

Eucalyptus Study Group Newsletter

July 2016

No. **66/67**

Study Group Leader
Warwick Varley
PO Box 456, WOLLONGONG, NSW 2520
Email: tallowwood@hotmail.com

Membership Officer
Steve Harries
50 Nardoo Rd., PEATS RIDGE, NSW 2250
Email: abodepool@bigpond.com

Eucalyptus Study Group Website
Web address: <http://asgap.org.au/EucSG/index.html>

Eucalyptus Facebook page
Web address: <http://www.facebook.com/pages/Eucalyptus-Trees/124249007754284?ref=hl>

Contents

- Vale: Dr Ian Brooker, expert in the eucalyptus genus – SMH
 - Abstract- Phylogenomics of the green ash eucalypts (Myrtaceae): a tale of reticulate evolution and misidentification
 - Eucalyptus marking History; Australian Government
 - Abstract- Mistletoes increasing in eucalypt forest near Eden, New South Wales
 - Abstract- Living (and reproducing) on the edge: reproductive phenology is impacted by rainfall and canopy decline in a Mediterranean eucalypt
 - New tree species selected for Northbourne Avenue, (ACT) corridor - Andrew Benson
 - The Flowering Gums; *Corymbia ficifolia* and cultivars - Linda Ross care of the Garden Clinic
 - Species profile: *Corymbia ficifolia*; Red-flowering gum – *Euclid*
 - Grafted Flowering Gums - Tarrawood Native Nursery
 - Notes from Angus Stewart on the Red flowering gum - Angus Stewart
 - Cultivar profile: Eucalyptus Little Star; *Eucalyptus forresterae* – Austraflo
 - Cultivar profile: Eucalyptus Purple Patch; *Eucalyptus lansdowneana ssp albopurpurea*– Austraflo
 - Cultivar profile: Eucalyptus Euky Dwarf; *Eucalyptus leucoxydon* (dwarf selection) – Austraflo
 - Abstract- Impact of high-severity fire in a Tasmanian dry eucalypt forest
 - Web link: How Trees talk to each other
 - Abstract: Feeling the cold in a warming climate: differential effects of low temperatures on co-occurring eucalypts
 - Abstract: Eucalypts face increasing climate stress
 - Hawkesbury Forest Experiment; A Global Change Experiment
 - Abstract: Fire regime and vegetation change in the transition from Aboriginal to European land management in a Tasmanian eucalypt savanna
-

Vale: Dr Ian Brooker, expert in the eucalyptus genus

DR IAN BROOKER 1934 – 2016

Source: SMH; 27 JULY 2016

Ian Brooker was for much of his life widely considered to be the leading authority of the eucalyptus genus, collecting and identified specimens from all over the world by combining his love of travel and discovery with scientific knowledge. Such was his contribution that the Brooker's gum or *Eucalyptus brookeriana* was named in his honour.

Murray Ian Hill Brooker was born on June 2 1934 to Flossie and Murray Brooker. Ian was educated at East Adelaide Primary School and later at the prestigious St Peter's College where he had been awarded a full academic scholarship.



Though social in later life, he was a quiet child, focused on his studies in school and then at university, obtaining a bachelor of agricultural science from the University of Adelaide. He worked with the soil conservation branch of the Department of Agriculture in South Australia from 1957 to 1963; then joined the Department of Botany at the Australian National University, undertaking further studies until 1969; and then spent a year with the Western Australian Herbarium.

In 1970, Brooker joined the Forest Research Institute in Canberra, now part of CSIRO, where he worked in the Australian National Herbarium in Canberra. His research from that time was centred on the taxonomy and identification of the eucalyptus genus. He published more than 100 research papers, 180 leaflets, four books, and is the principal author of *Forest Trees of Australia*. His specialist knowledge led to the production of the interactive computer key to the eucalyptus, EUCLID, in ever more comprehensive editions from 1997 to 2008.

In his role as a eucalypt specialist, he travelled widely throughout the world, including the US, Brazil, most European countries, southern and eastern Africa, Morocco, Israel, India, China, and New Zealand. In 1980-81 he was appointed Australian botanical liaison officer at the Royal Botanic Gardens in Kew, Britain.



In a private capacity he published the popular *Field Guide to Eucalypts*, Vol. 1 in 1983, Vol. 2 in 1990, and Vol. 3 in 1994, in collaboration with David Kleinig with whom he worked in the CSIRO Division of Forest Research. Brooker described 44 taxa of eucalyptus on his own, but collaborated widely and jointly described another 172. His name was honoured in 1979 when Alan Gray described Brooker's gum or *Eucalyptus brookeriana*.

Since 1993 he mentored Dean Nicolle, who now runs the largest eucalyptus arboretum in the world in Currency Creek, South Australia, containing more than 900 species.

Through these travels he discovered a love for the art and music of Eastern Christian Orthodoxy, and wrote long memoirs of these experiences. Though largely focused around his work,

Brooker's travel was formative in his other great passions for literature, art and music. He wrote many memoirs of his experiences, from being interrogated for hours by KGB officers in Siberia, to discovering the sublime beauty of orthodoxy in Sofia, Bulgaria, to complaining about blowflies found in a salad roll purchased at the WACA.

He also was a passionate and loyal friend, travelling across Australia and the world to spend time in conversation with those he loved. Partly because Brooker lived and travelled alone, he was able to deeply experience his surroundings, his friends and the culture of each place he visited or lived. For him, the most sublime experiences were reading a passage of Dostoyevsky, listening to orthodox liturgy in a majestic cathedral, or gazing upon a great piece of art, whether a Byzantine icon, a Cezanne or a still life by Margaret Olley. As he oft quoted from Byron: "There is a pleasure in the pathless woods, There is a rapture on the lonely shore, There is society, where none intrudes ..."

Brooker was bestowed an honorary doctorate of science by the Australian National University, and in 2006 was awarded membership to the Order of Australia, with his sister Rosalie in proud attendance at the ceremony.

Though suffering from increased physical difficulty in his last months, Brooker was intellectually active for all his later life, working in an honorary capacity at the CSIRO until 2015. He became part of a notorious group of friends who gathered at the Debacle pub in Canberra four or five times a week, to share stories, argue and debate matters of life, love and everything else that goes with a glass of Marlborough sauvignon blanc.

He maintained an especially close relationship with his great-niece Melissa Frost and her three children, along with many other members of his family whom he often visited in South Australia. Though never married, he was a loving brother to his three sisters and uncle to ten nieces and nephews spanning three generations.

Abstract- Phylogenomics of the green ash eucalypts (Myrtaceae): a tale of reticulate evolution and misidentification

Susan Rutherford^{A B C}, Peter G. Wilson^B, Maurizio Rossetto^B and Stephen P. Bonser^A

^A Evolution and Ecology Research Centre, School of Biological, Earth and Environmental Sciences, UNSW Australia, Sydney, NSW 2052, Australia.

^B National Herbarium of NSW, Royal Botanic Garden Sydney, Mrs Macquaries Road, Sydney, NSW 2000, Australia.

