The Australasian Bat Society Newsletter

Number 10 March 1998

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Editorial & farewell

This is my last newsletter as Editor. After Rockhampton 1998 you'll have a new one, along with various other new Executive members. I recall saying when I took on this job that a couple of years was long enough. That time has arrived, and I look forward to seeing the newsletter continuing its development under the guidance of a new Editor, with new ideas.

Looking back over the last couple of years, I'm proud to have established a record of regular publication of the newsletter - two per year. This frequency is enshrined in our new constitution, and I think it reflects as well as promotes a healthy society to get our newsletter out reliably and in a timely way. I'm also proud of the diversity of papers and notes we've been able to bring in for members' edification. Perhaps particularly the high quality updates/articles on viruses in this edition and the last are amongst the most important, but the reporting of ecological and conservation work has been important too. My time as newsletter editor coincided with the widespread and routine implementation of bat detectors for survey in Australia, and for a while there we carried some of the debate about hardware, methodology and "brand allegiance"!

I'd like to thank everyone who has helped me during my term as Editor, but will single out a few people in particular, starting with contributors.

- Many of you would have experienced my editorial efforts at getting members to write for the newsletter - no easy matter let me assure you! Ken Sanderson never needed much prompting, and I think it's safe to say that I've built each of my newsletters so far around Ken's reliable, early contributions. Of course I'm grateful to all others who contributed too.
- David Hosken and Brad Law, those shameless self-promoters, have taken to supporting the "recent literature" section with great gusto. I'm sure others of you publish too, but you should really consult David and Brad for some hints on how to get noticed!
- In terms of support, both moral and advisory, I'd like to single out Greg Richards and Terry Reardon for special mention. Thanks guys.
- Jillian Snell has unfailingly translated my master copies into printed, collated and mailed newsletters. A big task, aided I'm sure by other members of the Ku-ring-gai committee. Thanks to you all.

Farewell from me as Editor, but look out for me on the ABS web page. I'll still be on the prowl for members contributions!

Lawrie Conole

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The Bargain Basement Harp Trap: a Variation on the Theme.

Chris Clague
Vision Touch and Hearing Research Centre
Department of Physiology and Pharmacology
University of Queensland

The presented design is a cheap ($30 to $60) alternative to popular designs, which can be constructed with minimum tool use and minimal skill. The design is that of Palmeirim and Rodrigues (1993) with a few basic modifications to create a design which is flexible in size and shape and potentially more suited to Australian conditions. The principle remains the same as was developed by Constantine (1958) which has been echoed in subsequent designs (Francis, 1989; Kunz & Anthony, 1977; Petit *et al.*, 1994; Tidemann & Loughland, 1993; Tidemann & Woodside, 1978; Tuttle, 1974).

This design remains permanently strung and folds using a parallelogram style motion. The trap can be virtually any size and can carry an almost unlimited number of string decks. Thus the trap is cheap, portable, quick to erect and easy to construct.

Advantages of this design

- Cheapness allows more trap area for the dollars and therefore a greater trapping effort is possible (more intense sampling). (Mills *et al.*,1996)
- No bottom bar to prevent bats falling into the bat bag.
- Robust
- Can be transported in roof top tubes
- Canopy sampling
- No trap hips
- Multiple string decks easily created with the addition of a greater number of string carriers

Disadvantages

- Difficult to equal quality of commercially available traps
- Heavy, especially if use steel construction
- Difficult to set legs for.

Trap Construction

Please refer to the figure to aid in understanding the construction of this trap.

Cut the aluminium string holders to length (a maximum length of 2 metres is recommended), then tape them together. Drill ¼ inch holes for the threaded rod, then using a 3/16 bit drill the holes for the strings, a string gap of 25mm is recommended. Using a larger drill bit twist in the drilled holes by hand to remove any burs which may damage the nylon lines. If the trap is of steel construction and a drill press is not available, hold the taped together pieces in a vice and use a hack saw to notch the top and bottom to the carriers to create grooves for the strings.

Construct the bag carrier from flat bar steel or aluminium. The length of the bag carrier will depend on the trap bag size and the number of string decks being used. The bag carrier will need to be notched at either end for the bag rods and will also need a ¼ inch hole drilled through its centre for the bolt which attaches the carrier to the trap frame.

Cut the angle iron to length (or have your metal supplier do this for you) and drill ¼ inch holes in the top and bottom for the threaded rod, the bag carrier and the suspension hook mount.

