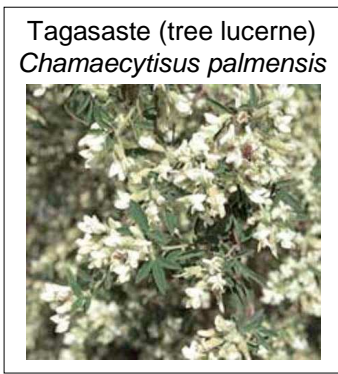




# The Atlas of Living Australia

**Challenges and Opportunities  
for Managing Biodiversity  
Information**

# Biodiversity information



Parasitises

Preys upon

Feeds upon

*Uresiphita ornithopteralis* (Guenée, 1854)

= *Mecyna ornithopteralis* Guenée, 1854

English: tree lucerne moth

Identified as

Kingdom: Animalia  
Phylum: Arthropoda  
Class: Insecta  
Order: Lepidoptera  
Family: Crambidae  
Subfamily: Pyraustinae  
Tribe: Pyraustini  
Genus: *Uresiphita* Hübner, 1825

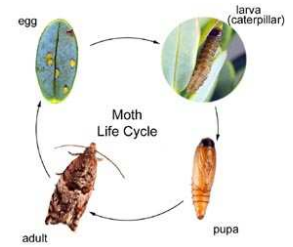
Molecular biology

Locality: Reid, ACT  
GPS: 35.280S 149.138E  
Date: 1 January 2008

Distribution

Biology and ecology

Fact sheets



**PestWeb**  
**Crop Insects**

**NEW SEARCH**

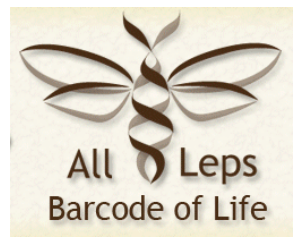
**Tree lucerne moth**  
*Uresiphita ornithopteralis*

**Description**  
This species has a fringe of sparse hairs, and grows to 30 mm long. The head is pale brown through to a shiny light brown, and thorax is a black color with three white stripes. The body is light green with a yellow and white line just above the legs on each side. Above this there is a pale band made up of black blotches on each segment. Each leg is long and long hairs arising from it, and also has one or two white spots. Three pairs of dark legs at the base are followed by four pairs of green 'feet'. They are similar in color to the other legs but are thicker, much more sparsely webbed. The moth has a distinct 'head' at rest with wings folded. It is about 20 mm long, and 30 mm across with its wings spread. The forewings are dark grey-brown with a white line towards the fore edge. On the hindwings there are light brown bands where the wing scales have been rubbed off. The hind wings are orange-brown with a broad dark brown margin. The underbody is mostly white, with a white face and coiled feeding tube. Moths have been caught in light traps from early spring to late autumn.

**Life cycle**  
Details are uncertain, but it appears that moths are active throughout the year, with most activity in the warmer months. Eggs are laid on the tips of twigs, and the young caterpillars are somewhat gregarious. They pupate after three to five weeks, and emerge as moths four to eight weeks later.

**Damage**  
Caterpillars of the tree lucerne moth can completely defoliate tagasaste (tree lucerne), perennial lucerne, and some native leguminous shrubs such as honey loc, lavender, heath and similar shrubs, and some native leguminous shrubs such as honey loc, lavender, heath and similar shrubs are unlikely to be killed, but plants less than a year old may be at risk. The insect is not commonly reported, probably because, until recently, most tagasaste has been planted in commercial plantations in semi-arid, irrigated farm settings. In order to aid conservation and provide more extensive opportunities for tree lucerne moth, land by greater production may be significant, and will depend on how tagasaste is used on farms.

**Control**  
There are no registered insecticides, but chemical control can be effective. Harvesting or grazing sheep when caterpillars are small may be the most control. Control methods to prevent defoliation in young plants will have to be determined in trials.