^C Corresponding author. Email: susan.rutherford@rbgsyd.nsw.gov.au

Australian Systematic Botany 28(6) 326-354 <http://dx.doi.org/10.1071/SB15038>

Submitted: 3 September 2015 Accepted: 7 December 2015 Published: 10 May 2016

Eucalyptus is a genus that occurs in a range of habitats in Australia, Papua New Guinea, Timor, Sulawesi and the Philippines, with several species being used as sources of timber and fibre. However, despite its ecological and commercial significance, understanding its evolutionary history remains a challenge. The focus of the present study is the green ashes (subgenus *Eucalyptus* section *Eucalyptus*). Although previous studies, based primarily on morphology, suggest that the green ashes form a monophyletic group, there has been disagreement concerning the divergence of taxa. The present study aims to estimate the phylogeny of the green ashes and closely related eucalypts (37 taxa from over 50 locations in south-eastern Australia), using genome-wide analyses based on Diversity Arrays Technology (DArT). Results of analyses were similar in topology and consistent with previous phylogenies based on sequence data. Many of the relationships supported those proposed by earlier workers. However, other relationships, particularly of taxa within the Sydney region and Blue Mountains, were not consistent with previous classifications. These findings raise important questions concerning how we define species and discern relationships in *Eucalyptus* and may have implications for other plant species, particularly those with a complex evolutionary history where hybridisation and recombination have occurred.

Eucalypts marking history

Source: Australian Government; <http://www.australia.gov.au/about-australia/australian-story/eucalypts>

Just as eucalypts mark the Australian landscape, so too there are individual trees that mark out points of Australia's history.

Old Gum Tree – Glenelg, South Australia

On 28 December 1836 the establishment of the new colony of South Australia's government was proclaimed. The Old Gum Tree in Glenelg marks the supposed site of this proclamation, though there has been considerable debate as to whether it is the actual site.

Herbig's Tree – Springton, South Australia

When Johann Friedrich Herbig arrived in the colony of South Australia in 1855, his first home was the large hollow trunk of a river redgum tree. The tree, six metres across its widest point, had a hollow opening which faced away from the direction of rain. It was conveniently located on the banks of a stream 1.5 km from the dairy where Herbig worked. In 1858 Herbig married, and the family continued to live in the tree until 1860. After the birth of their second child, the family decided they needed more room, and moved into a hut. Herbig's Tree is located on the main road in Springton.

Burke and Wills 'Dig Tree' – Thargomindah, Queensland



Burke and Wills Dig Tree, Thargomindah. Image Courtesy of the Queensland Heritage Register.

Burke and Wills were the first explorers to traverse the continent from south to north, opening up the country to pastoralism, though the expedition itself proved disastrous. In December 1860 Burke and seven men established Camp LXV (65) at Cooper's Creek where Burke split his party before pressing on to the Gulf accompanied only by Wills, King and Gray.

Brah, Thomas McDonough, William Patten and Dost Mahomet were instructed by Burke to wait for at least three months (the more cautious Wills preferred four months). On the morning of 21 April, Brah embarked on the four-hundred-mile return journey to Melbourne, having carved three separate messages into a Coolibah tree on the banks of Cooper's Creek. The 'Dig Tree' in south-west Queensland marked a buried cache containing provisions.

Burke's party reached Camp LXV on the evening of 21 April 1861 to discovered that Brah had departed that same day. This marked the beginning of a series of missed opportunities and failed communications with Burke departing and Brah returning once more to Camp LXV. Only King survived the expedition.

Called in 1911 by the Sydney Mail 'William Brah's Tree', in 1928 the Royal Geographical Society of South Australia referred to the tree as the 'Depot Tree'. Frank Clune's 1937 book *Dig* has been credited with changing the tree's popular, and still-current name, to the 'Dig Tree'. The Burke and Wills Dig Tree eventually came to be regarded as central to the story of the expedition, partly as a result of John Longstaff's iconic 1907 painting exhibited in the National Gallery of Victoria, *The arrival of Burke, Wills and King at the deserted camp at Coopers Creek*.

The Burke and Wills 'Dig Tree' is one of Australia's national icons. It is an enduring reminder of our pioneering spirit. It is believed that the coolibah tree is 200 to 250 years old. The land surrounding the tree is under the trusteeship of the Royal Historical Society of Queensland.

Tree of Knowledge – Barcaldine, Queensland



Barcaldine Tree of Knowledge<, J.W. Wilson Award for Building of the Year Central Queensland, Brian Hooper Architect and m3architecture. Photo by Jon Linkins. Image courtesy of Australian Institute of Architects.

The Tree of Knowledge is a symbol of an important time in Australia's political development. The ghost gum was used by shearers as a meeting place during their unsuccessful strike in 1891. During that strike, as well as the maritime strike of 1890, a crucial and historical connection was forged between unions and what was to become the Australian Labor Party.

The Tree of Knowledge has since become immortalised in Australian political history as the place where the Australian Labor Party was founded. The John Oxley Library holds the original world heritage-listed Manifesto of the Queensland Labour Party to the People of Queensland (dated 1882).

In April 2006 the Tree of Knowledge was poisoned and did not recover. It was felled the following year, but the site is still considered an important place of National Heritage.

Following the poisoning of the original tree in 2006, cuttings held in storage were used to make new cuttings. A grafted plant from the Tree of Knowledge is planted beside the State Library, home to the John Oxley Library.

Visual arts

As a major feature of the Australian landscape, eucalypts feature strongly in Australian art as Australian painters attempted to capture the unique quality of the Australian bush. Early colonial landscapes conveyed the eucalypt as a towering presence, albeit often with the dense green foliage of typical of European trees instead of the lighter open canopy to which we are now accustomed. Art from the Heidelberg School often features landscapes framed by eucalypts.

Cazneau Tree – South Australia

In 1937 Harold Cazneau photographed a red gum in Wilpena Pound, in South Australia's Flinders Ranges. The photograph, titled *The Spirit of Endurance*, was reproduced on calendars and posters all over the world and won many awards in Australian and International exhibitions. The tree became known as the Cazneau Tree.



Harold Cazneau (1878–1953), The Spirit of Endurance, 1937. Image Courtesy of the State Library of South Australia.

In May 1941 Cazneau reportedly wrote:

This giant gum tree stands in solitary grandeur on a lonely plateau in the arid Flinders Ranges, South Australia, where it has grown up from a sapling through the years, and long before the shade from its giant limbs ever gave shelter from heat to white men. The passing of the years has left it scarred and marked by the elements – storm, fire, water, – unconquered, it speaks to us from a Spirit of Endurance. Although

aged, its widespread limbs speak of a vitality that will carry on for many more years. One day, when the sun shone hot and strong, I stood before this giant in silent wonder and admiration. The hot wind stirred its leafy boughs, and some of the living elements of this tree passed to me in understanding and friendliness expressing The Spirit of Australia.

Hans Heysen

Gum trees and pastoral landscapes were favourite subjects for Hans Heysen (1877–1968). Probably more than any other artist, Hans Heysen changed the way Australia saw the gum tree. Heysen trained his eye on the eucalypts in the landscape of Hahndorf, the Adelaide Hills and Flinders Ranges.

Albert Namatjira



Albert Namatjira (1902-1959), *Ghost gum*, c.1948, watercolour. Image courtesy of the National Gallery of Australia: NGA 2008.241.

The grandeur and spirit of eucalypts was captured on canvas in an iconic fashion by Albert Namatjira. Namatjira's renditions of gums in his country became iconic symbols of the Australian spirit.

Literature and poetry

Eucalypts have also made their presence felt in literature and poetry. Australian writers have attempted to capture the nature of its presence in the landscape. Its nature is seen as both pervasive and evocative. Banjo Paterson describes how the 'subtle strange perfume' of the eucalyptus in blossom drifting amongst the leaves, ferns and grasses overlays the Australian landscape from the mountains, the swamps and the hills of pine.

