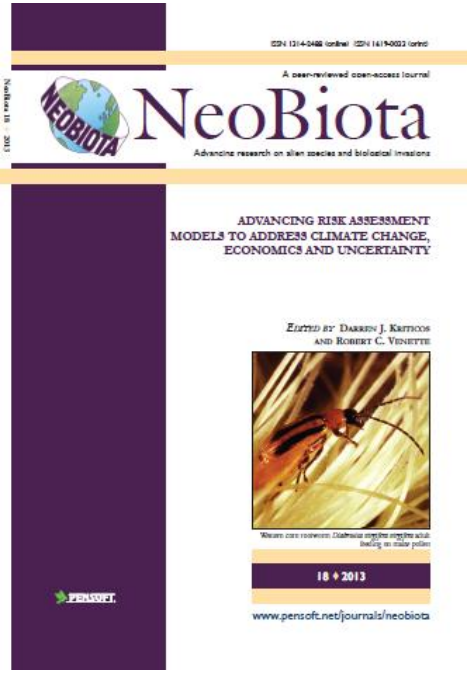
ii. Advancing risk assessment models to address climate change, economics and uncertainty (Kriticos DJ et al; *Neobiota* Special Issue; 2013)

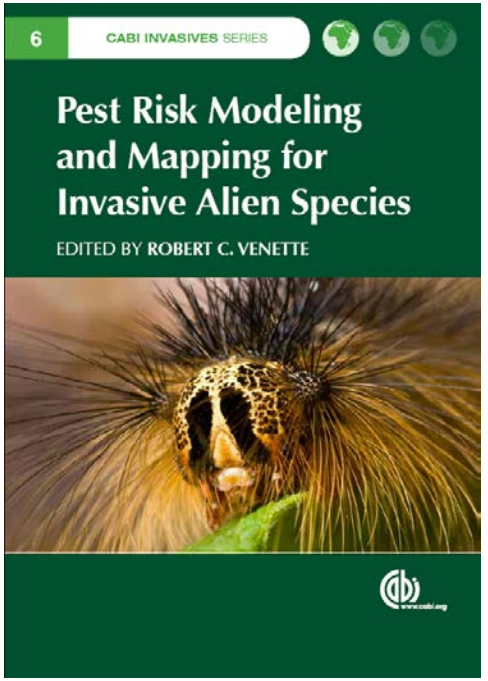
iii. Pest Risk Modelling and Mapping for Invasive Alien Species. (Venette RC (Ed); 2015. CAB International)

