

Why plant biosecurity?

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Outline

- What is plant biosecurity?
- Importance of plant biosecurity
- Biosecurity challenges
- Biosecurity continuum
- Current high priority pests–
Australian perspective
- Sleepers

What is plant biosecurity?

- One of the six national rural research and development priorities
- *'Plant biosecurity is a set of measures designed to protect a crop from exotic plant pests (pathogens and insects) at national, regional and individual farm levels'*
- *'The protection of the economy, environment and human health from negative impacts associated with pests, diseases and weeds'.*
- It is an insurance policy for the future



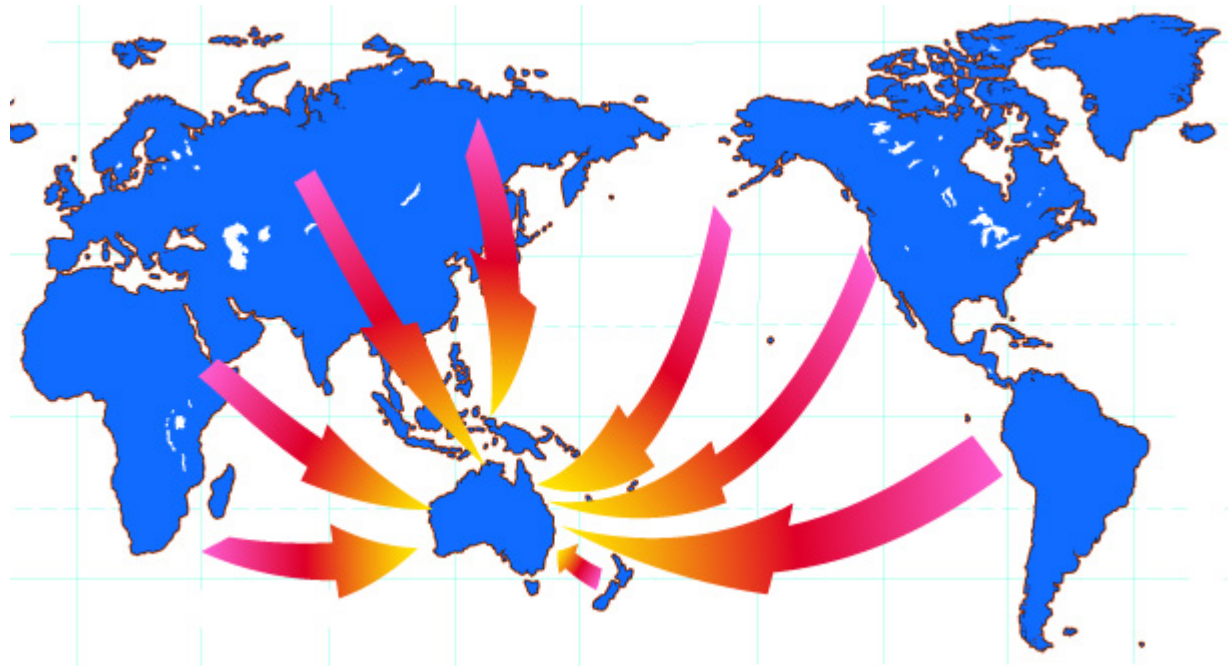
What is plant biosecurity?

- Biosecurity has emerged as a major global issue
- Passenger and trade movements are increasing (a shrinking world...)



Challenges to trading nations

Global Trade: Exports **OUT**



Potential Incursions **IN**

Current global trade

- World sea container trade reached 7.4 billion metric tons in 2006.
- A 13.4% increase in container movements to 440 million 20ft equiv units occurred in 2006.