There came a whisper down the Bland between the dawn and dark, Above the tossing of the pines, above the river's flow; It stirred the boughs of giant gums and stalwart ironbark; It drifted where the wild ducks played amid the swamps below; It brought a breath of mountain air from off the hills of pine, A scent of eucalyptus trees in honey-laden bloom; And drifting, drifting far away along the southern line It caught from leaf and grass and fern a subtle strange perfume.

A.B. 'Banjo' Paterson, *The wind's message*

Many other writers have also attempted to capture the sometimes overwhelming and defining nature of the eucalypt; 'A galah done like a dinner/ In burning eucalypts (Peter Nicholson, *Gifts*) Scribbly gums, Blue Mountains National Park. Australia's obsession with eucalypts becomes a metaphor for obsession in Murray Bail's award-winning novel *Eucalyptus* (1998). Bail's work centres around a man whose obsession with eucalypts won't be relinquished until his daughter's suitors are able to name all species.

The smell of eucalyptus has created both a yearning and recognition of its fragrance and associated qualities.

I'm yearning for the fragrance of eucalyptus gums and kookaburras laughter through
John Hayes, *Longing for My Homeland*

The smell is also a trigger for memory

*Here in Great-grandpa's hut
an invocation of eucalyptus...*

Ian C Smith: *Your hair was so yellow*

Combined with other characteristics it also becomes part of the quintessential experience of growing up in Australia.

*the laugh of wet-haired youths
around a Zepher 6, the smell of insect repellent and eucalyptus and the distant constant slowly listless bang
of the flywire door*

Dylan Thompson, *A child's Christmas in Warrnambool*

Abstract- Mistletoes increasing in eucalypt forest near Eden, New South Wales

R. J. Turner ^{A C} and Peter Smith ^B

^A 24 Hume Road, Lapstone, NSW 2773, Australia.

^B 44 Hawkins Parade, Blaxland, NSW 2774, Australia.

^C Corresponding author. Email: rj.turner@bigpond.com

Australian Journal of Botany 64(2) 171-179 <http://dx.doi.org/10.1071/BT15253>

Submitted: 4 November 2015 Accepted: 25 February 2016 Published: 1 April 2016

Mistletoe proliferation has contributed to eucalypt decline in rural lands in south-eastern Australia, but has seldom been recorded within forests. We report here on mistletoes increasing deep inside extensive eucalypt forest near Eden. Mistletoes (chiefly *Amyema pendula* (Sieber ex Spreng.) Tiegh., some *Muellerina eucalyptoides* (DC.) Barlow) were counted in 180 plots in various logging and burning treatments within a long-term experimental area. In 141.4 ha, there were 516 mistletoes in 1990–1991, and 1478 mistletoes in 2004–2006. The number of trees with mistletoes increased (doubling in logged coupes and almost tripling in unlogged coupes), and the number of mistletoes per tree increased (by ~30%). However, mistletoe prevalence remained low in 2004–2006 (2.7% of trees in logged coupes and 3.7% in unlogged coupes). Intensive logging limited the increase in mistletoe-bearing trees, probably because there were fewer trees available in logged coupes, but had no significant effect on the increase in mistletoes per tree. Low-intensity prescribed burns had no significant effect on mistletoe numbers, even with a high frequency of burning, probably because of their low scorch heights. We suggest that the observed increase in mistletoes in this forest, rather than indicating an ecological imbalance, is part of a natural cycle of boom and bust, with populations crashing in severe wildfires.

.....

Abstract- Living (and reproducing) on the edge: reproductive phenology is impacted by rainfall and canopy decline in a Mediterranean eucalypt

T. L. Moore ^{A C}, K. X. Ruthrof ^A, M. D. Craig ^{A B}, L. E. Valentine ^{A B}, G. E. St J. Hardy ^A and P. A. Fleming ^A

^A State Centre of Excellence for Climate Change, Woodland and Forest Health, School of Veterinary and Life Sciences, Murdoch University, 90 South St, Murdoch, WA 6150, Australia.

^B ARC Centre of Excellence for Environmental Decisions, School of Plant Biology, University of Western Australia, 35 Stirling Hwy, Crawley, WA 6009, Australia.

^C Corresponding author. Email: t.moore@murdoch.edu.au; mooretraceylee@gmail.com

Australian Journal of Botany 64(2) 129-141 <http://dx.doi.org/10.1071/BT15004>

Submitted: 9 January 2015 Accepted: 22 December 2015 Published: 26 February 2016

Many of the worlds' forests and woodlands are currently showing symptoms of declining condition due to a range of factors, including changing climatic conditions, drought and insect herbivory. Altered abiotic and biotic conditions can influence the condition of trees that can, in turn, affect tree reproductive cycles. However, the potential impact of tree decline on reproductive cycles has rarely been examined. This study investigated the influence of canopy condition on the reproductive cycle of *Eucalyptus wandoo* Blakely in south-western Australia. Canopy and seed trap monitoring were used to assess bud production, flowering, fruiting and seed fall over 12 months at 24 sites across two locations (Dryandra Woodland and Wandoo Conservation Park). Time since last fire, rainfall, ambient temperatures and the condition of individual trees were recorded. We found that bud production, flowering and fruiting was correlated with tree condition: healthier trees were generally associated with higher reproductive effort. Time since last fire was also strongly related to the reproductive efforts at both locations. Declining annual rainfall and increased temperatures also impact on reproduction, made evident by the aborted flowering in Dryandra Woodland. Decline in tree condition, coupled with changes in climate, have major implications for flowering phenology of this species and

have the potential to alter reproductive effort, recruitment and future population dynamics. Consideration of these issues should be incorporated into the conservation management of *E. wandoo* and similar Eucalypt species.

.....

New tree species selected for Northbourne Avenue, (ACT) corridor

Source: Andrew Benson; <http://www.capitalmetro.act.gov.au/news-and-resources/media-releases/new-tree-species-selected-for-northbourne-avenue-corridor>

Following community consultation and further technical analysis, the *Eucalyptus mannifera* has been selected as the new preferred tree for the Northbourne Avenue corridor, Minister for Capital Metro Simon Corbell announced today.

“Earlier this year community feedback was invited on the landscaping vision for Northbourne Avenue as part of Capital Metro’s urban design consultation,” Mr Corbell said.

“As a result of this consultation and of further advice from industry experts the *Eucalyptus mannifera* has been selected as the preferred species to be the fourth generation of trees along the Northbourne Avenue corridor.

“The selection of *Eucalyptus mannifera* was made following extensive consultation with the public and experts and included input from Parks and Territory Services, dsb Landscape Architects, an expert arborist, the Australian National Botanic Gardens, Provincial Nursery and Yarralumla Nursery.

“I am pleased to say that this tree selection has been endorsed by National Capital Authority.”

Earlier work had identified the *Eucalyptus rossii*, better known as Scribbly Gum, as a possible new species for the median on Northbourne Avenue. However further analysis of the existing soils within the Northbourne Avenue median found the soil make-up could impact on the success of *Eucalyptus rossii*.

A set of design and performance criteria as well as advice from relevant experts had originally led to *Eucalyptus rossii* and *Eucalyptus mannifera* being identified as the two suitable eucalypt species for the corridor.