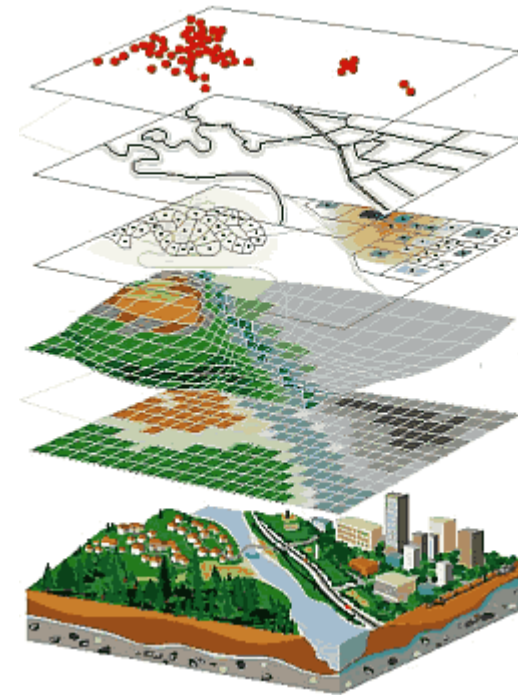
# Uses: Biosecurity

- Questions
  - What is this organism?
  - What does it eat?
  - Does it carry disease?
  - Could it spread in Australia?
  - How can it be controlled?
- Information needed
  - Names and classification
  - Identification keys
  - Images
  - Distribution data
  - Food webs
  - Literature (biology and control)



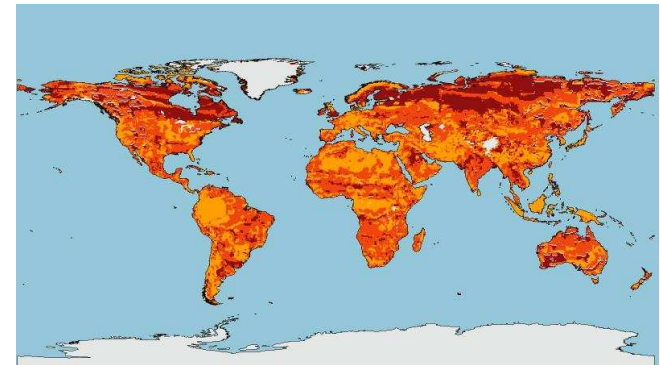
# Uses: Land-use planning

- Questions
  - What species are found here?
  - Are they threatened?
  - What are their needs?
  - How can impacts be minimised?
  - How can habitats be restored?
- Information needed
  - Names and classification
  - Distribution data
  - Food webs
  - Literature (biology and control)



# Uses: Conservation and climate change

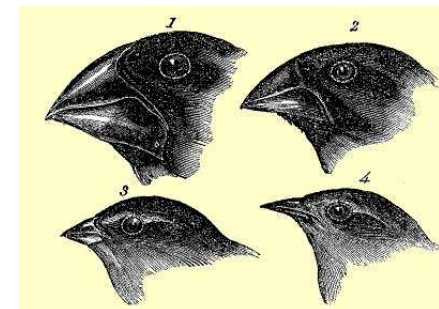
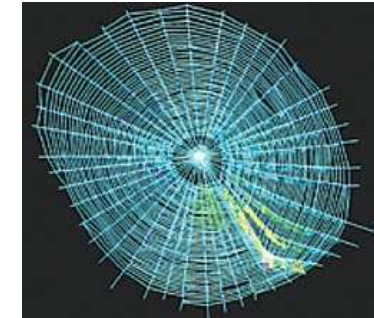
- Questions
  - Which species will be affected?
  - How will their ranges be affected?
  - Can they colonise more favourable regions?
  - Will pest species benefit?
- Information needed
  - Names and classification
  - Climate change models
  - Distribution data
  - Environmental niche models
  - Food webs
  - Literature (conservation and biology)





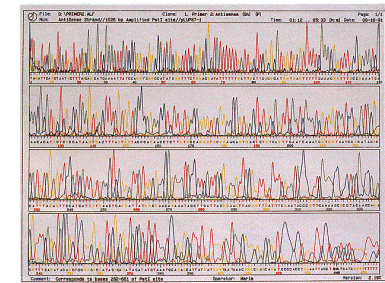
# Other uses

- Crop improvement
- Sustainable use
- Health and medicine
- Biomaterials
- Forensics
- Taxonomy

