CALEYI


pic Andre Porteners

NORTHERN BEACHES GROUP

austplants.com.au/northern-beaches **May 2019**

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CALENDAR

APS Northern Beaches meeting Thursday May 2, 2019 at Stony Range Botanic Garden, Dee Why.
7.00 pm Plant family. Araliaceae; sp. Astrotricha - **Eleanor Eakins**.
7.15 pm Presentation Wendy Grimm, APS NSG. **"Pollination – not just the realm of bees!"**
What motivates insects to visit plants? How do plants deceive insects into providing pollination services?
These questions have tied Wendy's interest in Australian native plants to her passion for capturing images of small, mostly inconspicuous insects. She will talk about insect pollinator relationships to several well-known plant families.
Wendy recently spent three months with biologists from China and the USA exploring pollination in several species of Corunastylis (Genoplesium), a genus of orchid found in the Sydney area, and is currently on the track of the pollinator of Genoplesium baueri.
Supper: Estelle & Roger.

APS NSW Quarterly + AGM at Blaxland. Saturday May 18, 2019. (See p.3).
APS NSW Get-Together Newcastle Sat 17 & Sun 18 August, 2019 (See p. 3)
2019 ANPSA 'Blooming Biodiversity' Sunday 29 Sept. to Friday 4 Oct. 2019 **Albany, WA.**
Editor march@ozemail.com.au

NORTH HEAD SANCTUARY WALK

Starting out pic: Richard Hunstead

The day was perfect for our walk in North Head Sanctuary on Saturday, 14th April. Bright and sunny, 22C with high cirrus clouds and a light breeze. Anne (our leader) was accompanied by Penny & Richard, Jane, Julia & David, Jennifer and Jan. The carpark behind the restaurant where we met had been planted with *Bankia collina*, *Grevillea buxifolia*, *Epacris longifolia* (all in flower) and *Themeda australis* – all of which were seen on our walk. Penny explained the geology of the headland being one giant ancient dune so that sand-loving plants do best here.


Pittosporum undulata pic: RH

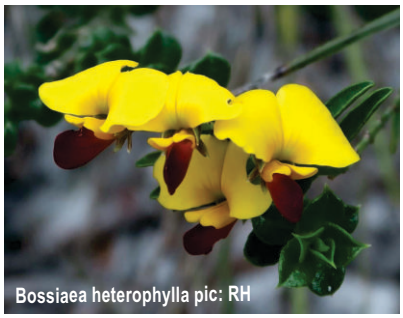

Banksia collina pic: RH


Grevillea buxifolia pic: Ed.

Early on the Memorial Walk we came upon a magnificent vista to South Head and the tall buildings of the cityscape. Here the wind had sculpted the taller shrubs of *Banksia serrata* and *Callitris rhomboidea* to much shorter, sloping heights. Typical heath plants abounded – *Woolsia pungens* (flowering profusely in white), the tiny-flowered *Leucopogon microphylla*, *Actinotus helianth*i (looking a bit worse for wear) and *Boronia serrata* spot-flowering. We saw *Pittosporum undulatum* in seed and *Hibbertia scandens* too.


Lambertia formosa pic: RH


Acacia terminalis pic: RH


Bossiaea heterophylla pic: RH

The walk to the Hanging Swamp was lined with *Banksia ericifolia* with its deep orange flower spikes, *Bossiaea heterophylla* with its dark red keels and banks of Coral Fern (*Gleichenia dicarpa*). After the recent rains the swamp was full of water with island clumps of *Gahnia seiberiana* being attended by Swamp Grass Brown butterflies.


Richard and Julia view the hanging swamp pic:Ed.

On our way out we came across *Kunzea ambigua*, *Xanthosia pilosa*, *Persoonia lanceolata* and *Cyathea australis*. Taller shrubs of *Callistemon rigidus* and *Glochidion ferdinandi* occurred here with the tiny cheese trees self-propogating everywhere. We noticed that the parasitic plant *Olax stricta* with its distinctive yellow stems seemed to be always near a clump of the rush *Restio dimorphus*. Richard was able to take a photo of a native bee on the persoonia flowers and Penny couldn't stop herself from weeding the edge of the track!


