

# PhyloJIVE ( and others): Integrating biodiversity data with the Tree of Life

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National Science Foundation

# Collaborators

Funding: DEWR, CANBR and ALA

- \* CANBR

- \* Garry Jolley-Rogers

- \* ALA

- \* Temi Varghese

- \* Rebecca Pirzl

- \* Nic dos Remedios

- \* iDigBio

- \* Andréa Matsunaga

- \* others

- \* Andrew Thornhill-ATH

- \* Darren Crayn-ATH

- \* John Pickering –  
DiscoverLife

- \* Dan Rosauer-ANU

# Our Data

- \* Biological collection informatics community
  - \* Individual datasets
  - \* iDigBio, GBIF, EOL, ALA, Map of Life
  - \* Dryad, Morphbank, Morphobank, Traitbase, IDLife
- \* Evolution and phylogenetics community
  - \* Individual datasets
  - \* Open Tree of Life
  - \* Treebase

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**Data is not integrated.**

# Why Integrate Data?

The image features a blue header with rounded corners at the top. The text "Why Integrate Data?" is centered in white. Below the header, there are several overlapping, wavy, light blue shapes that create a sense of depth and movement, extending across the width of the slide.


# Integrated Data?

## Currently done for individual studies

- \* Currently done for individual studies
  - \* Manual data generation and curation
- \* Goal: Community resource
  - \* Tools to link data

# Why Integrate Data?

- \* To understand our data
- \* Study biodiversity at all levels, not just species
- \* Facilitate comparative biology research
  - \* Visualize patterns
  - \* Develop and test hypotheses
- \* Conservation planning
- \* Evidence-based decision making

- 
- \* “the ability to search multiple databases using the nodes of a phylogenetic tree may be the single most important contribution of systematics to conservation and sustainable use of biodiversity”

Cracraft (2002)



# Outline

- \* PhyloJIVE
- \* Numerous screencasts
- \* Other integrating and visualization tools

# PhyloJIVE

## Phylogeny Javascript Information Visualiser and Explorer

**A**

**B**

- External Links
- View Map
- Expand/Collapse
- Rotate
- Set Root

**C**

**D** *Acacia camptoclada*

**Growth form:** erect shrub

**Inflorescence shape:** globular

**Inflorescence\_arrangement:** racemose

**plant\_height:** 0.6000

**Phyllode\_length\_\_median:** 12.0000

**E**

**Legend**

**Growth form**

- erect shrub
- prostrate shrub
- tree
- multiple

**Inflorescence shape**

- globular
- obloid to ellipsoid

**F**

External Links	Taxa
<a href="#">ALA</a> <a href="#">APII</a> <a href="#">EOL</a> <a href="#">APNI</a>	<i>Acacia prainii</i>
<a href="#">ALA</a> <a href="#">APII</a> <a href="#">EOL</a> <a href="#">APNI</a>	<i>Acacia camptoclada</i>
<a href="#">ALA</a> <a href="#">APII</a> <a href="#">EOL</a> <a href="#">APNI</a>	<i>Acacia anthochaera</i>
<a href="#">ALA</a> <a href="#">APII</a> <a href="#">EOL</a> <a href="#">APNI</a>	<i>Acacia suaveolens</i>
<a href="#">ALA</a> <a href="#">APII</a> <a href="#">EOL</a> <a href="#">APNI</a>	<i>Acacia iteaphylla</i>

**G**

**ATLAS of LIVING AUSTRALIA**  
sharing biodiversity knowledge

Species Locations Collections Mapping & analysis

*Acacia murrayana* F.Muell. ex Benth.

Colony Wattle

Overview Gallery Names Classification Records Literature Sequences

**H**

*Acacia murrayana* F.Muell. ex Benth. [apni \(as xml\)](#)

URI <http://biodiversity.org.au/apni.name/12669>

LSID <urn:lsid:biodiversity.org.au:apni.name:12669>

source [http://www.anbg.gov.au/cgi-bin/apni?taxon\\_id=12669](http://www.anbg.gov.au/cgi-bin/apni?taxon_id=12669)

modified 2013-01-08

Title *Acacia murrayana* F.Muell. ex Benth.

