



Landcare UpHunter

Autumn 2021

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The Secret Life of Echidnas

The short-beaked Echidna is one of Australia's most iconic species, yet there is still much to learn about their 'highly cryptic' wild populations (meaning they are incredibly difficult to find and to study in the wild). Short-beaked echidnas are one of only three egg-laying mammals (called monotremes), alongside the three species of long-beaked echidna (only found in Papua New Guinea) and the platypus, which inhabits the east coast of mainland Australia. Monotremes split from all other mammals, including from us humans, around 187 million years ago, making them the oldest surviving mammals in the world.

Echidnas are unique-looking animals that are covered in sharp, specialised spines which help to protect them from most predators, though larger birds of prey and carnivorous mammals like the dingo, fox, cat and the Tasmanian Devil can overcome these defence mechanisms. They are also affected by roadkill and habitat loss. They are well adapted to harsh Australian environments—desert, alpine, tropical, temperate and coastal regions.

This native species has a long snout with a fused jaw and is only able to eat by sucking up insects with their long, sticky tongues. It has a 'cloaca' like a bird, rather than a separate reproductive and digestive system like other mammals and is warm blooded, covered in fur (hair) and produces milk for its young. A baby echidna is called a 'puggle'.

Echidnas are very difficult to study in the wild as they are not attracted to food, cannot be easily trapped, shy away from human disturbance and can dig themselves underground in seconds. They will shelter in a range of locations like in native vegetation, caves, other animals' burrows (such as rabbits and wombats) or self-dug burrows and can have large home-ranges of over 190 hectares, depending on the environment they are living in.

During breeding season (June to September), echidnas form 'mating trains' where one female is followed by two or more males for several weeks, until she chooses one to mate with. She is pregnant for 23 days before she lays her egg directly into a pseudo-pouch, which forms during pregnancy, caused by the swelling of her mammary glands. The puggle then hatches around 10 days later, very underdeveloped, similar to marsupials.

Echidnas lack nipples, so the puggle uses its snout to massage its mother's mammary glands until milk emerges, so it can suckle.

For echidnas on Kangaroo Island, it is observed that the young stay in their mothers' pouch until around 50 days old. It then starts to produce spines and the mother will place the puggle in a nursery burrow, only returning every five days to feed it milk, until weaning at 204-210 days of age. The young are also vulnerable to predators like goannas and snakes once they are dropped in the burrow.

Most of what we understand about echidna biology and behaviour is from observational research in two locations within Australia, Kangaroo Island and parts of Tasmania. Research by world-leading Dr Peggy Rismiller, on Kangaroo island, over 30 years, has shown their echidnas to be endangered. Only the subspecies of echidnas on Kangaroo Island are listed as 'endangered' and have officially 'protected' status. All other populations in Australia are 'least concern' so they aren't an officially protected species yet.

To gain Australia-wide population information requires innovative approaches. Researchers at the University of Adelaide, Professor Frank Grutzner, Tahlia Perry and Alan Stenhouse, along with Dr. Rismiller, wanted to know where exactly echidnas are found today.

The Echidna Conservation Science Initiative (Echidna CSI) is a citizen science project aimed at engaging Australians in research to gather the largest population database for echidnas across Australia, in order to track their population changes into the future.

When I was a PHD student at the University of Adelaide, I was fundamentally involved in the creation of this project. A phone app was developed, called EchidnaCSI, for citizen scientists across the country to download and submit their sightings of echidnas.

Since it was launched in September 2017, more than 10,000 participants have provided information on over 11,000 sightings of this species, to EchidnaCSI - the largest population database for echidnas collected in this time period. From these sightings, the researchers found that echidnas are inhabiting much more urban areas than anticipated, even in the middle of major cities such as Adelaide and Sydney. This is concerning as urban areas generally lack appropriate habitat and food sources. *Cont'd on page 4.*



How To Measure A Tree

Trees are one of the most important living organisms in our environment. Did you know they are the biggest plant in the world? Without trees around us we wouldn't be here. Trees provide oxygen, an essential ingredient in life for us humans, for animals, plants etc. We need them to help us breathe, to grow up and live healthy lives and to be able to produce food across our planet. Our streams, rivers, dams and other waterways need trees to help them to maintain their natural balance.

