

ENRICHMENT AN INTEGRAL PART OF BASIC NATIVE FAUNA REHABILITATION AND ANIMAL WELFARE

How carers can enrich native fauna in rehabilitation and enhance their chances of post-release survival.

By Toni Mitchell & Jane Wilson



Figure 0 Use of natural pelt for security/comfort in hand-raised juvenile mammals
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DEFINITIONS

Trichiary	This description is coined by us to differentiate the housing facilities required for <i>Trichosaurus vulpecula arnhemensis</i> (and most arboreal mammals) as opposed to an aviary, which should be structured specifically for avian species i.e. complete with tree trunks, branches, grass cover, suspended ropes, rocks and varying substrates that are appropriate for housing a possum post-release.
Continental	Supplementary food ie. corn, bok choy, broccoli, pumpkin, apple, carrot etc.
Time Budget	Activity patterns i.e. how a species utilises its time (feeding, sitting, grooming, interacting with same species etc).
Pre-release stage carer	Carers who house and rehabilitate native fauna prior to release.
Species specific behaviour	Behaviour exhibited by native fauna in the wild.
Physiology	Function and phenomena of living organisms and their parts.

ENRICHMENT – WHAT IS IT?

The American Zoo and Aquarium Association (AZA) define enrichment as:

"a process for improving or enhancing animal environments and care within the context of their inhabitants' behavioral biology and natural history. It is a dynamic process in which changes to structures and husbandry practices are made with the goal of increasing behavioral choices available to animals and drawing out their species-appropriate behaviors and abilities, thus enhancing animal welfare" (AZA/ BAG, 1999).

The Marsupial Society of Australia provides four aims of behavioural enrichment:

- 1. To preserve and conserve natural behaviour e.g. searching for food in a particular manner, digging, climbing, browsing, foraging, caching etc.*
- 2. To eliminate or reduce levels of stress, abnormal or stereotypic behaviour, such as pacing, rocking, over-eating, aggression, hyper-sexuality or over-grooming.*
- 3. To increase the behavioural diversity of the animal by giving it a variety of different things that it can do and choices it can make, each day.*
- 4. To increase the animals' activity levels and thereby increase the overall levels of both mental and physical fitness.*

They go on to discuss the benefits of providing various husbandry-based and environmental enrichment techniques to lessen negative behavioural patterns - a visit to their website is worth the look..

BACKGROUND

Current NT legislation dictates that any native fauna that comes into care has to be released, they are not pets. Therefore, all carers need to be mindful of the principles discussed and actively strive to provide the necessary environment to stimulate and encourage species-specific behaviours, for every animal in their care.

As carers who receive pre-release stage hand-raised mammals passed onto us for final preparation, we realised from the number of observed behaviours (or lack of) that some simple opportunities to provide these animals with survival skills and encourage species-specific behaviours are often missed by the first stage carer. This paper is written from personal experience, data sourced from research papers, research establishments and zoo environments. We predominantly sight native fauna, endemic to the Top End region, given that this is where we draw most of our personal observations and experience from. However, the enrichment principles applied to these animals in care/rehabilitation are easily adapted to other like species. It is essential that carers of wildlife have a sound understanding of the physiology of the species they take into care – otherwise, how can we fulfil the needs of that animal? This basic knowledge and understanding is paramount if an animal is to be successfully released back into the wild.

INTRODUCTION

In discussing enrichment, it should be clearly understood that this is a vital component of good animal rehabilitation practice and is essential for the animals' health and well being. Having a native animal in-care is not only about providing appropriate food, housing and shelter. We, as the "provider of all things", can do much in the way of enriching each animal's time in captivity as well as building skills necessary for post-release survival. Providing enrichment and stimulation can help reduce boredom and stress – often exhibited by abnormal behaviour or illness i.e. pacing, figure of eight, digging to escape, self-mutilation, aggression, recurrent incidence of disease etc.

There are a number of basic principles/practices that can be implemented to provide an enriched environment, thus affording each animal an opportunity to exhibit species-specific behaviours. It should be noted that this applies to all species be they birds, reptiles or mammals.

