

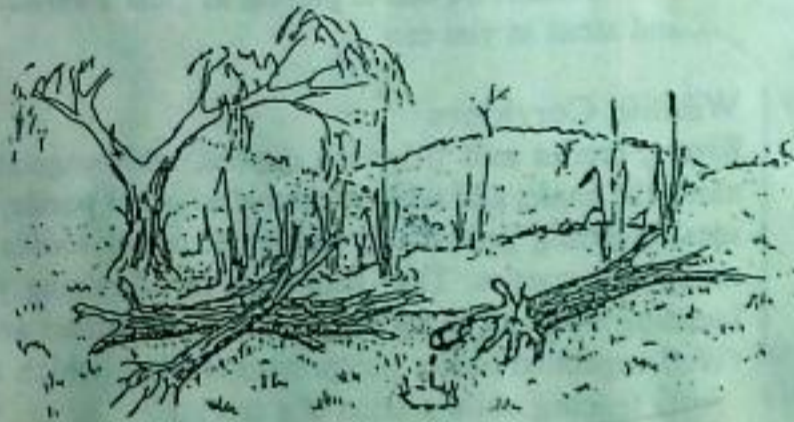
FROG CALL



THE FROG AND TADPOLE
STUDY GROUP OF NSW INC.

NUMBER 32 - November 1997
PO Box A2405
Sydney South NSW 1235

THE NEXT MEETING
7.00 PM, FRIDAY 5th DECEMBER 1997
AT THE AUSTRALIAN MUSEUM (WILLIAM ST ENTRANCE)



Meeting Format for 5th December 1997

- 7:30pm Reproductive Strategies and
Habitat Selection - Garry Daly
- 8.15pm 5 favourite frog slides or 5 minutes
- 8.40pm Raffle and Auction
- 9.00pm Finish for tea, coffee & biscuits



CONTENTS

The next meeting	p1
Last meeting	p2
Hip-pocket frogs - Michael Mahony	p2
Xmas party at ARP	p2
Feeding Frog Babies	p2
Tadbites and Frogpieces	p3
Bush Regeneration	p3
The Science Page	p4
Amphibian Keepers Licence - amnesty period ends 31 October 1997	p5-8
"A Frog In My Pocket" Michael Mahony	p10-11
Press Clippings	p12
Committee contacts	p12

REGULAR FEATURES

News and announcements, field trips, projects and committee reports.
Discussions, advice, gossip, welcome table, auction, sales table!
Bring a visitor!

THE LAST MEETING (3. 10. 97)

Hip-pocket Frogs or Marsupial Frogs, or *Assa darlingtoni* to Michael Mahony, were the subject of his amazing slide show. Small enough to fit on a five cent coin and secretive enough to tax a saint, they nevertheless surrendered their strange ways to Mike's camera. And he made it look so simple. All you need to do is go to the Border Ranges between October and April on a number of wet evenings (Dorrigo N.P. will do at a pinch but it's not the same), listen for them going E-E-E-E-E-E-E-E, triangulate and then start digging - very, very patiently. They sit at the bottom of the wet leaf litter and usually on a beastly slippery slope. The male's call perks up as soon as a female approaches within sniffing (???) distance; they amplex and crawl piggyback from the calling site to the egg-laying site. She lays 6 to 16 eggs (yes, on land!) and he (he!!!) stays with them. They hatch - all their egg jelly turns liquid at once - and they swim up the jelly into one of his two pouches on his hips. White little sluggy taddies wriggling their way unerringly into daddy's wallet, and all in great detail on Michael's slides! The fathers in the audience couldn't help being alarmed but also impressed. Daddy then goes back to the calling site and tries to get another lady or two - until he just can't take any more. Sixteen offspring is about his limit. After about 30 days in the pouches, the youngsters emerge into the fresh air, and they hop away as frogs - the size of the head of a match.

Needless to say, we were all greatly surprised and couldn't get over it that it's the male who does all this. Next time Michael needs volunteers to spend their evenings clinging to the slopes while clutching their pockets and sifting wet leaf litter through their fingers, we will know what we're in for. And we're going to queue up.

For further facts see pages 10 and 11 for Michael Mahony's article on "A Frog In My Pocket".

The 5 slides - provided by Arthur White - were about what's happening at Kurnell: There's the Jervis Bay Tree Frog, the biggest population of them in the Sydney area. They were calling from July to September. And there's Haswell's Frog quacking away (the one with the marbled tummy and red groin flashes and the strangely shaped tadpoles). A bit further inland, at the N.T./Queensland

border, an even stranger sight posed for Arthur: a Crucifix Frog without the cross but with even speckles all over.

