

# Through the looking glass:

visualising taxonomic histories on the ARGA user interface for richer  
provenance

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Atlas of Living Australia  
Australian BioCommons  
Bioplatforms Australia



# ARGA Partnerships

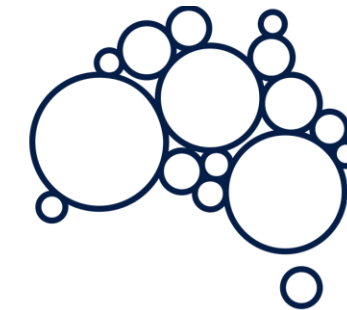
The Australian Reference Genome Atlas (ARGA) is an NCRIS-enabled platform powered by the Atlas of Living Australia (ALA), in collaboration with Bioplatforms Australia and the Australian BioCommons, with investment from the Australian Research Data Commons (ARDC) (<https://doi.org/10.47486/DC011>). ARGA integrates data sourced from a number of international repositories, including NCBI GenBank, EMBL-ENA and Bioplatforms Australia.



**ARGA**  
Australian Reference Genome Atlas



Australian  
**BioCommons**

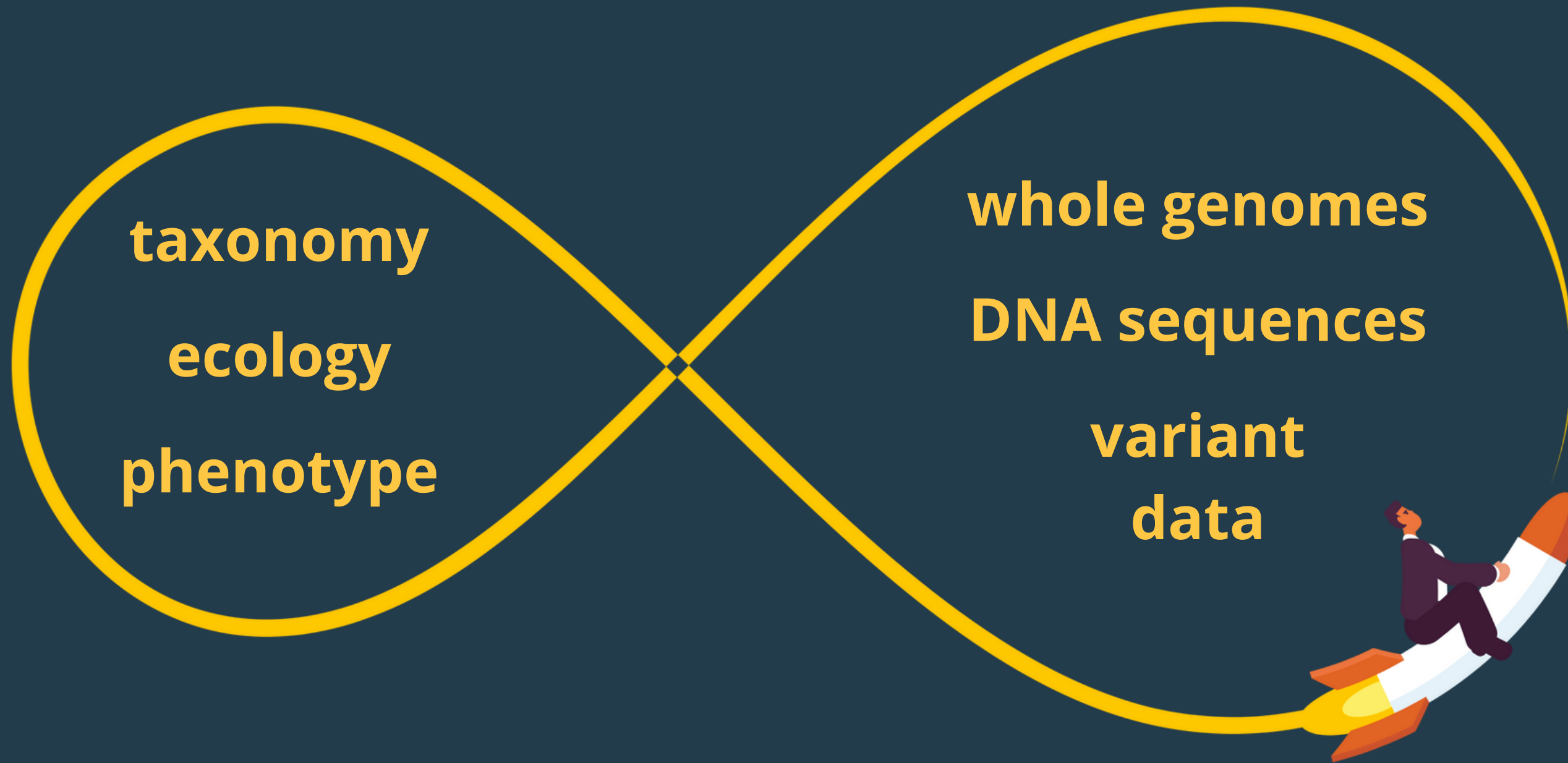


**BIOPLATFORMS**  
**AUSTRALIA**



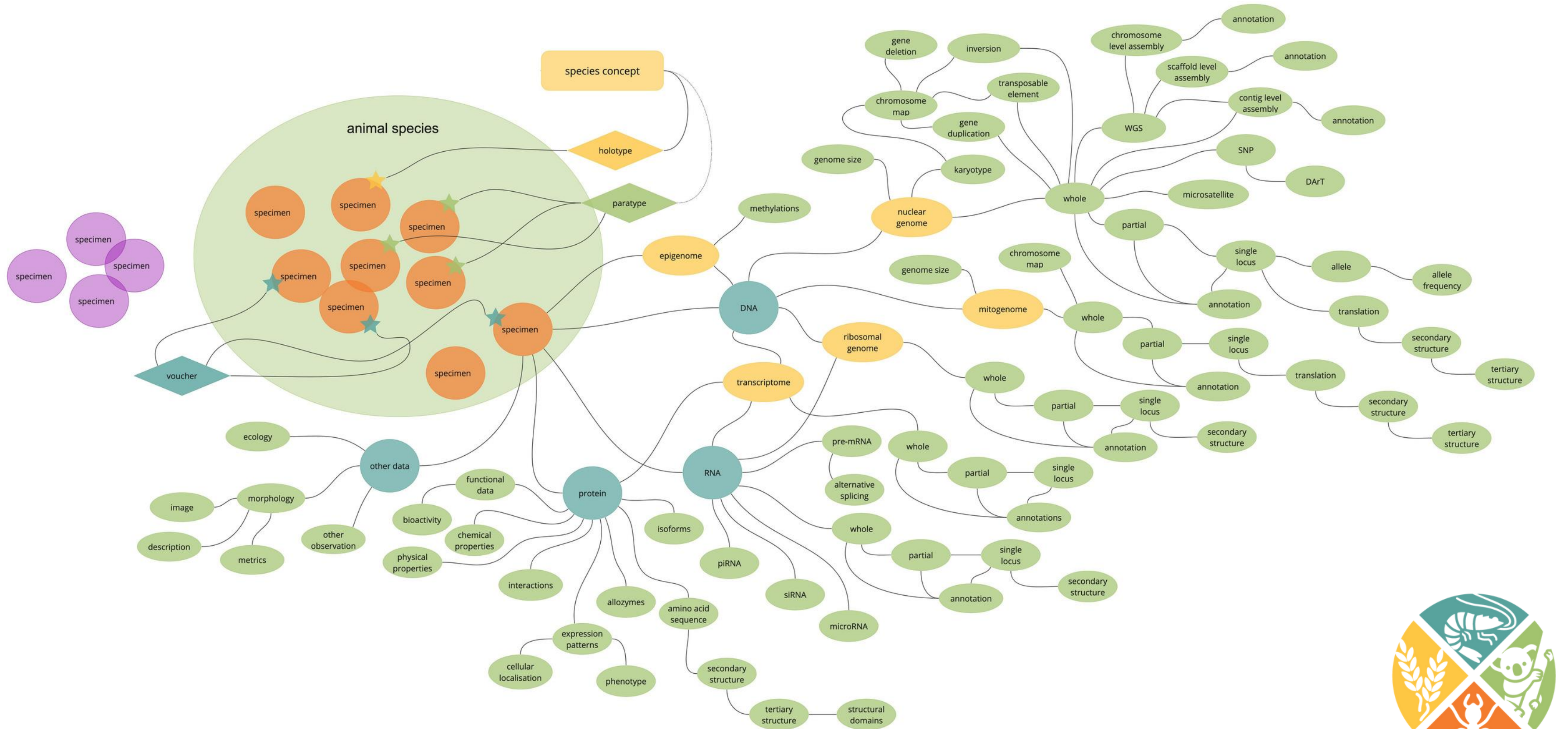
Australian Research Data Commons





The Australian Reference Genome Atlas (ARGA) is an indexing service for discovering, filtering and accessing complex life science data within biological contexts.

