

FROG CALL

THE FROG AND TADPOLE STUDY GROUP NSW Inc.

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NEWSLETTER No. 172 APRIL 2021

FATS don't meet on Good Friday 2/4/21.



Some of our FATS members at Smiths Lake, Photo by Phillip Grimm

FATS MEETING 7PM FRIDAY 9th APRIL 2021

Due to COVID19 requirements the Education Centre can hold no more than 25 people. Please contact Arthur White by email P11 to confirm your attendance and total number of people with you. He will advise if there is room, or whether the meeting is booked out.

6.30 pm Lost Green Tree Frogs seeking forever homes: Please bring your membership card and cash \$50 donation. Sorry, we don't have EFTPOS. Your NSW NPWS amphibian licence must be sighted on the night. Adopted frogs can never be released. Contact us before the night and FATS will confirm if any frogs are ready to rehome.

7.00 pm Welcome and announcements

7.30 pm The main speaker is Samantha Wallace from Newcastle Uni. Talking about the "Strange World of Littlejohn's and Watsons' Tree frogs".

9.30 pm Show us your frog images. Tell us about your frogging trips or experiences. Guessing competition, frog adoptions continue, supper, relax and chat with frog friends and experts.

CELEBRATING WOMEN IN SCIENCE

You are invited to our FATS meeting. It's free. Everyone is welcome.

Arrive from 6.30 pm for a 7pm start.

Friday 9th April 2021

FATS meets at the Education Centre, Bicentennial Pk, Sydney Olympic Park

Easy walk from Concord West Railway Station and straight down Victoria Ave. Take a torch in winter.

By car: Enter from Australia Ave at the Bicentennial Park main entrance, turn off to the right and drive through the park. It's a one way road. Turn right into P10f car park.

Or enter from Bennelong Rd/Parkway. It's a short stretch of two way road. Turn left.

Park in P10f car park, the last car park before the Bennelong Rd. exit gate.

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2021 FATS FROG-O-GRAPHIC COMPETITION

The FATS members' 2021 Frog-O-Graphic competition opens on the 1st May and closes on the 31st August 2021.

Categories:

Best Frog Image,
Best Pet Frog Image,
Most Interesting Image and
People's Choice.

Category winners are decided by a panel of judges.

People's Choice is voted for by everyone present at the October FATS meeting. Alternate arrangements will be made if we can't meet in October.

All entries are by email to photos@fats.org.au

Please state:

your name,
confirm that you are a financial FATS member,
identify the frog species preferably by scientific name (in the file name) and location, if known,
whether the image is a pet frog and
your contact phone number.

Max 6 entries per person.

Max attachment size 6 MB.

Fabulous prizes awarded. Entries must be original and your own work. They don't have to be recent images. The entries may appear in FrogCall, FATS Facebook, our web site and other FATS publications.

Arthur White

FATS AGM NOTICE FRIDAY 7 AUGUST 2021

The FATS AGM will be held on Friday 7/8/2021, commencing 7pm. FATS meets at the Education Centre, Bicentennial Park, Sydney Olympic Park. If you would like to ask any questions about joining the FATS committee, please give us a call. Contact our President Arthur White at least two weeks before the meeting for further information and to submit items.

We appreciate fresh ideas and new members on our committee. No experience required. The committee meets 6 times a year. No task commitments or time expected of committee members, other than what you are able to spare.

See contacts details on page 11. **Arthur White**

IN NSW, FROG KEEPER RECORD BOOKS NEED TO BE LODGED BETWEEN 1 & 30 APRIL 2021

Licence holders must keep records of their native animal pets in an electronic record book or 'e-book'. If you hold a Native Animal Keeper Licence you must keep records. The electronic native animal keeper record book, or e-book, is an easy-to-use web-based record. It is a condition of your licence to keep your native animal records up-to-date.

This includes records of:

- native animals you own
- details of how you acquired and disposed of them
- breeding events
- deaths or escapes.

These records help keep track of the supply chain and ensure that captive-bred animals, and not animals taken from the wild, are being bought and sold. If you don't have access to a computer you can complete a paper record.

There are even simpler requirements if you only have one "companion animal" pet frog.

Companion Animal Keeper Licence

With this licence you can keep one native frog bred in captivity or FATS rescue, as a pet. If you want to buy and keep more than one frog you will need to change to a Native Animal Keeper Licence. Animals covered by the Companion Animal Keeper Licence have basic keeping requirements and are readily available in captivity. Licences cost \$50, less for pensioners and last 5 years.

Keep a record of when you buy your frog (including supplier's details, your details and date of purchase) to demonstrate that it has been legally obtained. You do not have to submit records to the NPWS Wildlife Team for animals kept under a Companion Animal Keeper Licence.

For licences:

<https://www.environment.nsw.gov.au/licences-and-permits/wildlife-licences/native-animals-as-pets/frog-keeper-licences>

To complete your yearly frog returns if you have more than one frog:

<https://www.environment.nsw.gov.au/licences-and-permits/wildlife-licences/native-animals-as-pets/native-animal-keeper-record-book>



Recordings of the *Geocrinia Victoriana* Victorian Smooth Froglet's bi-phasic call, used to find out which part females were attracted to.

**REFLECTIONS BY MURRAY LITTLEJOHN
EARLY FIELD WORK ON VICTORIAN FROGS
1959 – 1980 - photo right**

In late 1959, there were no publications that dealt with the biology of the frogs of Victoria as a local or regional fauna, only references to particular taxa, usually associated with descriptions of new species. This contrasts markedly with the present comprehensive state of knowledge.

