



Waite Arboretum – An enduring gift

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Abstract: An overview is presented of the history of the Waite Arboretum from its establishment in 1928, through pivotal developments as a rain-fed scientific collection with expanding educational and community outreach programs, to the digital technology making the information embodied in this significant collection available to the widest possible audience.

Keywords: Waite Arboretum, homoclimes, urban forestry, garden history

Introduction

The Waite Arboretum originated following a bequest by Peter Waite to The University of Adelaide in 1914 of his Urrbrae estate nestled in the foothills of Adelaide together with a substantial endowment fund. The Deed of Gift stipulated that the eastern half of the estate be used for the purpose of teaching and study of agriculture and related fields, and that the western half be a park for the enjoyment of the public. Waite was a strong advocate of science, so from the outset the park took the form of a scientific collection and good records were kept. The collection currently occupies around 25 hectares comprising more than 2,400 specimens from around the world representing over 1,000 taxa. Major collections include *Eucalyptus* L'Hér., *Quercus* L., *Pyrus* L., arborescent *Dracaena* Vand., palms and cycads. The Waite Arboretum is more than a public park; the Arboretum is used for testing suitable plant species for their performance under natural conditions, alongside the conservation of genetic material, research and education, the retention of local biodiversity, and community engagement. An overview is here presented of the development of the Waite Arboretum from its establishment to the present with a view to the future.

The Waite Bequest

Peter Waite was born of humble origin near Kirkcaldy in Scotland in 1834. At the age of 25 he migrated to South Australia, joining his brother James in the pastoral country. Through innovative and effective land management Waite became a very successful pastoralist and businessman. In 1877 Waite and his family took up residence at the 54-hectare Urrbrae estate which

is probably unique in the Adelaide region, as it has remained undivided since the original land grant in 1839 (Zeitz 2014). Peter and Matilda had eight children, but as they approached the age of 80 none was in a position to take over management of the properties and fortune.

Waite held the view that with comparatively little scientific training, South Australian agriculturalists and pastoralist had placed wheat, wool, fruits and machinery in the highest estimation in the world, but that to keep in the forefront science must be applied¹. So in 1913 Waite wrote to the Chancellor of the University of Adelaide informing him of his intention to offer his Urrbrae estate of 54 hectares to the University to advance its work in agriculture and allied fields, observing that as the climate, rainfall and soil at Urrbrae are typical of large areas of agricultural land, the results of the research undertaken there could be relied on by agriculturalists throughout Australia².

The Urrbrae estate (Fig. 1) was formally transferred to the University, subject to the life tenancy of Waite and of his wife, by an Indenture dated 29 January 1914³. The Deed of Gift specified that the University hold the eastern half of the estate together with the mansion house and other buildings for the purpose of teaching and study of agriculture, botany, zoology, veterinary science, entomology, horticulture, forestry and related fields, and that the western half be held in perpetuity as a park or garden for the recreation and enjoyment of the public. In addition, Waite transferred shares to create an endowment fund to establish and run the future institution. The total value of the Waite Endowment was determined to be £100,000. It was one of the most generous public benefactions in the history of South Australia (Zeitz 2014).

1 Peter Waite, Letter to Hon. A.H. Peake, Premier of South Australia, 3 Oct. 1913, published in Edgeloe (1984).

2 Peter Waite, Letter to Sir Samuel Way, Chancellor of the University of Adelaide, 3 Oct. 1913.

3 Indenture between Peter Waite and The University of Adelaide, 29 Jan. 1914.



Fig. 1. Aerial view (looking east) of the eastern part of Urrbrae estate. Urrbrae House and gardens are located on the right side of the photograph. The original driveway was lined with Sugar Gums planted in 1877. The photograph was taken by Frank Hurley in 1920. An arrow indicates the location of Urrbrae House. Image courtesy of Marian Wells.