# Understanding the ARGGA data space



# Understanding the ARGGA data space: taxonomy



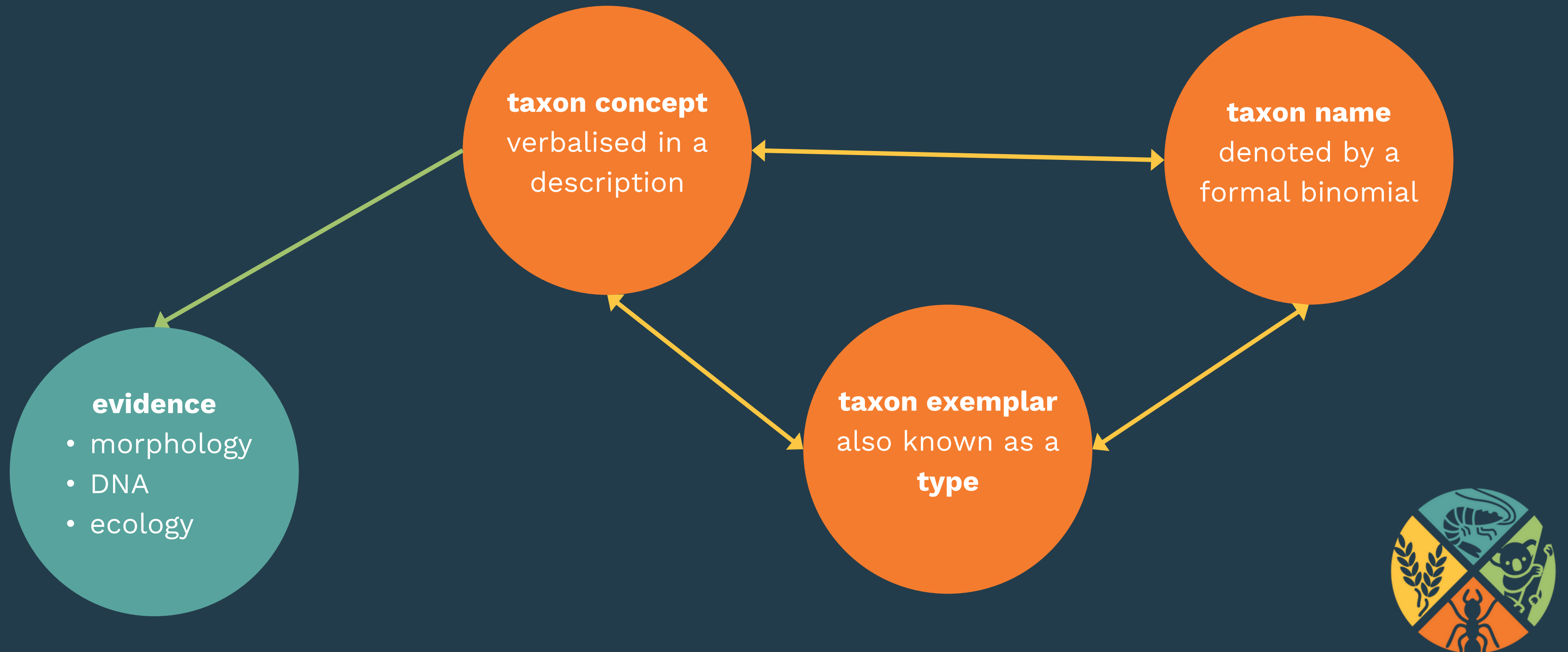
- taxonomy provides a hierarchical structure
- a scientific discovery process
- refined through opinion
- governed by a code
  - International Code of Zoological Nomenclature (ICZN)
  - International Code of Nomenclature for algae, fungi, and plants (ICN)
  - The International Code of Nomenclature of Prokaryotes (ICNP)





