

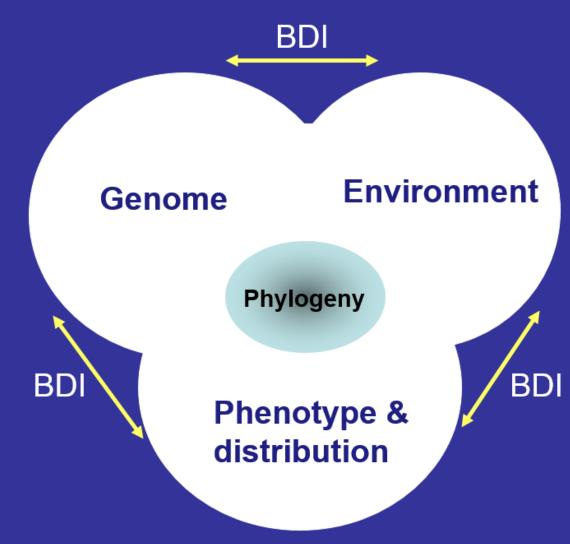
Biodiversity discovery, documentation and analysis in the digital era



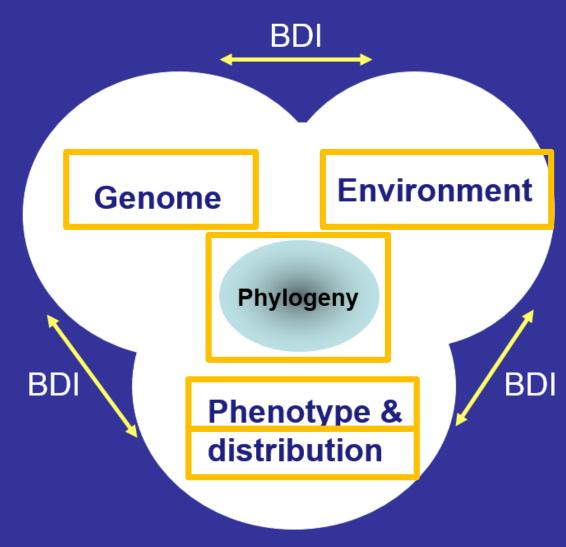
John La Salle



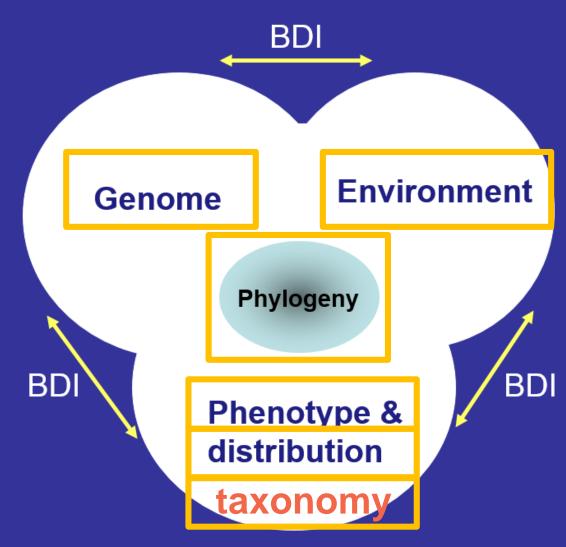
- Discovering and understanding biodiversity
- Incorporating evolutionary dynamics
- Protecting diversity in a changing world
- Sharing knowledge



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# ALA – sharing biodiversity knowledge





## \$50 million investment

NCRIS
National Research
Infrastructure for Australia
An Australian Government Initiative

Leverage the investment



A world-leading collaborative e-infrastructure integral to growing biodiversity knowledge



## Partners – founding & beyond







>56 million records

>980 data sets

>444 spatial layers

>6.1 billion records downloaded



## National Research infrastructure







### Data

- specimens
- occurrence
- images, sounds
- literature
- sequences
- more coming......



Open source & open access



## System

- data capture & aggregation
- data management
- data discovery
- data visualisation
- data analysis & reporting

# ALA — open infrastructure - "Powered by ALA"





















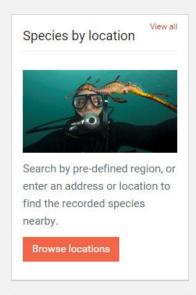
## One infrastructure - many systems



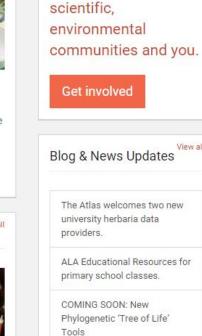
Search the Atlas ... Submit

## Explore the Atlas of Living Australia







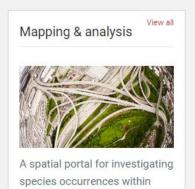


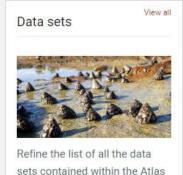
Sharing biodiversity

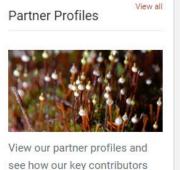
Australia's academic,

knowledge

Contributed by







s Of Living Australia Contact us Get involved ALA Apps - Search the Atlas Search

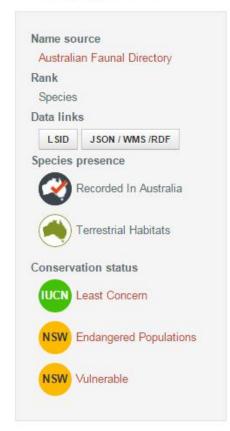
Source: Australian National Wildlife Collection

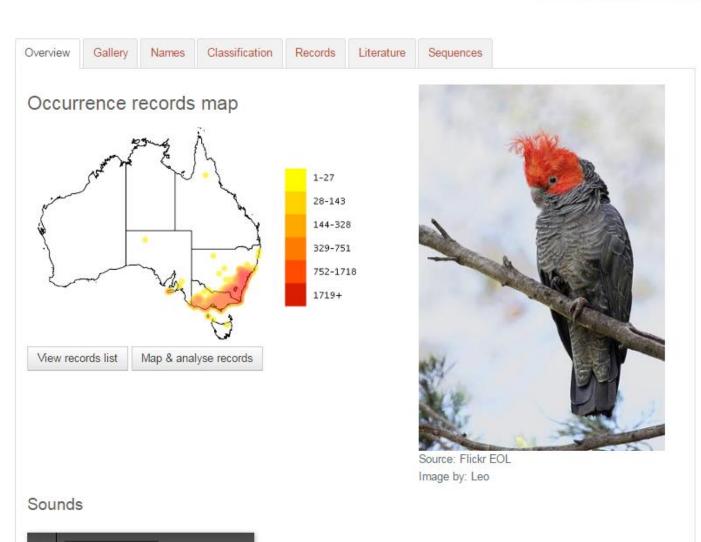
View more details of this audio

Home → Australia's species → Callocephalon fimbriatum

# Callocephalon fimbriatum (Grant, 1803)

## Gang-gang Cockatoo





Record a sighting

Alerts A

# Explore by pre-defined region



Pre-defined regions include states and territories, local government areas, biogeographic regions, marine regions, management regions and more. Explore regions

# Explore by address or location



Simply enter an address or location to find the recorded species nearby. You can set the size of the search area and download the results.

Explore your area

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Contributed by Australia's academic, scientific, environmental communities and you.

Get involved

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ALA Educational Resources for primary school classes.

COMING SOON: New Phylogenetic 'Tree of Life' Tools

#### Connect with us







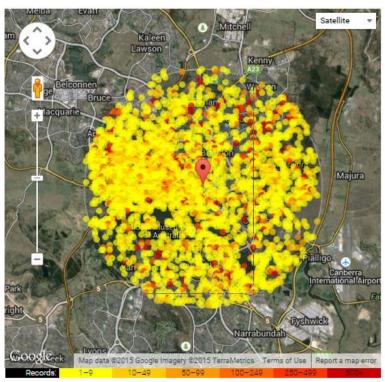
# Explore Your Area

Enter your location or address:

50 marcus clarke street canberra Search E.g. a street address, place name, postcode or GPS coordinates (as lat, long)

Showing records for 50 Marcus Clarke Street, Canberra ACT 2601, Australia Display records in a 5 ▼ km radius ₩ View all records Downloads

Group	Species		Species : Common Name	Red	cords
All Species	6733	1.	ARCTIINAE	1	-
Animals	2077	2.	Abelia x grandiflora	1	
Mammals	39	3.	Abelmoschus ficulneus: Native Rosella	1	
Birds	376	4.	Abelmoschus moschatus subsp. tuberosus: Native Rosella	2	
Reptiles	36	5.	Abutilon theophrasti: Chigma Lantern	1	
Amphibians	11	6.	Acacia acinacea: Gold-dust Acacia	4	
Fish	5	7.	Acacia acuminata: Jam Wattle	2	
Molluscs	9	8.	Acacia adsurgens: Whipstick Wattle	1	
Arthropods	1598	9.	Acacia adunca : Cascade Wattle	6	
Crustaceans	1	10.	Acacia aestivalis	1	
Insects	1550	11.	Acacia alata var. biglandulosa	1	
Plants	4146	12.	Acacia alcockii : Alcock's Wattle	1	
Bryophytes	49	13.	Acacia amblyophylla	1	
Gymnosperms	42	14.	Acacia amoena : Boomerang Wattle	1	
FernsAndAllies	107	15.	Acacia ampliceps : Jila Jila Bush	1	
Angiosperms	3845	16.	Acacia anceps	1	
Monocots	765	17.	Acacia andrewsii	1	
Dicots	3080	18.	Acacia aneura var. microcarpa: Mulga	1	
Fungi	155	19.	Acacia aneura : Mulga	1	
Chromista	2	20.	Acacia anthochaera : Kimberly's Wattle	1	
Protozoa	20	21.	Acacia aphylla: Leafless Rock Wattle	1	
Bacteria	0		Acacia argyrophylla: Silver Mulga	1	
Algae	0	23.	Acacia ashbyae	1	*



Tips: you can fine-tune the location of the area by dragging the red marker icon

Home → Locations → Your Area

## Explore Your Area

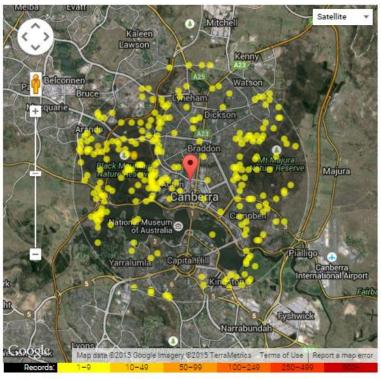
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50 marcus clarke street canberra Search

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#### Showing records for: 50 Marcus Clarke Street, Canberra ACT 2601, Australia

Group	Species		Species : Common Name	Rece	ords
All Species	6732	1.	Amphibolurus muricatus: Jacky Lizard	15	orus
Animals	2077	2.	Austrelaps superbus: Lowland Copperhead	10	_
Mammals	39	3.	Chelodina (Chelodina) longicollis: Eastern Snake-necked	17	
		٥.	Turtle	11.6	-
Reptiles	36	4.	Christinus marmoratus: Marbled Gecko	9	
Amphibians	11	5	Ctenatus robustus: Robust Ctenatus	2	
Fish	5	6.	N 100 N 1	5	
Molluscs	9	7	Delma impar: Striped Legless Lizard	2	
Arthropods	1598	8.		13	
Crustaceans	1	9.	Diplodactylus vittatus : Eastern Stone Gecko	2	
Insects	1550	10.	Drysdalia coronoides: White-lipped Snake	1	
Plants	4146	11.	Egernia cunninghami: Cunningham's Skink	11	
Bryophytes	49		Eulamprus quoyii : Eastern Water-skink	2	
Gymnosperms	42		Hemiergis decresiensis: Three-toed Earless Skink	26	
FernsAndAllies	107		Intellagama lesueurii howitti	3	
Angiosperms	3845		Intellagama lesueurii lesueurii : Water Dragon	2	
Monocots	765		Intellagama lesueurii: Eastern Water Dragon	41	
Dicots	3080	17.	Lampropholis delicata: Dark-flecked Garden Sunskink	65	
Fungi	154		Lampropholis guichenoti: Pale-flecked Garden Sunskink	1	
Chromista	2		Lialis burtonis: Burton's Snake-lizard	1	
Protozoa	20	20.	Morethia boulengeri: Boulenger's Snake-eyed Skink	5	
Bacteria	0		Notechis scutatus: Tiger Snake	4	
Algae	0	22	Parasuta dwyeri: Dwyer's Snake	2	



Tips: you can fine-tune the location of the area by dragging the red marker icon

## Explore Your Area

Enter your location or address:

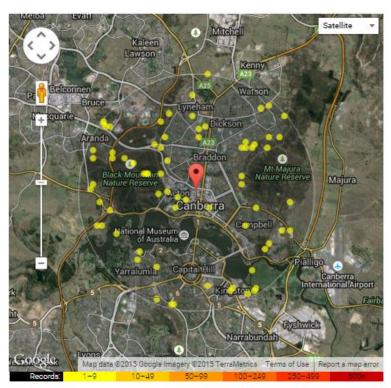
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#### Showing records for: 50 Marcus Clarke Street, Canberra ACT 2601, Australia

Display records in a c v km radius Way selected records O Downloads

Group	Species	Species : Common Name	Recor
All Species 6732 Animals 2077 Mammals 39 Birds 376 Reptiles 36 Amphibians 11 Fish 5 Molluscs 9 Arthropods 1598 Crustaceans 1 Insects 1550 Plants 4146	6732 2077 39 376 <b>36</b> 11 5 9 1598 1 1550 4146	13. Hemiergis decresiensis: Three-toed Earless Skink 14. Intellagama lesueurii howitti 15. Intellagama lesueurii lesueurii: Water Dragon 16. Intellagama lesueurii: Eastern Water Dragon 17. Lampropholis delicata: Dark-flecked Garden Sunskink 18. Lampropholis guichenoti: Pale-flecked Garden Sunskink 19. Lialis burtonis: Burton's Snake-lizard 20. Morethia boulengeri: Boulenger's Snake-eyed Skink 21. Notechis scutatus: Tiger Snake 22. Parasuta dwyeri: Dwyer's Snake 23. Pogona barbata: Eastern Bearded Dragon 24. Pseudechis porphyriacus: Red-bellied Black Snake	26 3 2 41 65 1 1 5 4 2 53 15
Bryophytes Gymnosperms FernsAndAllies	49 42 107	26. <i>Pseudonaja textilis</i> : Eastern Brown Snake  species profile   light of records	87
Angiosperms Monocots Dicots Fungi Chromista Protozoa Bacteria Algae	3845 765 3080 154 2 20 0	27. Ramphotyphilops higrescens: blackish blind shake 28. Saproscincus mustelinus: Weasel Skink 29. Tiliqua nigrolutea: Blotched Blue-tongue 30. Tiliqua rugosa rugosa 31. Tiliqua rugosa: Bobtail 32. Tiliqua scincoides scincoides: Common Blue-tongue 33. Tiliqua scincoides: Eastern Blue-tongue 34. Tympanocryptis pinguicolla: Grassland Earless Dragon	1 5 5 1 1 59



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# Explore Your Area

Enter your location or address:

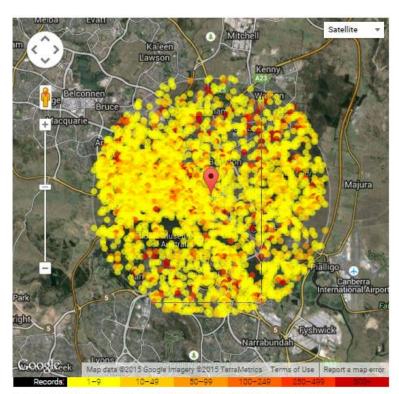
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Protozoa	20	21. Acacia aphylla: Leafless Rock Wattle	1
Bacteria	0	22. Acacia argyrophylla: Silver Mulga	1
Algae	0	23. Acacia ashbyae	1



Tips: you can fine-tune the location of the area by dragging the red marker icon

Species: Vittadinia gracilia I Woolly New Holland Daiey - Date: 2014-12-29 State: Australian Capital Tarritons

Janet Russell (56)

John La Salle (40)

View record

## Occurrence records

Customise filters \*

Narrow your results Taxonomic Geospatial Uncertainty (in metres) less than 100 (479.855) between 100 and 500 (48.722). between 500 and 1000 (26.414) between 1000 and 5000 (4.833)

choose more.. Sensitive Generalised (14)

no choose more State conservation

Endangered (2,442)

Location ID

1 (61)

10 (538)

100 (615)

105 (3,817)

choose more...