Olax stricta pic: RH


Persoonia lanceolata pic: RH


Hemigenia purpurea pic: RH


Xanthorrhoea resinosa pic: RH

Birds seen or heard included wattlebirds, New Holland honeyeaters and White-cheeked honeyeaters.

Then on to the Eastern Suburbs Banksia Scrub walk where there had been a hazard reduction burn last winter. *Xanthorrhoea* species abounded here plus *Allocasuarina distyla* and many banksias. We were lucky to see the gorgeous *Astroloma humifusum* (Cranberry Heath) in flower – I would love to have this green and red ground-cover gem in my garden! Now we came to a lookout to the north – a 180 degree view from Manly Harbour to the hazy headlands of Avalon or Whale Beach.


Astroloma humifusum pic: RH


Hibbertia bracteata pic: RH

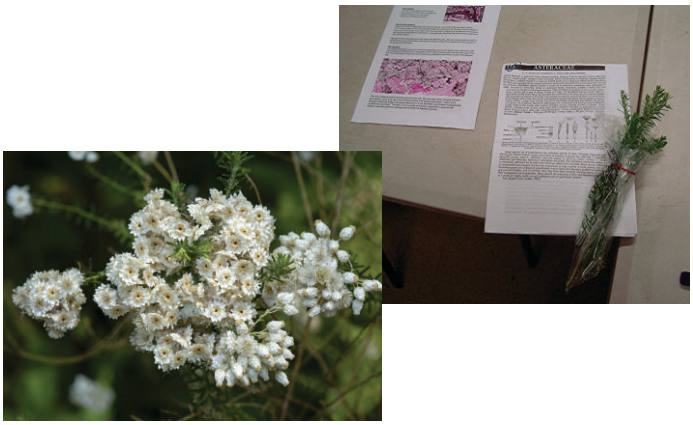
Near the end of this walk is the Third Quarantine Cemetery which was established in 1881 to cope with deaths from an outbreak of smallpox and later bubonic plague and the 1918 flu epidemic. These people now have a wonderful view looking west up the harbour to the city.

Our lovely walk ended at the Bella Vista Café where sumptuous repasts were indulged in, much conversation had and I amused David by trying vainly to identify a tiny hibbertia with very fine leaves!

Jan Carnes


Reporter and photographer check ident. pic:Ed..

APRIL MEETING



Ozothamnus diosmifolium pic. ontheroadmagazine.com.au

Our esteemed vice president, David Drage, chaired our April meeting with another episode in our feature spot for plant families. This month the Asteraceae, which as David pointed out, though ironically listed in the 'Lesser Families' in Robinson's 'Field Guide to Native Plants of Sydney', is one of the most prolific worldwide. The selected species was *Ozothamnus diosmifolium*. A not so obvious member of this daisy family.

The following 'Show & Tell' session had Anne displaying a specimens from her garden including the obscure, primitive plant *Psilotus nudum* (Skeleton Fork Fern).

Eleanor let us explore Stony Range's amazing collection of Banksia cones. The photo shows only a fraction of the specimens.

Penny revisited her February plant family with examples of both the genuine *Brunoniella australis* (l) and the Mexican imposter *Ruellia squarrosa* (r).

APS NSW QUARTERLY GATHERING & AGM
Saturday, 18 May 2019

Our AGM and May Quarterly Gathering is being hosted by the **Blue Mountains Group.**

Start the day with a short walk to **Pippa's Pass**, led by Jim Ward.
Meet at **Blaxland Library** car park, 33 Hope St., Blaxland at 9..45am for 10am start. The walk is a little rough at the start with a few uneven steps and may be slippery if wet but it then levels out and becomes easier. We would expect to see some of the common Blue Mountains species such as *Xanthosia pilosa* and the Green Grevillea, *Grevillea mucronulata*, which occur near the start of the walk.

OR 10 am meet at **Glenbrook Native Plant Reserve** and Nursery, 41 Great Western Highway, Glenbrook (Opposite Tourist Information Centre), for a guided walk around the reserve and an opportunity to buy plants.

