

## URBAN FOREST / URBAN FAUNA

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Given my background, most people assume that I will have a strong preference for plants from the Northern Hemisphere and particularly Europe. The fact is that I have spent 3/5<sup>th</sup> of my life in Australia and did my degree in Australia. Admittedly, I did my first training, in Horticulture, in Ireland, but most of my real experience has been gained in this country.

During my time at the University of New England, where I worked as a Technician, while doing my BSc., I was fortunate to be able to travel quite extensively, collecting plants, throughout NSW and southern Queensland. On coming to Adelaide, as Horticultural Botanist at the Botanic Gardens of Adelaide, another opportunity opened up. My responsibility was to run the Technical and Advisory Section and also identify any un-named plants within the three Botanic Gardens, Adelaide, Wittunga and Mt. Lofty. I was also responsible for the seed collection and the seed exchange system for the Botanic Gardens. This allowed me to travel extensively throughout the semi-arid regions of South Australia, getting to know the flora and collecting seed.

I have also been fortunate to travel extensively in various parts of the world, including the United Kingdom and Ireland, Europe, North America and South America and a little in South-East Asia. During these travels, I have been able to visit both natural areas, and botanic gardens and, more recently, a number of zoos.

And why am I telling you all this? The reason is to assure you that I have had a love of plants, and an interest in plants, for more than fifty years, both privately and professionally. This love has not diminished and I count myself lucky to have had a career which has allowed me to get paid for undertaking my hobby. The result is a reasonably extensive knowledge of plants, both native and exotic, and their use in the landscape.

My interest in plants is such that, when I see a new plant, I ask three questions:-

- a) What is it? (Botanical name, of course).
- b) What family does it belong to?
- c) Where does it come from?

The reason for the last question, of course, is because I am interested in biogeography and how plants are spread throughout the world. Possibly more importantly, if I can find out the habitat, I can then determine whether it will survive in Adelaide.

In recent years, I have also gained a bit knowledge about animals. This should put me in the box seat to talk about the connection between Urban Forests and Urban Fauna. Looking at the list of other speakers, I will leave this to you to judge.

I must confess to having some difficulty with the idea of an urban forest. To me a forest means a wild place with, more or less, a full complement of species, both plant and animal. Putting this definition to one side, I am, like everyone else here, committed to the concept of making our cities better places to live by the use of plant material. Making our cities a better place to live, of course, goes far beyond the use of plants, it includes reduced traffic movements, better designed buildings, thus cutting down the use of air conditioners, shade structures and using ceramic paint to reduce the effects of insolation, use of solar power, reduction in water usage,

pedestrian only areas, etc.. However, this is not the forum for a dissertation on this topic, suffice to say that what we are talking about is what has become known as a Biocity.

Many of you will be aware of the recently created Centre for Urban Habitats which has as its byline, Biocity. I have been fortunate enough to have been appointed to the Advisory Committee of this exciting development with a particular responsibility for Communication. Two other sub-committees exist, Research and Education. A Finance Sub-Committee, which I will steer well clear of, will be formed later.

The Mission Statement of Biocity is “to enhance the environment of Adelaide through multidisciplinary research, design, development and education that promote a rich diversity of flora and fauna in the context of urban living.”

The centre, or Biocity, describes itself as

“A centre which utilises the best of a diverse range of disciplines from plant and animal science to engineering and architecture in order to enrich the lives of the people of Adelaide through study, understanding and education in urban environmental issues.

The Centre will facilitate the creation of a rich, interesting and harmonious environment that is in keeping with the historical development and cultural richness of our parks and gardens”.