Local Gov. Area

Unincorporated ACT (670,853)

choose more...

State/Territory

Australian Capital Territory (674,260)

choose more...

Country

Australia (674.260)

choose more...

**IBRA** 

South Eastern Highlands (674,231)

Terrestrial Vegetation Woody Trees Open

choose more..

**IMCRA** 

n/a (24,791)

choose more. Dynamic land cover

Primarily Vegetated Natural & Semi-Natural

674,263 results for [all records] - within 5.0 km of point(-35.27145,149.11092) Selected filters: Spatial filter: CIRCLE x

Мар Records Charts Record images Downloads Alerts

Institution: Centre For Australian National Biodiversity Research Collection: Australian National Herbarium Basis Of Record: Preserved Specimen Catalog Number: CANB:CANB 873558.1

View record

Species: Isolepis sepulcralis Date: 2011-02-01 State: Australian Capital Territory

Institution: Centre For Australian National Biodiversity Research Collection: Australian National Herbarium Basis Of Record: Preserved Specimen Catalog Number: CANB:CANB 873559.1 View record

per page: 20 ▼ sort: Date added

Advanced search Quick search

▼ order: Descending ▼

Species: Eragrostis brownii | Brown love grass Date: 2011-02-01 State: Australian Capital Territory

Species: Juncus planifolius | Broad Leaved Rush Date: 2011-02-01 State: Australian Capital Territory

Institution: Centre For Australian National Biodiversity Research Collection: Australian National Herbarium Basis Of Record: Preserved Specimen Catalog Number: CANB:CANB 873560.1 View record

Species: Cyperus sanguinolentus | Flat-sedge Date: 2011-02-01 State: Australian Capital Territory

Institution: Centre For Australian National Biodiversity Research Collection: Australian National Herbarium Basis Of Record: Preserved Specimen Catalog Number: CANB; CANB 873561.1

Species: Leptospermum continentale | Prickly Teatree Date: 2014-11-21 State: Australian Capital Territory

Institution: Centre For Australian National Biodiversity Research Collection: Australian National Herbarium Basis Of Record: Preserved Specimen Catalog Number: CANB:CANB 878594.1

Species: Leptospermum brevipes | Slender Tea Tree Date: 2014-11-21 State: Australian Capital Territory

Institution: Centre For Australian National Biodiversity Research Collection: Australian National Herbarium Basis Of Record: Preserved Specimen Catalog Number: CANB:CANB 878595.1 View record

Species: Festuca arundinacea | Giant Fescue Date: 2014-11-26 State: Australian Capital Territory

Institution: Centre For Australian National Biodiversity Research Collection: Australian National Herbarium Basis Of Record: Preserved Specimen Catalog Number: CANB:CANB 878600.1 View record

Species: Haloragis heterophylla | Variable raspwort" Date: 2014-11-26 State: Australian Capital Territory

Institution: Centre For Australian National Biodiversity Research Collection: Australian National Herbarium Basis Of Record: Preserved Specimen Catalog Number: CANB:CANB 878609.1

Species: Chrysocephalum semipapposum | Clustered Everlasting Date: 2014-11-26 State: Australian Capital Territory

Institution: Centre For Australian National Biodiversity Research Collection: Australian National Herbarium Basis Of Record: Preserved Specimen Catalog Number: CANB:CANB 878614.1 View record

Species: Oxalis latifolia | Fishtail Oxalis Date: 2014-12-12 State: Australian Capital Territory

Institution: Centre For Australian National Biodiversity Research Collection: Australian National Herbarium Basis Of Record: Preserved Specimen Catalog Number: CANB:CANB 878637.1 View record

Species: Cynosurus echinatus | Rough Dog's Tail Date: 2014-12-28 State: Australian Capital Territory

Institution: Centre For Australian National Biodiversity Research Collection: Australian National Herbarium Basis Of Record: Preserved Specimen Catalog Number: CANB:CANB 878655.1 View record

Species: Vittadinia muelleri | Narrow Leaf New Holland Daisy Date: 2014-12-28 State: Australian Capital Territory

Institution: Centre For Australian National Biodiversity Research Collection: Australian National Herbarium Basis Of Record: Preserved Specimen Catalog Number: CANB:CANB 878656.1 View record

Species: Vittadinia gracilis I Woolly New Holland Daisy Date: 2014-12-28 State: Australian Capital Territory

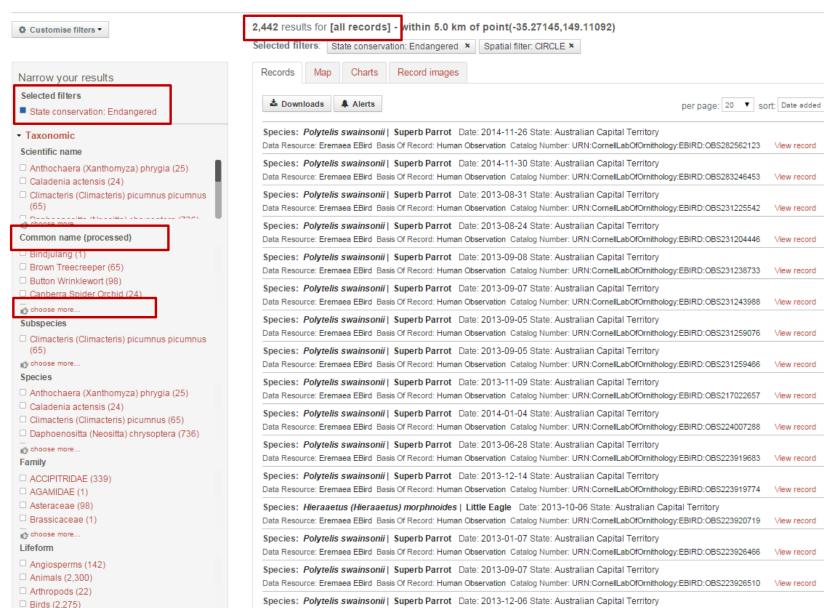
Advanced search
Quick search

▼ order: Descending ▼

### Occurrence records

choose more..

Species habitats



ocache.ala.org.au/occurrences/search?g=\*%3A\*&lat=-35.27145&lon=149.1109... Fremaea FBird Basis Of Record: Human Observation Catalog Number: URN:Cornelli abOfOrnithobox:FBIRD:OBS221804015 View record

Species: Polytelis swainsonii | Superb Parrot | Date: 2013-12-16 State: Australian Capital Territory

Data Resource: Eremaea EBird Basis Of Record: Human Observation Catalog Number: URN:CornellLabOfOrnithology:EBIRD:OBS223928034

# Explore by pre-defined region



Pre-defined regions include states and territories, local government areas, biogeographic regions, marine regions, management regions and more. Explore regions

# Explore by address or location



Simply enter an address or location to find the recorded species nearby. You can set the size of the search area and download the results.

Explore your area

# Sharing biodiversity knowledge

Contributed by Australia's academic, scientific, environmental communities and you.

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ALA Educational Resources for primary school classes.

COMING SOON: New Phylogenetic 'Tree of Life' Tools

#### Connect with us







Species

Locations

Collections

Mapping & analysis

Data sets

Blogs

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About the Atlas

Home: Locations: Regions

# Select a region to explore

Select the type of region on the left. Click a name or click on the map to select a region. Use map controls or shift-drag with your mouse to zoom the map. Click the region link to explore occurrence records, images and documents associated with the region.

Click on a region name to select an area.

N/A

Reset map

feedback





# Select a region to explore

Select the type of region on the left. Click a name or click on the map to select a region. Use map controls or shift-drag with your mouse to zoom the map. Click the region link to explore occurrence records, images and documents associated with the region.

Click on a region name to select an area.

Click on the map to select an area.

Reset map





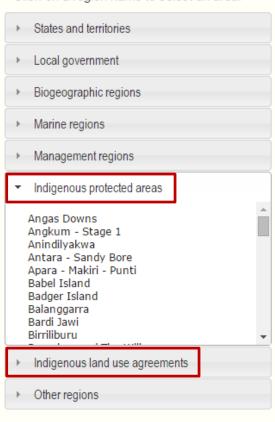
# Select a region to explore

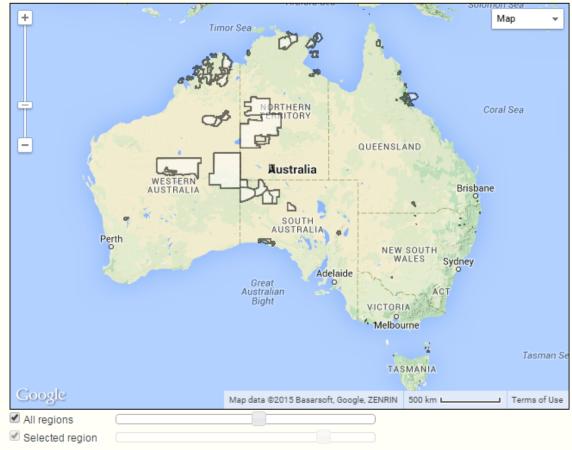
Select the type of region on the left. Click a name or click on the map to select a region. Use map controls or shift-drag with your mouse to zoom the map. Click the region link to explore occurrence records, images and documents associated with the region.

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Reset map





Species

Locations

Collections

Mapping & analysis

Data sets

Blogs

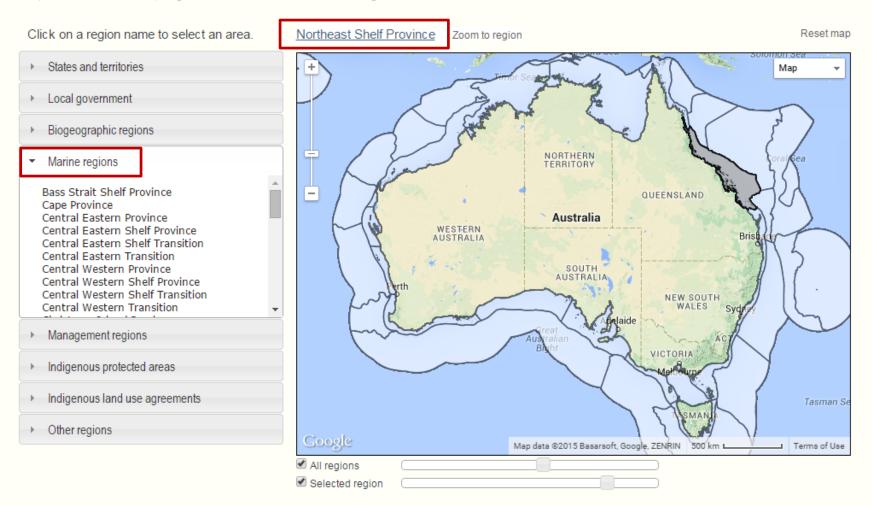
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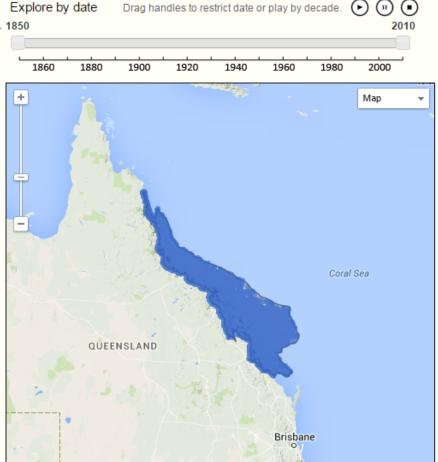


Google

## Northeast Shelf Province

## Occurrence records (472,272)





Map data ©2015 GBRMPA, Google 200 km L

Terms of Use

View all



Search for Australian flora and fauna species by common, scientific name or search by category.

Browse species



Search by pre-defined region, or enter an address or location to find the recorded species nearby.

Browse locations



Learn about the institution, the collections they hold and view records of specimens that have been databased.

Browse collections

academic, scientific, environmental communities and you.

Get involved

# Mapping & analysis



View all

A spatial portal for investigating species occurrences within specified locations and the environmental impacts.

Browse mapping

## Data sets



View all

Refine the list of all the data sets contained within the Atlas by institution, integration status, content, resource, and license.

Browse data sets

## Partner Profiles



View all

View our partner profiles and see how our key contributors help grow the Atlas of Living Australia.