Beginnings

Peter and Matilda Waite died in 1922 and the University came into full possession of the estate in early 1923. A committee of 12 members was appointed to make recommendations to the University Council on how best to give effect to the objectives of the Waite bequest. The Committee's report, dated 19 May 1923, recommended unanimously that the public park take the form of an arboretum to demonstrate the kinds of tree that may thrive in the State. Echoing Waite's assertion, H. Hugh Corbin, Department of Forestry, University of Adelaide, observed that 2,400,000 hectares of land in South Australia has a climate like that of Urrbrae from an arboricultural point of view. Thus the Arboretum would offer an exceptionally good opportunity and its experimental value would be high (Corbin 1923).

The Waite Arboretum is located at 34°59'S, 138°38'E at an altitude of 84–118 metres. It is virtually frost-free, with a mean rainfall (recorded 1925–1999) of 622 millimetres, mainly in winter, followed by a warm dry summer. The soil type is Urrbrae Fine Sandy Loam to 35 cm, then predominantly clay to 90 cm, with a pH range from 5.7 at the surface to 8.6 below a metre.

The original vegetation of the site was open grassy woodland of Grey Box (*Eucalyptus microcarpa* Maiden), South Australian Blue Gum (*E. leucoxylon* F.Muell.) and River Red Gum (*E. camaldulensis* Dehnh.), but the land had been cleared for agriculture before planting of the Arboretum began and only a few original trees remain (Symon 1984).

Under the direction of Dr Arnold E.V. Richardson, Foundation Director of the Waite Agricultural Research Institute, planting began in 1928 and within 10 years reached over 400 specimens representing more than 170 species that were readily available from botanical institutions and established nurseries.

Although its scientific value was acknowledged from the start, Richardson (1927) did not wish to sacrifice the aesthetic aspect of the planting for mere systematic arrangement of species. The original design by Richardson and John F. Bailey, Director of the Adelaide Botanic Gardens, was a series of sweeping paths and circles of trees representing different genera, but is barely discernible now, and the aesthetic objective has long lapsed. Only one prominent landscaping element remains today – the avenue of 69 English Elm (*Ulmus minor* Mill., syn.: *U. procera* Salisb.), which frames

a vista from the centre of the main Waite building to the sea. Arrangement of the trees was on broad taxonomic grouping and to some extent continues to the present where space allows. Two main plantings were envisaged with hardier Australian species on the higher eastern areas where the soil is shallow and the subsoil of a gravelly nature, and exotic broad-leaved trees and conifers on the lower western areas of deeper soil (Richardson 1928).

Constance M. Eardley was appointed the first taxonomic botanist at the Waite Institute with the position of Curator of Waite Herbarium (ADW) and Waite Arboretum (1933–1949) (Gardner 1990a). Eardley, followed by systematic botanists Enid L. Robertson (1950–1953) and Frank M. Hilton (1953–1955), kept records of every specimen, but there is little sign that they influenced the way the collection developed (Gardner & Symon 2004).

Development of the collection

Agrostologist David E. Symon joined the staff of the Waite Institute in 1951 and was appointed Systematic Botanist in 1956. In addition to teaching and research, he paid considerable attention to the Arboretum and had a much greater influence on its composition and documentation than previous curators. He represents the second phase of the development of the Arboretum as a directed botanical collection.

In 1961, Symon made a pivotal policy decision not to water the trees after establishment. This established the Arboretum as a significant rain-fed collection, distinguishing it from most botanic gardens. Symon sourced wild collected material from regions of the globe with similar climates to Adelaide (homoclimes) such as the eastern Mediterranean, California, South Africa and Chile. He added a large number of eucalypts to the collection and other genera of interest to him such as *Pyrus*, *Quercus*, *Casuarina* L. and *Allocasuarina* L.A.S.Johnson, *Juniperus* L., *Pistacia* L., *Yucca* L., *Brachychiton* Schott & Endl. and *Dracaena*. He also initiated fortnightly recording of flowering and fruiting data of a number of species of interest, especially the eucalypts and pears, a task diligently performed over the next 12 years by his technical assistant Roy D. Pearce.

