

FROG CALL



THE FROG AND TADPOLE
STUDY GROUP OF NSW INC.

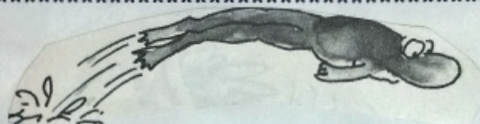
NUMBER 34 - March 1998
PO Box A2405
Sydney South NSW 1235

THE NEXT MEETING

7.00 PM, FRIDAY 3rd April 1998

AT THE AUSTRALIAN MUSEUM (WILLIAM ST ENTRANCE)

** Please note that annual memberships are due for renewal on 1-6-98 **



MEETING FORMAT for 3rd APRIL 1998

7:30pm	Guest Speaker
8.15pm	5 favourite frog slides <u>or</u> 5 minutes
8.40pm	Raffle and Auction
9.00pm	Finish for tea, coffee & biscuits

with compliments
Philip Green



URGENT NOTICE
FATS EASTER SHOW VOLUNTEERS
REQUIRED see page 3

CONTENTS

Last meeting	
Environmental Education and Interpretation,	
Philip Green	p2
Past and Future Field trips	p2
AGM Notice	p2
Urgent - Assistance required for FATS Exhibition at the Easter Show	p3
Frog eats Snake	p3
Frogs and Chemicals	p4
Book Review	p4
AHS Annual Conference	p5-7
Looking for Sunsets after dark	p8
U V Radiation	p8
Wanted	
Frog for a Frog Pond	p9
Press Clippings	p10 + 11
Committee contacts	p12

How do you confuse a frog?
Put it in a round bowl and tell it to take a nap in the corner.
How does a frog confuse you?
When he comes out and says he needed that nap and feels much better.

THE LAST MEETING 6th February 1998

"It is not half so important to know as to feel" Rachael Carson.

Philip Green offered us an extraordinary and entertaining view of his unique experiences in the USA and Central America. He delighted us with souvenirs, some of which had surprising environmental uses and sayings such as the Mohawk "If you walk in the footsteps of strangers you will learn things you never knew, you never knew".

In California, parks have their own police force, the call "broccoli, broccoli, broccoli" sends students to landslide protection positions on the hill sides and programs such as "adopt a water shed" are in place. We learnt how bears can jump on some car roofs to pop the doors open to steal food inside.

In 1997 Philip Green was awarded a Churchill Fellowship to study Environmental Education and Interpretation in Central America and the USA. Wisconsin, Iowa and California are considered to be among the leading states in environmental communication in the U.S. Extensive input was also given by Indigenous Peoples.

Some extracts from literature provided include:- "The general consensus is also that personal experiences in nature and the land are imperative to build a connection before people can come to understand, care and then appropriately act for the environment. In some school districts, week-long school camps at outdoor education centres are mandatory for Year 6 students and naturalists were skilfully weaving in geology, ecology, Native Indian use of the land, species classification. The students will remember those experiences for the rest of their lives. They will also remember the curriculum information without even realising that they learned it. They will also develop strong, positive attitudes toward the environment."

Let us not lose sight of the goal posts! Australia has a long way to go to place its natural environment on a high priority, provide us with sufficient naturalists, herpetologists, research, education and fund it appropriately. Hopefully some of the USA's environmental initiatives identified by Philip Green are implemented in Australia to ensure that there is something left of our froggie habitat and diverse species for the future. Without some government high priority placed on the preservation and appreciation of our Australian environment through research and protection programs there is unlikely to be frogs or frog spotting in the future. **The Editor**

FATS wishes to thank Martyn Robinson and the Australian Museum for arranging temporary alternate accommodation and guiding us through the Museum's corridors for the February 98 FATS meeting. **MW**

Ken Griffiths provided us with great slides of *Litoria phyllochroa* (Green Leaf Tree Frog) seen at the Barington Tops, *Lechriodus fletcheri* from Nangan camping grounds, *Limnodynastes ornatus*, *Litoria lesueuri* males by the hundreds at Carnarvon Gorge but only two females sighted, *Adelotus brevis* (Tusked Frog), *Litoria jervisiensis* (Jervis Bay Tree Frog) and *Litoria citropa* (Blue Mountains Tree Frog). **MW**

INVITATION TO GO FROG SPOTTING

Our Field Trip Co-ordinator, Ken Griffiths is continuing his invitation to all FATS members. Join him for frog spotting. Please call Ken on 9520 9961 between 7pm and 8pm. He regularly goes on long and short, easy and rigorous excursions and would be very happy to include enthusiasts. Families welcome. So don't be shy. Give him a call! **MW**

NOTICE OF AGM

The Annual General Meeting is to be held on Friday the 5th June 1998. Nomination forms will be available at the April meeting and posted in the May Newsletter along with membership renewals **MW**

FIELD TRIP REPORT 27/2 TO 1/3/98

We had a wonderful froggie weekend at Smiths Lake thanks to Arthur and Karen White. Our merry band included Marcelle and Lauren O'Brien, and Debbie Little who collected her niece and nephew from Wootton, for Saturday night's frogging. Anthony Nicholson and Anne Peaston joined us for the weekend and also enjoyed the varied bird life. Graham Pike, from the Australian Museum, stayed briefly whilst on Golden Bell Frog work in the area.

Frogs seen included:- *Litoria fallax* Dwarf Tree Frog, *Litoria freycineti*, *Mixophyes fasciolatus* Great Barred Frog, *Litoria tylei*, *Crinia timulla* Wallum Froglet, *Limnodynastes peronii* Stripped Marsh Frog, *Litoria nasuta* Rocket Frog, *Pseudophryne coracea* Red-backed Toadlet and we heard *Litoria revelata* Whirring Tree Frog.

Discovering that Katherine Wangmann was a leach magnet, we wanted to use her as bait, to get Martyn a free swimming water leach but she wouldn't agree.