Browse profiles

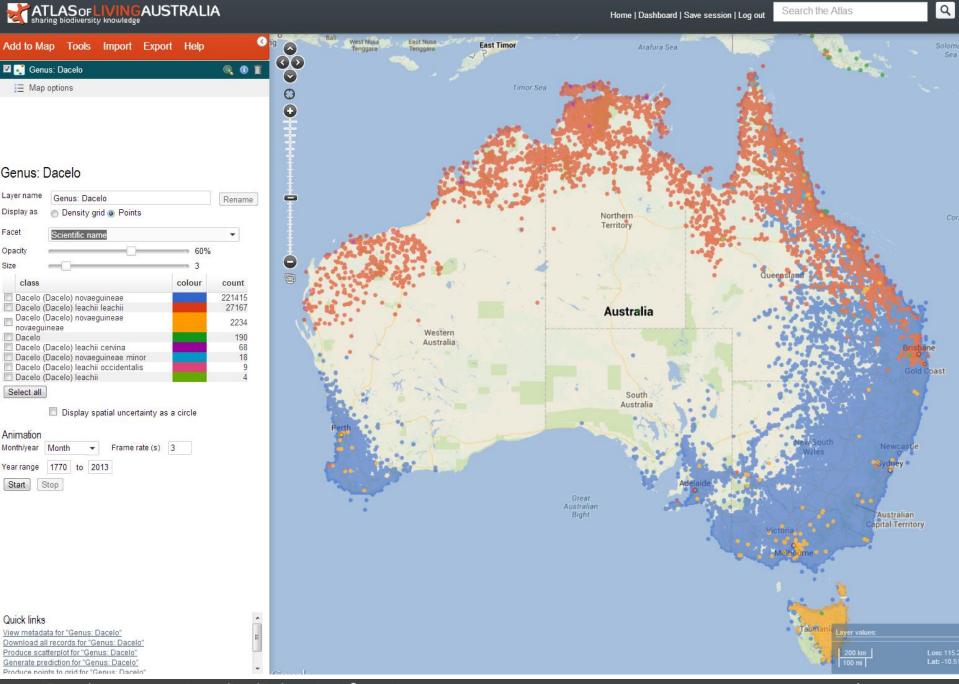
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ALA Educational Resources for primary school classes.

COMING SOON: New Phylogenetic 'Tree of Life' Tools

### Connect with us



Kakadu

National Park

Nitmiluk

National Park

**3** 

•

3f

6

Mary River

National Park

Umbrawarra

Gorge

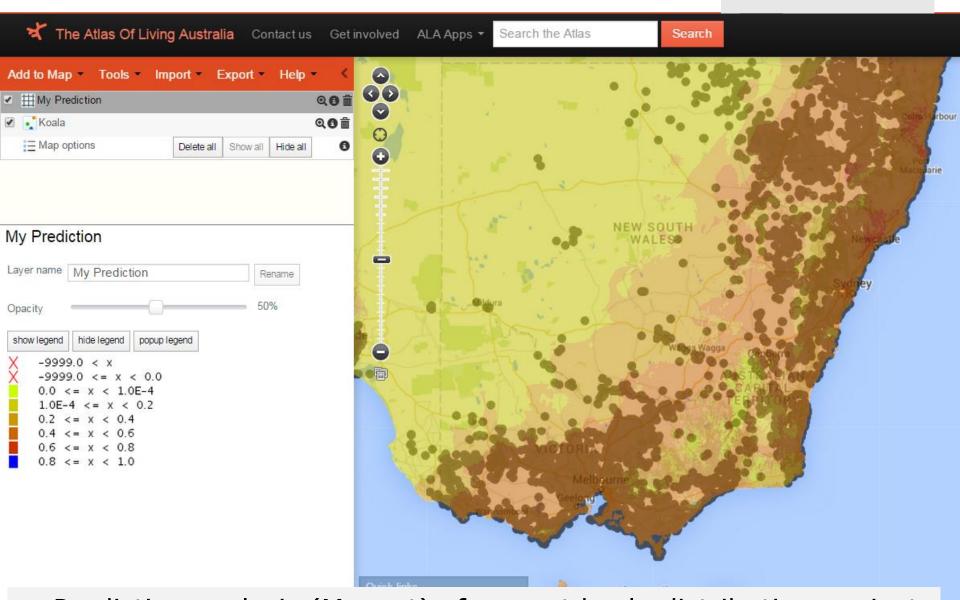
Nature Park



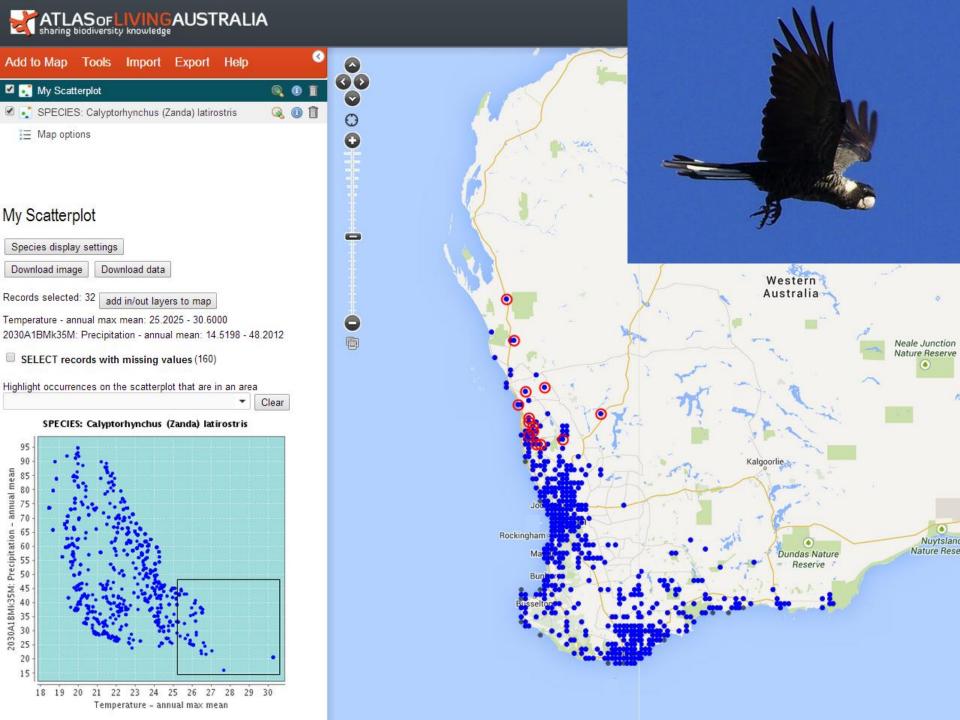
Clear selection

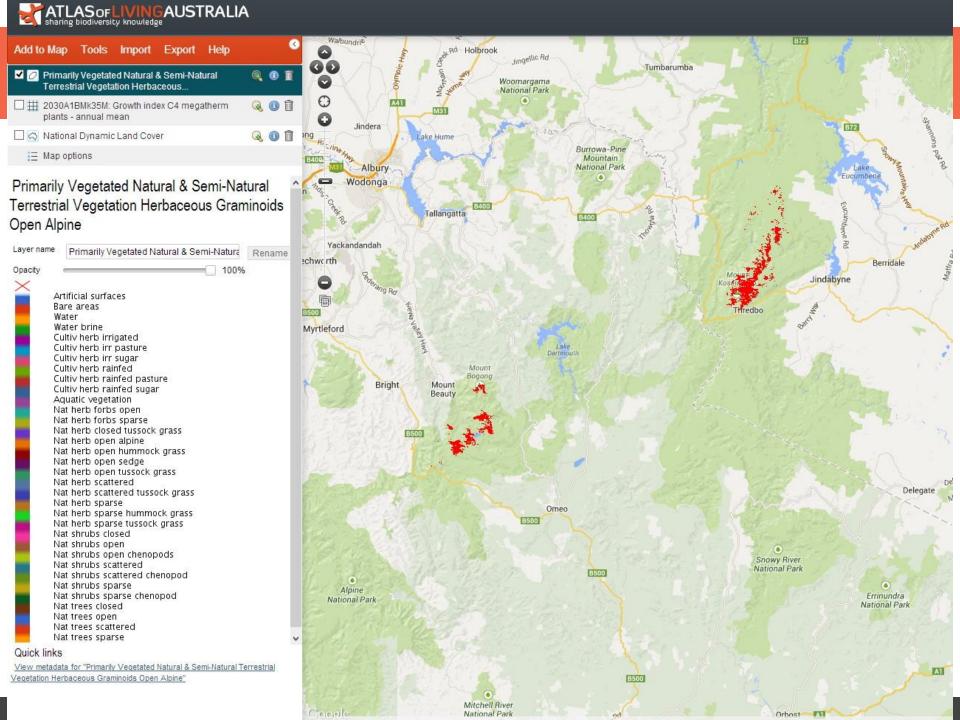
Select all

Create layer

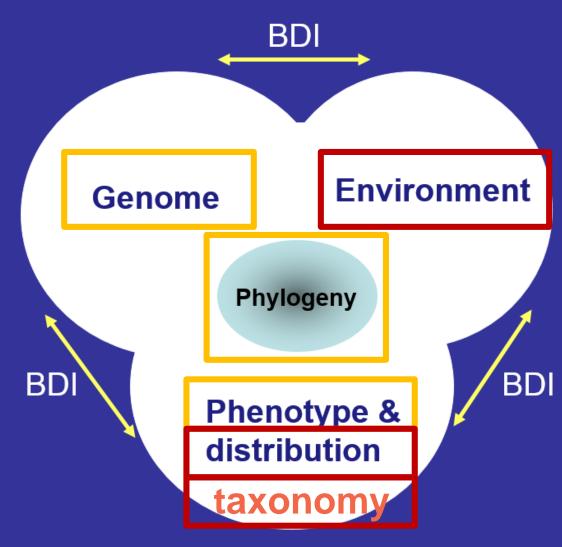


Predictive analysis (Maxent) of current koala distribution against predicted 2030 climate layers: parts of the current distribution of koala become quite marginal in years to come.





- Discovering and understanding biodiversity
- Incorporating evolutionary dynamics
- Protecting diversity in a changing world
- Sharing knowledge



# Phylolink



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## Phylolink

#### Overview

Phylolink is a collection of tools through which biodiversity can be explored from a phylogenetic (or tree of life) perspective.

At the core of these tools is the ability to easily intersect a phylogenetic tree with species occurrence records, environmental data, and species character information.

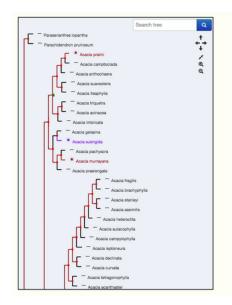
The result is powerful ways of combining data to generate flexible and customisable visualisations, profiles and metrics for biodiversity.

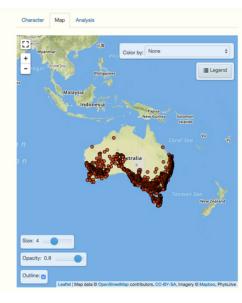
#### Otant Dhylalink

**Explore Phylogenetic Diversity** 

#### Collaborators and acknowledgement:

These tools are the result of a collaboration between scientists, the creators of PhyloJIVE and the Atlas of Living Australia. The tools have been developed by Temi Varghese, Rebecca Pirzl, Adam Collins, Nick dos Remedios and Dave Martin, with advice from Joe Miller, Craig Moritz, Dan Rosauer and Garry Jolley-Rogers.





# Phylolink



# Phylolink DOES

- Import trees
- Import characters
- Map taxa
- Select characters
- Map characters
- See environmental ranges for clades
- Look at Phylogenetic Diversity

# Phylolink DOESN'T

Create trees on the fly



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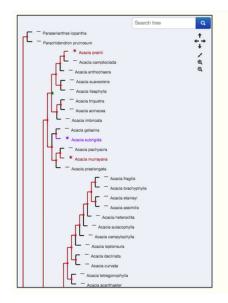
The result is powerful ways of combining data to generate flexible and customisable visualisations, profiles and metrics for biodiversity.

#### Start Phylolink

#### **Explore Phylogenetic Diversity**

#### Collaborators and acknowledgement:

These tools are the result of a collaboration between scientists, the creators of PhyloJIVE and the Atlas of Living Australia. The tools have been developed by Temi Varghese, Rebecca Pirzl, Adam Collins, Nick dos Remedios and Dave Martin, with advice from Joe Miller, Craig Moritz, Dan Rosauer and Garry Jolley-Rogers.



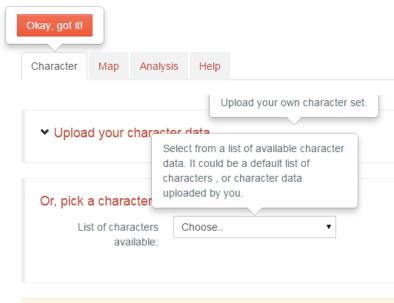


Home / Start PhyloLink / My Visualisations

## My viz #339 /

Okay, got it!



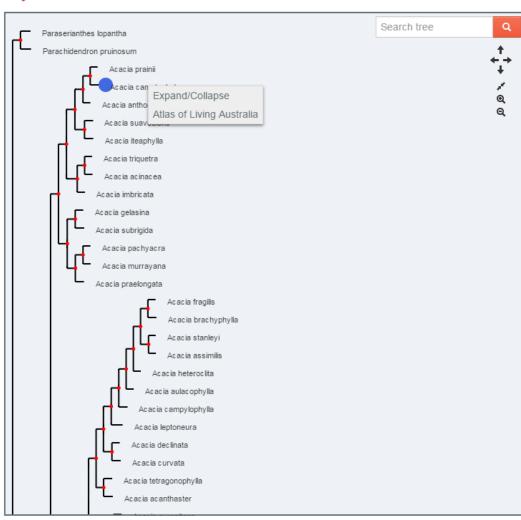


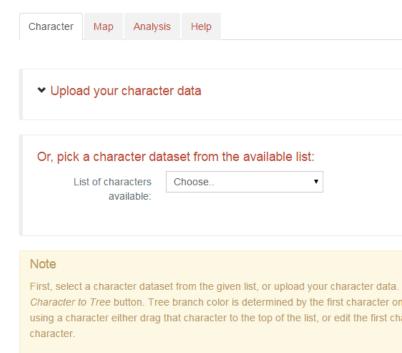
#### Note

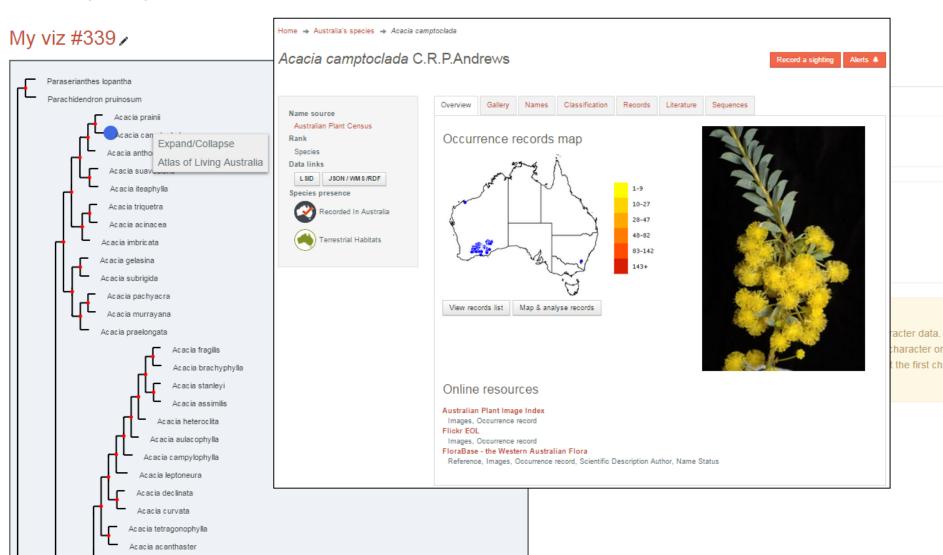
First, select a character dataset from the given list, or upload your character of *Character to Tree* button. Tree branch color is determined by the first character using a character either drag that character to the top of the list, or edit the fir character.