Discussion galore on frog keepers' licensing - which had just been announced the day before - and on Frogweek planning. Frank Lemckert thought it's best to keep local species, in case any of them get away. Danny Wotherspoon announced a Frogweek special for guests at Rose Lindsay Cottage in the Blue Mountains: ring 02 47 514 273 if you're curious.

The kids' auction (run by Danny), the normal auction (by Arthur) and the raffle scraped in \$45 for our coffers. Thanks to the donors and donees alike.

L.V.

XMAS PARTY AT ARP

The Weigels are doing it again and have invited all FATS members to a Christmas party at their beautiful new Australian Reptile Park. Sunday, 7 . 12 . 97 at 12 noon. Admission free for FATS members. Robyn and John will also shout the meat and the soft drinks. Bring your salads. At the FATS meeting on 5.12. we'll do a headcount of how many are going. If you won't be at the meeting but at the party, please ring me, so that they don't kill an extra roo for nothing. (That's what's planned for the barbie, folks!)

L.V.

FEEDING FROG BABIES

Concern that two small ponds could not support half of Sydney's population of Striped Marsh Frogs, prompted me to experiment with a Food Replenishment as an Ongoing Goal (FROG) program. I used the dry dog food pellets that are made up of vegetable matter and small amounts of meat that are pressed together. The pellets after an hour or so would expand and the tadpoles literally swarmed around them to feed. I only used a few pellets per pond and they would last a day or so. There didn't appear to be any residue.

(I asked Arthur White, (Herpetologist) what he used for his tadpoles. He predominately used lettuce leaves that had been soaked in boiling water and had become limp and slimy).

Les M'Cluskey

Les is in the environment section of the RTA and a friend of Giselle Howard's. M.W.

TADBITS AND FROGPIECES

The next workshop on "Care and Study of Frogs and Reptiles" will run on Saturdays 22, 11, and 29, 11, 97 in Blacktown. Two full days for \$85. Ring Blacktown District Community College on 9622 1011.

Sydney Metropolitan Wildlife Services presents an Urban Wildlife Ecology seminar. Two days (22, and 23, 10.) at Lane Cove N.P. for \$80 plus optional lunch. Includes frogs. Ring (02) 9413 4300.

Volunteers needed for Friday, 28, 11. All day at Lane Cove N.P. - the annual Streamwatch prizegiving ceremony for schools. Help set up FATS displays and do hands-on stuff. Free feed. Must like frogs. Ring me on 9371 9129.

More volunteers needed for Frogweek last minute things. Water Week on 19.10. ok, Taronga on 2, 11. ok, ARP ok for the moment; but for media articles, talkback stations and schools we need lots more. 9371 9129.

L.V.

For the discerning shopper:

Coin purses made out of tanned cane toads with front legs intact. You put your money where its mouth is. From Birdsalls Leather & Craft Emporium, Botany, at a cost of \$18.

Floating rubber frogs attached to bath plugs which squeak as well (the frogs not the plugs). They are to be found in the gift shop of the Museum of Sydney in Bridge Street, Sydney, at \$16.95.

Australian Geographic Shops have a watchdog substitute called a "croaking watch-frog" which makes a noise when someone walks by. They retail for \$19.95 and cost nothing to feed. There is also a "No-hands" torch, ideal for frog spotting at night, for \$64.95. A computer mouse pad displaying a green tree frog for \$9.95.

The Wilderness Shop has an inexpensive soft cloth spectacle bag with frogs on it.

Postcards from Australia Post feature the Red-eyed Green Frog, and gift cards cut out in the shape of a frog from The Ink Group card shop, are to be found on the ground floor, Queen Victoria Building, Sydney.

Pam Mawbey



Frogs fence with stamen swords.

In an exhibition of exquisite paintings by Helen Leitch, frogs, geckos and assorted insects mimic humans by using and abusing Australian rare and endangered plants.

BUSH REGENERATION

A bush regeneration course being run by Ryde College of TAFE is using some material about frogs provided by FATS. It is part of a module called Introduction to Fauna and deals with three frogs - Striped Marsh, Brown Froglet and Red Crown Toadlet.

This material was provided by the very enthusiastic and diligent FATS committee member, Lothar Voigt, after Ryde TAFE appealed to the Australian Museum for help.

The college's Bush Regeneration Teacher, Michael Clarke, says the information is used to help alert students to the dangers of herbicides in relation to frogs, and to the necessity of leaving frogs where they find them.

Lothar also provided some frog call tapes and Ryde TAFE bush regeneration students are now being encouraged to try and identify any frogs they come across.

It all sounds like one giant step forward for mankind and several leaps of joy for frogs!