**I**

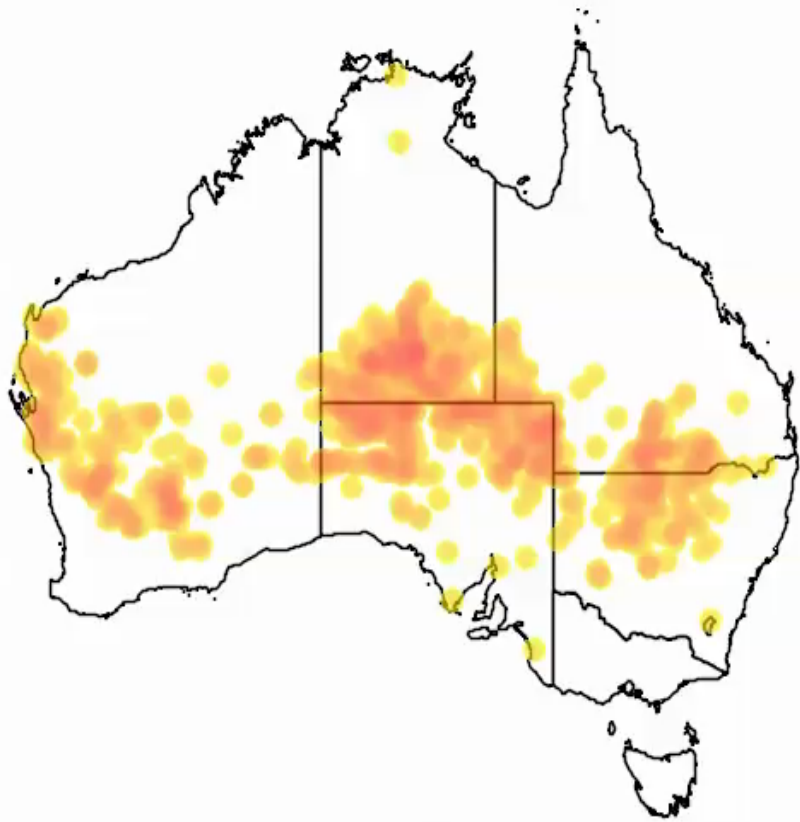
**Australian Plant Image Index**

[Acacia triquetra](#)

Taken at. ANBG

Photographer. Fagg, M.

dig 22097





Home : [Phyto](#) : Tree Viewer

Create a new tree

## Tree for Case Study 1: Acacia

Admin actions: [Tree list](#) [Edit tree](#)