“While measures could be taken to modify the existing soils in the median of Northbourne Avenue, *Eucalyptus mannifera* is the preferred species for the corridor as it is better suited to the existing soil conditions,” Mr Corbell said.

“*Eucalyptus mannifera* is a local species that occurs naturally on Black Mountain and in many areas throughout the Gungahlin region. Grown for its ornamental value, it is an attractive, stately tree that is also widely planted in Canberra as an urban tree with more than 100,000 planted in streets and parks.

“There are many fine examples of *Eucalyptus mannifera* planted across the city including in some of the older streets in Canberra such as in the median of Captain Cook Crescent in Griffith, on the verges of Northbourne Avenue and in the verges at the southern end of Mugga Way in Red Hill.”

The selection of a suitable replacement tree species for the Northbourne corridor is significant as it represents the fourth generation of trees to be planted within the median since around 1913.

“Many of the trees remaining in the median on Northbourne Avenue are in decline and will need to be replaced in the near future regardless of the light rail project,” Mr Corbell said.

“Between 2010 and 2014 the number of trees on the Northbourne Avenue and Federal Highway median of the light rail corridor reduced from 802 to just 484 through failing health, storm damage and removal of dead and dangerous trees. Furthermore, the 2014 assessment of the trees in the corridor found only 59% of the remaining trees were healthy.

“The selection of a suitable species to replace the current Eucalyptus elata trees is important as it creates the sense of arrival to the nation’s capital. The overarching landscape design for light rail, including the selection of Eucalyptus mannifera, will uphold the grand boulevard character of Northbourne Avenue.”

Eucalyptus mannifera is commonly known as Brittle Gum or Red Spotted Gum. The name Brittle Gum refers to the useability of the wood (i.e. for use as furniture).

The Flowering Gums; *Corymbia ficifolia* and cultivars

Source: Linda Ross care of the Garden Clinic; <http://www.gardenclinic.com.au/how-to-grow-article/flowering-gums?pid=44203>

Fact file

Name: *Corymbia ficifolia* and cultivars

Belongs: to the Myrtaceae family

Origins: Mainly Australia, some from Papua New Guinea

Flowering: Summer (usually December)

Corymbia is a fairly recent genus (previously in *Eucalyptus*) of about 110 species of evergreen trees, generally known as “bloodwoods”, with outstanding terminal flowers. Their nectar-rich flowers are white, yellow, cream, red, pink or orange with stamens held in cup-like bases. Urn-shaped capsules form after flowers fade, against aromatic gum leaves. They enjoy full sun and are tolerant of drought and light frost once established, can tolerate pruning if you so desire and need little else. Most are fast-growing and long-lived, however growing species outside of their endemic region can be problematic, with Western Australian species struggling in the wet, humid summers of the Eastern states. *Corymbia ficifolia* (*Eucalyptus ficifolia*) – one of Western Australia’s best, with red, orange, white or pink flowers and a rounded canopy to 9m tall, thrives in low humidity, however the following Summer Series hybrids have been developed for gardens across to Sydney and up to Brisbane. Grafting has made them tolerant of most soil types and also insures that vigour, colour and size grow ‘true to type’.



‘Summer Beauty’ – soft pink flowers, to 5m tall.

Photo - Linda Ross

Summer: Should you not notice yours flowering, the noise from the party the Lorikeets are having in it will give you a hint! Fluffy, fluorescent-like stamens appear at the ends of each branch, so wonderfully bright in colour. Prune off spent flowers on young trees in January so they don’t put all their energy into developing big gumnuts. Established trees don’t have to be pruned so you can choose to let the birds continue

with their after-party amongst the gumnuts, or prune lightly after flowering to create an even better floral display next year.

Autumn: Tidy up any wayward growth.

Winter: Mulch around the base, in preparation for spring and summer.

Spring: Fertilise in early spring with a native fertiliser. The recommended time to plant a young tree is in early spring, after the threat of frost has passed. A free draining spot is best; improve the soil with composted cow manure and slightly mound-up the planting location. This will improve drainage and root development. Avoid disturbing the root ball unless roots are 'pot bound', in this case, lightly tease out the lower roots. Plant centrally in the mound at a depth not above the graft union; identified by a change in bark colour. Firm down the soil lightly and water in well with a seaweed solution.



'Summer Glory' – vibrant pink flowers, 4-6m tall.

Photo - Linda Ross



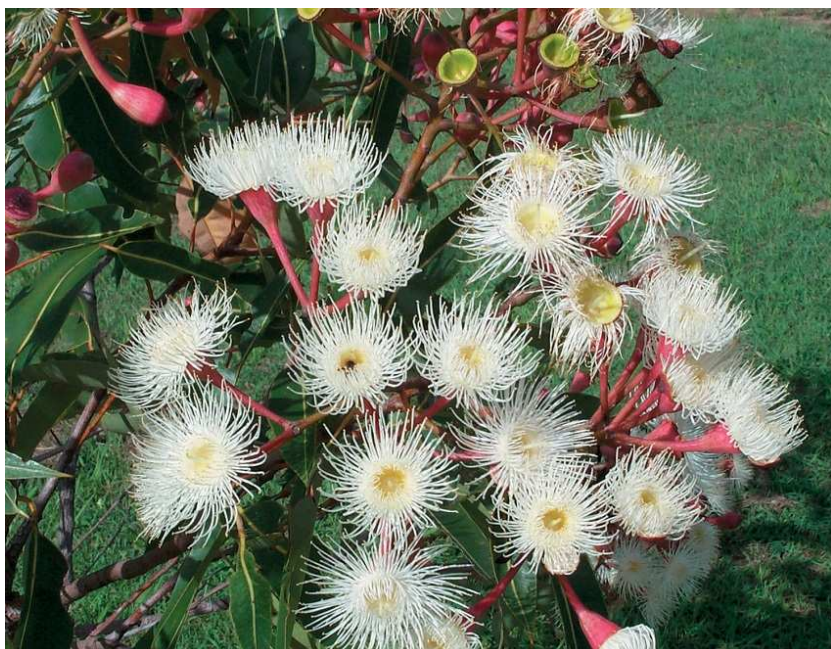
Orange Splendour.

Photo - Linda Ross



Brilliant Orange.

Photo - Linda Ross



Summer Snow.

Photo - photolibrary.com

Species profile: *Corymbia ficifolia*; Red-flowering gum

Source: Euclid: https://www.anbg.gov.au/cpbr/cd-keys/euclid3/euclidsample/html/Corymbia_ficifolia.htm

Corymbia ficifolia (F.Muell.) K.D.Hill & L.A.S.Johnson, *Telopea* 6: 245 (1995).

Corymbia ficifolia: Latin *fici*, of figs and *folium*, leaf, referring to the leaf shape.

Eucalyptus ficifolia F.Muell., *Fragm.* 2: 85 (1860). T: Western Australia: Broke Inlet, G. Maxwell *s.n.*; holo: MEL; iso: K.

Eucalyptus ficifolia F.Muell. var. *carmina* Blakely, *Key Eucalypts*: 85 (1934). T: cultivated New South Wales: Domain plot, tree on W. side, W.F. Blakely, 2 Jan. 1925; lecto: NSW [*fide* K.D.Hill & L.A.S.Johnson, *Telopea* 6: 245 (1995)].



Description

Tree, usually small and straggly, to 10 m tall. Forming a lignotuber.