Symon was best known for his work on Australasian Solanaceae for which he was awarded a DSc by the University of Adelaide in 1996. He published over 250 papers on a wide variety of topics, mostly scientific papers but many for a general audience with whom he loved to share his passion for botany. A comprehensive list of his taxonomic work can be found in Barker (2013).

After the retirement of Symon in 1985, the academic position of Systematic Botanist was discontinued. The Waite Herbarium, by then comprising over 52,000 numbered sheets plus numerous miscellaneous collections and seed collections, was transferred to State

Herbarium of South Australia (AD) and integrated with their collection.

In 1986, a new half-time professional position was created for a botanist to manage and develop the Waite Arboretum and provide a taxonomic botany advisory service to staff and students; Jennifer A. Gardner was appointed. Her curatorship represented the third phase of the development of the Arboretum as a working collection with a strong focus on education and community outreach.

Prof. Harold W. Woolhouse, a distinguished botanist appointed as the fifth Director of the Waite Institute in 1990, took a great interest in the Arboretum. He implemented a number of changes including the removal of sheep which had until then been used to mow the grass. This enabled the trees to redevelop their natural form; internal fences and tree guards were removed improving public access and visual aspect. For the first time the Arboretum received operating funds. Under Woolhouse the position of Curator of the Arboretum was increased to full-time with additional responsibilities of managing the conservation and restoration of the newly established 121-hectare Waite Conservation Reserve and overseeing the redevelopment and management of the gardens surrounding historic Urrbrae House, now an accredited museum with History SA. A new vision emerged to make all the Waite Campus open spaces accessible and inviting to the public, to encourage community support and connection.

The Waite Arboretum entered the fourth phase in 2017 with the appointment of horticulturalist Dr Kate Delaporte to drive the research and education focus. Delaporte recognised the importance of the Arboretum as a place to educate the university and local community regarding local biodiversity enhancement, localised impacts of climate change on plants and trees, and native plants in horticulture, and is actively working to develop a forward plan for the Arboretum. The plan will include development of a new planting strategy to enhance the collection with consideration of the local impacts of the changing climate, increasing support for local fauna biodiversity by planting targeted biodiversity gardens, and raising awareness of native species through establishment of a 'Graminetum' of native grass species and a 'First Nations Food Garden'.

Roles of Waite Arboretum

Experimental

From the outset, the main aim of the Waite Arboretum was to evaluate the performance of a wide range of species to assess their habits of growth and suitability to its soils and climate. With the now long established policy of not watering after establishment, the Arboretum collection demonstrates performance for over 60 years on rainfall alone and informs more sustainable species selection for our street and amenity planting. This increasingly valuable

information is disseminated in public presentations and publications, such as Gardner (1995), and has been facilitated with the formation of TREENET (discussed below). With the oldest Arboretum specimens reaching 100 years and the impacts of the change in climate now apparent, the imperative is to develop a forward plan, focussing on plantings that will thrive in the predicted climate scenarios.

Conservation of genetic material

Waite Arboretum is a repository of rare and endangered species. Arboretum specimens representing about 150 taxa are listed on the International Union for the Conservation of Nature (IUCN) Red List with a status of Near Threatened or greater concern, including 60 palm and cycad taxa and 70 eucalypts, with 132 taxa Endangered and two central Asian species, *Pyrus tadshikistanica* Zaprjagaeva and *P. korshinskyi* Litv., Critically Endangered in the wild (IUCN 2023). Propagating material from the latter species has been distributed to botanic gardens and specialist nurseries.

Preservation of local biodiversity

Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands are listed with Endangered status, in the Environment Protection and Biodiversity Conservation (EPBC) Act – List of Threatened Ecological Communities (DCCEEW 2023).