Research has shown the high levels of stress that POWs experienced under inappropriate and inhumane 'housing' facilities, essentially this is no different for any wild animal in our care. There is a plethora of information and research data available to anyone who cares to take the time and interest to look at what basic needs should be provided for animals in captive environments, in order to rehabilitate them for reintroduction into the wild. Research from zoo facilities constantly demonstrates the need to enrich and stimulate any animal in a captive environment, especially those species that are to undergo reintroduction 'into the wild'.

Every carer should strive to apply the principles of 'The 5 Freedoms' appropriately, as defined by the RSPCA (RSPCA Australia, www.rspca.org).

The Five Freedoms are:

1. Freedom from hunger and thirst: by ready access to fresh water and a diet to maintain full health and vigour;
2. Freedom from discomfort: by providing an appropriate environment including shelter and a comfortable resting area;
3. Freedom from pain, injury and disease: by prevention through rapid diagnosis and treatment;
4. Freedom to express normal behaviours: by providing sufficient space, proper facilities and company of the animal's own kind; and
5. Freedom from fear and distress: by ensuring conditions and treatment which avoid mental suffering.

SOME QUICK AND SIMPLE ENRICHMENTS

Below are a couple of quick ideas that are easy to do and may well make life more interesting for the animal in your care. These examples can be readily adapted for a variety of species (mammals, birds, reptiles).

Apple 'bobbing'!

Apples make cheap, simple, yet effective enrichment feeders, as well as providing a source of food on their own. Try pushing hard nuts into a sliced apple and hang from the roof or cage side, but be conscious of weight gaining foods and perhaps only feed once per week. Also, almonds are high in calcium and are not necessarily recommended for

sub-adult and adult possums. This practice was successfully used with a possum that was preoccupied with trying to dig out of her trichiary – this seemed to avert this behaviour and provided a positive distraction. Substitute a pine cone for the apple and push nuts, dried fruit etc into the crevices to be extracted. This will also occupy more of the animals' time.

Food accessibility

Provision of food should be such that an animal has to hunt for it, don't put their food in one container so that they go to the container, eat, and that is the end of the eating experience. Hook hard foods such as corn, carrots, cauliflower, broccoli etc and stash them amongst your bush tucker (which should be the main food source) so that they have to find each item individually. Make animals in-care work for it. Research on lab rats shows that they cope better if they have to actually find their food as opposed to having it presented all in one container with no effort on their behalf. This is part of the animals' opportunity to have control of their environment.

Frequency of feeding should be small amounts, provided often. Timing of feeds must mimic natural behaviours i.e. nocturnal animals fed at night. Food needs to be presented in such a way that each species must forage/seek as it would in the wild. Native food is seasonal and a variety of options should be presented to each animal – at various times of the year bush tucker can be scarce, but that is what is available at the time and release candidates must be able to cope with the seasonal changes and what is available. Each animal has a 'time budget' relevant for that species and this should be pre-eminent in the mind of the carer i.e. possums are low metabolic, generally sedentary animals that have long sessions where they just sit, showing no activity – this means they can easily become obese if fed inappropriately.

Therefore, if you feed more calories than the expended activity, the possum will become overweight and often susceptible to injury or disease. Most animals will not stay in a predicted home range but use an extended area to source nesting and food resources, this means that their environment is changing, therefore consider changing their environment whilst in-care by introducing novel structures into their facilities as this will assist them to cope with change once released.

Feed exclusively native bush tucker once or twice a week (no continental). Vary the foods offered i.e. mealworms, nuts spiked into apples, different choices of fruit, sugar cane, vegetables etc. Offer more vegetables than fruit as it has lower sugar content, leafy greens such as bok choy, spinach, Chinese cabbage (for example) are good options.

Dry rotting wood

Place rotting, dry, tree branches or trucks on the floor of the facility and scatter crickets, mealworms or larvae into crevices to encourage foraging.

Rope

Run rope through the facility, to provide an unstable climbing structure, with or without knots along it. Try to use natural fibres in case they are nibbled.

Sprinkler System

Encourages native grasses and potted plant growth. Simulates natural rainfall and creates flight response from animals when turned on.

Enclosure/Roof Top

Don't fully cover the roof as views of the skyline allows exposure to the elements, social interactions with resident animals and detection of threats by predators e.g. Rufous owls.

Rocks

Different sizes and shapes, placed in different sites of the enclosure, provides climbing opportunities, hiding and observation sites.