Bark rough to the small branches, fibrous, rarely tessellated, brown to grey-brown.

Branchlets lacking oil glands in the pith.

Juvenile growth (coppice or field seedlings to 50 cm): stems round in cross-section, sometimes scabrid on the lower portion; juvenile leaves petiolate, alternate, ovate to broadly lanceolate, bases cordate to rounded to truncate, lower leaves sometimes scabrid.

Adult leaves alternate, petioles 0.8–2 (2.5) cm long; blade ovate to broadly lanceolate, 7–13 (15) cm long, (2.2) 2.5–5 (5.5) cm wide, flat to slightly undulate, dull to slightly glossy, discolorous, darker green above, paler below, base tapering to the petiole, occasionally rounded, margin entire, apex acute, side-veins penniveined, reticulation very dense, intramarginal vein present but very close to the leaf margin (almost confluent), oil glands obscure or absent, island.

Inflorescences terminal, peduncles 1.5–3.2 cm long; buds 7 per umbel, pedicels 1.3–2.7(4) cm long. **Mature buds** obovoid to pyriform, 1.2–1.8 cm long, 0.6–0.8 cm wide, surface smooth (not scurfy), scar absent, operculum rounded to flattened, stamens inflexed, anthers oblong, versatile, dorsifixed, dehiscing by longitudinal slits, style long and straight, stigma papillate (mop-like), locules commonly 3 (rarely 4), ovules not in regular rows. Flowers bright red to pink to orange.

Fruit pedicellate (pedicels 1.5–2.7(4)) cm long, urceolate (rarely truncate-ovoid to truncate-globose), 2–4.2 cm long, 1.8–3 cm wide, disc vertically descending, valves 3 (rarely 4), deeply enclosed.

Seed dark brown to black, ellipsoidal with terminal wing, often extending narrowly along margins also, 12–18 mm long (including wing).

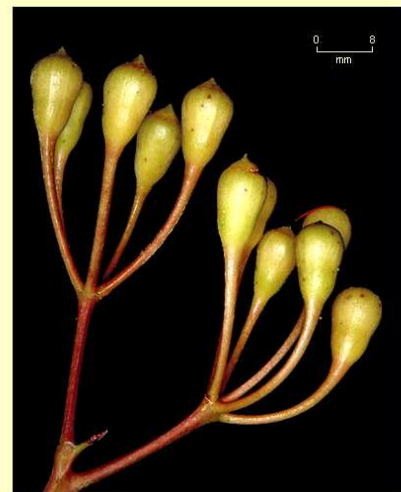
Cultivated seedling (measured at node 10): cotyledons reniform to orbicular; stems round in cross-section, scabrid to ca the 6th node; leaves petiolate, opposite for the first 2 nodes then alternate, broadly lanceolate, 6.5–14 cm long, 3.5–6 cm wide, dull to slightly glossy green, base on some individuals peltate, others lobed to rounded, lamina scabrid till ca the 8th node.

Flowering Time

Flowering has been recorded in January, February, March, April, May and September.

Notes

A small tree of very restricted, subcoastal distribution south-east of Perth, east of Mt Frankland and Walpole, near Albany and in the Stirling Range. The bark is rough, longitudinally furrowed, or less often tessellated on larger trees.



The adult leaves of *Corymbia ficifolia* are strongly discoloured being darker green above, paler below, stiff, with dense pinnate venation and usually lacking oil glands. The flowers are brilliantly coloured red or pinkish or orange whilst the seeds are prominently winged like those of the desert and northern bloodwoods.

Eucalyptus ficifolia is very common and popular in horticulture, widely used throughout cooler coastal southern Australia as a street tree because of its massed colourful flowers that are highly attractive to humans, lorikeets and honeyeaters.

Corymbia ficifolia is one of three species of bloodwood found in the south-west of Western Australia. The others both have wingless seeds. *Corymbia haematoxylon*, which has a western coastal distribution from Mt Lesueur south to near Busselton, differs further in its distinctly tessellated bark, white flowers, and fruit much narrowed at the top, and Marri, *C. calophylla*, which can be a much taller tree, has tessellated bark, thinner glossy leaves with clear oil glands. *Corymbia calophylla* ranges from Geraldton to near Albany.

Grafted Flowering Gums

Source: Tarrawood Native Nursery; <http://www.tarrawood.com.au/floweringgums/gums.html>

Amongst Australia's most popular native trees are the different varieties of Flowering Gums. While all *Eucalypt's/ Corymbia's/ Angophora's* flower here we are talking about trees based on *Corymbia ficifolia* or its hybrids.

From careful selection and breeding over many years a variety in a good range of colours from white, through to pink, to red, and everything in between are now available.

There are two main types available:

The hybrid versions

- Summer Red 4-5 m, Scarlet Red colour,
- Summer Beauty 5-7 m, Pale Pink colour,
- Summer Glory 5-7 m, Purple Pink colour,
- Summer Snow 5-7 m, Cream colour.

To get these hybrid flowering gums, a breeder has crossed a *Corymbia ficifolia* (Red Flowering Gum) with its close relative *Corymbia ptychocarpa* (Swamp Bloodwood) to end up with a range of beautiful small trees.

With these hybrids, the flower size is slightly bigger than the straight *Corymbia ficifolias*. All need to be grafted to ensure they grow true to type and label.

Because they have tropical tree genes in them, they have proven to have better and stronger growth in more humid climates such as Northern NSW and Queensland.

The non-hybrid versions

- Dwarf Orange 2-3 m, Fluoro Orange colour,
- Calypso Queen 3-4 m, Watermelon colour,
- Baby Scarlet 2-3 m, Scarlet Red colour,
- Wild Fires 5-6 m, Fire Engine Red colour,
- Lollypops 5-6 m, Powder Puff Pink colour,
- Little Sweetie 5-6 m, Cerise Pink colour.

These non-hybrid varieties are generally selections based on normal seedling variation. Here collectors have found mature specimens that flower well, have good growth habit, size and colour, and have replicated them with grafting.

To produce large numbers, grafting is necessary to guarantee vigour, colour, form and size and that they grow true to label.

The rootstocks for all flowering gums are usually 'Bloodwood' or 'Spotted Gum'. Although these can grow into big trees, as rootstocks for these Flowering Gums they seem to be governed by the size of the tree/bush grafted onto them. The grafting of Eucalypts has been proven to reduce the mature size of the tree.

Planting

All of these trees but particularly the hybrid ones, are sensitive to severe frost if they are under five years old. After this they develop resistance as they mature, so some protection is advised if you are in a frost prone area.

The best time to buy them is in spring and plant out when all danger of frost is finished. This gives them time to get established and acclimatised before winter. For gardeners in colder areas, the worst time to buy them is in autumn if you intend to plant them out close to winter.

Along the NSW coast north of the Illawarra into southern Queensland, they can be planted almost any time except in winter. The non-hybrid Flowering Gums come from South West of Western Australia where there is little humidity, consequently they appreciate a temperate climate better than tropical or humid climates. The 'Summer' hybrid gums are ideal in these conditions.

When planting do not disturb the root ball, gently knock off pot and plant into a prepared hole. If the plant is old and potbound, some gentle teasing out of the lower roots may be required. Prune off any rootstock shoots you see growing from below the graft union (indicated by a change of bark colour).

The plants appreciate an annual prune after flowering before the gum nuts begin to form if you want exceptional flowering the next year. A dose of a native blend (low phosphorus) fertiliser in early spring will also ensure better flowering next season.