Articles

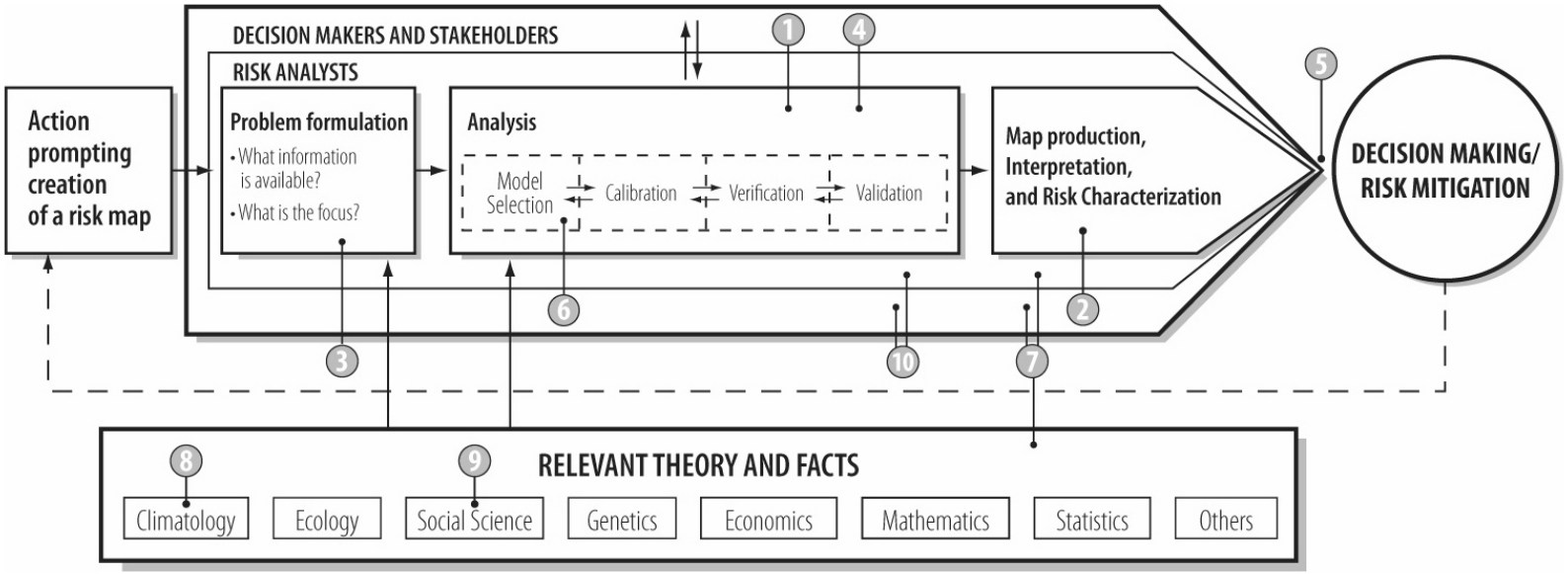
Pest Risk Maps for Invasive Alien Species: A Roadmap for Improvement

ROBERT C. VENETTE, DARREN J. KRITICOS, ROGER D. MAGAREY, FRANK H. KOCH, RICHARD H. A. BAKER, SUSAN P. WORNER, NADILA N. GÓMEZ RASOTEAUX, DANIEL W. MCKENNEY, ERHARD J. DOBESBERGER, DENYS YEMSHANOV, PAUL J. DE BARRO, WILLIAM D. HUTCHISON, GLENN FOWLER, TOM M. KALARIS, AND JOHN FEDLAN





4. What have we achieved? (iii) Publication 1: The Road Map

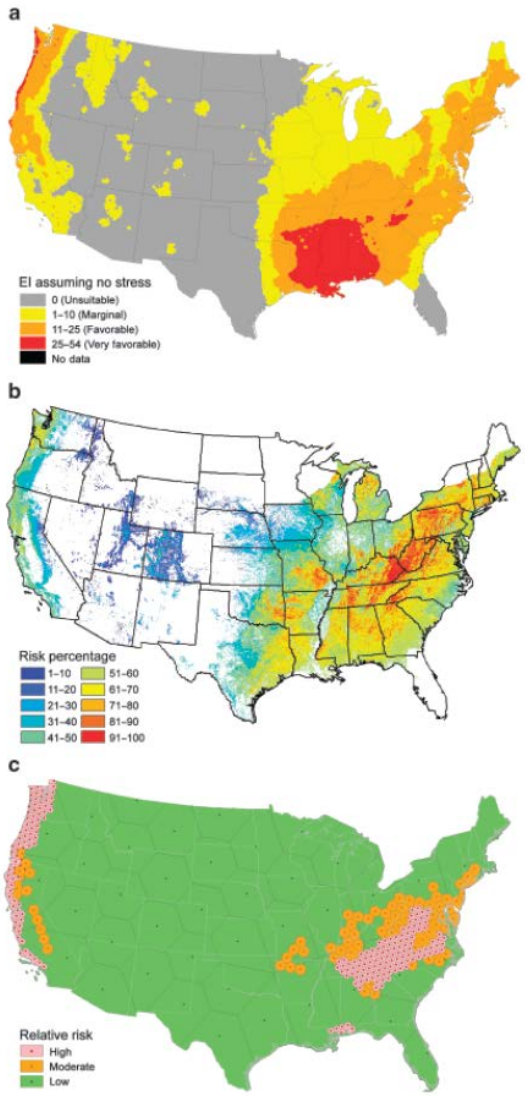


1. **Provide greater documentation of model development and assessment.**
2. **Improve representation of uncertainty.**
3. **Expand availability and accessibility of primary data.**
4. **Develop a best practice guide and toolkit for modeling.**
5. **Expand communications with decision-makers on the interpretation and use of risk maps.**
6. **Work towards impact mapping.**
7. **Increase international collaboration.**
8. **Incorporate climate change.**
9. **Study how human and biological dimensions interact.**
10. **Provide training in pest risk modeling practice.**