The Ryde TAFE bush regeneration program is offered on two levels: operational and managerial. The introductory course, Bush Regeneration Certificate Level 2, includes subjects like weed recognition, native plant recognition, soils and ecology. There is even a module on how to use a chain saw. The advanced course is the Certificate 4 in Bushland Regeneration which is more career oriented.

It is all co-ordinated by Robin Buchanan, a longstanding bush regenerator and the author of the book *Bush Regeneration - Recovering Australian Landscapes*.

Further information about these courses can be obtained from Michael Clarke on 9808 8222.

P.M.

SENIOR SID

by WAGGERS



The Science Page

with Michael Harvey

Year of the Frog - Part 1.

Regular readers of *Frogcall* may have noticed the absence of the Science Pages over the last couple of issues. I apologise for not keeping in touch, but I have been somewhat overwhelmed by a bunch of essays that my University course unreasonably demanded I complete. For this month's article I thought I might atone by presenting a brief overview of the stories that the Science Page might have covered over the last year. In short, here are the frog-related news stories that have caught my eye in 1996/97.

It's been a big year for work on how frogs make it from egg to frog. Published studies have shown some remarkable adaptations that help frogs make it through this very hazardous part of their lives. In the USA, Andy McAllum and Jeff Leimberger have found that tadpoles of the **Grey Tree Frog** (*Hyla chrysoscelis*) are able to respond to the presence or absence of predators in their environment by varying their "escape equipment". Tadpoles raised in a tank with a voracious tadpole-predator, a dragonfly nymph, grew significantly larger tails than those raised in a dragonfly-free environment. The larger tails allow the tads to swim faster and may also serve as improved camouflage. However a big tail is a lot to carry around and so if there are no predators, it is not needed. As the tadpoles did not grow larger tails when kept in a tank with a dragonfly nymph which was not feeding on tadpoles, the scientists have suggested that the tadpoles are "tipped off" to the presence of a predator by chemicals released into the water when a tadpole gets eaten.

Tadpoles can also increase their survival chances by resorting to strong-arm tactics. Sarah Faragher, at the Northern Arizona University, has found that large tadpoles of the **Southern Leopard Frog** (*Rana utricularia*) repeatedly harass the smaller tads of the **Green Tree Frog** (*Hyla cinerea*, a different species from our *Litoria caerulea*). The two species naturally occupy the same habitat, and the Leopard tadpoles frequently "swam aggressively" at the Green Tree tadpoles, more so than they harassed members of their own species. The victimised tadpoles had to expend energy to keep out of the way of their tormentors, and showed slower growth than when they were kept separately from the Leopard tads.

German biologists have discovered a remarkable case of frog parental care, in a cave in Jamaica. Rudolf Diesel (formerly of 'Rudolf Diesel and the Injectors', now of Universitat Bielefeld) has found that female *Eleutherodactylus cundalli*, lay their eggs up to 90 metres inside caves. After the eggs have been fertilised by the males, the females sit on them (the eggs, not the males) and vigorously defend them (to the extent of biting at the scientists who tried to remove them). The eggs do not hatch into tadpoles, but fully formed froglets. These little frogs (up to 70 individuals) climb on to their mother's back and get a ride out of the cave. They are capable of hanging on to mother as she makes meter-long hops towards the cave mouth. Once the froglets leave the cave, they are on their own.

The genus *Eleutherodactylus* is actually the world's largest vertebrate genus, containing over 500 species, and an unusual new species was added to the genus earlier this year. The **Phantom Frog** (*Eleutherodactylus phasma*) is around 5cm long, and is nearly pure white (with a few dark spots). Karen Lips from St Lawrence University and Jay Savage from the University of Miami discovered the new species on the banks of a Costa Rican stream at an altitude of 1,850 metres. Originally thought to be an albino edition of another *Eleutherodactylus* species, *E. phasma* has now been shown to be a separate species.

M.H.

Facing up to the enemy



◆ Escape tactics. The tadpole on the right has spent time in predator-infested waters and has developed a larger tail in comparison to its counterpart on the left.



MINISTER FOR THE ENVIRONMENT
NEW SOUTH WALES

Level 9 St James Centre 111 Elizabeth Street Sydney 2000
Telephone: (02) 9233 4044 Facsimilie: (02) 9233 3617

2 October 1997

Crackdown on smuggling with new licensing system for reptiles and amphibians

Environment Minister Pam Allan today announced a crackdown on the illegal trade of reptiles and amphibians with the launch of a new licensing system for those animals kept in captivity.

Ms Allan said for the first time, the NSW National Parks and Wildlife Service (NPWS) would be permitted to issue licenses to reptile and amphibian enthusiasts, bringing it into line with other Australian states.