Contact us

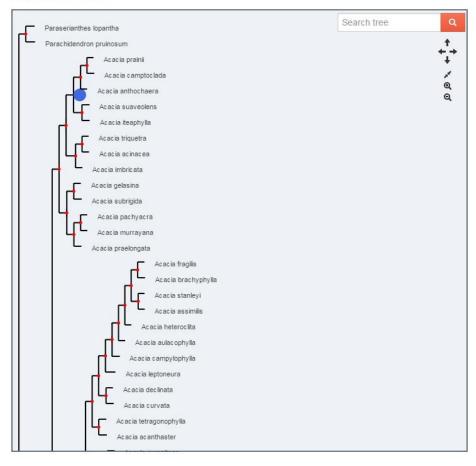
## My viz #339 /

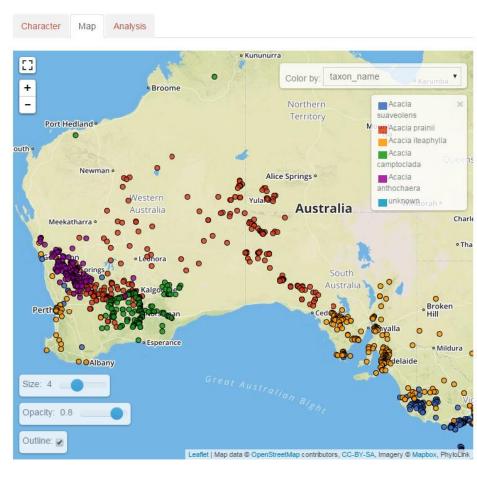






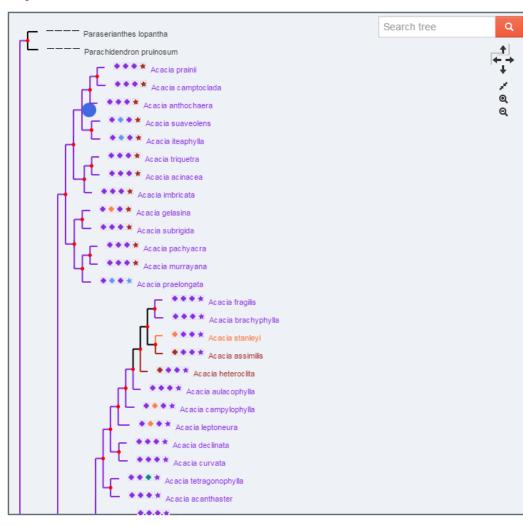
#### My viz #122

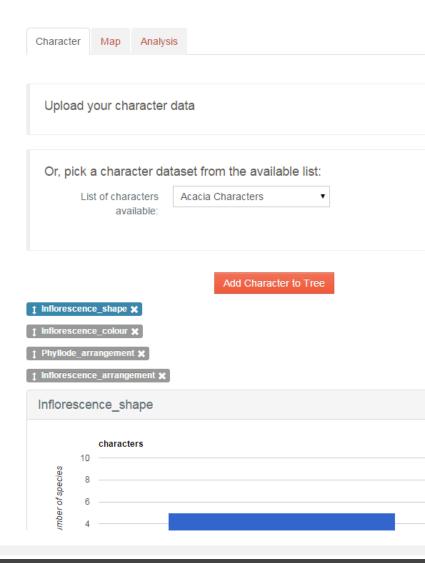




 ALA's new phylogenetic tools integrate phylogenetic trees and spatial mapping so that phylogenies can be represented spatially by, for example species occurrence or character. Here, the occurrence of Acacia species from the clade highlighted by the blue node is mapped and coloured by species.

#### My viz #122





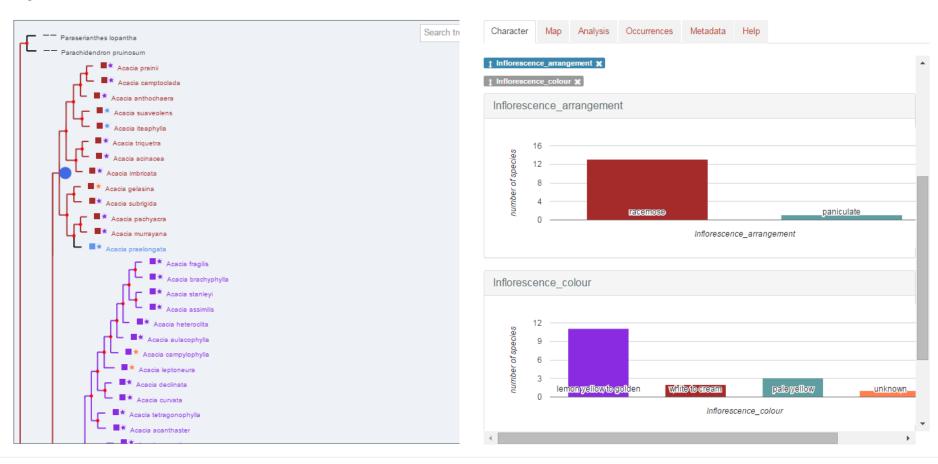
#### My viz #122



Character	Мар	Analysis	
Upload your character data			
Or, pick	a chara	cter data	set from the available list:
List of characters Acacia Characters  available:			
			Add Character to Tree
<pre>† Inflorescence_shape ★ † Inflorescence_colour ★</pre>			
† Phyllode_arrangement 🗶			
† Inflorescend	ce_arrange	ement 🗶	
Inflorescence_shape			
mber of species 9 8 001		ers	



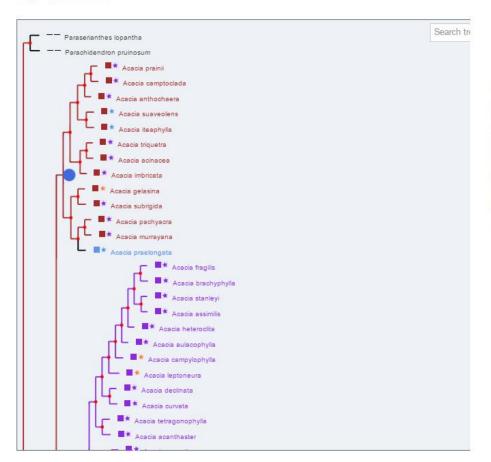
#### My viz #221

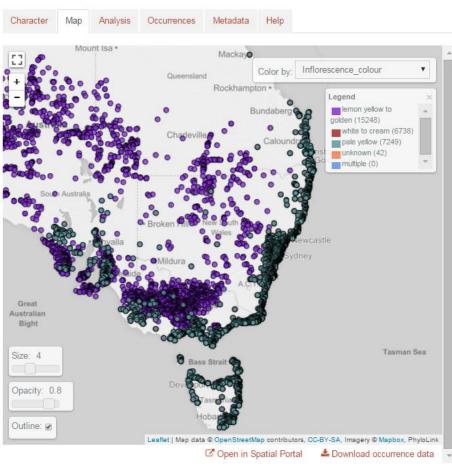


 Caption: A phylogenetic tree for Acacia is mapped with characters (inflorescence arrangement and colour), and the prevalence of those characters in the selected clade is plotted.

Atlas of Living Australia (All data) 13 taxa selected

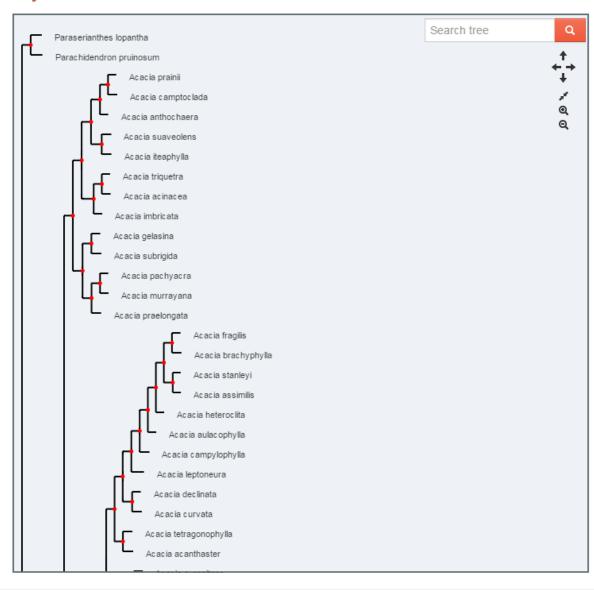
#### My viz #221





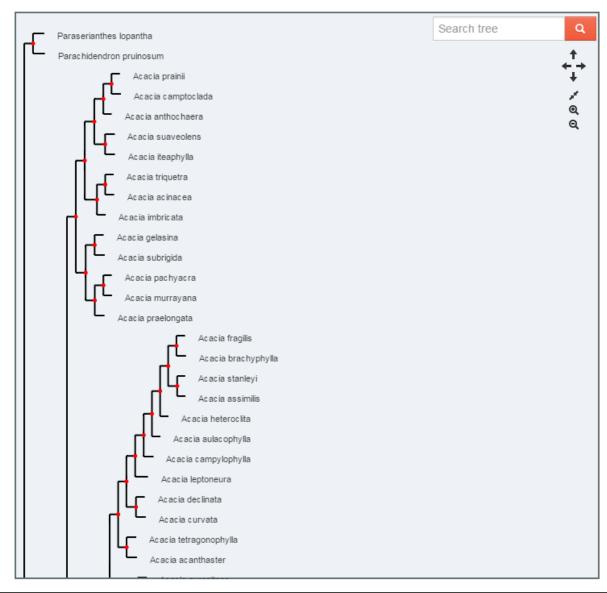
 ALA's new phylogenetic tools integrate phylogenetic trees and spatial mapping so that phylogenies can be represented spatially by, for example species occurrence or character. Here, the occurrence of Acacia species from the clade highlighted by the blue node is mapped and coloured by inflorescence colour.

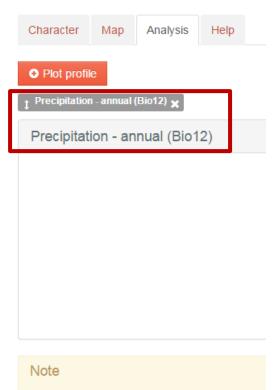
#### My viz #329 /





#### My viz #329 /





You can click on *Plot profile* button to find out t temperature etc. of a clade. You can pick the  $\epsilon$  list by typing into the input box.



The Atlas Of Living Australia Contact us

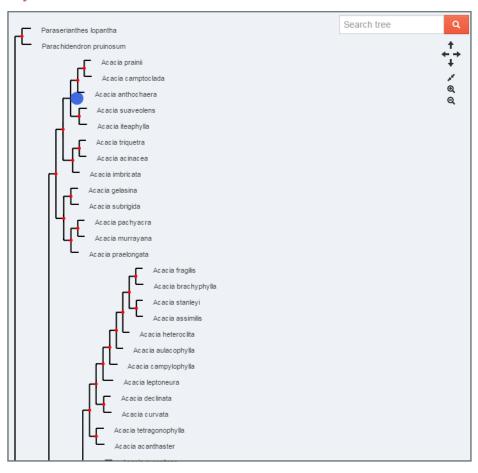
ALA Apps ▼

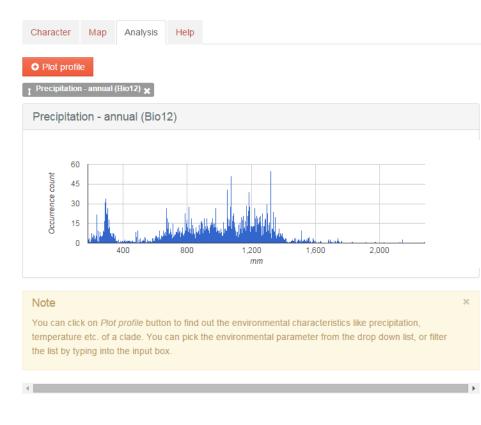
Search the Atlas

User settings

Home / Start PhyloLink / My Visualisations

#### My viz #329 /







The Atlas Of Living Australia Contact us

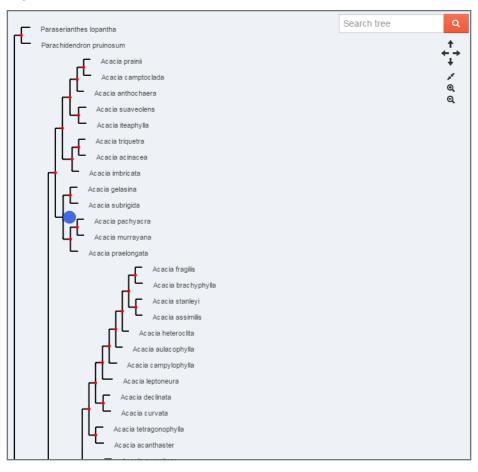
Get involved

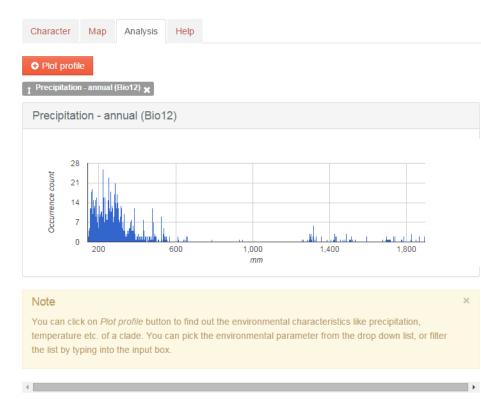
Search the Atlas ALA Apps ▼

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#### My viz #329 /

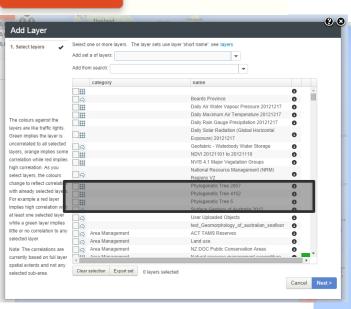






## View phylogenetic diversity (PD) gridded at a continental scale





Import ▼ Export ▼ Help ▼

Add to Map -

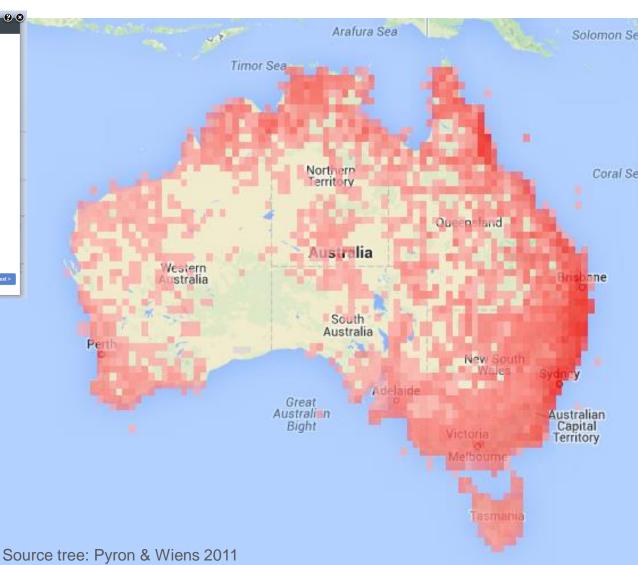
Species

Areas

Facet

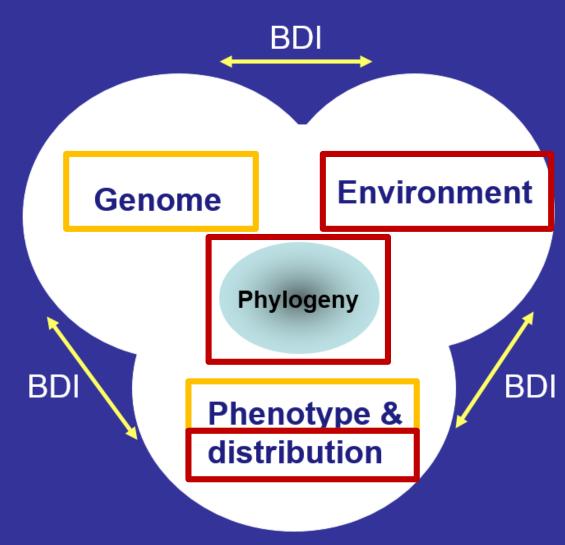
Tools ▼

Choose a pre-generated PD layer from layer menu options



# The future of museums and biodiversity research

- Discovering and understanding biodiversity
- Incorporating evolutionary dynamics
- Protecting diversity in a changing world
- Sharing knowledge