Trees store carbon that all our human activity produces. they help to balance the soil so that plants can grow and give life to a wide variety of our wildlife like insects, invertebrates, birds, native animals and fungi. They also provide homes for some of our wildlife. Many materials we use to build our homes, work places and other buildings and produce goods etc. rely on product from our trees. In short, without trees, we and the world around us wouldn't be able to exist—with food, clean water and healthy ecosystems.

Have you ever tried to measure a tree? Think about how tall are the different trees you can see outside of your window. How many years would they have likely been growing to reach their current height? Which ones are native trees or are some exotic trees?

You may know some details about a particular tree species (or several species). Pick one tree and see if you can answer:

- 1 Where it comes from—is it indigenous (native) to the Shire or from another area.
- 2 What type and colour of flowers it produces and what time of the year it will bud.
- 3 If it is significantly affected in a drought or if it is usually drought tolerant.
- 4 What are the names of some of the birds and other wildlife you have seen in or around the tree.
- 5 If you have seen any of them using the tree bark, buds, flowers, seeds or nectar being used as a source for food.
- 6 What birds or native animals you have seen in the tree and if any of them use it to nest and raise their young.
- 7 Think about any insects you have seen on or around the tree and what their benefits may be to our environment.

When you walk through the bush, the local park, through town, go on holiday or travel to school, trees are all around us.

Have you ever thought about the value of measuring trees? At school, your teachers and class can measure a tree (or trees). There are different methods of finding the height of a tree and learning about the mathematical basis behind different approaches to this, to help you, your class and teacher study this outside of the classroom, in your school grounds or even outside of school.

The Forest Learning website has a great resource called "Measurement & Trees, for students in school years 4-7, in mathematics.

It looks at how people in the forest industry measure trees. You, your class and teacher can compare and contrast the methods to do this. Learn from the results and assess what measuring instruments then helped you and your class to get the accurate results.

Find out more by linking into the website at <https://forestlearning.edu.au/find-a-resource/article/43/measurement-and-trees.html> and you can also go to Youtube <https://www.youtube.com/watch?v=F6FitSqlmFM>

Ruth Hardy



Landcare UpHunter Stall

In 2020, many of our annual, local community events usually held in the Shire could not go ahead, due to COVID-19 restrictions. So this year we were delighted when it was announced that the Scone Horse Festival would be held again over two weeks in May. This year marks the 40th anniversary since the Festival first began so there was a lot to celebrate and plenty of activities in Scone.

Scone Grammar School held its traditional Markets & Fete day as part of the Festival activities and Landcare UpHunter was there.

Younger children particularly were fascinated by our fossil on display, listening to our 'frog that croaks' and by Tassie the life-sized Tasmanian Devil statue (although one young visitor said they thought that Tassie was a wolf).

Some children and parents told us about visiting Aussie Ark to see the devils and other native animals like the Eastern Quoll, Parma wallaby, Rufous bettong and Southern brown bandicoot.

It turned out to be a very busy day for all of our Landcare UpHunter volunteers on the stall.

Students of all ages told us about native plants and animals they have seen in their garden and in the bush, what they have planted at their school and what they know about protecting their local environment.

Relieving Principal at Ellerston Public School, Mr. Damien Vaughan, visited the stall. It was great to meet Mr. Vaughan, to share knowledge about environment and sustainability education in our Primary Schools and to hear about current and planned activities at the Ellerston school.

