The Atlas of Living Australia: informing our response to global change

John La Salle

The Atlas is funded by the Australian Government under the National Collaborative Research Infrastructure Strategy and further supported by the Super Science Initiative of the Education Investment Fund
The future of biodiversity research and analysis

Enabling/informing
- Discovering and understanding biodiversity
- Incorporating evolutionary dynamics
- Protecting diversity in a changing world
- Sharing knowledge
- Rapid biodiversity analysis

Tools:
- Discovery
- Visualisation
- Mapping
- Analysis
- Annotation

Core principles around open data and infrastructure
The future of biodiversity research and analysis

Enabling/informing
- Discovering and understanding biodiversity
- Incorporating evolutionary dynamics
- Protecting diversity in a changing world
- Sharing knowledge
- Rapid biodiversity analysis

TOOLS:
- Distribution
- Morphology
- Genomic
- Traits
- Species interactions

Evolution

Environment

Taxon information

Biodiversity informatics
<table>
<thead>
<tr>
<th>Category</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Area (sq km)</strong></td>
<td>8.03</td>
</tr>
<tr>
<td><strong>Number of species</strong></td>
<td>2,754</td>
</tr>
<tr>
<td><strong>Number of species - spatially valid only</strong></td>
<td>2,753</td>
</tr>
<tr>
<td><strong>Occurrences</strong></td>
<td>49,036</td>
</tr>
<tr>
<td><strong>Occurrences - spatially valid only</strong></td>
<td>49,034</td>
</tr>
<tr>
<td><strong>Expert distributions</strong></td>
<td>285</td>
</tr>
<tr>
<td><strong>Checklist areas</strong></td>
<td>0</td>
</tr>
<tr>
<td><strong>Checklist species</strong></td>
<td>0</td>
</tr>
<tr>
<td><strong>Biodiversity documents</strong></td>
<td>1</td>
</tr>
<tr>
<td><strong>JournalMap documents</strong></td>
<td>2</td>
</tr>
<tr>
<td><strong>Gazetteer points</strong></td>
<td>2</td>
</tr>
<tr>
<td><strong>Points of Interest</strong></td>
<td>0</td>
</tr>
<tr>
<td><strong>Migratory species - EPBC</strong></td>
<td>0</td>
</tr>
<tr>
<td><strong>Threatened Species (sensitive only lists)</strong></td>
<td>13</td>
</tr>
<tr>
<td><strong>Invasive Species (sensitive only lists)</strong></td>
<td>3</td>
</tr>
</tbody>
</table>
Explore the Atlas of Living Australia

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

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

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

**Mapping & analysis**
Visit the Atlas research portal

**Data sets**
Refine the list of all the data sets available.

**ALA Community**
Partner profiles, collaborations, community activities and engagement.

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**Sharing biodiversity knowledge**
Contributed by Australia’s academic, scientific, environmental communities and you.

**Get involved**

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**Blog & News Updates**
Phylolink to be launched at ASBS Conference 2015

Indigenous Ecological Knowledge: Okola and Killarney Station

Counting Koalas Across the Country: Citizen Science
**Eucalyptus camaldulensis** Dehn.

River Red Gum

### Description

Tree, commonly up to 20 m tall, occasionally reaching 50 m with a trunk diameter of 1 m (source: Prosea)

The river red gum is one of the best known of all eucalypts. It is common along the Murray-Darling river system and along watercourses in much of semi-arid Australia. It is a medium sized tree usually branching not far above the ground. It may reach 30 - 40 metres in height.

The bark is smooth and white or greyish in colour except near the base of the trunk where it is often rough. ... source: Australian Native Plants Society (Australia)

The tree can grow to 45 metres tall, it has smooth bark, ranging in colour from white and grey to red-brown, which is shed in long ribbons. The tree has a large, dense crown of leaves. The base of the bole can be covered with rough, reddish-brown bark. The juvenile and adult leaves are stalked, with the adult leaves broad at the base, tapering to the tip. ... source: Wikipedia

### Online resources
**Eucalyptus camaldulensis** Dehn.

River Red Gum
Eucalyptus camaldulensis Dehnh.