Our **AGM** will be held from 12.30 to 1pm.

The highlight of the day will be a talk on **Australian carnivorous plants** by **Mt Tomah Botanic Garden** manager and curator, **Greg Bourke**, who has an unbridled passion for these highly unusual plants.

1-2 pm 'Plants with Bite'

2.30-3 pm 'Growing and maintaining Australian carnivorous plants'

You will also be able to purchase a carnivorous plant on the day.

SAT, 18 MAY AT 09:45
Blaxland Library 33 Hope St, Blaxland, New South Wales

SAVE THE DATE - 17 TO 18 AUGUST 2019
APS NSW GET-TOGETHER IN NEWCASTLE AREA

Heather Miles (APS NSW Administrator)

You are cordially invited to the 2019 APS NSW Get-Together. This not to be missed event is being held at a varied range of locations in the Newcastle area.

There are a range of different native vegetation communities available to explore. Your visit will take you to some of the gems of the area and you will be able to see the spectacular coastal flora at its peak.

Highlights will include a visit to the Hunter Wetlands Centre where you will be welcomed to the Newcastle Groups home base, this will also include the opportunity to purchase from the wide range of native plants produced by the "Thursday Mob". https://wetlands.org.au

A visit to the award-winning Hunter Region Botanic Gardens and herbarium is also on the agenda. https://huntergardens.org.au

There will be some gentle bushwalks included, these will feature some of the special places that can be found in the Newcastle area. There will also be an evening dinner to look forward to on the Saturday night. More details including registration forms and prices will be covered in the next issue of Native Plants.

MOUNTAINTOP RESCUE MISSION IN FNQ'S WET TROPICS TO SAVE THREATENED PLANT SPECIES

ABC Far North April 22, 2019 Brendan Mounter

Photo: Mount Lewis in far north Queensland is home to about 70 endemic plant species. (ABC Far North: Brendan Mounter)

Botanists have embarked on a mountaintop rescue mission in far north Queensland's Wet Tropics World Heritage Area to collect and record plant species at risk from climate change.

Key points:

· Climate modelling suggests the habitat of endemic plant species in the Wet Tropics will drastically decline within as little as 15 years

· Target species including tiny orchids and native rhododendrons will be collected and propagated in botanic gardens

· Attempts will be made to build a seed bank of the plant species so there is a back-up collection of seeds

The mountain ranges of the far north are home to about 70 endemic species that rely on cooler climates at 1,000 metres above sea level.

Australian Tropical Herbarium director Professor Darren Crayn said climate modelling suggested their habitat would decline drastically. "Climate modelling now predicts drastic habitat loss from the highlands within as little as 15 years, with droughts being longer, hotter, drier and more frequent," Professor Crayn said. "Lowland species might be able to migrate to favourable niches elsewhere, but these mountaintop species may already be at their limits.

"They can't go up as the climate warms — they're running out of space and they're running out of time."

Over the next five years scientists, together with Western Yalinji Indigenous rangers, will collect target species including tiny orchids, huge trees and Australia's only native rhododendrons from Mount Lewis, near Mossman.

The species will be distributed to subtropical and cool-climate botanic gardens in Queensland, New South Wales and Victoria, where they will be propagated in conservation collections and used in research and education.

Photo: Mount Lewis's endemic plant species rely on the cooler climates 1,000m above sea level. (ABC Far North: Brendan Mounter)

"The aim is to secure the most severely threatened tropical mountaintop species in well-managed, living collections with microclimates as close as possible to their original habitat," Professor Crayn said.

Royal Botanic Gardens scientific officer Dr Karen Sommerville said once the plants were safely cultivated, experimental work would assess the physical limitations of the species, while the Australian PlantBank would attempt to build a seed bank of the species. "We'll test them to see if they'll tolerate drying and … we'll test them to tolerate freezing," Dr Sommerville said. "If they do, we can store them in the seed bank and we can have a back-up collection of those seeds.

"It's an insurance program to guard against extinction of the species.