Cut the threaded rod to length, this length will depend on the number of string decks being used and the distance between the decks. When cutting the threaded rod always have a nut on either side of the cut, this saves the thread.

Place the threaded rod through the angle iron and secure into place with nuts. Place nuts onto the threaded rod to hold the string carriers the desired distance apart. On one of the top string carriers mount the top threaded rods and lock into place with a bolt on either side. Place this string carrier onto the end of the threaded rod which passes through the angle irons and lock into place with a washer and wing nut. Place the lower string carrier for the same side on the bottom threaded rods on the angle irons. Repeat this procedure for the other side string carriers. Now attach the trap suspension hooks and elevate the trap from a rope or clothes line. Attach the bag holder with a bolt through the angle iron. True up the trap with the addition of extra threaded rod or through the tightening of the existing nuts and wing nuts. The trap is now ready to string.

Bag Material

The bag is best constructed from 80% shade cloth, which is cheap, durable, light and allow free drainage of water. In three years of use this material is yet to show signs of rotting. The bag has it's ends and sides covered with clear gardening plastic. The bag rods can be quickly and easily made from 11mm PVC conduit. See Tidemann & Woodside (1978) for a pattern for bag construction. This pattern is very successful and can be adapted to suit traps of varying size and numbers of decks.

String Material

Use 3kg light tackle game fishing line as fine and yet strong enough for larger species such as the Diadem Leafnosed-bat *Hipposideros diadema*. The most efficient method for string attachment is through the use of a locked half blood knot.

Trap Setting

Palmeirim & Rodrigues (1993) style legs do work but the weight of the trap, if larger than the original design or if constructed from steel makes their usage difficult, as the trap tends to try and fold itself down. Thus it is recommended to use hooks and suspend the trap from a rope.

Regularly sampled sites can have semi-permanent attachments for ropes to hang traps from, thus extremely quick trap placement and hanging. A rope with rubber tire inner tube (for tree protection), with the use of a "truckies" hitch for tensioning the rope can be a quick and effective method of trap placement.

A tent pole secured in the ground can make an efficient trap leg, especially if they are attached within the angle of the vertical angle iron. This attachment to the trap can be made permanent. The use of telescopic tent poles can allow varying trap heights to be utilised.

The size of the folded trap (due to its parallelogram action) is dependent on the size of the trap and whether angle iron or parallel verticals are used. Most traps should fit into a PVC tube which can be carried on vehicle roof racks.

Discussion

The concept of a trap folding in a parallelogram manner at first may seem unusual but it works very efficiently, often causing amazement among fellow bat workers. This method of erection as well as the permanent nature of the strings allows trap setting to be rapid (with practice).

The author feels that trap catch area height should not exceed 1.5 metres. It is tempting to increase deck height to sample higher flying bats. The bats do encounter the trap, but tend to escape as they slide down the strings. I would recommend using elevated canopy sampling traps, using the methods adopted by Olivia Whybird. These methods include using canopy lines to "winch" traps to the desired elevation or using multiple interlocking legs to raise the trap.

The use of multiple strings has been suggested and trialed by several authors (eg. Petit *et al.* 1994; Francis, 1989) and has the potential to increase the efficiency of harp trapping. Traps with three or four string decks can be easily constructed using this basic design, allowing much experimentation to be cheaply undertaken using variations on deck and string spacing. There is little published work currently available on such trials.

The materials from which this design can be constructed vary from the usage of flat bar steel to aluminium and beyond. A 1 x 1.25 metre catch area trap cost less than $30 when constructed using flat bar steel the same sized trap using aluminium string carriers would cost around $45 dollars. Aluminium has the advantages of being not only lighter than steel but it is also much easier to "work". Further option on this trap design include:

- entire aluminium construction,
- aluminium string carriers with flat bar sides, and
- aluminium string carriers with angle iron sides.

I would encourage anybody whom tries this design and can suggest improvements or modification to publish this information to allow a greater spread of knowledge on this method of bat capture.

I have now constructed two traps based on the Palermeirim and Rodrigues design and the modifications listed above. These traps have been used on only a couple of occasions but have already captured six bat species including the Flores Murina *Murina florium.* I am intending on constructing a number of these traps to enable my sampling to be at an intensity suggested by Mills *et al.* (1996).