The northwest Arboretum contains six remnant Grey Box trees, four of which are thought to pre-date European settlement. The site of the Waite Arboretum was formerly within an extensive area of Grey Box woodland, referred to as the Black Forest by early European settlers. In 1998, a project commenced to conserve the indigenous species and reinstate some of the original Black Forest understorey such as Drooping Sheoak (*Allocasuarina verticillata* (Lam.) L.A.S.Johnson), Sticky Hop-bush (*Dodonaea viscosa* Jacq.), Wreath Wattle (*Acacia acinacea* Lindl.), Golden Wattle (*Acacia pycnantha* Benth.) and Native Lilac (*Hardenbergia violacea* (Schneev.) Stearn), all propagated from seed collected in the Waite Conservation Reserve and now self-seeding. Spear-grasses (*Austrostipa* spp.), wallaby-grasses (*Rytidosperma* spp.), Windmill Grass (*Chloris truncata* R.Br.) and other native grasses are now well established and a seed source for efforts to replace exotic grasses and broad-leaved forbs with native grasses throughout the Arboretum.

In 2019, the first of the targeted biodiversity gardens was established; the 500 m² site now holds over 1,000 endemic grasses, forbs, climbers, groundcovers and shrubs to support local invertebrate life (Delaporte & Boyle 2022).

Research

The Waite Arboretum has provided experimental material for research in plant physiology, phytochemistry, chemotaxonomy, and reproductive biology of eucalypts

and banksias. It is also a repository for cultivars developed in plant breeding programs. Recent research includes the study of pollination and native bee ecology by the University of Adelaide's Katja Hogendoorn and her research team (Williamson *et al.* 2019, 2022).

A recent project has quantified the environmental benefits of half of the Arboretum trees (Gardner *et al.* 2017). A team of volunteers collected standardised field data on over 1,200 specimens using ESRI ArcGIS Collector software. Attributes recorded include trunk diameter, height, crown width, canopy percent coverage, dieback and shading. This data is linked to the species and local meteorological data and analysed in free i-Tree Eco software developed by the U.S. Forest Service, Northern Research Station. The results quantify carbon storage and sequestration, air pollution removal (O₃, CO, NO₂, SO₂ and particulate matter), oxygen production, avoided runoff and other environmental benefits, and assigns a dollar value. This understanding will help promote the Arboretum for its benefits to human and environmental health as well as its experimental, research, conservation, wildlife habitat and educational benefits. The analysis of 1,255 specimens, completed in 2017, determined that the structural value of these specimens was A\$13M (Gardner *et al.* 2017).

Education

The Arboretum is a valuable resource for education at all levels, fostering a connection with nature and promoting the study of the natural environment. The Arboretum is used by groups across the age spectrum from pre-school children, primary and secondary school students, to tertiary students undertaking practical sessions in plant taxonomy, soil science, entomology and horticulture, as well as retirees attending the University of the Third Age.

Community Outreach

Waite Arboretum is open every day of the year from dawn till dusk. It attracts a growing number of interstate and overseas visitors and many local residents, staff and students of the campus walk through the Arboretum regularly, appreciating its beauty and tranquillity. The amenity and visitor experience has been enhanced with seats, sculptures, interpretive signs, a wildlife discovery trail and the Waite Arboretum App for mobile devices (<https://www.adelaide.edu.au/waite-historic/waite-arboretum>).

There is a strong commitment to raise public and professional awareness of the Arboretum. Community outreach programs include regular free guided walks and booked tours and public presentations. The Friends of the Arboretum Inc. was founded in 1995 to raise awareness and funds to support the Arboretum (<https://friendsofwaitearboretum.org/>). There is also a vibrant volunteer program in the Arboretum and Urrbrae House gardens.

TREENET

In 1997, nurseryman David Lawry proposed the formation of a new group for those with an interest in the urban forest. Together with Gardner he founded TREENET Inc., a not-for-profit research and educational organisation based at the Waite Arboretum and involving researchers, educators, local and State Governments, industry, planners and other professionals (<https://treenet.org/>).