Options Character Legend  
Map Search About

### Actions

Tree Options

Align Names

Ladderize

Animate

Branch Length

Length Multiplier  x0.1  x1  x2  x5

Load characters via

Identify Life

Add to Map ▾ Tools ▾ Import ▾ Export ▾ Help ▾

☑ dunii

Map options Delete all Show all Hide all

---

dunii

Species display settings Download image Download data

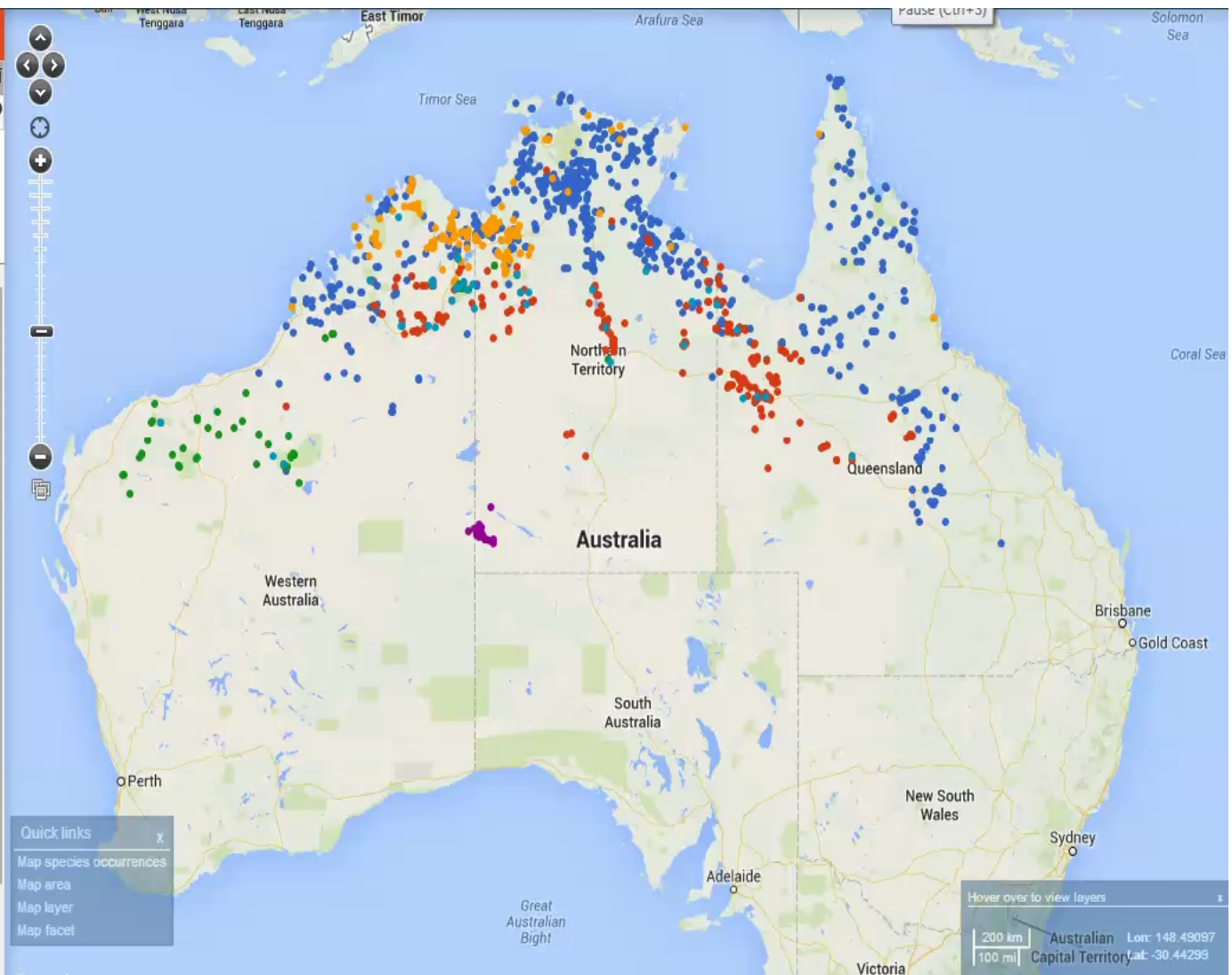
Records selected: 0

Highlight occurrences on the scatterplot that are in an area  
 Australia ▾ Clear

**Selected species**

Temperature - annual mean (Bio01)

Precipitation - annual (Bio12)



Home → Phylojive

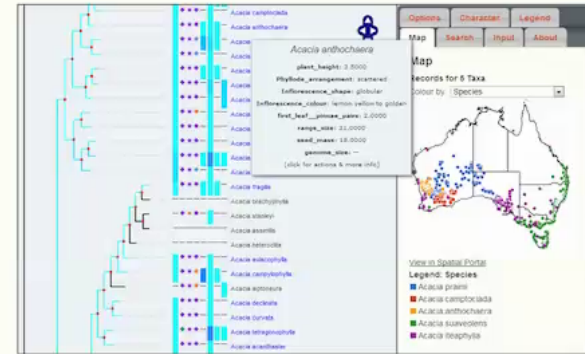
# Phylojive

PhyloJive ([Phy](#)lology [J](#)avascript [I](#)nformation [V](#)isualiser and [E](#)xplorer) is a web based application that places biodiversity information aggregated from many sources onto compact phylogenetic trees.

The project is the brainchild of [Garry Jolley-Rogers](#) and [Joe Miller](#) and was developed by [Temi Varghese](#) and [Garry Jolley-Rogers](#) as part of the [Taxonomy Research & Information Network \(TRIN\)](#) – see the [original project page](#), [original code repository](#) and [ALA code repository](#). The ALA has contributed to the PhyloJive codebase to integrate a number of web services: occurrence data, maps and character data from [Identify Life](#). This work has been undertaken with help and advice from [Joe Miller](#).

The [getting started](#) page outlines the steps for creating a new phylogenetic tree and contains demo data sets that can be used to get up and running.

Create a new tree



## Trees with character data

- quantitative characters
- demo
- ARFK1
- joe test July 26
- Boletes
- Damien
- Joe's acacia
- kimberley land snails3
- opentree
- Asteraceae coll bias
- treetest
- Tests

## "Bare" Trees

- Mollusca-tree of life
- amphibia - frogs, salamanders and caecilians
- Damien
- Maluridae
- Bird super tree
- kimberley land snails3
- 4000 lizards
- test3
- Characteristics 1-8
- dfd
- Tests
- opentree