.....

Notes from Angus Stewart on the Red flowering gum

Source: Angus Stewart, January 24, 2012; <http://gardendrum.com/2012/01/24/red-flowering-gum/>

The red flowering gum, *Corymbia ficifolia* (formerly *Eucalyptus ficifolia*) is one of those trees that really grabs your attention when it's in full flower, like very few other flowering trees can, perhaps with the exception of the jacaranda or the Illawarra flame tree.

However, one of the ongoing problems with the red flowering gum has been that it's always been grown from seed in the nursery industry in the past. When it did flower, after 5 to 10 years, the colour varied enormously as there is a great deal of genetic variability within this species. Not only does the colour vary, but the height of the tree can vary from a 10-15 metre substantial tree to a mallee form that's no more than a couple of metres in height – a form which does have its advantages in the smaller gardens of today. One of the exciting developments in horticulture in recent years has been the development of the red flowering gum to make it more predictable and amenable to garden culture.

Before I talk about that, though, I'd like to talk about the botany and the name change from *Eucalyptus ficifolia* to *Corymbia ficifolia*. The reason why the group of gums that include the red flowering gum were separated from *Eucalyptus* were that there are considerable differences. *Corymbia* are generally known as the bloodwoods and they have a special characteristic of being terminal flowering, with all

those big sprays of flowers held on the end of the branches, which can be seen from a very long distance away. Many of what have remained as *Eucalyptus* flower way back inside the canopy on the axillary buds, unlike the terminal buds of *Corymbia*. Indeed, many people are surprised to hear that all gums are ‘flowering gums’; the red flowering gum just holds its flowers where they can be easily seen. *Corymbia* shares this terminal flowering with *Angophora*, sometimes known as the apple gums, of which the Sydney red gum, *Angophora costata* is probably the best known in cultivation. The botanists faced the dilemma that *Corymbia* gums were more closely related to *Angophora*, both being terminal flowering and sharing some other characteristics. Being closer to *Angophora*, it was either include everything within the one genus of *Eucalyptus*, or split off the bloodwoods and create a separate group for them sitting in between *Angophora* and *Eucalyptus*.

Which brings me to the genetic improvement of the red flowering gum, a brilliant but unreliable species, in the genetic sense that you don’t know what you’re getting! One of the more amazing projects that I’ve seen in my career as a plant breeder happened up in Queensland. A fellow by the name of Stan Henry, a retired horticulturist, wanted to grow a red flowering gum in his home garden but he was in the humid climate of coastal central Queensland. He watched a number of his *Corymbia ficifolia* die from the heat and humidity, and from the leaf spot that they tend to get when they’re grown in Sydney and further north (you can grow them but they look very ratty and not a good garden specimen).

The strategy that he then chose was to hybridise *Corymbia ficifolia*, the red flowering gum from around Albany in south-west Western Australia with the swamp bloodwood, *Corymbia ptychocarpa* from northern Australia, which has the same spectacular terminal flowers common to all the *Corymbias*, but is obviously much better equipped to cope with the humidity and heat of northern Australia. By crossing those two species together, we get a group of hybrids which has been marketed as the Summer series – ‘Summer Red’, ‘Summer Beauty’ and ‘Summer Snow’, a white variety. By and large it’s been quite a successful series when planted in gardens up and down the east coast, from Melbourne through to Queensland. Hybridisation is one way to go, and I like to think of what he’s done as a wonderful reconciliation, a sort of ‘east meets west’, between the swamp bloodwood from the east and north east and, from the other corner of the continent right down in the south-west, the red flowering gum. That’s where I think plant breeding really does have a place in modern horticulture; to combine the outstanding features of two different species to come up with a plant that has all the right attributes to be a successful garden plant.

One of the issues with all the selections, whether they’re straight selections of *Corymbia ficifolia* or hybrids like the Summer series, is that they are difficult to propagate by cuttings – too difficult for commercial production. The way that they’re propagated now is by grafting onto the rootstock of a hardy member of the *Corymbia* group, such as the spotted gum, *Corymbia maculata*, or the red bloodwood, *Corymbia gummifera*. Finding the right species to use as a rootstock for different areas has become one of the key challenges for the selection and improvement of the *Corymbia* group, and in particular the flowering gums.

The second wave of improvement of the red flowering gum has come about through the selection of different clones of the red flowering gum though the hundred years or so that this plant has been in cultivation. In southern Australia, from Perth across to Melbourne and up the southern coast of NSW, *Corymbia ficifolia* is quite a reliable species in its own right. Having been grown from seed, there’s all sorts of variation, so various nurseries have selected their outstanding forms of *Corymbia ficifolia* and we’re now seeing some interesting new cultivars emerge from that work. ‘Wildfire’ is one the oldest selections, and there are new ones called ‘Baby Red’, ‘Baby Orange’ and ‘Calypso’. They’re all slightly different in both flower colour and plant height, so it’s a matter of going out and finding out what is available from your local garden retailer. There will be a continuing series of new selections in the future as we get more confident with the grafting of red flowering gums in its various colour selections and finding the right rootstock partner.

The red flowering gum is one of our most iconic Australian species in cultivation, and through some judicious genetic selection and breeding work, we’re now starting to see cultivars emerge which are going to be more reliable – as far as knowing what flower colour and height you’re going to get.

Hopefully in the future, you'll be able to find anything from a 2 metre shrub to a 15m tree to match your garden requirements. So if you've ever planted a seedling tree and been disappointed, have another look as more new colours and forms emerge.

.....

Cultivar profile: Eucalyptus Little Star; *Eucalyptus forresterae*

Source: Austrafloora; <http://austrafloora.com/project/eucalyptus-little-star/>

Little Star is a small tree or mallee named after Austrafloora's Sue Forrester who, together with Bill Molyneux, recognized it as a new species in a remote region of Gippsland, Victoria. At a height of 3-7 metres & a width of 2-3 metres, it has much to recommend it for small or large gardens and streetscape planting; its smooth olive green or gold stems, small grey-green foliage, clusters of red-orange buds throughout winter and a massed display of cream flowers from spring to early summer set it aside from other small eucalypts. It is extremely frost & cold resistant so cool to temperate climates suit it best. It likes moist but well drained gravelly or clay loams of neutral to acid pH. Little Star is a big winner.

Genus/Species: *Eucalyptus forresterae*

Cultivar Name: Little Star

Habit: Small often multi stemmed tree

Plant Type: Small Tree

Height (m): 3-5m

Width (m): none

Frost Tolerance: High

Growth Rate: Medium

Position: Full Sun to Part Shade

Flower Information: Clusters of green to red buds open to creamy nectar-rich flowers mid summer to early winter occasionally spring. Stems shedding to olive green in summer

Foliage Information: Young foliage rounded grey maturing to green or grey-green small

Cultivation: Well drained clay or sandy soils of a neutral to low acid pH

Fertiliser: Low P required at around 1.6 %

.....



Cultivar profile: Eucalyptus Purple Patch; *Eucalyptus lansdowneana ssp albopurpurea*

Source: Austrafloora; <http://austrafloora.com/project/eucalyptus-purple-patch/>

Remarkable for its startling clusters of purple bird-attracting flowers in winter & spring, Purple Patch is a small clear-trunked tree (4-6 metres tall & 2-3 metres wide) with much to offer the designer of small gardens and streetscapes. Its adaptability to a wide range of climates from cool temperate, sub tropical & semi arid in neutral to alkaline soils gives it the OK for both coastal and inland planting, where it is very frost hardy. And it's an eye-catching selection in parkland planting with other small cream, pink or yellow flowering Eucalypts. The honey-eating birds will become dizzy with the choice.

