Food and Agriculture Organization of the United Nations

International Plant Protection Convention

Department for Environment Food & Rural Affairs

Environmental pests – Australian Context

Importance of biodiversity and future approaches to minimise pest risks associated with imported inanimate pathways

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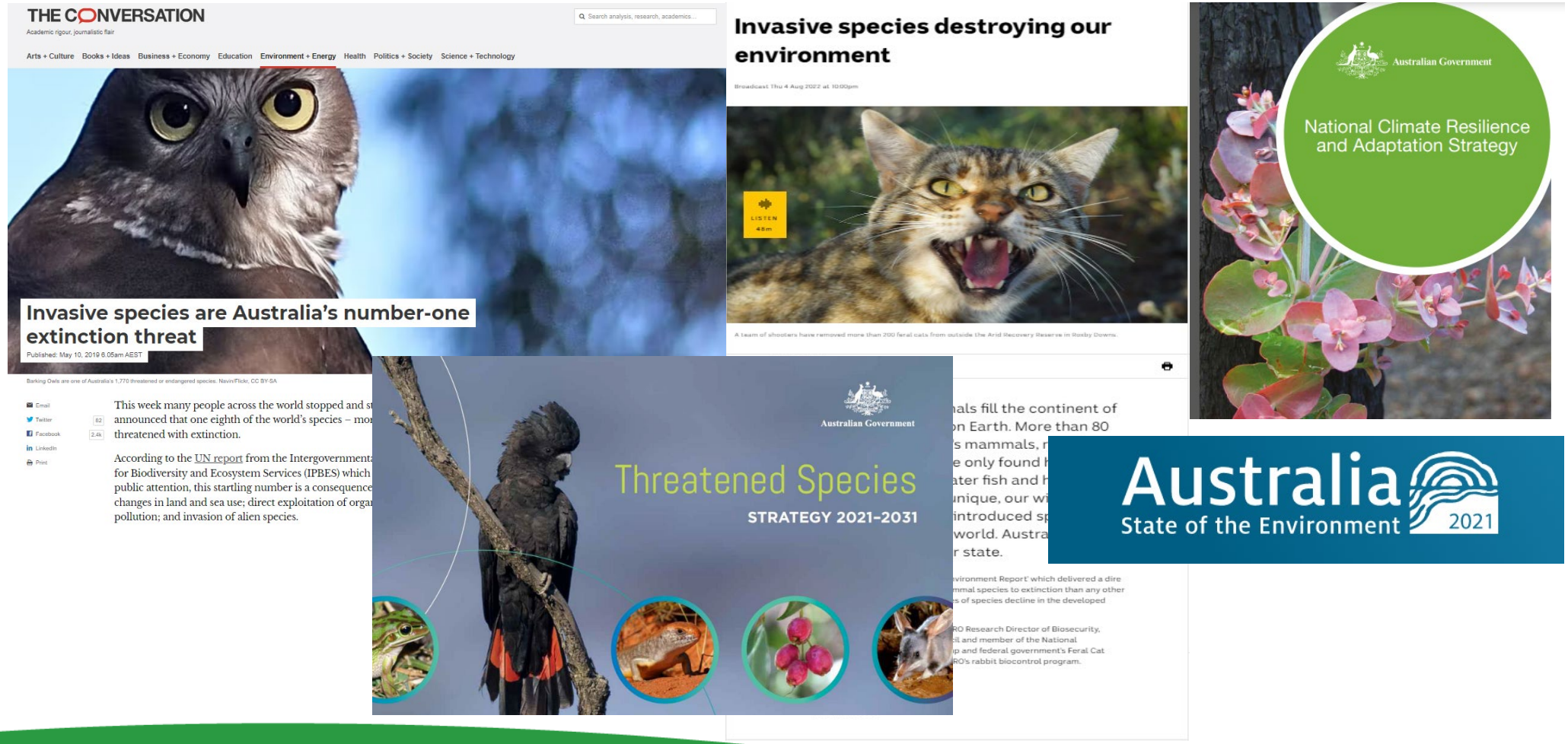
Why is biodiversity important to Australia?