# iDigBio Implementation

The screenshot shows the website's header with navigation links: "About iDigBio", "Portal", "Technical Information", and "Education". Below this is a green navigation bar with links: "iDigBio Home", "iDigBio Portal", "PhyloJIVE Home", "OpenTree Studies", "Sample Trees", "Tutorial", "Research Tools", and "Feedback". The main content area features the "PhyloJIVE" logo, a tagline "integrating phylogenies ... with online biodiversity data sources", and a "View on GitHub" button. A small phylogenetic tree is shown in a dark box. Below this are download buttons for "tar.gz" and ".zip". The text explains that the growing catalogue of online biodiversity data sources has reached a scale where data integration and mashups can be truly useful. It mentions "PhyloJIVE (Phylogeny Javascript Information Visualiser and Explorer)" as a mashup placing biodiversity web-services into an evolutionary context. A section titled "Integration with Atlas of Living Australia and iDigBio" describes Joe Miller's detailed instructions and lists additional features: linkage to specimens on iDigBio, visualization on a world map, external links to ALA Taxonomy, EOL, Discover Life, and ALA maps, and access to phylogenetic studies from OpenTree. A small image shows a phylogenetic tree of *Helianthus* species with a world map overlay showing their reported occurrences. A "Pause (Ctrl+S)" button is visible in the bottom right corner of the screenshot.

phylojive.acis.ufl.edu/PhyloJive/index.jsp

About iDigBio | Portal | Technical Information | Education

iDigBio Home | iDigBio Portal | **PhyloJIVE Home** | OpenTree Studies | Sample Trees | Tutorial | Research Tools | Feedback

**PhyloJIVE**  
integrating phylogenies  
... with online biodiversity data sources

for developers, [wiki instructions + known problems](#), [download PhyloJIVE](#)

View on GitHub

tar.gz .zip

The growing catalogue of online biodiversity data sources has reached a scale where data integration and mashups can be truly useful. Information about species is being aggregated at national and international scales. [PhyloJIVE \(Phylogeny Javascript Information Visualiser and Explorer\)](#) is one such mashup placing biodiversity web-services into an evolutionary context.

### Integration with Atlas of Living Australia and iDigBio

Joe Miller's has made [detailed](#) instructions on the use of the ALA implementation of phyloJIVE including videos, which are similar to the [instructions for the iDigBio instance of PhyloJIVE](#). Briefly, this instance offers the following additional features:

- linkage to specimens available on iDigBio
- visualization of iDigBio specimen on a world map
- external links to ALA Taxonomy, EOL, Discover Life, ALA maps
- access to a list of phylogenetic studies made available by OpenTree

Example trees on iDigBio+PhyloJive:

Pause (Ctrl+S)