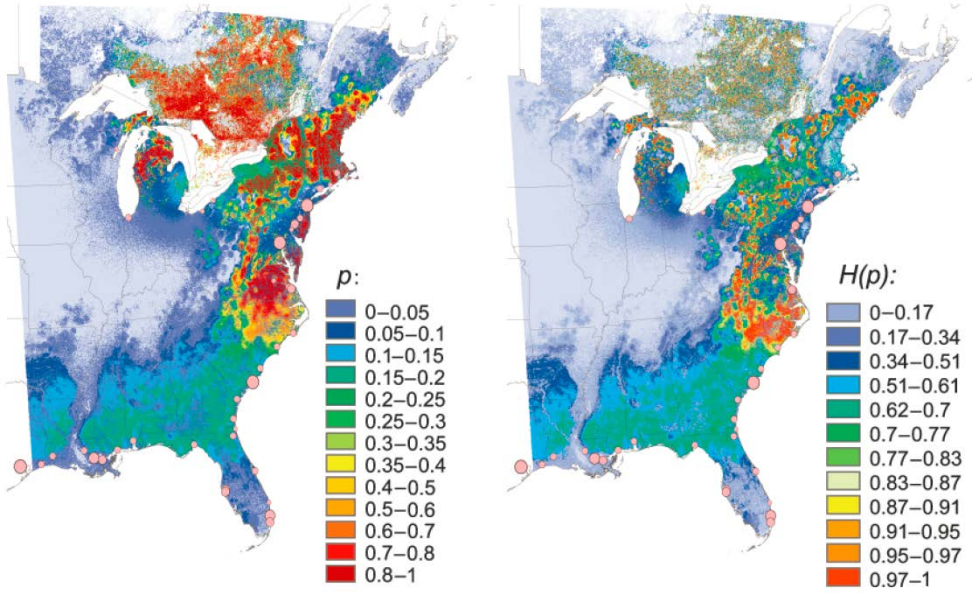
Venette RC, Kriticos DJ, Magarey RD, Koch FH, Baker RHA, Worner SP, Gomez R, Nadilia N, McKenney DW, Dobesberger EJ, Yemshanov D, De Barro PJ, Hutchison WD, Fowler G, Kalaris TM, Pedlar J (2010) Pest risk maps for invasive alien species: a roadmap for improvement. Bioscience 60: 349-362

4. What have we achieved? (iii) Publication 1: Examples

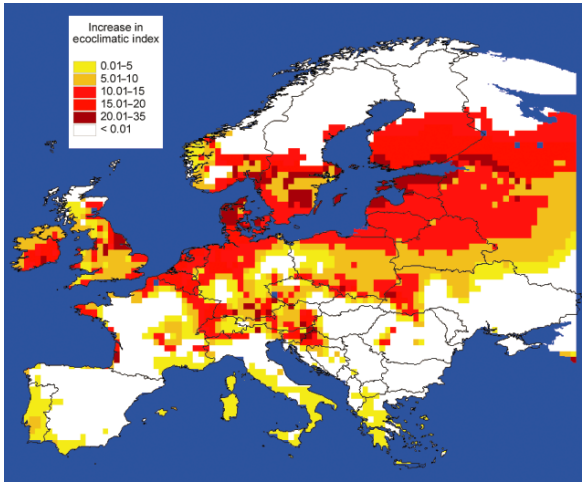
Phytophthora ramorum **risk maps based on (a) CLIMEX, (b) NAPPFAST & (c) expert rules**