Genus/Species: *Eucalyptus lansdowneana ssp albopurpurea*

Cultivar Name: Purple Patch

Habit: small to medium semi-weeping clear-trunked tree

Plant Type: Small Tree

Height (m): 3-5m

Width (m): none

Frost Tolerance: High

Growth Rate: Medium

Position: Full Sun to Part Shade

Flower Information: Massed purple flowers winter and spring

Foliage Information: Foliage green or grey-green small

Cultivation: Well drained clay or sandy soils of a neutral to low acid pH

Fertiliser: Low P required at around 1.6 %

Climate: Cold temperate to sub tropical; 2nd line coastal

Maintenance: Requires little or no pruning



.....

Cultivar profile: Eucalyptus Euky Dwarf; *Eucalyptus leucoxylon* (dwarf selection)

Source: Austrafloora; <http://austrafloora.com/project/eucalyptus-euky-dwarf/>

Euky Dwarf is perhaps the most popular small tree for gardens, streetscapes, freeways and parks across Australia, notching up more than 30 years since its introduction. Why? Because of its medium size (5-6 metre tall & 3-4 m wide), adaptability to a range of soils, and cold temperate, sub tropical and semi arid climates. It flowers from autumn right up to mid December. Red, pink or cream blossom ~ it doesn't matter to the numerous species of honey-eating birds, either resident or migratory, who find this supply of nectar over such a long period irresistible; as have generations of gardeners who've chosen this bird magnet for their gardens. Gardens without Euky Dwarf are only half done!

Genus/Species: *Eucalyptus leucoxylon* dwarf

Cultivar Name: Euky Dwarf

Habit: Small open canopied tree

Plant Type: Small Tree

Height (m): 5-10m

Width (m): none

Frost Tolerance: Medium

Growth Rate: Fast

Position: Full Sun to Part Shade

Flower Information: Red pink or occasionally cream gum blossoms are profuse in late autumn winter spring and early summer

Foliage Information: Narrow openly arranged mid green

Cultivation: Moist well drained clay sandy or stony soils neutral acid or alkaline pH

Fertiliser: Low P required at around 1.6 %



Climate: Cool temperate sub tropical semi arid; 1st line coastal

Maintenance: Minimal develop trunk or low branching habit when young by judicial pruning

.....

Abstract- Impact of high-severity fire in a Tasmanian dry eucalypt forest

Lynda D. Prior ^{A B}, Grant J. Williamson ^A and David M. J. S. Bowman ^A

^A School of Biological Sciences, Private Bag 55, University of Tasmania, Hobart, Tas. 7001, Australia.

^B Corresponding author. Email: lynda.prior@utas.edu.au

Australian Journal of Botany 64(3) 193-205 <http://dx.doi.org/10.1071/BT15259>

Submitted: 17 November 2015 Accepted: 9 March 2016 Published: 2 May 2016

Dry eucalypt forests are believed to be highly fire tolerant, but their response to fire is not well quantified. We measured the effect of high-severity fires in dry eucalypt forest in the Tasmanian Midlands, the driest region on the island. We compared stand structures and fuel loads in long-unburnt (>15 years since fire) and recently burnt (<5 years since fire) sites that had been completely defoliated. Even in unburnt plots, 37% of eucalypt stems and 56% of acacia stems ≥ 5 cm in diameter were dead, possibly because of antecedent drought. The density of live eucalypt stems was 37% lower overall in burnt than in unburnt plots, compared with 78% lower for acacias. Whole-plant mortality caused by fire was estimated at 25% for eucalypt trees and 33% for acacias. Fire stimulated establishment of both eucalypt and acacia seedlings, although some seedlings and saplings were present in long-unburnt plots. The present study confirmed that eucalypts in dry forests are more tolerant of fire than the obligate seeder eucalypts in wet forests. However, there were few live mature stems remaining in some burnt plots, suggesting that dry eucalypt forests could be vulnerable to increasingly frequent, severe fires.

Additional keywords: epicormic shoots, *Eucalyptus*, fire tolerance, fuel loads, mortality, resprouting, stand structure, tree biomass, wet eucalypt forest.

.....

Web link: How Trees talk to each other

Source: TED; Suzanne Simard, link listed below

"A forest is much more than what you see," says ecologist Suzanne Simard. Her 30 years of research in Canadian forests have led to an astounding discovery — trees talk, often and over vast distances. Learn more about the harmonious yet complicated social lives of trees and prepare to see the natural world with new eyes.

This is an interesting link to a presentation on the subject of active interaction between forest trees, supporting the hypothesis that trees are aware organisms. Copy and paste the following link into your browser.

http://www.ted.com/talks/suzanne_simard_how_trees_talk_to_each_other?utm_source=newsletter_weekly_2016-07-23&utm_campaign=newsletter_weekly&utm_medium=email&utm_content=talk_of_the_week_button

.....

Abstract: Feeling the cold in a warming climate: differential effects of low temperatures on co-occurring eucalypts

George Matusick^{A B C}, Katinka X. Ruthrof^A, Jason Pitman^A and Giles E. St. J. Hardy^A

^A School of Veterinary and Life Sciences, Murdoch University, WA 6150, Australia.

^B Present address: The Nature Conservancy, Georgia Chapter, Chattahoochee Fall Line Project, Fort Benning, Georgia, 31905, United States.

^C Corresponding author. Email: G.Matusick@murdoch.edu.au

Australian Journal of Botany 64(5) 456-466 <http://dx.doi.org/10.1071/BT16064>

Submitted: 1 April 2016 Accepted: 13 July 2016 Published: 29 July 2016

Climate change is altering extreme temperature events, and is expected to drive changes in species composition as a result. To assess the potential for compositional shifts from low-temperature events, the effects of repeated events in 2010 and 2012 on three co-occurring eucalypts were determined in south-western Australia. To examine the climatic conditions that led to tree damage, and the long-term pattern of low-temperature events, temperatures were monitored on affected sites, and modelled from climate-station data. The three species varied considerably in their susceptibility to low temperatures. *Corymbia calophylla* K.D.Hill & L.A.S.Johnson was most affected (crown-damage index (CDI) = 47), followed by *Eucalyptus marginata* Sm. (CDI = 17) and *E. wandoo* Blakely (CDI = 3), which was comparatively tolerant. The temperatures leading to damage in 2010 and 2012 were -3.4°C and -2.1°C respectively. The frequency of low-temperature events (days below 0°C) have been steadily increasing in the study area since the mid-1990s. Because minimal tree mortality was observed, species composition is unlikely to change as a result of low temperatures in the short term. However, continued dieback from repeated events may disrupt regenerative processes, and cause long-term compositional shifts.

Additional keywords: climate change, eucalypt dieback, *Eucalyptus*, forest ecology, frost, jarrah.

