CALEYI

Australian Plants SOCIETY NSW

NORTHERN BEACHES GROUP

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pic Andre Porteners

October 2018

Australian Plants Society Northern Beaches
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Next Meeting: **Thursday October 4, 2018** at Stony Range Regional Botanic Garden, Dee Why.
7.00 pm Committee meeting.
7.30 pm Presentation: Warren Henry: 'Aboriginal Australia before European Settlement. **Supper**: Penny & Jan C.

Sunday October 21 APS Northern Beaches visit **Katandra Bushland Sanctuary** on Lane Cove Rd, Ingleside. Meeting at 11 am, at the Katandra Hut. After David Seymour's presentation at the August meeting we're sure many will be keen to explore this precious reserve. More details by email from Penny penny_hunstead@bigpond.com.

November Meeting 7.15 pm Thursday November 1, 2018 at Stony Range Regional Botanic Garden. **Presentation: Richard Hunstead** Beautiful flowers pics from his walks.

Saturday November 10 APS NSW Quarterly at **Loftus** with workshop for presidents in the morning or walks for others. In the afternoon **Lawrie Smith** speaks about native garden landscaping.

STONY RANGE SPRING FESTIVAL - 'Bush Dreaming'

What a glorious day! The weather gods really smiled on us for the annual Spring Festival. Thanks to the members of East Hills, North Shore and Sutherland APS groups who travelled to Dee Why for our festival

Here are a few images of the fun.








VALE CYNTHIA LEECH

Julia Tomkinson


pic: Ed

APS Northern Beaches has lost a very special member of our group: Cynthia Leech, who had belonged to APS for about 50 years, passed away on 17th September 2018.

Cynthia was a woman of many interests and activities, which ranged from Olympic-level synchronised swimming as a young woman; and Archaeology, Latin, Ancient Greek, Botany and Zoology during her university studies; to Art as her major career choice, with music appreciation and Australian native plants as her hobbies. Cynthia worked in the animation industry in Australia for about 35 years, contributing to 68 animated films during that period. She developed an interest in 'the bush' while growing up in Mosman beside Parriwi Park bushland reserve, and later when she moved to Frenchs Forest in 1957, at which time that area was still relatively undeveloped and the native vegetation was all around.


Cynthia in the nursery. Pic David Drage

Cynthia was a very important member of our APS group, as well as the Stony Range Volunteers. Her native plant knowledge was amazing, and she was a long-time friend of other notable APS members such as Betty Maloney and Alec Blomberry, who co-authored several books on Australian native plants.

For many years Cynthia led the team in the propagation nursery at Stony Range Flora Reserve, (later S R Regional Botanic Garden), and was always happy to help identify mysterious plant specimens. Cynthia was a good friend, always ready to listen with a smile even when she was not in the best of health. She enjoyed the group's bushwalks and garden visits as long as she was able, and her desserts were a great feature of our Christmas lunches. Until this year she was also one of the regular stalwart helpers at our annual Plant Sale and Spring Festival, and she developed the system for the plant specimen boards that attract so many visitors on Sale Days.

With the help of her family, former school friends and colleagues, several members of APS Northern Beaches and Stony Range Volunteers were able to give Cynthia a suitable farewell, complete with her favourite champagne and oysters, at Stony Range. Cynthia was very close to her sister and niece and nephews. She will be very much missed by all her family and friends.


With Angus.


In Eleanor's garden. Pic: Ed


What plant is that? pic: Ed


Mmmmm! strawberries. pic: Ed

SEPTEMBER SHOW & TELL

Ed.

APS Northern Beaches September meeting was a most enjoyable Show & Tell session. There were many outstanding plant specimens.

Russell Beardmore's example was of *Pultanaea villosa*.

He writes -

'The description of it in Robinson is:

A softly spreading or erect shrub 0.5 to 2m metres high, densely covered in soft white hairs, especially the new foliage. Found in sclerophyll woodland on the Cumberland Plain as well as other dry sites on clays.