**BDI**: Biodiversity Informatics

## ATLAS OF LIVING AUSTRALIA

## Virtual Natural History Museum

- Around 60 million specimens in Australian biological collections (2-3 billion worldwide)
- Imagine fully digitised, research-ready Australian collections
  - And having open access that information
  - anyone, anywhere, anytime
- Resource to support research, quarantine
- But same tools support education, general interest
- And tools to support museum-type research activities

#### Acacia pubifolia

#### Description

Shrub or tree to 8 m high, single-stemmed. Bark rough to 'ironbark'-type, black. Branchlets angular, brown or orange-brown, sometimes slightly pruinose, velvety-pubescent; ridges not prominent. Phyllodes narrowly elliptic, elliptic or narrowly obovate, straight, 2–8.5 (–10) cm long, 8–30 mm wide, silvery, velvety-pubescent, later puberulous, with 1–3 slightly prominent main nerves reaching apex and base; minor nerves 5 or 6 per mm, not anastomosing; gland 1, small, basal, hairy. Spikes almost sessile, 2–5 cm long, golden. Flowers 5-merous; calyx 0.5–0.9 mm long, truncate or dissected to c. 1/6, white-pubescent, papillose at apices; corolla 1.6–1.8 mm long, dissected to 1/2–5/8, glabrous; ovary villous. Pods linear, slightly constricted between and slightly raised over seeds, 3–8 cm long, 3–4 mm wide, chartaceous, greyish, longitudinally nerved, pubescent. Seeds longitudinal, oblong-elliptic, 4–4.5 mm long, black; pleurogram indistinct, narrowly U-shaped, kdfhdslfjdsjfdslff

- Contributed by Dr M.D.Tindale and Dr P.G.Kodela with the assistance of M.Bectward, S.J.Davies, C.Herscovitch, D.A.Keith and/or D.A.Morrison
- Edited by Dave Martin

#### Distribution

Occurs in the Darling Downs District, south-eastern Qld, from Glen Aplin to Wallangarra, common near Wyberba, S of Stanthorpe; less common in N.S.W. where it is recorded from Torrington State Recreation Area (NW of Emmaville) and near Warrabah National Park (c. 60 km W of Armidale).

Contributed by Dr M.D.Tindele and Dr P.G.Kodela with the assistance of M.Bedward, S.J.Davies, C.Herscovitch, D.A.Keith and/or D.A.Morrison

#### Habitat

Grows on rocky granite hillsides, in sandy, stony or loam soil in eucalypt-scrub woodland or Eucalyptus -Callitris forest.

Contributed by Dr M.D.Tindale and Dr P.G.Kodela with the assistance of M. Bedward, S.J.Davies, C. Herscovitch, D.A.Keith and/or D

#### Links

· Acacia pubifolia - Old Flora of Australia site page for Acacia pubifolia

#### Taxonomy from Australian Plant Census

- Kingdom: Plantae
- · Phylum: Charophyta
- · Class: Equisetopsida
- · Subclass: Magnoliidae
- · Order: Fabales
- Family: Fabaceae
- Genus: Acacia
- · Species: Acacia pubifolia





Australian Plant Image Index

#### Conservation & sensitivity lists

- . Census of the Queensland Flora 2013 Vascular plants
- Greening the Grain Belt test list.



#### Acacia pubifolia

#### & Edit JSON

ta © OpenStreetMap contributors, CC-BY-

#### Description

- Contributed by Dr M.D.Tindale
- Edited by Dave Martin

#### Distribution

Occurs in the Darling Dow common in N.S.W. where km W of Armidale).

- Contributed by Dr M.D.Tindele a

#### Habitat

Grows on rocky granite if

— Contributed by Dr M.D.Tindale

#### Links

· Acacia pubifolia - Old Flora

Virtual publication — Dynamic, persistent, continually updated and accessible

#### Taxonomy from Australian Plant Census

- Kingdom: Plantae
- · Phylum: Charophyta
- · Class: Equisetopsida
- · Subclass: Magnoliidae
- · Order: Fabales
- Family: Fabaceae
- Genus: Acacia
- · Species: Acacia pubifolia

Australian Plant Image Index

#### Conservation & sensitivity lists

- . Census of the Queensland Flora 2013 Vascular plants
- . Greening the Grain Belt test list.

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User settings +

#### Specimens images from Australia's Natural History collections

Images from Australian Natural History collections made available by the museums and herbaria of Australia. To view images from all collections, click here.

### South Australian Museum Terrestrial Invertebrate Collection

South Australian Museum



The collection has Australia-Wide and Indo-Pacific representation, plus some world specimens for comparative purposes.

#### Australian National Insect Collection

Commonwealth Scientific and Industrial Research Organisation



The Australian National Insect Collection is recognized both nationally and internationally as a major research collection.

#### Museum Victoria Ornithology Collection

Museum Victoria



The Omithology Collection contains more than 70 000 specimens of mounted birds, sixins, sixeletons, eggs and specimens preserved in alcohol. One of the largest Australian avian collections, primarily of Australian species and with a strong Victorian emphasis, it includes material from a broad spectrum of the world's avifauna and represents in excess of 4000 species.

#### Australian Museum Entomology Collection

Australian Museum



#### Museum Victoria Entomology Collection

Museum Victoria



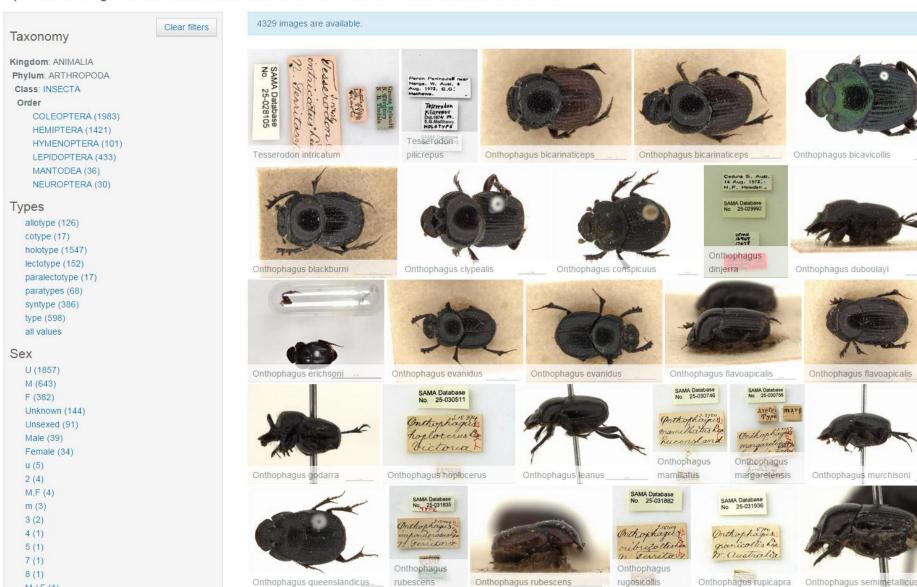
#### Australian Museum Marine Invertebrate Collection

Australian Museum



Home → Specimen images → South Australian Museum Terrestrial Invertebrate Collection

#### Specimen images from South Australian Museum Terrestrial Invertebrate Collection



User settings ▼

Lesser Queensland Fruit Fly

Bactrocera (Bactrocera)

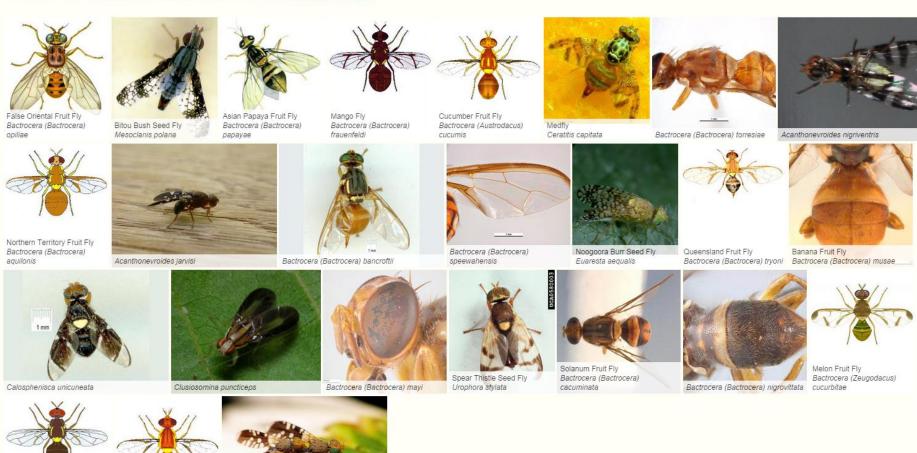
neohumeralis

Jarvis's Fruit Fly

iarvisi

Bactrocera (Bactrocera)

#### Images of 25 species from family: TEPHRITIDAE



Load more images

Spathulina acroleuca

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Species

Locations Collections

Mapping & analysis

Data sets

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Home → Australia's species → LIBELLULIDAE

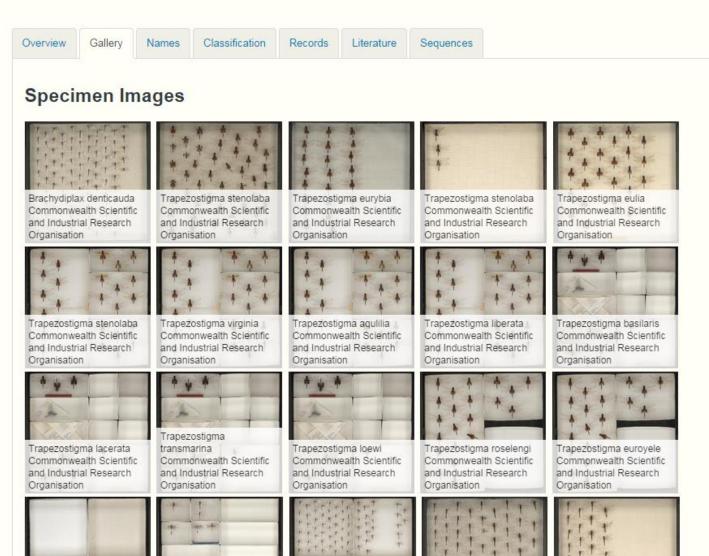
#### LIBELLULIDAE

Record a sighting

Alerts 🔔

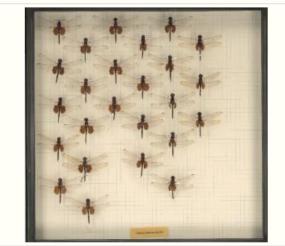
#### Common Skimmers



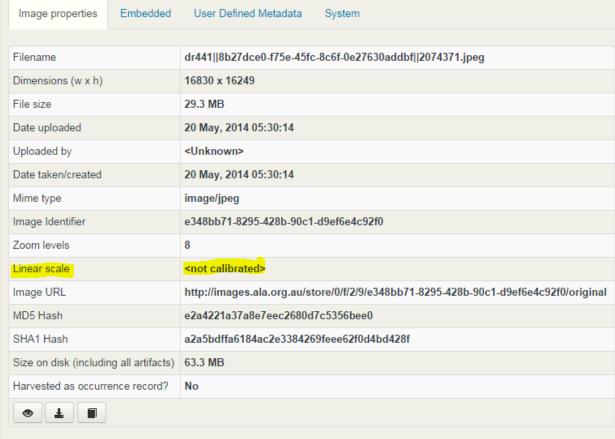


#### Image details dr441||8b27dce0-f75e-45fc-8c6f-

#### 0e27630addbf||2074371.jpeg







#### Home » Image Details » Viewing Image 4845589











Species Locations

Collections

Mapping & analysis

Data sets

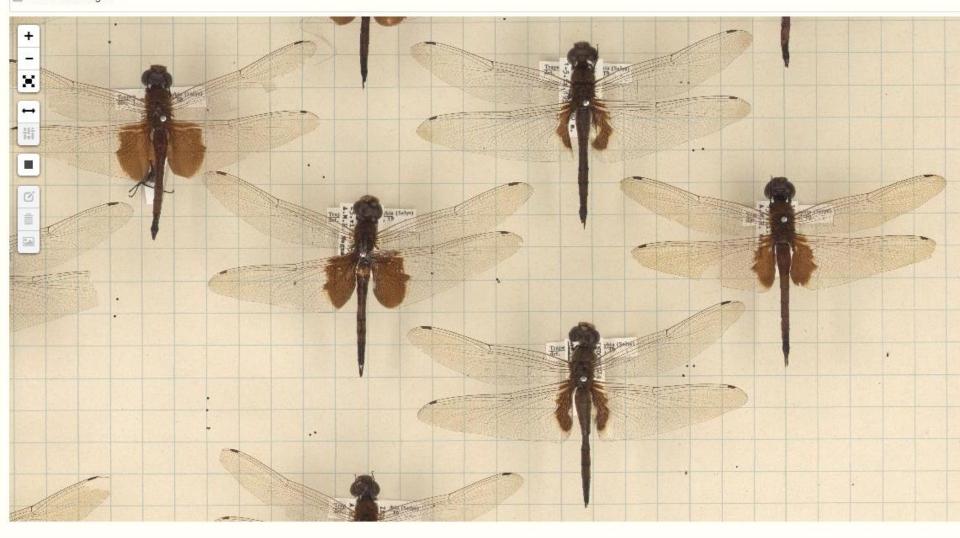
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Data sets