My field experience with Victorian frogs began during two short visits in August of 1955 and 1957, while studying for a PhD in zoology at the University of Western Australia. In October 1959 I began a lectureship in the Department of Zoology at the University of Melbourne. My field work was started shortly afterwards and continued until mid-2004. The initial research was focussed on the *Crinia signifera* complex, the *Litoria ewingii* complex, and the two species of *Geocrinia*. Observations were also made on all other south-eastern Australian species that I encountered. I concentrated on acoustic communication, particularly the structure of advertisement calls - their function and evolution, and their value in the identification of species and the detection of new species.

In 1962 Angus Martin was appointed to the Department of Zoology and began studies on the biology and evolution of the *Limnodynastes dorsalis* complex for his PhD research topic. Angus also carried out broad studies on the biology, development and morphology of tadpoles of south-eastern Australian frogs.

Arthur Brook, a secondary-school teacher, later joined our group and enrolled for a part-time MSc degree in Zoology. He produced a biogeographic synthesis of the available information on Victorian frogs, derived from our field notes and his own surveys and later used these sources to summarise information on their breeding seasons.

The above work led to a series of articles in *The Victorian Naturalist* on the frogs of the Melbourne area, starting with adult frogs (Littlejohn 1963), tadpoles (Martin 1965), eggs (Martin, Littlejohn and Rawlinson 1966) and calls (Littlejohn and Martin 1969). Distribution maps and information on breeding seasons for all then known taxa in Victoria followed (Brook 1975, 1980).

Later syntheses extended the geographic scope to all of Victoria and noted changes in taxonomic nomenclature, and also included: (1) a compilation of available audio recordings of calls of known species of Victorian frogs as an analogue compact cassette (Littlejohn 1987); (2) a field guide to the frogs of Victoria (Hero, Littlejohn and Marantelli 1991); and (3) a review of the research on zones of hybridisation and intergradation, many of which are located in Victoria (Littlejohn and Watson 1993). Thus there was now sufficient accessible published material to facilitate further studies of this regional fauna.

References Brook A. J. (1980). The breeding seasons of frogs in Victoria and Tasmania. *The Victorian Naturalist* 97: 6-11. (All of the other early papers published in *The Victorian Naturalist* are cited).
Hero, J-M, Littlejohn, M.J., and Marantelli, G. (1991) *Frogwatch Field Guide to Victorian Frogs*. Department of Conservation and Environment, East Melbourne. 108 pages.
Littlejohn M. J. (1987). Calls of Victorian Frogs. Department of Zoology, University of Melbourne, Parkville. (audio cassette tape recording).
Littlejohn, M. J. and Watson, G. F. (1993). Hybrid zones in Australian frogs: their significance for conservation. Pages 239-249. In: *Herpetology in Australia - A diverse discipline*.
D. Lunney and D. Ayers (eds). Royal Zoological Society of New South Wales, Mosman.

Compliments of Frogs Victoria Winter 2020 newsletter article from their patron Murray Littlejohn



Wife Patsy, an accomplished scientist in her own right, often worked afterhours, recording frogs.



frog into the future, they could also provide enormously valuable lessons for reintroductions of pond-breeding amphibians elsewhere. It's a similar story with the emerging conservation paradigm of 'genetic rescue' – this frog is an ideal candidate for exploring that approach.

Uni students: Feel free to quote from these context pieces of this frog's plight. Pro tip: you rarely need to read more than the Abstract.

Brannelly, L. A., R. J. Webb, D. A. Hunter, N. Clemann, K. Howard, L. F. Skerratt, L. Berger, and B. C. Scheele. Non-declining amphibians can be important reservoir hosts for amphibian chytrid fungus. *Animal Conservation* 21, no. 2 (2018): 91-101.

Brannelly, L.A., Clemann, N., Skerratt, L.F., Webb, R.J., Berger, L. and Scheele, B.C., 2018. Investigating community disease dynamics can lead to more effective conservation efforts. *Animal Conservation*, 21(2), pp.108-109.

Howard, K. M., Antrobus, J. and Clemann, N. (2011). A tale of two mountains: fire, fungus and Alpine Tree Frogs. *Victorian Naturalist*, The, 128(6), 360-365.

Hunter, D., Clemann, N., Coote, D., Gillespie, G., Hollis, G., Scheele, B., Philips, A. and West, M., 2018. Frog declines and associated management response in south-eastern mainland Australia and Tasmania. *Status of Conservation and Decline of Amphibians: Australia, New Zealand, and Pacific Islands*. CSIRO Publishing, pp.39-58.

Scheele, B.C., Skerratt, L.F., Grogan, L.F., Hunter, D.A., Clemann, N., McFadden, M., Newell, D., Hoskin, C.J., Gillespie, G.R., Heard, G.W. and Brannelly, L., 2017. After the epidemic: ongoing declines, stabilizations and recoveries in amphibians afflicted by chytridiomycosis. *Biological Conservation*, 206, pp.37-46.

Skerratt, L.F., Berger, L., Clemann, N., Hunter, D.A., Marantelli, G., Newell, D.A., Philips, A., McFadden, M., Hines, H.B., Scheele, B.C. and Brannelly, L.A., 2016. Priorities for management of chytridiomycosis in Australia: saving frogs from extinction. *Wildlife Research*, 43(2), pp.105-120.