My plants is growing right on the coast in fairly sandy soil - no clay in sight! You can never tell how a plant will go in a particular location without giving it a go. "

Pultanaea villosa pic: Russell Beardmore.

Penny Hunstead brought not a specimen but the whole plant of the moniecious shrub *Pseudanthus pimeleoides*. Such a pretty plant, with white flowers, from the same family as Homeranthus.

Pseudanthus pimeleoides pic: D. Hardin 1993 ©The Royal Botanic Gardens & Domain Trust

Among the others were Eleanor Eakins - *Eremophila maculata*; Harry Loots - photo of Ironbark Orchid - *Dendrobium aemulum*; Anne Gray - *Scaevola calendulacea, Thryptomene saxicola, Philotheca myoporoides, and a mystery Darwinia*.

My apologies if I have omitted your contribution. My notes were pretty scrappy.

REVEALING THE WORLD OF TINY PLANTS

CSIRO: 13 April 2017

Research undertaken through the Centre for Plant Biodiversity Research has led to a better understanding of the world of the tiny and ancient bryophytes.

The challenge

Evolution of tiny plants

Hornworts, liverworts and mosses are all spore-producing plants known as bryophytes.

Bryophytes can live in a wide range of ecosystems from Antarctica to arid Australia and even suburban backyards.

Bryophytes include hornworts, liverworts and mosses.

In Australia there are approximately 2,000 species of bryophytes, made up of about 1,100 species of mosses, 900 liverworts and 30 hornworts.

These typically small plants are important in water retention and nutrient recycling in many habitats, including forming biological soil crusts, which prevent soil erosion in rangelands in semi-arid and arid regions.

Bryophytes are also interesting from an evolutionary point of view, being considered the amphibians of the plant world for the ancient characteristics that link them both to their algal ancestors and to terrestrial plants.

Yet there is still much mystery surrounding the evolution of these important plants.

Gaining a better understanding of bryophytes

Our researchers are using the collection at the Australian National Herbarium to better understand the taxonomy, evolutionary relationships, biogeography and ecology of bryophytes.

The results

Sharing valuable knowledge

Our research has built a better picture of the relationship of the hornwort genus Megaceros worldwide.

We also discovered that the New World species of tropical Central and South America are not closely related to the Old World taxa in our own region.

The Australian Bryophytes website was developed to share this knowledge and highlight the importance of bryophytes to ecology.

FRANK HURLEY'S OTHER TALENTS.

David Drage

Most people will know of Frank Hurley for his adventurous exploits as a photographer on Antarctic expeditions and in two World Wars. Hurley went to the Antarctic three times with Douglas Mawson and once with Ernest Shackleton, producing amazing images of the explorers and the environment while enduring great difficulties. Hurley continued his exploits and further developed his photographic expertise in wartime, being appointed an official war photographer in World War 1, 1914-1918 and World War 2, 1939-1945.

Frank Hurley had other talents which are highlighted in an exhibition currently showing at the Manly Art Gallery and Museum. Entitled “Frank Hurley Photographer and Gardener”, the exhibition runs until the 14th October.

In the 1920s, now married and with a growing family, Hurley developed his interest in building gardens for the children and growing Australian native plants there, notably at their home in Rose Bay. After World War 2, the Hurley family moved to Collaroy Plateau, into a new house with a panoramic view that still exists today over Narrabeen Lagoon. Here Hurley developed a large garden which included many native plants. There was also natural bush vegetation on the property.

Throughout his photographic career, Hurley had used his images to produce postcards to supplement his income. A large collection of these postcards is included in the exhibition. Hurley's work expanded to include leaflets, calendars, books and booklets featuring native plants, and he continued to produce such publications until his death in 1962. The exhibition showcases many such items, as well as photographs of the Hurley family, their various houses and gardens, and scenes of the Northern Beaches area.