References

1. Constantine, D.G. (1958). An automatic bat collecting device. *Journal of Wildlife Management* **22**(1):17-22.
2. Francis, C.M. (1989). A comparison of mist nets and two designs of harp traps for capturing bats. *Journal of Mammalogy* **70**(4):865-870.
3. Kunz, T.H. & Anthony, L.P. (1977). On the efficiency of the Tuttle bat trap. *Journal of Mammalogy* **58**(3): 309-315.
4. Palmeirim, J.M. & Rodrigues, L. (1993). The two minute harp trap for bats. *Bat Research News* **34**(2&3):60-64.

5. Petit, S., Pors, L., Surrel, M. & Petit, J. (1994). Capture of a nectar-feeding bat species with a modified harp trap. *Bat Research News* **35**(2&3):62.
6. Mills, D.J., Norton, T.W., Parnaby, H.E., Cunningham, R.B. & Nix, H.A. (1996). Designing surveys for microchiropteran bats in complex forest landscapes - a pilot study from south-east Australia. *Forest Ecology and Management* **85**:149-161.
7. Tidemann, C.R. & Loughland, R.A. (1993). A harp trap for large megachiroptera. *Wildlife Research* **20**:607-614.
8. Tidemann, C.R. & Woodside, D.P. (1985). A collapsible bat trap and comparison of results obtained with the trap and with mist nets. *Australian Wildlife Research* **5**:355-362.
9. Tuttle, M.D. (1974). An improved trap for bats. *Journal of Mammalogy* **55** (2): 475-477.

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The 10 minute/2 dollar Bat House

Chris Clague, Olivia Whybird & Mike Trennery
PO Box 9
Millaa Millaa 4886 Qld
E-mail: <phoniscus@internetnorth.com.au>

The construction of bat houses have been covered in many publications (eg. Needham, 1995). These bat houses range for the basic to the elaborate, but generally seem to take the form of a modified bird house. After a recent survey of a revegetation area (Clague & Whybird, 1997) where a lack of hollow roosting bats was noted it was decided to construct some bat houses. The cost of materials and the amount of labour for the construction of conventional bat houses precluded their use. The weight of a "standard" bat house was also of concern as the largest trees in the revegetation area were quite small (dbh 10-20cm).

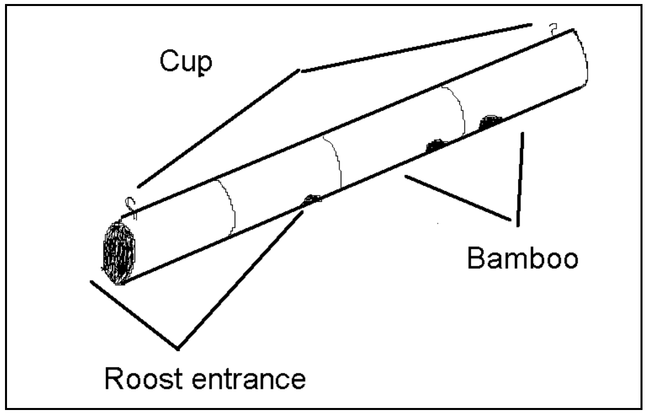
A design was arrived at which provided artificial hollows to both bats and other creatures, the other target inhabitants included rodents (*Melomys* spp.), spiders and geckoes. All of which were considered to make a positive contribution to the pest management and biodiversity of the plot.

This design was very basic and roosts were able to be constructed in a matter of minutes. The design is as follows.

Materials

- large diameter bamboo (>13cm diameter)
- wood saw
- drill with a 1 inch bit
- cup hooks
- wood rasp
- panty-hose

Construction



Cut the bamboo into lengths containing up to 4 chambers, ensure that you cut one end to provide an end hollow (refer figure). Drill one hole into each chamber using the 1 inch bit. Roughen the area around the holes with the wood rasp (rasping the upper-side will hasten accelerate the bamboo rotting). Attach the cup hooks so the holes in the bamboo face downwards. Using the panty-hose to protect the tree, attach the completed roost.

This multi-chambered design offers a range of microhabitats for a variety of animal species. These roosts have only been installed for a six months. They have already been occupied by Queensland Long-eared Bats *Nyctophylus bifax* and Large-footed Myotis *Myotis macropus richardsi*.

Such a cheap and quick design enables an area to be saturated with roosts facing differing aspects set on differing angles and at a variety of heights. These roosts can also be bound together to form a cluster or used singularly.