CRITICALLY ENDANGERED ALPINE TREE FROGS *LITORIA VERREAUXII ALPINA*

Last week we found the last straggler tadpoles of this season's clutches of Critically Endangered Alpine Tree Frogs (*Litoria verreauxii alpina*) about to complete development and make their way onto land. Way back in '03 I was tasked with drafting the National Recovery Plan for this beautiful frog, as well as assembling a National Recovery Team to oversee conservation actions. Unfortunately, the feds never got around to publishing the Plan, and although I updated it several times over the years, it remains in draft form 18 years on. Despite that, the (now low key) Recovery Team continues to plan for this frog's future. I've experienced the highs of being involved in the discovery of populations, and the lows of watching several of those populations crash, sometimes to total loss.

There is some conjecture as to whether the ATF truly 'deserves' subspecies' status, but however that topic is decided, the facts are that it was once almost ubiquitous in the High Country, from Mt Baw Baw to Davies Plain (and on into Kosciuszko National Park; but, curiously, absent from Mt Buffalo), but is now barely hanging on at less than a handful of localities in Vic. There has been a catastrophic 'crash' across the high elevation parts of the nominal species' range, and it is now totally gone from places like Baw Baw, Lake Mountain, and the Bogong High Plains, and disappearing fast from some other areas.

This means a serious loss of intra-species diversity, and a loss of a significant proportion of the amphibian fauna and biomass in the High Country.

The primary driver of the rapid (mere decades) losses has almost certainly been the disease chytridiomycosis. However, where it is just hanging on a range of highly plausible pressures (as well as the disease) continue, including: drought, use of breeding ponds for fire fighting / training, logging, development in alpine resorts, damage to habitat from deer, feral horses and cattle (seen here), and – of course – a changing climate. In fact, every one of the few remaining populations has at least one (and most have several) existential threats operating right now.

On the up-side, the Alpine Tree Frog has the potential to be a remarkably informative model frog for experimental reintroductions. Not only could such actions secure this



disease's dynamics is the role of 'reservoir hosts' for the chytrid fungus that causes the disease. The key reservoir host in Alpine Tree Frog habitat is the Common Froglet (*Crinia signifera*). Common Froglets carry the fungus but are largely resistant to the disease, which makes them a potentially devastating agent of spread and infection. Common Froglets also thrive in and will colonise disturbed areas.

So disturbing areas (or further disturbing areas) where Alpine Tree Frogs occur can result in worsening disease dynamics because it can lead to incursion or proliferation of Common Froglets, with potentially serious consequences for the ATF. As well as Ben and Laura's papers, you can read more about this here:

https://zslpublications.onlinelibrary.wiley.com/doi/full/10.1111/acv.12380?fbclid=IwAR3OX_6T7CcYjDReC_rn4pQYy4FGTnb6BIqQhfs2HMrqO5qBMgewQKS2_4w

Conservation plans often take a year or two to work through the system anyway, but this little frog ends up being a political football because protecting it potentially brings it into conflict with various interests (alp resort development, logging, cattle grazing, road construction or widening, etc.).

That means that at any given time governments in Sydney, Melbourne and / or Canberra are too nervous to sign-off. And all need to be in agreement at the same time. **Nick Clemann has been working on threatened species for about 25 years. All photos are by Nick Clemann**

Just last week we came across a brand new logging coupe that has removed ATF habitat from one of the last Vic populations. You better believe I photographed the damage and have sent it and a very frank message to the senior forest policy folks in the Vic government. Just as I did a few weeks earlier when we came across a 'salvage' logging coupe in a spot that was severely burned in the Black Summer fires, and where some *Heleioporus* tads has been found just earlier. I was stunned to see the already-burnt non-breeding habitat for *Heleioporus* trashed like that! (Not to mention the fact that our post-fire surveys 12 months ago showed that every stick of timber, fallen or still standing, was critical for the persistence/recovery of small animals in those severely burned areas!).

Another obvious impact from the fires is mass burial of stream cobble banks from the ash/sediment inputs in the storms just after the fires. 12 months on, shelter and breeding sites for obligate stream-dwellers remains under about half a metre of this sludge.

We shall continue to report all threatening processes we see during our field work.

Marion Anstis' book, *Tadpoles and Frogs of Australia* remains a constantly-used and highly valued tool for our work.

Disease is a major driver of declines for this frog (if you search Google Scholar for papers by the authors Ben Scheele and Laura Brannelly you can find a fair bit of info on this). One of the key factors in the



RECOGNISING WOMEN IN SCIENCE ASSOCIATE PROFESSOR LEE BERGER

Female scientists remain under-recognised. That must change. In contemporary times we can start with recognising the two scientists who cracked the mystery of the most significant driver of modern amphibian declines, Joyce Longcore and Lee Berger, Principal Research Fellow (Wildlife Health & Co'N) Veterinary Biosciences



Lee Berger

EXTRACTS: At 7am on January 13, 1984, ranger Keith McDonald was driving along a dirt road deep in the rainforest of Eungella National Park, 80km west of Mackay, when one of the most implausible events in the natural world occurred on the passenger seat beside him.