River Red Gum

Names and sources

Accepted name

Eucalyptus camaldulensis

Source

- Australian Plant Census

Common Names

Common name

Source

River Red Gum

- Office of Environment and Heritage
- Customary Medicinal Knowledgebase
- Australian Native Plants Society (Australia)

Blaill

- Australian Plant Names Index

Blue Gum

- Customary Medicinal Knowledgebase

Creek Gum

- Australian Plant Names Index

Flooded Gum

- Australian Plant Names Index

Forest Gum

- Australian Plant Names Index

Murray Red Gum

- Customary Medicinal Knowledgebase

Red Gum

- Customary Medicinal Knowledgebase

River Gum

- Australian Plant Names Index

River Red gum

- Australian Plant Names Index

Yarrah

- Australian Plant Names Index

Yarrow

- Customary Medicinal Knowledgebase

River Redgum

- Encyclopedia of Life

River Gum, River Red Gum

- Plant NET Flora Online

Eucalyptus Camaldulensis Population In The Hunter Catchment

- Office of Environment and Heritage
**Eucalyptus camaldulensis** Dehn.

River Red Gum

### Working classification

- **kingdom**: Plantae
- **phylum**: Charophyta
- **class**: Equisetopsida
- **subclass**: Magnolidae
- **superorder**: Rosanae
- **order**: Myrtales
- **family**: Myrtaceae
- **genus**: Eucalyptus
- **species**: Eucalyptus camaldulensis
  - **subspecies**: Eucalyptus camaldulensis subsp. Torrumberry
  - **subspecies**: Eucalyptus camaldulensis subsp. acuta
  - **subspecies**: Eucalyptus camaldulensis subsp. arida
  - **subspecies**: Eucalyptus camaldulensis subsp. camaldulensis : River Red Gum
  - **subspecies**: Eucalyptus camaldulensis subsp. minima
  - **subspecies**: Eucalyptus camaldulensis subsp. obtusa : Red River Gum
  - **subspecies**: Eucalyptus camaldulensis subsp. refugens
  - **subspecies**: Eucalyptus camaldulensis subsp. simulata : Red gum
**Eucalyptus camaldulensis** Dehnh.

River Red Gum

**Name references found in the Biodiversity Heritage Library**

Showing 1 to 10 of 92 results for the query

"Eucalyptus camaldulensis"

1. *Proceedings of the Linnean Society of New South Wales*. (2 matching pages)
   ![Image](image1.png)

2. *Transactions of the Royal Society of South Australia, Incorporated*. (1 matching page)
   ![Image](image2.png)

3. *The victorian naturalist*. (2 matching pages)
   ![Image](image3.png)

   ![Image](image4.png)
**Eucalyptus camaldulensis** Dehn.

River Red Gum

### Genbank - view all results - Items: 1 to 20 of 42455

- **Eucalyptus camaldulensis** ascorbate peroxidase mRNA, partial cds
  664 bp linear mRNA
  Accession: DQ839845.1 GI: 111434272

- **Eucalyptus camaldulensis** Cu/Zn superoxide dismutase mRNA, partial cds
  390 bp linear mRNA
  Accession: DQ839844.1 GI: 111434270

- **Eucalyptus camaldulensis** alpha-glucan phosphorylase-like mRNA, partial sequence
  353 bp linear mRNA
  Accession: EF374118.1 GI: 134142651

- **Eucalyptus camaldulensis** DNA, scaffold: EcC000710, isolate: CPT-1, whole genome shotgun sequence
  22,785 bp linear DNA
  Accession: DQ8398120.1 GI: 373838699

- **Eucalyptus camaldulensis** DNA, scaffold: EcC000709, isolate: CPT-1, whole genome shotgun sequence
  6,019 bp linear DNA
  Accession: DQ8398128.1 GI: 373838698

- **Eucalyptus camaldulensis** DNA, scaffold: EcC000706, isolate: CPT-1, whole genome shotgun sequence
  3,605 bp linear DNA
  Accession: DQ8398127.1 GI: 373838697

- **Eucalyptus camaldulensis** DNA, scaffold: EcC000705, isolate: CPT-1, whole genome shotgun sequence
  5,577 bp linear DNA
  Accession: DQ8398126.1 GI: 373838696

- **Eucalyptus camaldulensis** DNA, scaffold: EcC000703, isolate: CPT-1, whole genome shotgun sequence
  8,569 bp linear DNA
  Accession: DQ8398125.1 GI: 373838695

- **Eucalyptus camaldulensis** DNA, scaffold: EcC000701, isolate: CPT-1, whole genome shotgun sequence
  3,210 bp linear DNA
  Accession: DQ8398124.1 GI: 373838694
**Eucalyptus camaldulensis** Dehn.