(United Nations Conference on Trade and Development, UNCTAD 2007 report)



People on the move

- Over 760 million international tourists
- 70+ countries host more than a million visitors



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Importance of plant biosecurity

- Regulatory framework (internal and international)
- Biosecurity impacts on food safety, food security, trade, market access, market development
- Biosecurity impacts on profitability and sustainability of plant industries

Importance of plant biosecurity

- Future pulse production in Australia will be dependent on many factors (Alliance Grain Traders 2008)
- **changes in the environment - climate change, salinisation, pathogen, exotic incursions**



An international agenda 2008

- Climate change
- Energy crisis and biofuels
- FOOD SECURITY



International approaches to plant biosecurity

- **International Plant Protection Convention**

International Standards for Phytosanitary Measures (recognised by WTO)

- **Sanitary and Phytosanitary Agreement (SPS)**

All members of WTO bound by SPS Agreement

Biosecurity impacts on Australian lupin industry

- Lupin anthracnose – incursion in 1996.
 - Interstate marketing restrictions still exist (area freedom advantage)
 - Developing market for *L. albus* to middle east lost

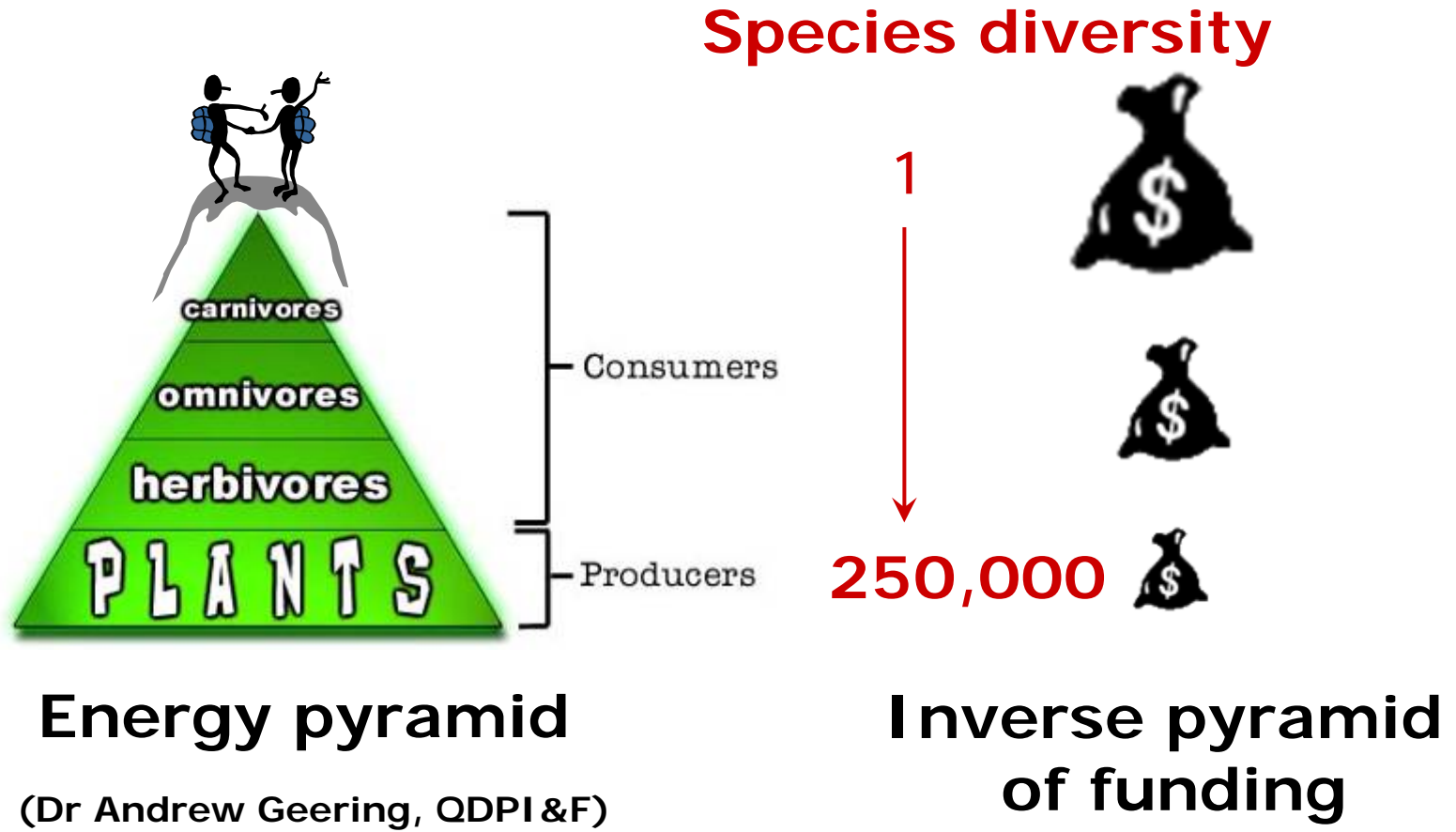
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Biosecurity challenges