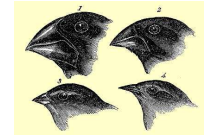
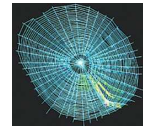
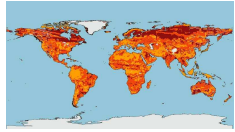
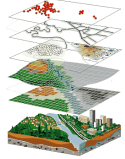


# Sources of biodiversity information

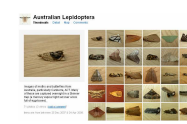
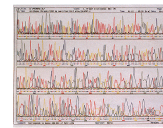
- Natural history collections and herbaria
- Living collections
- Field studies
- Literature
- Molecular research
- Images and multimedia
- Experts



# Making information available to users



**ALA**  
ATLAS OF LIVING AUSTRALIA



**ALA**

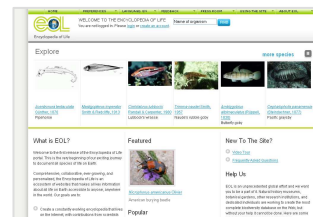
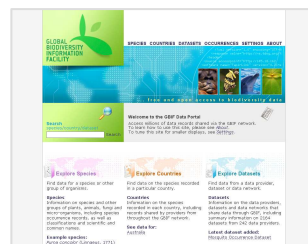
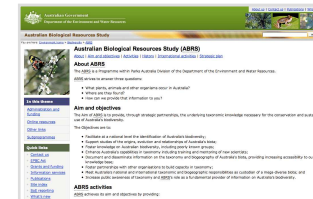


# Atlas of Living Australia

- Government-funded (NCRIS) project to June 2011
- Mission:
  - To develop an authoritative, freely accessible, distributed and federated biodiversity data management system that links Australia's biological knowledge with its scientific reference collections and other custodians of biological information
- Participants
  - CSIRO
  - The Australian Museum
  - Museum Victoria
  - Queensland Museum
  - The Tasmanian Museum and Art Gallery
  - Southern Cross University
  - The University of Adelaide
  - DAFF
  - DEWHA
  - CHAH
  - CHAFC
  - CHAEC
  - AMRRN

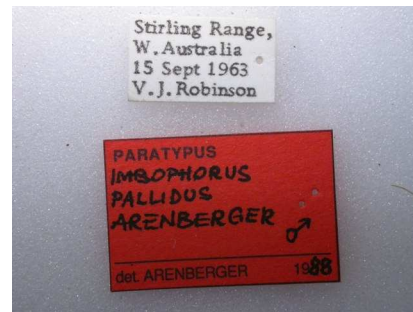
# Timing of Atlas

- Builds on other national and global projects
  - Australian Virtual Herbarium
  - Online Zoological Collections of Australian Museums
  - Australian Biological Resources Study
  - Global Biodiversity Information Facility
  - Oceanographic Biogeographic Information System
  - Encyclopedia of Life
  - Many more



# Challenges: Digitising information

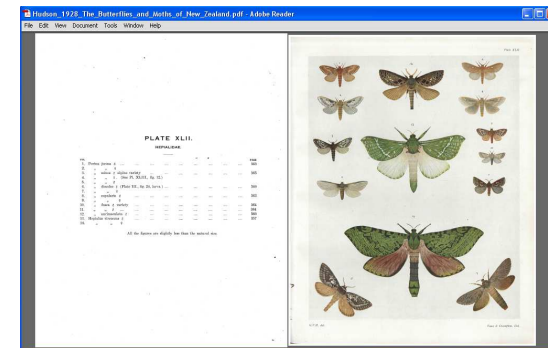
- Important information in non-digital forms:
  - History of printed descriptions and other literature
  - Specimen labels (estimated 1.5 billion globally)
  - Field notebooks
- Many millions of dollars required to make all of this information fully accessible
- Work shared with GBIF and other projects