After seeing the exhibition Julia delved into her extensive personal archive and found the book shown here. Unfortunately, my attempts to photograph it were not terribly successful, so my advice is to go to the exhibition and see the real thing. The style of the books may be regarded as a little dated today, but at the time they were published they may have contributed to the increasing interest in Australian native plants in the community.

Ed note. Julia’s copy inscribed by her Gran in 1962.

GRASS TREES AREN'T A GRASS (and they're not trees)

batb@theconversation.edu.au September 21, 2018 John Patykowski, Plant ecologist, Deakin University

Grass trees (genus Xanthorrhoea) look like they were imagined by Dr Seuss. An unmistakable tuft of wiry, grass-like leaves atop a blackened, fire-charred trunk. Of all the wonderfully unique plants in Australia, surely grass trees rank among the most iconic.

The common name grass tree is a misnomer: Xanthorrhoea are not grasses, nor are they trees. Actually, they are distantly related to lilies. Xanthorrhoea translates to “yellow flow”, the genus named in reference to the ample resin produced at the bases of their leaves.

All 28 species of grass tree are native only to Australia. Xanthorrhoea started diversifying around 24-35 million years ago – shortly after the Eocene/Oligocene mass extinctions – so they have had quite some time to adapt to Australian conditions.

Wander through remnant heathland or dry sclerophyll forest, particularly throughout the eastern and south-western regions of Australia, and you'll likely find a grass tree.

Perfectly adapted to their environment

Xanthorrhoea are perfectly adapted to the Australian environment, and in turn, the environment has adapted to Xanthorrhoea. Let's start the story from when a grass tree begins as a seed.

After germination, Xanthorrhoea seedlings develop roots that pull the growing tip of the plant up to 12cm below the soil surface, protecting the young plant from damage. These roots quickly bond with fungi that help supply water and minerals.

Once the tip of the young plant emerges above ground, it is protected from damage by moist, tightly packed leaf bases, although shoots may develop if it is damaged. The leaves of Xanthorrhoea are tough, but they lack prickles or spines to deter passing herbivores. Instead, they produce toxic chemicals with anaesthetising effects.

All Xanthorrhoea are perennial; some species are estimated to live for over 600 years. Most grow slowly (0.8–6 cm in height per year), but increase their rate of growth in response to season and rainfall. The most “tree-like” species grow “trunks” up to 6 metres tall, while trunkless species grow from subterranean stems. Grass trees don't shed their old leaves. The bases of their leaves are packed tightly around their stem, and are held together by a strong, water-proof resin. As the old leaves accumulate, they form a thick bushy “skirt” around the trunk. This skirt is excellent habitat for native mammals. It's also highly flammable. However, in a bushfire, the tightly-packed leaf bases shield the stem from heat, and allow grass trees to survive the passage of fire.

Xanthorrhoea can recover quickly after a fire thanks to reserves of starch stored in their stem. By examining the size of a grass tree's skirt, we can estimate when a fire last occurred.

It can take over 20 years before a grass tree produces its first flowers. When they do flower it can be spectacular, producing a spike and scape up to four metres long advertising hundreds of nectar-rich, creamy-white flowers to all manner of fauna. Flowering is not dependent on fire, but it stimulates the process. The ability of grass trees to resprout after fire and quickly produce flowers makes them a vital life-line for fauna living in recently-burnt landscapes.

Grass trees provide food for birds, insects, and mammals, which feast on the nectar, pollen, and seeds. Beetle larvae living within the flower spikes are a delicacy for cockatoos. Invertebrates such as green carpenter bees build nests inside the hollowed out scapes of flowers. Small native mammals become more abundant where grass trees are found, for the dense, unburnt skirt of leaves around the trunk provides shelter and sites for nesting.

Indigenous use of grass trees

For Indigenous people living where grass trees grow, they were (and remain) a resource of great importance.

The resin secreted by the leaf-bases was used as an adhesive to attach tool heads to handles and could be used as a sealant for water containers. This valuable and versatile resin was an important item of trade.