It has taken me quite a while to get to one of the points which I wish to make and I draw your attention to the last sentence in the description which I have just read out, “The Centre will facilitate the creation of a rich, interesting and harmonious environment that is in keeping with the historical development and cultural richness of our parks and gardens”. A modern-day city cannot afford to be xenophobic in relation to plants, we need to use what we know will do well in the vastly modified environment which many of us call home. There may be little place for exotic trees in National Parks and the rural or “natural” landscape, but there is a place for exotic vegetation in our cities. If we exhibit such xenophobia we greatly reduce the palette of plant material available to us. Conversely, if other countries exhibited the same prejudice they would be denied the pleasure of our Australian heritage.

What do I mean by “exotic?” Do I simply mean those from outside our shores? Or do I mean all vegetation that is not local or indigenous to the Adelaide Plains? I am using the latter definition and later in this talk I will touch upon the use of Australian native plants which come from outside our local area and their benefits and detractions. Perhaps it is an oxymoron to refer to exotic native plants but I presume you will understand what I mean.

A debate has been going on about the selection of tree species for the front of the SA Museum and eventually, by definition, the whole North Terrace boulevard. It is my opinion, currently a MINORITY position I might add, that classical “European” architecture needs classical “European” trees to complement it. In the case of the North Terrace institutions there has been an extra complication. The directors and boards of the institutions want trees which have crowns, or canopies, sufficiently high to allow a clear view of the built structures behind them. As you can imagine, this severely limits the number of tree species which can be considered. Many of the local species develop branches close to the ground and are not suitable for this purpose. Thus, we have to consider “forest giants” or trees such as the species currently being promoted, i.e., *Eucalyptus maculata*. For many reasons I would simply put *Platanus*

*hybrida* or *Platanus digitata* in the scheme: it does well in Adelaide, has a beautiful shape and bark and will complement other city plantings including North Terrace, Frome Road and Hutt Street. I am out of step because the feeling of a need for "reconciliation" with our native vegetation is becoming very "fashionable" and I fear it may overwhelm other considerations.

Each morning I undertake a 3km walk at 6.30am and tend to follow much the same route. I live in Parkside, which, as those of you who are local know, is the first suburb south of the Adelaide Parklands. During my walks, I have been observing the wide range of street trees used in this, and surrounding suburbs. As I am a "lumper" rather than a "splitter" I will use the name I am comfortable with, please forgive me!

Among the trees (and large shrubs) I have seen used as street trees are the following:-

*Platanus hybrida* (Europe)  
*Jacaranda mimosifolia* (S. America)  
*Fraxinus excelsior* (Europe)  
*Ulmus procera* (Europe)  
*Ulmus procera* 'Louis van Houtte' (Europe)  
*Koelreuteria paniculata* (China)  
*Fraxinus excelsior* 'Raywood' (cultivar)  
*Fraxinus americana* (N. America)  
*Pyrus calleryana* (China)  
*Casuarina cunninghamiana* (Australia)  
*Melaluca lanceolata* (?) (Australia)  
*Melaluca armillaris* (Australia)  
*Pittosporum undulatum* (Australia)  
*Eucalyptus leucoxylon* (Australia)  
*Eucalyptus sideroxylon* (Australia)  
*Eucalyptus melliodora* (Australia)  
*Lophostemon confertus* (Australia)  
*Eucalyptus torquata* (Australia)  
*Eucalyptus spathulata* (Australia)  
*Eucalyptus cneorifolia* (Australia)  
*Eucalyptus nicholii* (Australia)  
*Eucalyptus platypus* (Australia)  
*Callistemon* 'Harkness' (Australia)  
*Araucaria* spp (Australia)  
*Acacia pendula* (Australia)  
*Lagunaria patersonii* (Australia)  
*Hymenosporum flavum* (Australia)  
*Melia azederach* var *australasica* (?)

Quite an impressive list and there are probably many more commonly used throughout Adelaide. For example, where would our coastal suburbs be without the Norfolk Island Pine (*Araucaria heterophylla*). Two things come to mind. One is that these trees have been chosen over a number of years, as fashions change, and often one ends up with a patchwork or "mish-mash" of trees chosen because they are known to succeed in difficult areas. The second is that, regardless of the particular time at which they were chosen, the specimen chosen was chosen with a landscape effect or streetscape in mind. No consideration would have been given to the needs of

urban fauna, whether it walks, flies or crawls. No consideration was given, certainly in a number of cases, to the effect upon overhead power lines and the consequent need for lopping, or "butchering" in some cases.