River Red Gum

**Description**

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The tree can grow to 45 metres tall, it has smooth bark, ranging in colour from white and grey to red-brown, which is shed in long ribbons. The tree has a large, dense crown of leaves. The base of the bole can be covered with rough, reddish-brown bark. The juvenile and adult leaves are stalked, with the adult leaves broad at the base, tapering to the tip. ... Source: Wikipedia

**Online resources**
Eucalyptus camaldulensis

Layer name: Eucalyptus camaldulensis

Display as:
- Density grid
- Points

Facet:
- User defined colour

Opacity: 60%

Size: 3

Display spatial uncertainty as a circle

Animation: show
Temperature - annual max mean

Layer name: Temperature - annual max mean

Opacity: 75%

Show legend, hide legend, popup legend

6.0433335 degrees C

35.4675 degrees C
Precipitation - annual

Layer name: Precipitation - annual

Opacity: 75%

View legend options: show legend, hide legend, popup legend

Minimum precipitation: 107.0 mm
Maximum precipitation: 4141.0 mm
My Scatterplot

Species display settings  Download image  Download data

Records selected: 0

SELECT records with missing values (268)

Highlight occurrences on the scatterplot that are in an area

Eucalyptus camaldulensis

Quick links
View metadata for "Eucalyptus camaldulensis"
Download all records for "Eucalyptus camaldulensis"
My Scatterplot

Species display settings  Download image  Download data

Records selected: 49

Precipitation - annual: 1183.34 - 1378.83
Temperature - annual max mean: 27.1237 - 35.5487

SELECT records with missing values (268)

Highlight occurrences on the scatterplot that are in an area

Clear

Eucalyptus camaldulensis

Quick links
View metadata for "Eucalyptus camaldulensis"
Download all records for "Eucalyptus camaldulensis"
Produce scatterplot for "Eucalyptus camaldulensis"
Generate prediction for "Eucalyptus camaldulensis"
My Scatterplot

Species display settings  Download image  Download data

Records selected: 0

SELECT records with missing values (268)

Highlight occurrences on the scatterplot that are in an area
My Area  Clear

Eucalyptus camaldulensis

Quick links
- View area report for "My Area"
- View metadata for "My Area"
- Download species list for "My Area"
- Download all records for "Eucalyptus camaldulensis" in "My Area"
- Generate classification for "My Area"
- Produce scatterplot for "Eucalyptus camaldulensis" in "My Area"
Developing biodiverse plantings suitable for changing climatic conditions 2: Using the Atlas of Living Australia

By Trevor H. Booth, Kristen J. Williams and Lee Belbin

Summary
There has been an increasing investment of taxpayer dollars in revegetation in Australia over the past 20 years, at both federal and state levels. The largest of these, the Australian Government’s Biodiversity Fund, will invest AS946 million to revegetate, rehabilitate and restore landscapes to store carbon, enhance biodiversity and build environmental resilience under climate change. The universal challenge for restoration practitioners working within these programmes is species selection for both current and future environmental conditions at a given site. For policy makers, the challenge is to provide guidelines and tools for this process. The first paper in this series of two papers looked at scientific methods that could provide underpinning knowledge to improve the assessment of species vulnerability to climatic and atmospheric change. In this paper, the publically accessible Atlas of Living Australia is used to demonstrate how revegetation project leaders can assess whether the species and provenances used in their revegetation projects are likely to be suitable for changing environmental conditions. While using the Atlas can assist current selections, ways in which more reliable selections for changing climatic conditions could be made are also outlined.

Key words: Atlas of Living Australia, biodiversity, climate change, revegetation, maxent models, species distribution models.