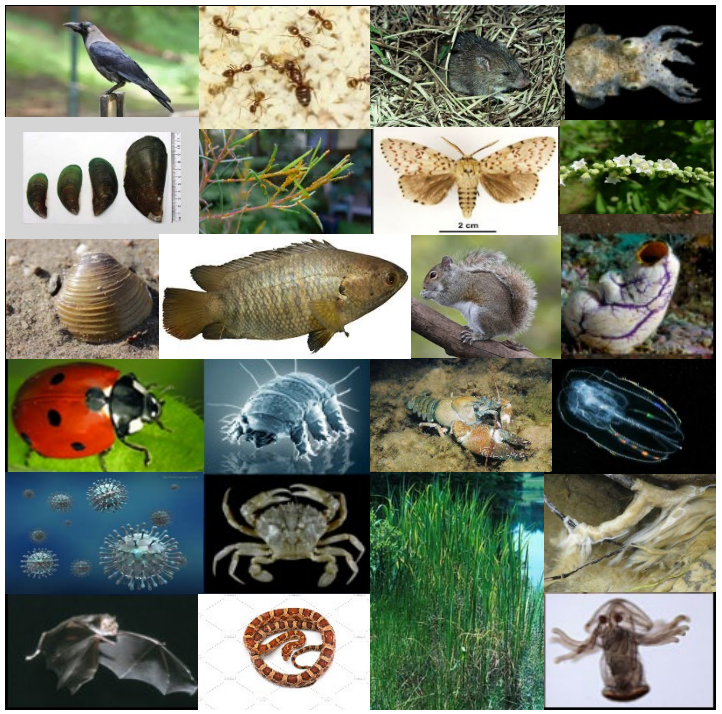
- Abundance of **unique biodiversity**
- Home to between **600,000 and 700,000 species**, many of which are found nowhere else in the world.
- About 84% of plants, 83% of mammals, and 45% of birds are **only found in Australia**.

How are climate change and invasive species affecting biodiversity in Australia?



National Priority List of Exotic Environmental Pests, Weeds and Diseases

- **168** pests, weeds and diseases that are considered the greatest biosecurity risks to the Australian environment
- Species must be a risk to one or more of the following:
  - Environment (native species, ecosystems, natural resources etc)
  - Social amenity (recreation opportunities, way of life etc)
- May be a species, set of species or genus-level entries
- Eight biological or ecological groupings – including vertebrates and wildlife diseases



Examples of biosecurity issues in Australia

- Red imported fire ant
- Smooth newt
- Asian black spined toad
- Argentine ant (Norfolk Island)

- Asian honey bee
- Jack Dempsey cichlid
- Emerald furrow bee
- Mexican feathergrass

- Myrtle rust
- Pigeon paramyxovirus
- Red-eared slider turtle
- Yellow crazy ant

Biological characteristics of successful hitchhikers

1. Entry onto inanimate cargo, shipping containers and/or conveyances
   - ✓Attracted to inanimate goods, conveyance areas, overwintering sites, industrial lights, lays eggs on substrates, areas of refuge etc.

2. Reaching the destination country
   - ✓Survive transport conditions (temperature, humidity)
   - ✓Able to survive periods without food source and/or water
   - ✓Overwinters/Aestivates/Hibernates/Functional diapause etc.
   - ✓Scavengers