**Taxonomy:**  
into the  
looking glass

# Taxonomy is an hypothesis



# Understanding taxon histories

## Taxon histories are a complex problem

- scattered through historical documents
- must be linked to tangible elements
- application of concepts subject to drift
- species change over time



Summary

Data distribution

Taxonomy

Genome assemblies

Genomic components

Single locus data

Specimens

## Taxonomy

Source: Australian Faunal Directory

Scientific name

***Theonella maricae***

**Hall, Ekins & Hooper, 2014**

Status

**accepted**

Original description

No data

Type material

**QM G331427**

Type location (from source)

**Great Barrier Reef, Australia**

**-23.095, 151.875**

Type location (geo)

 [View map](#)

Common names

Subspecies

# ARGA UI

- shows data about:
  - scientific name with Authority
  - type specimen information
  - higher classification information

Atlas of Living Australia

## Australian Faunal Directory

Domain

**Eukaryota**

Kingdom

**Animalia**

Phylum

**Porifera**

Class

**Demospongiae**

Subclass

**Heteroscleromorpha**

Order

**Tetractinellida**

Suborder

**Astrophorina**

Family

**Theonellidae**

Genus

**Theonella**

**Taxonomy** Source: Australian Faunal Directory

Scientific name	<b><i>Theonella maricae</i></b> Hall, Ekins & Hooper, 2014
Status	<b>accepted</b>
Original description	No data
Type material	QM G331427
Type location (from source)	Great Barrier Reef, -23.095, 151.875
Type location (geo)	<a href="#">View map</a>

Common names

Subspecies



# ARGA UI

- allows users to visualise:
  - type locations on a map
  - alternative higher classification models
  - full provenance information for the data shown in ARGAs

Atlas of Living Australia  
Australian Faunal Directory

## WoRMS

- Unranked: **Biota**
- Kingdom: **Animalia**
- Phylum: **Porifera**
- Class: **Demospongiae**
- Subclass: **Heteroscleromorpha**
- Order: **Tetractinellida**
- Suborder: **Astrophorina**
- Family: **Theonellidae**
- Genus: **Theonella**