Annual symposia have been held since 2000 to showcase current research, disseminate information, and foster interdisciplinary collaboration. Proceedings and videos including outdoor presentations are available free online.

TREENET encourages participation in street tree trials of different species, best practice tree planting techniques and storm water harvesting systems. Recommendations from the Waite Arboretum, which species have performed well in street trials, include Sydney Red Gum or Smooth-barked Apple (*Angophora costata* (Gaertn.) Britten), Wilga (*Geijera parviflora* Lindl.) and Australian Teak (*Flindersia australis* R.Br.).

TREENET's Avenues of Honour 1915–2015 project is a national initiative to honour with a tree, the memory

of each of the 102,000 Australians who have died while on military service in any conflict. TREENET works with communities across Australia to support efforts to document, preserve and restore Avenues and establish new ones. New Avenues of Honour are being established in Adelaide using *Angophora costata*.

Major collections

Eucalypt Collection

Three main areas of the Waite Arboretum have been planted with *Angophora* Cav., *Corymbia* K.D.Hill & L.A.S.Johnson and *Eucalyptus*. The north-west Arboretum was established in 1949 primarily for large species. Another collection of mainly mallees was established in 1955 close to Urrbrae House. When an additional 4.8 hectares were added to the Arboretum in 1993–1994, a third eucalypt planting was established grown from seed collected in the wild by Dean Nicolle, renowned eucalyptologist from the Currency Creek Arboretum, Currency Creek, South Australia (Nicolle 2023). The Waite Arboretum eucalypt collection now comprises 840 specimens representing 332 taxa.

An imposing avenue of Sugar Gums (*Eucalyptus cladocalyx* F.Muell.) was planted by Peter Waite in 1877



Fig. 2. Sugar Gum (*Eucalyptus cladocalyx*) at the entrance to the Arboretum, 2016. The avenue was planted by Peter Waite in 1877. Photo: Jeffrey Rose.

along the sweeping driveway from the gatehouse to his residence (Fig. 2). Only 13 of these trees remain and some are in decline. One very majestic specimen has State significance listing on the National Trust of Australia's Trust Trees (<https://trusttrees.org.au/>) and features as one of Australia's remarkable trees (Allen & Baker 2009).

Eucalyptus 'Urrbrae Gem' (*E. erythronema* Turcz. × *E. stricklandii* Maiden) was a chance hybrid discovered at the Waite Arboretum in 1936 by Fred A. Couzens Jnr, the head gardener (1928–1966) responsible for planting the Arboretum. The original tree is still extant. It is an attractive small tree with white bark, glossy green leaves and spectacular dense red blossoms. Research at the Waite Institute to develop ornamental eucalypts was initiated by Prof. Margaret Sedgley, who worked at the Waite Institute (1985–2005). She was the driving force behind the University's horticultural research efforts to develop ornamental eucalypts. Recognising the potential of 'Urrbrae Gem' she sought to bring this selection into cultivation, but the progeny were unreliable and tissue culture proved too difficult at that time (Delaporte *et al.* 2001; Glocke *et al.* 2006). Sedgley commercialised three *Banksia* cultivars—'Waite Orange', 'Waite Crimson' and 'Waite Flame'—with 'Waite Orange' represented in the Arboretum .

The Ornamental Eucalypt Development Program at the Waite is led by the Waite Arboretum Curator, Kate Delaporte, who has established in-ground trials of over 20 new hybrid lines, some of which have been planted in the Waite Arboretum. Work is ongoing to develop clonal propagation methods that are suitable for selected lines to provide new small flowering gum trees for the urban forest and home gardens.