When one looks over the fences of the houses in my area, and many other parts of Adelaide, you will see the species I have mentioned plus the following, and this is by no means an exhaustive list:-

*Eucalyptus globulus* (Australia)  
*Eucalyptus cinerea* (Australia)  
*Eucalyptus gillii* (Australia)  
*Eucalyptus viminalis* (Australia)  
*Eucalyptus camaldulensis* (Australia)  
*Eucalyptus maculata* (Australia)  
*Eucalyptus citriodora* (Australia)  
*Acmena* spp (Australia)  
*Syzygium* spp (Australia)  
*Grevillea robusta*. (Australia)  
*Archontophoenix cunninghamiana* (Australia)  
*Ficus macrophylla* (Australia)  
*Acacia* spp (Australia)  
*Ficus hillii* (Australia)  
*Acer negundo* (N. America)  
*Alnus jorulensis* (S. America)  
*Phoenix canariensis* (Europe)  
*Washingtonia filifera* (USA)  
*Washingtonia robusta* (USA)  
*Photinia* spp (Europe)  
*Dracena draco* (Europe)  
*Erythrina indica* (India)  
*Nerium oleander* (Europe)  
*Prunus* spp (Europe)  
*Schinus molle* (S. America)  
*Salix babylonica* (China)  
*Olea europea* (Europe)  
*Olea africana* (Africa)  
*Liquidambar styraciflua* (N. America)  
*Robinia pseudoacacia* (N. America)  
*Gleditsia tricanthos* (N. America)  
*Brachychiton discolor* (Australia)  
*Buckinghamia celissima* (Australia)  
*Cupaniopsis anacardioides* (Australia)  
*Grevillea robusta* (Australia)  
*Harpullia pendula* (Australia)  
*Pittosporum rhombifolia* (Australia)  
*Stenocarpus sinuatus* (Australia)  
*Schefflera actinophylla* (Australia)

Various conifers including *Pinus* spp, *cupressus* spp, and *Cedrus* spp, are present and as one moves towards the Hills area of Adelaide other genera such as *Quercus* make

their presence felt. In addition Magnolia, Camellia and Rhododendrons are very common in a number of areas.

Once again, these trees and large shrubs were chosen for landscape effect, certainly not with animals in mind until a few years ago when there was a move to “birdscape” our gardens. Can there be anything more quintessentially Australian than to listen and enjoy the sound of our native birds close to the house? Even with your eyes closed you would know that you are in Australia. Our native birds are one of the things that sets this country apart from others. Perhaps as an aside I can share something with you which I only learned in Perth last month. Earlier in this paper I referred to “exotic native” in reference to plants. I was surprised when attending a meeting of the CRC for Pest Animal Control to see two “introduced birds” being listed as pests, in addition to sparrows and starlings. These were the Kookaburra and Rainbow lorikeets which are, apparently, causing mayhem; the Kookaburra with animals and the Lorikeet with fruit, particularly.

One observation I have made over the years since I have been here is that some of the plant selections must have been made by some landscapers in the 1970’s with a view to having their children set up businesses in tree removal and arboriculture. We still see towering forest giants in small gardens in the suburbs, plus the “disease of overplanting” to achieve an immediate effect. Certainly fast growing and designed to give an immediate effect, but the problems created for homeowners, and their neighbours, by some of their choices will be with us for years to come.

