

DO WE DO ENOUGH ENRICHMENT FOR AUSTRALIAN MAMMALS?

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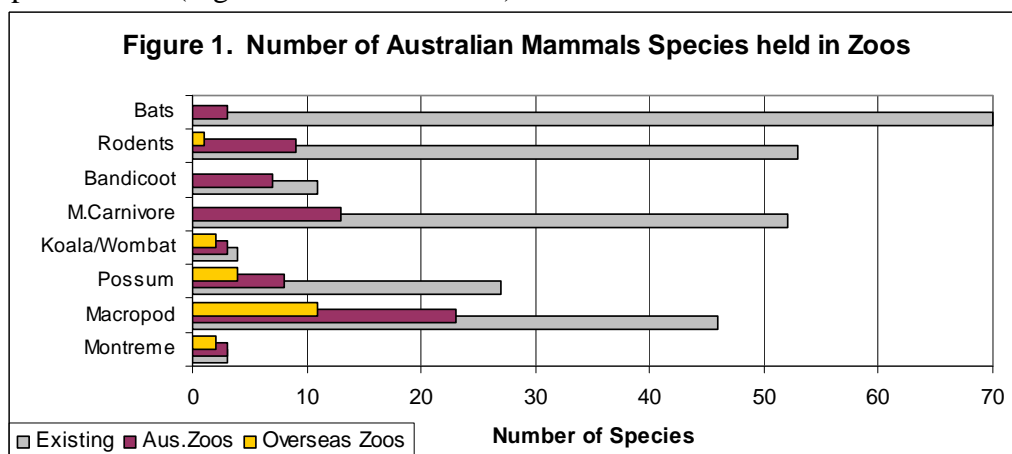
INTRODUCTION

The nocturnal nature of the great majority of indigenous mammals presents zoos with challenges of display and therefore enrichment. As with all enrichment, knowledge of the wild activity of animals is basic to providing a stimulating environment for them in captivity but there is a paucity of such behavioural information in the literature on native fauna. In captivity also there is very limited information on what native mammals do at night, when staff is not present, both when housed outside and under reverse daylight conditions. At worst the extent of stereotypic behaviour may be ignored or overlooked because of lack of awareness.

The idea of behavioural enrichment for native species has been slow to establish in Australasian zoos especially the smaller private fauna parks due to a lack of resources and the prioritization of enrichment. The enrichment options and the effectiveness of techniques used for other species have been less explored and reported for Australian fauna. Many of the papers written come from overseas zoos where our fauna is “exotic”. Though the native animals in our zoos are “in their own environment”, confining them to an enclosure and managing their movement and activity, reduces choices so the enrichment principles of complexity, choice and change apply equally to our native fauna as to any other species. The captive environment is inherently less stimulating and has to be dynamically manipulated to stimulate natural behaviour. A lack of observed response is not a good reason for not enriching captive environments.

WHAT AUSTRALIAN SPECIES ARE HELD IN ZOOS

An analysis of information from the www.isis.org website reveals that Australasian regional zoos do not hold all existing indigenous species, some of which have proved difficult to keep in captivity, but do hold representatives of all major mammal groups but zoos outside the region hold limited and somewhat unbalanced species representation (Figure 1. Hawkins 2005).



NOCTURNAL NATURE

Ninety nine percent of Australian mammals are nocturnal, thought to be a behavioural response to historical climate change – the drying of the continent. In a zoo situation

this presents many difficulties for confinement and display which present many enrichment implementation challenges and can also raise welfare questions and issues. The two main methods of display and some of the issues they raise are:-

1. Out-door displays

- Inactivity, the display of animals during their resting period. This may result in efforts to change the activity pattern of an animal by feeding regimes etc
- Out of sight in dens or nestboxes. This may result in exhibits that open these areas to public viewing. How does this affect the sleep pattern of the animal?
- Lack of knowledge of what animals do at night. Most behavioural problems occur at night so may not be noticed.
- Animals being locked (away because of possible escape or from predators) into small holding areas at night. How do they behave when confined at night? – an even greater likelihood of stereotypy?

