Purpose of workshop

"*to generate lots of exciting plant biosecurity research ideas that link to the CRC objectives and milestones*" (Simon)

For you: strategic alignment, find collaborators, creative spark

For me:

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In the medium term: arrive at a small number of large cohesive projects that address C'wealth milestones

Program 1 Strategic Overview

Rieks van Klinken
Program Leader

Program 1 objective

Reduce **impacts** by identifying **points of biosecurity vulnerability** and **optimal points for intervention**

[What will a biosecurity system that minimised impact look like?]

Context:

- National, state, regional
- industry sector, environmental, specific stakeholders/commodities

Constraints:

- Low probability events
- Many uncertainties (and unknowables)
- Finite resources
- The political, institutional and social context of plant biosecurity (producer to bureaucrat).

Program 1 C'wealth agreement

- Develop tools and approaches through to adoption:
  - Pest threat tools for pest entry, establishment and spread
  - Decision making support tools and techniques that allow the evaluation of different biosecurity options (enterprise, regional to national)
- Capability development through PhDs and PDF
- High quality science through peer-review publication

The biosecurity continuum

PREVENTION

Biosecurity Continuum	Considerations
Source	Specific or general threats
Pathways	Kernels or networks, multiple vectors, primary/secondary dispersal
Australia (or state or region)	
Arrival (alive)	Diffuse or point
Establishment	Idiosyncratic, can depend on propagule pressure and context
Dispersal	Kernels or networks, multiple vectors
Impact	Damage type and density (and trade)

Risks change with time (global, industry and local changes)

ADAPTATION

Biosecurity threats: the "science" of impact

- What is the "base rate" of high impact incursions?
  - How does it relate to interception rates, incursion rates, naturalisation rates?
  - What level and type of impact occurs (in terms of trade impositions, biosecurity responses, and "real" direct impacts)?
  - Are high impact species different?

- Predicting impact
  - How often do we get it wrong ("outfielders" or "crying wolf")?
  - Can those error rates be improved?

- How can science help reduce the "base rate" or its consequences?
  - E.g. only 3 (of 89) incursions (1986-2005) were intercepted prior to the event (Caley). Given that, how can we reduce incursions through better interception, and will that reduce impact?

What is biosecurity worth, and where should resources be directed along the Biosecurity continuum?

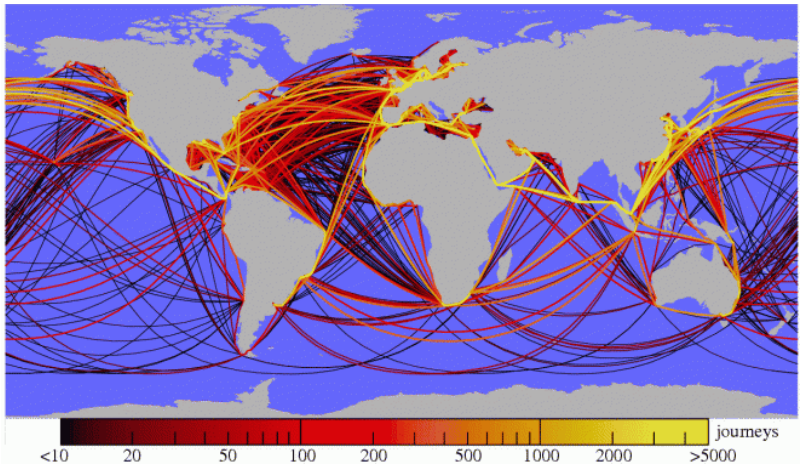
Some examples:

- Biosecurity as a "food security technology" (Cook et al. 2011a): e.g. phytosanitary measures for Ug99 may improve global farm profitability by over US$4.5billion
- Economics of trade-barriers (Cook et al. 2011b): does not support importation of New Zealand apples

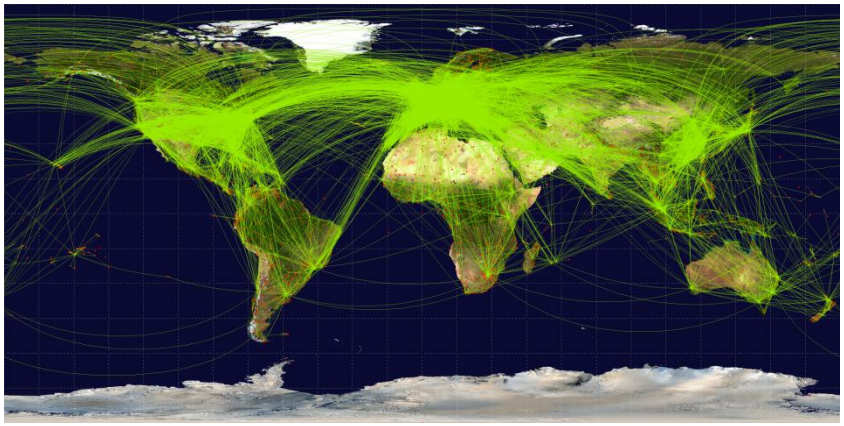
Some challenges for the PBCRC

- How should resources best be allocated along the biosecurity continuum, at enterprise, regional, state and national level. E.g.
  - Are high impact species best prevented at source, in pathways, or ??
  - Trade restrictions and biosecurity
  - What is the relative importance of targeting specific vs general risks?
  - Incursion response: what resources are justified, and when to stop?
- Economics (+ statistics, institutional arrangements …)