We bagged and released a Bandy Bandy Snake - a rare find as they mostly live under ground searching for Blind Snakes. Rebecca Drury and Bennett Wangmann had sighted it. I stood in awe as Arthur White and Debbie Andrew ran down the side of a hill and grabbed it as it hurried down the slope. He was released the next night and casually moved away into the dark. **MW**



With compliments
Arthur White

URGENT ASSISTANCE

required for the FATS EXHIBITION
at the EASTER SHOW

The FATS Group will have a display in the cat pavilion at the Easter Show on 8 and 9 April. We need people to represent us each day and also set up on Wednesday morning 7 to 9am and disassemble the display 7 to 9 pm. Thursday. Even 1 hour will help. Landcare will also have a marquee and would be happy for FATS representatives. Offers of help should be directed to Arthur White on 9599 1161 MW

SNAKES AND FROGS

The relationship is not consistently one-sided.
Walkabout 6-1950 David Fleay -extracts only

"In good seasons along the great waterway of the river Murray with its many overflows, venomous snakes and frogs are co-dwellers in teeming numbers. During spring, breeding time frogs roaring, booming chorus is the deafening symphony of the marshes and there are clammy amphibians overhead, underfoot and even in one's blankets during camps on the box ridges.

About this time (March 1935) numerous families of baby snakes, mainly members of the Tiger species, were born, averaging 30 or more to each litter. Kookaburras made unobtrusive but very business-like visits; Nankeen Night Herons arrived after dark and took both infant snakes and frogs; but the most astounding thing of all, at the time, was the hitherto unobserved propensity displayed by the Golden Bell Frogs for the new born Tiger-snake wrigglers.

As an instance of an endurance contest, however, there occurred one afternoon at the open air "grange" of the Melbourne Zoo, a classical duel of amazing duration. A lively young Copperheaded snake eight and a half inches in length glided out from cover for a late afternoon sun bath. It had partly shed its skin when it was spied by a small golden bell frog two inches in length. Slowly and deliberately the big-eyed amphibian began to hop towards the little reptile. The snake sensed danger from this wet-skinned ogre and retreated; but its pursuer persisted in approaching, and eventually the tiny serpent, forked tongue flickering rapidly in and out, was forced to turn and face its adversary. With a quick movement the frog engulfed the little snake's head and clamped its jaws fast. Then began a furious struggle with the threshing body of the pinioned reptile writhing and twisting in all directions. Repeatedly it turned the frog upside down and coiled about its head and body; but grimly the amphibian retained a hold.

Each time the snake relaxed its struggles, the frog lost no time in jerking down a little more of its victim's body. Five hours later, at nine o'clock in the evening, a party which ducted through the Australian section of the Zoo by spotlight, saw the frog squatting stoically in the self-same spot hanging on grimly to the half-swallowed victim, which had almost ceased to struggle.

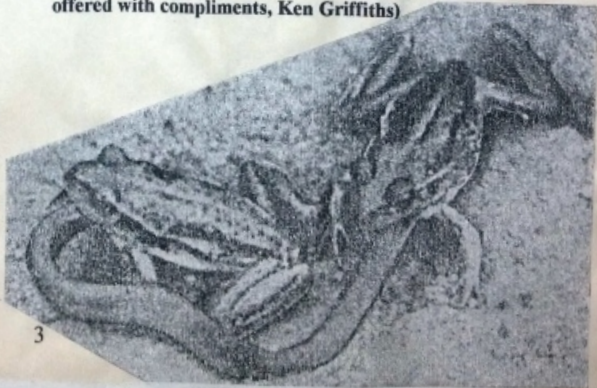


Golden Bell Frog with tail of a young Copperhead Snake protruding from its mouth after a struggle of 22 hours.

The victor made little progress over night. Apparently an over-wrought stomach refused to speed up its functioning, and by morning the now thoroughly dead snake still projected about two inches from the frog's jaws. In the afternoon, twenty-two hours after the commencement of the struggle, the frog was photographed with the final piece of tail just visible. Unmistakable evidence of the little snake's resting place showed in the curious bulge of the frog's distended abdomen and the victor was more pop-eyed than ever.

However, quite a tragedy now occurred, for, when the overloaded frog was picked up and posed for its picture with the tip of its victim's tail still protruding, it became most apprehensive of the photographer's intentions. Internal disturbances of a violent nature were observed, and gradually more and more of the dead reptile's tail was regurgitated, with the frog actually helping its disgorgement with its fore limbs. Within a few minutes the crowning misfortune of that great swallowing feat occurred when, with the complete disgorgement of its victim, the frog had its twenty-two hours of hard work brought to nought.

The most amusing incident was the one in which two frogs attacked one little snake simultaneously from opposite ends. One attacked the head, and the other the wriggling tail, each swallowing until at last the jaws met in the middle of the victim. Here they meditated over the problem for an hour or two, until the more energetic of them made up its mind and wrested the prize from the other." (article found and offered with compliments, Ken Griffiths)



Golden Bell Frogs swallowing the same young Tiger Snake from opposite ends.

BOOK REVIEW

Amazing Facts About Frogs and Reptiles. Discover and Learn Series - Vol. 4 Published by Steve Parish, Queensland, 1997. Softback. 80 pp., Available from Australian Museum Bookshop \$9.95 + \$3.50 P&H.

This 80 page book is a ripper for those with a starter's interest in frogs. Unfortunately only 17 pages are dedicated to frogs and the rest to reptiles. However, it is well written and set out. The text by Pat Slater is easy to read without being childish or condescending. Its main drawback is the inserting of little three or four line interesting fact boxes. There are about three or four on these on every page.

Perhaps the best way of getting youngsters interested in something is to have plenty of photos to look at. There are many colourful and detailed pictures in the book. Although you may expect something extraordinary considering publisher Steve Parish's photographic background, the photos are just honest, clear photos of the subjects and in this regard perhaps a little disappointing. However, youngsters are sure not to know Steve Parish and therefore are bound not to be disappointed.