ScientificName:	<i>Imbophorus pallidus</i>
Family:	Pterophoridae
Locality:	Stirling Range
State:	WA
DateCollected:	1963-09-15
Latitude:	-34.3
Longitude:	118.0
CoordinatePrecision:	10000
CoordinateMethod:	Google Earth
TypeStatus:	Paratypus

# Challenges: Digitising literature

- An example:
  - BUGS - Bibliography of New Zealand terrestrial invertebrates 1775-1985
  - BUGZ online  
<http://entdocs.landcareresearch.co.nz>
  - Scanned entomological literature
  - Searchable text
  - Downloadable PDFs
- Result:
  - A significant body of literature more accessible and better managed than ever before



ALA

# Challenges: Standardising data

- Need structured data for machine use
- Need agreed standard data elements
  - ScientificName
  - DecimalLatitude, Decimal Longitude
  - CoordinatePrecision
- Need standard formats for data values
  - New South Wales vs. NSW vs. N.S.W.
  - Australia vs. Australien vs. AU
  - 2008-05-15 vs. 05/15/2008 vs. 15 May 2008
  - Specimen vs. S vs. Voucher
- Standards allow data to be combined and reused
- Biodiversity Information Standards (TDWG)

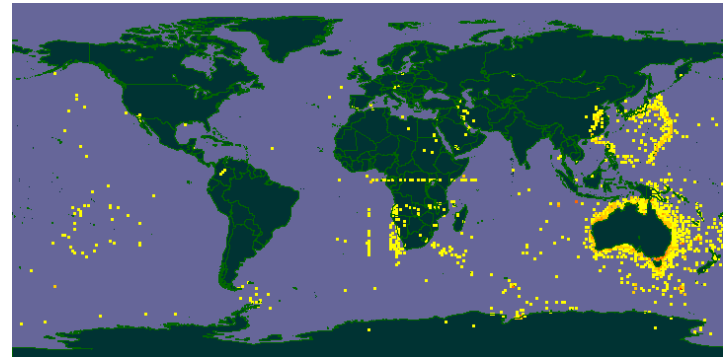
Biodiversity  
Information  
Standards  
TDWG

ALA



# Challenges: Detecting errors

- Misspellings:
  - *Ornithorynchus* or *Ornithorhynchus*?
  - Mount Tambourine or Mount Tamborine?
- Coordinate problems:
  - Positive values for South or West
  - Latitude and Longitude transposed
  - Coordinates not near Locality
  - Unknown precision
- Other issues:
  - Same record shared through different routes
  - Missing information on collecting strategy



# Challenges: Handling taxonomy

- 250-year history of seeking to interpret biodiversity
- Many names for the same species
  - *Ornithorhynchus anatinus* vs. *Ornithorhynchus paradoxus*
  - Species described more than once
  - Species moved to new genus
  - Split into multiple species concepts
  - Merge into one species concepts
- Common names
- Alternative opinions on higher classification
- Result:
  - Related information found under different names



# Developing the ALA

- User needs analysis
  - Document how users find biodiversity information today
- Collaborative software development
  - Reuse code from GBIF data portal
  - Share components with Encyclopedia of Life, OBIS, etc.
  - Develop taxonomic tools with ABRS and ANBG
- Work with other Australian infrastructure projects
  - NCRIS Platforms for Collaboration
  - NCRIS Australian Phenomics Network
  - NCRIS Australian Plant Phenomics Network
  - NCRIS Australian Biosecurity Information Network
- Start with general purpose tools
  - In future develop portals for specific user groups

# ALA: Metadata Repository

- Metadata: information about data resources
- Describe all relevant resources, including:
  - Collection databases
  - Ecological and observational databases
  - Images and image libraries
  - Online bibliographies and literature
  - Sequence data
  - International networks
- Metadata includes:
  - Description
  - Ownership and access details
  - Terms from vocabularies, gazetteers, ontologies...