Photo: If the plants tolerate drying and freezing they will be stored in a seed bank. (ABC Far North: Brendan Mounter)

"If the species happen to disappear on the tropical mountaintops then we'll at least have a back-up collection that we can have to maintain them in botanic gardens if nowhere else."

Australian National Botanic Gardens seed biologist Dr Lydia Guja said the job of ensuring the survival of the tropical seeds and plants remained a challenge. "There hasn't been a lot of research on how to keep the seeds of these species alive in conservation," Dr Guja said. "Due to their origins high in the mountains, the seeds may not survive the processes of drying and freezing that are typically used in seed banking. "Once we've found ways to conserve these seeds, we'll look at germination requirements to better understand what impact climate change might have on their germination.

"If we can understand the capacity of these seeds and plants to germinate and grow under a broad range of conditions we will know what we need to do to grow back-up plants for future generations."

Photo: The Wet Tropics are World Heritage-listed for their natural heritage values. (ABC Far North: Brendan Mounter)

The Wet Tropics of far north Queensland were inscribed on the World Heritage Register in 1988, due to the region's immense natural heritage values. "These mountaintop ecosystems are unique, not just nationally but globally; many of the species, both plants and animals, are found nowhere else on Earth," said Dr Sandra Abell, Wet Tropics Management Authority principal scientist. "The best conservation outcome is to protect species in their original habitat but the modelling tells us we're unlikely to have that option.

"So, this is Plan B: act now to secure the most diverse 'captive' collection we can," she said.

The five-year project is funded by a $500,000 grant from the Ian Potter Foundation and $50,000 from the Wet Tropics Management Authority.

TO PROTECT STEM CELLS, PLANTS HAVE DIVERSE GENETIC BACKUP PLANS

Sciencedaily.com April 15, 2019 Cold Spring Harbor Laboratory

When the maintenance of stem cells is disrupted, the consequences are often very visual. In the case of this tomato plant, the cells driving flower growth have over-proliferated, creating a disorganized mass of petals. Credit: Lippman Lab/CSHL, 2019

Despite evolution driving a wide variety of differences, many plants function the same way. Now a new study has revealed the different genetic strategies various flowering plant species use to achieve the same status quo.

In flowering plants, stem cells are critical for survival. Influenced by environmental factors, stem cells direct how and when a plant will grow. Whether a plant needs deep-reaching roots, taller stems, or more leaves and flowers, it is the stem cells that produce new cells for the job.

That's also why having too many or too few stem cells can disrupt a plant's growth. Responsible for all this is a "core genetic circuitry found in all flowering plants," says CSHL Professor and HHMI Investigator Zach Lippman.

In a paper published in Nature Genetics, Lippman and CSHL Professor David Jackson describe the genetic mechanisms that ensure "a deeply conserved stem cell circuit" maintains some function, even if defects occur in a signaling protein called CLV3, and the receptor with which it interacts, CLV1. "Those players are critical for ensuring a plant has the right number of stem cells throughout life, and we discovered there are backup systems that kick in when these players are compromised through chance mutations," explains Lippman.

The researchers determined that although the stem cell circuits are essential for flowering plants, the genetic backup systems can vary drastically from plant to plant. If the gene producing CLV3 is disrupted by a mutation in a tomato, for instance, a related gene will stand in for it. However, Jackson's team discovered that in the case of maize, two genes are working in parallel to produce the essential signaling protein.

"I like to compare it to a rowboat," Lippman adds. "In tomato there are two people who can row, but only one is rowing. But if the main rower injures his arm, the second person can take up the oars. In maize, both are rowing all the time, though not necessarily with equal effort. And in Arabidopsis [rockcress] you have one main rower supported by seven, eight, or nine other rowers in the boat; and it looks like only one has a full-size oar. The rest are just using very small paddles."

"We were surprised to see such big differences," says Jackson, "but in retrospect it reveals the power of evolution in finding novel ways to protect critical developmental circuits."