- Decreasing and ageing expertise base
- Operational vs research
- Large number of industries, very large number of pests, small resource base

An economic perspective



Plant biosecurity challenges: climate change

- What are the major climate changes events most likely to influence the behaviour and distribution of plant pests and diseases?



Wheat fields under threatening skies, V. van Gogh

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Biosecurity continuum

- Pre-border, border, post-border
- Preparedness and prevention
- Detection (surveillance)
- Identification/diagnosis
- Response (impact and post harvest)

Preparedness and Prevention

- RISK = the chance of something happening that will have an impact on objectives
- It is measured in terms of consequence and likelihood
- Real versus perceived risks
- Risk based approaches should underpin all decisions that determine priorities and investments.



Invasive species

Pathways for introduction

- Accidental
contaminants; organisms 'hitching a free ride'
- Deliberate
(a) benign
(b) malignant



Detection

- Surveillance
- Large number of targets
- Trade imperatives (known not/not known)
- Evidence based
- Our resource base is small

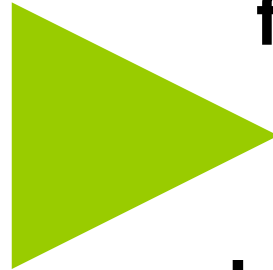


Regulators are more vigilant...



Greater demands on industry

More regulations
wider scope
boosted
enforcement
greater penalties



**food must be safe
and
industry must
demonstrate it's safe**

Identification



- **Need for policy reality:** *Why have the latest technology when 'traditional methods' suffice?*
- **Does every jurisdiction need to do everything?** *Not all services will be offered by each centre because of budget; erosion of the skill base and demands for greater quality assurance*
- A web-based 'One Stop Shop' that provides accurate, comprehensive and accredited diagnostic information for exotic pests
- Emergencies require emphasis on accuracy, throughput, sensitivity while surveillance needs simplicity, cost-effective, reliability

Comparative images



Response

- Impact management
- Post-harvest integrity



Impact management

Protecting Australia's trade position

- Eradication
- Disinfestation
- New virulence
 - Input to breeding activities

Post-harvest integrity



- **Pests:** *nil tolerance** to live insects, other invertebrates, rodents etc
- **Plant pathogens:** *nil tolerance** fungi, bacteria, viruses
- **Weed seeds:** *nil tolerance** for seeds
- **Chemical residues:** nil tolerance* or *Codex levels, or less.*
(** nil tolerance – none in a representative sample, or certified absolute absence*)

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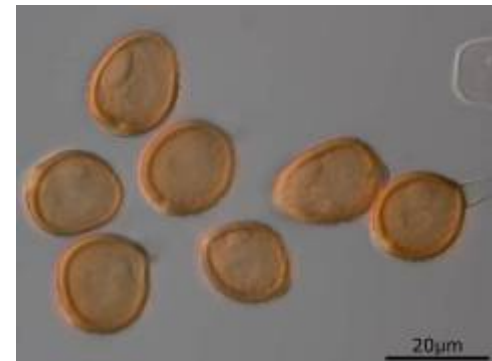
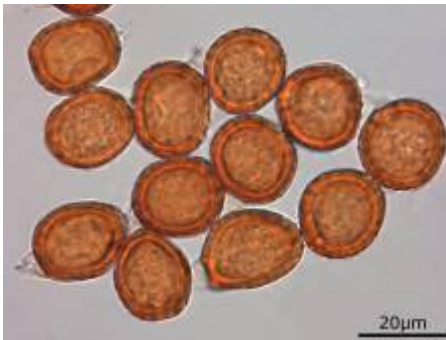
High priority pests

- Australian industry biosecurity plan
- pea leaf weevil (*Sitona lineatus*),
- khapra beetle (*Trogoderma granarium*),
- leafminers (*Liriomyza huidobrensis*, *L. trifolii*),
- turnip moth (*Agrotis segetum*),
- apion weevils (*Apion antiqium*, *A. arrogans*, *A. clavipes*),



High priority pests

- fusarium wilt (*Fusarium oxysporum* f.sp. *lupini*)
- rust (*Uromyces lupinicolus*, *U. renovatus*)
- leaf spot (*Mycosphaerella lupini*) and
- *bean yellow mosaic virus* (seed-borne)



What makes a pest a priority?