Scientific name ***Theonella maricae* Hall, Ekins & Hooper, 2014**

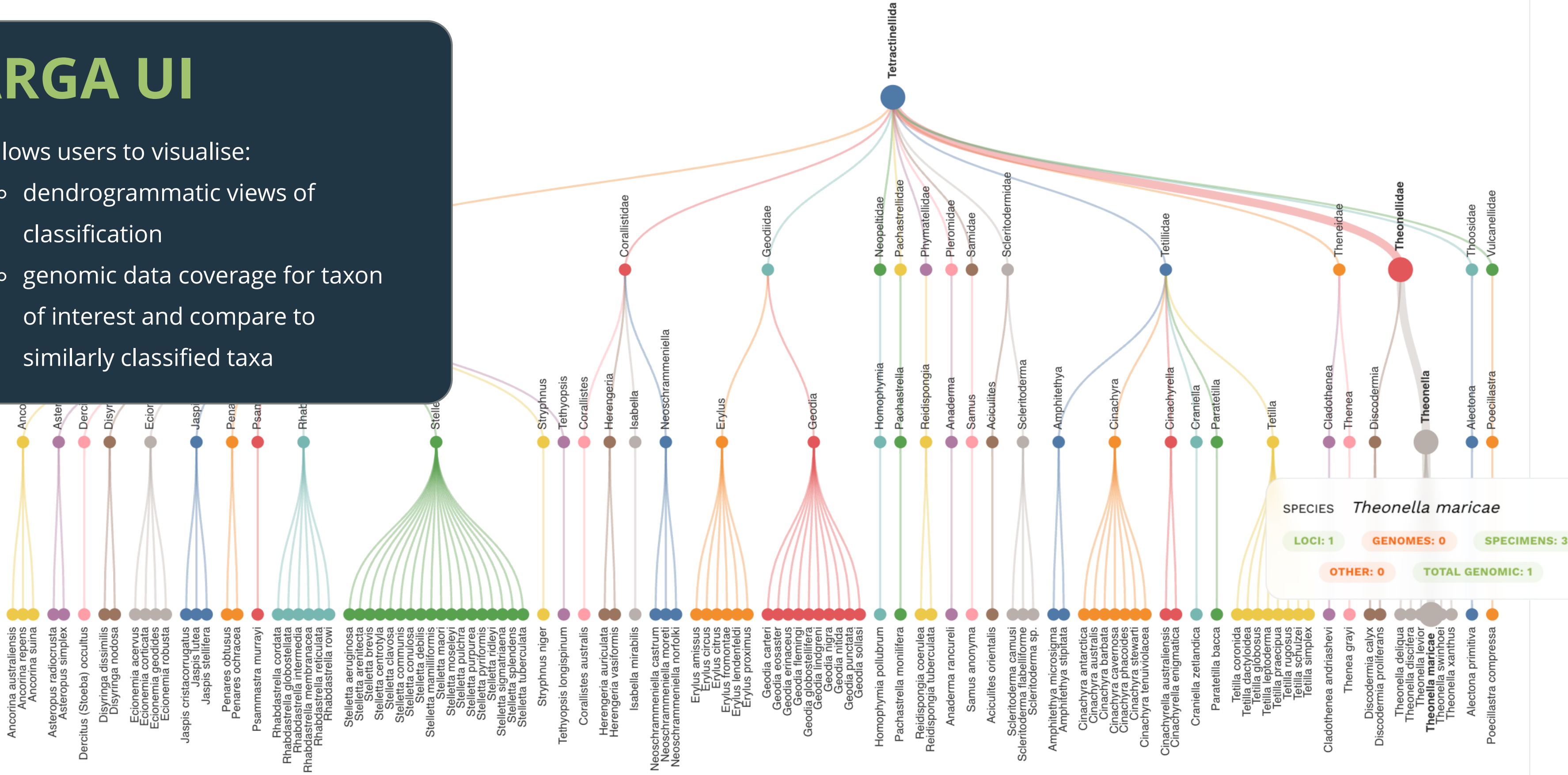
[record history](#)

Interactive higher classification



# ARGA UI

- allows users to visualise:
  - dendrogrammatic views of classification
  - genomic data coverage for taxon of interest and compare to similarly classified taxa



# Working with historical taxa

( 318 )

XV. *Description of a New Species of Macropus from New Holland.* By Aylmer Bourke Lambert, Esq. F.R.S. V.P.L.S.

Read April 16, 1805.

MACROPUS ELEGANS.

MACROPUS argenteus auriculis subobtusis, pedibus anticis pentadactylis.

TAB. XVI.

The account of this animal, and the drawing which I here offer to the Society, were taken from a living specimen lately brought from New South Wales, and now in the possession of Mr. Pidcock of Exeter 'Change. It is distinguished by the Settlers in that country, by the name of the *Silver* or *Brush Kangaroo*, and by the Natives is called *Ba-ga-ree*. It appears to be a very distinct species from the first discovered one, which Dr. Shaw in his *General Zoology*\* has named *Macropus major*, differing from that, not only in colour, but also in being much smaller, and of a more handsome shape. The colour is a beautiful silver-gray; and, upon the whole, it is one of the most elegant animals I ever saw. It is also very docile.

Dr. White, who so long resided in New South Wales, informs me that this species is very scarce, and that its habits are very different from those of the common Kangaroo, it being always

\* Shaw's General Zoology, vol. i. p. 505.

found



Mr. LAMBERT'S *Description of a New Species of Macropus.* 319

found solitary, whereas the other is found in herds of forty or fifty together. Among the numerous Drawings of Natural History which Dr. White brought home from that country, and are now in my possession, this animal is wanting, owing, no doubt, to the difficulty of procuring a specimen.