2. Reverse daylight viewing areas

- Lack of climatic stimuli such sun, wind and rain, little temperature gradient either daily or seasonally.
- Lack of day length variation – though this may be programmed into time clocks
- Plants do not survive so have to be frequently changed or fresh vegetation cut, brought into the exhibits and regularly changed. This frequent change of furniture could be enriching.

From a visitor experience view point there are also difficulties

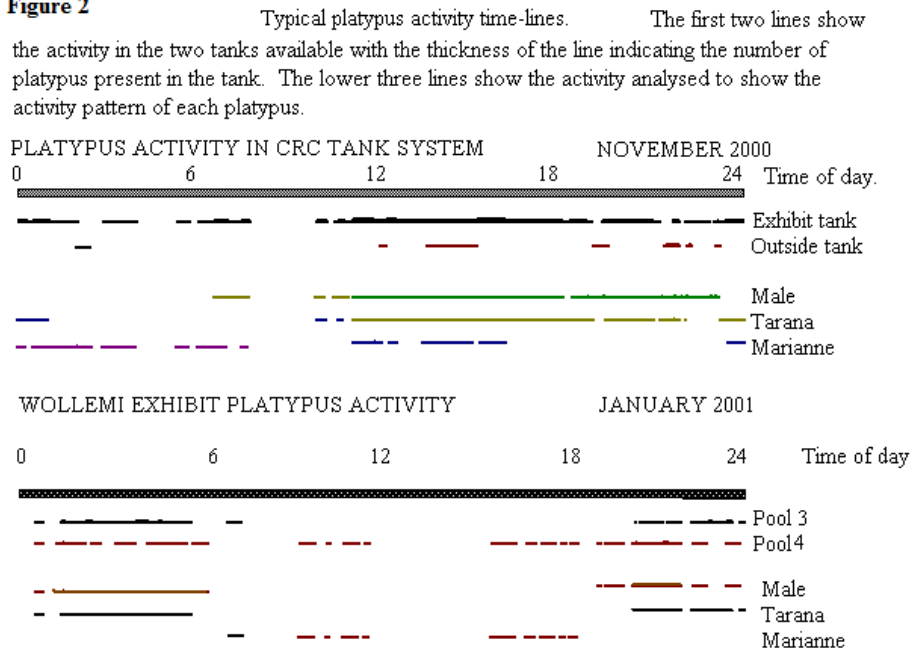
- not allowing time for their eyes to adjust so not seeing animals
- feeling uncomfortable or frightened (small children) in the dark
- high noise levels especially with school children

The use of enrichment techniques can overcome many of these difficulties (Lindsay, 2004)

CAPTIVE ACTIVITY

Generally, even more particularly with nocturnal species, we need to know more about what captive animals do 24 hours a day.

Figure 2



Then we can do comparisons of the differences between different facilities and between indoor and outdoor housing for the same species (Figure 2). It would also be good to know how husbandry from routine cleaning to husbandry changes and exhibit moves affect this activity.

Most behavioural problems in nocturnal species also occur at night so may not be noticed. Behavioural problems are hard to solve and it is easy to ignore something you don't see.

Such information is basic to enrichment goal setting

How: The use of cameras is now a lot more technically feasible though video monitoring is still time-consuming.

Disseminate any information you do collect – how ? ASZK website??

Let the animals tell us – watch out and record interesting use of exhibit materials, substrates, food processing etc

If possible conduct and record the results of choice tests.

WILD ACTIVITY

For effective environmental enrichment we need to know as much as possible about the natural behaviour of the species they display and use that knowledge to implement a behavioural program to overcome the challenges and which would allow animals to display their full range and variety of behaviour.

Again there is a paucity of published behavioural information. Field guides tell us more about physical appearance and distribution than behaviour. The early naturalists and the lay magazines from the observers clubs are often useful sources of behavioural information. Detailed quantitative behavioural data is time consuming to collect, particularly with nocturnal species, and difficult to analyse. Even when there is published behavioural information there are gaps - in detailed information such as what animals use for nesting materials and how they gather it.

ARE MARSUPIALS MORE STUPID THAN EUTHERIANS?