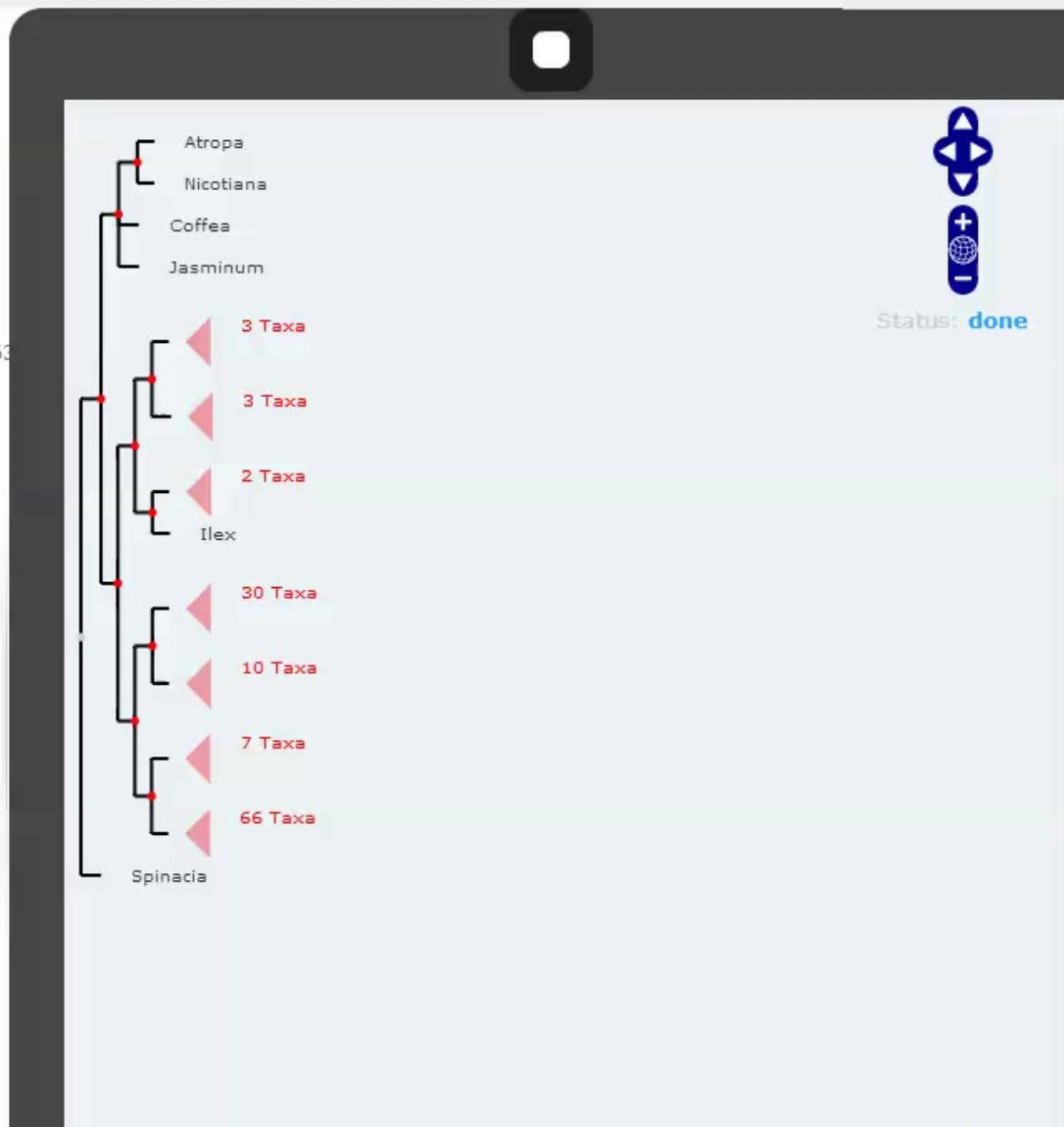
Andréa Matsunaga, iDigBio, UF

[OpenTree Study: pg\\_09](#)

Tank, David C., and Michael J. Donoghue. 2010. Phylogeny and Phylogenetic Nomenclature of the Campanulidae based on an Expanded Sample of Genes and Taxa. *Systematic Botany* 35, no. 2 (6): 425-441.  
doi:10.1600/03636441079163

Select another OT study:

- Click the top button to get the navigation aid
- Click nodes to get maps and external services
- Try choosing characters (if available) to plot on the tree;
- Align-names feature; search; set-root; rotate, etc.





# OneZoom, James Rosindell

<http://www.onezoom.org/>

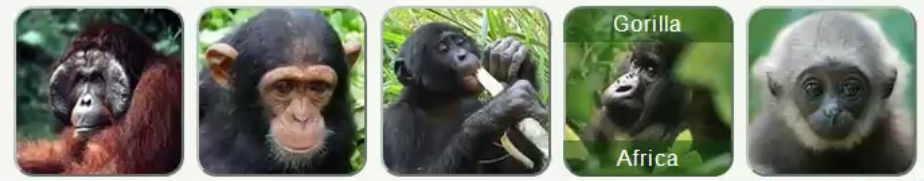
Linking phylogenetic widget into you webpage



The image shows a screenshot of the OneZoom web interface. At the top, there is a black header bar with the OneZoom logo on the left and four navigation icons (plus, minus, refresh, and zoom) on the right. Below the header, the main content area has a light blue background. In the center, a large, stylized phylogenetic tree is displayed. The tree is primarily green, with some branches in brown and red. The word "Tetrapods" is written in a large, black, serif font across the middle of the tree. At the bottom of the interface, there is a dark grey bar with the text "Click to see animation" in white.



Help save the Great Apes & their habitats



Gorilla  
Africa



- Home
- News
- Events
- Working Groups
- Get Involved
- Ape Inspired
- The Apes
- About Us
- Shop