The book does have an index to the photographs and a Bibliography that will help the reader when they wish to progress further. Carl Spears

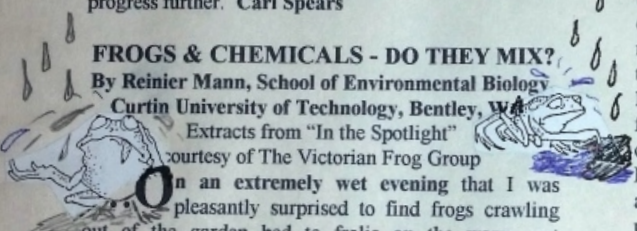
FROGS & CHEMICALS - DO THEY MIX?

By Reinier Mann, School of Environmental Biology

Curtin University of Technology, Bentley, WA

Extracts from "In the Spotlight"

courtesy of The Victorian Frog Group



On an extremely wet evening that I was pleasantly surprised to find frogs crawling out of the garden bed to frolic on the warm wet driveway. Our over excited cats were promptly locked inside. We lived about 200 meters from Stoney Creek.... Now if I were a gardener (or a reserve manager) who relied upon insecticides, herbicides and other products available to make the job easier, would I still have frogs in my garden?

One such chemical has been in the spotlight recently. The chemical is a herbicide called glyphosate and it is considered to be one of the most non-toxic pesticides available. Consequently, glyphosate has a reputation as an environmentally friendly pesticide. This reputation extends to the numerous products which incorporate this chemical.... Western Australian Department of Environmental Protection (DEP) commissioned the Curtin University Ecotoxicology Unit to investigate the toxicity of commonly used glyphosate-based herbicides to several species of Western Australian frogs.

The subsequent report (Bidwell and Gorrie, 1995), highlighted the importance of formulation additives as toxicological agents rather than the active ingredient glyphosate. The additive in question was a surfactant which has been used for many years in such formulations. The toxicological properties of the surfactants employed in these formulations with regard to some aquatic species have been known for a long

time (Folmar, et al 1979). In general, such chemicals have not been considered a threat to aquatic organisms for two reasons. Firstly they do not persist in the environment and second, the dilution factor in open water bodies is considered great enough to reduce the concentrations of these chemicals below toxic thresholds. Contrary to this conventional wisdom, the DEP report concluded that the herbicide in question may present a toxic risk to tadpoles and frogs where the water is shallow and the dilution factor is low.

As a consequence of this report the National Registration Authority released the NRA Special Review of Glyphosate (NRA, 1996). The review recommended that the majority of glyphosate based products (i.e. all those that utilise these particular surfactants) be relabeled (before 30 June 1997) such that they are no longer recommended for aquatic use. They can however still be used in "Dry drains and channels, dry margins of dams, lakes and streams."

.....What is the consequence of herbicide application for adult frogs which live in the soil, or those frogs and tadpoles restricted to small or temporary ponds in areas which are not designated as 'aquatic'. While I am reluctant to endorse any chemical, where a glyphosate based product is deemed necessary, it may be prudent to employ one of the newer products which have been registered for aquatic situations, in preference to any of the older formulations, irrespective of the location.....What are the implications of the use of fertilisers and even animal manure which may radically change the pH and chemical profile of the soil ...As a PhD student at the Curtin University of Technology I am looking at some of these chemicals and their potential as toxic agents to frogs. If you are a gardener, a golf course green keeper, a reserve manager, a municipal environmental officer or an employee of a state conservation department, you may want to keep these questions in -mind.....Editorial note: As far as we are aware the only chemical mix that is currently thought to be OK for use near wetlands is a mix being sold by Monsanto Chemicals called Biactive. We have tried to source it but it seems it is only available in large quantities. Perhaps some pressure from gardeners and small users of such herbicides may cause Monsanto to make this mix more readily available.

AHS CONFERENCE YUNGABURRA

Had a great time in Atherton, well Yungaburra. We hit the bush every night and I saw some great frogs and possums too. I saw *Litoria genimaculata*. After Red-Crowned Toadlets (of course) this must be just the most amazingly beautiful frog, with camouflage lichen colours, with bright emerald green in between, little bits hanging off this lichen camouflage, bright aqua eyes and blue toe-pads. Wow! Also saw *Mixophyes schevelli* (?) and *L. rothi* and a *microhylid*, *cophixalis*. and copper brushtail possums, green possums and butterflies and leaf-tailed geckoes and swam in lake Eacham. It was too good. Back to reality. KT
Abstracts on pages 5to7:-compliments of Karen Thumm

Conroy, S. Population regulation in *Geocrinia alba* and *G. vitellina*.

Population regulation in the anurans occurs primarily during the embryonic and larval phases. In this study survival of *Geocrinia alba* and *G. vitellina*, two terrestrial breeding frogs from the southwest of WA, was determined during the embryonic, larval, and juvenile phases, as well as from calling males. Calling male survival for both species, determined using mark-recapture studies, was high. Embryonic and larval survival was recorded from nests in situ. Pre-metamorphic survival in these species is variable and may be low. Mark-recapture studies were also used to determine juvenile survival. Metamorphs were both toe-clipped and bathed in a tetracycline solution to ensure they would be recognisable as adults. Preliminary results suggest that juvenile survival is low. However, the poor survival of juveniles and the variable survival of embryos and larvae are not sufficient to explain the limited recruitment of calling males observed.

Meyer, E., B.G.M. Jamieson and D.M. Scheitinga*. Sperm ultrastructure of six Australian hylid frogs from 2 genera (*Litoria* & *Cyclorana*): Phylogenetic implications.