The advantages of this design are:

- Cheap
- Light
- Bamboo is readily available from botanical gardens (during pruning season)etc.
- Able to construct roosts quickly with minimal of tools
- Able to saturate an area with roosts
- Bamboo is extremely durable and each roost should last several years.

If you should choose to use this style of roost we would like feedback on the problems and successes encountered.

References:

1. Clague, C. & Whybird, O. (1997). *A survey of the bat fauna of the Pelican Point re-vegetation project*. Report to Trees for the Atherton and Evelyn Tablelands.
2. Needham, B. (1996). *Beastly abodes: homes for birds, bats, butterflies and other backyard wildlife*. (Sterling: New York).

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RFI: National estate values, long term study sites.

Martin Denny
Tel: (02) 6336 2244
E-mail: <mtking@ozemail.com.au>

I have been asked by Environment Australia to assess sites within eastern New South Wales on the basis of their National Estate values, particularly as research, teaching and/or benchmark sites. I am interested in finding out about any long-term study sites used by members of your Society.

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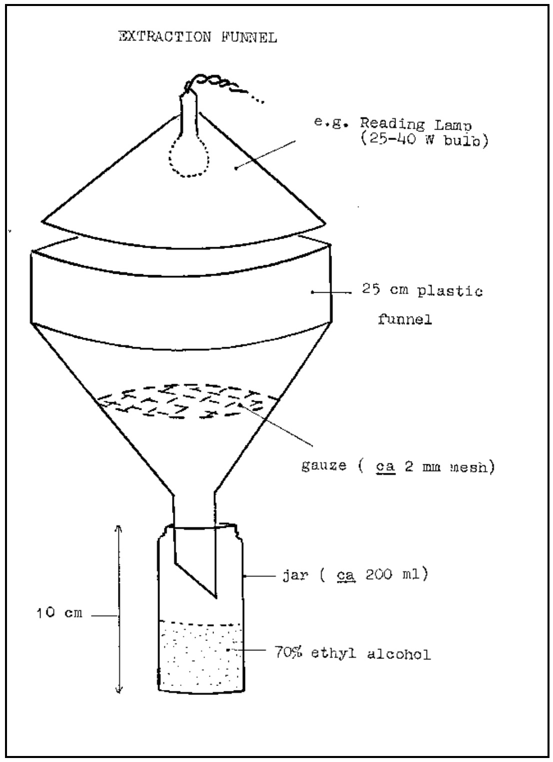
RFI: Bat fleas

Professor R.L.C. Pilgrim
Department of Zoology,
University of Canterbury
Private Bag 4800
CHRISTCHURCH, New Zealand.
E-mail: <Pilgrim@zool.canterbury.ac.nz>

All animal species are infested with parasites of one sort or another. Internally, they are invaded by worms of various kinds inhabiting gut, muscle, blood, and indeed most soft tissues; by microscopic Protozoa; and by a variety of arthropods. On the outside, they commonly harbour ectoparasites - mostly arthropods such as mites, ticks, and a great range of insects. Among the latter are fleas, which are widely distributed on warm-blooded animals only; about 5% of the known 2,500 kinds of fleas are parasites of birds, the remainder are found on mammals. The life cycle of a flea comprises an egg, from which hatches a small (1-2 mm) pale, legless "maggot-like" larva; this moults twice into increasingly larger stages and finally (at some 5-8 mm) spins a cocoon inside which it moults once more, transforming into a pupa. Within the pupa, the final adult stage is reached by a profound transformation of the pupal tissues. The adult (male or female) remains within the cocoon until stimulated to emerge by the physical disturbance and warming by a nearby potential host victim; the now very hungry adult emerges rapidly, seeks out the host and proceeds to feed by piercing the skin and penetrating a blood vessel to suck blood. Only this, adult, stage of the flea is strictly speaking parasitic; the larva, the only other feeding stage, gains its nutrition from detritus of various kinds in the hosts' nests.

Many bats carry fleas. Among the roughly 950 species of bats, there have been described around 100 species/subspecies of fleas. These all belong to the Ischnopsyllidae - a family of fleas known only from bats. Their larvae live in the guano and other debris on the floor of the roosting area. Some bat species are known to carry 2 or even 3 different fleas, while some species of flea may be found on several bat hosts, though not necessarily in the same area. Not all bats have been found to be flea hosts, but there are probably unknown fleas awaiting discovery; solitary bats with no regular roosts do not have fleas.