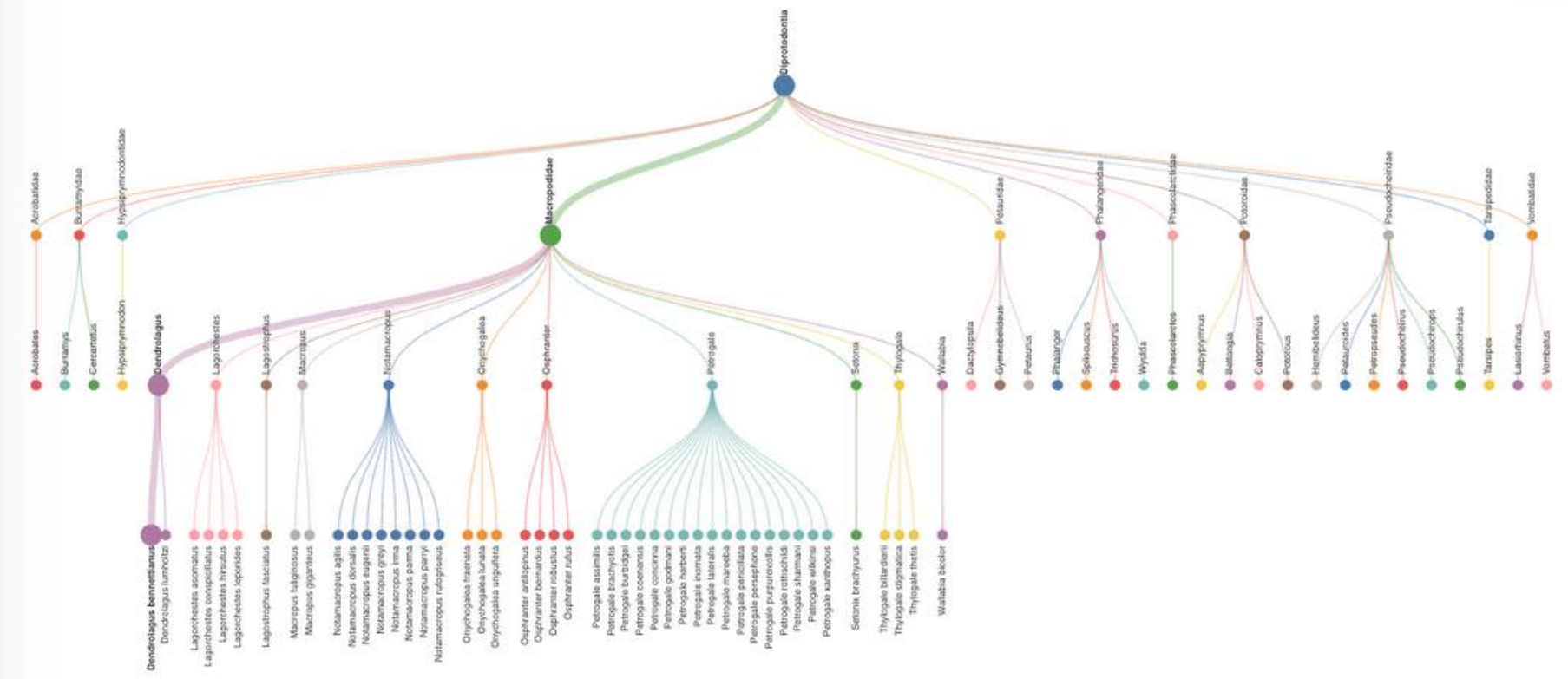
The measurement of the animal above described, is as follows :

	Inches.
Length from the tip of the nose to the end of the tail	62 $\frac{7}{8}$
From the tip of the nose to the eye	2 $\frac{1}{8}$
From the tip of the nose to the back part of the skull	5 $\frac{7}{8}$
From the back part of the skull to the tip of the tail	57
Length of the tail	26 $\frac{3}{8}$
Length of the ears	3 $\frac{1}{8}$
From the tip of the fore claw to the top of the shoulder	12 $\frac{1}{8}$
Length of the fore leg from the claw to the knee	8
From the tip of the hind claw to the top of the thigh	24
Length of the hind leg from the claw to the knee	10
Girth at the widest part, three inches before the hind legs	28
Girth three inches behind the fore legs	19