Pathways into Australia: Global threats



17,000 cargo ships/year



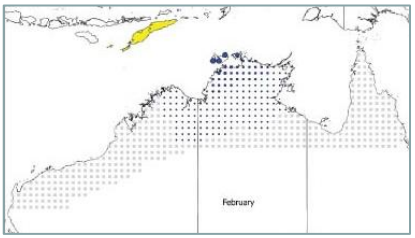
57,000 routes between 3,310 airports

Major investment in targeting specific threats and minimising "unforeseen" threats (DAFF)

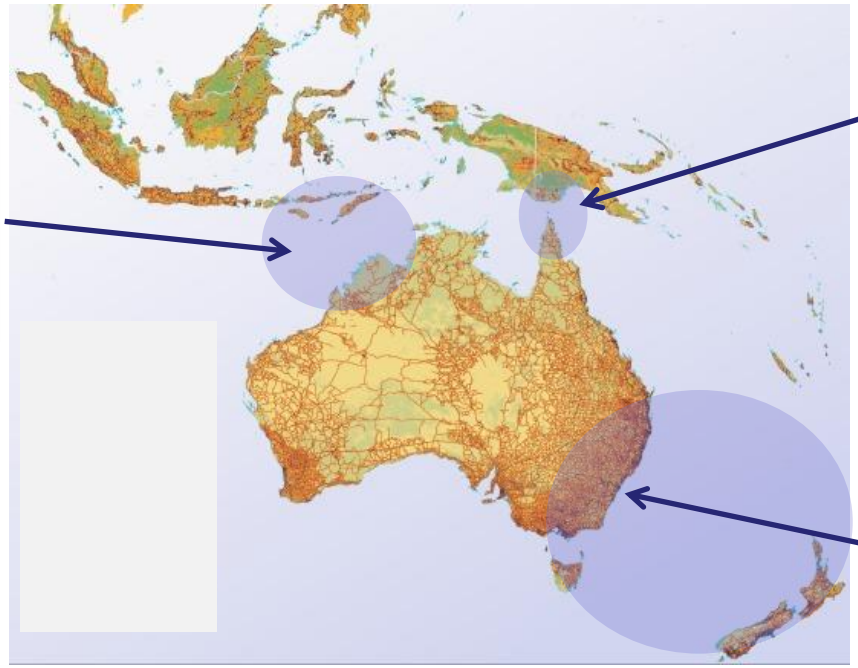
Some challenges for the PBCRC

- What are the greatest risks for plant biosecurity and how will they change through time (e.g. shifting trade patterns)?
- What are the best ways to reduce risks (specific and general)?
- How can science help?

Pathways into Australia: Natural spread



Asia (500 km)



Torres Straits (160 km)

New Zealand (1500 km)

- For which high-impact organisms does this pathway pose a risk?
- "TAPAS": predicting wind-borne dispersal from your desk-top
  + likelihood of departure and successful establishment
- Empirical evidence of connectivity: case-studies using genetics and other lines of evidence
- Aeroecology: what makes an organism amenable to natural dispersal?
- How will risk change with time (e.g. with development of northern Agriculture)?
- What can we do about it?

Rapid response to new incursions

Predicting dispersal is necessary for crafting incursion responses

Features of new incursion responses

- Idiosyncratic: dispersal will differ with organism and context
- Data poor: a heavy reliance on expert opinion (and "real-time learning")
- Need for rapid decision making: e.g. mobilisation of resources, feasibility of eradication
- Multiple vectors: "kernels" (e.g. wind) and "networks" (e.g. vehicles)
- Scenario analyses ("war games") can help with response planning

Some challenges for the PBCRC

Completion and adoption of dispersal modelling capability that adds value to rapid response activities. Includes all main dispersal pathways and likelihood of establishment.

Build linkages with other projects and programmes (e.g. Program 2: optimal allocation of surveillance resources)

Potential links with other programs

- Underpinning work: help decide where investment should be made across the biosecurity continuum and agencies
- Program 2 [Effective detection and response]:
  - What diagnostics do we need?
  - When is surveillance a good investment?
  - Where and when surveillance should occur
  - To survey or to eradicate?
- Program 3 [Safeguarding trade]:
  - Applications to maintenance of area freedom (e.g. dispersal)
- Program 4 [Secure Future]:
  - Who to engage, why and to do what? (e.g. natural dispersal)
  - Identify areas where community engagement is most useful

Biosecurity challenges for discussion

- 1. Biosecurity threats: the science of impact
- 2. What is biosecurity worth, and where should resources be directed along the biosecurity continuum?
- 3. Pathways into Australia: global threats
- 4. Pathways into Australia: natural dispersal
- 5. Dispersal modelling and early detection

Criteria for research

- Does it fall within CRC scope?
- Will it reduce **potential impact** from pests and diseases?
- Is it collaborative, high quality, leading-edge science?
- Does it offer best value from science?
- Is it technically feasible?
- Is there a clear pathway to impact?
- Does it make the most of available capability?

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Turning talk into action

- Program 1 strategy document for internal use
- Natural dispersal project approved for early 12-13
- Develop program structure and finalise project development process