Mt. Kilimanjaro

# Climb for Change

Sponsor Ian, Support the Ape Alliance



Gorilla

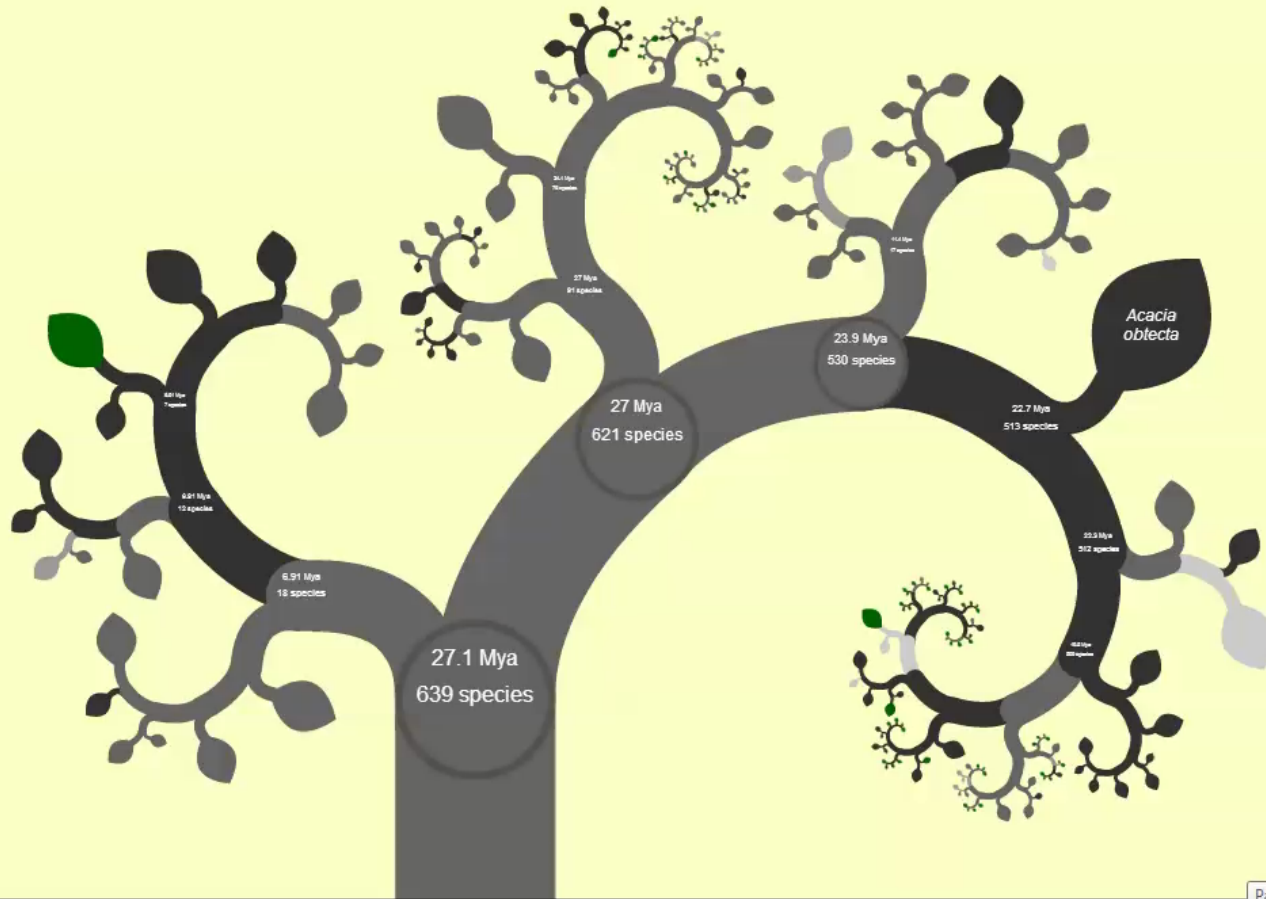
© Ian Redmond

[Back to Top](#)

# OneZoom with PhyloJIVE



Inflorescence Arrangement ▾



Pause (Ctrl+S)