XVI. Ex-



Interactive higher classification



External links

View on ALA

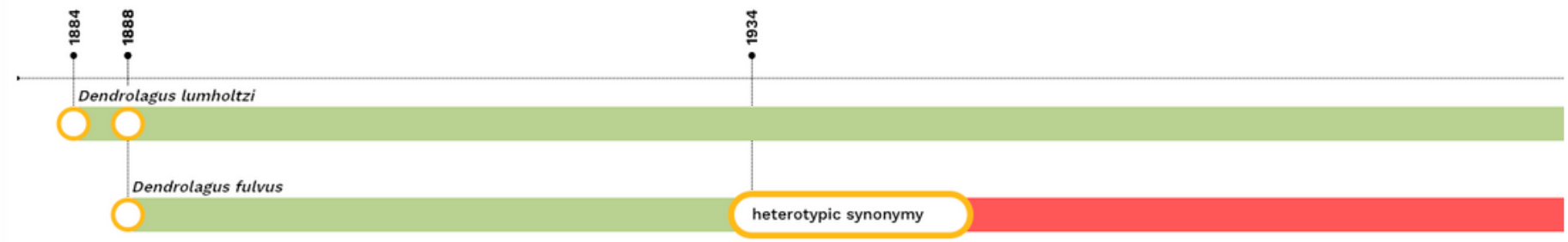
Taxon History



Nomenclatural timeline

Year	Scientific name	Nomenclatural act	Publication	Protonym/Basionym	Current status	Atom	Dataset	Record History
1887	<i>Dendrolagus bennettianus</i> De Vis, 1887	Original description	De Vis CW. 1887. Notice of a possible new species of <i>Dendrolagus</i> . The Proceedings of the Royal Society of Queensland 3: 11–14.	<i>Dendrolagus bennettianus</i> De Vis, 1887	Accepted	<p><b>Atom</b></p> <p><b>Scientific name</b> Dendrolagus bennettianus De Vis, 1887</p> <p><b>Canonical name</b> Dendrolagus bennettianus</p> <p><b>Nomenclatural act type</b> Original description</p> <p><b>Source url</b> https://biodiversity.org.au/afd/home</p> <p><b>Publication</b> De Vis CW. 1887. Notice of a possible new species of <i>Dendrolagus</i>. The Proceedings of the</p>	ARGA	
1934	<i>Dendrolagus bennettianus</i> De Vis, 1887	Name usage	Iredale T, Troughton ELG. 1934. A check-list of the mammals recorded from Australia. Australian Museum Memoir 6: 1–122.	<i>Dendrolagus bennettianus</i> De Vis, 1887	Accepted	<p><b>Atom</b></p> <p><b>Scientific name</b> Dendrolagus bennettianus De Vis, 1887</p> <p><b>Canonical name</b> Dendrolagus bennettianus</p> <p><b>Nomenclatural act type</b> Name usage</p> <p><b>Source url</b> https://biodiversity.org.au/afd/home</p> <p><b>Publication</b> ABRS 2020. Australian Faunal Directory. Australian Biological Resources Study, Canberra.</p>	ARGA	