Sirex noctilio **model showing: (a) the joint probability of successful entry, spread, and establishment and (b) the uncertainty**

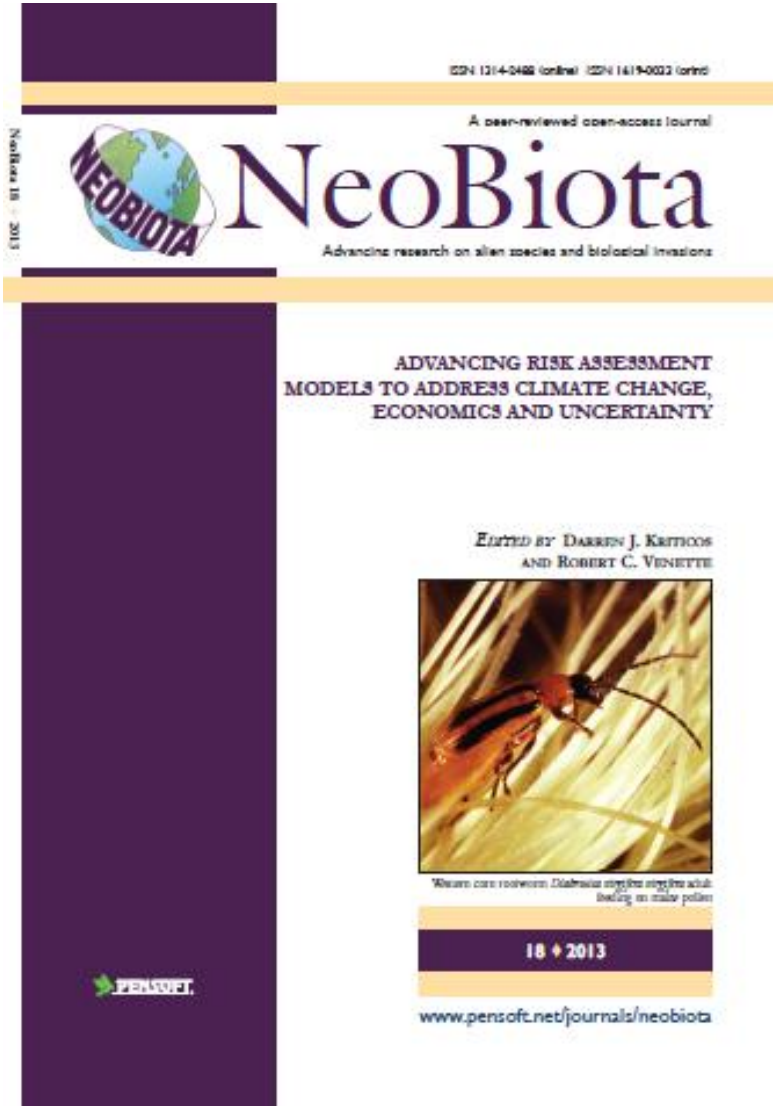


Increases in climatic suitability for the Colorado beetle (*Leptinotarsa decemlineata*) by 2050 based on CLIMEX and the HadCM2 global climate model



4. What have we achieved? (iii) Publication 2: Neobiota

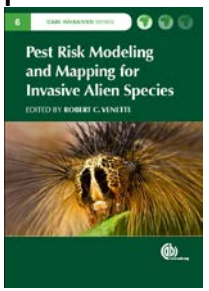
- Neobiota Special Issue (2013) “Advancing risk assessment models to address climate change, economics and uncertainty”
- Based on OECD funded meeting in Tromso, Norway July 2012
  - 13 papers covering:
    - Pest risk science and policy
    - Pest invasions, spread, and surveillance
    - Mapping establishment, endangered areas and economic impacts
    - Representing uncertainty
    - Integrative models



Kriticos D & Venette RC (Eds) (2013) Advancing risk assessment models to address climate change, economics and uncertainty, NeoBiota 18, Special Issue, pp. 1-218

4. What have we achieved? (iii) Publication 3: CABI Book

Seventeen chapters provide describe pest risk mapping and modelling techniques with worked examples to explain modelling and help development of tool kits for assessment.