<b>Title</b>	Australian National Insect Collection	
<b>Access point</b>	<a href="http://anic.entom.csiro.au/tapirlink/www/tapir.php/anic/">http://anic.entom.csiro.au/tapirlink/www/tapir.php/anic/</a>	
<b>Description</b>	The world's largest collection of Australian insects and related organisms.	
<b>Language</b>	English	
<b>Subject</b>	Australia, insects, ANIC	
<b>Rights</b>	Source of data should be cited where possible	
<b>Created</b>	2007-08-07T06:25:49	
<b>Modified</b>	2008-05-15T09:31:06	
<b>Institution</b>	<b>Role</b>	Technical host
	<b>Identifier</b>	ANIC
	<b>Name</b>	Australian National Insect Collection, CSIRO Entomology
	<b>Address</b>	Canberra, Australia
	<b>Related information</b>	<a href="http://anic.entom.csiro.au/">http://anic.entom.csiro.au/</a>
<b>Contact</b>	<b>Role</b>	Data administrator
	<b>Full name</b>	Steve Shattuck
	<b>Title</b>	Research Scientist
	<b>Telephone</b>	+61 2 6246 4273
	<b>Email</b>	<a href="mailto:steve.shattuck@csiro.au">steve.shattuck@csiro.au</a>

# ALA: Taxonomic authorities

- Australian authority lists:
  - APNI – Australian Plant Name Index
  - APC – Australian Plant Census
  - AFD – Australian Faunal Directory
- International projects:
  - International Plant Name Index
  - Index Fungorum
  - ZooBank
  - Catalogue of Life
  - World Register of Marine Species
- Other checklists:
  - Red lists, CITES, regional species lists, new taxonomic revisions
- Build tools to bring these resources together



# ALA: “Yellow Pages” for species

- Pages for every species (and higher taxon)
  - Links to all information resources
  - Organised by major category
  - Image thumbnails
  - Literature links
  - Links to GIS mapping
- Dynamically generated from index of data
- Provide links to original resources
- Web services
  - Allow other sites to embed ALA content


**Latrodectus hasselti**

**Wikipedia**  
The Redback spider (*Latrodectus hasselti*) is a potentially dangerous spider native to Australia. It resembles a Black widow spider. It is a member of the genus *Latrodectus* of the widow family of spiders, which are found throughout the world. The female is easily recognisable by its black body with prominent red stripes on its abdomen. Females have a body length of about a centimetre while the male is smaller, being only 3 to 4 millimetres long. The Redback spider is one of few animals which display sexual cannibalism while mating. Redbacks are considered one of the most dangerous spiders in...


Original article

**Genomics from NCBI**  
TaxId: 256736 *Latrodectus hasselti* "redback spider" [Spiders] Sequences: 23 nucleotide, 14 protein  
Global Biodiversity Information Facility

**Map from GBIF**



**Images from Yahoo**

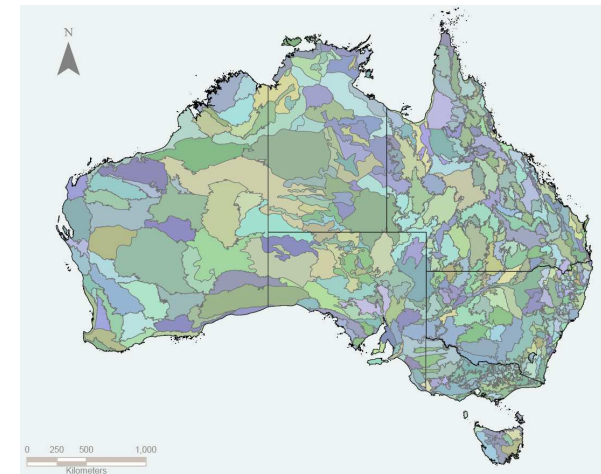


**Articles from Google**

- ... stereotyped behaviour of sexual cannibalism in *Latrodectus hasselti* Thorell (Araneae: Theridiidae), ...
- Red-back spider (*latrodectus hasselti*) antivenom prevents the toxicity of widow spider venoms
- ... evidence for the efficacy of Australian red-back spider (*Latrodectus hasselti*) antivenom in the ...
- The Australian redback spider (*Latrodectus hasselti*): its introduction and potential for ...
- Postembryonic development of *Latrodectus hasselti* Thorell (Araneae, Theridiidae)