3. Ability to distribute and establish
   - ✓Ability to spread to hosts upon arrival
   - ✓Forms aggregations/nests

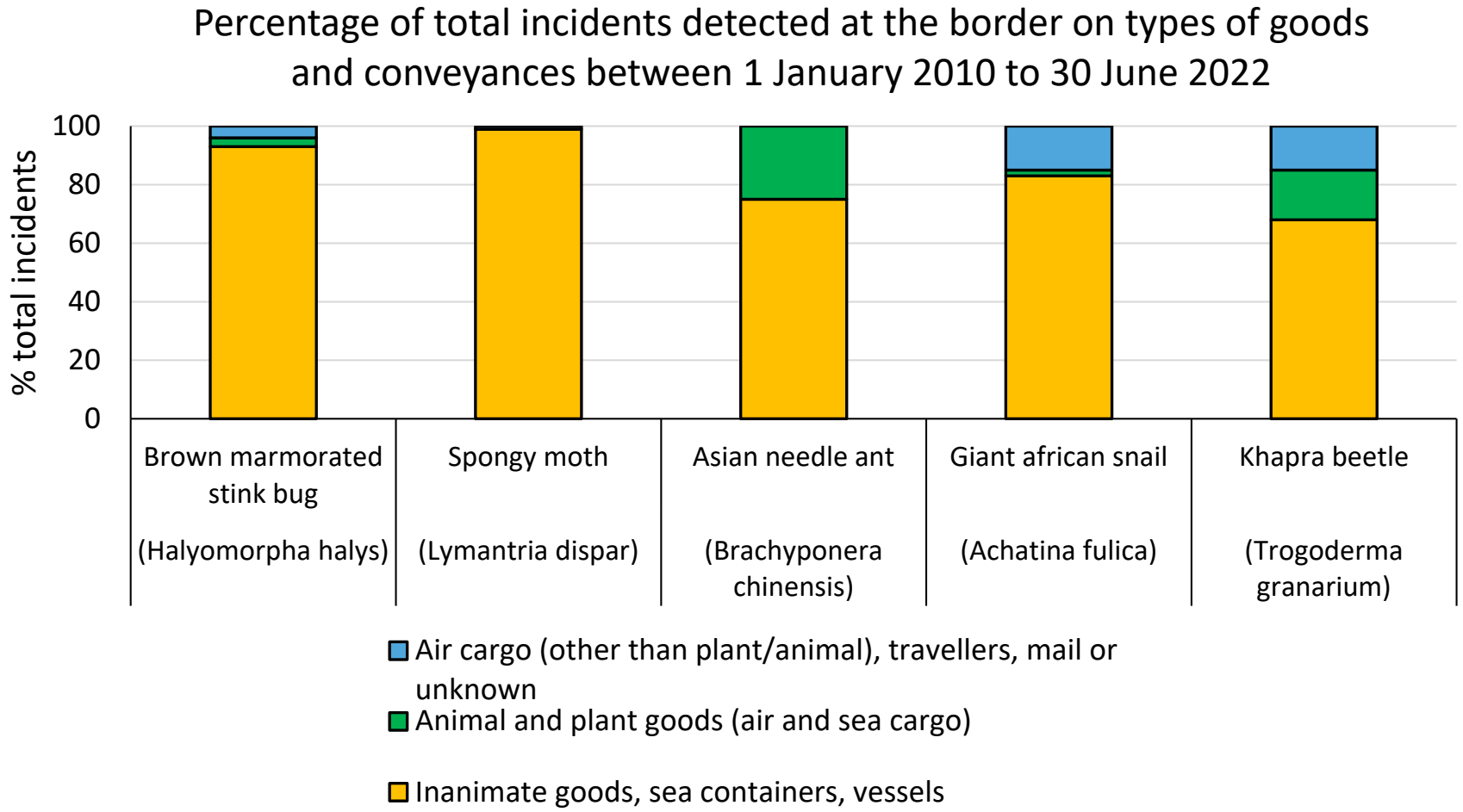
How many hitchhikers?!