But, just as adult bat fleas show structural differences from other fleas, so too do their larvae differ in some remarkable aspects. For example, the setae ("hairs") on much of the body surface of bat-flea larvae, instead of tapering to a fine needle-like tip as in other flea larvae, are swollen into a thin-walled bulb. This is not seen anywhere else among flea larvae and must surely have some significance related to life among guano-laden nest debris? Does the bulb act as a site for the uptake of nitrogenous substances from the guano and so perhaps act as an accessory food supply, or does it function to regulate the water and/or salt content of the larva's blood? The setae are hollow and the contents of the bulb must be in communication with the body fluids of the larva. At present, this all remains an open question, as no research has been carried out on these possible functions.



My personal research work is concerned with the description of flea larvae, from all types of bird and mammal hosts from around the world. From this, I am constructing a KEY to identify flea larvae without requiring the presence of accompanying adult fleas. From the known *circa* 100 kinds of bat fleas, I have been able to obtain larvae of only 4 genera (including about 10 species), so there are many more which I would like to examine; both the number and the pattern of the bulb-bearing setae vary among the larvae I have already seen, and this will be an important factor in constructing the KEY; but what is the pattern in other bat-flea larvae? For this study, I need the co-operation of persons who are in a position to collect from the debris in bat roosts. A few 'handfuls' of such material, placed in a Berlese Funnel is the most convenient way to extract both adult fleas and their larvae. [Such extracts will also contain other associated nest fauna (mites, fly and beetle larvae, etc), but it is not necessary to sort these components out unless they are wanted by the collector].

If anyone is prepared to do this, I will be extremely grateful and will acknowledge receipt of any collection(s) received. Please send *at least some adult fleas* from the same collecting site -- they help in the preliminary identification of the larvae. I shall be pleased, and excited!, to receive material for my researches from **identified bat colonies** (including Fruit bats, *Rousettus*); most of my limited material at present comes from Europe (including England), U.S.A. (one species), and most recently, thanks to devoted efforts on the part of Jane Sedgeley and Colin O'Donnell, some specimens from the New Zealand native Long-tailed Bat (*Chalinolobus tuberculatus*). There are many bats in Australia, Africa, Asia, and the Americas which are untapped, yet, for flea larvae; and the European scene is by no means exhausted!

Suggestions for extracting flea larvae from debris

Flea larvae live as scavengers among the debris in the nests/lairs/roosts of their host mammal or bird. They are quite readily recoverable in a Berlese Funnel, or similar thermo-extractor.

The procedure I have found effective is to collect a few handfuls of the debris into a plastic bag. Seal the bag to prevent escape of the fauna (*but not too tightly*; some air space should be included if the sample cannot be processed immediately). Do not allow the bag to become heated; if delay is expected before processing can begin, keep the bag cool but do not freeze it.

Spread the sample over the gauze in the funnel, having at first a *dry* container beneath the spout: the initial fine material which falls though can be carefully returned to the funnel later -- this avoids overloading the final, alcohol-containing jar with dirt and rubbish. When no further disturbance will be made, replace the dry container with one containing 70% ethyl alcohol to a depth of *ca* 50 mm. Arrange a heat source (25-40 W electric lamp) above the debris and *leave undisturbed for 3-4 days*.

The entire extract can be sent without further sorting (if you wish to have the associated fauna, it will be returned on request);

OR

the extract can be sorted to separate the fleas and flea larvae. ***Please send both larvae and adults***, if the latter appear in the extracts - they are valuable as indicators of the possible identity of the accompanying larvae.

If no larvae appear in the extract, dead specimens may sometimes be extracted by standard flotation methods, or the debris may be sieved and larvae recovered from the lower sieves or in the receiver tray.

For posting, it is preferable to use small *plastic* vials/tubes. International Customs Declaration forms should show the following information:

"Preserved Insects, for Scientific Study"

"N.C.V." *

* N.C.V. = No Commercial Value

Send extracts to:

Professor R L C Pilgrim
Department of Zoology,
University of Canterbury
Private Bag 4800
CHRISTCHURCH, New Zealand.
FAX: 03-364-2024.
E-mail: <Pilgrim@zool.canterbury.ac.nz>

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RFI: Flying-fox scat morphology

"Large bats, such as the flying-foxes, produce scats that accumulate on the ground at their camps, forming a shapeless mass. Firm scats are occasionally produced, but generally the soft fruit in the diet of these bats makes the waste material wet and formless." (Triggs 1996: 177).