Oak Collection

The Waite Arboretum Oak Collection comprises 114 specimens representing 60 taxa. The best performing species from the Mediterranean are Cork Oak (*Quercus suber* L.), Algerian or Canary Oak (*Q. canariensis* Willd.), Kermes Oak (*Q. coccifera* subsp. *calliprinos* (Webb) Holmboe), Holly or Holm Oak (*Q. ilex* L.) and Tabor or Vallonea Oak (*Q. ithaburensis* Decne.). Those from California are California Field or Coast Live Oak (*Q. agrifolia* Née), Canyon Oak (*Q. chrysolepis* Liebm.), Blue Oak (*Q. douglasii* Hook. & Arn.), Engelmann Oak (*Q. engelmannii* Greene) which is on the IUCN Red List, Valley Oak (*Q. lobata* Née), and Interior Live Oak (*Q. wislizenii* A.DC.). The 12 Californian species in the collection were introduced by soil scientist Prof. James Prescott in collaboration with botanist Prof. Lindsey Pryor who supervised the development of the Australian National Botanic Garden in Canberra between 1945 and 1958 and shared Prescott's interest in homoclimes. Acorns of uncommon species have been provided to nurseries and the fledging NSW truffle growing industry.

Pear Collection

From the mid 1960s Symon assembled a pear collection, which now comprises 91 specimens representing 30 taxa.

Much of his material was wild collected. He recognised that ornamental pears (*Pyrus* spp.) were much more drought tolerant, disease resistant and better suited to Adelaide's climate than other genera commonly planted for their showy spring blossom (Symon 1983; Symon & Gardner 1991). An outstanding success was Callery Pear (*P. calleryana* Decne.) which is now widely planted as a street tree in Adelaide. Symon made a selection of Callery Pear, which he dubbed 'Lynington', and a unique hybrid of *P. calleryana* × *P. amygdaliformis* Forssk., which he dubbed 'Prescott'.

Dragon Tree Collection

David Symon was also fascinated with arborescent Dragon trees (*Dracaena* spp.; Fig. 3) and assembled a collection of 31 specimens representing five species and one subspecies. Two particularly fine specimens of Dragon's Blood Tree (*Dracaena draco* (L.) L.), planted in 1929 (#363 & #467), were listed on the National Trust of South Australia Register of Significant Trees and were adopted as the Waite Arboretum emblem. Both the large Canary Islands and much more compact Cape Verde Islands forms of *D. draco* are common in cultivation. The other species from Socotra (Yemen), Somalia, Oman, Saudi Arabia, Egypt and Sudan are uncommon. All the Arboretum species are listed in the IUCN Red List, three with Vulnerable and two with Endangered status. Symon secured seed collected in 2009 by another enthusiast from three iconic *D. draco* specimens named 'Drago Chico' and 'El Drago Millenario' on Tenerife and 'La Tosca' on La Palma Island. These specimens are now thriving in the Arboretum. Symon published on *Dracaena* (Symon 2000, 2008). Left unfinished was his manuscript of a booklet on *Dracaena draco* and its allies, which is presently with Dr. Geoffrey Bishop, historian and scientist and one of David's students, to progress.

Palm and Cycad Collection

Palms were included in the earliest plantings of the collection and now comprise 235 specimens in 95 taxa. Of the earliest plantings, the most impressive specimen is the Chilean Wine Palm (*Jubaea chilensis* (Molina) Baill.). In 1994, Gardner initiated a project to landscape the open channel connecting the Waite Campus bore to the Arboretum dam to more resemble a meandering watercourse with ponds and native aquatic vegetation. The Palm and Cycad Society (South Australia) became involved in planting the verges. That partnership has continued over 25 years as the Society still donates, plants and tends an expanding collection of palms and cycad species, many of which are rare in the wild and not commercially available.

Documentation – opening the digital door

From the beginning, details of each Arboretum specimen were recorded on index cards including individual tree number, scientific and common names, family, distribution, source of material, and



Fig. 3. Dragon's Blood Tree (*Dracaena draco*), Waite Arboretum #363, 2016. Photo: Eileen Harvey.

for many specimens, flowering, fruiting and other observations. In 1986, Gardner developed the first electronic catalogue which could be readily updated, searched, sorted or exported as a spreadsheet; this was subsequently made available to the public on the Arboretum website. Gardner and Douglas Gardner, developed the first electronic map of the Arboretum. A tape measure was used to determine the extent of each canopy and the position of each specimen in relation to a grid of existing taps. The data was plotted using what was then new technology, Computer Aided Drafting (CAD) software. The catalogue and map were published as a booklet (Gardner 1990b).