Is there a lack of response to enrichment? Marsupials may not respond to 'toys' but do respond to relevant enrichment, presented at a relevant time.

We need to do more evaluation of enrichment and more publication of the results.

Are marsupials un-trainable? This has been found not to be the case and increasingly husbandry conditioning is being carried out with marsupials Figures 3.



Figure 3 shows conditioning for weighing by a wombat at Perth Zoo (photo by Arthur Ferguson) and target training of a water rat at Taronga Zoo.

ENRICHMENT LITERATURE

There is little published in the zoo enrichment literature about environmental enrichment ideas and strategies for Australian mammals (Figure 4), particularly the unique marsupial and monotreme species.

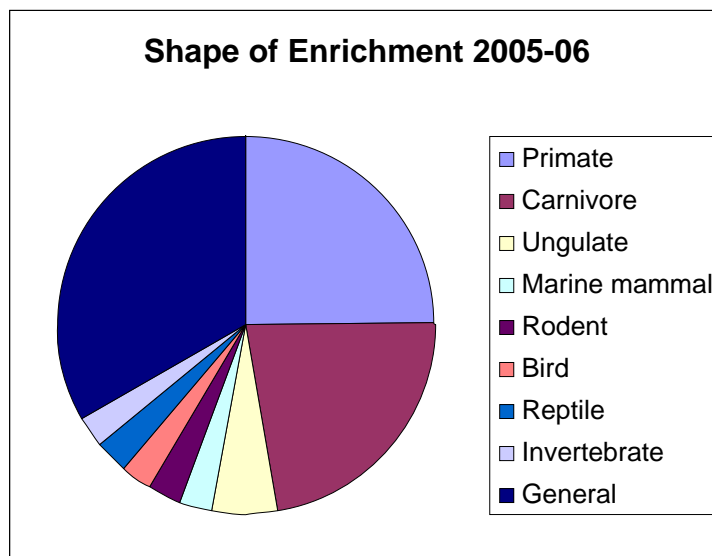


Figure 4 graphs the proportion of articles on enrichment for different animal groups in the journal *Shape of Enrichment* in 2005 and 2006.

One reason for the paucity of information may be that Australian zoo staff are not publishing what enrichment they are doing with native species, though increasingly enrichment information is being included in husbandry manuals (www.aszk.org.au, 2005).

Staff of overseas zoos where an enrichment philosophy is well established and where the Australian mammals are exotic have also included enrichment options in their husbandry guidelines, such as the detailed ideas for Tree Kangaroo in the US manual (Blessington 2000). When seeking information for the Australian Animal Enrichment Handbook, we received some detailed responses from US zoos showing that Australian species were being included in their programs.

ENRICHMENT OPTIONS

Some species are challenging to enrich – the koala, because of its low energy diet, saves energy by sleeping up to 20 hours a day (Martin R. and Handasyde K. 1995), which leaves little window of opportunity for behavioural stimulation.

Feeding:	Specialist feeders - gum, fungus, termites. Feeding wild food when possible: native flowers, bush tucker. feeding browsers browse.
Physical	Animals adapted to a low nutrient diet – do we feed them too well? Substrate Diggable, climbable Resting areas – provision of nesting materials
Sensory	Many marsupials use olfactory communication widely Transfer of browse or furniture between exhibits, both intra- and inter-species; prey or predator scents Food scents – fungus trails for bettongs, blood or ‘dead animal’ trails for carnivores or scavengers, ant (formic acid) trails for echidna.
Social	Manipulation of groupings, allowing space and choices for separation, mate choices.

EVALUATION (Plowman, 2006, Hawkins 2006)

The reason to evaluate enrichment is so that we know what we are doing is valuable

- worthwhile for the animal - that it improves animal welfare.
- worthwhile for the people doing it - time well spent

GOAL SETTING To know if enrichment is effective it is really important to set measurable enrichment goals. Once goals have been set activity studies can be done to see how enrichment is affecting goal behaviour

RESPONSE There may be little response to enrichment given during the day in outdoor exhibit by nocturnal species, so information on effectiveness may be difficult to collect and mainly be indirect.