Ruth Hardy



Photo: Landcarer Kaye showing Mr. Vaughan the fossil

Save the date

Saturday 5th of June at Rouchel School of Arts Hall

**Join us for a relaxing night out
catch up with your friends
meet new people and
enjoy good food and good music**

This is a FREE event

**To book your place click on this
[Eventbrite link](#)**

See you there!

* Catering by *the Hunted Gourmet*

Landcare UpHunter & Rouchel School of Arts Hall



Invite you to a
FREE farmer & community

Dinner Night

Live music by Kyda Rock

at
*Rouchel School
of Arts Hall*

Saturday
*5th June
6.30 pm*

Book your ticket at
www.eventbrite.com.au/e/farmer-community-dinner-night-tickets-154494127093

Enquiries contact Ruth Hardy 0407 232 539



Please bring your beverage of choice



Resources & Funding

Climate Risk & Farming—RuralBiz Training webinars that look at climate risk and management for farmers in Australia. Produced in a three-part series, the webinar topics covered include Climate drivers; Understanding climate & weather risks for your farm; Preparing for climate risks on farm; Interpreting climate outlook information; Planning for the short, medium & long term; Carbon cycle & carbon sequestration; Soil health management; Water infiltration & efficiency; Climate change trends & projections; How farmers have adapted to changes; Regenerative agriculture. You can watch recordings of these three events and/or download a webinar 1 presentation (Climate Risk Management) at www.ruralbiztraining.com.au/announcements/climate-risk-farming-webinars

New artificial intelligence technology used to protect bees from Varroa Destructor Mite—ABC article focussing on a project at the Port of Melbourne to detect Varroa Destructor Mite on bees arriving on container ships at the Port. Using 360 degree cameras and artificial intelligence, every bee that enters the hive is photographed in order to identify any bees carrying abnormalities. An alert is then sent to a remote computer or mobile device, giving real-time information to project staff. The hive is purple (a colour attractive to bees). You can read the article at www.abc.net.au/news/2021-03-29/ai-technology-used-to-protect-bees-from-pests/100035134

Propagate Podcast—a Young Farmer Business Program production focussed on young people in the farming and fishing sector talking about their experiences on primary production in business; From fishing in the Hawkesbury area of Greater Sydney to farming on a far west remote property, young farmers in New South Wales reflect on their work in a variety of production areas. Subjects covered include Financing your first season; Building a brand; Raising capital and Managing mental health. You can listen via <https://youngfarmer.farmltable.com.au/podcast-propagate-podcast/> or on Apple Podcasts, Spotify or your other podcast avenue.

The power of 'Management Knowledge' brings back native animals—a Centre for Invasive Species Solutions (CISS) article focussing on a semi-professional predator trapper in Queensland, their successful pest animal management experience and the return of native wildlife in a region. Also looks at native species returning to their home property, using remote camera observations after a pest animal trapping project. Go to <https://invasives.com.au/news-events/> then click on CISS Chronicle for March 2021.

Funding

Chemical Card Plus—RuralBiz Training course which covers TAFE subjects AHCCHM307 Prepare & apply chemicals to control pests, weeds & diseases, also AHCCHM304 Transport & store chemicals. The course is open to new participants, or those who already have this qualification but need to update it. Various training avenues are offered: online, self-paced, distance education or face-to-face. You choose which learning method works best for you. Applicants must be aged 15 years or older, live in NSW & be either an Australian citizen, a permanent resident, humanitarian visa holder or hold a current New Zealand passport.

The current round closes on 31st of May. Training for this course is FREE to eligible participants. For more information, enquiries or to register your interest just go to www.ruralbiztraining.com.au/chemical-card-plus-one-day-training-online-training.

Events for your Diary

Landcare UpHunter stall—farming, environment, Landcare, education resources, plants/herbs. Visit us at: Future 2021 events TBA.

Farmer & Community Dinner Nights Landcare UpHunter free events in June. See page 3 for information on the first dinner night. Other TBA.