Growth animation Reverse Pause Play Stop Close Present day

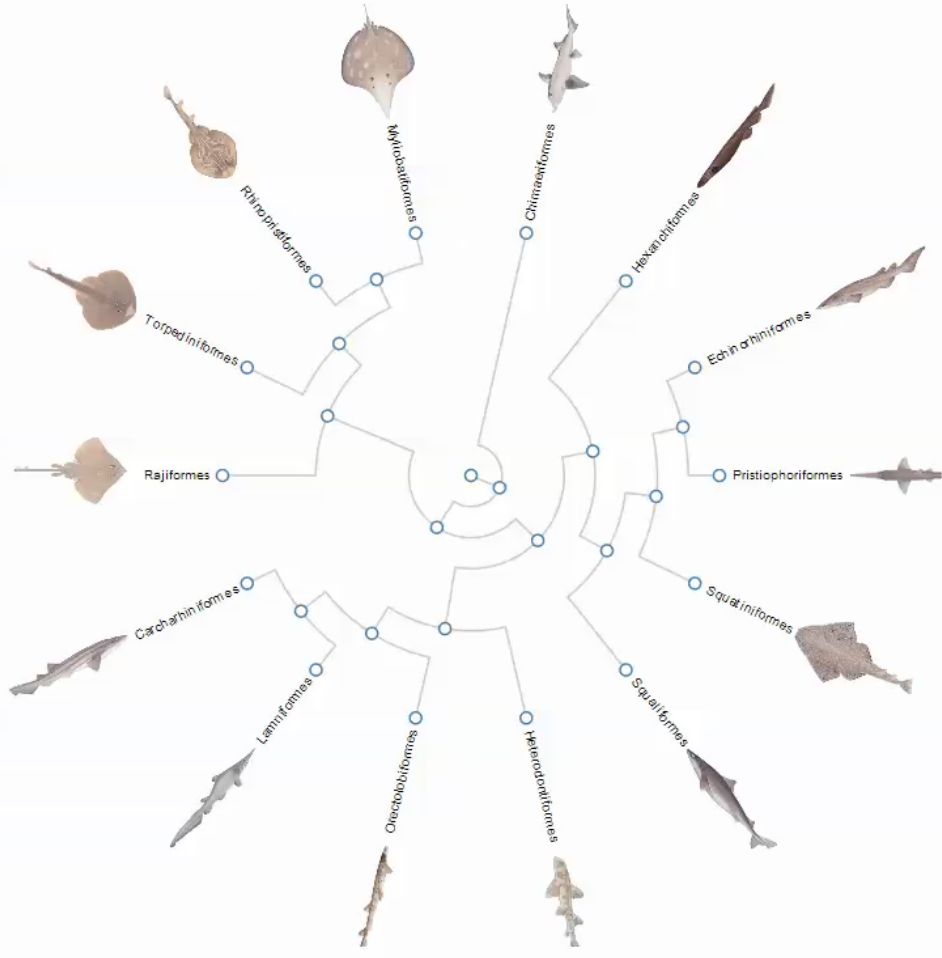
# Gavin Naylor, shakrays.org

## Chondrichthyes: Tree of Life

[Phylogeny](#) [Atlas](#) [DNA](#) [Anatomy](#)

Contact: Gavin Naylor


- Callorhynchus callorhynchus
- Callorhynchus capensis
- Callorhynchus milii
- Rhinodimaera pacifica GN8979
- Rhinodimaera pacifica
- Rhinodimaera atlantica \*
- Rhinodimaera pacifica
- Harriotta haeckeli
- Harriotta raleighana \*
- Necharriotta carri
- Necharriotta pinnata
- Necharriotta pumila
- Hydrolagus bemisi GN8988
- Hydrolagus colliiei GN1179 GOA 40
- Chimaera argiloba
- Chimaera bahamaensis
- Chimaera cubana \*
- Chimaera fulva
- Chimaera jordani
- Chimaera lignaria
- Chimaera macrospina
- Chimaera notafriicana
- Chimaera obscura
- Chimaera opalescens
- Chimaera owstoni
- Chimaera panthera
- Hydrolagus affinis
- Hydrolagus africanus
- Hydrolagus alberti
- Hydrolagus alphas
- Hydrolagus barbouri
- Hydrolagus deani
- Hydrolagus eidolon
- Hydrolagus homonycteris
- Hydrolagus lemures
- Hydrolagus lusitanicus
- Hydrolagus macrophthalmus
- Hydrolagus marmoratus
- Hydrolagus matallanasi
- Hydrolagus mocoekeri
- Hydrolagus melanophasma
- Hydrolagus mirabilis
- Hydrolagus mitsukurii
- Hydrolagus ogilbyi
- Hydrolagus pallidus
- Hydrolagus purpureoens
- Hydrolagus trolli
- Chimaera monstrosa
- Chimaera phantasma
- Hydrolagus novaezealandiae
- Chlamydoselachus anguineus GN1403
- Chlamydoselachus africana
- Notorynchus cepedianus GN1
- Heptranchias perlo GN978 \*
- Hexanchus griseus GN2342
- Hexanchus nakamurai GN2015 GA 14
- Hexanchus vitulus GN1988
- Echinorhinus brucus GN1983



Look Delete Expand Collapse

# Future

- \* All data integrated
  - \* GoLife, Genealogy of Life
- \* Other integration platforms
  - \* Arbor
  - \* ???



\* “Physicists acknowledge the power of the fundamental forces, such as gravity, incorporating them into every calculation. To successfully conserve our dwindling global biodiversity which we rely upon economically and aesthetically for sustenance and pleasure, biology must integrate evolution into every assessment of biodiversity.”