There has been, and remains, considerable disagreement over the affinities of Australia's fossorial hylids (Anura, Amphibia): *Litoria alboguttata* and *Cyclorana* spp. Sperm ultrastructure, which has previously been examined in some *Litoria* species but not in *L. alboguttata* and *Cyclorana* spp., has proved useful in resolving phylogenetic relationships at various taxonomic levels within the Tetrapoda. Seeking clarification of the phylogeny of Australia's fossorial hylids, we compared the spermatozoa of *Cyclorana brevipes*, *C. novaehollandiae*, *C. cryptotis*, *Litoria alboguttata*, *L. moorei*, *L. aurea* and previously examined *Litoria* species. The evidence of sperm ultrastructure, supported by previously published molecular, morphological and karyological data, places *L. alboguttata* within the genus *Cyclorana*. On the basis of sperm ultrastructure three separate lineages are discerned within *Cyclorana* s. lat., (1) *C. cryptotis*; (2) *L. alboguttata* and *C. novaehollandiae*; and (3) *C. brevipes*.

Grigg, G.*, A. Taylor, G.F. Watson & H. McCallum. A method for long-term, automatic monitoring of calling activity by frogs.

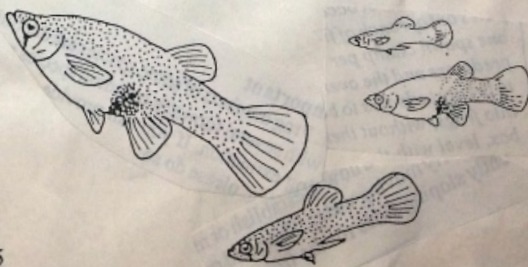
Much anecdotal information asserts that the expansion of Cane Toads into a new area has a deleterious effect on native fauna. Obtaining hard, quantitative data is not a simple task, partly because changes in abundance of the animals usually thought to be affected (e.g. goannas, snakes, quolls, as well as frogs) are difficult to pin down. Because native frogs are open to competition from toads in both larval and adult stages and, furthermore, lend themselves to acoustic monitoring, we developed an automatic system which has the capability to identify and log to memory nightly calling activity by frogs, along with rainfall, temperature and other data. Five pairs of such units are deployed this wet season between Roper Bar and Mataranka in the N.T., in an area judged likely to be soon invaded by toads. Four sites are being set up in Kakadu National Park also. The systems have the capacity to record calling activity for several hours every night throughout the whole wet season, thus offering a very high sampling intensity. Potentially, the method has application wherever monitoring of sounds is useful.

Reynolds, Stephen. Impact of the introduced mosquitofish (*Gambusia holbrooki*) on anurans in Perth metropolitan lakes.

Mosquitofish (*Gambusia holbrooki*) were introduced into Australia early this century and are now widespread. They occupy a variety of aquatic habitats throughout southwest Australia and are common in lakes on the Swan Coastal Plain. Previous studies indicate that mosquitofish are capable of consuming the eggs and larvae of anurans, but there are no specific studies in an Australian context examining impacts on aquatic developmental stages of native anurans, although the general consensus amongst herpetologists is that they are a menace. During laboratory feeding trials the palatability of native anuran eggs and larvae to mosquitofish and the influence of alternative (invertebrate) prey on feeding behaviour was examined. Field based observations indicate that anurans and mosquitofish coexist in some Coastal Plain lakes. An examination of the breeding biology of six anuran species occurring on the Swan Coastal Plain indicates that, particularly in natural systems, mosquitofish impacts may not be as significant as previously thought.



TRILLING FROG s/s



Hero, Jean-Marc. Ecological correlates of reproductive traits in Australian amphibians.

The reproductive traits (egg number, egg size and total clutch volume) of 89 species of amphibian and their relationship with female body size were examined. After removing the effects of body size, the relationships between these reproductive traits with the following ecological variables; 1) reproductive mode, 2) larval habitat, 3) adult activity period, 4) adult microhabitat, and the following geographical characteristics; 1) geographic range and 2) latitudinal range, were examined. Egg number (clutch size) and egg volume were significantly related to female body size and, negatively with each other. After removing the influence of female body size: egg number significantly increased as the reproductive mode shifted towards egg and larval development in the aquatic environment, and as geographic range increased; inversely, egg volume significantly increased as the reproductive mode shifted towards terrestrial development and as geographic range decreased. Furthermore, egg volume increased as larval habitat shifted from lentic ponds to lotic streams (after removing direct-developing species of the terrestrial environment). Clutch volume was significantly related to female body size but not associated with any ecological or geographic variables. The implications of these results on amphibian ecology and their application to the declining amphibian syndrome are discussed.



Knowles, R., H.B. Hines, K. Thumm, M. Mahony, and M. Cunningham. Oviposition of the barred-frogs (*Mixophyes* species) in southeastern Australia with implications for management.

Four species of barred-frogs occur in the ranges of southeastern Australia. Three species, *M. balbus*, *M. fleayi* and *M. iteratus* have declined for unknown reasons and are now considered threatened. The fourth species, *M. fasciolatus*, remains common. Within these four species there are two modes of oviposition. *Mixophyes balbus* and *M. fleayi* construct a nest in the shallow running water that occurs between pools in relatively wide, flat sections of mountain streams. Eggs are either deposited in a shallow excavation in the stream bed or pasted directly onto bed rock. Preliminary investigations suggests that this mode of oviposition, away from deeper water, protects the eggs from predation by native fish and large tadpoles of their own species. *Mixophyes fasciolatus* and *M. iteratus* deposit their eggs out of water, under overhanging banks or on steep banks of larger pools. This too appears to be a strategy to avoid aquatic predators. Unlike the other species *M. fasciolatus* also lays its eggs in pool and pond environments away from streams, a factor likely to be important in this species remaining widespread and common. The stream microhabitats used by the three threatened species for oviposition are limited. These sites are subject to a range of deleterious impacts (e.g. trampling by domestic stock). Ongoing research into the breeding biology of these species is enabling managers to develop better prescriptions for ameliorating potential impacts.