Inside a container of water, a female frog he had collected from a stream the night before opened her mouth and spat out a fully formed juvenile frog. Over the next half-hour, 14 more froglets were born through their mother's mouth.It was the first and last time anyone would see the unique birthing approach of the northern gastric-brooding frog. By March of 1985 the frogs, endemic to this one area on Earth, were gone, never to be seen again.

It wasn't the only species to go. Since 1979, scientists had reported that frogs in south-east Queensland were declining. The Mount Glorious day frog was the first to go missing in action, and the southern gastric-brooding frog — like its northern cousin, it gestated young in its stomach and gave birth through the mouth — vanished in 1981, just seven years after its discovery. It wasn't just Australia. Once abundant frogs of South, Central and North America were vanishing. More worryingly, no one could figure out why.

Worse was to come. In 1993, suspecting that whatever was killing the frogs was marching north, McDonald engaged the services of a pioneering wildlife veterinarian, Rick Speare, and the pair raced to the Atherton Tablelands near Cairns.

There was no obvious cause. Nothing appeared to have changed in the environment. Rainfall was average, the streams were pristine and other animals bountiful. It was a complete mystery. Determined to find the answer, McDonald and Speare assembled what would prove to be a remarkable and groundbreaking wildlife research team. Speare had noticed that the pattern of sudden decline in Queensland was consistent with what you'd expect from an infectious disease.

In 1997 his PhD student, Lee Berger, finally identified the culprit as an insidious fungus that attacked the skin of frogs. The fungus was named *Batrachochytrium dendrobatidis*, or chytrid fungus. Others call it the doomsday fungus.....

Yet when Berger published her paper in 1998 postulating the fungus as the cause of the declines, her idea was largely dismissed. It wasn't thought possible that a disease could be responsible for such catastrophic declines, scientific convention being that environmental forces such as climate change or habitat degradation must be the main drivers. Twenty years after her discovery, Berger — who was the Frank Fenner Life Scientist of the Year for solving the mystery of frog extinctions — now thinks she may be onto another major breakthrough in saving the frogs from chytrid fungus, this time using tools from animal breeding. And again, she says, Australia is looking the other way.....

Wildlife disease is only now beginning to be accepted as a global problem. "People didn't want to know," says Berger of her initial discovery. "It took 10 years after our discovery to stop arguing about it. **People had invested so much in looking at the environment that they weren't going to stop just because some young woman from Australia said the most likely thing was a disease.**"

"If you're on to a novel thing in science people typically don't believe it," says Berger's husband Lee Skerratt, a leading wildlife epidemiologist and head of the research group that published the paper detailing the extent of the carnage. "Anything that challenges a prior belief, scientists will find ways to reject."



Gastric-brooding frog. Picture: Michael J Tyler

.....But when it comes to wildlife, Skerratt and Berger say they're hitting a brick wall. They've seen

one grant application after another turned down. It's a different story in the US and Canada, where substantial grants have recently been awarded to work on genetic modification of frogs and RNA interference technology for controllers of chytrid.

"This is a blue sky scientific program," says Zenger. "The really exciting thing for me is, all this technology is proven over decades. We know it works, we know the statistics, we know what we need to do. We've got the genomic tools and we can really make a difference to conservation now." It's a question of who is going to pay. For direct conservation action Skerratt and Berger estimate \$15 million will be needed to fund recovery interventions for the six most endangered frog species. "It's simple, really," says Skerratt. "Procrastination will lead to more extinction.".....

We leave the aisle of amphibian archives and spin a wheel to roll the rack along. The frog is swallowed among the 180,000 other amphibian and reptile specimens that will float forever here in the spirit room. The last thing I notice is a new order of empty jars awaiting filling, and plenty of room on the rack. **Extracts from FrogCall 163. The whole article is available on FATS website www.fats.org.au**

<https://www.theaustralian.com.au/weekend-australian-magazine/why-are-our-frogs-disappearing-and-is-it-too-late-to-save-them/news-story/3497ecc586c1f2e24b8d7db27e50d885?fbclid=IwAR1Ljq-iYezdAQckkmiEXSJ8PwHzgXp8dZes5PkybSOPpGFxncCuiqdk9UM> Extracts from **The Weekend Australian Magazine 8/6/2019 By RICKY FRENCH Forwarded to FATS IN 2019 by Josie Styles.**

CHYTRIDIOMYCOSIS: A new disease of wild and captive amphibians 1/1998 DOI: 10.1515/9783110810653.1
Lee Berger James Cook University and R Speare
<https://www.researchgate.net/publication/284377384> **Chytridiomycosis A new disease of wild and captive amphibians** Lee Berger is part of the One Health Research Group of senior and postdoctoral scientists and PhD students <https://www.facebook.com/onehealthresearchgroup> for more information.

The group is led by Dr Lee Skerratt and use methods from veterinary science, ecology, and biochemistry to investigate wildlife diseases that impact biodiversity, humans or livestock. We work closely with zoos, environment departments and NGOs to develop improved wildlife management, in particular for frog conservation.

Lee commenced her PhD in 1995, with the aim of diagnosing the cause of the mysterious amphibian declines that were occurring in protected areas of Queensland. She discovered chytridiomycosis, now recognised as the worst disease to impact biodiversity as it has caused hundreds of amphibian species to decline globally. Since having 3 children, she has continued research on this disease part time with her salary funded by an ARC postdoctoral fellowship and an ARC Future Fellowship. This has enabled further discoveries on pathogenesis, distribution, disease ecology, diagnosis, conservation management and immunity resulting in over 100 publications, 10,000 citations and an H-index of 40. During 2017 -2018 she was Associate Dean, Research for the College

of Public Health, Medical and Veterinary Sciences. Recent support for the group until 2016 has come from an ARC Discovery Project and an ARC Linkage with Taronga Zoo and NSW OEH. We are currently looking for funds to use proven methods from aquaculture to improve resistance in endangered frogs.