According to Jackson, Lippman and their colleagues, understanding these species-specific strategies for protecting key genetic interactions will be essential for achieving "intelligent crop design" and using genome editing to improve agricultural productivity and sustainability.

COMMELINA CYANEA

ANPSA

Family:Commelinaceae
Distribution:Forests and woodlands of Queensland, New South Wales and Northern Territory
Common Name:Scurvy weed; native wandering jew
Derivation of Name:Commelina...after J. and G. Commelin, 17th century botanists
cyanea...from greek cyanos, "blue", referring to the flower colour.
Conservation Status:Not considered to be at risk in the wild.

General Description:
Commelina is a genus of about 230 species with about 7 occurring in Australia.

Commelina cyanea has been called "scurvy weed" as it was used by early European settlers to avoid or alleviate scurvy. It is a weak trailing perennial herb, generally prostrate or nearly so, with fleshy stems growing up to 1-2 metres in length. It superficially resembles the common introduced weed, wandering jew (*Trandescantia fluminensis; syn T.albiflora*), but differs in that the lance-shaped (lanceolate) leaves are narrower and it has bright blue (rather than white) flowers occurring over the summer and early autumn period. Scurvy weed tends to grow rapidly in warm and/or wet weather and die back in the cooler, dryer months.

Commelina cyanea Photo: Brian Walters.

Scurvy weed is a very versatile and hardy plant for the home garden; its blue flowers are distinctive and attract native bees. It can be grown in a wide range of conditions, but prefers those similar to its natural habitat (forests), such as half shade to full sun. It likes moisture and prefers heavier moisture-retentive soils. It will regenerate spontaneously from old plant material, such as stems, nodes or seeds and may colonise bare ground quite readily. On occasions, it can become weedy and smother small plants if not watched closely. However, in other cases its appearance in summer is a welcome and colourful addition to the garden

The species is easily grown from cuttings and will probably germinate from seed readily.

MONDAY WALKS & TALKS - Introduction to Australian Native Plants

Monday, 17 June 2019 from 09:45-12:45
Ku-ring-gai Wildflower Garden, 420 Mona Vale Road.

If you love the Australian bush and want to find out more about Australian native plants, then join us at our Walks & Talks event at the Wildflower Garden for an introductory talk and walk. No prior knowledge is required & information sheets are provided.

Meet at Caley's Pavilion at 9.45am for a 10.00am start.
Please wear suitable footwear & bring a hat and water.
Fee is $5 for non-members and $2 for APS members.

APS North Shore Group run talks & walks each Monday during the winter school term. You can download a 2019 program https://austplants.com.au/North-Shore-Walks-&-Talks

A DETAILED EUCALYPT FAMILY TREE HELPS US SEE HOW THEY CAME TO DOMINATE AUSTRALIA

Theconversation.com April 9, 2019 Andrew Thornhill

In Australia you can have any tree you want, as long as it's a eucalypt. Shutterstock

Eucalypts dominate Australia's landscape like no other plant group in the world.

Europe's pine forests consist of many different types of trees. North America's forests change over the width of the continent, from redwood, to pine and oak, to deserts and grassland. Africa is a mixture of savannah, rainforest and desert. South America has rainforests that contain the most diversity of trees in one place. Antarctica has tree fossils.

But in Australia we have the eucalypts, an informal name for three plant genera: Angophora, Corymbia and Eucalyptus. They are the dominant tree in great diversity just about everywhere, except for a small region of mulga, rainforest and some deserts.

My research, published today, has sequenced the DNA of more than 700 eucalypt species to map how they came to dominate the continent. We found eucalypts have been in Australia for at least 60 million years, but a comparatively recent explosion in diversity 2 million years ago is the secret to their spread across southern Australia.

Hundreds of species

The oldest known Eucalyptus macrofossil, from Patagonia in South America, is 52 million years old. The fossil pollen record also provides evidence of eucalypts in Australia for 45 million years, with the oldest specimen coming from Bass Strait.

Despite the antiquity of the eucalypts, researchers assumed they did not begin to spread around Australia until the continent began drying up around 20 million years ago, when Australia was covered in rainforests. But once drier environmental conditions kicked in, the eucalypts seized their chance and took over, especially in southeastern Australia.