Retallick, Richard W.R. The distribution of tadpoles in streams with respect to predation.

The most immediate selective pressure on tadpoles is predation. Predation theory predicts that prey should favour habitats which harbour minimal risk of predation. The distribution of tadpoles among habitats with respect to the distribution of their predators forms the basis of this study. Predation trials were run with five species of tadpoles and four types of aquatic macroinvertebrates, to determine the vulnerability of each species to each type of potential predator. Macroinvertebrates were effective predators of tadpoles, although there were differences in predatory effects among tadpole species and among predators. Relative abundances of predators and tadpoles in four habitats of stream systems were then obtained by seasonal visits to streams at Eungella National Park. Tadpoles and predators showed strong patterns in their use of the habitats. Tadpole abundances were highest in pools that were isolated from the main stream channel, and two species occurred exclusively in that habitat. Three species regularly used mid-stream pools, and one of those species used that habitat exclusively. No tadpoles used fast flowing waters. In contrast, the abundances of predators were greatest in mid-stream habitats, and lowest in isolated pools. These distribution patterns and experimental results suggest that tadpole distributions in streams may be influenced by the distribution of invertebrate predators.

Gillespie, G.R. Population Dynamics of the Spotted Tree Frog (*Litoria spenceri*).

Knowledge of the population dynamics of a species is necessary for understanding factors which influence variability in abundance of species in space and time. The population dynamics of many amphibian species are poorly understood, which has hampered interpretations of the nature of recent population declines. The Spotted Tree Frog is a riverine species in south-eastern Australia which has declined throughout its former range. Populations of *Litoria spenceri* were studied to gain an understanding of the population dynamics of temperate riverine frog species, and the nature of population declines. Two populations were studied over several years in two streams with markedly different environments and population densities, so that differences in population dynamics could be examined. Aspects of the population dynamics at both sites are compared, including annual variation in population, size, recruitment, dispersal and age structure. Factors influencing variation in population dynamics of the species, and the significance for interpreting population declines, are discussed.

Olding, P. The diversity of microhylid calls from the Wet Tropics with particular reference to the calls as species isolating and specific mate recognition systems.

A comprehensive investigation was made into the diversity of calls produced by the Wet Tropics microhylids. All calls were recorded in situ from October 95 to March 97. Using computer sound analysis software, the calls were dissected into a range of components, from the level of gross morphology to fine-scale microstructure. Within species, relationships were assessed between the call components and associated environmental and body factors. Between species, variation in call components was analysed to see which components were possibly involved in the isolation and recognition mechanisms of the species. No evidence was found to suggest reinforcement or character displacement was playing any role in the narrow overlap zone of two *Sphenophyme* species. Two new species groups were proposed from Mt Lewis based on the uniqueness of their call compared to sympatric species. The fine microstructure described for each species revealed that some species produced amplitude modulated calls whereas others had calls comprised of discrete pulses.

The People

Today we have gathered and we see that the cycles of life continue. We have been given the duty to live in balance and harmony with each other and all living things. So now, we bring our minds together as one as we give greetings and thanks to each other as People.

Now our minds are one.

with compliments
Philip Green

Thumm, Karen* and Michael Mahony. Does Size Count? Does ovum size in *Pseudophryne australis* (Red-Crowned Toadlet) explain hatching variability? Red-Crowned Toadlet egg masses are rarely subjected to long-term inundation. Terrestrial egg masses are generally laid within a slope where water will flow through the egg mass after a heavy rain episode. This may explain the difference in hatching behaviour observed between Red-Crowned Toadlets and some other *Pseudophryne* species, in which the tadpoles are reported to halt development between Gosner Stages 26 - 28 and then hatch when the water table rises. Eggs of *Pseudophryne australis* can hatch earlier (Stage 23) or much later (Stage 36), and eggs from within one egg mass can hatch over an extended period, even when inundated. Egg masses vary in the spread of hatching stages and time taken to hatch. Variation in maternal provisioning has been suggested as a cause of developmental differences, and can be viewed as an adaptation to an uncertain environment (Crump 1981, Capinera 1979). The distribution of ovum sizes of different clutches has been investigated. Although there appears to be considerable size variation between clutches and within clutches there is no evidence to date of ovum size influencing the time taken to hatching.

McDonald, K.R. and Margaret Davies*. Unusual reproductive biology in an Australian hylid frog The Australian hylid frog *Litoria longirostris* Tyler & Davies 1977 lays pale green eggs on vegetation overhanging pools at the sides of streams in the McIlwraith Range on the Cape York Peninsula. Amplexus between males and females does not appear to occur. Egg nests are attended by the female for the period before hatching and she remains with the abandoned jelly matrix after the larvae have escaped and fallen into the pool below. It is postulated that the role of the female in nest attendance is to maintain water content of the egg mass. Larvae do not have extreme lotic adaptations



LOOKING FOR SUNSETS AFTER DARK

By Gerry Marantelli, Amphibian Research Centre

Extracts from "In the Spotlight"

compliments of The Victorian Frog Group

"Arriving at Walpole at dusk we headed into Sunset Frog country. Only two sites were then known for this frog. Each consists of a drainage line crossing the road where seepage from the forest runs into swampy peat bogs and later small forest streams. Each site is only a few hundred metres in length and they are about 2 kms apart....."

When the sun had set completely a few frogs began to call, a few more and then a chorus of about 50!! Why were they so hard to find during the day? I crept slowly towards the chorus and turned off my headlamp when I got to about twenty metres from the sound. Slowly in the dark I approached as one after the other the frogs stopped as they became aware of my presence. I knelt in the mud and began to crawl in search of the sound of one excited male. As I turned on my light, staring at the spot - a flat open 5cm deep 'tray' of mossy water - what seemed like an enormous balloon of bright orange quickly deflated as the frog slowly sank below the crystal clear-water. As it sank, in almost ostrich like fashion, it raised its hands over its eyes. Its bright orange 'socks' stood out like little stars upon its deep purple-chocolate head and back!!!