The first digital georeferenced map was produced in 2014 by Gardner and Marian McDuire. An aerial image to 10 cm resolution allowed trees and other features to be accurately digitised to provide a comprehensive dataset of the current Arboretum collection as well as infrastructure such as gates, fences, roads, paths and seats. The spatial dataset was then joined with the tree catalogue using the specimen number as the unique identifier. The merged data enabled the development of the Waite Arboretum App that allows any user with a smart device to easily locate a specific tree or call up the label information of every specimen. Labelling trees is a costly and an on-going challenge as names change and labels are lost or become obscured by the growing canopy. The App makes the current label information available at the tap of a finger.

The Waite Arboretum App, released in 2015, has proved to be a very useful management tool. It enables

researchers and professionals such as arborists, landscape architects and urban planners to readily locate a species of interest. Visitors can learn about the wildlife and discover other features, as well as follow a series of themed walks. Using digital technology connects and appeals to children who are all adept at using tablets and smart phones for learning and play, thus fostering a connection to the Arboretum in the next generations, who will hopefully become its supporters, champions and custodians.

Conclusion

Peter Waite understood the value of science and enthusiastically embraced new technology. The Waite Campus of the University of Adelaide now comprises 200 hectares where more than 1,100 people work and study in 12 research organisations. Waite's generous bequest has resulted in the internationally renowned Waite Research Institute – doing leading research and delivering world class teaching. The facility is the largest concentration of expertise in the southern hemisphere in the areas of plant biotechnology, cereal breeding, sustainable agriculture, wine, horticulture and land management. Waite also had the generosity and foresight to leave a portion of his estate in perpetuity for a park or garden for the enjoyment of the public. This has resulted in the Waite Arboretum, a significant scientific collection of trees that can be explored and its embodied information accessed worldwide with digital technology. Waite left a much loved and enduring living legacy.