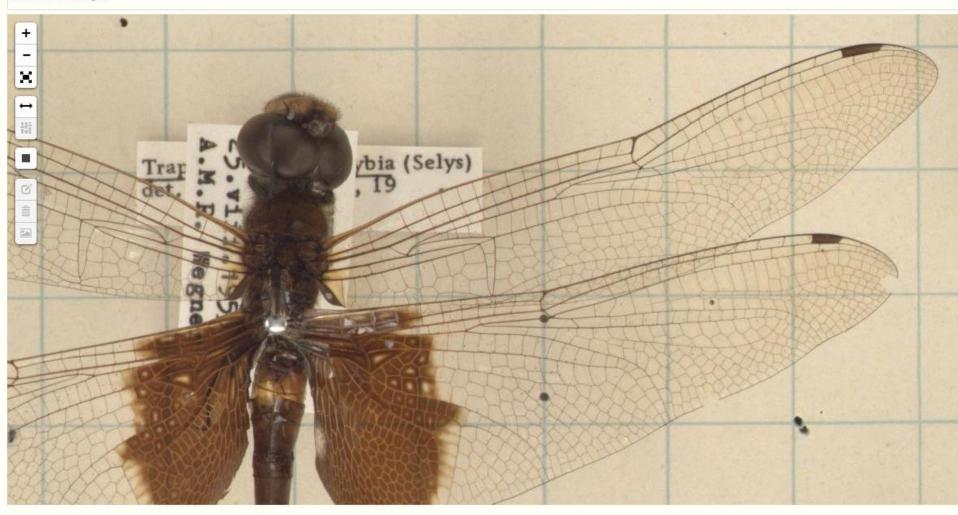
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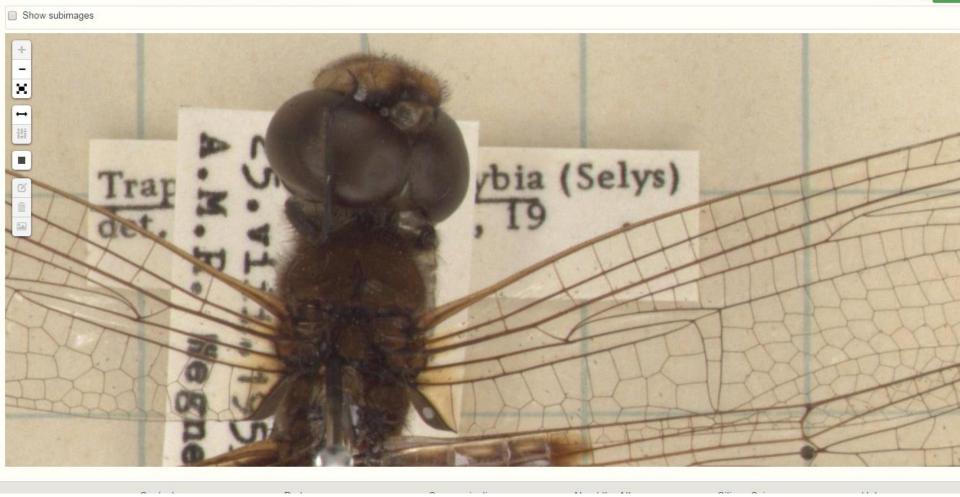
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Home » Image Details » Viewing Image 4845307



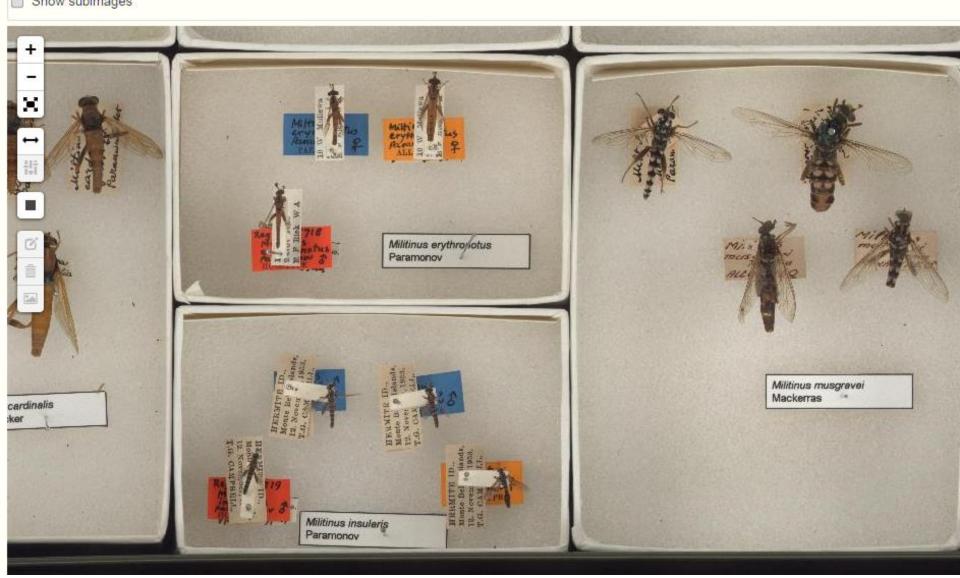








Home » Image Details » Viewing Image 4845307



Species Locations Collections Mapping & analysis Data sets Blogs Get involved About the

Home » Image Details » Viewing Image 4845307



IG

A



NSW/DATA DATABASE Vest side of the Gulf

Erokelaria Cumingham From map of route in Bartholemen + Cramp, School Atlas, This collin would date from 1844-4

S. Lichhardt.

NSW

LOAN: 099 449

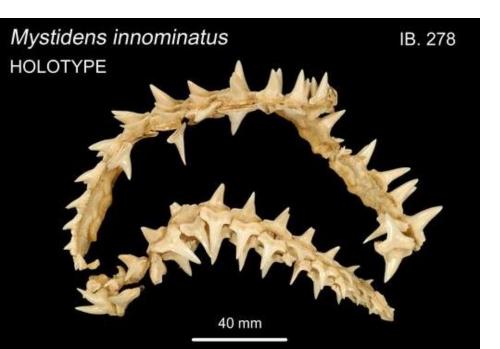


Haplotoxio Au. Brigges Calek am puddock as odle 43

Januaria carthamoides, Benty [22'00's 152" 86'E]

Dr. Luchhardt.







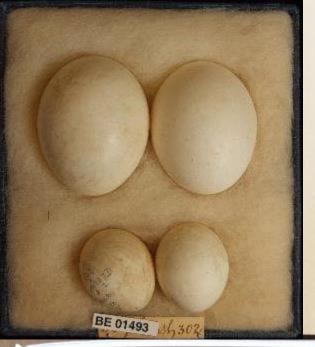
Syntype TMAG A808
Arctocephalus tasmanicus



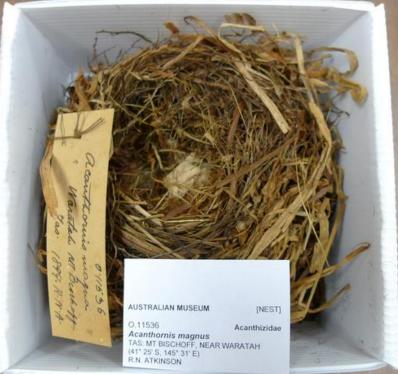


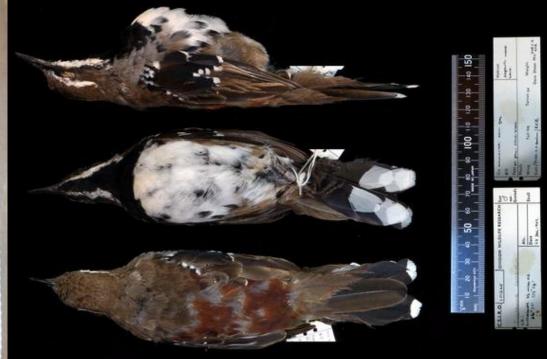


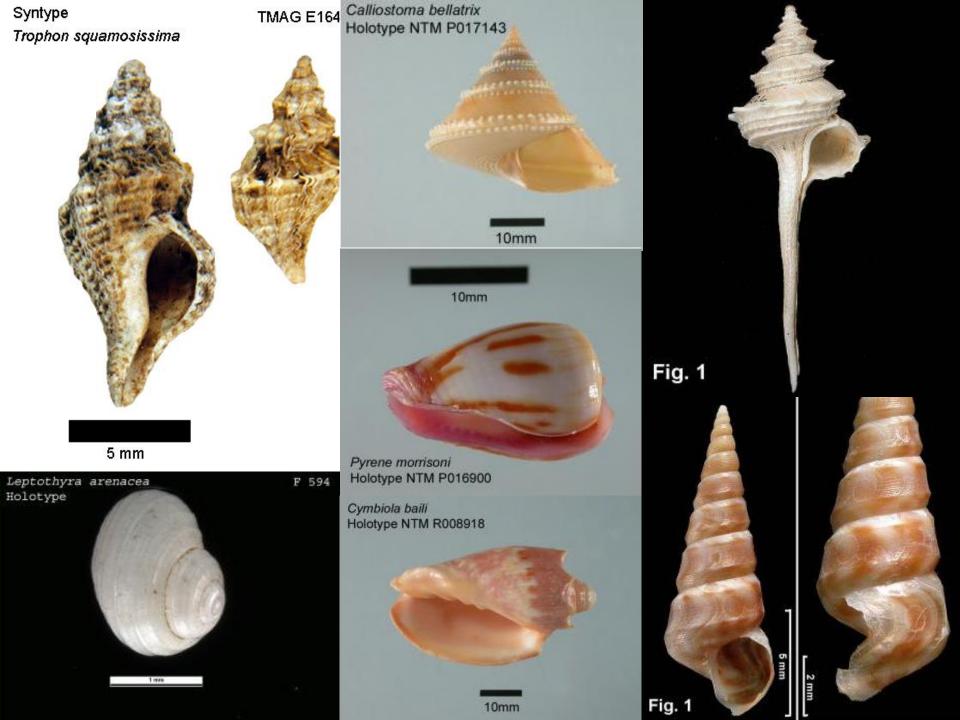






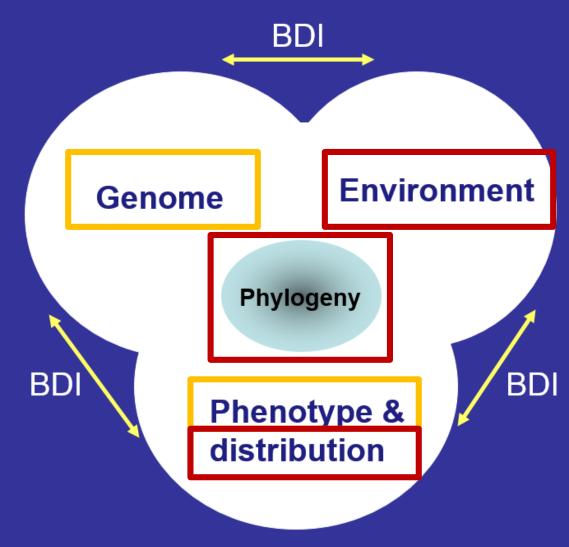






# The future of museums and biodiversity research

- Discovering and understanding biodiversity
- Incorporating evolutionary dynamics
- Protecting diversity in a changing world
- Sharing knowledge



**BDI**: Biodiversity Informatics





## Extracting information from image libraries

- 1. No use having information libraries if you don't extract rich information from them ...
- 2. ... in a fashion that gives you the ability to store, manage, discover, share and re-use information associated with the images
- 3. Character matrix / trait bank (specimen and species level)

## ATLAS OF LIVING AUSTRALIA

## Why is morphology still relevant?

- While acknowledging that the "omics revolution" is transforming biological science – the fact remains that vision is the principle way in which humans gather and assimilate information.
- "Because half of the human brain is devoted directly or indirectly to vision ..."

Professor Mriganka Sur

MIT's Department of Brain and Cognitive Sciences.