- how quickly the animals respond to it,
- how much time they spend at it,
- how they use it
- how long they keep using it: still being used on a later visit to exhibit?
- indirect measures of its use - when you go back to the exhibit during the day and the next day when you remove it.
- there are scoring scales available to quickly record direct responses, indirect responses and appropriate use to enrichment (DAK, 2003).

AUSTRALIAN ANIMAL ENRICHMENT HANDBOOK

As the result of an ASZK Environmental Enrichment workshop held in 2001, surveys were circulated in the zoo community which resulted in a regional enrichment handbook for Australian species (Hawkins and Willemsen, 2003). The handbook still can be purchased as a hardcopy or on CD from ASZK but it is surely time for an update.

Planning for a new edition of the handbook includes chapter introductions for each group written by local experts, more information on activity budgets and enrichment evaluation.

Please contact the author if you are willing to help.

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Regional Environmental Enrichment Conferences. www.reec.info

Shape of Enrichment. www.enrichment.org

APPENDIX:

INFORMATION COLLECTED ON WILD BEHAVIOUR OF

Activity Patterns: time spent per activity- inactive, feeding etc., degree of diurnal/nocturnal activity, etc.

Dietary: eg. Diet items in the wild, feeding habits/methods (incl. specialized feeding behaviours), seasonal variation, etc.

Social: eg. Group dynamics, communication, breeding behaviour, play, development of young, resting/sleeping/nesting habits,, etc.

Physical Environment: eg. habitat, niche, climate, range and daily movements, locomotion, etc.

References:

SUMMARY OF ENRICHMENT DEVICE OR TECHNIQUE EVALUATION

SPECIES:

ANIMALS' RESPONSES TO ENRICHMENT IDEAS TRIED

Enrichment	Date	Hours obs.	Total time	No. times at	Time from 1 st – last interest	Response Grade	Grade Change to goal behav.	Comments on use

Grading Key of Animals' Responses
 (From Disney's Animal Kingdom Animal Enrichment Program website: www.animallenrich.org)
 1 = animal runs/flees or obviously avoids enrichment
 2 = animal ignores or appears to avoid the enrichment
 3 = animal orients to or looks at but does not physically contact the enrichment
 4 = animal makes brief contact with enrichment (<10 minutes), sniffs/licks enrichment.
 5 = animal makes substantial contact with enrichment (>10 minutes).
 IE = indirect evidence, response not observed but signs of response to enrichment can be graded from 1(no evidence) to 5(significant evidence of interaction).
 UK = unknown, no information.
Grading Key of Changes to Goal Behaviour
 0 = enrichment encourages undesirable/dangerous behaviour (describe what)
 1 = no reaction, did not encourage goal behaviour
 2 = animal reacted but behaviours were unrelated to planned goal (describe)
 3 = some reaction; some goal behaviours observed
 4 = moderate reaction, achieved moderate amount of goal behaviour.
 5 = strong reaction, encouraged many or substantial amount of goal behaviour.

EVALUATION OF ENRICHMENT:

ACTIVITY AND REACTION TO DEVICE

DATE:

OBSERVER:

OBSERVATION TIME: Start:

Stop:

SPECIES:

No. Present/ IDs:

GOAL OF ENRICHMENT:

INSTRUCTIONS: On interval record behaviour for each animal (it is not usually necessary to distinguish between individuals) and how many are at the item being evaluated if there are several in the group*. Within the interval note details of activity at the enrichment device/s.

If making only periodic visits note time of visit, location and activity on arrival, and device use over the time you are there.

ENRICHMENT PRESENT:

When introduced:

ACTIVITY

REACTIONS TO ENRICHMENT

TIME INT. 5min or other?	ACTIVITY						REACTIONS TO ENRICHMENT										COMMENTS			
	* No. at	R	A	M	F	I	E	M			O				F	L		A	T	M
	E	I	R	A	M	F	I	E	M											
	N	T	E	L	O	E	N	X	A											
	R	E	S	E	V	E	P	P	I											
	I	M	T	R	E	R	L	O	I											
	C	H		T	D	A	R	E	P											
	H																			

Totals