The base of the flowering stem was used as the base of composite spear shafts, and when dried was used to generate fire by hand-drill friction. The flowers themselves could be soaked in water to dissolve the nectar, making a sweet drink that could be fermented to create a lightly alcoholic beverage.

When young, the leaves of subspecies Xanthorrhoea australis arise from an underground stem which is seasonally surrounded by sweet, succulent roots that can be eaten. The soft leaf bases also were eaten, and the seeds were collected and ground into flour. Edible insect larvae residing at the base of grass tree stems could be collected. Honey could be collected from flower stems containing the hives of carpenter bees.

European exploitation

European settlers were quick to clue onto the usefulness of the resin , using it in the production of medicines, as a glue and varnish, and burning it as incense in churches. It was even used as a coating on metal surfaces and telephone poles, and used in the production of wine, soap, perfume and gramophone records.

Resin can easily be collected from around the trunk of plants, but early settlers used more destructive methods, removing whole plants on an industrial scale. The resin was exported worldwide; during 1928-29, exported resin was valued at over £25,000 (equivalent to A$2 million today!).

We still have much to learn about grass trees. Current research indicates an extract from one subspecies can be used as a cheap, environmentally-friendly agent to synthesise silver nanoparticles that are useful for their antibacterial properties.
Threats to grass trees

Many of the oldest grass trees have been lost to land clearing, illegal collection, and changes to fire regimes. It's vital we care for those remaining. Grass trees are particularly sensitive to Phytophthora cinnamomi, a widespread plant pathogen that is difficult to detect and control, and kills plants by restricting movement of water and nutrients through the vascular tissue.

Growing native plants can be a wonderful way to contribute to the conservation of genetic diversity, and attract native fauna into your garden. Grass trees certainly make an interesting conversation plant!

They can easily be grown at home, provided they're sourced from a reputable supplier. The best way is to grow from seed, but patience is required as growth can be slow. Despite being relatively hardy, grass trees do not like being moved once large or established, so translocation of plants is not advised. In my opinion, the best way to see grass trees in their true splendour is to visit them in their natural habitat.

ANTARCTICA'S 'MOSS FORESTS' ARE DRYING AND DYING

Theconversation.com September 25, 2018 Melinda Waterman, Johanna Turnbull, Sharon Robinson.

The lush moss beds that grow near East Antarctica's coast are among the only plants that can withstand life on the frozen continent. But our new research shows that these slow-growing plants are changing at a far faster rate than anticipated.

We began monitoring plant ecosystems 18 years ago, near Australia's Casey Station in the Windmill Islands, East Antarctica. Casey Station is on East Antarctica's coast. Click map to zoom. Australian Antarctic Data Centre

As we report in Nature Climate Change today, within just 13 years we observed significant changes in the composition and health of these moss beds, due to the drying effects of weather changes prompted by damage to the ozone layer.

Living on the edge

Visitors to Antarctica expect to see a stark landscape of white and blue: ice, water, and sky. But in some places summer brings a surprisingly verdant green, as lush mosses emerge from under their winter snow blanket.

Because it contains the best moss beds on continental Antarctica, Casey Station is dubbed the Daintree of the Antarctic. Individual plants have been growing here for at least 100 years; fertilised by ancient penguin poo.

Antarctic mosses are extremophiles, the only plants that can survive the continent's frigid winters. They live in a frozen desert where life-sustaining water is mostly locked up as ice, and they grow at a glacial pace – typically just 1 mm a year.

These mosses are home to tardigrades and other organisms, all of which survive harsh conditions by drying out and becoming dormant. When meltwater is available, mosses soak it up like a sponge and spring back to life.

The short summer growing season runs from December to March. Day temperatures finally rise above freezing, providing water from melting snow. Overnight temperatures drop below zero and mosses refreeze. Harsh, drying winds reach speeds of 200 km per hour. This is life on the edge.

Moss beds, with moss in the foreground showing signs of stress. Sharon Robinson, Author provide

Tough turf

When we first began monitoring the moss beds, they were dominated by Schistidium antarctici, a species found only in Antarctica. These areas were typically submerged through most of the summer, favouring the water-loving Schistidium. But as the area dries, two hardy, global species have encroached on Schistidium's turf.