http://newsoffice.mit.edu/1996/visualprocessing



Species Locations Collections Mapping & analysis

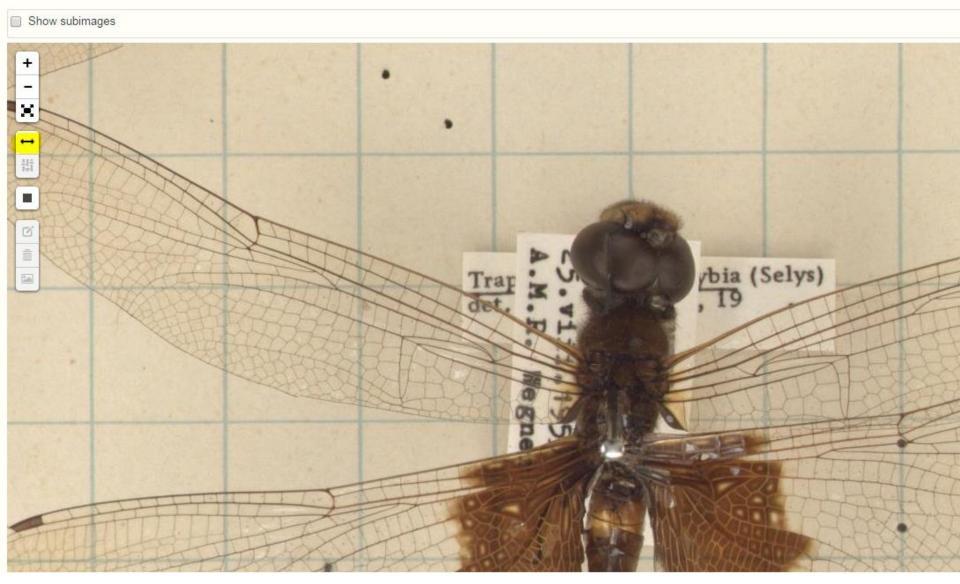
Data sets

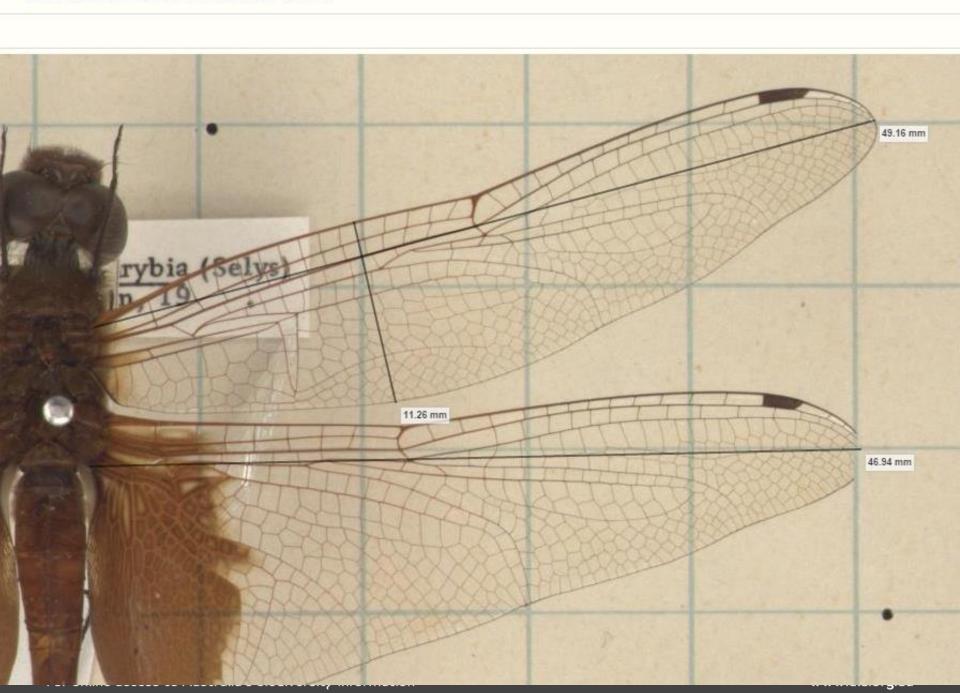
Blogs

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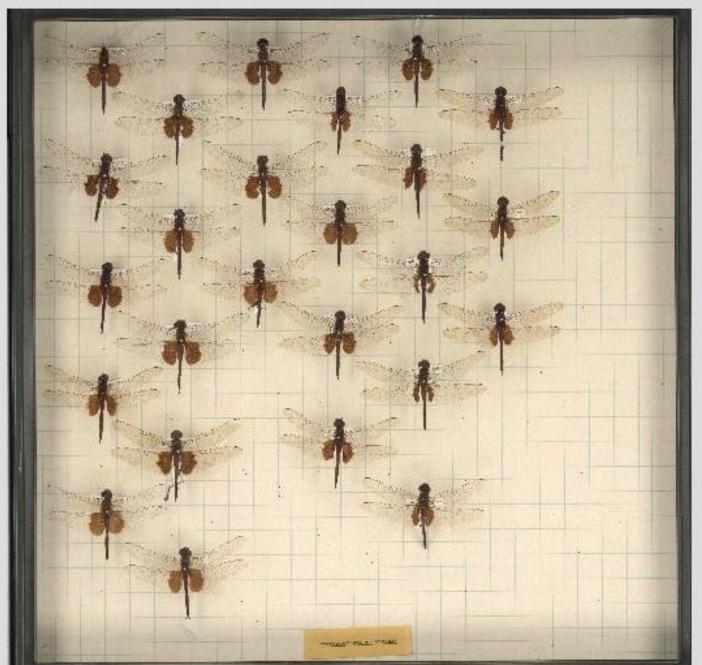
















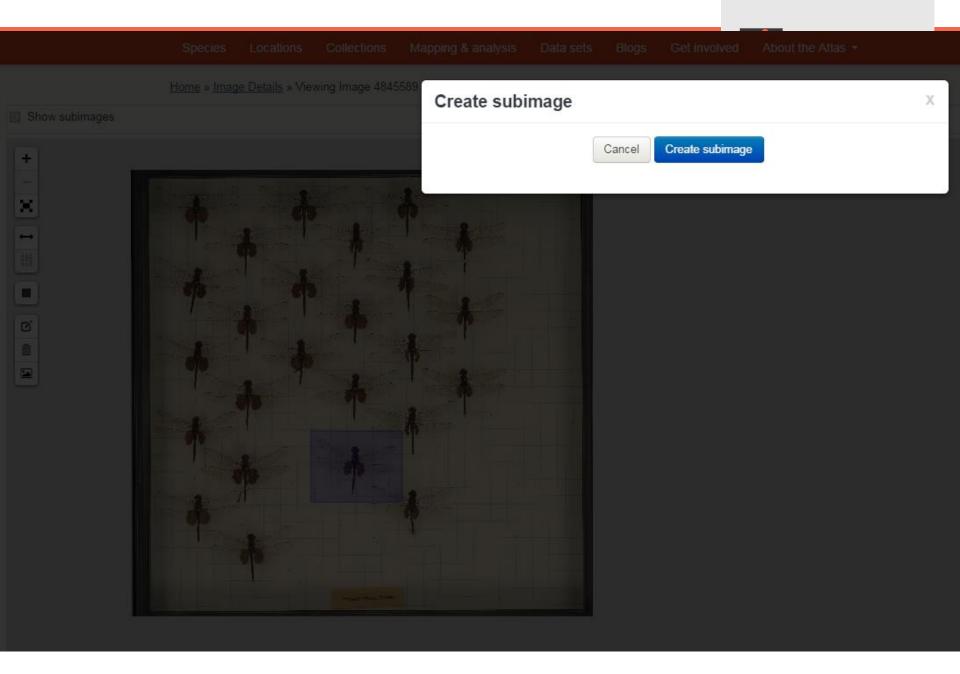








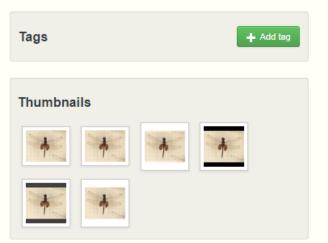


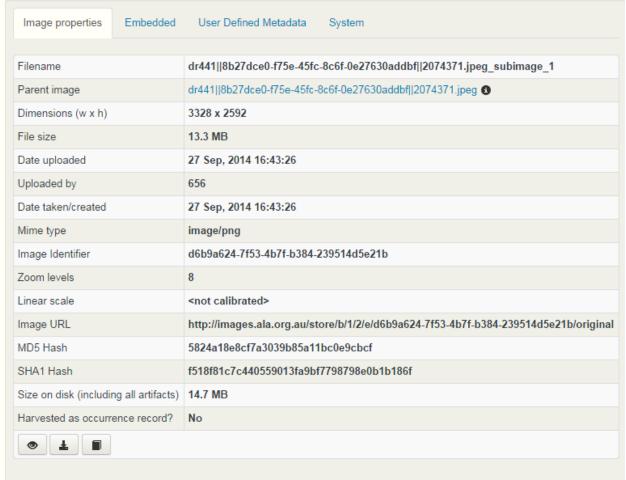


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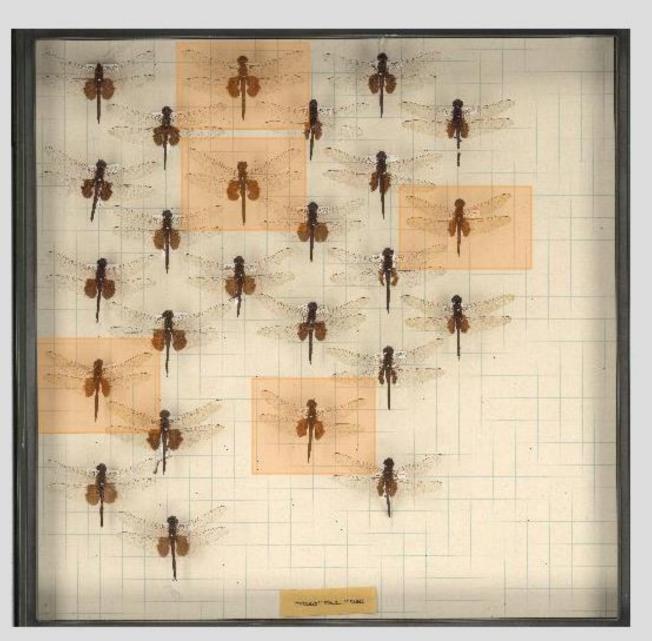












3D models provided by Chuong Nguyen of CSIRO Computational Informatics. The specimens were mostly from

This data set is provided to accompany the following paper:

Chuong Nguyen, David Lovell, Matt Adcock and John La Salle (2013) Capture natural-colour 3D models of ir



This YouTube video describes the 3D insect scanning systems that created these 3D models.

This work is supported by CSIRO Computational Informatics, CSIRO Ecosystem Sciences, Atlas of Living Austr

Licence: 3D models are released under Creative Commons Attribution Licence.

Rights statement: All Rights (including copyright) CSIRO Australia 2013.

Contact: Chuong Nguyen of CSIRO Computational Informatics.

Note: 3D models were tested with Firefox 25.0 and Chrome 31.0. Last update on 19 December 2013.







#### Close

Annotations

Tools

[DEBUG] Event Test

[DEBUG] Texture Paint

Add Image

Add Viewpoint

Mark Body Part

Paint Highlight

Take Measurement

Collaboration

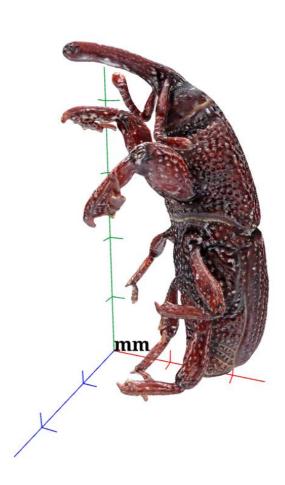
Model

Scale Bar

Lighting

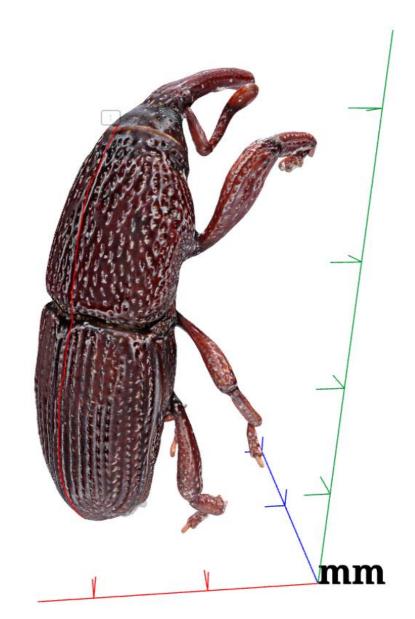
Camera

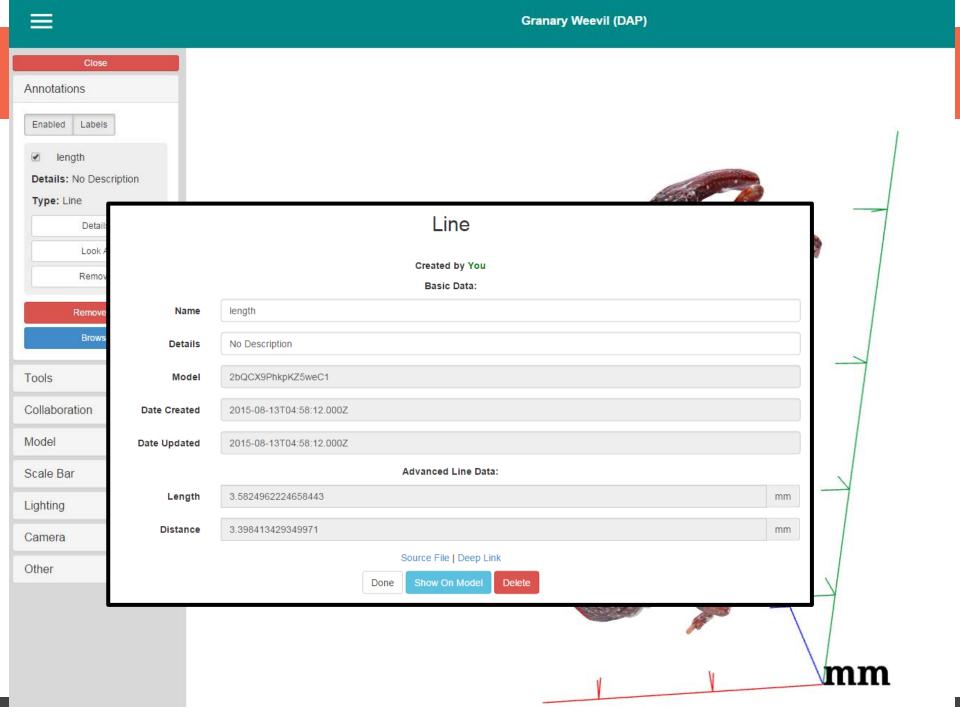
Other





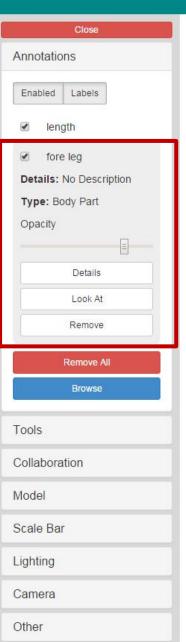
Close
Annotations
Enabled Labels
<b>⊘</b> length
Details: No Description
Type: Line
Details
Look At
Remove
Remove All
Browse
Tools
Collaboration
Model
Scale Bar
Lighting
Camera
Other