Eucalypts are classified by their various characteristics, including the number of buds. Mary and Andrew/flickr, CC BY-NC-SA

There are over 800 described species of eucalypts. Most of them are native only to Australia, although some have managed to naturally escape further north to New Guinea, Timor and Indonesia. Many eucalypts have been introduced to other parts of the world, including California, where Aussie eucalypts make cameos in Hollywood movies.

Eucalypts can grow as tall trees, as various multi-trunk or single-trunk trees, or in rare cases as shrubs. The combination of main characteristics – such as leaf shape, fruit shape, bud number and bark type – provided botanists with enough evidence to describe 800 species and estimate how they were all related to each other, a field of science known as "taxonomy".

Since the 1990s and early 2000s, taxonomy has been slightly superseded by a new field called "phylogenetics". This is the study of how organisms are related to each other using DNA, which produces something akin to a family tree.

Phylogenetics still relies on the species to be named though, so there is something to sample. New scientific fields rely on the old. There have been a number of eucalypt phylogenetic studies over the years, but none have ever sampled all of the eucalypt species in one phylogeny.

Our new paper in Australian Systematic Botany aimed to change that. We attempted to genetically sample every described eucalypt species and place them in one phylogeny to determine how they are related to each other. We sampled 711 species (86% of all eucalypts) as well as rainforest species considered most closely related to the eucalypts.

We also dated the phylogeny by time-stamping certain parts using the ages of the fossils mentioned above. This allowed us to estimate how old eucalypt groups are and when they separated from each other in the past.

Not so ancient

We found that the eucalypts are an old group that date back at least 60 million years. This aligns with previous studies and the fossil record. However, a lot of the diversification in the Eucalyptus genus has happened only in the last 2 million years.

Gum trees are iconic Australian eucalypts. Shutterstock

Hundreds of species have appeared very recently in evolutionary history. Studies on other organisms have shown rapid diversification, but none of them compare to the eucalypts. Many species of the eucalypt forests of southeastern Australia are new in evolutionary terms (10 million years or less).

This includes many of the tall eucalypts that grow in the wet forests of southern Australia. They are not, as was previously assumed, ancient remnants from Gondwana, a supercontinent that gradually broke up between 180 million and 45 million years ago and resulted in the continents of Australia, Africa, South America and Antarctica, as well as India, New Zealand, New Guinea and New Caledonia.

The eucalypts that grow natively overseas have only made it out from Australia in the last 2 million years or less. Other groups in the eucalypts

such as Angophora and Corymbia didn't exhibit the same rapid diversification as the Eucalyptus species.

What we confirmed with the fossil record using our phylogeny is that until very recently, and I mean in terms of the Earth being 4 billion years old, the vegetation of southeastern Australia was vastly different.

At some point in the last 2-10 million years the Eucalyptus arrived in new environmental conditions. They thrived, they most likely helped spread fire to wipe out their competition, and they then rapidly changed their physical form to give us the many species that we see today.

Very few other groups in the world have made this amount of change so quickly, and arguably dramatically. The east coast of Australia would look very different if it wasn't dominated by gum trees.

The next time you're in a eucalypt forest, take a look around and notice all of the different types of bark and gumnuts and leaves on the trees, and know that all of that diversity has happened quite recently, but with a deep and long link to trees that once grew in Gondwana.

They have been highly advantageous, highly adaptable and, with the exception of a small number of species, are uniquely Australian. They are, as the press would put it, "a great Australian success story".

THE DINGO IS A TRUE-BLUE, NATIVE AUSTRALIAN SPECIES

Theconversation.com March 7, 2019 Bradley Smith, CQUniversity Australia, Corey J. A. Bradshaw, Flinders University, Euan Ritchie, Deakin University, Justin W. Adams, Monash University, Kylie M Cairns, UNSW, Mathew Crowther, University of Sydney

theconversation.com

Of all Australia's wildlife, one stands out as having an identity crisis: the dingo. But our recent article in the journal Zootaxa argues that dingoes should be regarded as a bona fide species on multiple fronts.