<https://research.jcu.edu.au/portfolio/lee.berger/>

ONE HEALTH RESEARCH GROUP

Our research group investigates the causes and control of infectious diseases in wildlife that impact biodiversity, human health and domestic animal health

Infectious diseases of wildlife are becoming increasingly important as globalisation and environmental change are causing them to emerge and re-emerge. The One Health Research Group uses a multidisciplinary approach to provide holistic solutions to mitigate their impact (Skerratt et al 2009, Murray et al 2012).

Our major ongoing research activity over the past 20 years has been the discovery and control of one of the major causes of global amphibian decline, chytridiomycosis (Berger et al 1998, Skerratt et al 2007). Other current research includes determining ways to improve the control of transmission of Hendra virus from flying foxes into horses and humans (Mendez et al 2012), assessing the risk of spill over of wild dog zoonoses (Banks et al 2006) and determining the importance of disease in the conservation of the endangered Proserpine rock wallaby and the vulnerable spectacled flying fox. Recent past work includes investigating the causes of avian influenza and Newcastle disease in waterfowl in northern Australia, both these diseases sporadically spill over into poultry (Hoque et al 2011).

The group provides advice on wildlife health issues to the general public, private companies, state and national governments and international bodies such as the IUCN and OIE. It is a member of the JCU level 1 research centre, Biosecurity and Tropical Infectious Diseases and the Queensland Tropical Health Alliance.
<https://onehealthresearchgroup.wordpress.com/>
<https://www.facebook.com/onehealthresearchgroup>



Lee Berger and Lee Skerratt. Picture: Andrew Rankin



2020 NSW ENVIRONMENTAL EDUCATION

Award Winners Take Me Outside NSW

Excellence Award - Seaforth Public School, Garden Frog Pond Project. Seaforth Public School students wanted a frog pond in their school kitchen garden to compliment the 3 new chickens and the hand-built recycled hen house. Year 3-5 students worked with garden staff to create the pond.

In small teams, they positioned the recycled pond disc (an old satellite dish), dug out the required hole, and fixed the pond liner. Sandstones rocks, logs, and plants were the final touches to create the habitat needed for our amphibious friends. Then, the rains came and naturally filled the pond up. Quickly word spread and many school socks and shoes were drenched during the first wave of tadpole observations. Students and staff then painted and wrote signs to educate pond admirers to look but not touch.



Tadpoles and spawn have been observed in the pond during garden lessons and a variety of sounds have been recorded in the evening. Students and families remain engaged by tracking the frogs that use the pond by using the Frog ID app.

The pond contributes to the riparian corridor of nearby Burnt Bridge Creek and has provided students critical opportunities to learn how to create a healthy pond environment and how to value the needs of local frog species.

The Seaforth Public School project showcases the core values of the Take Me Outside NSW program –student empowerment and education, an immediate on-ground environmental benefit and an ongoing opportunity for engagement in nature for future years.

Forwarded to FATS by Giselle Howard

https://www.aaeensw.org.au/sites/aaeensw/files/pages/files/2020nswenvironmentaleducationawardwinners.pdf?fbclid=IwAR1woDxwrrusbqX4iJFLYbTTJj6Igh2E4LqzuUYM_dc7UUqJqv3TxdF44TA

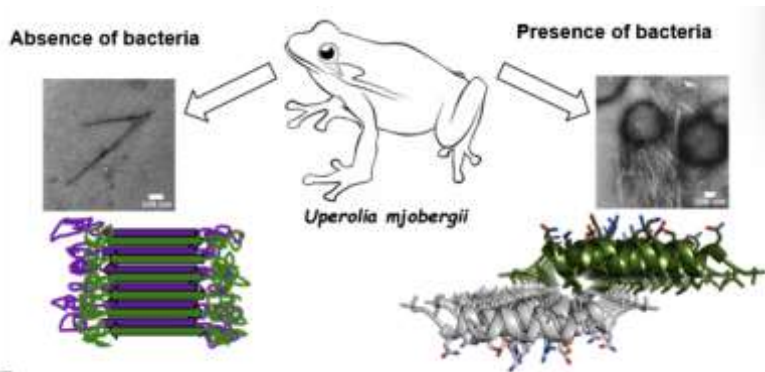
Photo by Andre Rank Smiths Lake 2010 *Litoria peroni*



Litoria caerulea Green Tree Frog Image by George Madani

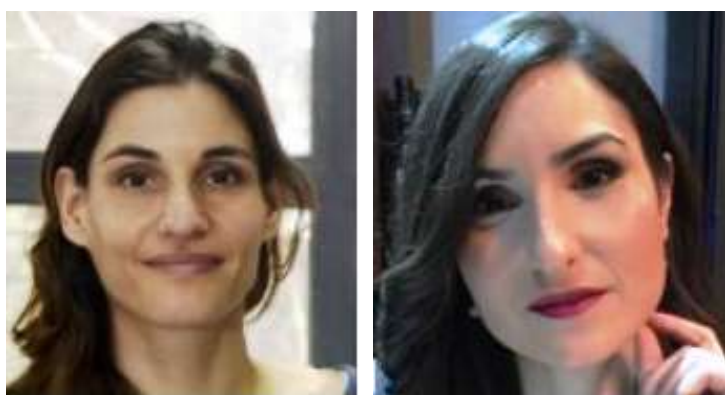


Photo Wendy Grimm, *Crinia signifera*



TOADLET PEPTIDE TRANSFORMS INTO A DEADLY WEAPON AGAINST BACTERIA

Researchers have discovered remarkable molecular properties of an antimicrobial peptide from the skin of the Australian toadlet. The discovery could inspire the development of novel synthetic drugs to combat bacterial infections.