Before leaving this topic of street and other trees in Adelaide, I should mention the fact that, as one goes around the world, especially places with a climate similar to Adelaide’s, one is struck by the small suite of trees and other plant material which appears to be heavily used in many cities. Once again they include species such as:- Jacaranda, Platanus, Erythrina, Euc. globulus (before being declared a weed in many places); *Ulmus parvifolia*; *Fraxinus*, *Hibiscus*; *Nerium*, *Callistemon*, *Washingtonia robusta*, *Washingtonia filifera*. Ground covers also tend to be part of a small suite of “appropriate” species. So much confusion has been created by this ubiquitous flora that in many countries people regard some of the plants as being native. One such species is the Jacaranda, which many people are surprised to find is not Australian but actually South American.

Turning now to the fauna associated with urban trees, Biocity or an Urban Forest. Obviously, the most conspicuous feature of the fauna is the avifauna, the birds. When one discounts all of the introduced species which inhabit our cities, pigeon, sparrow, starlings, etc., we are still left with an astonishing array of native birds, particularly those which feed on pollen or nectar. I have watched Rainbow lorikeets in Adelaide Botanic Gardens squabble over nectar on a beautiful member of the family Papilionaceae from South Africa, *Schotia brachypetala*, but of course also seen them and Adelaide rosellas, wattle birds, honeyeaters etc. “Working” both native and exotic plant material. Where there is a little more grass of course I take great pleasure in watching galahs, corellas and sulphur-crested cockatoos searching through the grass for food. The Children’s Zoo at Adelaide Zoo, where there is always an abundance of food, is always resplendent with flocks of crested pigeons and at certain times of the year wood ducks are in profusion.

To achieve a full complement of birds native to the Adelaide Plains would require a large planting of the understorey species, and groundcovers, somewhat difficult to do, even in public parks. The fact that there are a number of species around is also

evidenced by the fact that mistletoe can be seen from time to time on plants, both native and exotic, in suburban gardens. This means that the mistletoe bird *Dicaeum hirundinaceum*, must be persisting at least, if not thriving.

One thing which has helped us to maintain the suite of birds in our suburbs, and even in parts of the city, is the wide range of plants now being grown which does allow birds to get food at times when they would otherwise have to migrate. There is a down side to this however and that is that, because birds no longer have to migrate to find food in winter, or even summer, in some cases, there has been a great reduction in the amount of seed set in native plants, e.g., in the Coorong and even in the Adelaide Hills. I believe this will become an even greater problem in the future as current mature flora dies and is not replaced with young plants.

Maintaining mammals in the city and suburbs forms a greater challenge. Even if we accept the fact that all of the larger macropods have had to leave the city and could not be expected to persist, the possibility of even smaller marsupials persisting is extremely unlikely. While Pinky Flat was once so named because of the number of "pinkies" or bilbies caught there, it has been a long time since one has been caught there and I suspect it will never happen again. The same story would apply to bandicoots and bettongs, and echidnas and native water rats are certainly in short supply.

One group of mammals which still persists, and in some places in reasonable numbers, is the bats. The ravages of cats and dogs are less on these creatures and I believe it would require little work to assist them to thrive and persist.

We are of course blessed with the fact that possums exist very well in the city parks, parklands and suburbs. These animals are the great survivors and have done so well, in conjunction with humans, that they are regarded as a pest by many who have them in their roof space or clumping about in the roof at night. Many gardens are devastated by the effects of possums which seem to have a particular regard for fresh rose shoots. I have also discovered that they do like violets (*Viola odorata*) and one way to discourage them is to use copious amounts of blood and bone. The downside of this cure is the fact that blood and bone attracts foxes and that obviously has its own problems.

Unfortunately, many people catch their possums and surreptitiously take them out at dead of night and release them, either in the hills, or in Botanic Park. The result, because these animals are so territorial, is that the possum usually turns up again and often badly injured as a result of all of the fighting it has had to do to try to establish itself.