If you have not yet seen a picture of this frog my description of its underside will be hard to believe. Like a sunset its belly was shades of orange and blue - from deep ocean to the most brilliant sky blue. Its name is well deserved and this is one frog that really, must be seen to be fully appreciated. Another twenty or so of these frogs were located, several pairs in amplexus told us that this was a good night to be here....If you ever get the chance to go west, it may also be the only place on earth where you can see a sunset after dark."

Amphibian Mortality Due To UV Radiation

Presented at the American Association for the Advancement of Science Annual Meeting, Philadelphia compliments of Martyn Robinson,

Cynthia Atwood cynthia.atwood@yale.edu

203 432-1326 Yale University and Peter Macinnis.
Many frog and other amphibian species throughout the world appear to be experiencing declining populations, with several species already extinct and others showing alarming rates of deformities. No single cause has been identified. Some scientists believe habitat disturbances are to blame, although declines have occurred in relatively undisturbed areas. Now, field experiments in the Oregon Cascade Mountains have confirmed what many scientists had suspected -- ambient levels of ultraviolet-B (UV-B) radiation from the sun can cause high rates of mortality and deformity in some species of frogs and other amphibians. The earth is shielded from UV radiation by the ozone layer, which is believed to be thinning because of the increased use of chlorofluorocarbons as refrigerants, solvents and cleaning agents. "There has been a great deal of recent attention to the suspected increase in amphibian

deformities. However, most reports have been anecdotal, and no experiment in the field under natural conditions had been performed previously," said Joseph M. Kiesecker of Yale University, who presented his findings Feb. 17 at the annual meeting of the American Association for the Advancement of Science in Philadelphia. Kiesecker, along with Andrew R. Blaustein of Oregon State University, compared the embryos of long-toed salamanders shielded from UV-B radiation by mylar filters to unshielded embryos. They found that 95 percent of the shielded embryos hatched, compared to only 14.5 percent of the unshielded embryos. Even more striking, only 0.5 percent of the surviving shielded salamanders had deformities while 91.9 percent of the unshielded salamanders had deformities. Malformed tails, blisters and edema were the most frequent deformities. "The recent thinning of the protective ozone layer in the upper atmosphere has been linked to increased risks of skin cancer and cataracts in humans as well as to the destruction of fragile plant life. Deformed and dying frogs may be linked to thinning ozone as well," said Kiesecker, who is studying other possible factors, such as water level and quality, which also can affect the amount of UV-B radiation reaching amphibians. UV-B radiation also may impair disease defence mechanisms, making amphibians more susceptible to pathogens and parasites that may hamper normal development and increase mortality, Kiesecker said he found increased mortality associated with a pathogenic fungus (*Saprolegnia ferax*) infecting some embryos exposed to UV-B, while embryos under mylar filters were not infected. The UV-B may work synergistically with the fungus, said Kiesecker, who reports seeing an outbreak of fungal pathogens in a number of amphibian species in the last 10 years. Amphibians are ideal species for the study of UV-B exposure, he noted. Many lay their eggs in open, shallow water where exposure to UV-B is high. Typically, a population of 200 breeding pairs of toads, for example, will produce as many as 1 million embryos. Furthermore, amphibian species have varying amounts of an enzyme called photolyase, which is the principal enzyme for repairing UV damage to DNA. Photolyase attacks a major UV photoproduct in DNA -- cyclobutane pyrimidine dimers -- which can cause mutations and cell death if left unchecked. Kiesecker, a zoologist and postdoctoral fellow, reported that frog and toad species with the greatest photolyase activity had the lowest mortality rates in developing embryos. For example, he and his colleagues noted an increase in embryo mortality of 15 to 20 percent in the Western toad and the Cascade frog -- two species with low levels of photolyase -- while the Pacific tree frog, which has a high photolyase level, is thriving. All three species live in the same habitat in the Cascade Mountains. The field studies, which were completed in May and June 1997, also are reported in part in the December issue of the Proceedings of the National Academy of Sciences. Funding was from the National Science Foundation and the Donnelley Fellowship sponsored by the Yale

Wanted! Frogs for a frogless pond

By Mark Avery



I suppose it all started when, as a little fellow, we visited Mrs Painter's bungalow at Rosebud Beach (near Melbourne) for our Christmas holidays.

All I remember of Mrs Painter is a hawkish face peering from behind a pair of spectacles, but I remember the red bull ants clearly enough. With scythe-like pincers they appeared when you least expected them, and their habit of travelling alone made them seem all the more treacherous.

But it is the frogs I really remember. Mrs Painter had a fountain, its pond covered with lily pads on which sat little green frogs.

They had long given up hiding from humans—the pond was too small and shallow for that. They were fascinating to watch, as they jumped at the hovering mosquitoes.

I watched them jump from lily pad to lily pad. I watched them just sit. I was bitten by more bull ants around that pond than by the rest of Rosebud's bull ants combined.

The frogs were still there when we visited the bungalows the next two Christmases, but when a log cabin near Swifts Creek became our new holiday venue, the memory faded somewhat. A child doesn't dwell on the past—the Gippsland bush and a disused mine have their own treasures to discover. Yet memories have a habit of resurfacing, and when I moved to Sydney and bought a house several years ago, the first thing I resolved to do was dig a frog pond.

Actually I dug two ponds, to make good use of the slope in my yard. A waterfall would help aerate the water and prevent stagnation.

It took me four months to dig them—but what ponds! Three and five metres long and a metre deep, ringed by lumps of sandstone and crammed with 20 varieties of mostly native water plants. All I needed were the frogs.

