



## Collaboration the key to conserving Australia's unique native plant life

Australia's unique native plant life is under threat, with 75% of our native vegetation impacted due to varying degrees of disturbance or neglect since the first Europeans came to Australia.

The Genomics for Australian Plants Framework Initiative establishes a nationally-inclusive and collaborative platform that will facilitate research using genomics approaches towards a more thorough understanding of the evolution and conservation of our unique flora.

The project is led by researchers from the Australian State and National Herbaria and Botanic Gardens community and will be driven by the plant research community, bringing together researchers, data specialists, state governments, commonwealth government agencies and plant conservation agencies.

Genome sequencing is providing significant genetic information for many of the world's plant species, however, Andrew Gilbert, General Manager of Bioplatforms Australia believes that more can be achieved in Australia through an innovative collaborative approach. "Australia has a long history of cooperation and creation of world-class and game changing approaches such as Australia's Virtual Herbarium (AVH), a single portal for critical biodiversity information and a global first. Similarly, this initiative will place Australia at the forefront of understanding plant evolution and conservation," he said.

Professor David Cantrill, the scientific lead of the initiative and Executive Director of Science at the Royal Botanic Gardens Victoria, says "Using genomics has accelerated our understanding and ability to conserve Australian plant diversity, however, collaboration will advance our depth and breadth of knowledge significantly."

This new initiative will create genomic infrastructure across the 'Plant Tree of Life' with the sequencing of key/strategic native plant specimen/species. The integrated network built across the country will collaborate in the collection, management, dissemination and application of genomic data for Australian plants.

"Building this network will provide herbaria and conservation agencies with tools enabling genetic data to be used to identify and classify biodiversity at a range of scales to inform conservation management of Australia's rich plant biodiversity and support better decision-making, which is vital for future sustainability" said Dr Margaret Byrne, Director of Biodiversity and Conservation Science at the Western Australian Department of Biodiversity, Conservation and Attractions.

Australia's unique flora is the result of millions of years of isolated evolution prior to collision with the Asian continent and subsequent floral exchange. There is an astounding 24,000 species of native vascular plants, many of which are found nowhere else in the world. These plants have evolved highly diverse traits to thrive in the continent's varied and often harsh climates and provide a unique landscape to the region. This diversity is reflected in the high variation in size and the complexity of Australian plant genomes, ranging from a fiftieth to 50 times that of the human genome (60Mb to ~150Gb).

"Genomic information is the new research frontier for biological collections globally. The consortium will allow the Australian plant research community to unlock evolutionary, conservation and phylogenetic data from plant specimens that have been collected since the late 1770s. This will help us to better manage and conserve Australia's unique plants and plant communities for future generations." said Dr Linda Broadhurst, Director of the Centre for Australian National Biodiversity Research at CSIRO

Australian native plants support many important sectors of the Australian economy, including agriculture, forestry, fisheries, aquaculture and tourism. For the local Indigenous communities, the land and its resources have underpinned Indigenous history, innovation, culture, spirituality and economics for tens of thousands of years. But Australia's native flora has suffered from various degrees of disturbances since the first Europeans came to Australia.

"It is vital that we move quickly to conserve our unique native flora. Genomic approaches offer the possibility of revealing the enormous information in nuclear genomes for plant evolutionary and conservation studies to significantly improve conservation management decisions." says Prof Cantrill.

The consortium will carry out an initial pilot on three native plant species: the golden wattle (*Acacia pycnantha*) native to Australia's Capital territory and the floral emblem of Australia; an Australian endemic spider flower native to Western Australia (*Areocleome oxalidea*); and the Waratah (*Telopea speciosissima*) native to the south-eastern parts of Australia and the NSW state emblem.

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## **NOTE TO EDITORS:**

### 1) Current consortium members include:

Australian National Herbarium, Australian Tropical Herbarium, Medicinal Plant Herbarium and Southern Cross Plant Science – Southern Cross University, NCW Beadle Herbarium – University of New England, Queensland Herbarium, Royal Botanic Garden Sydney, Royal Botanic Gardens Victoria, State Herbarium of South Australia, University of Melbourne Herbarium, Department of Biodiversity, Conservation and Attractions - Western Australian Herbarium and Kings Park Science, CSIRO, La Trobe University, University of Adelaide, University of Melbourne, Australian National University, Western Sydney University, Government of Western Australia, TERN and Atlas of Living Australia.

### 2) Funding

The project is supported by funding from Bioplatforms Australia through the Australian Government National Collaborative Research Infrastructure Strategy (NCRIS), the Royal Botanic Gardens Victoria, the Department of Biodiversity, Conservation and Attractions and CSIRO. The initiative is the recipient of a grant from The Ian Potter Foundation.

### 3) Definition – ‘Plant Tree of Life’

The tree of life is used to explain the relationships between the different species on Earth. From microorganisms to trees to fungi and animals, life has evolved through time down countless pathways to provide us with the incredible present-day collection of different species.

The Plant Tree of Life specifically focusses on the plant world, its diversity, origin and evolution.

### 4) Imagery available for the 3 species selected for the initial pilot study at

(<https://www.dropbox.com/sh/u7iam1h214skg23/AABrnnDVoXLXiMrDSt1DoGRDa?dl=0>)