A second Dinner Night in the Upper Hunter Shire soon to be published.

An Introduction to Biodynamics workshop 17th to 18th of June at Broke. Cost applies. Register at www.charliearnott.com.au/events/

Plastic Free July—throughout the month. Learn more about this & participate www.plasticfreejuly.org

National Landcare Conference—Sydney 4th to 6th August incl. field trips, National Landcare Awards dinner/presentations (cost applies).

Alternatively, register for the online speaker & workshop events (free).

Link into www.nationallandcareconference.org.au for conference program, enquiries or to register.

Merriwa Landcare Group. Contact Jenny Lee on 0429 337 557

Murrurundi Landcare Group just Email Sandy@boydscreek.com.au

Pages River Warriors Working Bee Wilson Memorial Oval, Murrurundi 1st & 3rd Sunday monthly (morning) Email Sandy@boydscreek.com.au Working Bee activities on hold.

Scone Landcare—Contact Ruth at Email: sconelandcare@gmail.com or Tel: 0407 232 539

Landcare UpHunter—details below

Echidna CSI (cont'd)

Like many other citizen science projects, most of the sighting data is from heavily human populated areas. Therefore, researchers are now aiming to engage with rural, regional and indigenous communities to better assess echidna populations in these vital areas.

Echidna sightings is not the only way that you can assist in this research. You can also collect echidna scats (faeces), for molecular analysis (the studying of tissues, cells and fluids). Luckily, echidna scats are easy to identify. They are long and cylindrical in shape, the thickness of about a 10-cent coin and have a very dry texture, consisting mainly of soil and insect exoskeletons, which are the hard outer coating or shell of some insects.

Over 500 scats have been received so far—the largest material collection for echidnas.

Scats are a very powerful material as they can be collected non-invasively from the chosen animal and have a range of DNA and hormones in them that can provide indications about diet, gut health, stress, reproductive activity, sex and gene flow.



Diet and gut health are of particular interest to the EchidnaCSI team, as echidnas are often mistakenly labelled as myrmecophagous (meaning they eat exclusively ants and termites). Although a large part of an echidna's diet consists of ants and termites, there is growing evidence they also consume beetles and a variety of insect larvae, also found associated with dispersing fungi. Their diet is much more diverse than we once believed.

The diet of an animal also plays a vital role in shaping its gut microbiome, which is heavily linked to health. Microbiomes are tiny organisms in the body that help to protect against germs, that break down food, release energy and produce vitamins.

The EchidnaCSI team have worked hard genetically describing echidna diet and gut microbiome to better understand the health of wild echidna populations. As part of our research, as we learn more about echidnas we review and update our current papers.

By understanding wild echidna microbiomes, researchers have teamed up with Taronga and Perth Zoos, to assess how artificial diets in captivity have affected their echidnas' gut health. This research led onto assessment of the Kangaroo Island bushfires on echidnas, to determine the potential diet and health changes associated with destruction of half of their natural habitat, placing further strain on this endangered population of echidnas.

For a small mammal, Echidnas are long-lived, up to 25 years in the wild (50 in captivity).

EchidnaCSI has only been a success because of participants who have volunteered their time to submit data and material to the project, which the research team are incredibly grateful for. It would have been impossible to collect this quantity of data over such a short period of time and from locations all across Australia, without local input. It highlights the power citizen science has for research as well as community engagement.

You can get involved in EchidnaCSI. Just Download the EchidnaCSI app from your App Store or on Google Play. Record your echidna finds and send them in. Maybe you can send in some scats too!

Follow EchidnaCSI on social media, Facebook, Twitter or Instagram.

Go to the website at <https://grutznerlab.weebly.com/echidna-csi.html> for more information or contact me at tahlia.perry@adelaide.edu.au

Tahlia Perry



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Photos: Page 1 & 4 from Echidna CSI

Visit us at www.landcare.nsw.gov.au/groups/scone-landcare-group