Threat analysis (Grainguard)

Case study 1: pea leaf weevil

- Host range: large,
- Distribution: worldwide
- Potential distribution Aust: all lupin production
- Natural dispersal: will disperse
- Economic impact: rated as **moderate** based on losses caused to other legumes. Weevil will also vector viruses and bacteria
- Entry potential: rated as **moderate** based on its inconspicuous nature
- Establishment potential: rated as **moderate** based on climate suitability
- Spread potential: rated as **high**
- Total risk category: **moderate**



What makes a pest a priority?

Threat analysis (Plant Health Australia)

Case study 2: khapra beetle

- Host range: grain and cereals,
- Distribution: Asia, Europe, Africa, Middle East
- Potential distribution Aust: all lupin production
- Natural dispersal: **low**
- Economic impact: rated as **highly significant** based on direct losses and trade
- Entry potential: rated as **high** based on high rates of trade and secretive nature
- Establishment potential: rated as **high** based on climate suitability
- Spread potential: rated as **moderate** (human mediated)
- Total risk category: **extreme**



What makes a pest a priority?

Threat analysis (Grainguard)

Case study 2: fusarium wilt

- Host range: race to species specificity. Limited global literature
- Distribution: limited in Europe and Africa
- Potential distribution Aust: all lupin production
- Natural dispersal: will disperse and has longevity in soil
- Economic impact: rated as **high** based on major impact on three commercial species in Europe
- Entry potential: rated as **low** based on current quarantine restrictions
- Establishment potential: rated as **high** based on climate suitability
- Spread potential: rated as **low** assuming strict movement restrictions enacted after detection
- Total risk category: **moderate**





Healthy

Discoloration obvious in vascular strand just below epidermis

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Unknown
unknown or a
known unknown,
with an unknown
relationship to
the known....



Museum curiosity: The red-and-black mystery insect.

Insect ID bugs the boffins

LONDON

The experts at the Natural History Museum in London pride themselves on being able to classify and display thousands of species — from birds and mammals to insects, dinosaurs and snakes — and are confident they can identify most living things on the planet.

Except for a tiny red-and-black bug that has appeared in the museum's gardens.

The almond-shaped insect, about the size of a grain of rice, was first seen in March last year on some of the plane trees that grow on the grounds of the 19th-century museum, collections manager at the museum Max Barclay said on Monday.

Within three months, it had become the most common insect in the garden and had also been spotted in other central London parks.

The museum has more than 28 million insect species in its collection, but none is an exact match for this insect.

Nonetheless, Mr Barclay was cautious about calling it a new discovery.

"I don't expect to find a new species in the gardens of a museum," he said. "Deep inside a tropical rainforest yes, but not in central London."

The bug resembles the *Arocatus roeselii*, which is usually found in central Europe but is a brighter red and lives on alder trees.

Entomologists suspect the new bug could be a version of the roeselii that has adapted to live on plane trees. However, they have acknowledged it could be an entirely new species. Either way, it appears the museum's tiny visitor, which appears harmless, is here to stay.

"We waited to see if the insect would survive the British winter," Mr Barclay said.

"It did and it's thriving, so now we had better figure out what it is."

Vigilance

- As a relatively new domesticated crop a high level of biosecurity awareness is required
- New environments, new pests
- Other *Sitona* species
- Bruchus species
- Other
- Regular communication/collaboration within the global lupin industry to identify potential threats will assist in maintaining a vigilant biosecurity system



Blister bug (*Lytta* spp.)

- They feed on flowers sometimes leaves, of many plant species
- Have recently had impact on lupins in Canada
- Human/animal health aspect





Thank you

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