Introduction

Part 1 of this paper briefly reviewed scientific methods that could be used to assist Australian revegetation programmes to better refine the selection of species and provenances for replanting or direct seeding in the context of a changing climate (Booth et al. 2012). In this context, ‘provenance’ refers to genetic material (e.g. seed or seedlings) when compared with the climate of recent decades (CSIRO/BoM 2012). If eucalypts are any indication, this degree of change is likely to take entire species, let alone regional genotypes, outside their current climatic ranges within a few decades (Hughes et al. 1996). Even widely distributed species may be vulnerable in particular areas near the hotter and/or drier extremes of their current distributions. The existing scientific methods described in Part 1 provide valuable information about (i) current distributions of species and (ii) factors that affect where and how well particular plants will grow and, presumably, reproduce. They are all useful for their intended purposes, but are difficult for nonspecialists to use to assess climate change effects. In their current form, most of the methods are too slow...
Developing biodiverse plantings suitable for changing climatic conditions 2: Using the Atlas of Living Australia

Trevor H. Booth
CSIRO Ecosystem Sciences and CSIRO Climate Adaptation Flagship, GPO Box 1700, Canberra, ACT 2601, Australia

Using biodiversity databases to verify and improve descriptions of tree species climatic requirements

ABSTRACT

Understanding tree species climatic adaptability, as well as climatic conditions within their natural distributions, is crucial for managing forests for both commercial and conservation objectives under climate change. Multi-million dollar investments in biodiversity databases are providing forestry professionals with freely accessible tools to carry out these kinds of analyses for many tree species. The climatic requirements of hundreds of tree species have been described in the commercially available Forestry Compendium developed by CAB International, but these descriptions have often relied on expert opinion where information is lacking. It is desirable that descriptions of tree species climatic requirements should, as far as possible, be explicit, quantitative and based on specific observations. This paper describes how the Atlas of Living Australia (ALA) and the Global Biodiversity Information Facility (GBIF) can provide specific observations to assist verifying and, where necessary, improving descriptions of tree species climatic requirements. It focuses mainly on Australian species as the ALA is one of the most sophisticated biodiversity databases currently available for a single country. However, the ALA also has international relevance as Australian eucalypts and acacias are important plantation species in many countries. Data in the GBIF complement the ALA data by providing very useful information on where Australian tree species are growing outside Australia. Analyses of a commercially important species (Eucalyptus nitens) and a lesser-known species (E. botryoides) demonstrate how descriptions of climatic requirements can be verified and, if necessary, improved. However, the general methods described have the potential to be applied to many tree species. Some of the advantages and disadvantages of these methods are discussed.
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.

Start Phylolink

Explore Phylogenetic Diversity

Collaborators and acknowledgement:
These tools are the result of a collaboration between scientists, the creators of PhylJIVE 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
Phylolink

Overview

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My viz #339

Note

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

Acacia anthochaera
Inflorescence_shape: globular
Inflorescence_colour: lemon yellow to golden
Phyllode_arrangements: scattered
Inflorescence_arrangement: racemose
[click for actions & more info]

Upload your character data

Or, pick a character dataset from the available list:

List of characters available:
- Acacia Characters

Add Character to Tree

Inflorescence_shape

<table>
<thead>
<tr>
<th>characters</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
</tr>
<tr>
<td>8</td>
</tr>
<tr>
<td>6</td>
</tr>
<tr>
<td>4</td>
</tr>
</tbody>
</table>
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.
• 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

Note
You can click on Plot profile button to find out the environmental temperature etc. of a clade. You can pick the environments list by typing into the input box.
My viz #329

Paraserianthes lophantha
Parachidonium prunicolus

Acacia prainii
Acacia camptoedra
Acacia anchoora
Acacia euveliola
Acacia Jessophylla
Acacia brasiliana
Acacia acaesica
Acacia imbricata
Acacia gelasina
Acacia subregiona
Acacia pachyacora
Acacia marlyosa
Acacia prosilangata

Acacia frigilla
Acacia brasiliophylla
Acacia stanleyi
Acacia assimilis
Acacia heterococca
Acacia exalophylla
Acacia comptonphylle
Acacia leptonorata
Acacia declinata
Acacia curvata
Acacia tetragonophylla
Acacia acanthothea

Search tree

Character  Map  Analysis  Help

Plot profile

Precipitation - annual (Bio12)

Note
You can click on Plot profile button to find out the environmental characteristics like precipitation, temperature etc. of a clade. You can pick the environmental parameter from the drop down list, or filter the list by typing into the input box.
My viz #329