Professor Meytal Landau | Dr. Einav Tayeb-Fligelman

The researchers solved the 3D molecular structure of an antibacterial peptide named uperin 3.5, which is secreted on the skin of the Australian toadlet (*Uperoleia mjobergii*) as part of its immune system. They found that the peptide self-assembles into a unique fibrous structure, which via a sophisticated structural adaptation mechanism can change its form in the presence of bacteria to protect the toadlet from infections. This provides unique atomic-level evidence explaining a regulation mechanism of an antimicrobial peptide.

The antibacterial fibrils on the toadlet's skin have a structure that is reminiscent of amyloid fibrils, which are a hallmark of neurodegenerative diseases, such as Alzheimer's and Parkinson's. Although amyloid fibrils have been considered pathogenic for decades, it has recently been discovered that certain amyloid fibrils can benefit the organisms that produce them, from human to microbes. For example, certain bacteria produce such fibrils to fight human immune cells.

The findings suggest that the antibacterial peptide secreted on the toadlet's skin self-assembles into a "dormant" configuration in the form of highly stable amyloid fibrils, which scientists describe as a cross- β conformation. These fibrils serve as a reservoir of potential attacker molecules that can be activated when bacteria are present. Once the peptide encounters the bacterial membrane, it changes its molecular configuration to a less compact cross- β form, and transforms into a deadly weapon. "This is a sophisticated protective

mechanism of the toadlet, induced by the attacking bacteria themselves," says structural biologist Meytal Landau, the lead author of this study. "This is a unique example of an evolutionary design of switchable supramolecular structures to control activity."

Potential for future medical applications

Antimicrobial peptides are found in all kingdoms of life, and thus are hypothesised to be commonly used as weapons in nature, occasionally effective in killing not only bacteria, but also cancer cells. Moreover, the unique amyloid-like properties of the toadlet's antibacterial peptide, discovered in this study, shed light on potential physiological properties of amyloid fibrils associated with neurodegenerative and systemic disorders.

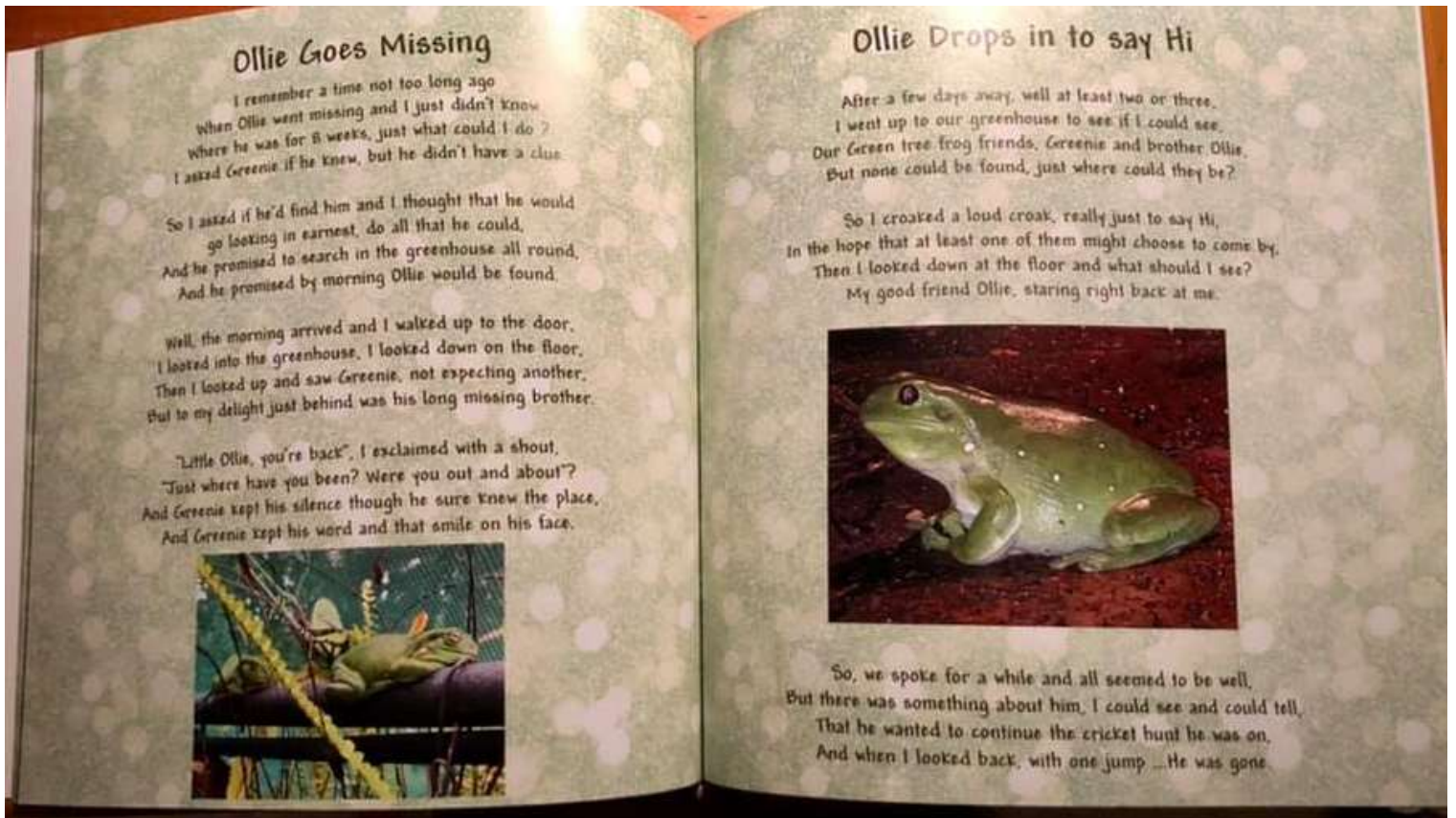
The researchers hope that their discovery will lead to medical and technological applications, e.g. development of synthetic antimicrobial peptides that would be activated only in the presence of bacteria. Synthetic peptides of this kind could also serve as a stable coating for medical devices or implants, or even in industrial equipment that requires sterile conditions.