She said the new licensing system would be established following a one month amnesty where unlicensed keepers of reptiles and amphibians could sign up with the National Parks and Wildlife Service.

"The new system would allow for enthusiasts to keep as pets native and exotic reptiles and amphibians, which will all continue to be protected under the NSW National Parks and Wildlife Act.

"Once these keepers are licensed it will be possible to both monitor their collections while nabbing unlawful traders and smugglers.

"The key is to track existing private collections so that no new reptiles can be illegally taken from the wild for the benefit of profiteers.

"The new licensing system will be backed up by an overhaul of the NPWS's law enforcement division with hundreds of rangers being trained to detect and investigate any illegal keeping of wildlife.

"This new licensing system has great significance because it recognises the contribution reptile and amphibian keepers have made to herpetology.

"About 80 per cent of what we know about reptiles and amphibians comes from the work of these amateur researchers who keep these animals in captivity.

"The new system also means NPWS will be better equipped to monitor and regulate the keeping of reptiles and frogs while at the same time stemming the illegal removal of these animals from the wild.

"The licensing system will prohibit the commercial trade of reptiles and frogs through pet shops or through open advertising, and will restrict animals being exported from NSW to commercial dealers interstate.

"Amateur herpetologists have been able to successfully breed many species of reptiles and amphibians in captivity for many years, but have been unable to legally dispose of the offspring. They will now be able to pass captive bred animals on to other licensed enthusiasts.

"The existing NPWS policy will continue to allow people, especially children and schools, to collect tadpoles from the wild without a licence for the purpose of observing metamorphosis.

"I believe that most people who collect tadpoles for this purpose are responsible enough to return the frogs to the place from which they were captured as tadpoles.

Media Enquiries: Allan Hansell 0412 403 334, Adam Olive 018 974 845



APPLICATION FOR AN AMPHIBIAN KEEPERS' LICENCE

Note: This form may be used to lodge an application for an Amphibian Keepers' Licence only during the period of amnesty which expires on 31 October 1997.

I, Date of Birth

(Print name in full)

of Postcode

(Print postal address)

Phone No: (.....) (Home) (Business Hours)

hereby apply for an Amphibian Keepers' Licence to authorise me to be in possession of amphibians at the following address:

.....
(Print full address of place where amphibians are held)

List below all of the amphibians which you presently hold. Species you may have in your possession which are listed in the Prohibited category, including species not listed for Class 1, 2 or 3, should be included and shown in the column titled "Licence Class" as "P". A separate licence will be issued to you to authorise your continued possession of those animals, but you will not be permitted to dispose of them without the prior consent of NPWS. If additional space is required please attach a separate signed and dated sheet.

Code No	Scientific Name	Common Name	Number Held	Licence Class

I declare that the above information is true and accurate and that I will not acquire any additional amphibians prior to the granting of an Amphibian Keepers' Licence to me. I enclose the fee of \$ for a Class Amphibian Keepers' Licence.

Signed Date

Forward application and fee (cheques/postal orders to be made payable to National Parks and Wildlife Service) to:

National Parks and Wildlife Service
PO Box 1967
HURSTVILLE NSW 2220



AMPHIBIAN KEEPERS' LICENCE

Native frogs (and tadpoles) are protected under the National Parks and Wildlife Act and it is against the law to take them from the wild or to have them in your possession without an appropriate licence from the National Parks and Wildlife Service (NPWS). The NPWS does allow private people to keep frogs as pets under a licensing and record keeping system which allows the NPWS to monitor what species are being kept, bred and traded amongst enthusiasts. A person who wishes to keep frogs may do so only if an Amphibian Keepers Licence (AKL) is held by that person. Frogs may be obtained from other people who legally hold them, but they are not allowed to be sold through pet shops.

The NPWS recommends that all frog enthusiasts join one or more of the amphibian or reptile organisations listed below. This will put you in touch with other people who have similar interests and who may have animals which may be traded among licensees. Benefits will also be gained from the knowledge, experience and expertise of other frog keepers and perhaps the opportunity to participate in field observation and research activities.

There are three classes of AKL as detailed below and an application form is attached.

EXEMPT SPECIES

No species are exempt from the requirement for a licence to hold or trade. However, a licence will not be required for the collection of small numbers of tadpoles by children and institutions for the purpose of observing metamorphosis from tadpole to frog. Persons who collect tadpoles for this purpose are expected to return frogs to the area from which the tadpoles were collected.