Acacia pranili
Acacia cemprbolea
Acacia anthochaera
Acacia suaveolens
Acacia ficiphylla
Acacia triquetera
Acacia acarinna
Acacia amboecata
Acacia gregasina
Acacia subgida
Acacia pachyacora
Acacia murrayana
Acacia praedongana

Acacia fragilia
Acacia brachyphylla
Acacia stanleyi
Acacia assimilis
Acacia heterocita
Acacia aulyophylla
Acacia campylophylla
Acacia leptoneura
Acacia decoburta
Acacia curvata
Acacia tetragonophylla
Acacia acanthaster

Plot profile

Precipitation - annual (B1012)

Note
You can click on Plot profile button to find out the environmental characteristics like precipitation, temperature etc. of a clade. You can pick the environmental parameter from the drop down list, or filter the list by typing into the input box.
My Prediction

Layer name: My Prediction

Opacity: 100%

show legend  hide legend  popup legend

-9999.0 < x
-9999.0 <= x < 0.0
0.0 <= x < 1.0E-4
1.0E-4 <= x < 0.2
0.2 <= x < 0.4
0.4 <= x < 0.6
0.6 <= x < 0.8
0.8 <= x < 1.0
My Scatterplot

Species display settings  Download image  Download data

Records selected: 123  add in/out layers to map

Precipitation - annual: 97.2999 - 276.497
Temperature - annual max mean: 30.4647 - 35.6939

SELECT records with missing values (268)

Highlight occurrences on the scatterplot that are in an area  Clear

Quick links
View metadata for "Eucalyptus camaldulensis"
Download all records for "Eucalyptus camaldulensis"
Produce scatterplot for "Eucalyptus camaldulensis"
Species distribution experiments, at your fingertips.

Want to refine or project an experiment into the future? Log in now.

Model: Maxent
Climate Dataset: Current Climate (5km resolution)
Climate Layers: Annual Mean Temperature, Temperature Seasonality, Maximum Temperature of Warmest Month, Minimum Temperature of Warmest Month, Annual Precipitation, Precipitation Seasonality, Precipitation of Wettest Quarter, Precipitation of Driest Quarter
Run time: 1 second – 5 minutes

Choose from five types of experiments
Explore anyone of our 5 experiments, including Species Distribution Modelling, Climate Change, Species Trait, Biodiverse and Ensemble.
Datasets

The BCCVL offers a number of data collections that can be utilised when conducting experiments within the BCCVL. Each of these collections has numerous layers and variables. In fact, the total number of datasets available through the BCCVL is over 4500. To keep this simple, below is a list of the data collections at your disposal. To visualise these datasets log in to the BCCVL!

Datasets

Biological

- Species Data from the Australian Living Atlas
- User uploaded species data

Climate
Edgar is a website where visitors can explore the future impact of climate change on Australian birds.

Birdwatchers and other experts can improve the accuracy of Edgar's projections by classifying observations.

Edgar shows locations where a bird species has been observed and uses this information to calculate and display how well the climate the climate across Australia suits that species.

Edgar can also show an animation of how the suitable climate for a species may change into the future.

tell me more »

Edgar requires a modern web browser with JavaScript enabled. If you are using an older version of Microsoft Internet Explorer, the Chrome Frame plug-in from Google can significantly improve your experience of this site.

This project is supported by the Australian National Data Service (ANDS) through the National Collaborative Research Infrastructure Strategy Program and the Education Investment Fund (EIF) Super Science Initiative, as well as through the Queensland Cyber Infrastructure Foundation (QCIF)

This site by the Centre for Tropical Biodiversity & Climate Change and the eResearch Centre, James Cook University is licensed under a Creative Commons Attribution 3.0 Australia License.
Edgar was developed by a team at JCU's eResearch Centre and uses data from the Atlas of Living Australia. The project maintains a development blog and the source code is available on github.

The principal researcher and project advisor is Dr Jeremy VanDerWal.

Contact Dr VanDerWal »

This project was supported by the Australian National Data Service (ANDS) through the National Collaborative Research Infrastructure Strategy Program and the Education Investment Fund (EIF) Super Science Initiative, as well as through the Queensland Cyber Infrastructure Foundation (QCIF)
Thank you

www.ala.org.au