In my childhood, the puddles in the nearby paddocks teemed with tadpoles, and like every other kid I collected them to watch them metamorphose. Now the paddocks are suburbs, and I had to go a long way to find the watery ditches and dams of Sydney's outskirts. Alas, it was all in vain. I found not one tadpole.

So, from the solitary aquarium in Sydney which sold amphibians, I bought a mating pair of brown marsh frogs and five young green tree frogs. Fifty dollars worth. As soon as I arrived home I released them into their paradise, and with a glad heart watched them swim lazily away. I never saw them again.

It took me another six months to finally accept the fact that I wasn't going to have any green tree frogs or brown marsh frogs hopping about the place, so I advertised in the wanted section of the *Weekly Trading Post*: FROGS OR TADPOLES FOR FROG POND WITH NO FROGS. WILL PAY 30c EACH.

I figured I would get a selection of frogs, and hopefully a healthy gene pool for future generations. There were six responses—six kids ringing up to say they had a jarful of tadpoles waiting for me. I visited the budding entrepreneurs over two weekends, armed each time with a carry-bag and a bus pass.

Trying to count tadpoles in a jar while they are swimming around isn't the easiest of tasks, so a sum of money agreeable to both parties was reached. I learned later it is illegal to sell frogs or tadpoles, so it seems I have made felons of six children at least 50 times over. (I can still sleep nights though).

The purchases were uneventful, except for the time I was returning from Hurstville by train with a jar leaking into my carry-bag, which in turn leaked onto my lap. When I alighted I found to my dismay that there was a large wet patch around my groin. And I still had a bus to catch!

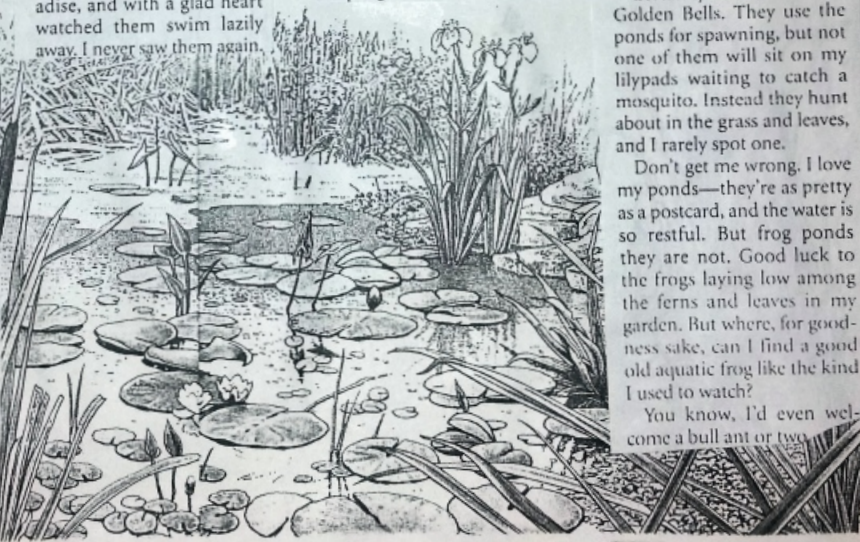
But all six jars of tadpoles made it to the ponds, and I was rewarded a few months later with a croak, then another, different croak. Frogs at last! But thorough searches failed to reveal the croakers, though one day neighbours two doors down remarked complacently that they had found three frogs sitting under their sprinkler.

I still hear my frogs, but never see them. Of course, I realise now that none of the tadpoles I bought were the offspring of aquatic frogs, the type that hang around water.

Certainly there are no Golden Bells. They use the ponds for spawning, but not one of them will sit on my lily pads waiting to catch a mosquito. Instead they hunt about in the grass and leaves, and I rarely spot one.

Don't get me wrong, I love my ponds—they're as pretty as a postcard, and the water is so restful. But frog ponds they are not. Good luck to the frogs laying low among the ferns and leaves in my garden. But where, for goodness sake, can I find a good old aquatic frog like the kind I used to watch?

You know, I'd even welcome a bull ant or two.



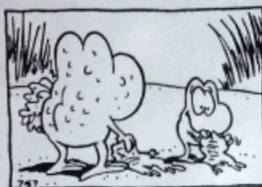
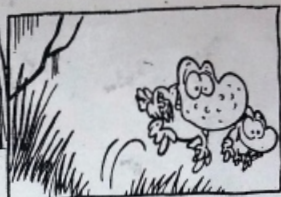
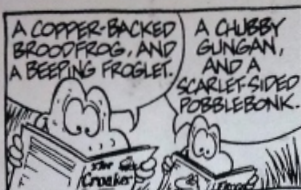
Addendum

Please forgive me! That was 3 or 4 years ago, before I joined the FATS group. The Frog Facts articles and the Frogcall newsletter have taught me a great deal, and even though I have just dug two huge ponds in my new garden, I won't be employing those methods of stocking my ponds. I know the best habitat for the frogs I'm after. Thank you FATS Group for being around.

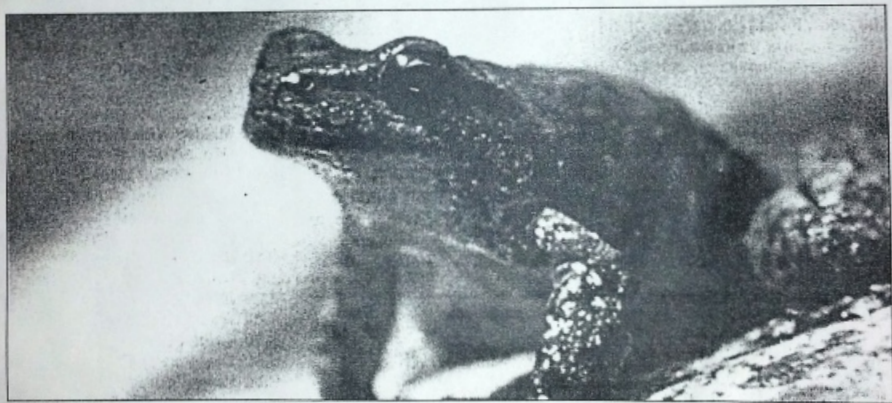
Mark Avery

SWAMP

by Gary Clark



A delicate balance



Environmental signposts ... the presence of frogs in an area is indicative of a healthy natural environment.