This isn't just an issue of semantics. How someone refers to dingoes may reflect their values and interests, as much as the science.

How scientists refer to dingoes in print reflects their background and place of employment, and the Western Australian government recently made a controversial attempt to classify the dingo as "non-native fauna". How we define species – called taxonomy – affects our attitudes, and long-term goals for their conservation.

What is a dog?

Over many years, dingoes have been called many scientific names: Canis lupus dingo (a subspecies of the wolf), Canis familiaris (a domestic dog), and Canis dingo (its own species within the genus Canis). But these names have been applied inconsistently in both academic literature and government policy.

This inconsistency partially reflects the global arguments regarding the naming of canids. For those who adhere to the traditional "biological" species concept (in which a "species" is a group of organisms that can interbreed), one might consider the dingo (and all other canids that can interbreed, like wolves, coyotes, and black-backed jackals) to be part of a single, highly variable and widely distributed species.

Members of the Canis genus: wolf (Canis lupus), coyote (Canis latrans), Ethiopian wolf (Canis simensis), black-backed jackal (Canis mesomelas), dingo (Canis dingo), and a representative of the domestic dog (Canis familiaris).

But the "biological" species concept used to name species came about long before modern genetic tools, or even before many hybrid species were identified by their DNA (such as the "red wolf," an ancient hybrid of grey wolves and coyotes found in the southeastern United States).

Few people would really argue that a chihuahua, a wolf, and a coyote are the same species. In reality there are many more comprehensive and logical ways to classify a species. In our latest paper we argue that a holistic approach to defining species is essential in the case of the dingo and other canids.

Our work shows conclusively that dingoes are distinct from wild canids and domestic dogs based on many different criteria.

Truly wild

The first criterion is that dingoes are wild animals, and live completely independent from humans. This is fundamentally different to domestic, feral, or wild dogs, which must live near human settlements and rely on humans for food and water in some way to survive.

Yes, the dingo might have arrived in Australia with humans, and we know that Aboriginal Australians have had a close relationship with dingoes following the latter's arrival. But neither of these observations excludes dingoes from being wild.

For example, a relationship with humans does not constitute the rigorous definitions of domestication. Consider the red fox (Vulpes vulpes), which was also introduced to Australia by people and are now free-ranging: they are also not considered to be domesticated. Neither are wild animals such as birds that we feed in our backyards domesticated simply because they are sometimes fed by us.

Ecological role

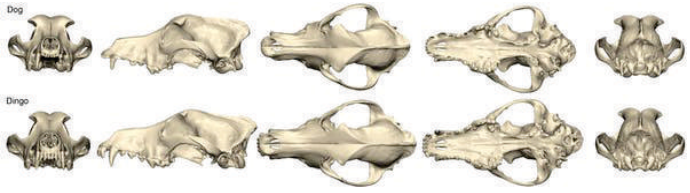
In fact, dingoes have been living wild and independently of humans for a very long time — they have a distinct and unique evolutionary past that diverged some 5 to 10 thousand years ago from other canids. This is more than enough time for the dingo to have evolved into a naturalised predator now integral to maintaining the health of many Australian ecosystems.

Dogs do not have the brain power or body adaptations to survive in the wild, and they cannot play the same ecological role as dingoes. From this ecological perspective alone, the two species are not interchangeable. Dingoes are Australia's only large (between 15-20 kg), land-based predator, and as such play a 'vital role in Australias environment.

Shape and size

Viewed alone, the overall shape of the body and skull does not easily

distinguish wild canids from dogs, mainly because of the sheer diversity among different breeds of domestic dogs. But there are some important body differences between free-ranging dogs and dingoes, mainly in the skull region (as shown here and here).



Cranial 3-D reconstructions of a dingo (bottom) and a free-ranging dog (top), highlighting the differences in cranial morphology mentioned in the text.

Behaviour

Dingoes (and other truly wild canids) have some fundamentally unique behaviours that set them apart from dogs (although like shape, there are often exceptions among the artificial dog breeds). For example, dingoes have significantly different reproductive biology and care-giving strategies.