Like tree rings, mosses preserve a record of past climate in their shoots. From this we found nearly half of the mosses showed evidence of drying. Healthy green moss has turned red or grey, indicating that plants are under stress and dying. This is due to the area drying because of colder summers and stronger winds. This increased desertification of East Antarctica is caused by both climate change and ozone depletion.

Since the 1970s, man-made substances have thinned Earth's protective sunscreen, the ozone layer, creating a hole that appears directly over Antarctica during the southern spring (September–November). This has 'dramatically affected the southern hemispheres climate. Westerly winds have moved closer to Antarctica and strengthened, shielding much of continental East Antarctica from global warming.

Our study shows that these effects are contributing to drying of East Antarctica, which is in turn altering plant communities and affecting the health of some native plant species. East Antarctica's mosses can be viewed as sentinels for a rapidly drying coastal climate.

But there is good news. The ozone layer is slowly recovering as pollutants are phased out thanks to the 1987 Montreal Protocol. What is likely to happen to Antarctic coastal climates when ozone levels recover fully by the middle of this century?

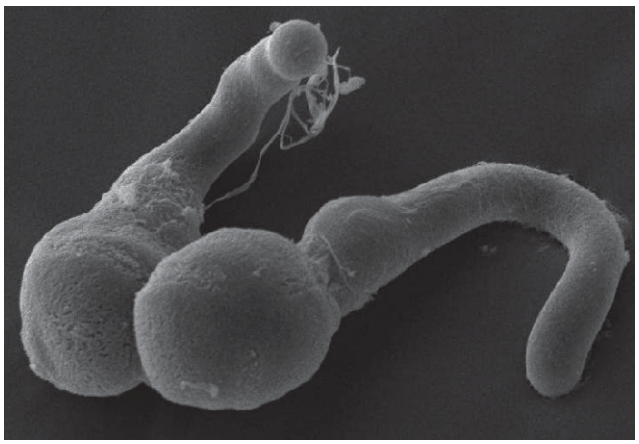
Unlike other polar regions, East Antarctica has so far experienced little or no warming. Antarctic ice-free areas are currently less than 1% of the continent but are predicted to expand over the coming century. Our research suggests that this may isolate moss beds from snow banks, which are their water reservoirs. Ironically, increased ice melt may be bad news for some Antarctic mosses.

East Antarctica is drying – first at the hands of ozone depletion, and then by climate change. How its native mosses fare in the future depends on how we control greenhouse gas emissions. But with decisive action and continued monitoring, we can hopefully preserve these fascinating ecosystems for the future.

SEX IN PLANTS REQUIRES THRUST

www.sciencedaily.com September 24, 2018 McGill University

In plants, to fertilize the egg, the pollen tube (which is between 1/20 and 1/5 of the width of a human hair) has to navigate through a maze of tissue, no matter what obstacles it encounters. Thanks to the lab-on-a chip technology scientists were able to actually see and measure exactly what was going on within the pollen tube as it grew.



Electron micrograph scan of pollen grains forming pollen tubes in Camillia japonica. Credit: Youssef Chebli & Anja Geitmann, Université de Montréal / McGill University

Plant sex relies on a combination of prodding and a lot of communication and guidance suggests a study published in the September 2018 issue of Technology. It's a process that is fraught with challenges. The sperm, two of which are housed in each grain of pollen, are unable to move on their own and the egg cell is deeply embedded in the pistil (the female tissues of the flower). So, to reach the egg the sperm rely on a pollen tube that extends into the pistil. These invasive tubes are the fastest growing cells in the plant kingdom, growing up to 1-2 cm (or 500x their original dimension) an hour, and can sometimes extend up to 30 cm, depending on the anatomy of the flower. To fertilize the egg, the pollen tube (which is between 1/20 and 1/5 of the width of a human hair) has to navigate through a maze of tissue, no matter what obstacles it encounters. The phenomenon is well-documented and known to require communication at cellular level with the female flower tissues, but relatively little is understood about the cell mechanics involved. So scientists from McGill and Concordia collaborated to look more closely at the growth force of individual pollen tubes using a microfluidic lab-on-a-chip.