WILDSCREEN

ABC, 8pm

WHEN you're part of the food chain, you're only a winner until you're a loser.

Unless you belong to our species which has the food chain organised, mechanised and pasteurised. So we gamble in other ways to approximate the adrenalin rush that comes from survival in a hostile environment.

But as a highly successful species, we are altering all sorts of natural balances and, by doing so, shortening the odds in the survival game for a multitude of creatures. Including ourselves.

This program ranges the adaptive capacity of various species against the vagaries of Nature and the numerous "necessities" via which human recklessness minimises the odds for survival as ours.

Pygmy possums, lyrebirds, wombats and other creatures with finely tuned environmental strategies risk their survival on natural balances. Any climatic event can bring extinction.

But surely humans are superbly adaptive? Indeed we are, but our flexibility has withered into specialisation and the danger with specialisation is ... one tilt and *Bing!* You're over the line. Good night!

Nature's Gamblers is a thought-provoking documentary which boots home stuff we are only too aware of but somehow insist on ignoring in the shrinking comfort zone.

We must plant billions of trees. We must preserve natural diversity ... not just media diversity. We must let our awe overcome our arrogance. There's nowhere else to go if we bugger this planet. And there's no guarantee the rich or the intelligent will survive any longer than the poor and stupid.

Ultimately, we're all stupid if we commit this auto-holocaust and earn the dubious distinction of being the first species to make itself extinct.

Doug Anderson

Toad tragedy.
Costa Rica's golden
toad was one of the first
to go. Many more are
now following. Why?

Michael Fogden/Oxford Scientific Films



WORLD UV? Pesticides? Oestrogens?
Biologists gather a few more clues.

Many of the world's amphibians, particularly frogs and toads, are becoming extinct faster than scientists can determine the causes. At the Third World Congress of Herpetology, held in Prague in August, it became clear that the phenomenon is a global one. Serious declines and several probable extinctions have been reported from the Pacific North-west of America, from Central America and from Western Australia. While most amphibian declines around the world are attributable to habitat destruction, in all these three areas, some species (but not all) have declined rapidly in nature reserves, national parks and other areas set aside for the protection of biodiversity.

Since 1991, several possible causes for the phenomenon have been suggested, most of which are now the subject of intensive scientific research.

BBC wildlife
10/97

Frog mystery deepens as extinctions quicken

SWAMP

by Gary Clark



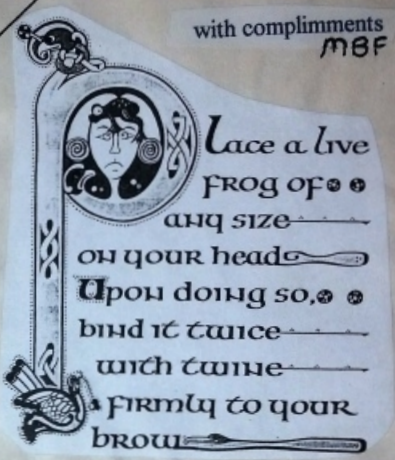
Sunday Telegraph



A big thank you
 contribute to our
Barbra Harvey Karen Thumm Anthony Nicholson
Frank Lemckert Michael Harvey Lothar Voigt
Katherine, Bennett and Bill Wangmann
Carl Spears Arthur White Ken Grithiths
Hal Cogger Martyn Robinson
Peter Ryan Pam Mawbey

Giselle Howard
Mark Williams
Philip Green
 and
 all
 the
 rest

with compliments
MBF



CONTACTS

Frank Lemckert
 Giselle Howard
 Alison Frappell
 Arthur White
 Anthony Nicholson
 Lothar Voigt
 Vacant
 Ken Griffiths
 Monica Wangmann
 Vacant
 Vacant

President
 Chairperson
 Secretary
 Treasurer
 Membership Officer
 Publicity / Exhib Officer
 Publicity / Exhib Officer
 Field Trip Co-ordinator
 Editorial Panel
 Editorial Panel
 Editorial Panel

phone
 (02) 9872 0159 (w)
 (02) 9636 3762 (h)
 (02) 9436 0188 (h)
 (02) 9599 1161 (h)
 (02) 9660 4393 (h)
 (02) 9371 9129 (h)
 (02) 9520 9961 (h)
 (02) 9797 6543 (h)

fax
 (02) 9871 6941 (w)
 (02) 9895 7501 (w)
 (02) 9418 9964 (w)
 (02) 95991161 (h)
 (02) 9361 7981 (w)
 phone first (h)

between 7pm and 8pm

An ancient Celtic cue from
 "The Encyclopedia of Magic, Myth and Medicine."



with compliments
 the Victorian
 Frog Group

Please see page 3 about the **EASTER SHOW DISPLAY** for the
FROG AND TADPOLE STUDY GROUP and
OUR NEED FOR YOUR SUPPORT

We hold six informative, informal, topical and practical meetings each year at the Australian Museum (William Street entrance) in Sydney. Meetings are held on the first Friday of every even month (February, April, June, August, Oct. and Dec.) at 7 pm for a 7:30 start. Visitors are welcome. We are actively involved in monitoring frog populations and in other frog studies, and we produce the newsletter **FROGCALL** and **FROGFACTS** information sheets. All expressions of opinion and information are published on the basis that they are not to be regarded as an official opinion of the Frog and Tadpole Study Group Committee unless expressly so stated.