CLASS 1 LICENCE

The following common amphibian species are readily maintained in captivity by keepers with a basic knowledge of amphibian care may be held under a Class 1 AKL licence. A Class 1 Licence must be granted by the NPWS prior to obtaining any of these species and the licensee's records must be submitted to the NPWS annually. The Class 1 licence is issued for a period of two years and the licence fee is \$40.

Code	Scientific Name	English Name
U3018	<i>Cyclorana brevipes</i>	Short-footed Frog
Q3024	<i>Cyclorana novaehollandiae</i>	New Holland Frog
S3025	<i>Cyclorana platycephala</i>	Water-holding Frog
S3165	<i>Litoria alboguttata</i>	Striped Burrowing Frog
W3167	<i>Litoria bicolor</i>	Northern Dwarf Tree Frog
Z3171	<i>Litoria caerulea</i>	Green Tree Frog
U3174	<i>Litoria chloris</i>	Red-eyed Green Tree Frog
W3175	<i>Litoria citropa</i>	Blue Mountains Tree Frog
Q3180	<i>Litoria dentata</i>	Kerferstein's Tree Frog
U3182	<i>Litoria ewingi</i>	Ewing's Tree Frog
W3183	<i>Litoria fallax</i>	Eastern Dwarf Tree Frog
A3184	<i>Litoria freycineti</i>	Freycinet's Tree Frog

G3187	<i>Litoria gracilentia</i>	Dainty Green Tree Frog
K3189	<i>Litoria infrafrontata</i>	White-lipped Tree Frog
U3190	<i>Litoria jervisiensis</i>	Jervis Bay Tree Frog
W3191	<i>Litoria latopalmeta</i>	Broad-palmed Frog
A3192	<i>Litoria lesueurii</i>	Lesueur's Frog
Z3199	<i>Litoria nasuta</i>	Rocket Frog
A3204	<i>Litoria peronii</i>	Peron's Tree Frog
E3206	<i>Litoria phyllochroa</i>	Leaf-green Tree Frog
K3209	<i>Litoria rothii</i>	Roth's Tree Frog
U3210	<i>Litoria rubella</i>	Red Tree Frog
E3214	<i>Litoria tyleri</i>	Tyler's Tree Frog
G3215	<i>Litoria verreauxii</i>	Verreaux's Tree Frog
C3001	<i>Adelotus brevis</i>	Tusked Frog
W3131	<i>Crinia parinsignifera</i>	Eastern Sign-bearing Froglet
E3134	<i>Crinia signifera</i>	Common Froglet
G3135	<i>Crinia sloanei</i>	Sloane's Froglet
A3052	<i>Lechriodus fletcheri</i>	Fletcher's Frog
M3058	<i>Limnodynastes dumerilii</i>	Bullfrog
Z3059	<i>Limnodynastes fletcheri</i>	Long-thumbed Frog
A3060	<i>Limnodynastes interioris</i>	Giant Bullfrog
Q3112	<i>Limnodynastes ornatus</i>	Ornate Burrowing Frog
C3061	<i>Limnodynastes peroni</i>	Striped Marsh Frog
E3062	<i>Limnodynastes salmini</i>	Salmon-striped frog
G3063	<i>Limnodynastes tasmaniensis</i>	Spotted Grass Frog
Y3064	<i>Limnodynastes terraereginae</i>	Northern Bullfrog
Z3083	<i>Neobatrachus centralis</i>	Trilling Frog
U3086	<i>Neobatrachus sudelli</i>	Sudell's Frog
K3013	<i>Uperoleia capitulata</i>	Small-headed Toadlet
W3035	<i>Uperoleia fusca</i>	Dusky Toadlet
U3158	<i>Uperoleia laevigata</i>	Smooth Toadlet
G3151	<i>Uperoleia rugosa</i>	Wrinkled Toadlet
E3302	<i>Uperoleia tyleri</i>	Tyler's Toadlet

CLASS 2 LICENCE

A Class 2 Licence is available only to persons who are over the age of 18 years who can demonstrate a minimum of 2 years relevant amphibian keeping experience. A Class 2 licence must be obtained before any of the following species are acquired. A Class 2 licence permits the licensee to also hold species listed for a Class 1 licence. Records detailing all species held and all transactions must be submitted to the NPWS every twelve months. Class 2 licences are issued for a period of one year and the annual licence fee is \$50.