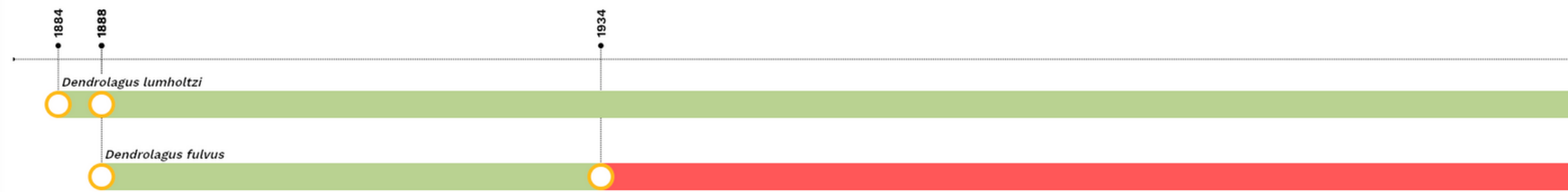
Taxon History



Nomenclatural timeline

Year	Scientific name	Nomenclatural act	Publication	Protonym/Basionym	Current status	Atom	Dataset	Record History
1884	<i>Dendrolagus lumholtzi</i> Collett, 1884	Original description	Collett R. 1884. On some apparently new marsupials from Queensland. Proceedings of the Zoological Society of London 1884: 381–389.	<i>Dendrolagus lumholtzi</i> Collett, 1884	Accepted	<p><b>Atom</b></p> <p><b>Scientific name</b> Dendrolagus lumholtzi Collett, 1884</p> <p><b>Canonical name</b> Dendrolagus lumholtzi</p> <p><b>Nomenclatural act type</b> Original description</p> <p><b>Source url</b> https://biodiversity.org.au/afd/home</p> <p><b>Publication</b> Collett R. 1884. On some apparently new marsupials from Queensland</p>	ARGA	
1888	<i>Dendrolagus fulvus</i> De Vis, 1888	Original description	De Vis CW. 1888. On a third species of the Australian Tree Kangaroo. The Proceedings of the Royal Society of Queensland 4: 132–134.	<i>Dendrolagus lumholtzi</i> Collett, 1884	Unaccepted, Synonym	<p><b>Atom</b></p> <p><b>Scientific name</b> Dendrolagus fulvus De Vis, 1888</p> <p><b>Canonical name</b> Dendrolagus fulvus</p> <p><b>Nomenclatural act type</b> Original description</p> <p><b>Source url</b> https://biodiversity.org.au/afd/home</p> <p><b>Publication</b> De Vis CW. 1888. On a third species of the Australian Tree Kangaroo</p>	ARGA	
1888	<i>Dendrolagus lumholtzi</i> Collett, 1884	Name usage	Thomas O. 1888. Catalogue of the Marsupialia and Monotremata in the collection of the British Museum (Natural History). London: Printed by order of the Trustees.	<i>Dendrolagus lumholtzi</i> Collett, 1884	Accepted	<p><b>Atom</b></p> <p><b>Scientific name</b> Dendrolagus lumholtzi Collett, 1884</p> <p><b>Canonical name</b> Dendrolagus lumholtzi</p> <p><b>Nomenclatural act type</b> Name usage</p> <p><b>Source url</b> https://biodiversity.org.au/afd/home</p> <p><b>Publication</b> ABRS 2020. Australian Faunal Directory. Australian Biological Resources Study, Canberra.</p>	ARGA	
1934	<i>Dendrolagus fulvus</i> De Vis, 1888	Heterotypic synonymy	Iredale T, Troughton ELG. 1934. A check-list of the mammals recorded from Australia. Australian Museum Memoir 6: 1–122.	<i>Dendrolagus lumholtzi</i> Collett, 1884	Unaccepted, Synonym	<p><b>Atom</b></p> <p><b>Scientific name</b> Dendrolagus fulvus De Vis, 1888</p> <p><b>Canonical name</b> Dendrolagus fulvus</p> <p><b>Nomenclatural act type</b> Heterotypic synonymy</p> <p><b>Source url</b> https://biodiversity.org.au/afd/home</p> <p><b>Publication</b> Iredale T, Troughton ELG. 1934. A check-list of the mammals recorded from</p>	ARGA	

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# ARGA UI

- is a radically new approach to visualising taxonomy
- allows users to visualise and track:
  - scientific names over time
  - see original descriptions
  - find holotypes
  - **why, when** and **how** names change over time
  - compare different nomenclators
- empowers user to test taxonomic hypotheses using new tools, including genomics data



# ARGA Team

## ARGA Core Project Team

Kathryn Hall: Project Manager

Jack Brinkman: Software Engineer

Keeva Connolly: Scientific Business Analyst

Christopher Mangion: Data Engineer

Caitlin Ramsay: Junior Software Engineer

Goran Sterjov: Senior Software Engineer



## Other contributors

Matt Andrews

Peter Brenton

Simon Checksfield

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Yasima Kankanamge

Winnie Mok

Vikas Nagaraju

Lars Nauheimer

Sarah Richmond

Nigel Ward

# Visit ARGGA team

Atlas of Living Australia  
Stand 29

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