When we speak about the urban environment and the concept of urban forests and urban fauna, we tend to forget two things. The first is reptiles, and while we are all delighted to have blue-tongue lizards, skinks, etc., in our backyards and gardens, we are not so enthusiastic about other reptiles such as snakes. Given the fact that the River Torrens comes right through the city and a number of creeks also flow into the Torrens and elsewhere, there is a constant recruitment process going on for these reptiles. I am confident that, once again, despite the effect of cats and dogs we will maintain at least a few species of reptiles, especially in our parklands.

We also tend to forget about the aquatic environment in our cities although a great deal is now being done to try to address this. A number of wetlands have been established and stocked with native fish, amphibians, invertebrates and other animals.

The effects of salination upstream, silting, leaf litter and the resultant eutrophication and algal blooms mean that our waterways are often little better than open drains. To restore waterways to an almost pristine situation will be one of the real challenges for all of us. Judicious use of plant material will help greatly here.

Work is being undertaken by the CRC for Pest Animal Control to try to solve the problem caused by European carp. Little else will exist in an environment inhabited by carp and natural recruitment will ensure that the battle is on-going.

In this new technology, which will be tested on the Murray/Darling system first, fish will be altered to ensure that all animals born are male. This technology, which is called "daughterless", offers some hope of control but probably not elimination. I feel that, like the rabbit and the fox, the carp is here to stay and there will be a constant battle to keep it in check.

So what do I feel about the concept of an urban forest and associated urban fauna? I believe that the Adelaide city square mile is probably too far gone to be regarded as an urban forest in the true sense of the word. However, the parks within the city, whether they be Botanic Park, Botanic Gardens or the Adelaide Zoo, do offer some areas where the avifauna can persist. The proposed roof top gardens on top of a number of carparks will add a little to these refuges. The sum total will be some mitigation of the effects of human activity.

The 1,700 acres (750ha) of Parklands surrounding Adelaide of course offer us an even better chance and work has already begun on changing the plant species used in certain areas of the Parklands. The species being planted are being selected from species which once grew in profusion on the Plains. Quite correctly, it has not just been tree species which have been chosen, tall shrubs and smaller shrubs are also being planted. However safety concerns will mean that dense planting will never be allowed.

From these areas of "natural" woodland, major roads with appropriate plantings will radiate out, allowing a corridor for birds to move from place to place, adding to our enjoyment of native vegetation. Better opportunity exists for those creeks not converted to concrete culverts and drains. Appropriate plantings in these areas will allow animals to migrate to and from areas of greater population density. Remnant areas of vegetation in the suburbs should be preserved and amplified where possible.

Thus while I believe that the concept of an Urban Forest for Adelaide is flawed I believe that we can begin to think seriously about a suburban forest or woodland and certainly as we move to the outer city limits e.g. to the Hills Face Zone, which incidentally must be preserved at all costs, one can see the opportunities which are presented to us.

I drive very frequently out of the city on the south East Freeway on my way to Monarto Zoological Park. What has been done around the Heysen Tunnels is a good start to what could be done. Anywhere where the batter is not too steep, has been planted with local plant species and the European olives have been removed and/or poisoned. I was also musing on one of these journeys about the opportunity which would be presented, for example, by worked out quarries to gradually revegetate them with local species.

Having been involved in releases of native animals in different parts of the state, but always remote from Adelaide I look forward one day to being able to release a native

species, most probably a bird species within the limits of Greater Metropolitan Adelaide.

Having said all the things that I have said, there are two things which those of us living in cities can do, both of which will reduce our "ecological footprint" on this Earth. Firstly we can review our own practices and try to improve the way we use our resources i.e. set a good example, "practice what we preach". The second is to educate people about the damage we as a species are doing to the planet and how each of us can make a difference, albeit only an infinitesimal part of the whole.

For example, the development at the front of the SA Museum allows an opportunity to deliver a strong environmental message. I have been privileged to see the plans and they include water harvesting from North Terrace; collection of rainwater from the Museum roof and using this to irrigate the trees and lawn which are needed in front of the Museum. Reed beds will be established to one side of the front courtyard and will be used to clean the water of its pollutants. This is the type of system which should be in every Botanic Garden and Zoo in Australia and, where possible, in school grounds.