Materials provided by European Molecular Biology Laboratory. Note: Content may be edited for style and length. Journal Reference: Nir Salinas et al. The amphibian antimicrobial peptide uperin 3.5 is a cross- α /cross- β chameleon functional amyloid. PNAS, 2021 DOI: 10.1073/pnas.201444211 <https://www.sciencedaily.com/releases/2021/01/210114163851.htm> Science Daily 14/1/2021 forwarded to FATS by Marion Anstis

FATS MAIN SPEAKER AT THE APRIL 2021 MEETING IS SAMANTHA WALLACE

Samantha Wallace from Newcastle University will be talking about the "Strange World of Littlejohn's and Watsons' Tree frogs".





Ollie Goes Missing

I remember a time not too long ago
 When Ollie went missing and I just didn't know
 Where he was for 8 weeks, just what could I do?
 I asked Greenie if he knew, but he didn't have a clue.

So I asked if he'd find him and I thought that he would
 go looking in earnest, do all that he could,
 And he promised to search in the greenhouse all round,
 And he promised by morning Ollie would be found.

Well, the morning arrived and I walked up to the door,
 I looked into the greenhouse, I looked down on the floor,
 Then I looked up and saw Greenie, not expecting another,
 But to my delight just behind was his long missing brother.

"Little Ollie, you're back", I exclaimed with a shout,
 "Just where have you been? Were you out and about?"
 And Greenie kept his silence though he sure knew the place,
 And Greenie kept his word and that smile on his face.



Ollie Drops in to say Hi

After a few days away, well at least two or three,
 I went up to our greenhouse to see if I could see,
 Our Green tree frog friends, Greenie and brother Ollie,
 But none could be found, just where could they be?

So I croaked a loud croak, really just to say Hi,
 In the hope that at least one of them might choose to come by,
 Then I looked down at the floor and what should I see?
 My good friend Ollie, staring right back at me.



So, we spoke for a while and all seemed to be well,
 But there was something about him, I could see and could tell,
 That he wanted to continue the cricket hunt he was on,
 And when I looked back, with one jump ... He was gone.

THE ADVENTURES OF OLLIE THE RAIN GAUGE FROG

Over time Ollie, the Green Tree Frog *Litoria caerulea* and crew have gained quite a following. After repeated requests Jim has written a short book in verse with photographs portraying their lives in the greenhouse. It is mainly for children but if the interest shown thus far is any indication I think many adults will also want a copy.

Jim has posted information about the book which is self-published. See his personal Facebook Page. It has been professionally printed in the USA on glossy paper. To cover costs should sell for around \$40AUD + postage. The printing and binding is very nicely done. We are looking for cheaper alternatives. Jim would love it if the book were to be taken up and distributed by a publisher. However, until then, their kitchen table will remain rather busy with Ollie books. The 15 stories are written in verse.



OLLIE AND GREENIE "The book" is out!

The story of their lives in Jim's southern Sydney, Australia, greenhouse in 43 colour photographs and 15 rhyming verses. To purchase a book, please feel free to contact Jim Greenstein on his Facebook page, by Private Message for more information. or email Ollieandgreenie@gmail.com



There are 15 rhyming verses, 43 colour photos, 4 of which are a full page and all beautifully bound and presented in a 20 page book.

The FATS meeting commences at 7 pm, (arrive from 6.30 pm) and ends about 10 pm, at the Education Centre, Bicentennial Park, Sydney Olympic Park, Homebush Bay. FATS meetings are usually held on the **first Friday of every EVEN month** February, April (**except Good Friday**), June, August, October and December. Call, check our web site, Facebook page or email us for further directions. We hold 6 informative, informal, topical, practical and free meetings each year. Visitors are welcome. We are actively involved in monitoring frog populations, field studies and trips, have displays at local events, produce the newsletter FROGCALL and FROGFACTS information sheets. FATS exhibit at many community fairs and shows. Please contact Events Coordinator Kathy Potter if you can assist as a frog explainer, even for an hour. No experience required. Encourage your frog friends to join or donate to FATS. Donations help with the costs of frog rescue, student grants, research and advocacy. All expressions of opinion and information in FrogCall are published on the basis that they are not to be regarded as an official opinion of the FATS Committee, unless expressly so stated.