Overwintering	Egg laying	Nesting	Sheltering	Internal
Brown marmorated stink bug	Spongy moth	Asian honey bee	Giant African snail	Khapra beetle
Yellow spotted stink bug	Nun moth	Giant honey bee	Korean round snail	Trogoderma spp.
Western conifer seed bug	*Hylesia nigricans*	Dwarf honey bee	Golden apple snail	
Green polished stink bug	Spotted lantern fly	Red imported fire ant	Chocolate banded snail	
Mottled shield bug	Joro spider	Little fire ant	White-lip garden snail	
Harlequin ladybeetle		*Nylanderia fulva*		
Seven spotted ladybeetle		Browsing ant		
Asian giant hornet		Asian needle ant		
Asian hornet				

Hitchhiker functional groups and high-level pathways

Hitchhiker Functional Group	Container external surfaces	Container internal areas	Non-commodity goods
Overwintering pests (stinkbugs, ladybeetles, hornets)			✓
Bees and Ants	✓	✓	✓
Snails	✓		✓
Egg masses (*Lymantria*)	✓		✓
Scavenging Pests (khapra)		✓	✓

Successful hitchhikers are biologically associated with inanimate pathways



Detection Capability (RingIR)

Pest detection

Phase 1 of this project confirmed that the RingIR technology can detect all 3 fumigants of concern - methyl bromide, sulfuryl fluoride and phosphine.

Phase 2 has commenced and is split into 2 sub-projects.

The first project aimed to develop a portable prototype to detect all 3 fumigants that could be trialed in our operations.

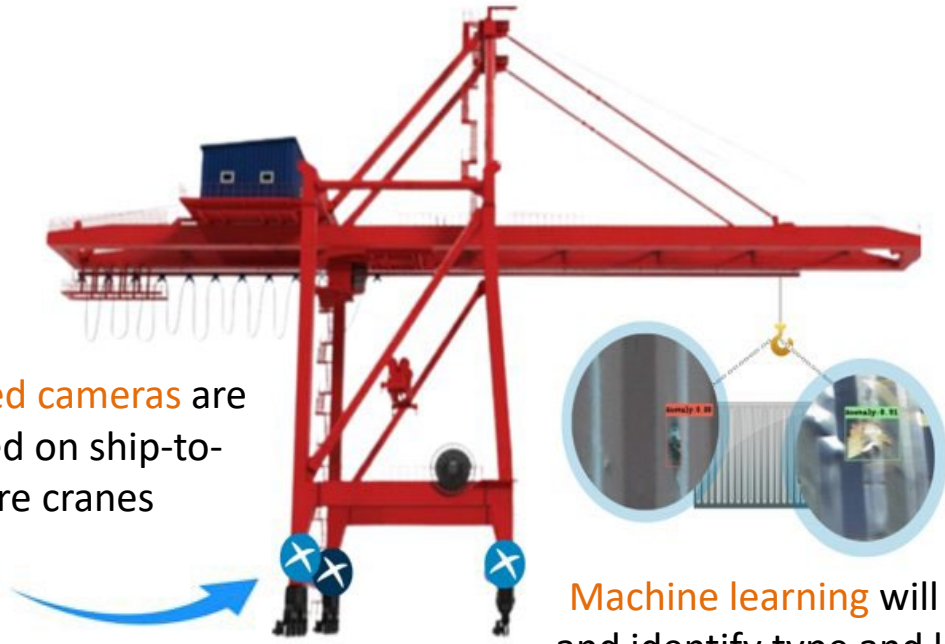
The second project aims to test whether RingIR technology can be expanded to identify hitchhiker pests associated with containers.

Biosecurity Automated Threat Detection System

Trialing a camera system (BATDS) installed on ship-to-shore cranes to improve our surveillance capability at container ports.

The system combines automated cameras and real-time machine learning to scan the external surfaces of sea containers for pests and contaminants as they are discharged from cargo ships.

Early detections of exotic pests at the border provides greater protection and capacity to respond to immediate biosecurity threats.



Automated cameras are mounted on ship-to-shore cranes

Machine learning will detect and identify type and location of biosecurity risks

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Thank you

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