Y3020	<i>Cyclorana cultripes</i>	Knife-footed Frog
A3212	<i>Litoria splendida</i>	Magnificent Tree-frog
A3220	<i>Litoria xanthomera</i>	Orange-thighed Frog
G3029	<i>Geocrinia laevis</i>	Smooth Frog

M3074	Mixophyes fasciolatus	Great Barred Frog
Z3103	Paracrinia haswelli	Haswell's Froglet
C3117	Pseudophryne bibronii	Bibron's Toadlet
E3118	Pseudophryne coriacea	Keferstein's Toadlet
Q3120	Pseudophryne dendyi	Southern Toadlet

CLASS 3 LICENCE

Rare and extremely difficult to keep species. This class of licence is restricted to persons over the age of 18 years with at least 2 years relevant experience in keeping amphibians. A Class 3 licence must be obtained before any of these species are acquired. A Class 3 licence will also permit the licensee to hold species listed for Classes 1 and 2. Written notification of all transactions involving Class 3 species is required from both parties within 10 days of the transaction. Detailed records for holdings and transactions of all licensed species must be submitted to the NPWS on a common date each year. Class 3 licences are issued for a period of one year and the annual licence fee is \$120.

U3026	Cyclorana verrucosa	Rough Frog
U3166	Litoria aurea	Green and Golden Bell Frog
A3168	Litoria booroolongensis	Booroolong Frog
C3169	Litoria brevipalmata	Green-thighed Frog
G3039	Litoria littlejohni	Littlejohn's Tree Frog
G3003	Litoria pearsoniana	Pearson's Green Tree Frog
G3207	Litoria raniformis	Southern Bell Frog
Z3219	Litoria revelata	Revealed Frog
Z3007	Assa darlingtoni	Hip-pocket Frog
Y3128	Crinia deserticola	Desert Froglet
K3137	Crinia tinnula	Tinkling Froglet
S3033	Geocrinia victoriana	Eastern Smooth Frog
K3006	Geocrinia vitellina	Orange-bellied Frog
U3042	Heleioporus australiacus	Giant Burrowing Frog
W3107	Kyrannus kundagungan	Mountain Frog
A3108	Kyrannus loveridgei	Loveridge's Frog
C3109	Kyrannus sphagnicola	Sphagnum Frog
K3073	Mixophyes balbus	Stuttering Frog
Z3075	Mixophyes iteratus	Southern Barred Frog
E3098	Notaden bennetti	Holy Cross Toad
C3125	Pseudophryne semimarmorata	Southern Toadlet

PROHIBITED

The species listed may not be held under an Amphibian Keeper's Licence. These species may be held by:

- exhibitors licensed under the Exhibited Animals Protection Act, 1986; or
- researchers holding relevant licences and certificates under the National Parks and Wildlife Act, 1974 and the Animal Research Act, 1985; or

- persons holding another licence under the National Parks and Wildlife Act, 1974 which specifically authorises the possession of the species concerned.

Q3172	Litoria castanea	New England Swamp Frog
M3198	Litoria nannotis	Torrent Tree Frog
U3202	Litoria olongburensis	Olongburra Frog
K3217	Litoria piperata	Peppered Tree Frog
Y3208	Litoria rheocola	Creek Frog
G3195	Litoria spenceri	Spotted Tree Frog
E3186	Litoria subglandulosa	Glandular Frog
C3221	Nyctimystes dayi	Australian Lace-lid
Q3008	Mixophyes fleayi	Fleay's Barred Frog
A3116	Pseudophryne australis	Red-crowned Toadlet
G3119	Pseudophryne corroboree	Corroboree Frog
C3141	Rheobatrachus silus	Southern Gastric Brooding Frog
E3142	Rheobatrachus vitellinus	Northern Gastric Brooding Frog
Y3144	Taudactylus acutirostris	Sharp-nosed Torrent Frog
K3145	Taudactylus diurnis	Mount Glorious Torrent Frog
M3146	Taudactylus eungellensis	Eungella Torrent Frog
Q3148	Taudactylus liemi	Liem's Frog
G3143	Taudactylus pleione	Pleione's Torrent Frog
Z3147	Taudactylus rheophilus	Tinkling Frog

Plus all native amphibians not otherwise listed in Class 1, Class 2 or Class 3 species lists for the NSW Amphibian Keeper's Licence. These species may not be held under the Amphibian Keeper's Licensing System until such time as they may be assessed for classification.

AMPHIBIAN AND REPTILE KEEPERS' ORGANISATIONS

Statewide groups:

- Australian Herpetological Society - PO Box R79, Royal Exchange, Sydney 2000
- Frog and Tadpole Study Group - PO Box A2405, Sydney South 2000
- Reptile Keepers Association of NSW - PO Box 227 Gosford 2250

Regional groups:

- Central Coast Reptile and Frog Group - PO Box 828, Gosford 2250
- Hawkesbury Herpetological Society - PO Box 2, Whalan 2770
- Orana Herpetological Society - PO Box 809 Mudgee 2850
- Reptile and Amphibian Interest Group - PO Box 5013, East Lismore 2480

FURTHER ENQUIRIES

For further information on the Amphibian Keepers Licensing system please contact the National Parks and Wildlife Service, Wildlife Licensing Unit (Level 3, 43 Bridge Street, Hurstville) between 8:30am and 4:30pm Monday to Friday on phone 02 9585 6406 or 02 9585 6407 or fax 02 9585 6401. Written enquiries should be addressed to the Director-General, NPWS, PO Box 1967, Hurstville NSW 2220.