The Museum has also installed solar panels on the roof of the building, this will help reduce the amount of CO<sub>2</sub> going into the atmosphere while also reducing our dependence on fossil fuel. I am not sure of the statistics for the Museum but the small unit which I placed on top of the Animal Health and Research Centre at Adelaide Zoo will eliminate 2 tonnes of CO<sub>2</sub> from the atmosphere each year. We have put a slightly larger unit on top of the new Visitor Facilities at the Zoo and, in addition to saving money we will be doing something for our future comfort and survival. It behoves us to utilise this technology as an education tool as well.

Australia is the most urbanised country on Earth; about 90% of us hug the coasts and are aggregated, to a great extent, into just a few major population centres. I would say that the total space these cities would take up would be less than 1% of our total land mass of 5,000,000 square kilometres; however, our ecological impact goes far beyond our city and town boundaries.

Our lifestyle is such that we have demanded the clearing of large tracts of land all over the country. We are still clearing land at a tremendous rate in Queensland. Many parts of this state, already cleared, are marginal for agriculture, but still we persist. Pastoralists are still doing great damage to our rangelands, although the picture there is improving. Salination is affecting even greater areas of our country each year. Many parts of WA and other parts of the country which were once cleared for farming are now being turned over to tree plantations. Other areas of the country are being revegetated, albeit slowly.

All over the world, including Australia, of course, there was the feeling that the wilderness had to be conquered. It was something to be feared and/or tamed. We were surrounded by animals, and in the case of Europe and North America, dangerous animals. The wheel has turned a half circle - now we surround the animals and, as our population continues to explode, the islands of animals are becoming even smaller. The vegetation is usually the first to go and, as surely as night follows day, the animals go next.

There is little likelihood that we are going to want to reduce our lifestyle. Every generation wants more than the generation before and indeed every parent wants to see their children have a better life than they had.

How does one define better? Is it more of the trappings of the developed world, or is it a cleaner, more sustainable way of achieving our lifestyle. I don't believe that they are mutually exclusive. I believe my children and more particularly, my grandchildren, will have to grapple with this problem, particularly as other parts of the developing world demand what we have and have come to expect. We cannot, in all conscience, deny these people their claim to a better quality of life.

I have previously mentioned the term "ecological footprint". Recently, Adelaide's first 'Thinker in Residence', Herbert Giradet, who is based in London, made the following comment, "If we all want to live like Londoners, it would take three Earths, if we want to live like Australians, we would require four Earths, if we want to live like Americans, we would require five Earths."

Clearly, we do not have three, four or five planets, we only have the one, and it behoves us to look after it better than we have been doing to this time.

Using the Biocity concept to reduce our call upon the Earth and its resources will give us time to sort through the problems and come up with a solution before things are taken out of our hands completely by the Earth itself. We have commenced the journey; Homo sapiens after all is "thinking man". The clamour for change is growing. It is not that many years ago that the things I am speaking about were the province of the "looney left" or "greenies". Who would have thought that wind turbines would actually be constructed and seen as part of the solution to the Earth's energy problems? Initially some people in the U.S.A. became involved in this technology as a 'tax dodge'.

Unfortunately for them but fortunately for us, the technology proved to be viable.

Things which were once only a part of science fiction are now becoming a reality. I regard myself as a realist, perhaps I am an "optimistic realist", but I like to think that we as a species will be able to think our way out of the problems before us. As plants are the building blocks of all life we need to promote them, not just for their intrinsic beauty and worth, but also as reservoirs for CO<sub>2</sub> and resources of Oxygen, a MOST useful product. I am confident that those of us in the "plant world" have a great contribution to make and I wish us all well as we undertake this process. A good result is critical to our future as a species.