Scented branches

Introduce foreign scents into an enclosure by taking a scented branch from one enclosure and putting it in another one. This has the advantage of allowing the use of branches from enclosures of other animals. It is important to note that there is a risk of cross-infection when moving branches from one enclosure to another so ensure each animal is in good health and not afflicted with any transmittable disease. Why not try aromatherapy? Cats are known to love Catnip, try different scents in your trichiaries i.e. vanilla, mint, etc sprayed onto branches.

Tree trunks

Placed in different positions (horizontal, vertical, at ground level) throughout the enclosure to encourage climbing skills, play and exploratory behaviour and scent marking.

Branches

Branches with leaves placed in the enclosure to resemble a living tree, provide perching sites and can be useful with destructive (chewing) species. They can be changed as needed. In 'the wild' branches of trees will fall and disrupt the thoroughfare of passageways, simulate this by moving branches round and 'challenge' in-care animals. We cut appropriate sized branches and place them in poly pipe with water as this keeps bush tucker fresh longer.

Potted plants

Different species of potted trees and bushes placed both inside and outside (for privacy screening). Preferably native species but, if not, must be non-toxic. Helps create a more natural environment and for arboreal mammals can be used to provide a climbing stimuli and natural behaviours, for birds it provides perching and a safe place to rest.

ENRICHMENT IDEAS

Species	Habitat	Characteristics	Native Diet	Enrichment Ideas	Desired Outcomes
<i>Bar-shouldered dove</i>	<ul style="list-style-type: none"> • Eucalypt woodlands • Shrubby undergrowth • Urban backyards • Mangroves • Low herbage and grasses • Open ground for feeding. 	<ul style="list-style-type: none"> • Granivorous • Approx 26-30cm in length • Direct swift flight • Spends time on ground • Feeds throughout the day • Pairs or small groups • Wings whistle in flight • Needs water • Bathes in water and in substrate 	<ul style="list-style-type: none"> • Grass seeds • Herbs • Shrubs • Sedges 	<ul style="list-style-type: none"> • Clumps of seeding native grasses placed throughout the aviary • Plant native shrubs • Plant native herbage • Scatter seeds throughout the aviary to encourage foraging • Water container on ground, large enough to allow bathing • Substrate suitable for dust bathing • Large flight aviary to allow direct flight pattern • Rehabilitate in pairs or small groups to allow socialisation • Use pot plants for cover 	<ul style="list-style-type: none"> • Active food seeking at appropriate time of the day • Sources a variety of native food i.e. ground level, grass heads – middle story flora etc • Self-cleans by water and dust bathing • Socialises with own species • Can fly swiftly • Reduced abnormal behaviour • Increased set of natural behaviours • Able to cope with change/novelty • Improved physical fitness

Species	Habitat	Characteristics	Native Diet	Enrichment Ideas	Desired Outcomes
<i>Galah</i>	<ul style="list-style-type: none"> • Found throughout Australia • Variety of timbered habitats • Woodlands • Wooded grassland • Usually near water 	<ul style="list-style-type: none"> • Feeds throughout the day • Flock bird – its own and other species (Corella) • Pair bonds • Requires water 	<ul style="list-style-type: none"> • Grass tubers and seeds • Cultivated agricultural crops • Seeds, grains and nuts • Some fruits 	<ul style="list-style-type: none"> • Scatter seeds throughout aviary • Hang seeding bush tucker from holders • Scatter bush tucker throughout aviary • Place /panels of lawn type grasses on the ground • Dig in native herbage and grasses throughout the aviary • Use pot plants for chew material • Poly pipe to hold bush tucker 	<ul style="list-style-type: none"> • Foraging and digging. • Sourcing food from different levels throughout captive facility (ie ground, mid-level grasses, trees) • Exhibits diurnal behaviours • Chews branches • Reduced abnormal behaviour – feather plucking • Increased set of natural behaviours • Able to cope with change/novelty • Improved physical fitness