1. **The Challenge of Modelling and Mapping the Future Distribution and Impact of Invasive Alien Species**
1. **Mapping Endangered Areas** for Pest Risk Analysis
2. **Following the Transportation Trail** to Anticipate Human-mediated Invasions in Terrestrial Ecosystems
3. Simulation **Modelling of Long-distance Windborne Dispersal** for Invasion Ecology
4. Using the **MAXENT** Program for Species Distribution Modelling to Assess Invasion Risk
5. The NCSU/APHIS Plant Pest Forecasting System (**NAPPFAST**)
6. Detecting and Interpreting Patterns within Regional Pest Species Assemblages using **Self-organizing Maps** and Other Clustering Methods
7. **Modelling the Spread of Invasive Species** to Support Pest Risk Assessment: Principles and Application of a Suite of Generic Models
8. **Estimating Spread Rates** of Non-native Species: The Gypsy Moth as a Case Study
9. **Predicting the Economic Impacts** of Invasive Species: The Eradication of the Giant Sensitive Plant from Western Australia
10. Spatial Modelling Approaches for **Understanding and Predicting the Impacts** of Invasive Alien Species on Native Species and Ecosystems
11. Process-based Pest Risk Mapping using **Bayesian Networks and GIS**
12. Identifying and Assessing **Critical Uncertainty Thresholds** in a Forest Pest Risk Model
13. **Making Invasion Models Useful for Decision Makers**: Incorporating Uncertainty, Knowledge Gaps and Decision-making Preferences
14. **Assessing the Quality of Pest Risk Models**

Venette RC (Ed) (2015) Pest Risk Modelling and Mapping for Invasive Alien Species. CAB International

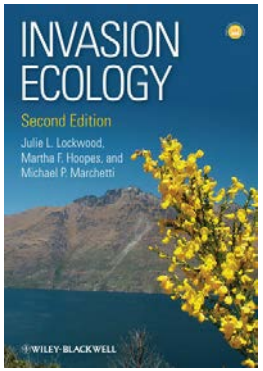
5. What are our current and future objectives? (i)

Current objectives are as stated in the Group's constitution:

To develop enhanced pest risk modelling and mapping methods through rigorous and innovative research *focused on the key challenges faced by the discipline, exploiting advances made in related fields. This objective is achieved by regular meetings where developments are presented, discussed, and tested, together with publications as appropriate.*

A related objective is ***to communicate findings of the Group*** *and its members regarding these topics to a broad international audience that includes scientists, policymakers, and other end users, seeking their feedback to ensure that their needs are recognized, and that modelling and mapping outputs are used as effectively as possible.*

Another key objective is ***to provide technical training*** *in the methods utilized to generate these outputs, thereby promoting best practice in their application.*



5. What are our current and future objectives? (ii)

Key future objective is to create a global pest risk assessment for the brown marmorated stink bug (*Halyomorpha halys*) - BMSB

This project is intended to focus the skills and talents of the IPRRG on a pressing global issue and to demonstrate the value of the Group to scientists, managers, and policy makers with interests in biosecurity and pest invasions.

- Produce pest risk models and maps that assess the global threat posed by BMSB to agriculture, natural resources, and human welfare.
- Provide detailed examples to illustrate how thinking and modelling about pest invasion, specifically pest entry, establishment, spread, and impact, evolve as new information becomes available.
- Share insights about the modelling and mapping process with new pest risk analysts.
- Deliver map products and training opportunities based on BMSB to developing nations and others.

Project Prospectus

A global pest risk assessment for the brown marmorated stink bug: a product of the International Pest Risk Research Group

December 15, 2015

Codename: "Project Stinky"

6. How can I take part?

- Register at http://www.pestrisk.org/
- Attend Annual Meetings
- Contribute to the Agora (Discussion Forums)
- Engage with Project Stinky http://www.pestrisk.org/?page_id=877
- Identify and offer to lead a work group activity