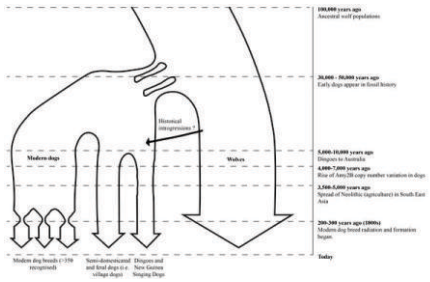
There are also differences in brain function, such as in the way the two species solve problems, and dingoes and dogs communicate differently with humans.

Genetics

While dingoes and dogs obviously share an ancestral relationship, there is a lot of genetic data to support the distinction between dingoes and dogs.

While dingoes share ancestry with ancient Asian dogs from 10,000 years ago, the dingo has been geographically isolated from all other canids for many thousands of years, and genetic mixing has only been occurring recently, most probably driven by human intervention.

Since the 1990s, genetic markers have been in widespread use by land managers, conservation groups, and researchers to differentiate dingoes from domestic dogs.



A summary of the evolutionary relationships among wolves, dingoes and modern domestic dogs. Dingoes and other ancient lineages of dog such as New Guinea singing dogs form a distinct lineage separate from modern domestic dogs that have undergone successive generations of artificial selection.

What's at stake?

Even acknowledging the dingo's uncertain and distant past, lumping dingoes and dogs together is unjustified.

Labelling dingoes as “feral domestic dogs” or some other misnomer ignores their unique, long, and quintessentially wild history in Australia.

Inappropriate naming also has serious implications for their treatment. Any label less than “dingo” can be used to justify their legal persecution.

Further loss of dingoes could have serious, negative ecological consequences, including potentially placing other Australian native animals at increased risk of extinction.

RABBITS, FUNGUS TOP AUSTRALIAN INVASIVE SPECIES PEST LIST

australiascience.tv February 28, 2019 Nick Carne

Four out of five native species threatened by feral invasive species, research finds.

Rabbits are present in Australia in plague proportions, affecting the survival chances of more than 300 native species. Credit: Jose A. Bernat Bacete/Getty Images

Fungi don't have a reputation as marauding invaders, but they are a serious threat in Australia.

New research ranking the top 10 pest or invasive species in the country has just been released, and coming in at number two is a plant disease called rot root fungus, also known as phytophthora.

The list ranks introduced animal and plant pests according to how many native species they impact. Rot root fungus is bad news for 236.

Two weeds – lantana (Lantana camara) and blackberry (Rubus fruticosus) – also make the list, alongside more obvious bad guys such as rats and feral pigs.

Leading the pack – and this would be no surprise to any Australian – are rabbits. They were brought over when the British first colonised the land down under in the eighteenth century, quickly got loose, and bred like, well, rabbits. They have been present in plague proportions ever since.

“Rabbits destroy plants and can stop them regenerating by eating the seedlings, they compete with native grazing animals for food, and boost the number of predators like cats and foxes,” says Stephen Kearney from the University of Queensland, which conducted the research in collaboration with Australia's Threatened Species Recovery Hub.

Their findings, which are published in the journal Pacific Conservation Biology, show that invasive or pest species are a major problem for four out of five Australian threatened species – more than 1250 of them in all.

Kearney concedes that foxes ranking as low as six may surprise many, if only because their impact is highlighted regularly in the media. The reality, however, is that feral goats affect more threatened species. “This does not mean foxes are not a problem, it means there are other really problematic pests out there that as a community we have not been talking about as much,” he says.

The Top 10

The full Top 10, with the number of species they affect, comprises:

1. European rabbit (321)
2. Phytophthora plant disease (236)
3. Feral pig (149)
4. Feral cat (123)
5. Feral goat (116)
6. European red fox (95)
7. Lantana (95)
8. Blackberry (47)
9. Black rat (42)
10. Feral cattle (39)

The Threatened Species Recovery Hub is a collaboration of 10 Australian universities and the Australian Wildlife Conservancy.