Species	Habitat	Characteristics	Native Diet	Enrichment Ideas	Desired Outcomes
<i>Bush Stone Curlew</i>	<ul style="list-style-type: none"> • Found in most of Australia • Open Forests and woodland 	<ul style="list-style-type: none"> • Mainly nocturnal • Insectivorous • Pair raise young • Approx 52-58cm in length • Uses camouflage • Ground dweller/nester • Flattens body along ground when approached • Requires water 	<ul style="list-style-type: none"> • Grasshoppers • Crickets • Spiders • Moths and other insects • Small frogs and lizards 	<ul style="list-style-type: none"> • Scatter crickets, mealworms, woodies throughout the aviary • Allow leaf litter to accumulate for insects to hide/live in • Tree trunks along the ground provides environment for insects • Needs adequate ground space to hunt • Water container on ground • Provide clumping scrubs for screening 	<ul style="list-style-type: none"> • Actively chases food source • Forages for insects • Seek insects from under bark, behind structures • Exhibits nocturnal behaviours • Uses camouflage and flattening behaviour to avoid detection • Reduced abnormal behaviours • Increased set of natural behaviours • Able to cope with change/novelty • Improved physical fitness

Species	Habitat	Characteristics	Native Diet	Enrichment Ideas	Desired Outcomes
Northern Brush Tail Possum	<ul style="list-style-type: none"> • Eucalypt woodland • High incidence of <i>E. miniata</i> • Low ground level flora • High frequency of flowering scrubs • Common in urban areas, including rooftops 	<ul style="list-style-type: none"> • Arboreal • Marsupial mammal • Nocturnal • Mainly solitary/loosely communal • Predominantly foliage feeder but is omnivorous • No set breeding season (Top End) • Female raises pouch young alone 	<ul style="list-style-type: none"> • Native foliage • In-season fruits, nuts and flowers • Opportunistic insect feeders • Has been known to eat eggs and chicks 	<ul style="list-style-type: none"> • Multiple nesting logs • Climbing trunks larger than circumference of possum's grip • Varied flexibility of horizontal branches • Strung ropes for flexible climbing • Hooked continental food to encourage foraging • Native grasses with roots • Variety of bush tucker i.e. native trees and shrubs • Half apple spiked with hard nuts, seeds • Rotting logs on ground to encourage insect foraging • Poly pipe to hold bush tucker • Occasionally place logs with other animals' scent in trichiatry 	<ul style="list-style-type: none"> • Copes with changing environment • Moves to different nesting sites • Forages food at varying heights • Displays nocturnal tendencies • Recognises predators • Sources wide variety of food • Climbing skills increased • Uses prehensile tail when moving, sourcing food • Reduces abnormal behaviour – pacing, self-mutilation • Reduced incidence of bacterial dermatitis • Increased set of natural behaviours • Able to cope with change/novelty • Improved physical fitness • Scent marks environment

Species	Habitat	Characteristics	Native Diet	Enrichment Ideas	Desired Outcomes
<i>Northern Brown Bandicoot</i>	<ul style="list-style-type: none"> • Areas of low ground cover • Dense shrubs 	<ul style="list-style-type: none"> • Nocturnal • Poor eye sight • Keen sense of smell • Solitary • Omnivorous • Aggressive • Makes nests on the ground using grasses, twigs, leaves • Defensive of territory • Exhibits swift, erratic movements 	<ul style="list-style-type: none"> • Omnivorous • Insects, spiders, earthworms, beetles, grasshoppers, etc • Grass roots • Seeds • Certain fungi 	<ul style="list-style-type: none"> • Native clumping grasses throughout facility • Hollow logs on ground to hid in • Free access to crickets, woodies etc by scattering throughout enclosure • Substrate that allows digging • Scatter seeds, nuts etc throughout enclosure • Rotting logs on ground to encourage insect foraging • Large facility 	<ul style="list-style-type: none"> • Sources native food • Displays nocturnal characteristics • Digs for ground dwelling grubs • Sources root and grass vegetation • Recognises predators • Reduced abnormal behaviour – pacing • Increased set of natural behaviours • Able to cope with change/novelty • Improved physical fitness