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FATS ON FACEBOOK: FATS has about 3,630 Facebook members from across the world. Posts vary from husbandry, disease and frog identification enquiries, to photos and posts about pets, gardens, wild frogs, research, new discoveries, jokes, cartoons, events and habitats from all over the world. The page was created 10 years ago and includes dozens of information files – just keep scrolling to see them all. <https://www.facebook.com/groups/FATSNSW/>

RESCUED FROGS are at our meetings. Contact us if you wish to adopt a frog. A cash donation of \$50 is appreciated to cover care and feeding costs. Sorry we have no EFTPOS. FATS must sight your current amphibian licence. NSW pet frog licences, can be obtained from the NSW Department of Planning, Industry and Environment (link below). Please join FATS before adopting a frog. This can be done at the meeting. Most rescued frogs have not had a vet visit unless obviously sick. Please take you new, formerly wild pet to an experienced herpetological vet for an annual check-up and possible worming and/or antibiotics after adoption. Some vets offer discounts for pets that were rescued wildlife.

<https://www.environment.nsw.gov.au/licences-and-permits/wildlife-licences/native-animals-as-pets/frog-keeper-licences>

FATS has student memberships for \$20 annually with electronic FrogCall (but no hard copy mail outs).
<https://www.fats.org.au/membership-form>



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WELCOME NEW FANGED FRIEND: A NEW SPECIES OF FANGED FROG DISCOVERED IN CAMBODIA

From the forests of northeastern Cambodia, another frog species new to science is scientifically named!



Male Cambodian Fanged Frog (*Limnonectes fastigatus*).

Image: Jodi Rowley © Jodi Rowley

The Fanged Frogs of Southeast Asia are truly remarkable beasts. Males have a particularly large, muscular head and sport “fangs” (actually projections of their jaw bone) used to battle it out with each other for the best stream territory. Whilst rather fantastic frogs, many species of fanged frogs look very similar to each other; this has resulted in an underestimation of just how many fanged frogs are out there. With forests rapidly disappearing in Southeast Asia, this has serious implications for species such as Fanged Frogs, which are dependent on forested streams.

For a long time, Kuhl’s Fanged Frog (*Limnonectes kuhlii*) was thought to be very widespread - from the tropical forests of Indonesia to the cool mountains of southern China. In the past decade, genetic evidence has revealed the possibility that there may be at least twenty species ‘hidden’ within seemingly singular frog species.



Cambodian Fanged Frog (*Limnonectes fastigatus*) males have long pointed “fangs”. Image & © Jodi Rowley

We took a closer look at the frogs that were previously thought to be Kuhl’s Fanged Frog from the forested streams of Virachey National Park in northeastern Cambodia. We found that these frogs differed from Kuhl’s Fanged Frog, and all related species, in their head shape, body size, aspects of their skin, as well as molecular data. Based on these lines of evidence, we scientifically name the Cambodian Fanged Frog (*Limnonectes fastigatus*). The Latin word *fastigatus*, meaning

sharp or pointed, refers to the particularly pointy fangs in this species. Some males of the Cambodian Fanged Frog also have some of the most impressive head muscles we’ve ever seen in this group of Fanged Frogs! The Cambodian Fanged Frog is only known from Virachey National Park in northeastern Cambodia. This park is home to a high diversity of amphibians and is the only place in Cambodia that many of these amphibian species occur. This is the same place that we, together with Cambodian herpetologist Thy Neang, surveyed for amphibians and reptiles in 2007. Since then, our team of collaborators has named four frog species found on that survey, including: the Cambodian Fanged Frog, the [Musical Leaf-litter Frog \(*Leptobrachella melica*\)](#), the [Similar Leaf-litter Frog \(*Leptobrachella isos*\)](#) and the [Crescent Moon Spadefoot Frog \(*Leptobrachium lunatum*\)](#). Further scientific discoveries are likely in the biodiverse and imperilled forests of northeastern Cambodia.



A particularly large male Cambodian Fanged Frog (*Limnonectes fastigatus*). Image: and © Jodi Rowley

Dr Jodi Rowley, Curator, Amphibian & Reptile Conservation Biology, Australian Museum Research Institute & UNSW Sydney. **Dr Bryan Stuart**, North Carolina Museum of Natural Sciences, USA. **More information** Stuart, B. L., Schoen, S.N., Nelson, E.E.M., Maher, H., Neang, T., Rowley, J.J.L., McLeod, D.S. (2020). A new fanged frog in the *Limnonectes kuhlii* complex (Anura: Dicroglossidae) from northeastern Cambodia. [Zootaxa 4894 \(3\): 451–473.](#)



Hilly evergreen forest habitat of the Male Cambodian Fanged Frog (*Limnonectes fastigatus*) in northeastern Cambodia. Image: Jodi Rowley © Jodi Rowley

Author(s) [Dr Jodi Rowley](#), [Dr Bryan Stuart](#) 10/12/2020 <https://australian.museum/blog/amri-news/new-species-of-fanged-frog/> sent to FATS by Punia Jeffery