Having made numerous visits to eight flying-fox colonies in New South Wales, I would not describe flying-fox scats as 'accumulating on the ground'. At any given time there are droppings beneath the roosting flying-foxes but these degrade quickly and disappear into the soil.

Several years ago the Ku-ring-gai Bat Colony Committee Inc was asked for photographs of the dung heaps under flying-fox colonies for publication in a secondary school text. I redrafted the section of text to emphasise the ecological roles of these mammals and loaned a photograph of a Grey-headed Flying-fox. We were never advised of the outcome of our contribution.

I would appreciate the views of other bat watchers on whether flying-fox scats can be said to accumulate on the ground. I look forward to your views in the next newsletter.

Reference:

Triggs, B. (1996). *Tracks, Scats and other Traces. A Field Guide to Australian Mammals.* (Oxford University Press: Melbourne).

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Latest Queensland Department of Primary Industries (QDPI) research findings on Australian Bat Lyssavirus and Equine Morbillivirus.

Kim Halpin & Hume Field
Queensland DPI-Animal Research Institute (ARI)
Locked Bag 4
Moorooka 4105 Qld

Australian Bat Lyssavirus Infection In An Orphan Black Flying-fox *Pteropus alecto*.

Queensland DPI has recently confirmed Australian bat lyssavirus (ABL) infection in an 8 week old orphan Black Flying-fox. This apparently healthy animal was in care for five weeks before it suddenly developed neurological signs reported as agitation, aggression toward it's mate, persistent crying, 'spasms' with back arching, and frothing at the mouth. There was some temporary improvement before the animal died seven days after onset of symptoms. Virus was detected in the brain tissue and in salivary gland tissue. The cooperation (and record-taking) of members of the carer group *Orphan Native Animal Rear & Release* (ONARR) deserves acknowledgement.

Equine Morbillivirus Antibody Surveillance In Orphan Flying-foxes In South-East Queensland.

One epidemiological objective of Queensland DPI's screening of flying-foxes for antibodies to equine morbillivirus (EMV) is to compare antibody prevalence in different age classes of flying foxes.

In February 1997, with the cooperation of *Orphan Native Animal Rear & Release* (ONARR), we undertook serological testing of orphan flying foxes for the presence of antibodies to EMV. ONARR had a total of 124 orphan flying foxes in care from the 1996 season - 83 *Pteropus alecto* and 41 Grey-headed Flying-foxes *P. poliocephalus.* As the animals were creched (in several groups), each was microchipped, weighed, forearm measured, and a blood sample taken.

Overall, 59 orphans (47.5%) tested positive for antibodies to EMV by serum neutralisation test (SNT). This finding identifies a significantly higher EMV antibody prevalence in orphan juveniles than in other age classes. Further, antibody prevalence was significantly different in *P. alecto* orphans (57%) and in *P. poliocephalus* orphans (29%).

But were these antibodies a result of active infection in the perinatal period, or were they passively transferred to neonates via maternal colostrum? And why the difference between species? We are currently working to answer these questions.

An Update Of Equine Morbillivirus (EMV) And Australian Bat Lyssavirus (ABL) Prevalence In Flying-foxes In Queensland.

Preliminary results of Queensland DPI research indicates that the prevalence of both equine morbillivirus (EMV) and Australian bat lyssavirus (ABL) varies with species. For example, for EMV, antibody prevalence in south-east Queensland flying foxes is 41% in *Pteropus alecto,* 23.5% in *P. poliocephalus*, and 6.5% in the Little Red Flying-fox *P. scapulatus.*

For Australian bat lyssavirus, disease prevalence in flying foxes on a Queensland-wide basis is 5% in *Pteropus alecto*, 2% in *P. poliocephalus*, 10.5% in *P. scapulatus* and 1% in the Spectacled Flying-fox *P. conspicillatus.*

While it is probable that these figures are an over-estimate of the true wild population prevalence (as the sample includes 'rescued' sick and injured animals), they are likely to represent the true prevalence in those animals that wildlife rescuers and carers come in contact with.

Analysis of the effect of geographic location of the prevalence of both EMV and ABL is currently underway.