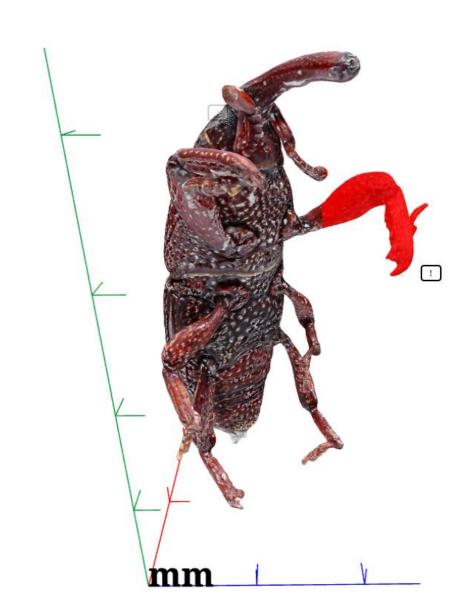






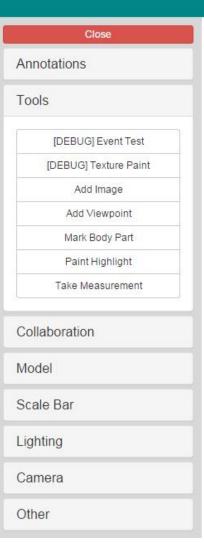


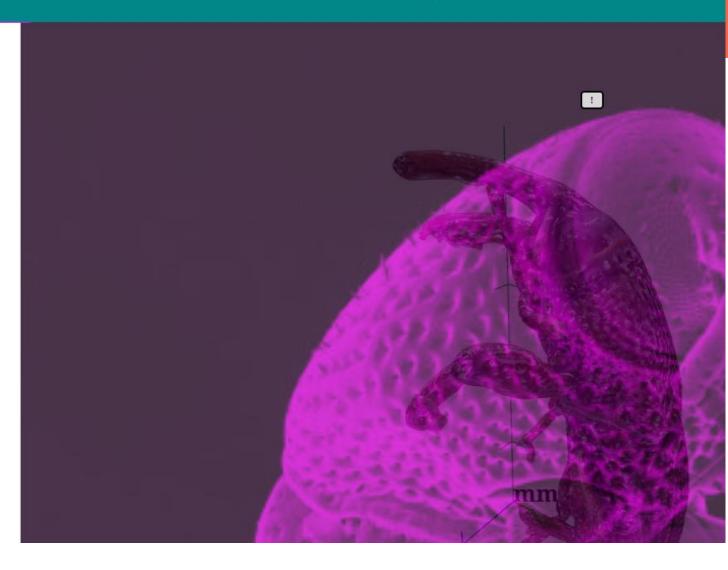






#### **Granary Weevil (DAP)**





## Accelerating biodiversity discovery and documentation



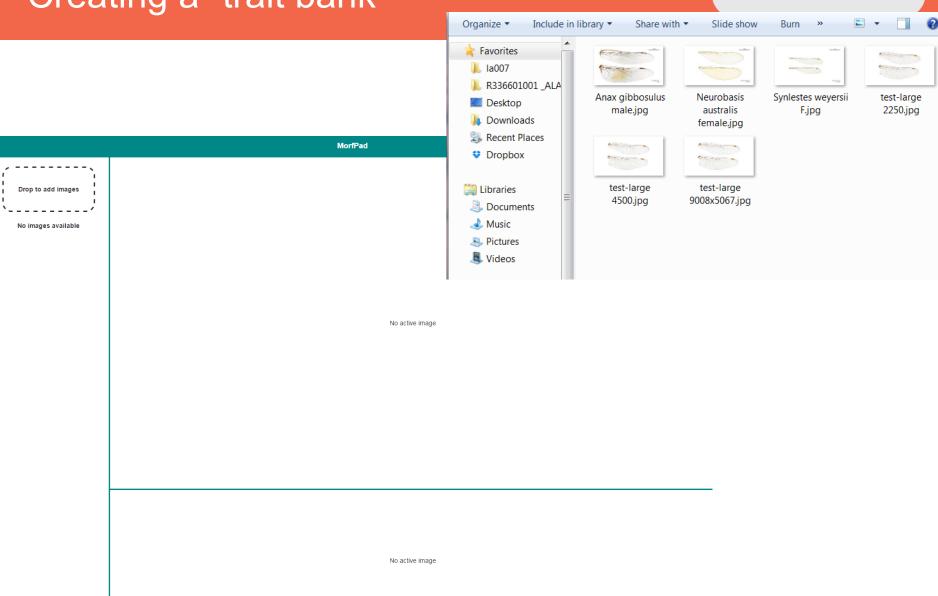
Need an order of magnitude increase in how we capture information from image libraries

- 1. Working with CSIRO computer vision team\*
- 2. Current "best practice" in image based phenomics is automated identification ...
- 3. ... which does not give you the ability to store, manage, discover, share and re-use information associated with the images

\*Changming Sun, Chuong Nguyen, Matt Adcock, Stuart Anderson

### Creating a "trait bank"

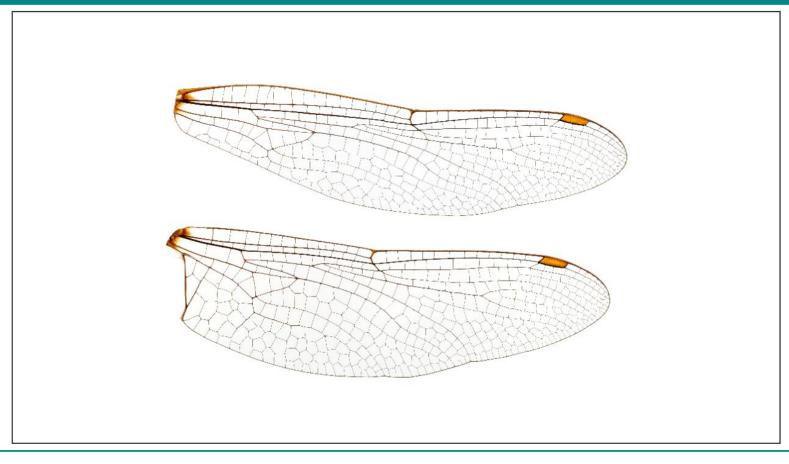






test-large 9008x5067.jpg

Synlestes weyersii F.jpg



#### Image Details

Name: test-large 9008x5067.jpg

Size (KB): 4918.84

Type: image/jpeg

Width (Pixels): 9008 Height (Pixels): 5067

#### Image Actions

Analyse

coom To Fit

Delete

#### Analysis Results

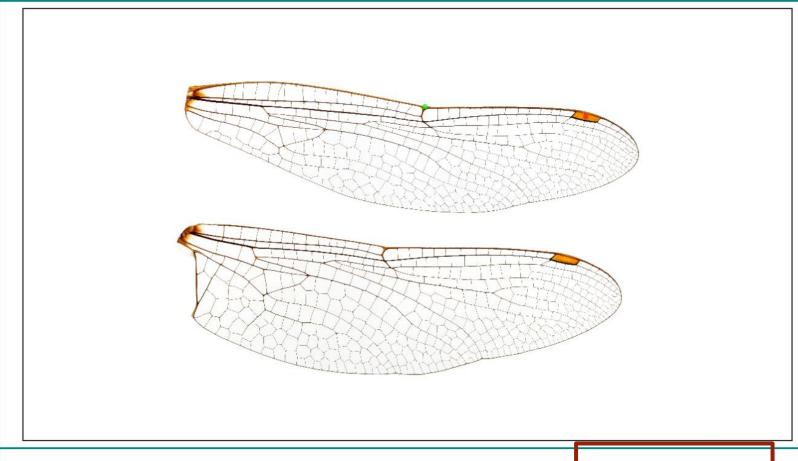
No analysis performed

CSIRC



test-large 9008x5067.jpg

Synlestes weyersii F.jpg



#### Image Details

Name: test-large 9008x5067.jpg

Size (KB): 4918.84

Type: image/jpeg

Width (Pixels): 9008

Height (Pixels): 5067

#### Image Actions

Analyse

Zoom To Fit

Export Character Matrix

Delete

#### Analysis Results

Pterostigma: [6591,1263]

Nodus Point: [4706,1146]

Anti-Nodal Cross Veins: 17

Post-Nodal Cross Veins: 12

Wing Similarity: 0.760291

Forewing Length: 5365.83

CSIR



test-large 9008x5067.jpg

Synlestes weyersii F.jpg

10 mm

Synlestes weyersii Female

#### Image Details

Name: Synlestes weyersii F.jpg

Size (KB): 3040.95

Type: image/jpeg

Width (Pixels): 9008

Height (Pixels): 5067

#### Image Actions

Analyse

Zoom To Fil

Export Character Matrix

Delete

#### Analysis Results

Pterostigma: [5694,1726]

Nodus Point: [3285,1592]

Anti-Nodal Cross Veins: 2

Post-Nodal Cross Veins: 19

Wing Similarity: 0.993792

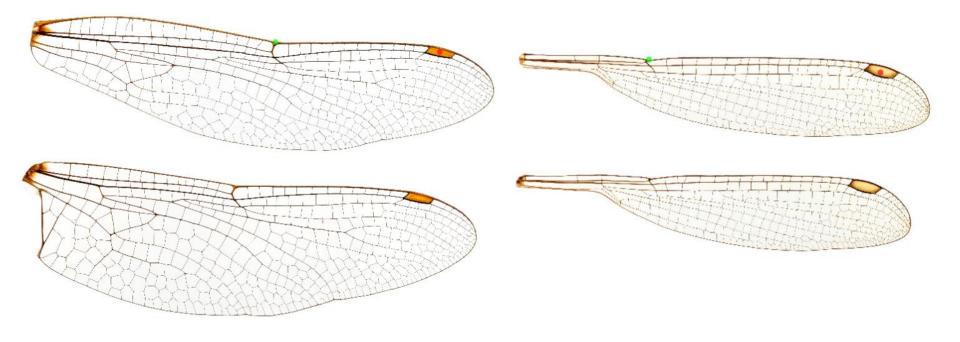
Forewing Length: 3969.73

CSIRO

## Accelerating biodiversity discovery and documentation



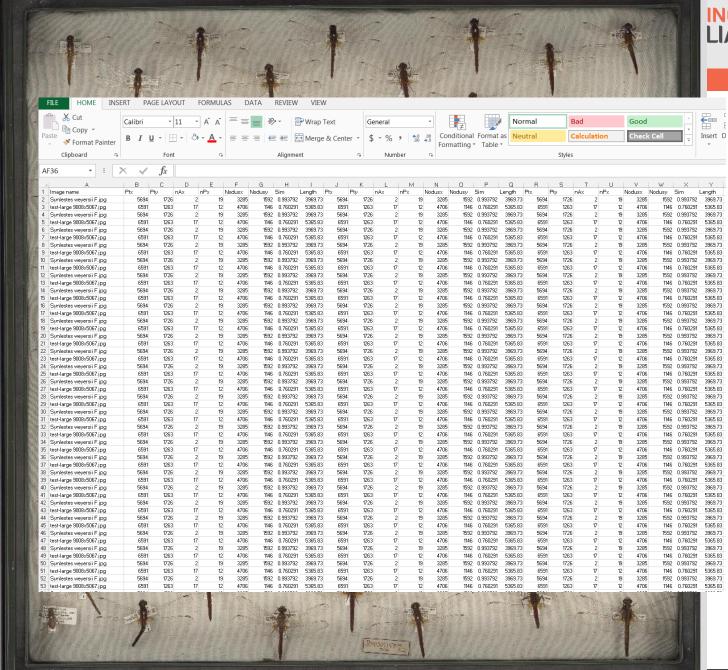
1	Α	В	С	D	Е	F	G	Н	I	
1	Image name	Ptx	Pty	nAx	nPx	Nodusx	Nodusy	Sim	Length	
2	Synlestes weyersii F.jpg	5694	1726	2	19	3285	1592	0.993792	3969.73	
3	test-large 9008x5067.jpg	6591	1263	17	12	4706	1146	0.760291	5365.83	
4										





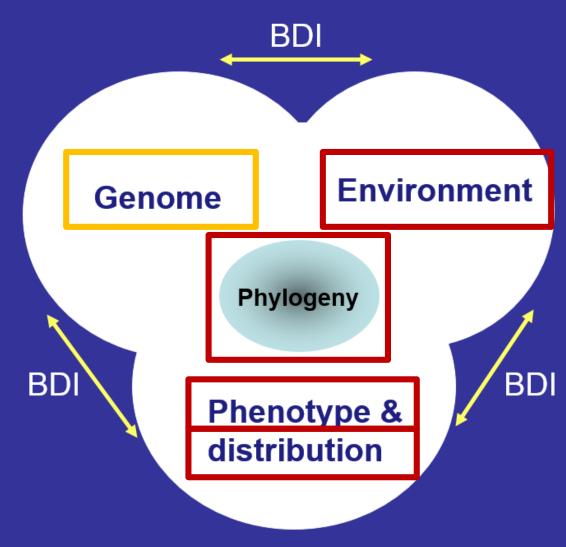
-X

17



# The future of museums and biodiversity research

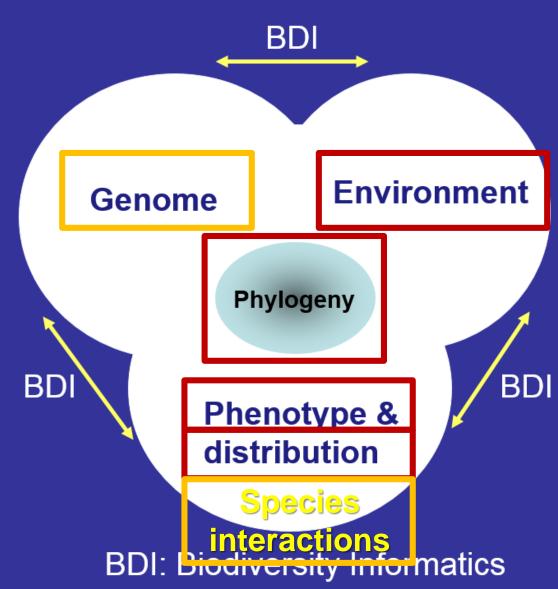
- Discovering and understanding biodiversity
- Incorporating evolutionary dynamics
- Protecting diversity in a changing world
- Sharing knowledge



**BDI**: Biodiversity Informatics

# The future of museums and biodiversity research

- Discovering and understanding biodiversity
- Incorporating evolutionary dynamics
- Protecting diversity in a changing world
- Sharing knowledge



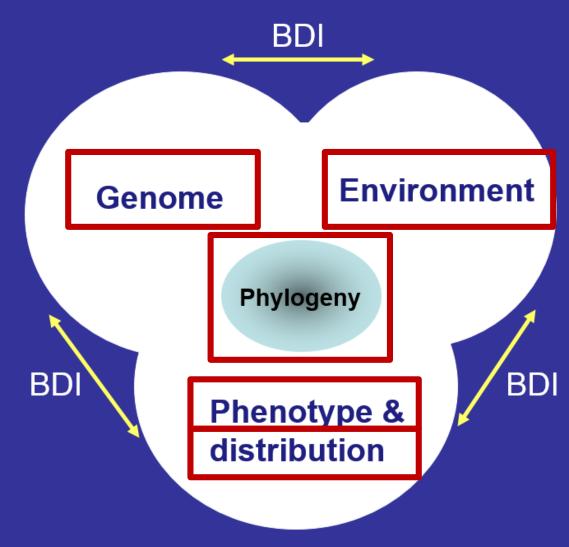
### LINK TO GENOMIC



- Work with others who are experts in
  - Genomic data standards and management
  - Bioinformatics tools
- Link to genomic data in order to bring it into Atlas environment
  - For discovery
  - Integration
  - Visualisation
  - Mapping
  - Analysis
- Or perhaps just need to bring in the products of molecular analysis done elsewhere for visualisation and mapping

## The future of museums and biodiversity research

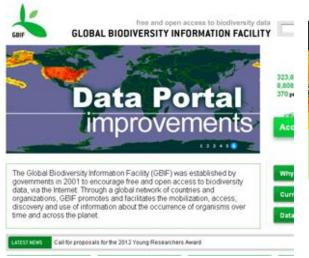
- Discovering and understanding biodiversity
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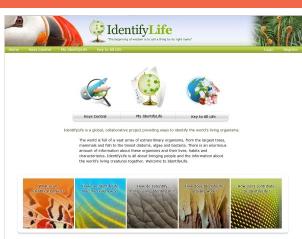
**BDI**: Biodiversity Informatics

## Global projects











53,992

1,796

terriani and

throught produced.





### ALA — open infrastructure - "Powered by ALA"





















#### One infrastructure - many systems



## ALA — open infrastructure - "Powered by ALA"





- Identification support
- Virtual taxonomy
- eFlora
- Trait bank
- Species interactions
- Volunteer digitisation portal
- Fossils
- Indigenous Knowledge
- Biosecurity
- Plot / Survey Data
- Tracking Data
- Environmental monitoring and reporting
- DOI's, annotations, citations





DATA













It is amazing what you can accomplish if you do not care who gets the credit

Harry S. Truman



www.ala.org.au