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References

- Allen, R. & Baker, K. (2009). *Australia's Remarkable Trees*. (The Miegunyah Press: Melbourne).
- Barker, R.M. (2013). David Eric Symon (1920–2011). *Journal of the Adelaide Botanic Gardens* 26: 71–96.
- Corbin, H.H. (1923). *Suggestions concerning the University Arboretum*. Unpublished report dated Nov. 1923, accompanying letter to C. R. Hodge, Registrar, dated 4 December 1923. University of Adelaide Archives, series no. 200, 716/23.
- Delaporte, K., Conran, J. & Sedgley, M. (2001). Morphological analysis to identify the pollen parent of an ornamental interspecific hybrid *Eucalyptus*. *Scientia Horticulturae* 89(1): 57–74.
- Delaporte, K.L. & Boyle, E. (2022). *BBB – what's it all about? (Hint: Bringing Biodiversity Back)*. Poster presentation, 7th Global Botanic Gardens Congress, Melbourne, Australia, 25–29 Sep. 2022.
- Department of Climate Change, Energy, the Environment and Water [DCCEE] (2023). *Grey Box* (*Eucalyptus microcarpa*) *Grassy Woodlands and derived native grasslands of south-eastern Australia*. In: Community and Species Profile and Threats Database (SPRAT). <http://www.environment.gov.au/sprat> [accessed: 7 Mar. 2023].
- Edgeloe, V.A. (1984). *The Waite Agricultural Research Institute: The first fifty years 1924–1974*. (Waite Agricultural Research Institute: Glen Osmond).
- Gardner, J.A. (1990a). History of the Waite Arboretum and Waite Herbarium. In: Short P.S. (ed), *History of Systematic Botany in Australasia: Proceedings of a symposium held at the University of Melbourne, 25–27 May 1988*, pp. 29–35. (Australian Systematic Botany Society: Melbourne).
- Gardner, J.A. (1990b). *The Waite Arboretum – A Guide and Catalogue of Trees*. (Concord Press: Adelaide).
- Gardner, J.A. (1995). Future species selection of urban street trees: some suggestions from the Waite Arboretum. In: *Proceedings of the Trees in the Urban Environment Seminar, held at the University of Adelaide, 21 February 1995*, pp. 36–37. (Royal Australian Institute of Parks and Recreation: Canberra).
- Gardner, J.A. (2015). The Waite Arboretum – Science, Trees and Technology. In: *Proceedings of the ninth national conference, Mt Gambier, 21–24 October 2015*, 20 pp. (Australian Forest History Society: Kingston). <https://www.foresthistory.org.au/conference-2015/> [accessed: 7 Mar. 2023].
- Gardner, J.A., McDuie, M. & Boyle, E. (2017). Valuing the Waite Arboretum, South Australia; an i_tree Ecosystem Analysis. (The University of Adelaide: Adelaide). https://www.itreetools.org/documents/378/WaiteArb_iTree_2017.pdf [accessed: 7 Mar. 2023].
- Gardner, J.A. & Symon, D.E. (2004). The Waite Arboretum – Past and Future. *Australian Garden History* 15: 15–19.
- Glocke, P., Delaporte, K., Collings, G. & Sedgley, M. (2006). Micropropagation of juvenile tissue of *Eucalyptus erythronema* × *Eucalyptus stricklandii* cv. 'Urrbrae Gem'. In *Vitro Cellular & Developmental Biology – Plant* 42: 139–143.
- International Union for Conservation of Nature and Natural Resources [IUCN] (2023). *The IUCN Red List of Threatened Species*. Version 2022-2. <https://www.iucnredlist.org> [accessed: 7 Mar. 2023].
- Nicolle, D. (2023). *Currency Creek Arboretum*. (Dean Nicolle: Melrose Park). https://www.dn.com.au/Currency_Creek_Arboretum.html [accessed: 7 Mar. 2023].
- Richardson, A.E.V. (1927). Unpublished report to the University Council on the Arboretum, No. 5/27, dated May [1927]. University of Adelaide Archives, series no. 150.
- Richardson, A.E.V. (1928). Unpublished report to the University Council on the establishment of an arboretum at the Waite Institute. No. 5/28, dated 21 May 1928. University of Adelaide Archives, series no. 150.
- Symon, D.E. (1983). Ornamental Pears. *Australian Parks & Recreation* Nov. 1983: 54–55.
- Symon, D.E. (1984). Taxonomic Botany at the Waite Agricultural Research Institute. *Waite Agricultural Research Institute Biennial Report 1982/83*, pp. 29–33. (The University of Adelaide: Adelaide).
- Symon, D.E. & Gardner, J.A. (1991). Ornamental pears have potential for landscape use. *Australian Horticulture* 89: 100–105.
- Symon, D.E. (2000). Dragon's Blood Tree (*Dracaena draco*). *The Mediterranean Garden* 21: 30–32.
- Symon, D.E. (2008). Dragon decapitated. *The Friends of the Waite Arboretum Newsletter* 55: 8.
- Williamson, E., Groom, S. & Hogendoorn, K. (2019). A new method to sample DNA from feral honey bee hives in trees. *Transactions of the Royal Society of South Australia* 143: 92–96.
- Williamson, E., Groom, S., Utaipanon, P., Oldroyd, B.P., Chapman, N. & Hogendoorn, K. (2022). The reliability of honey bee density estimates from trapped drones. *Apidologie* 53(6): 1–12.
- Zeitz, L.D. (2014). *The Waite: A social and scientific history of the Waite Agricultural Research Institute*. (Barr Smith Press: Adelaide).



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