"From a mechanical point of view, the process of pollen tube elongation is similar to that of a balloon catheter used in angioplasty -- forces are generated based on fluid under pressure," explains Muthukumaran Packirisamy from Concordia University's Department of Mechanical and Industrial Engineering. "So, we designed a microscopic cantilever with a gauge built-in that the pollen tubes had to forcefully push against in order to continue to elongate."

Anja Geitmann, formerly at l'Université de Montréal who is now Canada Research Chair in McGill's Department of Plant Science is the senior author on the paper. She adds:

"Thanks to the lab-on-a chip technology we were able to actually see and measure exactly what was going on within the pollen tube as it grew. We discovered that the water pressure and force that these tiny cells exert as they push through the plant tissue to reach their destination is equivalent to the air pressure we put in our car tires to keep them rolling. What is even more exciting is that we found that when the pollen tube encounters an obstacle, it changes its growth pattern, suggesting that the cells are in some ways able to 'feel' and respond to the physical resistance in their environment. It's very exciting to be able to see this process, and it leaves us with a lot of interesting questions ahead about male-female communication."

The research was funded by the Fonds de Recherche du Québec (FQRNT) and a Concordia Research Chair.

A QUEST FOR SURVIVORS

SMH September 22, 2018 Robin Powell

Over the coming decades our parks and gardens are likely to face longer, more frequent and more intense heat waves; unreliable rainfall tending to either drought or deluge; and unseasonably hot days. That's our climate future, even if we manage to halt the damage now. Gardeners are already noting, with a kind of appalled fascination, how climate change is impacting their gardens.

Ivory curl tree, Buckinghamia celsissima, a rainforest tree from northern Queensland that has made a successful foray south.

A major, five-year, multi-partner research project called Which Plant Where aims to make greener, cooler and more liveable cities part of our future by identifying the plants that will cope best with a changing climate in the country's five most populous cities.

"We know the importance of urban greening for human health and wellbeing, for moderating temperatures and providing a whole range of ecosystem benefits, but we are increasingly facing issues with climate change," says the project's chief investigator, Professor Michelle Leishman, of Macquarie University.

"The main role of the Which Plant Where project is to give plant practitioners – landscape designers, urban planners, councils, nurseries and growers, as well as home gardeners – a broader range of appropriate and climate-ready plant species, and an evidence base to maximise the benefits and reduce the risk and expense of planting species that won't survive."

The first part of the project collected existing data from a wide range of sources to develop a comprehensive picture of size, growth rate, canopy density, longevity, allergenicity, insect resistance, biodiversity impacts and influence on air and water quality and urban temperatures of 50 plant species. The data will also be used to develop maps of each species' suitability to both current and future climates across Australia.

Two years into the project, the current focus is on glasshouse experiments in which 100 plants are being put to the test for their heat and drought-tolerance. The subject list includes mostly native and some exotic trees, shrubs, ground covers and grasses. On the list are well-known garden options, such as magnolia, as well as those that could be better known, such as the ivory curl tree, Buckinghamia celsissima, a rainforest tree from northern Queensland that has made a successful foray south.

Also being tested are plants that are hardly known at all, but are considered by experts as having great potential for gardens and urban greenspace. One of these is blue tongue, Melastoma affine, named for the effect of its sweet blue-black berries. It's an evergreen shrub to two-three metres that looks a bit like a tibouchina, hence its other common name, native lasiandra.

By 2021, when the project is complete, Which Plant Where will have generated an interactive online database that will allow gardeners – and professional plant people – to identify the plants best able to cope with the environmental changes forecast for the next 50 years, offering more reliable ways of greening our cities.