# ALA: Regional biodiversity atlas

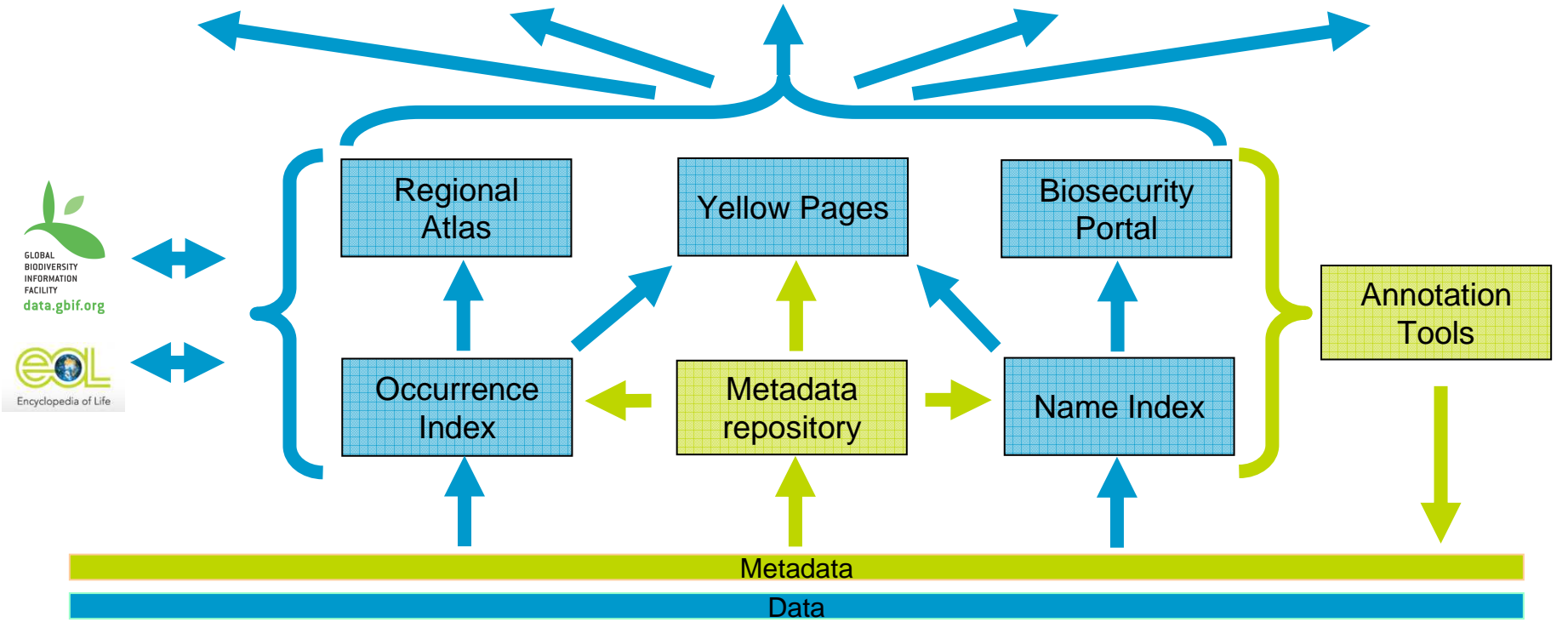
- All georeferenced data for Australian biota
  - Specimen records
  - Observations
  - Ecological data sets
- Integrated GIS layers
  - Climate, geology, soil, vegetation, etc.
- Indexed by regions
  - Local government areas
  - Water catchment areas
  - IBRA regions
  - National parks
- Fact sheets/species lists for each region



# ALA: Annotating data

- Need tools to store comments on any record
  - User-suggested errors or corrections
  - Corrections from automated validation tools
  - Comments or structured corrections
  - Links to further information
  - Responses from data providers (conversation threads)
- Services to retrieve comments via record identifier
- Allow any tool or web site to see comments
- Allow data providers to import comments

# ALA: Putting it all together



ALA

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Director, Atlas of Living Australia

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Email: [Donald.Hobern@csiro.au](mailto:Donald.Hobern@csiro.au)  
Web: <http://www.ala.org.au/>

Thank you

ALA