extra



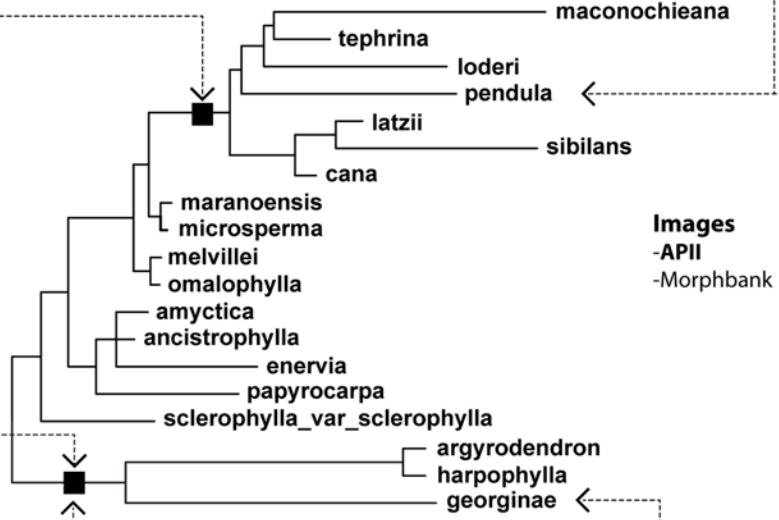
<b>Acacia latzii Maslin</b> <i>sp. nov.</i> (ex. 100)
LDI: <a href="http://www.identifylife.org/australia/nomenclature">http://www.identifylife.org/australia/nomenclature</a>
LSID: <a href="http://dx.doi.org/10.31212/australia.nomenclature.1001">http://dx.doi.org/10.31212/australia.nomenclature.1001</a>
Source: <a href="http://www.identifylife.org/australia/nomenclature/1001">http://www.identifylife.org/australia/nomenclature/1001</a>
modified: 2012-10-21
Title: Acacia latzii Maslin
Complex: Acacia latzii
Authority: Maslin
Contributor Authority: Maslin
Year: 2005
Accepted: Acacia latzii Maslin <i>nom. nov.</i> <a href="http://www.csiro.au">www.csiro.au</a>
Publication: Maslin, B. R. (2005) Acacia (Leguminosae-Mimosoideae): A contribution to the flora of central Australia. <i>Journal of the Adelaide Botanic Garden</i> 2(5): 313. fig. 1, 8 (map)
Base rank: Species
Genus aut: Acacia
Specific ep: latzii
Cont. authority: Maslin
Type locality: "Shallow Range, New Cavena Station, 25-08E(=49-MEN-6, 134-08E(=26-MEN-6, Northern Territory ... 21 April 1977, P.K. Lee 6999 (det. NY, in AD, C. MASLIN, 8-1982) (type seen with the 69 and 697 specimens)"
Taxonomic events: Acacia latzii Maslin <i>nom. nov.</i> <a href="http://www.csiro.au">www.csiro.au</a>
Acacia latzii Maslin <i>nom. nov.</i> <a href="http://www.csiro.au">www.csiro.au</a>
Acacia latzii Maslin <i>nom. nov.</i> <a href="http://www.csiro.au">www.csiro.au</a>
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Acacia latzii Maslin <i>nom. nov.</i> <a href="http://www.csiro.au">www.csiro.au</a>

**NOMENCATURE**  
 - APNI  
 - IPNI

**TAXONOMIC PAGES**  
 - EOL  
 - ALA  
 - GBIF  
 - Wikipedia  
 - DiscoverLife  
 - Google

node support  
 divergence times

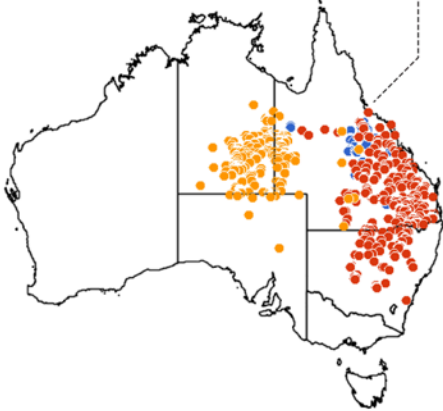
**ANCESTRAL CHARACTER STATES FOR CLADE**  
 - Foliage=phyllodes  
 - inflorescence type=globular  
 - Growth form= tree or shrub



**Images**  
 -APII  
 -Morphbank



Australian Plant Image Index (APII)-  
 Photo No. : a.19340



**DISTRIBUTION MAPS (ALA)**  
 - environmental layers (climate and geography)  
 - Google earth  
 - analytical tools (endemism)

**CHARACTER STATES FROM IDENTIFY LIFE**  
 - Foliage=phyllodes  
 - inflorescence type-globular  
 - Growth form= tree

**TRAITS**  
 - user defined  
 - ID keys Identify Life  
 - webservices  
 - text mining  
 - floras

# Generate a new tree



## Create Phylogenetic Tree

Name \*

Owner \*

Is Public



Newick \*

Characters

Input characters in [charJSON format](#). Alternatively, you can paste [CSV data](#) and then click:

## Create Phylogenetic Tree

Name \*

Owner \*

Joe Miller ▼

Is Public



Tree (nexml or newick)



Search Treebase

Search

*Search for a study in treebase*

Treebase Tree ID

*eg: Tr2026*