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Bat Studies at Naracoorte, South Australia, using Infrared Video Cameras

Ken Sanderson
School of Biological Sciences
Flinders University of South Australia
GPO Box 2100
Adelaide 5001 South Austraila
Email: <bikjs@cc.flinders.edu.au>

In 1997 honours student Jon Codd spent about 3 months at Naracoorte (from late February to early June with some breaks in Adelaide) observing bat activity in Bat Cave. Jon watched the activity of Common Bentwing-bats, *Miniopterus schreibersii*, with the infrared video cameras which allow observation of bats in complete darkness. Bat Cave has 4 cameras installed. Bat activity was classified into a number of categories: flying, roosting, grooming, alert, and crawling over the surface of the cave. During the daylight hours the predominant activity was roosting, though some bats were flying around. In the hour or two before bats emerged from Bat Cave for their nightly foraging activity, many more bats became active. Jon monitored bat activity at all hours of the night and day - on a rolling observation schedule where there were 2 hour blocks of observation twice a day, taken 2 hours later each day, for a total of 240 hours of observation. During the night there were always some bats present in the cave, though most were outside.

On the Saturday of the Anzac long weekend in April, Terry Reardon, Ken Sanderson and Nick Birks assisted Jon with bat studies. About 5:30 pm we set up a harp trap about 50 m inside the entrance to Bat Cave, and Nick set up his photographic equipment. In the hour between 6 and 7 pm, when most bats left the cave, a team of 3 (Terry, Jon & Ken) removed bats from the harp net, trimmed their fur and applied a reflective sticker to their heads, until we had marked 45 bats. We marked 15 males with a rectangular tag, 15 mature females with a square tag and 15 juvenile females with a triangular tag. During the next 10 days, Jon was able to monitor the activity of some of these marked bats, until all the tags had fallen off. Some of these marked bats were found in the same cave locations over the course of several days, suggesting that they occupied particular locations.

Jon's observations at Bat Cave Naracoorte concluded in early June 1997, when most bats had left the cave, and fewer than 50 bats were present. Jon and his helpers (Steve Bourne, Greg Johnston & Nick Birks) also visited other caves in the South East during the year and found several thousand bats in two of these caves in mid-May.

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Don't believe all you read.

Nancy Pallin
45 Highfield Rd
LINDFIELD NSW 2070
<pallin@bigpond.com>

The following excerpt was shown to a member of the Ku-ring-gai Bat Colony Committee Inc., intimating that she really did not know all there was to know about bats. Fortunately, we could check with a higher authority, the ABS, to confirm what we thought we already knew, that this was a load of rubbish.

"*Bats. Thousands of them live in caves; sometimes the guano below the roof is two and a half metres deep. Australia has one blood-sucking bat that inhabits the Wilson River area in central Queensland.*"

This quote was taken from page 132 of "*Beyond the Bitumen*" by W.A. Winter-Irving, in an edition published in 1995 for Hinkler Book Distributors. First published by Rigby Publishers in 1971.

Sadly publishers of such books would not realise the damage such an inaccurate statement can make. We will advise the publisher of our concerns.

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The Australasian Bat Society on the World Wide Web - revamped web page

We have a newly revamped web page which you can find at:

http://www.batcall.csu.edu.au/abs/welcome.html

Note that there are various new sections, and also opportunities for members to contribute text and images to keep the site fresh and up-to-date. Contact the webmasters, Lawrie Conole <ocoineoil@bigpond.com> or Alexander Herr (Herry) <aherr@csu.edu.au>, to find out how you can help.

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Recent literature

Compiled By Grant Baverstock <gbaverstock@geelongcity.vic.gov.au>

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- Hosken, D.J. (1997). Reproduction and the Female Reproductive Cycle of *Nyctophilus geoffroyi* and *N.major* (Chiroptera : Vespertilionidae) from South-western Australia. *Australian Journal of Zoology* **45:** 489-504

- Hosken, D.J. (1997). Thermal biology and metabolism of the greater long-eared bat, *Nyctophilus major* (Chiroptera:Vespertilionidae). *Aust.Journal of Zoology* **45:** 145-156

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Organisers

David Gee
P.O. Box 189
Gol Gol NSW 2738
ph (03) 50 248 708
fax (03) 50 213 328
E-mail: <dgee@mildura.net.au>

Mary McCabe & Dianne Vavryn
64 Wentworth Terrace
Rockhampton Qld 4700
ph (079) 34 2788
ph (079) 27 1051
<vavryn@networx.com.au>

IF YOU WISH FURTHER INFORMATION ABOUT THE CONFERENCE OR WISH TO RECEIVE THE REGISTRATION FORMS, PLEASE CONTACT DAVID GEE.

Contact can be made either by telephone or email or ordinary mail.

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