PREPARING FROGS' LEGS

In anatomic terms frogs' legs come close to perfection, allowing, as they do, frogs to launch themselves into dizzying leaps. But the food-loving French have fallen upon the poor frogs' leg as a delicacy. That peculiarity has led to the French being called frogs in the English-speaking world. Derogatory as the term may be it hasn't stopped the French from devouring the creatures. Frogs' legs are cooked variously with garlic and parsley, with tomato sauce or with cream. And the French eat so many that frogs have become scarce in French ponds or marshes. Never to be outdone when it comes to food, the French now import frogs from the Nile waters in Egypt or the swampy banks of the Euphrates in Turkey. It strikes nobody as odd that Africa and Asia have had to come to the rescue of French gourmets. Nor does anybody worry about the extra cost. Money is no object where the Frenchman's stomach is concerned.

A Frog In My Pocket

by Michael Mahony

WILDLIFE AUSTRALIA, SPRING 1992

It's always interesting to ask a married couple who proposed. According to the romantic tradition, the man is supposed to pop the question. According to Charles Darwin's theory of sexual selection, however, it is generally the female who chooses her mate. Biologists have theorised that the sex which makes the greater investment in offspring is the sex which chooses, while the other sex must compete to be chosen.

The theory of sexual selection through male competition has been widely accepted. The male Bird of Paradise, for example, uses incredible plumage and seductive displays to compete against other males for a mate. The outcome is not death to the loser, but fewer or no offspring. The successful male not only wins the female; he passes on his genes through her young.

Female choice in sexual selection is perhaps less noticeable, but at the most basic level, because eggs require more energy to produce than sperm, females are generally the sex which chooses a mate. They are often the sex which rears the young as well.

Sex and the Hip-pocket Frog

What has all this got to do with the Hip-pocket Frog (*Assa darlingtoni*)? In this species, the male frog invests a great deal in the upbringing of his offspring. Therefore, the theory predicts the sex roles should be reversed. The females should compete to be chosen and the male should choose.

Parental care is not common in frogs, but where it occurs, the female is generally responsible. Indeed, we tend to assume that whenever parental care occurs, it is the female's role. The unusual feature of male parental care drew us to examine closely the sex life of the Hip-pocket Frog.

The Hip-pocket Frog is the only species of frog in the world which carries its developing tadpoles in pouches on either side of its body. These pouches open at small slits in the groin; hence the frog's common name. It is the male Hip-pocket Frog, not the female, that has these pouches and cares for the young.

Reproductive biology

A brief outline of the reproductive biology of the Hip-pocket Frog is as follows:

- A female with ripe eggs is attracted to a calling male.
- She lays the small clutch of eggs (usually about 9-16) in the moist leaf litter and the male sits nearby guarding them.
- After ten days, the eggs hatch. The male straddles the egg mass and the tadpoles wriggle from their jelly capsules into his pouch openings.
- The tadpoles grow to metamorphosis in the pouch and emerge as young frogs 28-32 days later.

Calling

Our observations, taken in the rainforests of the Border Ranges National Park, New South Wales over a period of six weeks in the summers of 1990-1991 and 1991-1992, revealed that male Hip-pocket Frogs call vigorously to attract females. They also call to establish territories. After spring and summer rains, males will call for several hours in the early evening and again before dawn. They may also call intermittently during the day.

Males show a high level of calling site fidelity. Some have been observed calling in the same site for over 14 days. They also form choruses. In some instances, groups of five to six males may share a square metre of forest floor. Neighbours synchronise their calls and at other times alternate with one another.

Ladies' choice

On seven occasions, we observed a female which we knew to be ripe with eggs approach a group of males. On each occasion, the female moved towards one particular male, often bypassing other calling males. It should be pointed out that the forest floor is covered in a deep layer of leaf litter, and the movement of a small female towards a mate could be more aptly described as a search. These frogs are remarkably camouflaged, and it requires great patience to watch a group carefully.

When the female finds the male, she immediately jumps on top of him. A small wrestle occurs. The male moves to couple with the female by holding her firmly around the waist with his arms. Once coupled, the pair move off to find a suitable location to deposit the clutch of eggs.