Abstract: Eucalypts face increasing climate stress

Nathalie Butt^{1,*}, Laura J. Pollock², Clive A. McAlpine³

1. ARC Centre of Excellence for Environmental Decisions and School of Biological Sciences, The University of Queensland, St. Lucia, Queensland, Australia
2. National Environmental Research Program, School of Botany, The University of Melbourne, Melbourne, Victoria, Australia
3. National Environmental Research Program and School of Geography, Planning and Environmental Management, The University of Queensland, St. Lucia, Queensland, Australia

Ecology and Evolution 2013; 3(15): 5011–5022

Global climate change is already impacting species and ecosystems across the planet. Trees, although long-lived, are sensitive to changes in climate, including climate extremes. Shifts in tree species' distributions will influence biodiversity and ecosystem function at scales ranging from local to landscape; dry and hot regions will be especially vulnerable. The Australian continent has been especially susceptible to climate change with extreme heat waves, droughts, and flooding in recent years, and this climate trajectory is expected to continue. We sought to understand how climate change may impact Australian ecosystems by modeling distributional changes in eucalypt species, which dominate or codominate most forested ecosystems across Australia. We modeled a representative sample of *Eucalyptus* and *Corymbia* species ($n = 108$, or 14% of all species) using newly available Representative Concentration Pathway (RCP) scenarios developed for the 5th Assessment Report of the IPCC, and bioclimatic and substrate predictor variables. We compared current, 2025, 2055, and 2085 distributions. Overall, *Eucalyptus* and *Corymbia* species in the central desert and open woodland regions will be the most affected, losing 20% of their climate space under the mid-range climate scenario and twice that under the extreme scenario. The least affected species, in eastern Australia, are likely to lose 10% of their climate space under the mid-range climate scenario and twice that under the

extreme scenario. Range shifts will be lateral as well as polewards, and these east–west transitions will be more significant, reflecting the strong influence of precipitation rather than temperature changes in subtropical and midlatitudes. These net losses, and the direction of shifts and contractions in range, suggest that many species in the eastern and southern seaboard will be pushed toward the continental limit and that large tracts of currently treed landscapes, especially in the continental interior, will change dramatically in terms of species composition and ecosystem structure.

Hawkesbury Forest Experiment; A Global Change Experiment

Source: University of Western Sydney 2010;
http://www.uws.edu.au/hie/facilities/hawkesbury_forest_experiment

How will Australia's eucalypt forests respond to changes in atmospheric carbon dioxide (CO₂) and climate?



A continuing rise in the atmospheric CO₂ concentration is inevitable, and its impact on Australia's forest and woodland ecosystems must be considered in our environmental management and water catchment strategies.

There are several widely-known direct effects of rising atmospheric CO₂ on plants that can potentially impact Australia's Eucalyptus species. These include:

- stimulation of photosynthetic activity that may result in increases in carbohydrates in plants that may accelerate the growth of canopies and stems of trees leading to greater forest productivity
- reductions in stomatal aperture that means decreased water use, and impact on the amount of water flowing into streams and rivers as well as groundwater recharge.

These direct effects have largely been studied for Northern Hemisphere tree species, whose biology and origins can be distinct from Australia's native flora. Information is urgently required to underpin Australia's environmental and catchment management strategies for the 21st century.

The Hawkesbury Forest Experiment in Western Sydney, Australia, is designed to provide this information. The experiment brings together an expert team of researchers from a number of universities to address these concerns. Our broad focus is on developing a predictive understanding of the growth and carbon storage potential and productivity of both managed and unmanaged eucalypt forests, growing in typical Australian conditions, and their responses to the rising CO₂ levels that will occur during the next 50 years.

The project is a carefully integrated program of experimental and modelling approaches. The centrepiece of the project is a field facility with 12 CO₂ and temperature-controlled whole-tree chambers provided by the Swedish University of Agricultural Sciences. The whole-tree chambers can

house entire trees up to 12 metres tall. This unique facility is the first of its type in Australia and the Southern Hemisphere.

We are growing a major Eucalyptus species (*E. saligna*) native to the Hawkesbury region, under conditions expected in a future, higher CO₂ world. The experiment involves chambers controlled at CO₂ levels expected within the next 50 years. Water deprivation will add additional stress to half of the chambers in order to help unravel possible interactions between elevated CO₂ and drought.

Abstract: Fire regime and vegetation change in the transition from Aboriginal to European land management in a Tasmanian eucalypt savanna

Louise M. Romanin ^{A C}, Feli Hopf ^B, Simon G. Haberle ^B and David M. J. S. Bowman^A

^A School of Biological Sciences, University of Tasmania, Private Bag 55, Hobart, Tas. 7001, Australia.

^B ANU College of Asia and the Pacific, Australian National University, Canberra, ACT 0200, Australia.

^C Corresponding author. Email: Louise.Romanin@utas.edu.au

Australian Journal of Botany 64(5) 427-440 <http://dx.doi.org/10.1071/BT16032>
Submitted: 24 February 2016 Accepted: 11 July 2016 Published: 2 August 2016

Using pollen and charcoal analysis we examined how vegetation and fire regimes have changed over the last 600 years in the Midlands of Tasmania. Sediment cores from seven lagoons were sampled, with a chronology developed at one site (Diprose Lagoon) using ²¹⁰Pb and ¹⁴C dating. Statistical contrasts of six cores where *Pinus* served as a marker of European settlement in the early 19th Century and showed significant changes in pollen composition following settlement with (a) influx of ruderal exotic taxa including *Plantago lanceolata* L., Brassicaceae, Asteraceae (Liguliflorae) and *Rumex*, (b) increase in pollen of the aquatics *Myriophyllum* spp. and Cyperaceae, (c) a decline in native herbaceous pollen taxa, including Chenopodiaceae and Asteraceae (Tubuliflorae) and (d) a decline in *Allocasuarina* and an initial decline and then increase of Poaceae. The presence of Asteraceae (Liguliflorae) in the pre-European period suggests that an important root vegetable *Microseris lanceolata* (Walp.) Sch.Bip. may have been abundant. Charcoal deposition was low in the pre-European period and significantly increased immediately after European arrival. Collectively, these changes suggest substantial ecological impacts following European settlement including cessation of Aboriginal traditions of fire management, a shift in hydrological conditions from open water lagoons to more ephemeral herb covered lagoons, and increased diversity of alien herbaceous species following pasture establishment.

Additional keywords: Aboriginal fire management, grassland, grassy woodland historical ecology, landscape ecology, macro-charcoal, palynology.

Articles, requests and questions are needed
Please send all correspondence to my;
email address; tallowwood@hotmail.com
or postal; PO Box 456, WOLLONGONG 2520

Membership

New members wishing to subscribe to the *Eucalyptus Study Group*, please fill out the following application and forward to Steve Harries at;

Email: abodepool@bigpond.com

Postal: No. 50 Nardoo Road, PEATS RIDGE NSW 2250

Annual membership costs are;

- \$A 10 per year national members, newsletter mailed (black and white).
- \$A 20 per year international members, newsletter mailed (black and white).
- \$A 5 per year, national and international, newsletter emailed, full colour PDF.

All subscriptions can be mailed via a cheque (made out to the *Eucalyptus Study Group*) or payment made via direct deposit into the account listed below. For payments made via direct deposit, please add your name as reference.

Postal: No. 50 Nardoo Road, PEATS RIDGE NSW 2250

Bank details:

BSB No: **033-044**

Account No: **289 847**

Account name: **ANPSA Euc. Study Group**

Application for membership to the *Eucalyptus Study Group*

Date:

Name:.....

Postal address: post code.....

Contact Phone number:.....

Email:

Payment method: Cheque Direct Deposit