Species	Habitat	Characteristics	Native Diet	Enrichment Ideas	Desired Outcomes
<i>Black Footed Tree Rat</i>	<ul style="list-style-type: none"> • Eucalypt forest • Bordering vine thickets 	<ul style="list-style-type: none"> • Arboreal • Nocturnal • Solitary • Omnivorous • Tail is not prehensile • Keen sense of smell and hearing • Teeth will continue to grow so requires hard chewing material • Secretive feeders who cache food 	<ul style="list-style-type: none"> • Pandanus fruit • Native foliage/flowers • Some shellfish • Traces of termites • Native seeds 	<ul style="list-style-type: none"> • Provision of Pandanus tree for nesting • Multiple hollows • Multiple climbing structures • Ground rock structures • Provision of Pandanus nuts, seeding bush tucker, termite damaged tree trunks • Provide hard chewing material ie sugar cane • Poly pipe to hold bush tucker • Provide large diameter hanging logs, open at both ends to allow secretive feeding site 	<ul style="list-style-type: none"> • Sources native foods ie Pandanus, nuts, seeds flowers • Uses multiple nesting sites • Is arboreal • Displays nocturnal behaviours • Recognises predators • Caches food • Reduced abnormal behaviour – pacing • Increased set of natural behaviours • Able to cope with change/novelty • Improved physical fitness

Species	Habitat	Characteristics	Native Diet	Enrichment Ideas	Desired Outcomes
<i>Agile Wallaby</i>	<ul style="list-style-type: none"> • Open savannah woodland • Adjacent grasslands • Near rivers and streams 	<ul style="list-style-type: none"> • Predominantly feeds at dawn/dusk • Herbivorous • Mob/group structure • Rests during heat of day • Activity budget changes during Wet and Dry seasons • Swift, erratic movement behaviour • Exhibits directional “dashing” movements to fine tune agility 	<ul style="list-style-type: none"> • Opportunistic feeders • Native herbage and grasses • Some dropped flowers and fruits 	<ul style="list-style-type: none"> • Scatter ‘continental’ food throughout enclosure • Provide native grasses with roots and soil • Provide branches of native trees and shrubs that are in flower and/or seeding • Rehabilitate with same species • Large facility • Fallen logs and obstacles will fine tune agility when exercising 	<ul style="list-style-type: none"> • Can source native foods • Digs for roots and grasses • Feeds at dawn/dusk • Sources a variety of native foods • Recognises predators • Socialises with same species (pecking order established) • Reduces abnormal behaviour – self mutilation • Increased set of natural behaviours • Able to cope with change/novelty • Improved physical fitness

Safety issues

Consider safety to the animal when making a choice of what enrichment tools to use, i.e.

- Can the animal get cut by, caught up in, hung up on, or trapped inside of the structure or device?
- Can it cause a gut impaction or obstruction if eaten?
- Is it non-toxic?
- Can enrichment item be used as a 'weapon' against a cohabiter?
- Can item be dropped on or can it fall on a cohabiter?

Personally, we have not experienced any problems with hooked food in our trichiaries and have found this to be an invaluable enrichment tool. Above all, experiment and have fun with different ideas, your animals will appreciate your efforts and they may well be better prepared for life 'in the wild'.

CONCLUSION

It is essential to understand the physiology of each species of animal in your care, provide the appropriate environment and implement techniques that will allow for the exhibition of species-specific behaviours. We encourage all carers, be they first stage or pre-release, to search out reference material and information about enrichment and stimulation. There is a vast amount of knowledge readily available and it is great fun setting up new scenarios and watching our animals explore them. It is wonderful when its time to release an animal from care back into their natural environment but also a time of apprehension – have we done the best we possibly can to help this animal survive post-release – we hope so. But, hope is not enough and we will continue to improve our practices based on new knowledge and understanding.



Figure 2 Variety of climbing structures, suitable for arboreal fauna © T Mitchell 2006



Figure 3 Flexibility of climbers suitable for arboreal fauna © T Mitchell 2006

Figure 3 shows use of rope, horizontal branches and varying diameter of upright trunks and bush tucker holders. This set-up would be suitable for arboreal mammals but could be readily changed to suit flight birds by removing any structures that impede free flight along the length of the facility.



Figure 4 Trichiary converted to suit ground dweller i.e. bandicoot © T Mitchell 2006

Figure 4 Shows set-up for bandicoots with clumping grasses, open ground space, low growing grasses and areas to hide in.



Figure 5 This possum was passed on for pre-release stage rehabilitation. Two undesirable characteristics are obvious i.e. this animal is active in daytime and is overweight. The positive is that he is feeding on native bush tucker. © T Mitchell 2006

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