There was no evidence that the male inspected or chose the female. For the males to make choice, females would need to vary in some way. We saw no evidence of selection for any quality. Our quest, it seemed, was in vain. The males competed by establishing territories and calling to attract a female. The female then chose the male. There was no evidence the sex roles had been reversed.



The Hip-pocket Frog

The energy question

But our story does not end here. Just when we thought the Hip-pocket Frog behaves like most other frogs, at least in attracting and selecting a mate, we noticed that some of our calling males were already carrying offspring. We had presumed that once a male was carrying young, he would hide away under the leaf litter and not advertise his location. A male carrying young is considerably enlarged and less likely to be able to escape predators. Furthermore, he has a great deal at risk: his own life, and that of his offspring.

There is evidence, also, that calling consumes a considerable portion of the energy budget of frogs. Why then do we find so many males already carrying offspring, yet continuing to call? Even if our assumption about the dangers of predators were invalid, why expend the energy?

Tantalising twist

We have some tantalising evidence, but our observations are too few for firm conclusions or generalisations at this stage.

One male who had already successfully attracted a female and was guarding a developing clutch of eggs continued to call. He attracted a second female, and fertilised a second clutch. Does the male choose which of the two clutches he should carry—for example, the larger clutch? Or does he play a more cunning game, picking up as many young from the first clutch as possible and then as many as possible from the second clutch because that maximises his genetic input into the next generation?

Several pieces of evidence suggest he does the latter. Firstly, not all eggs develop at the same rate. Also, at hatching, some tadpoles are stronger than others. We have often observed that a few fail. Only the most vigorous enter the male's pouches. Secondly, we have found males carrying clutches of differing ages.

Does this evidence support the proposition that since the male invests so much towards his offspring, he does have a choice—a choice based on the reproductive quality of a female as measured by the number and vigour of eggs she has laid?

More questions

Why does this frog carry its young? How did such a system evolve? Are the forces that led to male parental care the same forces that maintain it today? The above discussion has focused on the male. It is equally instructive to ask similar questions about the competition between females and their choice of partners. So many questions remain about the life history of this frog.

The Hip-pocket Frog is a secretive animal and difficult to observe. The work reported above would not have been possible without the assistance of a most wonderful bunch of volunteer observers and the sponsorship of the international research organisation Earthwatch.

Michael Mahony graduated in 1986 with a doctorate in biology from Macquarie University. His postgraduate studies investigated the cell genetics of the Australian ground frogs, and he continues to study the genetics of desert burrowing frogs as a major research topic. His main interests lie in the study of evolutionary biology, with emphasis on Australian fauna.

By TERRY PLANE

DO respondents in the frog census answer in French? Well may you ask, but it is not a question they are expected to answer. Instead, all they have to do is croak.

When they do, with any luck, one of a thousand or so census collectors will be on hand, tape recorder at the ready.

It is Frog Week in South Australia and volunteers are hanging around creeks, drains, swamps, rivers and any other dank spot where a frog might spend its days.

The census collectors are armed with a frog census kit, the key element of which is a tape recorder. At the end of the week, collectors will return their kits to the Environment Protection Authority for assessment.

That's the hard part: assessors pick species present at a particular habitat, and the abundance of frogs, by ear.

Anyone who has tried frog-catching as a child will know that frogs respond to each other, so once you get one croaking, others in the area tend to speak up. And each species has a distinctive call.

It is the fourth annual frog census. Co-ordinator David Gooding says the EPA isn't looking for specific numbers of frogs, but whether frog populations are increasing or declining.

Last year, 786 sites were monitored, with 22 per cent showing an increase in species and 45 per cent a decrease over the previous year. But 12 of the 28 known species in the State were recorded last year, compared with 11 in 1995.

Most of the data is collected in and around Adelaide. There are few volunteers for desert regions, where several of the 28 known species live, so there is no information on them.

"The main objective of the census is to get the community involved in protecting our waterways," says Mr Gooding.

Many of the volunteer collectors belong to school or conservation groups. Numbers are growing every year. "The community has really taken hold of this project," he says.

Frogs are useful environmental indicators because they are the highest life-form that lays eggs in the open in aquatic environments. Pollutants in waterways tend to come into contact with developing embryos, resulting in death, deformity or behavioural abnormalities.

It also means frogs are sensitive to habitat degradation.

From the census, EPA officers determine which wetland areas are being degraded and then "work with community groups to rectify the problems", Mr Gooding says. "Obviously the major areas of concern are around industrial sites.

"The census involves a simple assessment of the health of aquatic environments by assuming that healthy habitats provide suitable conditions for diverse and abundant frog populations. It's a useful snapshot."



